



Appraisals and Consulting of C.T. P.M.
Boards summary of accident events analyzed in detail

Case n°1

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: internal organs Type of injury: Death by asphyxiation	<i>ev. sist. protective passive / active (in the case given the severity of the accident) – Rear suspension - PPE protection would not solve the problem</i>	
1	CONTACT WITH OTHER MATERIAL OR SUBSTANCE – Drowning in a liquid – drowning in the lake inside the cab of the truck	<i>The worker to the detection of a deviation of the functionality of truck called the technical expertise and not using the failure transport</i>	7
2	BREAKAGE, BURSTING, SPLITTING, SLIPPING, FALL, COLLAPSE OF MATERIAL AGENT - Break of material, at junctions, connections, material agent - linked to the sudden failure of the rear suspension. LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - related to the fact that it is generated a sudden imbalance of the truck, with primer pair of rollover and push towards the lake	<i>Inclusion of a system for the maintenance of truck;</i>	6

<p>3</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Machinery and transport equipment - related to the truck used for processing</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – How to use - related to the actions performed by the worker at the time of sudden breakage of the suspension</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – Maintenance status - linked to the maintenance of the truck;</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - Operating conditions - Verification functionality before to use - linked to the checks to be carried on the truck after to its use</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - related to transport, operating instructions, maintenance status;</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to inspections of the means</p>	<p>MACHINERY, EQUIPMENT AND PROVISIONAL WORKS - transport used for processing</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - inspections of the means</p>	<p>4</p>

5.1	<i>poor maintenance of the truck</i>	A. Technological / plant solutions contrast deviations (emergencies) external or internal (from process deviations) and provided means intervention (linked to the fact that it needs a system that blocks in case of failure the lifting body of the truck);	3
5.2	<i>no operators procedures for the transport maintenance (truck)</i> <i>no information, education and training</i> <i>operation not analyzed</i>	A. Procedures of verification, control and detection / reporting / management of elementary functional anomalies - regarding the maintenance of the truck and checks after to use B. Definition of the working phases and the contingent operations for the subjects (to the several levels) (related the definition of working procedures); C. Operating procedures in emergency situations internal or external (uncontrollable evolution process) - Signs of Emergency (call procedure) , – concerning the establishment of procedures to be applied in case of emergency	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>Definition of the technical maintenance of transport</i>	1

ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES <input type="checkbox"/> Mecanical systems <input type="checkbox"/> Mec. sist.- operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

<input type="checkbox"/> Operator - operator		
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TECHNIQUE INTERVENTIONS

Structural, plant and technology solutions for the workplace management

Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge)

Technological/Plant solutions for interference management: current operational situations

Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations)

Technological / plant solutions contrast deviations (emergencies) external or internal (from process deviations) and provided means intervention

WORK PLANNING AND PROCEDURAL INTERVENTIONS

Definition of the working phases and the contingent operations for the subjects (to the several levels)

Procedures for checking presence

Procedures of the action of the preplaces to the several levels

Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure)

Procedures of verification, control and detection / reporting / management of elementary functional anomalies

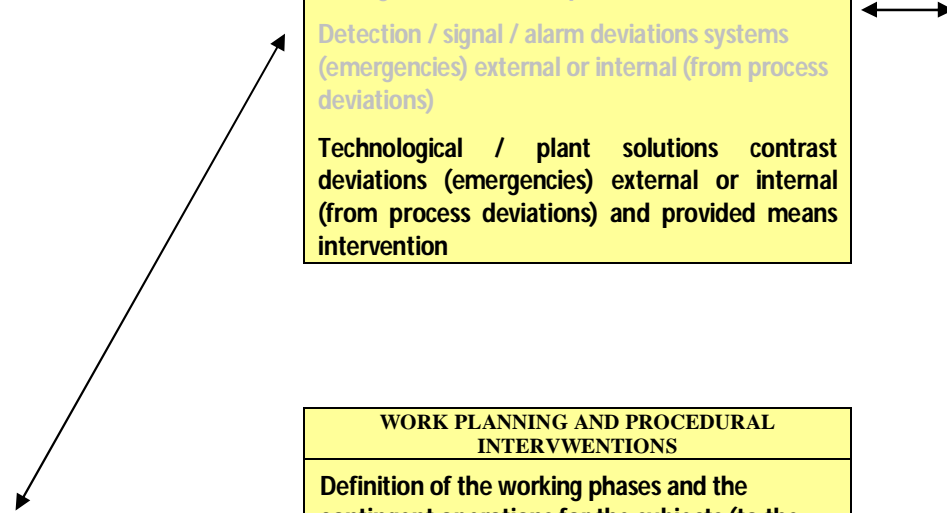
Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external

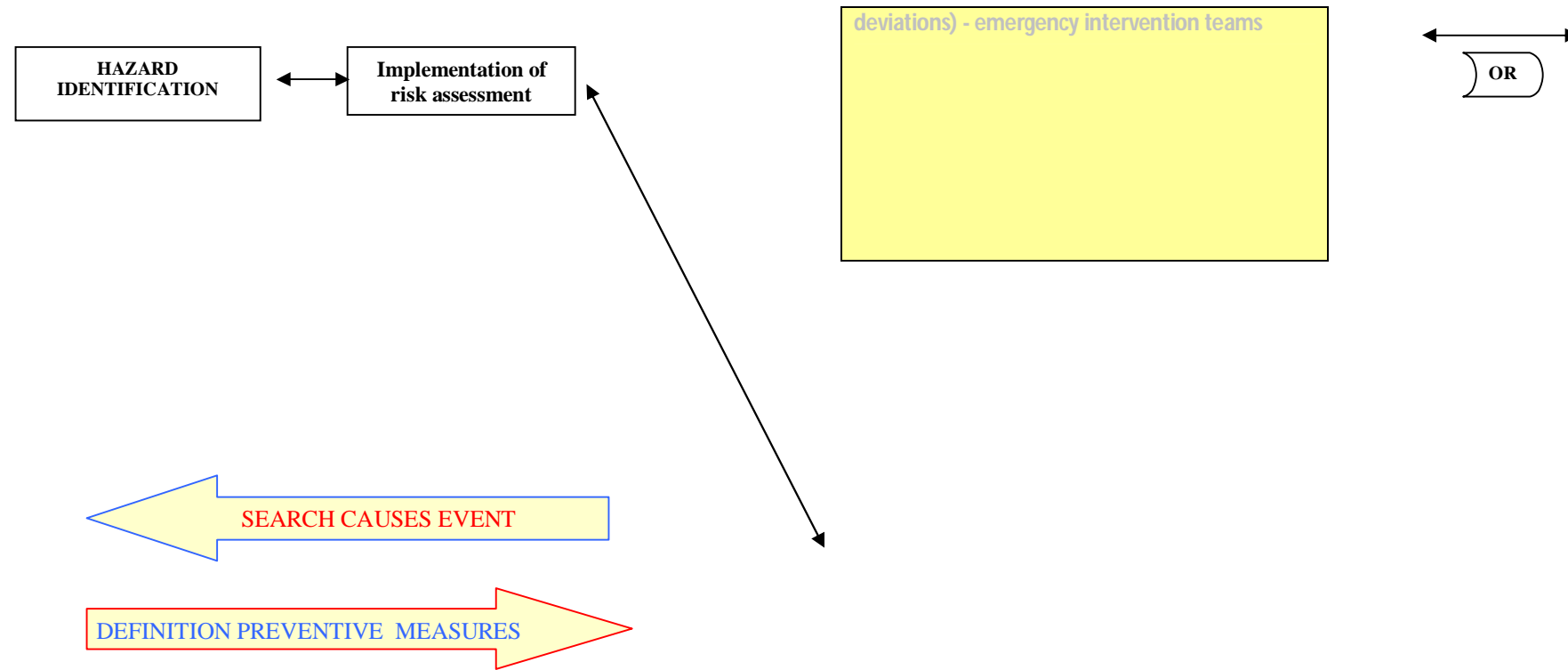
Procedures for the detection / warning / alarm emergencies external or internal (from process deviations)

Operating procedures in emergency situations internal or external (uncontrollable evolution process) - Signs of Emergency (call procedure),

Operating Procedures contrast of external (emergencies) or internal deviation (process)

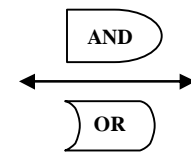
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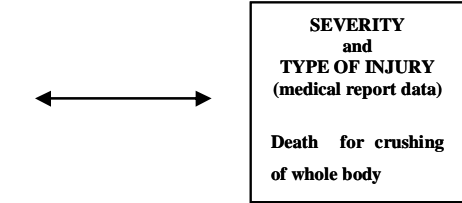
INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not)

	<ul style="list-style-type: none"> Problems of total or partial control of a means of transport / handling of people and / or animals Problems of total or partial control of hand tool (motorized or not) as well as the material machined by Problems of total or partial control of object (led, moved, moved, etc.). Problems of total or partial control of animal Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> Fall of person from the top through the opening Slipping or tripping - with the fall of man - from Slipping or tripping - with the fall of person - at the same level Loss of balance - with the fall of man - from Loss of balance - with the fall of person - at the same level Slipping or tripping on machinery Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> Walking on a sharp object Kneel, sit, lean against Being grabbed, dragged, or moved by something from their momentum Uncoordinated movements, gestures, inopportune, inappropriate Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> Lifting, carrying or standing Pushing, pulling, pulling Depositing, dropping Twisting, turning, turning Step false twisting of the leg or ankle, slipping without falling Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> Surprise, fear Violence, aggression, threat - including employees of the Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). Aggression, mobs, violence by animals Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other Another case involving surprise, fright, violence, aggression, threat, presence

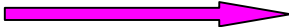
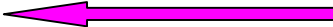


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DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> Indirect contact with the electrical circuit, lightning (passive) Direct contact with electricity, suffer an electric discharge in the body Contact with flame or object / warm or red-hot Contact with object or cold or frozen Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> Contact with hazardous substances for nasal, oral, inhalation Contact with hazardous substances through the skin or eyes Contact with hazardous substances through the digestive system, swallowing or eating Drowning in a liquid Burial under a solid Immersion in a gas, in a suspension of particles Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> Vertical motion, crash on / against (the result of a fall) Horizontal motion, crash on / against Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> Struck by object projected Struck by falling object Struck by object that oscillates Struck by object in rotation, motion, displacement, including vehicles Collision with a moving object, including vehicles - a collision with a person (the victim is moving) Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> Contact with a sharp Material Agent (knife / blade) Contact with a sharp Material Agent (nail / sharp tool) Contact agent with hard or abrasive material Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> Nesting, trapping, crushing in / inside Nesting, trapping, crushing under Nesting, trapping, crushing between Tearing, cutting of a member, a hand, a finger or more parts of the body Constrict of whole body or of one or more parts of it By pinching Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> Physical effort at the expense of the musculoskeletal system Physical exertion caused by radiation, noise, light, pressure Effort psychic, mental shock Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> Bite Puncture by insects or fish Shot, football, head, strangulation Another case relating to bite, kick, etc., by animals or humans

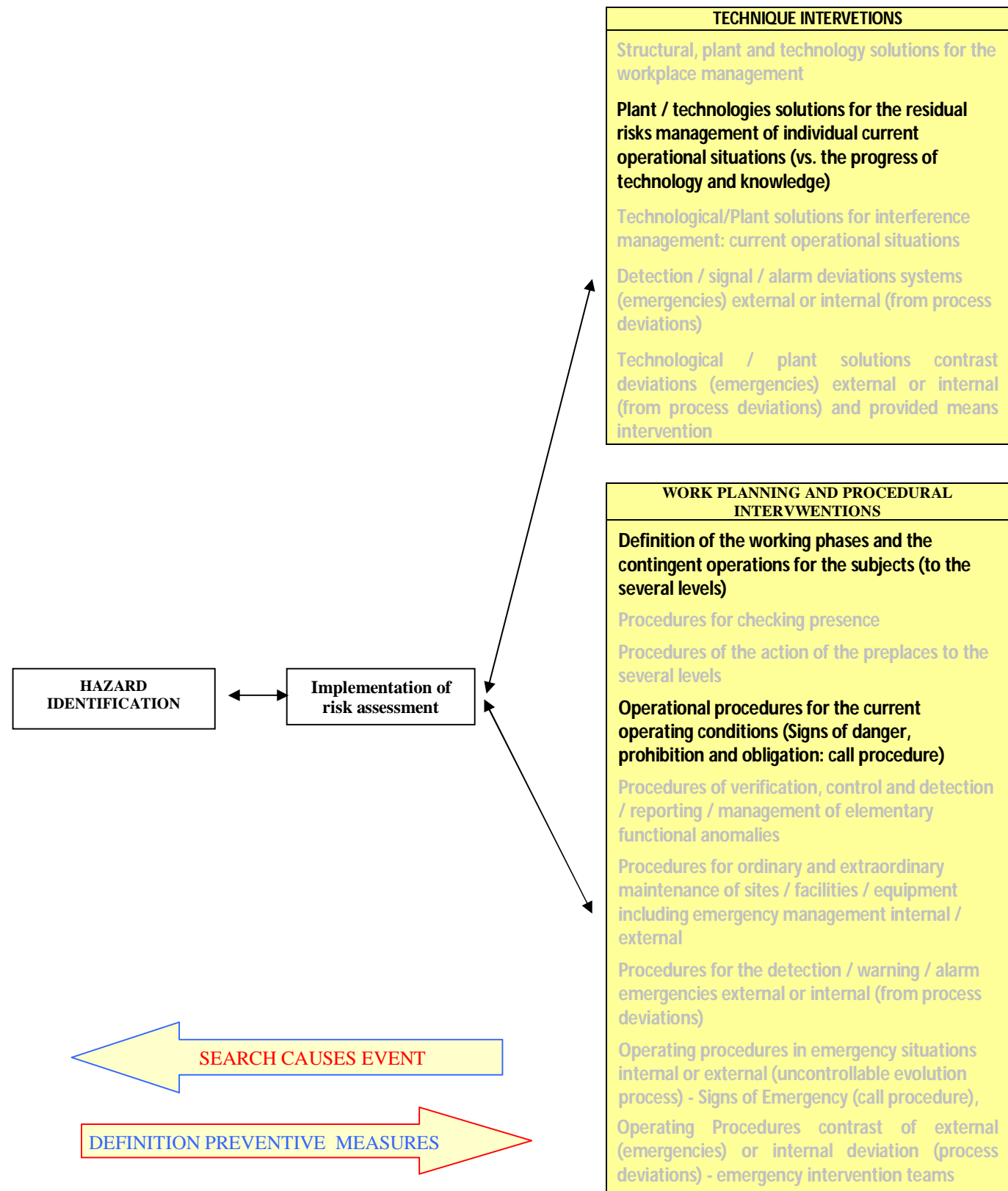


Case n°2

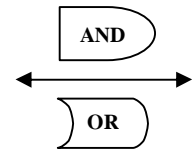
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: total body and internal organs Type of injury: Death for multiple trauma fracture	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion) - related to the fall by 15 m in height	<i>If the repair was not practicable to secure position and required to leave the decking had to be done using the proper equipment, such as a drum or similar self-lifting.</i>	7
2	SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Loss of balance - with the fall of man - from - related to the fall by 15 m in height outside the protection of the storage silos BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Uncoordinated movements, gestures, inopportune, inappropriate - likely related to the sliding surface of the silo	<i>identification of the correct method for performing maintenance tasks</i>	6

<p>3</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Works provisional (eg. scaffolding, ...) - linked to the choice of the appropriate means for the execution of the processing EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – Suitability to the development of specific operations in the context <i>- linked to the choice of the appropriate means for the execution of the processing</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for supervisors - related to the procedures to be adopted</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - related to the choice of temporary equipment transport; AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p>	<p>MACHINERY, EQUIPMENT AND PROVISIONAL WORKS - equipment used for processing</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p>	<p>4</p>

5.1	<i>equipment is not suitable for processing</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) (linked to the choice of equipment);	3
5.2	<i>no upgrade of information, education and training</i> <i>operation not analyzed</i> <i>wrong choice of equipment</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the methods for the selection of equipment B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>definition of the methodology to be applied for the selection of equipment and methods of implementation of activities</i>	1

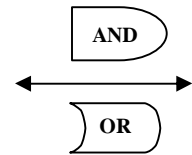


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
INTERFERENCE OF FUNCTIONAL VOLUMES <input type="checkbox"/> Mechanical systems <input type="checkbox"/> Mec. sist.- operator <input type="checkbox"/> Operator - operator	External criticality	General criticality (boundary conditions (eg.
	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	Structure	- Specific structural Aspects (eg. Structural safety equipment, escape routes (eg fire escape) and safe places) 3 Consistency with the uses
	Common Plant	- General Plants (eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg, heating, cooling, air exchange, lighting,...), communication systems) 4 Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	- Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg, depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)



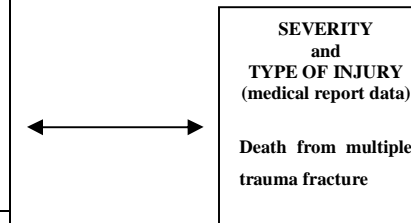
INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals

	Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence
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AND

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

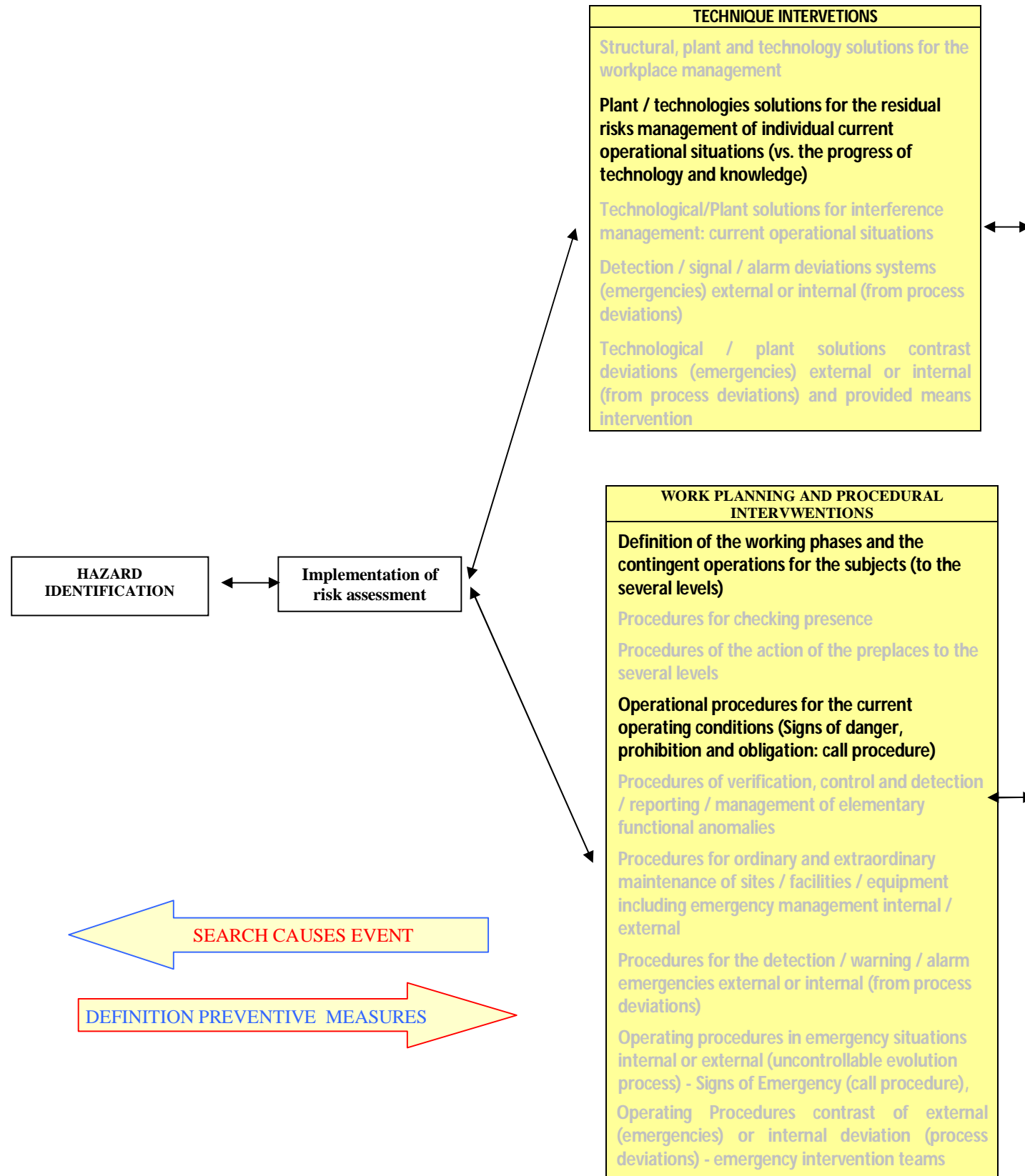


Case n°3

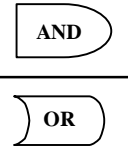
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: totally of the body and internal organs Type of injury: Other types of concussion and internal injuries	<i>ev. sist. protective passive / active (in the case given the severity of the accident – constriction by the movement of the rod / crank - PPE protection would not solve the problem</i>	
1	STRUCK BY MOVING OBJECT, COLLISIONS WITH – Struck by object in rotation, motion, movement –movement of the impact bars and plates of crusher	<i>At the time of deviation operator intervenes with the machine stopped</i>	7
2	BREAKAGE, BURSTING, SPLITTING, SLIPPING, FALL, COLLAPSE OF MATERIAL AGENT - Breakage, bursting - causing splinters (wood, glass, metal, stone, plastic, others - chinks blocks LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Loss of control (total or partial) - of machine (including unwanted start-up) or of the material being worked by the machine –linked to the fact that crushing was blocked and then resumed SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Fall of person - to a lower level – related to the fact that the person is precipitated in the mill bar following the unblocking BODY MOVEMENT UNDER OR WITH PHYSICAL STRESS (GENERALLY LEADING TO AN INTERNAL INJURY) - Pushing, pulling –linked to the fact that the injured pushing the chalk block with force	<i>Installing the device to stop functioning equipment at the time of the door opening</i> <i>Operator training in case of anomaly in the operation of the mill bar</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - related to the unblocking of the material in the feeding of the mill EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Devices (command and control, signaling, security) - related to the unblocking of the material in the feeding of the mill and to the block of the machine at the time	<i>Evaluation of the choice of the solutions adopted</i>	5

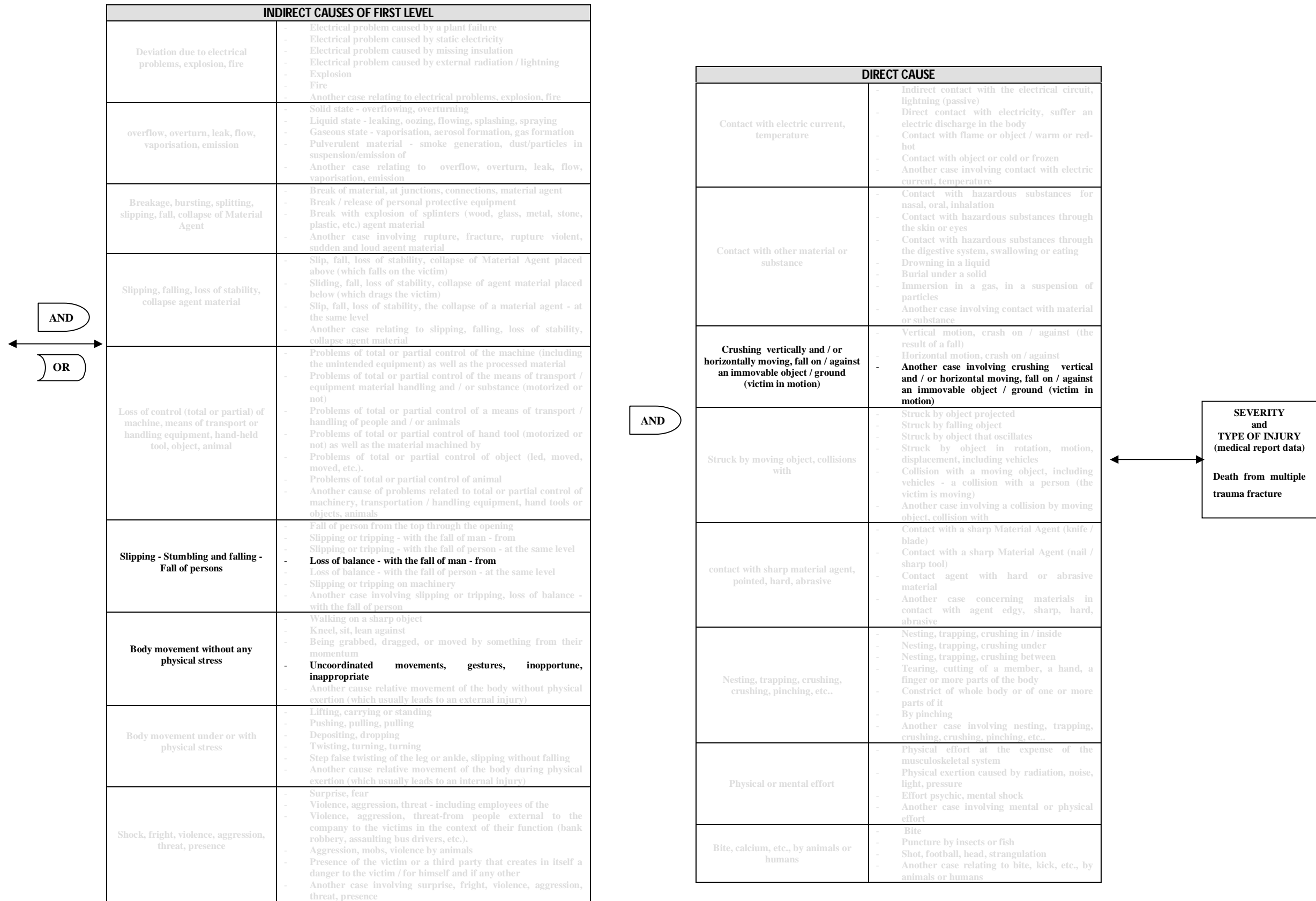
	<p><i>of the opening of the intervention window</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers, Procedures for machine operators, Procedures - related to the fact that he was not present any specific control problems procedure</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – operating condition – Verification functionality before to use – related to the fact that the grind is interrupted and then resumed without permission</p>		
<p>4</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – related to equipments and control devices of bar mill;</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – related to the absence of procedures for different levels of emercy situation</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – related to verify functionality before to use</p>	<p>MACHINERY, EQUIPMENT AND PROVISIONAL WORKS – equipments used and control devices of machine used for the work</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, education and training of every level of worker; behavioural and operational procedure; supervision of the worker</p> <p>REVISION, UPDATING AND MAINTENANCES – verification of functionality before to use and upgrade of procedure and formation</p>	<p>4</p>

<p>5.1</p>	<p><i>Failure block of the mill to the opening of the intervention door - failure of safety equipment systems for any deviation</i></p> <p><i>Equipment not suitable for the task of unblocking the mill</i></p>	<p>Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) – related to the adjustment of the control device of interruption operation of the mill when the interventions door opens and definition of the equipment to be used for the unblocking</p> <p>Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations) – related to the inclusion of the breaking device operating</p>	<p>3</p>
<p>5.2</p>	<p><i>no specific procedures for operators at different levels on the activities to be carried out</i></p> <p><i>No information, education and training</i></p> <p><i>no supervision and procedures both operational and behavioral deficient</i></p>	<p>A. Definition of the working phases and the contingent operations for the subjects (to the several levels) (establishment of procedures for the use and maintenance of the mill bar and supervisor control)</p> <p>B. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) (danger signalling of moving machine and illustration of an intervention procedure in the case of filling of the mill bar)</p>	<p>2</p>
<p>6</p>	<p>Hazard factor not identified (choice of H.I. technique not appropriate for the context)</p>	<p><i>Definition of the applicable updates to the situation and any subsequent actions</i></p>	<p>1</p>





ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places]
	Common Plant	5 - Consistency with the uses - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems]
	Structure maintenance	6 - Specific Plants (systems of emergency management, detection, contrast and alarm) - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES <input type="checkbox"/> Mecanical systems <input type="checkbox"/> Mec. sist.- operator <input type="checkbox"/> Operator - operator	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move





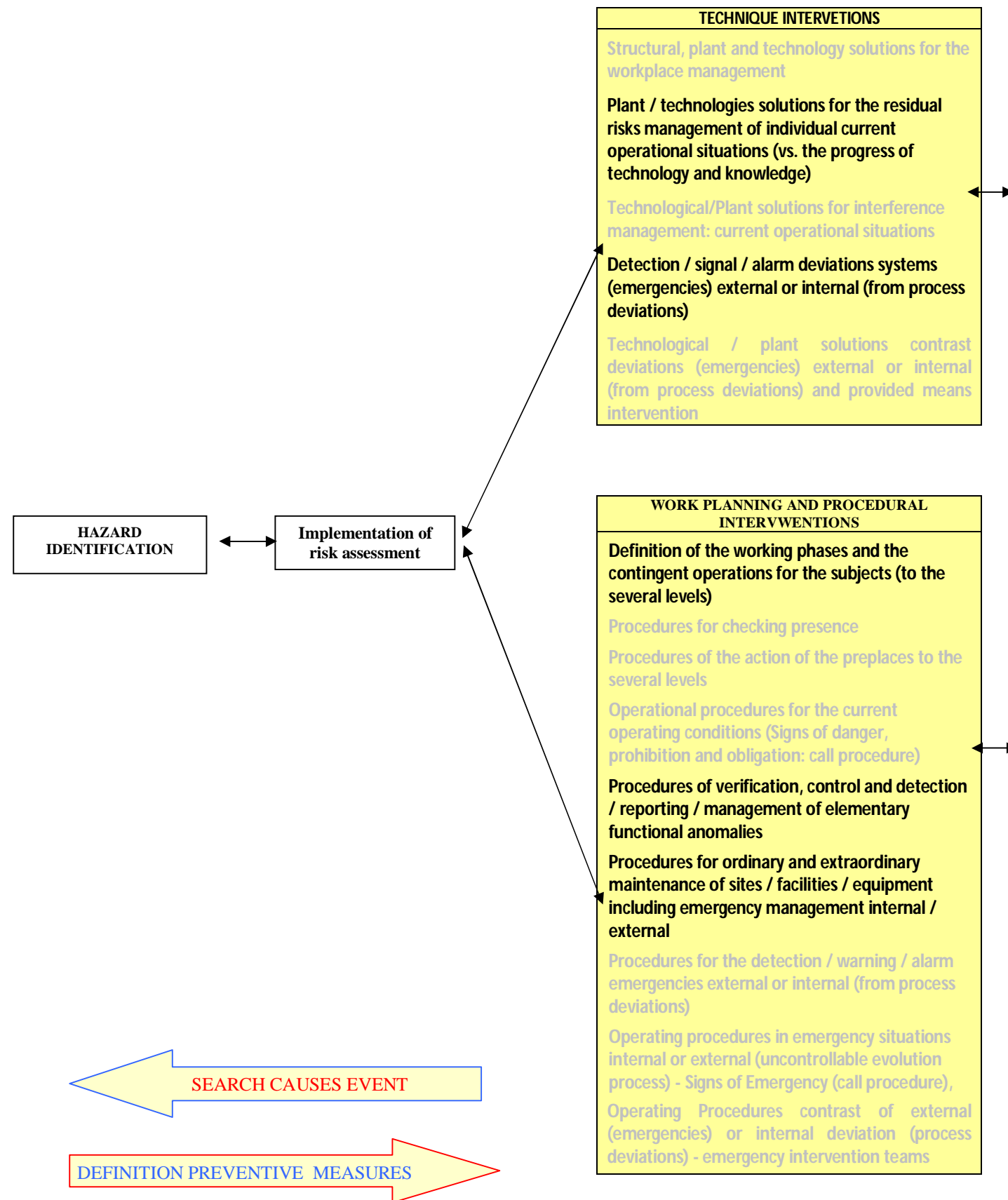
Case n°4

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	<p><i>ED: 7500 Id (death)</i> Part of body injured: trunk and internal organs Type of injury: mixed mechanical asphyxia</p>	<p><i>ev. sist. protective passive / active (in the case given the severity of the accident) - to constrict the movement of the rod / crank - PPE protection would not solve the problem</i></p>	
1	<p>NESTING, TRAPPING, CRUSHING, CRUSHING, PINCHING, ETC.– Constrict of whole body or of one or more parts of it – neck and chest crushing</p>	<p><i>The P.O. at the time of emergency is limited to support his colleague, and to carry out the order him to him</i></p>	7
2	<p>BREAKAGE, BURSTING, SPLITTING, SLIPPING, FALL, COLLAPSE OF MATERIAL AGENT - Break of material, at junctions, connections, material agent - destruction of the bearing collar</p> <p>LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - crank mechanism that transmits the reciprocating motion to the system horizontal oscillating multi sprayer nozzle</p> <p>BODY MOVEMENT UNDER OR WITH PHYSICAL STRESS – Pushing, pulling - Share of P.O. to try to remedy the malfunction of the transmission of the reciprocating sietta</p>	<p><i>Control action on the safety of the plant installation and maintenance</i></p> <p><i>Vigilance on the part of those in charge and information, training of PO recently inserted in the activity</i></p>	6
3	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - External criticality - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)]- related to the climatic conditions of the work environment in which it operated Part abuse</p> <p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Common Plant - Specific Parts (systems of emergency management, detection, contrast and alarm) - related to the fact that the emergency stop button was not easily accessible and not blocked the progress of the whole machine, but only some parts of it;</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5

	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure maintenance – Conservation work - <i>related to the fact that pieces have been recovered from the existing system, like the engine crank-connecting rod system, which had many flaws, and the gear that was in terms of improper maintenance</i></p> <p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure maintenance – Participation of adaptation to the norms - <i>related to the fact that the gear had been recovered without consideration of its seal that contained asbestos, and that the bearing crank was in poor condition</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Devices (command and control, signaling, security) - <i>related to the fact that the emergency stop button was not easily accessible and not blocked the progress of the whole machine, but only some parts of it</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – Maintenance status - <i>related to the fact that the gearbox was in a state of improper service, and that the bearing crank was in poor condition</i></p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - Localized solutions for the management of environmental conditions – lighting - <i>related to visibility problems in the operational area of the continuous line</i></p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - physiological Aspects – work experience - <i>linked to the fact that the P.O. had been included recently in the activity with the task of "guiding the chief engineer" for the purpose of learning the conduct of the paper machine</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers, procedures for machine operators, Procedures for supervisors - <i>related to the fact that it was not present no procedure for interventions in case of emergency on the continuous line</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating conditions – Types of maintenance applied – <i>related to lack of maintenance both in the workplace and the equipment</i></p>		
4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – <i>related to general criticality, to the consistency with the uses and to actions to norms adaptation and specific systems for emergency management</i></p>	<p>EXTERNAL/INTERNAL STRUCTURAL AND PLANT CHARACTERISTICS – work environment</p> <p>MACHINERY, EQUIPMENT AND PROVISIONAL WORKS - equipment used</p>	4

<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – <i>related to the maintenance type and status of continuous line and its equipments;</i></p> <p>PHYSICAL, CHEMICAL AND BIOLOGICAL ASPECTS OF THE WORK ENVIRONMENT - <i>related to the lighting of the environment work</i></p> <p>PHYSIOLOGICAL, SUBJECTIVE AND IDEOLOGICAL ASPECTS – <i>related to the work experience of the injured;</i></p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - <i>related to the fact that it was not present no procedure</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – <i>related to maintenance</i></p>	<p>for processing</p> <p>PHYSICAL, CHEMICAL AND BIOLOGICAL ASPECTS OF THE WORK ENVIRONMENT – related to working conditions in the workplace</p> <p>PHYSIOLOGICAL, SUBJECTIVE AND IDEOLOGICAL ASPECTS – Type of employment contract, choice of workers, work experience</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels, both operational and behavioral procedures, supervision of the worker by the Head</p>	
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<p>5.1</p>	<p><i>poor maintenance of the workplace</i> <i>lack of maintenance of the equipment</i> <i>failure of safety equipment systems for maintenance activities</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) <i>(related to all Root Causes identified);</i> B. Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations) - <i>(related to the difficulties of finding a PO and linked to the external and internal structural characteristics of the continuous line);</i></p>	<p>3</p>
<p>5.2</p>	<p><i>no procedures for the operators at different levels on the activities to be carried out in case of emergency</i> <i>failure to provide information, education and training</i> <i>no supervision / operational and behavioural procedures deficient</i> <i>operation not provided and not analyzed</i></p>	<p>A. Definition of operational procedures for emergency conditions <i>(related to machinery, equipment and temporary works);</i> B. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external <i>(related to machinery, equipment and temporary works);</i> C. Procedures of verification, control and detection / reporting / management of elementary functional anomalies <i>(related to the definition of working procedures and consequent information, education and training)</i></p>	<p>2</p>
<p>6</p>	<p>Hazard factor not identified <i>(choice of H.I. technique not appropriate for the context)</i></p>	<p><i>Definition of the technical maintenance of equipment and the organization of society at various levels</i></p>	<p>1</p>



SEARCH CAUSES EVENT

DEFINITION PREVENTIVE MEASURES

AND

OR

ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

- Mechanical systems
- Mec. sist.- operator
- Operator - operator

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

AND

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



SEVERITY and TYPE OF INJURY (medical report data)

mixed mechanical asphyxia

AND

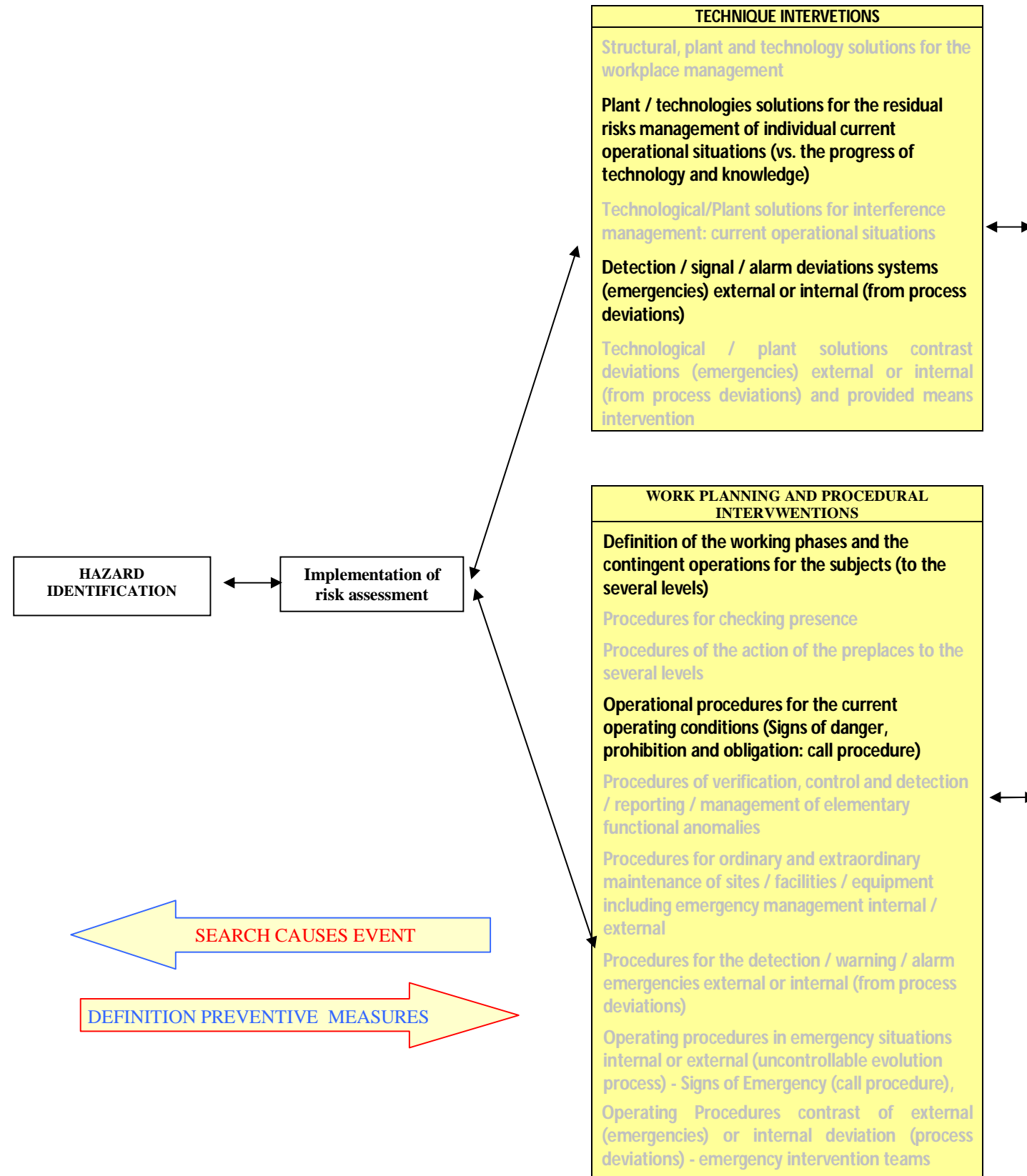
OR

Case n°5

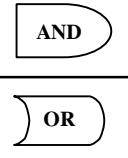
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: Lower Extremities Type of injury: Closed fractures	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CONTACT WITH SHARP MATERIAL AGENT, POINTED, HARD, ABRASIVE - Contact with a sharp Material Agent (nail / sharp tool) <i>- linked to the contact with the blade of the inkwell</i>	<i>If the repair was not practicable to secure position and required to leave the decking had to be done using the proper equipment, such as a drum or similar self-lifting.</i>	7
2	LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - related to goodwill sudden knife inkwell	<i>identification of the correct method for performing maintenance tasks</i>	6

<p>3</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - linked to the type of machine on which the intervention is carried out</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Devices (command and control, signaling, security) - likely related to the temporary failure of the control circuit</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – How to use - linked to the maintenance use of the machine on which the intervention is carried out</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for supervisors - related to the procedures to be adopted</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - linked to the types of maintenance to be performed on the machine</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p>	<p>MACHINERY, EQUIPMENT AND PROVISIONAL WORKS - equipment used for processing and them maintenance</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p>	<p>4</p>

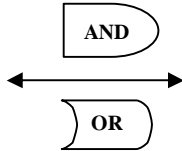
5.1	<i>temporary failure of the control circuit of the machine</i>	A. Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations) (linked to the maintenance of control circuit);	3
5.2	<i>no upgrade of information, education and training</i> <i>operation not analyzed</i> <i>maintenance procedures</i>	A. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - related to the definition of the type of maintenance to applied B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures); C. Procedures of verification, control and detection / reporting / management of elementary functional anomalies - related to failure to report a fault in the control system of the machine	2
6	Hazard factor not identified (choice of H.I. technique not appropriate for the context)	<i>introduction of a system which highlights the anomalies and identifying the maintenance type to be applied with the subsequent procedure</i>	1



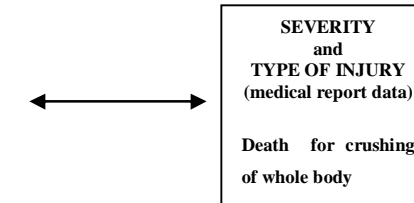
ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places]
	Common Plant	7 - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] 8 - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	- Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg. noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES <input type="checkbox"/> Mecanical systems <input type="checkbox"/> Mec. sist.- operator <input type="checkbox"/> Operator - operator	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move





INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence



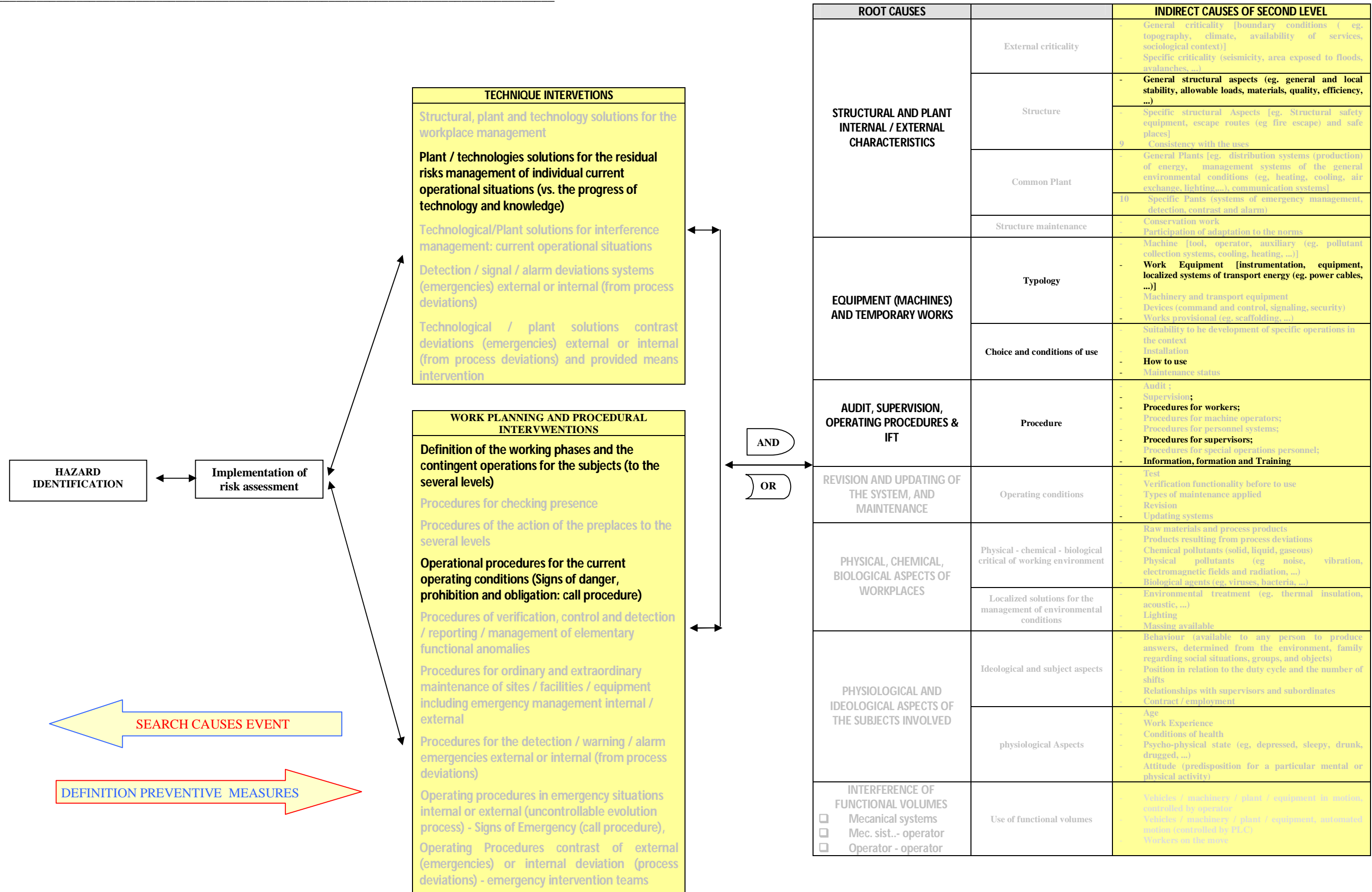
DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



Case n°6

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 40 Id (death) Part of body injured: Total body Type of injury: 1 and 2 degree burns	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CONTACT WITH ELECTRIC CURRENT, TEMPERATURE - Contact with flame or object / warm or red-hot – linked to the contact with hot drops of steel	<i>If there was a procedure for the processing and an ideal equipment to use accident can't be verified</i>	7
2	OVERFLOW, OVERTURN, LEAK, FLOW, VAPORISATION, EMISSION - Liquid state - leaking, oozing, flowing, splashing, spraying – related to hot drops of steel SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Slipping or tripping - with the fall of man - from - related to the worker's fall in the pit under Siviera	<i>identification of the correct method for the processing</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) – related to the pit under the Siviera EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - linked to the equipment used to complete its activity EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – How to use - linked to the use of the equipment on to take care for complete the activity AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers - related to the procedures to be adopted AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>linked to the pit under the Siviera</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>linked to the types of maintenance to be performed on the machine</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - <i>related to the workers procedures and the resulting IFT</i></p>	<p>MACHINERY, EQUIPMENT AND PROVISIONAL WORKS - equipment used for processing</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p>	4
5.1	<p><i>Protection device of the ladle from the heat</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) (linked to the Protection device of the ladle from the heat);</p>	3
5.2	<p><i>no upgrade of information, education and training</i></p> <p><i>operation not correctly analyzed</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the definition of the current procedure</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>introduction of a procedure for the current activity and worker's information, formation and training</i></p>	1



TECHNIQUE INTERVENTIONS

Structural, plant and technology solutions for the workplace management

Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge)

Technological/Plant solutions for interference management: current operational situations

Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations)

Technological / plant solutions contrast deviations (emergencies) external or internal (from process deviations) and provided means intervention

WORK PLANNING AND PROCEDURAL INTERVENTIONS

Definition of the working phases and the contingent operations for the subjects (to the several levels)

Procedures for checking presence

Procedures of the action of the preplaces to the several levels

Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure)

Procedures of verification, control and detection / reporting / management of elementary functional anomalies

Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external

Procedures for the detection / warning / alarm emergencies external or internal (from process deviations)

Operating procedures in emergency situations internal or external (uncontrollable evolution process) - Signs of Emergency (call procedure), Operating Procedures contrast of external (emergencies) or internal deviation (process deviations) - emergency intervention teams

ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places]
	Common Plant	9 - Consistency with the uses - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems]
	Structure maintenance	10 - Specific Plants (systems of emergency management, detection, contrast and alarm) - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg. noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

HAZARD IDENTIFICATION

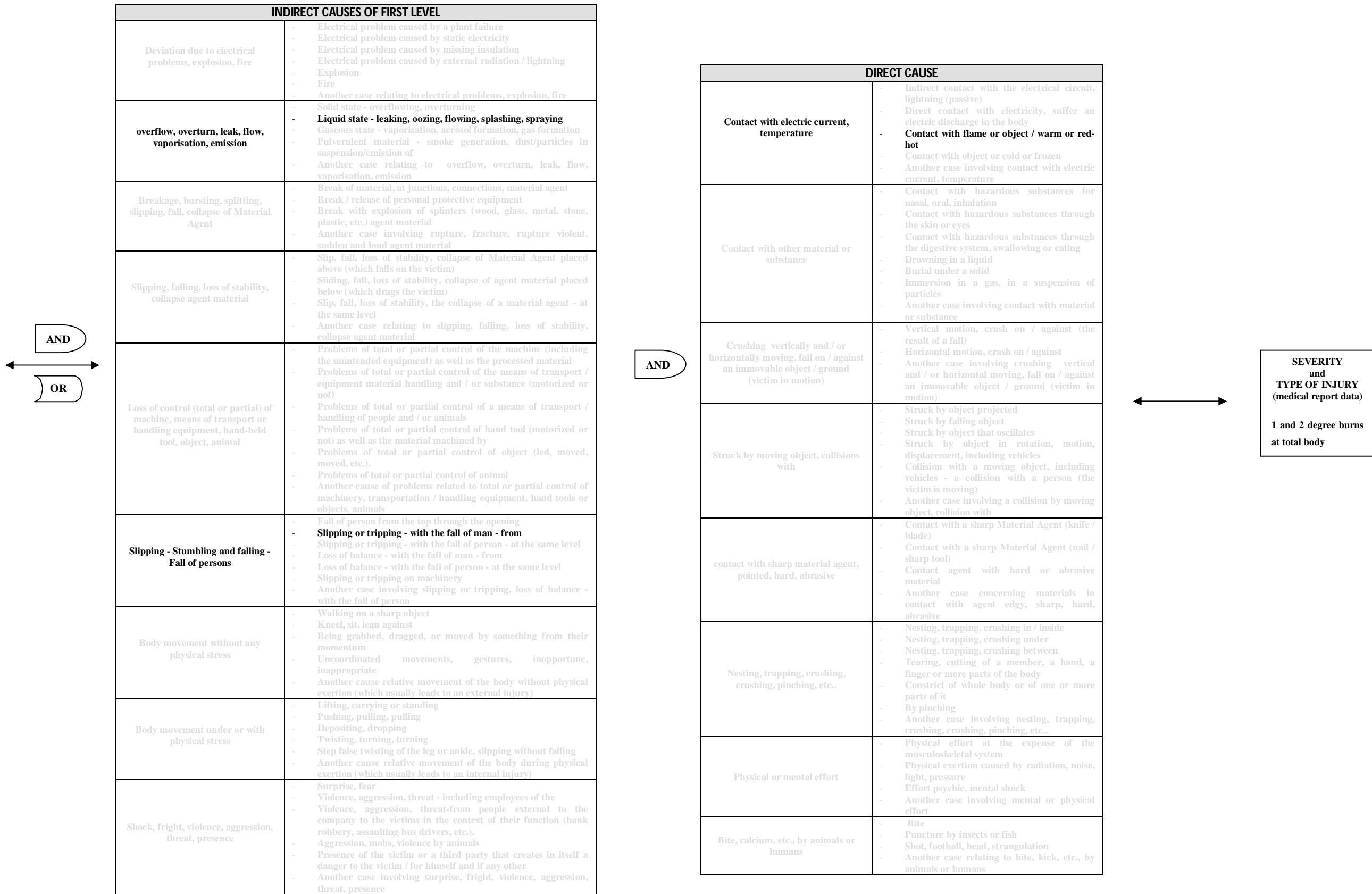
Implementation of risk assessment

SEARCH CAUSES EVENT



DEFINITION PREVENTIVE MEASURES

AND

OR



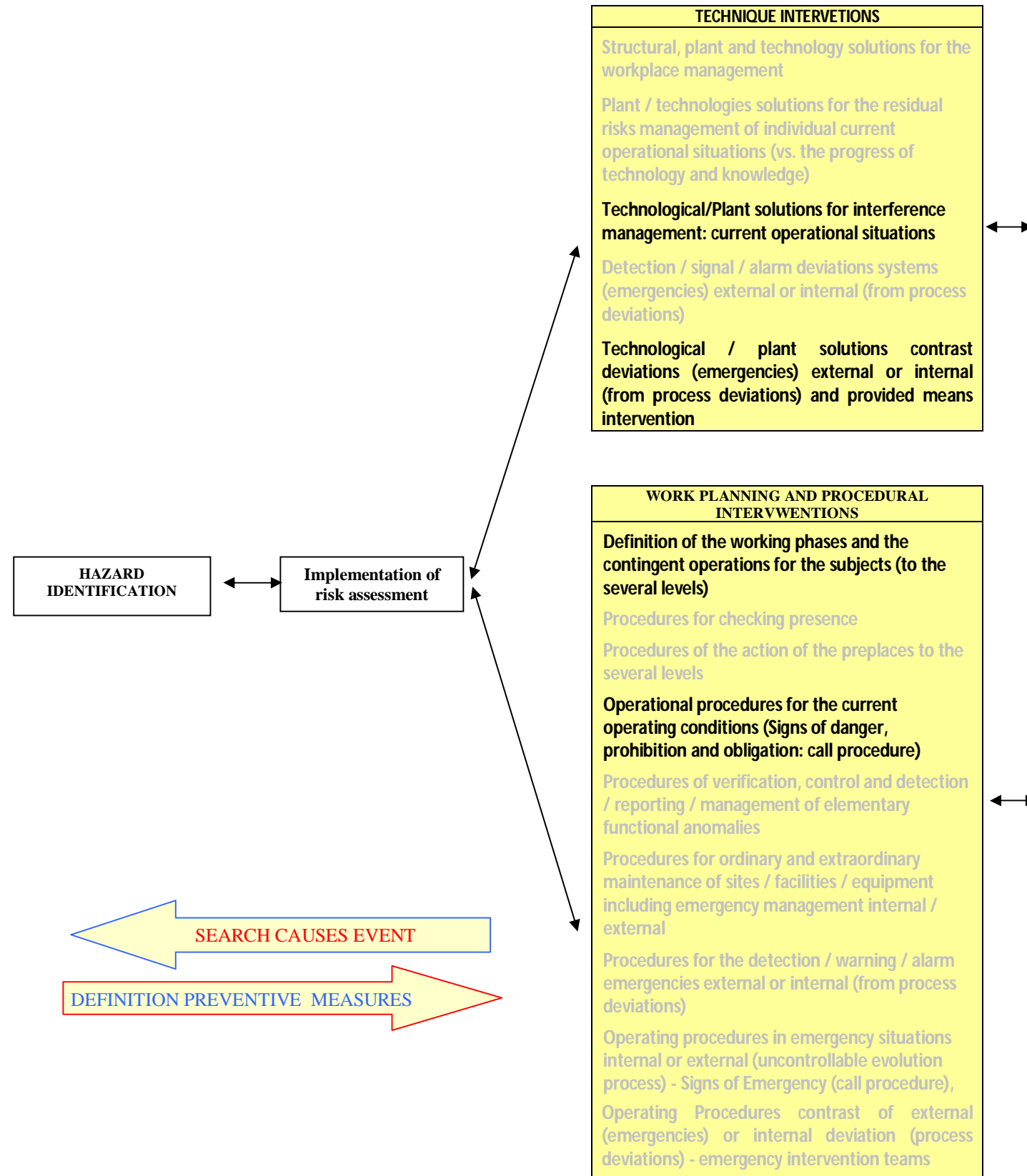
Case n°7

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	<p><i>ED: 7500 Id (death)</i> Part of body injured: Total body and internal organs Type of injury: Death for burns and lesions</p>	<p><i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i></p>	
1	<p>CONTACT WITH ELECTRIC CURRENT, TEMPERATURE - Contact with flame or object / warm or red-hot – linked to the contact with hot droplets of melted metal</p>	<p><i>If worker wasn't in the storage area of the ladle and the worker that moves the ladle was correctly former and train the accident can't be verified</i></p>	7
2	<p>OVERFLOW, OVERTURN, LEAK, FLOW, VAPORISATION, EMISSION - Liquid state - leaking, oozing, flowing, splashing, spraying – related to hot drops of steel by the ladle BREAKAGE, BURSTING, SPLITTING, SLIPPING, FALL, COLLAPSE OF MATERIAL AGENT . Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material -related to the reaction with generation of airborne droplets, that are thee cause of the contact between ground and hot steel LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - related to the control movement of the ladle</p>	<p><i>Upgrade of information, formation and training of modify of control system of movement and distinction of identification of the storage area of the ladle and the run of the pedestrian</i></p>	6

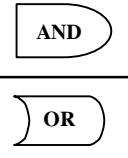
<p>3</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) – related to the structure of the ground in the ladle area</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology - Machine <i>[tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - linked to the ladle used</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – How to use - <i>linked to the uncorrect use of the ladle caused by the change of control system</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers , and supervisors- <i>related to the procedures to be adopted</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - <i>linked to the IFT that must be made on the procedures enacted</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating conditions - <i>Update systems – related to the changeling of the control system of the ladle</i></p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - physiological Aspects – Work experience – <i>related to the experience of the worker that moved the ladle</i></p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
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4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>linked to the storage area of the ladle</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>linked to the ladle used to performing the activity</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - <i>related to the workers procedures and the resulting IFT</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – <i>related to the upgrade of the control system of the ladle</i></p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED – <i>related to the worker used for the processing</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS related to the storage area of the ladle</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – control system of the movement ladle</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - control system of the movement ladle</p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED – <i>worker correctly former and trained</i></p>	4
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5.1	<p><i>Storage Area not suitable for the ladle</i> <i>Control system not suitable for this type of ladle</i></p>	<p>A. Technological / plant solutions contrast deviations (emergencies) external or internal (from process deviations) and provided means intervention (linked to the Protection device of the movement system of the ladle); B. Technological/Plant solutions for interference management: current operational situations - related to the delimitation of the storage area of the ladle</p>	3
5.2	<p><i>no upgrade of information, education and training</i> <i>operation not correctly analyzed</i> <i>Interference of volume functional</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the definition of the procedure of movement of the ladle and of worker's move B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p>	2
6	<p>Hazard factor not identified (choice of H.I. technique not appropriate for the context)</p>	<p><i>introduction of a correct modify to the control system and of procedures for the movement of ladle and consequently worker's information, formation and training</i></p>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] 11 Consistency with the uses
	Common Plant	- General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] 12 Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	- Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg. noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES <input type="checkbox"/> Mecanical systems <input type="checkbox"/> Mec. sist.- operator <input type="checkbox"/> Operator - operator	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

AND

OR



AND

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

SEVERITY and TYPE OF INJURY (medical report data)

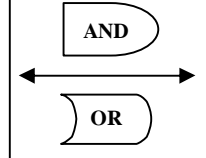
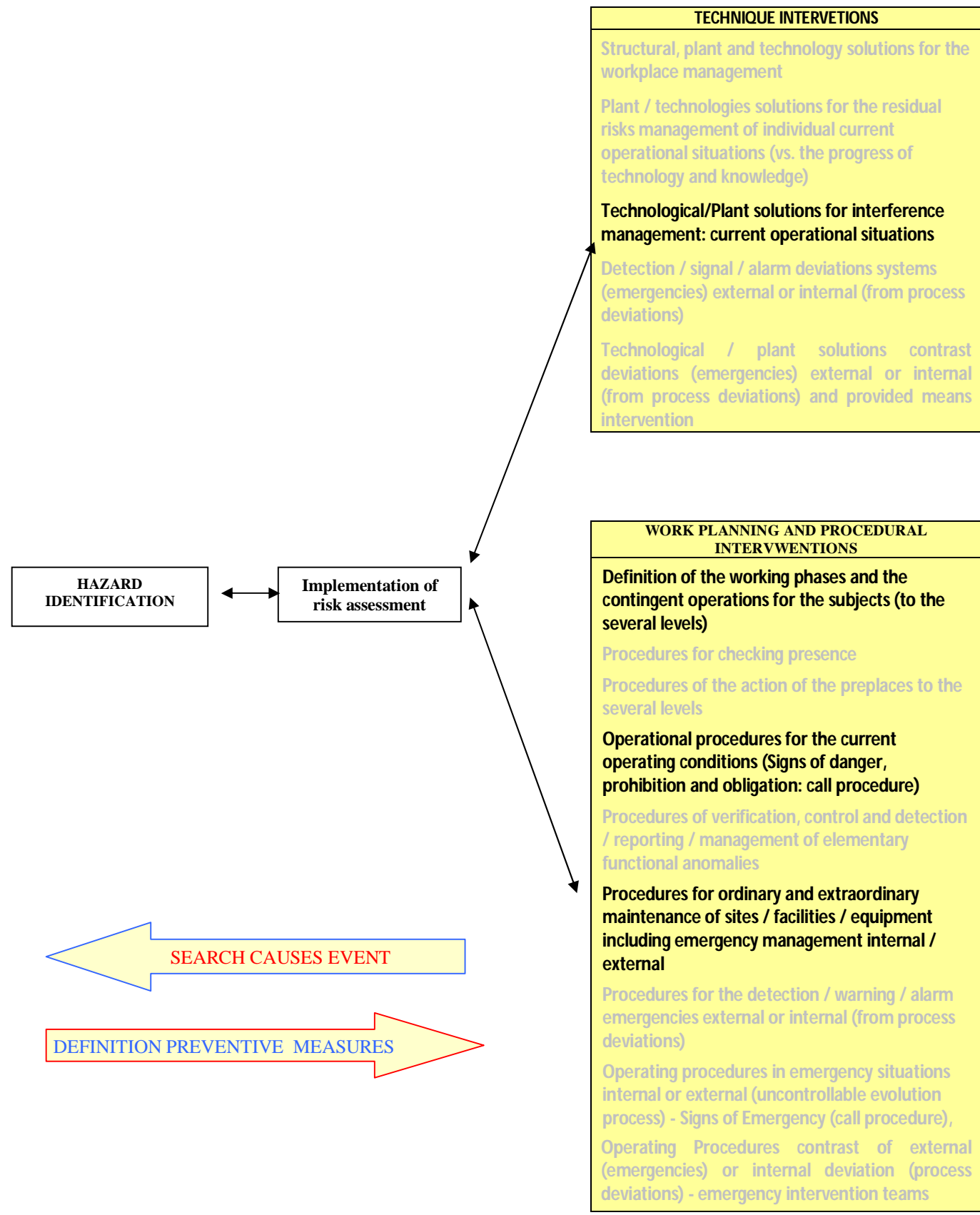
Death for burns at total body and internal lesions

Case n°8

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	<p><i>ED: 7500 Id (death)</i> Part of body injured: Torso, multiple sites affected Type of injury: Death for internal and superficial injuries</p>	<p><i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i></p>	
1	<p>STRUCK BY MOVING OBJECT, COLLISIONS WITH - Struck by object in rotation, motion, displacement, including vehicles - linked to the contact with some components of machine in movement</p>	<p><i>If worker respects safety devices the accident can't be verified</i></p>	7
2	<p>SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Slipping or tripping - with the fall of person - at the same level - related to contact between the protective clothes with components of machine in movement</p> <p>BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Being grabbed, dragged, or moved by something from their momentum -related to the entanglement on the components of the machine in rotation</p>	<p><i>It must avoid the manumission of safety device with a correct upgrade of information, formation and training and supervision of the worker activity</i></p>	6

<p>3</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology – Devices (command and control, signalling, security) - linked to the safety devices manomitted</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – How to use - linked to the action of manumission of the safety devices did by worker</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers , and supervisors- related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - Ideological and subject aspects - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) – related to the experience of the worker that manomits safety device to do maintenance</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - linked to the safety device manomitted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED – related to the worker experience</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – a safety device that it can't tamper with</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED – worker correctly former and trained</p>	<p>4</p>

5.1	<i>Safety device that it can tamper</i>	A. Technological/Plant solutions for interference management: current operational situations - related to the delimitation of the storage area of the ladle	3
5.2	<p><i>no upgrade of information, education and training</i></p> <p><i>Interference of volume functional</i></p> <p><i>No procedure of supervision</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the definition of the procedure of maintenance in safety</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p> <p>C. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - procedure of maintenance</p>	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>introduction of a can't tamper safety devices and consequently worker's information, formation and training</i>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to he development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



AND
OR

AND

SEVERITY and TYPE OF INJURY (medical report data)

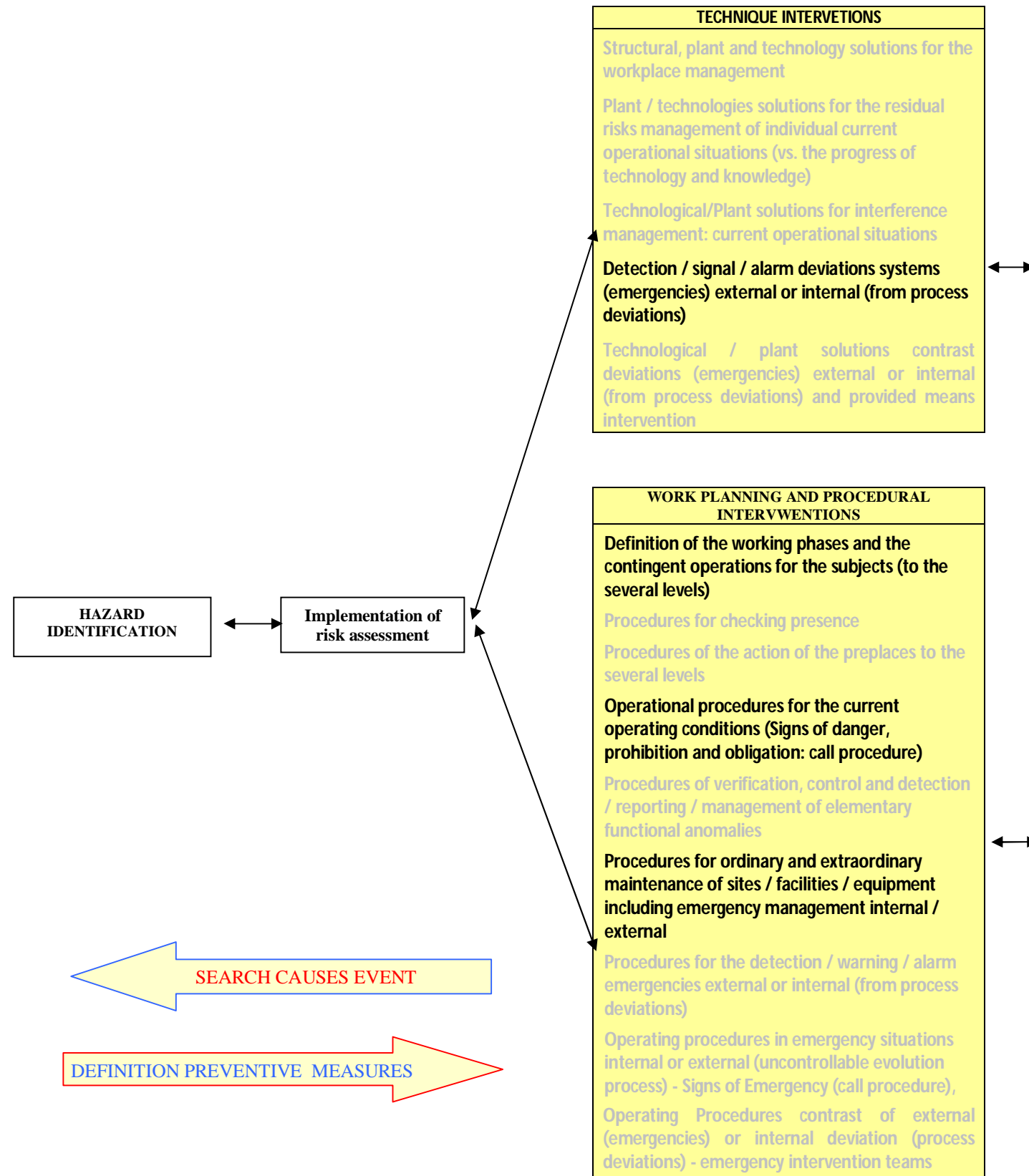
Death for internal and superficial injuries

Case n°9

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	<p><i>ED: amputation of the hand</i> Part of body injured: Hand Type of injury: Traumatic amputation</p>	<p><i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i></p>	
1	<p>STRUCK BY MOVING OBJECT, COLLISIONS WITH - Struck by falling object – linked to the stamp fall against the worker's hand</p>	<p><i>If there was a correct maintenance of the control plant of the machine or there was a device to report anomalies of the machine and to interrupt availability of the machine</i></p>	7
2	<p>DEVIATION DUE TO ELECTRICAL PROBLEMS, EXPLOSION, FIRE - Electrical problem caused by a plant failure – related to electrical contact that starts descent of the stamp SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) -related to the stamp failed</p>	<p><i>It must need a correct system of report anomalies of the machine and of its system of control</i></p>	6

3	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Tipology – Devices (command and control, signalling, security) - linked to the control devices involves to the injury</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Choice and condition of use – Maintenance status - linked to the maintenance status of the control plant of the machine</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating conditions - Verification functionality before to use – related to the control procedure to adopt before to use the stamp machine</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating conditions - Types of maintenance applied - related to the types of maintenance applied on the control system of the stamp machine</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5
4	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - linked to the stamp machine and its control device</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE– related to the procedure of control and of the maintenance for the stamp machine</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS –control device of stamp machine</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – procedure of control of functionality of the machine</p>	4

5.1	<i>Control device for stamp machine correctly works</i>	A. Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations) - device that reports the anomalies of the machine	3
5.2	<i>no upgrade of information, education and training</i> <i>Procedure of verification functionality before the use of the stamp machine</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the definition of the procedure of maintenance B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures); C. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - procedure to do in emergency situations	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>introduction of a device that reports the anomalies of the stamp machine and consequently worker's information, formation and training</i>	1

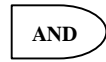
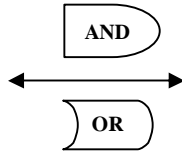


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

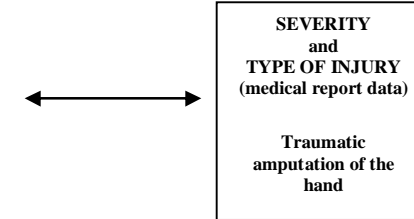
SEARCH CAUSES EVENT

DEFINITION PREVENTIVE MEASURES



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence



DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

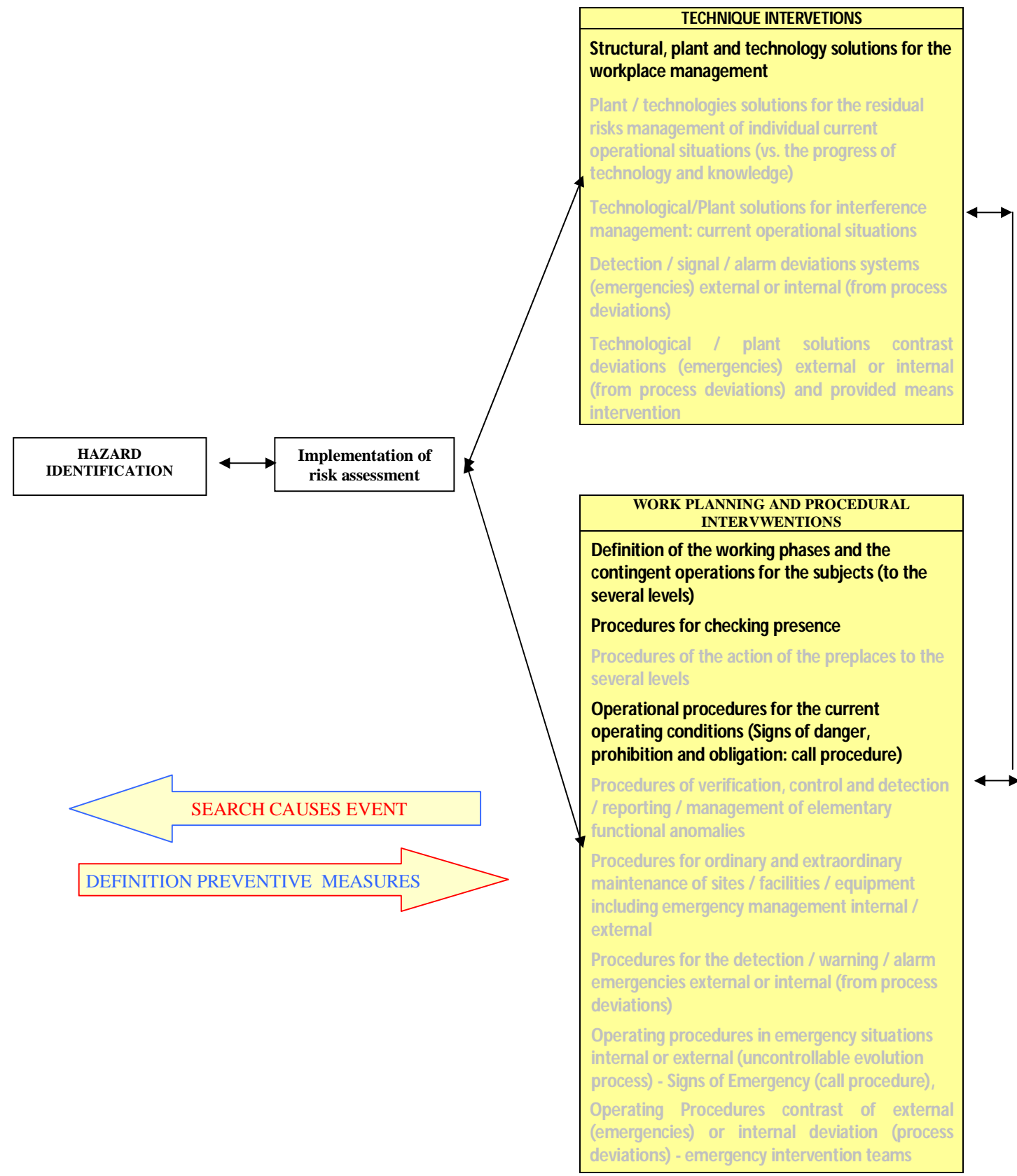


Case n°10

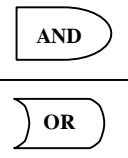
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: Total body and internal organs Type of injury: Death of multiple trauma	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	STRUCK BY MOVING OBJECT, COLLISIONS WITH - Struck by falling object - linked to the metal pipes fall	<i>There will not be a person under the temporary structure of metal pipes or the temporary structure must built in a correctly way</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) -related to the metal pipes fall LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of object (led, moved, moved, etc.). - related to inferior metal pipes moved	<i>It must need a correct way to built the temporary structure of metal pipes and consequently procedure</i>	6

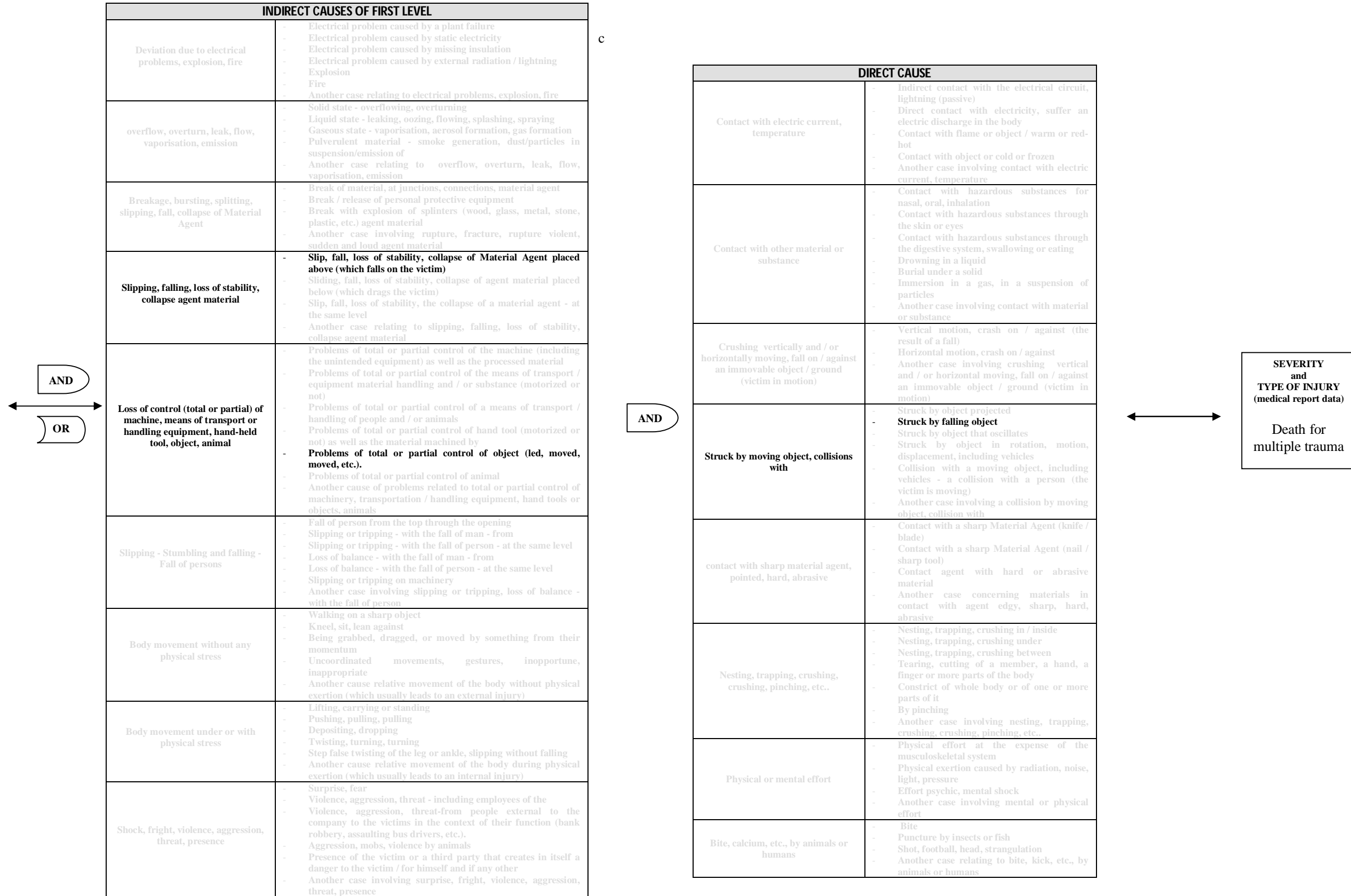
<p>3</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) – - linked to the temporary structure of metal pipes</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers and supervisor - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating conditions - Verification functionality before to use – related to the control procedure to adopt before to use the temporary structure</p> <p>INTERFERENCE OF FUNCTIONAL VOLUMES - Use of functional volumes - - related to the presence of people in under the temporary structure</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - linked to the temporary structure</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE– related to the procedure of control and of the maintenance for the stamp machine</p> <p>INTERFERENCE OF FUNCTIONAL VOLUMES related to the presence of the worker under the structure</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – temporary structure of metal pipes</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – procedure of control of functionality of the structure</p> <p>INTERFERENCE OF FUNCTIONAL VOLUMES related to the control of presence in the work area</p>	<p>4</p>

5.1	<i>Temporary structure built in a wrong way</i>	A. Structural, plant and technology solutions for the workplace management - temporary structure correctly mounted	3
5.2	<p><i>no upgrade of information, education and training</i></p> <p><i>Procedure of verification functionality before the use</i></p> <p><i>Procedure of the presence control</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the definition of the procedure to built the structure</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p> <p>C. Procedures for checking presence - procedure to repor the presence of the worker</p>	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>introduction of procedure to check the presence of the worker and to built in a correct way the temporary structure</i>	1





ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects (eg. Structural safety equipment, escape routes (eg fire escape) and safe places) - Consistency with the uses
	Common Plant	- General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	- Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

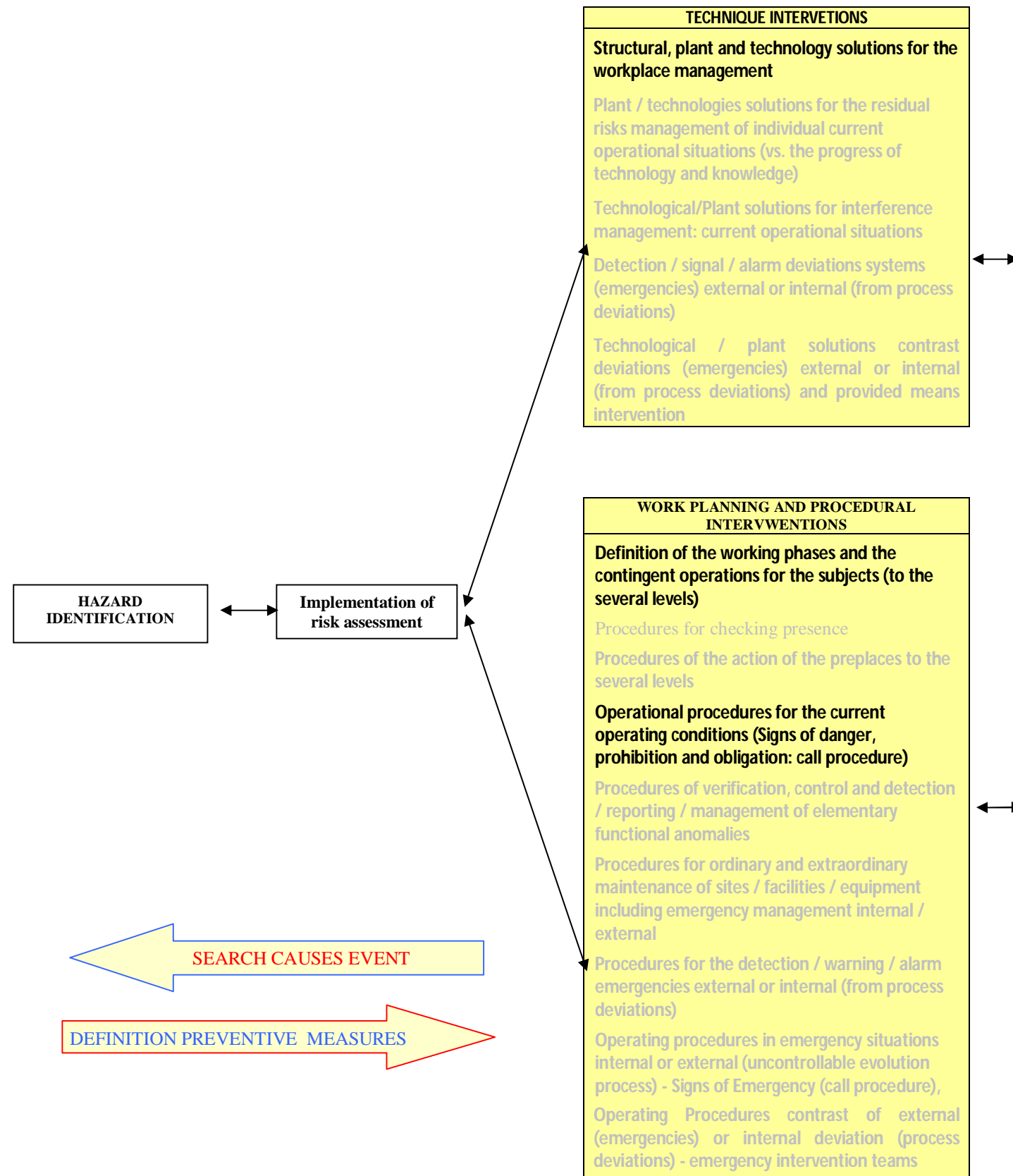




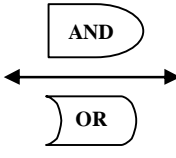
Case n°11

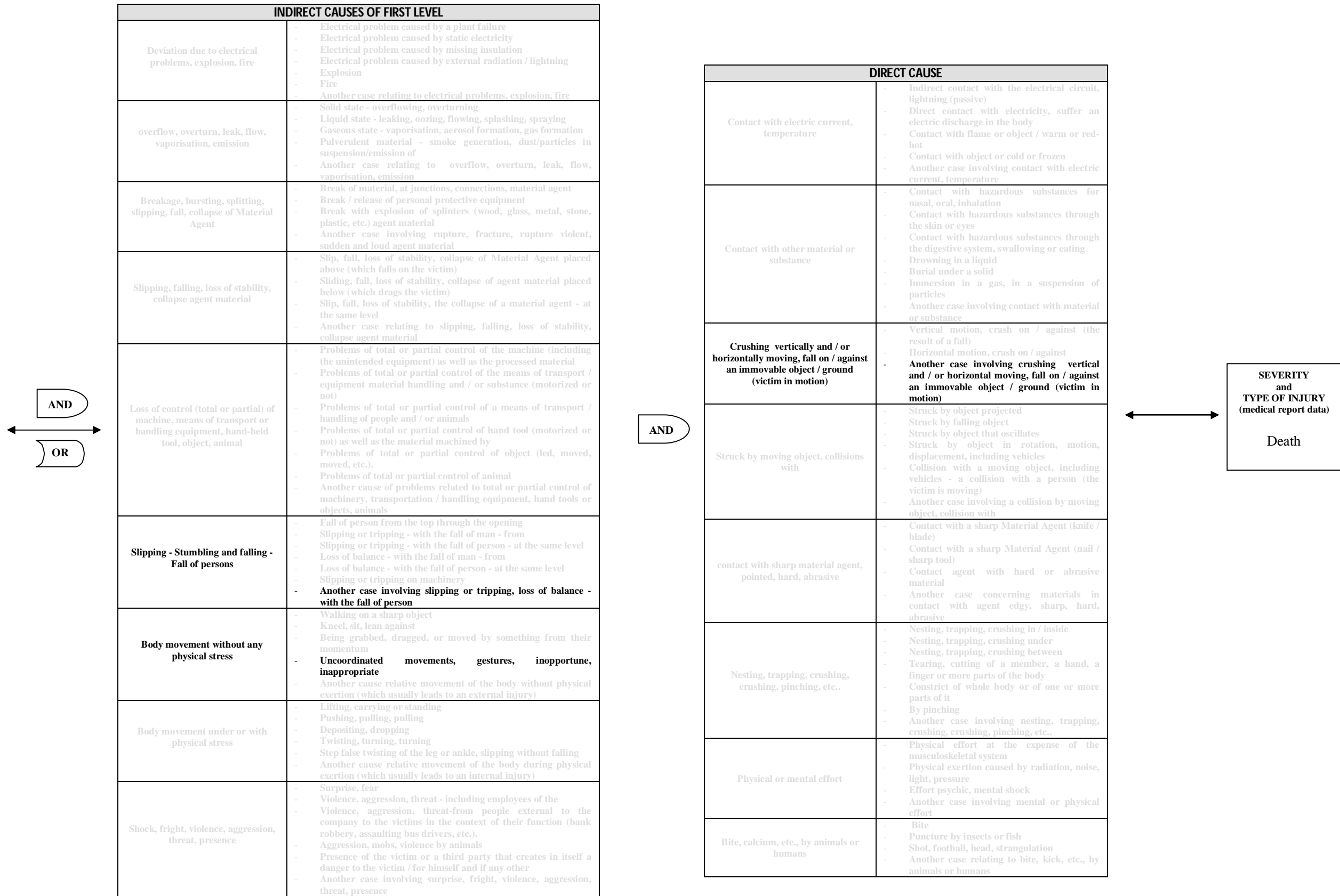
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: Total body and internal organs Type of injury: Death	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion) – linked to the worker fall by the scale	<i>It is necessary a correct and complete risk analysis</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Another case involving slipping or tripping, loss of balance - with the fall of person) -related to worker fall BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Uncoordinated movements, gestures, inopportune, inappropriate – related to the uncoordinated movements of the worker during the scale descent	<i>It must need a risk analysis and consequently procedure and information, formation and training and a correct supervision of workers</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) -- linked to the scale of the stack AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers and supervisor - related to the procedures to be adopted AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use - How to use – related to the use of the stack scale	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>linked to the structure</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - <i>related to the workers procedures and the resulting IFT</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – <i>related to the equipment use in the processing</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – structure where the worker moves</p> <p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – equipment used during the worker movements</p>	4
5.1	<p><i>New structure to use for moving around the area</i></p>	<p>A. Structural, plant and technology solutions for the workplace management - a correct organization of the work area</p>	3
5.2	<p><i>Risk analysis complete</i></p> <p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the organization of the work area</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Realization of a correct and complete risk analysis with a consequently elaboration of procedure and information, formation and training of workers</i></p>	1





ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	- General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	- Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



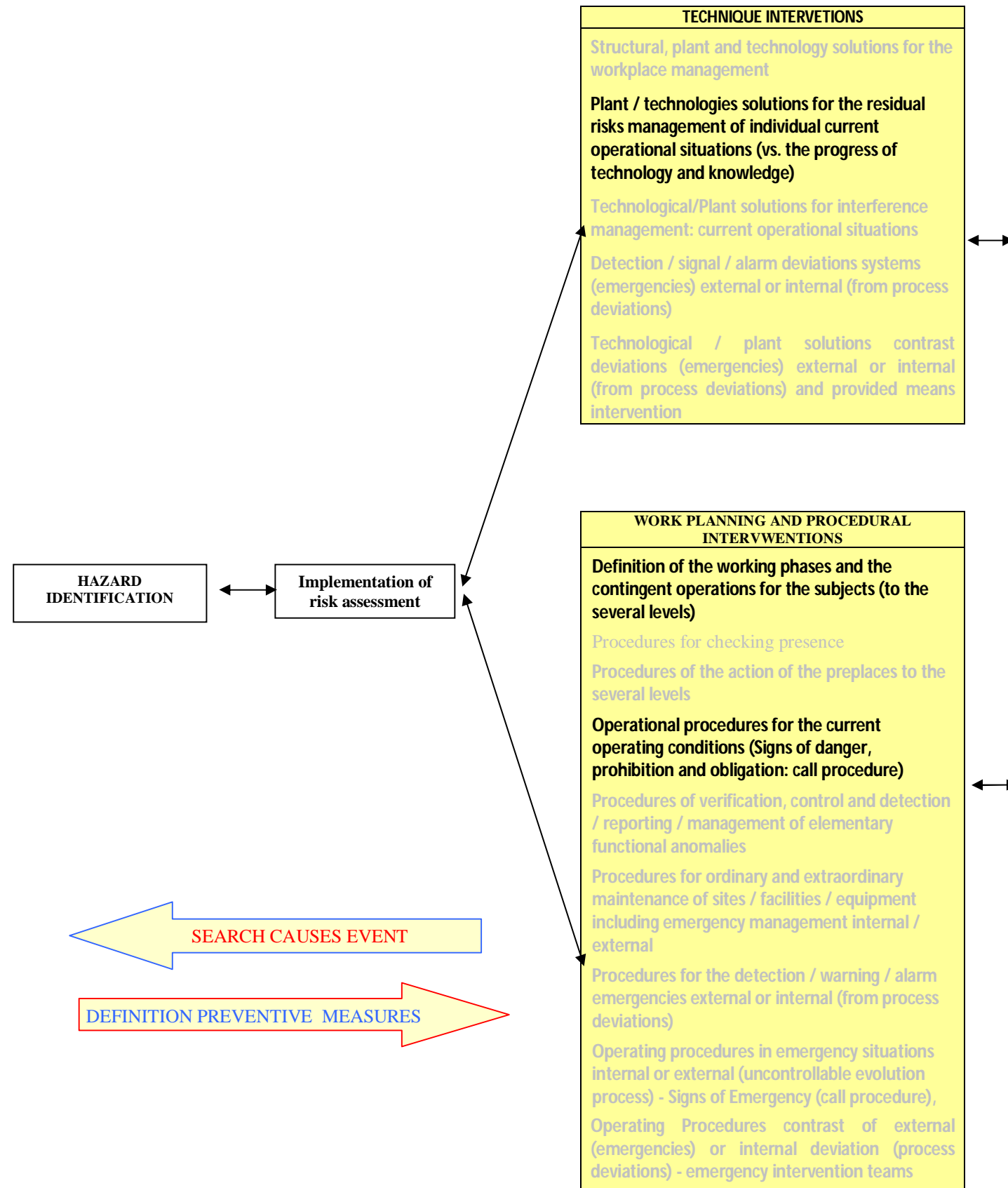


Case n°12

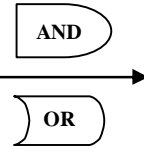
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: Head Type of injury: Death for head trauma	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion) – linked to the crush of the worker to the wall of the gallery	<i>It is necessary a correct and complete risk analysis and an adjustment of the equipments</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Another case involving slipping or tripping, loss of balance - with the fall of person) -related to the subsidence of the quarterdeck BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Loss of balance - with the fall of person - at the same level – related to the uncoordinated movements of the worker after the subsidence of the quarterdeck	<i>It must need a risk analysis and consequently procedure and information, formation and training and a correct supervision of workers; or a suitable maintenance of the machine</i>	6

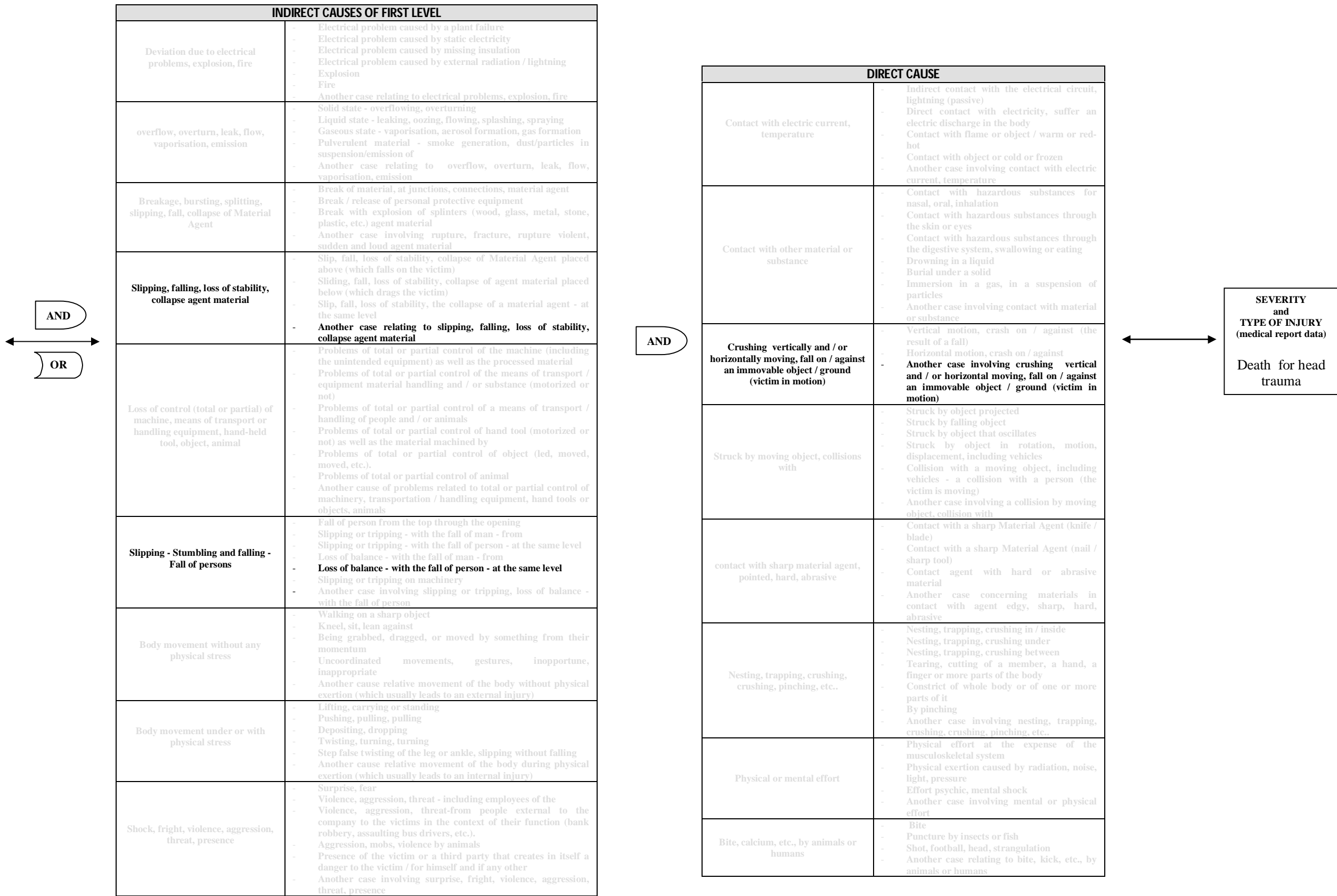
3	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology - Works provisional (eg. scaffolding, ...) - linked to the quarterdeck EQUIPMENT (MACHINES) AND TEMPORARY WORKS -Choice and conditions of use – How to use - linked to the use of the quarterdeck EQUIPMENT (MACHINES) AND TEMPORARY WORKS -Choice and conditions of use – Maintenance status – related to the maintenance status of quarterdeck</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers and supervisor - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - Operating conditions - Verification functionality before to use – related to the check to do before of the use of quarterdeck</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5
4	<p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – related to the machine used in the processing</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to check to do before the use of the quarterdeck</p>	<p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – quarterdeck used during the processing</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE control to do before the use of the machine</p>	4

5.1	<i>New quarterdeck to use during the processing</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - a new quarterdeck to use	3
5.2	<i>Risk analysis complete information, education and training Procedure of the worker</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the organization of the work area B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>Realization of a correct and complete risk analysis with a consequently elaboration of procedure and information, formation and training of workers</i>	1

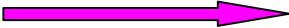
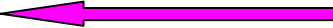


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	- General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	- General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	- General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	- Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	- Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	- Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	- Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	- Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	- Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	- Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	- Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	- Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	- Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



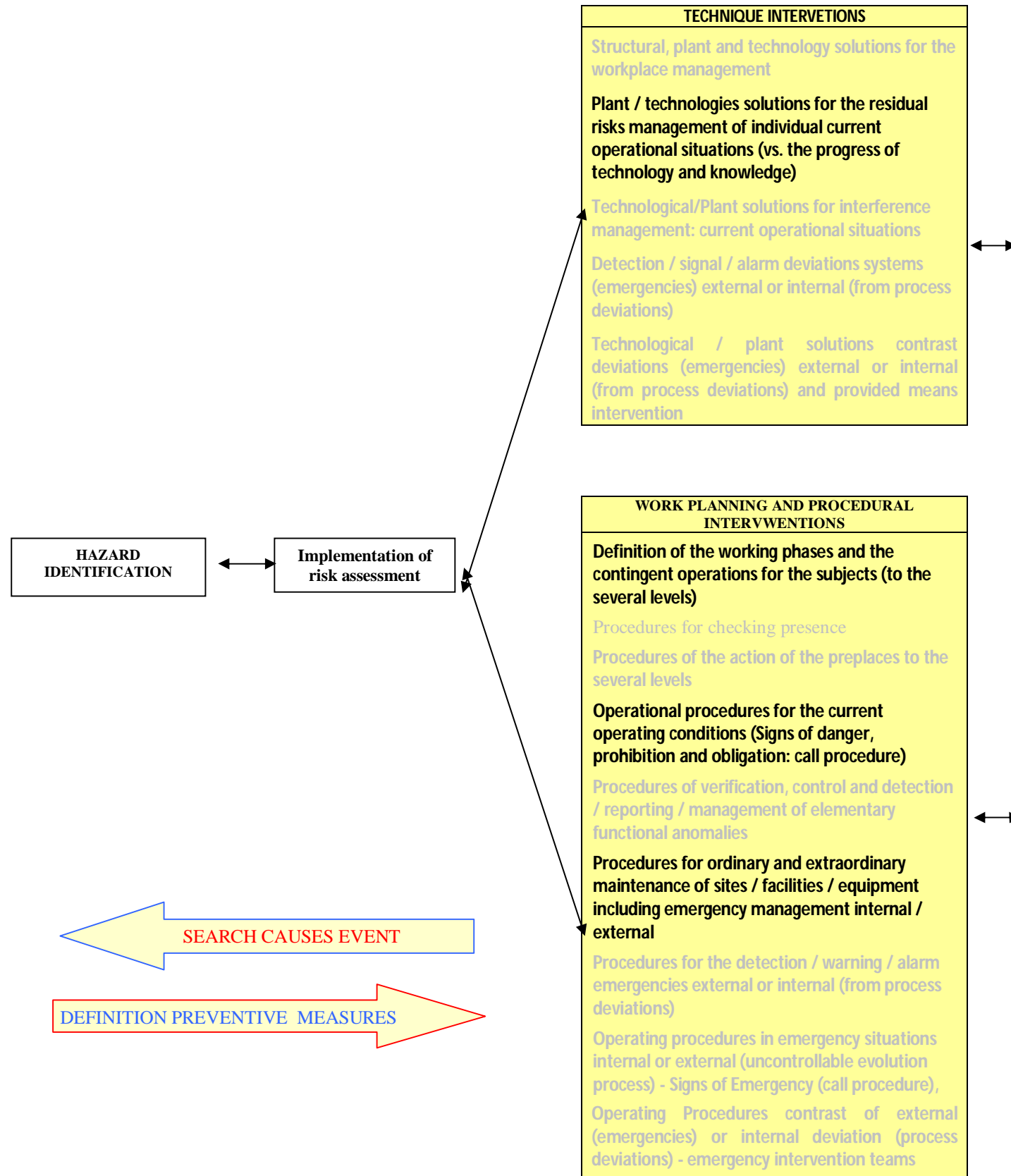


Case n°13

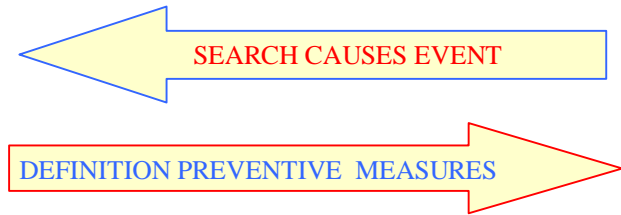
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	<p><i>ED: 7500 Id (death)</i> Part of body injured: Total body and internal organs Type of injury: Death for closed fractures and internal injuries</p>	<p><i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i></p>	
1	<p>NESTING, TRAPPING, CRUSHING, CRUSHING, PINCHING, ETC..- Constrict of whole body or of one or more parts of it – linked to the crush of the worker between the protection bar and the strut of centering</p>	<p><i>It is necessary a correct and maintenance of the control plant of the platform lift and a complete risk analysis and an adjustment of the equipments</i></p>	7
2	<p>DEVIATION DUE TO ELECTRICAL PROBLEMS, EXPLOSION, FIRE - Electrical problem caused by a plant failure -related to the anomaly of the function of the control plant of platform lift LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of a means of transport / handling of people and / or animals – related to the uncoordinated movements of platform lift</p>	<p><i>It must need a risk analysis and consequently procedure and information, formation and training and a correct supervision of workers; or a suitable maintenance of the machine</i></p>	6

<p>3</p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology - Works provisional (eg. scaffolding, ...) - linked to the platform lift used EQUIPMENT (MACHINES) AND TEMPORARY WORKS -Choice and conditions of use – How to use - linked to the use of the machine EQUIPMENT (MACHINES) AND TEMPORARY WORKS -Choice and conditions of use – Maintenance status – related to the maintenance status of platform lift EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology Devices (command and control, signaling, security) - related to the control plant of the platform lift AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers and supervisor - related to the procedures to be adopted AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - Operating conditions - Verification functionality before to use – related to the check to do before of the use of quarterdeck</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT EQUIPMENT (MACHINES) AND TEMPORARY WORKS – related to the machine used in the processing REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to check to do before the use of the platform lift</p>	<p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels, EQUIPMENT (MACHINES) AND TEMPORARY WORKS – control plant and platform lift used during the processing REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE control to do before the use of the machine</p>	<p>4</p>

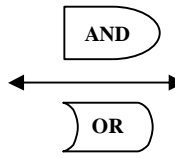
5.1	<i>A functional control plant of the platform lift</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - a new platform lift to use	3
5.2	<p><i>Risk analysis complete</i></p> <p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p> <p><i>Procedure of maintenance</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p> <p>C. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - (related the definition of maintenance procedures);</p>	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<p><i>Realization of a correct and complete risk analysis with a consequently elaboration of procedure and information, formation and training of workers</i></p> <p><i>Maintenance of control plants of platform lift</i></p>	1



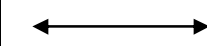
ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality (boundary conditions (eg. topography, climate, availability of services, sociological context)) - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects (eg. Structural safety equipment, escape routes (eg fire escape) and safe places) - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants (eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems) - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine (tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)) - Work Equipment (Instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)) - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to be development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision: - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence





DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



SEVERITY and TYPE OF INJURY (medical report data)

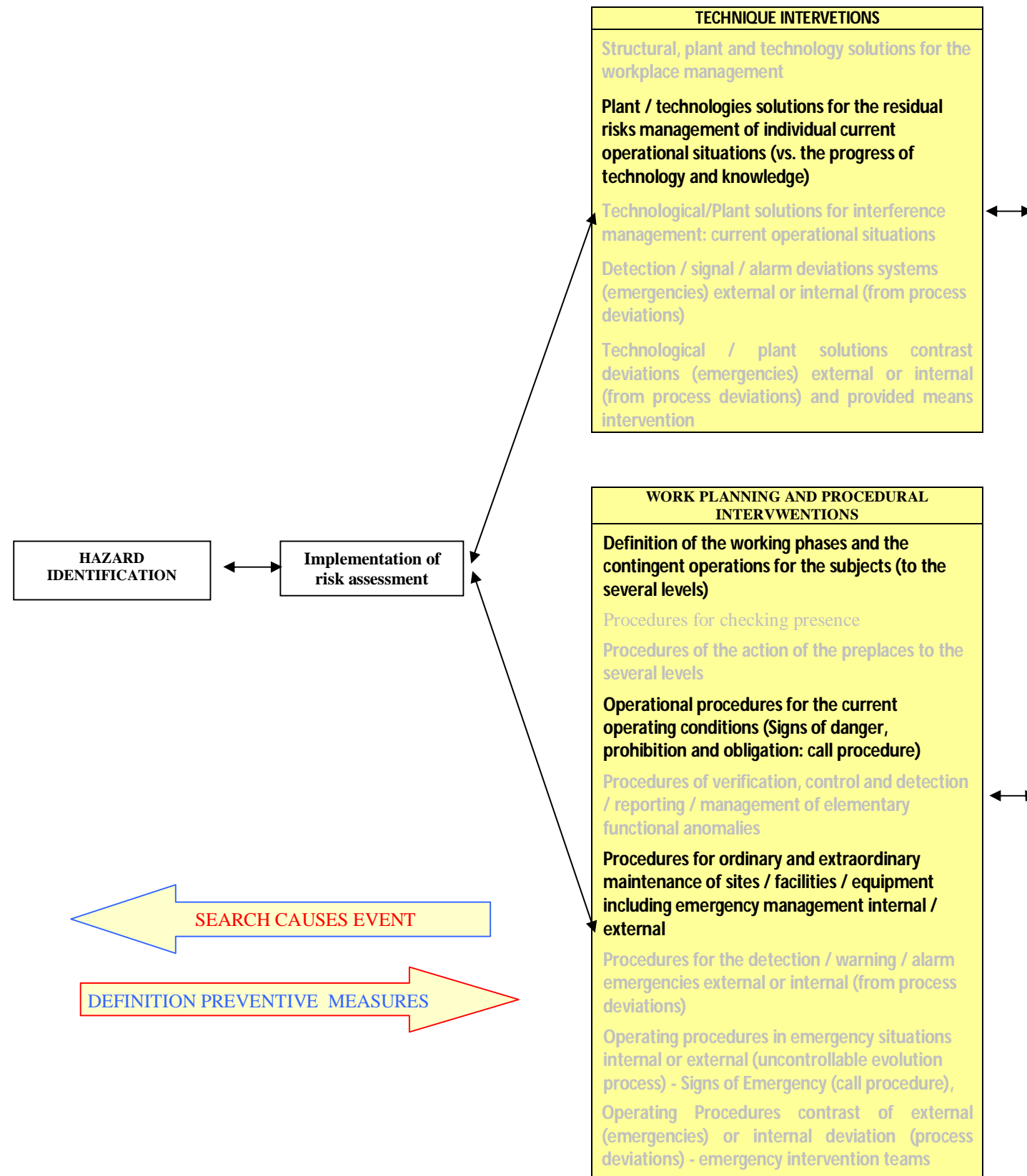
Death for closed fractures and internal injuries

Case n°14

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: Total body and internal organs Type of injury: Death for closed fractures and internal injuries	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Vertical motion, crash on / against (the result of a fall) – linked to the crush of the worker to the ground under the movable bridge	<i>It is necessary a to use an equipment suitable to the activity</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) -related to the overturning of the movable bridge LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of a means of transport / handling of people and / or animals – related to the movements of the equipment	<i>It must need an equipment suitable and consequently procedure and information, formation and training and a correct supervision of workers</i>	6

3	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology - Works provisional (eg. scaffolding, ...) - linked to the movable bridge used EQUIPMENT (MACHINES) AND TEMPORARY WORKS -Choice and conditions of use – How to use - linked to the use of the equipment EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology Devices (command and control, signaling, security) - related to the control plant of the movable bridge</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers and supervisor - related to the procedures to be adopted</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - Operating conditions - Verification functionality before to use – related to the check to do before of the use of the movable brisge</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5
4	<p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – related to the machine used in the processing</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to check to do before the use of the platform lift</p>	<p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels,</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – control plant or movable bridge used during the processing</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE control to do before the use of the machine</p>	4

5.1	<i>A suitable movable bridge for the processing</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - a new movable bridge to use	3
5.2	<i>information, education and training</i> <i>Procedure of the worker for the use of movable bridge</i> <i>Procedure of maintenance</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures); C. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - (related the definition of maintenance procedures);	2
6	Hazard factor not identified (choice of H.I. technique not appropriate for the context)	<i>Use of a suitable movable bridge for the processing</i>	1



SEARCH CAUSES EVENT

DEFINITION PREVENTIVE MEASURES

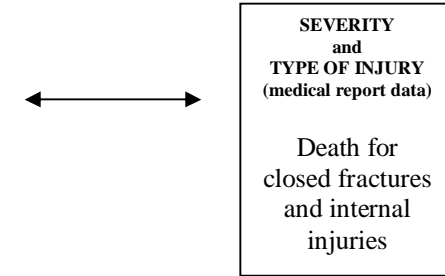
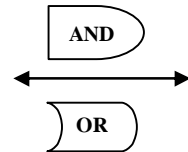
AND

OR



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to he development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

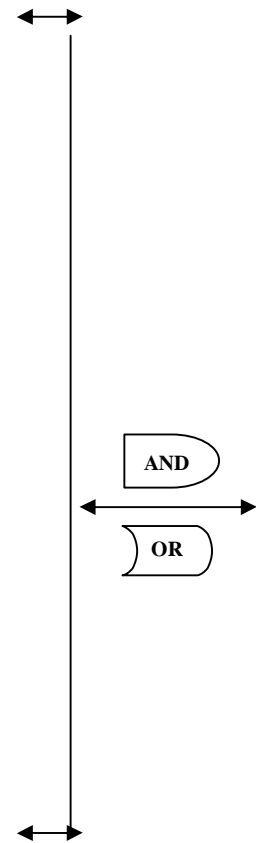
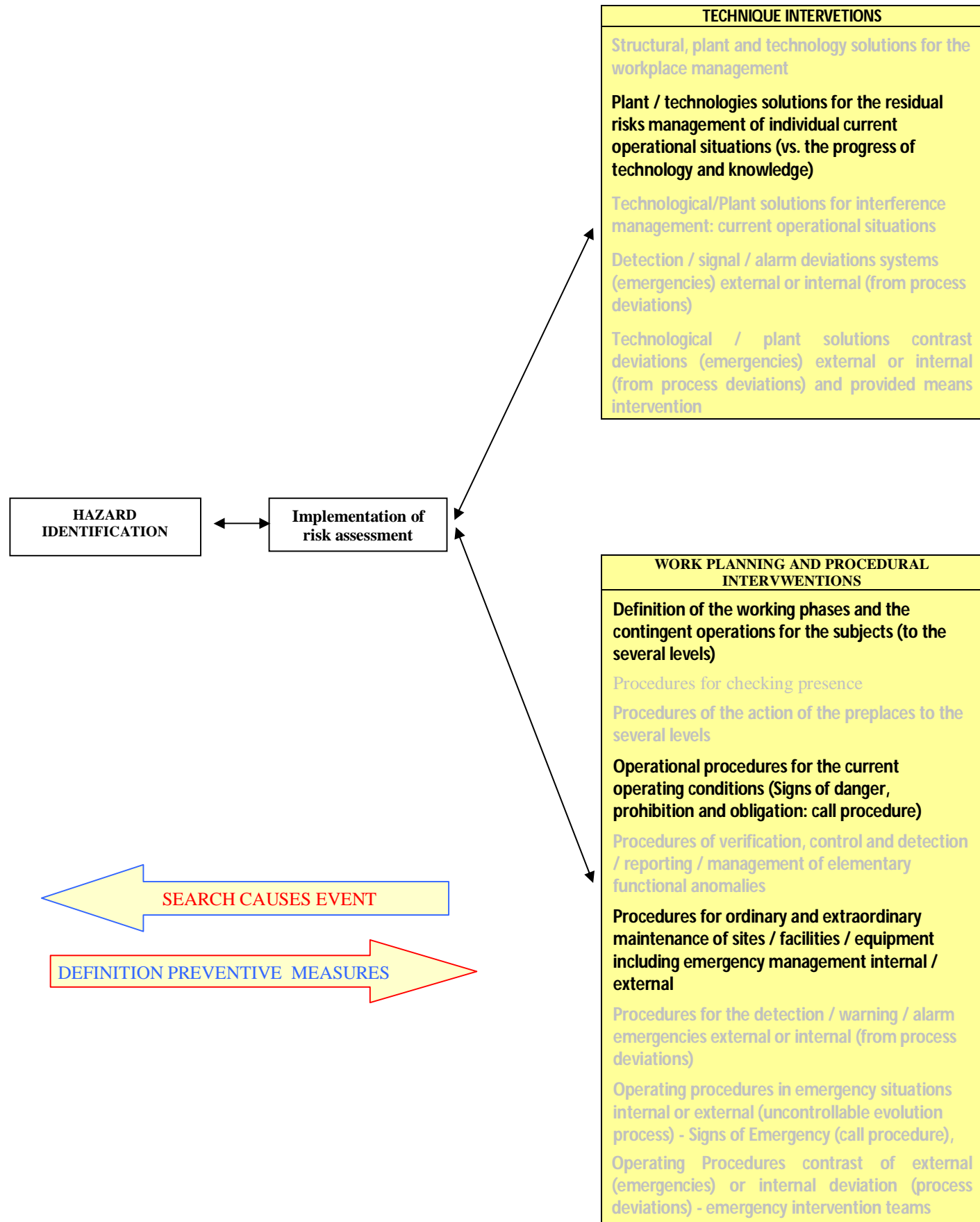


Case n°15

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 7500 Id (death) Part of body injured: Chest area including organs Type of injury: Death for closed fractures and internal injuries	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	NESTING, TRAPPING, CRUSHING, CRUSHING, PINCHING, ETC.. - Nesting, trapping, crushing under – linked to the crush of the worker by the truck	<i>It is necessary a to use an equipment suitable to the activity</i>	7
2	BREAKAGE, BURSTING, SPLITTING, SLIPPING, FALL, COLLAPSE OF MATERIAL AGENT - Break of material, at junctions, connections, material agent - related to the break of the steering of the truck LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of a means of transport / handling of people and / or animals – related to the control of the truck during the drive SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Fall of person from the top through the opening – related to the exit of the worker from the truck throught the window	<i>It must need an equipment suitable and consequently procedure and information, formation and training and a correct supervision of workers</i>	6

3	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology - Machinery and transport equipment - linked to the truck used EQUIPMENT (MACHINES) AND TEMPORARY WORKS -Choice and conditions of use – How to use - linked to the use of the truck AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers and supervisor - related to the procedures to be adopted AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Information, formation and Training - linked to the IFT that must be made on the procedures enacted REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - Operating conditions - Verification functionality before to use – related to the check to do before of the use of the truck</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5
4	<p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the workers procedures and the resulting IFT EQUIPMENT (MACHINES) AND TEMPORARY WORKS – related to the transport used in the processing REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to check to do before the use of the truck</p>	<p>AUDIT, SUPERVISION AND OPERATING PROCEDURES & IFT - information, training and operator training at various levels, EQUIPMENT (MACHINES) AND TEMPORARY WORKS – control plant or movable bridge used during the processing REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE control to do before the use of the machine</p>	4

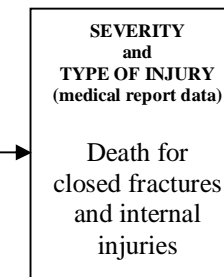
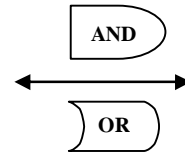
5.1	<i>A truck kept under maintenance</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - a new truck to use	3
5.2	<i>information, education and training</i> <i>Procedure of the worker for the use of the truck</i> <i>Procedure of maintenance</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures); C. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - (related the definition of maintenance procedures);	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>Correct maintenance of the truck and application of technical solutions on the truck</i>	1





ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency,...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
	Localized solutions for the management of environmental conditions	
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move
Mechanical systems Mec. sist.- operator Operator - operator		

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertically and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

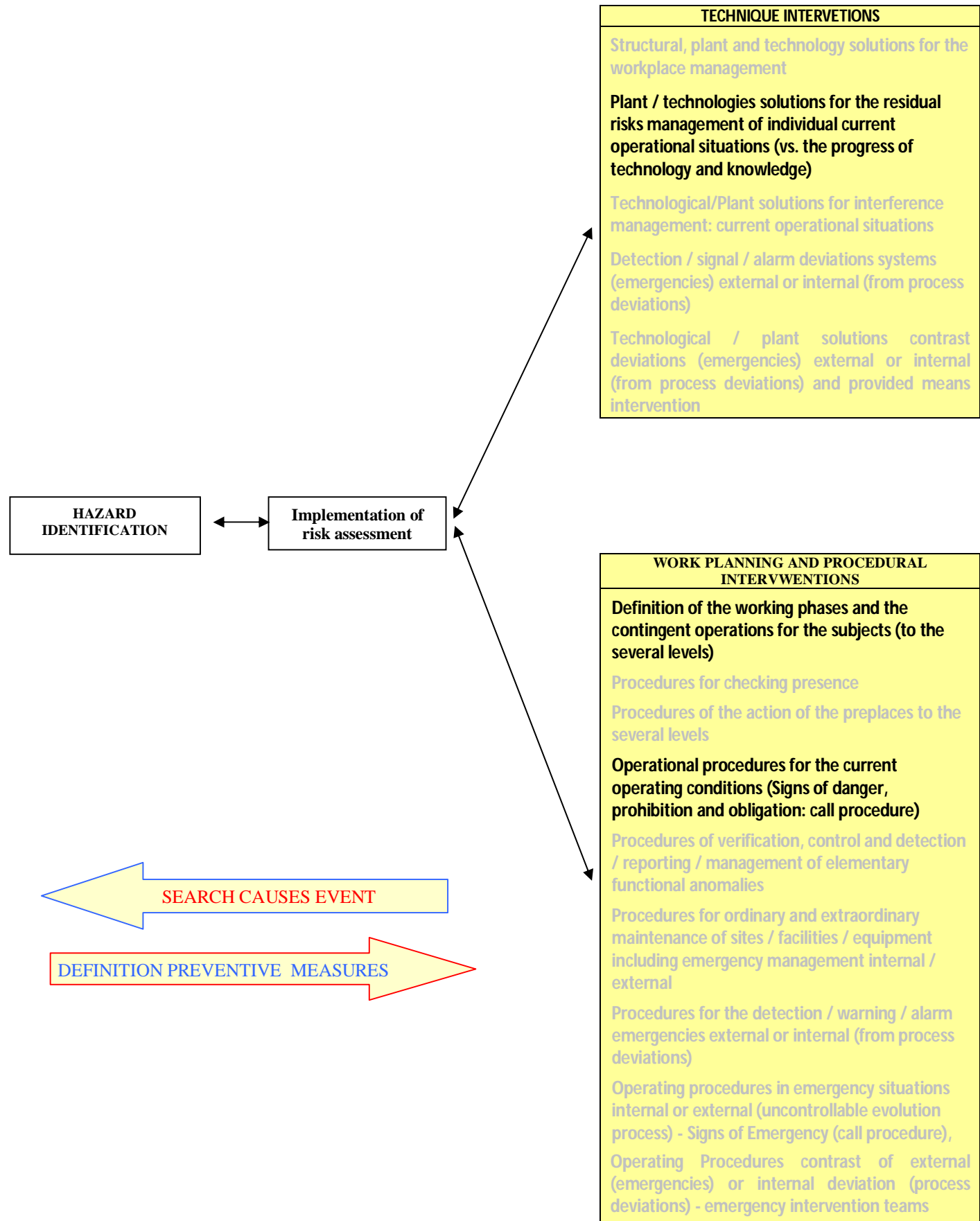


Case n°16

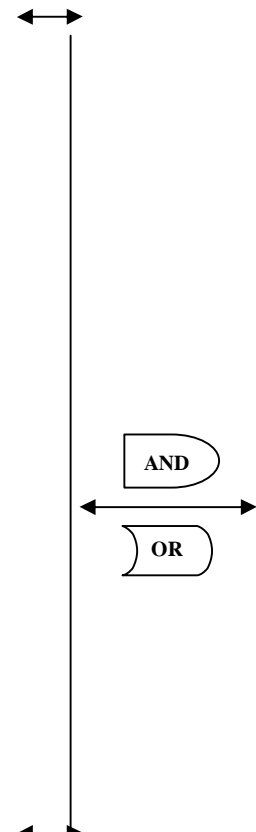
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 20 Id Part of body injured: left hand and Pelvic area Type of injury: Superficial lesion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Vertical motion, crash on / against (the result of a fall) – linked to the worker fall to the stair of the ladle furnace	<i>It is necessary to use an equipment suitable to the activity(ladder with non-slip grating and handrail)</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) -related to the plane of the staircase slippery SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Another case involving slipping or tripping, loss of balance - with the fall of person – related to the loss of balance of the worker	<i>It must need an equipment suitable and consequently equipment and a consequently procedure and information, formation and training and a correct supervision of workers</i>	6

<p>3</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...)- linked to the slippery and dirty floor STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - Structure Maintenance- Conservation work - linked to the stairs maintenance PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - Ideological and subject aspects - Position in relation to the duty cycle and the number of shifts –linked to the not completely activities did by the worker REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - Operating conditions - Verification functionality before to use – related to the check to do before of the use of the stairs</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - related to the floor in the area of activity and state of the stairs PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED – related to the behaviour of worker during the activity REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to check to do before the use of the stairs</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - cleanliness of the work environment and introduction of a scale in accordance with the law PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED –update the training of the worker and control the orderly conduct of the cycle REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE control to do before the use of the equipment</p>	<p>4</p>

5.1	<i>A stairs kept under maintenance</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - a ladder with non-slip grating and handrail to use	3
5.2	<i>information, education and training</i> <i>Procedure of the worker for the use of the stairs</i> <i>Procedure of maintenance</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);	2
6	Hazard factor not identified (choice of H.I. technique not appropriate for the context)	<i>Correct choice of a suitable equipment for the conduct of activity</i>	1

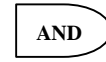
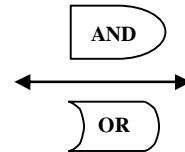


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mechanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence



DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



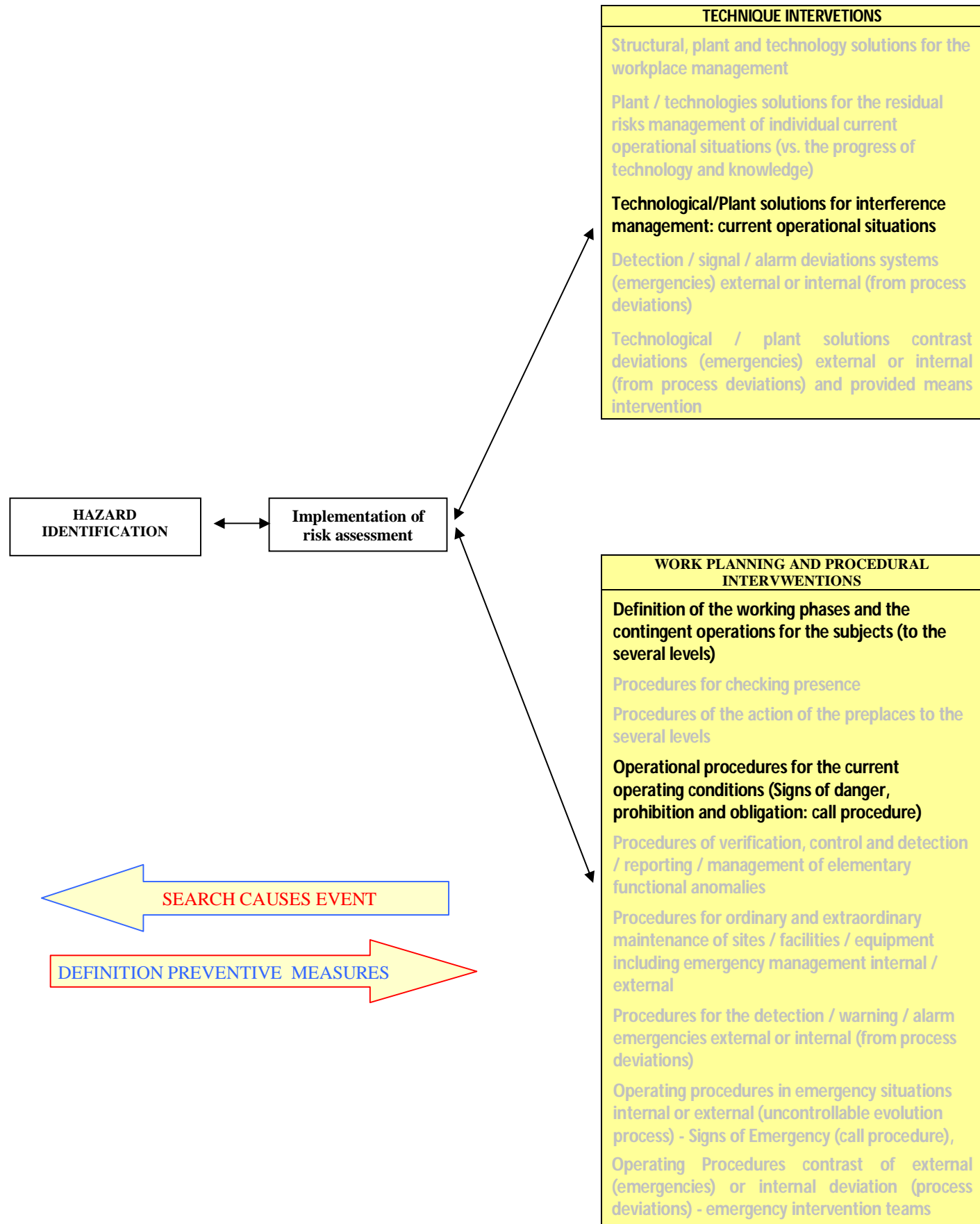
SEVERITY and TYPE OF INJURY (medical report data)

Superficial lesion to left hand and Pelvic area

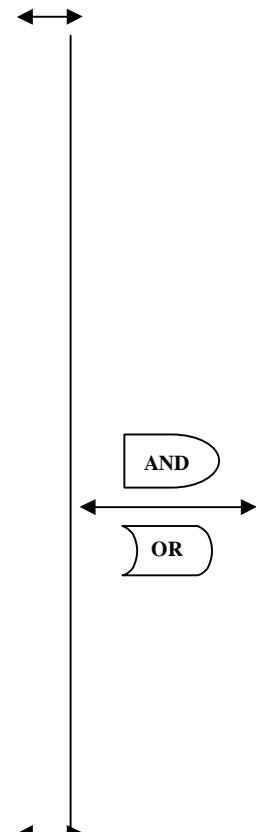
Case n°17

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 30 Id Part of body injured: left leg Type of injury: Superficial lesion and injury	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Horizontal motion, crash on / against - linked to the collision operator against an iron bar	<i>It is necessary the definition of a pedestrian way and procedures to ensure order and cleanliness in the wards</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Slip, fall, loss of stability, the collapse of a material agent - at the same level - related to the collision of the worker BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Another cause relative movement of the body without physical exertion (which usually leads to an external injury) - related to the operator inattention during the move	<i>It must need an pedestrian way that are not subject to deposit of iron bars</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...)- linked to the position of the iron bar AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers; -linked to the absence of procedures for maintaining order in the wards and for the crossing of the ladle furnace INTERFERENCE OF FUNCTIONAL VOLUMES - Use of functional volumes - Workers on the move - related to the paths crossing the ladle furnace area	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - related to the position of iron bar</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – related to the absence of procedure</p> <p>INTERFERENCE OF FUNCTIONAL VOLUMES - related to the interference of functional volumes between worker and ladle furnace area</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - cleanliness of the work environment</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p> <p>INTERFERENCE OF FUNCTIONAL VOLUMES - creation of a pedestrian way across ladle furnace area</p>	4
5.1	<p>Absence of the pedestrian way into ladle furnace area</p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - a pedestrian way protected</p>	3
5.2	<p>information, education and training</p> <p>Procedure of the worker for the use of the area</p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p>	2
6	<p>Hazard factor not identified (choice of H.I. technique not appropriate for the context)</p>	<p>Creation of a safe pedestrian route and maintenance of order in the ladle furnace area</p>	1

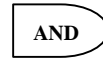
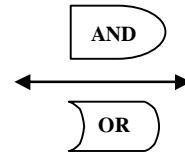


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence



DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



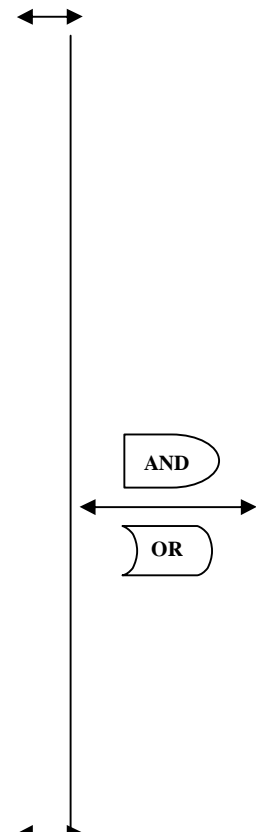
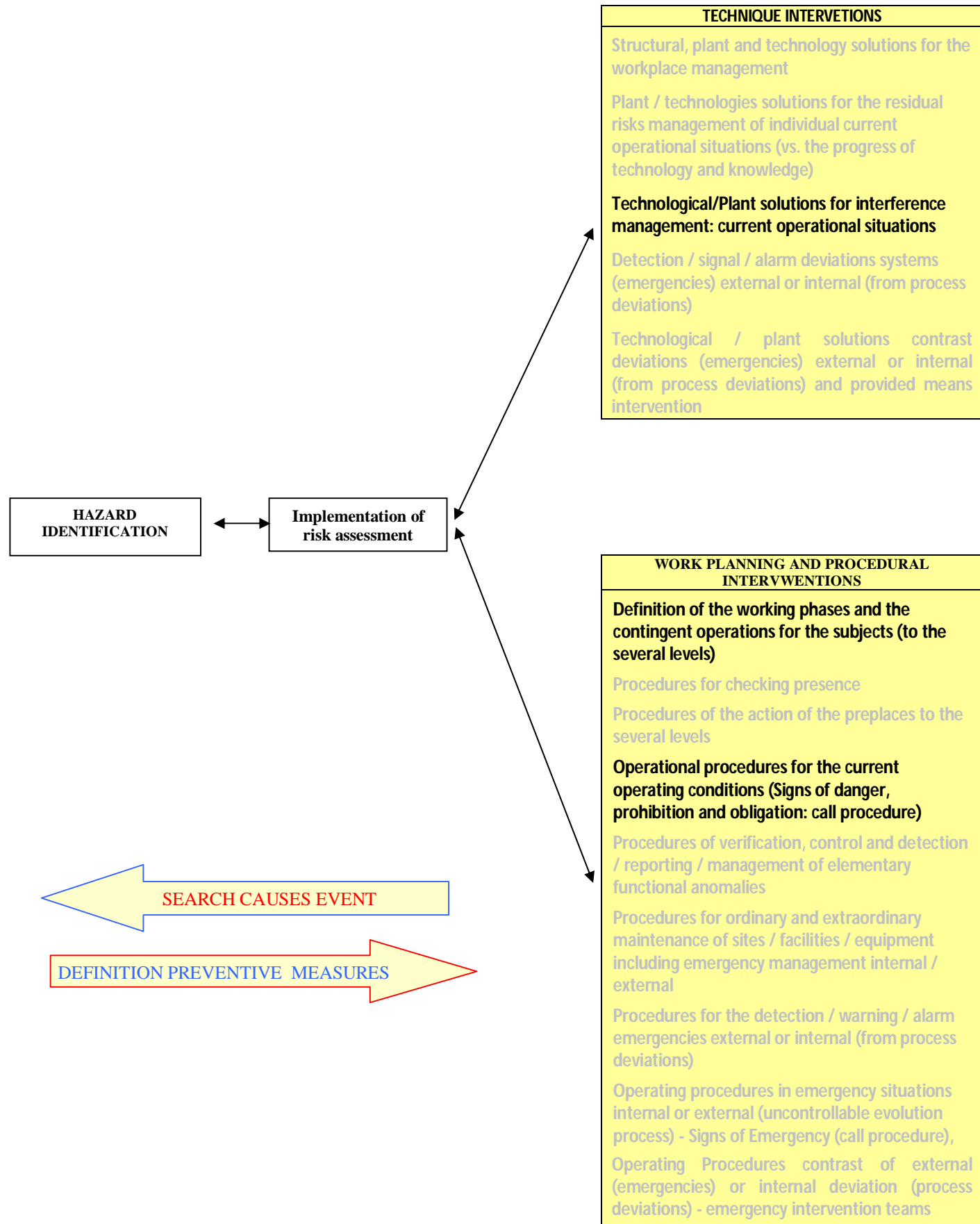
SEVERITY and TYPE OF INJURY (medical report data)

Superficial lesion and injury to left leg

Case n°18

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	<p><i>ED: 30 Id</i> Part of body injured: left ankle Type of injury: Sprain</p>	<p><i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i></p>	
1	<p>CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Horizontal motion, crash on / against - linked to the collision operator against an iron bar</p>	<p><i>It is necessary the definition of a storage area for the materials, like iron bar or axes, and procedures to ensure order and cleanliness in the wards</i></p>	7
2	<p>SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Slipping or tripping - with the fall of person - at the same level -related to the fall of the worker BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Another cause relative movement of the body without physical exertion (which usually leads to an external injury) - related to the operator inattention during the movement</p>	<p><i>It must need a storage area for the materials</i></p>	6
3	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...)- linked to the position of the material (pieces of iron and axes) AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedures for workers; -linked to the absence of procedures for maintaining order in the wards PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - Localized solutions for the management of environmental conditions - Massing available - related to the storage area of materials</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>related to the position of the materials</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - <i>related to the interference of functional volumes between worker and materials</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - cleanliness of the work environment</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - creation of a storage area for materials</p>	4
5.1	<p><i>Absence of the storage area and absence of a warning of an obstacle on the path</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - path for pedestrian only and definition of a storage area</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker for the use of the area</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers</p> <p>B. Definition of the working phases and the contingent operations for the subjects (to the several levels) - (related the definition of working procedures);</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Creation of a safe path for only pedestrian and definition of a storage area for materials</i></p>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vapourisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vapourisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

AND

OR



AND

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

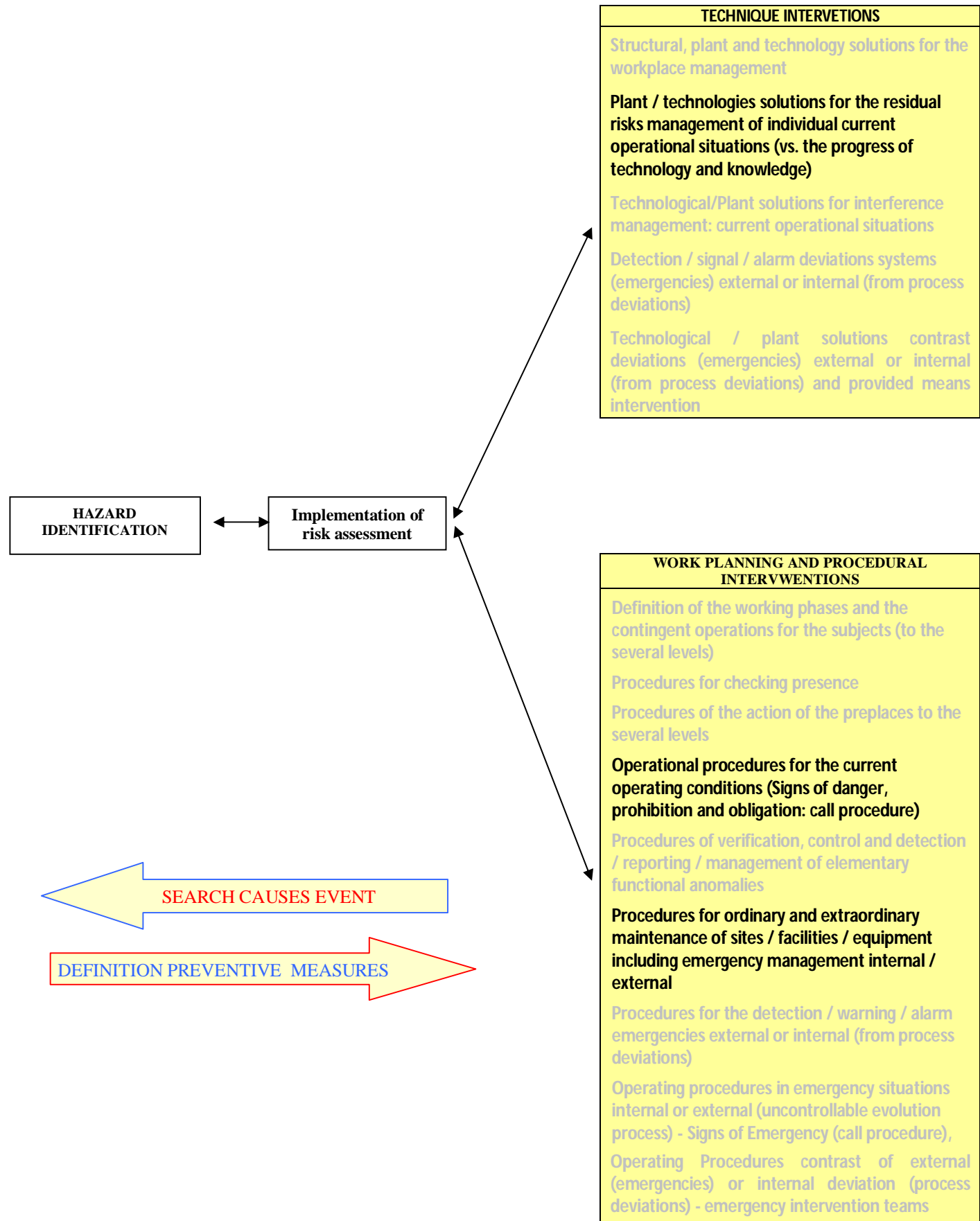
SEVERITY and TYPE OF INJURY (medical report data)

Left ankle sprain

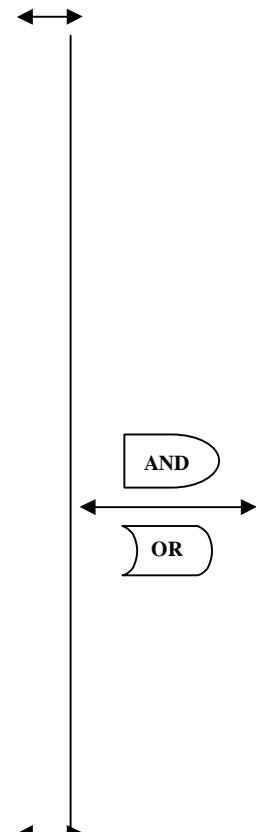
Case n°19

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 30 Id Part of body injured: right thumb Type of injury: Superficial lesion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would solve the problem</i>	
1	CONTACT WITH SHARP MATERIAL AGENT, POINTED, HARD, abrasive - Contact agent with hard or abrasive material – linked to the fall and the collision of operator's hand against the abrasive wheel	<i>It is necessary the definition of PPE to use and a safety device for abrasive wheel</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Another case relating to slipping, falling, loss of stability, collapse agent material -related to the fall of the abrasive wheel LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by – related to the loss of control of the abrasive wheel	<i>It must need a safety device for the abrasive wheel</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology - Devices (command and control, signaling, security) - linked to the absence of the safety device of the abrasive wheel EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use – How to use –linked to the uncorrect use of the abrasive wheel AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure for maintenance of abrasive wheel AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Information, formation and Training– related to the information, formation and training of workers	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>related to the abrasive wheel</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - safety device of abrasive wheel during maintenance</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p>	4
5.1	<p><i>Absence of the safety device of abrasive wheel</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - safety device of abrasive wheel</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker for the use of the abrasive wheel</i></p> <p><i>PPE</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers</p> <p>B. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - related the definition of maintenance procedure;</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Choosing an equipment with suitable protection systems and related information, formation and training</i></p>	1

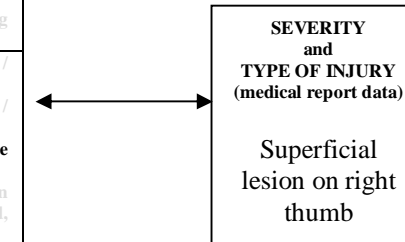
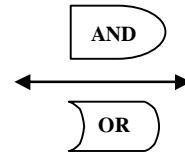


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency,...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move





INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

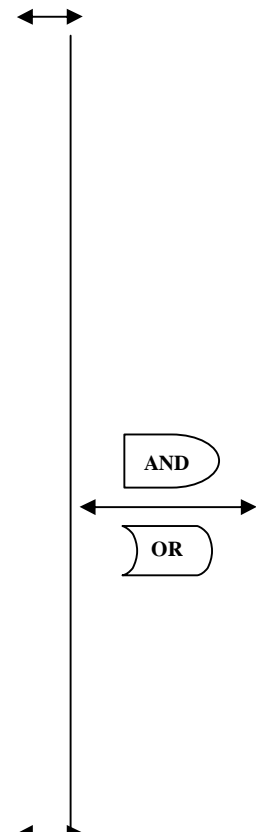
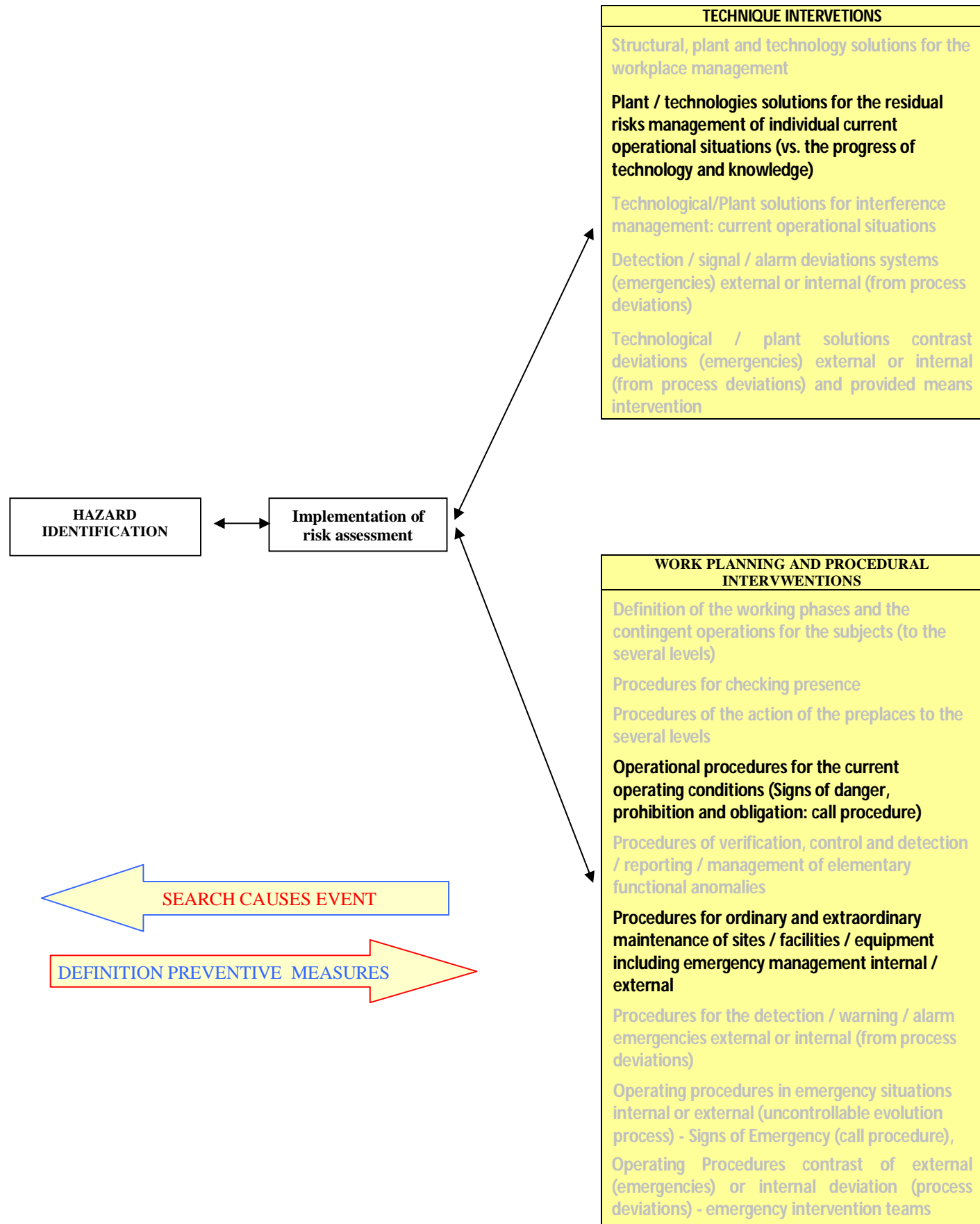
DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



Case n°20

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 07 Id Part of body injured: right hand Type of injury: Abrasion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would solve the problem</i>	
1	CONTACT WITH SHARP MATERIAL AGENT, POINTED, HARD, abrasive - Contact agent with hard or abrasive material – linked to the contact of operator's hand against the sander	<i>It is necessary the definition of PPE to use and a maintenance of the specimen</i>	7
2	LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by – related to the loss of control of the sander	<i>It must need a procedure for maintenance of the equipment and introduction of PPE</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Typology - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - linked to the typology of the sander and the specimen EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use – How to use –linked to the uncorrect use of the equipment EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use – Maintenance status – related to the maintenance status of equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure for maintenance of sander and specimen AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Information, formation and Training– related to the information, formation and training of workers	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>related to the equipment</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - suitable equipment</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p>	4
5.1	<p><i>Equipment not functional</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - suitable specimen and sander</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p> <p><i>PPE</i></p>	<p>A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related to the working procedures for different workers</p> <p>B. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - related the definition of maintenance procedure;</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Choosing an equipment suitable and related information, formation and training</i></p>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency,...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertically and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

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OR

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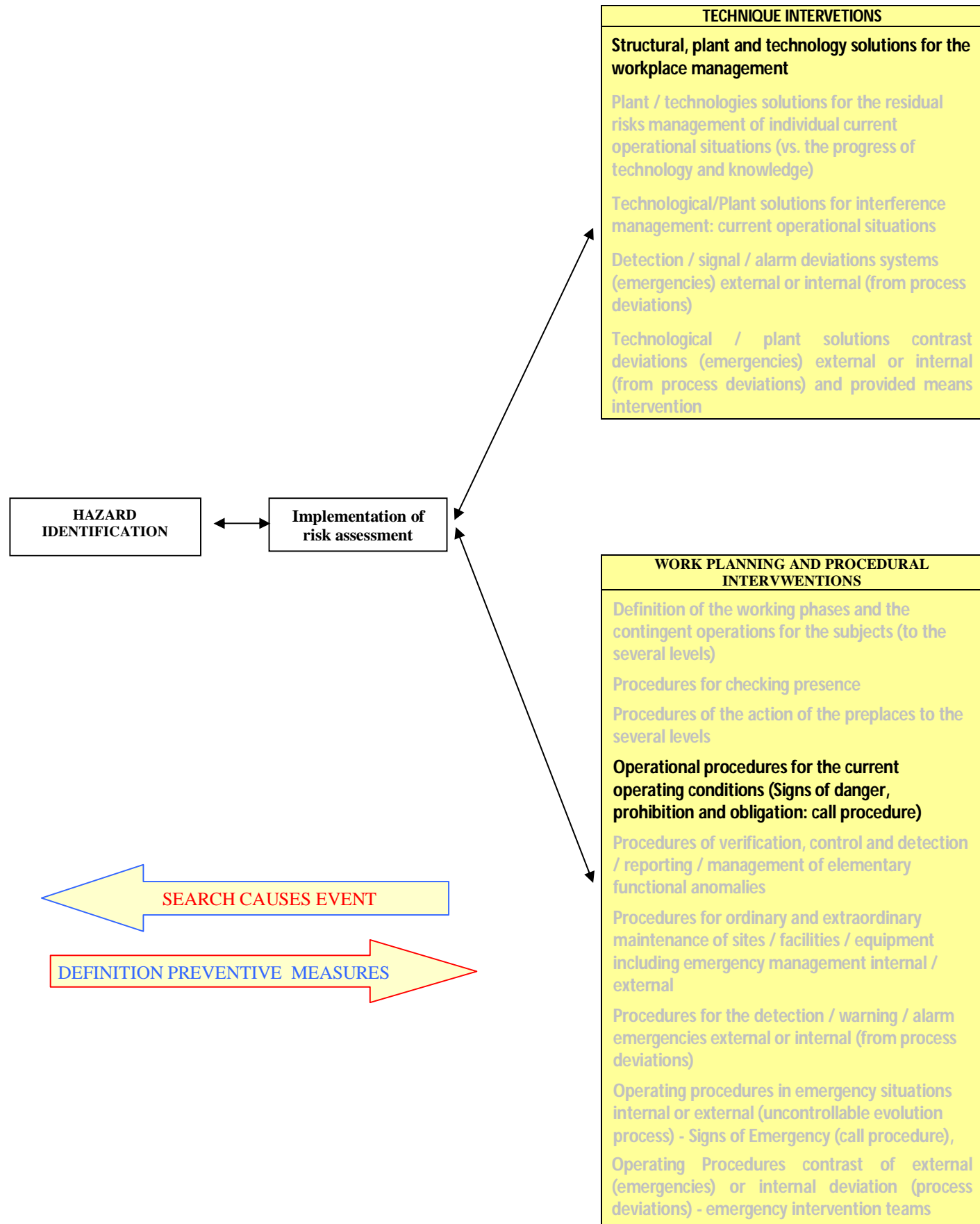
SEVERITY and TYPE OF INJURY (medical report data)

Abrasion on right hand

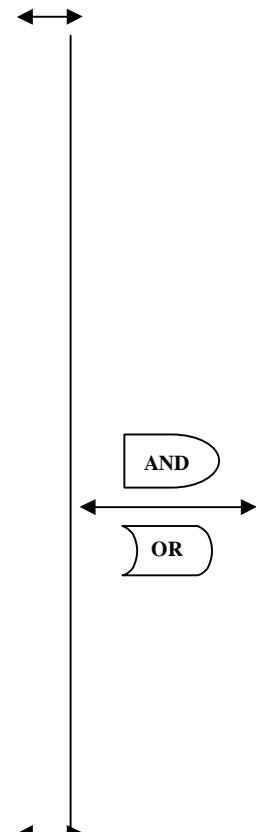
Case n°21

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 20 Id Part of body injured: left ankle Type of injury: Sprain	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION) - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion) abrasive - linked to the fall of operator	<i>It is necessary the definition of procedure for workers movements across the ladle area or an alternative pedestrian path</i>	7
2	SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS - Loss of balance - with the fall of man - from - related to the worker fall down from stair	<i>It must need a procedure or an alternative path for workers</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...)- linked to the typology of pedestrian path across ladle area AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedure for workers - related to the not upgrade procedure for movements of workers PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - Physiological Aspects - Psycho-physical state (eg, depressed, sleepy, drunk, drugged, ...) - related to the worker inattention	<i>Evaluation of the choice of the solutions adopted</i>	5
4	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - related to the pedestrian path AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the not upgrade of procedure PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - related to worker's inattention	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - suitable pedestrian path AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - creation of procedure and formation, training of the worker PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - state of worker's attention	4

5.1	<i>Not completely safety of pedestrian path</i>	A. Structural, plant and technology solutions for the workplace management - safety pedestrian path	3
5.2	<i>information, education and training Procedure of the worker</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related the definition of procedure	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>Definition of a safety pedestrian path and related information, formation and training</i>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mechanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

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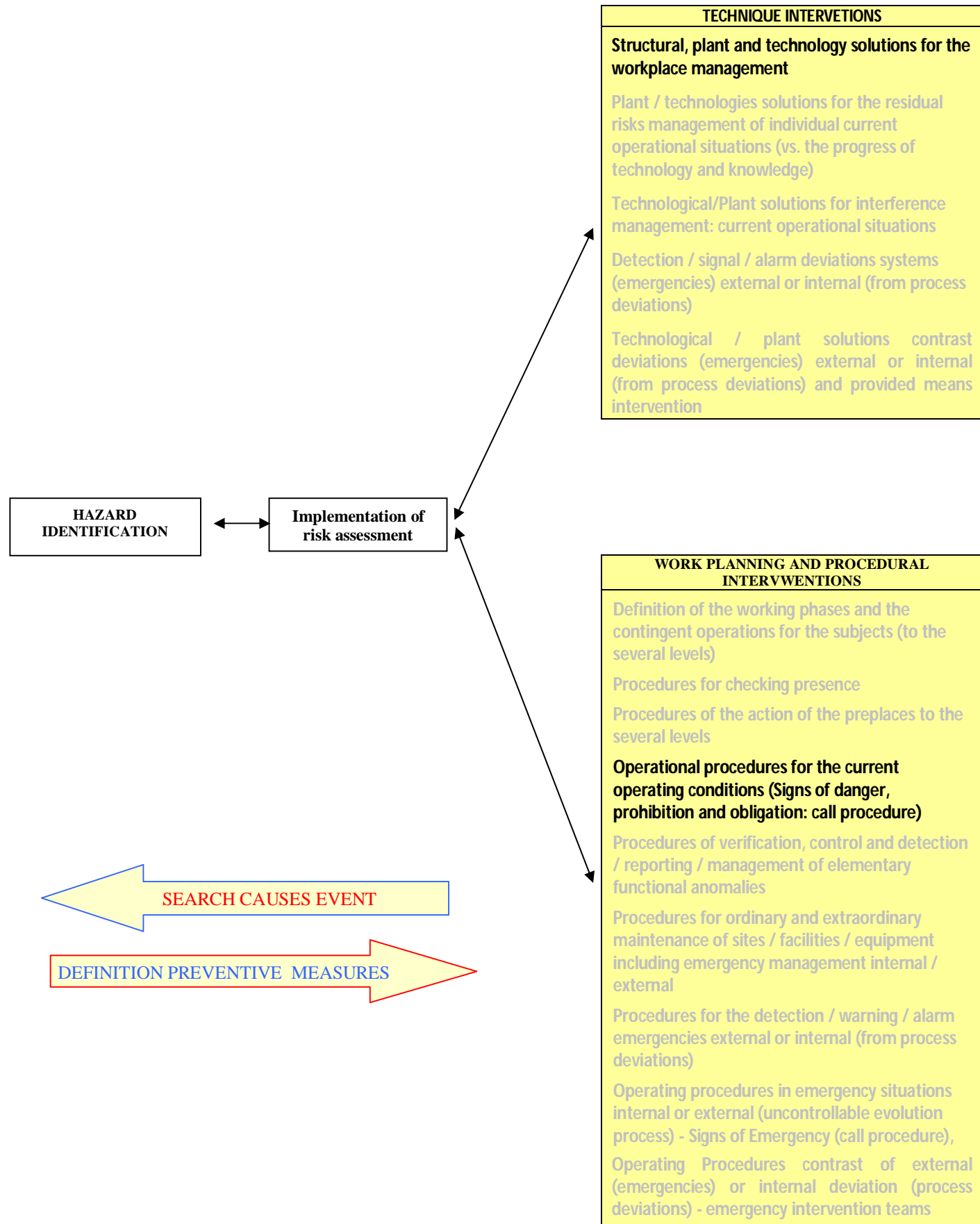
SEVERITY and TYPE OF INJURY (medical report data)

Sprain on left ankle

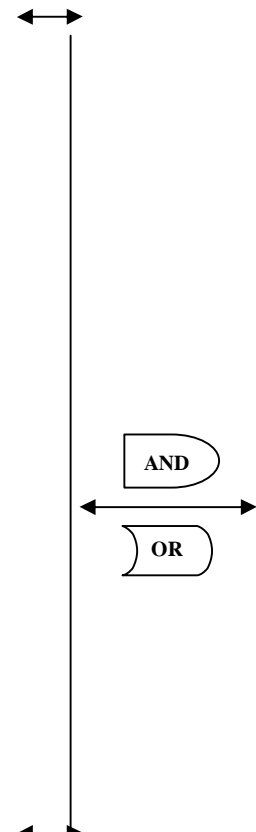
Case n°22

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 20 Id Part of body injured: thumb of the right hand Type of injury: Contusion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	NESTING, TRAPPING, CRUSHING, CRUSHING, PINCHING, ETC..- Nesting, trapping, crushing under - linked to the crushing of the finger by the hammer	<i>It is necessary the definition of procedure for workers and related information, formation and training</i>	7
2	LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - related to the loss of control of hammer	<i>It must need a procedure and information, formation and training of workers</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use - How to use- linked to the use of the hammer AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - Procedure - Procedure for workers - related to the absence of procedure and related IFT PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - Physiological Aspects - Psycho-physical state (eg, depressed, sleepy, drunk, drugged, ...) - related to the worker inattention	<i>Evaluation of the choice of the solutions adopted</i>	5
4	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - related to the type of hammer AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - related to the absence of procedure PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - related to worker's inattention	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - suitable hammer AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT - creation of procedure and formation, training of the worker PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED - state of worker's attention	4

5.1	<i>Absence of a protection system for worker's hand</i>	A. Structural, plant and technology solutions for the workplace management - suitable and safety hammer	3
5.2	<i>information, education and training Procedure of the worker</i>	A. Operational procedures for the current operating conditions (Signs of danger, prohibition and obligation: call procedure) - related the definition of procedure and IFT	2
6	Hazard factor not identified (choice of H.I. technique not appropriate for the context)	<i>Definition of procedure and related information, formation and training with choice of a suitable hammer</i>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants (eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to he development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mechanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertically and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

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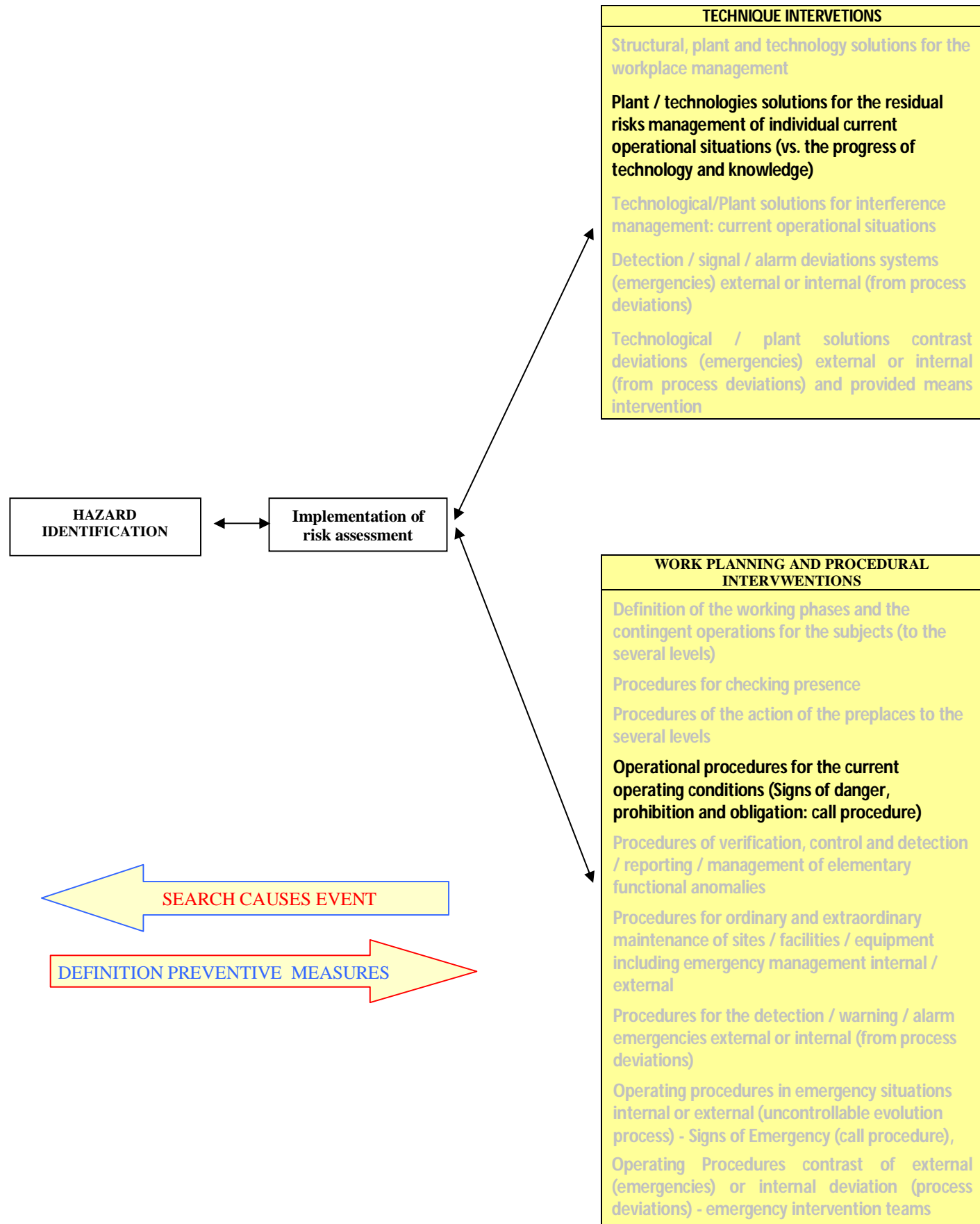
SEVERITY and TYPE OF INJURY (medical report data)

Contusion on thumb of the right hand

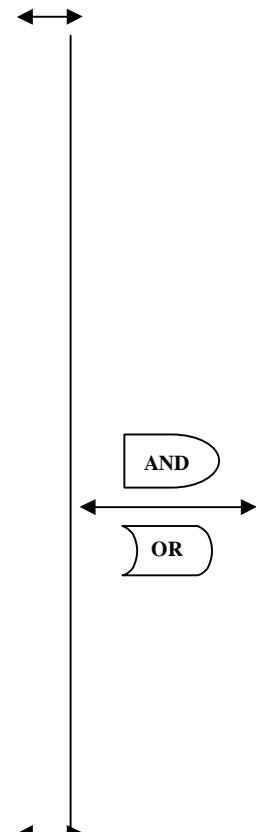
Case n°23

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 35 Id Part of body injured: right arm Type of injury: Distraction	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	PHYSICAL OR MENTAL EFFORT - Physical effort at the expense of the musculoskeletal system – linked to the arm effort during the lift of equipment	<i>It is necessary a suitable equipment</i>	7
2	LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by – related to the loss of control of the equipment BODY MOVEMENT UNDER OR WITH PHYSICAL STRESS - Lifting, carrying or standing – related to the worker's effort for the lift of equipment	<i>It must need a suitable equipment and a procedure with information, formation and training of workers</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Typology - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] linked to the equipment use for the lift of the materials EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use - How to use- linked to the use of the equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT	<i>Evaluation of the choice of the solutions adopted</i>	5
4	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - related to the type of equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – related to the absence of procedure	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - suitable equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker	4

5.1	<i>Equipment not suitable for the work to be done</i>	A. Structural, plant and technology solutions for the workplace management - suitable and safety equipment	3
5.2	<i>information, education and training</i> <i>Procedure of the worker</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>Choice of a suitable equipment for the lift of materials</i>	1

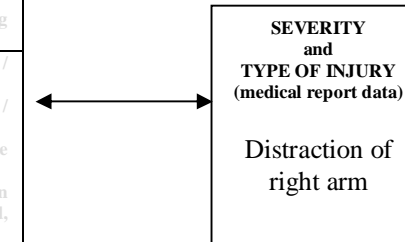
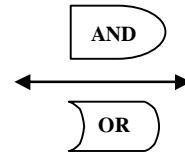


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants (eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to he development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mechanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move





INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

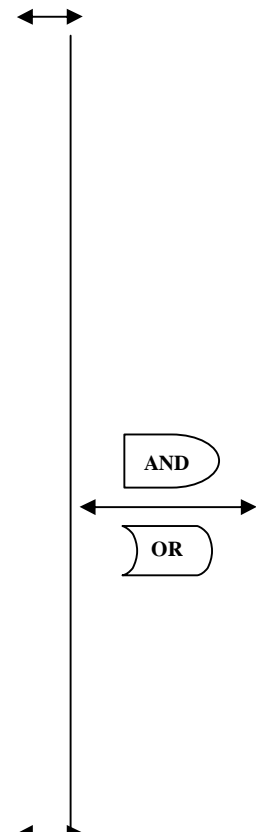
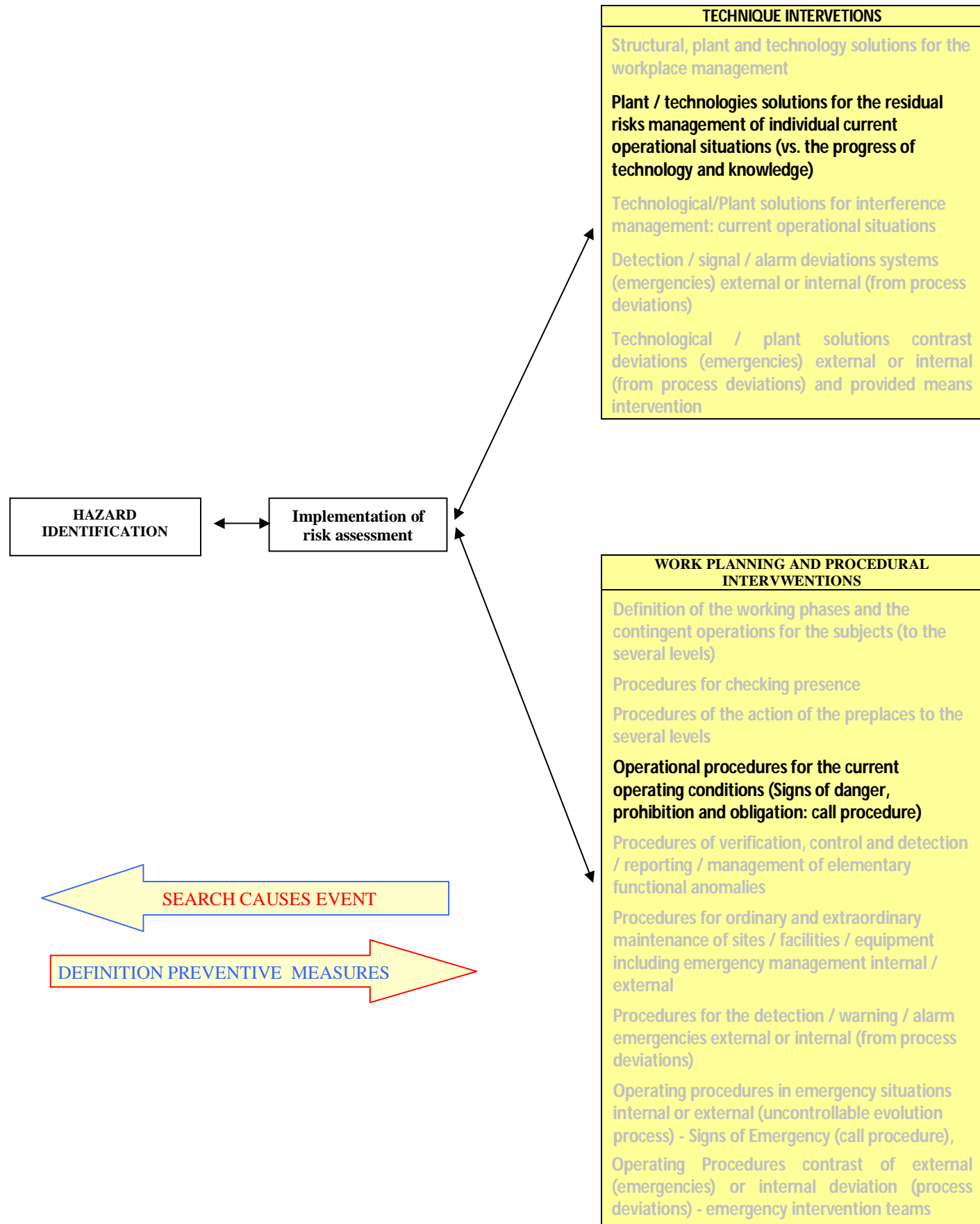
DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



Case n°24

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 35 Id Part of body injured: right and left shinbone Type of injury: Contusion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	NESTING, TRAPPING, CRUSHING, CRUSHING, PINCHING, ETC..- Constrict of whole body or of one or more parts of it – linked to the Nesting in the rungs of the ladder portable	<i>It is necessary a suitable ladder</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Slip, fall, loss of stability, the collapse of a material agent - at the same level – related to the fall of ladder BODY MOVEMENT WITHOUTH ANY PHYSICAL STRESS - Being grabbed, dragged, or moved by something from their momentum – related to the entrapment of the workers	<i>It must need a suitable equipment and a procedure with information, formation and training of workers</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Typology - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] linked to the ladder use EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use - How to use- linked to the use of the equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT	<i>Evaluation of the choice of the solutions adopted</i>	5
4	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - related to the type of equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – related to the absence of procedure	EQUIPMENT (MACHINES) AND TEMPORARY WORKS - suitable equipment (ladder) AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker	4

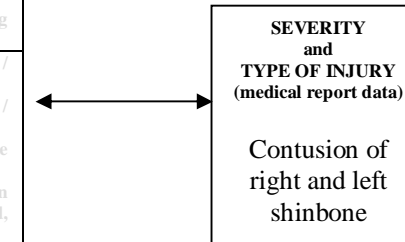
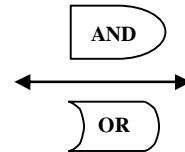
5.1	<i>Equipment not suitable for the work to be done</i>	A. Structural, plant and technology solutions for the workplace management - suitable and safety equipment	3
5.2	<i>information, education and training</i> <i>Procedure of the worker</i>	A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT	2
6	Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)	<i>Choice of a suitable equipment</i>	1





ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Plants (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to he development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mechanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

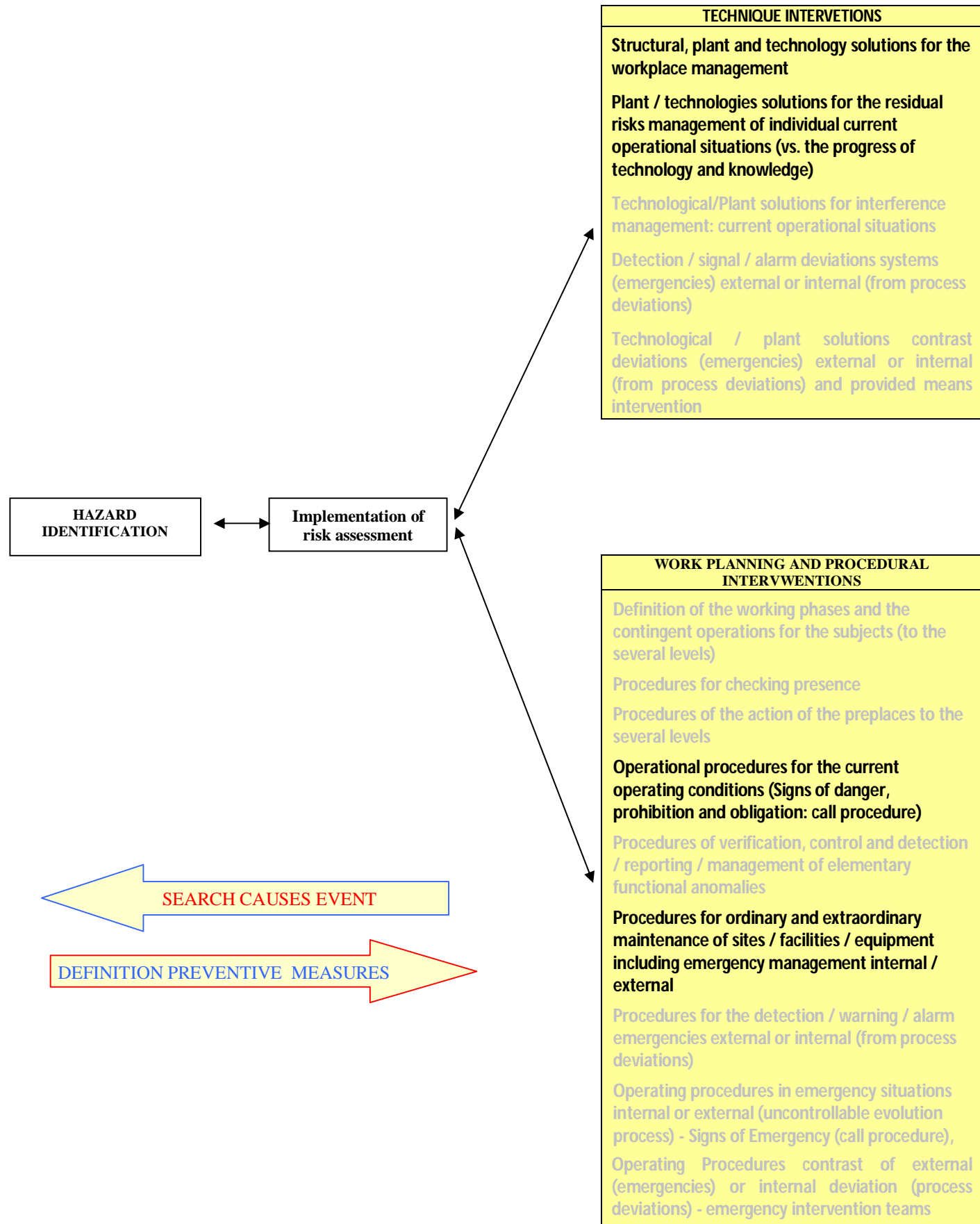


Case n°25

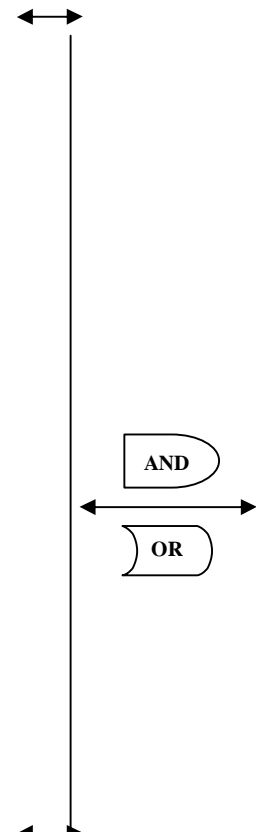
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 35 Id Part of body injured: shoulder and neck Type of injury: Contusion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	STRUCK BY MOVING OBJECT, COLLISIONS WITH - Struck by object projected <i>- linked to the impact of the cab of the forklift against the operator</i>	<i>It is necessary a suitable cab and a procedure for maintenance</i>	7
2	SLIPPING, FALLING, LOSS OF STABILITY, COLLAPSE AGENT MATERIAL - Slip, fall, loss of stability, the collapse of a material agent - at the same level - related to the loss of the control of the cab LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - related to the loss of the control of the forklift	<i>It must need a safety cab of the forklift</i>	6

<p>3</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) linked to the floor STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure Maintenance – Conservation work linked to the state of repair of the floor EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Typology - Machinery and transport equipment linked to the forklift EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use - How to use- linked to the use of the forklift AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating condition - Verification functionality before to use linked to the control to do before the use of the forklift</p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	<p>5</p>
<p>4</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - related to the work environment EQUIPMENT (MACHINES) AND TEMPORARY WORKS - related to the type of forklift AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – related to the absence of procedure REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE - related to the control to do before the use of the forklift</p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – maintenance of the floor of work environment EQUIPMENT (MACHINES) AND TEMPORARY WORKS - suitable forklift AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – procedure of control for the use of the forklift</p>	<p>4</p>

5.1	<p><i>Not safety device of the cab of the forklift</i> <i>Bad maintenance of the floor of the work environment</i></p>	<p>A. Structural, plant and technology solutions for the workplace management - maintenance of the work environment B. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - suitable and safety forklift</p>	3
5.2	<p><i>information, education and training</i> <i>Procedure of the worker</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT B. Procedures for ordinary and extraordinary maintenance of sites / facilities / equipment including emergency management internal / external - related the definition of procedure and IFT</p>	2
6	<p>Hazard factor not identified (choice of H.I. technique not appropriate for the context)</p>	<p><i>Choice of a suitable forklift and definition of a maintenance procedure for equipment and work environment</i></p>	1

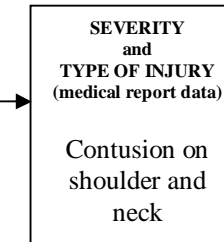
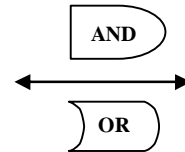


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move





INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

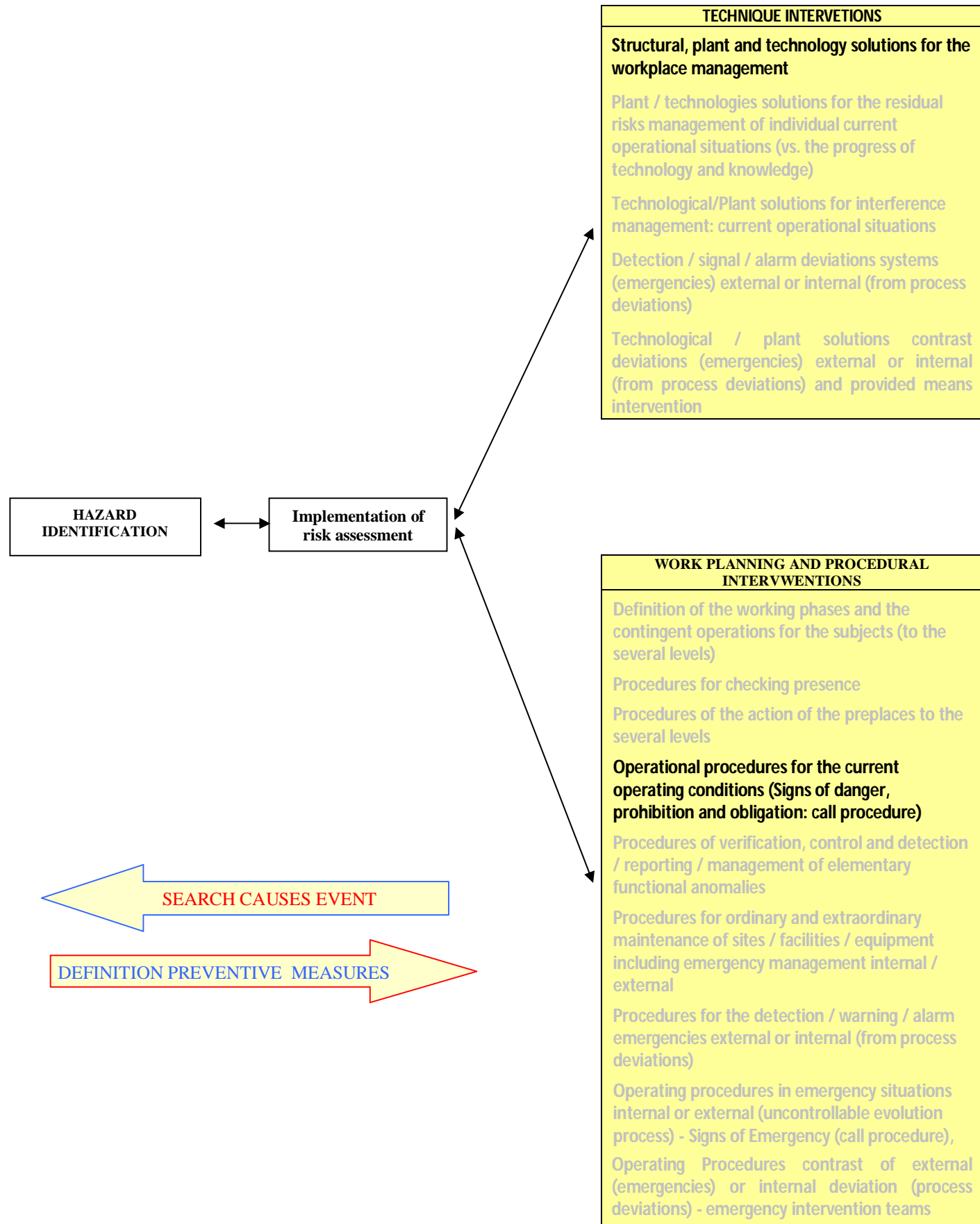
DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



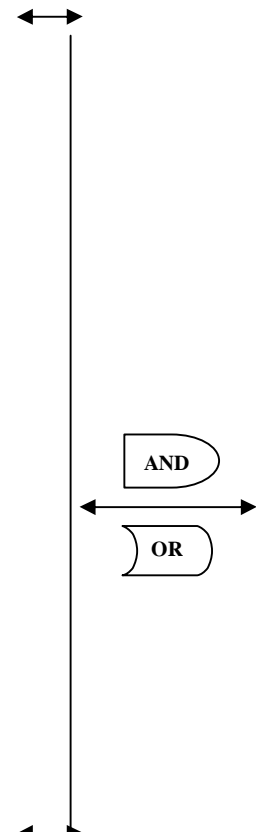
Case n°26

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 35 Id Part of body injured: Elbow Type of injury: Fracture	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION)- Vertical motion, crash on / against (the result of a fall) – linked to the collision of the worker against the ground	<i>It is necessary a pedestrian path or a storage area for materials</i>	7
2	SLIPPING - STUMBLING AND FALLING - FALL OF PERSONS -- Slipping or tripping - with the fall of person - at the same level – related to the fall of the worker BODY MOVEMENT WITHOUT ANY PHYSICAL STRESS - Uncoordinated movements, gestures, inopportune, inappropriate – related to the uncoordinated movements of the workers	<i>It must need a pedestrian path</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) linked to the pedestrian path across the ward continuous casting AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES – Localized solutions for the management of environmental conditions - linked to the management of the areas	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>related to the work environment</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - <i>related to the bad management of the areas</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – creation of pedestrian path</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES –better maintenance of the areas</p>	4
5.1	<p><i>Bad maintenance of the work environment (pedestrian path)</i></p>	<p>A. Structural, plant and technology solutions for the workplace management - management of the areas and creation of pedestrian path</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Better management of areas and creation of a pedestrian path</i></p>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mechanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

AND

OR

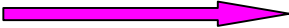
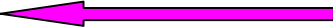
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DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

SEVERITY and TYPE OF INJURY (medical report data)

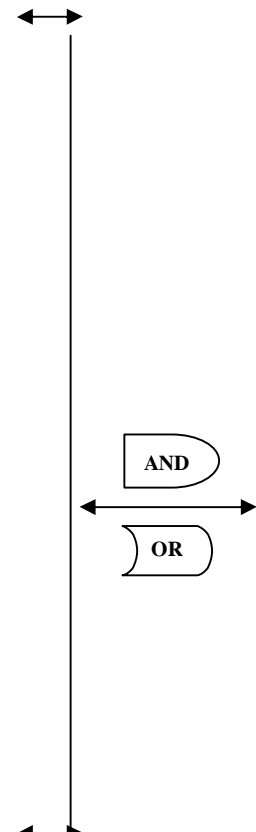
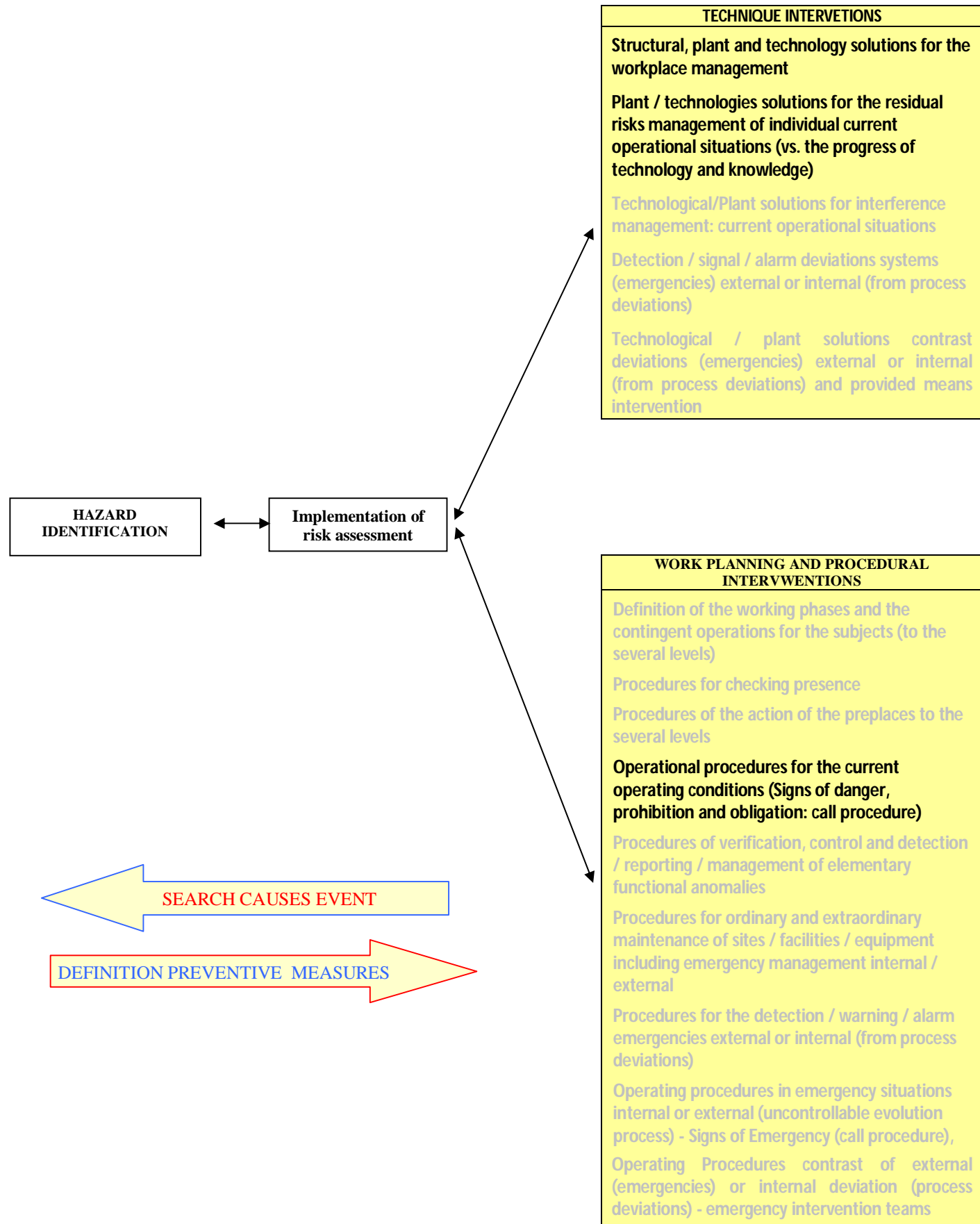
Fracture of elbow

Case n°27

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 20 Id Part of body injured: right wrist Type of injury: Contusion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION)- Horizontal motion, crash on / against – linked to the collision of the worker wrist against a part of the ladle	<i>It is necessary a work environment suitable and a work procedure</i>	7
2	BODY MOVEMENT UNDER OR WITH PHYSICAL STRESS - Lifting, carrying or standing – related to the uncoordinated movements of the workers	<i>It must need a suitable work area</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) linked to the work area EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use – How to use - - related to the use of the equipment AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES – Localized solutions for the management of environmental conditions - linked to the management of the areas	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>related to the work environment</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>related to the equipment used</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - <i>related to the bad management of the areas</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – creation of a suitable work area</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – suitable equipment for the lift of the materials</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES – better maintenance of the areas</p>	4
5.1	<p><i>Bad management of the work environment</i></p> <p><i>Not suitable equipment</i></p>	<p>A. Structural, plant and technology solutions for the workplace management - management of the areas</p> <p>B. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - choice of a suitable equipment</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT</p>	2

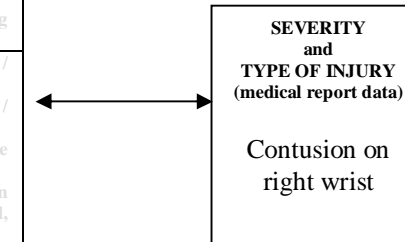
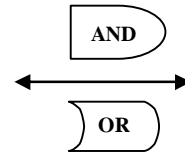
6	Hazard factor not identified (choice of H.I. technique not appropriate for the context)	<i>Better management of areas and choice of a suitable equipment</i>	1
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ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move

INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

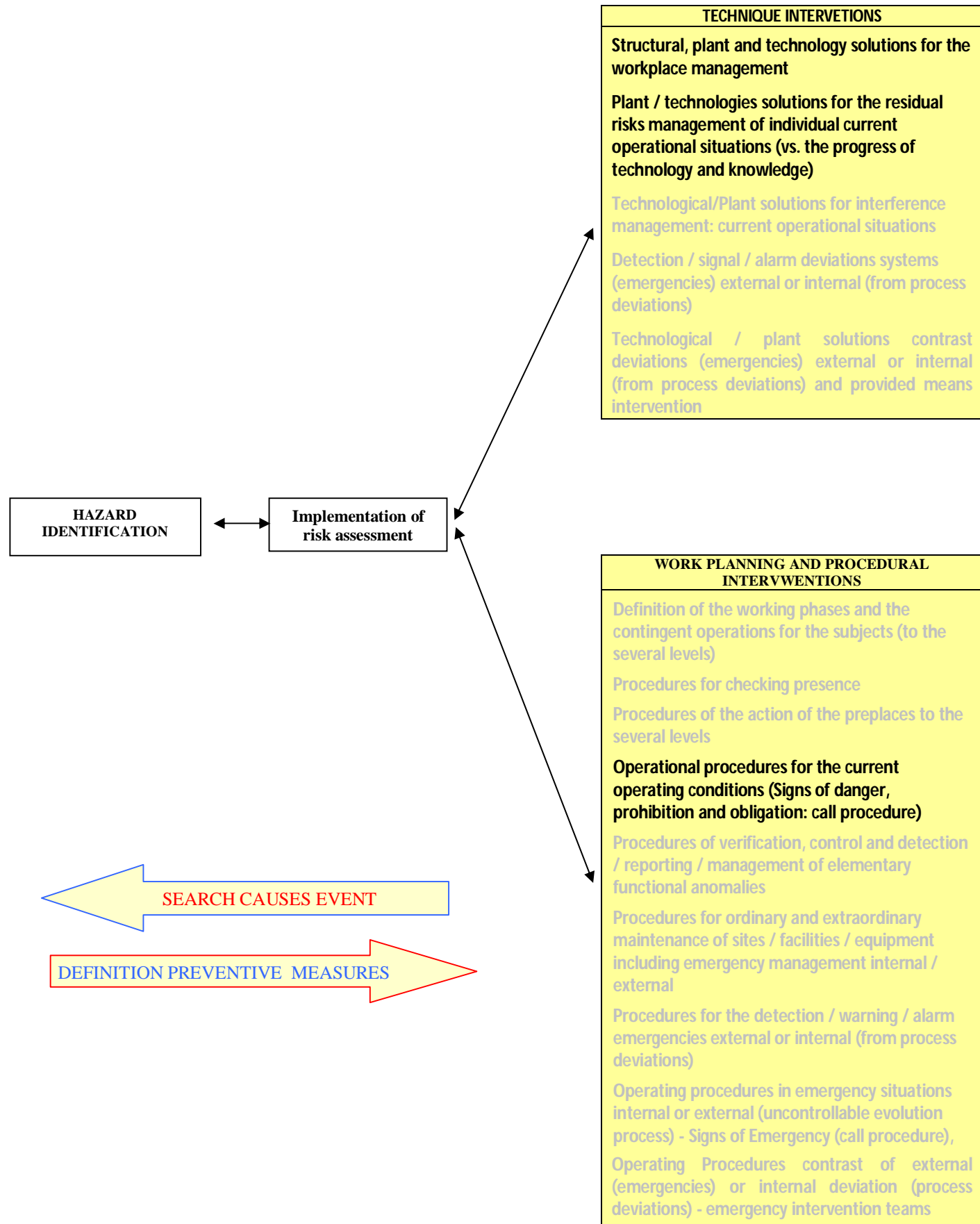


Case n°28

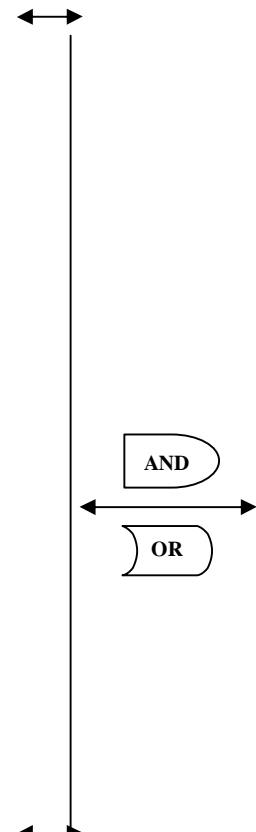
	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 20 Id Part of body injured: right wrist Type of injury: Contusion	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would not solve the problem</i>	
1	CRUSHING VERTICALLY AND / OR HORIZONTALLY MOVING, FALL ON / AGAINST AN IMMOVABLE OBJECT / GROUND (VICTIM IN MOTION)- <i>Horizontal motion, crash on / against – linked to the collision of the worker wrist against a part of the ladle</i>	<i>It is necessary a suitable equipment and a work procedure</i>	7
2	LOSS OF CONTROL (TOTAL OR PARTIAL) OF MACHINE, MEANS OF TRANSPORT OR HANDLING EQUIPMENT, HAND-HELD TOOL, OBJECT, ANIMAL - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by – related to the loss of control of the equipment BODY MOVEMENT UNDER OR WITH PHYSICAL STRESS - Lifting, carrying or standing – related to the movements of the workers for for loading of the tray	<i>It must need a suitable equipment and work area</i>	6

3	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) <i>linked to the work area</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use – How to use - - <i>related to the use of the equipment</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – <i>related to the absence of procedure and related IFT</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating condition - Verification functionality before to use <i>linked to the control to do before the use of the equipment</i></p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES – Localized solutions for the management of environmental conditions - <i>linked to the management of the areas</i></p>	<p><i>Evaluation of the choice of the solutions adopted</i></p>	5
4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>related to the work environment</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>related to the equipment used</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE– <i>related to the check to do on the equipment</i></p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES - <i>related to the bad management of the areas</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – creation of a suitable work area</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – suitable equipment for the lift of the materials</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – creation of a control procedure for the use of equipment</p> <p>PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES –better maintenance of the areas</p>	4

5.1	<p><i>Bad management of the work environment</i> <i>Not suitable equipment</i></p>	<p>A. Structural, plant and technology solutions for the workplace management - management of the areas B. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - choice of a suitable equipment</p>	3
5.2	<p><i>information, education and training</i> <i>Procedure of the worker</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT</p>	2
6	<p>Hazard factor not identified (choice of H.I. technique not appropriate for the context)</p>	<p><i>Better management of areas and choice of a suitable equipment</i></p>	1

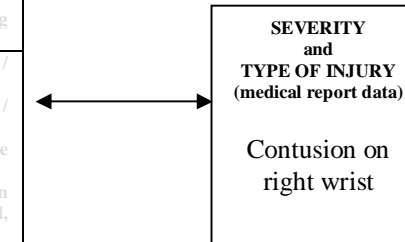
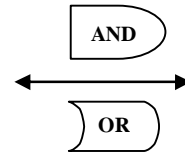


ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move





INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

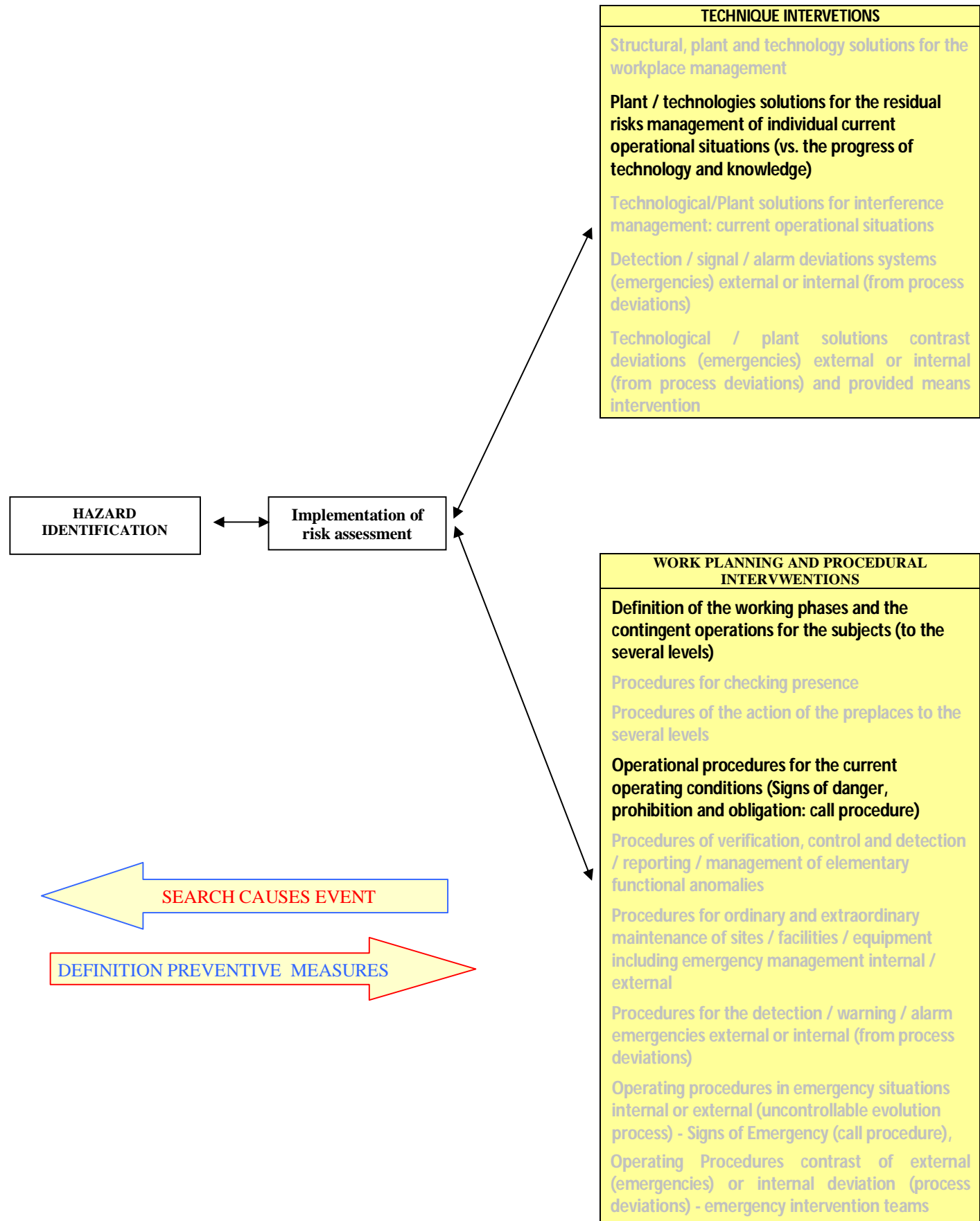
DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans



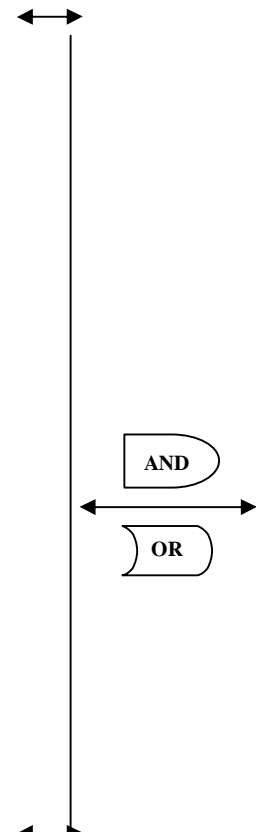
Case n°29

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 15 Id Part of body injured: right eye Type of injury: Burn	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would solve the problem</i>	
1	CONTACT WITH OTHER MATERIAL OR SUBSTANCE - Contact with hazardous substances through the skin or eyes – linked to the contact between the iron sketch to the worker	<i>It is necessary a suitable PPE or a protection system for the capture of the sketches</i>	7
2	OVERFLOW, OVERTURN, LEAK, FLOW, VAPORISATION, EMISSION - Liquid state - leaking, oozing, flowing, splashing, spraying – related to the overflow of the iron by the ladle BODY MOVEMENT WITHOUTH ANY PHYSICAL STRESS - Uncoordinated movements, gestures, inopportune, inappropriate – related to the movements of the workers	<i>It must need a suitable system for the capture of the iron sketches</i>	6
3	STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – Structure - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - linked to the absence of a protection system for the capture of iron sketches EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Typology - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] – related to the type of ladle used AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS - <i>related to the protection system in the area of the ladles</i></p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>related to the ladle and equipment used</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p>	<p>STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS – creation of a suitable and safety work area</p> <p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – suitable equipment (ladle)</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p>	4
5.1	<p><i>Absence of a protection system</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - choice of a suitable protection system</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p>	<p>A. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Choice of a protection system and related procedure with IFT</i></p>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency,...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
Nesting, trapping, crushing, crushing, pinching, etc..	<ul style="list-style-type: none"> - Nesting, trapping, crushing in / inside - Nesting, trapping, crushing under - Nesting, trapping, crushing between - Tearing, cutting of a member, a hand, a finger or more parts of the body - Constrict of whole body or of one or more parts of it - By pinching - Another case involving nesting, trapping, crushing, crushing, pinching, etc..
Physical or mental effort	<ul style="list-style-type: none"> - Physical effort at the expense of the musculoskeletal system - Physical exertion caused by radiation, noise, light, pressure - Effort psychic, mental shock - Another case involving mental or physical effort
Bite, calcium, etc., by animals or humans	<ul style="list-style-type: none"> - Bite - Puncture by insects or fish - Shot, football, head, strangulation - Another case relating to bite, kick, etc., by animals or humans

AND



OR

AND

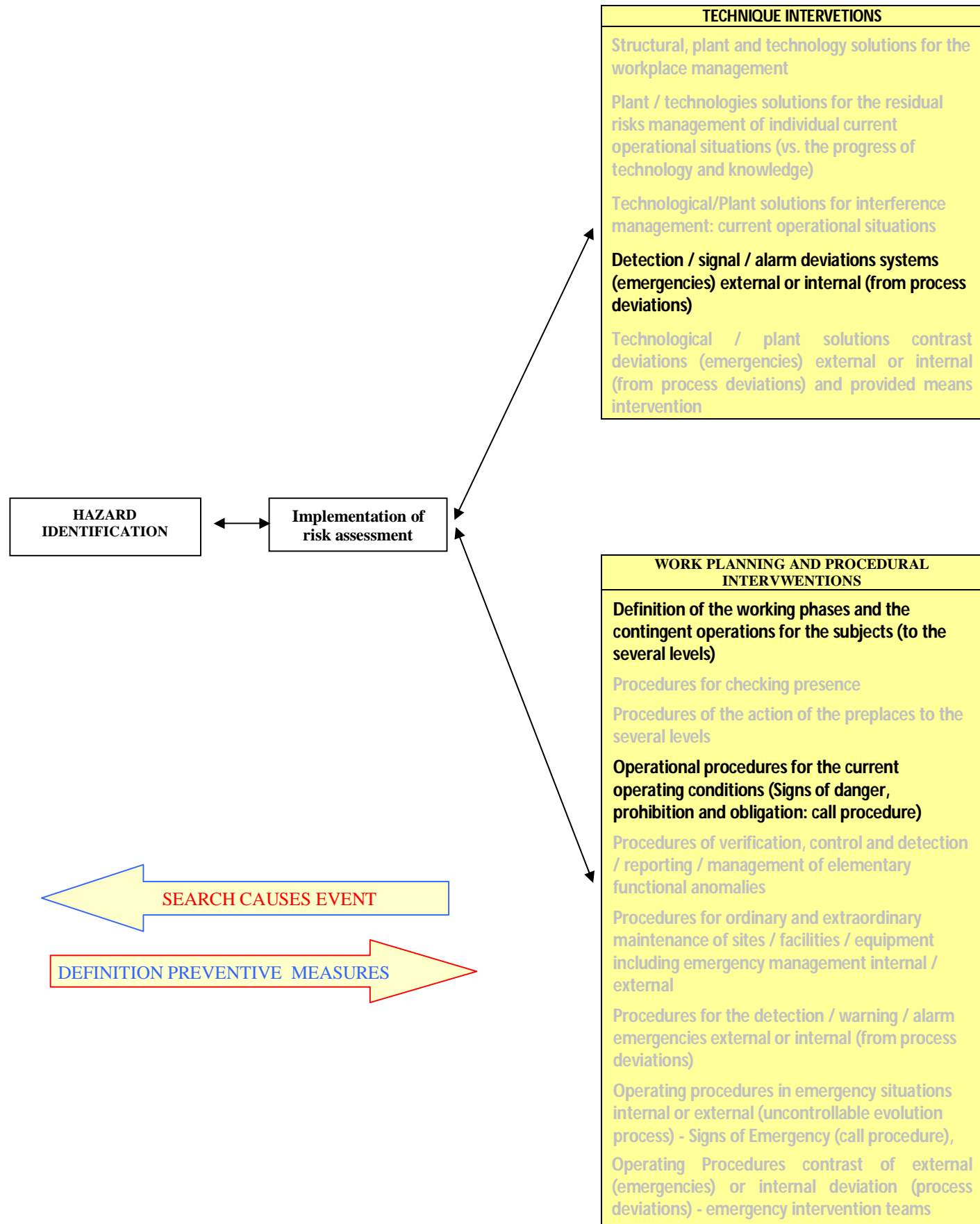
SEVERITY and TYPE OF INJURY (medical report data)

Burn on the eye

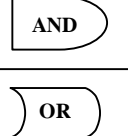
Case n°30

	RESEARCH CAUSES	ADOPTION PREVENTIVE MEASURES	
			
	ED: 30 Id Part of body injured: Face Type of injury: Burn	<i>ev. sist. protective passive / active (in the case given the severity of the accident) -- PPE protection would solve in part the problem</i>	
1	CONTACT WITH OTHER MATERIAL OR SUBSTANCE - Contact with hazardous substances through the skin or eyes – linked to the contact between the fire to the worker's face	<i>It is necessary a suitable device for the equipment</i>	7
2	DEVIATION DUE TO ELECTRICAL PROBLEMS, EXPLOSION, FIRE – Fire – related to the fire born by the power of the gas methane BREAKAGE, BURSTING, SPLITTING, SLIPPING, FALL, COLLAPSE OF MATERIAL AGENT - Break / release of personal protective equipment – related to the breaks of the safety device of the equipment	<i>It must need a detection system of methane</i>	6
3	EQUIPMENT (MACHINES) AND TEMPORARY WORKS – Typology - Devices (command and control, signaling, security) - related to the safety device of the equipment EQUIPMENT (MACHINES) AND TEMPORARY WORKS - Choice and conditions of use – Maintenance status - related to the status of maintenance of the detection device AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – Procedure – Procedure for workers – related to the absence of procedure and related IFT REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – Operating condition - Verification functionality before to use linked to the control to do before the use of the equipment	<i>Evaluation of the choice of the solutions adopted</i>	5

4	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS - <i>related to the equipment used</i></p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – <i>related to the absence of procedure</i></p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE- <i>related to the detection system of the equipment</i></p>	<p>EQUIPMENT (MACHINES) AND TEMPORARY WORKS – suitable equipment (ladle)</p> <p>AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT – creation of procedure and formation, training of the worker</p> <p>REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE – suitable detection device for methane</p>	4
5.1	<p><i>Absence of a detection system on the equipment</i></p>	<p>A. Detection / signal / alarm deviations systems (emergencies) external or internal (from process deviations) - choice of a suitable detection device</p>	3
5.2	<p><i>information, education and training</i></p> <p><i>Procedure of the worker</i></p>	<p>A. Definition of the working phases and the contingent operations for the subjects (to the several levels) - related the definition of procedure and IFT</p> <p>B. Plant / technologies solutions for the residual risks management of individual current operational situations (vs. the progress of technology and knowledge) - related the definition of procedure and IFT</p>	2
6	<p>Hazard factor not identified (<i>choice of H.I. technique not appropriate for the context</i>)</p>	<p><i>Setting of a detection device of methane on the equipment</i></p>	1



ROOT CAUSES		INDIRECT CAUSES OF SECOND LEVEL
STRUCTURAL AND PLANT INTERNAL / EXTERNAL CHARACTERISTICS	External criticality	<ul style="list-style-type: none"> - General criticality [boundary conditions (eg. topography, climate, availability of services, sociological context)] - Specific criticality (seismicity, area exposed to floods, avalanches, ...)
	Structure	<ul style="list-style-type: none"> - General structural aspects (eg. general and local stability, allowable loads, materials, quality, efficiency, ...) - Specific structural Aspects [eg. Structural safety equipment, escape routes (eg fire escape) and safe places] - Consistency with the uses
	Common Plant	<ul style="list-style-type: none"> - General Plants [eg. distribution systems (production) of energy, management systems of the general environmental conditions (eg. heating, cooling, air exchange, lighting,...), communication systems] - Specific Parts (systems of emergency management, detection, contrast and alarm)
	Structure maintenance	<ul style="list-style-type: none"> - Conservation work - Participation of adaptation to the norms
EQUIPMENT (MACHINES) AND TEMPORARY WORKS	Typology	<ul style="list-style-type: none"> - Machine [tool, operator, auxiliary (eg. pollutant collection systems, cooling, heating, ...)] - Work Equipment [instrumentation, equipment, localized systems of transport energy (eg. power cables, ...)] - Machinery and transport equipment - Devices (command and control, signaling, security) - Works provisional (eg. scaffolding, ...)
	Choice and conditions of use	<ul style="list-style-type: none"> - Suitability to the development of specific operations in the context - Installation - How to use - Maintenance status
AUDIT, SUPERVISION, OPERATING PROCEDURES & IFT	Procedure	<ul style="list-style-type: none"> - Audit ; - Supervision; - Procedures for workers; - Procedures for machine operators; - Procedures for personnel systems; - Procedures for supervisors; - Procedures for special operations personnel; - Information, formation and Training
REVISION AND UPDATING OF THE SYSTEM, AND MAINTENANCE	Operating conditions	<ul style="list-style-type: none"> - Test - Verification functionality before to use - Types of maintenance applied - Revision - Updating systems
PHYSICAL, CHEMICAL, BIOLOGICAL ASPECTS OF WORKPLACES	Physical - chemical - biological critical of working environment	<ul style="list-style-type: none"> - Raw materials and process products - Products resulting from process deviations - Chemical pollutants (solid, liquid, gaseous) - Physical pollutants (eg noise, vibration, electromagnetic fields and radiation, ...) - Biological agents (eg. viruses, bacteria, ...)
	Localized solutions for the management of environmental conditions	<ul style="list-style-type: none"> - Environmental treatment (eg. thermal insulation, acoustic, ...) - Lighting - Massing available
PHYSIOLOGICAL AND IDEOLOGICAL ASPECTS OF THE SUBJECTS INVOLVED	Ideological and subject aspects	<ul style="list-style-type: none"> - Behaviour (available to any person to produce answers, determined from the environment, family regarding social situations, groups, and objects) - Position in relation to the duty cycle and the number of shifts - Relationships with supervisors and subordinates - Contract / employment
	physiological Aspects	<ul style="list-style-type: none"> - Age - Work Experience - Conditions of health - Psycho-physical state (eg. depressed, sleepy, drunk, drugged, ...) - Attitude (predisposition for a particular mental or physical activity)
INTERFERENCE OF FUNCTIONAL VOLUMES Mecanical systems Mec. sist.- operator Operator - operator	Use of functional volumes	<ul style="list-style-type: none"> - Vehicles / machinery / plant / equipment in motion, controlled by operator - Vehicles / machinery / plant / equipment, automated motion (controlled by PLC) - Workers on the move



INDIRECT CAUSES OF FIRST LEVEL	
Deviation due to electrical problems, explosion, fire	<ul style="list-style-type: none"> - Electrical problem caused by a plant failure - Electrical problem caused by static electricity - Electrical problem caused by missing insulation - Electrical problem caused by external radiation / lightning - Explosion - Fire - Another case relating to electrical problems, explosion, fire
overflow, overturn, leak, flow, vaporisation, emission	<ul style="list-style-type: none"> - Solid state - overflowing, overturning - Liquid state - leaking, oozing, flowing, splashing, spraying - Gaseous state - vaporisation, aerosol formation, gas formation - Pulverulent material - smoke generation, dust/particles in suspension/emission of - Another case relating to overflow, overturn, leak, flow, vaporisation, emission
Breakage, bursting, splitting, slipping, fall, collapse of Material Agent	<ul style="list-style-type: none"> - Break of material, at junctions, connections, material agent - Break / release of personal protective equipment - Break with explosion of splinters (wood, glass, metal, stone, plastic, etc.) agent material - Another case involving rupture, fracture, rupture violent, sudden and loud agent material
Slipping, falling, loss of stability, collapse agent material	<ul style="list-style-type: none"> - Slip, fall, loss of stability, collapse of Material Agent placed above (which falls on the victim) - Sliding, fall, loss of stability, collapse of agent material placed below (which drags the victim) - Slip, fall, loss of stability, the collapse of a material agent - at the same level - Another case relating to slipping, falling, loss of stability, collapse agent material
Loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	<ul style="list-style-type: none"> - Problems of total or partial control of the machine (including the unintended equipment) as well as the processed material - Problems of total or partial control of the means of transport / equipment material handling and / or substance (motorized or not) - Problems of total or partial control of a means of transport / handling of people and / or animals - Problems of total or partial control of hand tool (motorized or not) as well as the material machined by - Problems of total or partial control of object (led, moved, moved, etc.). - Problems of total or partial control of animal - Another cause of problems related to total or partial control of machinery, transportation / handling equipment, hand tools or objects, animals
Slipping - Stumbling and falling - Fall of persons	<ul style="list-style-type: none"> - Fall of person from the top through the opening - Slipping or tripping - with the fall of man - from - Slipping or tripping - with the fall of person - at the same level - Loss of balance - with the fall of man - from - Loss of balance - with the fall of person - at the same level - Slipping or tripping on machinery - Another case involving slipping or tripping, loss of balance - with the fall of person
Body movement without any physical stress	<ul style="list-style-type: none"> - Walking on a sharp object - Kneel, sit, lean against - Being grabbed, dragged, or moved by something from their momentum - Uncoordinated movements, gestures, inopportune, inappropriate - Another cause relative movement of the body without physical exertion (which usually leads to an external injury)
Body movement under or with physical stress	<ul style="list-style-type: none"> - Lifting, carrying or standing - Pushing, pulling, pulling - Depositing, dropping - Twisting, turning, turning - Step false twisting of the leg or ankle, slipping without falling - Another cause relative movement of the body during physical exertion (which usually leads to an internal injury)
Shock, fright, violence, aggression, threat, presence	<ul style="list-style-type: none"> - Surprise, fear - Violence, aggression, threat - including employees of the - Violence, aggression, threat-from people external to the company to the victims in the context of their function (bank robbery, assaulting bus drivers, etc.). - Aggression, mobs, violence by animals - Presence of the victim or a third party that creates in itself a danger to the victim / for himself and if any other - Another case involving surprise, fright, violence, aggression, threat, presence

DIRECT CAUSE	
Contact with electric current, temperature	<ul style="list-style-type: none"> - Indirect contact with the electrical circuit, lightning (passive) - Direct contact with electricity, suffer an electric discharge in the body - Contact with flame or object / warm or red-hot - Contact with object or cold or frozen - Another case involving contact with electric current, temperature
Contact with other material or substance	<ul style="list-style-type: none"> - Contact with hazardous substances for nasal, oral, inhalation - Contact with hazardous substances through the skin or eyes - Contact with hazardous substances through the digestive system, swallowing or eating - Drowning in a liquid - Burial under a solid - Immersion in a gas, in a suspension of particles - Another case involving contact with material or substance
Crushing vertically and / or horizontally moving, fall on / against an immovable object / ground (victim in motion)	<ul style="list-style-type: none"> - Vertical motion, crash on / against (the result of a fall) - Horizontal motion, crash on / against - Another case involving crushing vertical and / or horizontal moving, fall on / against an immovable object / ground (victim in motion)
Struck by moving object, collisions with	<ul style="list-style-type: none"> - Struck by object projected - Struck by falling object - Struck by object that oscillates - Struck by object in rotation, motion, displacement, including vehicles - Collision with a moving object, including vehicles - a collision with a person (the victim is moving) - Another case involving a collision by moving object, collision with
contact with sharp material agent, pointed, hard, abrasive	<ul style="list-style-type: none"> - Contact with a sharp Material Agent (knife / blade) - Contact with a sharp Material Agent (nail / sharp tool) - Contact agent with hard or abrasive material - Another case concerning materials in contact with agent edgy, sharp, hard, abrasive
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