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Perceiving New Sustainable Materials

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Università di Genova | DAD DIPARTIMENTO ARCHITETTURA E DESIGN

Circular design in Action: practices, networks, education and research

Exploring the role of community and education in driving action-oriented research and practical innovation

edited by:
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CiD

Proceedings of the Conference „Circular design in action: practices, networks, education and research - Exploring the role of community and education in driving action-oriented research and practical innovation“.
Conference in Genova, 22-23 May 2025
„Circular Design Education“ conference
from **CiD Erasmus+ Project** - www.cid-innovationalliance.eu

conference organized by
UniGe DAD CiD team - Department of Architecture and Design
- University of Genova: Silvia Pericu, Federica Delprino, Niccolò Casiddu, Luisa Chimenz, Nicola Canessa, Giorgia Tucci, Manuel Gausa, Chiara Olivastri, Claudia Porfirione
with: Stella Femke Rigo, Chiara Garofalo, Lara Ippolito, Omar Tonella

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The Innovation Alliance Circular Design (CiD) offers a radically new model on how to link design to circularity and urban transformation. The Alliance aims to establish benchmarks for rethinking design in a circular economy, shifting urban design, architecture, product and service design towards carbon-neutral cities, and enhancing bio-based innovation for building.

Blueprints for green, resilience, and digital skills are to support the change towards sustainable, inclusive, affordable cities. They boost the turn to a circular construction and design econ my driven by culture and creativity.

CiD operates on three levels: the co-creation of knowledge on circular design, the set-up of an innovation ecosystem for circular design, and educational innovation in academia, green entrepreneurship, and continuous learning and upskilling.

The CiD Innovation Ecosystem brings together relevant actors from academia, research, business incubators, continuous education, civil society organisations, and enterprises. The evolution of the Alliance's results, their dissemination and sustainability beyond the project is supported through the involvement of Europe-wide organisations in architectural practice, society, and culture.

Local and Europe-wide observatories set up within CiD aim at including relevant stakeholders to connect the education and research environments with the surrounding socio/economic environment. The Observatories will contribute to the framework of challenges for the co-creation and flow of knowledge and to novel models for challenge-based education.

Circular design in Action: practices, networks, education and research

Exploring the role of community and education in driving action-oriented research and practical innovation

The Circular Design in Action: Practices and Research conference - organized by Department Architecture and Design of University of Genova - invites scholars, researchers, designers, and practitioners to share their insights and innovative approaches in circular design. This event is part of the CiD Project – Circular Design for Bio-based Innovation towards Climate-Neutral Cities, an initiative fostering sustainable solutions in architecture, product design, and urban transformation.

In an era of pressing environmental challenges, design plays a fundamental role in shaping a sustainable future. The conference will explore circular economy principles, bio-based materials, and innovative design methodologies that drive the transition toward carbon-neutral cities. Participants will have the opportunity to showcase research, methodologies, and practical applications that redefine how materials, products, and built environments are designed, produced, and regenerated, within two tracks:

+ Track 1: Design for change
+ Track 2: Circular Cities

3.2.1

Poster Session

Track 2: Circular Cities

Circular Economy | Sustainability | Biomaterials
Renewable Materials | Built Environment
Supply chains | Climate Change

Authors are encouraged to contribute their research and experience exploring the future of architecture and urban planning: how can participative design example as well as resilient architecture experiences, or the use of renewable or reprocessed materials and innovative procedures in the built environment, the optimization of short supply chains and circular economy principles allow the spread of sustainability, answering to the green mandate imposed us from the cogent climate change? This track seeks to empower participants with the tools and knowledge and emerging trends within the architectural and urban planning realms to lead the transformation toward a sustainable

Perceiving New Sustainable Materials. Perceptual and Sensory Analysis of Transparent Wood and its Competitors / Eva Vanessa Bruno, Doriana Dal Palù, Beatrice Lerma — page 108

Reciprocity of Perception and Conception. From Embodied Experience to Responsive Architectural Design / Dr. Katharina Voigt — page 110

Circularity begins with design. Circularity Begins with Design: Rethinking Material Approaches from Static to Dynamic in AEC / Mariia Deinega — page 112

Dirty & Dusty. Exploring Circularity Through Bioinspired Research and Reclaimed Resources / Camille Breuil, Petra Gruber, Damjan Minovski, Clemens Preisinger, Rebekka Waters, Thibaut Houette — page 114

Dirty & Dusty. Exploring Circularity Through Bioinspired Research and Reclaimed Resources / Camille Breuil, Luca Beltrame — page 116

Growing Futures: a design futures art-driven approach to bio-co-design / Daniela Amandolese — page 118

Water Design for the Amazon / Angela Yangali — page 120

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Sabão / Joana Tomás, Vincent Rault — page 126

Perceiving New Sustainable Materials

Eva Vanessa Bruno, Doriana Dal Palù, Beatrice Lerma

Full paper page 194

Transparent Wood (TW) is an innovative material with potential applications in construction, automotive, electronics, and interior design. The AI-TranspWood project, a three-year Horizon Europe initiative, aims to develop AI-driven methods for designing and manufacturing transparent wood composites under the EU's „Safe and Sustainable-by-Design" framework. The project involves international collaboration between universities, research centres, and companies, with the goal of boosting Europe's leadership in transparent wood production. A research team from Politecnico di Torino leads the project's Dissemination and Communication work packages, ensuring effective communication of findings and stakeholder engagement. A sensory and perceptual analysis of transparent wood was conducted to answer the following research question (RQ): How to promote the adoption and dissemination of Transparent Wood among stakeholders and civil society despite the expectation about native wood and clear plastic? The analysis followed a protocol derived from scientific literature, evaluating samples of transparent wood alongside its direct competitors: wood and transparent plastic. Eighty participants, referred to as "materials testers," took part in a two-hour workshop where they used a sensory vocabulary tool to describe the three samples in a standardized manner. The research results provide a sensory and perceptual comparison of the materials, offering project partners valuable insights for material development and supporting researchers in promoting the acceptance of new sustainable materials not yet available on the market.

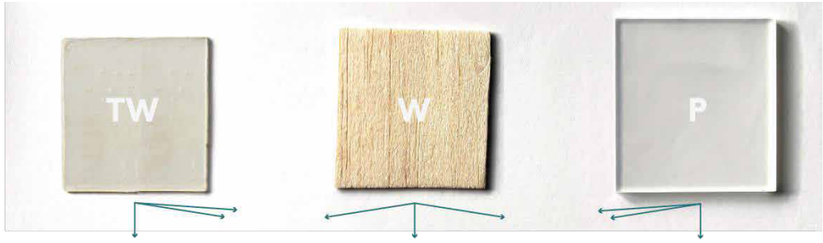
Circular Design in Action
22 — 23.05.2025, Genova

Eva Vanessa Bruno, Doriana Dal Palù, Beatrice Lerma, Politecnico di Torino

Perceiving new sustainable materials

#Materials #SSbD #Transparent Wood #Senses #MaterialsLibrary

Samples



Actions

TW	W	P
Rotate the sample to make it vertical, horizontal, oblique	*Tap the sample with your knuckles, with a pen or a marker*	*Rotate the sample to make it vertical, horizontal, oblique*

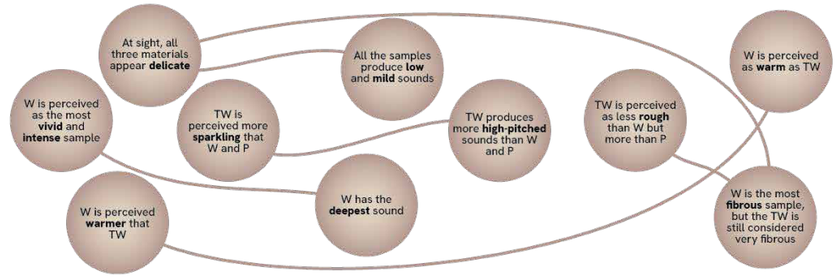
Test

	TW	W	P
Vivid	2	12	1
Warm	14	34	3
Bright	6	14	8
Clear	9	3	25
Sparkling	17	12	14
Delicate	11	7	9
Mellow	17	14	10
Faded	20	9	12
Pale	20	9	25
Opaque	30	39	34

	TW	W	P
Dull	30	33	22
Irregular	14	12	13
Penetrating	7	24	24
Strident	11	1	9
Harsh	12	19	26
High-pitch.	35	10	21
Low	26	26	31
Mild	40	25	18
Deep	4	45	28
Subtle	35	15	19

	TW	W	P
Warm	10	12	10
Irregular	28	43	0
Hard	10	18	27
Soft	16	12	18
Rough	17	43	2
Slippery	35	8	41
Sticky	18	1	23
Fibrous	42	55	1
Rigid	7	18	22
Smooth	8	2	18

Insights



Perceptual and sensory analysis of Transparent Wood, Wood and Plastic samples. Insights derived from the test.

Transparent Wood (TW) is an innovative material with potential applications in construction, automotive, electronics, and interior design. The AI-TranspWood project, a three-year Horizon Europe initiative, aims to develop AI-driven methods for designing and manufacturing TW composites. A sensory and perceptual analysis of TW was conducted aiming at promoting the adoption and dissemination of it among stakeholders and civil society.

The analysis evaluated samples of Transparent Wood alongside its direct competitors: wood and transparent plastic. Eighty "materials testers" took part in a two-hour workshop to describe the samples in a standardized manner. The results provide a sensory and perceptual comparison of the materials, offering valuable insights for material development and for promoting new sustainable materials not yet available on the market.

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