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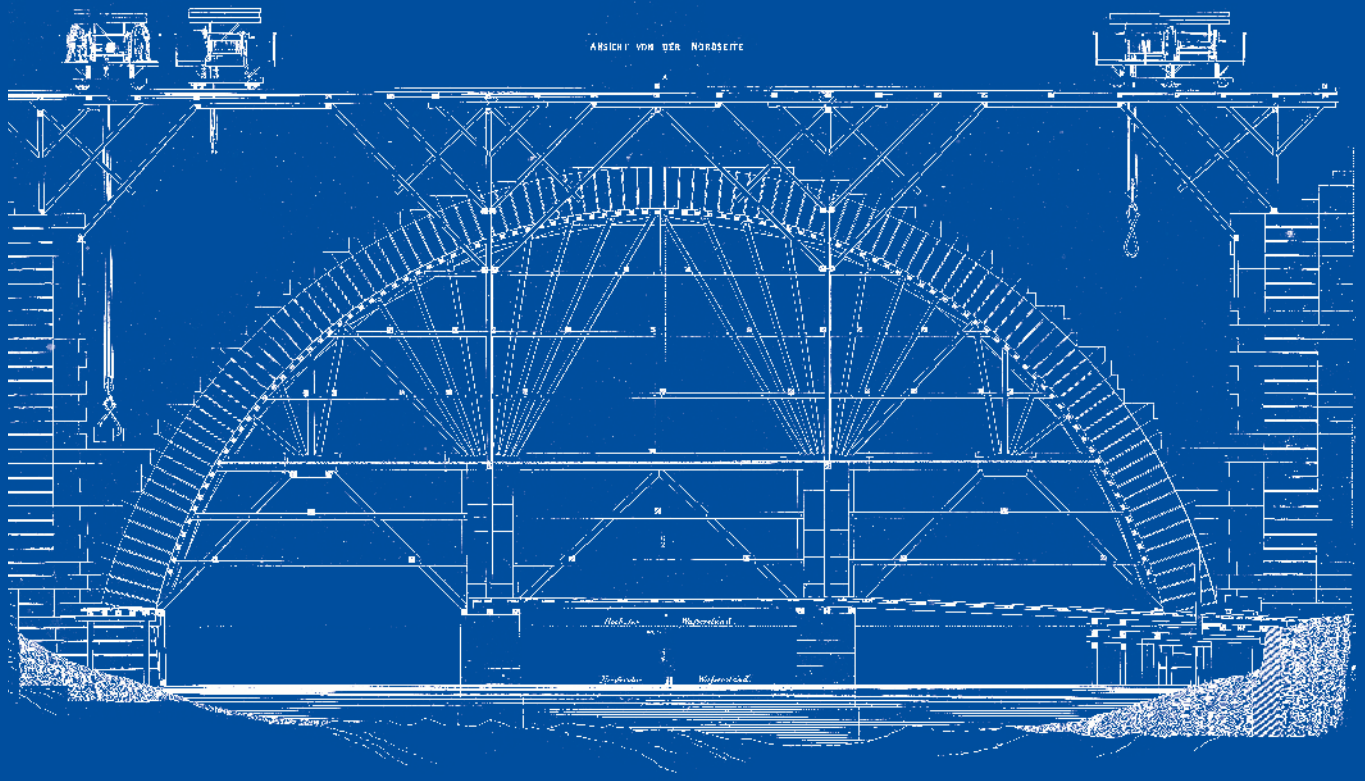
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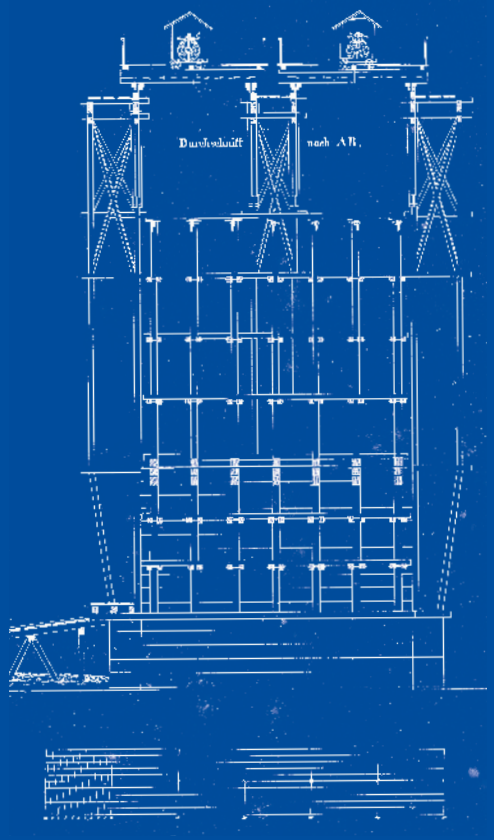
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Proceedings of the 8th International Congress on Construction History
Stefan Holzer, Silke Langenberg, Clemens Knobling, Orkun Kasap (Eds.)



Construction Matters



Stefan Holzer, Silke Langenberg,
Clemens Knobling, Orkun Kasap (Eds.)

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Administration in the mid 17th century court of Savoy

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Abstract: This research aims to delve into the construction techniques employed at the Savoy Court, bridging the gap between theoretical concepts and practical applications. It seeks to directly examine how the instructions provided by architects and engineers align with the existing structures, many of which endure despite the transformations brought about by time.
Drawing from an extensive analysis of documents spanning the 17th and 18th centuries, the study uncovers the meticulous bureaucratic and managerial procedures adopted at the Savoy construction sites. These procedures, illuminated by the systematic analysis, unveil a well-organized technical framework employed in executing projects, whether commissioned privately or for public purposes. The significant role played by the Council of Artillery, Buildings, and Fortifications in Piedmont is evident in overseeing fund allocation and the detailed recording of transactions, now preserved in the State Archive of Turin.
This study encourages for the continuation of research into the complex organizational structures governing Savoy construction processes. It also emphasizes the necessity for parallel investigations into similar cases across Italy and Europe, offering a comprehensive understanding of historical construction practices.

Introduction

Since the early decades of the 20th century, there has been a growing research interest in Turin, once the capital of the Savoy State. Contributions in this field include Brinckmann, Wittkower, Pommer and Millon. Very often, the emphasis in these studies has been on what might be defined "exceptional" construction processes and projects, in particular those by Guarino Guarini. More recent studies have focused on the ongoing and long-term refinement of construction techniques and of local construction traditions, which interacted with the knowledge and skills of the technical figures of the Savoy architecture.

This paper examines the organization of the building process and of the craftsmen at the Savoy court. Management of accounts is investigated in order to allow a broader comprehension of the construction processes of Baroque Turin. The mid 17th century marks a significant period for the construction of the Savoy residences. The construction of the Royal Palace of Venaria Reale, between 1659–1660, based on the design by the Chief Court Architect Amedeo di Castellamonte, introduces the grand period of renewal of the Savoy commissions, in connection with important historical events.

This investigation focuses on the court residences in Turin as well as on other significant buildings with public purposes in the city. These buildings represented a meaningful site for experimentation, but also for continuity with local construction traditions.

1. The study on the administration

1.1. State of the art

From the early 20th century, there has been a growing interest in the study of Turin and the court of the Savoy state. This scholarly curiosity is evident in internationally renowned works like Brinckmann's (1931) and Wittkower's (1958) volumes. Wittkower's book delved into the significance of the presence of the Savoy state in Piedmont between the 17th and 18th centuries in shaping the grand architectural works of Guarini and Juvarra on the international Baroque stage. Additionally, Millon (1961), through his work "Baroque and Rococo Architecture," not only transformed our understanding of Michelangelo's role in St. Peter's construction but also explored Guarini's contributions in the Carignano Palace and the works of Juvarra. Pommer's book (1967) sparked extensive debates among scholars and enriched our understanding of Juvarra and Vittone's activities with its new documentary corpus. Beyond these national and international studies, local researchers like Giannazzo di Pamparato (1888) dedicated their work to specific aspects, especially Venaria Reale. Chevalley (1912) provided detailed insights into the architectural and decorative aspects of 18th century construction processes. The article by Brayda, Coli, and Sesia (1963) in the journal "Atti e Rassegna Tecnica della Società degli ingegneri e architetti in Torino" focused on engineers and architects in the major construction sites of Baroque Piedmont between the 17th and 18th centuries. Furthermore, the 1963 exhibition catalog on Piedmontese Baroque shed light on painting, sculpture, and architecture in minor arts during the 17th and 18th centuries.

These studies shed light on the major construction sites of the Savoy residences and the architects of the court. Significant contributions were made by Portoghesi's volume (1956) on Guarini, Gritella's in-depth explorations of Savoy residences like Rivoli (1986) and Stupinigi (1987), and the two volumes dedicated to Juvarra (1992). In recent years, Carboneri's studies on Superga by Juvarra and Bellini's monographic volume on Alfieri (1978) revealed unexplored drawings and the participation of influential baroque architects in the construction processes of the Savoy residences. The 1981 exhibition and its related catalog, organized at the State Archives of Turin by Bertini Casadio and Massabò Ricci, played a significant role in clarifying the historical and architectural aspects of the period from the 17th to the early 18th century. Dardanello's volume (1988) focused on the roles of craftsmen in Baroque construction sites in Piedmont, including woodworkers and cabinetmakers. Essential studies on construction practices were published by Carboni (1986) and Cerri (1987), sparking new discussions about roles, bureaucracy, and the organization of craftsmen.

Carbone was the first to propose an organizational structure for Savoy construction sites, although without delving too deeply into details through archival sources. This systematic study has evolved within a project developed at CHG research center, and this article represents an initial outcome. Bardelli's papers and Vinardi's contributions at the Bressanone conferences addressed the history and techniques of construction from its origins, with specific cases related to the situation in Piedmont during the 16th and 17th centuries. The volume "Ville Sabaude," edited by Roggero, Vinardi, and Defabiani, revealed unpublished documents on the construction processes of the Savoy residences between the 17th and 18th centuries, with particular attention to the dynamics of architectural construction (Vinardi's essay). As mentioned earlier, the "Quaderni dei Mestieri Reali" series became particularly relevant in Baroque construction studies, synthesizing ongoing research on the Reggia di Venaria Reale and other Savoy residences. The works of the Foundation 1563 for Art and Culture of the Compagnia di San Paolo are also highlighted. This foundation conceived the series "Quaderni della Fondazione dell'Arte della Compagnia di San Paolo" with the aim of disseminating research on cultural heritage promoted by the Foundation, with a particular focus on the Piedmontese Baroque.

Based on the existing literature on the topic, this paper provides a more detailed analysis compared to previous studies on the bureaucratic system at the Savoy court in the mid 17th century. It also draws comparisons with other contemporary construction sites at the national level, such as the Roman and Milanese cases.

1.2. Methodology and the use of sources in the research

The research into the Savoy court's administration was conducted through an extensive range of documentary sources. This comprehensive approach involved examining a substantial bibliography related to the topic, printed materials, archival resources, and iconographic sources, which encompassed historical maps, engravings, prints, and photographs, especially those related to the construction site of the Reggia di Venaria Reale. A pivotal aspect of the research process revolved around the analysis of archival and iconographic sources. Archives, in particular, proved invaluable as they house essential documents that shed light on the phases of historical construction sites. These sources facilitated the identification of master builders involved in construction processes, the materials used, their geographical origins, and the operational methods employed in various stages of the construction process. The State Archive of Turin, renowned as a primary repository for the study of the Savoy residences, holds records from both central and peripheral bodies of the Savoy state up to the unification of Italy. To ensure focused and targeted investigations, specific collections with pertinent documentation related to construction bureaucracy were carefully selected. Subsequently, critical abstracts were meticulously prepared and juxtaposed with existing literature to construct interpretative summaries encompassing the administrative organization of court construction, as well as the techniques and trades involved. Given the intricate and expansive nature of the research, the methodology adopted entailed critical sampling and in-depth analysis. While some collections exhibited gaps in certain years, the archive overall presented a sufficiently rich repository of information, marked by a degree of continuity.

2. The administration structure at the Savoy court

The urban renewal of the capital city, in terms of a structured program, began with Duke Emanuele Filiberto and continued with his successors, reaching its zenith with Vittorio Amedeo II during the transformation of the duchy into a kingdom. Between the 17th and 18th centuries, the Duchy of Savoy reached the height of its splendor. Architecture became the direct means of expression of Savoy power and political promotion. Territorial control by the duchy was consolidated through the organization of the state, in which the introduction of new regulations of construction processes played a key role in the 17th century. Direct supervision by the bodies responsible for construction and the precise organization of the construction processes were necessary to control the image of the capital city. The comprehensive structure designed to control construction activities within the duchy (and later within the kingdom) employed a large number of people and resources. Managing the construction processes required a thorough organization by the responsible governing bodies. According to the classification proposed years ago by Carbone, three fundamental structures could be identified within the "ars aedificandi" domain that ensured the perfect functioning of the complex construction machinery: the bureaucratic structure, the design structure, and the executive structure. This paper focuses on the role of the administrative structure, while the specifics of the other components of the Savoy organizational machinery are discussed in other works (Burgassi 2023). The term "administrative structure" is used here to refer to the administrative body responsible for the construction management and include the Council of Buildings and Fortifications (or Consiglio delle Fabbriche e Fortificazioni), as well as the Council of Finances (or Consiglio delle Finanze).

The design phase for the construction of a building followed a precise order and began with the desire expressed by the monarch, which was communicated to the architect or engineer. These technical figures developed a project through sketches and scale drawings, accompanied by wooden

models, and formulated an initial cost estimate. A positive response from the monarch allowed the "instructions" (or Istruzioni) to be drawn up. These instructions were plans and drawings drafted by the First Architect containing all the information required for the building or refurbishment of the structure in question. This design phase or *struttura progettuale* was highly structured and supervised all stages of the construction. Typically, military works were entrusted to engineers, while civil works, as well as temporary apparatus for scenography and ephemeral architecture, were the responsibility of architects.

The operational structure or "struttura organizzativa" of the construction process involved a team of highly specialized craftsmen (master builders, woodworkers, gilders, and stonemasons). These craftsmen were recognized as serious and thorough professionals, who gave rise to an efficient working machine in Piedmont. There was a high degree of specialization among these craftsmen, who frequently moved about, which resulted in a significant migratory phenomenon driven by both economic and professional reasons.

The analysis of contracts, and especially of the architect's instructions, allows the identification of the areas of expertise and specializations of various master craftsmen who worked between the 17th and 18th centuries. The whole process was controlled at a higher level by the Agency of Buildings and Fortifications (or Agenzia delle Fabbriche e Fortificazioni). Each master had a specific professional qualification and field experience. Only a perfect organization could lead to the construction of such accurate works. This great specialization was required due to the complexity of the works to be carried out, while high quality was demanded because it directly reflected the power of the monarch. There were several specializations, and each worker focused solely on their craft, to perfection, as reported in the documents, but always in close collaboration with others. It was customary to hire, as assistants, multiple members of the same family, passing down not only the activity itself from generation to generation but also all the trade traditions and construction techniques. There was a widespread migratory phenomenon of craftsmen, who often originated from the lake regions of Lombardy and Ticino. There were provinces with pronounced professional vocations, whose reputation was so renowned that these craftsmen were called to work in very distant places. The migratory phenomenon of highly specialized craftsmen regarded the Lombard, but also the Roman territories, as well as other European regions, and dates back to the 14th century. It involved a significant movement of men, as well as of ideas and artistic and construction techniques, and led to the rapid spread of new decorative tastes.

2.1. The Council of Buildings and Fortifications

The Letters Patent (May 16, 1566) issued by Duchess Margaret of Valois, wife of the Duke Emanuele Filiberto of Savoy, prohibited any citizen residing in the city of Turin from constructing any building. Similarly, "mastri da muro" (or master builders) and craftsmen were required to obtain a specific ducal license to construct, with penalties including the termination of any ongoing project and a fine of "one hundred lire," as reported in Duboin's collection.

This decree was accompanied by others, such as those determining the size and price of bricks, or of the "carrette di sabbia" (Duboin 1818–1869, pp. 905–909) or cartloads, the price of lime and plaster (September 30, 1621), or the cost of other building materials (July 4, 1624). Duke Carlo Emanuele I's Ordinance instituted ad administrative body called "Magistrato delle fabbriche" (Magistracy of Buildings) to oversee not only the construction of the ducal residences but also that of private buildings in the city of Turin "for the purpose of embellishment (March 10, 1621)" (Duboin 1818–1869, pp. 913). In this way, the duke resolved the issue of possible discrepancies between the design and the result, ensuring that the work adhered to the ordinances and plans, which resulted in savings for the royal finances. The Magistracy of Buildings controlled all construction activities with the aim of enhancing the beauty of the city, and also of ensuring a coherent urban design. This body originally consisted of two Councilors of State, three Master Auditors or Mastri Auditori, two engineers (including Carlo Vanelli and Carlo di Castellamonte), one Auditor, one Controller of the House, one Chief Engineer, one Controller of Buildings, and a secretary, chosen from those serving the crown.

The "Magistrato delle fabbriche" had supervisory and control duties on construction, with the main task of overseeing the construction of houses and roads. Its role primarily regarded inspection, rather than decision-making. Nevertheless, it was the first administrative body from which the subsequent, more detailed Savoy bureaucracy took shape, with the establishment of the "Council of Buildings and Fortifications." This council, founded on August 17, 1635, by Duke Vittorio Amedeo I, united the "Delegation on Fortification Buildings" of Turin (responsible for military works) and the "Council of Buildings" (for controlling the ducal construction sites). The "Council of Buildings" was separated from the "Council of Fortifications" in 1666 by Duke Carlo Emanuele II through the Patent of October 27, 1666, only to be reunited in 1678 by Regent Maria Giovanna Battista of Savoy Nemours (Duboin 1818–1869, pp. 931). In practice, the duke had divided the "Council of Buildings and Fortifications" into two parts, a civil body (Buildings) and a military body (Fortifications), temporarily delegating fortification matters to the "Council of Finances," whose General Superintendent was Count Filippo di San Martino d'Aglié, except for Mirafiori, Venaria Reale, and Stupinigi, which had their direct overseer, the General Superintendent of Fortifications. The same reasons that led Duke Carlo Emanuele II to dissolve the Council due to the absence of certain figures. The second *Madama Reale* reinstated the Council: "The very reasons that, due to the absence of the Controller, Treasurer, and Secretary of the buildings, persuaded the late SAR Carlo Emanuele II, my lord and consort of glorious memory, to abolish the Council of these buildings and entrust its management to that of finances, now invite us, after these positions have been filled, to reinstate the said Council of Buildings and Fortifications" (Borelli 1681, p. 864).

The renewed Council could include a President, a General of Finances, two Auditors, one of whom had the authority to participate as an expert, one Controller, one Secretary, the Superintendent of Buildings and Fortifications, and the Chief Engineer, who was involved in matters related to the military arts. With the provisions dated March 28, 1717 (ASTo, Intendenza Generale Fabbriche e Fortificazioni, m. 1, n. 28, c. 87r), by King Vittorio Amedeo II, the "Council of Buildings

and Fortifications" finally reached its definitive form. Prior to the monarch's reforms, construction practices had persisted as remnants of experiments on construction processes in the previous century, with no real rules for building. There were no government regulations for the administration of property, mainly due to the heterogeneous acquisition of lands by the Duchy of Savoy. In general, there was much confusion in the institutions due to the duplication of administrative offices in the Savoy territory, language issues, and the two Chambers of Accounts (one in Chambéry and one in Turin), which were only merged on January 7, 1720. In 1723, with the publication of the "Laws and Constitutions of His Majesty", Vittorio Amedeo II conducted a true reorganization of the state and legislative tools: the first volume dealt with religious matters, the second with the judiciary, the third with civil procedures, the fourth with criminal law, and the fifth with private law. The functional structures of the state established by Vittorio Amedeo II aimed at centralizing power and emphasizing the role of the sovereign, with the creation of the Council of Artillery, Buildings, and Fortifications.

The Council of Buildings and Fortifications was responsible for supervising construction in the capital city and ensuring that the construction processes adhered strictly to the instructions provided by the court architects and the corresponding technical provisions. Under the close supervision of a General Intendant, the Office of Buildings managed materials from quarries, procurement, storage of construction materials, and produced the estimates for civil and military works. Additionally, it was responsible for the announcement and oversight of contract tenders, monitoring the proper execution of works, and preparing cost estimates for civil and military projects. In summary, the Council of Buildings and Fortifications was a fundamental component of the entire administrative complex, responsible for construction activities and the oversight of the city's image. It was entrusted with monitoring construction sites, adhering to architects' and engineers' instructions, as well as overseeing construction management.

2.2. Council of Finances

Another essential body was the Council of Finances. This council was part of the administration, with the power to influence decisions. This council had deliberative power over all matters concerning the state's finances, especially on expensive construction works, which imposed a heavy burden on the royal finances. Since it was headed by the duke, any operations on the territory were subject to his permission and approval. King Vittorio Amedeo II established the General Council of Finances to create a single central treasury, from which funds were redistributed to the ministries. The council included the President of the Chamber of Accounts, the Chief Secretary of War, the General Controller, the General of Finances, and the General Accountant, who was responsible for the War Administration. The council met twice a week and, whenever necessary, it controlled and evaluated all financial matters concerning the Kingdom. In addition, it exercised control and oversight over all payments and potential exemptions by heads of the Administrations and their staff. It is clear that this body had a significant influence on the Council of Buildings and Fortifications, even though the latter was not directly dependent on the Council of Finances. The Council of Finances had the executive power to deliberate on all matter's dependent on the state's finances, including decisions regarding construction works, restorations, and the construction projects that were the most financially burdensome.

3. The procedure

3.1. Decisions and approval

Once a project had been approved by the Chief Architect or Chief Engineer, the sovereign sent a note to the General Intendant, with the request for the budget of expected expenses in the coming year. This had the purpose of directly assessing the state of court finances, and to decide whether to proceed with a project. Alternatively, orders could be given to post "tiletti" or notices, with the Regio Biglietto of the Duchess Maria Giovanna Battista of Savoy Nemours, dated October 6, 1670, for "renting houses at the Valentino" (ASTo, Camera dei Conti Piemonte, art. 809).

The General Intendant played a crucial role, serving as the linchpin of the entire construction process, and acting in connection between the sovereign and the complex construction machinery. The role of the General Intendant was explicitly mentioned in the 1662 Regulations, which described his prerogative to "receive orders regarding buildings, report to the king on these matters and provide with information on the executions and write records of funds allocated for building expenses" (ASTo, Intendenza Generale Fabbriche e Fortificazioni, m. 1, n. 6). Therefore, the General Intendants had to calculate budgets based on orders by the sovereign before starting any construction activities, and subsequently present accounts to the Council of Finances for approval. The project started immediately after the approval of the drawings and calculations, and the instructions drafted by the First Architect (Fig. 1).

The project would then move into the execution phase, which involved a series of steps that are described in the next subsections.

3.2. Tiletti

The first administrative step in the execution phase was the bidding competition, which was made public to ensure that all interested contractors were informed of the work to be done. This was followed by the publication of "tiletti". This

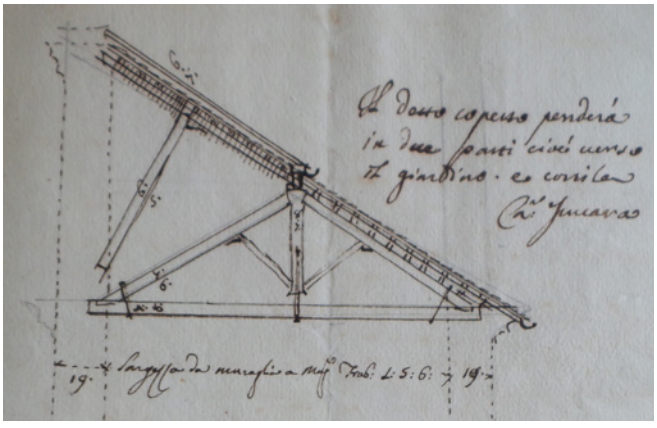


Figure 1. Timber structure drafted by Filippo Juvarra, 1733 (ASTo, Miscellanea Quirinale, m. 53, c. 239r.).


SI notifica ad ogn'vno volent' attender alla prouisione di trabuchi cento circa Canali di Rame da mettersi alle Galerie, o Paraglioni del Valentino, di douer frà tutto li 10. del corrent' Agosto dar il partito in mani del Sig. Patrimoniale generale Fecia, che se ne farà indi il deliberamento à chi lo farà in maggior vantaggio del Real seruitio. Torino li 2. Agosto 1675.

Figure 2. Example of the printed "tiletti" under the Duchess Maria Giovanna Battista of Savoy Nemours in 1675 (ASTo, Riunite, Camera dei Conti di Piemonte, Art. 809, anni 1694–1709, 2nd August 1675).

is an Italian term that refers to public notices that were used to announce and invite contractors to submit their bids for construction projects. They served as a means of publicizing the terms and details of the work to be carried out. Tiletti played a significant role in the administrative process of awarding construction contracts. In the competition, all the master craftsmen had to submit their offers at the Intendancy Office following the bidding procedure. A preference was expressed for offers presented "to the greater advantage of the Royal service".

The tiletti were displayed at fixed locations in the capital city, but not only there. If the construction site was in another city, as was the case with the Royal Palace of Venaria, they were posted at the working site. The procedure of posting the tiletti was especially established to facilitate the organization of the works, with consequent cost savings on material transportation. The tiletti where positioned "at the four corners and the usual places in the city". They were usually displayed and read during market days when large numbers of people were present. The preferred time for posting was in the morning before midday, or three o'clock in the afternoon. The publication of tiletti was followed by the Mozione di Deliberazione or indication for deliberation, that is to say a meeting in which contractors interested in the work were invited. A representative of the Council of Buildings and Fortifications and later the Agency of Buildings and Fortifications, explained the works to be done, using the First Architect's drawings. It was during this phase that the master craftsmen could ask questions about specific techniques to better understand the requirements. Only a few days passed between the publication of tiletti and the indication for deliberation.

For example, the tiletti for the construction of the Royal Palace of Venaria were published and read on March 18, 1753, while the indications for deliberation were scheduled for the 20th of the same month. The motion for deliberation was followed by the parties, i.e., the offers from various contractors (ASTo, Misc. Quirinale. Min. Contratti, 55, vol. 11, cc. 96r–98v).

3.3. Partiti

As mentioned earlier, the various offers could only be heard and accepted by the Council and the Agency after the publication of tiletti. The "Regulation or New Constitution for the Council of Artillery, Buildings, and Fortifications of SAR" of March 17, 1711, imposed that: "All parties regarding the aforementioned companies [...] will be decided upon by the Council prior to the posting of tiletti, unless urgency or low expenditure requires otherwise". Once all the competitors had announced their interest, the actual bidding competition began. The General Intendant first read the work estimates and then the master craftsmen presented their best offers. This detailed offer for the costs of the construction works was called "partito" (ASto, Mat. Mil. Intendenza Generale Fabbriche e Fortificazioni, m. 3, n. 7).

Numerous examples of Partiti are available in the State Archive of Turin. They began with a standard initial formula, as: "I, the Undersigned, make an offer and undertake to…. [...]" This sentence was followed by a description of the work the master craftsman would perform: "to paint and deliver the two vessels to be used for fireworks on the occasion of the Illumination to be held in the current city and Royal Valentino, and on the Po in front of the said Valentino." The architect's instructions were strictly followed, and wooden models were used as a reference for every construction detail. The offers had to be made following a strict format, including every material or part of the work to be performed with its corresponding unit price. In cases where the master craftsman was working alone on the task, the master's craftsmen would make a declaration of acceptance, promising to "carry out everything according to the best rules of the art. In the case where multiple master craftsmen worked together in the same work, they would accept "jointly, for the whole, and with all the obligations stipulated in the Chamber's fiscal clause." Often, the master craftsmen were illiterate and in such cases the Secretary of the Office would write the partito, and the master craftsman would only place an X next to their name to formalize the proposal and certify its authenticity.

An example of 17th century partiti is taken from the archival sources for the doors and windows to be made at the Zecca factory. As it was reported in the Council of Buildings and Fortifications on July 4th, 1678, different costs correspond to the degree of refinement of the work, the materials used, and the hours of labor involved (ASTo, Camera dei Conti di Piemonte, Registri relativi ai conti Fabbriche e Fortificazioni, art. 188–207, m. 1, cc. 41v–42r). The contractors had to be well aware of the costs as they determined their prices. The competition could also be held at a reduced price, depending on how much the head contractor was willing to lower their offer to secure the contract.

The reliability of the contractor was an additional criterion taken into account. It was indeed essential to award contracts to trustworthy contractors that could ensure the proper execution of the work. For this reason, in the 17th and 18th centuries, the master craftsmen working in the Savoy residences were often the same individuals working on multiple construction works. Typically, the "mastro lacuale" that is to say a stucco worker from Switzerland or Milan, made stuccos and frescoes in the royal residences of the Savoy court, and had a certain degree of artistic freedom, with some exceptions granted during the contractual phase.

This autonomy was due to the trust relationship that the stucco worker had built over time with the sovereign, earned through his professionality.

3.4. The contract

In accordance with the Council of Buildings and Fortifications, the General Intendant determined which offer was most advantageous, taking into account the contractor's reliability. The official allocation of the work was done through a resolution of the Council of Buildings and Fortifications, which appointed the contractors who would carry out the work and summoned the master craftsmen to the Council's headquarters for the stipulation of the contract. Through this process, the winning contractor made an oath of fidelity, and they were subject to the risk of having to pay for any part of the work that was not executed correctly or in the case of non-compliance.

4. Conclusions

4.1. A new bureaucratic body

The 17th and 18th centuries marked the peak of construction activity for the Savoy residences, and a tangible change in construction practices took place during this period. What is evident from the analyzed documents is the shift in terms of organization from an approach based on tradition and recurring practices, to a regulated approach, thanks to the reorganization ordered by King Vittorio Amedeo II. With the advent of the kingdom of Sardinia (1713), the intense construction was codified to align with the absolutist European approach. This is evident from the General Instruction of 1702 for surveyors, engineers, and superintendents. Further standardization took place within the state bodies and bureaucratic practices in the construction processes.

On March 17, 1711, a new regulation was developed, the Regulation, or the new Constitution of the Council of Artillery, Buildings, and Fortifications of SAR, signed by King Vittorio Amedeo II and printed very quickly. It constitutes one of the first comprehensive documents regulating a bureaucratic body of the Savoy state and establishing provisions regarding the composition of the new Council. On March 28 of the same year (ASTo, Ministero della Guerra, Carte Antiche di Artiglieria, vol. 1), the king added further instructions regarding the operational prescriptions for the Intendant, the Treasurer, the Controller, the Secretary, the Engineers, and the Surveyors, as well as all those involved in the administrative apparatus concerning the royal buildings. The subsequent document of April 11, 1717, which essentially supplements the previous regulation, reaffirmed the need to "increase, decrease, and reform some of the prescribed rules". The printed regulation of May 10, 1726 (ASTo, Mat. Mil. Intendenza Generale d'Artiglieria, m. 1, n. 28), introduced an additional administrative aspect, emphasizing, in particular, the observance of rules for "well-regulated administration".

With the separation of the Agency of Buildings and Fortifications from the Artillery under King Carlo Emanuele III (reunited again with a Royal Patent by King Carlo Emanuele IV on December 8, 1797), the process of defining the bureaucratic and administrative organization of the royal buildings was finally completed with full autonomy. In the 18th century, bureaucratic procedures, with the reorganization of administrative bodies and the introduction of new regulations, became stricter. Under the Agency, the offers (partiti) were made systematically and analytically, associating a unit price with each material or individual part. Following an established practice, the General Intendant invited competitors "to offer reductions through secret negotiations" (ASTo, Misc. Quirinale, Mat. Mil., 50, vol. 1, cc. 50r–60v). It no longer regarded offers with unit prices, but rather reductions expressed as a percentage of the total price. This procedure was so standardized that, starting in the mid 18th century, pre-printed forms were distributed to competitors, and it was only necessary to record the subject of the offer, the reduction, the date, and the signature of the contractor. The moment of the contractor's oath, a crucial phase of the entire administrative process, was also formalized. In the 17th century, elaborate canonical oaths were used indicating the profession, baptismal name and surname, the name of the father with the phrase "son of the late[...]," and the place of the family's origin. From the mid 18th century, the formulas were more concise and included essential details, including the nature of the work and the general information about the contractor, including name, surname, place of origin, and profession.

The bureaucratic and managerial procedures employed at the Savoy construction sites, as inferred from a systematic analysis of extensive document series spanning the 17th and 18th centuries, reveal a well-structured technical framework for executing projects, whether for private or public commissions.

Analogous scenarios can be identified in the organization of Roman construction projects, where both papal and private initiatives held substantial significance from technical and organizational standpoints. The role of the Council of Artillery, Buildings, and Fortifications in Piedmont closely resembled the responsibilities of the Apostolic Chamber in the construction sites under papal jurisdiction. Their officials oversaw fund allocation and disbursed payments to craftsmen, meticulously recording each transaction and expenditure in documents now archived in the Chamber archives of the State Archive of Rome, as well as in private collections. In these construction sites, akin to those in Piedmont, Lombard, and Ticino area craftsmen played a pivotal role in disseminating technical knowledge and expertise. Their practical skills



Figure 3. Royal palace of Venaria Reale and the detail of the stucco work by the Swiss artist Piscina (picture by the author, 2022).



Figure 4. Decorative apparatus in the Church of San Carlo in Turin (picture and collage by the author, 2022).

seamlessly melded with entrepreneurial acumen in managing and coordinating construction sites, optimizing both timeframes and financial resources. By studying sites where such craftsmen were active, it becomes feasible to discern operational and managerial characteristics, both in Piedmont and in other regions where Lombard and Ticino area craftsmen were highly esteemed for their capabilities.

Hence, there is a compelling rationale for continuing research into the intricate design and execution organization of the Savoy construction sites through critical analysis. This endeavor should run in parallel with research on analogous cases in Italy and Europe. The objective of this research is to scrutinize construction techniques, juxtapose theoretical frameworks with on-site practices, and directly assess the confluence between the descriptions and representations found in the instructions of architects and engineers and the actual structures, many of which still stand, albeit transformed by the passage of time.

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Bibliography

Balestrieri I. 1998 “Milano 1595–1623. Notizie sulla presenza di maestranze provenienti dalla regione dei laghi nei cantieri arcivescovili”, in Della Torre S. (ed), Magistri d’Europa. Eventi, relazioni, strutture della migrazione di artisti e costruttori dai laghi lombardi, atti del convegno. Como: Nodo Libri, pp. 221–236.

Barberis, W. 1988 “Le armi del Principe. La tradizione militare sabauda”. Torino: Einaudi.

Bellini, A. 1978 “Benedetto Alfieri”. Milano: Electa.

Borelli, G.B. 1681 “Editti antichi e nuovi dei Sovrani Principi della Real Casa di Savoia, delle loro Tutrici, e del Magistrati di qua de’monti raccolti d’ordine di Madama Reale Maria Giovanna Battista, dal senatore Giovanni Battista Borelli”. Torino: Zappata.

Brayda, C., Coli, L., Sesia, D. 1963 “Ingegneri e architetti del Sei e Settecento in Piemonte”, Atti e Rassegna Tecnica della Società degli Ingegneri e degli Architetti in Torino, no. 3, pp. 73–82.

Brinckmann, A.E., 1931. Theatrum Novum Pedemontii: Ideen, Entwürfen und Bauten von Guarini, Juvarra, Vittone wie anderen bedeutenden Architekten des piemontesischen Hochbarocks, Düsseldorf, L. Schwann.

Brook, C., Camboni E., Consoli G.P., Moschini F., Pasquali S. (eds) 2016. L’Accademia di San Luca e gli artisti francesi, xvii–xix secolo. Roma: Accademia Nazionale di San Luca.

Burgassi, V., Volpiano, M. 2020 “Tradition and innovation: the construction of court palaces and the role of professional figures in eighteenth-century Piedmont”, in Campbell, J.W.P. (ed), Iron, Steel and Buildings. Studies in the History of Construction. Proceedings. Cambridge: University of Cambridge, pp. 275–286.

Burgassi, V. 2021a “Le parole di cantiere nel Ducato di Savoia tra XVII e XVIII secolo e la costruzione di un glossario”, in Piccoli E., Volpiano M., Burgassi, V. (eds), Storia della costruzione: percorsi politecnici. Torino: Politecnico di Torino, pp. 67–82.

Burgassi, V., Volpiano, M. 2021b “Building the ephemeral in Turin, capital of the Savoyard States”, in Mascarenhas-Mateus J. (ed), History of Construction Cultures. Proceedings of the Seventh International Congress on Construction History (7ICCH), Proceedings. London: Routledge, pp. 457–462.

Burgassi, V. 2023 “Méthode de construction d’un glossaire de termes architecturaux se fondant sur l’étude des Instructions des ingénieurs militaires de la cour des ducs de Savoie (XVIIe–XVIIIe siècles)”, Mosaique, no. 19, pp. 22–37.

Carbone, P. 1986 “Il cantiere settecentesco: ruoli, burocrazia ed organizzazione del lavoro”, Studi Piemontesi, XV, no. 2, pp. 335–358.

Cattaneo, M.V., Ostorero, N. 2006. L’Archivio della Compagnia di Sant’Anna dei Luganesi in Torino. Una fonte documentaria per cantieri e maestranze fra architettura e decorazione nel Piemonte sabaudo. San Mauro Torinese: Stargrafica.

Cattaneo, M.V. 2023. Ingegneri e capomastri tra Svizzera e Piemonte sabaudo. I Tosetti di Castagnola (Lugano) 1630–1750, Torino: Centro Studi Piemontesi.

Cerri, M.G. 1987 “Costruire una città: note sulle fortificazioni di Torino tra 1632 e 1637”, in Spagnesi G. (ed), Esperienze di Storia dell’Architettura e di restauro 2, Roma: Istituto della Enciclopedia Italiana, pp. 711–723.

Cojannot, A., Gady, A. (eds) 2017. Dessiner pour batir. Le métier d’architecture au xviie siècle. Paris: Le Passage.

Comoli Mandracci, V. 1983. Torino. Roma-Bari: Laterza.

Cornaglia, P., Merlotti, A., Roggero, C. (eds) 2014. Filippo Juvarra 1678–1736 architetto dei Savoia. Roma: Campisano.

Cuneo C. 2018. “L’espace urbain à Turin. Modèles, stratégies et pratiques d’une ville-capitale”, in Ferretti G. (eds), L’État, la cour et la ville. Le duché de Savoie au temps de Christine de France (1619–1663). Paris: Garnier, pp. 513–535.

Devoti, C. (ed) 2021. Maria Giovanna Battista di Savoia-Nemours. Stato, Capitale, Architettura. Firenze: Olschki.

Duboin, F.A. 1818–1869. Raccolta per ordine di materie delle leggi, provvidenze, editti, manifesti, ecc. pubblicati dal principio dell’anno 1681 sino agli 8 dicembre 1798 sotto il felicissimo dominio della Real Casa di Savoia per servire a continuazione a quella del senatore Borelli, 16

libri in 29 tomi (31 voll.) e 2 volumi di indici. Torino: Stamperie diverse.
Gady, A. 2005. Jacques Lemercier, architecte et ingénieur du roi. Paris: Maisons des Sciences de l'Homme.
Gianasso, E. 2021. Tra lo Stato e la Città: «du surintendant, des Ingénieurs, et du contrôleur». Saperi tecnici negli anni di governo di Maria Giovanna Battista di Savoia Nemours (1675–1684), in: Devoti 2021, pp. 432–448.
Kieven, E., Ruggero, C. (eds) 2014. Filippo Juvarra 1678–1736 architetto in Europa. Roma: Campisano.
Marconi, N. 2000 "La cultura materiale del cantiere barocco romano e il ruolo delle maestranze lombarde: metodi, tecniche e apparati", Arte Lombarda, no. 130, 3, 2000, pp. 103–126.
Merlotti, A., Roggero, C. (eds) 2016. Carlo e Amedeo di Castellamonte. 1571–1683, ingegneri e architetti per i duchi di Savoia. Roma: Campisano.
Millon, H.A., 1961. Baroque and Rococo Architecture. New York: George Braziller.
Pommer, R., 1967. Eighteenth-century Architecture in Piedmont: the open structures of Juvarra, Alfieri & Vittone, New York, New York University Press.
Roggero C., Vinardi M.G., Defabiani, V. 1990. Ville Sabaude. Milano: Rusconi.
Romano, G. (ed) 1988. Figure del Barocco in Piemonte. La corte, la città, i cantieri, le provincie. Torino: Editris.
Symcox, G.2002. "La trasformazione dello Stato e il riflesso nella capitale", in Ricuperati G. (ed), Storia di Torino IV. La città fra crisi e ripresa (1630–1730), Torino: Einaudi, pp. 719–870.
Vinardi, M.G. 1990. "Architetti, cantieri, cultura architettonica", in Roggero C., Vinardi M.G., Defabiani V. Milano: Rusconi, pp. 87–117.
Vinardi, M.G. 1998. "Maestranze, architetti e cantiere", in Della Torre S. (eds), Magistri d'Europa. Eventi, relazioni, strutture della migrazione di artisti e costruttori dai laghi lombardi, proceedings. Como: Nodo Libri, pp. 249–276.
Volpiano, M. (ed) 2005a, Le residenze sabaude come cantieri di conoscenza. Ricerca storica, materiali e tecniche costruttive, Torino: Fondazione Cassa di Risparmio di Torino.
Volpiano, M. (ed) 2005b, Le residenze sabaude come cantieri di conoscenza. Progetto di conservazione, tecniche di intervento e nuove professionalità, Torino: Fondazione Cassa di Risparmio di Torino.
Wittkover, R. 1958, Art and Architecture in Italy: 1600 to 1750. London: Penguin Books Ltd.

Archival sources

Letters in ASTo, Corte, Materie Politiche per rapporto all'interno, Principi di Savoia-Carignano, Miscellanea ex Quirinale, Patenti 1711–1737, m. 41, reg. 1 (1711–1722), cc. 1 e segg.
Letters in ASTo, Riunite, Camera dei Conti di Piemonte, Art. 809, anni 1694–1709, 6 ottobre 1670.
Contracts in ASTo, Riunite, Camera dei Conti di Piemonte, Art. 809, anni 1694–1709.
Contracts in ASTo, Corte, Miscellanea Quirinale, Materie Militari, Minutari Contratti, 55, vol. 11, c. 48 r–c. 50 v. Sottomissione dell'impresario Cesare Castelli per diversi travaglij da farsi alla Venaria Reale, in data 18 marzo 1750.
Contracts in ASTo, Corte, Miscellanee, Miscellanea Quirinale, primo versamento, Materie Militari, mazzo 57, c. 11 r. Sottomissione delli Steffano Borione e Carlo Anto De Steffanij per diversi travaglij da eseguirsi nell'anno corr[ent]e alla nuova Fabbrica e Palazzi di SM alla Venaria Reale, in data 5 aprile 1753.
New procedures in ASTo, Corte, Materie Militari, Intendenza Generale Fabbriche e Fortificazioni, m. 3, n. 7, Torino, 17 marzo 1711. Regolamento, o sij nuova Constituzione del Conseglio dell'Artiglieria, Fabbriche e Fortificazioni di SAR, pp. 17–18.
Contracts in ASTo, Corte, Miscellanea Quirinale, Materie Militari, Minutari Contratti, 55, vol. 11, c. 66 r. Sottomissione di Pietro Ant[oni]o Ossano? Et Gio Batta Ollivetto per formaz[io]ne con boscami e loggie laterali all'atrio del R[ea]le Valentino, in data 20 marzo 1750.
"Partiti" in ASTo, Riunite, Camera dei Conti, Camera dei Conti di Piemonte, Registri relativi ai conti fabbriche e fortificazioni (Articoli 188–207), Articolo 200, Sessioni del Consiglio di artiglieria, fabbriche e fortificazioni, m. 1, cc. 41 v, 42 r.
Contracts in ASTo, Corte, Miscellanea Quirinale, Materie Militari, Minutari Contratti, 55, vol. 11, c. 76 r. Sottomissione di Bernardino Viani per la provvisione di numero diecimilla lumi di tola da servire per l'Illumi[nazio]ne della Città di Torino, in data 20 marzo 1750.
Letters in ASTo, Corte, Miscellanee, Miscellanea Quirinale, primo versamento, Materie Militari, mazzo 57, c. 61 r, 61 v. 19 maggio 1753.
Letters in ASTo, Riunite, Camera dei Conti, Camera dei Conti di Piemonte, Registri relativi ai conti fabbriche e fortificazioni (Articoli 188–207), Articolo 200, Sessioni del Consiglio di artiglieria, fabbriche e fortificazioni, m. 1, cc. 82 r–83 r.
New procedures in ASTo, Corte, Materie Militari, Intendenza Generale Fabbriche e Fortificazioni, m. 1, n. 28, c. 87 r: Constitutioni sopra il Consiglio dell'Artiglieria, Fabbriche e Fortificazioni, Torino, 11 aprile 1717.
New procedures in ASTo, Ministero della Guerra, Carte Antiche di Artiglieria, vol. 1, Provvedimenti per l'Artiglieria per le Fortificazioni e fabbriche regie, Militari dal 1711 al 1789, c. 1r. Istruzione relativa all'andamento del servizio d'artiglieria, fabbriche e fortificazioni. Torino 28 marzo 1711.

Construction History is still a fairly new and small but quickly evolving field. The current trends in Construction History are well reflected in the papers of the present conference. Construction History has strong roots in the historiography of the 19th century and the evolution of industrialization, but the focus of our research field has meanwhile shifted notably to include more recent and also more distant histories as well. This is reflected in these conference proceedings, where 65 out of 148 contributed papers deal with the built heritage or building actors of the 20th or 21st century. The conference also mirrors the wide spectrum of documentary and analytical approaches comprised within the discipline of Construction History. Papers dealing with the technical and functional analysis of specific buildings or building types are complemented by other studies focusing on the lives and formation of building actors, from laborers to architects and engineers, from economical aspects to social and political implications, on legal aspects and the strong ties between the history of construction and the history of engineering sciences.

The conference integrates perfectly into the daily work at the Institute for Preservation and Construction History at ETH Zurich. Its two chairs – the Chair for Building Archaeology and Construction History and the Chair for Construction Heritage and Preservation – endeavor to cover the entire field and to bridge the gaps between the different approaches, methodologies and disciplines, between various centuries as well as technologies – learning together and from each other. The proceedings of 8ICCH give a representative picture of the state of the art in the field, and will serve as a reference point for future studies.

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