

5th interuniversity research seminar on Construction History in Belgium. Book of Abstracts

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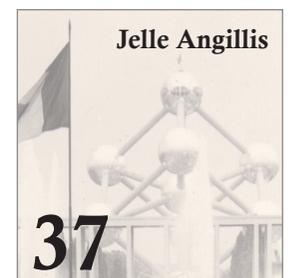
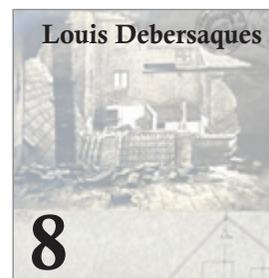
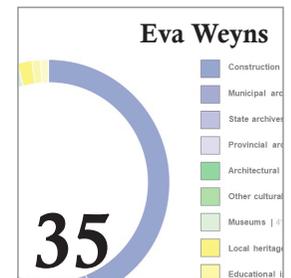
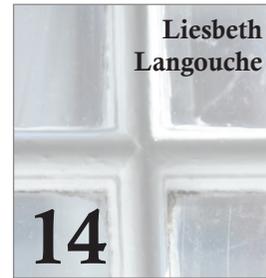
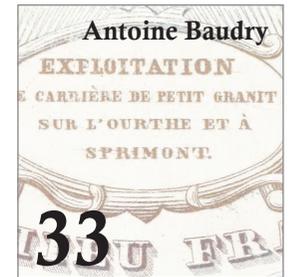
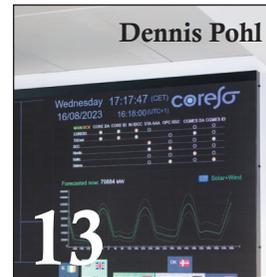
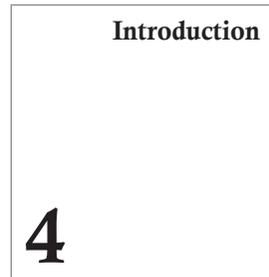
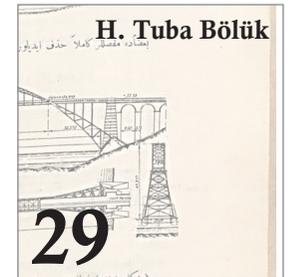
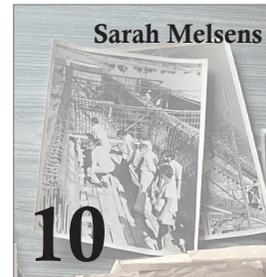
5th Interuniversity research seminar
Construction History in Belgium

March 14, 2024

Book of Abstracts

Stephanie Van de Voorde (ed.)

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Introduction

Welcome to the 5th Interuniversity Research Seminar on Construction History in Belgium. Building upon the success of previous editions held in Antwerp (2019 & 2023), Brussels (2021), and Liège (2022), this seminar continues to serve as a pivotal platform for the exchange of knowledge and ideas within Belgium's academic landscape.

The seminar series originated in the wake of the 6th International Congress on Construction History (6ICCH, 2018) in Brussels, driven by the collaborative efforts among scholars affiliated with five Belgian universities. These seminars foster a space where researchers can convene, discuss their findings, share insights, and establish collaborative endeavors. Particularly significant in the absence of a formal society for construction history in Belgium, these seminars play a crucial role in cultivating a cohesive research community across various universities. Moreover, these gatherings uphold the tradition of facilitating knowledge exchange not only among universities but also between academics, policymakers, and industry experts involved in history and heritage preservation. Notably, architectural and archival institutions are increasingly recognizing the importance of preserving sources related to 'the art of building', further enriching the scholarly landscape.

Construction history research in Belgium is currently thriving. An analysis I conducted for the symposium commemorating the tenth anniversary of the Gesellschaft für

Bautechnikgeschichte in Berlin, held in May 2023, revealed significant findings. Over the past decade, 43 PhDs have been completed in the field, with approximately 30 more currently in progress, indicating sustained momentum. Moreover, there has been a remarkable presence of construction history researchers within the Belgian academic landscape. Approximately 150 scholars have contributed to construction history research in Belgium over the past decade. It's noteworthy that not all scholars on this list strictly identify (themselves) as construction historians, yet their work aligns with the themes addressed at construction history conferences and seminars. Additionally, the twenty research groups in which these scholars are embedded, spread across eight different universities, do not primarily or exclusively engage with construction history but rather focus on related fields such as architectural history, design sciences, heritage studies, archaeology, structural engineering, urban planning, urban history, contemporary history, and art history.

This Book of Abstracts provides an overview of (PhD) research that will be presented during the 5th interuniversity research seminar on construction history in Belgium, covering a wide range of topics from introductory pitches to more elaborate presentations. The participating scholars span diverse disciplinary backgrounds, including architecture, history, engineering, law, heritage, archaeology, and environmental studies. Therefore, research topics often transcend

Stephanie Van de Voorde

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disciplinary boundaries, incorporating insights from multiple fields to offer holistic perspectives on how constructions reflect societal values, technological advancements, and cultural norms. Studies delve into the socio-economic dynamics of construction industries, labor relations, and regulatory frameworks, offering insights into the lived experiences of workers and the broader social implications of construction activities. Additionally, presentations explore questions of identity, corporate branding, and architectural representation.

The research presented spans a broad temporal spectrum, from the 15th to the 20th century, focusing primarily on Belgium but also extends to other geographical contexts including India and the Ottoman Empire.

Researchers draw upon a wide range of archival sources, including court reports, patents, photographs, architectural plans, and historical documents, to reconstruct and analyse historical construction practices. In particular the use of visual evidence, such as construction site photographs and architectural drawings, plays a significant role in understanding construction processes, architectural design, and socio-cultural contexts.

Overall, this quick sketch of some of the overarching trends and themes in the research presented during the seminar underscores the dynamic and interdisciplinary nature of construction history research, offering valuable insights into the historical, social, and cultural significance of the built environment.

We extend our gratitude to all participants for their invaluable contributions and express our sincere appreciation to Prof. Tom Leslie (University of Illinois) for his role as an external reviewer.

Special thanks are also extended to the VUB and ULB for their financial support through the joint VUB-ULB research group on Construction History and the NSE Doctoral School (VUB).

We look forward to a day filled with engaging discussions, insightful presentations, and the forging of new collaborations in the dynamic field of construction history!

Architecture and identity of the regional power company Centrales Electriques des Flandres (1911-1928) and its successors: a case study

Pieter De Raedt

affiliation: VUB Architectural Engineering

research project: History and Heritage of the Belgian Power Industry (1885-2015) [2015-2025]

supervisors: Ine Wouters (VUB); Inge Bertels (UAntwerpen)

website: <https://www.vub.be/arch/people/pieter-de-raedt>

Since the beginning of the twentieth century, the landscape of the Belgian power industry has been both complex and in a continuous state of change. Scientific literature on this industry is extremely sparse and its deeper understanding requires in-depth investigations. Yet, the results can be rewarding, as the history and organization of the power industry, maybe more than any other industry, allows to reflect on the entrepreneurship and policy-making adopted by a country as a whole. The built heritage of the power industry can thus serve as a mirror for society to reflect on its evolution and identity.

The PhD, entitled *History and Heritage of the Belgian Power Industry (1885-2015)* aims at invigorating this idea or debate, by applying new results from industrial archeological research to tackle a set of research questions. During most of the twentieth century, dozens of private or public regional power companies were active simultaneously in Belgium. In this contribution, the architecture and the identity of the private regional company *Centrales Electriques des Flandres* (CEF), which was active in large parts of the Belgian provinces East Flanders and West Flanders as of 1911, will be analysed as a case study.

Soon after its establishment as a company, the CEF called upon a young architect Eugène Dhuicque (1877-1955) to design the iconic central power station of Langerbrugge, near Ghent. The CEF created its own construction service for laying the cables of the distribution

network and for building transformer houses, partially using materials or techniques which were developed in-house. Leopold Herry, who directed the power station from 1914 to 1933, was a daring entrepreneur who did not hesitate to have international technology suppliers put their latest technology into practice for the first time at Langerbrugge. In 1928 the company was renamed *Centrales Electriques des Flandres et du Brabant* (CEFB) after a merger which hardly impacted its autonomy. In 1956 and 1990, other mergers followed. The power plant was extended for the last time in 1993, and shut down in 2010. The older parts were turned into a museum in 1986, but this activity was closed down in the late nineties and the site was briefly abandoned after the closure of the power plant in 2010.

Today, with parts of the site being reused and others still looking for a final destiny, it is time to look back at the role which the CEF played in bringing together some of the most remarkable actors of the time in this industry. This contribution will explore the influence of architects and engineers in shaping the future, by making design choices which could stand the test of time. Inspired by ideas first forwarded by Thomas P. Hughes in his masterpiece *Networks of Power : Electrification in Western Society, 1880-1930*, a critical reflection will be developed on the relation between technology and society : did new technology define society or did society define the way in which new technology was applied ? The



timing of the successive transformations of power station will be compared to that of new advances in technology and of general changes in the organization of the Belgian power industry. Finally, the potential of smaller built heritage (such as transformer houses) to serve as living testimonies of the past and present organization of the country will be analysed.

Transformer house of the Centrales Electriques des Flandres in Aalter, Belgium. Converted into a tiny museum for the 100th anniversary of electric power distribution in the municipality of Aalter, 1923-2023 (photo by the author).

Normativity and expertise: a case study concerning the use of Belgian criminal court reports in construction history research (1907)

Louis Debersaques

affiliation: Vrije Universiteit Brussel, Faculty of Law & Criminology & Faculty of Engineering Sciences

research project: The Judge and the Builder. Expertise, normativity and the diffusion of liability in the Belgian construction sector through formal litigation records (1890-1970). [EOS project 'Construction History: Above and Beyond', 2023-2027]

supervisors: Dave De ruyscher (VUB+Tilburg University) & Stephanie Van de Voorde (VUB Architectural Engineering)

website: <https://researchportal.vub.be/en/persons/louis-debersaques>

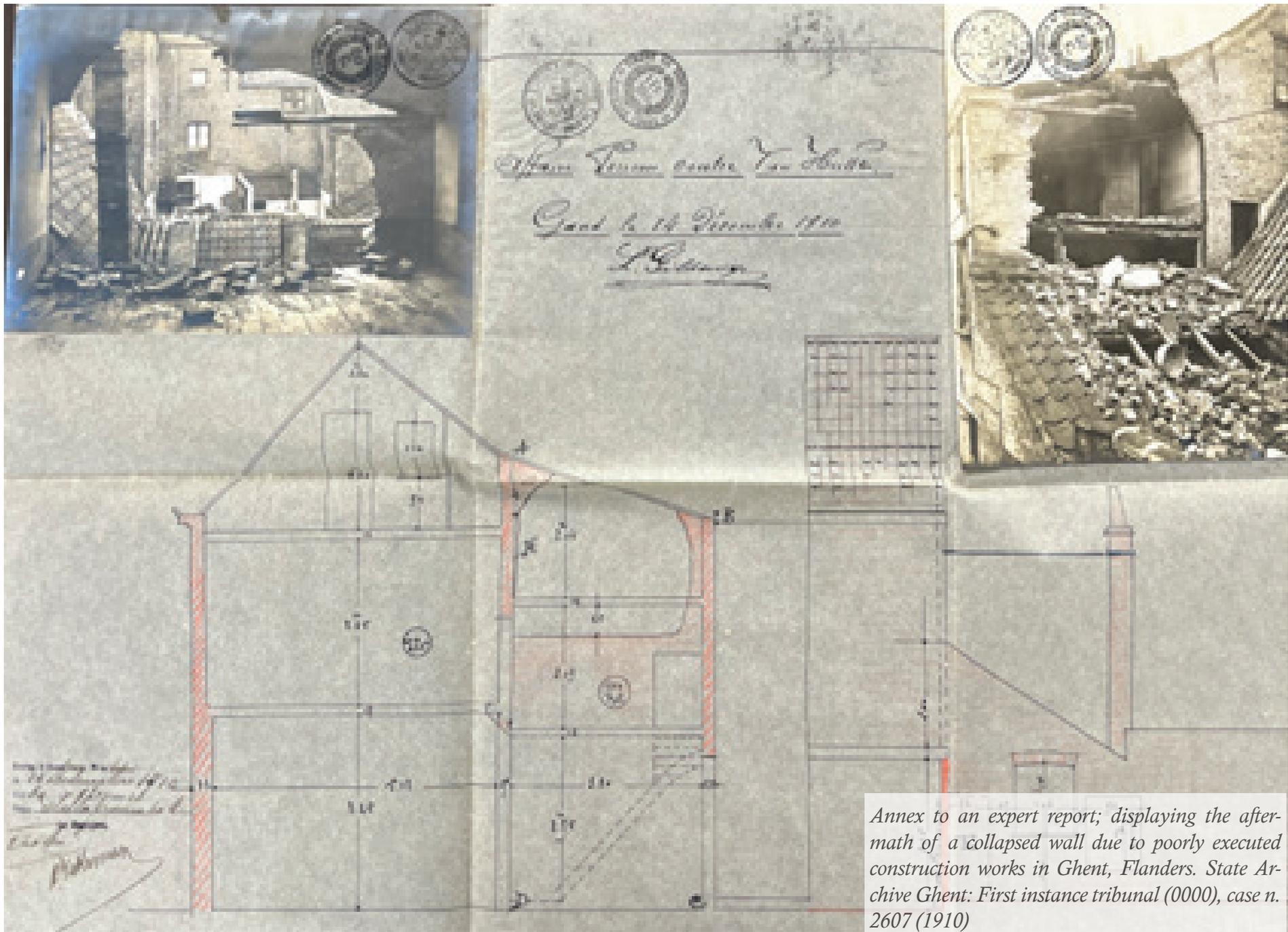
Situated at the intersection between construction history and legal history, this PhD research sheds light on previously overlooked aspects of the construction site through an integrative analysis of legal actors and judicial sources. While previous historical research has explored collaboration among different construction professionals, there remains a significant gap in understanding their interactions during conflicts. In my study, I aim to address this gap by scrutinizing instances of dispute among building actors in Belgium between approx. 1890 and 1970. Specifically, the focus is on legal disputes related to structural damage, which entail considerations of fault liability and its implications (e.g., debt-claiming).

The central research question guiding this investigation is: “How was responsibility for structural damage allocated among building actors in civil and criminal litigation proceedings in Belgium (1890-1970)?” This question delves into how professional competence and identity were articulated in litigation files during a period marked by adaptations in both legal and professional frameworks to accommodate the changing social realities spurred by technological advancements and industrialization in the aftermath of socio-economical upheavals (e.g. worker protests in 1886). To explore liability, I investigate the concepts of ‘expertise’ and ‘customary practice’ through formally sentenced (in Dutch: *gevonnisse*) litigation documents to elucidate the implicit normativity regarding

practical knowledge on construction sites. The timeframe under scrutiny will be divided into distinct ‘time blocks’ separated by significant legislation milestones such as the Architects’ Act of 1939 and the adoption of the Belgian Judicial Code in 1967.

The utilization of judicial archives offers a diverse array of sources. The research involves a meticulous assessment of data from first-instance tribunals in the jurisdictional appellate resorts of Ghent and Brussels (incl. Antwerp), with a particular focus on expert reports from both civil and correctional tribunals. This comparative approach examines civil and criminal procedures concerning carefully selected cases of conflict, exploring questions such as the identification and qualification of experts, the nature of disputes over structural damage, and the allocation of responsibility. Additionally, witness reports in correctional files are examined to understand the concept of customary practice.

In this presentation, I will spotlight a criminal case involving a construction accident in Turnhout (1907) that violated article 418 of the Penal Code (pertaining to involuntary injury and/or death) and involved instances of ‘blame shifting’. By showcasing this specific case, I aim to demonstrate how judicial documents focusing on expertise and customary practice can unlock the potential of construction history as a field of research through a contextual legal history approach, enriched by the method of critical discourse analysis.



Annex to an expert report; displaying the aftermath of a collapsed wall due to poorly executed construction works in Ghent, Flanders. State Archive Ghent: First instance tribunal (0000), case n. 2607 (1910)

Opaque windows into building workers' lives: Construction site photographs from twentieth-century India

Sarah Melsens

affiliation: Centre for South Asian and Himalayan Studies, EHESS-CNRS, Paris and Flame University, Pune (scientific collaborator Universiteit Antwerpen)

research project: Omitted from history: How workers on India's building sites mediated twentieth-century modernity [European Union, Marie Skłodowska-Curie global postdoctoral fellowship, 2023-2026]

supervisor(s): Vanessa Caru, CNRS; Maya Dodd, FLAME University

website: www.buildingpune.com

Omitted from history

Urban and architectural histories of 20th-century India tend to focus on how policies, design concepts, and ideas of modernity have shaped urbanisation. They often neglect the contingencies of actual building processes and the essential contribution of workers in constructing the nation's built environments. The research project 'Omitted from History: How Workers on India's Building Sites Mediated Twentieth-century Modernity' proposes to rewrite India's modern urban-architectural history from a bottom-up perspective; as a history of changes and continuities on the building site. Focusing on the key period of transition between India's colonial past and the present (1917-1992) and the regional city of Pune, the project involves active participation from local architects, building contractors, engineers and construction workers, along with their descendants. The aim is to co-create knowledge on aspects of expertise, technology, and the market as they played out on building sites.

Building sites are constellations where sophisticated machinery and archaic muscular work occur simultaneously and where divergent socio-professional groups interact. Reconstructing their inherent complexity necessitates diverse sources and methods. Decolonial praxis has highlighted the epistemological value of non-written sources for exposing gaps in institutionalised archives that

are often associated with power (Cusicanqui, 2005). It also questions traditional models in which academics are centred as arbiters of knowledge or considered the most important consumers of archival records (Caswell, 2017). In an endeavour to include under-represented perspectives, the project deploys the power of building site photographs to gather memories of construction work. The first phase of data collection will result in a postcustodial public archive of digitised historical photographs of building sites in and around Pune. The second phase involves person-to-person and social-media interactions that draw on these photographs to elicit and record lived experiences.

Construction site photographs and their afterlives

Building site photographs, such as those of Indian labourers building colonial New Delhi or Le Corbusier's new capital city of Chandigarh, increasingly feature as evocative 'illustrations' in architectural historiography on the region. Yet, photos of building sites in (British) India have not themselves been used as primary sources that warrant methodological scrutiny. Through a case-study of two construction photograph collections this paper discusses methodological approaches that enable such images to 'speak' of the histories of building workers. As elsewhere, building site photographs were often commissioned or taken by actors in the building industry as a



form of 'instrumental' or 'record photography' for communicating the works' progress and for evidence keeping (Chrimmes 1991), for business promotion, and also out of artistic curiosity. In many cases, photographers were not particularly committed to documenting building workers.

Drawing upon recent insights in (post)colonial photography and archival ethnography, I argue that three moments of 'mediation', inherent to the medium of building site photography, are revealing of (perceptions of) building workers' lives: the moment of photographic action, the initial insertion of photographs in the organisational record, and the afterlives of the photographs. I demonstrate this by comparing two collections of building site photographs from twentieth-century (British) India: photos of road and bridge construction in the Pune Public Works Department records room (1930s-1980s) and photographs of infrastructure works by Pune building contractor V.R. Ranade & Sons (1920s-1970s) in the ownership of the firm's descendants. While these collections were selected at random for the purposes of this study, they all result from 'self-archiving' processes and remain with the organisations

Photographs of buildings and building sites in the records room of the Public Works Department, Pune. (photo by the author)

that originally commissioned the photographs. One can therefore not only draw meanings from them by retracing the contexts in which the photos were commissioned and made, but also by analysing the photographs continued interactions, as objects, with the institutions in which they are housed and the people who now act as their custodians.

The first moment of mediation involves the content of the photographs themselves. What do the images reveal of the photographic event as an action that implies both the recording of 'facts' and the making of meanings. These meanings are, intentionally or not, inscribed by photographers—who may frame workers in a particular manner—as well as the photographed workers—who may strike a pose. Even when workers do not form the main subject, cameras, as Elizabeth Edwards and Chris Pinney have shown, tend to register far more than intended (Edwards, 2021; Pinney). Photographs may thus visualize 'the unseen and unspoken' such as the presence of infants on the work sites of the Public Works Department.

The second moment of mediation, considers the materiality of printed construction site photographs as objects that were immediately stored among other records within bureaucracies of building. Materiality is inevitably 'tied to the archive' and, as it enters into dialogue with the image content itself, becomes integral to the meanings of photographs (Gomez-Popescu; Edwards, 2004). Some photographs

within the studied collections are mounted on decorated cards, others carefully placed in albums, and yet others remain as loose prints. Some are annotated by multiple hands, others not. In the absence of detailed information on the photographic event, these material clues, together with other non-visual historical sources in the same collections, help reconstruct values assigned by commissioners and users of the photographs. By confronting the materiality and archival contexts of photographs to the images' content, contested meanings of the roles of building workers in a modernising India emerge.

The third moment of mediation involves the afterlife of building site photographs as objects which may be forgotten or conversely, to which 'things happen' at a later moment in time (Edwards, 2021). In this part I discuss examples of how custodians reappropriated certain images of building sites to different ends – whether Public Works Department employees reordering the record room and according new values, or Ranade family members deploying photographs to promote a legacy construction firm. These afterlives further testify to those characteristics of photographs that perhaps set them apart the most from narrative sources such as texts and oral testimonies: the photograph's tendency to record more than intended and its 'recordability' ('it can never belong to one narrative exclusively') (Edwards, 2021; Azouley, 2008). Drawing upon recent interactions at a photo exhibition of research-

in-progress, I argue that it is these characteristics that allow photographs to effectively be deployed in collective events of participatory history-making that extend beyond academic boundaries. Reinserting building site photographs in new interpretational contexts thus emerges as a promising way of rendering these windows into building workers' pasts less opaque.

Building Carbon Europe

Dennis Pohl

affiliation:
TUDelft/Vlaams
Architectuurinstituut

book presentation
(Sternberg Press, 2023)



In this volume of the Critical Spatial Practice series, I locate the origin of Europe's dependency on carbon and nuclear power in the postwar architectural designs and energy policies of the European Community. Since the 1950s, architects have proposed territorial, regional, and urban development plans that served the European political project. They collaborated with the European Coal and Steel Community in an effort to render the steel building industry as efficient as the car industry; they incorporated the ideas of infinite nuclear energy, as promoted by the European Atomic Energy Community, into their designs.

This book demonstrates how architecture served the political economy of postwar Europe as a means of turning coal, steel, and radioactivity into tools of European governance. Architectural design enabled EU institutions to support social policies and worker housing within the coal and steel industry as well as to promote a new pan-European lifestyle based on nuclear energy. In other words, architecture powered Europe's larger infrastructural, economic, and cultural network. This work not only sheds light on how architecture has contributed to the carbonization of Europe, it also highlights the environmental issue, which challenges both architectural criticism and historiography in the era of the Anthropocene.

Perception and use of clear window glass in the 15th-19th centuries

Liesbeth Langouche

affiliation: Antwerp University

research project: The look of window glass. A social and cultural history of clear window glass from the 15th to the late 19th centuries in the Scheldt-Meuse-Rhine-region [BOF, 2018-2022]

supervisors: Joost Cean (Antwerp University), Bert De Munck (Antwerp University), Bruno Blondé (Antwerp University)

In 2022, I finished my PhD on the topic of the application of clear window glass in the Scheldt-Meuse-Rhine region from the 15th to the late 19th century. This subject is particularly interesting, as throughout this period a large – though ever varying – range in window-glass types was available in different qualities and price categories. This implies that, when glazing their houses, people had a choice of window glass. The awareness about the different types of window glass also influenced the perception of window glass and its application. The general idea that window glass changed from a luxury item to a commodity is definitely only partly true. However, the following questions can be asked: (since) when was window glass considered an element of comfort or even a necessity? At this point, did it completely lose its luxury status, and if not, to what extent? What were the reasons behind opting for a certain type of window glass? Exactly which glass types were available, and what did they look like?

These questions form the core of my study, which discerns three major turning points in the history of window glass in the Southern Netherlands. The first is the generalisation of window glass from the 15th century onwards, a development that was stimulated by urbanisation, improving living standards, increased demands for comfort,... and a significant drop in glazing prices in the early 16th century. Secondly, I zoom in on the 17-18th centuries, when revolutionary changes

occurred with respect to both window design and the production of window glass. Although different glass types circulated during the previous centuries, their number experienced a serious ‘boost’ from the late 17th century onwards with the emergence of some high-quality varieties. These expanded the choice of window glass, and their specific qualities contrasted greatly with some of the long-known types of glass insofar as these last were considered inferior and even old-fashioned. Moreover, this new evolution took place at a time when light became more significant. With their craze for brilliance and illumination, the 17th and more particularly the 18th century are legitimately called ‘the Age of Enlightenment’.



De Neve-d'Hanins House, Waasmunster. In its street façade, at least three sorts of original window glass can be discerned.

© Liesbeth Langouche.

Finally, although the new perception of window glass lived on in the 19th century, it was challenged by the Romantic spirit, which made the past fashionable again, without totally rejecting innovation. Furthermore, the 19th century was an energising period because of the many technological and social changes. New building typologies were developed. Iron and steel led to new architectural possibilities while creating openness. And thanks to industrial innovations, cheaper window glass came on the market and was available in larger panes. But most of all, it had become easier to maintain the same quality. The divergence between this 'modern' tendency on the one hand, and the Romantic embrace of tinted or stained glass in leaded windows on the other, is the third turning point that is discussed.

Comfort, luxury, fashion and conventions are just some of the central elements in my study, which is situated in the broader field of material culture. Besides broadening our knowledge about the history of clear window-glass consumption, it also fills a gap in the field of conservation and restoration of built heritage. In many ways, historical window glass is now a neglected material, all too often substituted by modern window glass, if only because of modern insulation regulations. It is not only a material, but also unique physical evidence of our history that is being thrown away without us even realising. Some of the glass types have long since ceased to be produced, and have



therefore become irreplaceable. Moreover, as my study makes clear, the original window glass can be a social marker: a well-chosen application of certain types of glass within a building can reveal a great deal about that building's original status and its owners or inhabitants. For all these reasons, it is vital to raise awareness about the significance of historical window glass.

Another problem is that when monuments are reglazed, a science-based, ethically justified approach is currently lacking. As a solution to his hiatus, I present a roadmap for conservation practices as a new tool for the heritage professional. The proposed methodology accentuates the importance of combining different disciplines and every available source. Conservation ethics and investigation of the historical material need to be supplemented with sufficient historical knowledge. My own study provides the necessary background, including an overview of the history of window glass production and the trade, which gives insights into, for instance, the differences between types of glass and their denominations. Besides this, it shows the value and relevance of combining several sources.

Pinkish pane of crown glass, in the vestibule of De Neve-d'Hanins House.

© Liesbeth Langouche.



During my study, I made use of four different sources. The first are iconographical sources: paintings and drawings showing windows and their window filling. Secondly, I searched for historical window glass, preferably in its original context, as this could be revealing about its application. As such, I visited many historical buildings which still have their original window glass. Besides examining the glass visually, I also analysed the glass chemically. That is why, whenever loose fragments of window glass were available, these were collected on the sites. After all, the analytical method used was SEM-EDX, which requires embedded samples. The third source is literature, including architectural treatises and glaziers' manuals. And last but not least, archival study must be mentioned. Several of my own conclusions are indeed supported by new

data from archival documents such as building specifications and other correspondence regarding building projects and window glass. Most important were the many hundreds of glaziers' invoices that I analysed, covering a period from the late 15th to the late 19th century. Often very detailed, these give crucial information about the conscious application of window glass. Because the invoices originate from the archives of important and noble families, the buildings they refer to are mostly stately residences. Nonetheless, these same families owned lower-ranked buildings as well, including rental houses, farms and stables. Obviously, this increases the invoices' value. But it also shows that they must be included in the study of a monument's construction history, especially in view of (re)glazing it.

A pane of cylinder glass, in one of the rooms of the first floor of De Neve-d'Hanins House.

© Liesbeth Langouche.

Invention patents and the technological innovation in the 19th-century window-glass industry

Vitaly Volkov

affiliation: Antwerp University, Faculty of Arts, History Department

research project: Governance, technology and craftsmanship in the Belgian window-glass industry: The Charleroi region, 1830-1914 [FWO, 2018-2023]

supervisors: Bert De Munck (Antwerp University, History Department), Joost Ceau (Antwerp University, Cultural Heritage Science Department)

The research project entitled ‘Governance, technology and craftsmanship in the Belgian window-glass industry: The Charleroi region, 1830-1914’ contributes to the debates on the nature of the 19th-century industrialisation and technological development exploring the case of the Belgian window-glass industry. During the period between the Belgian independence in 1830 and the outbreak of the First World War in 1914, this industry experienced steady growth, making Belgium one of the most important window glass manufacturers in the world. Moreover, during this period, this industry was largely concentrated in the Charleroi region. Therefore, the study takes a primarily regional approach, adopting the Industrial-district theory as its principal conceptual framework.

The present research project contributes to several historiographical topics, such as the history of the window-glass industry in 19th-century Belgium, the history of industrial districts as specific structures of business organisation, and the history of the relationships between technological innovations and craftsmanship in the context of the industrial revolution. Therefore, the objectives of this study transcend the purely Belgian context, as it contributes to important international debates, taking the often-overlooked industry as a specific case.

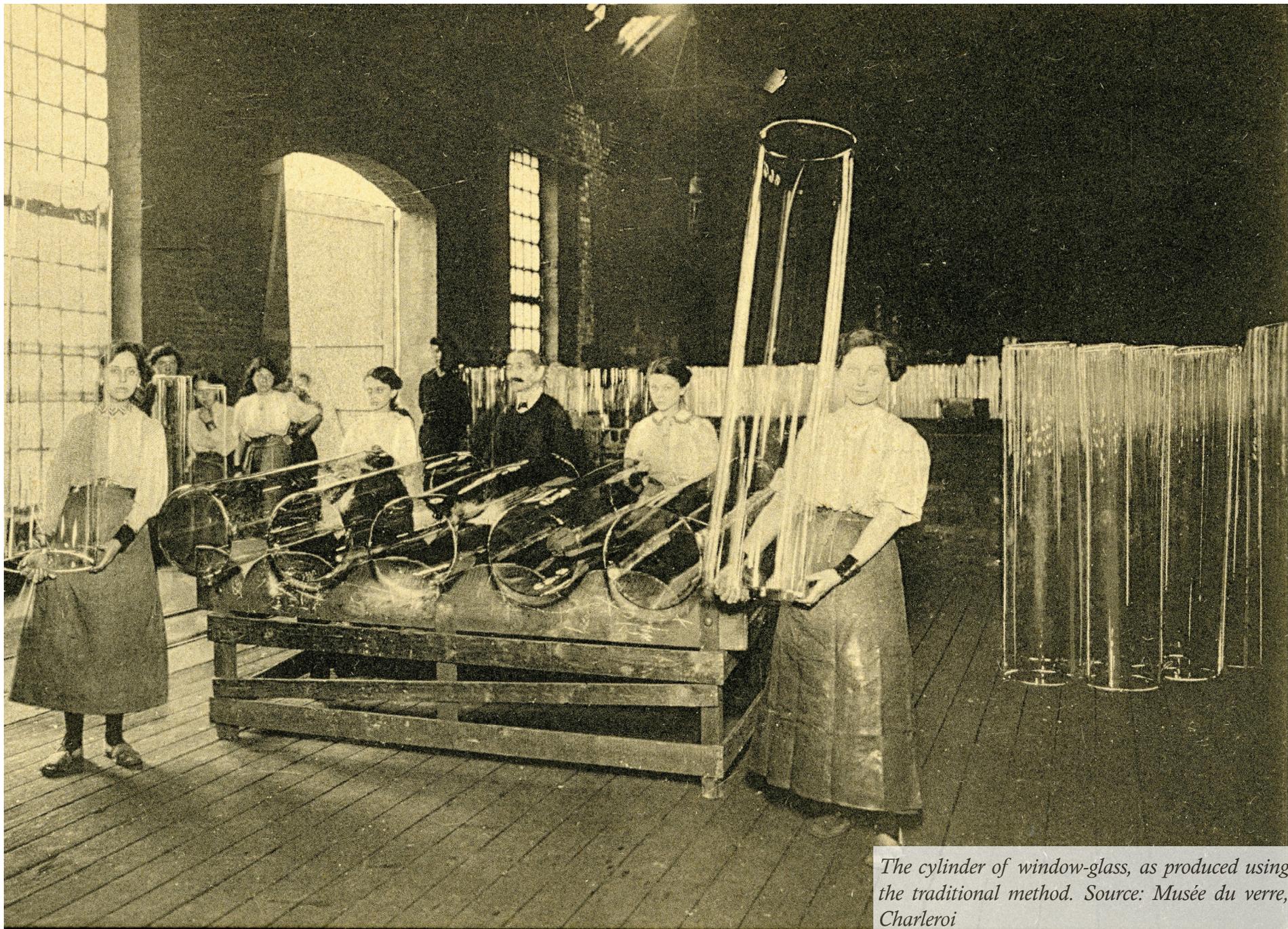
The development of the Belgian window-glass industry is specifically explored through the examination of the governance structures

that emerged in the Charleroi district, as well as through the development and management of technological innovations and their relationship to craft traditions.

The findings of this study present a picture of a dynamic industrial environment consisting of multiple actors (firms, business interest organisations, government) that showed remarkable technological creativity, integrating traditional craftsmanship and technological innovations, and was characterised by business organisations that was tightly integrated in the international networks of commerce and information exchange. Yet, this organisation was not without its limitations, as exemplified by some ‘dissident firms’ that refused cooperation for various reasons.

The part presented at the 5th interuniversity research seminar on construction history in Belgium considers the specific topic of invention patents. The invention patents can provide a rich source for the history of innovation and technology. Hereby, they can be employed in district ways, depending on the research objectives. In the context of the present project, invention patents were used as sources in following ways.

On the one hand, invention patents were used in the context of knowledge-management, as patenting was one of various strategies for the protection and dissemination of knowledge. In this context, the ‘subjects’ of patents (the innovations themselves) are of lesser importance. Most attention goes to



The cylinder of window-glass, as produced using the traditional method. Source: Musée du verre, Charleroi

questions like what kinds of innovation were patented (and what kinds were not) and why. In more general terms and regarded in this way, patents can provide us with valuable information about the functioning of the 'knowledge community' within the given industry. Moreover, invention patents can be seen as a key part of the international 'market for technology' (or the 'market for innovation'), as they facilitated trade in know-how. Patent agents, that is, lawyers specialised in intellectual property, assumed the role of intermediaries assisting the functioning of this market. In various national contexts, their functions could include the provision of legal information for inventors or the for the trade in patent rights. In the latter case, they can be described as 'brokers'. Therefore, in this case, patents were treated as a source for the history of knowledge-management.

On the other hand, patents were used as a source of knowledge about the development of technology. Despite their potential value from this research perspective, patents should be used with a certain caution, as the relationship between patenting and innovation is not always straightforward. While not all patents were put into practice as a useful innovation, not all inventions were patented. In some cases, the practical implementation of innovations can be corroborated by other sources, such as descriptions and plans (drawings) of factories, found in the files of the requests for the establishment or modification of factories. In this case patents are to be considered as a

qualitative source for the history of technology.

Invention patents can also be employed for the study of the history of technology in another way, as an indicator of the general trends of innovative activity. Even if many of the patents were not put into practice, the general trends in patenting indicate which aspects of the production process (specific devices or production steps) attracted special attention in specific periods of time. In a way, patents at least reveal what was seen as 'problematic', 'in need of improvement' and induced most of the 'technological creativity', even if the majority of those improvements remained without practical implementation. However, the impression gained from the quantitative analysis of invention patents can be one-sided. General trends in patenting can reveal certain aspects of innovative activity while eclipsing others. Therefore, corroboration by other sources is desirable. In this case, patents are to be regarded as a quantitative source for the history of technology.

The empirical research, based on a representative sample of invention patents, shows that the propensity to patent appears to have been high. Of course, it is impossible to find the ratio between patented inventions and non-patented inventions as we simply do not have any indication of the number of the latter. However, all important technological developments (melting furnaces and annealers) were represented by patents. Moreover, the

proliferation of 'trivial patents' for very simple tools and devices reinforces the idea that the propensity to patent was high, and that patenting was popular in the community (including humble members). Another important conclusion is that patenting activity was strongly embedded locally within the Charleroi region. On the other hand, Brussels, that lacked any window-glass industry, started to play a role as an 'innovation gateway' and a 'market for innovation' from the 1840s on. The first foreign window-glass related patents were registered in Brussels in 1846, 1847 and 1848. By the early 20th century, the Brussels 'market for innovation' seems to have become truly well-developed. By that time, multiple patenting agents (individuals as well as, apparently, firms) were active in the city as representatives of foreign patentees. Yet the 'import of innovation' was not a one-way street. While the detailed study of the 'export' of Belgian innovations was beyond the scope of the present study, France can be given as an example. Several Belgian window-glass related patents were registered in France from, at least, the 1860s on.

All in all, the research on invention patents reveals important findings that allow for the better understanding of how innovation was developed.

Working with water. Artisans, skills and regulations in the plumbing trade in Brussels, Paris and London (1850-1940)

Matthijs Degraeve

affiliation: Vrije Universiteit Brussel, Departments of History and Architectural Engineering

research project: Plumbing the City. The regulation of sanitary installers in urban Europe (1850-1940) [FWO, 2022-2025]

supervisors: Wouter Ryckbosch (VUB Social History of Capitalism), Ine Wouters (VUB Architectural Engineering)

website: <https://researchportal.vub.be/en/persons/matthijs-degraeve>

In the nineteenth and early twentieth centuries, increasing middle-class standards for domestic comfort, health and safety rapidly transformed the way in which homes were built. The installation of a variety of new and improved building services and utilities – from in-house systems for heating and ventilation to water and energy supply – made building and renovation sites increasingly complex, as they required the appearance of a whole new set of building actors, skills and regulations. Within the discipline of Construction History, the development of building services benefits from a growing attention in recent years, which is especially true for the historical development of water supply. Very often, however, this history is reduced to the construction of public utilities, while a crucial step consisted of water supply and sewer systems also being extended into private homes and other buildings as indoor plumbing. Only in this way could public systems actually be utilised and achieve the desired effect in improving public health and private hygiene. However, it is hardly known how and by whom this construction of indoor water and sanitary amenities was carried out. For this, the existing research scope on business actors in Construction History is in need of an expansion, not only looking at large-scale (general) contractors but also at the smaller-scale building artisans who, often working as subcontractors, used their highly specialised skills in order to decorate, furnish and equip homes and buildings in a variety of ways.

The FWO post-doctoral research project ‘Plumbing the City’ aims to address this research gap in Construction History by focusing on one of these little-studied building trades, that of plumbers. In a modernising and industrialising society, plumbers formed a remarkable group of artisans, who on the one hand flexibly adapted and reacted in large numbers to a rapidly emerging and transforming market demand for domestic sanitary comfort, while on the other hand remaining organised in a strikingly traditional way, with labour-intensive work, small-scale businesses, and the importance of skills and craftsmanship outweighing the formation of capital-intensive and large-scale companies that characterized many other industrial sectors. Instead, given the fragile, heterogeneous and technologically complex nature of modern systems of in-house water supply and drainage, plumbers became prime agents of maintenance, renovation and repair, thus showcasing the enduring relevance of these alternative modes of production in the midst of a modernising society, which increasingly relied on mass production and consumption, not least in terms of housing and construction.

This research focuses on the historical development and transformations of the plumbing trade (1850-1940) in London, Paris and Brussels. They are comparable as rapidly growing and industrialising capital cities in Western Europe, where indoor sanitary comfort developed at an early stage. However,



Plumbing at Hotel Solvay, 1901, Avenue Louise 224, Brussels (photo F. Vandeputte)

in terms of the cities' political and institutional organisation, socio-environmental conditions and layout of the urban fabric, they represent fundamental differences which impacted the installation of in-house sanitary amenities. It warrants an explicitly comparative approach to assess whether this also produced different modes of organisation among plumbers in these cities.

The research is divided into three subquestions. The first focuses on the impact of urban governments on in-house plumbing, as part of their objectives to improve public health and sanitation in the city. In this way, it can be assessed how government interference on private property directly or indirectly influenced the formation and development of local plumbing trades, for example by performing sanitary inspections or by imposing the use of certain materials and technologies in building regulations. A comparative perspective on the progressive implementation of rules on in-house toilets and water closets shows that – although at different paces in the three cities – governments increasingly attempted to regulate the installation of toilets on private property in order to realise their ambition to establish the entire system of urban drainage on the principle of 'tout-à-l'égout'. The interactions between government regulations and plumbing artisans worked in two directions, however, as various reactions and lobbying attempts by Parisian plumbers provoked by the implementation of 'tout-à-

l'égout' in the 1880s and 1890s make clear.

Secondly, the business organisation among plumbers is placed central. Census data, fiscal registers and trade directories provide insight into the persistently small scale of operations, informal company forms and low levels of capital input among plumbing firms, which nonetheless often joined forces in trade associations. The sources also allow to analyse the growing amounts of plumbers in each city, and how these were affected by changes in regulation and the development of public utility infrastructure. However, not only plumbers had their eyes set on the promising upcoming market for indoor sanitary installations. In various other trades, entrepreneurs initially reoriented towards working with water as well, before they eventually all marketed themselves as plumbers. The emergence of sanitary comfort in the nineteenth and early twentieth century marked an era of conflict between different actors in the sanitary market, including government employees, public works contractors, manufacturers of sanitaryware, and in-house installers. Following frequent redrawings of market relations and trade demarcations, a power balance between government and industry eventually emerged in the early twentieth century, based on a strong market dominance of mass producing suppliers of sanitaryware, which usually relegated plumbers into a state of dependency.

Lastly, the development of plumbing skills is studied. The installation of modern indoor sanitary amenities, such as water closets and bathrooms, connected by intricate networks of in-house water pipes and drains to public water supply and sewer systems, was a challenging task. It required highly skilled artisans who could flexibly adapt their skill set to rapidly changing technologies, materials, market demands and regulations. This part of the research investigates how this know-how was produced, especially in interaction with government regulations and manufacturers, and how it was disseminated within the plumbing trade. In this respect, an especially important role was reserved for plumbing trade unions and associations. They participated to conferences and committees where plumbing standards were set, promoted the establishment of vocational schools and on-the-job trainings, set up internal quality standards and systems of registration for 'qualified plumbers', and lobbied with their national governments to establish a nationwide legally recognised scheme of licensing and registration for plumbers.

Constructing the Modern Church. A Multidisciplinary Analysis of Post-War Church Roofs in the Context of Adaptive Reuse

Chiara Kuijpers & Femke Van der Meulen

affiliation: VUB Architectural Engineering, KU Leuven

research project: Meaning and Material. Towards a Multidisciplinary Assessment of Post-War Church Roofs in the Context of Adaptive Reuse [FWO, 2023-2027]

supervisors: Stephanie Van de Voorde (VUB), Sven Sterken (KU Leuven)

website: www.vub.be/arch/project/postwarchurchroofs

After the Second World War, ecclesiastical authorities set out on an extensive church building campaign aimed at promoting the Catholic faith in newly developing neighbourhoods. Thousands of churches were built all over Europe, with over 250 alone in Flanders between 1945 and 1964. This surge in construction was facilitated by the widespread use of innovative building materials and techniques, alongside the expertise of architects, engineers and/or contractors who became increasingly familiar with these advancements.

Materials such as glued laminated timber (glulam), prestressed concrete, and steel 'space frames' were prominently utilized in the roof structure of these churches. This allowed for the creation of large, open spaces, while simultaneously serving as tangible signs of modernity. The experimentation with both building materials and architectural designs posed a significant challenge to the traditional image of the Flemish parish church, as architects but also church authorities sought to create modern spaces conducive to a more interactive form of liturgy.

However, this era of innovation in church architecture came to an end in the early 1970s with the onset of a wave of secularisation, leading to the gradual abandonment of many more churches in subsequent decades.

Today, the fate of many of these once-modern church buildings increasingly hinges on their ability to adapt to new purposes. Neglected

maintenance has resulted in signs of decay such as structural instability, leaks, and fungal infestations. The combination of high costs, widespread vacancy, and a lack of knowledge and awareness regarding the value of these relatively young constructions often results in their demolition or repurposing. Unfortunately, this often occurs without due consideration for their historical significance, heritage value and spatial qualities.

This research will examine the roof structures of post-war churches from four different perspectives: construction history, conservation theory, building pathology and adaptive reuse. We will delve into the history of innovative materials used in their construction and how they fit within broader architectural and structural developments of the time. Additionally, we will assess the current state of these roof structures, identifying patterns of deterioration. Through this comprehensive analysis, we will reexamine the heritage criteria that apply to these post-war church roofs and integrate these findings into a spatial study exploring their refurbishment potential. In this way, we aim to gain a deeper understanding of their roof constructions, as the continued viability of these churches strongly relies on their ability to adapt and remain in use.



Interior image of the Notre-Dame de Stockel in Woluwe-Saint-Pierre (La Technique des Travaux, 1968)

Building the university at the end of the 19th century: the Trasenster Institutes of Lambert-Henri Noppus in Liege (1880-1889)

Astrid Schreurs

affiliation: University of Liege, Faculty of Architecture (DIVA research group – Art, Archaeology & Heritage research unit)

research project: Building Belgian universities in urban areas at the end of the 19th century. The case of the construction of the Trasenster Institutes in Liege by Lambert-Henri Noppus, between 1880 and 1889. (Working Title)

supervisors: Philippe Sosnowska (University of Liege)

website: https://www.diva.uliege.be/cms/c_5387783/en/diva

This research project delves into the construction of universities in urban settings during the last quarter of the 19th century, with a specific focus on the Trasenster Institutes of the architect Lambert-Henri Noppus in Liege. Built between 1880 and 1889, these six scientific institutes were named after their founder, Louis Trasenster, the rector of the University of Liege. From the perspective of construction and architectural history, the study aims to comprehensively understand the genesis of these buildings which are part of our cultural heritage and remain important landmarks in today's city centre. This architectural ensemble also holds significant value within the realm of science history: by analysing their functional design, we can observe the major shifts in research and teaching methods that occurred towards the end of the 19th century, instigated by German universities.

Studying the institutes themselves, along with their intricate creation and construction processes, will enhance our understanding of the technologies and techniques from the period being discussed, as well as the experimentation that might have taken place at the different building sites. The production methods will especially be identified, examining whether they adhered to established construction traditions or adopted innovative approaches. Given the advanced architectural program, tailored to accommodate new equipment to be installed in the laboratories and classrooms,

it will be particularly interesting to determine the extent to which the construction systems were experimental. Additionally, the research will explore the level of interconnection between the building sites, questioning the presence of networked design and planning, as well as economies of scale. Throughout the decade under review, it will also observe the evolution of decision-making and choices within the history of the six constructions, which generally followed a sequential order but occasionally overlapped.

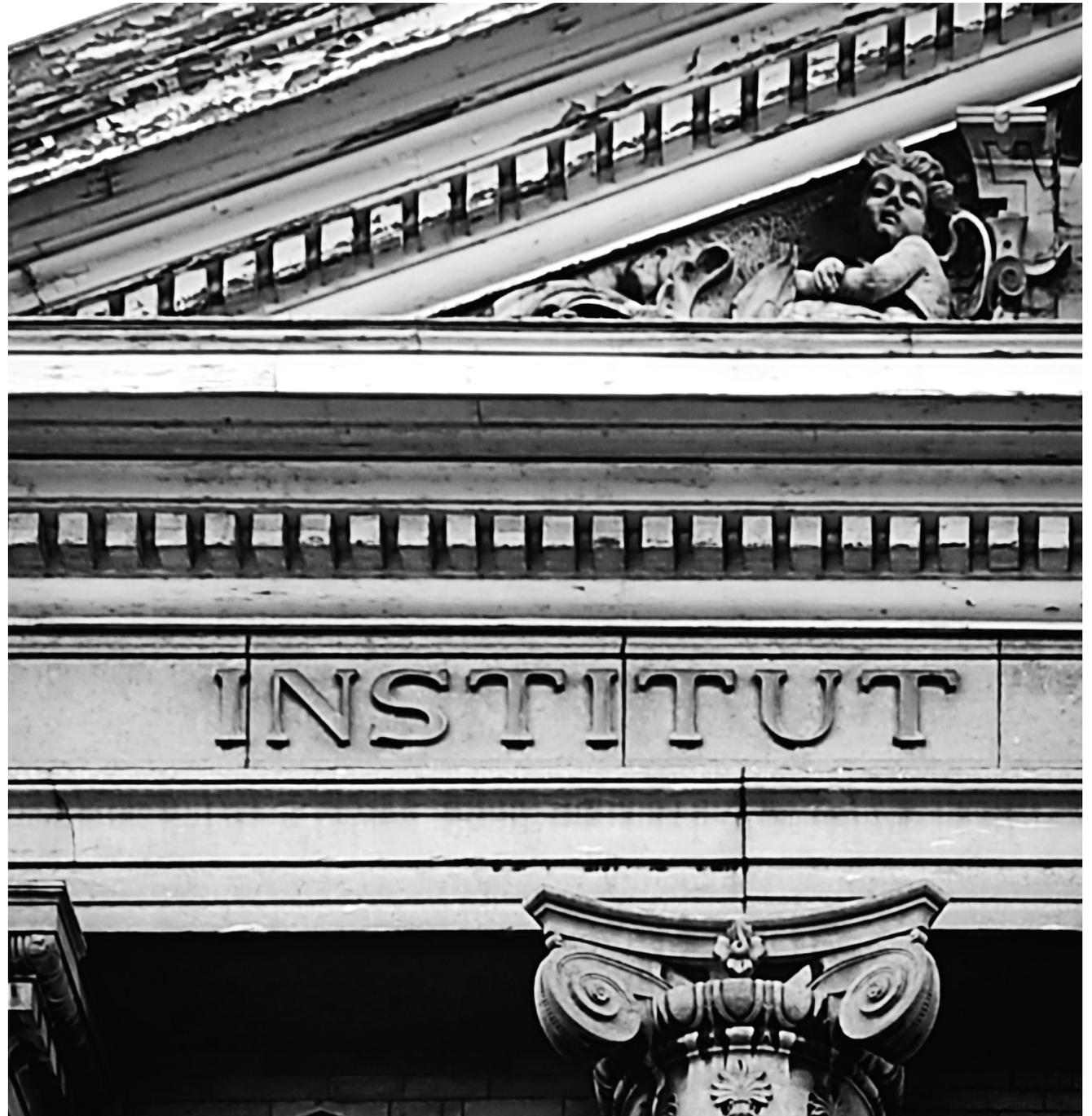
Furthermore, the study will shed light on different actors of the construction field, witnessing at that point a significant professionalization and a shift between craftsmanship and manufacturing. The involvement of other stakeholders beyond the building sector will also be highlighted, such as the national and local authorities, who were notably responsible for funding the project. The crucial role of university staff will also be examined, particularly the one the professors played in shaping the architectural program and influencing various practical choices before and during the construction phase of the institute they would eventually teach at. Finally, studying these monumental construction sites and their interactions will provide a new outlook on the evolving landscape of the university town, then itself 'under construction'. Indeed, understanding the establishment of these six sites located in the city centre will offer insights into their impact on the urban environment and on the

infrastructure development at that time.

To achieve this, three key phases of the Trasenster Institutes' history will be investigated in all their complexity: their conception, their construction, and their reception. Specifically, the analysis of the latter phase will focus on the problems that might have arisen right after the building phase, as well as the feedback provided at that point from different stakeholders. This will enhance the critical assessment of how effectively these buildings met the demands and requirements of the university, city, and state.

Despite the apparent disappearance of the architect's original plans, the research already conducted on the Pharmaceutical Institute as part of my Master's thesis, which I am currently expanding upon, has revealed the wealth of available documentation. Have not only been uncovered an extensive collection of archives, but also a richness of architectural and technical details that can be observed on-site.

Facade ornamentation of the former Zoological Institute of the University of Liege (now "Aquarium-Museum of Liege"). Personal photograph, February 11, 2023.



Railway passenger shelter in Belgium. Built along a dynamic railway line

Baptiste Drugmand

affiliation: ULiège, Faculty of Architecture

research project: Development of rail passenger waiting shelters in Belgium from 1835 to 1950: architectural, constructive and heritage approaches [ULiège, 2022-2028]

supervisors: Philippe Sosnowska (ULiège) & Claudine Houbart (ULiège)

In the 19th century, Belgium experienced international railway fever, driven both by its central location in European territory and the development of its industry. In this dynamic context, an impressive number of technical buildings were necessary to ensure the operation of the dense railway network. Engineers questioned the role of innovation and techniques in achieving their goals: creating functional, inexpensive, and quickly constructible buildings. Among the new building typologies created for the railway, platform shelters stand out as one of the most remarkable elements. These structures are notable for their innovative construction methods and the use of new materials.

Despite the significant role of these structures in 19th-century architecture, most research on shelters remains to be done. Current attention primarily focuses on large halls in contact with the public, recognized for their architectural value. Thus, the majority of platform canopies built according to standard models generally go unnoticed. This is the case for shelters built on the Liège-Namur-Givet line for the network of the Compagnie du Nord-Belge. These modest constructions were mostly erected with an emphasis on economy and functionality during the period 1860-1880. Despite belonging to the same standard model, the ensemble was built by a multitude of contractors, presenting variations and evolutions.

The reflection on this set of standard

shelters constitutes the first case study of the doctoral project aiming to analyse Belgian railway shelters from 1835 to 1914 from a construction and architectural perspective. Research following themes dear to the history of construction aims to renew the study of railway construction over a wide territory and in an evolving manner. It seeks to understand the entire constructive diversity of a standard architecture, focusing on the comprehension of the construction sector from project conception to the finished product. This includes understanding the involvement of engineers, contractors, architects, and public figures in construction, identifying contract awards, prosopographic studies of contractors and suppliers, as well as understanding material transport and on-site assembly.

In parallel with archival research, a material study on the field is pursued for the entire passenger building and shelter at Godinne station (1862). The goal is to confront historical sources with the realities of the terrain. Using building archaeology techniques allows the effects of speed and economy on construction to be understood, and it also enables the detection of construction defects and entrepreneurial initiatives.



Godinne and Hastière stations (1863) and their wooden and cast-iron shelters

After Hejaz Railway: Tracing Civil Engineers from the Ottoman Empire to the Republic

H. Tuba Bölük

affiliation: Antwerp University, Design Sciences

research project: The Formation of Civil Engineering in the Ottoman Empire [2021-2025]

supervisors: Mario Rinke (Antwerp University), João Mascarenhas Mateus (University of Lisbon)

website: <https://artuklu.academia.edu/htubaboluk>

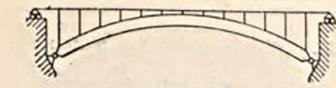
This research project investigates the formation of civil engineering in the Ottoman Empire from the 1830s to the 1930s by focusing on the construction of scientific and technical knowledge. More specifically, this research focuses on conceptual exchange in science and technology through various compilation and translated books, and the processes of implementation through the collaborations between the various actors in the construction sector. In doing so, this analysis draws upon a diverse range of primary sources, including various textbooks, archival materials, such as laws, photographs, diplomatic correspondence, and diaries. Through this approach, the research aims to shift away from the traditional tendency in 18th and 19th-century studies to attribute knowledge production solely to the particular individuals, groups, countries, or organizations. Therefore, by repositioning itself within broader political, economic, and cultural contexts, the research highlights how history can be seen as a dynamic knowledge movement that fosters dialogue and mutual learning.

The research project, firstly, puts the theoretical discussion in the spotlight. The first part of the research offers an interpretive lens that, in a novel way, expounds the difference between simply translating scientific knowledge, and adopting it to Ottoman intellectual structures as a dynamic knowledge through the case study of Ishak Efendi the educator-translator who had a profound impact on modern Ottoman

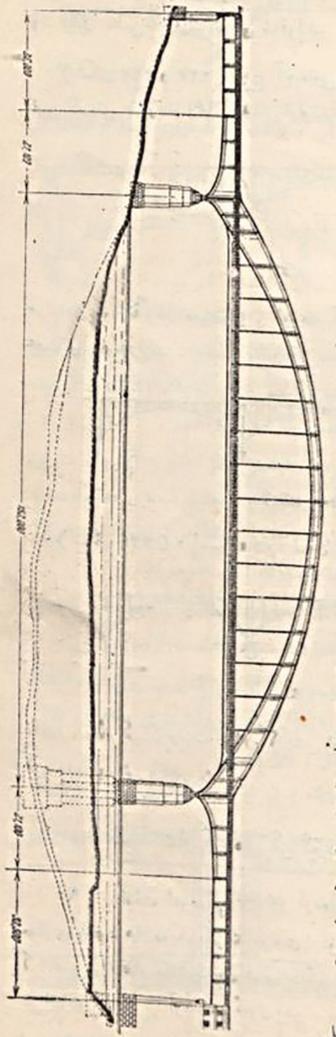
scientific knowledge and his compilation book. Investigating these cases from multiple angles such as the complex interplay between local institutions and various actors, besides textual analysis, this allows the research to reveal the network and interconnected discussions in the early 19th century.

The second part of the thesis follows two different trajectories: on the one hand, it explores, especially after 1900, the historical context within which competencies of Ottoman civil engineers led to the divergent professional identities and on the other, construction practices that a mutually beneficial knowledge exchange developed in the sites. Both strands of this part aim to illuminate the unique ways in which scientific knowledge was produced, disseminated, and valued within the Ottoman context.

This abstract is part of the second axis of study and analyses the historical context in the period following the completion of the Hejaz Railway (1900-1908), where the figure of the Ottoman engineer became increasingly widespread and their field of competence enhanced, through the work of civil engineers and its physical manifestations. This ‘cut-off point’ in the history of Ottoman civil engineering was not chosen at random. In particular, the picture drawn after the 1900s that has changed considerably. The figure of the Ottoman engineer became increasingly common and practically became altogether. What were the reasons for this? The decision of the Ottoman

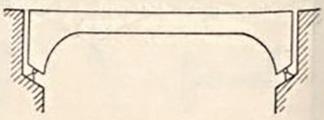


(شکل ۲۱۶)



(شکل ۲۱۷)

مملو گوده کر کپریشلر اکثر یا کمرک یولک آلتنه
 موضوع اولسی حالده انشا ایلمشلدردر . مع هذا
 فوقانی کر لکرده مملو گوده ملی اولهرق انشا ایلمشلدردر
 مانع هیچ بر سبب بوقدر (شکل ۲۱۷) بو صورته
 انشایی متصور بر کر کپریش پروژه سی از اناه ایدر .
 - کمرک ارتفاعی (شکل ۲۱۶) ده اولدینی کبی ثابت
 اوله بیلور . یا خود (شکل ۲۱۷) ده کوسترلیدیکی وجهله
 کمر متحول ارتفاعی اولوق اوزره انشا ایلمه بیلور .



(شکل ۲۱۸)

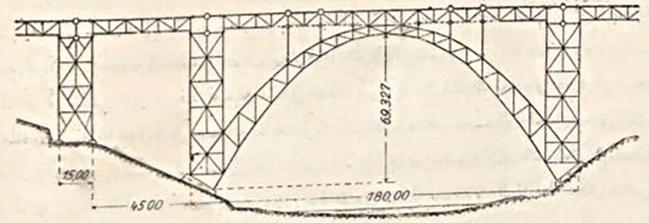
کمره بمضاده (شکل ۲۱۸) ده کوستریلن شکل اعطا ایلملور .
 بو شکلده انشا ایلمن کر لکره قولتوقلی کپریش نامی وریلور .
 بو کپریشلر موافق بر شکلی و غایت آزار تقاضی حازر
 اولدق لردن کوی آلتنده براقامسی لازم کن سربست
 ارتفاع وعرضک استحصالی تسهیل ایلک محسنتی حازردر .

۸۹ - متعده آیم بقیلگی کرلر - مستقیم کپریشلر ده
 اولدینی کبی کر لکرده متعدد آجیققلی اولهرق انشا
 ایلمه بیلورلر . (شکل ۲۱۹) ده کوستریلن
 اوج آجیققلی کر کپریش اوجنی مرتبه دن
 موازنه غیر معین بر کپریشد . طرفینده کی
 آجیققلره قونسول شکلی ویرلش اولدیفندن
 کمرک دافعه افقیه سنک مقداری تقص ایلمشدر .
 (شکل ۲۲۰) نک صاغ طرفنده کوسترلیدیکی
 وجهله قونسولک مفصللی بر قسم مستقیم ایله
 تمدد ایلمی حالده موازنه غیر معینک
 عددی بر درجه تناقص ایلمر . دیگر قونسول ده
 عین طرزده تمدد ایلمه جک اولور ایسه .
 کپریش برنجی مرتبه دن موازنه غیر معین
 بر کپریش حاله انقلاب ایلمر .

(شکل ۲۲۱) ده کوستریلن آجیققلی

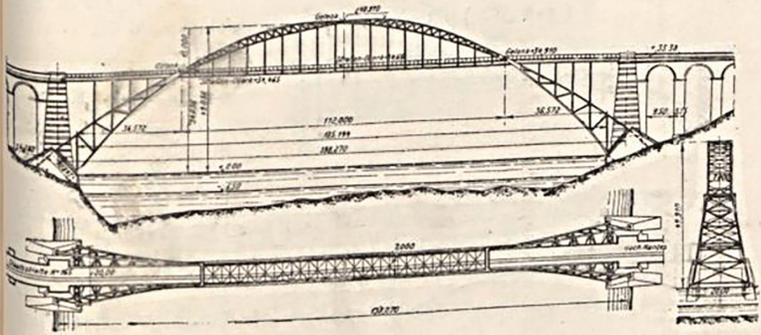
(شکل ۲۱۹)

ارلور . بو بدله حساباتنک اجراسی خبلی قولایلاشمش اولور . و مستدرده جو کوی حصوله کلسندر کر متاثر
 اولماز . مع هذا بونوع کر لر اویناق اولده لردن باخصوص دمیر یول کوی بریلری ایچون استعمال ایلمی مزملر .



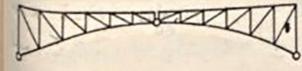
(شکل ۲۱۳)

بعضاده مفصللر کاملاً حذف ایلملور . (شکل ۲۱۳)



(شکل ۲۱۴)

(شکل ۲۱۴) فرانسه ده «ولمن» اوزرینه انشا ایلمش اولان اوج مفصللی کر کوی بری اراه
 ایلمر . کوی بری طرق عاده کوی بریسدر . مستد مفصللری یول سو به سنده موضوع اولوب کمرک تادیسندن
 عبارت بولنان متداخل قونسولره استناد ایتمیشلدردر .
 شمعی به قدر کمرلرک ایکی باشلغکده منحنی اولدینی
 فرض ایلمشدر . بعضا باشلغردن یالکیز بری منحنی باشلغردن



(شکل ۲۱۵)

تدقیق ایلمن شکلدرده کمرلرک قفس کپریش
 اولوق اوزرده پک چوق انشا ایلملورلر .

Demir Köprüler (Iron Bridges), Istanbul, 1338/1922.14. © Istanbul Technical University Institutional Archive. The book is written by Mehmet Fikri Santur. In addition to teaching, he had also developed intense professional activities in the early 1920s, along with the dissemination of technical and scientific knowledge.

authorities to have the Hejaz Railway (1900-1908) built by Ottoman engineers [1] should be understood within its two aspects: one the one hand it was set up to provide the Ottoman engineering with technical personnel and on the other, its propagandistic context as a display of Ottoman Engineers independence. After the Hejaz Railway was explicitly formed a close-knit world, existing the rest of the Ottoman higher education system [2]. This had several significant consequences.

Initially, the Ottoman Empire relied on foreign companies to build infrastructure (roads, railways, etc.) for faster and more efficient development. However, by the late 1860s, this reliance was seen as problematic as the Ministry of Public Works took a more direct role in fostering internal administrative control and development. Nevertheless, with the institutionalization of a civil administration of public works, a civil education [3] for Ottoman subjects appeared as a necessary next step. When the Hendese-i Mülkiye Mektebi (Civil Engineering School), established in 1884, became free from military supervision, the number of civilian experts among the staff increased. The Civil Engineering School/Higher School of Engineers produced 395 engineers between 1888, when the first students graduated, to 1920.

The construction of the Hejaz Railway (1900-1908) marked a significant milestone. The Hejaz Railway's initial engineering team composed of provincial chief engineers,

teachers, and recent Civil Engineering School graduates, initially hesitated to accept these appointments due to the remote locations. However, owing to its attractive salaries and career advancement opportunities the employment on the Hejaz Railway transitioned to a preferred position. Throughout the eight-year construction period, the presence of Ottoman engineers working on the project steadily increased. The Hejaz Railway project provided a formative experience for Ottoman engineers, as approximately 80% of graduates from the Hendese-i Mülkiye Mektebi, actively participated in its construction (Ilkin and Tekeli 2004). Upon completing their work on the railway, these engineers transitioned into diverse roles, including administrators, educators, and practicing engineers.

Most of the graduates occupied the post of assistant to the engineer-in-chief of a province, while a few were employed in the administration of the subsequent railways. If they worked satisfactorily, after two years of practice they obtained the rank of engineers of the second category. After two more years, they could be promoted to the rank of engineers of the first category and appointed to posts of engineer-in-chief, or as heads of provincial directions of Railroads, Roads and Bridges or Public Works, as well as inspectors. Despite the establishment of a civil engineering school, the available employment opportunities for engineers presented a dilemma. Working on construction sites limited their career options

within a relatively narrow market, while civil service positions offered more diverse career paths. For instance, Mustafa İvki Atayman (1872-1958) served as an operating branch engineer on the Hejaz railway during World War I, while Osman Tefvik Taylan (1884-1976) became the founding rector of Istanbul Technical University. Halil Rifat Ilgar continued career as an engineer with the Nafia Nezareti (The Ministry of Public Works). Mehmet Fikri Santur (1878-1951) was a lecturer and administrator at Istanbul Technical University and Yıldız Technical University.

Dedicated lecturers and civil servants were essential in the formation of the Ottoman civil engineering identity. As evidenced by the biographic research done by Frédéric Hitzel, Kemal Beydilli, and Mustafa Kaçar, their personal contribution was of fundamental importance in the prolonged period of institutional consolidation. Their personal efforts shaped the knowledge they passed on. The limitation of these studies is that they have been written by historians to analyse the biographies of diverse engineers and formulate nationwide engineering trends. These are studies that are relevant to all kinds of historians because they are about issues of evidence, interpretation, and generalization. In this sense, they are not well-equipped to contribute to the neglected domain of the private construction sector during the early twentieth century. Notwithstanding, science

historian Feza Günergun, for example, highlights that the role of individual efforts in Ottoman science and technology has been understudied.

The part of the second axis of study, would be more relevant by closely examining the work of a particular engineer, exploring how it deviates from historical narratives that tend to focus on overarching trends. However, the main weakness with this deviate is that elevating any one of these powerful archetypes to the position of the Chief-archetype. Nonetheless, how might one usefully combine a distinct practice and method of historical writing such as microhistory with a field of historical analysis such as global history? In other words, how does one connect different scales of analysis by 'playing with scales' (Ghobrial 2019)?

Through these questions, the second part of the study will focus on the historical context within which divergent biographies of some prominent civil engineer's identity. In doing so, it will attempt to paint a broader picture while moving away from biased narratives that oversimplify non-Western cultures through approaches such as detailed microhistory. Precise and well-documented microstudies are essential to understand this personal aspect. However, a complete understanding requires integrating it with the broader context of how institutions functioned then. Accordingly, the study will navigate permanently between

two scales. The selected case studies will be enhanced with autobiographical memories of distinguished engineers, which are considered the complementary sources. By highlighting how certain technological innovations in steel and concrete construction were key in addressing urgent societal, economic, or political problems, the selected actors and their works aim to illuminate the complex on-ground realities of from the late Ottoman Empire to early Republic of Türkiye.

[1] Unlike the Anatolian and Baghdad railways, Abdülhamid II maintained a persistent policy to turn the Hejaz Railway project into an opportunity for Ottoman engineering graduates to gain experience. Although the technical supervision was left to August Meissner at the beginning of the process due to the lack of experience in railway projects, the German engineer enabled Ottoman engineers to gain construction site experience with the apprenticeship model he developed.

[2] This process is also intricately linked to the history of engineering schools. The Engineering School had the history of a complicated process in a state of change. During the period between the 1780s and early 1900s, military-engineering education experienced a prolonged period of experimentation and change (Kaçar 2004). In this context, the French polytechnique model of engineering that enabled (quasi-) military patterns onto the engineers remained particularly attractive for the Ottoman reformers throughout the 19th century. At the end of the 18th century, beginning with the military emphasis of engineering changed over time. Nevertheless, there were shifts in the influence of different European models and practices after 1900. Thus, Ottoman engineering schools eclectically

combined unique features and traditions, integrating foreign models, maintaining Ottoman particularities, as well as creating new practices adjusted to immediate needs.

[3] Turuk u Maabir School was administered in accordance with the regulations of the Law School, which came into force in 1876, and its graduates were employed in the Ministry of Public Works.

Prosopographic studies to understand the industrial history of a territory. The case of Mathieu Franck, civil engineer, public contractor and master quarryman in the Ourthe-Amblève region during the XIXth century (Liège)

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In the 19th century, the Ourthe-Amblève region, located south of Liège, gradually became a leading quarry center for the Province of Liège. Sandstones and limestones extracted there are widely used in construction, architecture and public works. Despite its importance reflected in its national and international reputation, the history of this quarry centre remains to be written. The task is not easy, as the archives of companies active in the region during the 19th century are not preserved. One of the keys to understanding the metamorphosis of this traditionally agricultural region towards these industrial extractive activities lies in the prosopographic studies of the main entrepreneurs and master quarrymen in the sector. Indeed, by “tracking” these individuals in this way (family contexts, inheritances, studies and professional trainings, land rentals and purchases, infrastructures constructions,

business foundations and bankruptcies, successions, etc.), we can then identify their professional strategies and their weight in the construction sector, but also and above all, we can understand more precisely the occupation and development of this territory. This communication focuses on the civil engineer Mathieu Franck (1806-1888). Active for almost half a century, he is one of the most important public contractors of his time in the Liège region. He is also a very ambitious master quarryman : we now know of around ten quarries in the Ourthe-Amblève region, but also hydraulic cement and architectural terracotta factories along the Meuse, as well as a commercial store in the centre of Liège. This communication, which synthesizes data recently published or in the process of being published, constitutes a first extensive study on a Liège public contractor in the 19th century.

EXPLOITATION

**DE CARRIÈRE DE PETIT GRANIT
SUR L'OURTHE ET À
SPRIMONT.**

MATHIEU FRANCK

**PIERRE DE TAILLE,
PAVÉS EN GRÈS
DE MONTFORT,
TUILES &**

Entrepreneur de Travaux Publics

LIÈGE

**MARBRERIE,
CARRAUX POLIS
ET MONUMENTS
FUNÈBRES.**

MAGASIN

**ÉTABLI ENTRE LES PONTS
DE LA BOVERIE ET DE
LONGDOZ.**

Business card of Mathieu Franck, public contractor in Liège during the XIXth century. Private Collection

Field Analysis of the Cultural Heritage of Construction: Challenges for Archiving and Researching

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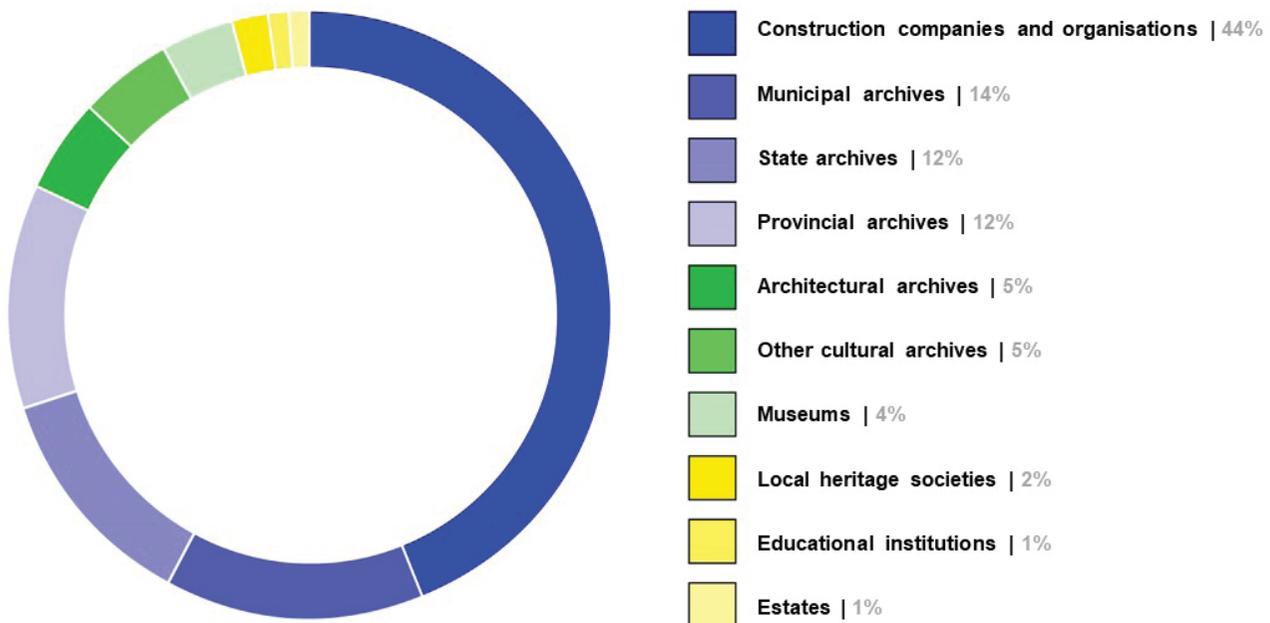
website: <https://www.vai.be/publicaties/integrale-veldanalyse-van-het-cultureel-erfgoed-van-stiel-tot-stad>

In Belgium, the archives of construction companies and organisations are kept and valorised in various places, such as municipal archives, state archives, cultural archives and local heritage societies. However, the main custodians of construction archives are construction companies and organisations themselves. Unfortunately, they are not always able - or willing - to keep their archives in optimal conditions. Today, construction archives are often at risk of being destroyed due to a lack of space, a relocation or a transfer. Companies and organisations insufficiently endorse the functional and cultural value of their archives. Similarly, knowledge accumulated in construction is usually not made explicit and therefore vulnerable. This situation poses challenges both to the cultural heritage sector, whose core task is the long-term preservation of valuable archives, and to architects, designers and researchers, for whom access to source material is difficult.

To assess the current situation, in 2023, the Flanders Architecture Institute (VAi) analysed the state of the cultural heritage of construction - as well as architectural heritage, cultural heritage of urbanism and spatial planning, and design heritage. This resulted in a recently published report. It is structured around the following four questions: Who produces this heritage? Where is this heritage kept? What are the challenges and opportunities around this heritage? What should we do in the future? For this research, we drew on the data on

actors and archives registered in our database, the VAI Archiefhub that was updated for this study. Talking to contractors about their views and approaches to archives, and visiting their archives on site, gave us insights into their needs. Construction history researchers and designers provided input on how they analyse archives of the construction sector.

This report is primarily aimed at the cultural heritage sector. It highlights the critical role that the field has to play in navigating the landscape of repositories for construction archives, in continuing to hold construction companies and organisations accountable for their heritage and supporting them in that task, and in providing frameworks for assessing this heritage. On the other hand, this report aims to be a resource for (beginning) researchers to find source material kept in various repositories. Finally, it is an invitation to keep the conversation going between construction companies and organisations, heritage professionals, designers and researchers, to strengthen the network of care for the cultural heritage of construction.



Percentage of archives from construction companies and organisations in 2023 by category of repository (n=106; source: VAI Archiefhub)

Expo '58: Showcase of (Social) Progress in Construction?

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Expo '58 was in many ways a major event in the history of Belgium in the 20th century. From its official opening on 17 April until its closure on 19 October 1958, the world exhibition attracted some 42 million visitors, including 80 per cent of the Belgian population (figure 1). On 220 hectares of exhibition grounds in the Belgian capital, 43 countries, including the two great powers, the United States and the Soviet Union, displayed science and technology, representing a global belief in progress [1]. The central theme of the Expo, 'balancing the world for a more humane world', underlined this aspiration, which was in line with the prevailing idea of the welfare state based on peace and social and economic progress [2].

From mid-1955, therefore, the construction industry had a major role to play, both in building the exhibition and in the infrastructure works that the host country had to undertake. Within the walls of the Heysel site, this meant, for example, the construction of pavilions using the latest techniques and materials, the building of large exhibition halls and works of art such as the iconic Atomium and the so-called 'Arrow of Civil Engineering', which pushed the limits of the iron and concrete industry (figure 2).

Outside the walls of the exhibition grounds, the programme included the further development of the road network to improve the accessibility of the capital, the construction of a new

national airport at Zaventem and the creation of car parks. In addition, the event was also used to launch major construction projects in the capital and its outskirts, such as the Brussels National Administration Centre [3].

From an architecture-historical point of view, the Expo has already attracted the attention of Rika Devos, who, together with 11 international architecture historians, has studied the impact of the event on the Belgian built environment. Like a Trojan horse, the Expo was said to have smuggled modern architecture into the country, which would be reflected in the city and in design for decades to come [4]. For the contractors involved, on the other hand, it was not only the race for the opening that was important, but also the demonstration of their skills in the actual realisation. Piet Lombaerde alluded to this when he described the Expo as the symbolic culmination of Belgium's reconstruction after the Second World War, with the construction industry now employing 9 per cent of the working population and occupying third place in the Belgian economy [5]. Around 60 contractors and hundreds of subcontractors were involved in the construction work, employing 12,000 people who together performed 60 million working hours [6]. In the run-up to this major project, the national contractors' confederation (Nationale Confederatie van het Bouwbedrijf, NCB) declared in 1956 that 'all the building sites that will be opened throughout the



country will be an impressive demonstration of the possibilities of the Belgian building industry' [7].

This case study puts the aforementioned NCB statement into perspective by looking at what went on behind the fences of the Expo construction sites. For decades, the construction industry suffered from a negative image and many workers fled the sector. Working conditions, safety and training and, above all, wages and livelihood security were hot topics of discussion, with employers' and workers' representatives often facing each other with suspicion or even hostility. The pressure of the deadline for completion and the opening date of the exhibition added further challenges to these relationships. In addition, the tendering process for the Expo-related work was slow, which created additional time pressure. Or, as the Christian construction union (Christelijke Centrale der Houtbewerkers en Bouwvakarbeiders, CCHB) put it at the opening of the exhibition:

Figure 1: 80 per cent of the Belgian population visited Expo '58, creating memories in their photo albums. A view of the exhibition from the entrance. In the background, the Atomium, symbol of progress and icon of the Expo. (Author's private archive)

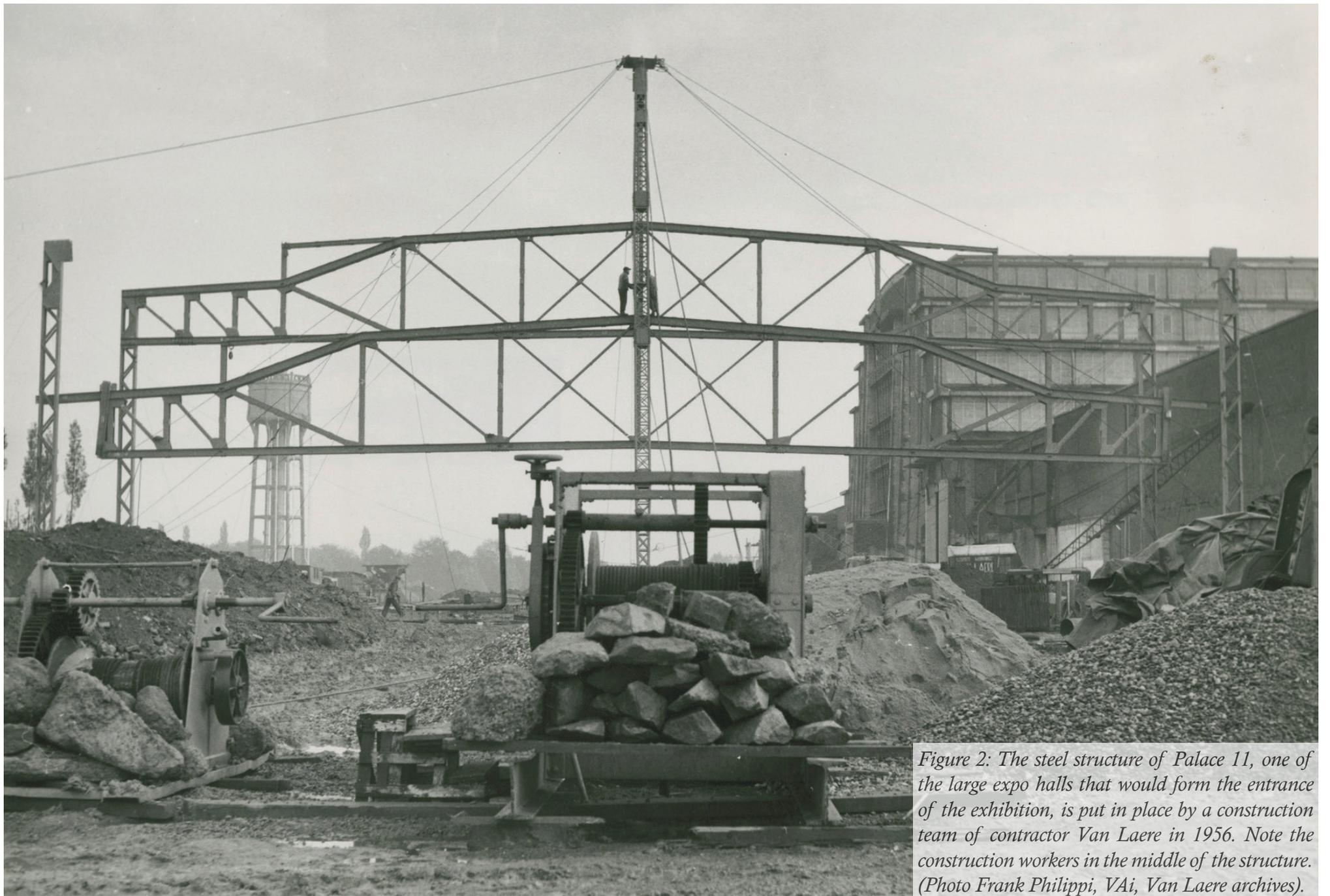


Figure 2: The steel structure of Palace 11, one of the large expo halls that would form the entrance of the exhibition, is put in place by a construction team of contractor Van Laere in 1956. Note the construction workers in the middle of the structure. (Photo Frank Philippi, VAI, Van Laere archives).

‘[i]nvariably we think of the hectic pace of work during the construction of the Expo, the numerous requests to employ foreign workers, the flagrant violation of the law on working hours and the numerous overtime hours that the workers had to perform, the chaotic organisation of the work, which meant that what was built today had to be demolished tomorrow, all because they did not start on time and did not know from the outset which direction to take’ [8].

The first part of the case study examines the construction of the Expo, asking to what extent the building sites were not only a model of technological innovation, as stated by the NCB, but also of social progress in the Belgian construction industry. Based on an analysis of literature published by the NCB and the socialist and Christian construction trade unions, figures from the National Institute of Statistics and visual material produced by the contractor Van Laere (°1938), the aspects of employment of foreign workers, training and safety that were specifically linked to the construction of the Expo are highlighted [9]. In this sense, a labour shortage during boom periods, such as that which occurred immediately after the Second World War, led to the use of foreign labour and an increased focus on training, which tended to change the face of work in the construction industry. A significant increase in the number of accidents on construction sites between 1956 and

1958, combined with increased government regulation of safety, also focused the attention of both employers and workers’ organisations on the need to urgently change the situation in practice.

The second part of the case study then places the Expo in the broader context of post-war labour relations in the Belgian construction industry and examines the impact of the event in this perspective. Tensions that had built up throughout the 1950s over relatively low wages, poor application of social security agreements by employers and the problems encountered on the Expo sites, among other things, led to an outbreak of discontent among construction workers in the summer of 1957 (figure 3). The high construction demand, the huge labour shortage and the importance attached to ensuring that the Expo opened on time provided the building unions with the leverage they needed to push through their demands. Expo ‘58 thus became not only a symbol of progress, but also a pivot of social conflict in the Belgian building industry, which would shape the basis of labour relations in the ‘golden’ 1960s.

The PhD thesis *Building in a Transforming Society: Contractors, Workers and the Belgian Post-War Construction Industry 1944-1985* analyses the post-war Belgian construction industry through the relationship between contractors

and construction workers as actors in the field. In doing so, it considers the surrounding political, economic and social conditions and how they affected the construction industry and vice versa. Productivity, labour relations, safety and training, and the way in which these issues have developed at the sectoral, company and construction site levels, are the central themes of the thesis.

[1] France Debray et al., *Expo 58: De Grote Ommeekeer* (Gent: Borgerhoff & Lambrigts, 2008), 24.

[2] Rika Devos and Mil De Kooning, ‘Staande Tegenover 58, Nogmaals, Waarheen?’ *Moderne Architectuur Op Expo 58*, in *Moderne Architectuur Op Expo 58: Voor Een Humaner Wereld*, ed. Rika Devos and Mil De Kooning (Brussel: Mercatorfonds, 2006), 12–15.

[3] Rika Devos, ‘Expo 58 - Katalysator En Vitrine Voor Het Belgische Bouwbedrijf’, in *1936-2016: België Bouwt*, ed. Yaron Pesztat and Stéphanie de Blicq (Brussel: AAM Éditions, 2016), 70–72.

[4] Rika Devos, Mil De Kooning, and Geert Bekaert, *Moderne Architectuur Op Expo 58: ‘Voor Een Humaner Wereld’* (Brussel: Mercatorfonds, 2006).

[5] Piet Lombaerde, *Bouwen Is Leven, Leven Is Bouwen* (Brussel: Nationale Confederatie van het Bouwbedrijf, 1996), 36.



Als uw machtige arm het wil,
liggen alle raderwerken stil.

Juni 1957 : Brussel stille stad !

[6] 'De Wereldtentoonstelling ingewijd', *Het Bouwbedrijf* 14, no. 16 (1956): 1.

[7] 'Wereldtentoonstelling', *Het Bouwbedrijf* 12, no. 25 (1956): 9.

[8] 'Bij de opening van de Wereldtentoonstelling', *CHB Maandblad* 16, no. 4 (1958): 138.

[9] See: Jelle Angillis, 'The Post-War Construction Site in Photographs : The Photographic Collection of the Belgian Contractor Firm Van Laere (°1938)', in *History of Construction Cultures*, vol. 1 (Seventh International Congress on Construction History, Leiden: CRC Press, 2021), 447–57.

Figure 3: 'All radar work stops when your mighty arm wants it to'. In the report of its Building Workers' Trade Congress in September 1958, the socialist construction trade union referred to the agency that construction workers possessed to bring about improvements and win their demands by joining forces and going on strike. In June 1957, Brussels briefly became a 'silent city', as they put it here, when the construction of the Expo was halted by the national building strike. (Black-and-white illustration in: Verslagen Voorgelegd Aan Het Vakcongres Der Bouwarbeiders Brussel, 27-28 September 1958)

