

Building Specifications and the Growing Standardizing of Public Building Regulation in Nineteenth-Century Belgium

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ABSTRACT: In the course of the nineteenth century public clients, architects, engineers and contractors increasingly desired a clear regulation of their collaboration. The tool 'par excellence' to communicate and to coordinate their cooperation were the building specifications. These written documents contained a detailed description of the job to be done, mostly written in accordance with the logical sequence of trades on the building site, with particular attention to the quality of materials and workmanship, as well as the organization of the whole. The aim of this paper is to study the evolution of building specifications for public building in nineteenth-century Belgium and this on various governmental levels (central, intermediate and local). Relevant international comparative analysis will be interwoven.

INTRODUCTION

In the course of the nineteenth century public clients, architects, engineers and contractors increasingly desired a clear regulation of their collaboration. The tool 'par excellence' to communicate and to coordinate their cooperation were the building specifications. These documents contained a detailed description of the job to be done, mostly written in the sequence of trades, explaining "those things concerning a project which cannot be shown on a drawing" (Marsh 1982, p. 189). In particular, the quality of materials and workmanship, as well as the organization of the whole became the subject of detailed description.

Building specifications, *cahiers de charge*, *bestekken* (in Belgium) or *voorwaarden* (in the Netherlands) are sources of special interest for construction history; multiple and elaborate nineteenth-century discussions in architectural and construction journals, municipal council reports as well as in manuals and publications are devoted to the importance of these bearers of material, technical and organizational knowledge. For sure, building specifications are not a 'typical' nineteenth-century phenomenon. However, the standardizing of these building regulations may be seen as the outcome of its nineteenth-century evolution. It is a logical consequence of the development of professional administrations on all governmental levels in Belgium. In contrast to the wealth of relevant data on (local) building practice, research devoted to these building specifications is still rather limited and focussed on national governmental levels. Hence many questions in relation to the core composition of these documents, both in form and content matter, and their role in the building process stay unanswered.

The aim of this paper is to study the evolution of building specifications for public building in nineteenth-century Belgium, on various governmental levels (central, intermediate and local). On the intermediate and local levels, the province and city of Antwerp will be worked out as a case study. Relevant international comparative analysis will be interwoven.

HISTORICAL CONTEXT

As known, the first appearance of written and of published building specifications predates the nineteenth century. In his study on *The Architectural Network of the Van Neurenberg Family in the Low Countries (1480-*

1640) Gabri Van Tussenbroek pointed out that the oldest known printed specifications in the Northern Low Countries go back to the end of the sixteenth century (1599):

The specification for the stonework for the Blue Gate in Leiden is a unique document. It consists of seven printed pages and is the oldest Dutch example of a printed specification made with the intention of circulating it among building contractors. Building contractors from various towns actually used the document during the bid process. (Van Tussenbroek 2006, p. 144; see also: Van Tussenbroek 2007, pp. 301-327)

During the Ancien Regime most of the specifications in the Low Countries appeared in a written; i.e. not printed form, however, and were also copied by hand by town clerks, by members of the municipal building companies and even by interested private persons. According to Dirk Van de Vijver it is only in the mid-eighteenth century that published specifications were first used in the Southern Low Countries (actually Belgium). Van de Vijver ascribes a pioneering role to the published specifications of the *Coupure* in Ghent and Bruges (public water works by the central government) (Van de Vijver et al. 2003, pp.124-125). As he demonstrated, the added value of printing specifications lies in the fact that information and knowledge can be easily copied and circulated. Such was the case in other nineteenth-century cities as well. For instance Inge Bertels demonstrated that in the city of Antwerp until far in the nineteenth century a single set of building specifications and related set of drawings for municipal public works was made available for consultation in the town hall and could be copied by interested contractors or a municipal clerk (25 centimes for each page in 1876) (Bertels 2008, p. 380). Furthermore, in his study of eighteenth- and early nineteenth-century libraries of architects and engineers Van de Vijver noticed that many of those specifications were part of their book collections, which goes to show that these documents were not only used for their regulating function but as a source of technical and practical knowledge as well (Van de Vijver et al. 2003, pp. 17-64). In the nineteenth century also building specifications were collected and studied. One example can be given for the library collection of the Antwerp industrial school (Bertels 2008, pp. 181-195). Its various catalogues list several building specifications drafted by public authorities.

NINETEENTH-CENTURY EVOLUTION

In Belgium, from the mid-nineteenth century building specifications drafted by various governmental authorities became the subject of a standardizing process. On the national level the Belgian Ministry of War imposed in 1848-1849 its general building specifications or *Conditions générales d'ordre et d'administration, applicables à toutes les entreprises concernant le service du matériel du Génie* (1848) and *Conditions générales pour la fourniture des matériaux et l'exécution des travaux, applicables à toutes les entreprises concernant le service du matériel du génie militaire* (1849). They were drafted by lieutenant-colonel Charles-Armand-Joseph Demanet (1808-1865) (Van de Vijver 2005, pp. 905-914). These formalized 'master documents' of construction knowledge included administrative (such as the procedure to invite tenders or the more managerial, responsibility and safety aspects of and on the building site) and technical aspects (materials and techniques). In 1876 and 1885 revised versions were published as *Conditions générales applicables aux entreprises de travaux, fournitures, etc. concernant le service du génie militaire* (1885). In practice the 1848-1849 version remained legitimate for more than fifty years.

Gradually, related ministries published their own standard specifications as well. For instance the standard specifications of the Ministry of Public Works were printed in 1863-1864 (Fig. 1) and were revised in 1881, 1890 and 1897. In the *Chronique des Travaux Publics* these specifications became the object of elaborate study and critique. In general, the critique was rather positive and these standardized building specifications were highly appreciated as a tool by architects, engineers and contractors. Furthermore, the Ministry of Education developed in 1874 and published in 1875 a new governmental programme for primary education under the title *Instructions concernant la construction et l'ameublement des Maisons d'Ecole suivies de plans et de devis types*. This elaborate programme offered a building specifications as well, the so called *Modèle d'un Cahier de Charges pour l'entreprise des travaux ayant pour objet la construction d'une Ecole* (1875, Fig. 2) (Bertels 2007, pp. 233-241).

Almost simultaneously with the national policy level, a similar evolution occurred on the intermediate level of the province of Antwerp. As such, the 1849 Antwerp *Règlement pour le service des architectes provinciaux* included next to the personnel regulations (chapter 1) information on the organization of the construction works (chapter 2 till 6) (Meul 1992, pp. 64-65). The second chapter of these regulations included standard specifications for construction, renovation or reparation works. These specifications were drafted in Dutch and again served a double purpose, on the one hand to inform the contractor about the work and on the other hand the execution of the works. Indeed, printed, uniform building specifications can be seen as an important evolution in the standardizing of the nineteenth-century building process. Furthermore they are also vectors of traditional construction and organization knowledge (Bertels 2008, p. 383 and Van de Vijver 2005, pp. 913-914).

On the local urban level we studied the Antwerp building specifications, *cahiers des charges, bestekken* or *lastvoorwaarden*, which can be dated between 1796 and 1900. They were drafted in close collaboration by

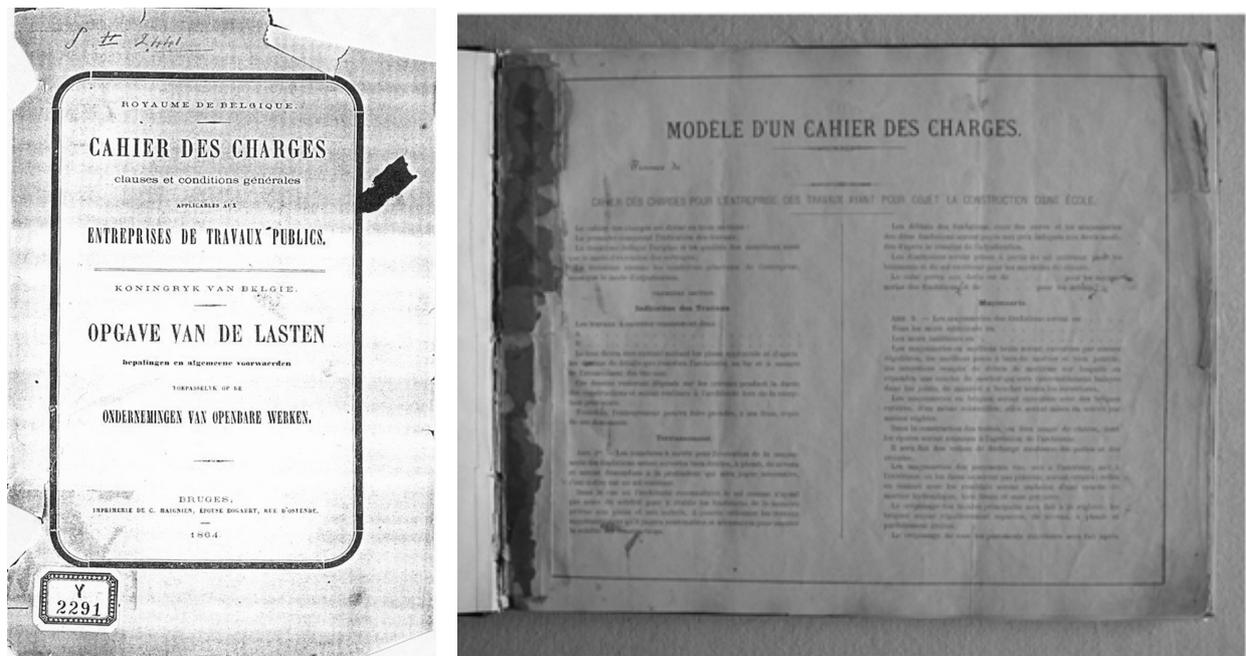


Figure 1-2: Standard specifications of the Ministry of Public Works dating from 1863-1864 (left) and the Ministry of Internal Affairs – Education dating from 1875.

the city architect, the city engineer and their staff. From the beginning a uniform format was adopted: a short description of the tenders' goal was succeeded by a thematic overview of the defined works and the text concluded with a description of the specific and general contractor stipulations. The whole precisely defined the scale of the project. Furthermore, it was an integral part of the contract between the Antwerp municipality and the public works contractors (which were privately owned companies). Hence both the public client and the contractor had a legal basis to appeal on in case of malpractice or disagreement. The text was drafted under the responsibility of the city architect or city engineer by various members of the Public Works Service. Frequently, the pressure of time to start the public tender was so high that the employees were asked to draft, translate or copy the building specification after working hours. For the municipal employees it became an interesting supplement to their income. Pages including numerical data could cost double the price of text pages (SAA, MA 8000 and following).

Also in the Antwerp situation, the impact of the building specifications reached further than the Antwerp municipal public works domain proper. The archive of the Antwerp *Cercle des Entrepreneurs des Travaux publics* shows that contractors used these Antwerp public building specifications and estimates, more particularly those drafted for the maintenance of public buildings and infrastructure, as an important source of information and as a standard in conflicts between contractors and their private customers and between contractors themselves (ACB 1874-1882), even beyond the city limits. Furthermore, the Antwerp town council and public works services received multiple requests from other municipal authorities, private contractors and construction workshops for a copy of their specifications, with various underlying motives (SAA MA 1019). For sister public works organizations (at all levels) these documents were both sources of inspiration and comparative material. On the other hand, private construction ateliers and material suppliers wanted to make sure that their products complied with the specification norms. Conversely, the contractors, material suppliers and construction ateliers tried to influence and change the traditional specification stipulations by sending their material and technical documentation - in various forms such as samples, brochures and advertisements - to the city architects, city engineer and their Public Works Service in order to sell their products and to inform the public clients (SAA MA 80903).

Private actors such as public works contractors and architects were particularly interested in building specifications as well. At the first international congresses for public works contractors in 1881 the *Conditions générales* constituted a major point of discussion (Venstermans 1954, pp. 12-13). Many years later professional organizations such as the *Koninklijke Maatschappij der Bouwmeesters van Antwerpen* also published for their members a proper set of standard building specifications or *Algemeen lastboek. Bepalingen en Voorwaarden* (1910-1911) (Koninklijke Maatschappij der Bouwmeester van Antwerpen, 1911).

Moreover, around the middle of the nineteenth century a series of publications dealing with building specifications were published. In 1857, former Amsterdam city engineer W.A. Froger (1812-1883) wrote - based on his municipal experience - general specifications or *Algemeene voorwaarden en bepalingen bij Bestek binnen het Rijk plaats hebbende werken en leveringen* (1857). Froger was convinced that the draft of "better specifications would lead to better work" (Jager 2002, p. 209). The publication strongly focussed on the standardizing of the general clauses, the estimation of the building costs, unit prices and the position of the contractor. Shortly after his *Algemeene voorwaarden en bepalingen* related publications appeared in other countries, such as Claudel's *Formules, Tables et Renseignements pratiques, Aide-Mémoire des Ingénieurs et des Architectes*.

tes (1857), Donaldson's *Handbook for Specifications* (1859) or Schwatlo's *Handbuch zur Beurteilung und Anfertigung von Bauanschlägen* (1877). To Thomas Leverton Donaldson (1795-1861) goes the honour of compiling the most elaborate study of the period, whether by architect, engineer, surveyor or contractor. The two volumes of his publication *Handbook of Specifications or Practical guide to the Architect, Engineer, Surveyor and Builder, in drawing up Specifications and Contracts for Works and Constructions* (Fig. 3) not only included several guidelines for drafting specifications, contracts and estimations, but they also incorporated not less than 46 examples of specification examples from construction projects in England, Ireland, Scotland and France: "It has been thought desirable to combine the most useful precedents in such works as this, so that the professional man may not have to refer to a variety of documents, many of which are now out of print" (Donaldson 1859, V). The publication ends with a contribution by William Cunningham Glen on the legal implications of the covenants in contracts and the responsibilities of architects, engineers, and builders.

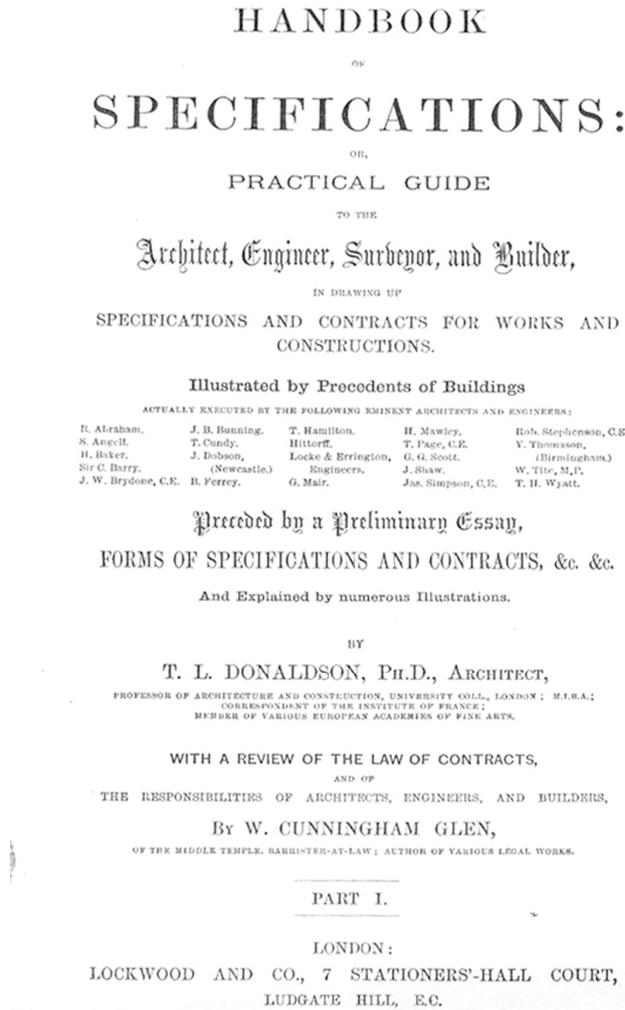


Figure 3: Frontispiece of Donaldson's Handbook of Specifications or Practical guide to the Architect, Engineer, Surveyor and Builder, in drawing up Specifications and Contracts for Works and Constructions (1859).

A MICRO PERSPECTIVE: THE EVOLUTION OF NINETEENTH-CENTURY ANTWERP MUNICIPAL SPECIFICATIONS, FROM WRITTEN TO PUBLISHED DOCUMENTS

The first act in the standardization process of the Antwerp building regulations took place in 1834. At that moment the *Conditions Générales* were printed; as a separate section, they preceded the – still handwritten – specifications properly speaking (Fig. 4). This evolution will be continued in the course of the nineteenth century. As far as could be traced back, the first 'fully' printed set of building specifications dates from 27 May 1859 and was drafted by the temporary city architect Frans Jacob Stoop (1815-1861) for a school in the *Deurnestraat* (current *Duinstraat*) (SAA MA 80903). They also included the general building conditions. Stoop's successor Pieter Dens (1819-1901) would follow his example. He clustered the clauses on the tender procedure, the time clauses and related payments and added them in printed form to the general conditions. Gradually, from 1863 onwards, with respect to content more restrictive clauses and new elements would be introduced as well, dealing amongst others with the position of the contractor, uniformity of prices, penalties and security aspects. For instance, it is only from that moment on that it was prohibited to work at night, on Sundays and on

official holidays. Breaking this regulation would lead to a fine of 50 francs (SAA MA 90994). Furthermore, the building specifications initially did not include the cost estimates, *devis des travaux* or *begrooting der werken*. It was only after 1863 that they became an integral part of the tender file, and only at the end of the 1870s they appeared in a printed format.

This process did not only influence the specifications, but led in some cases to a standardized design as well. For instance, the school furniture that city architect Pieter Dens designed in 1864 was made into a prototype by city engineer Gustave Royers (1848-1923). This prototype comprised a complete set of furniture elements (Fig. 5) with accompanying specifications that ranged from chairs and blackboard to coat hooks. Hence, for the interior design of a new school building the complete set or a selection of the furniture was made the subject of a public tender (Bertels 2004, pp. 401-437).

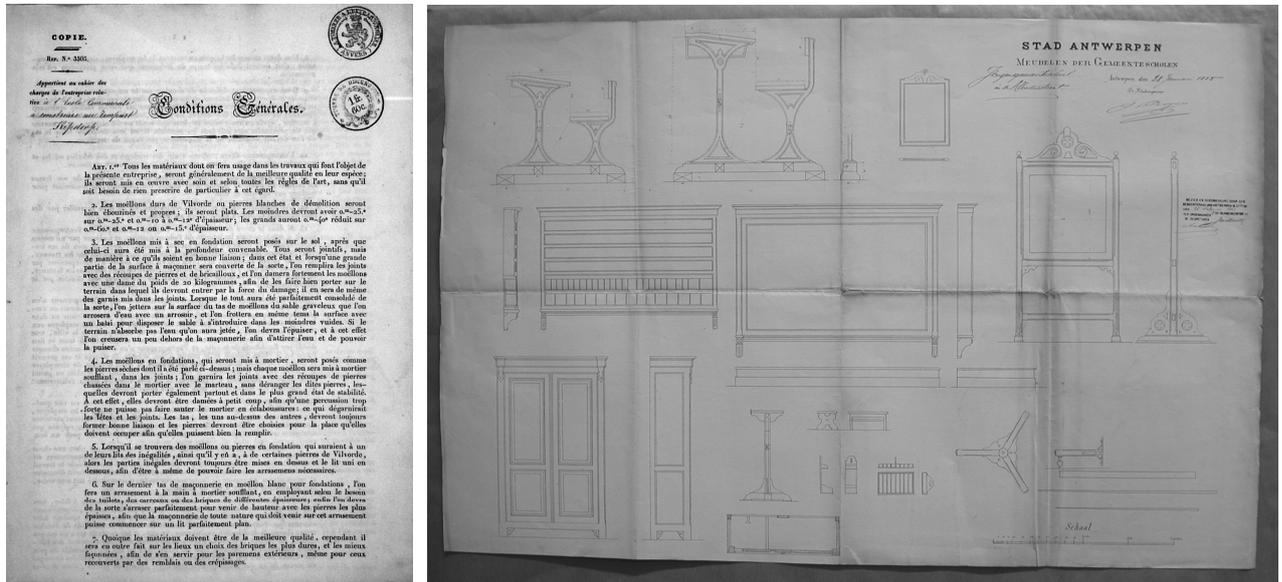


Figure 4 and 5: Printed general building conditions of the City of Antwerp from 1834 (left) and the prototype design for school furniture by Antwerp City Engineer Gustave Royers in 1883; (SAA, Aanbestedingen en PAA, school buildings)

However, these attempts at uniformity were not solely directed at specific assignments or building types. During the course of the eighteen-seventies the general Antwerp building specifications became the subject of a far-reaching standardizing process as, in that order, the city engineer and the city architect were asked to draft a *cahier de charge type* or *modellastkohier* (standard specifications). This initiative had been taken by the municipal government in 1875 and was inspired by the standard specifications of the Ministry of Public Works (1863) (SAA MA 1019). The municipality thus intended to 'save time, efforts and money' (*tijd, moeite en kosten*) in order to improve the 'efficiency' (*doelmatigheid*) of both services in a period of growing work pressure.

In contrast to his colleague, city architect Pieter Dens was not convinced of the usefulness of such a tool at all:

After serious consideration and studying the documents previously sent to me, I am convinced that a set of sound standard specifications for my service [public architecture] can not be drafted (...) As is known the type of works under my responsibility are extremely diverse and they each require specific descriptions both for all elements and the variation of used materials. Each building has a specific function as well as its own demands, either from the point of view of construction, ground plan or style, etc. It is true that it is possible, as I always do, to reuse some articles from former documents such as mortars, the way of tendering, or the General Clauses, but even for the latter aspect I often need to add supplements. I must add that each time my building specifications are simplified as much as possible by making reference to the maintenance specifications, wherein types and qualities of materials and the way of crafting are fully and clearly defined. Hence, the only option I see is to print those documents (SAA MA 1019).

The municipal government took Dens' remarks into consideration, but finally commissioned standard specifications both for maintenance and construction works. The manuscripts of the *cahier de charge type* printed in 1879 clearly show that the document itself - partially handwritten and partially cut-and-paste technique - was a mixture of new and traditional guidelines and regulations (Fig. 6-7). City Engineer Royers, highly enthusiastic about this development, requested the various specifications to be published in French and Dutch and to be printed *en petit format et en petit caractère environ de la dimension d'un carnet de poche* (SAA MA1019). Simultaneously, he ordered a large number of copies to be distributed to his own staff at the Antwerp Public Works Service as a source of reference in daily practice. They were sold at the Town Hall for 1 franc as well.

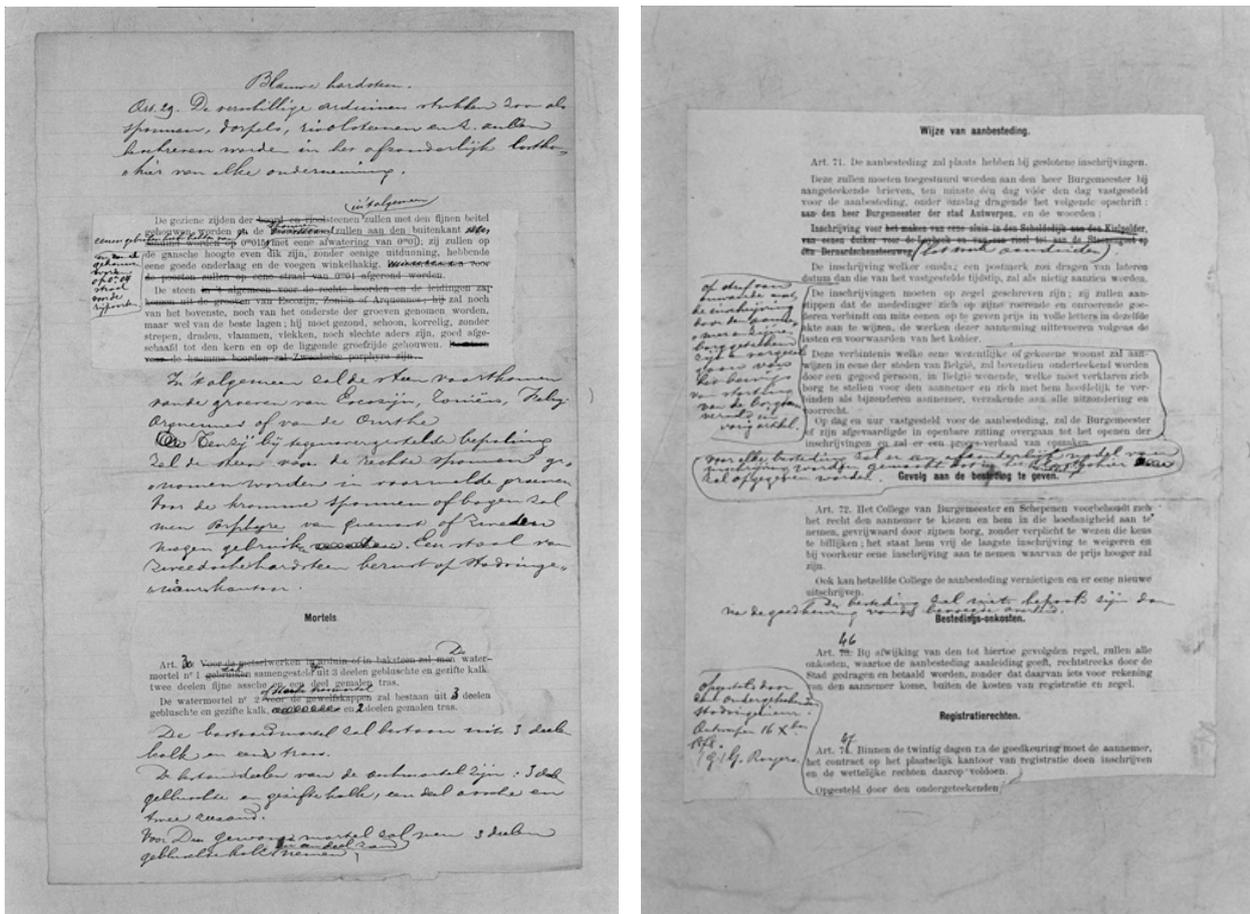


Figure 6-7: Manuscript of the standard specifications of the Antwerp public Works service, dating from 1879; (SAA MA 1019)

For new projects, the detailed building specifications could be copied or referred to. Finally, the whole of *plans et devis* was submitted to the special commissions of public works and later to the town council. It is clear that in the evaluation of the whole, financial constraints were decisive in the (dis-)approval of the project. If positive, the following step was to send the whole to the central government (province and state level) before putting up the work to public tender.

EVOLUTIONS IN A COMPARATIVE PERSPECTIVE

In the course of the nineteenth century several other European governments were faced with the same organizational problems. The City of Ghent published its *cahier de charge general pour les travaux de la ville* in 1875 (Heins 1912-1915, p. 353). Unfortunately, the Ghent City Archives did not preserve the written reflections which led to this final document. However, it must have been an important point of debate in Ghent as well, as alderman N. De Pauw dedicates multiple pages to this issue in his *Principes administratifs et applications en matière de travaux publics* (1849). For De Pauw public buildings had to be good, useful and inexpensive (*bonnes, utiles et peu coûteuses*). In order to obtain such a result, the city architect was commissioned for a design (De Pauw 1849, p. 67) and the specifications were entrusted to not one but at least two municipal employees. For the definitive price estimation, if the two versions were not too divergent, the average of the estimated prices was finally put to tender. It may be seriously doubted whether this procedure was really followed in daily practice.

In the cities of Rotterdam and Amsterdam the standardizing process developed in a somewhat different way. The introduction of the Municipal Law in 1851 whereby all public works needed to be tendered to external craftsmen and contractors that building specifications needed to be more elaborated and detailed for each of the specific projects. In Rotterdam a pragmatic approach resulted in the draft of separate General Conditions (*Algemene voorwaarden*) which were common to all public work projects. The General Conditions were printed in the official Bulletin of the Rotterdam Municipality in 1854, which later specifications referred to (GAR Bestekken 1854 and Leeuwenberg et al. 1993). Later in the Netherlands, as a result of the growing interventionism of the national authorities, in 1876 the Ministry of Public Works published *General Conditions for the construction and maintenance of public works of the Department of Internal Affairs* (GAR Bestekken 1876), and the version updated in 1882, 'Trade and Industry', would come to replace the local municipal General Conditions, although not without delay (GAR Bestekken, 1882).

CONCLUSIONS

This paper shows that the (re-)organisation of public building specifications, as a reaction to the changing nineteenth-century conditions and requirements, was processed in different ways on different governmental levels. The results, however, indicate a similar process of striving for professionalization and uniformity. Furthermore, they can be seen as important bearers of (evolving) knowledge on both technical and organisational building matters. Yet, an important observation that has to be made is that building specifications are strongly normative in nature. Hence, they reveal an 'ideal' building process and try to regulate those aspects of building that are hard to regulate in practice. Therefore, it is important to confront the results of their analysis with sources that expose how these rules and guidelines were put in practice and which tensions and conflicts arose between theory and practice.

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Provincial Archives, Antwerp (PAA)
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