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IRON AND STEEL CONSTRUCTION WORKSHOPS IN 19TH AND EARLY 20TH CENTURY BELGIUM: RETRIEVING THEIR OEUVRE VIA TRADE CATALOGUES

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Abstract. *In the 19th and 20th centuries both iron and steel were worldwide applied to construct structures such as halls, markets, stations and bridges. Belgium, an early industrialised country on the European mainland, was famous for its iron and steel production and the export of iron and steel structures. Nevertheless, most early Belgian construction workshops are under explored. Since the company archives of Belgian construction workshops are seldom preserved, trade catalogues are analysed in this paper to get insight in the structures the workshops built. These catalogues offer a broader context for the individual structures that were transported and built worldwide.*

1 INTRODUCTION

When studying historic iron and steel structures such as bridges, roof trusses, halls, markets, etc. it is not always feasible to retrieve the iron construction workshop that assembled the iron and steel structure. And if the name of a workshop can be retrieved, we often do not know much about it [1,2]. Nevertheless, it is important to position a construction within the global oeuvre of the workshop, as these workshops brought in their own expertise and insights [3]. Moreover, iron and steel structures occupy an exceptional position within the construction sector: they were often transported over long distances. Structures manufactured in Belgium have been shipped to countries all over the world.

Up until now, iron construction workshops got little attention in literature. In Belgium, too, there are only a few texts devoted to the subject [1,4]. The workshop *Baume & Marpent* is one of the few iron construction workshops that has been studied in depth in Belgium [5,6]. However, this is in great contradiction with the importance that Belgian workshops had in the 19th and early-20th centuries, both nationally and internationally [1].

In order to increase the knowledge of Belgian iron and steel workshops, this paper concentrates on trade catalogues published by Belgian iron workshops to promote their

activities. The catalogues enable to attribute a construction to a specific workshop and to position the importance of the construction of bridges and buildings in their activities.

2 TRADE CATALOGUES OF BELGIAN IRON AND STEEL WORKSHOPS

Two tracks were followed to collect historical catalogues of iron and steel companies with a workshop in Belgium. First the *Museum voor de Oudere Technieken* in Grimbergen (MOT), that contains a large collection of trade catalogues, was visited and all catalogues connected to the iron and steel industry were consulted to check if a company constructed bridges or buildings (as main or secondary activity) [7]. Second, the *Receuil Financier,* a yearly publication that lists and describes all stock-listed companies in Belgium was analysed to draft a list of companies that were involved in the construction of iron and steel bridges and buildings. By doing so, about 100 iron and steel workshops were retrieved that constructed bridges, roof trusses, frames, gasometers, etc. in Belgium in the 19th and early-20th centuries [7]. Next, national and international databases were consulted in order to trace trade catalogues of these companies. Additionally, city and company archives were consulted containing trade catalogues of their own and of competing companies.

Since companies still publish trade catalogues today, we set the end date in this paper to 1950 as from then on, the Belgian iron and steel workshops merged into larger national and international entities such as *Les Ateliers Belges Réunies* [7]. As most trade catalogues do not specify a publication date, the estimated publication date is derived, taking into account the dates indicated in the introductory texts as well as the construction date of the structures depicted in the trade catalogue. The starting date of the period studied in this paper is determined by the oldest trade catalogue found during the search, being approx. 1875. Table 1 gives an overview of the 15 trade catalogues of Belgian iron and steel workshops (c. 1875-1950) that included photographs or drawings of bridges and buildings.

It is noteworthy that the vast majority of the abovementioned trade catalogues do not focus on the construction sector, but on the railway sector. These trade catalogues mainly show wagons, tenders and railway equipment. It is also remarkable that the projects included in the trade catalogues are mainly intended for foreign markets. Yet this is not strange when we look at the broader Belgian context. In the 19th century, the Belgian state had followed a twin-track strategy with regard to the development of the railway network [8]. The state had first laid an iron cross over the country, whereby the main axes of the railway network were financed and exploited by the state (1835-1843). These main axes ensured a good connection between a large number of Belgian (harbour) cities, mining and industrial areas and the connection to the international network. Subsequently, private capital was stimulated for the construction of a secondary network. From 1843 onwards, massive private investments in the railway sector took place, in the beginning almost exclusively English capital, and after the crisis of 1847-48, Belgian capital plunged into the railway sector. Between 1843-1870, more than 2500 km of railroads were built by the private sector (and 24 km by the state). When the Belgian State started buying back the concessions from 1870 onwards, Belgian companies turned abroad to continue their investments in the construction of railway networks [8]. So, from 1870 onwards Belgian iron and steel construction workshops focused actively on foreign markets.

The trade catalogues we study all date from after 1875, corresponding to the period where Belgian companies strove to be strongly involved in building railways abroad. It is clear that

the trade catalogues target an international audience: some catalogues were printed on the occasion of a world exhibition, photographs of exhibition stands were included in the catalogue and several companies took up a description in four languages including French, English, Spanish and German or Portuguese. Business studies show that during the nineteenth century, Belgian iron and steel workshops exported between 70 to 90% of their production which corresponds with the proportion of foreign structures shown in the trade catalogues [9].

In the following paragraphs we zoom in on five trade catalogues (indicated in bold in table 1). First the oldest catalogue *S.A. des ateliers de la Dyle à Louvain* (c. 1875) is analysed. We then discuss the only catalogue that exclusively mentions bridges and buildings *Aug. Lecoq et Cie* (c. 1880). And finally, we compare the catalogues of two companies *Nicaise & Delcuve* and *La Brugeoise* before and after they merged.

Table 1: Trade catalogues of Belgian iron and steel construction workshops (1875-1950). Archives: Biblioteca National de Espana (BNE), Company archive Bombardier Transportation in Bruges (Bombardier), City Archive Bruges (CAB), Ecomusée Bois-du-Luc (EBL), Museum voor de Oudere Technieken in Grimbergen (MOT), Archive of the National Railway Company of Belgium (NMBS/SNCB)

Name of trade catalogue	Date	Archive
S.A. des Ateliers de la Dyle à Louvain	±1875	BNE
Aug. Lecoq et Cie. Constructeurs. Hal (Belgique)	±1880	MOT
S.A. des Ateliers Nicaise et Delcuve à la Louvière (Belgique)	±1895	NMBS/SNCB
S.A. des Aciéries d'Angleur. Liège	1896	MOT
S.A. de Produits Galvanisés et de Constructions Métalliques. Successeur de J.F. JOWA à Liège.	±1900	MOT
S.A. Compagnie Centrale de Construction	±1905	EBL
S.A. Compagnie Centrale de Construction. Wagons. Voitures. Ponts. Charpentes.	±1905	EBL
Société John Cockerill. Seraing	1905	MOT
Les Ateliers Métallurgiques. Bruxelles	±1910	MOT
S.A. La Brugeoise. Usines métallurgiques. Saint-Michel-Lez-Bruges	±1910	CAB
S.A. Ateliers de construction d'Hérinnes-lez-Enghien	1912	MOT
Baume et Marpent. Haine-St-Pierre (Belgique)	±1920	NMBS/SNCB
S.A. La Brugeoise et Nicaise & Delcuve. Usines métallurgiques. Ateliers de construction. St.-Michel-lez-Bruges et La Louvière	±1930	CAB
La Brugeoise et Nicaise & Delcuve	±1937	CAB
S.A. La Brugeoise et Nicaise & Delcuve	±1949	Bombardier

3 AN EARLY TRADE CATALOGUE : *SOCIETE ANONYME DES ATELIERS DE LA DYLE A LOUVAIN*

The oldest Belgian trade catalogue depicting the works of an iron workshop, traced back so far, dates from approx. 1875 and depicts the works of *Société Anonyme des Ateliers de la Dyle à Louvain (Belgique).* The subtitle *Matériel de Chemins de Fer, Sucreries, Raffineries, Distilleries, etc* already indicates that rolling stock for railways and equipment for refineries were products they produced. Another source that gives insight in the activities of the company

is the notarial act that was drafted when, in 1875, engineer Aimé Durieux changed the name of his company *Société en Commandite A. Durieux et Cie* (1866-1875) into *Société Anonyme des Ateliers de la Dyle* (1875-1879). The notarial act mentions that the main object of the company is 'the execution, sale and rental of railway equipment, all supplies for road, river and canal works, all metal construction for bridges, frames and other structures, all construction of machines for use in distilleries, breweries, refineries and others, in general, all construction of large iron and copper boiler works' [10]. Between 1879 and 1928 the company cooperated with the French naval company *Société des chantiers de Bacalan* in Bordeaux, moved its headquarter to Paris and changed its name to *Société de Travaux Dyle et Bacalan* (1879-1928). In the Belgian workshops in Louvain all activities continued and in 1928 the company split up again and pursued its activities as *SA des ateliers de la Dyle* (1928-1959). Since 1866 the company was located in Louvain in between the railway and the canal, offering excellent conditions for material supply and the presence of skilled workers [9].

The trade catalogue contains 87 photographs of which two depict the exterior and interior of the workshop, 76 illustrate wagons for railways and tramways, and only eleven photographs show bridges and roof trusses. A photograph of the stand for the World Exhibition in Vienna (1873) is included. Although the *Ateliers de la Dyle* is seen as an important actor within the construction sector, the main activities of the company are thus situated within the railway sector.

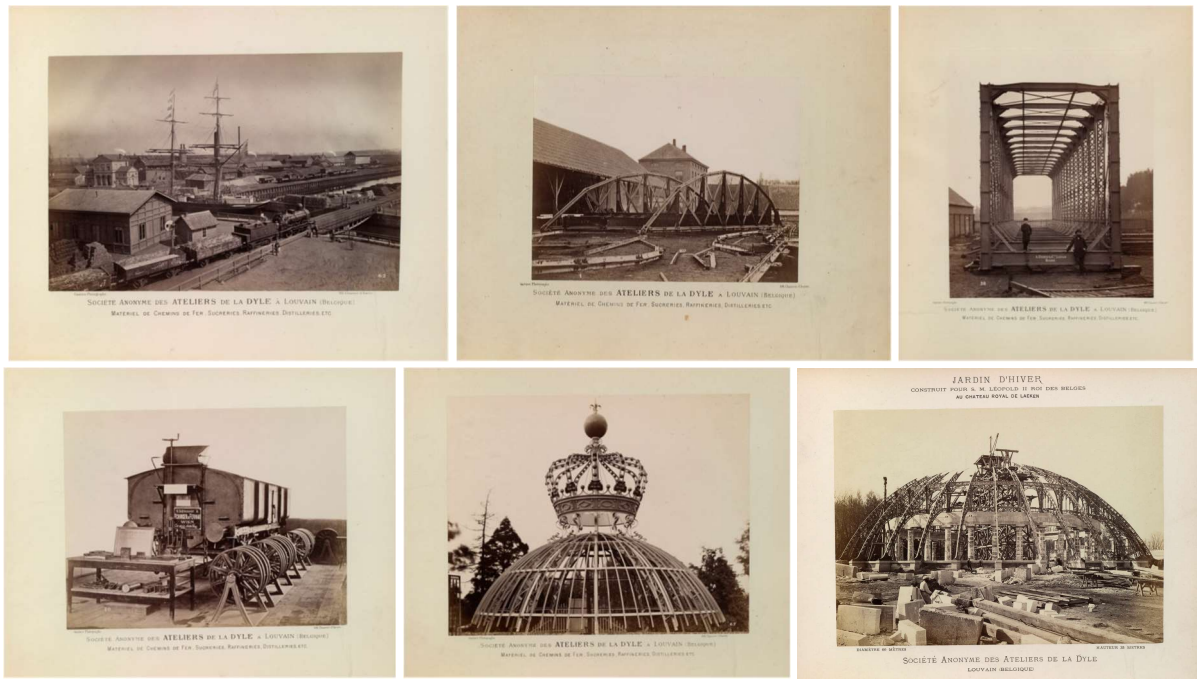

Figure 1: Album *Société Anonyme des Ateliers de la Dyle à Louvain* depicting an outside view of the factory in Louvain, two bridges assembled at the factory, the company's stand at the world exhibition in Vienna (1873), the crown of the Royal Wintergarden at the factory and the almost completed iron structure of the Royal Wintergarden at the Royal Palace in Laeken (1875) © Bibliotheca National Espana

The catalogue does not add titles to the objects depicted (see figure 1), but names mentioned on the wagons such as Lille-Valenciennes, Elsas-Lothringen, Chemnitz-aue-Adorf, Merida à Sevilla, Carlsruher Pferdebahn, Séville-Xeres-Cadix and abbreviations such as E.F.D.P.II (Estrada de Ferro Dom Pedro II) point to the export of rolling stock to France, Germany, Spain and Brazil. The catalogue depicts two bridges and four roof trusses and frames. The photographs are taken on a plot adjacent to the workshop. The geometry of the bridges and trusses, which is quite generic, does not enable to identify the structures. Yet, the shape of the cupola of Royal Wintergarden in Laeken, designed by architect Alphonse Balat is easily recognisable and is the only project that gets a caption *Jardin d'Hiver construit pour S.M. Leopold II Roi des Belges*. No less than five photographs of this construction are included in the album. They depict the pre-assembled crown at the workshop yard and several stages of the construction site until the completion of the iron structure in 1875.

The 1953 trade catalogue of the company mentions that *Ateliers de la Dyle* was the first Belgian workshop exporting rolling stock to Brasil [11]. By 1879 the workshop had supplied 39 bridges for the Baturité Railway and they constructed inter alia the Railway line Paranagua – Corytya (1880-1885) [12]. Furthermore they contributed to the Spanish railway line Palancia-Villalon and the electric lines of Nyon-Saint-Cergue (1916, Switzerland) and La Cure-Morez (1921, France) [11].

Figure 2: Trade catalogue *Aug. Lecoq & Cie. Constructeurs Hal (Belgique)* (c1880) depicting the roof truss of a safe deposit in Baltimore, the Corea Amphitheatre in Rome, a bridge over river Santa Cruz in Cuba, the Sarpsfos twin bridge and the Lysedal viaduct in Norway © het MOT, Grimbergen

3 BRIDGES AND ROOF TRUSSES BY *AUGUSTE LECOQ ET COMPAGNIE*

Although the company of Lecoq was involved in both the railway and the construction sector, the trade catalogue *Aug. Lecoq* is exceptional as it only mentions bridges and buildings.

In 1873 the industrial Auguste-Joseph Lecoq from Halle collaborated with Emile Ehlers from Antwerp, director of *Emile Ehlers et Cie*, to establish *La société commerciale en commandite "Auguste Lecoq et Compagnie, à Hal"* to make and sell iron and copper boilers and railway material [10]. After two years, in 1875 the company dissolved and Lecoq started a new cooperation with the Antwerp industrialist Charles Faider, who represented the company *Société commerciale "Bernstein et Faider"*. From august 1875 the company is called *Société commerciale en commandite "Aug. Lecoq et Cie, à Hal"*. It is unclear how the company developed during the following ten years, yet it can be expected that the production of rolling stock rose as *Bernstein et Faider* was active in the exploitation of Belgian and foreign railways and tramways since 1870. In 1875, for example, they became shareholder of the *Société des tramways d'Algers* [10].

In June 1894, after the death of Auguste Lecoq, widow Lecoq and family members erected the company *J.L. Lecoq et Cie* that went bankrupt by the end of 1895. In 1898, the production of fixed and rolling stock for railways and trams, steam engines, bridges and trusses was continued by the *Société des ateliers de construction de Hal* [9]. Although we do not have information about the activities in the period 1895-98 photographs taken during the positioning of a metallic bridge in Congo in 1898 show the partly visible painted letters *Ch. De Fer. Matadi Congo. Ateliers [de] construct[ion]. Aug. Lec[oq]. J.L. Lecoq Hal. Belg[ique]*' suggesting that bridge construction continued [13].

In the *Recueil Financier* we can follow up the yearly financial balances from 1898 onwards. The company stayed successful until the 1930s, but was loss-making in 1910 because of an incoherent contract for the construction of bridges in Bulgaria [14].

The trade catalogue that explicitly mentions *Aug. Lecoq & Cie* on the cover could have been published in the time period 1875-1894. Although the catalogue is not dated, the structures that could be identified date back from around 1877.

Although the company was also active in the railway sector, the catalogue *Aug. Lecoq & Cie. Constructeurs Hal* is the only catalogue in table 1 that solely contains bridges and roof trusses. The catalogue contains 16 photographs provided with explanatory titles. Only two structures in Belgium are depicted: the Kattendyck lock in Antwerp and a private suspension bridge in Mariemont. The other photographs show a roof truss to be shipped to England for the reading room in Liverpool, for the aquarium in Tynemouth and for a safe deposit building in Baltimore, frames for the panorama in Milan and the Corea Amphitheatre in Rome, lattice bridges for Australia (Parramatta) and Cuba (Arroyo Manso over Rio Santa Cruz) and four large bridges for Norway: the Prestebakke and Liadalen railway bridge, the Lysedal viaduct and the twin-deck bridge over river Sarps Fos (see figure 2). The export destinations of this company differ from the other workshops. Although Spain and Italy are a common destination, exporting Belgian iron structures to USA and England is rather exceptional as these countries had a flourishing iron and steel industry.

The bridges in Norway were all part of the construction of the Ostfold Railway Line and were designed by the Swedish-Norwegian structural engineer Axel Jacob Petersson. The Sarpsfos bridge was one of the first designs on this Railway Line. The English weekly magazine *Engineering* dedicated two issues to this bridge in January 1878 [15]. The bridge was built on top of an existing suspension road bridge, dating from 1854. Figure 2 shows how the lower road bridge deck is suspended to the new railway deck shaped as a lenticular truss spanning 54 meters at midspan. For this bridge the existing deck and columns of the former suspension

bridge were re-used, yet for the following bridges Petersson applied hinged columns, which was considered innovative. This design of Lysedal viaduct was praised in the English magazine *Engineering* in 1879 not only for its facility and quickness of erection, but also for the structural efficiency and economic advantages [16]. Tyrrell mentioned the Lysedal viaduct (1877) in his book *The history of bridge engineering* and explained the innovative shape of the pillars: the columns taper longitudinally, being wider at the middle than at the ends, and they are hinged at the shoes [17]. The railway line was in use from 1879 onwards. As the requirements of the railway network evolved, these bridges and viaducts were replaced over time.

4. TRADE CATALOGUES OF MERGING COMPANIES *LES ATELIERS NICAISE ET DELCUVE* AND *LA BRUGEOISE*

Today, most of the remaining Belgian iron workshops that have their roots in the 19th century are part of the international company *Bombardier Transportation* (1986-today). This company took over *B.N. Constructions Ferroviaires et Métalliques* in 1977, that is in its turn an alliance between *Les Ateliers Belges Réunis* (1956-77) and *La Brugeoise et Nivelles* (1956-77). [7] In the following, we study how companies merged between 1855 and 1956 to establish the company *La Brugeoise et Nivelles*.

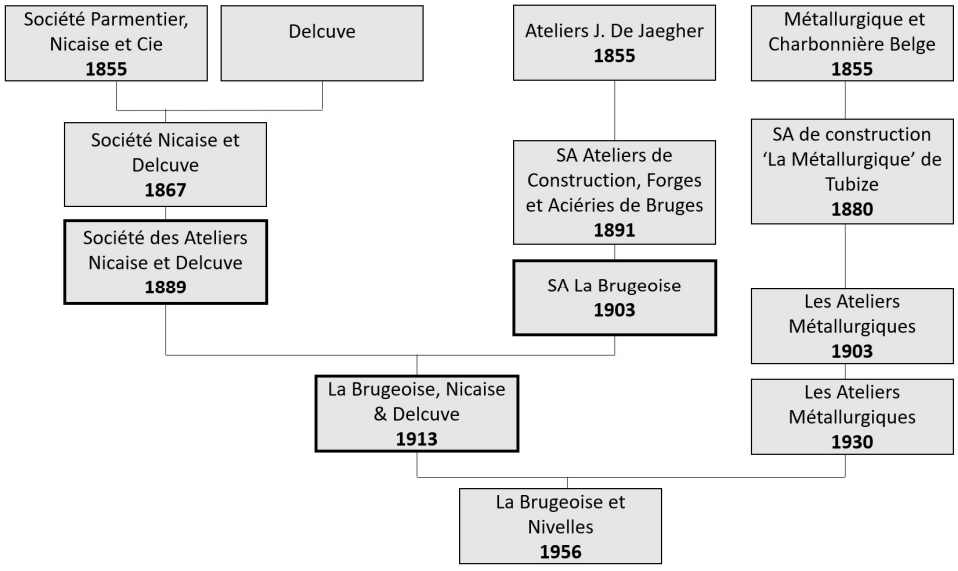

Figure 3: *La Brugeoise et Nivelles* was founded in 1956 by merging several Belgian workshops [7].

4.1. *Société des Ateliers Nicaise et Delcuve*

In 1956 the company *La Brugeoise et Nivelles* (1956-77) was founded. Figure 3 illustrates how the company brought together *La Brugeoise, Nicaise et delcuve* and *Les Ateliers Métallurgiques*. The first company in itself is an alliance between *Société des ateliers Nicaise et Delcuve* and *La Brugeoise* that merged in 1913 [7]. These different acquisitions explain why the image of a structure is sometimes repeated in various trade catalogues. In figure 3 the catalogues of the three companies we discuss in this section are marked with a bold frame.

The company *Société Nicaise et Delcuve*, founded in 1867 changed its statute in 1889 and underwent a minor name change: *Société des Ateliers Nicaise et Delcuve*. Next to rolling stock for railways and tramways they constructed bridged and metallic structures, and pieces of foundry in iron and copper. A famous employee of this company is the Belgian structural engineer and professor Arthur Vierendeel who invented the Vierendeel girder and published handbooks on iron architecture. After his graduation in 1874, Vierendeel started his career in the iron workshop *Société Nicaise et Delcuve* in La Louvière until 1885. That year he became provincial engineer in West-Flanders and combined this position with a professorship at the University in Leuven [18].

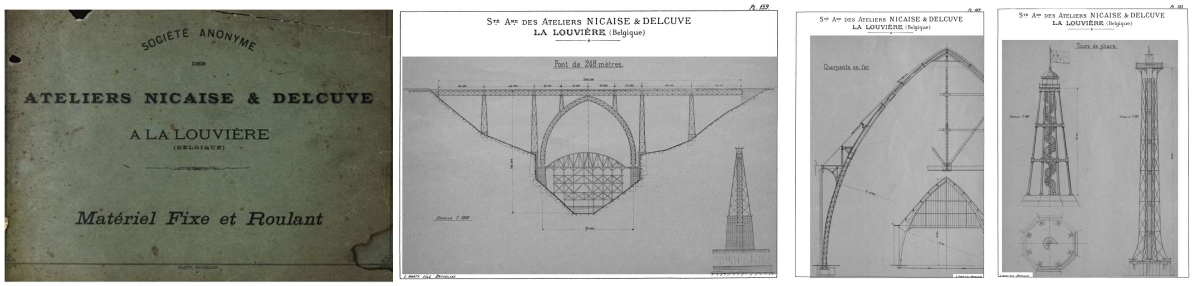

Figure 4: Trade catalogue *Société Anonyme des Ateliers Nicaise & Delcuve à La Louvière (Belgique). Matériel fixe et Roulant* (c1895) depicting a bridge spanning 248 meters, the hall calculated by Vierendeel in La Louvière, and two towers © Ecomusée du Bois-du-Luc

The catalogue *S.A. des Ateliers Nicaise et Delcuve à la Louvière (Belgique*) is not dated and does not contain any photographs but drawings. The catalogue contains 126 plates of which 43 wagons, 17 cranes and 18 plates depicting iron roof trusses for stations, halls and markets, iron towers, small and large bridges and gasometers. The title of the drawings is kept quite general (*charpente en fer, pont de 248 mètres, passerelle jardin*) and does not allow identification. It is therefore not clear whether the catalogue refers to structures that have been built or structures that could be build. However, some drawings could be identified. For example, there is a clear resemblance between plate 149 *charpente en fer* in the trade catalogue and the colour plate 65 in Vierendeel's publication *La construction architecturale en fonte, fer et acier* (1902*)*. As Vierendeel's plate is entitled *Atelier à La Louvière (Calculé et excécuté en 1881 par A. Vierendeel)* it is clear this structure had been built.

4.2. *La Brugeoise*

The trade catalogue *La brugeoise. Usines métallurgiques. Société Anonyme. Saint-Michel-lez-Bruges. Belgique* is published after the relocation of the factories to a plot in between the canal and the railway station in Saint-Michel-lez-Bruges, in the South of Bruges. This relocation might explain why so many interior pictures are included in the catalogue. One general drawing of the factory and twelve photographs depict the different workshops. A picture of the workman leaving the factory is also included. The catalogue starts off with a description and small history of the company in four languages (French, English, German, Spanish). These international ambitions are underpinned by adding two photographs of their participation in the world exhibition in Liège (1905) and Milan (1906). The main part of the catalogue shows 45 photographs of wagons and tenders shipped to all parts of the world. As the purchasers are

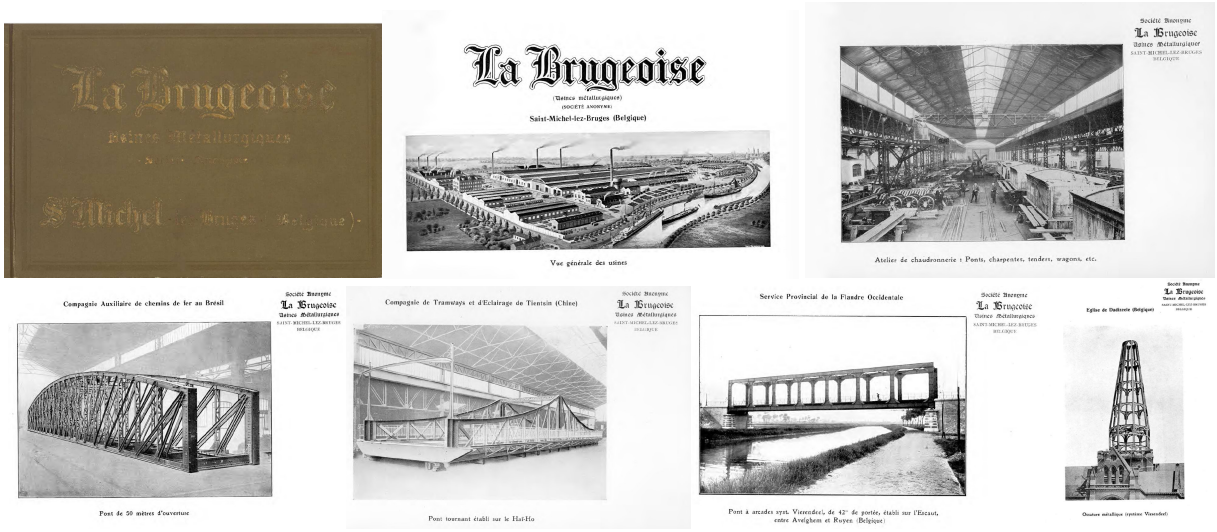

Figure 5: Trade catalogue *La brugeoise. Usines Métallurgiques. St-Michel-lez-Bruges* (c1910) depicting view of the new factory in Bruges, an interior view, a bridge spanning 50 meters for *Compagnie Auxiliaire de Chemins de fer au Brésil*, a turning bridge for *Compagnie de Tramways et d'Eclairage de Tientsien* (China), the first Vierdendeel bridge in Belgium (built 1904) and the iron tower of Dadizeele church © City Archive Bruges

clearly mentioned we get a view on their international clients : *Compagnie des chemins de fer de l'Ouest Paris*, *Chemin de fer du Nord de l'Espagne*, *Compagnie des Chemins de fer de la Tajuna* (Spain), *Chemin de fer de l'Etat Italien*, *Compagnie générale des tramways d'Athènes et du Pirée*, *Chemins de fer des Indes Anglaises*, *Chemins de fer de Rosario à Puerto-Belgrado*, *Compagnie Générale de Chemins de fer dans la province de Buenos-Ayres*, *Compagnie générale de Chemins de fer et de tramways en Chine. Chemins de fer du Pienlo*. The catalogue includes 19 photographs of bridges and structures. (see figure 5) Some of the destinations reappear: three bridges with a span of 10, 25 and 50 meters are destined for the *Compagnie auxiliaire de Chemins de fer au Brésil*, a dome for the Necroterio in Bello Horizonte (Brasil), a turning bridge over the Haï-Ho for *Compagnie de tramways et d'éclairage de Tientsin* (China) and a bridge with a span of 30 meters over the yellow river for *Chemin de fer de Pékin à Hankow (China)*. The photographs show the construction of these structures in the workshop. For the Belgian structures, iconic examples were selected: the catalogue includes two photographs of the first Vierendeel bridge, constructed in 1904 over river Sheldt, between Avelghem and Ruyen [3]. The bridge is commissioned by *Service provincial de la Flandre Occidental*, which is not a coincidence as Arthur Vierendeel was heading this department. Furthermore, there are two photographs of the iron tower of Dadizeele church (system Vierendeel), a military hall for balloons in Antwerp, bridges in Charleroi, Termonde and Marchienne-au-Pont and a gasometer. The Belgian examples are depicted in situ, during or just after construction.

4.3. *La Brugeoise et Nicaise & Delcuve*

In 1913 the two companies *Nicaise et Delcuve* and *La Brugeoise* join to become *La Brugeoise, Nicaise et Delcuve*. Table 1 includes three catalogues of this company dating from around 1930, 1937 and 1949. In the 1930 catalogue the German language has been replaced by Portuguese. The catalogue shows interior views of both factories in Bruges and La Louvière,

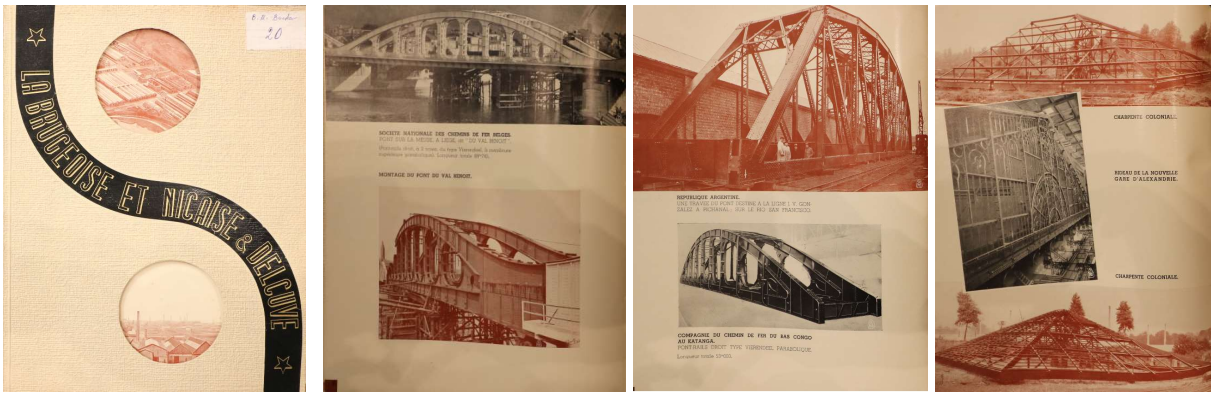

Figure 6: Trade catalogue *La brugeoise et Nicaise & Delcuve* (c1937) depicting the photos of the construction of the Vierendeel railway bridge Val Benoît in Liège (1935), a bridge in Argentina - a Vierendeel railway bridge for Congo (Bas-Congo au Katanga), roof trusses and the windscreen for the Alexandria station in Egypt © City Archive Bruges

followed by photographs of wagons, cranes, bridges and buildings. Many photographs are recuperated from the previous catalogues. Therefore, we go into the catalogue dating back to c1937. The lay-out of that catalogue is completely different, combining several pictures on one page (figure 6). After an introduction of the two factories in Bruges and La Louvière, bridges are the first structures that are shown. Indeed, large reconstruction and infrastructure works had taken place in inter-war Belgium. The construction and onsite pictures of Vierendeel bridges in Liège (Val Benoit), Gellick and Geel are shown. The pictures illustrate how the shape of Vierendeel bridges had been optimised: the upper part is curved as a parabola. In the 1930s also the connection techniques of steel Vierendeel bridges evolved from riveted to welded connections and Espion pointed out the leading role of the iron construction workshops in this evolution [3]. When workshops were invited to send in their offers to construct a Vierendeel bridge over the Albert canal the iron construction workshop *Société Métallurgique d'Enghien Saint-Eloi* send in a counterproposal in 1932 to weld parts of the Lanaye bridge in the workshop and hot rivet the parts on site. This method was accepted and the bridge in Lanaye became the first partly welded Vierendeel bridge in Belgium in 1933. In 1934 the first entirely welded Vierendeel bridge was constructed in Herentals, again because of an accepted counterproposal by *Société Métallurgique d'Enghien Saint-Eloi.* When a fully welded Vierendeel bridge collapsed in Hasselt in 1938, without any prior sign of failure, the optimism about this progress was tempered [3].

In the trade catalogue 'welded' is added to the description of the Vierendeel road bridge in Geel, spanning 49 meters. The other two depicted large span railway bridges are still hot riveted: Vierendeel bridge in Val Benoît (1935, spans 60m, 85m and 60m), Vierendeel bridge in Ghellick (1938, spans 113m). Next to these Belgian bridges, a Vierendeel railway bridge for Congo (chemin de fer du Bas-Congo) and several bridges for Republique Argentine are depicted: a road bridge 109m long over the Riachuelo with two movable parts, a railroad bridge for the line J.V. Gonzalez à Pichanal over Rio San Francisco and a bridge for Rio Sali. The two pages dedicated to buildings contain a roof structure mentioning *charpente coloniale* and the windscreen for the Alexandria station in Egypt (1927).

The main body of the catalogue is still dedicated to rolling stock (wagons and tenders), yet

new destinations appear which explain the link between bridge orders and rolling stock orders: Congo (*Chemin de fer Leopoldville-Katanga-Dilolo, Compagnie du chemin de fer du Bas-Congo au Katanga*), Maroc (*Chemin de fer de Maroc*), South-Africa (*Chemins de fer Sud-Africains, Johannesburg*), Peru (*The Peruvian Corporation LTD*), Egypt (*Chemins de fer de l'Etat Egyptien*), Argentina (*Chemin de fer de l'Etat Argentine*). Next to these destinations, wagons and tenders were still exported to France, Spain, China and Brazil.

5 CONCLUSIONS

In the 19th century about 100 Belgian iron and steel workshops were active in the construction of buildings and bridges. The search for trade catalogues of these workshops showed that widely-distributed catalogues were not used by companies whose main activity was in the construction sector. The 15 trade catalogues identified in this study all relate to companies with their main activity in the railway sector. For these companies it was an advantage to take up the construction of bridges and related structures when developing railway lines abroad to bridge rivers and roads when constructing a railway or tramway line. From the 1870s onwards Belgian construction workshops exported a vast amount of structures to countries where railway activities took place such as Spain, Italy, Egypt, Congo, Brazil, Argentina and China.

The trade catalogues are not comprehensive as they only cover a selection of projects and the data they provide is often too limited to identify a bridge or a building. However, these catalogues often provide new information because they contain little known pictures from the construction in the workshop or of the construction on site. The catalogue also provides insight into the company's broader oeuvre.

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