J.A. VAN DER KLOES (1845-1935). A PROFESSIONAL BIOGRAPHY OF THE FIRST DUTCH PROFESSOR IN BUILDING MATERIALS

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Abstract
Prof. Jacobus Alida van der Kloes (1845-1935) was appointed teacher in building materials at the “Polytechnische school” of Delft in 1882. From 1905 until his retirement in 1915 he was promoted to full professor on the subject of knowledge and research of building materials at the “Technische Hoogeschool Delft”, the predecessor of the current Delft University of Technology. Van der Kloes is well known in the Netherlands for his – over one thousand pages - magnum opus “Onze Bouwmaterialen” (Our Building Materials) that was first published in 1893 and followed by a revised edition in 1908 and followed by a third revised edition in 1923. Less known is that, together with different academic and professional co-authors, he published several manuals for craftsmen, for building in the Dutch colonies and reports on different topics. His manual for the bricklayer and stonemason has even been translated and published into English and German. Also other publications in German, English and French are known, for example in the journal of the International Association for Testing Materials.

Van der Kloes was editor in chief of the (weekly magazine “De Ambachtsman” (the craftsman), published from 1885 until 1905 and he published frequently in other Dutch architectural magazines such as “Bouwkundige Bijdragen” and “Architectura”. Many of his magazine publications cover topics of new inventions, discussions on durability of certain materials, testing methods or techniques for good craftsmanship. Recent publications and reports on early twentieth century architecture and building materials suggest that prof. Van der Kloes was the one and only authority in the field of building materials in the Netherlands and that he, almost personally, invented all new techniques and materials. This paper investigates whether this is true or a myth by describing, categorizing and analyzing his writings. By looking at his international publications and the references used in his books, his oeuvre will be compared to other international academic and professional writers on building materials.

This paper highly benefits from the collection of the Library of Delft University of Technology, which holds an original copy of most of Van der Kloes’ writings.

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5th International Congress on Construction History
INTRODUCTION

Although I came across the writings of prof. J.A. van der Kloes (1845-1935) many years ago during my PhD and other studies into the history of the use of building materials in the Netherlands (see i.e. Quist 2009; Quist 2011; Quist et al. 2013) it was not until spring 2013 that Van der Kloes got my special attention. It was due to a cellar clean up at the Faculty of Civil Engineering and Geosciences at Delft University of Technology (TU Delft) that a – to be thrown away - collection of building materials (mainly natural stone and wood) was brought to my attention by H.A. Heinemann. After consulting the collection it was immediately clear that – at least a part of – the collection dates back to the end of the nineteenth century and most probably prof. Van der Kloes was the one who started collecting. After transporting the collection to the Faculty of Architecture the search for the history of the collection started and consequently I came across all kinds of information on prof. Van der Kloes and the education and research on building materials at TU Delft (and his legal predecessors).

Due to Van der Kloes’ – over 1000 pages - book “Onze Bouwmaterialen” (Our Building Materials) that was first published in 1893, he is often referred to - without any criticism - by specialist in construction history and architectural history when describing and analyzing late nineteenth and early twentieth century buildings in the Netherlands. This paper is the first attempt to precisely order the information on and writings by prof. Van der Kloes and to define more precisely his national and international authority in the field of building materials.

SHORT BIOGRAPHY

Jacobus Alida van der Kloes (Fig. 1) was born on the third of June in 1845 in Doesburg and died, almost ninety years old, in Delft on January 13, 1935. He married Clasina Jacoba Brouwer in 1873 in Bolsward. They got three children (Louize Maria, 1874; Constantina Elizabeth, 1876; Jan, 1877), all born in Dordrecht.

According to Tjaden (1925, p. 214), Van der Kloes was preparing himself to study at the P.S. after secondary school (Gymnasium Nijmegen). Like many of his contemporaries, Van der Kloes presumably did this by following drawing lessons in the evening. But instead of going to Delft, he started working at Staatsspoorwegen (National Railway Services) directly after second-
ary school and within a year he was promoted ‘opzigt 5e klasse’ (Anonymous 1864) and sent
to Wijhe to supervise a part of the construction works of the railways. Afterwards he worked in
Hengelo on the drawings and the realisation of the first factory building of Stork, in Voorschoten
on a church and in Amsterdam on the construction works of the North Sea canal (Amsterdam-
IJmuiden) to become municipal architect of Bolsward in 1871 (Anonymous 1871) and in 1873
(Anonymous 1873) director of the municipal department of public works in Dordrecht. In Dor-
drecht Van der Kloes was – among others – involved in the design and construction of a hospital,
a gymnasiunm and a water tower (Van der Kloes 1878a,b; 1881).

As of August 1st, 1882 Van der Kloes was appointed teacher in building materials at the P.S.
in Delft. Apparently it had taken some years to create this position because prof. G.J. Morré al-
ready wrote in his report over the years 1870-1872 that he wanted to establish a chair for the
knowledge of building materials (Annema 1973). In 1905 Van der Kloes was promoted to pro-
fessor on the subject of knowledge and research of building materials at the “Technische
Hoogeschool Delft” (T.H.), the predecessor of the current TU Delft. In 1915 – at the age of 10 -
he retired and was succeeded by prof. Chr. K. Visser, former deputy director of the Department
of Public Works of Amsterdam. Although officially retired Van der Kloes was in the laboratory
on a daily basis up to his eightieth birthday according to Tjaden (1925).

KNOWLEDGE AND RESEARCH OF BUILDING MATERIALS

When appointed in 1882, the P.S. was organised to educate and prepare for six different di-
plomas: Technology, Civil Engineering, “Bouwkunde” (Architecture)², Maritime Engineering,
Mechanical Engineering and Mine Engineering (Westendorp et al, 1930, p. 11). From an organis-
ational perspective, Van der Kloes belonged to Architecture, but also taught in the other disci-
plines. In 1882 the courses of Van der Kloes were part of the exams B1 (natural stone, brick,
artificial stone, wood and woodlike materials), B2 (metals, mortars, other materials and testing of
materials) and C1 (public piping systems). The content of the courses and the position in the cur-
riculum only changed a little over the years.

Up to the end of the nineteenth century, the research and education at the P.S. was concen-
trated in a cluster of - often adapted and expanded - buildings on the Oude Delft and Westvest in
the historic inner city of Delft. From 1882 the education in building materials was situated in the
attics of the architecture building (a. in Fig. 2; a+b in Fig. 3). It took some years before a labora-
tory of 6x8 m. was built in the courtyards (b. in Fig. 2). Since 1904, when physics moved to a
new building, a lecture hall, cabinets and space for the different collections was put at the dis-
posal of prof. Van der Kloes in the Westvest 5a building (c. in Fig. 2; c+d in Fig. 3), next to the
earlier built laboratory for testing materials (Van der Kloes 1905; Annema 1973).

With the conversion of P.S. to T.H. in 1905, building materials became a more or less inde-
pendent department, belonging to the faculty of Civil Engineering (instead of Architecture). The
department of building materials stayed in the inner city of Delft up to 1917, when it moved to a
semi-permanent building at Mijnbouwstraat 6a. This move took place under prof. Chr. K. Visser,
successor of prof. Van der Kloes.

² The word “bouwkunde” in Dutch is different from the English word architecture; it implies building art, craft,
professions and application. It cannot be separated from the making as well as referring to existing and traditional
skills.

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Figure 2: Aerial view of the inner city T.H.-complex (from NL-HaNA, TH Delft tot 1956, 3.12.08.01)

Figure 3: a. Exterior view on the laboratory for testing building materials; b. Interior view of the laboratory for testing building materials; c. The collection of wood samples in the hall in front of the lecture hall for building materials; d. Lecture hall nr. 16 for building materials. (from P.S. 1905)

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WRITTEN OEUVE

It is not known based on what argumentation Van der Kloes was appointed at the P.S. in Delft neither who were the alternative candidates. Most likely his active membership of the Maatschappij tot bevordering der Bouwkunst among others reflected by his (translated) articles in the magazine Bouwkundige Bijdragen played a role. The very well elaborated articles on Public Works in Dordrecht and the design of the innovative sewerage system in Dordrecht will, without any doubt, have drawn the attention to him. After his appointment at the P.S., teaching building materials and writing a book on building materials became his first major goal as Van der Kloes points out himself in the preface of the first edition of “Onze Bouwmaterialen” (Van der Kloes 1893). The founding of the weekly magazine “De Ambachtsman” in 1885 helped Van der Kloes to spread knowledge on building materials and enabled him to discuss – publicly – with his readers. Those discussions were often referred to in “Onze Bouwmaterialen”. The many questions on practical issues according to the testing and approval of building materials to be used for building, together with the explicit professional opinion of Van der Kloes on those aspects and his loathing for the existing general requirements for building lead to the publication of the first edition of his “Algemeene voorschriften voor de levering en keuring van bouwstoffen en voor de uitvoering en het onderhoud van bouwwerken” in 1894.

As a spin-off from “Onze Bouwmaterialen” Van der Kloes starts to publish internationally on topics derived from the book. Also the “Bouwen in overzeesche gewesten” (building in the colonies) can be seen as a colonial version of “Onze Bouwmaterialen”. A second and even a third edition of “Onze Bouwmaterialen” has been published in the first and third decade of the twentieth century. Some topics see major revisions or additions, like concrete. Other topics such as natural stone receive only minor revisions which makes some of the information in the third edition a bit outdated (see also Quist 2011).

INTERNATIONAL WRITINGS

It was the International Association for testing Materials (IATM, Internationalen Verbandes für die Materialprüfung der Technik (D), L’association internationale pour l’essai des Matériaux (Fr)), established in 1895 in Zurich that provided Van der Kloes with an international network. Its journal and international conferences offered ways to internationally disseminate his idea’s. A reconstruction of the international status of Van der Kloes is difficult to make. He published only a few papers in “Baumaterialiën kunde”, the multi-lingual journal of the IATM, mainly on topics directly related to chapters in “Onze Bouwmaterialen”. Van der Kloes himself often referred to his paper for the 5th congress of the IATM in 1909 in Copenhagen entitled “Die Folgen des Gebrauchs unrichtig zusammen gesetzter Mörtel” (Van der Kloes 1909). His talk at the congress was the reason for creating an international committee for researching the influence of the mortar mixture on the durability of masonry. According to the proceedings of the 6th congress in 1912 in New York, the committee consisted of 15 members from all over Europe and America: J.A. van der Kloes; P.F. van der Wallen; P. Joosting; A. Adams; N. Beleubsky; E. Candlot; E. Eger; A. Hanisch; G. Herfeldt; J. Hirschwald; J. Allen Howe; N. Lamin; E. Leduc; A.E. Munby and D. Nowgorodsky. The reports and notes on the progress of this committee point out that Van der Kloes had a very specific opinion on the origin of and the cure for certain damages related to the use of mortar with improper properties. Many members of the committee publicly disagreed with him or did not comment at all, which made Van der Kloes react even more tenacious.
Due to the first World War, the activities of the IATM and its committees stopped halfway the second decade of the twentieth century. The initiation of the official Dutch working party of the IATM (est. March 19, 1926) was actually the start of a re-establishment of the international association. The Dutch working party was named “Bond voor Materialenkennis” (Algemeen Dagblad, 29/05/1926). The board consisted of: Prof. J.A. van der Kloes (chairman); Ir. M.E.H. Tjaden (second chairman); Ir. P. Jonker (treasurer); A.H. baron van Hardenbroek van Ammersstol; Prof. Dr. Ir. C.J. van Nieuwenbrug; Ir. C.F. Stork; Prof.ir. Chr. K. Visser; Dr.ir. E.B. Wolf; Ir. P.F. van der Wallen (secretary). It looks like the appointment of Van der Kloes as chairman was only for honorary reasons because of the second board meeting onwards, Tjaden chaired the meetings. It was on the occasion of the celebrations of his eightieth birthday that Van der Kloes together with Tjaden and Van der Wallen came up with the idea to re-establish international cooperation in the field of testing materials. This was effectuated by the organisation of a “Congres International pour l’essai des matériaux” held in September 1927 in Amsterdam and the establishment – during the congress - of a New International Association on Testing Materials (New IATM, Nouvelle Association Internationale pour l’Essai des Matériaux, see Tjaden (1928)). During the congress it was decided to organize a second international congress in Zurich in 1931. Presumably due to the worldwide economic crisis during the nineteen thirties and afterwards the Second World War the new established association did not develop and no activities after 1931 can be traced back. Although many national and still active organisations in the field of (testing of) building materials such as the American working party (ASTM, est. 1898) have their origin in the (New) IATM. Looking at the topic covered and the people involved in the establishment, it can also be argued that RILEM (Réunion Internationale des Laboratoires d’Essais et de recherches sur les Matériaux et les constructions, est. 1947) is the – still existing - successor of the (New) IATM.

**DISCUSSION**

When J.A. van der Kloes came to Delft to teach building materials he was a man of the practice. He only had a broad and classical oriented secondary education (Gymnasium). The knowledge of building in general and building materials in practice he gained during the different positions he took in twenty years. Because of his education, he was able to read, write and most probable also speak German and French that provided him with the opportunity to study the most important foreign books in the field of building materials. Looking at the structure and the topics covered in “Onze Bouwmaterialen” it is immediately clear he studied for example the books by Wolfram (1833), Weneck (1863), Gottgetreu (1869), Debauve (1888) and Baudson (1885). Especially in the first edition of “Onze Bouwmaterialen” Van der Kloes often refers to those (and other) books as well as to journal papers and brochures.

In approx. 55 years of active writing Van der Kloes managed to write over 1,5 million words in more or less unique texts, not taken into account the different (reworked) editions of many books. During the turn of the century there was no other scholar or professional in The Netherlands in the field of architecture and engineering that even came close to this production. Van der Kloes was seen as an authority in the field in those days, but the way he used his writings to spread his outspoken and sometimes even arrogant opinions often met resistance. See i.e. Nijland et al. (2015) for a discussion on the durability of Morley limestone.

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3 A rough calculation: “Onze Bouwmaterialen”: 1000 pages x 450 words = 450,000 words. 13 years of weekly editions of “De Ambachtsman: 50x 13 x 800 words = 520,000. Others: at least 500,000.
The first edition of “Onze Bouwmaterialen” was an up-to-date book that presented the state of the art in the field of building materials and because of Van der Kloes’ international view probably even ahead of its time in The Netherlands. The drawback of his assertive and stubborn attitude was that some parts of “Onze Bouwmaterialen” did not change in the second and third edition although many innovations had taken place in the period between 1893 and 1923. If referring to the (widespread) 2nd and 3rd edition one should keep in mind that concerning many topics, the books are not representing the state-of-the-art at the moment of publishing.

Although being the most complete book on building materials in his time, “Onze Bouwmaterialen” never reached a large international reading public because of the Dutch language. Prof. Van der Kloes’ international reputation, almost solely based on the topic of mortars, is at least doubtful. A closer review of his publications and the publications of his contemporaries on this topic, related to the current body of knowledge is necessary to evaluate the contribution of Van der Kloes. The – almost weekly – updates on his laboratory test, published in “De Ambachtsman” could be of great help to get insight in Van der Kloes’ reasoning.

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