

TECHNICAL LITERATURE IN THE SERVICE OF THE DAILY PRACTICE OF CIVIL ENGINEERING

Elek TÓTH

Department of Building Construction
Budapest University of Technology and Economics
H-1521 Budapest, POB. 91. Hungary

Received: December 10, 2002

Abstract

At the beginning of the 19th century there was a rapid growth in the number of methods for the analysis of loadbearing structures as a consequence of the revolution in natural science and later in scientific technology. At the same time new materials appeared and unprecedented functional demands arose. The social esteem of engineering grew and Hungarian engineers belonged to the best of their profession in Europe. They were assisted in their work by pragmatically compiled technical literature (handbooks, charts and reference books).

In the second half of the 20th century the theory and practice of engineering became more and more separated. The realisation of the body of knowledge captured in the excellent theoretical works was impeded by the poor technical standard of material production and construction. Access to information has been rendered difficult by the ‘revolution in the technology of finishing works’, which began approximately 30 years ago and is becoming ever more rapid in our days.

The unified Europe demands engineers to possess up-to-date knowledge of their profession, which is only accessible in the form of impartial, high quality technical literature.

The instructors of the Department of Building Construction co-operate with Verlag Dashöfer Szakkiadó Kft. (Verlag Dashöfer Specialised Publishers Ltd.) in the creation of the base of Hungarian technical literature of European standard.

Keywords: civil engineer, architect, structural engineer, finishing works, technical literature, Department of Building Construction.

1. The Good Old Days...

For a number of centuries building materials have gone through hardly any change in the European chapter of the 5000-year history of civil engineering. Built structures consisted of earth (mud/clay), stone, wood, bricks (burnt clay) and a small amount of wrought iron in varying proportions. The science of engineering primarily meant the knowledge passed on from generation to generation, the traditions, the realistic probing of the possibilities and the borders of technology, which had immediate feedback from practice.

That ‘golden age’ lasted as long as the turn of the 18th and 19th century. The last engineer who could have up-to-date knowledge without consulting technical literature might have lived in the court of Queen Maria Theresa...

That comfortable practice was turned upside down by the revolution in natural science and later in scientific technology, which shook the whole Europe. In the

course of no more than 50 years new structural materials were born such as cast iron, rolled steel, concrete and reinforced concrete. There was a demand for new and formerly unimaginable constructions. Due to their great height and great span or other extraordinary circumstances of their construction and maybe their operation structures required a higher standard of engineering. At first that led to the growing of the social esteem of calculation-based engineering science and later it caused an inevitable differentiation: construction-related engineering became divided into the activities of the architect and the structural engineer. Needless to say, the division did not appear in the form of complete separation, on the contrary, it meant a close co-operation of inseparable pairs of engineers or, in many cases, the two were united in the same person. In the age of the Art Nouveau it was usual for a third person representing one or other form of the applied arts to join the co-operation of the two engineers.

The engineers of that age were assisted in their work by well edited practice-oriented handbooks of engineering, simplified reference books containing charts for the calculation. The outstanding personalities of design and calculation theory were usually occupied in practical work of designing and construction at the same time, consequently, the technical literature of that age primarily contained directly applicable engineering information while the more abstract scientific analyses and deductions remained in the background.

We may proudly say that the erudition of Hungarian engineers of those times and their proficiency in the elaboration and the practical application of scientific achievements as well as in the introduction of new structures and technologies elevated Hungary in the front-rank of the world of technology.

2. Far from Europe...

Following World War II Hungary was left out of the technical life of Europe for about 50 years. Knowledge of building, which was traditionally passed on from generation to generation slowly came to be forgotten and engineering work became more and more theoretical and independent of practice. Some great projects occasionally allowed Hungarian engineers to show a glimpse of their expertise but that kind of opportunity was rare and reserved for few.

Some excellent comprehensive and systematic theoretical works (e.g. *Épületeszerkezettan I.–II.–III.–IV.* (Vol. 1 to 4 of Building Structures) by Dr. Gábor, László) and ones summarising the technical and technological knowledge of the age – but primarily that of previous ages – (e.g. *Magasépítéstan I.–II.* (Vol. 1 and 2 of Building Constructions) by Széll, László) were published in that period. However, the influence of those on practice and actual construction was less than expected, which may be accounted for mainly the kind of silent revolution of finishing works which began in the 1970s and which is speeding up in our times.

The essence of the revolutionary changes is that unquestionable fundamental truths ceased to exist in the field of built constructions, we can no longer talk

about good solutions in the general sense, merely about the designing of optimally functioning structural units and finishing works based on the theoretical knowledge of the age and making use of the materials available at the time.

The consequence of those changes in the field of the technical literature of engineering was that no new comprehensive university text-books were published in the past 20–25 years. The reason for that was not only the high technical standard of ‘the Gábor-books’ discouraging successors from making an effort, but also that it came to be generally believed that it was impossible to write a good text-book which would assist engineers in their practical work of construction. That is to say the changing of technology, materials, products is so rapid that by the time a text-book describing a certain state is published, the greater part of its ‘up-to-date information’ has already been outdated...

The last effort to keep up with the changing times was a study-aid under the title ‘Ábraanyag’ (Collection of Illustrations) by Brúzsa, László.

May it be true that the transmission of information and the acquisition of up-to-date knowledge is no longer possible in the traditional form of printed text-books?

Whose interest is it to obtain information?

Is the state wise enough to pay the related costs?

Are engineers specialised in design or construction capable of financing the acquisition of the necessary amount of information for themselves?

The state has not been able so far to allocate a sum worth mentioning for this purpose and that is not likely to change in the near future either. In the past three decades practising engineers have been trying to keep their knowledge up-to-date by the acquisition and systematisation of promotion leaflets, brochures and folders of guidelines. That method demanded enormous effort at times and as the accessible documents were primarily meant to advertise they typically tried to make an impression and contained less of actually applicable technical information.

The fact that the written and the actual technical characteristics of products were often significantly different in the period between the 1970s and the beginning of the 1990s did not lead to the increase of the demand for reliable technical information either. It would take a whole volume to sum up the lessons of that age but let us now merely accept the statement that the period mentioned above may justifiably be called the ‘ghost story’ of finishing works. And indeed it was the ghost story of low-quality products manufactured without supervision on the basis of partially purchased licences of obscure origin and structures of finishing works constructed incompetently out of materials produced on out-of-date production lines on the basis of methods badly learned in the course of study-trips abroad.

Many people tried to find a way out of that chaotic situation. For instance in the late 1980s and the early 1990s (then still) young instructors of the Department of Building Construction of the Budapest University of Technology attempted to transmit topical technical information directly to practising engineers by organising 4 to 5-day courses with residence and distributing printed reference materials. The organisation of that activity exceeded the financial capacity of the University and

thus in the spirit of the age the instructors pioneered to form Építési Szakcsoport (Specialised Group of Building) and later Építőmérnöki Kft. (Civil Engineering Ltd.) and went on with their ‘market-oriented’ enterprise of education.

The subject matters of the post-graduate courses included:

- The maintenance and renovation of pitched timber roofs
- The maintenance and renovation of the covering of pitched roofs
- The maintenance and renovation of flat and low-pitch roofs
- The maintenance and renovation of prefabricated buildings
- The architecture of the turn of the century

The courses proved to be exceptionally successful, however, their organisation required huge effort from the participating instructors. Due to the market-oriented nature of these courses they were slightly ahead of their time.

3. Once Again at the Gate of Europe...

At the present moment, whether we like it or not, we are once again standing in front of the gate we have been guarding and protecting inside for centuries, unlike now when we are knocking on it (for the second time) for permission to enter.

What does this situation have in store for engineers and the technical literature related to engineering?

It is a statement of eternal truth that a person’s value – and that applies to engineers, too – may be measured by the number of languages they speak. People fluent in German, English and French are theoretically capable of studying contemporary European technical literature, provided that they manage to overcome the financial and temporal difficulties of the acquisition. Unfortunately our national practice and capacity of building is not the same as that of other countries in Europe. That difference will remain even after we cross the threshold of that particular gate. The essence of European standardisation and unification is just the fact that it only provides basic principles and leaves the shaping of the details of the actual solutions to those in charge of production and development. Thus details of solutions may differ from each other not only across countries but even across regions of a larger country.

Therefore Hungarian engineers have to take the prescriptions of Hungarian manufacturers and merchants into consideration. The last few years did not bring about sufficient consolidation of the various professional chambers and associations which would have enabled them to issue principles, recommendations and assessment in all fields of building, even though the necessity of the acquisition of reliable and up-to-date information is becoming more and more pressing for practising engineers, regardless of the expense.

It was in that ‘historical moment’ that Verlag Dashöfer Szakkiadó Kft. (Verlag Dashöfer Specialised Publishers Ltd.), well known in Europe and around the world, appeared on the stage and offered the community of engineers an edition of a format

previously unusual in our country. The publisher had a system – formerly successful in the field of legal studies and economics – of ‘ringed books’ with detachable and replaceable pages to facilitate the process of bringing it up-to-date, which they introduced in 2000 for publications on engineering as well.

The handbooks make use of a favourable mixture of traditional and modern methods of publication and have the quality of impartiality and independence befitting a university:

- The text-pages provide space for analyses and the statement of general principles in the spirit of ‘the Gábor-books’.
- Detailed descriptions of technology and instructions for construction are also included in the spirit of ‘the Széll-books’.
- Its content of both intertextual and full-page illustrations takes the best out of ‘the Brúzsza-collection of illustrations’.
- Its ‘ringed-book’ format facilitates the regular (three-monthly) supplementation and updating of the content with unprecedented efficiency.
- The complete set of illustrations is made available in CAD format – which may be further edited – on the CDs attached to the updating versions.
- The questionnaires appearing in the 4 updating versions published in a year allow the readers to express and the editors to find out about special interests, which makes the activity of the authors and editors user-friendly and interactive.
- The publications are by principle free of advertisements and independent of companies, which gives the authors and the editors a unique opportunity to make realistic comparisons and fair evaluations.
- The authors are prominent personalities of their profession. The great number of authors vouches for the complexity of the content and the sincerity and validity of the analyses even at the cost of publishing conflicting views.

The above-mentioned virtues enable these publications to be applicable not only as useful text-books in the post-graduate training of engineers but also as reference books granted a special place on the shelves of practising professionals occupied in designing, building, operating, and development, that is to say all engineers.

The instructors of the Department of Building Construction of the Budapest University of Technology have been participating in the edition and writing of parts of the publications on construction from the very beginning. Here is a list of our most important works (the names of the instructors working for the Department of Building Constructions have been italicised):

Tetőszerkezetek A-tól Z-ig (A to Z of Roof Structures)

This handbook is the quarry of up-to-date information about roof structures. It provides assistance in designing, dimensioning and the building of structures con-

sisting of various materials and elements through the presentation of numerous charts, structural details and sample structures.

Editors: *Brúzsza, László; Horváth, Sándor; Dr. Tóth, Elek.*

Authors: Dr. Arany, Piroska; Dr. Bódi, István; Csott, Róbert; *Fórizs, Zoltán;* Horváth, Sándor; Király, András; Dr. Koppány, Attila; Dr. Osztroluczky, Miklós; Pataky, Rita; Reisch, Richárd; *Szabó, László;* Takács, Lajos; *Dr. Tóth, Elek; Zepkó, Ferenc.*

Beside the indispensable general and topical pieces of information independent chapters have been devoted in this handbook to roof trusses, roof covering, utilised attics, low-pitch roofs and flat roofs as well as the roofs of halls.

Until the end of 2002 the work itself and its series of supplementations and updating (9 times), altogether approx. 1200 pages of A4 format found their way to the shelves of readers and users.

Épületfelújítási Kézikönyv (The Handbook of Building-Renovation)

The book presents the materials, the diagnostic methods, the deficiencies, and the possibilities of reconstruction of the structures of traditional buildings from their foundations to their roofs. It mainly discusses the stock of constructions built around the turn of the century, but, in response to the demands of the readers, the ‘modern structures of building’ applied after the 1950s are treated in increasing detail. The practical utilisation of the publication is enhanced by its collection of situational exercises, which is based on realistic problems, outlines the typically wrong solutions and encourages the readers to participate actively in choosing the correct solutions.

Editor: *Dr. Tóth, Elek*

Authors: Dr. Arany, Piroska; Benedek, Béláné; Dr. Emhő, László; Dr. Gálos, Miklós; Dr. Horváth, Zoltán; Dr. Koppány, Attila; Mattyasovszky Zsolnay, Eszter; Dr. Orbán, József; Dr. Orcsik, Éva; Pozsonyi, László; Sturcz, Antal; *Dr. Széll, Mária; Dr. Tóth, Elek;* Tóth, Ernő; Tóth, László.

Beside the topical pieces of information this book contains the following chapters: diagnostics and renovation, the renovation of the façades of traditional buildings, the renovation of the roof covering of traditional buildings, the renovation of the loadbearing structures of traditional buildings, structures of internal finishing works, the renovation of plumbing and electric networks, the characteristics of the materials applied in traditional buildings, methods and techniques of diagnostics and renovation, questions – exercises – and the solutions, ‘modern’ building structures.

Until the end of 2002 the work itself and its series of supplementations and updating (8 times), altogether approx. 1100 pages of A4 format found their way to the shelves of readers and users.

Gyakorlati ingatlan-tanácsadó (Reference Book of Real Estate Management)

This publication is an indispensable practical guide for professionals specialising in real estate management and sales.

Readers: Dr. László, Tivadar; *Dr. Lévai, Jenő*; Dr. Vargha, Aurélné.

Editor: *Fórizs, Zoltán*.

Authors: Dr. Bódog, Máténé; Czerny, József; Dr. Czibere, Ilona; Duhay, Gábor; Farkas, Tamás; Dr. Forgách, Zoltán; *Fórizs, Zoltán*; Fürjes, Árpád; Gerő, Péter; Dr. Hajnal, István; Dr. habil. Mészáros, Károly; Herczeg, Levente; Juhász, István; *Dr. Karácson, Sándor*; Knízer, István; Krizsán, Kálmán; Dr. László, Tivadar; Pásztorné Gazsi, Júlia; Sagát, János; Soóki-Tóth, Gábor; Dr. Szabó, Márta; Telegdy, Pál; Tóth, Béla.

Beside the topical pieces of information this book contains the following chapters: real estate law, real estate management, real estate with buildings, real estate documentation, the maintenance and operation of real estates, the utilisation and development of real estate, the monuments real estates, loans and financing of real estates, the marketing and sales of real estates.

Until the end of 2002 the work itself and its series of supplementations, altogether approx. 1500 pages of A5 format found their way to the table of readers and users.

With regard to all that it may be safely said that we are on the best way to achieve a new reunion of science and technology, of theory and practice, and that we have a chance of assisting the practical designing, building and developing activity of Hungarian engineers through the publication of pragmatic, up-to-date and Hungarian technical literature.