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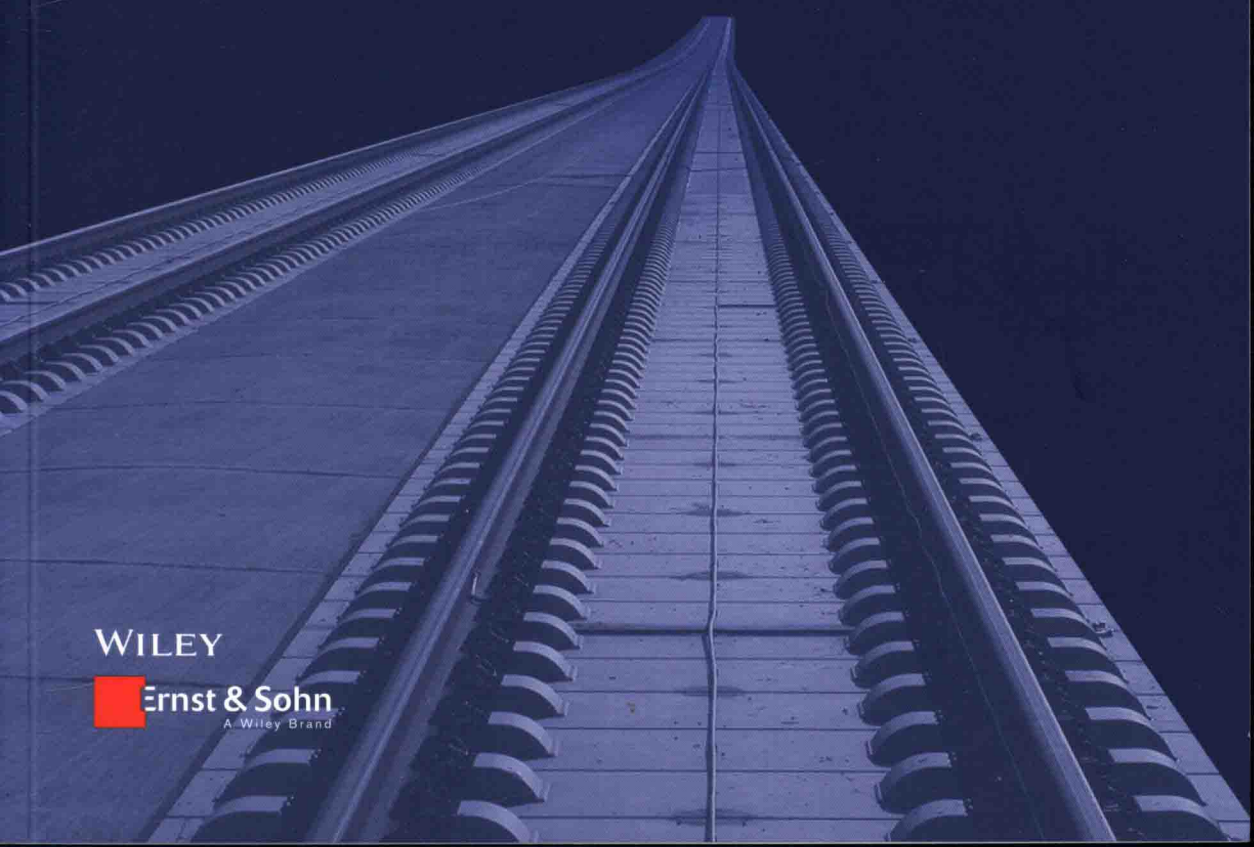
Ballastless Tracks

Stephan Freudenstein, Konstantin Geisler, Tristan Mölter,
Michael Mißler, Christian Stolz



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Due to increasing traffic flows the extension of transport infrastructure with rail roads and high speed lines is an ongoing process worldwide. Ballastless track systems with concrete slabs are used more and more. Following the first trials in the 1970s and more than four decades of R&D work on ballastless track, the level of development is such that it can be confirmed that ballastless track is suitable for use as an alternative to ballasted track. This book makes a contribution to the state of the art of ballastless track by describing the basics for designing the ballastless track. Important advice is provided regarding the construction of ballastless track on earthworks and in tunnels. There is also a description of the technical history of the development of ballastless track on bridges and the ensuing findings for bridge design. The state of the art of ballastless track for switches, important information on details concerning drainage, transitions, accessibility for road vehicles and experience gleaned from maintenance round off the work.

Univ.-Prof. Dr.-Ing. Stephan Freudenstein has been a full professor at the Chair and Institute of Road, Railway and Airfield Construction at TU Munich and director of the test institute with the same name in Pasing, Munich, since 2008. From 1995 he has been working at Heilit + Woerner Bau AG, at TU Munich and at Pfleiderer Infrastrukturtechnik GmbH, later RAILONE GmbH.

Dr.-Ing. Konstantin Geisler studied civil engineering at TU Munich. In 2016 he got his doctorate there and now works in academic research at TU Munich's Chair and Institute of Road, Railway and Airfield Construction.

Dipl.-Ing. Tristan Mölter studied civil engineering at TU Munich. Since 2000 he has been responsible for noise control, bridge equipment and provisional bridges at the technology and plant management department of DB Netz AG. He is the chair of the structural engineering commission (FA KIB) at VDEI (association of German railway engineers).

Dipl.-Ing. Michael Mißler studied civil engineering at TU Darmstadt. Since 1999 he has been responsible for the ballastless track systems at the track technology management department of DB Netz AG. Furthermore he is one of the responsible persons for the subjects of track elasticity and track stability at DB.

Dipl.-Ing. Christian Stolz studied civil engineering at Cologne's University of Applied Sciences. Since 2010 he has been responsible for ballastless track engineering in the track technology management department of DB Netz AG.

All authors are members of numerous German and European technical standard committees and committees of independent experts.

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The Authors

Univ.-Prof. Dr.-Ing. Stephan Freudenstein
Technical University of Munich
Chair and Institute of Road, Railway and Airfield Construction
Baumbachstr. 7
81245 Munich, Germany

Dr.-Ing. Konstantin Geisler
Technical University of Munich
Chair and Institute of Road, Railway and Airfield Construction
Baumbachstr. 7
81245 Munich, Germany

Dipl.-Ing. Tristan Mölter
DB Netz AG
Track Technology Management
Structural Engineering
Richelstraße 3
80634 München, Germany

Dipl.-Ing. Michael Mißler
DB Netz AG
Track Technology Management
Theodor-Heuss-Allee 7
60486 Frankfurt on the Main, Germany
www.fahrweg.dbnetze.com/fahrweg-en/start

Dipl.-Ing. Christian Stolz
DB Netz AG
Track Technology Management
Theodor-Heuss-Allee 7
60486 Frankfurt on the Main, Germany

The Editors of Beton-Kalender

Prof. Dipl.-Ing. Dr.-Ing. Konrad Bergmeister
ingwien.at engineering gmbh
Rotenturmstr. 1
1010 Vienna, Austria

Prof. Dr.-Ing. Frank Fingerloos
German Society for Concrete and Construction Technology
Kurfürstenstr. 129
10785 Berlin, Germany

Prof. Dr.-Ing. Dr. h. c. mult. Johann-Dietrich Wörner
ESA - European Space Agency
Headquarters
8-10, rue Mario Nikis
75738 Paris cedex 15, France

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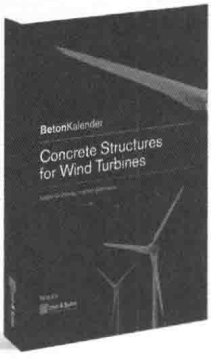
Ballastless Tracks

Since it was founded in 1906, the Ernst & Sohn "Beton-Kalender" has been supporting developments in reinforced and prestressed concrete. The aim was to publish a yearbook to reflect progress in "ferro-concrete" structures until – as the book's first editor, Fritz von Emperger (1862-1942), expressed it – the "tempestuous development" in this form of construction came to an end. However, the "Beton-Kalender" quickly became the chosen work of reference for civil and structural engineers, and apart from the years 1945-1950 has been published annually ever since.



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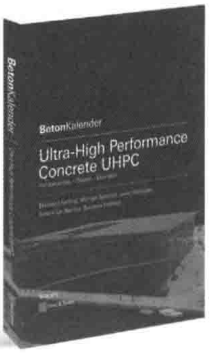

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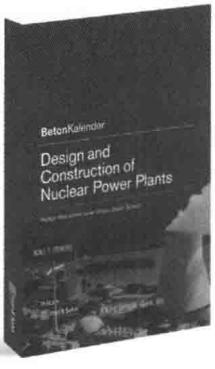

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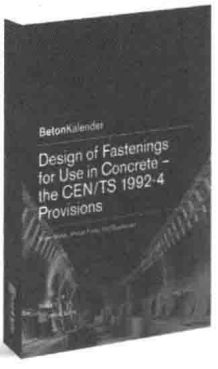

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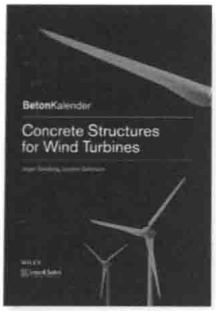

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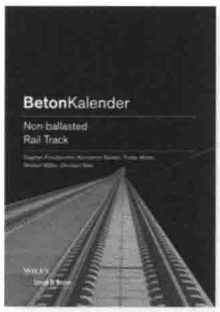

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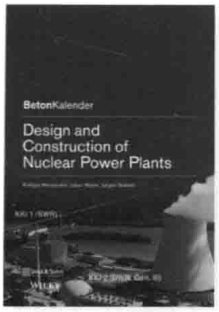

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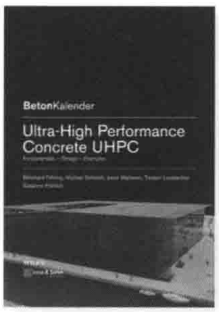

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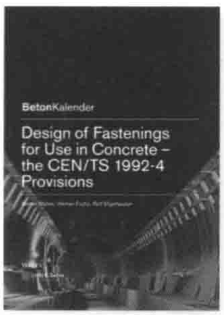

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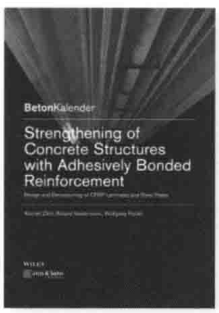

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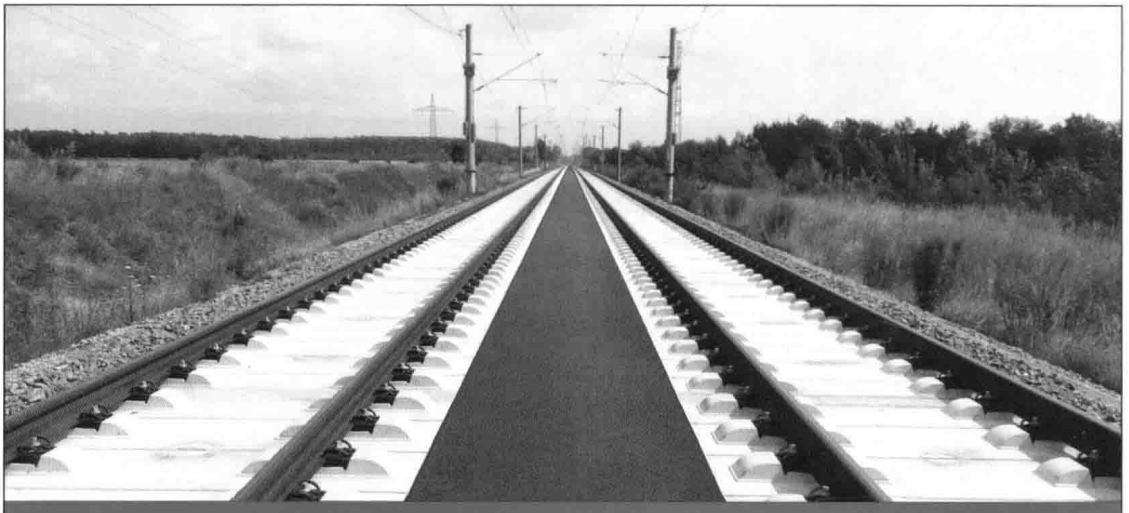

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Editorial

The *Concrete Yearbook* is a very important source of information for engineers involved in the planning, design, analysis and construction of concrete structures. It is published on a yearly basis and offers chapters devoted to various, highly topical subjects. Every chapter provides extensive, up-to-date information written by renowned experts in the areas concerned. The subjects change every year and may return in later years for an updated treatment. This publication strategy guarantees that not only is the latest knowledge presented, but that the choice of topics itself meets readers' demands for up-to-date news.

For decades, the themes chosen have been treated in such a way that, on the one hand, the reader gets background information and, on the other, becomes familiar with the practical experience, methods and rules needed to put this knowledge into practice. For practising engineers, this is an optimum combination. In order to find adequate solutions for the wide scope of everyday or special problems, engineering practice requires knowledge of the rules and recommendations as well as an understanding of the theories or assumptions behind them.

During the history of the *Concrete Yearbook*, an interesting development has taken place. In the early editions, themes of interest were chosen on an *ad hoc* basis. Meanwhile, however, the building industry has gone through a remarkable evolution. Whereas in the past attention focused predominantly on matters concerning structural safety and serviceability, nowadays there is an increasing awareness of our responsibility with regard to society in a broader sense. This is reflected, for example, in the wish to avoid problems related to the limited durability of structures. Expensive repairs to structures have been, and unfortunately still are, necessary because in the past our awareness of the deterioration processes affecting concrete and reinforcing steel was inadequate. Therefore, structural design should now focus on building structures with sufficient reliability and serviceability for a specified period of time, without substantial maintenance costs. Moreover, we are confronted by a legacy of older structures that must be assessed with regard to their suitability to carry safely the increased loads often applied to them today. In this respect, several aspects of structural engineering have to be considered in an interrelated way, such as risk, functionality, serviceability, deterioration processes, strengthening techniques, monitoring, dismantlement, adaptability and recycling of structures and structural materials plus the introduction of modern high-performance materials. The significance of sustainability has also been recognized. This must be added to the awareness that design should focus not just on individual structures and their service lives, but on their function in a wider context as well, i.e. harmony with their environment, acceptance by society, responsible use of resources, low energy consumption and economy. Construction processes must also become cleaner, cause less environmental impact and pollution.

The editors of the *Concrete Yearbook* have clearly recognized these and other trends and now offer a selection of coherent subjects that reside under the common 'umbrella' of a broader societal development of great relevance. In order to be able to

cope with the corresponding challenges, the reader can find information on progress in technology, theoretical methods, new research findings, new ideas on design and construction, developments in production and assessment and conservation strategies. The current selection of topics and the way they are treated makes the *Concrete Yearbook* a splendid opportunity for engineers to find out about and stay abreast of developments in engineering knowledge, practical experience and concepts in the field of the design of concrete structures on an international level.

Prof. Dr. Ir. Dr.-Ing. h. c. Joost Walraven, TU Delft

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About the authors

Univ.-Prof. Dr.-Ing. *Stephan Freudenstein* has been a full professor at the Chair and Institute of Road, Railway and Airfield Construction at the Technical University of Munich and director of the test institute of the same name in Pasing, Munich, since 2008. After graduating in civil engineering at TU Munich in 1995 and working at Heilit + Woerner Bau AG, Stephan Freudenstein became a research associate at TU Munich's Chair and Institute of Road, Railway and Airfield Construction in 1997. In 2002 he joined Pfleiderer Infrastrukturtechnik GmbH, now known as RAILONE GmbH, in Neumarkt in der Oberpfalz, Germany. While there, he headed up the technology and development department. He was responsible for prestressed concrete sleepers and the technical side of various ballastless track projects in Germany and farther afield. The main focus of Prof. Freudenstein's research is the structural design of road and rail superstructure systems and aviation surfaces. He is a member of numerous German and European technical standard committees and committees of independent experts.

Dr.-Ing. *Konstantin Geisler* graduated in civil engineering at TU Munich in 2010. He was awarded his doctorate by that university in 2016 and now works in academic research at TU Munich's Chair and Institute of Road, Railway and Airfield Construction.

Dipl.-Ing. *Tristan Mölter* studied civil engineering at TU Munich. Since 2000 he has been responsible for noise control, bridge equipment and provisional bridges at the technology and plant management department of DB Netz AG in Munich. He is the chair of the structural engineering commission (FA KIB) at VDEI (association of German railway engineers) and a member of numerous German and European technical standard committees and committees of independent experts.

Dipl.-Ing. *Michael Mißler* studied civil engineering at TU Darmstadt. Since 1999 he has been responsible for ballastless track engineering in the track technology management department of DB Netz AG in Frankfurt/Main, Germany. Further more he is one of the responsible persons for the subjects of track elasticity and track stability at DB. He is a member of numerous German and European technical standard committees and committees of independent experts.

Dipl.-Ing. *Christian Stolz* studied civil engineering at Cologne's University of Applied Sciences. Since 2010 he has been responsible for ballastless track engineering in the track technology management department of DB Netz AG in Frankfurt/Main, Germany. He is a member of numerous German and European technical standard committees, e.g. DIN Standards Committee Railway NA 087-00-01 AA 'Infrastructure', DIN subcommittee 'Ballastless track' and CEN TC 256/SC 1/WG 46 'Ballastless Track'.

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