

CHALMERS

Welcome to

DESIGN- OCH KONSTRUKTIONSDAGEN 2017

The Structural Design Day, 27 November 2017



Sustainable Design and Construction

Arranged by:

**konstruktions
centrum**





Sustainable Design and Construction

The structural Design Day, 27 November 2017

Programme

13:00 Introduction and welcome

Anders Logg, Prof. & Acting Area of Advance Director for Building Futures, Chalmers

13:10 Bridge Design from a Holistic Perspective

Mats D. Karlsson, Dep. Director of Investments Trafikverket, Prof. of the Practice, Chalmers

13:30 Will you need a PhD to make an EPD according to new standards for sustainable construction?

Rutger Gyllenram, Swedish Institute of Steel Construction / SIS TK209

14:10 Life cycle optimization in concrete bridge construction - A thrust towards sustainable construction

Daniel Ekström, WSP Sweden, Industrial Doctoral Student, Chalmers

14:40 CoffeeBreak

15:10 The Sustainable Design of Tall Buildings

Jane Richards, Head of UK Structures, WSP

15:50 “The consideration of sustainability in the management of structures”

Bryan T. Adey, Prof. Dr. at ETH Zürich

16:30 Questions and discussion

Moderator - Morten Lund, Artistic Prof., Chalmers

17:00 Mingle



Design- och konstruktionsdagen (The Structural Design Day) is an annual activity that aims at providing inspiration and incentives for design and engineering, reflecting the needs of modern societies for sound and sustainable development. The theme of 2017 is “Sustainable Design and Construction”, with focus on ways for different players in the building industry contribute to a sustainable society

Consideration of sustainability in the management of structures

Bryan T. Adey

Prof. Dr. Bryan T. Adey will present the principles of how managers of structures should take sustainability into consideration in their decision making with respect to the existing infrastructure networks, which includes the construction, use, operation, maintenance and demolition of individual objects. The basic principles are applicable at many different scales, from individual objects to entire networks. The results are easily and clearly explainable to all stakeholders, including politicians, concerned citizens infrastructure managers and engineers.

Prof. Dr. Bryan T. Adey is the professor of infrastructure management at the Swiss Federal Institute of Technology in Zürich, Switzerland. His research and teaching is focused on improving the construction and management of infrastructure with special attention on the improvement of decision making from general planning for entire networks to the detailed planning and control of specific projects. In order to

substantially increase the net-benefit of our infrastructure, his research is helping to automate much, if not all, of the infrastructure management process. His current research interests are, given goals and constraints, the automated development of intervention programs for infrastructure networks.



Will you need a PhD to make an EPD according to new standards for sustainable construction?

Rutger Gyllenram

Companies in the construction sector today face increased demands to report the impacts their products have throughout the life time, cradle to grave, on the social welfare, the environment and the economy. These demands come from regulations and different kinds of procurement schemes with different origins and logic. The main methodology to calculate and report environmental impacts is to use Life Cycle Assessment, LCA, and in order to make these assessments comparable between products and construction methods throughout Europe, standards and EPD schemes have evolved.

It is reasonable to assume that companies in the future need to be able to present an Environmental Product Declaration, EPD, based on a full LCA, for most of their products whether it is a light switch, a sack of cement, a steel beam, a window, a house or a railway. Some issues in this development are the complexity of the impact categories to assess, data quality, the size and financial strength of the companies that have to issue the EPDs and the number and variety of products to assess for each company. Furthermore the understanding and ability of the receiving end to



analyse and choose between the suppliers in order to make an enlightened choice and avoid any attempt of green wash is crucial.

Rutger Gyllenram has an MSc in Metallurgy and Materials Science and a Lic Tech in Steel and Metal Production Technology. He is the founder and CEO of Kobilde & Partners AB, the sustainability spokesperson for the Swedish Institute of Steel Construction, SBI, and the chair of the Swedish standardisation committee SIS/TK209 Sustainable Construction covering development of standards in this area on the CEN and ISO levels.

Life cycle optimization in concrete bridge construction - A thrust towards sustainable construction

Daniel Ekström

Estimates indicate that the total climate impact, from a lifecycle perspective, generated by Swedish construction processes reaches the same magnitude as emissions from all passenger cars in Sweden. A large part of the emissions from construction of roads and railways arise from production of steel and concrete used in bridges and other infrastructure structures. There is a variety of tools to make life cycle assessments (LCA) and life cycle cost estimations (LCC) of a bridge. These tools are used to optimize both the environmental impact and costs during construction. Unfortunately, the models are often complex and lack transparency and therefore are rarely used in practice within infrastructure projects.

Within structural design, there are several basic requirements of mechanical design that needs to be fulfilled, such as structural resistance, serviceability, durability and robustness. These are all requirements of structural performance, which are taken for granted without putting it into the context of sustainability. To generate a sustainable construction



process, a long-term perspective needs to be applied to each project and putting the built infrastructure into the context of the natural environment instead of a separate object. This type of life cycle consideration needs to be adopted by designers, constructors and clients to create any change. However, what are the available measures today? Without developing new ways to construct bridges, or comparing concrete with other materials, how can we use technology and opportunities that are already available today for constructing climate smarter versions of standard bridges?

Bridge Design from a Holistic Perspective

Mats Karlsson

A holistic perspective means that the whole describes more than the sum of the parts. For this reason, the combination of different aspects is so important. Regarding the performance of infrastructure as well as society at large should be done from a sustainability perspective.

The presentation briefly describes the design process and its working methods that will lead to the performance of a sustainable infrastructure.

Mats Karlsson is Professor of the practice in Bridge and structural engineering at Chalmers. He is also Deputy Director of Investments at Trafikverket. Before he started his employment in Trafikverket 2010 he has a long and solid experience in bridge and structural engineering in consulting firms and construction companies, both nationally and internationally. His responsibilities have often ranged from design work to leading projects in structural engineering and on to various management positions. It should be mentioned that according to current practice in the consulting industry, he has driven consultant assignments in parallel with management roles.

In part-time, he has worked with teaching within the business and industry sectors, as well as in universities and colleges, in the fields: concrete and steel structures, bridge engineering and construction, and procurement and construction law; the latter focused on contractual matters concerning bridge and civil engineering structures.



The Sustainable Design of Tall Buildings

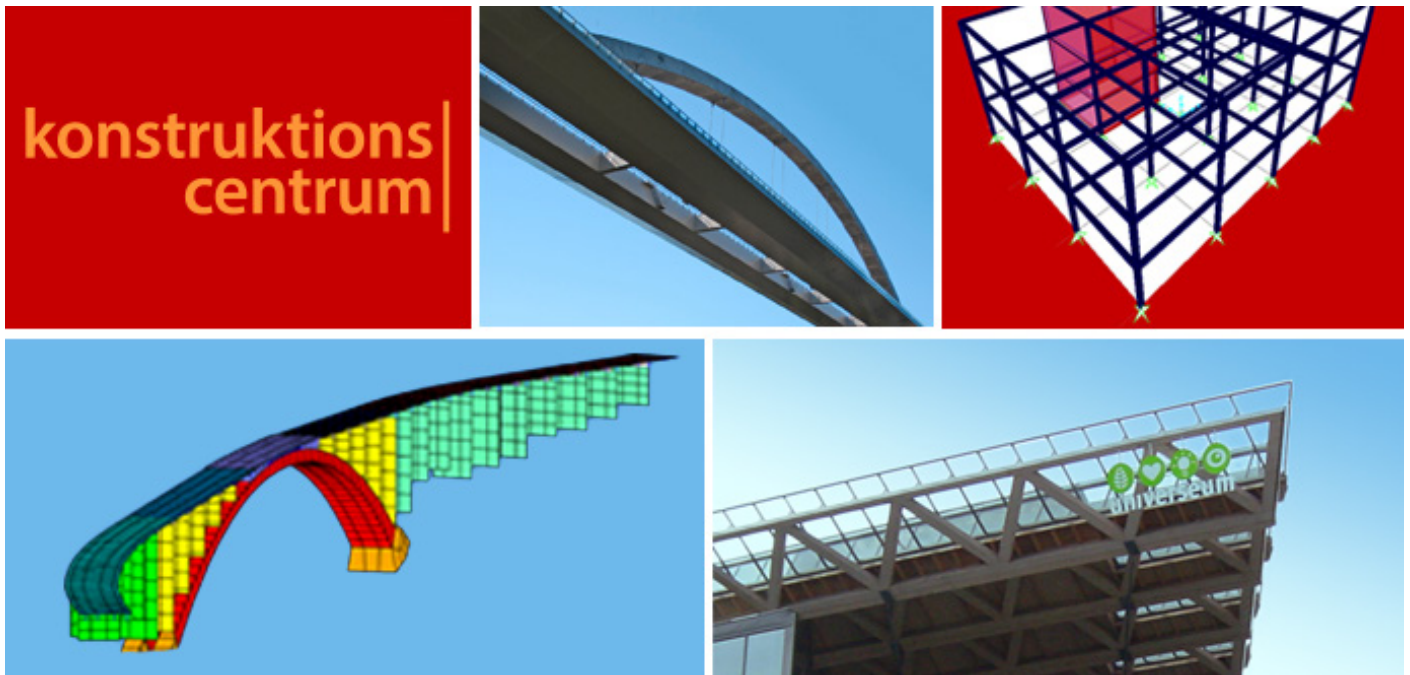
Jane Richards

What factors are driving the creation of increasing numbers of tall buildings and how do we make them more sustainable. What are the structural techniques and opportunities that we can use and how do we push the boundaries in the future.

Jane Richards joined WSP in 1998 and progressed to her current position as Head of Discipline for the Building Structures business. She leads a group of approximately 500 structural engineers across the UK and is based in the company's UK headquarters in London.

Jane Richards' role involves responsibility for the strategic growth, technical excellence and expertise within the structures UK business as well as the P&L delivery. She keeps involved in the delivery of the company's major projects, particularly large multi-disciplinary projects and those involving high-rise towers and deep basements with complex below ground constraints.





Konstruktionscentrum

The Structural Engineering Centre at Chalmers

The Structural Engineering Centre at Chalmers “Konstruktionscentrum” is the main organizer of the event. The Structural Engineering Centre is a collaboration body that aims at providing a platform for effective and broad interaction between research and education activities performed at the university and industry, primarily in the construction sector. The purpose is to develop and strengthen the theme of structural design.

Members of the Structural Engineering Centre are actors in the construction sector and representatives of major stakeholders who, together with Chalmers, share the objectives of developing, supporting and promoting knowledge and skills in this area. This is done by targeted training, research and seminars where participant persons and entities are actively involved in both planning and implementation of the activities in the centre.

Program committee:

Mats Ander, Industrial and Materials Science, Chalmers
 Mohammad Al-Emrani, Architecture and Civil Engineering, Chalmers
 Catharina Björk, Architecture and Civil Engineering, Chalmers
 Ignasi Fernandez Perez, Architecture and Civil Engineering, Chalmers
 Morten Lund, Architecture and Civil Engineering, Chalmers
 Karl-Gunnar Olsson, Architecture and Civil Engineering, Chalmers
 Roland Olsson, WSP
 Mario Plos, Architecture and Civil Engineering, Chalmers
 Holger Wallbaum, Architecture and Civil Engineering, Chalmers

The seminar will take place at:

RunAn, Chalmersplatsen 1, Kårhuset (Chalmers Conference Center). Chalmers, Gothenburg.

Documentation

Available for members after completion of the seminar, www.konstruktionscentrum.chalmers.se

Information

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The Structural Engineering Centre at Chalmers

