

Press Release by the Joint Committee on Structural Safety

GREENHOUSE GAS EMISSIONS – STRUCTURAL DESIGN CODES OVERLOOKED

It is generally recognized that greenhouse gas emissions must be reduced to avoid severe consequences of climate change. The built environment, infrastructure and construction in general contribute substantially to greenhouse gas emissions not only due to energy consumption for cooling and heating, but also due to the manufacturing of materials and construction processes.

There is an urgent need to substantially reduce greenhouse gas emissions from the built environment.

The potential for reducing greenhouse gas emissions through choice of structural materials, design concepts, design basis and construction processes have received little attention in the codes and regulations for design, assessment and retrofit of structures. In the newly developed Eurocode for instance, the need for sustainable building practices is mentioned as one of the objectives, but no operational guidelines are given nor envisaged.

The 5th Intergovernmental Panel on Climate Change (IPCC) assessment report states that to limit average global temperature rise to 2 degrees, reductions of global CO₂ emissions in the order of 40% by 2030 and 70% by 2050 (both relative to 2010) are needed. Following the Paris Agreement made in connection with the COP21 climate conference, almost all nations made pledges to substantially reduce CO₂ and other greenhouse emissions. As an example, the nations in the EU have targeted reductions in greenhouse gas emissions by 20% in 2020, 40% in 2030 and 80% in 2050 (relative to 1990 levels).

Approximately 40% of total greenhouse gas emissions originate from the built environment. About half of these originate from energy consumption related to cooling and heating of buildings. The other half originates from manufacturing of materials and construction processes. Trends for the future contribution of the built environment to global greenhouse gas emissions are grave. For example, it is estimated that within the past 3 – 4 years, China has used more concrete than has been used in the USA during the last century. Moreover, driven by globally improved welfare and population growth, it is estimated that the number of square meters of buildings – at the global level – will double over just one decade from 2020 to 2030.

Considering the significance of the built environment with respect to emissions of greenhouse gasses in the past combined with the alarming trends for the future, it is obvious that the present best practices in the construction sector with respect to choice of materials, design concepts, basis for design and assessment and construction processes must change substantially and very soon.

It is urgent that the construction sector address the challenges of climate change adaptation.

A large variety of relevant means for reducing greenhouse gas emissions have been identified. Many of them are presently being implemented through the power of free market mechanisms. In the construction sector, there are, however, at present no obvious incentives to change current practices towards climate adaptation with regard to choice of materials, design concepts, design basis and construction processes.

A crucially important instrument - if not the only instrument - towards timely reduction of emissions in the construction sector is regulation, i.e. standards, codes and best practices. Regulation has the potential to direct incentives and change best practices towards climate adaptation.

The international Joint Committee on Structural Safety (JCSS¹) is mandated by the Liaison Committee² of the International Associations of Civil Engineering (CIB, ECCS, fib, IABSE, IASS and RILEM) to help provide scientific and methodological bases that ensure an efficient and safe performance of the built environment, both in the context of developing and revising codes for the design of structures and in the context of individual projects.

Michael Havbro Faber³, Professor in Risk and Safety and President of the JCSS, speaking on behalf of the JCSS and the JCSS Special Task Force on Sustainable and Resilient Developments of the Built Environment, noted that:

“The JCSS is profoundly concerned about the:

- contribution of construction to greenhouse emissions;
- the urgent need to reduce this contribution substantially and;
- the neglected potential to do so through changes of regulation concerning how structures are designed with respect to choice of materials, design concepts and construction processes.

Efficiency and safe performance of the built environment and the construction sector is a necessity for sustainable societal development. In the JCSS we have recently initiated a special task force mandated to:

- map the major impacts of the built environment on global greenhouse emissions;
- identify scientific and methodological bases for the rational and consistent assessment and management of greenhouse emissions in the built environment;
- identify and develop structural design concepts and strategies facilitating substantial reduction of greenhouse gas emissions from the built environment.

This initiative aims to provide a better understanding of the details of the challenges and the most viable directions to pursue in the mid-term.

In the short term however, what is needed is that politicians, together with municipal, national and international authorities with the responsibility to standardize and codify design, assessment and retrofit of structures, take immediate action to ensure that the potential for reducing greenhouse gas emissions from the built environment is brought into focus and exploited in the construction sector. The JCSS and its special task force are committed to assist also in this process”

¹ See also <http://www.jcss.byg.dtu.dk>

² See http://www.iabse.org/IABSE/IABSE_Association/Liaison_Committee/IABSE/structural/Liaison_Committee.aspx

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