The Institution of Structural Engineers

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Dear Sirs

All Parliamentary Committee for Excellence in the Built Environment.
'Sustainable Construction and The Green Deal'

This response was prepared by the Sustainable Construction Panel of the Institution of Engineers. The Panel members comprise active structural engineers with a specific interest in sustainable construction and the influence structural engineering can have in improving the sustainability of the built environment. The members are drawn from a broad range of businesses ranging from SME's to international multi-disciplinary consultants.

Sarah Fray
Director: Engineering & Technical Services

The response is to the CIC briefing given at the end of this document.

Focus on Building Operational Impacts vs Total Construction Impacts
The focus of the enquiry seems to be:

- Carbon footprint of buildings
- Code for sustainable homes,
- Building regulations
- Green Deal

The approach of the enquiry places the emphasis on the operational impacts of buildings. This all but ignores the contribution of industry (including construction) which represents around 35% to global CO_2 emissions of which 25% are from steel production and 19% are from cement production. It is estimated that cement/clinker production alone accounts for around 5% of manmade global greenhouse gas emissions. The work of the Welmet research project (http://www.lcmp.eng.cam.ac.uk/wellmet2/introduction) , which is part published in the book 'Sustainable materials with both eyes open' demonstrates that industrial, manufacturing process improvements are unlikely to make further substantial reductions in their CO_2 emissions. The reductions (50% reduction needed in the next 40

years) need to come from resource efficiency measures undertaken by the end user: the construction industry.

This is a hard challenge for the Industry as 'least cost' design does not lead to proper consideration of material efficiency due to the relatively high cost of labour. Also the issues surrounding material efficiency are complex and require a balanced approach between initial material use and planning for end of life and life extension over a very long life span. Other incentives are needed to bring about change and Government therefore has a vital role to play.

A further ~30% of CO2 emissions come from Transport. The construction industry has a part to play in reducing these impacts through the provision of appropriate infrastructure and consideration of the balance of deployment of materials vs reduction in transport and other operational impacts. Again this issue does not seem to be the focus of the enquiry but should be noted nevertheless.

Progressive legislation is driving down energy consumption in buildings and it can be shown that the initial impacts of buildings could change from around 5-10% of whole life CO_2 footprint to 20% - 40%.

Reduction of Operational Impacts

Institution members produce structural designs in a multi-disciplinary environment. This process contributes to the whole-life performance of built assets such as buildings.
Institution members are supportive of legislation which reduces actual, as well as design, energy consumption and CO2 emissions associated with the occupation of buildings.

Members of the Institution's sustainable Construction Panel are connected to Build with CaRe. This is an international project with the ambition to help mainstream low-energy construction in the North Sea region and across the EU. Build with CaRe is partly funded by the European Regional Development Fund (www.buildwithcare.eu) . It is recommended that this group is included in the consultation process.
A few references regarding this are:

- http://www.buildwithcare.eu/news/244-delivering-a-low-energy-building
- http://www.uea.ac.uk/mac/comm/media/press/2012/October/passivhaus-bruce-tofield.
- http://www.cibsejournal.com/archive/2012-11/we-need-passivhaus
  http://greenallianceblog.org.uk/2012/11/05/tackling-the-other-housing-crisis/

With regard to retrofit of homes it is felt that Government introduction of planning relaxations with regard to extensions is likely to have unintended consequences. It is recommended that relaxations in extension planning are linked to requirements to retrofit existing fabric in order to provide incentives for a balanced approach.

Reducing Industrial Impacts Through Consideration of the Deployment of Materials in Construction

Reduction in the impact of the major construction materials is not well covered in the initiatives which are the focus of this consultation:

- Carbon footprint of buildings
- Code for Sustainable Homes,
- Building Regulations
- Green Deal

To fill the gap, Local Planning guidance and individual client procurement requirements attempt to supplement requirements (E.G. Brighton and Hove Council, the Olympics). This piecemeal approach is not successful in producing change across a large complex industry such as Construction. It is prone to simplistic policies with unintended consequences which do not allow our members and fellow construction professionals to deliver the most sustainable projects. Central Government needs to play a part in enabling the Construction Industry to develop a response to the challenge in a clear and fair competitive environment.

One barrier which is often quoted is the difficulty in assessing the CO2 footprint of materials. This is being overcome by standardisation and the Institution strongly recommends that Government is at the forefront of providing incentives for these standards to be adopted and developed in practice. Example references are:

- BS EN 15804:2012 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products
- BS EN 15978:2011 Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method.

The Government should publish a transitional plan and timescale for the inclusion of consideration of material impacts into Building Regulations. This is necessary in order for the material supply industry and construction industry to develop an appropriate response.

The Code for Sustainable Homes owes much of its basis to BREEAM. Institution members have long been concerned that these schemes do not adequately address building structure. This is the main use of steel and cement and typically represents 40-50% of the initial CO2 footprint of a building. The Institution commissioned research which recommends how this issue can be better addressed. These best practice recommendations are currently being considered with BRE in respect of BREEAM. Development of The Code for Sustainable Homes should be mindful of this research.

- The Value of Structural Engineering to Sustainable Construction (www.istructe.org/rating-schemes)

In seeking to make these changes and reduce the impacts associated with construction materials we should not lose sight of the need to ensure that what is constructed will be adequately durable and will satisfactory meet functional performance requirements.

- Whilst durability is perhaps seen at the moment as being most important for long-life buildings and infrastructure, it is likely to become more important in a future where there is greater desire to re-use structural and other building elements.
- Apart from performing full LCA evaluations to assess embodied building impacts, there is also the concept of other simplified approaches, such as material efficiency KPIs, which could help achieve an appropriate balance and reduce any tendency to over-provision in structural design.

As these are long-term considerations which influence first-cost and are generic in nature, there is a need for government to assist UK industry to achieve an appropriate balance in the approach to be adopted in response to these challenges.

Life Extension

The focus of CO2 reduction measures has been on operational emissions from new-build. The Institution supports all initiatives which will stimulate intelligent extension of life of existing assets.

The UK has a substantial stock of older properties. According to research by the BRE, 73% of buildings standing in 2010 will still be standing in 2050. These will account for 61% of the building stock in 2050. While approaches to planning with regard to retrofitting renewable technologies is becoming more consistent there is inconsistency in planning approaches to upgrading the thermal performance of the fabric of existing older properties. Many of these lie in conservation areas. Through The Green Deal, Central Government has a part to play in setting out acceptable technical and economic solutions to these situations and reducing the planning burden on individual property owners and local authorities.

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End of Life

The treatment of end of life of buildings is not well covered in legislation. The organisation WRAP has been mainly involved in encouragement of good recycling practice. This has involved funding of demonstration projects, production of industry guidance, etc.

However for steel, one of the main materials used in construction, re-use with minimal reprocessing is a possibility. Recycling rates for steel are already extremely efficient, however re-use saves significant CO_2 emissions from the re-melting, reforming process. The economics of this approach have been demonstrated to be currently at the tipping point between recycling and reuse. Re-use is not appropriate in all situations but there is undoubtedly potential for a much larger proportion than is currently quoted. (<10%)

Research through Welmet Consortium and elsewhere shows that the main barrier to re-use is the lack of a supply chain or material exchange industry to enable this to happen. Government is needed to play a part in stimulating and supporting development of a steel re-use industry, which could bolster employment in our steel processing industry and keep our existing steel stock within the UK.

One step to achieving this could be for Government to reframe the terms of reference of the work of WRAP to focus on higher efficiency end-of life outcomes. Another step would

be to support the development of re-use infrastructure to serve the retail and industrial sectors, where suitable steel stock is likely to be found.

Re-use could be encouraged by some form of tax-break. Perhaps like a negative version of the Aggregates Levy, where there is some form of offset on tax liability (so transferring money to the developer / other party) for the re-use of structural elements.

See Publications from Wellmet for facts about steel production and impacts

Basis of Response

This document is in response to the following briefing:

12th October 2012

All Party Parliamentary Group for Excellence in the Built Environment Inquiry into Sustainable Construction and the Green Deal – Call for Evidence

The All Party Parliamentary Committee for Excellence in the Built Environment is launching a far reaching inquiry into sustainable construction and the Green Deal, and it is calling on firms, organisations and individuals in the sector to submit evidence on best practice, challenges and barriers.

Buildings account for nearly 50% of all carbon dioxide emissions and reducing the carbon footprint of our new and existing buildings is vital if the UK is to reach its ambitious carbon reduction targets. In the last five years the UK government and the EU has introduced a raft of legislation to further these aims. This includes the code for sustainable homes, more stringent building regulations and the Green Deal - the instrument intended to kick start a revolution in retrofitting.

But is the industry playing its part? Is sustainability suffering in the recession? What more can be done to promote green construction in public and private sector building projects? We would like feedback on the spectrum of green construction and policies. These include:

• Evidence of best practice of sustainable construction in the built environment - and how this could be repeated?

• Barriers to sustainable construction - what is holding the industry back and how could this be improved?

• Progress on sustainable homes - too much too fast?

• The Green Deal - is the policy the right one? What can be done to ensure take up?

The closing date for evidence submissions is **30 November 2012**.

The APPG for EBE Commission of Inquiry comprises of members of both Houses of Parliament, senior members of the construction professions and key influencers and decision makers in other aspects of society. The Commission will hold sessions in **January to March 2013** to invite selected organisations to present oral evidence in support of their submissions. This will be the Committee's second report. It recently published 'A better deal for public building' which set out a number of measures for improving construction procurement, including adopting the 2012 Construction Commitments on all public building projects over £100m.

The findings of the Inquiry will be published before the parliamentary recess in **early summer 2013**.

Sir Tony Baldry chairman of the APPG for EBE said "The Group has been very pleased with the outcome of the Commission's first Inquiry and is keen to press on with an annual commitment to

investigate matters of great public importance in relation to the creation and maintenance of our built environment. The contribution of the built environment to climate change is immense and if the UK government is to meet its challenging targets for reducing carbon emissions then much has to be done to take carbon out of the construction and use of our buildings and facilities. So, we are looking for the best ideas in Green Construction – including how we can get the best out of the Green Deal – and invite evidence from clients and the industry to demonstrate the innovations that are already taking place or planned".

The Construction Industry Council acts as Secretariat to the Group. To make a submission or for further information please contact APPGInquiry@cic.org.uk or Graham Watts on 020 7399 7402.

Ends

Notes to the editor

1. CIC is the representative forum for the professional bodies, research organisations and specialist trade associations in the construction industry. It provides a single voice for professionals in all sectors of the built environment through its collective membership of 500,000 individual professionals and 25,000 firms of construction consultants.

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