



The Royal Academy
of Engineering



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Delivering innovation through sustainability

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Overview - key points of this presentation

1. Construction innovation occupies a complex landscape of regulation, harmonisation initiatives and voluntary standards
2. Standards are not Regulations.
3. Standards set aspirational, measurable targets that can stimulate and promote innovation if properly used.
4. The BREEAM schemes have driven innovation.
5. Sustainability is a key driver for innovation, but must be focussed on reducing cost and increasing value.




A complex landscape – from regulation to routemap






BREEAM Standards

Construction needs an efficient, cost effective and practical methodology that can recognise and differentiate building environmental performance. The context for BREEAM is set by:

1. The Building Regulations, especially the updated Part L2a, Conservation of Fuel and Power,
2. The EU Mandate 350 to CEN for the development of framework standards for the environmental assessment of buildings (see also BS EN 15643-2:2011 Sustainability of construction works. Assessment of buildings. Framework for the assessment of environmental performance, BSI, 2011), and
3. BRE's international Code for a Sustainable Built Environment.



BREEAM levels stretch well beyond the minimum requirements defined by Building Regulations

1. Building Regulations are setting progressively higher levels for new construction to meet over time in terms of reducing carbon emissions
2. BREEAM new build schemes also set progressively higher targets for new build construction over time, more onerous than Building Regulations
3. BREEAM targets are aspirational and the required level varies from 'Outstanding' to 'Excellent' to 'Very Good' etc.



Regulatory minimum versus aspirational targets

1. A high proportion of new buildings are constructed to comply with Building Regulations but many achieve little more than this.
2. Some new buildings even fall below Building Regulations.
3. BREEAM sets aspirational targets for construction to meet higher levels of performance than would otherwise be achieved.
4. These voluntary standards drive higher performance, providing a framework for constructors to provide alternative solutions.
5. Innovation is a necessary requirement to reach the highest, 'Outstanding' level under BREEAM.



Innovation opportunity is highest at the early stages

1. The opportunity for innovation is largest at project inception and decreases rapidly through the design stages.
2. The scope for innovation continues to reduce through construction and in-use phases.
3. At the same time, the cost of change rises steadily from project inception through design.
4. The cost of change increases very rapidly through the construction phase, with the rate of rise reducing during in-use.



The BREEAM Standard has driven innovation

1. Innovation credits have been available for some years under BREEAM.
2. The number of applications for innovation credits from design teams has risen steadily over the years since 2009.
3. Many have been approved, ranging from highly technical matters to innovations in procurement.




2012 Olympic Park Aquatics Centre

- 76% coarse aggregate substitution was achieved in concrete mixes in the 2012 Aquatic Centre whilst retaining the required high quality finish.
- This innovation by Balfour Beatty was recognised for the technical risk taken on this very high profile project, the extensive testing undertaken to prove the quality and the dissemination of the results for industry.



Learning legacy
Lessons learned from the London 2012 Olympic construction project




OVER TIME, LOW CARBON BEHAVIOUR AND INFRASTRUCTURE MUST CEASE TO BE A CHOICE AND BECOME THE NORM

“The challenge for engineers in the low carbon age is to understand and minimise the carbon emissions associated with designing, constructing, operating and maintaining this network, while still meeting society’s needs.” ICE, 2010





Sustainability will bring:

1. More integrated working,
2. Improved codes and standards for demonstrating performance (using SMART technology), with
3. Faster innovation cycles and
4. New business opportunities.
5. Carbon is going to be a key driver, but fundamentally sustainable innovation must mean less cost, more value.



Conclusions

Delivering innovation through sustainability

- Recognise that low carbon construction is here to stay,
- Use this new sustainable innovation paradigm to challenge conventional Client thinking,
- Shorten the innovation cycle through early linkage to appropriate codes and standards,
- Exploit the new tools and SMART technology to optimise performance and reduce costs.

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