

13th UIC Sustainability Conference



Life Cycle Thinking
Carbon and Cost
A Rail Perspective

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Agenda

- Drivers
- PAS 2080
- London Underground Maintenance
- Conclusion





Drivers for Carbon









Government drivers



Lower costs

33%

reduction in the initial cost of construction
and the whole life cost of built assets

Faster delivery

50%

reduction in the overall time, from inception to
completion, for newbuild and refurbished assets

Lower emissions

50%

reduction in greenhouse gas emissions
in the built environment

Improvement in exports

50%

reduction in the trade gap between total exports and
total imports for construction products and materials



Construction 2025

Strategic priorities



1

Smart
construction and
digital design

2

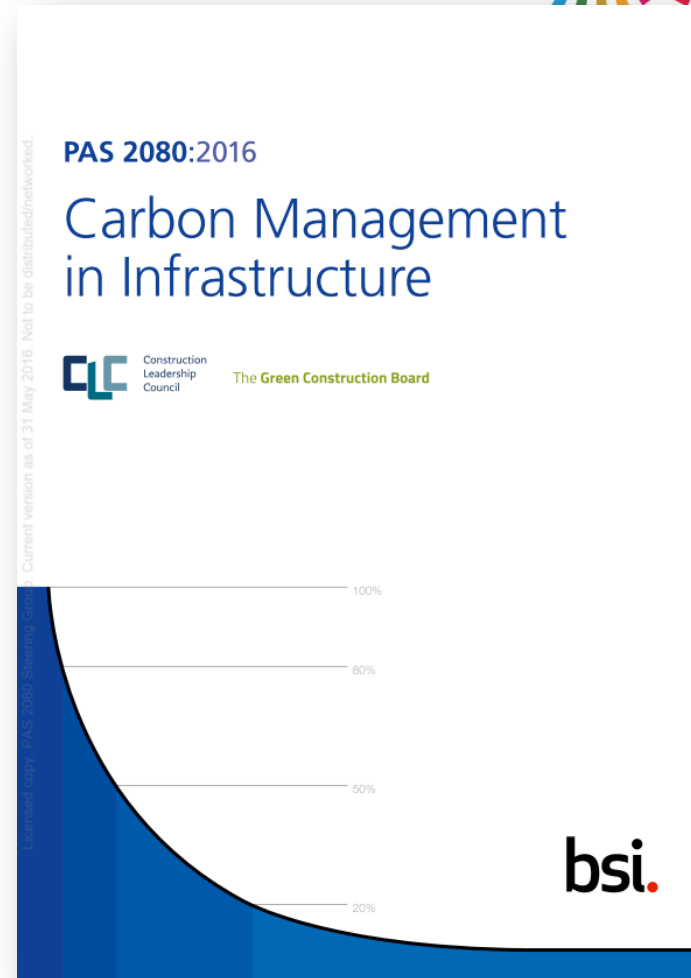
Low carbon and
sustainable
construction

3

Improved trade
performance



Infrastructure





nationalgrid

love every drop.
anglianwater 5



ARUP



hs2
engine for growth



Balfour Beatty



SKANSKA



bre



What is PAS2080?



Publically available standard

Based on the Infrastructure Carbon Review

Identifies how to manage carbon/cost through the value chain

Considers a whole life approach

Encourages value chain collaboration

Promotes Innovation



Design

Carbon Management Process activities during Design work stage		Asset Owner/ Manager	Designer	Constructor	Product/ Material Supplier
1	Detailed quantification of anticipated project carbon emissions against the baseline and target	R	A	C	I
2	Engage with the value chain to seek innovation and cost efficiencies for reducing carbon and to use specific information where it is available in the quantification	C	RA	C	C
3	Report carbon hotspots to focus efforts for further reduction and record carbon reductions in pursuit of the targets	R	A	I	I
4	Set out specification requirements relating to carbon emissions and set challenges for procurement and construction	A	R	C	C

Table 7: RACI chart summarising responsibilities during the Design work stage





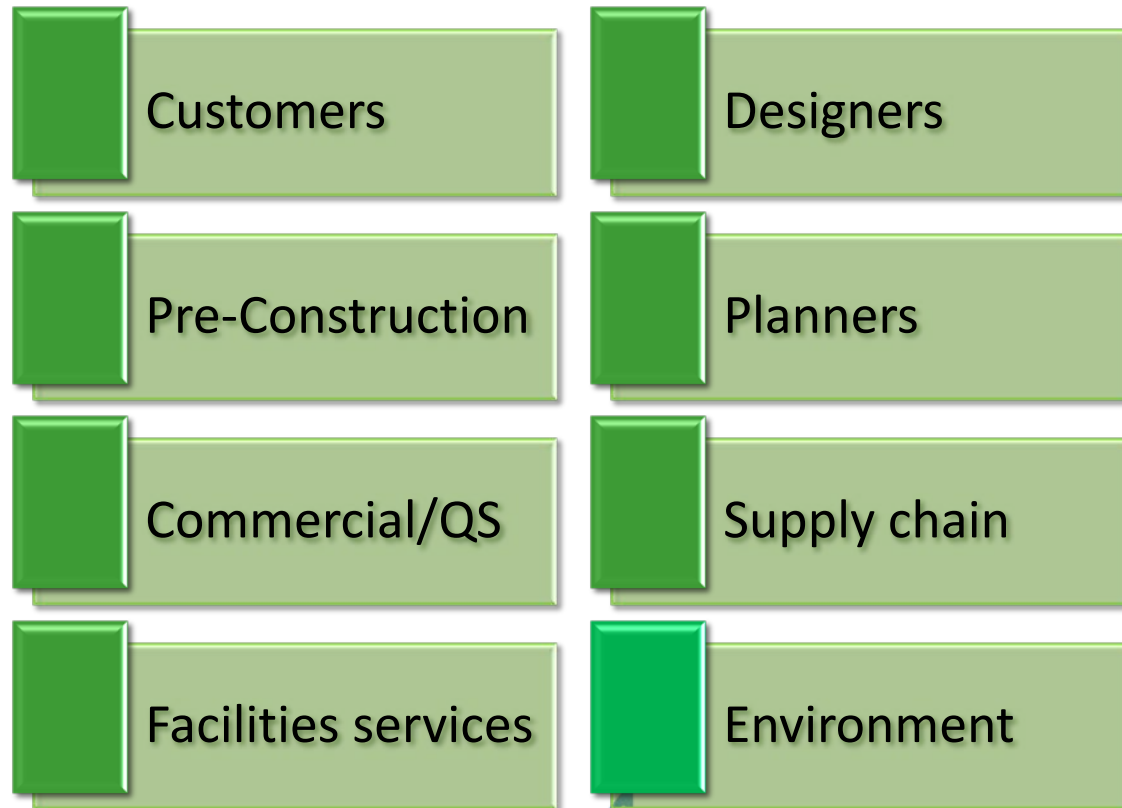
Construction and Handover

Carbon Management Process activities during Construction and Handover work stages		Asset Owner/ Manager	Designer	Constructor	Product/ Material Supplier
5	Use procurement to help embed the identified carbon reductions and challenge the value chain to seek innovation and cost efficiencies over and above design intent for reducing carbon	R	C	A	C
6	Detailed quantification and record of project carbon emissions based on as built information	I	I	RA	C
7	Engage with the value chain to use specific information where it is available (this might be on materials manufacture from the supplier; material quantity from the QS; etc.)	C	C	RA	C
8	Monitor progress to ensure project design aspirations for carbon emissions are delivered	A	I	R	C
9	Report back to Asset Owner/Manager as part of the continual improvement process	I	C	RA	I

Table 8: RACI chart summarising activities during Construction and Handover work stages



Who needs to be involved (The right people)



What is life cycle



Life Cycle Cost (LCC)

- is the cost of a product or process through construction, operation, maintenance and disposal.

Whole Life Cost (WLC)

- this covers all Life Cycle Costs but also includes others costs such as land acquisition costs and income from the building (e.g. rent/lease).

Life Cycle Assessment (LCA)

- does not cover costs. Assesses the environmental impacts of a product/service from cradle to grave.



Capital and Operational



Capex

- Initial upfront costs
- Materials, installation

Opex

- Ongoing running costs
- Energy, maintenance, cleaning, replacement**

Capcarb

- Embodied carbon
- Materials, installation

Opcarb

- Operational Carbon
- Energy use, water use



Skanska UK experience in Rail Maintenance



London Underground Structural Maintenance Service Contract:



- In collaboration with LUL, Skanska manages the planned maintenance for almost 1,000 bridges/underbridges and over 125 tunnels. The maintenance covers all but three underground lines. This represents about two-thirds of the London Underground network infrastructure.



Collaborative Carbon footprinting workshop



- workshop was too engage with London Underground attendees to discuss limitations of the footprinting exercise and deliver a Carbon reduction action plan that aligned with London Underground objectives





Carbon Reduction Action Plan

Project Name	LUL, Lot A, Civil Planned Maintenance 2011-2015.
Date of last review (update every 6 months)	08 February 2012
Total Carbon Footprint (TCO2e)	387
TCO2e / £m contractor spend	52

How does this compare with the construction industry?

UK Gov Industry Baseline (TCO2e)	57
UK Gov. Reduction Target	15% reduction
Skanska LUL Reduction from baseline	8%


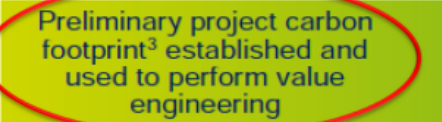
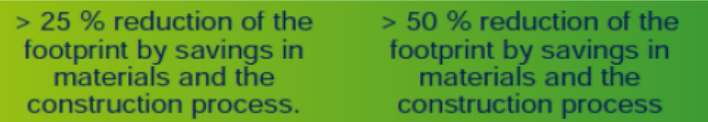
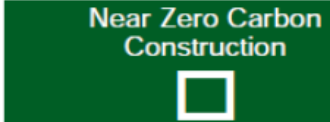
No.	Action	Responsible person	Timescales
1	Efficient driver training given to all Skanska drivers on Lot A (linked to FoRS training)	George Wilding/Campbell McKechnie	July 2014
2	Reduction in paper waste through use of Ipads/technology etc - quantify	Sasha Hastick	Jan 2014
4	Mini Bus transport to multiple sites as opposed to individual vehicles - Investigation/Business Case	George Wilding	March 2014
5	Use of Biodiesel, where possible	George Wilding	March 2014
6	Electric vehicle as part of Shell/Skanska trial	George Wilding	March 2014

Where does the project score on the Color Palette?

Vanilla (Compliance)

Green (beyond compliance)

Deep Green (Future Proof)

 <p>Preliminary project carbon footprint³ established and used to perform value engineering</p>	 <p>> 25 % reduction of the footprint by savings in materials and the construction process.</p>	 <p>> 50 % reduction of the footprint by savings in materials and the construction process</p>	 <p>Near Zero Carbon Construction</p>
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Life cycle costing / estimating 2016 deliverables

☐ offer customers sustainable solutions with a cost saving



Focus areas	Goal	Q1	Q2	Q3	Q4
<u>Raising awareness of Life cycle costing (LCC)</u>	Every preconstruction person trained and able to articulate LCC.	<ul style="list-style-type: none"> Report on who has received training in Preconstruction. Deliver training & produce Q report on progress. 	<ul style="list-style-type: none"> Raise quarterly within OU estimator meetings. Deliver training & produce Q report on progress. 	<ul style="list-style-type: none"> OneSkanska news story on costed sustainable solutions Deliver training & produce Q report on progress. 	<ul style="list-style-type: none"> Host lunch and learn on LCC. Deliver training & produce Q report on progress.
<u>Costed sustainable solutions in bids</u>	Offer our customers creative bids	<ul style="list-style-type: none"> Attend Ecobuild to identify innovative solutions to cost. Produce case studies for the priority areas of each sector. 	<ul style="list-style-type: none"> Target bids in pipeline and promote costed sustainable solutions (focus on owner occupiers /asset owners). Review of LCC in OWOW complete. 	<ul style="list-style-type: none"> Identify who you need to collaborate with to progress LCC in your sector. 	<ul style="list-style-type: none"> Meet and engage with key stakeholders. Develop plan for your sector and report on progress.
<u>Carbon footprinting</u>	Carbon footprinting aligned with estimating process and tools	<ul style="list-style-type: none"> Rob McCulloch to present to group on carbon at UK quarterly meeting. Review and report carbon capability of your estimating software at UK quarterly meeting. 		<ul style="list-style-type: none"> Trial carbon process on one project by end of year. Share knowledge with UK quarterly meeting. 	



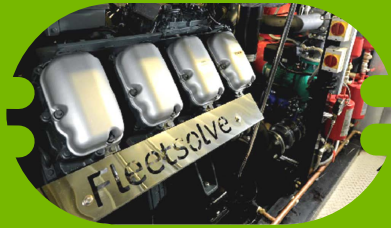
Library of supply chain green solutions/innovations



ArcelorMittal
sheet piling



SunMast™



Liquid Biomass CHP



Aquaflow
ThermoPave



Prosol TF



Hollywood House
lighting solution



Site Activities



- Measure monitor reduce carbon around fuel and energy use
- Telemetry for plant, data analysis, targeted driver training
- GIS, manage and optimise logistics



Conclusion



- PAS 2080 is here, a step change is needed to meet the requirements
- Engagement with the right people under way
- Still need input from planners and QS
- Incorporates whole life thinking (Carbon/cost with BIM)
- Needs more quantification of Maintenance aspect

