

***Delivering low carbon
concrete for Network
Rail***

Bruce Martin, Expedition
29th January 2021



Who + What

A work in progress

“Science Based Targets”

Set before Expedition involved

- 2019 – Baseline, 100%
 - 2024 – 75%
 - 2029 – 54%
 - 2034 – 35%
 - 2039 – 21%
 - 2044 – 10%
 - 2049 – 2%
 - 2050 – 0%
-
- Route to achieving the targets (More than specify a requirements for supply chain SBTs)

Precast

Cast Insitu

Different access to the supply chain

Same general principles for precast and insitu

- Set targets
- Hierarchy of action
 - Reduce the LCA Stage A CO₂e
 - Design and detail for long life with minimum maintenance
 - Design for ease of disassembly and re-use or reclamation of complete structural elements and / or materials in LCA Stage C.
- Meet LCA Stage A targets by
 - Reducing quantities per unit (concrete and reinforcement)
 - Reduce CO₂e of the materials
- Baselines
 - CO₂e – Concrete: BRMCA data for 2019 (note: varies with strength & region)
 - CO₂e – Reinforcement: CARES mean for UK rebar
 - Quantities ... harder, some scope to develop baselines for standard items

Precast concrete – Pilot project

- Know the supply chain (typically 8 year framework agreements)
 - Can work with the whole chain to develop the product
 - Can agree strategy for achieving medium term reductions
- Reduce quantities:
 - Efficient form
 - Make use of all the code provisions
- Reduce CO₂e of concrete
 - Now: Maximise use of Limestone, PFA and GGBS **within** BS EN 197 classes (intelligent mix design for strike times)
 - Now: AACMs based on PFA and GGBS (Wagners EFC, limited supplementary testing)
 - 4 years: Maximise use of Limestone **beyond** BS EN 197 classes (testing, design guidance)
 - 4 years: Use calcined clay **within** BS EN 197 classes
 - 8 years: Maximise use of calcined clay **beyond** BS EN 197 classes (testing, design guidance)
 - 8 years: Use calcined clay as an AACM (testing & design guidance)
- Notes on reinforcement
 - Takes a long time to demonstrate durability of mild steel rebar
 - Stainless steel has very high CO₂e
 - FRP (glass and basalt)

Key factor – Supply chain engagement

In situ concrete

- Typically framework agreements with Tier 1 contractors
 - Arms length relationship to ready-mix suppliers
 - Remote relationship with cement manufacturers
- Reduce quantities:
 - Require statements on steps taken & additional steps which were discounted (say why)
 - Where possible create baselines based on procurement of standard units
- Reduce CO₂e of concrete
 - Encourage use of performance specifications for concrete mix design
 - Require inclusions of kg CO₂e / m³ on delivery ticket with each wagon
 - Pre-approved low carbon mixes for some uses: Use the pre-approved mix or a mix with lower CO₂e (may be limited to mass concrete items initially)
 - Require Tier 1 contractors to partner with ready-mix suppliers to deliver:
 - Now: Maximise use of Limestone, PFA and GGBS **within** BS EN 197 classes
 - Now: AACMs based on PFA and GGBS (CEMEX, Aggregate Industries, Wagners, David Ball Group)
 - 4 years: Use of Limestone **beyond** BS EN 197 classes (testing, design guidance)
 - 4 years: Use of calcined clay **within** BS EN 197 classes (testing, develop calcined clay supply)
 - 8 years: Maximise use of calcined clay **beyond** BS EN 197 classes (testing, design guidance)
 - 8 years: Use calcined clay as an AACM (testing & design guidance)

Key factor – Accessing the right part of the supply chain

Thank you

