

# BSkyB Meeting Centre

## Low Embodied Impact Concrete Substructure



### Background

On the meeting centre a total of 1,564m<sup>3</sup> of concrete was delivered on site for the substructure. Approximately 78% of the concrete was a C32/40 which was used in the ground floor slab, pile caps, manhole etc. the remaining 22% was a low strength concrete (i.e. GEN 1) used exclusively for the blinding.

This case study explores the benefits of incorporating cement replacement and secondary aggregates in the Meeting Centre concrete mixes.

### Outcomes

#### Lower embodied carbon

A 30% cement substitute called Pulverised Fuel Ash (PFA) was included in both the RC32/40 pump and GEN 1 mixes. The total embodied carbon of the substructure amounts to 433tCO<sub>2</sub>e. The main contributors are the groundfloor slab, the pile caps and the blinding. A saving of 34 tCO<sub>2</sub>e was achieved compared to industry average<sup>1</sup> representing a 7% reduction. However there is a 25% embodied carbon reduction (or a saving of 145 tCO<sub>2</sub>e) when compared to concrete mixes with no cement replacement. [Ref Fig 1] A clear procedure to support the design team in the evaluation and selection of key building products and materials.

#### Increased recycled content

The initial concrete mixes did not incorporate any secondary aggregates. The mix design was then revised to incorporate 100% stent, a secondary aggregate, pushing the overall secondary materials content<sup>2</sup> from 5% to 53% (by weight) [Ref Fig 2]. There is often a misconception that stent is a recycled aggregate; stent is actually a weathered granite arising as a by-product from the china-clay mining process. Stent used in concrete mixes meet the secondary aggregates requirements set out in BS 8500-1&2:2006.

**Client**  
BskyB

**Architect**  
AL\_A

**Engineer**  
Arup

**Contractor**  
Lend Lease

**Year**  
2013/14

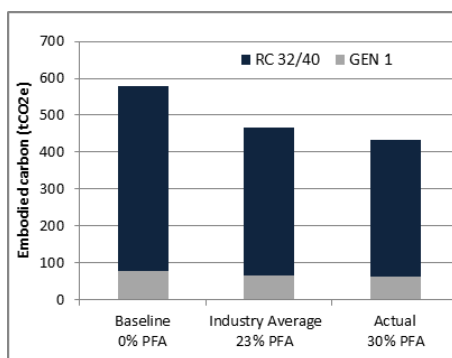


Figure 1 - Concrete substructure embodied carbon variation according to PFA content.

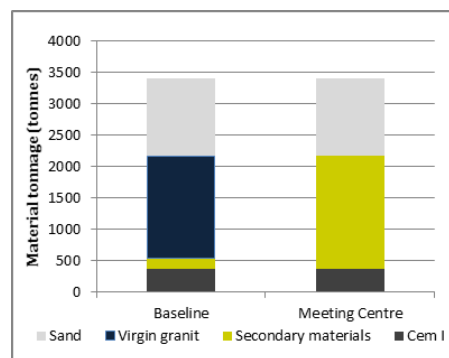


Figure 2 - Breakdown of concrete constituent

<sup>1</sup>Industry average concrete mixes incorporate 23% cementitious replacement (i.e. PFA or GGBS). Reference - British Cement Association Factsheet – Embodied carbon cementitious materials [http://www.ukcsma.co.uk/files/Factsheet\\_18\\_CO2e\\_of\\_Cementitious\\_Materials\\_2012.pdf](http://www.ukcsma.co.uk/files/Factsheet_18_CO2e_of_Cementitious_Materials_2012.pdf)

<sup>2</sup>The secondary material content include the amount of PFA .