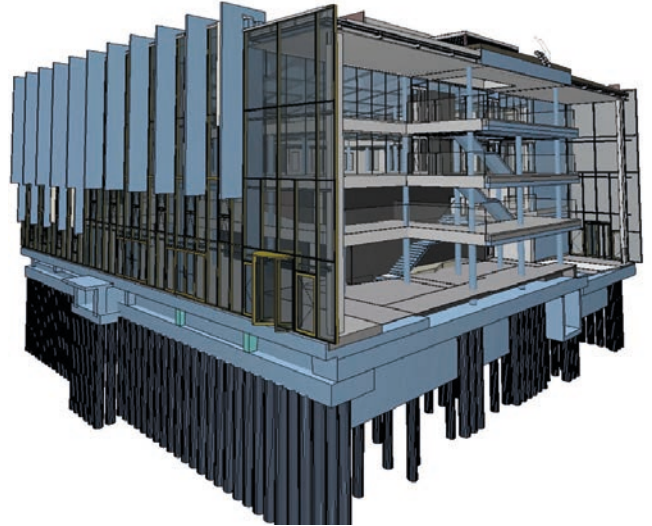


INSIGHT #10 : PERFORMANCE METRICS

Ten years of detailed sustainability data has laid a foundation for the future



Strategies and commitments are vital, but they must be underpinned by credible, appropriate performance indicators. This allows the industry to measure progress and, crucially, to set improvement targets. Consultation with internal and external stakeholders and material analysis enabled the industry to agree a series of indicators in 2008. The industry has reported on these metrics annually ever since.

The data is collected by companies in the nine sectors of the concrete production and supply chain and submitted to their relevant trade associations. This aggregated data is then

independently collated to provide the summary values reported. Where possible, the values represent a form of “embodied” indicator as they show data related to concrete production and proportionate contributions from the raw materials used. The values obtained this way do not represent a particular type or grade of concrete but are based on the average proportions of all types of concrete produced.

Both our methodology and indicators are reviewed annually to ensure they remain accurate and relevant. Examples of this are the indicators for “percentage of additional cementitious materials used” and “kg CO₂/tonne of concrete”.

In the case of additional



UNDERSTANDING WHOLE-LIFE IMPACTS

LCA stands for ... lifecycle analysis (or assessment), an approach to quantify the environmental impacts of a product against defined indicators. These indicators may include impacts on the climate, global warming potential (carbon footprint), resource and water use, and impacts on water and air quality. The impact is measured against these indicators across all the stages of a product’s life from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and end of life.

EPD stands for ... environmental product declaration, an independently verified and registered document that communicates the environmental impact of a product assessed by an LCA. EPDs are Type III Environmental Labels and report a specific set of indicators.

PCR stands for ... product category rules, the compilation of specific rules, requirements and guidelines for creating EPDs of a certain product group. The PCR ensures consistency and allows for comparison between functionally equivalent products as part of a building level assessment.



Photo: Quintin Lake; BIM image: Penoye & Prasad

Above and left: The refurbishment and extension of the Templeman Library at the University of Kent by Penoye & Prasad has a concrete frame and a distinctive facade made up of precast concrete projecting fins. The project team's shared use of data via collaborative BIM software made it possible for the precast contractor to develop the fins concurrently with the structural model (left), contributing to a successful outcome

cementitious materials, the original definition needed to be modified to ensure that only materials beneficial to improving sustainability performance were included. This led to a step reduction in the apparent value but the original 2020 target value of 35% has been retained.

The "rolling mix" value for carbon emissions reporting was found to be influenced strongly by year-on-year changes to the types of concrete requested by the construction market, which is outside the control of the concrete industry. A second indicator was therefore introduced based on maintaining the concrete mix proportions from 2008, in order to provide a "normalised" value for year-on-year comparison.

Each year new indicators are

considered based on stakeholder feedback. Several are undergoing testing to ensure that they can be reported consistently and credibly. Examples are indicators related to equal opportunities, local community, health and safety management, verified EPDs and data for building information modelling (BIM).

Accurate data is of course central to the future of BIM, which is another reason why the concrete industry's commitment to provide LCA data compliant with codes and standards is so important. Generic EPDs are now available for concrete and concrete products, which in turn are essential for BIM, as by linking EPD data to BIM objects designers can model the embodied impacts of their material and design choices.

'RESEARCH NEEDS GOOD DATA WITH GOOD TRANSPARENCY'

Dr Craig Jones is director of sustainability consultant Circular Ecology

How important is data to improving lifecycle sustainability?

It is very important as it allows us to produce quantitative rather than qualitative research. If we're to have confidence in them, studies need to be backed up by good data with good transparency. This is particularly important because although sustainability sounds like a simple concept, it's actually complicated since it covers social, environmental and economic factors. Carbon is very important, but it is just one of about 20 environmental impact factors in an LCA.

How can data be used to reduce embodied carbon?

The building design stage is the largest opportunity to reduce carbon – the earlier in the process the better. Data can feed into this by allowing design choices to undergo an embodied carbon assessment, which might lead to choosing longer life materials, for example. However, this isn't used enough. Embodied carbon isn't too difficult to calculate but if you haven't done it before, it can be a barrier.

What are the most important tools and data sources for designers?

There are a number of tools for measuring embodied carbon –

eTool (etoolglobal.com) or One Click LCA (oneclicklca.com), for example – but none have really grabbed the market. One free resource is the Inventory of Carbon & Energy database, which I am currently updating (circularecology.com).

What data is available about concrete and how this might be used?

There is useful data on sustainableconcrete.org.uk and mineralproducts.org. Concrete isn't really one material but a blend of many, and the amount of cement is the key indicator of embodied carbon. The next version of the Inventory of Carbon & Energy database allows a larger range of concretes to be modelled.

How could designers and product suppliers collect, manage and use data better?

Product suppliers could provide embodied carbon data for their product. The Concrete Centre has already got EPDs, for example, for an average concrete. We need to try to get carbon measurement alongside the activities that project teams are already doing in the design process. By setting a carbon target that's strong enough to encourage them to do things differently, designers would be more likely to look at things like retaining part of existing structures, or using innovative construction techniques.