# Training and reporting

Guidance note on WLCA and limitations includes recommendations on assessing the carbon impact of reused steel. It also covers Module C and Module D aspects and signposts to carbon measurement conducted by certain demolition contractors and carbon targets set by developers.

Toolbox training/talk provides information on reuse specifically intended for demolition contractors.

Reporting portal. Based on discussions with demolition contractors, a key theme that emerged is the need for an easy-to-use platform to capture steel reuse statistics, and potentially data on other materials. Currently, there is no standardised system for recording this information, and contractors' methods can vary. This reporting portal offers a centralised platform, allowing data to be aggregated across projects.

| **Training and reporting** | Guidance note on WLCA and limitations | Toolbox training - introduction to steel reuse | Reporting portal |
|---|---|---|---|

# Guidance note on WLCA and limitations (1/6)

## Reused steel and carbon

There is a carbon benefit from reusing steel in projects. This can be determined through a whole life carbon assessment at a building level, where the carbon impacts of the products that are used in the building are determined.

To understand how to evaluate the carbon impact of a reused product, there are two approaches:

a. The manufacturers/suppliers of a reused product have carried out an EPD and information from the EPD can be used in building whole life carbon assessments

b. There is no EPD for the product identified. Recommendations from the RICS Professional Statement on whole life carbon assessment are used.

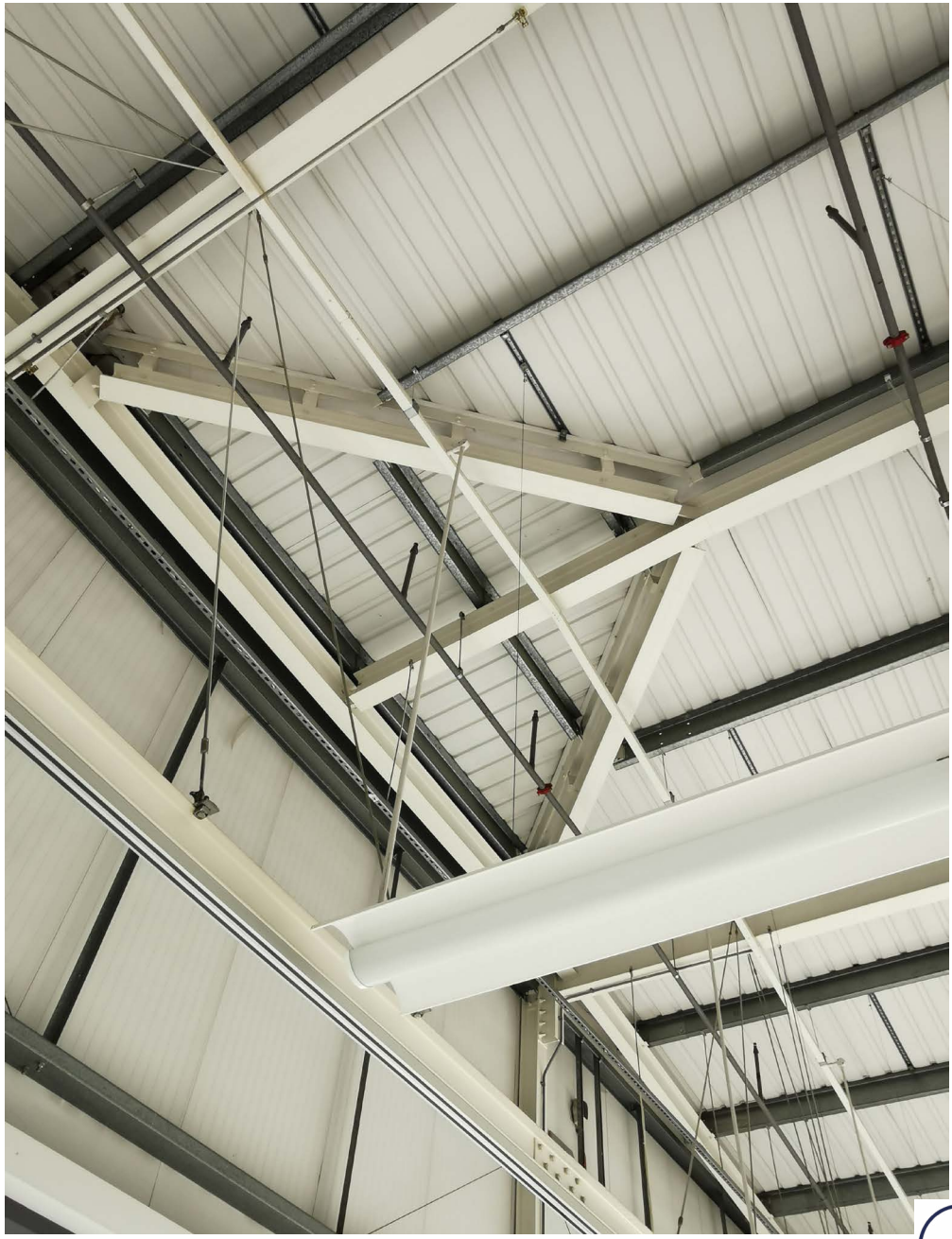
The following sections provide more information on these two approaches:

a. An EPD is available

To establish the carbon impacts of reclaimed steel, the reused steel stockholders Cleveland Steel and Tubes (CST) and EMR, have produced verified Environmental Product Declarations (EPD) for some of their products. For more information on EPDs, see ASBP's guidance

b. There is no EPD

RICS Whole life Carbon Assessment (2nd edition) provides the methodology for how whole life carbon assessments should be undertaken, based on BS EN 15978. This document also provides guidance on how to calculate the carbon emissions of reused products where there is no EPD.



**Using reclaimed steel will help clients and projects meet their carbon targets!**

**ASBP has guidance on embodied carbon and whole life carbon assessment, as well as an EPD workstream.**

# Guidance note on WLCA and limitations (2/6)

## a. an EPD is available

**Cleveland Steel and Tubes (CST)** Recovered and refurbished used steel I-beams EPD

- This was issued in 2024.
- This covers the modules A1 – A3 (product stage), Module C (end of life) and Module D (future recovery), based on data over a period of one calendar year (2023).
- The EPD includes the initial recovery and refurbishment of an I-beam that has been recovered as waste from a demolition site.
- The results and assumptions for A1-A3 are as follow:
  - A1 (product manufacturing): Based upon the cut off rules the I-beam is burden free at this point. Therefore A1 = 0 $kgCO_2$ eq
  - A2: transport from demolition site to CST has been assumed to be on average 277 km
  - A3: any reprocessing and factory activities are included in A3. Where some waste steel has been generated, it was assumed to be recycled.
  - For A1-A3 the $kgCO_2eq$ is 69.8 per tonne.
- The results and assumptions for C1 to C4 are as follow:
  - It has been assumed that 93% of beams can be recovered - 47% assumed to be reused, 47% recycled and the remainder landfilled.
  - For C1-C4 the $kCO_2eq$ is 13.2 for 1 tonne
- For Module A and Module C the $kgCO_2eq$ is 83.05 $kgCO_2eq$ per tonne

Cleveland Steel and Tubes also have a verified EPD for Recovered and reused mill surplus stock tubulars and mill downgrade steel tubulars and Recovered and refurbished steel tubulars from waste oil and gas pipelines and pipeline projects

CST also has an LCA study on recovered and refurbished coated steel tubes which shows that there is an indicative savings for all CST refurbished tubes of between 95% - 97% when compared to an equivalent uncoated prime steel tube.

**EMR – Reusable Steel EPD**

- This was issued in 2022
- This covers the modules A1 – A3, Module C and Module D, based on data over a period of one calendar year (2021).
- This covers various structural steel and will include Universal Beams and Universal Columns (but not limited to these).
- This covers the steel that is extracted from demolition/ deconstruction projects, transport to EMR and de-fabrication.
- For A1-A3 the $kgCO_2eq$ is 46.6 per tonne (this is broken down as A1 (raw materials) at 25.5 $kgCO2_2eq$/tonne; transportation to EMR (A2) at 13.4 $kgCO_2eq$/tonne and A3 (fabrication) at 7.7 $kgCO_2eq$/tonne.
- For C1-C4 the $kgCO_2eq$ is 32.4 for 1 tonne
- For Module A and Module C the $kgCO_2eq$ is 79.05 $kgCO_2eq$ per tonne

These can be compared to specific EPDs or the BCSA provide average UK embodied carbon emissions for new structural steelwork or, for Modules A1-A3 and Module D; these are:

- For Modules A1-A3, 1.74 tonne $CO_2e$ per tonne of sections
- For Module D, - 0.93 tonne $CO_2e$ per tonne of sections

# Guidance note on WLCA and limitations (3/6)

## b. There is no EPD (1/2) - For refurbishment (steel remaining in-situ):

If reused steel is remaining in situ, as the building is being refurbished; there will be in most cases a carbon emission benefit compared to demolition and redevelopment or new-build (as less new materials are needed). Comparative assessments between refurbishment and new-build options should be done to clarify this.

It is assumed that any materials remaining in-situ have no impact as their impact (A1 to A5) has already been taken into consideration in the existing building. However, any future maintenance, end of life and future recovery should be reported.

## b. There is no EPD (2/2) - End of life considerations for a new projects

**Module C**

- Module C impacts must be included for all components and materials that make up an asset at the end of the reference study period.
- Any impacts arising from decommissioning, stripping out, disassembly, deconstruction and demolition operations, as well as from transport, waste processing and disposal of materials at the end of life of the project, must be accounted for in Module C
- The end-of-life (EOL) scenarios must be clearly stated and explained in the whole life carbon report – default end of life routes for structural steel are 7% reuse and 93% recycling (see page 106 of Whole_life_carbon_assessment_PS_Sept23.pdf (rics.org)). Scenarios can be based on improvements to the default (business as usual) rates if they can be justified. Designers must demonstrate a credible deconstruction and recovery strategy using current technology to increase the EOL scenario percentages from the default rates.
- For C1, the work required for deconstruction or demolition, can vary considerably depending on the end of life scenario. Data could be taken from a EPD, if the scenario is similar or an adjustment made. If no information is available, C1 data can be taken from the construction activity impacts (A5.2) as a proportion.
- For C2, transport of materials to their final destination, if reuse is on site there is no transport impact; for reuse/recycling elsewhere, then the average distance to two closest construction waste processing sites should be used.
- Any material that can be reused on or off site, should be modelled in C3, waste processing; this is also the material amount used for Module D1 as a net output (benefits and loads from reuse). This should include any removal of coatings of steel including their disposal and removal of removal of joints and fixings from structural steel, including their recovery.

**Module D**

see section 5.7.1 and Appendix K of Whole_life_carbon_assessment_PS_Sept23.pdf (rics.org)

The RICS Professional Statement splits module D into two parts:

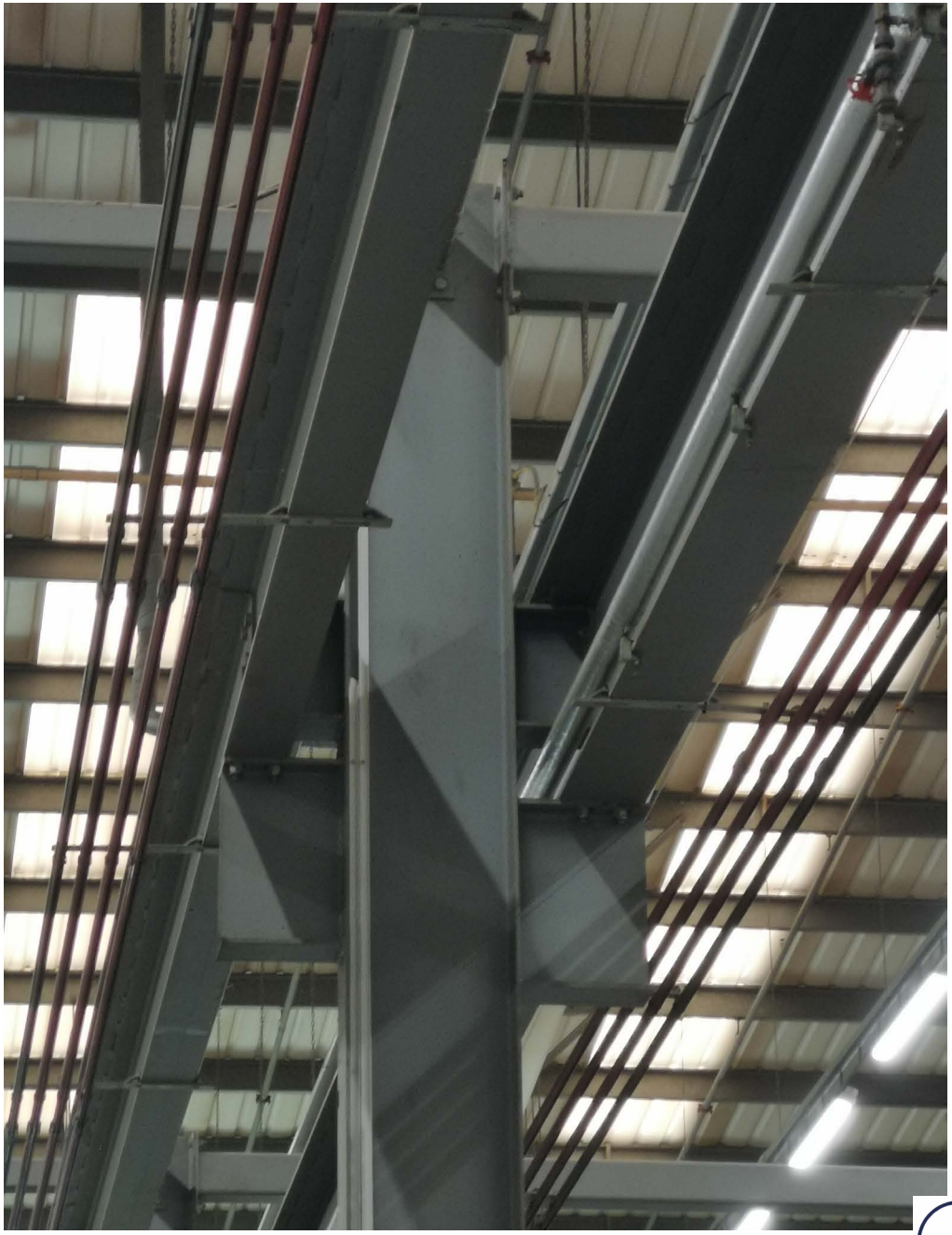
- Module D1: potential loads and benefits from materials
- Module D2: potential loads and benefits from exported utilities exiting the system boundary

The RICS document states that "*Module D1 is intended to provide a broader picture of the environmental impacts of a project by accounting for the future potential of any primary materials used when these are recovered, for example if they are reused and/or recycled.*"

Module D can be complicated as it works on a net flow methodology to calculate the loads and benefits from recycling or reusing. This means that module D1 only accounts for the benefits of reusing or recycling primary resources. Therefore, if reclaimed steel has been used in the new design and then also modelled to be reclaimed for reuse at EOL (in the same amounts) in a future building, then there is no benefit to the project that is being assessed in Module D1. However, if the EOL scenario is reuse, but the new steel is from a primary (recycled) source then the benefits can be seen in module D1. It is important to note that Module D is reported separately.

# Guidance note on WLCA and limitations (5/6)

- Retaining reused steel in-situ, should lead to a carbon saving
- Using reclaimed steel in a project should have a lower carbon impact than non-reused steel – EPDs can be used to show this
- The impact of deconstructing a building for reclaiming the steel for reuse should be measured (this maybe better than demolition e.g. if less equipment is used)
- The end of life scenario for structural steel has to be modelled. These scenarios should be clearly explained and evidence provided if they are better than the default rates (7% reuse for structural steel). Modelling the reuse of steel at end of life, will have less impact than recycling.
- Savings from the reuse of the steel at the end of the building's study period, into its next life can be accounted for in Module D
- If reused steel is being used in the project, there may be no benefit in future recovery for reuse of that steel (Module D) due to the net flow methodology



# Guidance note on WLCA and limitations (6/6)

**Demolition and whole life carbon assessment**

There is no benefit when doing a WLCA, for the building where the reclaimed steel is being sourced from (i.e. the donor project). The benefit lies with the new project, in using a low carbon product.

A separate sub-module A5.1 is now included in the RICS Standard, where the impacts associated with demolition/ deconstruction should be measured – this should go back 3 years of the sale/new proposal. This includes the demolition, waste processing and transport of any material from the demolition/deconstruction. This also applies to any demolition works associated with refurbishment of a buildings.

An as deconstructed assessment should be undertaken to understand the actual impact of the asset's end of life. This might mean an update of the impacts in Modules C1 -C4 and D1 of the building (which is being demolished) – how likely this assessment will occur, is not clear.

**Demolition and whole life carbon assessment**

More demolition contractors are measuring and setting targets for their carbon emissions. Examples include:

- Keltbray, to be net zero carbon across their operations by 2040 and all activities by 2050
- McGee, committed to achieving net zero emissions by 2040
- John F Hunt to be net zero carbon by 2050, with a target to half by 2030, through developing more efficient technologies, recycling, and waste minimalization, monitored through the use of our in-house carbon accounting platform

Larger organisations have to report this due to the UK's Streamlined Energy and Carbon Reporting (SECR) legislation. Scope 1 (direct emissions) and 2 (energy) have to be recorded, Scope 3 (indirect emissions) is voluntary (but recommended).

Demolition companies can show carbon savings from reuse through projects, and how much this is in in a given year in their annual reports and marketing materials. They can show how they are helping clients meet their own carbon targets both at a project and organisational level.

More and more clients are setting embodied carbon/whole life carbon targets and commitments to net zero carbon. The pilot version of the Net Zero Carbon Building Standard, requires the meeting of upfront carbon limits (the impact of a product and its construction process) and reporting life cycle embodied carbon limits.

Client examples:

- Grosvenor, all developments will be low embodied carbon (<500kg$CO_2$e/ $m^2$ from 2025)
- Derwent, has an embodied carbon target of <600kg$CO_2$e/ $m^2$ from 2025 and 500kg$CO_2$e/ $m^2$ from 2030
- Great Portland Estates, reducing embodied carbon of their new developments and major refurbishments by 40% by 2030, from our baseline of 954kg$CO_2$e to 572kg$CO_2$e per $m^2$ for new build developments and from 340kg$CCO_2$e to 204kg$CO_2$e per $m^2$ for refurbishments.
- British Land has a commitment of 50% reduction in embodied carbon, versus industry benchmarks.
- Royal London Asset Management is aiming to achieve net zero emissions in their property assets directly managed by them by 2030, and indirectly managed by 2040.

# Toolbox Training - Introduction to steel reuse

## Steel Reuse

More than one million tonnes of steel scrap is produced every year in the UK by the construction sector[1]. Conventional steel recycling sees a large proportion of this scrap exported to overseas plants, where it is processed and then re-imported to the UK. The ASBP DISRUPT II project aims to reduce this material export by promoting the closed-loop reuse of steel in construction projects.

1 Hall, R., Zhang, W., & Li, Z. (2021). Domestic scrap steel recycling – economic, environmental and social opportunities (EV0490). The Warwick Research Archive Portal (WRAP). https://wrap.warwick.ac.uk/152270/

## What is Steel Reuse

Steel reuse is not a new concept—the demolition sector has been reusing steel for many years. However, as planning conditions now require greater control over and measurable reductions in whole-life carbon on construction projects, steel reuse is experiencing a strong resurgence.

The ASBP DISRUPT II project has conducted detailed case studies of current projects to develop sector-specific guidance on steel reuse, which is seen as a valuable tool for reducing whole-life carbon (WLC).

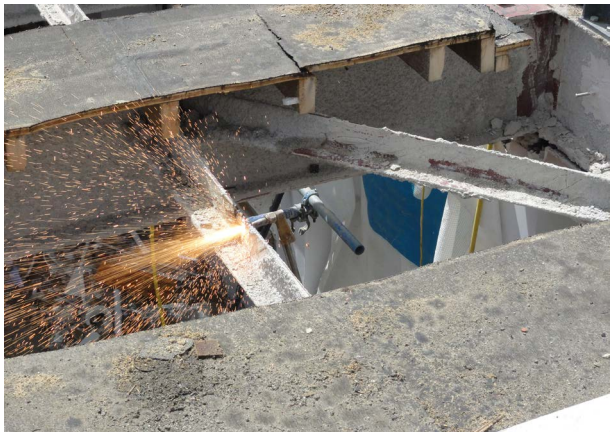
Recovered steel sections are removed from structures as identified within the Pre-Demolition Audit and subsequent surveys, following the project method statement. These sections are stockpiled until sufficient material is available for transport to a stockholder, where they will be graded, assessed, and tested, ready for redistribution.

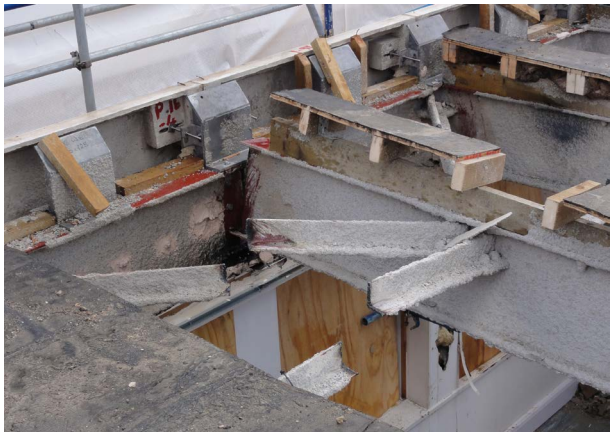
Every tonne of steel reused results in a significant carbon saving of 2,200kg of CO2, greatly reducing the project's embodied carbon footprint.

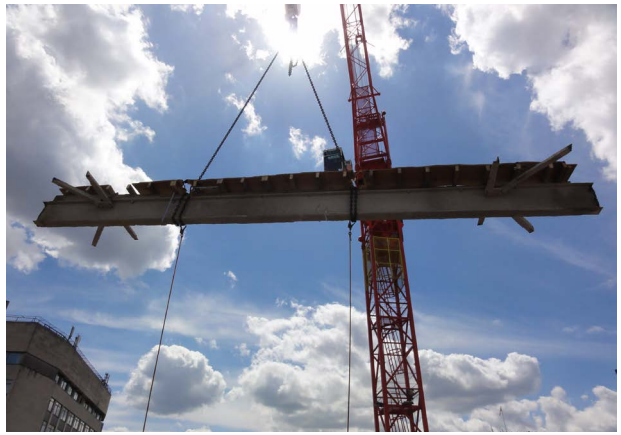
## What do we have to do?

Every effort will be made to use steel sections according to the project plan defined in the Pre-Demolition Audit. Sections to be recovered will be identified and marked in line with the audit, and removal will be carried out following the site RAMS (Risk Assessment and Method Statement).

Recovered sections will be trimmed and prepared for transport to the steel stockholder for further processing.







# Reporting portal

This simple online portal has been developed as part of the DISRUPT II project to track tonnes of steel recovered for reuse from deconstruction/demolition projects in the UK. Information submitted will initially be kept on file by ASBP as a record but the medium term aim is to create a map of steel reuse projects and a number counter showing total tonnes of steel reused and carbon saved.

**The Portal asks for the following information:**

- Project name or address
- Project postcode
- Amount of steel segregated/recovered for reuse (tonnes)
- Project completion date
- Company name
- Your company's role in project (E.g. Demolition contractor, main contractor)
- Your name
- Your email
- Any comments? (optional)

**Click here to visit the portal and add your project**