Requirements for Re-use of Structural Steel in the United Kingdom

This Loss Prevention Standard provides guidance on the direct re-use of structural steel in construction projects.

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Introduction

The re-use of structural steel is gaining traction across the UK construction industry as organisations adopt more sustainable methods of work. While steel is already widely recycled, direct re-use offers significantly greater environmental benefits—reducing embodied carbon by up to 97% compared to newly manufactured steel.

However, re-using structural steel introduces a range of challenges, including the need for robust assessment and testing, design compatibility, and traceability of materials. If not properly managed, these risks can compromise structural integrity and regulatory compliance.

This guidance outlines the key risks and provides practical recommendations for the safe and effective re-use of structural steel in UK construction projects.

Environmental and Economic Benefits

- **Carbon Savings.** Up to 97% reduction compared to virgin steel.
- **Cost Savings.** Reclaimed steel can be up to 20% cheaper.
- **Resilient Supply Chains.** Keeps steel within the UK market.
- **Sustainability.** Supports circular economic goals in local plans (e.g., London Plan).

Understanding the Risks

Key risks associated with the re-use of structural steel include:

- **Traceability and Certification.** Can the grade, and history of the steel be verified.
- **Degradation.** Steel may have suffered from corrosion or other damage.
- **Design Compatibility.** Materials may not precisely meet design requirements.
- **Design Changes.** Changes to the sections may compromise performance.
- **Supply Chain Limitations.** Availability of reclaimed steel may create challenges.

Managing the Risks

Assessment and Testing

Steel must be assessed for structural integrity, including:

- Visual inspection for damage or corrosion (corrosion loss to not exceed 5%).
- Chemical composition analysis.
- Mechanical testing (e.g., tensile strength, yield strength).
- Evidence of robust control procedures through the reclamation and storage process.
- Testing/scope of re-use is outlined in the SCI Re-use Protocol (SCI P427). This includes:
  - ✓ Steelwork is not from a date before the 1970s.
  - ✓ No built-up members unless all welds are tested.
  - ✓ No signs of fire exposure.
  - ✓ No evidence of plasticity observed in the surface or corrosion protection.

Design Considerations

- Re-used steel must be incorporated into design calculations with appropriate factors of safety and potential reduced section capacity applied.
- Clear articulation of the steel's intended use in the new structure, with appropriate engineering validation.
- Options for re-use include:
  - ✓ In-situ re-use.
  - ✓ Re-use in a different location.
  - ✓ Re-use of individual members.
  - ✓ Refabrication of members.

Traceability and Certification

- Reclaimed steel must be traceable and certified for re-use. Stockholders must maintain records, conduct testing, and ensure compliance with re-use protocols.
- Ensure evidence of robust quality assurance and control procedures through the re-fabrication process is retained.
- A comprehensive audit trail documenting the steel's provenance and prior use must be collated.
- Suppliers to comply with the British Constructional Steelwork Association (BCSA) Model Specification for Reclaimed Steel Sections and the SCI Re-use Protocol (SCI P427).
- CE certification for fabrication and steel must be compliant to BS EN 1090-1 and 2.

Deconstruction vs. Demolition

- Buildings should be deconstructed to preserve steel elements and not demolished.

Design for Re-use

Designers can also optimise for future re-use. Steps include:

- End plate beam-to-column and beam-to-beam connections.
- Use bolted connections in preference to welded joints to allow the structure to be more simply dismantled during deconstruction.
- Use standard connection details, including bolt sizes and the spacing of holes.
- Ensure easy and permanent access to connections.
- Where feasible, ensure the steel is free from coatings or coverings that prevent visual assessment of the condition of the steel.
- Minimise the use of fixings to structural steel elements that require welding, drilling,

or fixings; use clamped fittings where possible.
- Identify the origin and properties of the component, for example by barcoding or e-tagging or stamping and keep an inventory of products.
- Use long-span beams as they are likely to allow more flexibility for re-use.

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Sources and Useful Links

- Net Zero Strategy: Build Back Greener.
- Industrial Decarbonisation Strategy (2021).
- Resources and Waste Strategy.
- Environment Act 2021.

Note: Whilst UK standards and legislation are referenced in this document, other international standards and legislation should be referenced where applicable.

Additional Information

Relevant Aviva Loss Prevention Standards include:
- **Mass Timber - Planning and Design (RIBA 0-4)**
- **Low Carbon Concrete - Introduction**
- **Delivering Successful Construction Projects**
- **Temporary Works - Introduction**

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