



Greener Steel

Small changes to policy could open doors for repurposed steel in the circular economy



Sustainability in steel

Congratulations to all involved with the GE Awards.

We're proud to be industry leaders in sustainable solutions by repurposing steel tube and reducing our industry's carbon footprint.

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Time to support surplus steel

The use of surplus steel in construction and infrastructure projects can deliver huge savings on carbon emissions. But more needs to be done to encourage its wider use.

Recent studies have found that using surplus steel for construction projects can deliver carbon savings of up to 96% (see page four). One would expect a construction sector constantly challenged to improve sustainability would therefore be using surplus steel wherever possible – however, this is not the case.

Cleveland Steel & Tubes Ltd is a leading provider of surplus steel tubes for reuse in the construction sector. Its managing director, Roy Fishwick, highlights the barriers his company is facing, and explains the three ways in which policymakers and legislators can help to support reuse of steel.

Clarity

More clarity is required in the wording of building safety standards, to remove any doubt that surplus steel can be used. The wording of both the EN 1090 standard and the Construction Product Regulations (CPN) is ambiguous when it comes to surplus steel. This often leads to excessive caution on the part of purchasing managers, who will go with newly-milled steel instead as the 'safe' option. Explicitly stating how surplus steel can be used, and to what standards it must adhere, would remove this caution and open up more of the construction sector to the benefits of reuse.

If an alternative to newly-milled steel is used, then its properties have to be demonstrated via independent material testing. Unfortunately, some organisations interpret the regulations as meaning only new steel or steel certified to 3.1 mill-produced certification can be used. Clearly this inhibits the use of reused or surplus steel.

Roy said: "We have the capabilities to test the integrity of steel to an even greater level of detail than the standard tests at a steel mill. But the regulations prevent us from issuing the 3.1 certificates that some customers are insisting on having. In effect, the wording of the legislation is holding back the potential for surplus steel to reduce the environmental impact of construction."

Cooperation

Sustainability and construction safety are often dealt with by completely separate bodies of policymakers, typically working in isolation of one another.

"In the UK, DEFRA (the Department for the Environment, Food and Rural Affairs) is responsible for the circular economy and improving sustainability of business," added Roy. "However, MHCLG (the Ministry for Housing, Communities and Local Government) is responsible for regulating

construction projects and construction materials. This duality is commonplace across the EU; so along with legislative changes to enable wider use of surplus steel, we would love to see more joined-up working and cooperation between these bodies."

Commitment

The UK Government alone spent £38 billion on construction in 2016, according to a recent study. The 2016 Trends in UK Public Procurement, published by tender subscription site Tussell Ltd, found that UK public sector spending on construction almost doubled in the second half of 2016, compared to the same period the previous year.

"Across the EU, public sector procurement could play a leading role in the adoption of surplus steel for construction and infrastructure projects," said Roy.

"Government intervention - such as a strong commitment to using surplus steel wherever it is practicable to do so – could have a huge impact in the development of this market."



A study in sustainability

With a 45-year history of supplying surplus steel to the construction sector, Cleveland Steel & Tubes Ltd was embracing the circular economy long before the phrase came into popular use.

Celebrating its 45th anniversary this year, Cleveland Steel & Tubes Ltd has established itself as a leading supplier and stockist of surplus pipes. Its inventory is comprised of tubes recovered predominantly from steel mills and the oil and gas industry. For the most part, the pipes are surplus stock that is produced to a high standard – but never actually used. Cleveland Steel sources this product worldwide, stores it at its 100-acre facility in North Yorkshire, and supplies it to customers worldwide.

Cleveland Steel's core client base is comprised of major civil engineering and construction contractors, who purchase steel pipes for infrastructure and national construction projects. High profile structures that contain steel supplied by Cleveland Steel include the Olympic stadium in London, the roof of Wimbledon Court; and the London Eye. Cleveland Steel's strong export customer base has purchased pipes for projects as far afield as Australia and Hong Kong.

The company holds 70,000 tonnes of pipe at its headquarters, which enables Cleveland Steel to provide very short lead times to its client base, along with highly competitive pricing. If required, Cleveland

Steel can remove any coatings on the pipe and disposes of it responsibly – and can shot-blast the steel if required. It has in-house capabilities for inspection, cutting, welding, shot-blasting and coating.

The company can also provide verification on the structural integrity of every steel tube. Independent UKAS-accredited laboratories analyse the steel's properties, demonstrating it to be as good as newly-milled steel.

Life Cycle Analysis

With the environmental impact of major projects becoming an increasingly high priority for construction contractors, Cleveland Steel recently decided to commission independent research to quantify the carbon savings generated by reusing steel tubes.

The study was carried out by Giraffe Innovation, a consultancy which has worked with major corporations including Dell, Virgin Atlantic Airways, GSK, and Willmott Dixon. The life cycle analysis aimed to identify how 'green' Cleveland Steel's surplus steel was, compared to newly-milled steel. The results took everyone by surprise.

96% Carbon Savings

The experts from Giraffe Innovation found that the greenhouse gas emissions savings were as high as 96% when using surplus steel compared to buying brand new steel. Repurposing existing tubes was also far more environmentally-friendly than sending them back to the steel mill for recycling. The life cycle analysis considered a comprehensive range of factors, including material processing, logistics, and disposal of any generated waste.

The reuse of steel provided by Cleveland Steel means that its 45-year business model is clearly aligned with the key principles of the circular economy. Repurposing steel provides a substantial reduction in the carbon footprint of a core building material – which can help construction contractors to meet their sustainability obligations. It can be incorporated within a BREEAM assessment, which is the world's leading sustainability assessment method for major construction and infrastructure projects.



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Case study: London Olympic Stadium

The UK Government set out ambitious targets to make the London 2012 Olympic Games the 'greenest' games ever. Cleveland Steel & Tubes Ltd helped the Government achieve its objectives.

The Olympic Development Agency (ODA) was charged with delivering the most environmentally-friendly games ever, which included examining all aspects of the construction of the stadia and infrastructure for its carbon impact and sustainability. For example, the ODA mandated that each venue must be constructed of at least 25% recycled materials.

The flagship project for the Games was the 80,000-seat Olympic Stadium in Queen Elizabeth Olympic Park, London, which formed the centrepiece of the 2012 Summer Olympics and Paralympics. It was the venue for the track and field events as well as both the opening and closing ceremonies.

Watson Steel is part of Severfield plc, the UK's market-leading structural steel company. Watson Steel was contracted to construct the roof of the Olympic Stadium, which required 3,850 tonnes of steel. The contractor was concerned at the long lead times for the newly-milled steel required for this project, so it proposed the use of surplus steel to the Olympic Development Agency (ODA). The ODA approved the usage of surplus steel, based on its much lower carbon footprint.

Watson Steel turned to Cleveland Steel & Tubes Ltd, the UK's leading supplier of surplus steel, to meet its requirements. In total, Cleveland Steel supplied 2,500 tonnes of surplus steel for the stadium roof trusses, representing 65% of the steel used in the roof and 20% of the total steel used in the entire stadium.

Cleveland Steel commissioned extensive testing to demonstrate to Watson Steel that the steel tube exceeded the required grade. Cleveland Steel's early involvement in the design stages of this flagship project enabled the stadium to be completed ahead of schedule and below budget, while also helping to significantly reduce the structure's carbon footprint.

An audit was conducted after the Olympics by the independent Commission for a Sustainable London 2012, and it declared that London 2012 was indeed the greenest Olympics ever. It highlighted the Olympic Stadium as an example of this success.

In 2013, the venue was repurposed as a 60,000 capacity football and athletics stadium; it reopened in 2016 as the home of English Premier League club West Ham United. This, after all, is another great example of reuse.

The Olympic Stadium in numbers

- **80,000** seat flagship venue for 2012 Olympics
- **3,850** tonnes of steel used in its construction
- **2,500** tonnes of surplus steel supplied by Cleveland Steel
- **65%** of the steel in the roof is surplus steel
- **20%** of the steel in the entire stadium is surplus steel



Sustainability in practice

What sort of carbon and cost savings can you make through reuse, when constructing a new warehouse? Roy Fishwick, Managing Director of Cleveland Steel & Tubes Ltd, decided to find out.

Cleveland Steel & Tubes is part of the Bianco Group of companies, which also includes National Tube Stockholders (NTS). The two businesses are located on the same industrial park in Dalton, North Yorkshire.

Due to its continued expansion, NTS required a new warehouse, and contracted Cleveland Steel to deliver it. Roy Fishwick, Managing Director of Cleveland Steel, decided to use this as an opportunity to explore the cost and carbon savings achievable through reuse.

Steel Frame

Roy utilised steel from a cancelled construction project for the portal frame of the warehouse, which he sourced from a third party supplier on the same industrial estate. This meant that the steel travelled less than one mile from stockist to site, reducing transport costs and emissions. The 500-tonne steel structure would have cost circa £750,000 if bought as new. After modifications, the total costs for the steel frame came to approximately £450,000, representing a £300,000 saving.

The NTS warehouse in numbers

- **£650,000** saved in construction costs
- **51,000 miles** of HGV transport eliminated
- **12,000 tonnes** of soil donated to local farmers
- **20,000 tonnes** of road planings used for foundations

Combined with the 96% reduction in emissions achieved through reuse, this project demonstrated that even basic structures such as warehouses can be built at a lower commercial cost and significantly lower environmental cost. The design of the warehouse means that the steel portal frame can be recycled at the end of the building's life, further enhancing the environmental benefits delivered.

Flood Defences

The 12,000 tonnes of soil displaced during the groundworks would typically have been hauled off for reuse. Instead, Roy donated the top soil for free to local farmers all based within two miles of the site. The farmers used the soil for ground improvement and for building flood defences.

Based on pricing from the nearest available location of the nearest soil removal contractor, this represented a saving of more than £10 per tonne, equating to almost £150,000. In addition, each round trip by the soil removal contractor would have been 60 miles. With approximately 700 loads required to remove all the soil, this project therefore saved 42,000 miles of HGV emissions by donating the soil to local farmers.

It also benefited the local community. Dalton lies within a flood plain and is regularly blighted by flooding, so improving flood defences could play a major role in protecting the farmers' livelihoods, as well as avoiding flood damage to agricultural and commercial land.

Further Savings

Instead of using quarried stone for the building's foundations, Roy procured 20,000 tonnes of road planings generated by a nearby upgrade to a motorway. In this way the company reused an old road surface, which was removed before the road was resurfaced.

Using this aggregate from a local supplier reduced the carbon emissions associated with both excavating and transporting quarried stone, saving approximately 9,000 miles compared to using stone from the nearest quarry. It also delivered a cost saving of £10 per tonne, or £200,000.



Small changes can make big gains

The culture of sustainability is embedded in Cleveland Steel & Tubes Ltd. Roy Fishwick explains how the company is leading the campaign to grow reuse of steel in the construction sector.

Sustainability is embedded in Cleveland Steel's culture. Along with campaigning to highlight the environmental benefits of surplus steel, other company initiatives include incorporating electric cars into its corporate fleet and investing in the preservation of local woodland.

Cleveland Steel is also a member of the Association of Sustainable Building Products, UK Green Building Council, Supply Chain Sustainability School; and the British Constructional Steelworks Association. Through active participation within these prestigious bodies, Cleveland Steel is raising awareness of the benefits of surplus steel – but it acknowledges more must be done.

"For some companies, joining trade associations and industry bodies is about ticking a box," said Roy Fishwick. "However, we very much believe that you get out what you put in. Our philosophy is one of cooperation. By working more closely together, we have a much better chance of delivering solutions to the challenges facing our industry."

This commitment to sustainability was put into practice when Cleveland Steel was contracted to construct a new warehouse for its sister company, National Tube Stockholders (see page 6).

The project delivered substantial cost and carbon savings through reuse of steel for the structure's frame, repurposing an old road surface for the foundations; and reusing top soil excavated from the site.

"By its nature, innovation requires risk," added Roy. "We had to take some risks in order to demonstrate that reuse of steel – along with the other measures such as the road planings and top soil – could deliver warehouse construction in a much more cost-effective and sustainable way."

The almost unique experience and expertise of Cleveland Steel proved invaluable in making the project a success. "When reusing steel, you need both a deep understanding of the product and the capability to carry out modifications," said Roy. "You also need to be able to guide some customers through the legislation around reuse of steel. We have all of that in-house capability and experience in helping contractors to generate cost and carbon savings through repurposed steel."

While the warehouse project highlighted how this approach to sustainability can deliver substantial cost savings, there is still much more to be done to encourage reuse of steel.

"There remains a lack of clarity in our legislation around the reuse of steel," Roy said. "Having gone through the project management process, I now have an even better understanding of how that lack of clarity can put off risk-averse purchasing managers and specifiers from using surplus steel."

"The legislation should be encouraging reuse, not hampering its growth. Governments have a key role to play here in developing legislation that clearly supports reuse, as well as stimulating the marketing by mandating contractors to use as much surplus steel as possible for major public projects."



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