



In between **strength** and **beauty**

Steel is a thing of beauty, says **Barbara Rossi***, with its striking lines that don't overwhelm the landscape, but work with its inclines and slopes. It is also, in her eyes, deeply undervalued in terms of its potential to transform domestic industry, and help, rather than hinder, urgent decarbonization targets. Having recently spoken to the British parliament, submitting evidence on the irreplaceability and recyclability of the material, Rossi is politicizing the fight for funding research, and an increased public conscience of a material used and seen every day, but often misrepresented. By **Catherine Hill****

"I'M terrible at making coffee", Rossi is telling me, as she apologetically pours milk into a three quarters full cup, "I hope this is okay". I assure her it is, and we take a seat in two nearby velvet armchairs, in an

intimate room covered in wooden paneling, and chequered jacketed professors.

For someone who feels so underconfident in making hot drinks, her skills and knowledge in other reactive processes is

defining. Prior to being appointed as a tenure-track associate professor at the University of Oxford in 2019, she was an associate professor at KU Leuven in Belgium, and now runs the Sustainable

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Metal Structures Research Group at the University of Oxford, which conducts experiments on structures to perform ‘fundamental and applied research’. It is a striking combination on intense academic research, and sheer physical graft.

Once our coffees have settled into a drinkable temperature, I begin by asking what drew her to steel, and she tells me; ‘there is a history behind steel. I’m from Belgium, my grandfather was a coal miner... Belgium, just like the UK, has a long history of steelmaking and coal making, which has inevitably declined... I also come from a city where coal and steelmaking was very much present.’

Rossi studied under Professor René Maquoi of Belgium University – who received among other awards, the Charles

Massonnet Award from the European Convention for Construction Steelwork, the Gold Medal Gustave Trassenster, and the Medal of the Institute for Theoretical and Applied Mechanics from the Czech Academy of Sciences. I look impressed – and I am.

I ask if she has always been passionate about steel. She nods vigorously. ‘It’s impossible not to be passionate about steel’, she says, ‘when you look at structures that have been built, like Norman Foster’s viaduct of Millau’.

‘I won’t even use the word beautiful, because the word is subjective... but most of these bridges which do not disrupt the landscape too much... they look like pencil lines – and they could only be made with high strength materials like steel.’

As René Maquoi did in the past, she wants to leave a ‘footprint’ in the mind of her students and inspire them to use more steel as civil engineers.

I ask her what challenges this footprint requires, if there are perhaps misconceptions about steel.

‘There isn’t a misconception, there are just wrong messages. Some messages say concrete is 100% recyclable, and steel is not easily recyclable – it’s greenwashing – a certain way of describing materials that is misleading and inaccurate.

‘The lobby of the cement industry is a powerful one – the steel industry is fairer; they tend to want to support their own industry without saying anything inaccurate about other materials which I respect very much. But in the current context, I find it rather important to communicate more about this material even if that means to be sending negative messages about concrete’.

She pauses for a moment, as if she is catching a breath.

She tells me another big issue steel faces is that the industry is ‘slower’; ‘[the steel industry] is not responding as quickly to today’s society challenges. If you look at SSAB for instance; when they announced they were going to produce fossil-free steel a few years ago, they were laughed at. The industry regarded it as money thrown out of the window. And they were wrong, this is now the biggest change in steel production in over 100 years. Sweden is revolutionizing the industry and everybody else is just late.’

Some would call a lack of pace a sign of passivity, but Rossi disagrees, saying

that it is ‘not that they’re not open to change; it is just a complicated industry facing enormous technical and financial challenges.’

There is a small pause, I sense she has more to say on this note, and I am proved right – as she continues; ‘In the UK, there is also,’ Rossi tells me, a ‘national nostalgia’ that exists – the ‘greatness of the UK’s history is printed in its citizens’ hearts, and the steel industry is included in that.’

And so we move on to the topic of UK steel, which is frequently in domestic headlines, and more than often sandwiched between adjectives like ‘dying’, ‘ailing’ and ‘in decline’. In a quick internet search, the portrait that is painted is one of an industry that was once paramount to the British economy and is now struggling to survive.

‘The UK is facing huge competition’, Rossi says, ‘but in this race against the largest steel producers, we tend to forget our own strengths, that we produce enormous quantities of high value scrap, but what is happening here is incredible because more than 2/3 of it is exported! I see that as grains of gold slipping through our hands.’

I make a note on my laptop, writing ‘angry’, because that is how she sounds – in this moment, or perhaps it is more complex than that. Anger doesn’t often stew as long as she has had to live with the knowledge that the UK is doing things very (obviously) wrong. It is a keen frustration at the solution being in graspable reach, but repeatedly being overlooked.

‘With all the scrap we produce each year,’ Rossi tells me, ‘and knowing that there will not be a shortage in the future, we could build a more sustainable industry. In the US, more than 50% [of steel production] is based on EAFs fed on domestic scrap; they don’t export scrap, they guard it jealously. We should look at the US as a terrific example!’

The potential – and opportunity – is still there, according to Rossi, ‘but we [the UK] should catch the train now’.

‘We should,’ she says, ‘stop leaking scrap, make strategic acquisitions to secure supplies, increasing our efforts to have better control of contaminants. Steel is truly indefinitely recyclable. There is no other material that better fits a sustainable circular economy.’

‘The life cycle of steel is 40 years on average – concrete is at its maximum down-cyclable. That is not as strong as

the original product made from virgin materials” she tells me. “If you ask someone in the street if steel is recyclable they will say yes, we know we never throw it in the bin!”

This is a message Rossi desperately wants to spread. “This should be pink flashing on websites!”, she exclaims, as she frenziedly clenches and unclenches her fists, mimicking flickering lights.

“It should be the message.”

Is she hopeful about passing this message on?

important aspect; the bottom line for the construction sector is how we reduce material consumption to its bare minimum and guarantee environmentally friendly production means.”

The conversation shifts to UK politics, and their effect on the industry.

“Tax-payer money is not being used strategically with regards to the steel industry”, Rossi says, shaking her head emphatically. “We should use that money to help build a better [steel] industry rather

but sometimes it’s important to take a step back and think, what have we achieved so far and how can we further support smaller research increments towards more tangible solutions with greater and faster impact?

It does sound less exciting, I’ll give you that, and I suspect that’s why government funding isn’t actively supporting my research” she smiles.

Before things began to take the same melancholic turn as an Ingmar Bergman movie, I ask Rossi about her current projects. She tells me she is looking into ‘new production methods and new design formulae for highly sophisticated steel structures.’ “There are”, she says, “a number of essential problems – such as fatigue in hybrid structures – that need to be solved. That is where research is needed for the moment, we need to know the technical constraints of certain materials and manufacturing processes to be able to employ them to make structures more sustainable.

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I ask Rossi to summarize steel in three words, and symbolically of her passion for the material, she proceeds to say four, six, nine, and I begin to lose count.

She then manages to transform my somewhat pithy question into a more powerful statement, saying that steel is ‘both old and new’ - “a future without steel is...”, she pauses, grasping into her memory for the suitable turn of phrase. “Vouer à l’échec.” There’s a sense of a different language, not French, nor English – but of the industry itself – it’s only when she breaks off into smaller talk, that her vocabulary falters, and she has to search for a word. Within the language of steel, she is perfectly versed.

She smiles, trying to find the English equivalent.

After a moment, she resurfaces, and tells me it means ‘doomed to fail’, or more literally, ‘dedicated to lose.’ I tell her I prefer the second definition, in my mind, it takes away less culpability that from what Rossi has been saying for the last hour, is a salvageable set of conditions. If we are ‘doomed to fail’, the failure is already set – but if we are ‘dedicated to lose’, the enterprise exists – it simply needs to be redirected to fight for a world that advocates both for its industry, and its own life. ■



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“Sustainability and climate change is an important part of our educational offer, and that did not come from us”, she says, “it’s a community demand, birthed from the teachers and students.

“The younger generation...”, she pauses, perhaps reflecting on students she may even be lecturing after our interview, “we don’t have to teach them about sustainability, its already there – they tell us! They already know, and they see themselves in that larger context.

“Whatever the subject, this is the

than keep this war horse from the industrial age at all costs.”

In her eyes, it is a case of stratifying the sentiment into actionable solutions; better placed funding, greater dialogue between government and industry, and overall, a recognition of the power the steel industry holds in building a sustainable future.

There is a small pause, as she looks down briefly, and then continues; “what I regret, sometimes, is the way our government is funding research... we tend to want to fund innovations, fundamental innovation,