RBC Capital Markets

Steel and Sustainability

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Author of “Steel 2050; how steel transformed the world and now must transform itself”

With acknowledgement to Prof Allwood for numbers.

Sustainability is Simple

- What do we use?
- Do we have enough?
- How can we be more efficient?
- How to reduce or mitigate undesirable by-products?

Steel is 'Sexy'

- Cheap
- Ubiquitous
- Versatile
- Not a commodity: an engineered product
- Replete with development potential
- Hard to displace
- Infinitely recyclable

Useful approximate numbers for making estimates about the key materials

Material	Global annual production (Mt)	Energy intensity (GJ/t)	Carbon intensity (tCO2/t
Cement	2,800	5	1
Steel	1,400	35	3
Plastic	230	80	3
Paper	390	20	1
Aluminium	70	170	10

On simple measures Cement is best but not in recyclability and flexibility of use

Global yield losses in steel and aluminium production

Process		Steel		Aluminium
	Output (Mt)	Yield Loss	Output (Mt)	Yield Loss
Liquid Metal	1400		76	
Forming	1280	9%	54	28%
Fabrication	1040	18%	45	18%
Overall		26%		41%

Steel is the best metal for sustainability and yield

Estimated Weight savings for case study products

	Global demand (Mt)	Potential savings (Mt)	
Beams	49	8-21	20-50%
Line	25	3-8	10-30%
Pipe			
Car	48	10-20	20-40%
Body			
Rebar	170	51	30%
Food	8	2	30%
Cans			

But steel has still a way to go to achieve its potential

"X is essential to the modern world and the use of X is critical in enabling man to move towards a more sustainable future. X is fundamental in a greener world…."

"Y is key to improving global living standards and developing a better and more sustainable world environment."

"Even fewer people are aware of the many environmental benefits that using brings … with its strength, durability and excellent thermal mass, should be a key component in eco-buildings of today and the future."

"V make an immense contribution to the environmental sustainability through their energy saving potential and intrinsic recyclability and energy recovery options."

"W is a sustainable choice and ,if we only want to reduce paper consumption per se, the question is "what will we replace it with. If we need to consider the most sustainable solution, from an energy efficiency point of view as well as from the sustainability of the raw material, then normally the answer is W. "

A Final Thought

"Industrialisation is not the problem… it is the answer"

Steel's breakthrough imperatives are: near net shape casting and powder