

# CAN MATERIAL PASSPORTS LOWER FINANCIAL BARRIERS FOR STRUCTURAL STEEL RE-USE?

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# Material Passports

## What is it?

Sets of data describing defined characteristics of materials in (building) products that give them value for recovery and reuse.

## Target user groups?

Diverse groups along the value chain

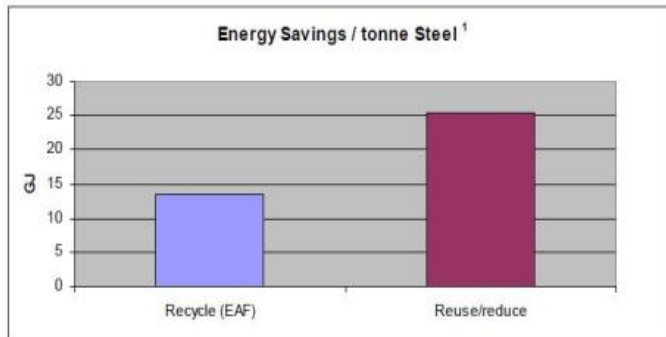
But how much does the data worth, and which user groups may be willing to pay for it?

→ business case study: Structural steel re-use



# Structural steel re-use sounds very logical

## Reduce & Reuse Vs Recycle



It's better for the environment

Source: The Crucible Group - A lifecycle perspective in steel building materials. April 2011 - Comparison with Basic Oxygen Furnace

BedZED  
London



It's technically feasible



And it can be economically attractive

Source: Cullen & Drewniok, Univ. Cambridge (2016)

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# But it's not happening yet...

Less than 10% gets re-used, and rates are falling

Year	Author	Reuse	Recycle	Landfill	Note
2001	Steel Construction Institute	12%	93%	5%	Heavy sections
2006	Gorgolewski <i>et al.</i>	10%	90%	nil	Sections, Canada
2012	EUROFER	7%	96%	2%	Heavy sections

Source: Cullen & Drewniak, Univ. Cambridge (2016)

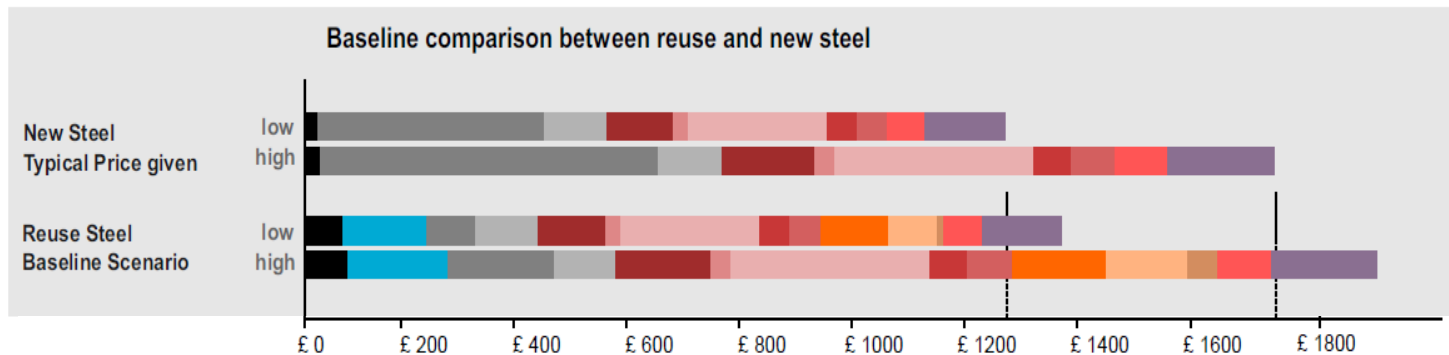


# Why?

AMONG MANY REASONS...



RE-USE IS OFTEN MORE EXPENSIVE THAN NEW!



Sources: Dunant et.al. (2018) ; Tingley, Cooper & Cullen (2017)

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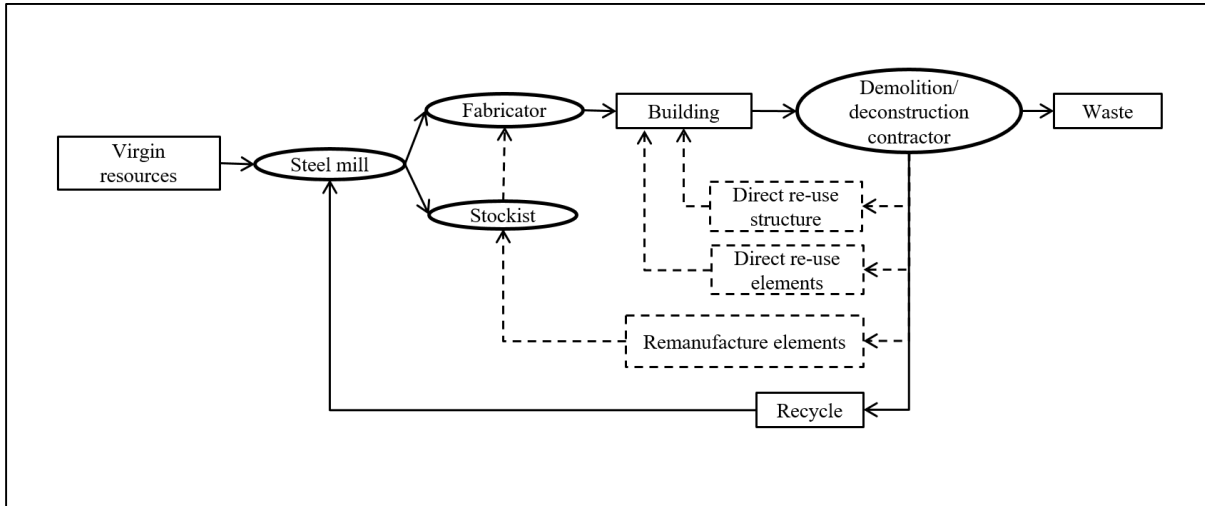
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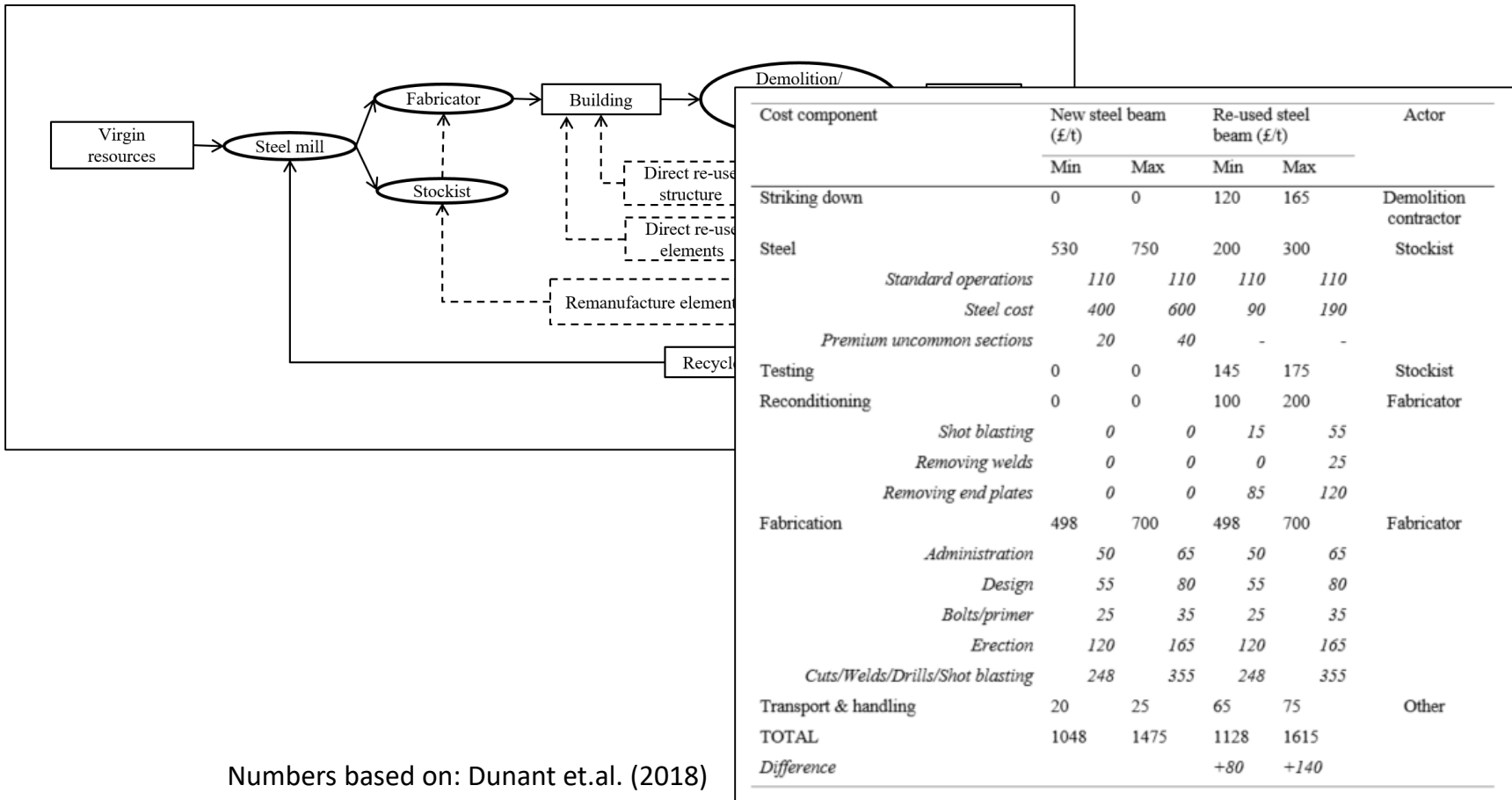
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... by making the right data available?



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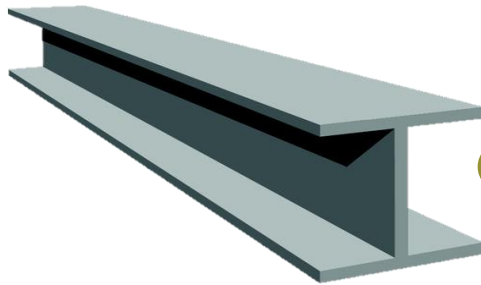
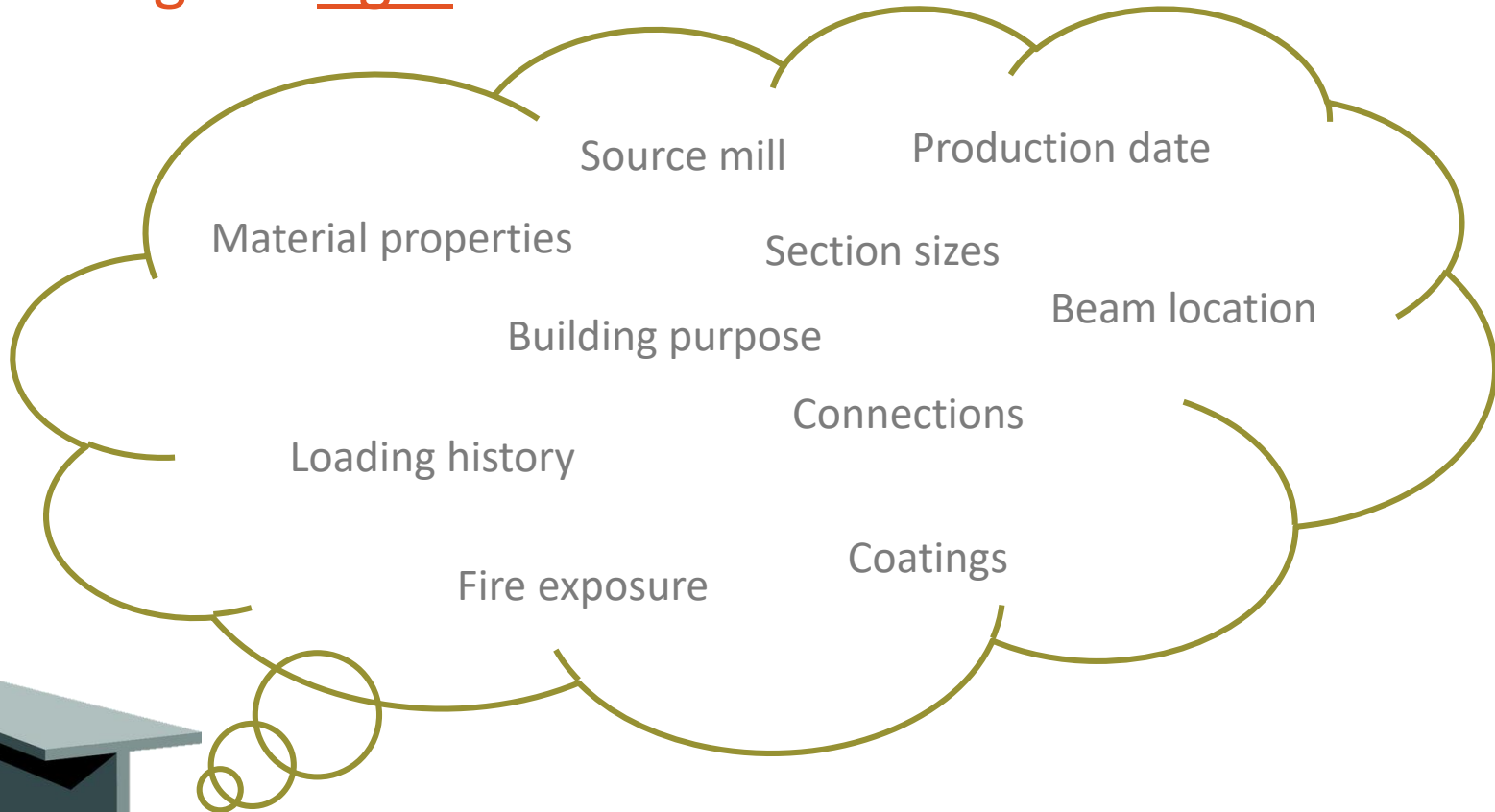


Numbers based on: Dunant et.al. (2018)



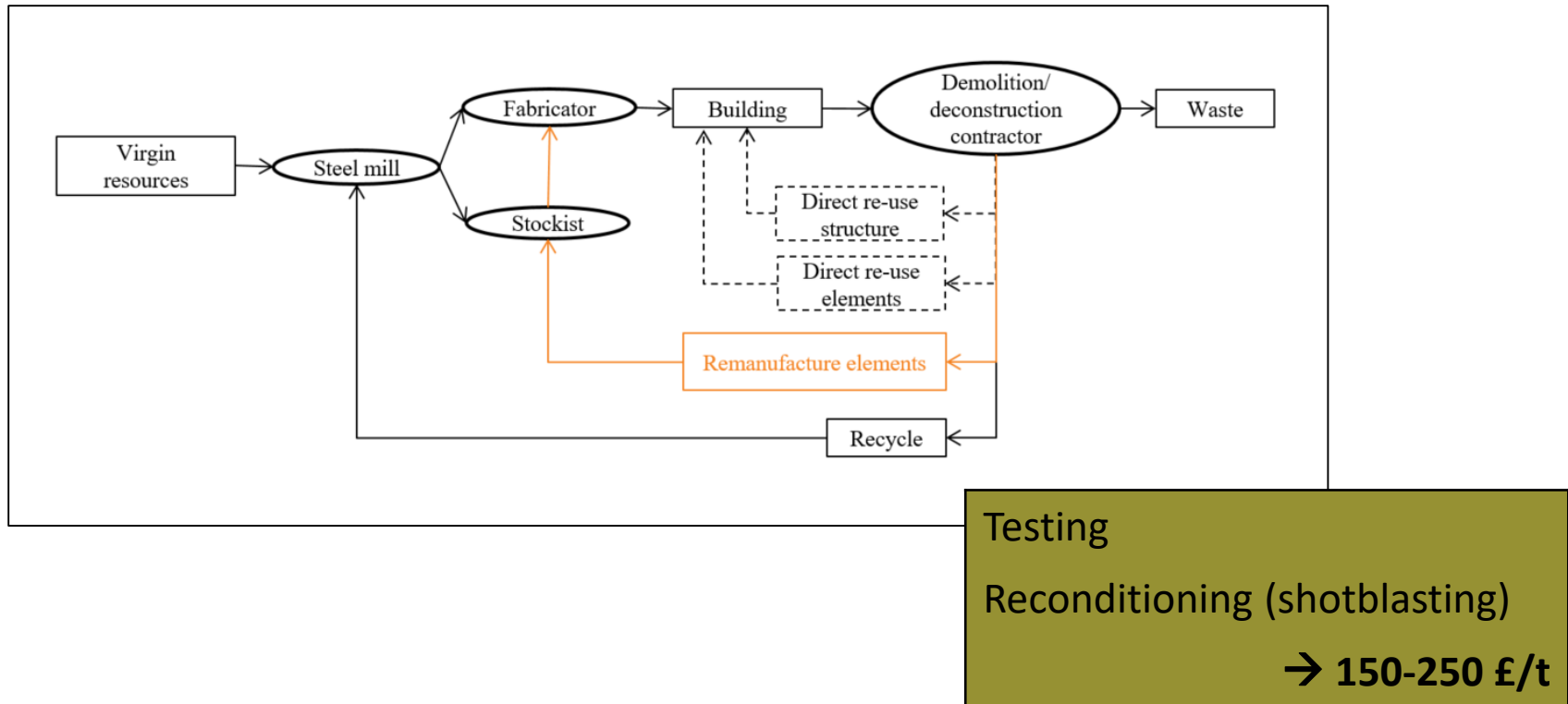
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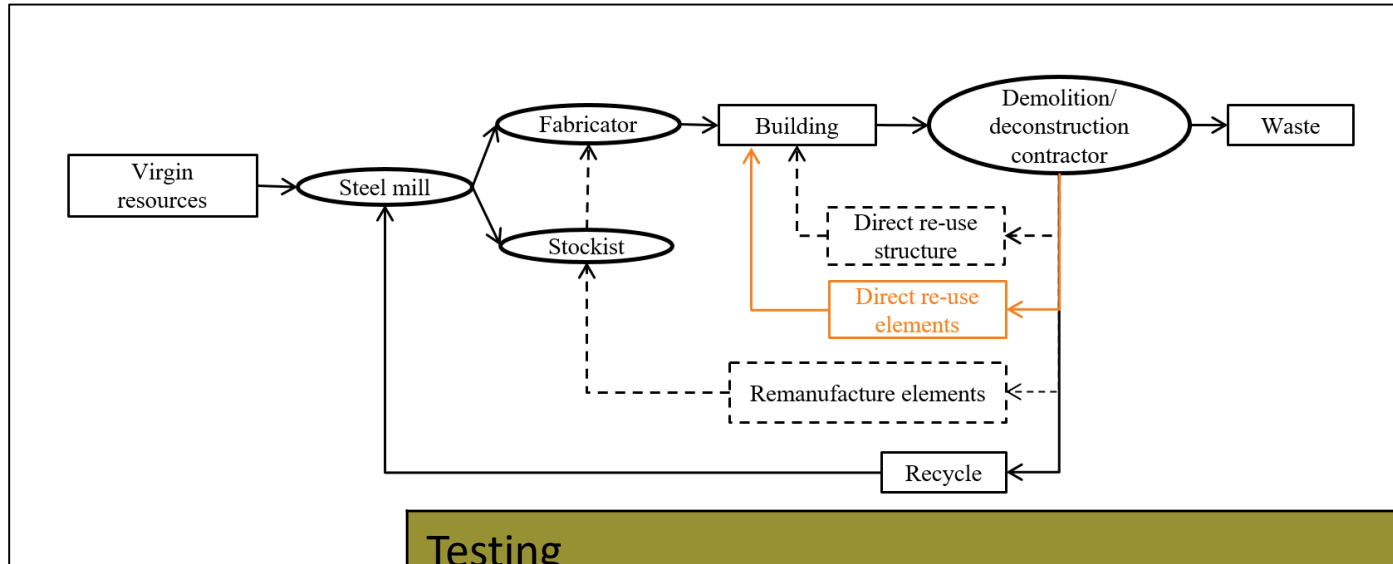
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## Testing

Reconditioning (shotblasting, removing welds and end plates)

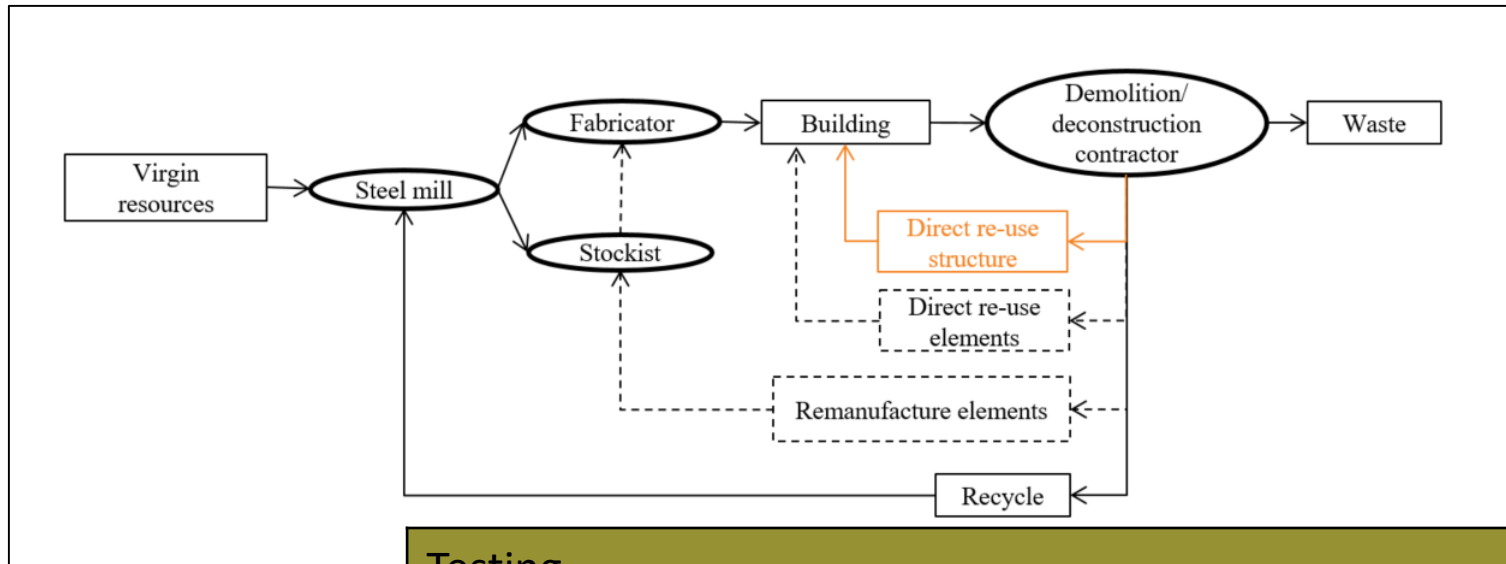
Fabrication (bolts/primer, cuts/welds/drills/shot blasting)

→ Up to 800 £/t

Numbers based on: Dunant et.al. (2018)

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... by making the right data available?



Testing  
 Reconditioning (shotblasting, removing welds and end plates)  
 Fabrication (bolts/primer, erection, cuts/welds/drills/shot blasting)  
**→ Up to 1,000 £/t**

Numbers based on: Dunant et.al. (2018)



# Can we make it cheaper and easier...

... by making the right data available?

Use case	Customer group	Value proposition of data	Added value
Direct re-use of structures	General contractors	Sourcing advantage	Up to 1000 £/tonne
Direct re-use of elements	Fabricators	<ol style="list-style-type: none"> <li>Sourcing advantage</li> <li>Cost reductions (lower testing and reconditioning costs enabled by technical/usage data)</li> </ol>	Up to 800 £/tonne
Remanufacturing (re-fabrication)	Stockists	Cost reductions (lower testing and reconditioning costs enabled by technical/usage data)	150 -250 £/tonne

**Material Passports can help to lower financial barriers of structural steel re-use**

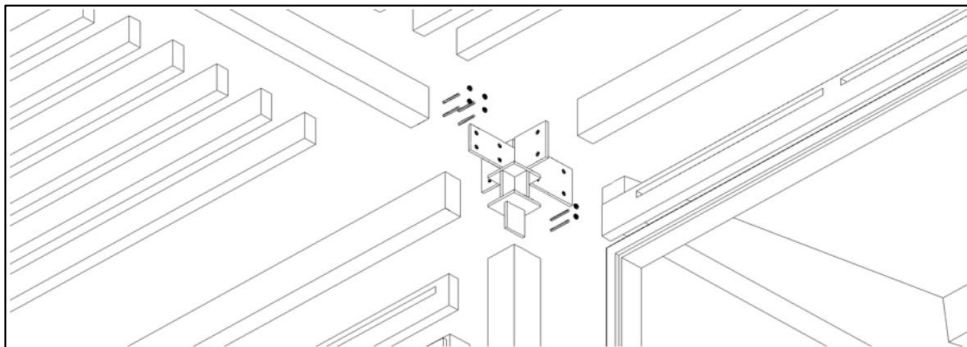
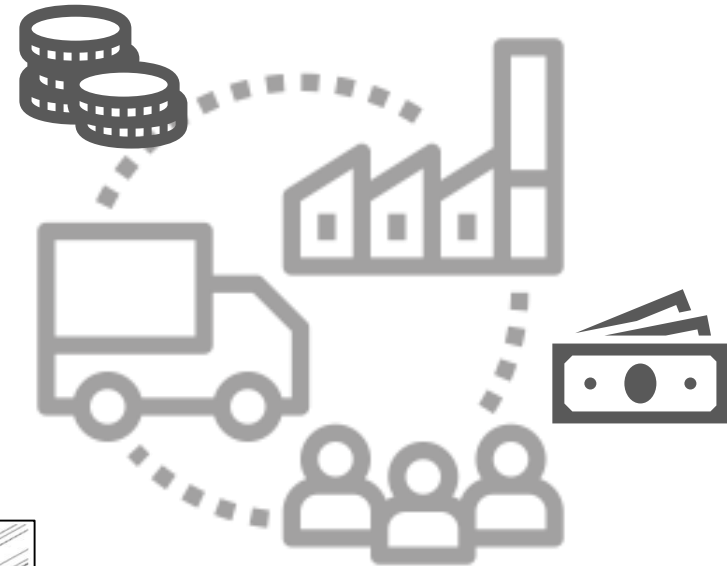


# Data alone may not be sufficient

Stronger business case if...

Value redistribution across  
the value chain

Shorter value chain/vertical integration



Standardization of dimensions and  
reversible design

# Thank you!

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