



Overview of the REDUCE project

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REDUCE project

REDUCE

- Reuse and Demountability using Steel Structures and the Circular Economy
- Duration: 42 months (July 2016 to December 2019)
- To provide practical tools and steel-based technologies to be able to design steel and **composite structures** for deconstruction and reuse

Why?

- Need to move from linear to circular economic models
- Retain the benefits of composite construction

REDUCE partners



Scope of REDUCE

- Design and testing of composite beams using demountable shear connection systems
- Design and testing of adaptable connections
- Quantification of benefits of reusable steel structures – LCA and CE indicators
- Standardisation and use of BIM
- Large-scale demonstration (car park)
- Guidance on design for deconstruction and reuse

Composite construction

Benefits:

- Efficient use of materials
- Lightweight
- Speed
- Cost effective



Through-deck welding



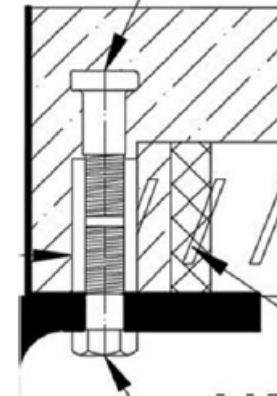
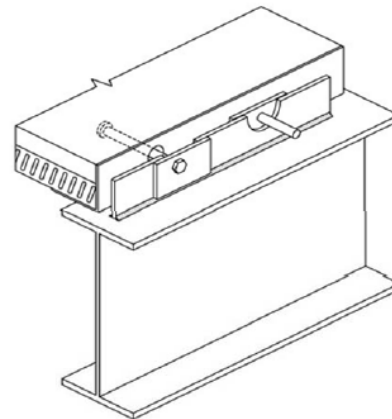
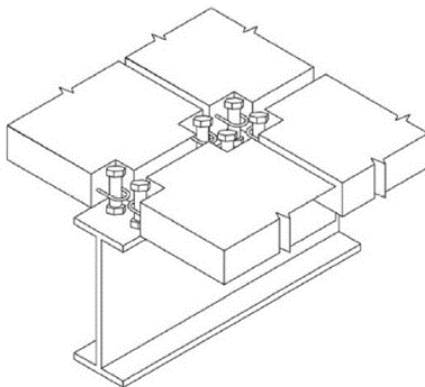
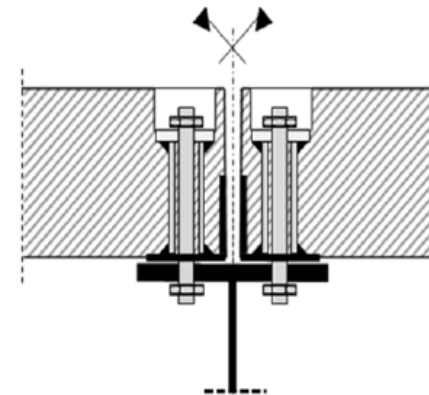
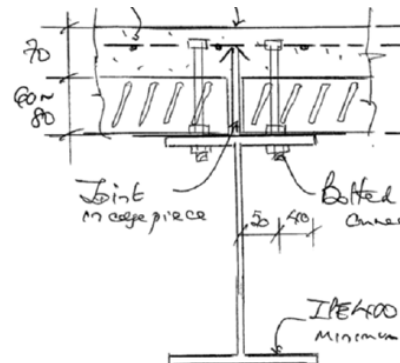
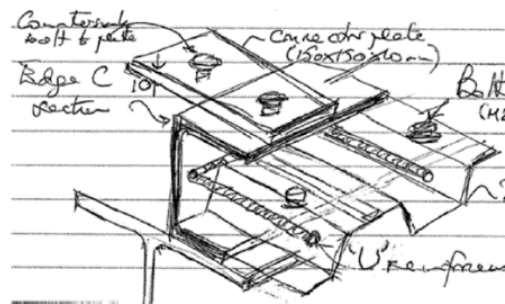
Fast and resource efficient but
difficult to deconstruct

Testing

- Push-tests
- Beam tests



Demountable shear connection systems

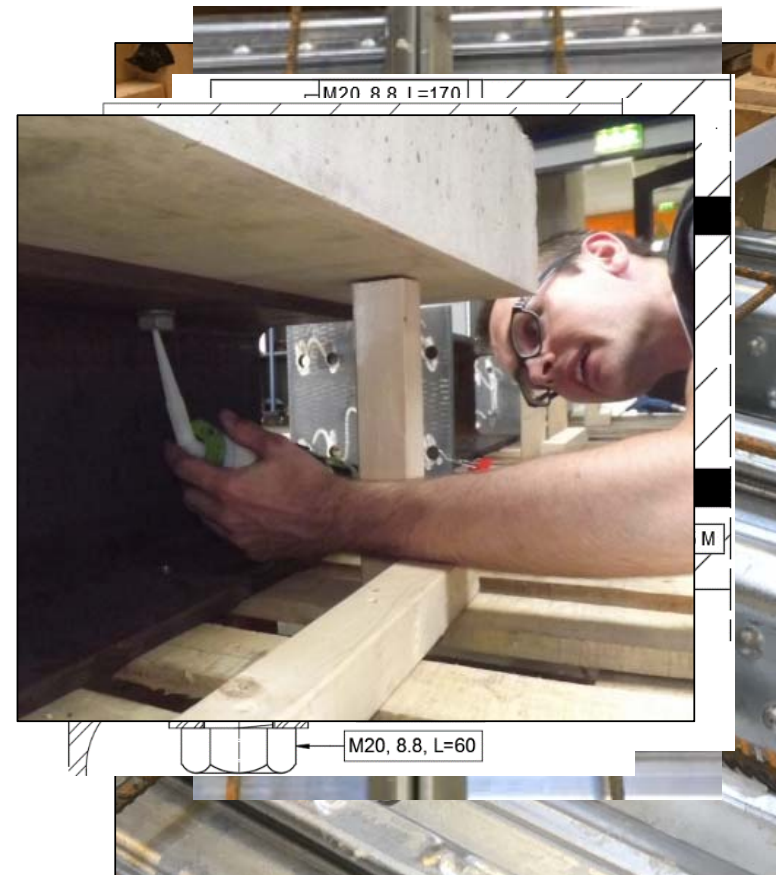


Demountable connector systems

- Precast and decking systems

Including:

- Decking with bolted connectors
- Precast slab with friction bolts in cylinders
- Decking/precast with embedded coupler

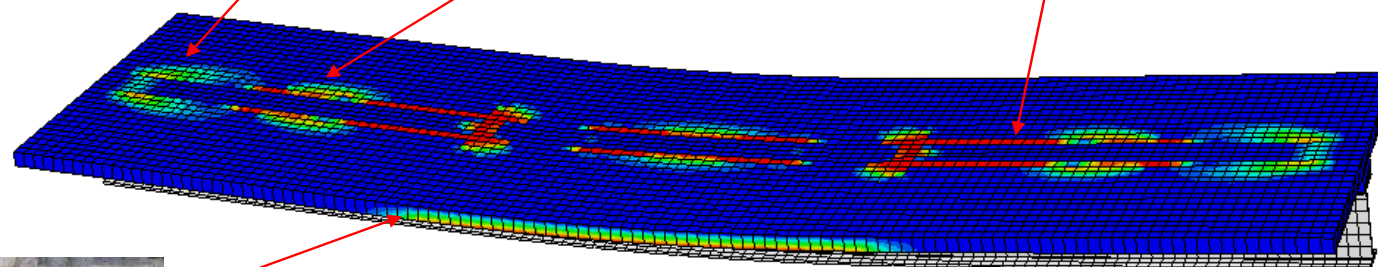
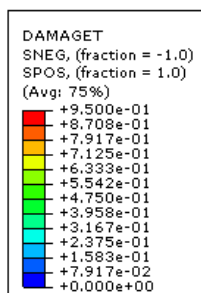


FE Analysis of test results

Cracks at the shear connectors



Longitudinal cracks



Demonstration – car park structure



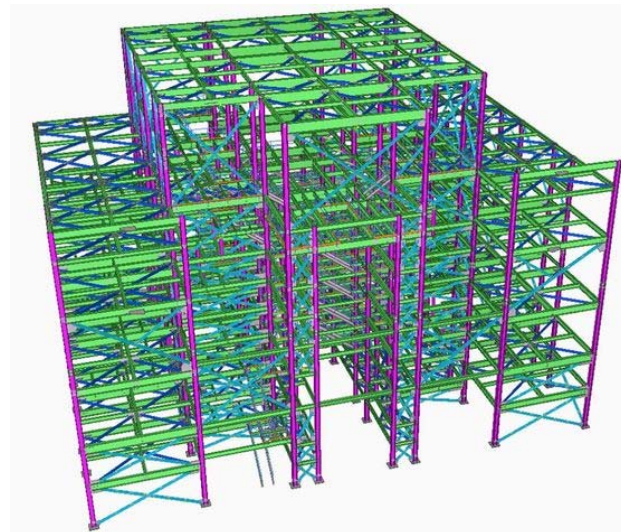
Demountable connections

- Block connector
 - University of Bradford
- Slotted connector
 - University of Luxembourg



BIM and LCA

- The role of BIM in supporting steel reuse
- Life cycle assessment of structural steel reuse



REDUCE presentations



- | | |
|-------------|--|
| 14.10-14.30 | <u>Demountable and reusable composite floor systems</u>
<i>Prof Mark Lawson, University of Surrey and SCI</i> |
| 14.30-14.45 | <u>Economic and environmental assessment of demountable composite beams</u>
<i>Jan-Pieter den Hollander, Bouwen met Staal, NL</i> |
| 14.45-15.05 | <u>Demountable car parks</u>
<i>Prof Milan Veljkovic, Delft University of Technology, NL</i> |
| 15.15-15.35 | <u>Demountable composite precast systems</u>
<i>Prof Christoph Odenbreit and Andras Kozma, University of Luxembourg</i> |
| 15.35-15.50 | <u>The role of BIM in supporting steel reuse</u>
<i>Nicholas Nisbet, AEC3, UK</i> |
| 15.50-16.10 | <u>Demountable steel connections</u>
<i>Prof Dennis Lam, University of Bradford, UK and Prof Christoph Odenbreit, University of Luxembourg</i> |
| 16.10-16.20 | Q&A and discussion |

And finally.....



16.20-16.40

[Overview of the EPSRC REUSE project](#)
Prof Dennis Lam, University of Bradford



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