mcavoy
Smart Offsite®

SEISMIC

Standardisation of School Components

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Offsite construction for a smarter tomorrow
mcavoygroup.com

Introduction

- The McAvoy Group
- SEISMIC Project
- Achievements of SEISMIC
- Next steps for SEISMIC

The McAvoy Group

- One of the UK's **leading offsite specialists**
- Independent, family-owned business
- Established **Principal Contractor**
- **Delivering high quality buildings** for education, healthcare, commercial, infrastructure and residential
- **Harnessing digital technology** to streamline processes and further improve the quality and efficiency of buildings

Smart facts

Winner of RICS Award for Best Virtual Reality BIM

Smart facts

Delivering bespoke offsite solutions for 50 years

Smart facts

BIM & VR – a vital part of our business

Smart facts

1st offsite specialist to achieve BIM Level 2 accreditation

Smart facts

Winner of BIM Contractor of the Year 2019

Smart facts

2 purpose-built offsite manufacturing centres spanning 150,000sq.ft

Homes England HQ, Northstowe

Client: Homes England

Size: 634m² 2-storey

Type: Office

Programme: 28 weeks on site

Northumbria Specialist Emergency Care Hospital

Client: Northumbria Healthcare NHS Foundation Trust

Size: 6,500m² 3-storey

Type: Hospital

Programme: 52 weeks

Lynch Hill Enterprise Academy

Client: Department for Education

Size: 8,759m²

Type: 1140-place academy

Programme: 53 weeks

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INDUSTRIAL STRATEGY | UK Research and Innovation

Standardisation of School Components

Bryden Wood

blacc

elliott® An ALGECO Company

mcavoy Smart Offsite®

mtc Manufacturing Technology Centre

WHO ARE SEISMIC?

Innovate UK

Bryden Wood

Technology & Digital Partner
Bryden Wood

blacc

Project Leadership & Integration
Blacc Ltd.

mtc
Manufacturing Technology Centre

Research & Technology Organisation
MTC

elliott®

An **ALGECO** Company
MMC Industrial Partner
Elliott OSS

mcavoy
Smart Offsite®

MMC Industrial Partner
The McAvoy Group

Department for Education

Client Contribution Advisor
DfE

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WHY SEISMIC?

What was the intention?

- Create … a collaborative environment with key players in MMC methods
- Create … a solution that has a ‘universal connector’ & ‘grid size’ which enables interconnectivity between different key players solutions
- Create… a supply chain which, through scale enables, optimum cost, increased speed & quality, and reduction in carbon emissions to be achieved
- Create… A digital tool (configurator) to enable rapid compliant design concepts
- Create… the start of a journey

WHY SEISMIC?

Benefits to be realised?

- Reduce cost
- Increase the speed and production
- Widen the market & make it easy for new market entrants for MMC
- Make manufacture & install easier, faster, better, safer
- Streamline the feasibility process

WHY SEISMIC PROJECT?

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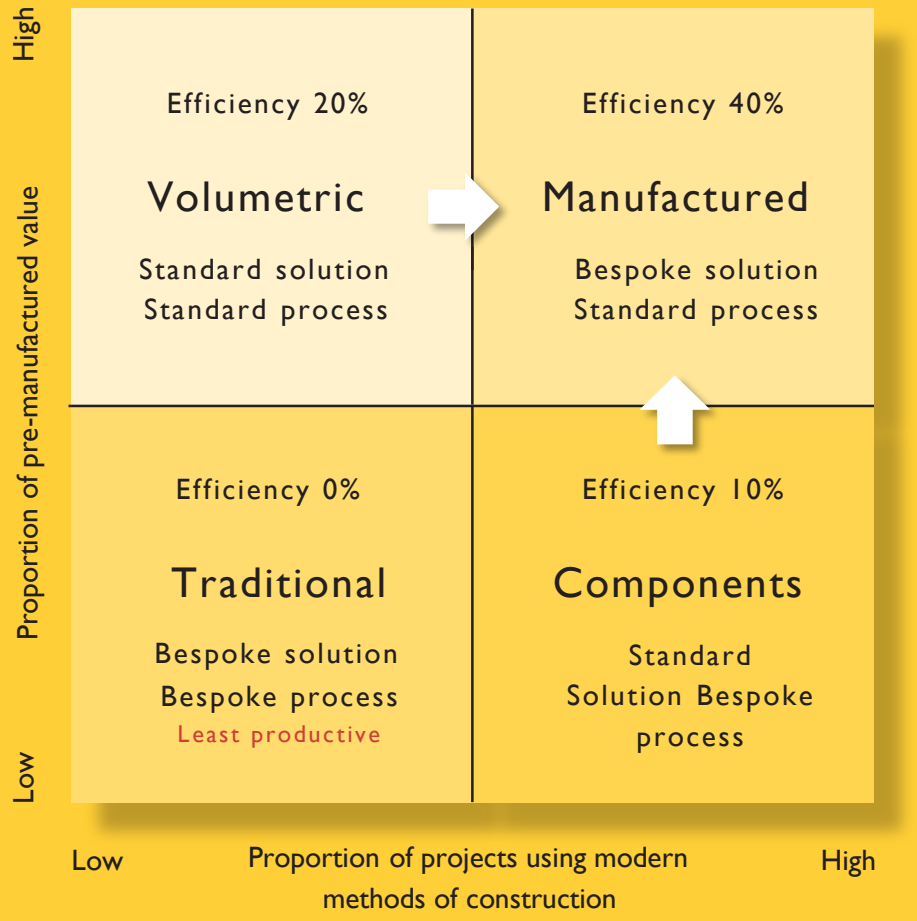
WHAT IS THE SEISMIC PROJECT?

- Budget 2017 announced that 5 government departments adopting presumption in favour of offsite by 2019
  - Linked with ambitions of the Construction Sector Deal
- Skills:
  - Different blend
  - Different amount
  - Different location



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A STANDARD PLATFORM FOR INDUSTRY

Component

Shipping container

Standardised, repeatable and interoperable, can be mass manufactured by a range of suppliers.

Platform

Global freight infrastructure

Can be physical or digital, allows components to be combined in a number of different ways.

Product

Low cost, reliable global trade + supply chains

Bespoke end product that meets user needs and takes advantage of economies and efficiencies of scale.

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03. WHAT?

a) The Frame

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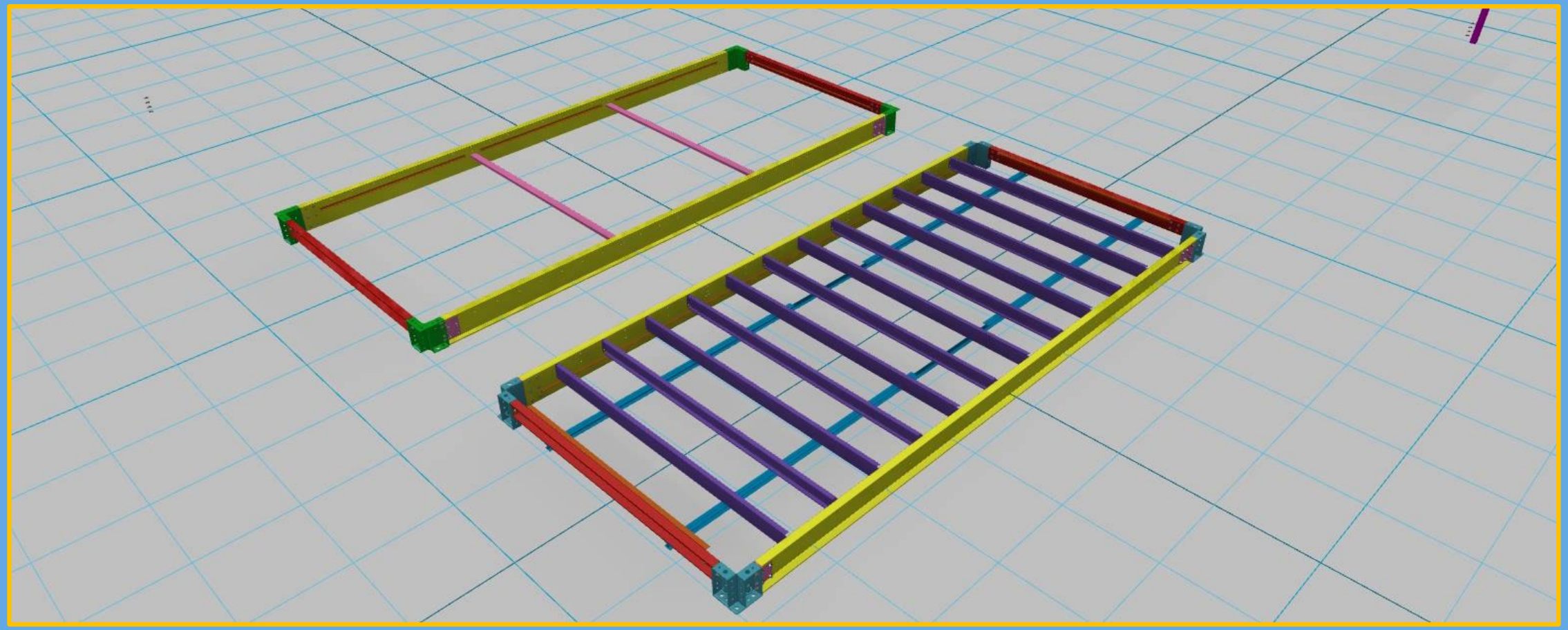
THE FRAME AND CONNECTOR

Rationalised steel design, with less parts and a universal corner connector



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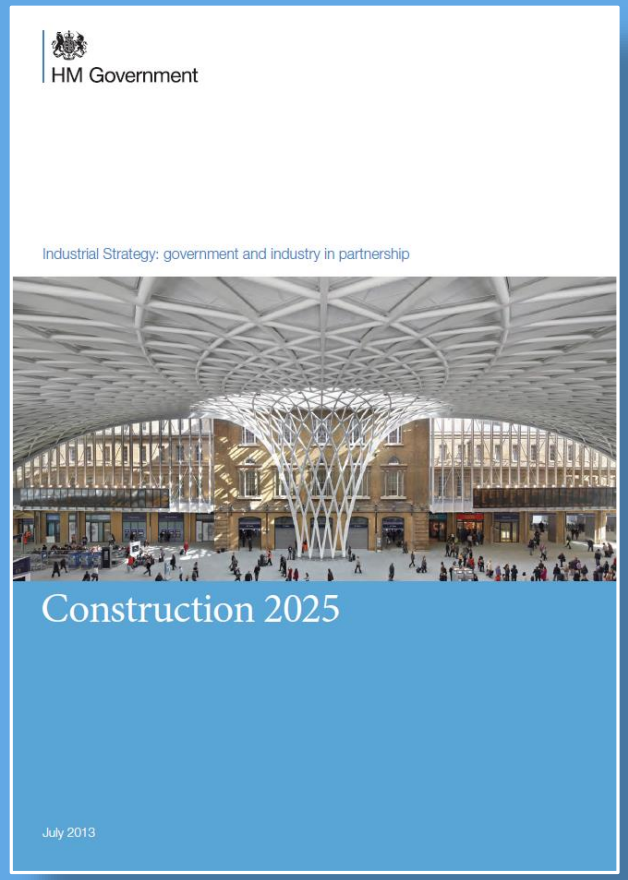
SEISMIC 1. IMPACT



- 50% faster delivery
- 50% lower emissions
- 33% lower costs
- 50% more exports

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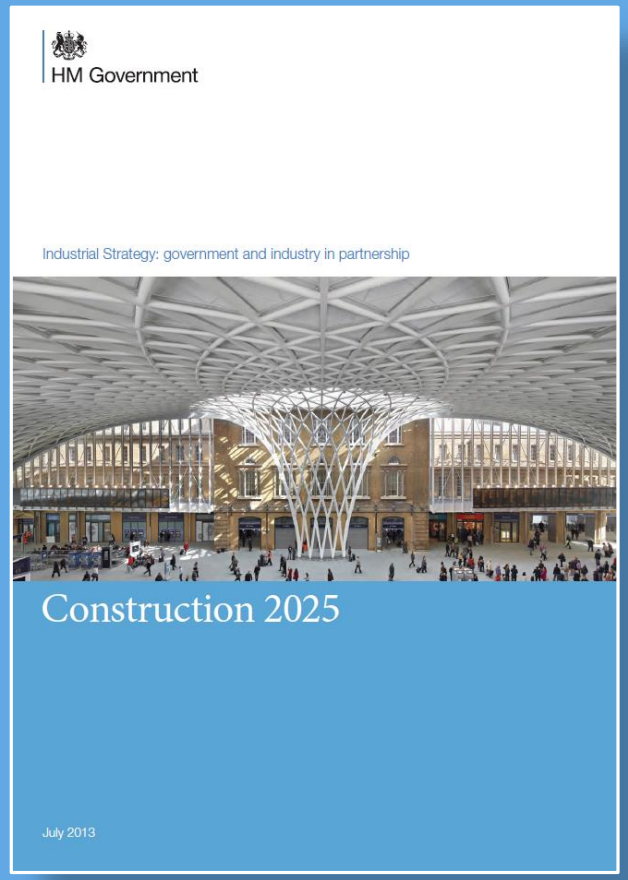
SEISMIC 1. IMPACT



50 % faster delivery

Frame parts have reduced from **2,736 parts** to **1,874 parts**

31% reduction in parts to handle and fix.

ASSEMBLE TIME REDUCTION OF UP TO 50%

** From analysis of one manufacturer's frame design **

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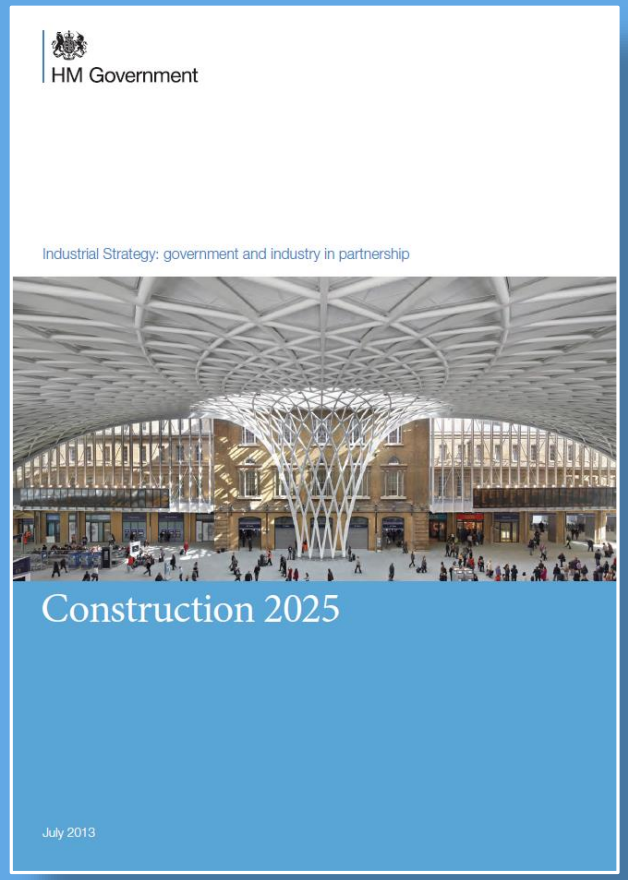
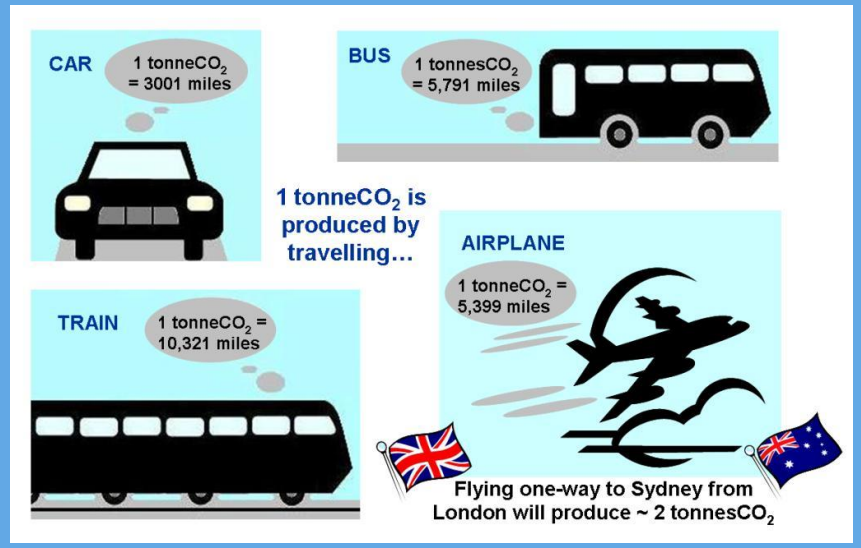
SEISMIC 1. IMPACT



50% lower emissions

An average school is made up of 40 modules – each SEISMIC school will save – 155,821 miles of car driving, or 17 flights from London to Sydney.



Conversion factor taken from Inventory of Carbon & Energy (ICE), Version 2.0.
**Embodied Carbon EC = 1.37kgCO_2/kg - General - UK (EU) Average Recycled Content
***Embodied Energy EE = 20.10MJ/kg - General - UK (EU) Average Recycled Content

EU 3-average recycled content of 59%. Estimated from UK's consumption mixture of types of steel (excluding stainless). **All data doesn't include the final cutting of the steel products to the specified dimensions or further fabrication activities.** Estimated from World Steel Association (Worldsteel) LCA data.

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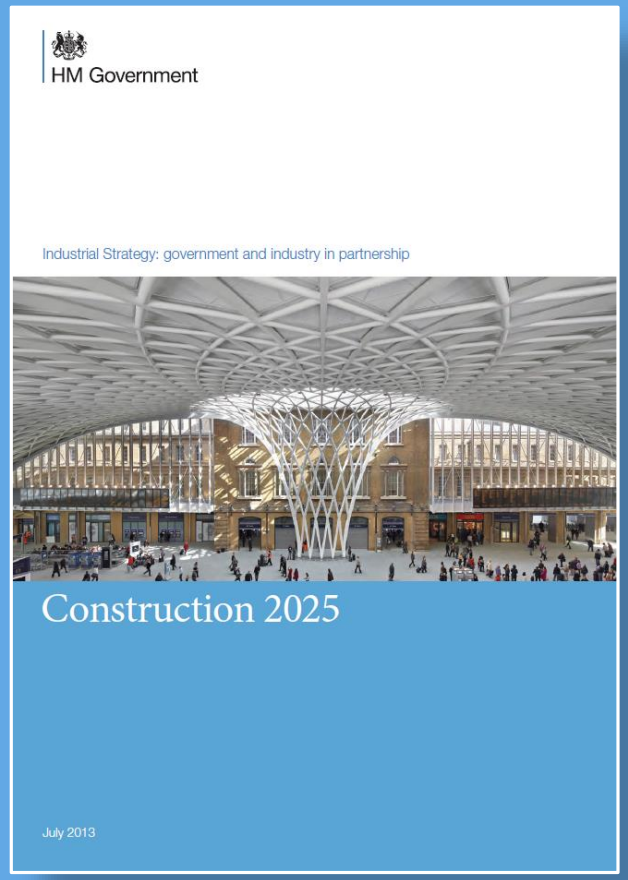
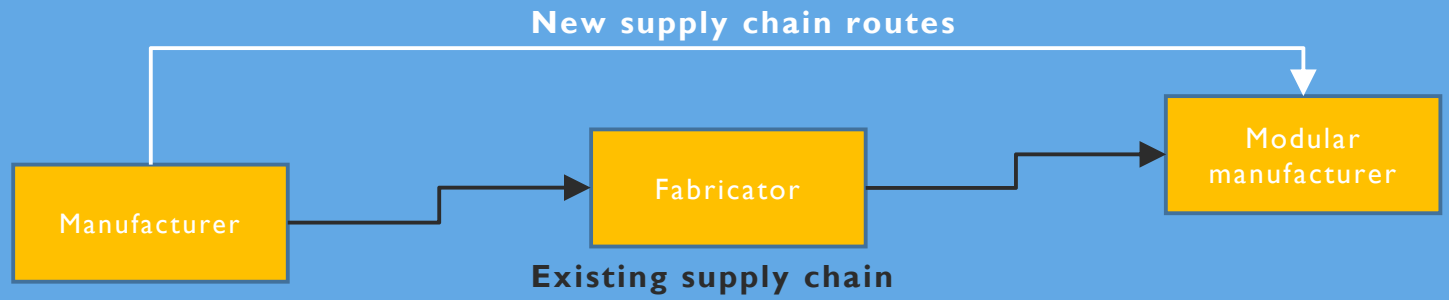
SEISMIC 1. IMPACT



33 % lower costs

- Steel reduction in the frame equates to a cost reduction of up to 25%
- Reduction of parts for assemble will reduce labour time. (2,736 to 1874 parts)



- Mass production of standardised components will create economies of scale for manufactures.

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03. WHAT?

b) The Configurator

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The Configurator

- Open source web app to accelerate early stage designs
- Spatial clusters embedded with DfE SOA areas/adjacencies and FOS requirements
- Easy to use and configure to suit site and operational requirements.
- GEN 5 frame size compliant.
- Can be adapted to latest Output Specifications.

https://seismic-school-app.io/

04. SUMMARY

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SEISMIC

What was achieved? Benefits gained

- Create… a collaborative environment with key players in MMC methods.
  - Collaboration between key Industry Suppliers, to produce a more efficient standardised solution.
  - Providing the solution to the open market, at same cost = fair market procurement

SEISMIC

What was achieved? Benefits gained

- Create… a solution that has a ‘universal connector’ & ‘grid size’ which enables interconnectivity between different key players solutions.
  - Structural corner connector developed, to provide interconnectivity between frame components
  - A standardised grid size, that provides a compliant solution for all potential design solutions

SEISMIC

What was achieved? Benefits gained

- Create… a supply chain which, through scale, enables optimum cost, increased speed & quality, and reduction in carbon emissions to be achieved.
  - Reduced component numbers
  - Increased Productivity, reduced labour costs, and more cost effective
  - Enables fully manufactured components.

SEISMIC

What was achieved? Benefits gained

- Create… A digital tool (configurator) to enable rapid compliant design concepts.
  - Open source, and freely available for the entire community
  - Easy and quick to use for professional users and non-professional users
  - Clusters are embedded with DfE compliant spatial logic
  - Tool is agnostic of construction methodology

05. JUST THE START

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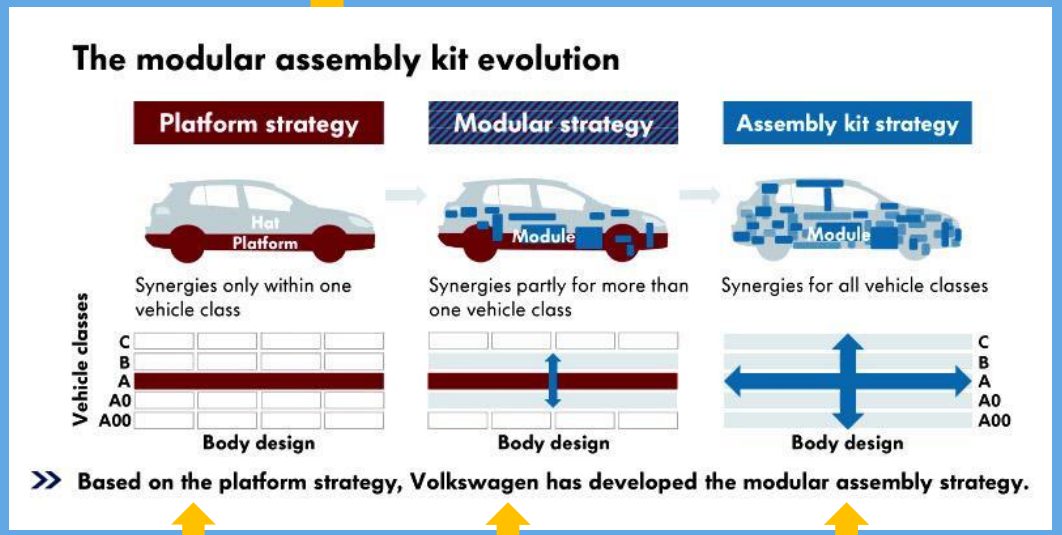
SEISMIC

What was the intention?

- Create… the start of a journey.
  - Expanding validation beyond project scope - For e.g. Fire testing
  - Ability to develop for use in secondary schools
  - Scalable, and applicable to further building components beyond the steel frame

SEISMIC 2

The opportunity and next steps



SEISMIC 1 **SEISMIC 2** **SEISMIC 3 (?)**

I. **STANDARDISATION OF FAÇADE, FLOOR AND ROOF DESIGNS**. *Focus on new material solutions, new fabric requirements, and life cycle performance/flexibility.*

II. **ENVIRONMENTAL SOLUTIONS.** *Adoption/alignment of new building services solutions. Off grid solutions, energy/carbon reduction. (Active Building Centre ABC)*

III. **EXPAND DIGITAL SOLUTIONS.** *Expansion of the configurator & other automated design dolutions.*

IV. **MANUFACTURING PERFORMANCE**. *Industry readiness levels for productionised construction. (IRL)*

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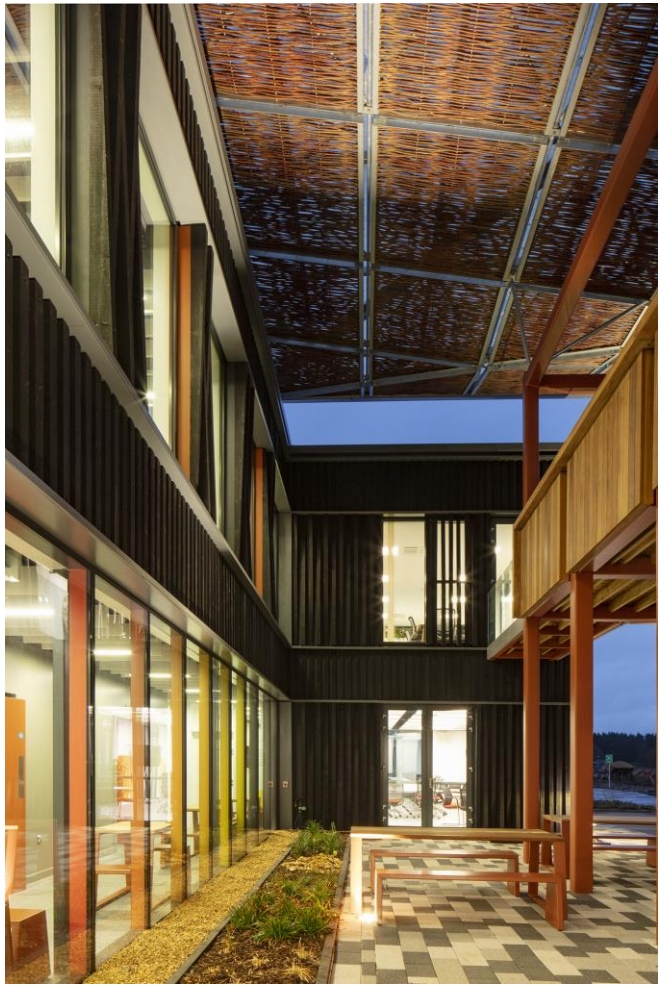

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