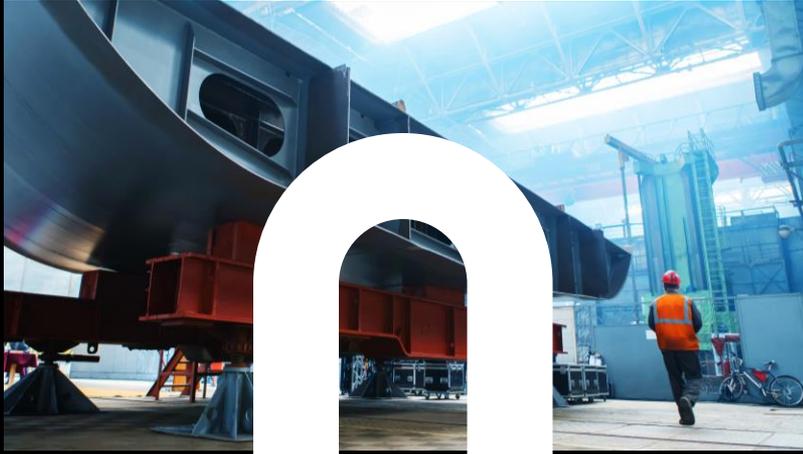




FROM CONSTRUCTING PROJECTS TO MANUFACTURING PROGRAMS

Dale Sinclair
CitA, Dublin
6 November 2025





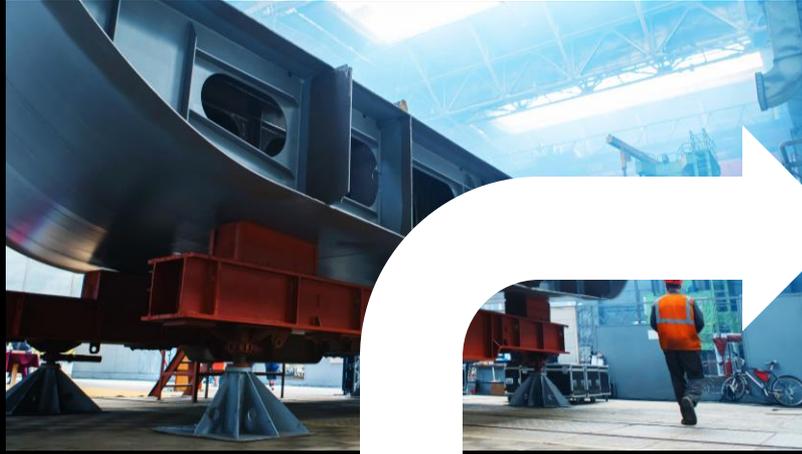
CONSTRUCTING PROJECTS



PROJECT

PROGRAM

MANUFACTURING

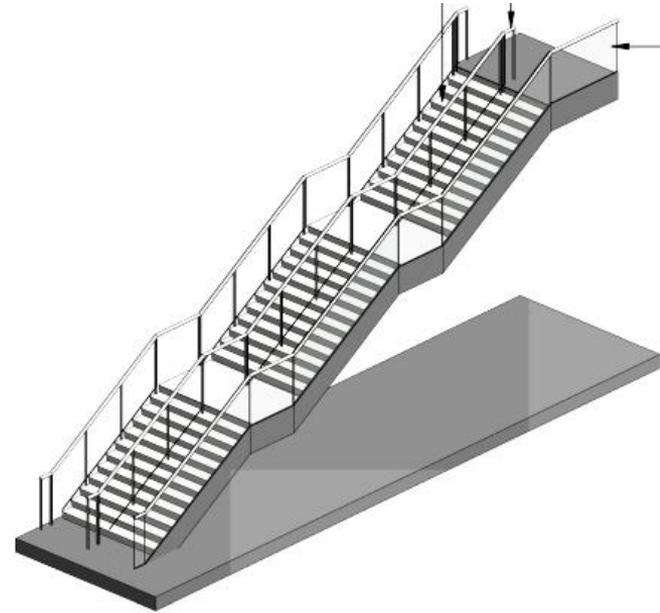
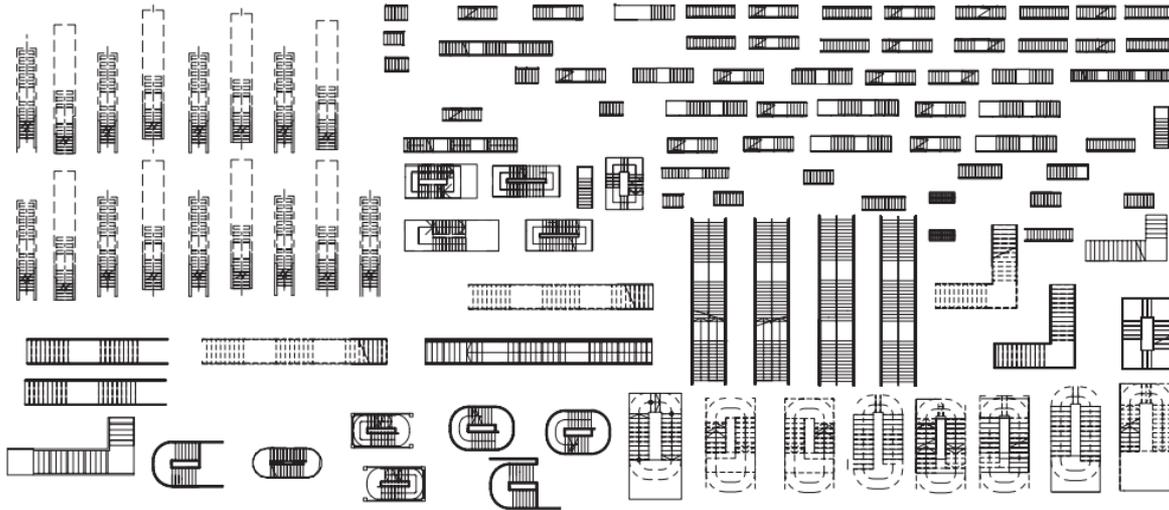


CONSTRUCTION





DESIGNING FOR CONSTRUCTION





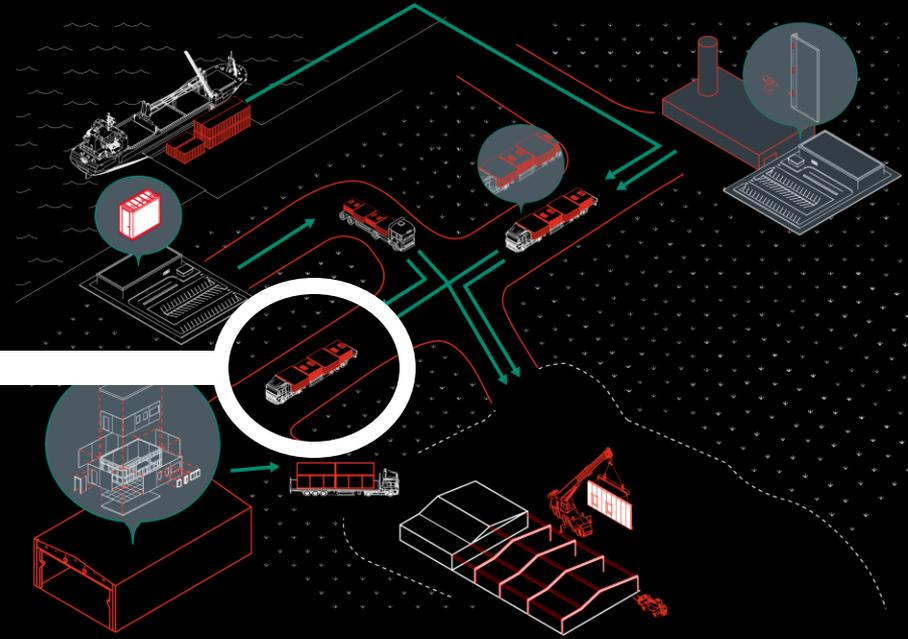
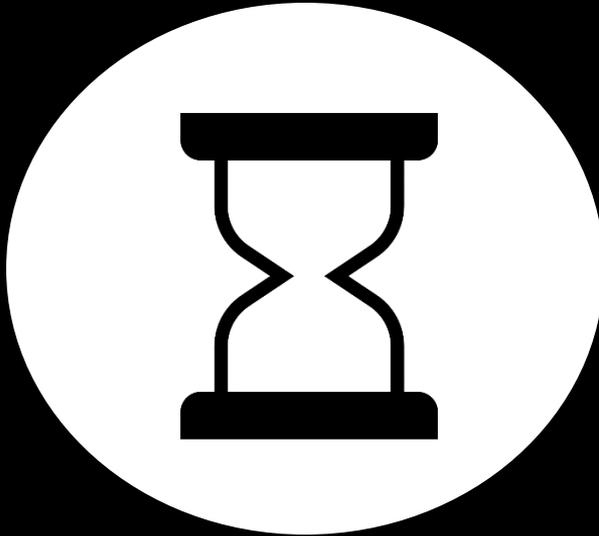
KIT-OF-PARTS

Project ONE

DfMA

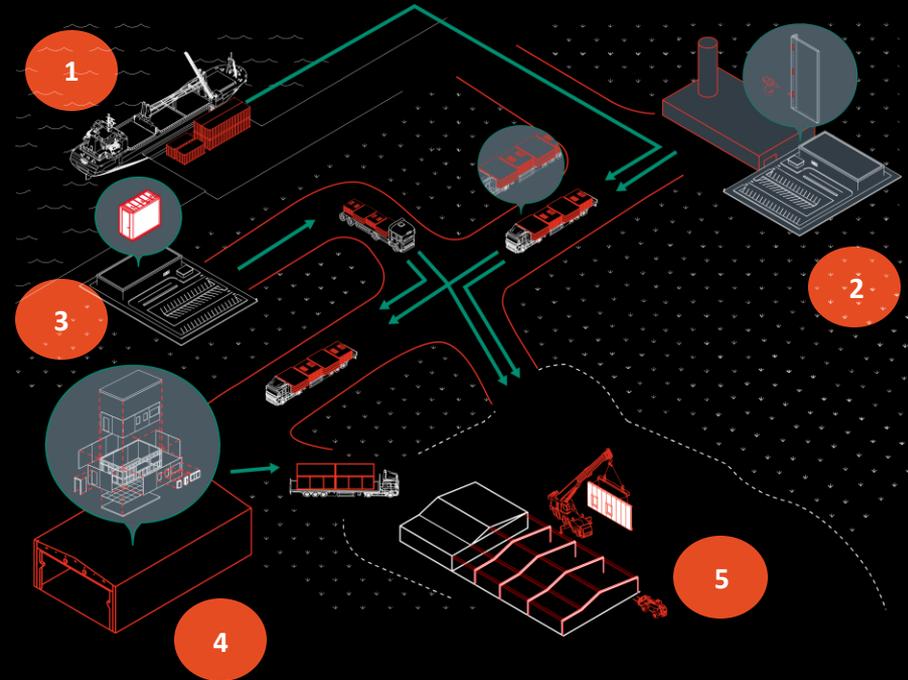
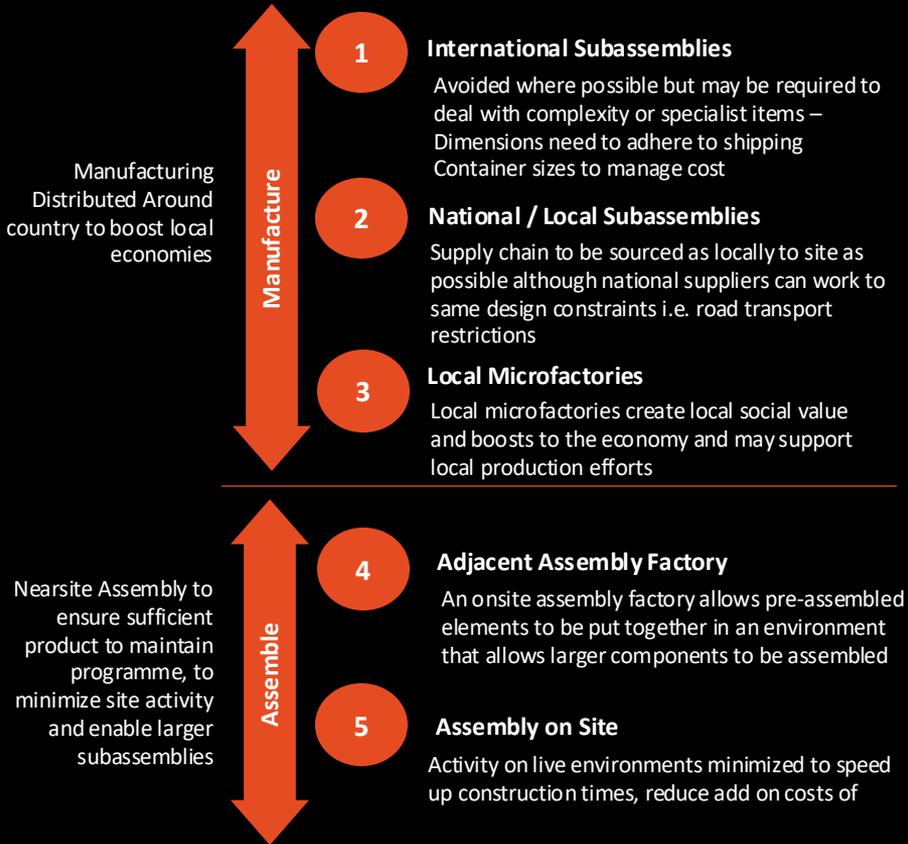
Design for Manufacture and Assembly

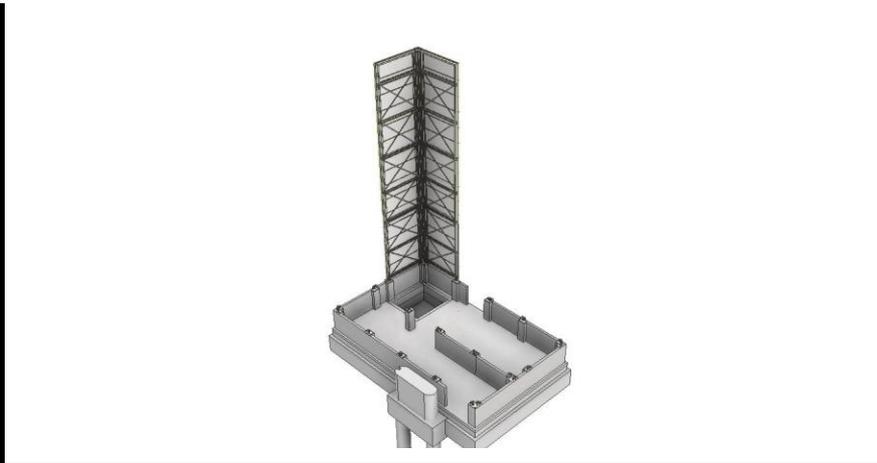
MANUFACTURING JOURNEY



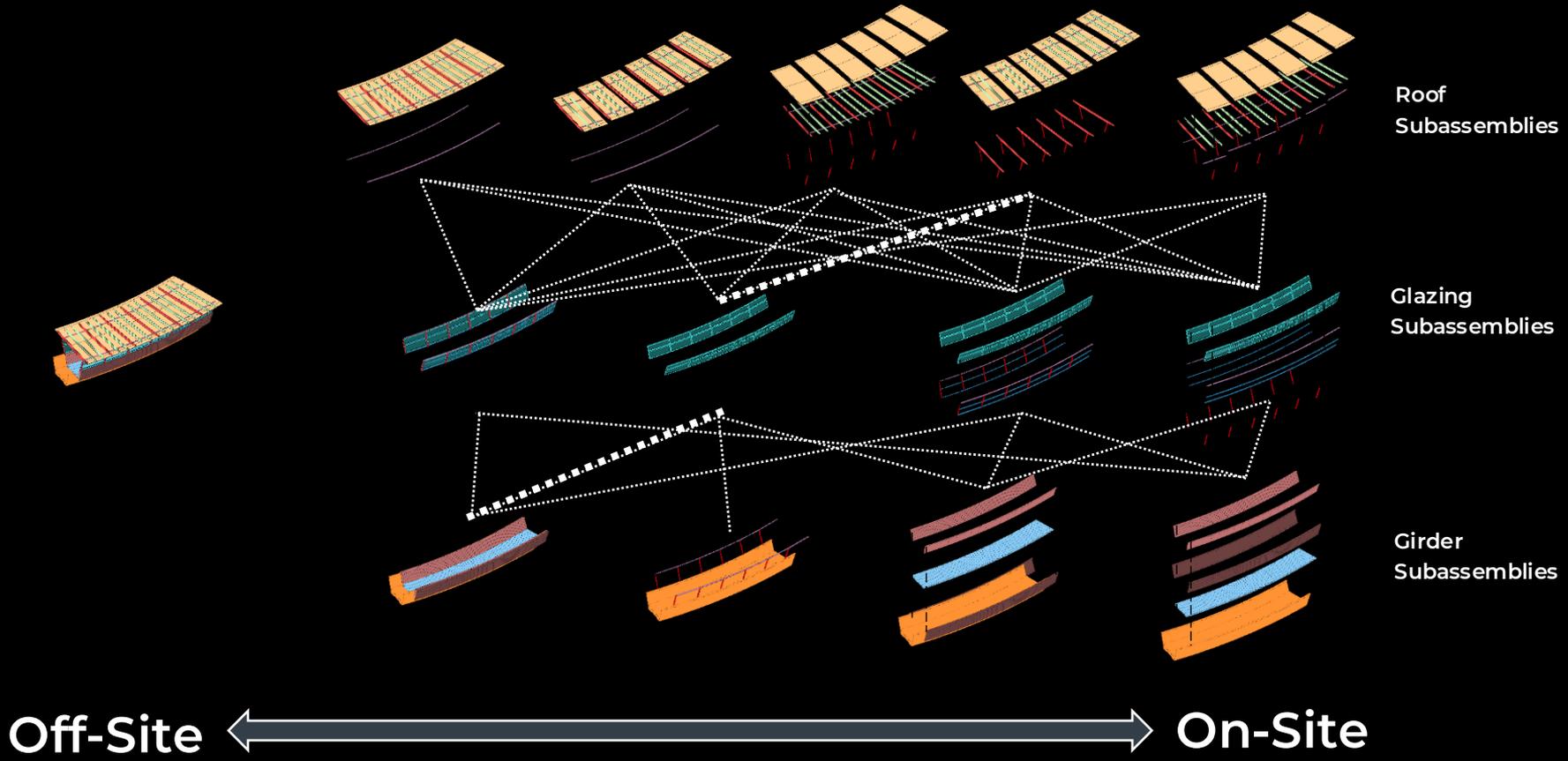


MANUFACTURING JOURNEY



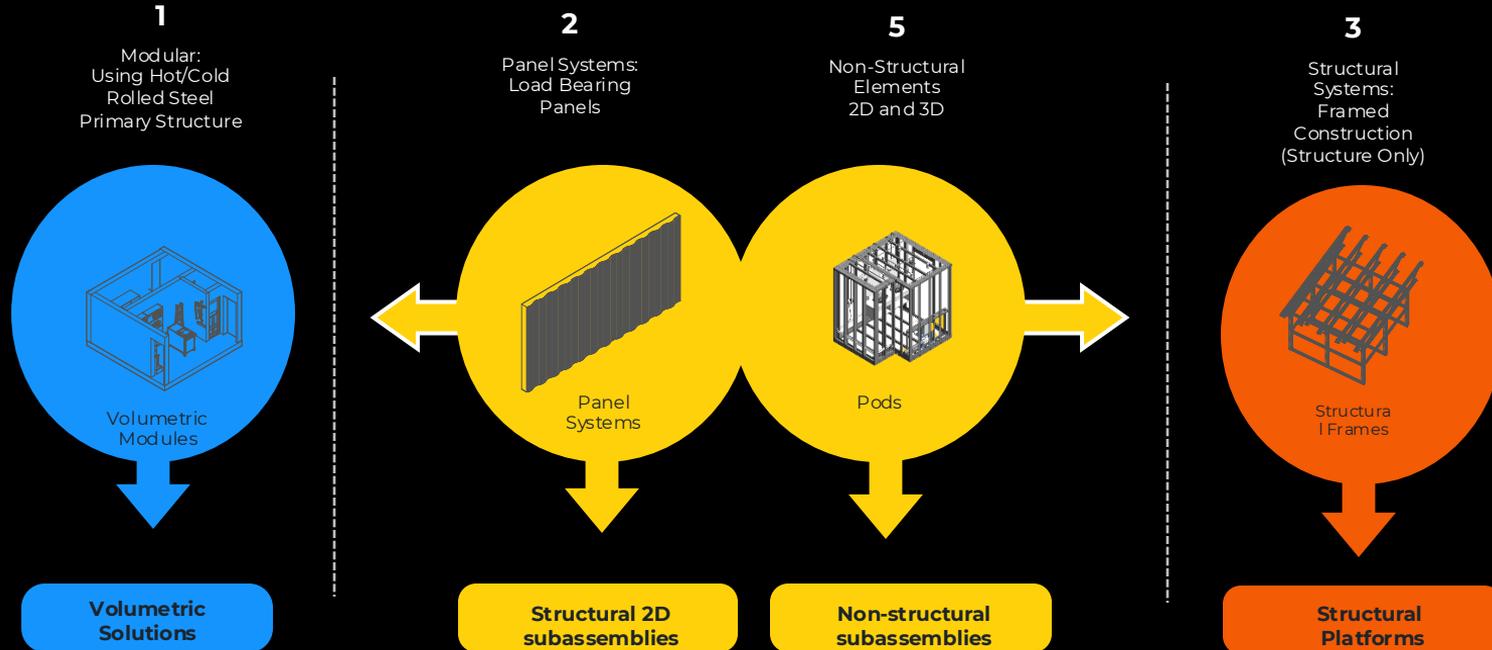


WSP SUPPLY CHAIN





STANDARDISATION - THE RIGHT MMC





STANDARDISATION - SMALL TO LARGE

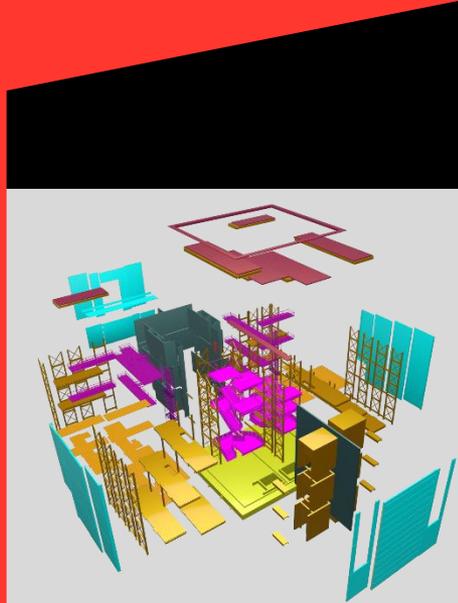
Using large subassemblies increases cost but can be advantageous in certain scenarios

Subassembly Sizes



Concourse D
Hartsfield--Jackson Atlanta
International Airport

Optimum Dimensions for Effective Manufacturing and Transport



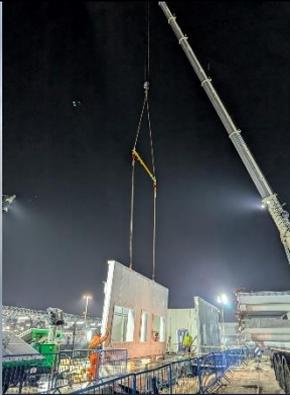
Construction

Assembling substantial numbers of small components takes time

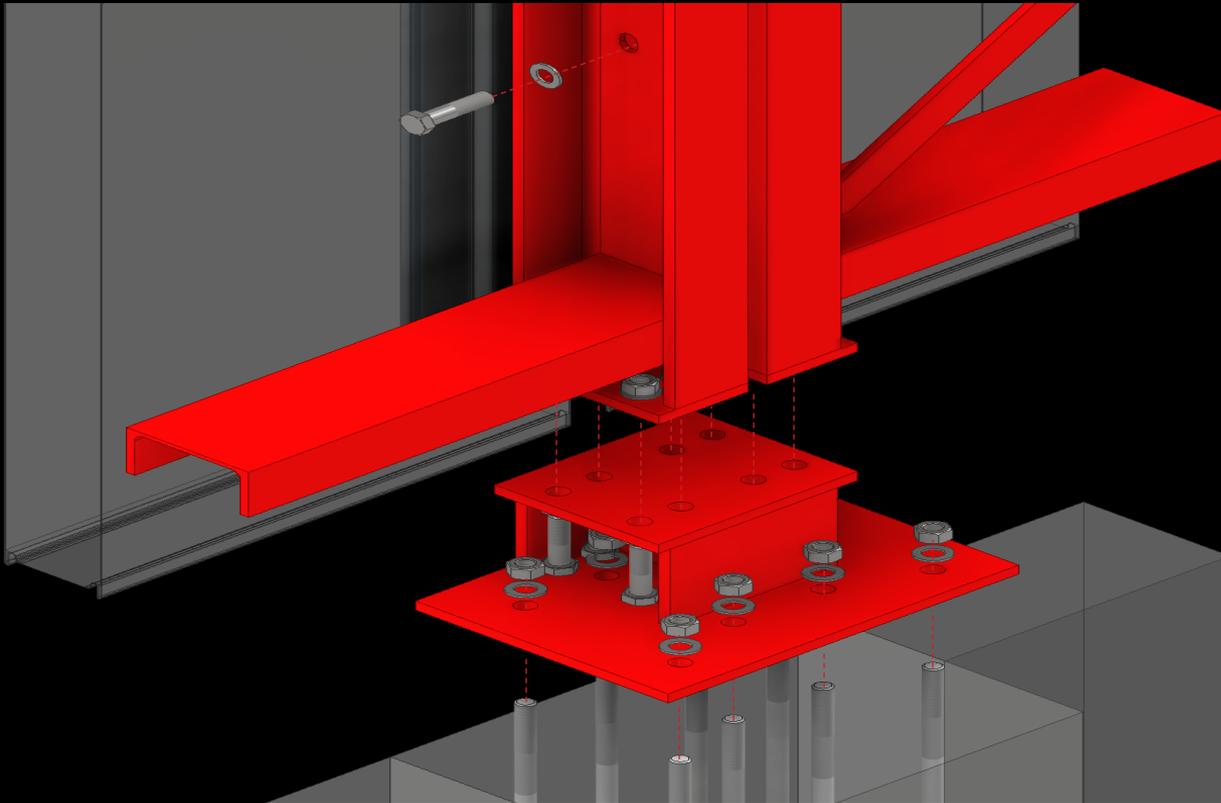
Pier 2
Manchester
International Airport



WSP DFMA IN ACTION

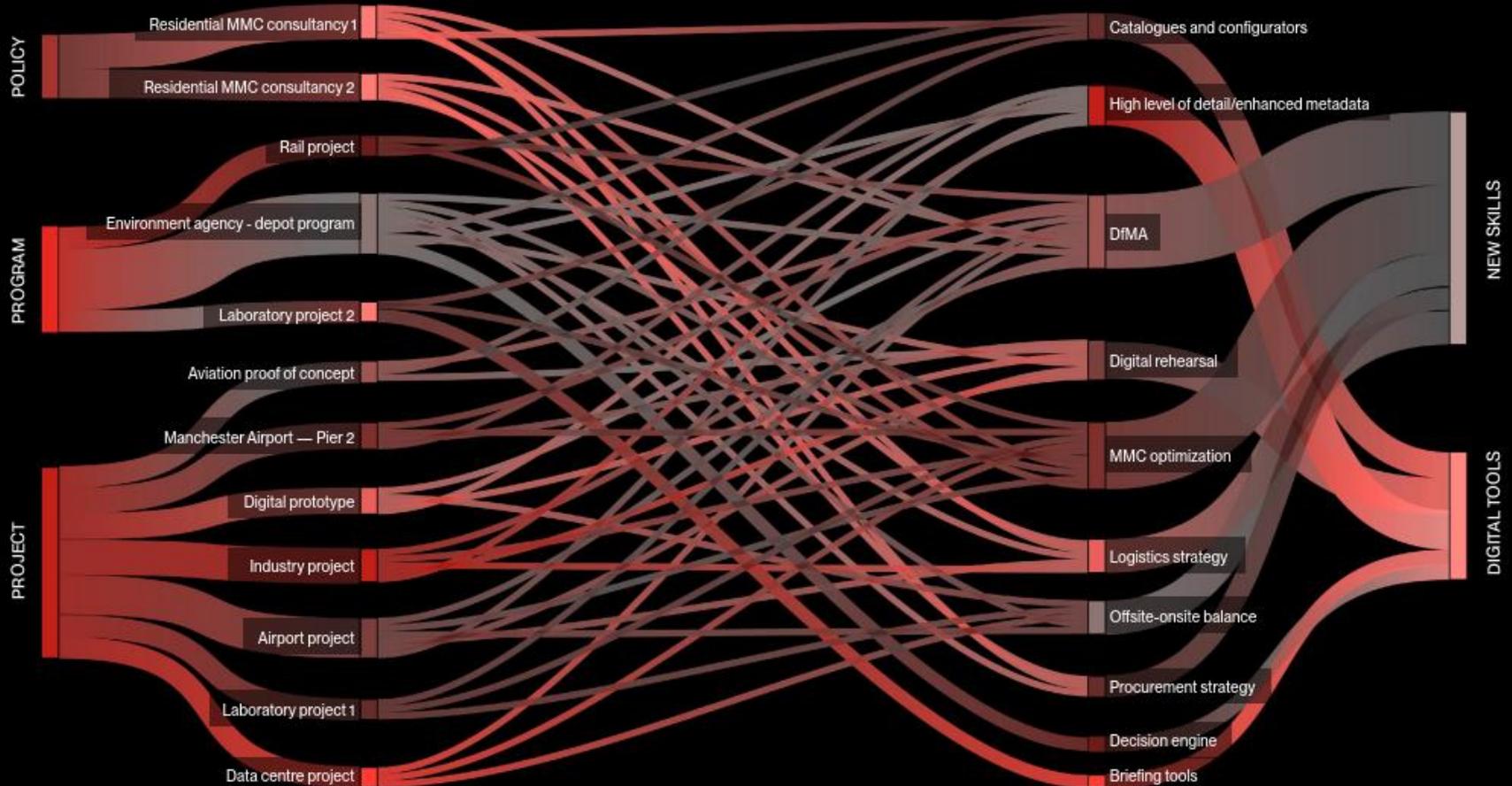


WSP DFMA IN ACTION





TOOLS AND TASKS TO INSIGHTS





KIT-OF-PARTS

Project TWO

PLM

Product Lifecycle Management



PROJECT TWO - LEFT SHIFT



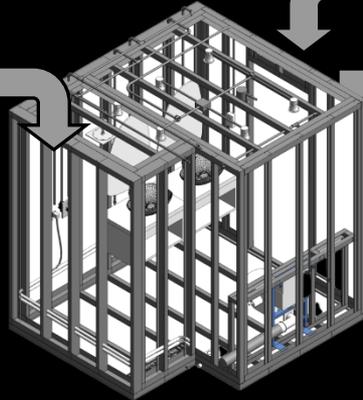
Low LOD models for integration into design model

Configurator to enable architect to customise finishes and specification

Content procured and managed at a programme level driving economies of scales

Reusable Program
Level Content From
Project ONE

Output from
briefing tool into
project
catalogue



Typical interfaces and interdependencies already considered in catalogue content. Project decisions minimised.

No need for shop drawings or other stage 4 technical information

Reduced number of RFIs and site queries and better information on site allowing faster erection and installation

Content mobilised for mass customisation by customers customer

WSP CATALOGUES / CONFIGURATORS

BMW

Model	<u>Engine</u>	<u>Colour</u>	<u>Wheels</u>	<u>Mirror Caps</u>	<u>Upholstery</u>	<u>Interior Trim</u>	<u>Packages</u>
	Petrol	Nine	Default	Option	Seven	Six	M Sports pro
	Deisel		22" 1				Entertainment
			22" 2				Comfort Plus
							Technology Plus
							Ultimate Pack

59

2

9

3

2

7

6

5

22,680

permutations

1,338,120

(approx overall)

Tesla

Model	<u>Colour</u>	<u>Wheels</u>	<u>Interior</u>	<u>Packages</u>
Standard	Five	One	Two	Enhanced Auto Drive
Long Range				Full Self driving
Performance				

2

3

5

1

2

1

30

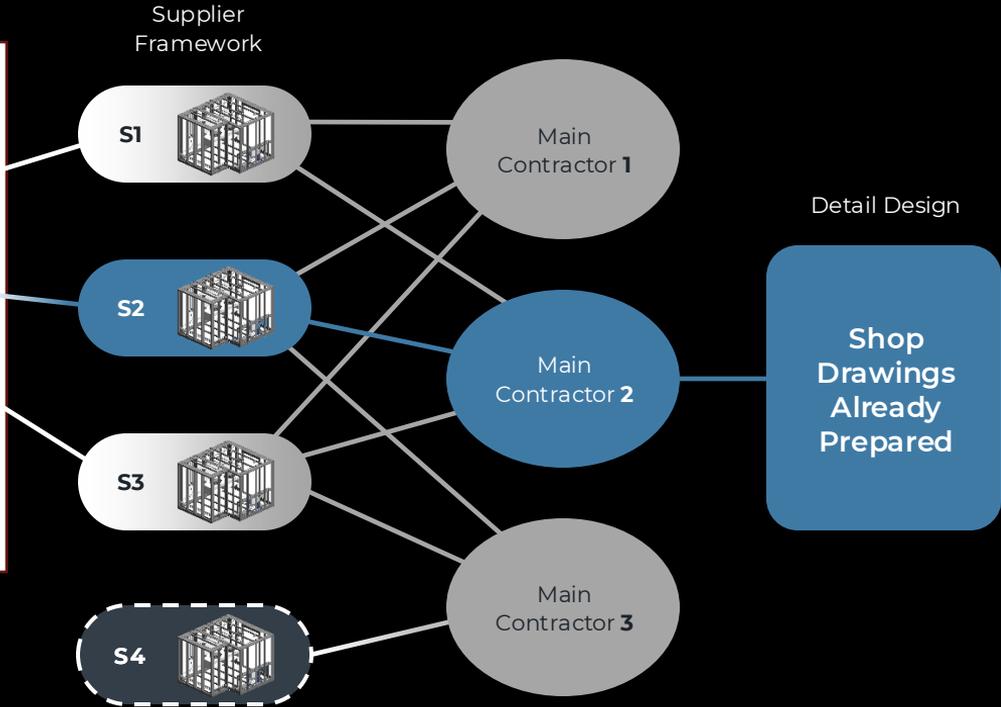
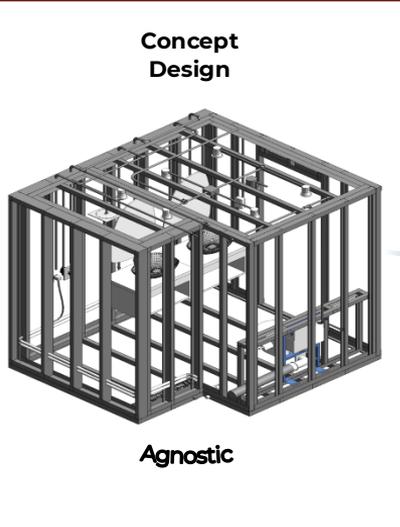
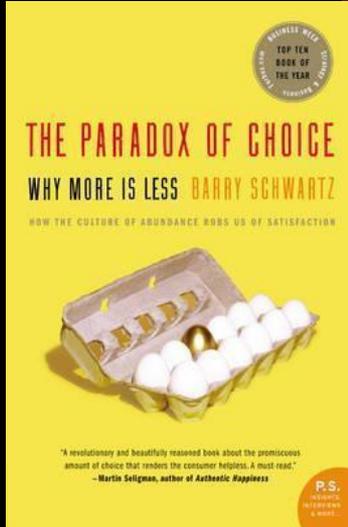
permutations

60

(approx overall)



PROGRAMME PROCUREMENT



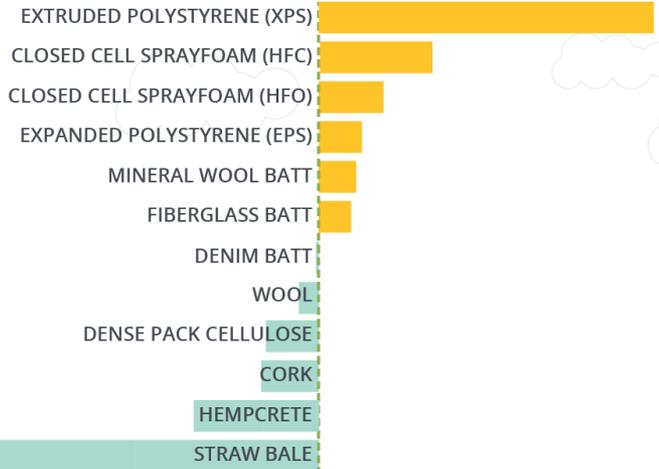


SIMPLIFYING COMPLEXITY

CARBON IMPACTS OF INSULATION

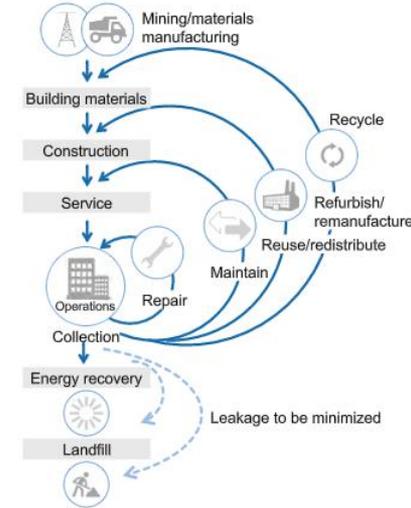
kgCO₂ represents R-20 at 234 m²

6,735 kgCO₂ emitted



-7,437 kgCO₂ embodied

Figure 14: Circular Economy Principles in the Construction Value Chain⁹⁰



Source: Ellen MacArthur Foundation; World Economic Forum; The Boston Consulting Group

System/Strategy	Then	Now
Superstructure	Concrete Steel	Concrete Steel Steel+Low Carbon Conc Steel+CLT ANO1
Mechanical Plant	Gas Boiler AHU	Ground Source Heat Pumps Air Source Heat Pumps PV Arrays
Electrical	HV/LV Lighting/Small Power Telecoms/Data/Security Fire Alarm/CCTV/Access BMS	HV/LV Lighting/Small Power Telecoms/Security Fire Alarm/CCTV/Access BMS/IT/5G Smart Building/Digital Twin
New	-	Asset Data Digital Twin
Project Strategies	Fire Strategy Acoustic Strategy Façade Strategy	Fire Strategy Acoustic Strategy Façade Strategy Smart Building Strategy MMC Strategy Security Strategy Circular Economy Strategy Net Zero Strategy



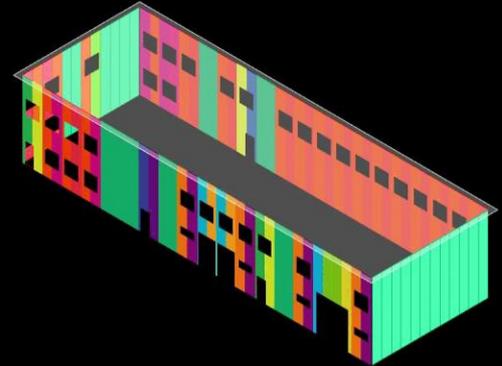
PROJECT AND PROGRAM



96 Total # of Panels
20 Types of Panels

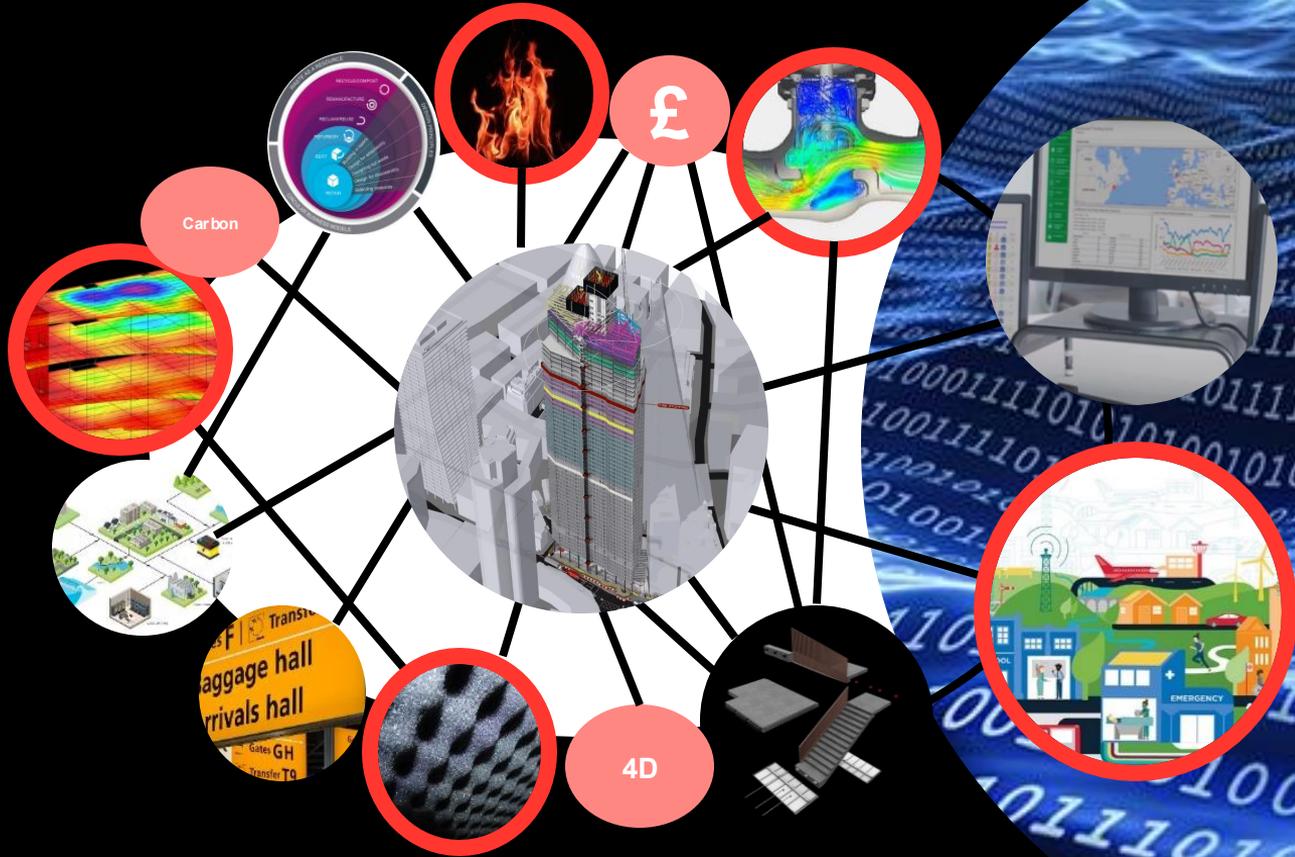


Roof Type:
Flat



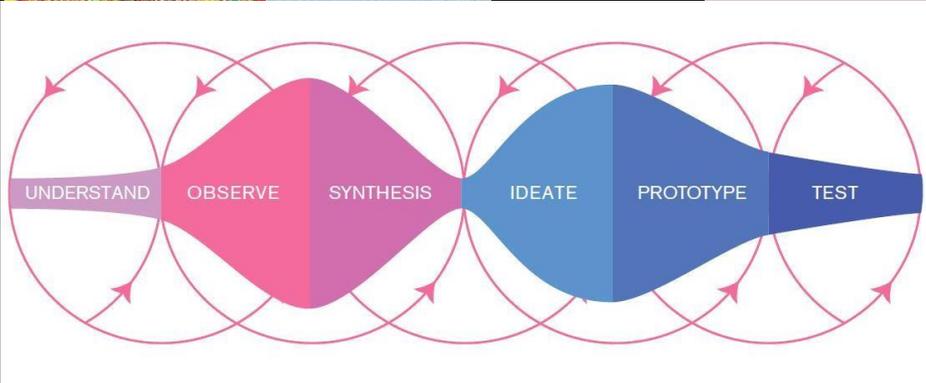
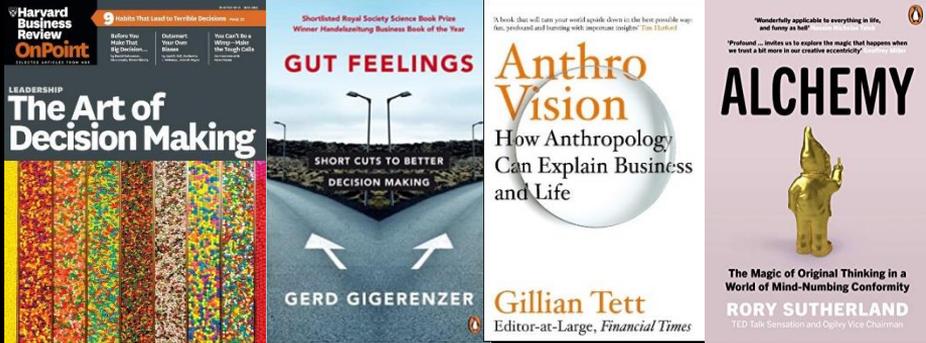


DRAWINGS TO CONNECTED DATA





DECISION ENGINE

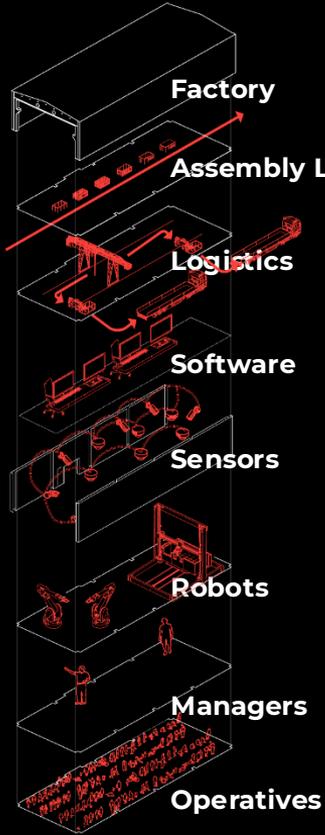


150



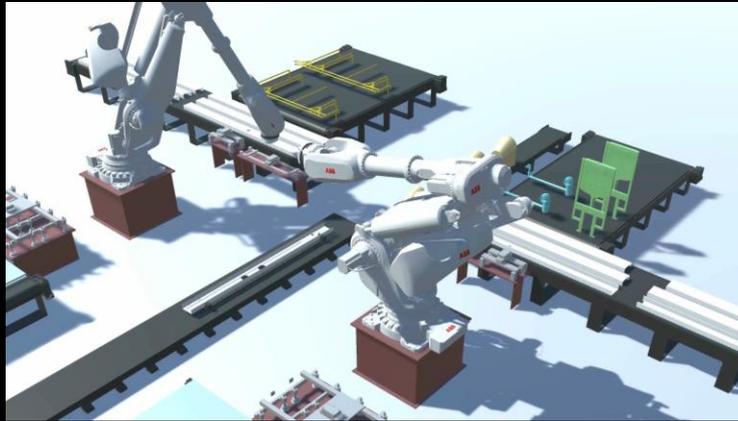


FACTORY OF THE FUTURE



ROBOTICS - PRODUCTIVITY

- **Highly repeatable parts required**
- **Parts need reengineered**
- **Opportunity to develop whole process**



CRAFT – SOCIAL VALUE

- **Where does craft add value?**
- **What are the skills that need dexterity?**
- **Where are areas where craft might prevail?**





KIT-OF-PARTS

Project ONE

DfMA

X

Project TWO

PLM



PROGRAM MANAGEMENT

**PROJECT
ONE**

Project
Brief

Concept/Scheme
Design

Construction
Documents

**PROJECT
TWO**

Project
Brief

Concept/Scheme
Design

Construction
Documents

**PROJECT
THREE**

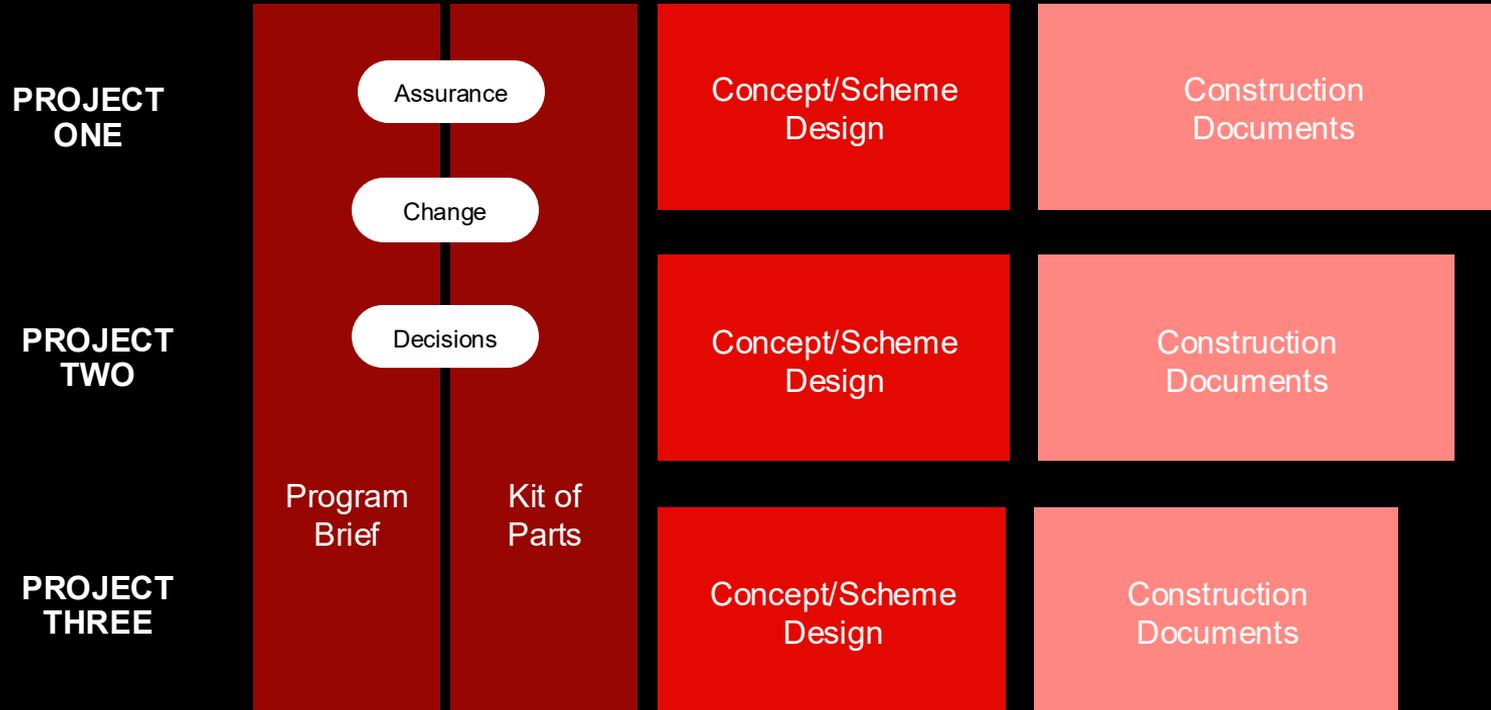
Project
Brief

Concept/Scheme
Design

Construction
Documents

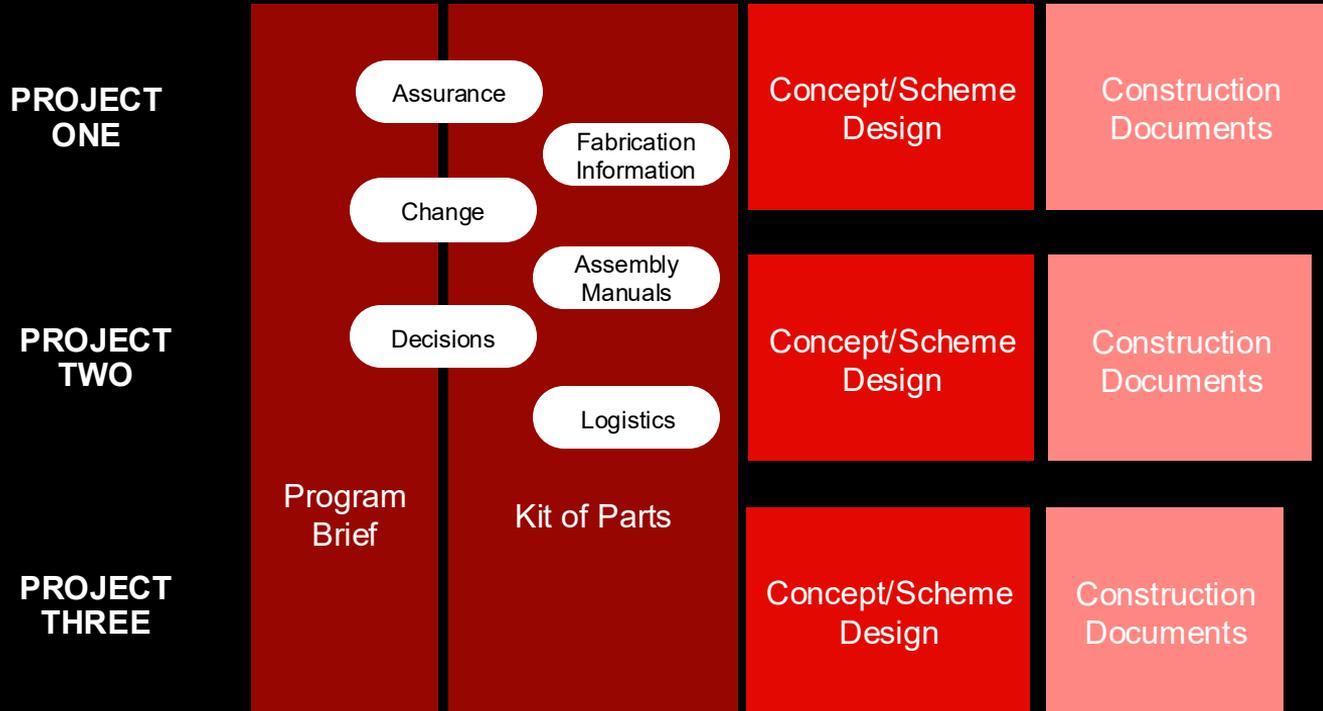


PROGRAM MANAGEMENT





PROGRAM MANAGEMENT



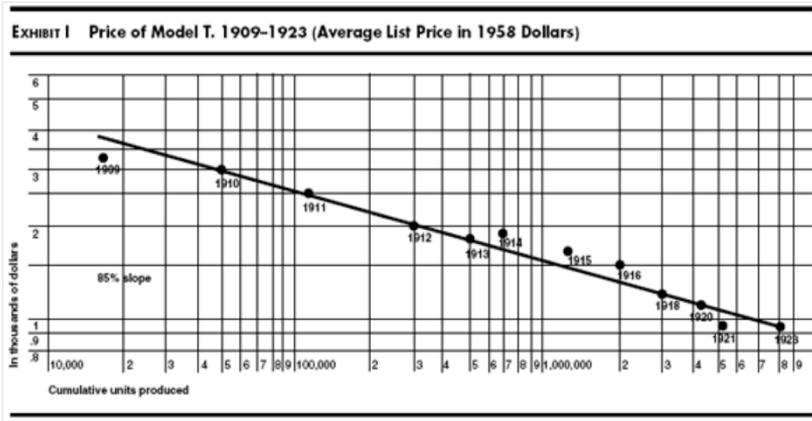
WSP KIT OF PARTS - LAWS

MANUFACTURING

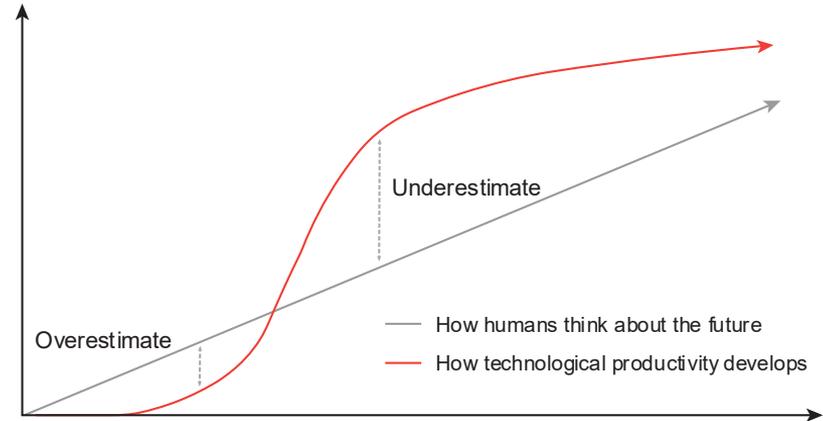
DFMA

PROGRAMS

PLM



X



WRIGHTS'S LAW

AMARA'S LAW



Scan to find out more
about our kit-of-parts
approach