



Fabrication Gap

Structural
Design



Wolf Mangelsdorf

HIM 

Fabian Scheurer

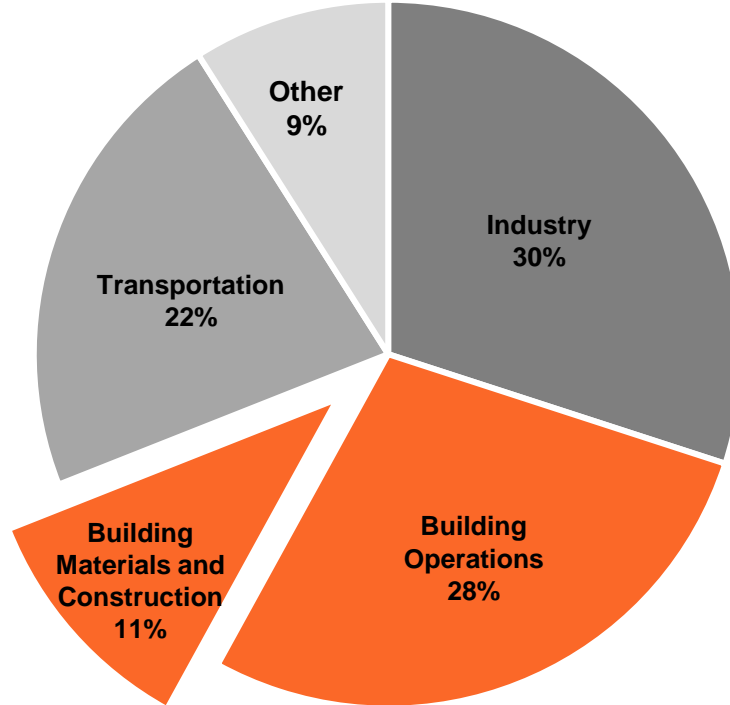
STUDIO
GREG
LYNN / UNIVERSITY OF
APPLIED ARTS VIENNA

Bence Pap

The background is a solid orange color. It features several 3D isometric geometric shapes in shades of light gray. In the top left, there is a cluster of four vertical rectangular blocks. In the bottom left, there is a larger, more complex structure composed of several interconnected rectangular blocks of varying heights and widths. On the right side, there is a large, prominent 3D isometric cube or rectangular prism, showing its top, front-left, and front-right faces. The overall aesthetic is clean, modern, and minimalist.

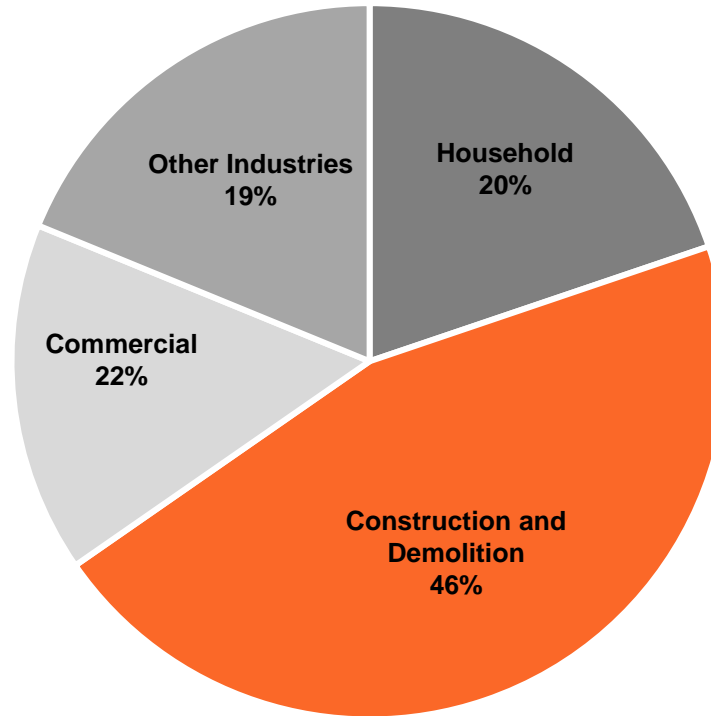
We Have A Problem

GHG Emissions



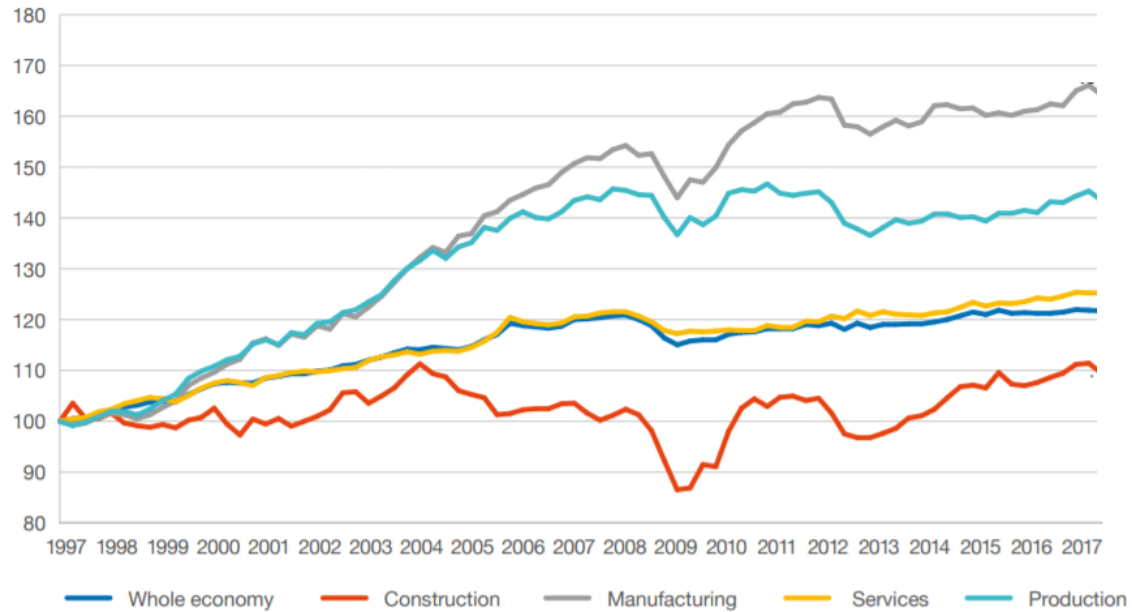
Source: Architecture 2030, from UN Environment Global Status Report 2017

Construction Waste



Source: Institution of Civil Engineers (ICE)
London, 2017

Productivity



Source: Office for National Statistics, UK, 2018

Modular Hasn't Worked



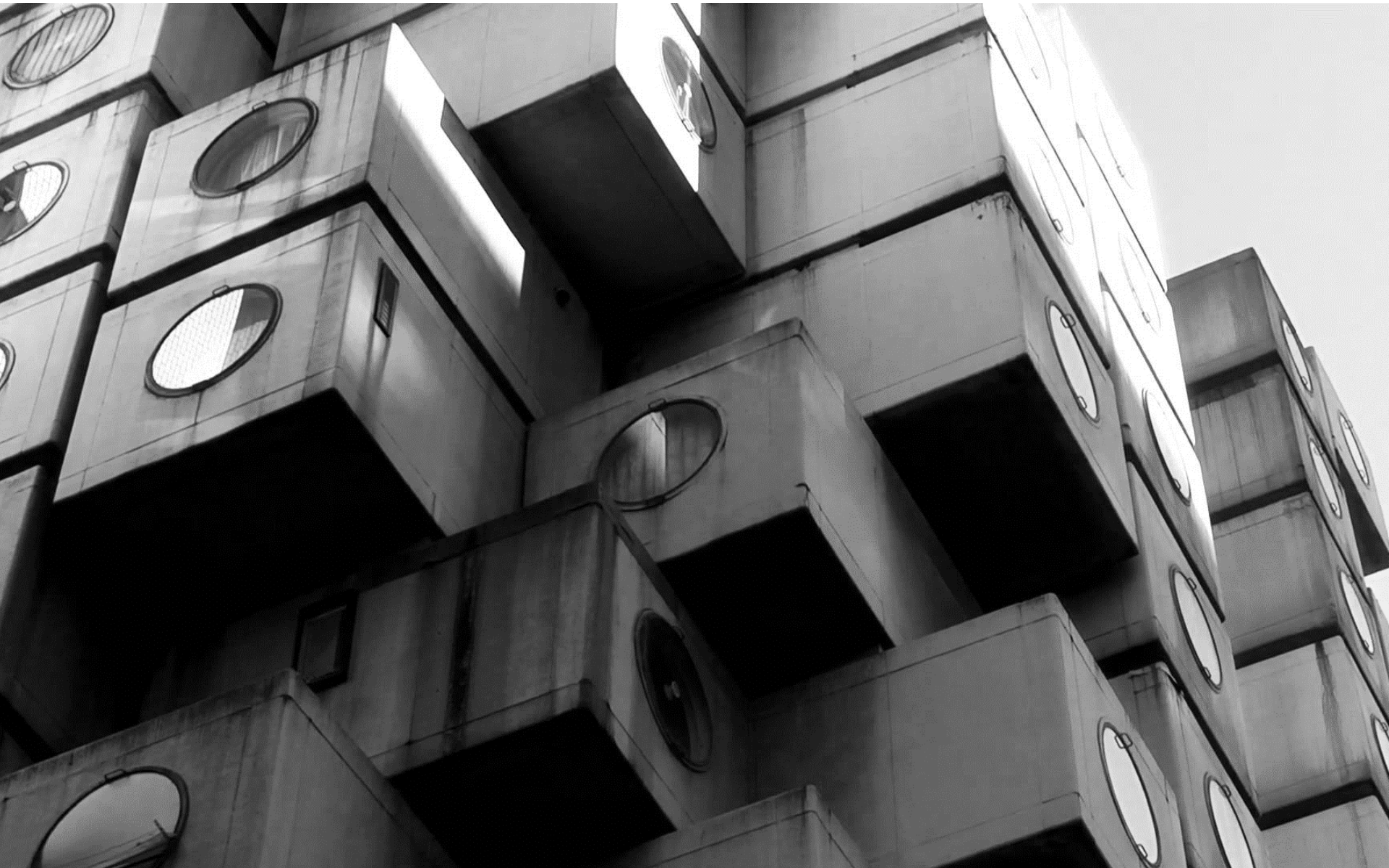




Halle, 1975













enasi-edne.co.uk

LINE D





The background is a solid orange color. It features several 3D geometric shapes in shades of light gray. In the top left, there are two vertical rectangular blocks. In the top right, there is a large, complex 3D structure composed of multiple rectangular blocks. In the bottom left, there are two more vertical rectangular blocks. The overall aesthetic is clean and modern, suggesting a focus on technology or manufacturing.

Prefabrication for Speed and Quality



airmace

MACE

SWAIN











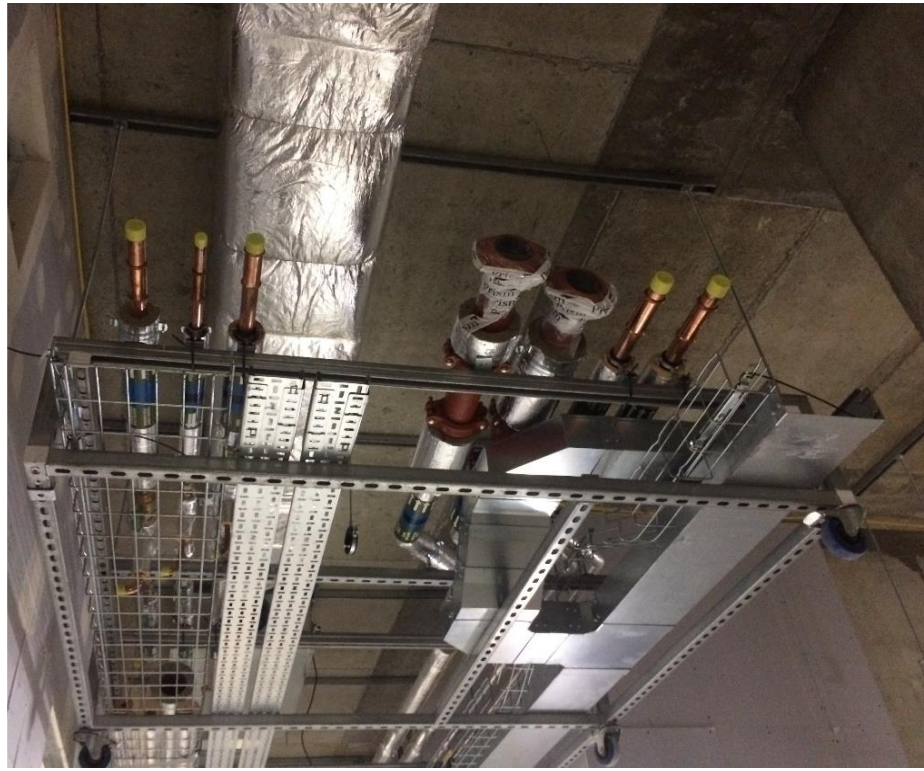


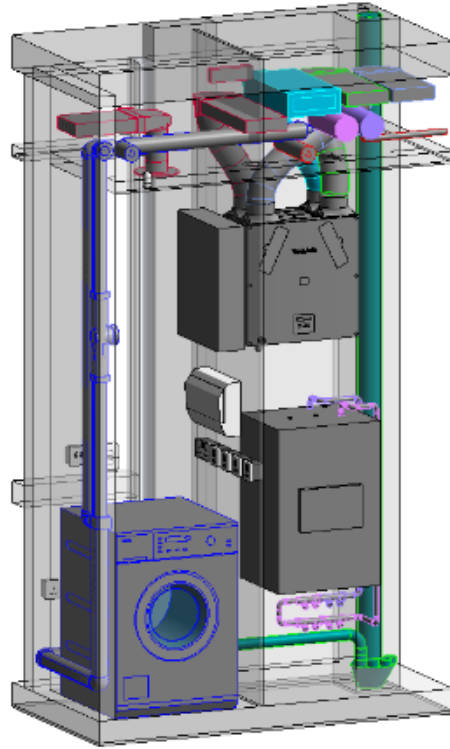


385 2004 71

 SurePods

CAP-9000 LBS





The background is a solid orange color. It features several light gray, three-dimensional geometric shapes. In the top left, there are two vertical rectangular blocks. In the top right, there is a large, complex shape composed of several rectangular blocks. In the bottom left, there are two more vertical rectangular blocks. The overall composition is abstract and modern.

We Need a Rethink

Design Process

- ***Involve the Supply Chain:***

- Recognise and use industrialised trade solutions (e.g. façade, MEP, Steelwork)
- Broad distribution of suppliers builds resilience and allows scalability, locally and globally.

- ***Flexible Design Solutions:***

- Industrialisation must not mean going back to the concepts of the 1970s. Standardization of design is no longer required.
- Industrialized construction must be adaptable to different (all!) typologies and boundary conditions.

- ***Designing for an Industrialized Process:***

- Fully resolved design, including all component details, assembly and interfaces
- Designed for future repair, maintenance and adaptability

Risks

Risks we can control

- Suitability of the design solution
- Coordination
- Physical interfaces
- How things go together
- Logistics and Delivery

Risks we cannot control

- Weather
- Ground
- Market
- Economy
- Diseases

The Current Approach

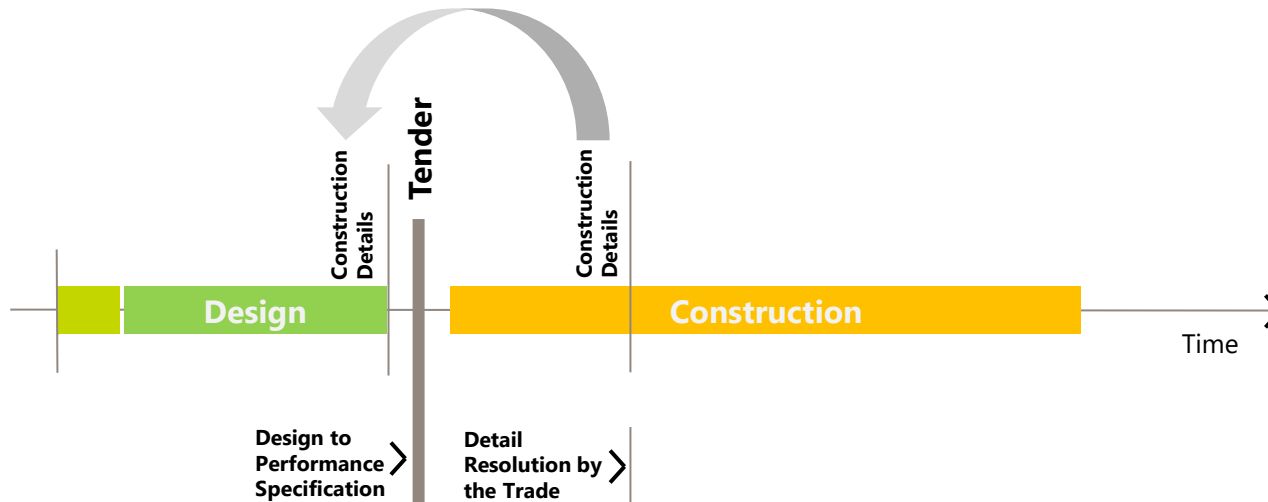
- Design Team -> Design Intent
- Trade Packages -> Resolving Design Detail
- Interfaces between packages not fully resolved.
- Interfaces between packages not owned by anyone, and depending on procurement
- -> Delays, Errors, Rework, Additional Costs and Quality Defects

Controllable risks are packaged and passed on—and remain unresolved.

Resolve Design Risks before Tender

- Trade Contractor Input to be brought into the design before tender
- Definition of the Components and Resolution of the Interfaces

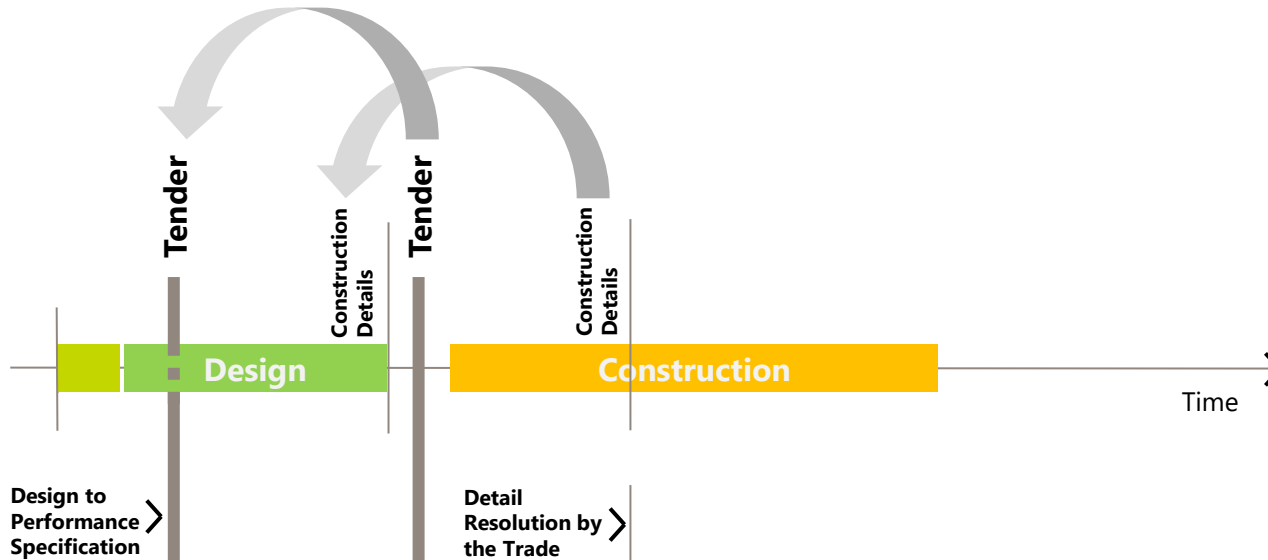
Preparation of the assembly details before going from Design into Construction



Resolve Design Risks before Tender Construction

- Trade Contractor Input to be brought into the design before tender construction
- Definition of the Components and Resolution of the Interfaces

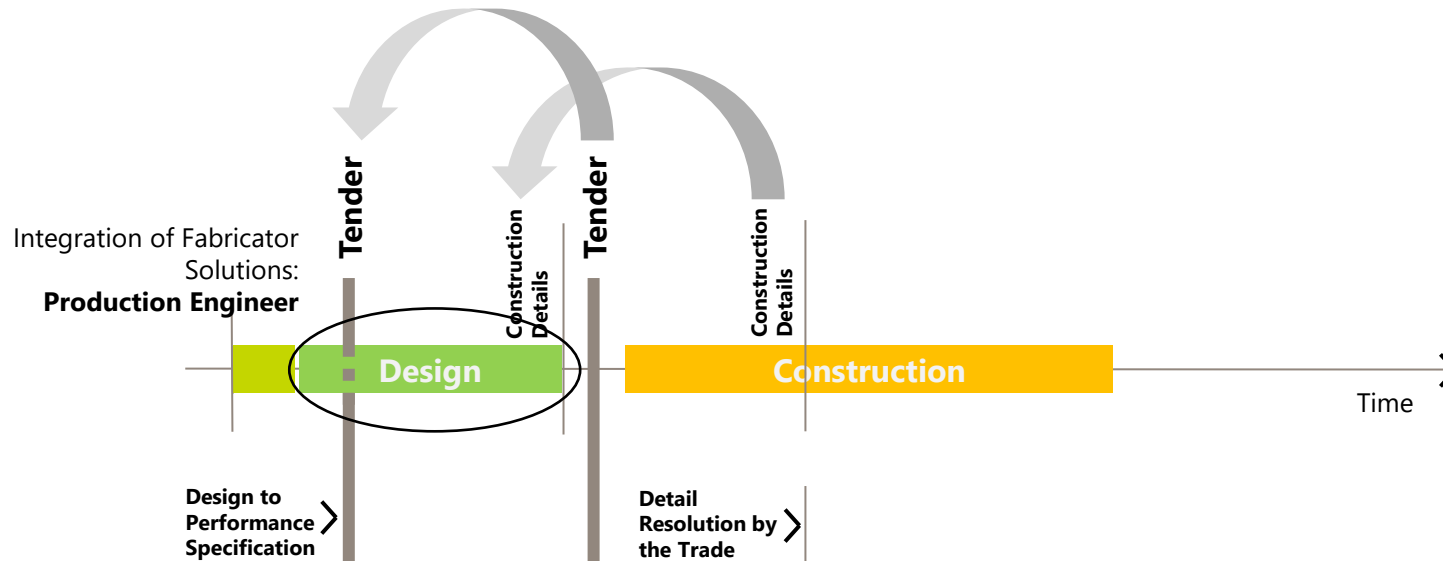
Preparation of the assembly details before going from Design into Construction



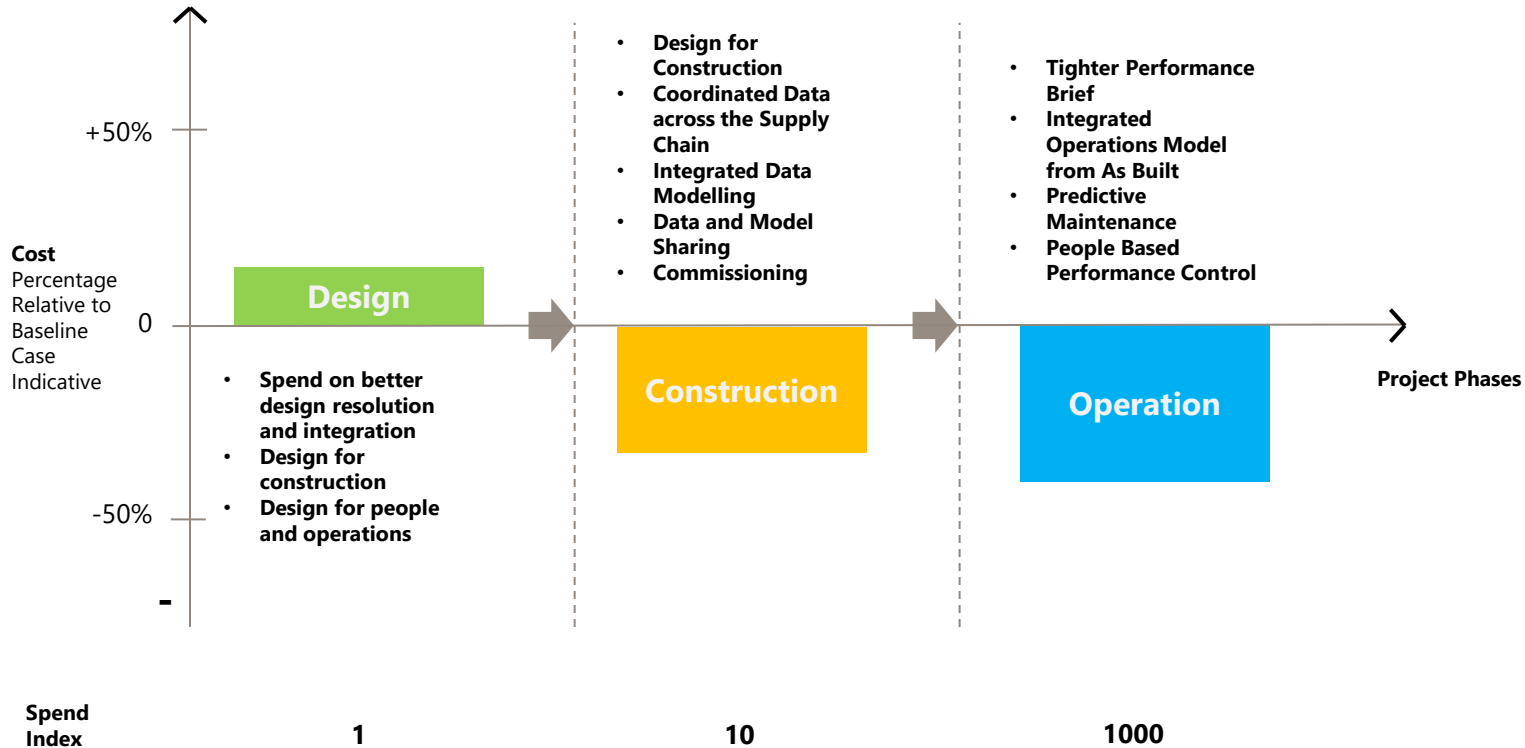
Resolve Design Risks before Tender Construction

- Trade Contractor Input to be brought into the design before tender construction
- Definition of the Components and Resolution of the Interfaces

Preparation of the assembly details before going from Design into Construction



Redefining the Value Beyond Tender Price

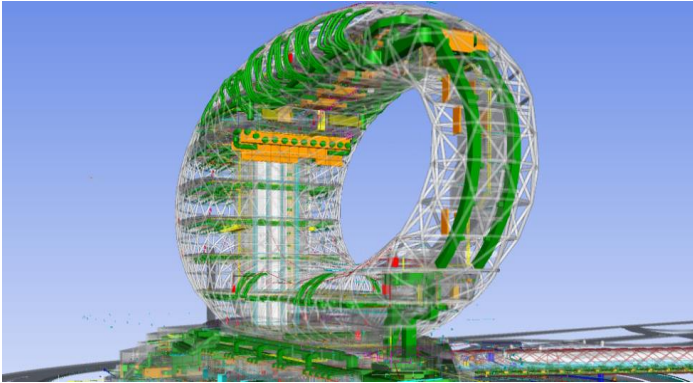


The background is a solid orange color. It features several light gray, three-dimensional geometric shapes. In the top left, there are two inverted trapezoidal shapes. In the bottom left, there are two rectangular blocks of different heights. On the right side, there is a large, complex structure composed of several rectangular blocks of varying heights and widths, creating a stepped, architectural appearance.

Focus on Interfaces

Spatial Coordination between Disciplines and Trades

- Clash detection and clash avoidance are ***not sufficient***.
- ***Spatial requirements for the installation*** of subassemblies and ease of construction.
- Space for ***access during and for installation*** will need to be built into the design.



Development of Customizable Standardized Physical Interfaces

- Establish **clear ownership** of interface between packages.
- **Interface solutions** will have to be **generated with and accepted by the trades**.
- Their development and adoption will happen **over time** and lead to a **continued improvement** of the process
- This requires moving from trade thinking to **component thinking** with the aim of resolving the physical assembly and connection of the components.
- Government, relevant institutions and academia will have to drive this and contribute.

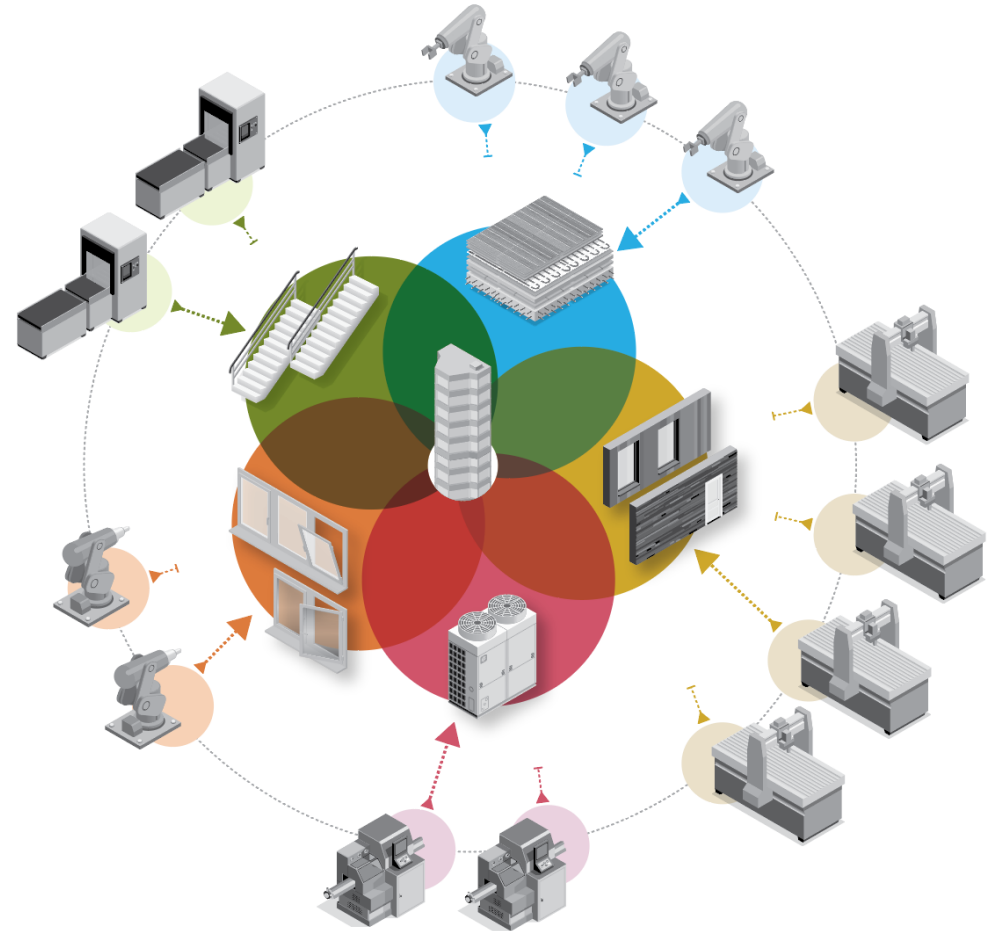
Considering the Lifespan of Components

Lifespan (Years)	Building Element
60+	Frame Openings in the Frame Party Walls
30	Partition Walls Lifts Façade MEP Installation
10	Kitchens Bathrooms

A Platform Approach

Industrialising Construction

- Kit of Parts
- Utilising Industrialised Manufacturing
- Supplier Agnostic
- Addressing and De-risking interfaces
- Construction stage focus



A Platform Focused Approach

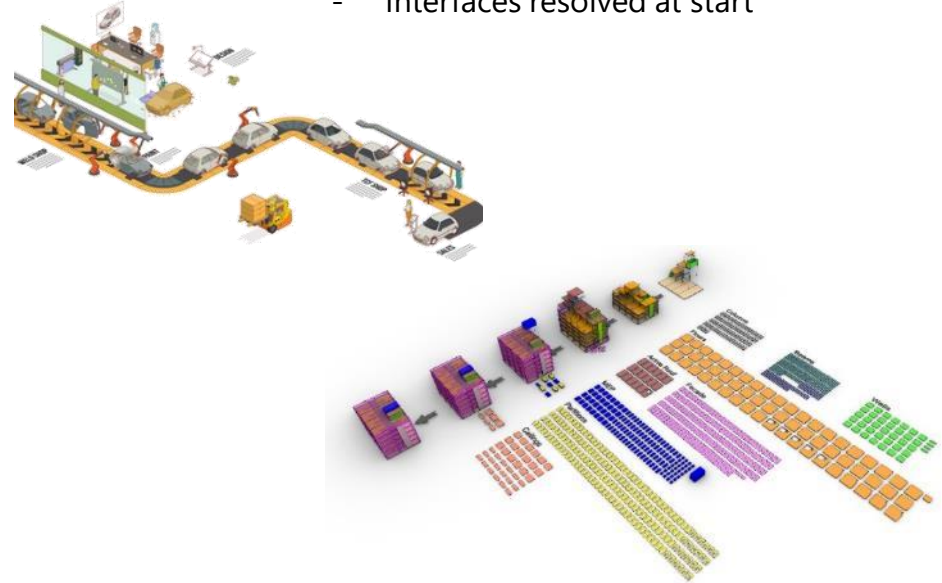
Traditional

- Each Building Bespoke
- Designed from Scratch
- Site focused works
- Interfaces resolved late on

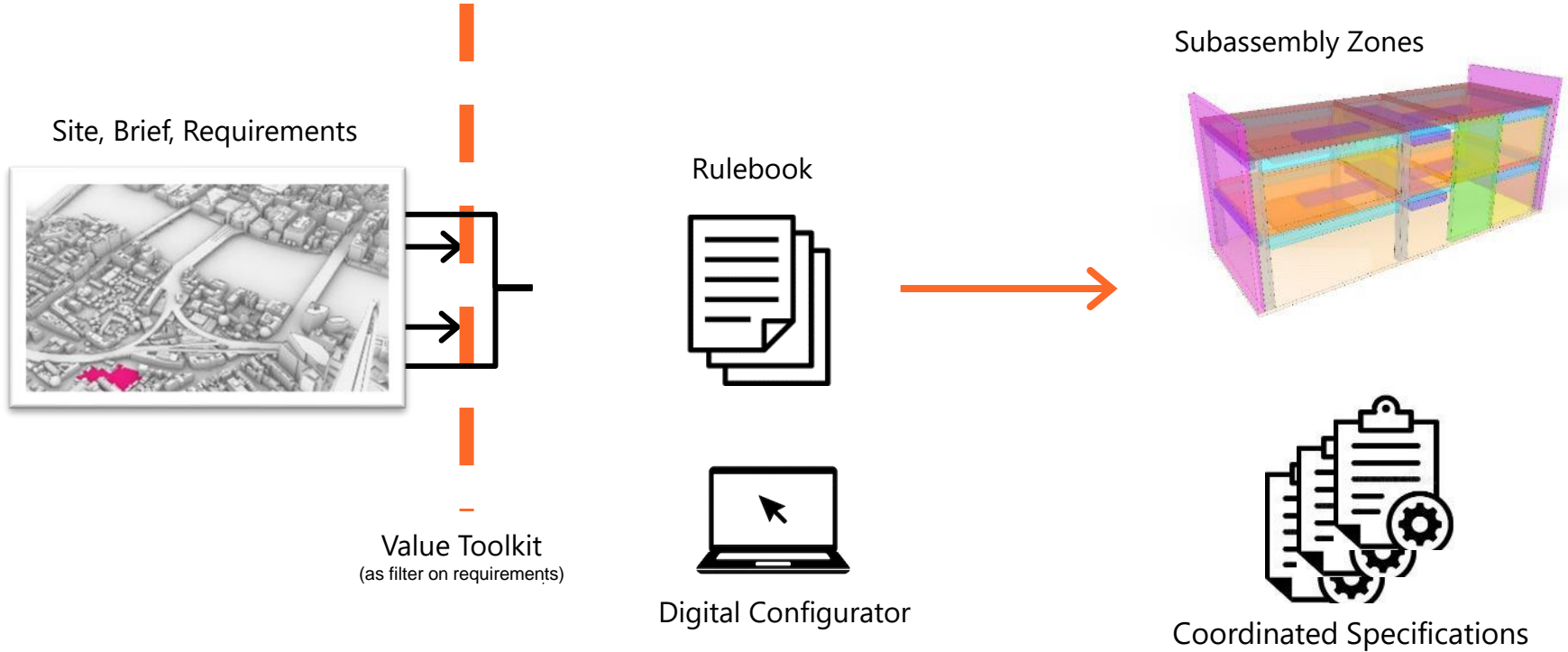


Platform

- Common Building System
- Assembled from kit of parts
- Off site focused
- Interfaces resolved at start

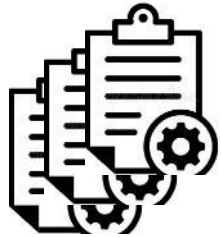
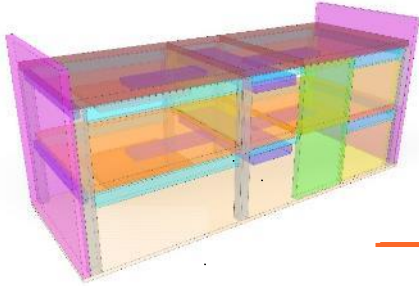


Platform Process Overview



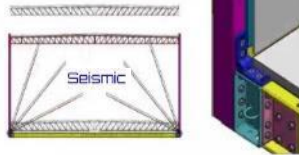
Platform Process Overview

Subassembly Zones

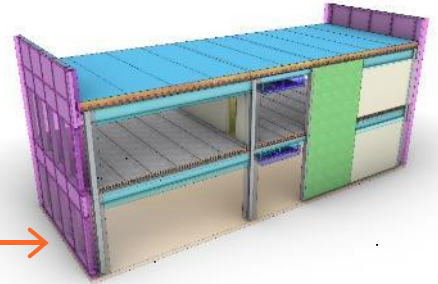


Coordinated Specifications

Sub-Assemblies



Sub-assemblies product offer

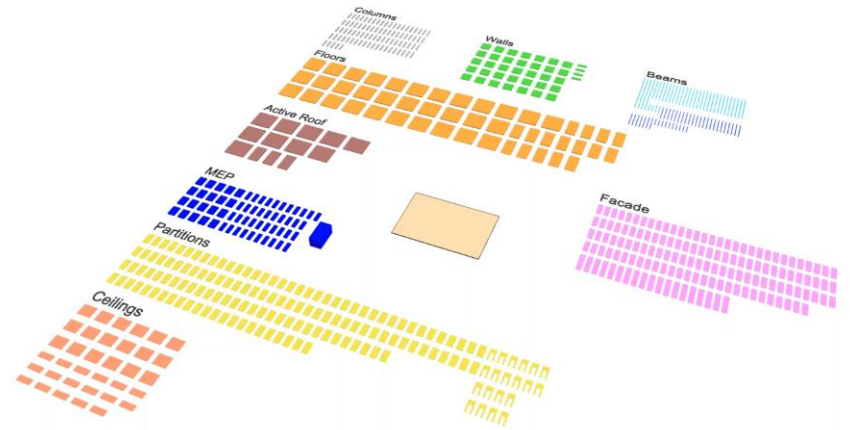
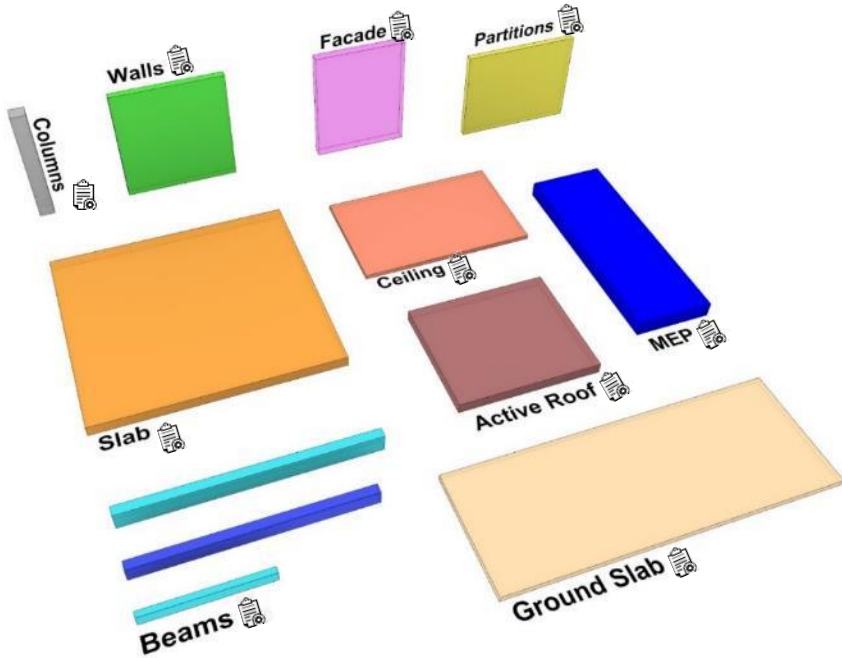


Verified Objects
(Built from Kit of Parts)

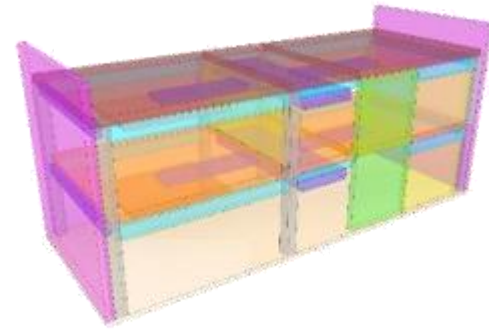
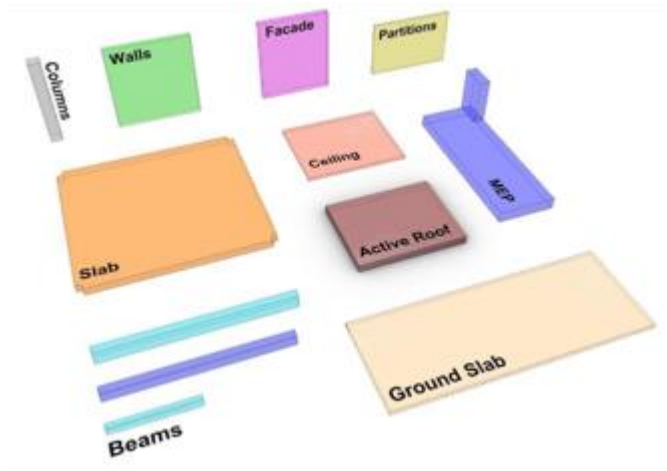


Product Specifications

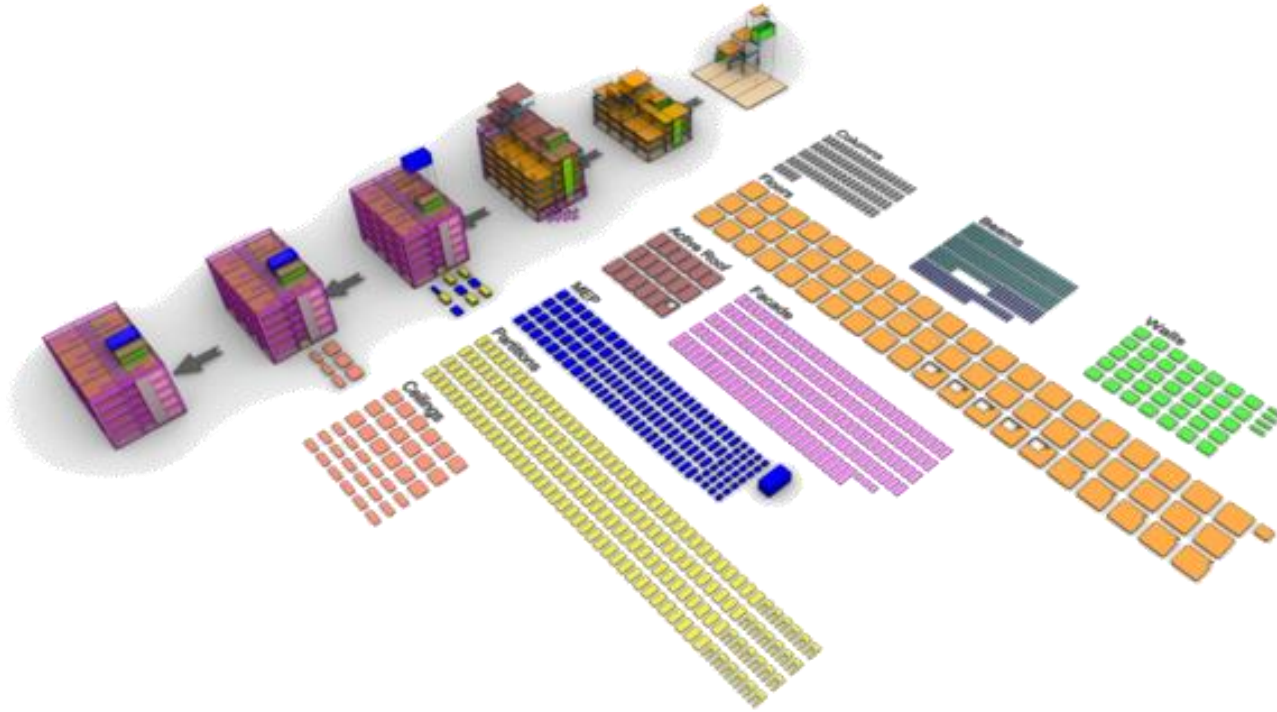
Subassembly Zones and Specifications



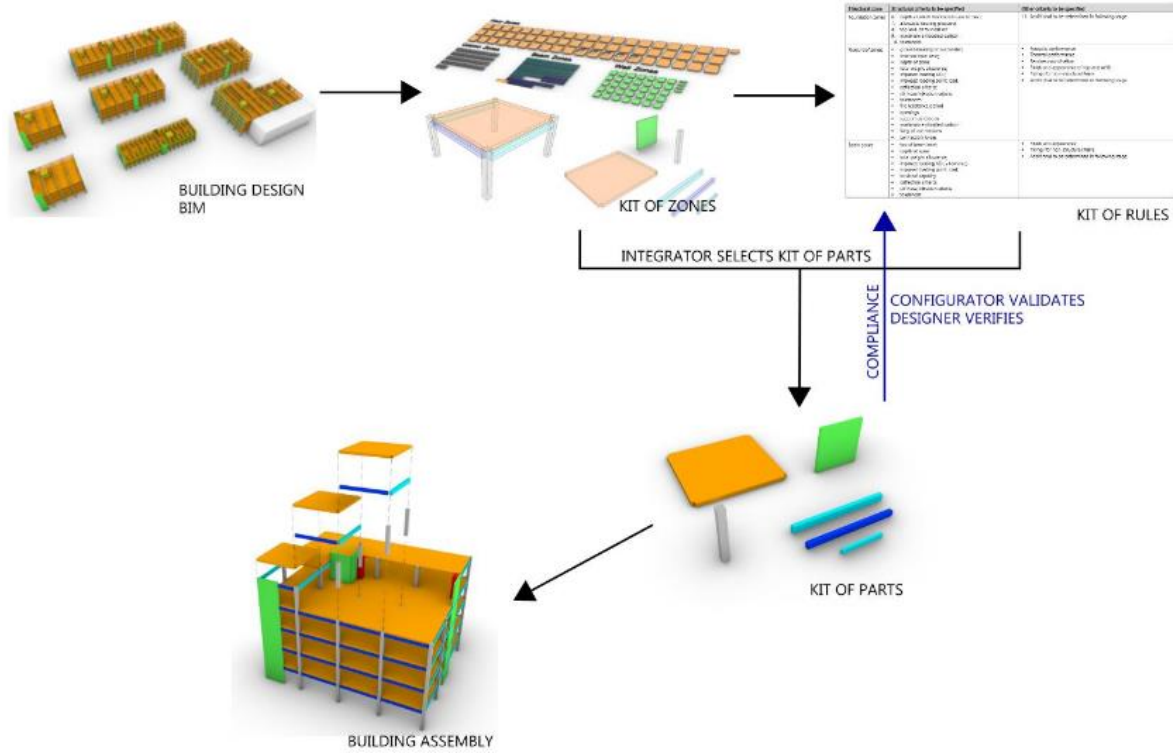
Componentized Prefabrication and Assembly



Digital Construction Platform

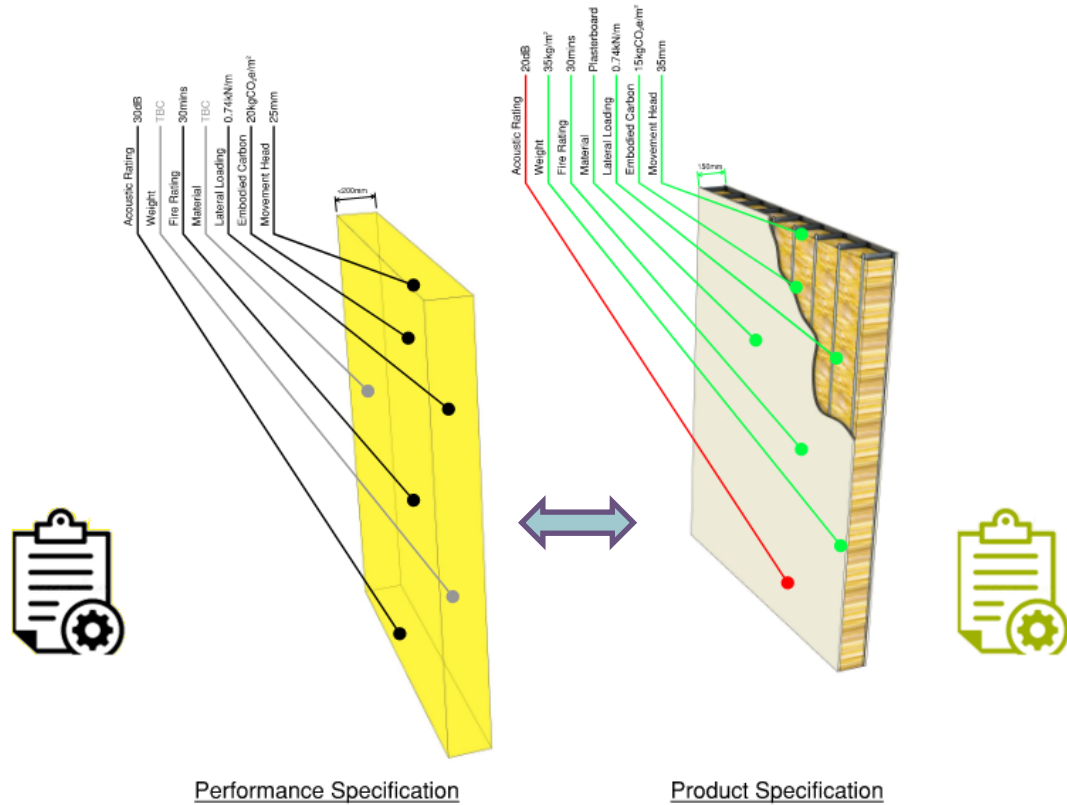


Digital Construction Platform

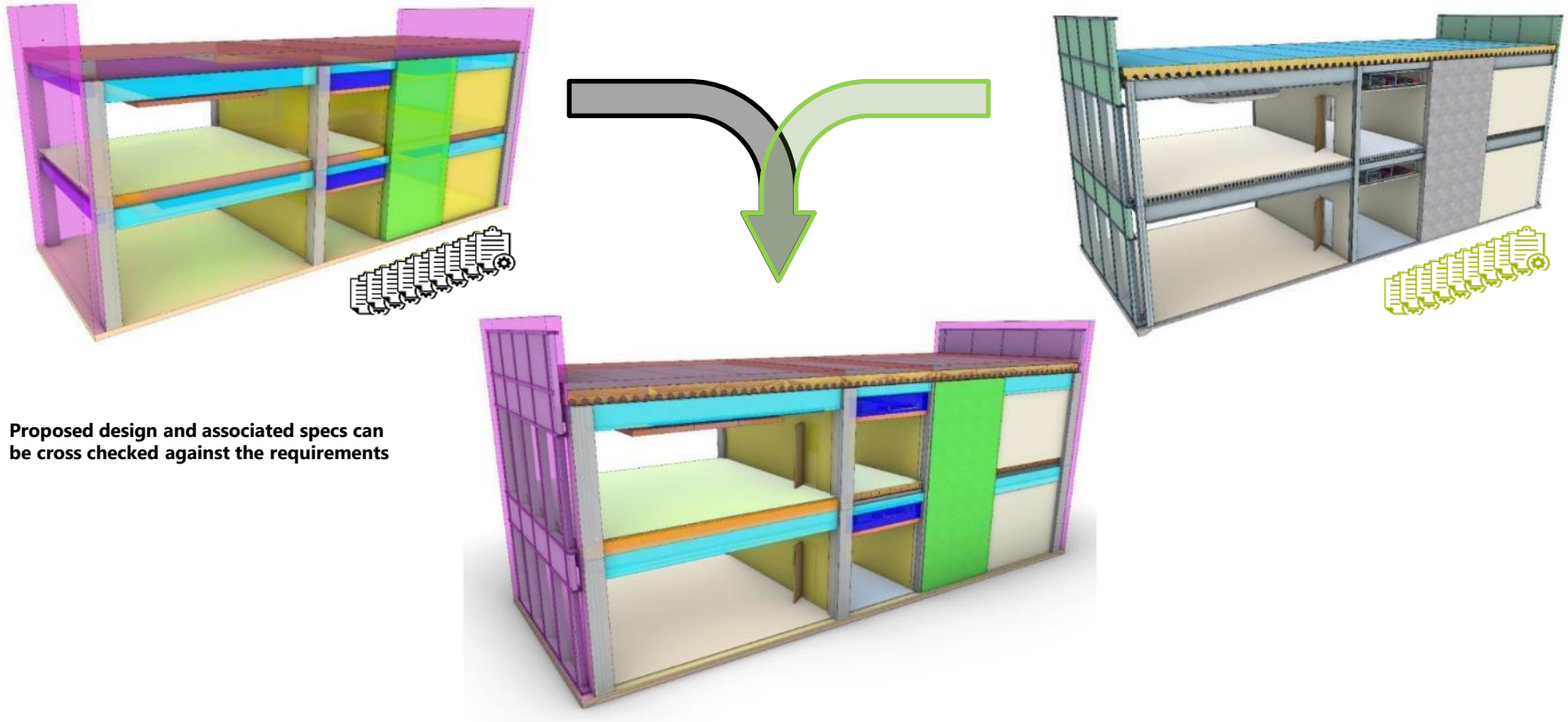


Verification and Validation – Subassemblies

Example: Internal Walls

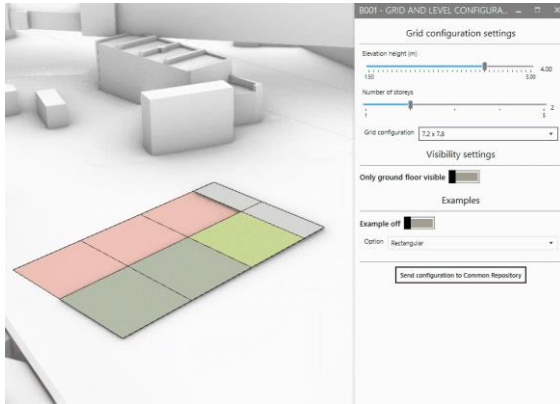


Verification and Validation – Whole Building

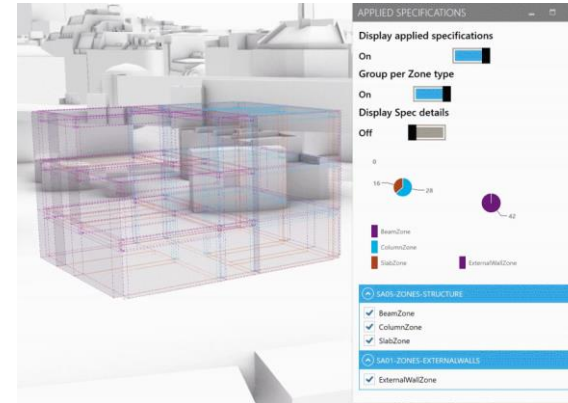


Proposed design and associated specs can be cross checked against the requirements

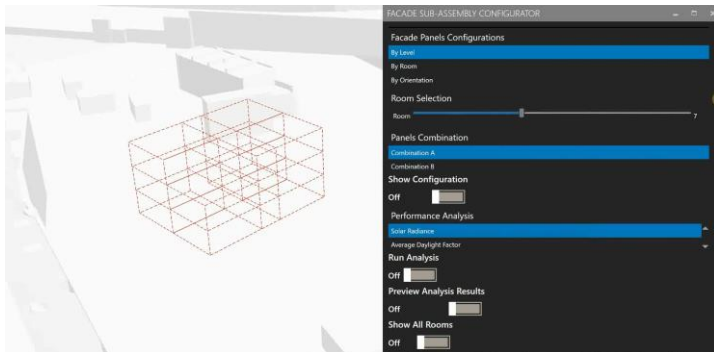
Digital Platform Tools



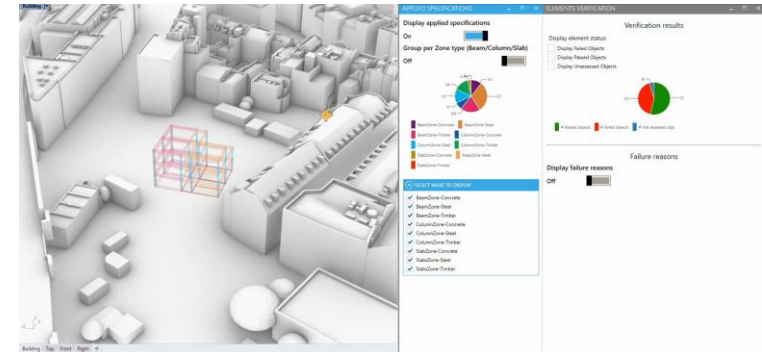
Building Specification



Zones and Performance Spec



Sub Assembly Configuration and Design



Verification and Validation

The background is a solid orange color. It features several light gray, three-dimensional geometric shapes. At the top, there are two inverted trapezoidal shapes. On the right side, there is a large, complex shape composed of several rectangular and trapezoidal faces, resembling a stylized building or a cluster of cubes. At the bottom left, there are two more trapezoidal shapes, one partially overlapping the other.

Programme

Programme

Day 1, 18 April 2024

14:30 - 17:30

Introduction and Keynotes

18:00 - 21:00

Food, Drinks and Networking

Day 2, 19 April 2024

9:00 - 11:00

Panel 1: Designing for Industrialised Construction

11:00 - 11:15

Refreshments

11:15 - 13:15

Panel 2: The Role of Technology

13:15 - 14:00

Lunch

14:00 - 16:00

Panel 3: Architectural Quality

16:00 - 16:15

Closing Remarks

Our Keynote Speakers

Chris Kaufield

Vice President of SaaS Growth, Stoke Space, Seattle

Fabian Scheurer

Professor for Digital Construction Technology and Fabrication, München
Partner at Design-to-Production, Zürich

Our Panellists

Al Fisher

Head of Design Technology, Buro Happold

Christian Kaufmann

Managing Director, Kaufmann Bausysteme

Daniel Wright

Associate Partner, RSHP, London

David Flynn

Co-founder and COO, Kope, London

Erlend Spets

Associate Partner, McKinsey, Oslo

Friedrich Ludewig

Founding Director, Acme, London

Jonathan Roynon

Lead, Industrial Construction, Buro Happold

Mareike Lamm

Partner, Sauerbruch Hutton

Maria Mateo Navarro

Head of Creative Design, ECE, Hamburg

Matthew Holloway

Principal, Grimshaw

Melike Altinisik

Founder, Melike Altinisik Architects

Roland Sitzberger

Partner, Porsche Consulting

Viviana Muscettola

Director, Zaha Hadid Architects, London

Wolfgang Rieder

CEO, Rieder Gruppe

Three Panel Discussions

Panel Discussion 1: Designing for Industrialised Construction

Roland Sitzberger, Jonathan Roynon, Viviana Muscettola, Erlend Spets, Christian Kaufmann

Chair: Wolf Mangelsdorf

Panel Discussion 2: The Role of Technology

Al Fisher, David Flynn, Wolfgang Rieder, Matthew Holloway

Chair: Fabian Scheurer

Panel Discussion 3: Architectural Quality

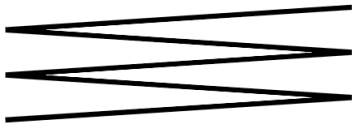
Maria Mateo Navarro, Daniel Wright, Friedrich Ludewig, Mareike Lamm, Melike Altinisik

Chair: Bence Pap



Baerbel Mueller
Claudia Rüssli

Structural
Design



Andrei Gheorghe
Florian Medicus
Eylül Icgören



Greg Lynn
Astrid Trinkbauer



Matt Samuel
Greg Palmer



Boris Schade-Bünsow
Jan Friedrich



Fabrication Gap

We must close the

Fabrication Gap