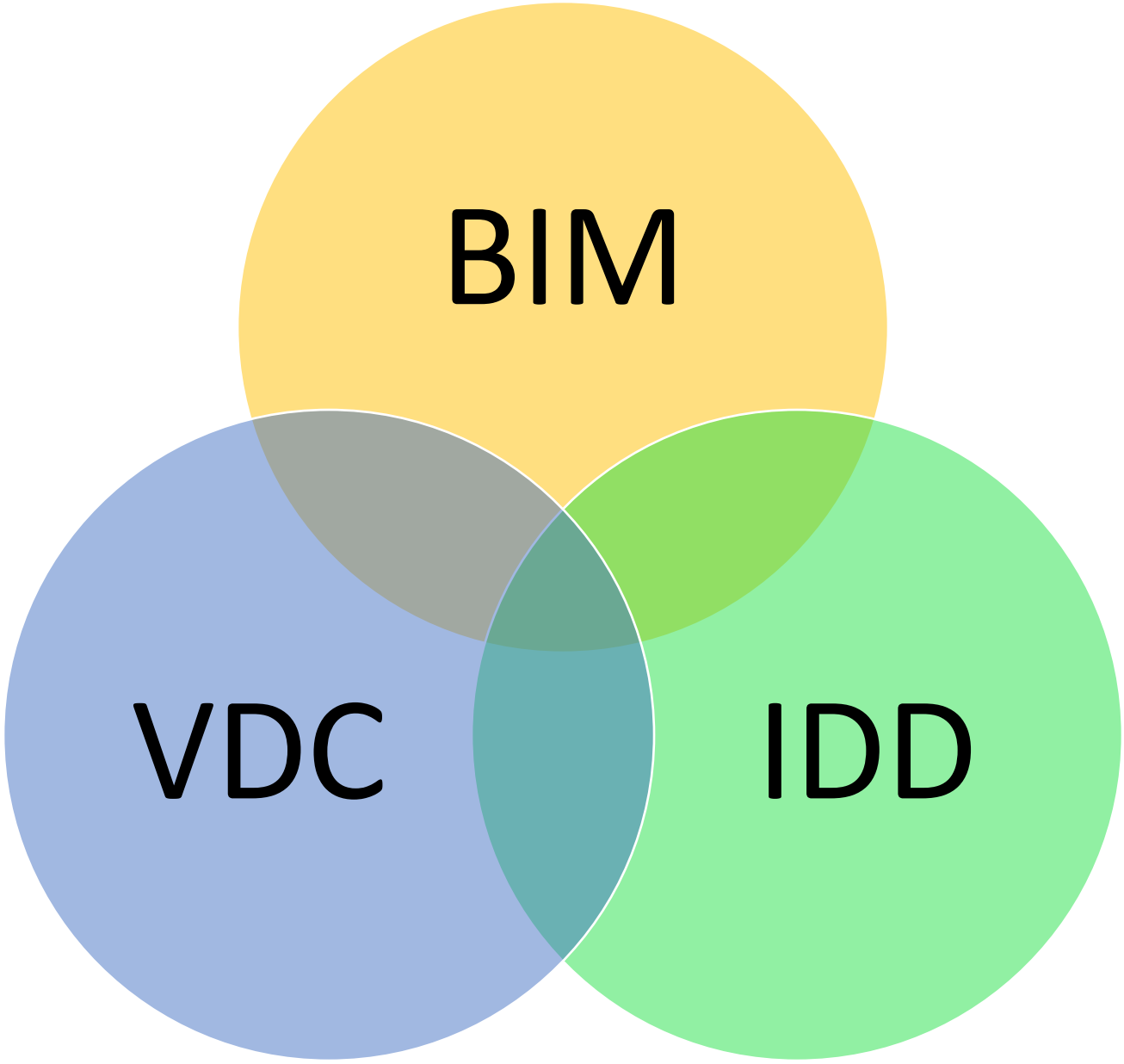
Communauté de pratique en innovation en construction

Le BIM, le VDC et le passage vers la réalisation numérique de projet intégrée (IDD) au Québec

GRIDD ÉTS

Déroulement

11:00 - Intro 5 minutes
11:05 - Présentation partie 01 - Définitions
11:30 - Breakout 01 -
différentiation des concepts
11:45 - Présentation parti 02 - études de cas
12:05 - Break out 02
discussion sur les cas/exemples, défis et besoins pour passer vers le IDD au Québec
12:30 - Plénière
12:45 - Fin


BIM
VDC
IDD

Définitions

« Modélisation des données des infrastructures - BIM

Un processus collaboratif axé sur le développement, l'utilisation, l'échange et la gestion de modèles de données numériques liés à un projet ou à un portefeuille d'infrastructures dans le but d'améliorer sa conception, sa construction et son exploitation. »

Définitions

Virtual Design and Construction:
the use of integrated multi-disciplinary performance models of design-construction projects to support explicit and public business objectives.


CIFE CENTER FOR INTEGRATED FACILITY ENGINEERING

Virtual Design and Construction:
Themes, Case Studies and
Implementation Suggestions

By

John Kunz & Martin Fischer

CIFE Working Paper #097
Version 14; January 2012

STANFORD UNIVERSITY

Définitions

Integrated Digital Delivery (IDD) is the use of digital technologies to integrate work processes and connect stakeholders working on the same project throughout the construction and building life cycle.

Quelques définitions

VDC is an industry management practice that allows multiple stakeholders to engage with the same data, models, and visualizations efficiently and effectively.
VDC methods support the design of a facility and its delivery process and help reduce the costs and maximize the value over its lifecycle. **(CIFE)**

VDC is a combination of new technologies (BIM) with an adequate work and management scheme (PPM), supporting people working together on the project, in an integrated and simultaneous way (ICE). The scheme is focused on achieving the project's objectives, which should help the client to achieve their goals while collecting data and tracking workflow progress. **(BIMcorner)**

Created by Martin Fischer, 2001
CIFE – Center for Integrated Facility Engineering at Stanford

https://cife.stanford.edu/education/workforce-vdc-education

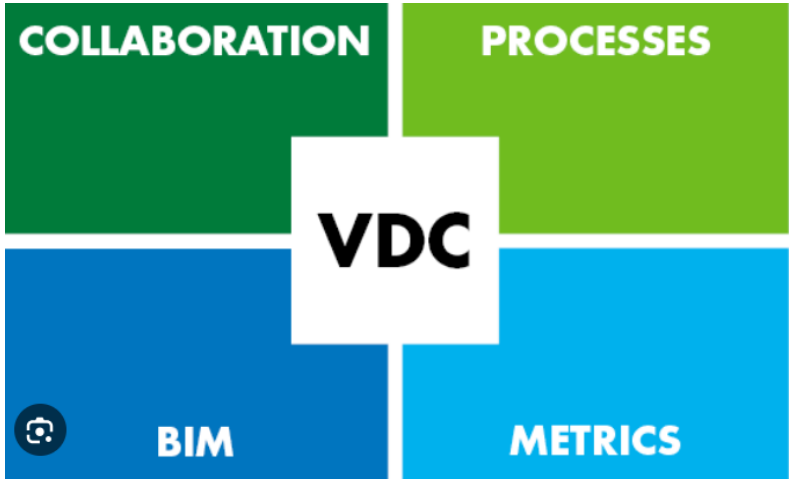
IDD Integrating Digital Delivery **(Singapore):**
IDD is the use of digital technologies to integrate work processes and connect stakeholders working on the same project throughout the construction and building life cycle.
IDD is one of the key thrusts in the Built Environment Industry Transformation Map (BEITM) and is aligned to Singapore's efforts to transform the built environment sector by creating a highly skilled workforce trained in use of the latest architecture, engineering, construction, and operations technologies.

IDD = ISO 19650 at the core (AECON)
Keyword: Integration
Leverages design and construction process and tools with digital information management and innovative construction technologies - to increase productivity, quality and risk management

https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd

Points principaux

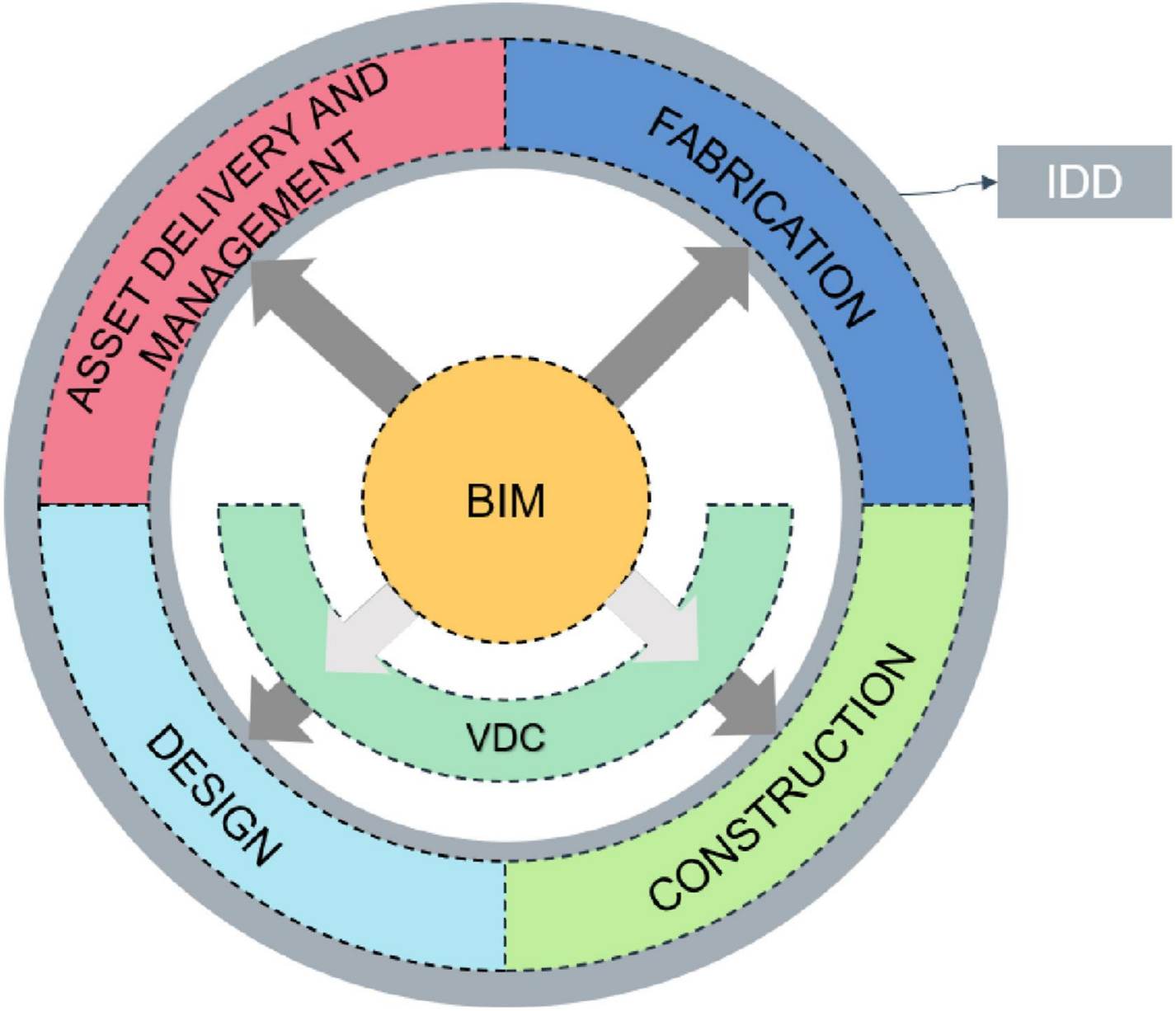
VDC
Virtual Design and Construction



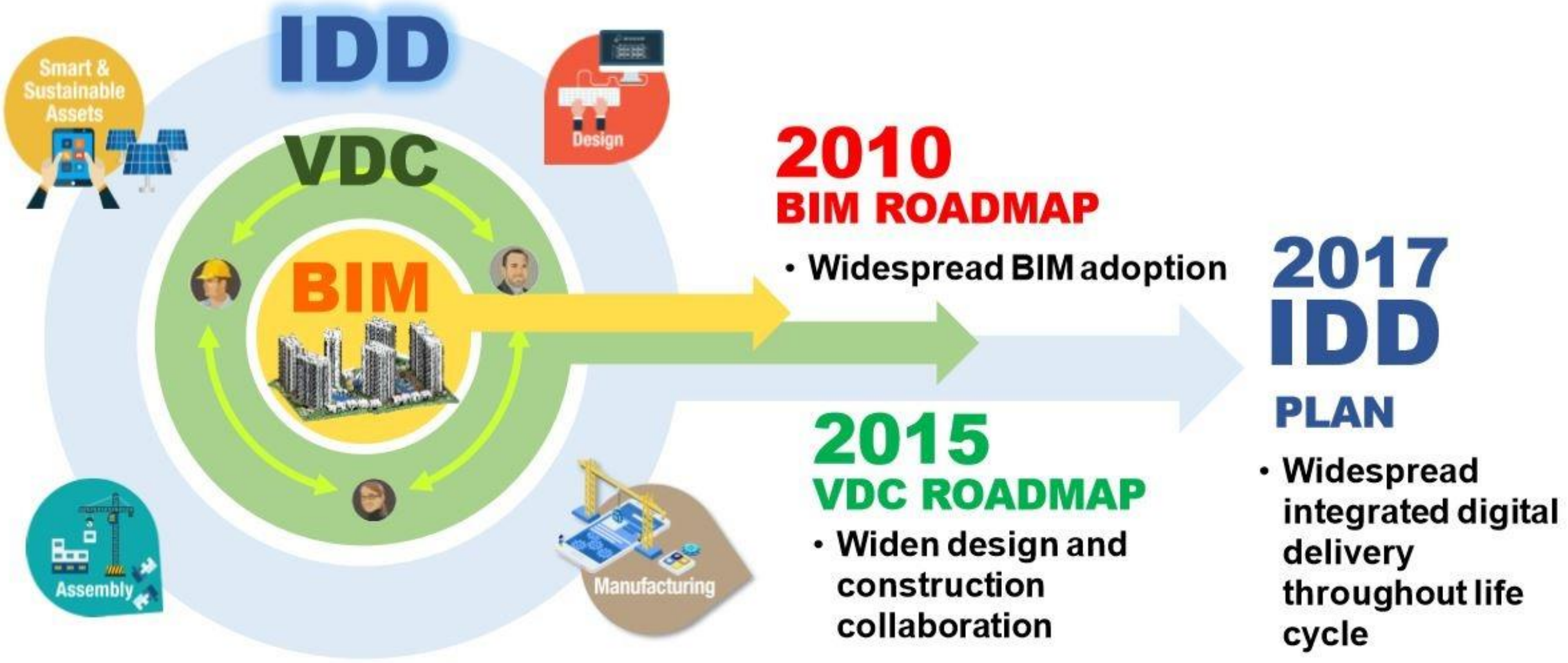
- CIFE, Stanford
- DPR Construction

IDD
Integrated Digital Delivery

- Singapore
- Aecon



Liu et al. 2021

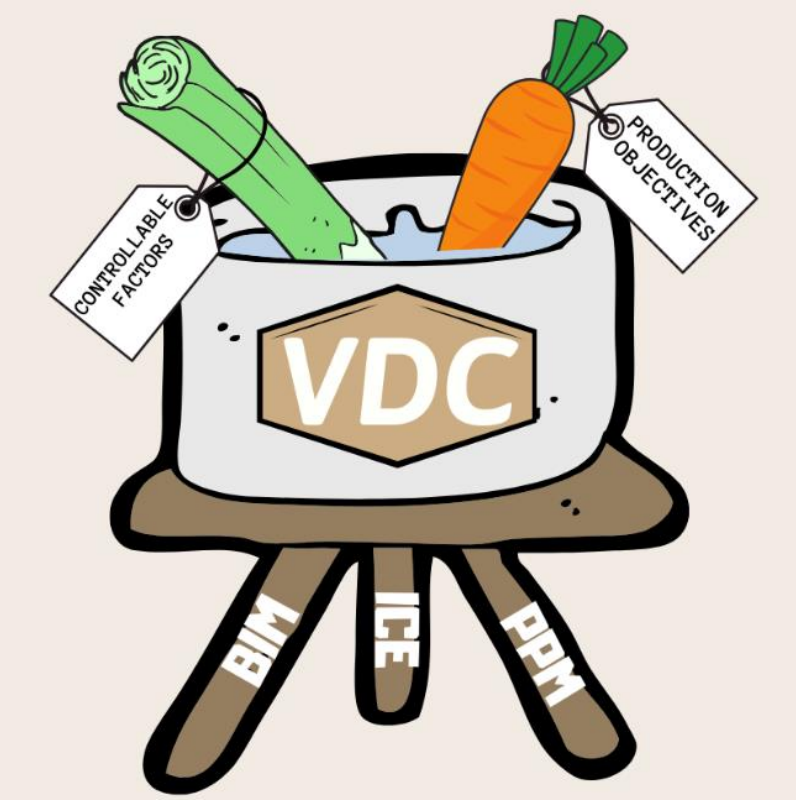

IDD
Smart & Sustainable Assets
Design
VDC
BIM
Assembly
Manufacturing
2010
BIM ROADMAP
• Widespread BIM adoption
2015
VDC ROADMAP
• Widen design and construction collaboration
2017
IDD
PLAN
• Widespread integrated digital delivery throughout life cycle

BCA, 2010

L’essence de la VDC

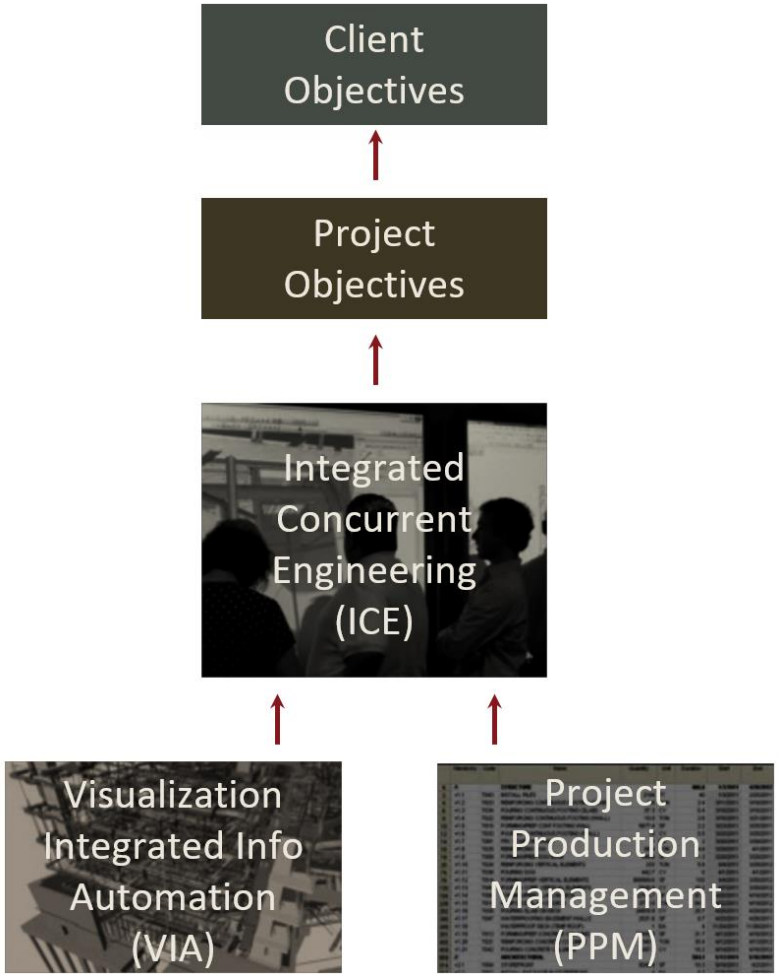
Mesures:

- alignement avec les objectifs
- contrôle de la performance du projet



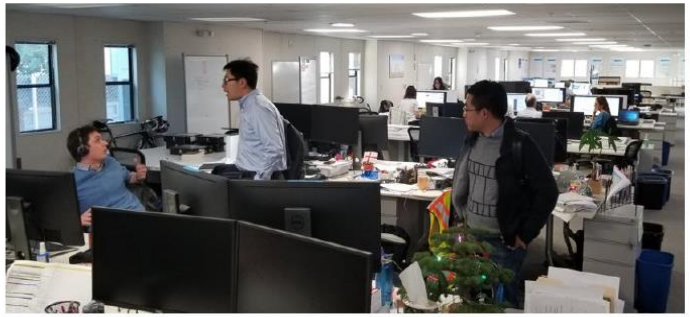
- L'**ICE** (Integrated Concurrent Engineering) travail collaboratif co-situé interdisciplinaire, permettant la réalisation simultanée de travaux de conception.
  - Supporté par des technologies de visualisation (BIM, etc.).
  - Permet d'introduire et de valider des modifications au cours d'une journée de travail.
- **PPM** (Product Production Management) méthode permettant d'établir un processus de production.
  - Ce processus définit le calendrier des flux de travail et les ressources nécessaires.
  - La PPM utilise des outils tels que le Last Planner System ou la méthodologie de planification visuelle pour gérer les processus, basés sur la construction LEAN.
- **BIM** (que vous connaissez déjà)

La structure (framework) du VDC



Source: Prof. Martin Fischer, CIFE

Integrated Concurrent Engineering Sessions



BIM

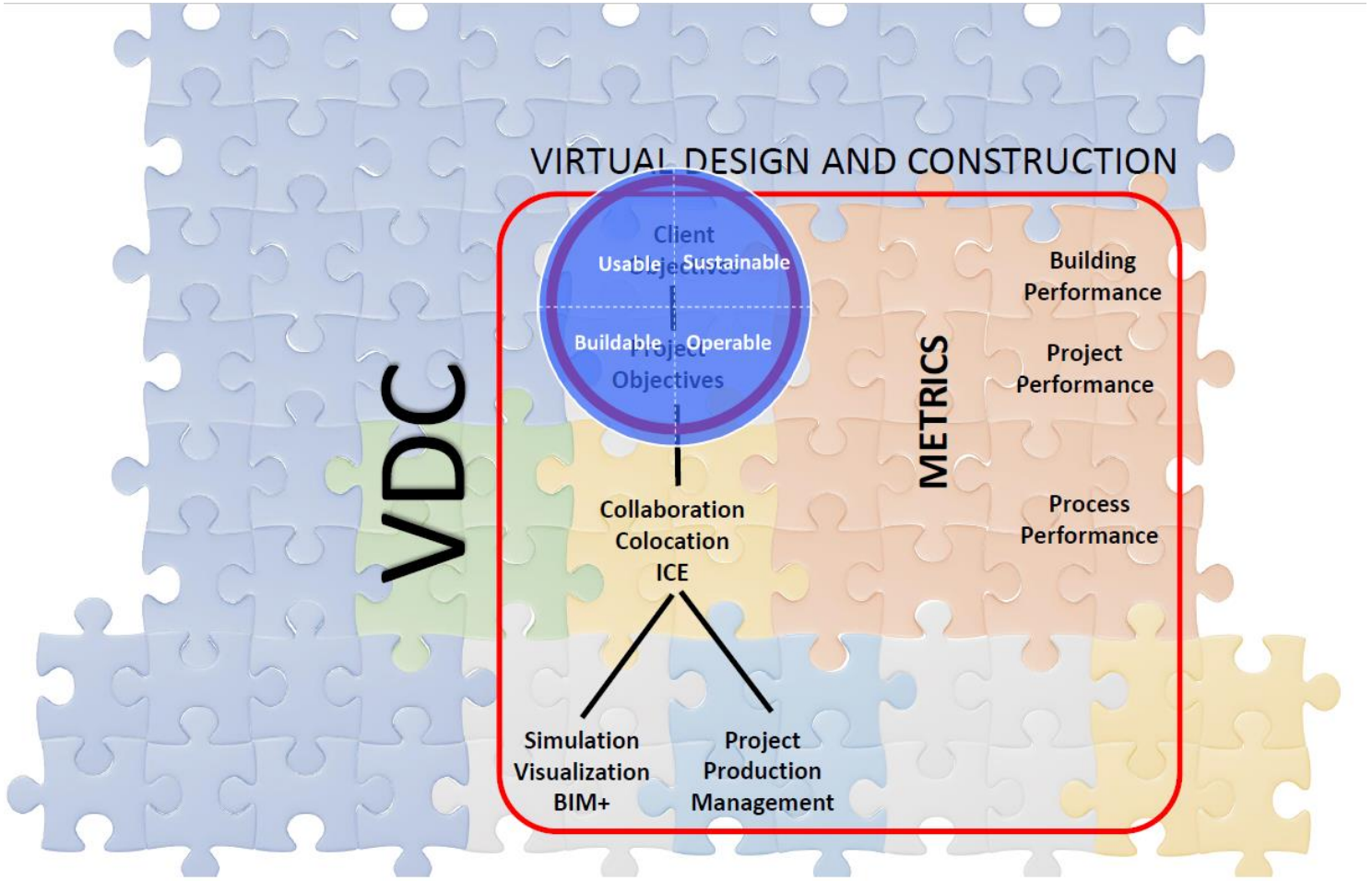
Project Production Management

Source: Leonardo Rischmoller, DPR Construction; CIFE

Intégration de stratégies dans un système complexe

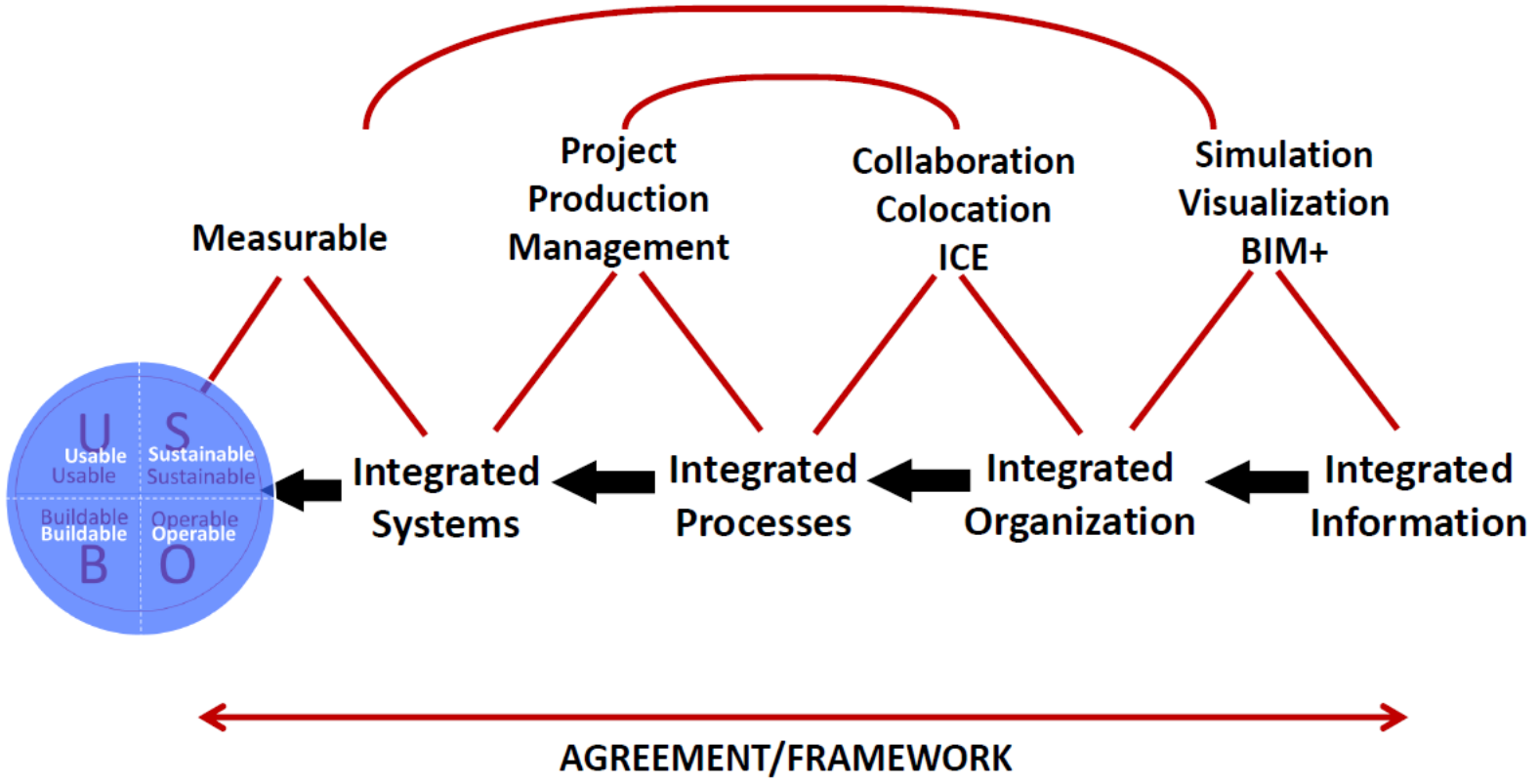
High performance facility:

Usable: functional, safe, comfortable, flexible
Sustainable: Economic, social, environment
Buildable: Lowest total cost, on-time delivery, high quality, injury free
Operable: safe, cleanable, maintainable, energy efficient, adaptable



https://www.dpr.com/view/a-guide-to-the-book-integrating-project-delivery

Un cadre conceptuel ‘simple’ pour l’intégration

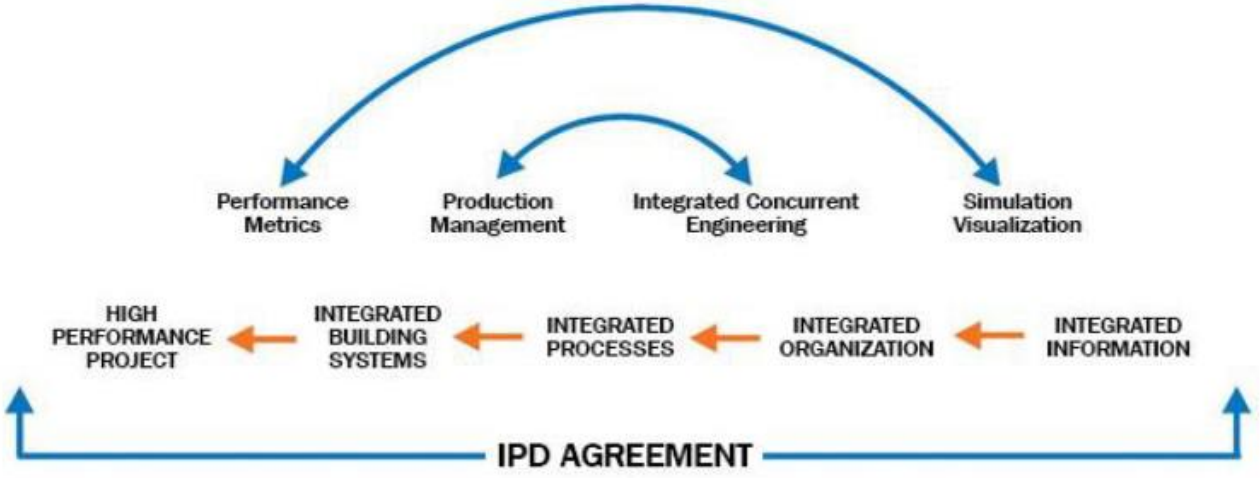


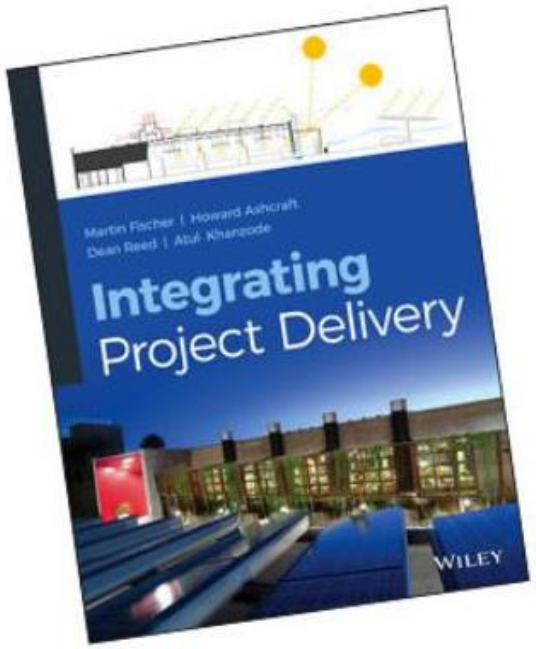
The Simple Framework. From the book “Integrating Project Delivery” by Martin Fischer, Howard W. Ashcraft, Dean Reed, Atul Khanzode. Wiley, March 2017

Integrating Project Delivery (IPD)

Home | Construction | Expertise | Integrating Project Delivery (IPD)

Integrated Project Delivery
a simple framework





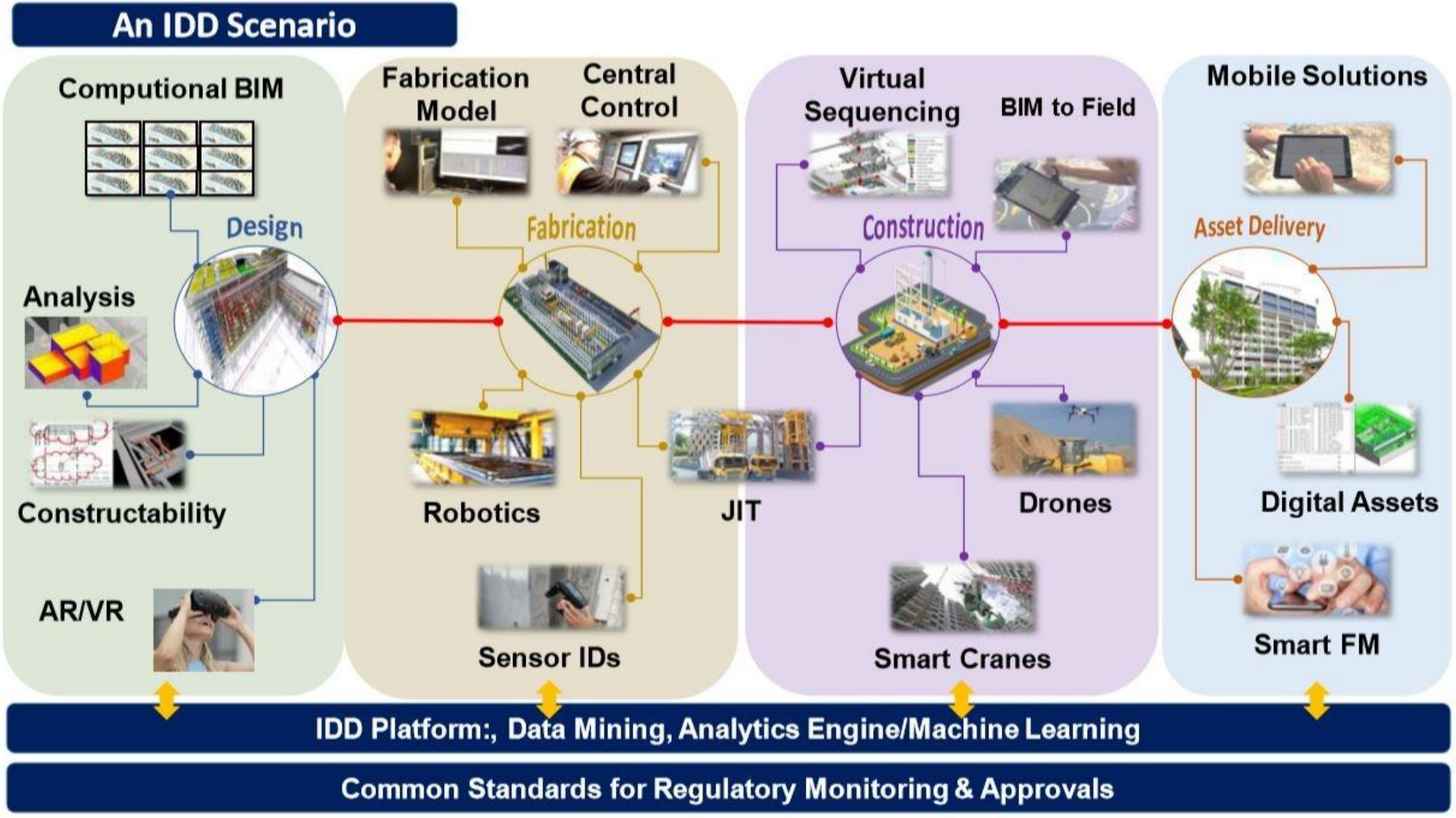
The new book by Martin Fischer, Howard Ashcraft, Dean Reed and Atul Khanzode, details a framework and road map for producing a "building that supports its end users in performing their activities as optimally as possible."

https://www.dpr.com/view/a-guide-to-the-book-integrating-project-delivery

IDD
Integrated Digital Delivery

Singapore

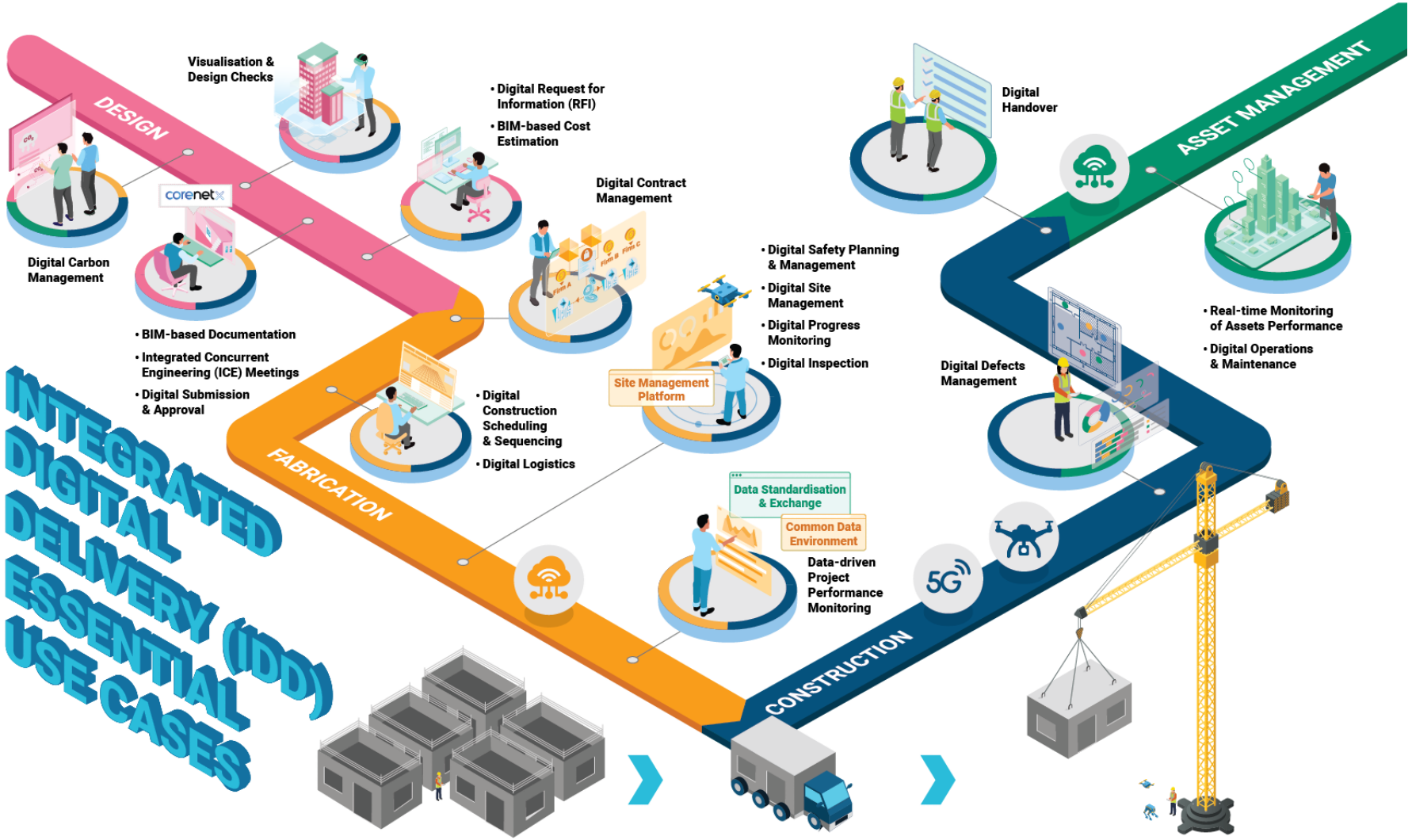
AECON


An IDD Scenario
Computional BIM
Design
Analysis
Constructability
AR/VR
Fabrication Model
Central Control
Fabrication
Robotics
JIT
Sensor IDs
Virtual Sequencing
BIM to Field
Construction
Drones
Smart Cranes
Mobile Solutions
Asset Delivery
Digital Assets
Smart FM
IDD Platform:, Data Mining, Analytics Engine/Machine Learning
Common Standards for Regulatory Monitoring & Approvals

BCA, 2010


Digital Design
Engaging stakeholders to achieve optimised and coordinated design that meets client's, regulatory and downstream requirements.
Design
Fabrication
Digital Fabrication
Translating design to standardised components for automating off-site production.
IDD
Digital Asset Delivery & Management
Real time monitoring for operations and maintenance to enhance asset values.
Asset Delivery & Management
Construction
Digital Construction
Just in time delivery, installation and monitoring of on-site activities to maximise productivity and minimise rework.
FLOOR 8
FLOOR 7

BCA, 2025


DESIGN
Visualisation & Design Checks
• Digital Request for Information (RFI)
• BIM-based Cost Estimation
Digital Contract Management
corenetx
Digital Carbon Management
• BIM-based Documentation
• Integrated Concurrent Engineering (ICE) Meetings
• Digital Submission & Approval
FABRICATION
• Digital Construction Scheduling & Sequencing
• Digital Logistics
• Digital Safety Planning & Management
• Digital Site Management
• Digital Progress Monitoring
• Digital Inspection
Site Management Platform
Data Standardisation & Exchange
Common Data Environment
Data-driven Project Performance Monitoring
CONSTRUCTION
5G
Digital Handover
ASSET MANAGEMENT
• Real-time Monitoring of Assets Performance
• Digital Operations & Maintenance
Digital Defects Management
INTEGRATED DIGITAL DELIVERY (IDD) ESSENTIAL USE CASES
Specifying clear IDD requirements to align expectations and minimise disputes
Issuing BIM contractual models to reduce remodelling efforts and improve coordination
Setting Model Content Requirements (MCR) to enhance standardisation and communication
Using Common Data Environment (CDE) to manage data effectively and facilitate collaboration

BCA, 2025

19 usages principaux: 1 à 5

IDD Essential Use Cases	Definitions	Digital Deliverables	Digital Means	Applicability vis-à-vis Building Lifecycle
1. Digital Carbon Management	Use digital platform or technology to compute, manage and analyse embodied and operational carbon emissions associated with the building works	• Digital calculations of carbon emission • Records of embodied carbon • Simulation of operational carbon • Visualisation of carbon emission data	• Common Data Environment (CDE) • Building Information Modelling (BIM) Authoring Tool • Digital Carbon Calculator	✓ Design ✓ Fabrication ✓ Construction ✓ Asset Management
2. Visualisation and Design Checks	Utilise BIM, digital 3-dimensional model or immersive technology to visualise, seek feedback and validate the design of the building works	• BIM or other digital 3D models • Rendered models	• Common Data Environment (CDE) • BIM Authoring Tool • Immersive & Visualisation Tool	✓ Design ✓ Fabrication ✓ Construction
3. BIM-based Documentation	Use digital technology to prepare documents relating to the building works based on information primarily generated/derived from a BIM model	• BIM • Drawings derived from BIM	• Common Data Environment (CDE) • BIM Authoring Tool	✓ Design ✓ Fabrication ✓ Construction
4. Integrated Concurrent Engineering (ICE) Meetings	Conduct an integrated concurrent engineering meeting in relation to the building works using digital platform and BIM	• Digital records of decisions, actions to be taken and party responsible	• Common Data Environment (CDE) • BIM	✓ Design ✓ Fabrication ✓ Construction
5. Digital Submission and Approval	Use digital platform to submit and obtain approval relating to the design and construction or any variation of the building works for regulatory compliance and project management	• Tracking of design issues, comments, submission, and revision records • Decision records	• Common Data Environment (CDE) • CORENET X	✓ Design ✓ Fabrication ✓ Construction

https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd

19 usages principaux: 6 à 11

IDD Essential Use Cases	Definitions	Digital Deliverables	Digital Means	Applicability vis-à-vis Building Lifecycle
6. Digital Request for Information (RFI)	Use digital platform to request for information to facilitate communication, tracking and resolution of issues arising from the building works	• Issues and resolution dashboards • Digital notes of discussion • Updates to BIM model	• Common Data Environment (CDE) • BIM Authoring Tool	✓ Design ✓ Fabrication ✓ Construction
7. BIM-based Cost Estimation	Use digital models to estimate quantity and costs at various stages of the building works	• Costing models • Costing and quantity take-off documentation	• BIM • Digital Quantity Surveying and Valuation Tool	✓ Design ✓ Fabrication ✓ Construction
8. Digital Contract Management	Use digital platform to manage contracts, claims, verification of building works and payments	• Digital procurement orders • Digital payment claims • Digital records of completion	• Common Data Environment (CDE) • Digital Contract Management System	✓ Fabrication ✓ Construction
9. Digital Construction Scheduling and Sequencing	Use digital models to simulate sequencing and scheduling of the construction activities of the building works	• Construction schedules and sequencing models	• Common Data Environment (CDE) • BIM • Digital Planning Tool	✓ Fabrication ✓ Construction
10. Digital Logistics	Use digital platform to plan production schedule of prefabricated components for the building works, and digitally track and monitor the production, delivery and installation of the components	• Production schedules • Digital logistics delivery records	• Common Data Environment (CDE) • BIM • QR Code/ RFID	✓ Fabrication ✓ Construction
11. Digital Safety Planning and Management	Use digital model for safety planning and digital platform to record and manage safety compliances, incidents, and observations	• Design for safety reports • Permit-to-work records • Records for safety incidents & observations • CCTV surveillance records	• Common Data Environment (CDE) • Site Management Platform (SMP) • Video Analytics	✓ Fabrication ✓ Construction

19 usages principaux: 12 à 16

IDD Essential Use Cases	Definitions	Digital Deliverables	Digital Means	Applicability vis-à-vis Building Lifecycle
12. Digital Site Management	Use digital platform to coordinate and monitor the various activities, manpower, resources and processes involved in managing a construction site	• Structured site management data	• Common Data Environment (CDE) • Site Management Platform (SMP)	✓ Fabrication ✓ Construction
13. Digital Progress Monitoring	Use digital solutions to track and monitor the progress of the building works	• Records of site progress photos or scanned models • Progress reports (actual vs planned)	• Common Data Environment (CDE) • Site Management Platform (SMP) • BIM • Reality Capture • Laser Scanning • Drones	✓ Fabrication ✓ Construction
14. Digital Inspections	Use digital platform to record the observations from site inspections of the building works and track the necessary follow-up actions taken	• Records of site inspections • Audit trails of resolutions/ approvals	• Common Data Environment (CDE) • Site Management Platform (SMP) • Reality Capture	✓ Fabrication ✓ Construction
15. Data-driven Project Performance Monitoring	Use digital platform to consolidate site data across multiple systems and leverage data analytics for project performance monitoring of the building works via a dashboard	• Project performance metrics	• Common Data Environment (CDE) • Dashboard	✓ Fabrication ✓ Construction
16. Digital Defects Management	Use digital platform to manage and track the defects of the building works and their rectification	• Defects reports • Defects rectification reports	• Common Data Environment (CDE) • Site Management Platform (SMP) • Digital Defects Management Platform	✓ Construction ✓ Asset Management

https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd

19 usages principaux: 17 à 19

IDD Essential Use Cases	Definitions	Digital Deliverables	Digital Means	Applicability vis-à-vis Building Lifecycle
17. Digital Handover	Use digital platform to generate and digitally handover: (i) digital model of a physical asset that is built as part of the building works; and (ii) any other documents relating to the physical asset	• Digital asset models • Any other documents relating to the physical asset, including but not limited to the following: - As-built records - Manufacturer's specifications and warranties - Operation and maintenance manuals	• Common Data Environment (CDE)	✓ Construction ✓ Asset Management
18. Real-time monitoring of assets performance	Set up a digital platform to monitor the real-time performance based on key operating parameters of a physical asset that is built as part of the building works	• Digital platform for building performance tracking	• Building Management System (BMS) • Asset Performance Dashboard •	✓ Asset Management
19. Digital operations and maintenance	Set up a digital platform to integrate other technologies to perform the operations or maintenance of a physical asset that is built as part of the building works	• Digital platform for operations and maintenance	• Operational Dashboard	✓ Asset Management

https://www1.bca.gov.sg/buildsg/digitalisation/integrated-digital-delivery-idd

IDD @ Aecon
IDD = ISO 19650 ‘at the core’

- Mot clé: Intégration
- Leverages design and construction process and tools with digital information management and innovative construction technologies
- To increase productivity, quality and risk management

Expanded use of 3D modelling (BIM) and GIS (Digital asset mapping) to fully integrate schedule and cost (i.e. the “4th and “5th” dimensions).

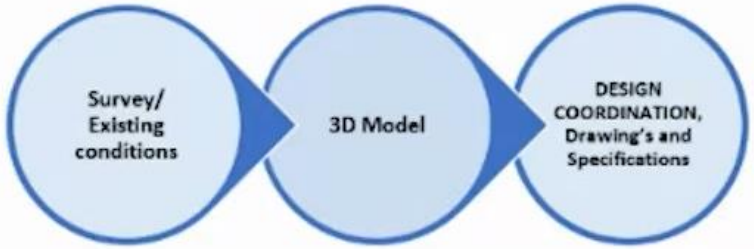
- Real time view on schedule and cost impacts
- Connects the design in the field through mobile tools and 3D digital imaging
- Validation drawing extraction and model
- Tracking of issues and field changes vs planned design
- Digital tracking of materials and pre-fabricated items

IDD approach is being utilized on several current Aecon projects, including our bid projects, Gardiner Expressway Rehabilitation, 401HOT Expansion, REM, Finch West LRT and Comox Water Treatment Projects.

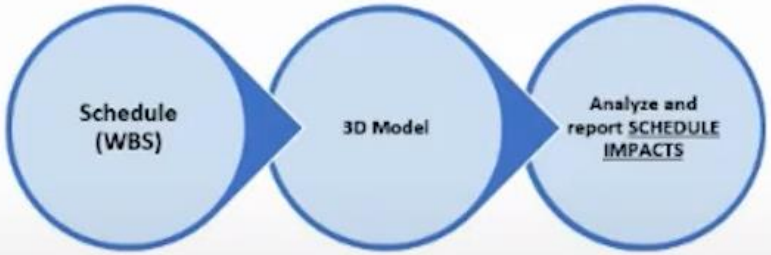
Aecon’s

IDD – Our minimum standard (3D/4D/ 5D)

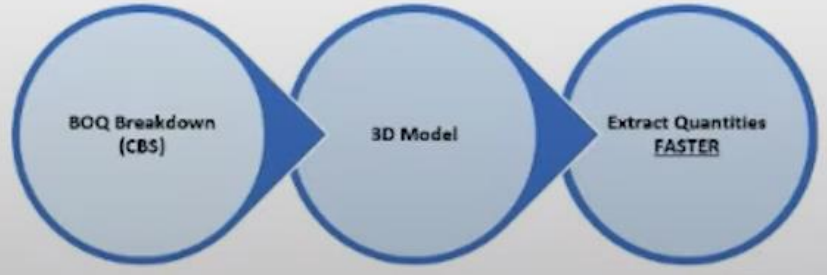
Design in 3D, as per the golden rules and extract drawings for detailing within this environment (2D)

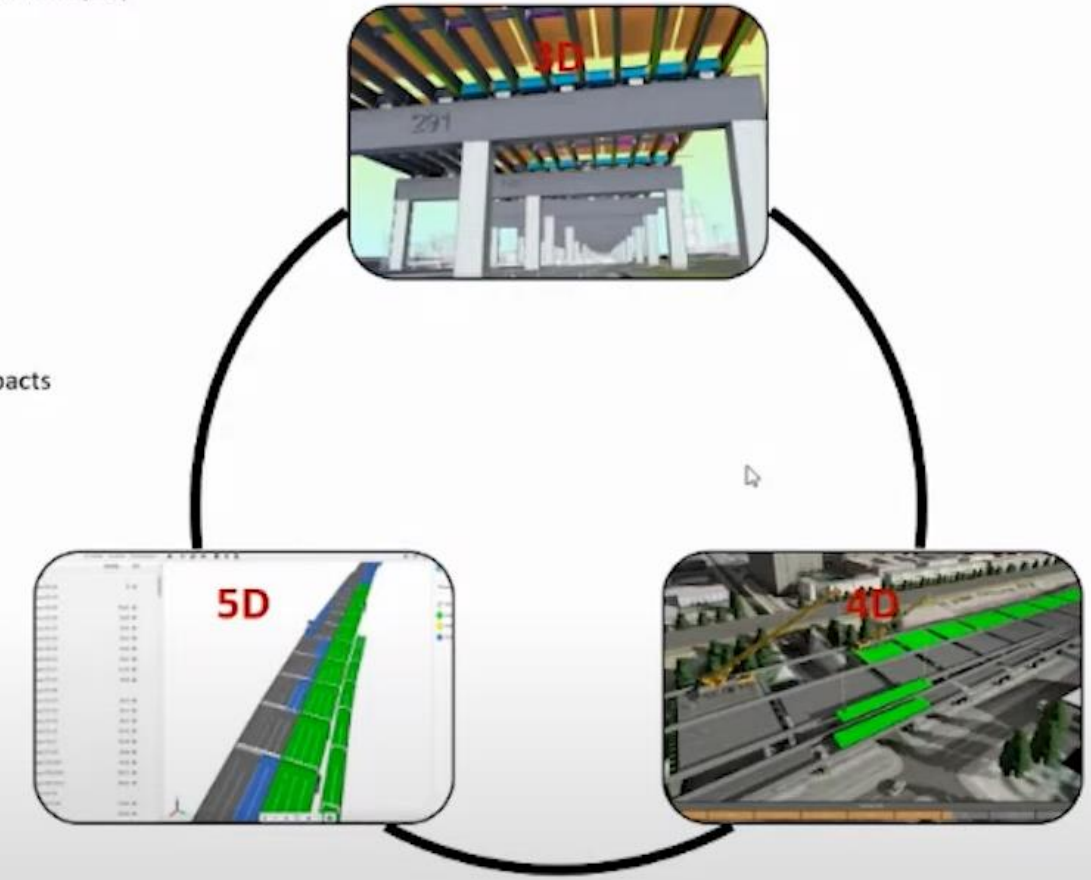


Connect the live schedule (4D) for planning and tracking progress and understanding impacts



Extract Quantities (5D) from the 3D design faster and connect to the BOQ





https://youtu.be/H5rq0SN7kSY

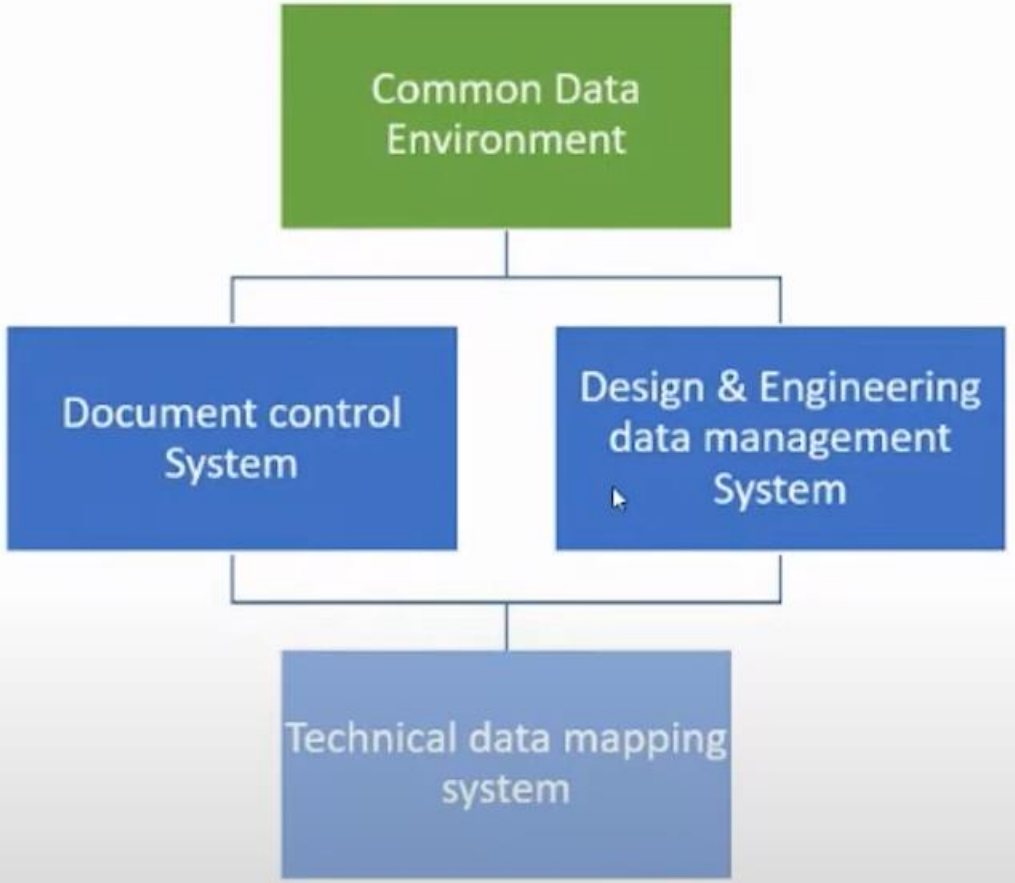
AECON

IDD – Implementation of ISO 19650 – The CDE

Aconex: Project Document control system
- All project documentation
- Transmittal/ RFI Management etc.
- Client and supplier communications

BIM 360: Project Design & Engineering data management system
- Design and Engineering CAD Data
- Design and Engineering BIM Data
- Land Survey Data (LiDAR/ Topographical data etc.)
- Field data capture (mobile)

Arc GIS (AeGIS): Technical data mapping system
- Mapping of design and engineering BIM and CAD data linked to key reports, documents and drawings
- Mapping of civil/ infrastructure data (utilities, ground investigation data etc.)
- Mapping of client background data
- Mapping of project land survey data



IDD – Critical setup of the CDE

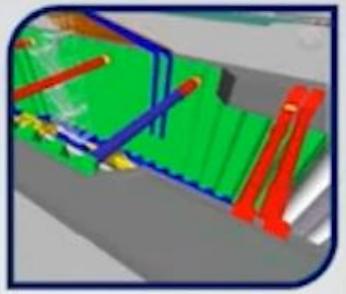
Suitability Code	Status Description
S0	Initial Status/ WIP
S1	Issued for Coordination
S2	Issued for Information
S3	Issued for Review/ Comment
S4	Issued for Construction Approval
D2	Issued for Proposal (For Client acceptance)
A	Issued for Construction (no comments)
B	Partial Sign off/ for construction
AB	As-Built
AC	As-Constructed
XX	Cancelled

IDD – Executive and Project Director buy in to the approach

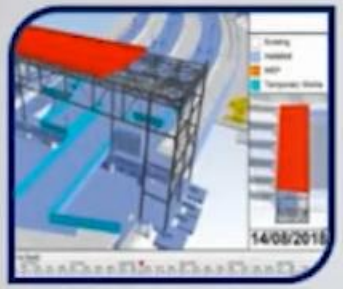
Common Data Environment (CDE)

Geographical Information System (GIS)

3D - Digital Project Information Modelling



Digital Validation and Coordination



4D – Digital Planning + Logistics construction Management

5D – QTO & Cost Assignment

Digital As-built Capture

6D – Sustainability (Carbon calc./ Energy Modelling and Analysis/ Life Cycle Costing)

Data Analytics *(Project Controls integration)*

IDD Field Solutions *(mobile and emerging technologies such as VR/ AR)*

Digital H&S Recording

7D – Asset info exchange & FM

- Break it down
- Areas of IDD defined
- Focus on the project needs
- Capture the benefits and the technical requirements

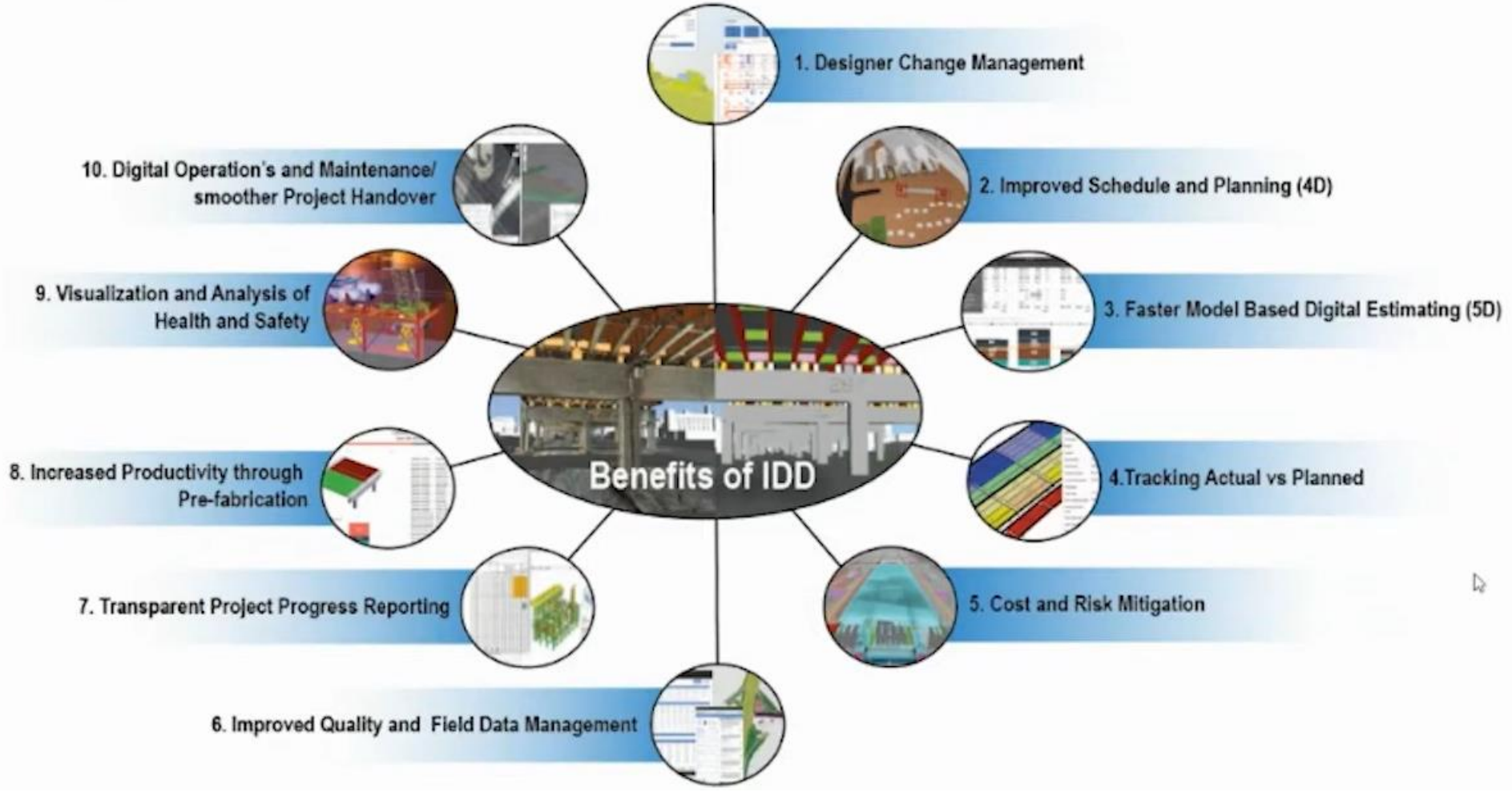
IDD – Executive and Project Director buy in

Area	Benefits	Standards/ Requirement	IDD Output Project Risk & Opportunities	Quality and Compliance	Ownership/ Responsibility	
CDE (Common Data Environment) Management & sharing of all key project information, documentation, models, and drawings  Software implemented: • Assemble Systems • Aconex • BIM 360	Project Data Management (NB Document **and** CAD management to be considered) Ensuring the right information, to the right people, at the right time Tracked and documented process for the issuing and receiving of information 3D Coordination of received 2D design within the Assemble environment.	ISO19650 Master Information Delivery Plan (**MIDP**) & Model Production Delivery Table (**MPDT**) used for BIM and Information Management through the CDE	***Project information becoming difficult to manage and maintain*** CDE will manage information through the IS019650 workflow and ISO19650 Suitability Codes. ***Staged handover of information*** Information verified and created in the correct template and format for Handover at the start of the project with client requirements for handover to O&M ***Precast Panel Validation*** Use of the Assemble platform to validate, manage and report coordination of point cloud survey data vs 3D design. ***Deliverables Management*** Tracking of through a master information management plan to enable alignment of subcontractor deliverables with construction deliverables and tracking through reporting. ***Construction Planning - Advanced Work Packaging*** Breaking down the received design to align with construction work packages and aligning them with sub-contractor work packages.	***Management of pre-cast quality assurance*** The Assemble platform will be used to coordinate the received design with the topographical survey data to support logistics' and construction management requirements.	*Guidance Note: Management & implementation of CDE to be facilitated by:* - *Client* - *Project management team* - *BIM team* - *Design Teams* Management and Coordination of the project CDE: - BIM Team - Document Control Manager - Project Controls lead - Commercial Manager	Aecon IDD Phase 1 Requirement

IDD Benefits Realized

Aecon's IDD Strategy is to support Aecon Forward **Key Focus Area #2** – "Embrace project complexity and ensure continuous risk management, which is embedded as part of the Complex Project Requirements under PRC Policy 2.10.

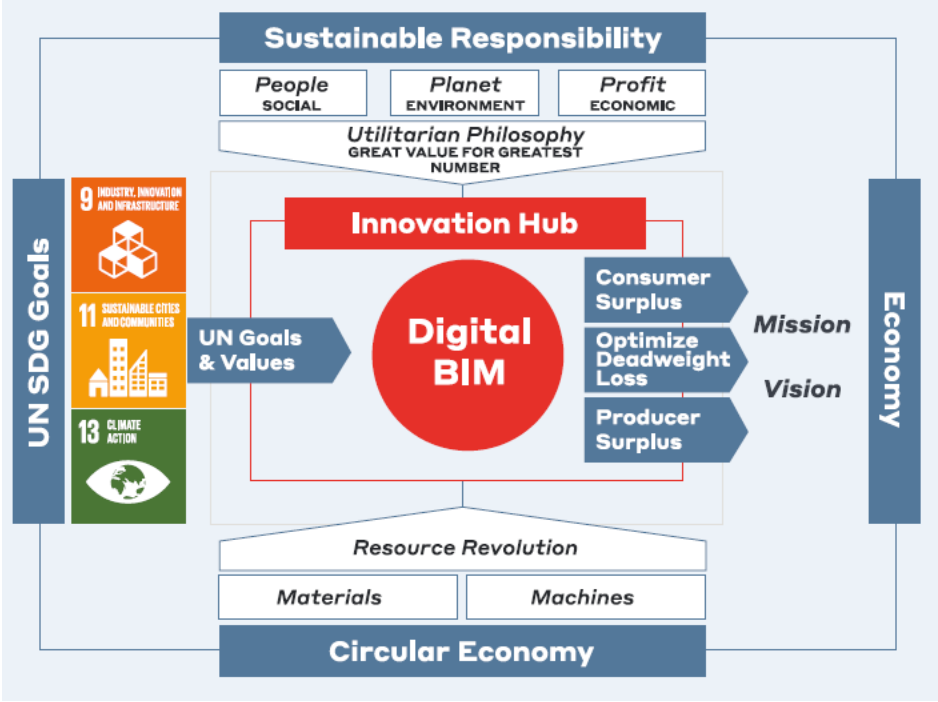
By adopting the minimum IDD approach, these are the added benefits realized.



AECON

Terminologie similaire - DPD

- DPD - Digital project delivery is a way of working where projects are conceived, planned, designed, built, and operated in an interactive digital space for all stakeholders to access. The approach relies on the use of a common data environment (CDE) to support multidiscipline collaboration and design management. (Autodesk)



https://www.autodesk.com/ae/campaigns/digital-project-delivery

https://www.wsp.com/en-ca/insights/pursuing-sustainability-and-productivity-gains-with-digital-project-delivery

Breakout 01

BIM

Modèle 3D intelligent
Représentation numérique d'un bâtiment contenant à la fois la géométrie et les données techniques.

Normes de donnée
Standards comme l
qui assurent la com
cohérence des écha

Bibliothèques d'objets
Composants numériques réutilisables intégrant des propriétés et métadonnées.

Détection de conflits
Identifier les interférences entre disciplines avant la construction.

Coordination du modèle
Assurer que tous les intervenants travaillent sur des données exactes et alignées.

VDC

Simulation 4D et 5D
Lier le modèle à l'échéancier (temps) et au coût pour mieux planifier.

Analyse de constructibilité
Tester la faisabilité d'un projet avant sa mise en chantier.

ue pour réduire

Visualiser et experim
espace ou une séque
construction.

Réunions de coordination
Collaborer en équipe à partir du modèle pour anticiper les problèmes.

IDD

Environnement commun de données (CDE)
Espace centralisé pour gérer, partager et suivre l'information du projet.

Remise numérique
Livraison des actifs numériques validés à l'exploitation et à la maintenance.

Intégration de l'approvisionnement
Connecter la chaîne d'approvisionnement au processus numérique.

Gestion du cycle de vie
Suivre et valoriser les données du design jusqu'à l'exploitation du bâtiment.

mes
cadres de
lards

Collaboration
Travailler ensemble de manière fluide grâce à l'information partagée.

Jumeau numérique
Réplique virtuelle et évolutive d'un actif physique.

Interopérabilité
Capacité des systèmes à échanger et utiliser les données de manière cohérente.

Gestion du changement
Accompagner les équipes dans la transformation numérique des processus.

Transparence et confiance
Favoriser la clarté et la responsabilisation à travers les données partagées.

Études de cas

VDC: Designing and Constructing a 97,000 m^2 Multi-Sports Facility for the Pan American Games LIMA 2019 in 16 Months

Slides by
Raúl Eyzaguirre
Head of VDC at COSAPI

Check out Raúl's presentation linked to the CIFE Summer Program page:
https://cife.stanford.edu/SP2020

Stanford
Center for Professional Development

Client Objectives

CO

PO

ICE

BIM

PPM

Metrics

Lima hosted the Pan American Games and needed Olympic-level sports facilities

National and international relevance

+1,800 athletes in 39 sports

33 countries

Legacy for Peruvian Sports Federations

Project Objectives

CO

PO

ICE

BIM

PPM

Metrics

Main venue for the Games

Fast Track, Design-Procurement-Construction

97,000 m^2 constructed area

150M+ USD

ICE

CO

PO

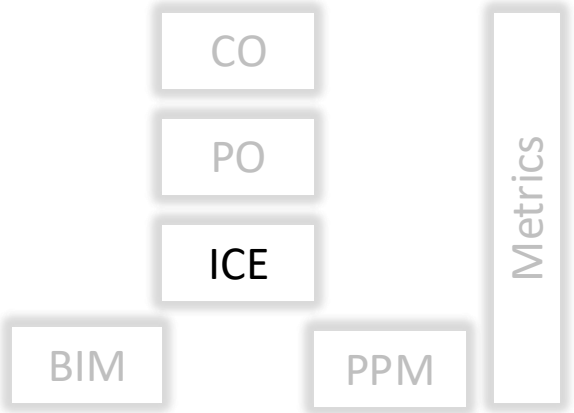
ICE

BIM

PPM

Metrics

ICE



BIM

CO

PO

ICE

BIM

PPM

Metrics

BIM

CO

PO

ICE

BIM

PPM

Metrics

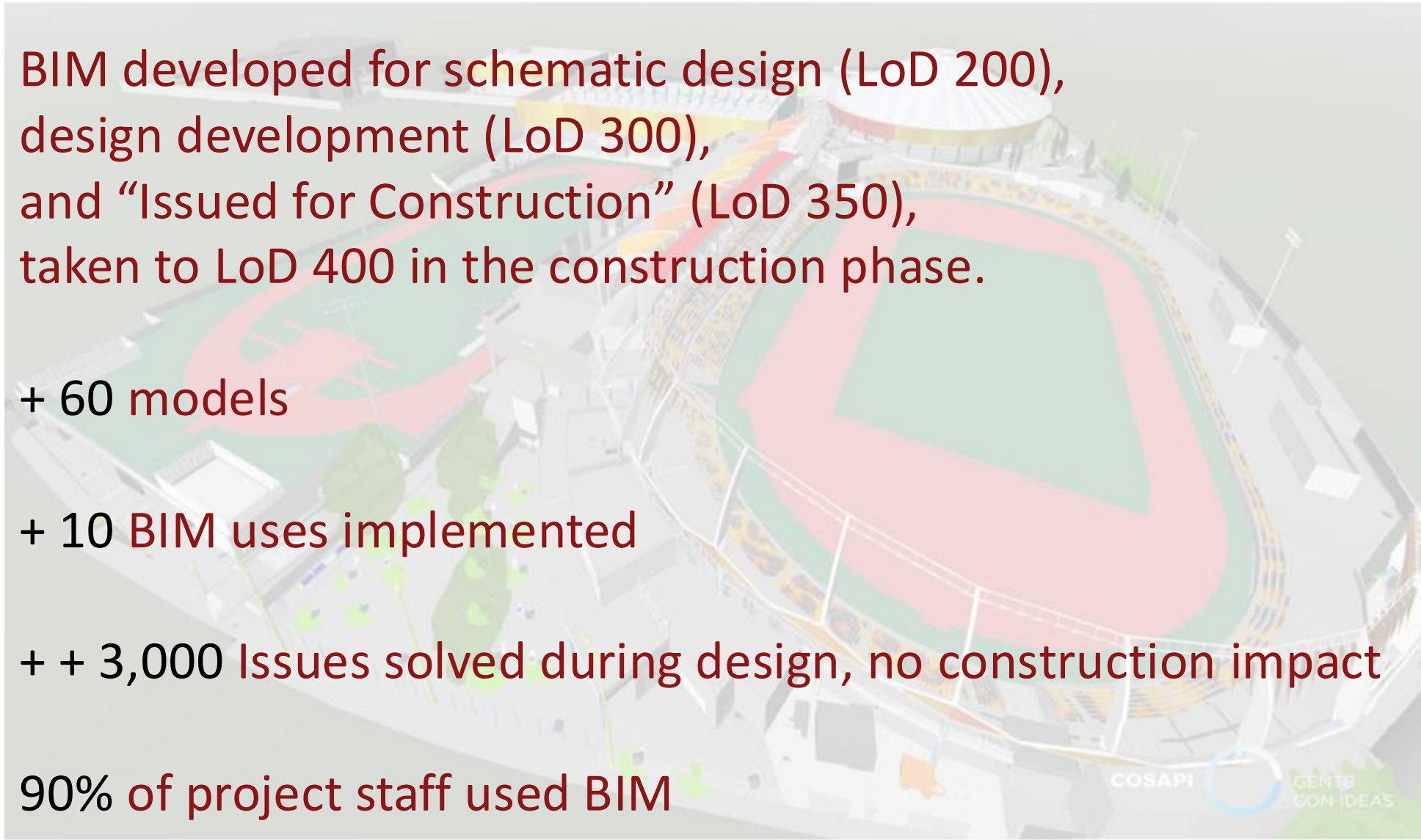
BIM developed for schematic design (LoD 200),
design development (LoD 300),
and “Issued for Construction” (LoD 350),
taken to LoD 400 in the construction phase.

+ 60 models

+ 10 BIM uses implemented

+ + 3,000 Issues solved during design, no construction impact

90% of project staff used BIM



PPM

CO

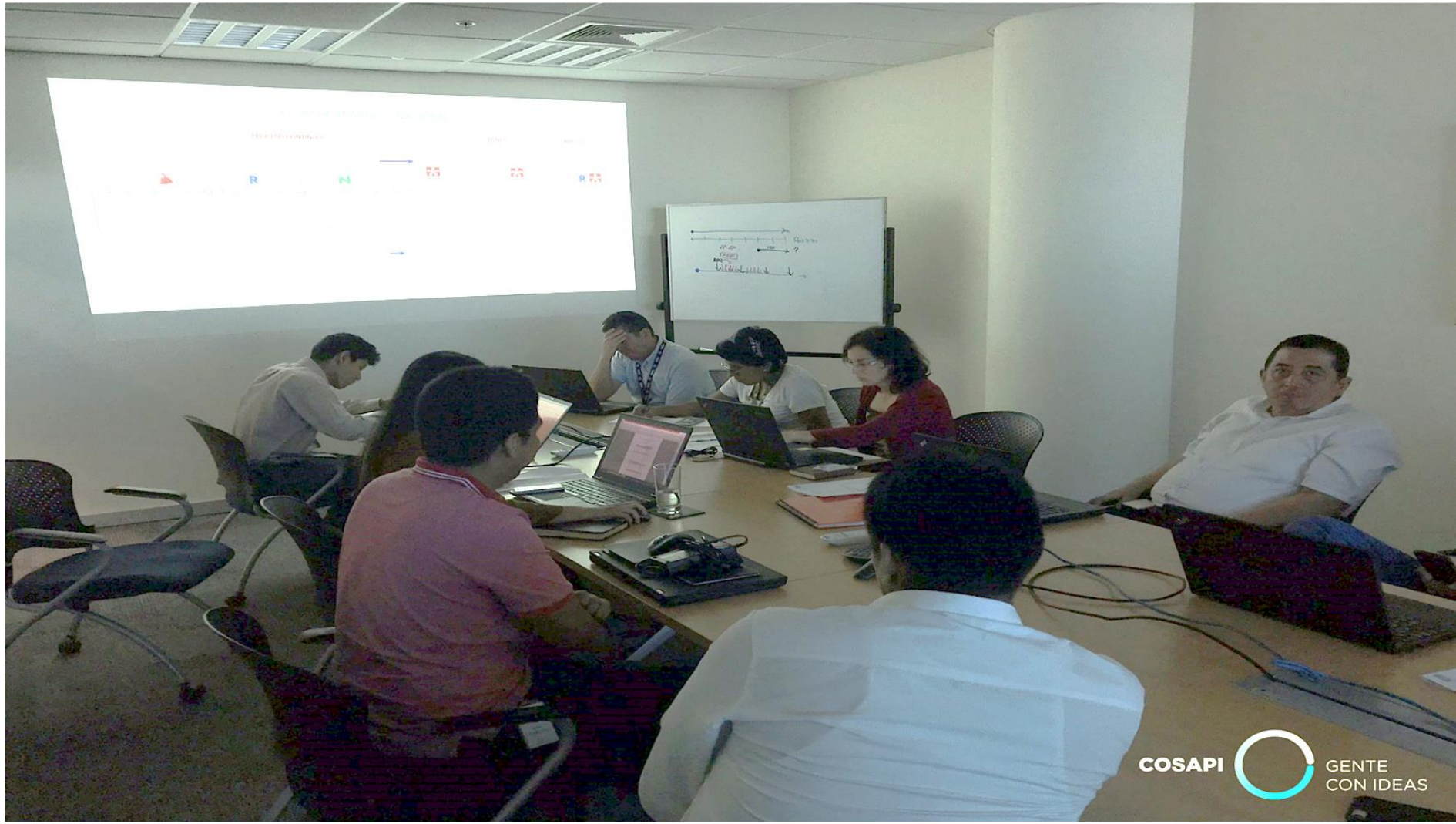
PO

ICE

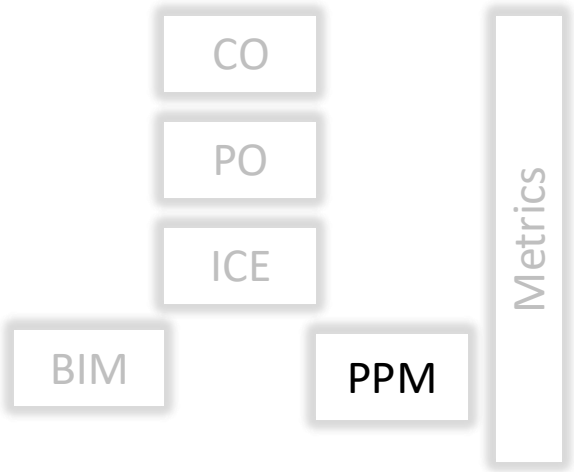
BIM

PPM

Metrics



PPM

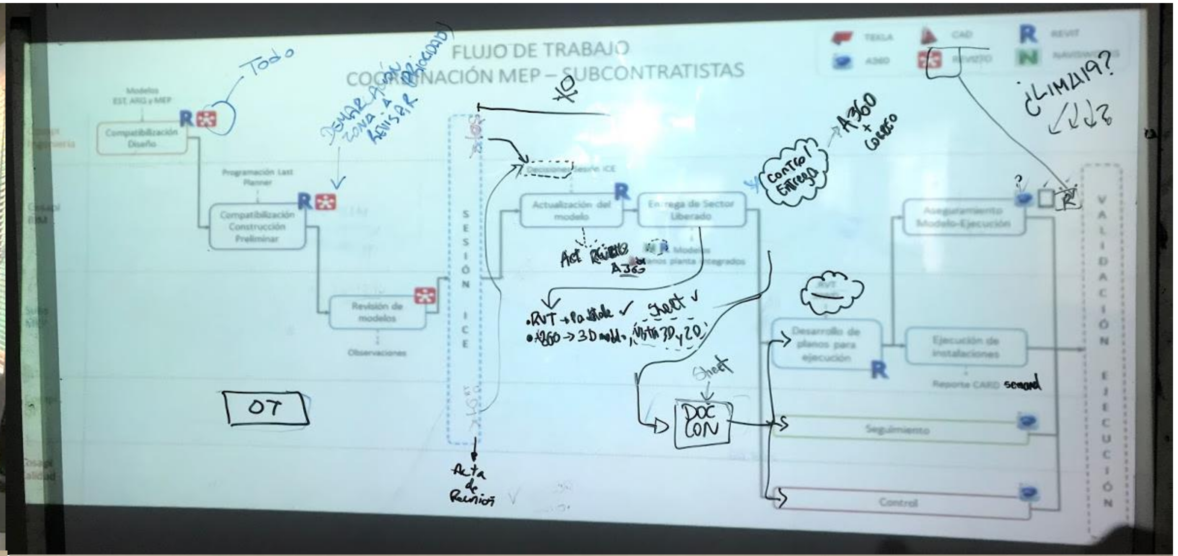


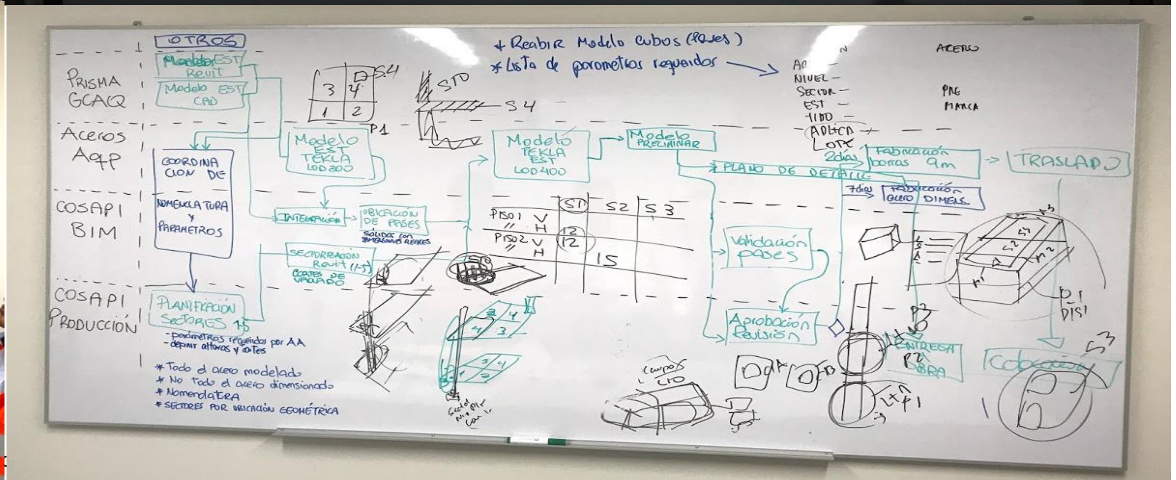
Design developed in the UK and Peru simultaneously. Thus, focus was on designing a process where the information was updated in real time helped by the cloud, having reliable information to make decisions.

= 2 sessions to design the process collaboratively
+ 10 procedures developed to align all design participants

Daily meetings during the project kick-off to report progress and share obstacles.

+ 10 participants (design supervisors, design project managers, construction project managers, planner, BIM managers, procurement team)


FLUJO DE TRABAJO
COORDINACIÓN MEP – SUBCONTRATISTAS
Compatibilización Diseño
Compatibilización Construcción Preliminar
Revisión de modelos
Actualización del modelo
Entrega de Sector liberado
Aseguramiento Modelo-Ejecución
Desarrollo de planos para ejecución
Ejecución de instalaciones
Seguimiento
Control
VALIDACIÓN EJECUCIÓN
OT
DOC CON


PRISMA GCAQ
Aceros Aqp
COSAPI BIM
COSAPI PRODUCCIÓN
TRASLADO
Validación pases
Aprobación Revisión

Metrics

CO

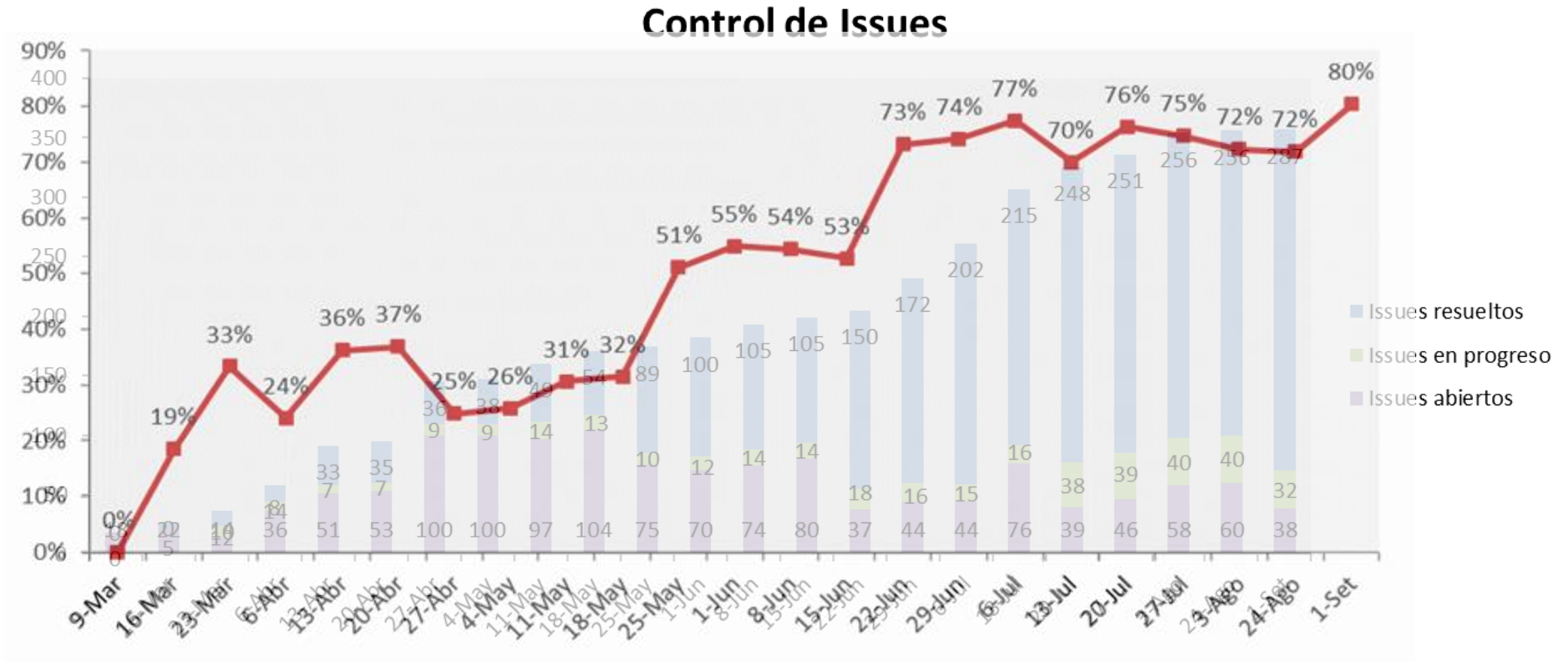
PO

ICE

BIM

PPM

Metrics



Designing and building Olympic-level sports facilities really fast

CO

PO

ICE

BIM

PPM

Metrics

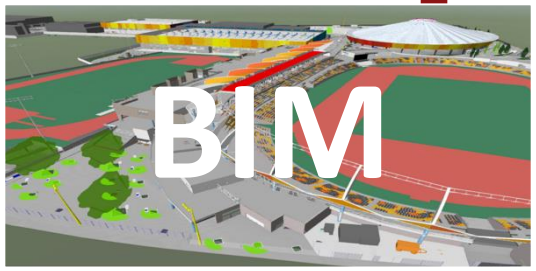
Have the sports facilities available for 1,800+ athletes from 33 countries to compete in 39 sports

Design and build 97,000 m2 of multi-sport facilities in 16 months

Resolve all issues (750 in total)
Hold 2-hour ICE sessions each day for 10 weeks

COSAPI GENTE CON IDEAS

Resolve all design conflicts before construction (3,000 in total)
60 discipline-level BIMs



Have CDE procedures that work across the UK and Peru
Co-develop procedures to use the CDE

CIFE CENTER FOR INTEGRATED FACILITY ENGINEERING

Significant reduction of costs and duration for design and construction and CO_2 emissions through the application of VDC

Example courtesy of
Max Tran (VDC certified), Lidl Sweden

Stanford
Center for Professional Development

NTNU
Norwegian University of
Science and Technology

Applying VDC to the development of LIDL stores

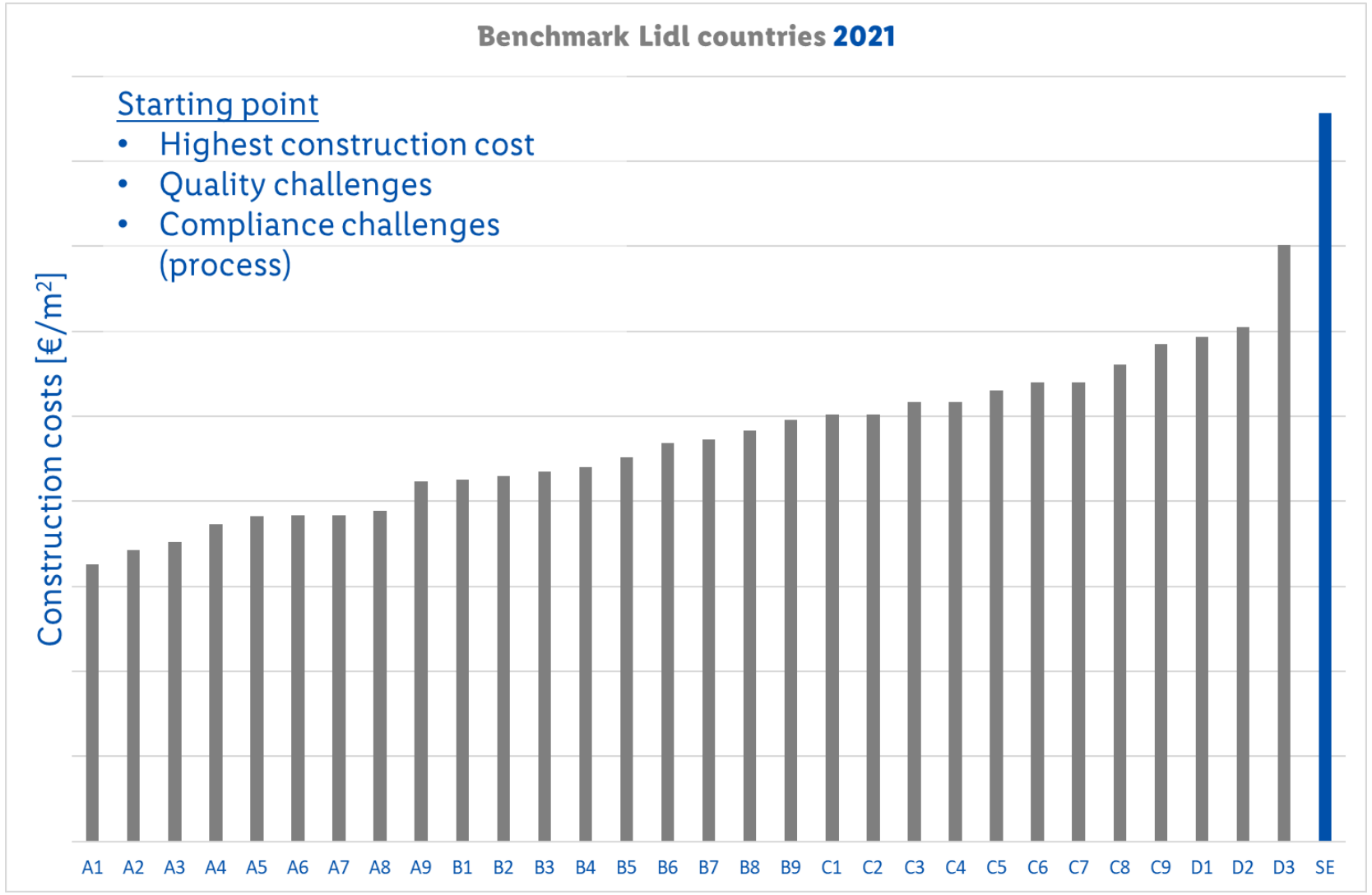
“VDC helped reduce construction cost by 45%”

Lidl is a German grocery chain with 13,000 stores around Europe and the US.

Max Tran was hired as a senior project developer in Lidl Sweden to change how they establish new stores.

Projekt i Världsklass

01 Om Lidl – Resan till Projekt i Världsklass

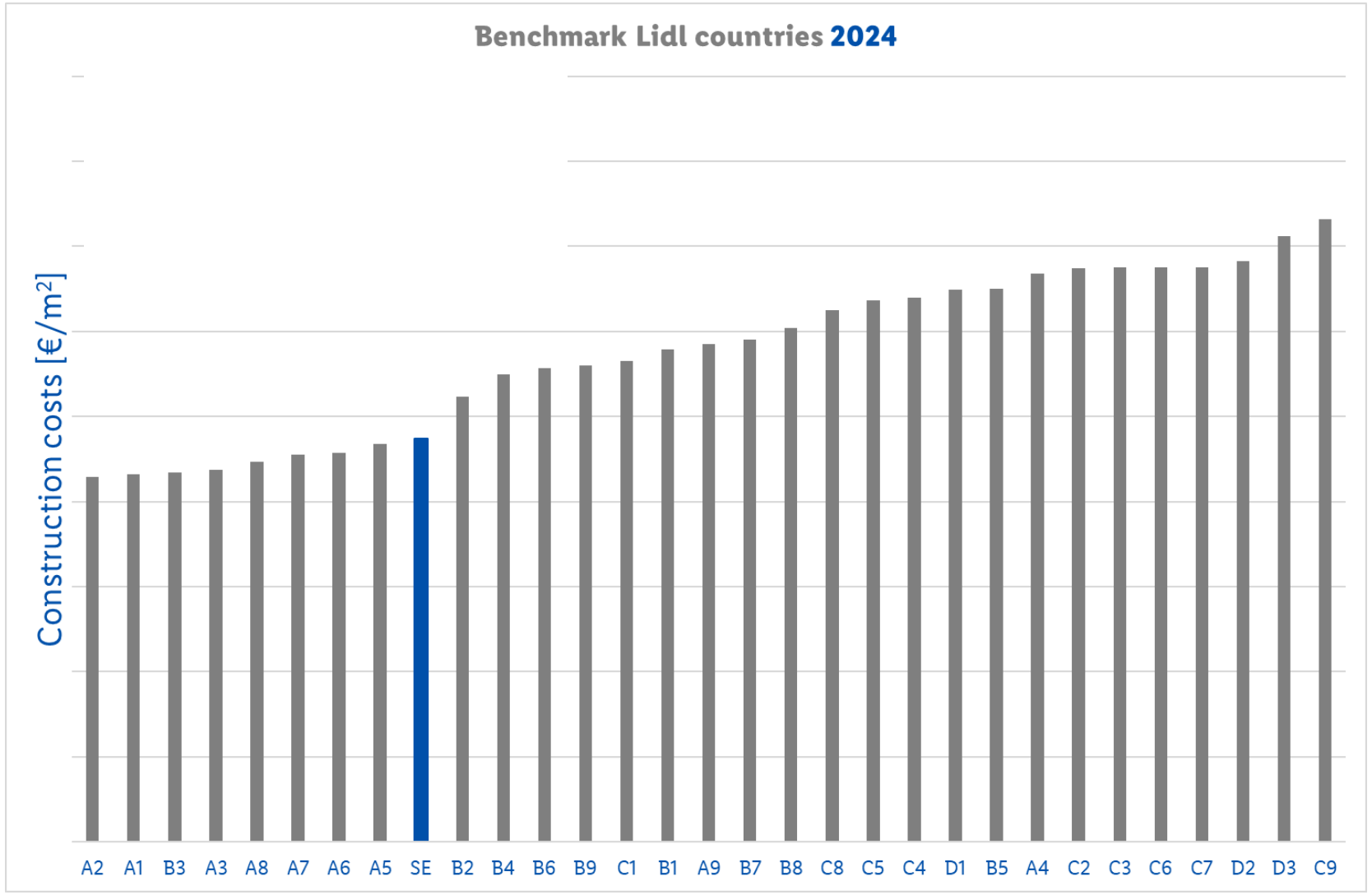


“Each store is unique”
“Construction costs in Sweden are high”

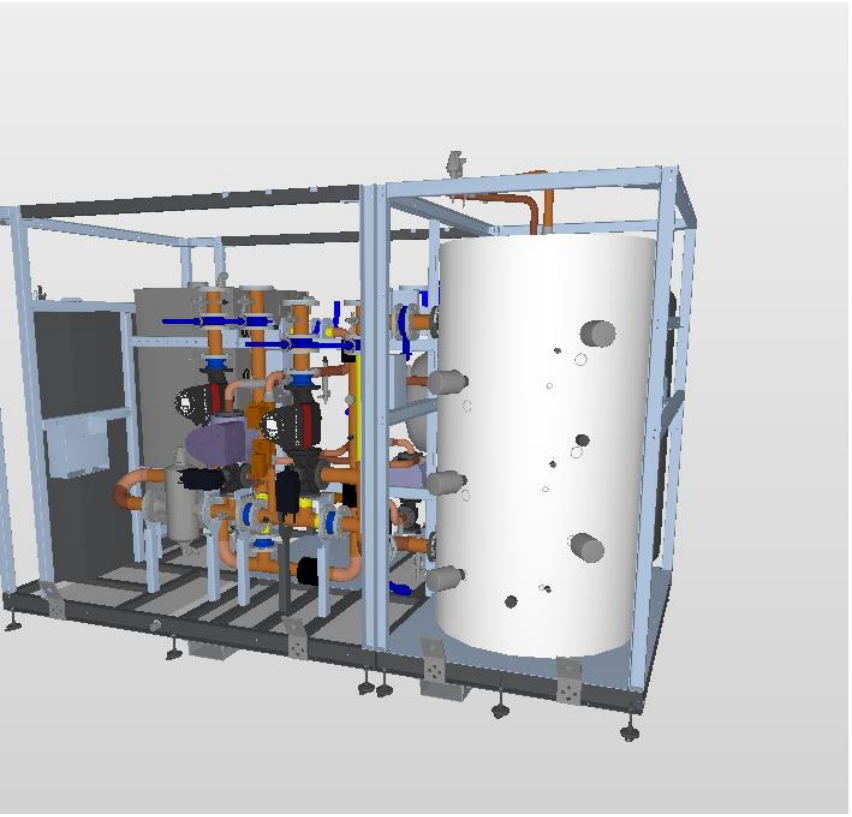
CIFE
CENTER FOR INTEGRATED FACILITY ENGINEERING

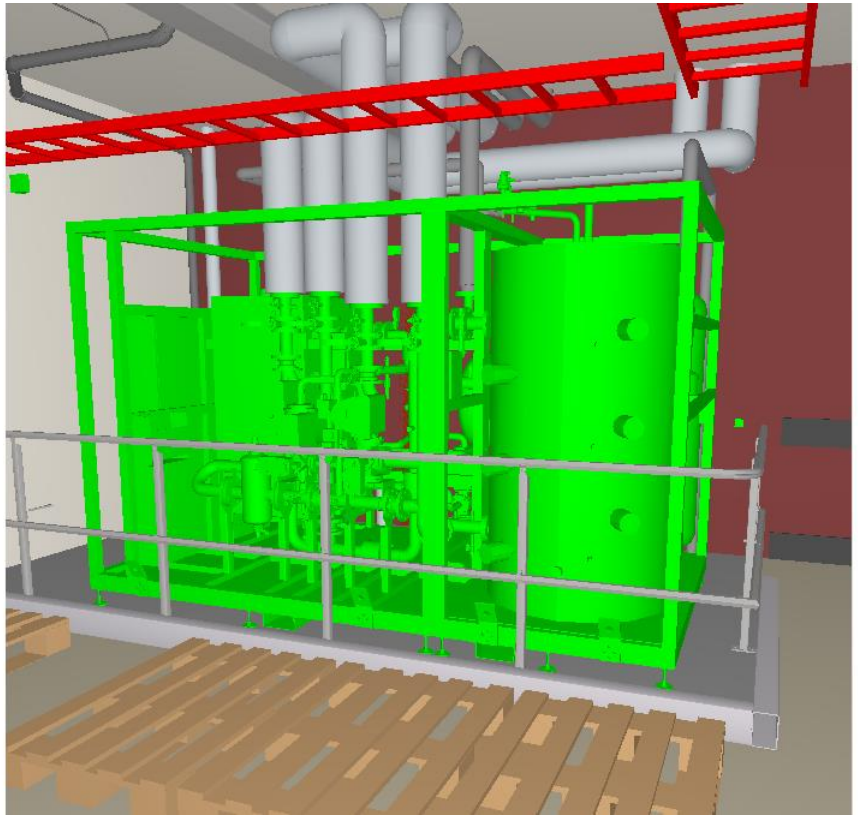
Projekt i Världsklass

01 Om Lidl – Resan till Projekt i Världsklass



Standardizing technical and other systems for the stores

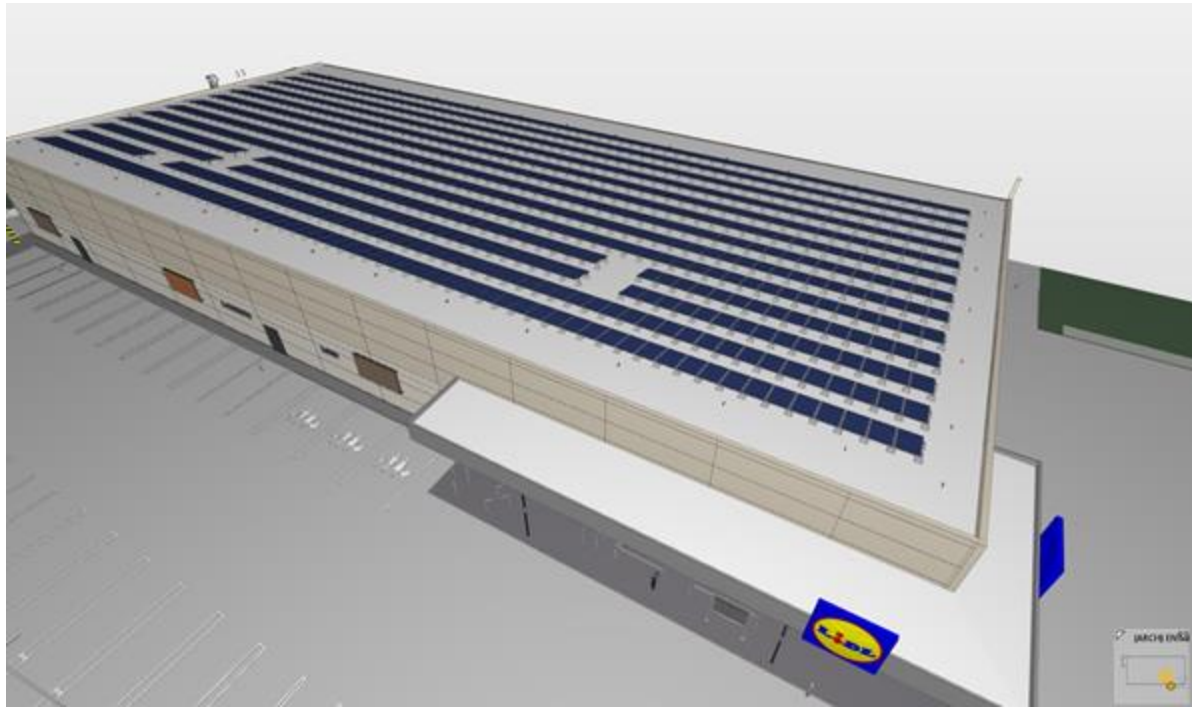




Master Model

- Starting point for all new projects
- Visualization for executives

Master Model at LOD 350



Copy

Update

Project n

Δ Improvements

Dramatically shorter design phase and increased cost reliability

- Decision latency: 75% < 1w, 82% < 2w, 94% < 3w
- Revised decisions < 3%

- Design duration 1-2 weeks → tender for GC vs. 2-6 months before
- Cost of design reduced by about 80%
- Cost of improvements to master design model around 2.5 mSEK/year vs. around 4 mSEK/year before

- Tender with detailed BOM (Bill of Materials) from BIM
- Reduced variability on bids from +/- 30% to +/-3%

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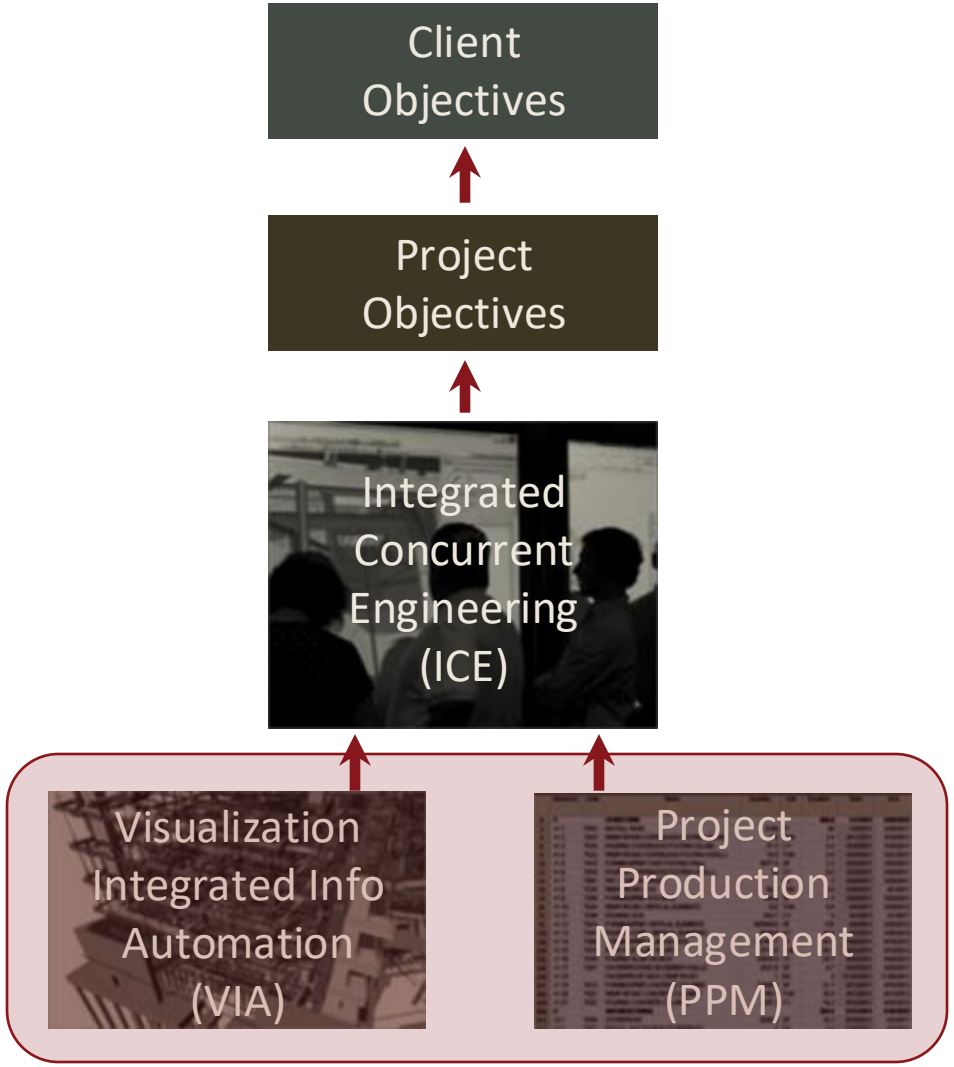
Bringing incremental innovations to projects

- Virtual Reality
- Construction Robots
- Generating data-driven insights

Prototype breakthrough innovations in a real setting:

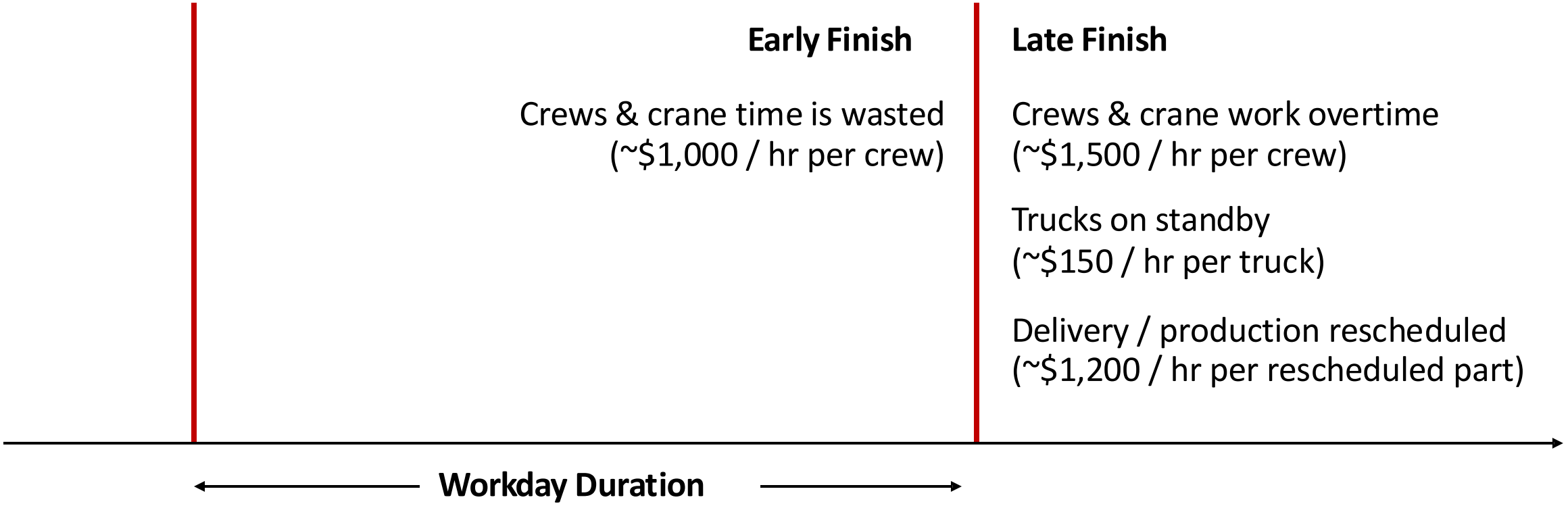
Data-driven construction management



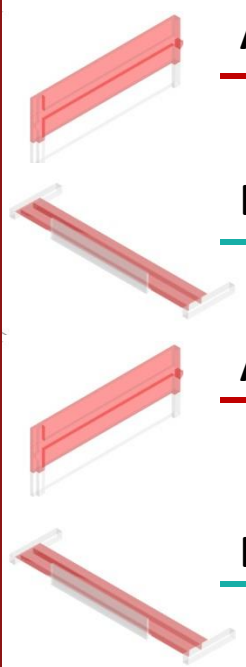
Daily planning with detailed cycle time data automated next-day construction planning and reduced forecast error by 50%

With Yan-Ping Wang, Clark Pacific, and Versatile

How many parts can we install tomorrow?



Look-ahead schedules typically use aggregate activity durations

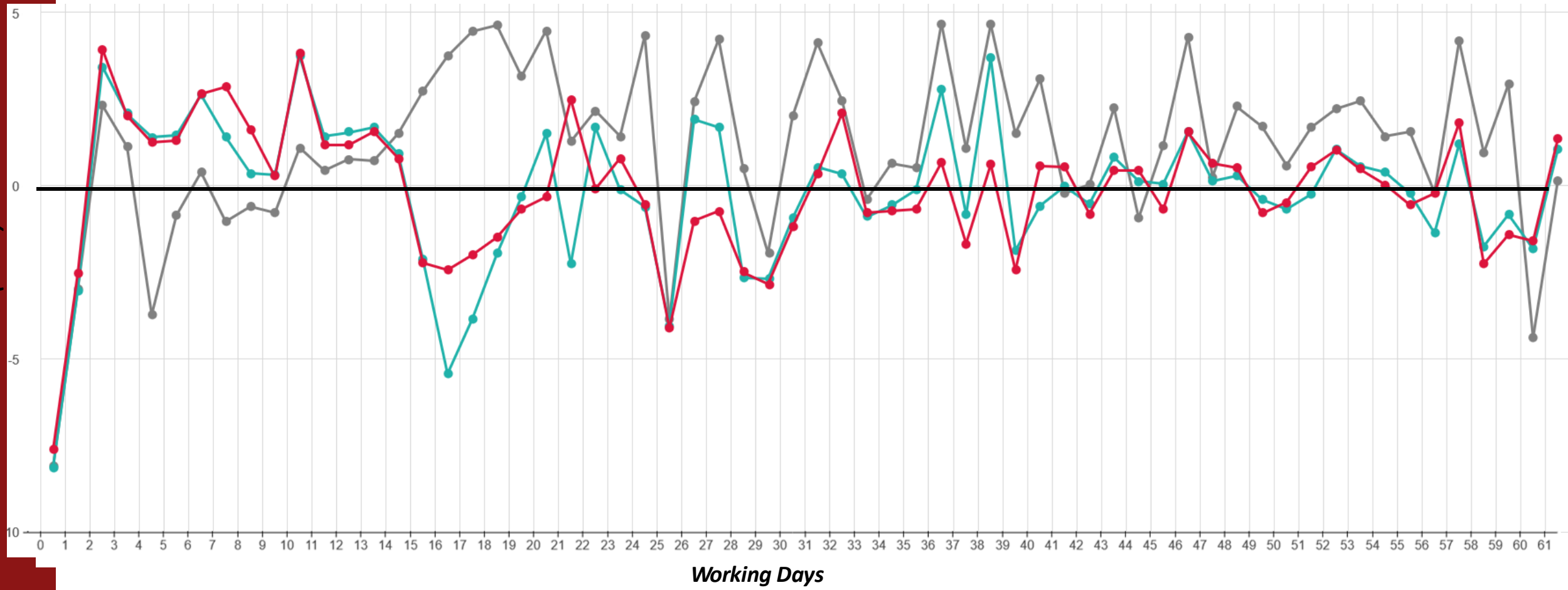


DAILY LOAD LIST		
DAY:	03.7.13. Thursday	Attention:
PLANT	LOAD #	DELIVERY TIME
W.SAC	11	7:00
W.SAC	12	7:30
W.SAC	13	8:00
W.SAC	14	8:30
W.SAC	15	9:00
W.SAC	16	9:30
W.SAC	17	10:00
W.SAC	18	10:30
W.SAC	19	11:00
W.SAC	20	11:30
W.SAC	21	12:00
W.SAC	22	12:30
W.SAC	23	13:00

Source: Clark Pacific

$$\textit{Aggregate activity duration} = \frac{\textit{Total parts installed}}{\textit{Total time installed}}$$

Using the detailed data enabled better prediction of the parts to order for tomorrow



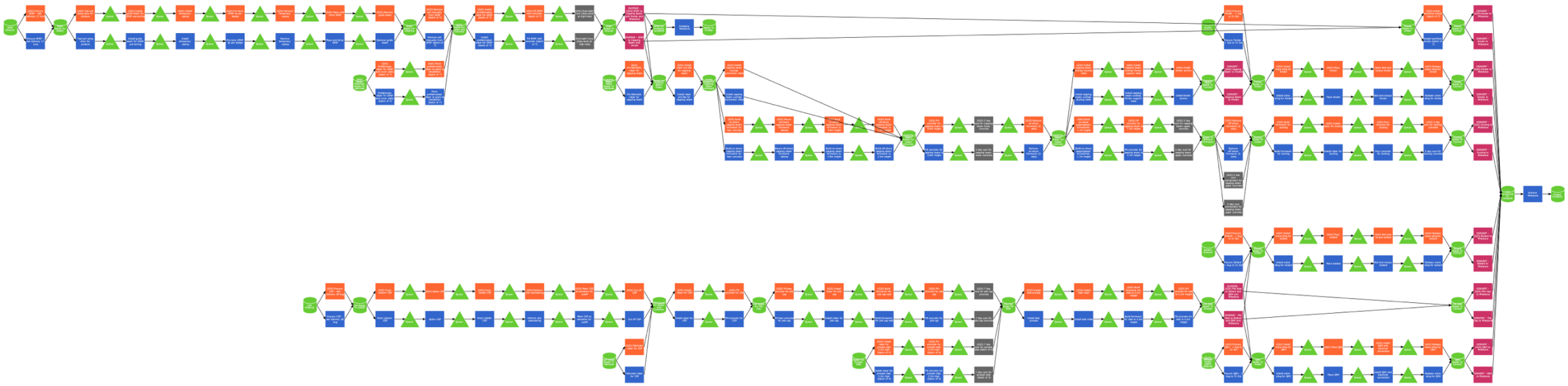
Impact on the Project

Forecast error reduced by ~50%

Daily effort to update the look-ahead schedule reduced from 2 hours to 1 minute

Developing truly data-driven construction management

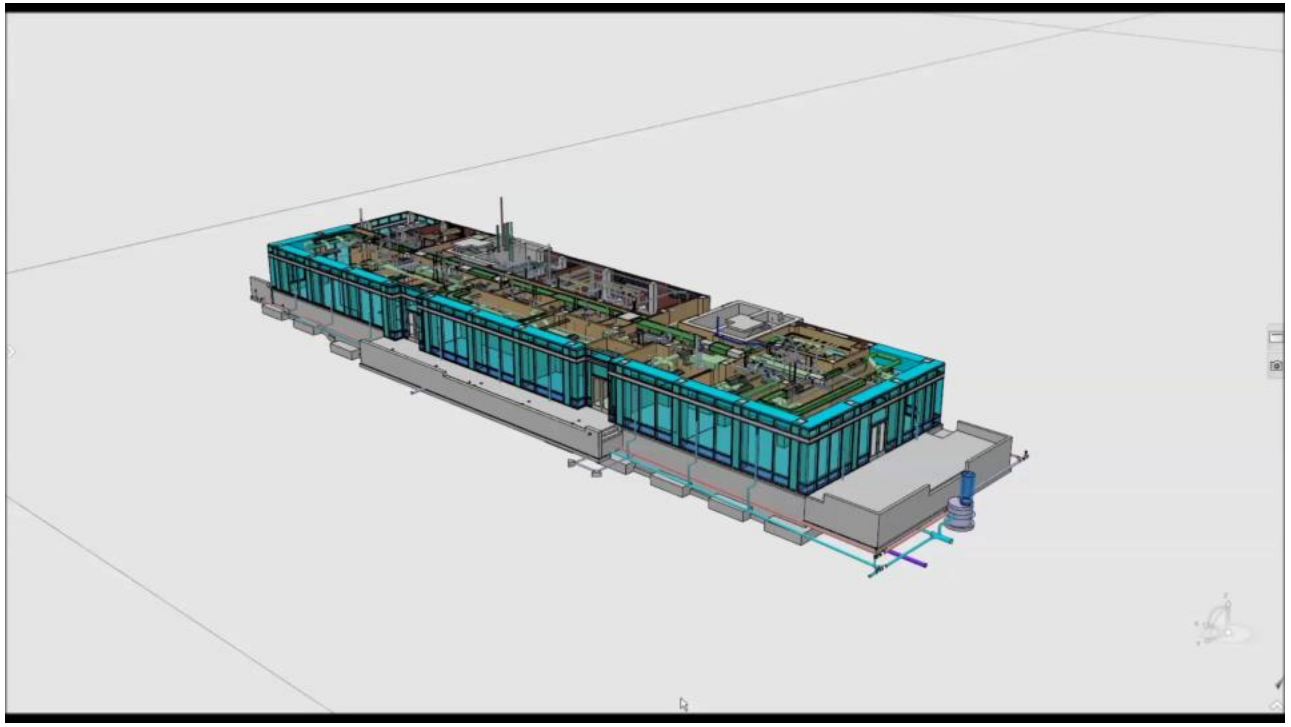
- Have a production systems mindset
- Setting production objectives
- Mapping production processes
- Collecting production data
- Leveraging production data in a digital twin of the production processes



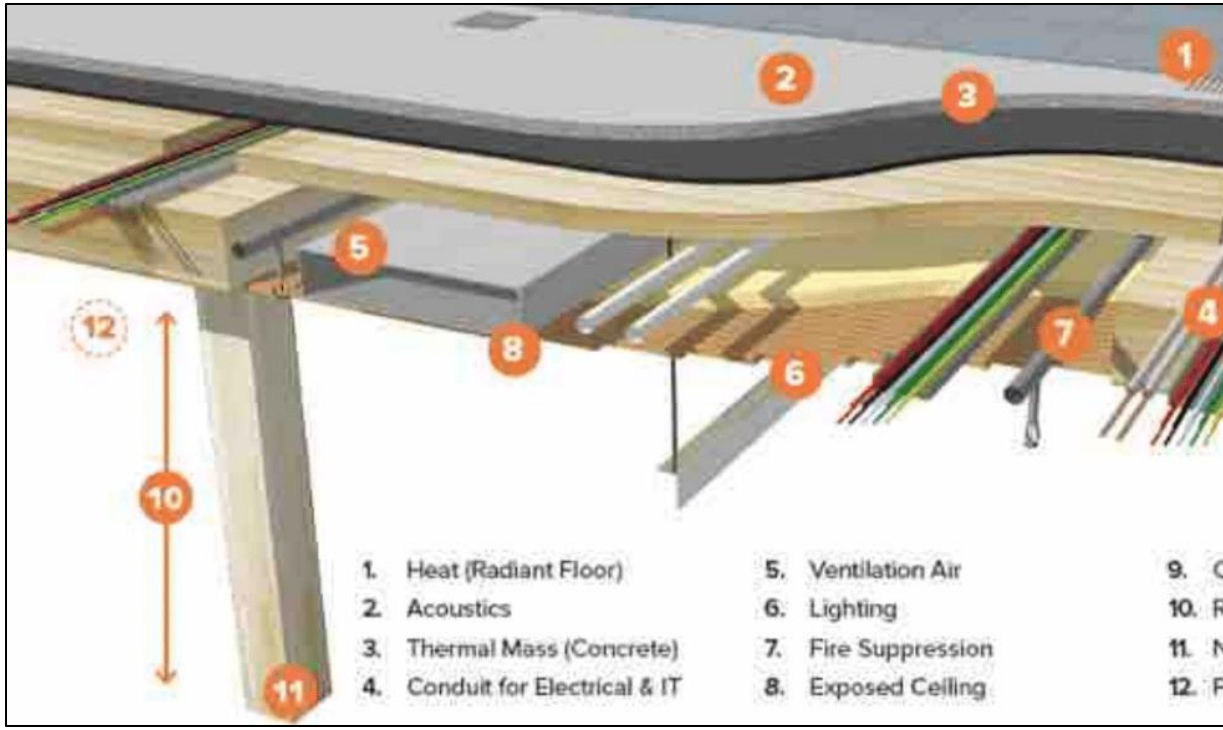
With Bochen Zhang

Tall Wood House UBC

Coordination

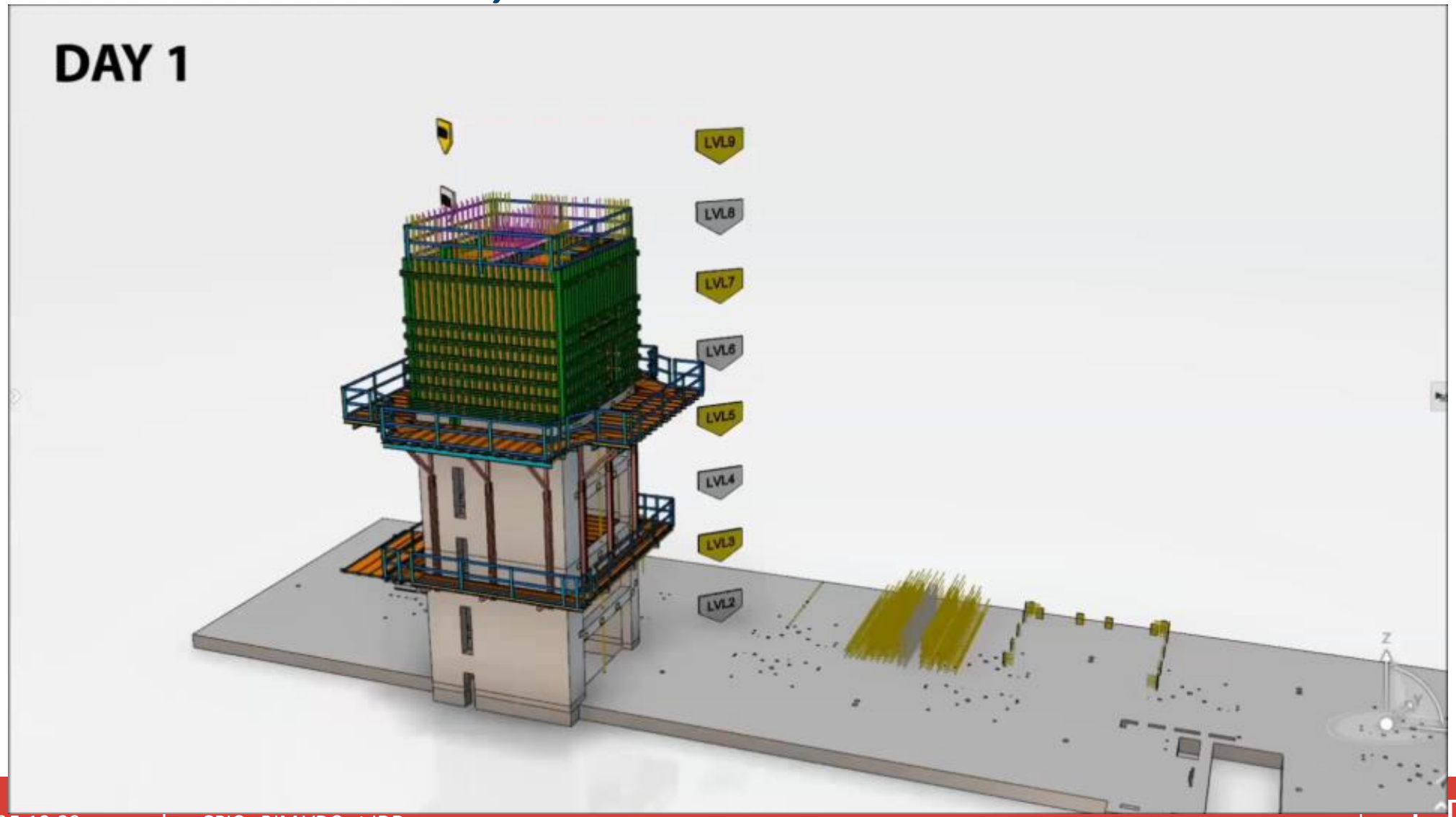


Courtesy of CadMakers



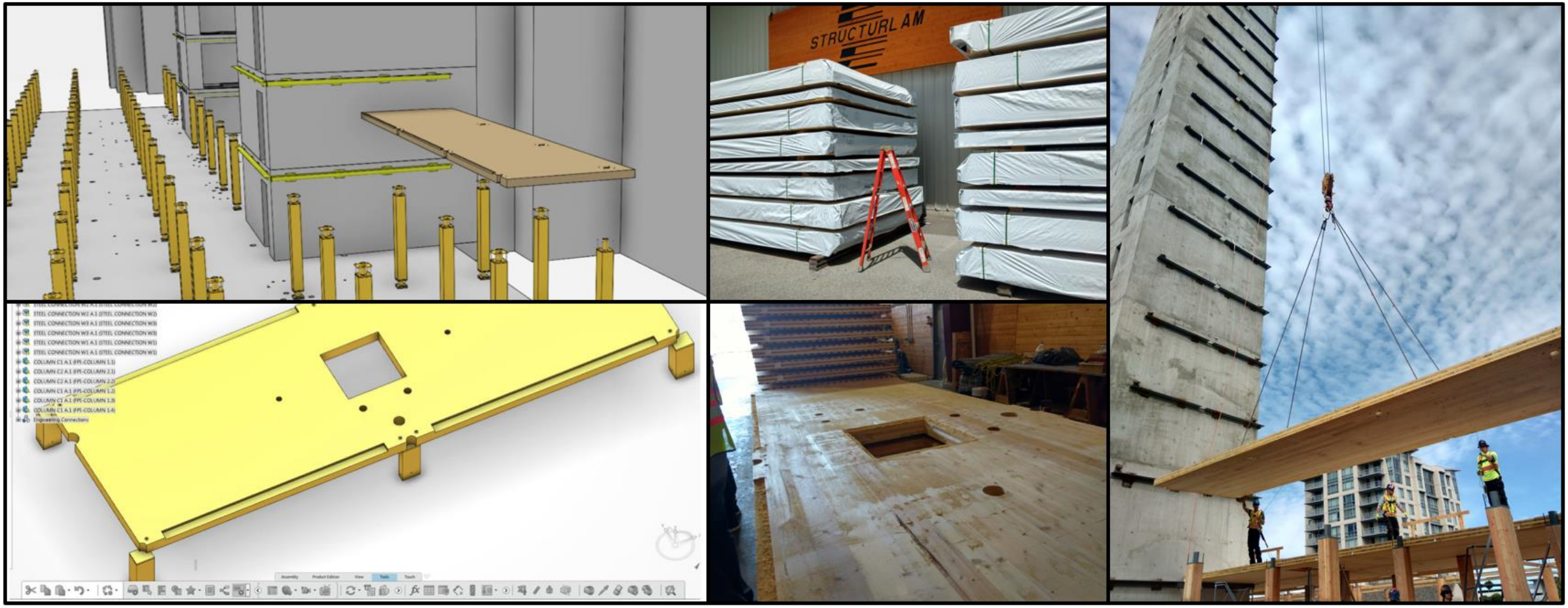
Wood Structure and MEP Modeling (TWPC, 2016)

Constructability



Courtesy of CadMakers

Digital Fabrication

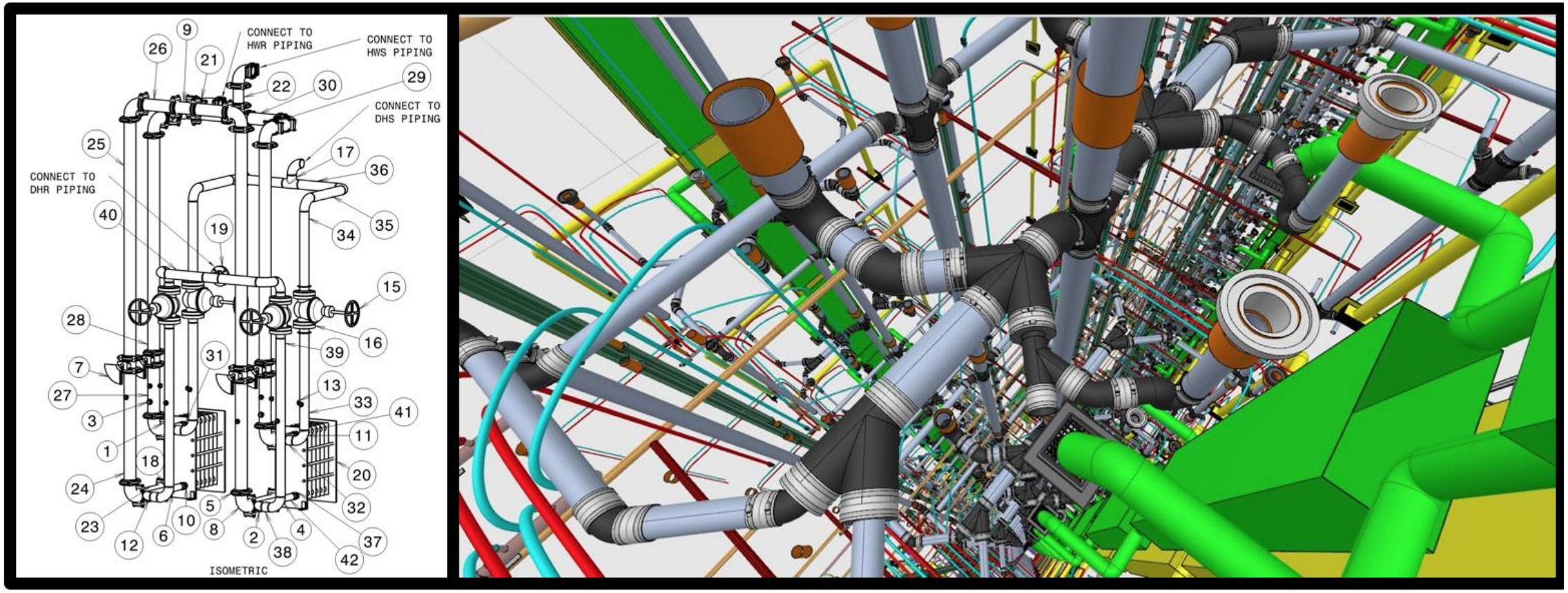


Courtesy of Structurelam and CadMakers

Digital Fabrication

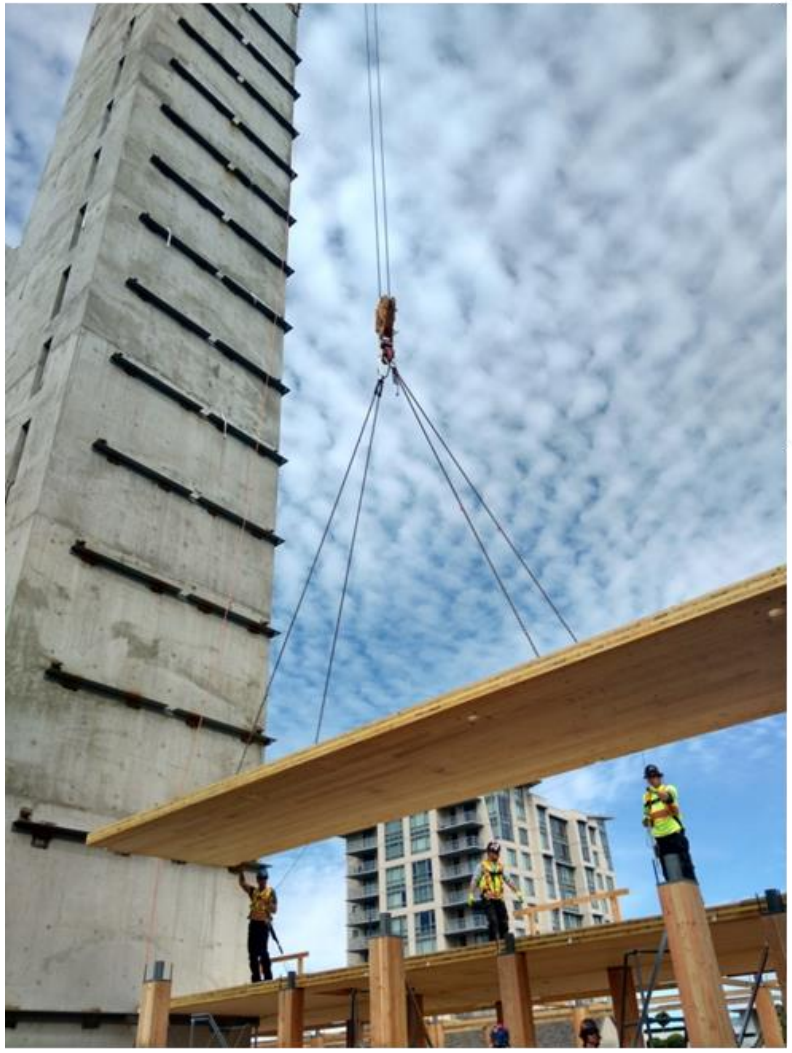
Courtesy of Structurelam

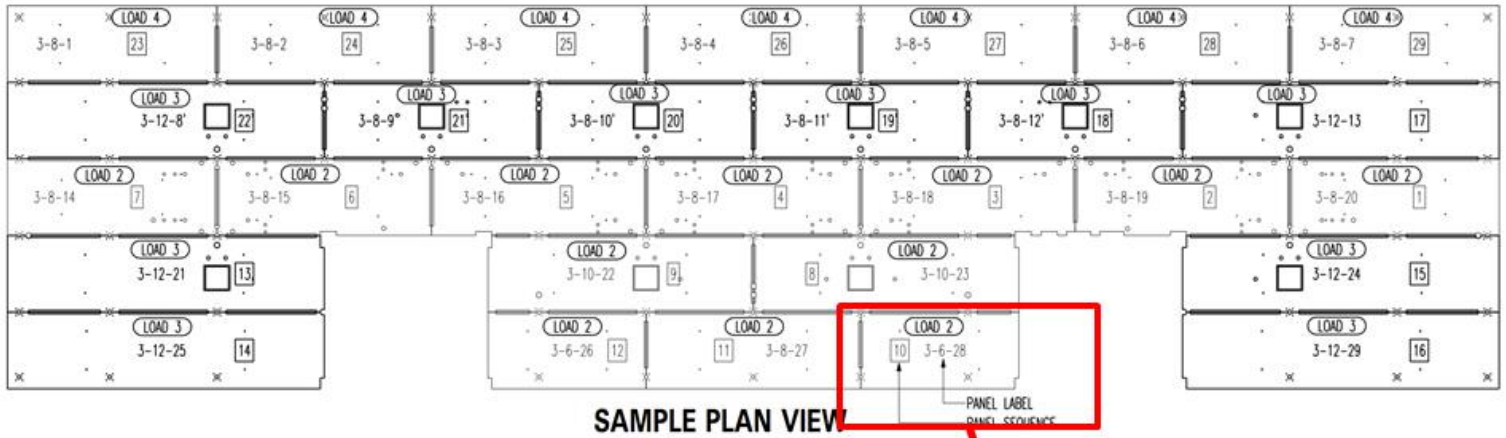

Review
Product Edition
View
Tools
Touch



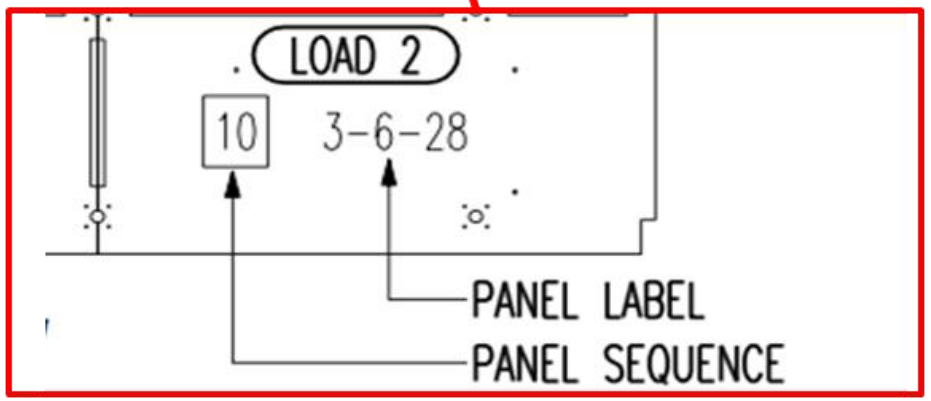
- Developed for timber penetrations
- 2 Spool Packages for all 17 floors
- Economy of Scale
- Mechanical room fully developed

Planning



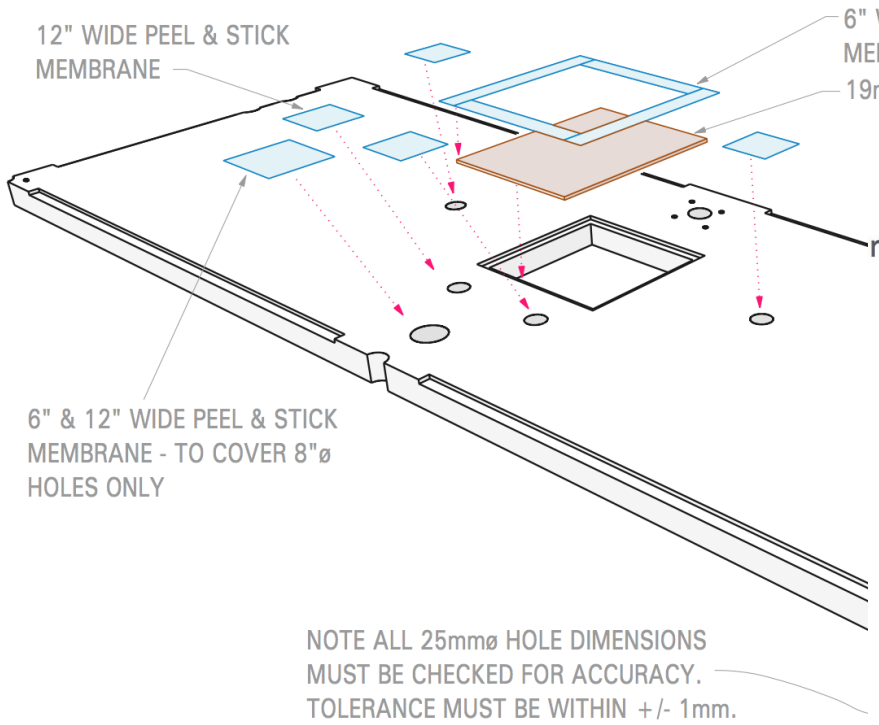


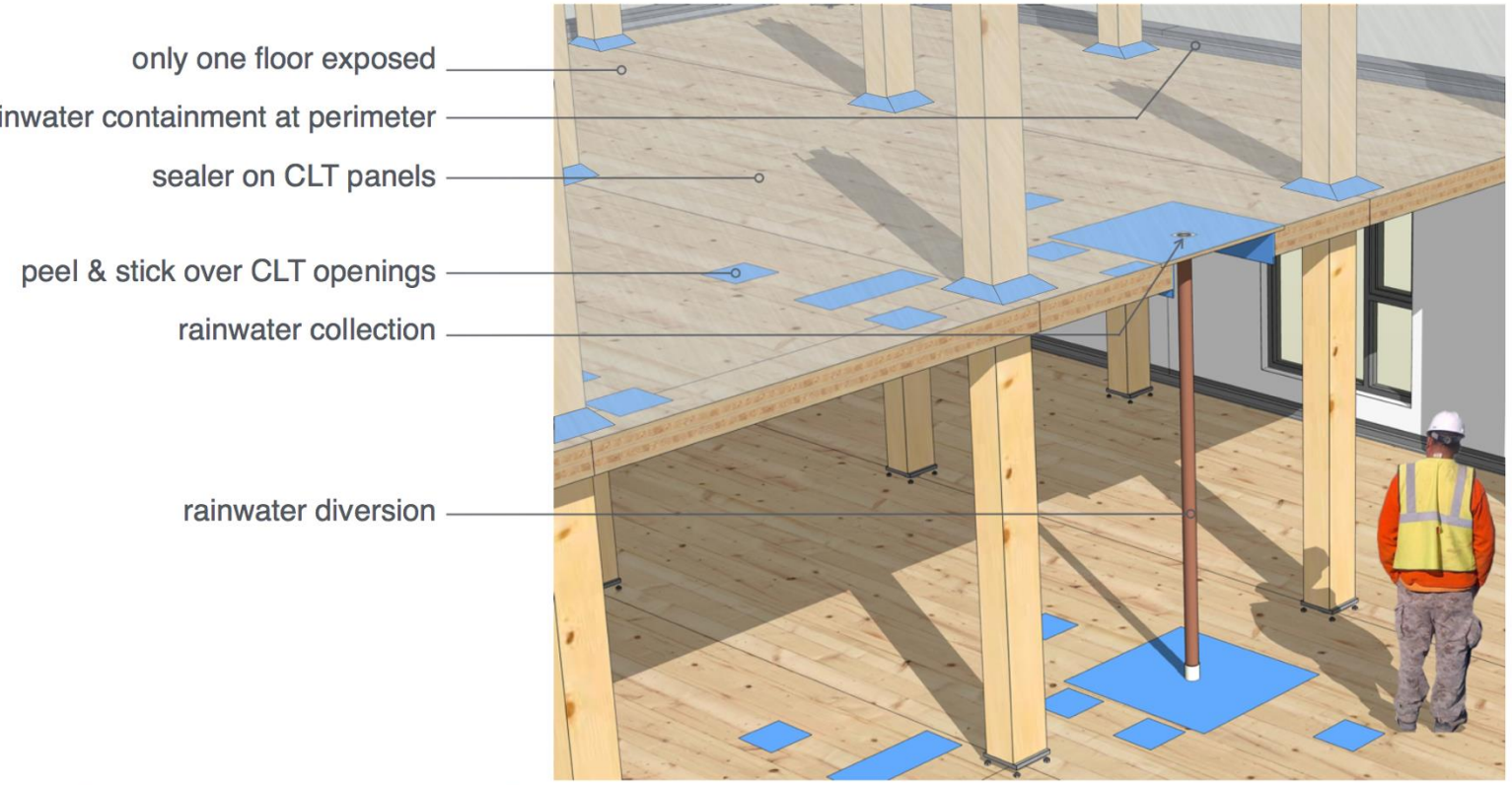
Panel Sizes
6000 X 2850 mm
8000 X 2850 mm
10000 X 2850 mm
12000 X 2850 mm
All 5ply, 169 mm



Courtesy of Structurelam, Urban One

Planning

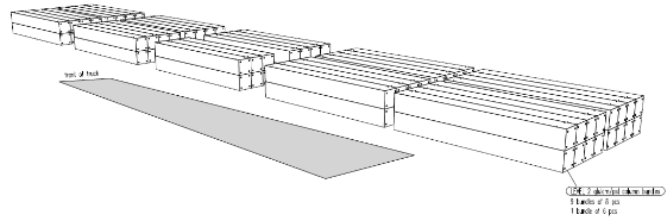




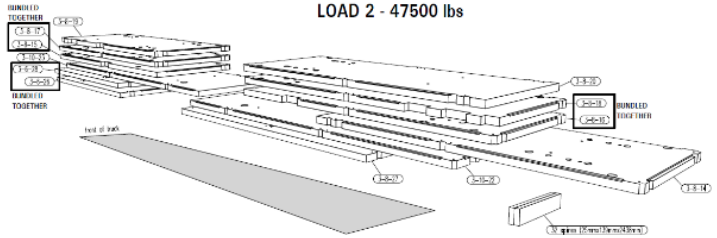
Courtesy of Urban One; CadMakers

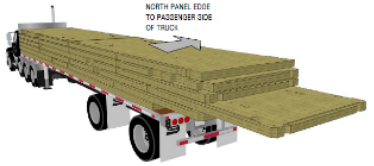
Séquencement

LOAD 1 - 17500 lbs

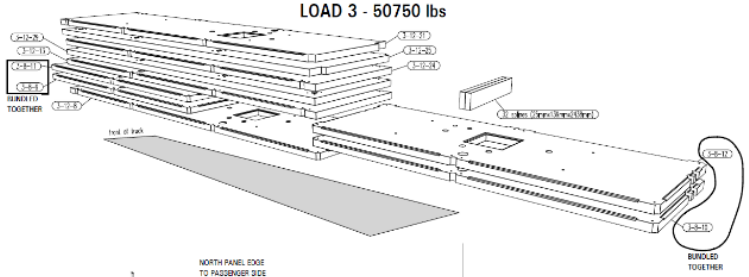


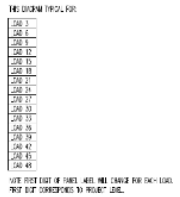
LOAD 2 - 47500 lbs



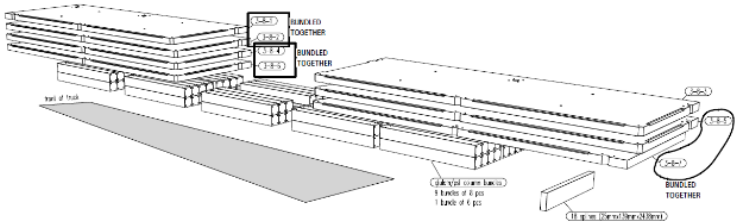


LOAD 3 - 50750 lbs





LOAD 4 - 44810 lbs



Courtesy of CadMakers

BIM uses: *4D Planning*

Courtesy of Urban One; CadMakers

Breakout 02

Discussion sur les cas/exemples, défis et besoins pour passer vers le IDD au Québec

Événement

Inscrivez-vous à Innover Ensemble 2025 !

Date : 2025-11-25

25 novembre 2025

Salle Vidéotron (E2033) – Maison des étudiants
1220 rue Notre-Dame O, Montreal, Québec

Accueil	**8h30**	
Bloc 1	**9h00**	• **Erik Poirier & Ivanka Iordanova -** Mot de bienvenue • **Daniel Forgues & Hugues Rivard -** 20 ans du GRIDD : constats et directions pour la suite • **Victoria Lerognon -** Innover en comparant : Comment structurer la transition numérique de la construction publique à travers l'exemple France-Québec ? • **Seyed Mohammad Ehsan Tabatabaee -** Assessing the impact of innovation in construction: Insights from Public Project Owners
Pause	**10h30**	
Bloc 2	**10h45**	• **Adam Jamel / Alexandre De Almeida Vasconcelos -** Optimizing Life-Cycle Cost Decision-Making in Early-Stage Building Projects • **Narimene Midoune -** Évaluation comparative des processus d'échange entre le BIM et les logiciels de simulation énergétique • **Youcef Ghebouli -** Analyse des Tendances et Anomalies dans les Contrats Publics de Construction au Québec : Une Analyse des Données du SEAO • **Esmaeil Naderi -** Automated rule compliance checking: digital representation of the rules • **Benz Ngwanga Bilam-** Gouvernance durable des infrastructures publiques : outils juridiques et stratégies contractuelles en mutation
Lunch	**12h25**	
Keynote	**13h25**	• **Angélique Montuwy -** Le design UX pour innover ensemble : supporter la prise de décision collective dans les projets bâtis par la géovisualisation accessible.
Bloc 3	**13h55**	• **Niloofar Karami -** Enhancing Structural Health Monitoring by Predictive Modeling Supported by Digital Twins • **Mahsa Paziraei -** Interactive Information Retrieval and Visualization Digital Twins for Bridge Structures • **Mina Shaygan Tabar -** Investigating a Domain-Specific Q&A System for lifecycle data of Infrastructure Assets Integrated with Digital Twin technology • **Hossein Pouresmaeeliasiabar/ Mohammad Bigdeli -** Framework for Acoustic Comfort Analysis in Digital Twins
Pause	**15h30**	
Bloc 4	**15h40**	• **Nathalia De Paula / Luciana Gondim de Almeida Guimarães -** Capacités dynamiques des organisations permettant la transformation numérique dans l'industrie de la construction • **Sara Aissat -** JuNo-OPS : un framework au service de l'ingénierie et de l'évolution des jumeaux numériques • **Adam Jamel -** Ingénierie des exigences : du logiciel au bâtiment • **Nabil Tayoubi -** reconfiguration des pratiques de gestion de projet chez Bâtir son quartier • **Kaïs Amor Benabderrahmane -** Co-creating Value -and avoiding Its co-destruction - in digital adoption : a meso-level framework for public transport and infrastructure organizations.

Contenu :

25 & 26 Novembre 2025, Salon des Diplomés Vidéotron (E2033), Pavillon E de l'ETS

Programme du 25 Novembre 2025 – voir programme ci-dessous.
Le déjeuner, diner et le cocktail seront offert
Programme du 26 Novembre 2025 – précisions à venir, le déjeuner et le diner seront offert, les blocs sont les suivants :

1. Les enjeux de la productivité dans la construction
2. Les constats de la productivité au Québec
3. Les solutions pratiques industrielles, gouvernementales et académiques

Si l'évènement est complet, nous souhaitons donner la priorité aux étudiants pour le 25 et aux partenaires pour le 26 – Nous vous contacterons si nécessaire.
Lorsque vous envoyez ce formulaire, il ne collecte pas automatiquement vos détails, tels que le nom et l'adresse de courriel, sauf si vous le fournissez vous-même.
Inscrivez-vous, cliquez ici!

En savoir plus ›

Merci