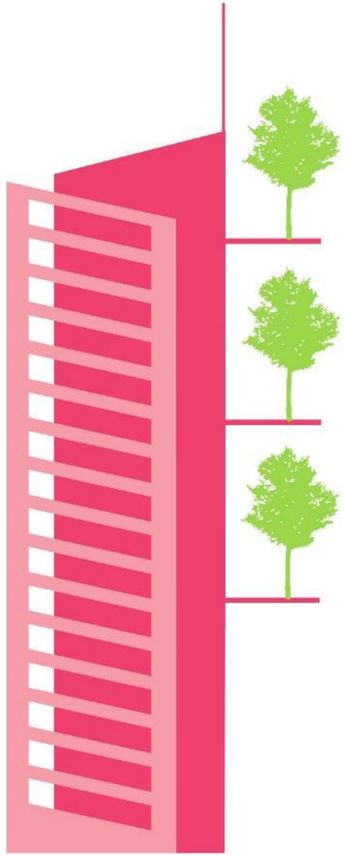
Trinity Tower - BIM to site to BIM



The speakers

JB.Valette
BIM Engineering Director

Engineering Departement
VINCI Construction France

D. Dureisseix
BIM Projects dept manager

BIM Engineering Departement
VINCI Construction France

F.Gonnard
Trnity Tower - MEP
construction supervisor

Bateg
VINCI Construction France

J. Köhler
Head of BIM Competence
Center

PERI

J. Ulrich
CEO

Itekube

Your Contact Person

Jean-Baptiste Valette
BIM Engineering director
VINCI Construction France

Phone : +33 (0)6 22641003
Email : jean-baptiste.valette@vinci-construction.fr

- **Jean-Baptiste Valette**
  - Graduate Civil Engineer
  - 2005 – 2008 : Studies at Ecole des Ingénieurs de la Ville à Paris
  - 2008 – 2010 : R&D Engineer BIM & Industrialization at VINCI Construction France
  - 2010 – 2012 : BIM team business development
  - 2012 – 2017 : Head of BIM Engineering Department at VINCI Construction France
  - Since 2017 : BIM Engineering director at VINCI Construction France

Your Contact Person

Daphne Dureisseix
Head of BIM management department
BIM Engineering - VINCI Construction France

- **Daphne Dureisseix**
  - Graduate Civil Engineer
  - 2008 – 2011 : Studies at Polytech‘Clermont-Ferrand
  - 2011 – 2012 : Junior Methods Engineer at Dumez – VINCI Construction France
  - 2012 – 2015 : BIM Engineer to BIM Manager at BIM Engineering Department - VINCI Construction France
  - Since 2016 : Head of BIM Management Department at BIM Engineering – VINCI Construction France

Your Contact Person

Francois Gonnard
Trinity Tower MEP Construction manager
Bateg – VINCI Construction France

- **Francois**
  - Graduate Management and Civil Engineer
  - 1999 – 2003 : Studies at Reims Management School
  - 2003 – 2005 : Studies at Ecole Spéciale des Travaux Publics
  - 2006 – 2007 : Sales at VINCI Networks (Optical fibers)
  - 2008 – 2010 : MEP engineer on CNIT project at VINCI Energies
  - 2011 – 2015 : MEP construction supervisor on major renovation projects at BATEG – VINCI Construction France
  - Since 2015 : MEP construction supervisor on Trinity Tower project at BATEG – VINCI Construction France

Your Contact Person

Jochen Koehler
Head of BIM Competence Center
PERI Group

Phone : +49 (0)175 - 2933618
Email : jochen.koehler@peri.de

- **Jochen Koehler**
  - Graduate Civil Engineer
  - 1992 – 1997: Studies at University Stuttgart
  - 1997 – 2002: Application Engineer at PERI
  - 2002 – 2009: Engineering Standards at PERI
  - 2009 – 2015: Head of Technical Office Formwork PERI Group
  - 2015 – 2017: Head of Engineering Tools and Innovation PERI Group
  - Since 2018: Head of BIM Competence Center PERI Group

Your Contact Person

Julien Ulrich
Founder and CEO
Itekube

Phone : +33 (0)6 33778820
Email : julien@itekube.com

- **Julien Ulrich**
  - Graduate Telecom Degree and HBS MBA
  - 1988 – 1991 : Computer Science - Institut National des Télécommunications
  - 1992 – 1993 : French Embassy Vienna
  - 1995 – 1998 : Business development Director at Orange New York
  - 1998 – 2000 : MBA Harvard Business School
  - 2003 – 2004 : CEO at UPOC – New York
  - Since 2011 : Founder and CEO at Itekube – Paris/Caen

VINCI, GLOBAL PLAYER IN CONCESSIONS AND CONSTRUCTION

THE MANIFESTO COMMITMENTS ADDRESS BOTH EXTERNAL AND INTERNAL ISSUES

VINCI in the world

2017 KEY FIGURES

> 40M€
REVENUE

~194 500
EMPLOYEES

2,75M€
NET ATTRIBUTABLE PROFIT

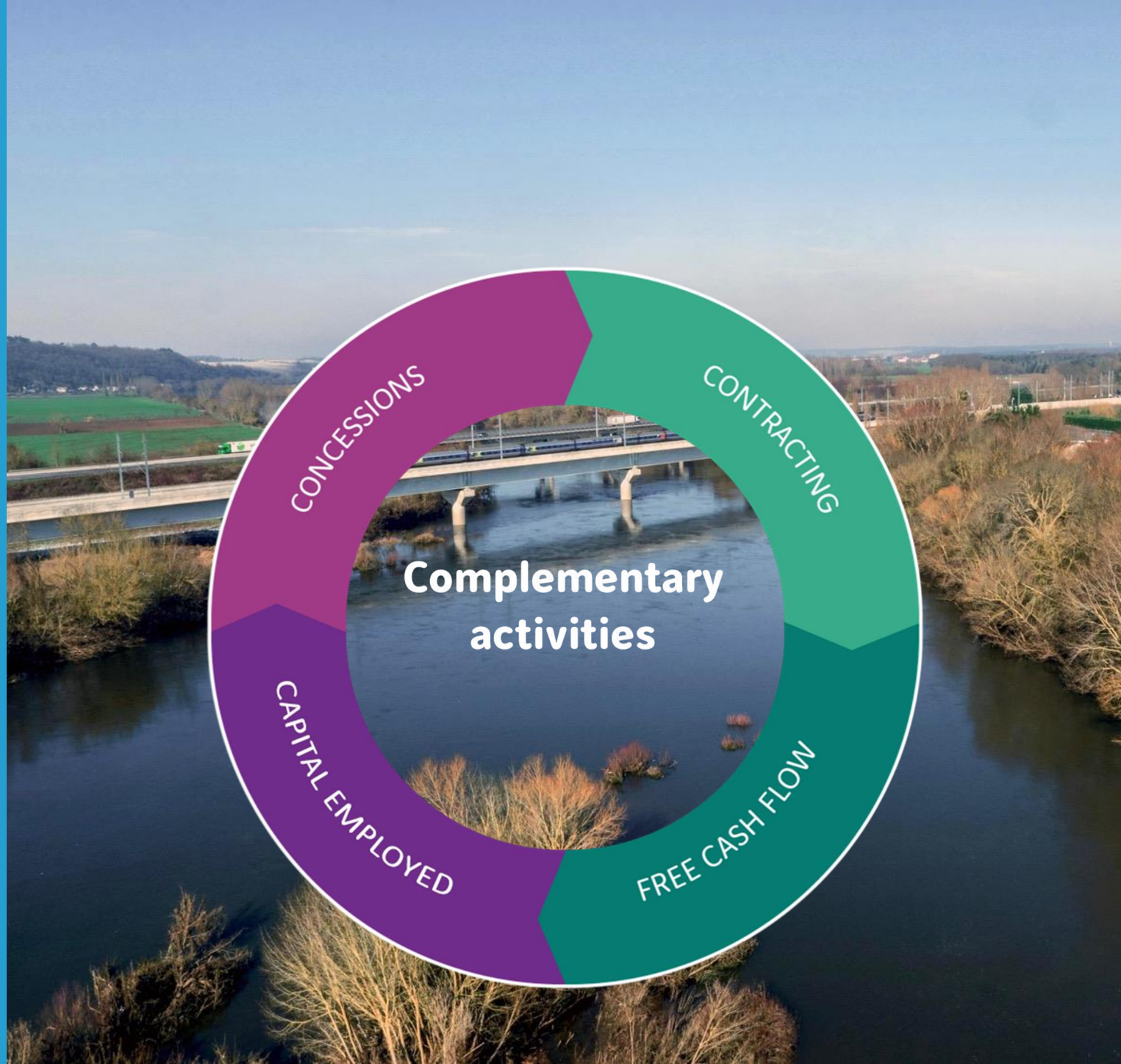
280 000
WORKSITES

WHO WE ARE

Our business activities focus on the long term

We are a multi-local and multi-cultural group

Our goal is all-round performance



VINCI Organisation

PERI VINCI CONSTRUCTION FRANCE

CONCESSIONS

€6,945m 14,443 EMPLOYEES

VINCI AUTOROUTES
€5,277m
6,309 EMPLOYEES

VINCI AIRPORTS
€1,409m
6,705 EMPLOYEES

OTHER CONCESSIONS
€258m
1,429 EMPLOYEES

VINCI Immobilier
€774 m
(incl. holdings)
874 EMPLOYEES

CONTRACTING

€32,830m 179,026 EMPLOYEES

VINCI ENERGIES
€10,759m
69,382 EMPLOYEES

EUROVIA
€8,112m
39,526 EMPLOYEES

VINCI CONSTRUCTION
€13,960m
70,118 EMPLOYEES

VINCI CONSTRUCTION KEY FIGURES

~14 M€
REVENUE

~70 000
EMPLOYEES

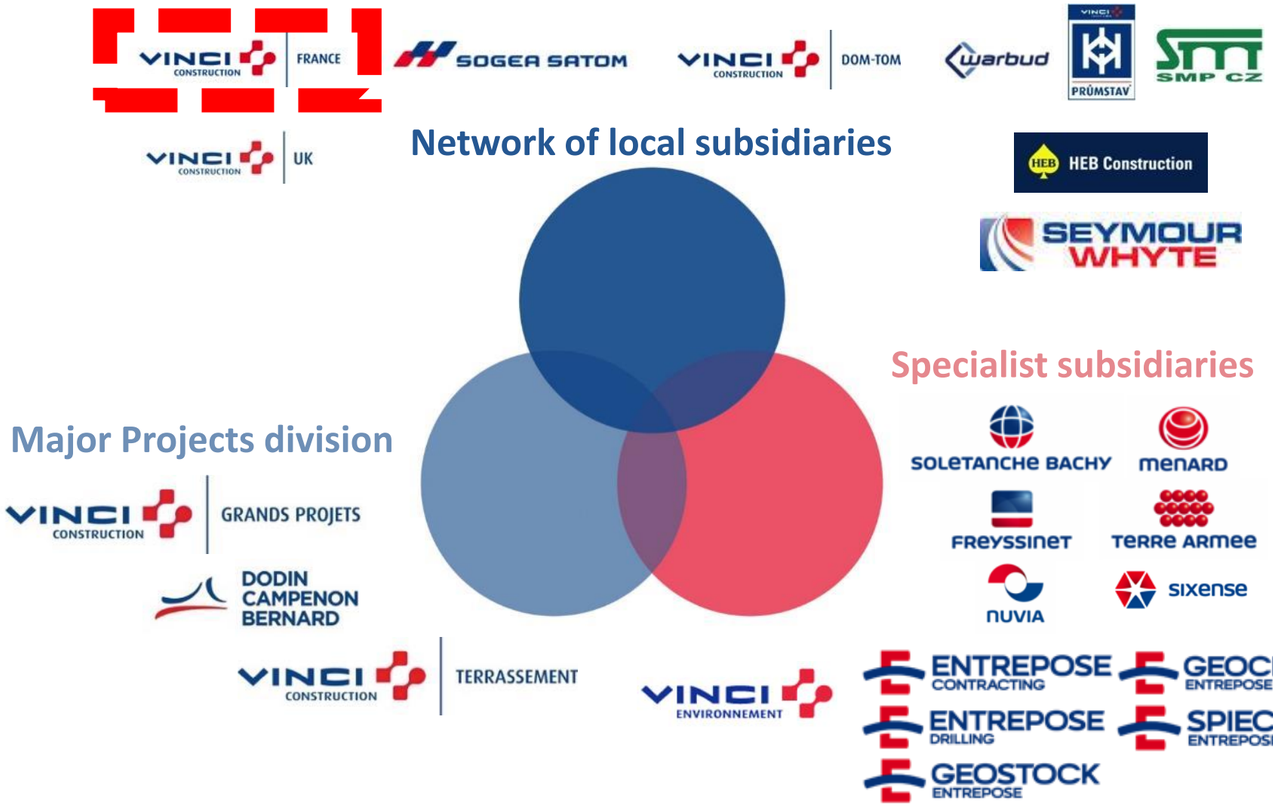
PRESENT IN
100
COUNTRIES

800
COMPANIES

VINCI Construction subsidiaries

- VINCI Construction's time-honoured trademarks.

- Covering the full range of skills required to carry out complex civil engineering structure, earthworks and building projects.
- High-level expertise, strong engineering and project management capabilities, risk management, simple, responsive organisational structure, comprehensive, modular solutions.

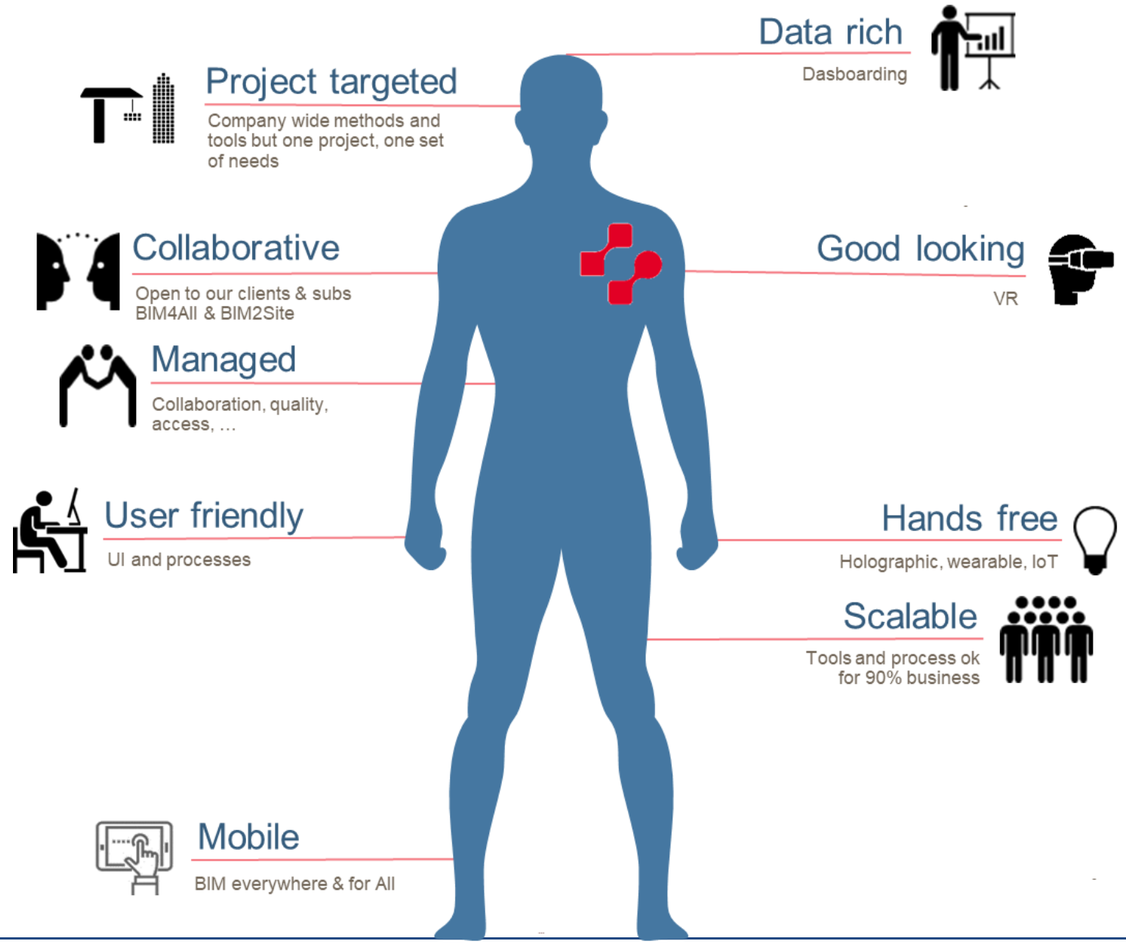


- A network of small and medium sized companies put together gradually in France and other countries over a period of 150 years.

- Solutions with high technological content, engineers with strong expertise in geotechnical, structural, digital, nuclear, oil, gas and renewable energy engineering.

VINCI Construction VDC vision scope

VDC must be :



VINCI Construction France :
A unified company with local roots

17
Divisions

393
Locations

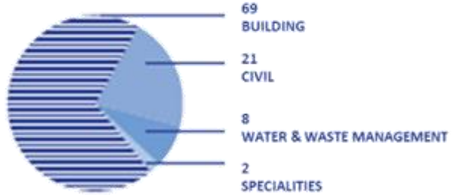
19 938
EMPLOYEES

n°1
FRENCH GENERAL CONTRACTOR

7 497
CONSTRUCTION SITES

5 372 M€
DE CHIFFRE D'AFFAIRES

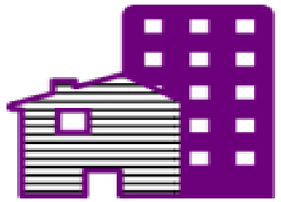
RÉPARTITION DU CHIFFRE D'AFFAIRES (EN %)



RÉPARTITION DE LA PRISE DE COMMANDES PAR CLIENT (EN %)

5 785 M€
2016
BACKLOG

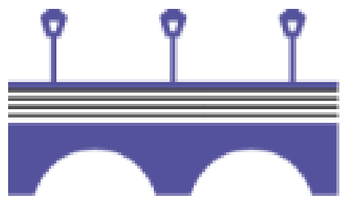
VINCI Construction France businesses



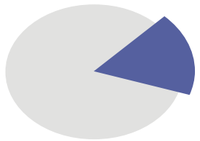
BUILDING

68 %
TURNOVER

3 217
SITES



CIVIL CONSTRUCTION



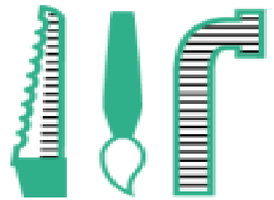
21 %
TURNOVER

1 534
SITES

HYDRAULIC & WASTE

7 %
TURNOVER

1 946
SITES



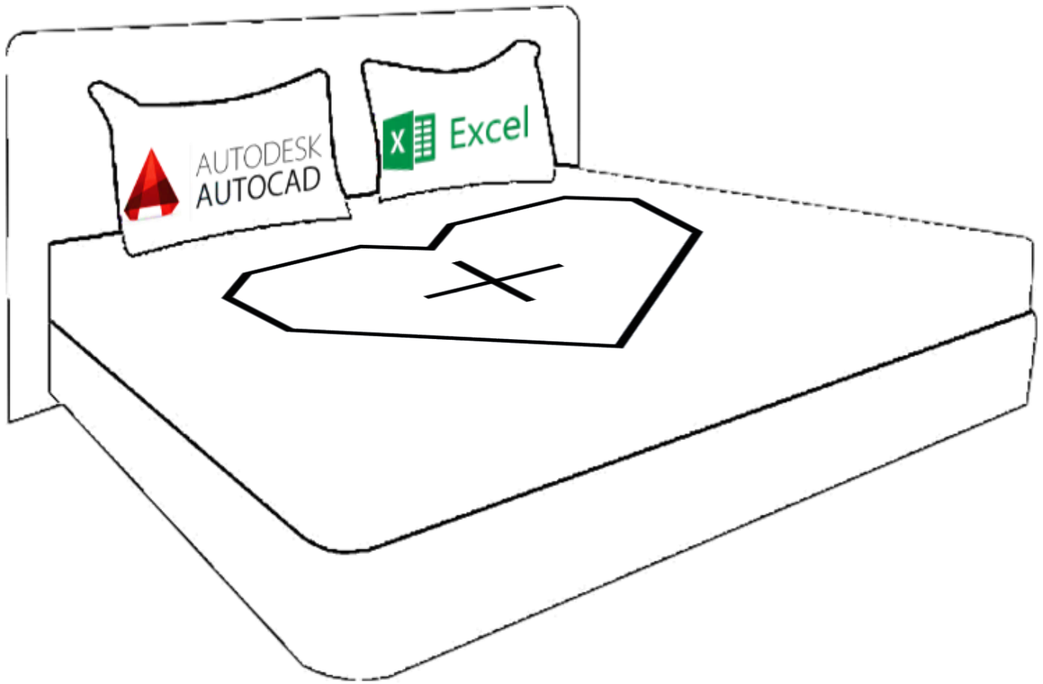
SPECIALITIES

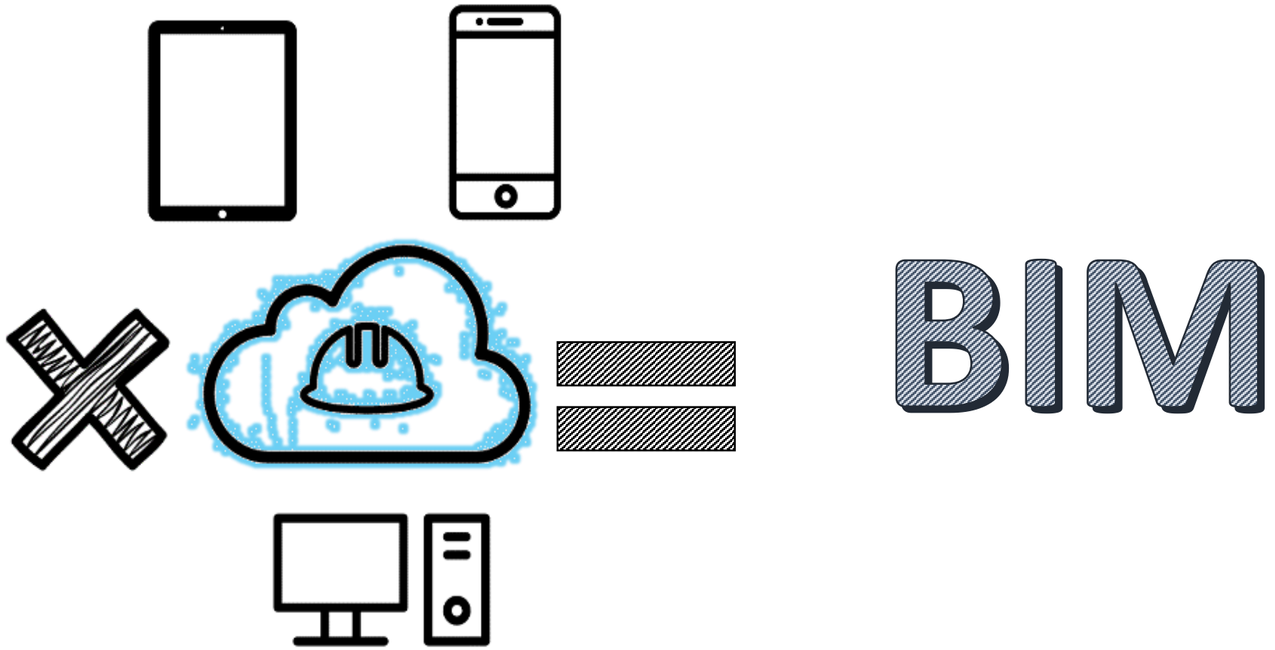
3 %
TURNOVER

793
SITES

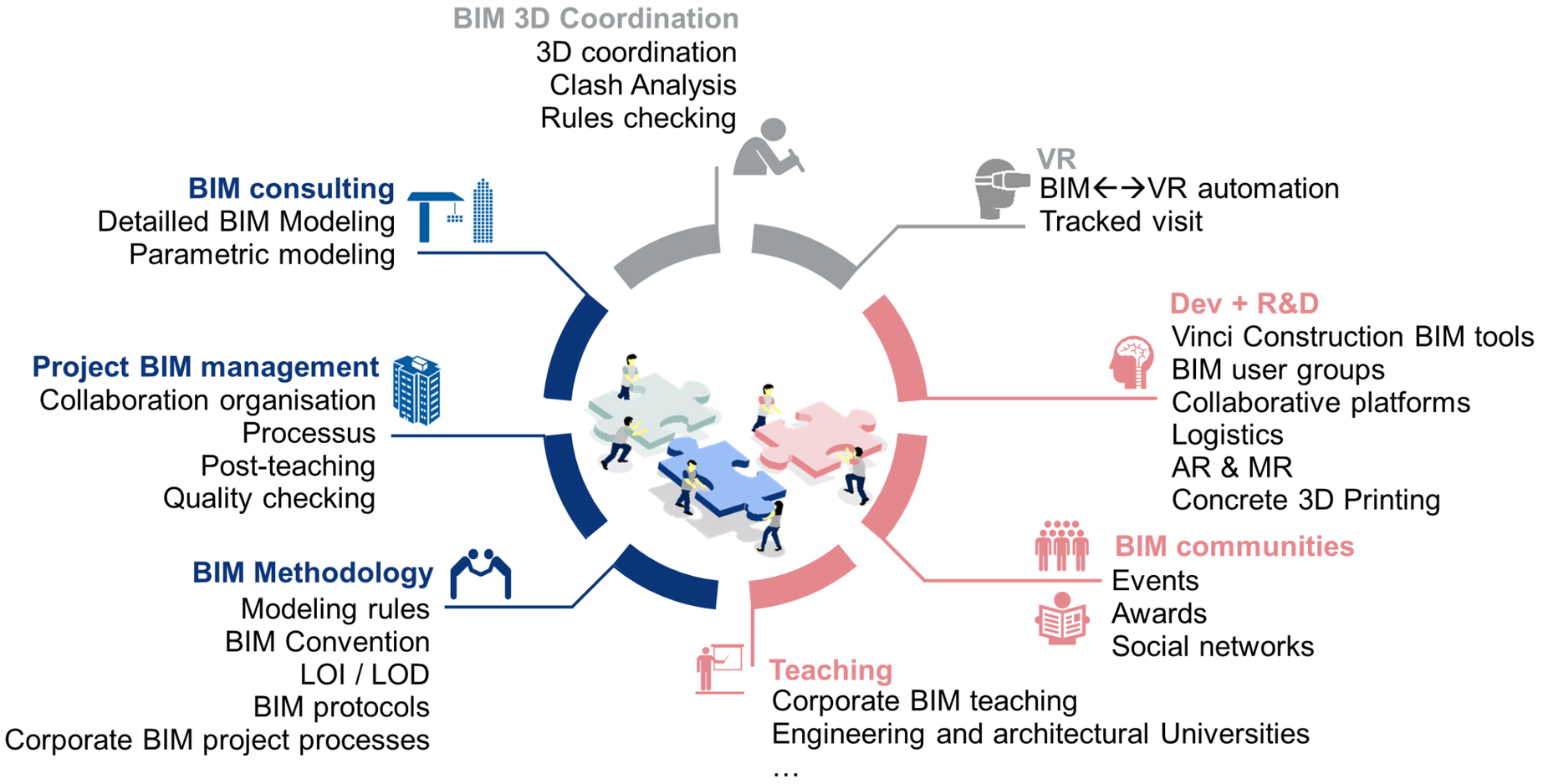
VINCI Construction France Culture

BIM = ?



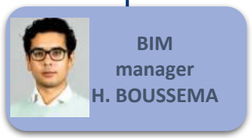


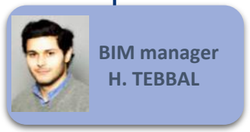
BIM engineering missions

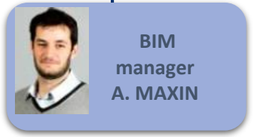


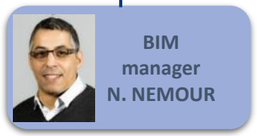
BIM Engineering

BIM Projects Management

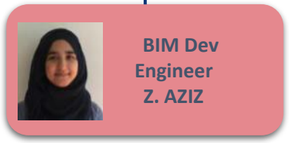






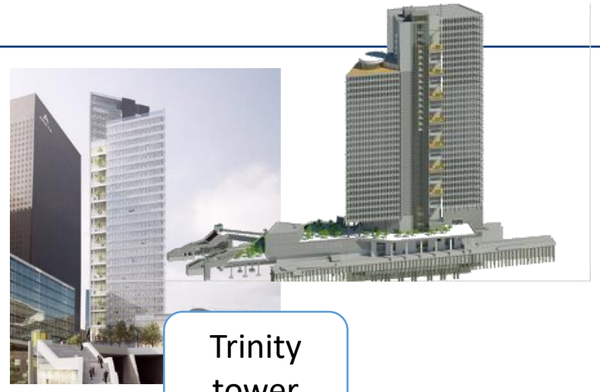


BIM Tools development



The projects we managed or manage

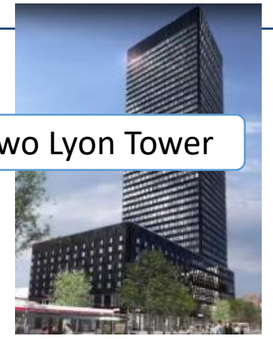
D² tower



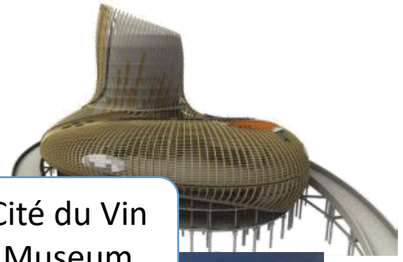
Trinity tower

DUO Towers (Offices+hotel)

Hekla Tower



Two Lyon Tower

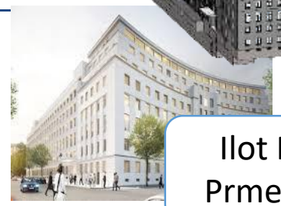


Cité du Vin Museum

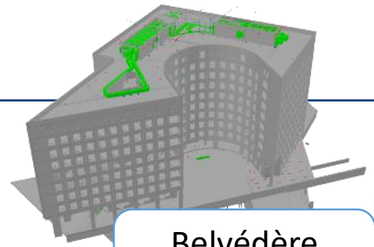
Saint Gobain HQ tower

Archipel VINCI HQ

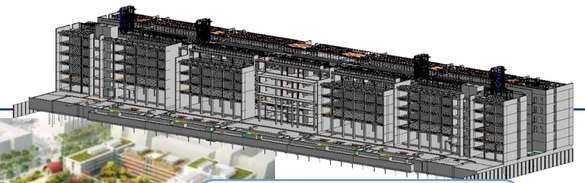
Jardins de l'Arche Mixed tower (offices+hotels)



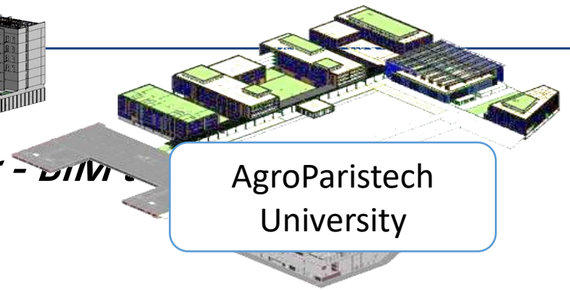
Ilot Fontenoy Segur Prme minister Offices



Belvédère refurbishment

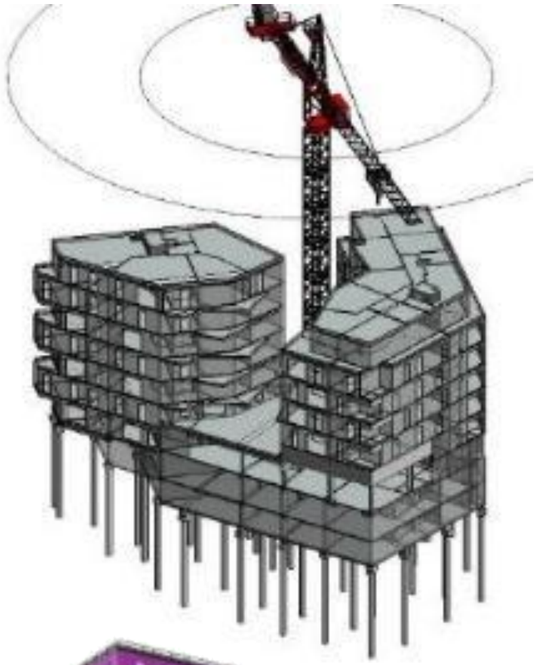


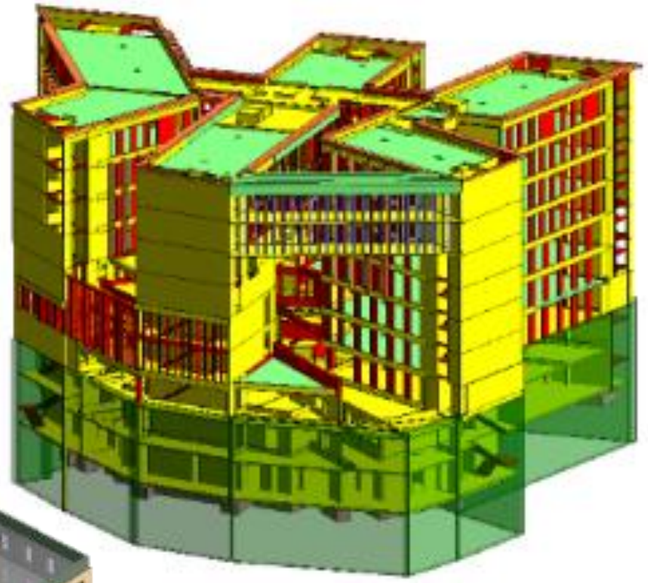
ENS University

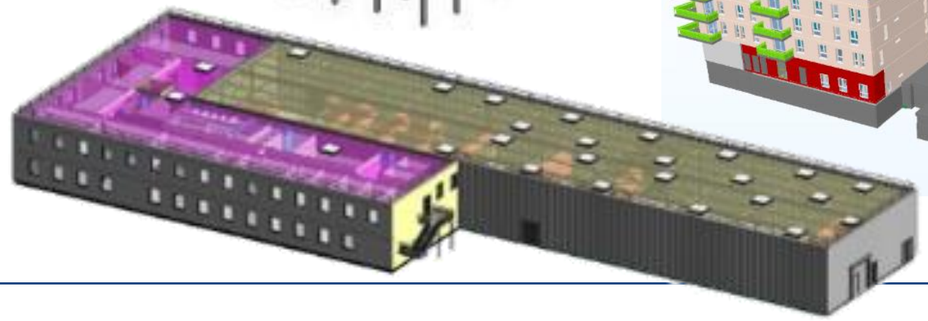


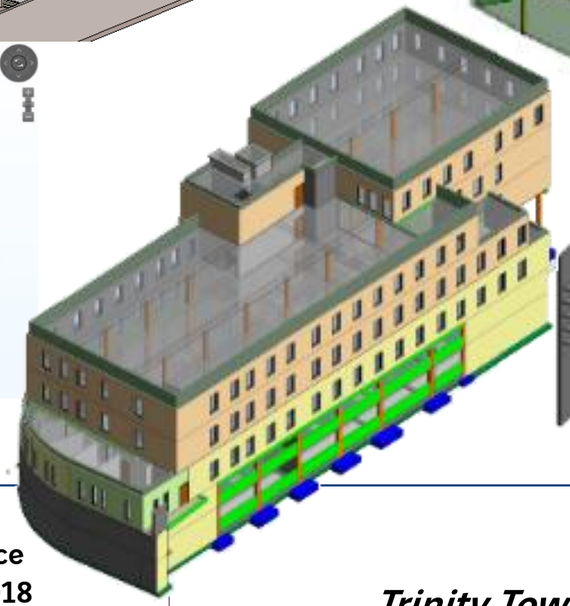
AgroParistech University

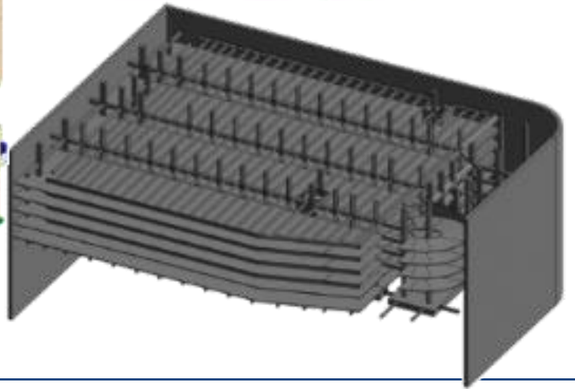
But company business (80% TO)





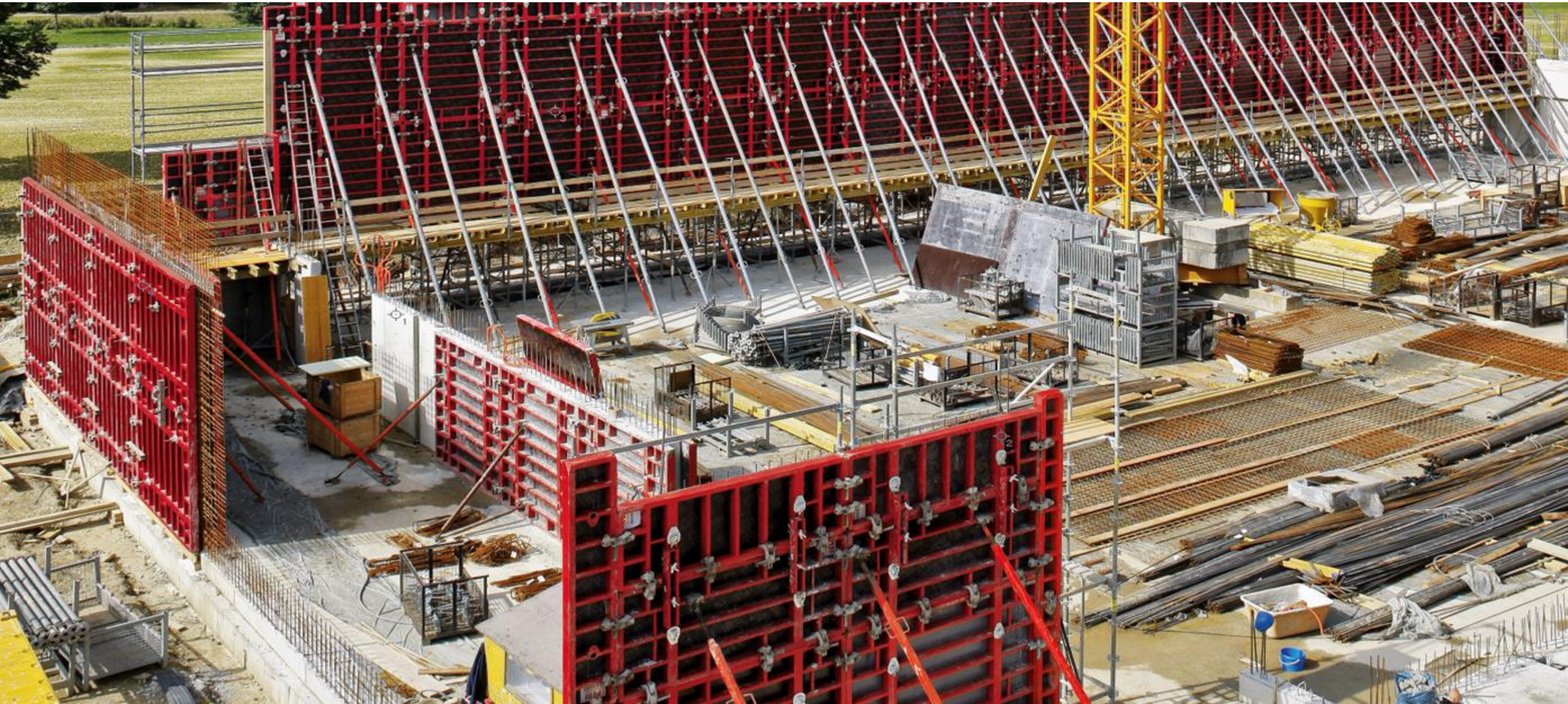






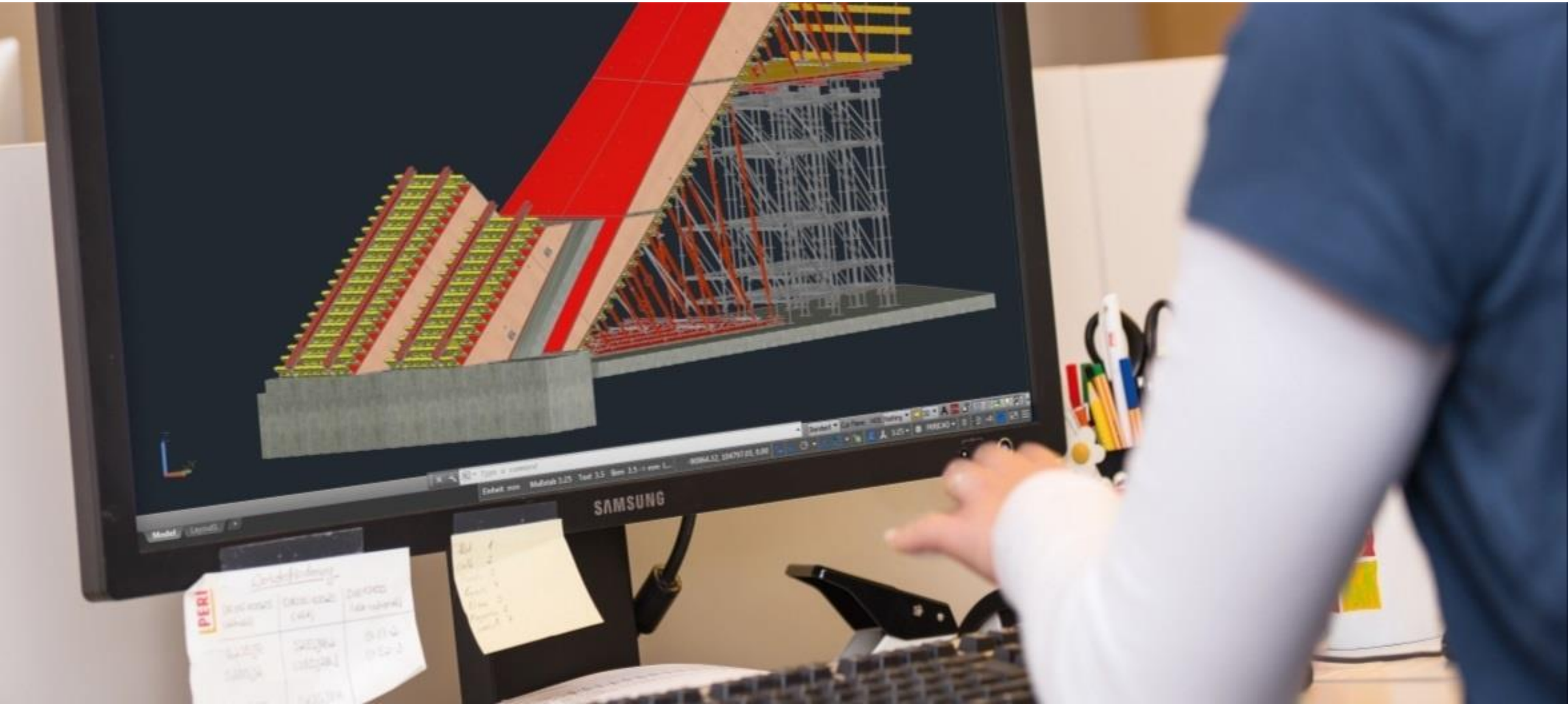
Trinity Tower - BIM to site to BIM

PERI – Our Company | Formwork



PERI – Our Company | Scaffolding

PERI – Our Company | Engineering

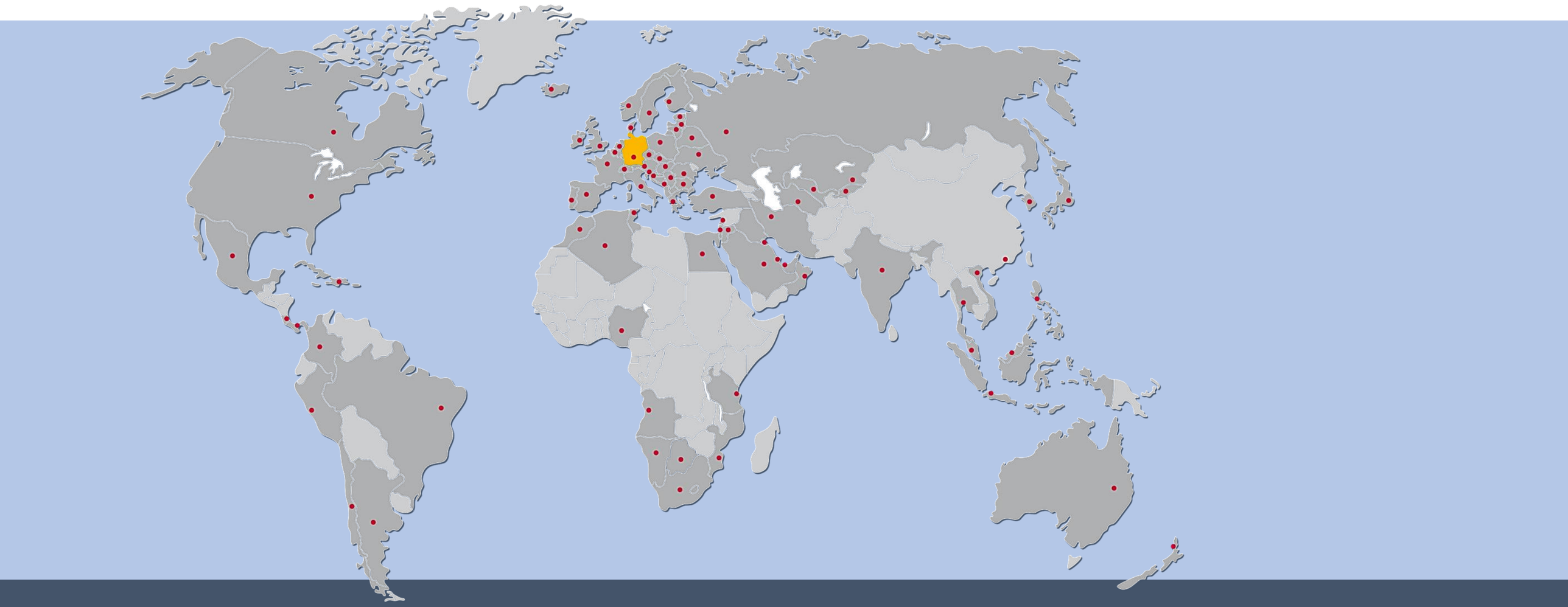


PERI – Today| Headquater Weißenhorn

Here, system equipment is developed, produced and held in readiness

Campus, total area 382,000 m²

PERI – Today| Globally

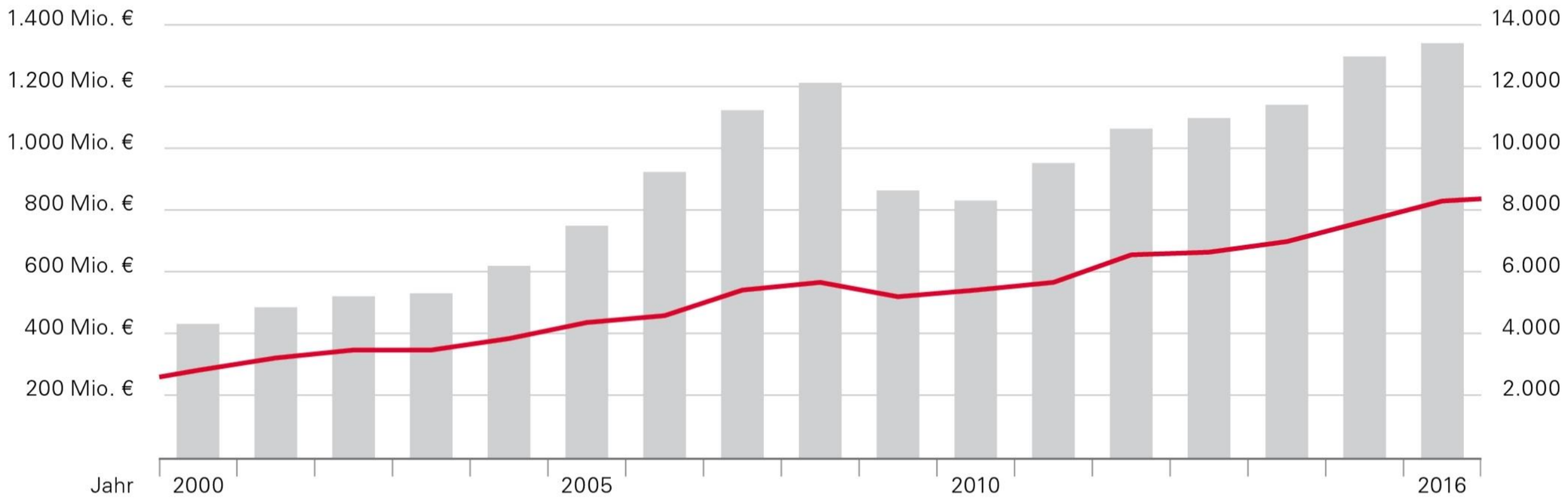


With more than 60 subsidiaries, PERI supports construction sites in more than 90 countries

PERI – Today| Turnover, Employees

Turnover in millions
1,46 in 2017

Number of employees
8,800 in 2017



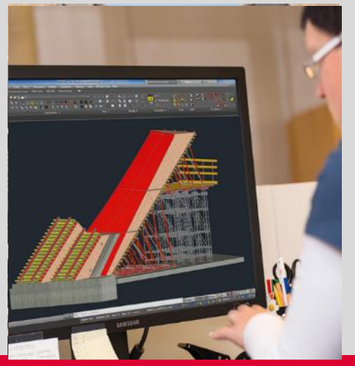
PERI – Services | Support

Technical processing

Rental parks and distribution

Cleaning and repairs

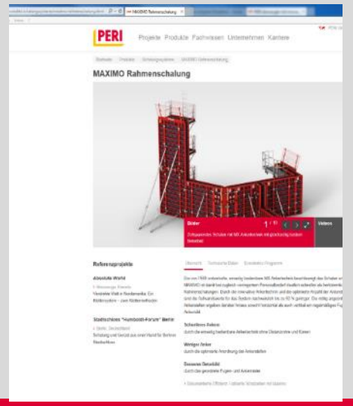
Formwork assembly



Software solutions and apps

Practice-oriented training

Product documentation



Website and country websites

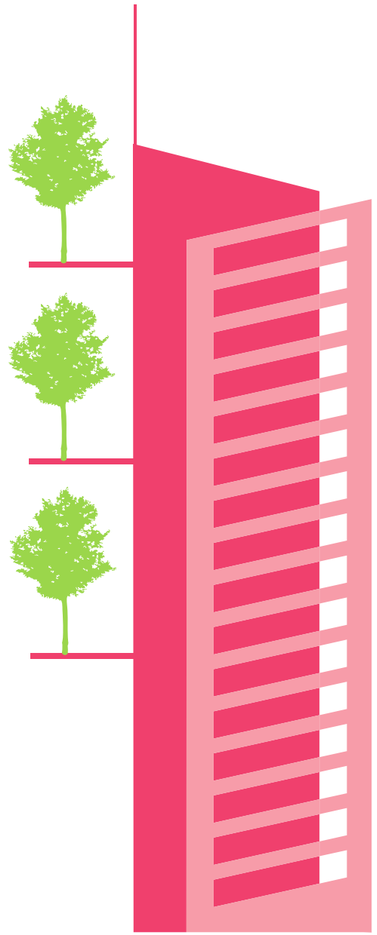
BIM Services

PERI – Digital Capabilities

BIM
Lebenzyklus

1 Gebäudeentwicklung / Raumplanung
2 Entwurfsplanung
3 Ausführungsplanung
4 Thermische und technische Analysen
5 Planerstellung / Dokumentation
6 Vorfabrikation / Elementierung
7 Werk- und Montageplanung
8 Erstellung / Baustellenplanung
9 Betriebsphase mit Facility Management
10 Revitalisierung / Umnutzung, Rückbau

Trinity tower



La Défense
trinity

Towers in La Défense

VINCI Headquarters
Delivery December 2020

Jardin de l'Arche
Delivery 2021

Trinity
Delivery March 2019

HEKLA
Delivery 2021

Saint-Gobain
Delivery May 2019

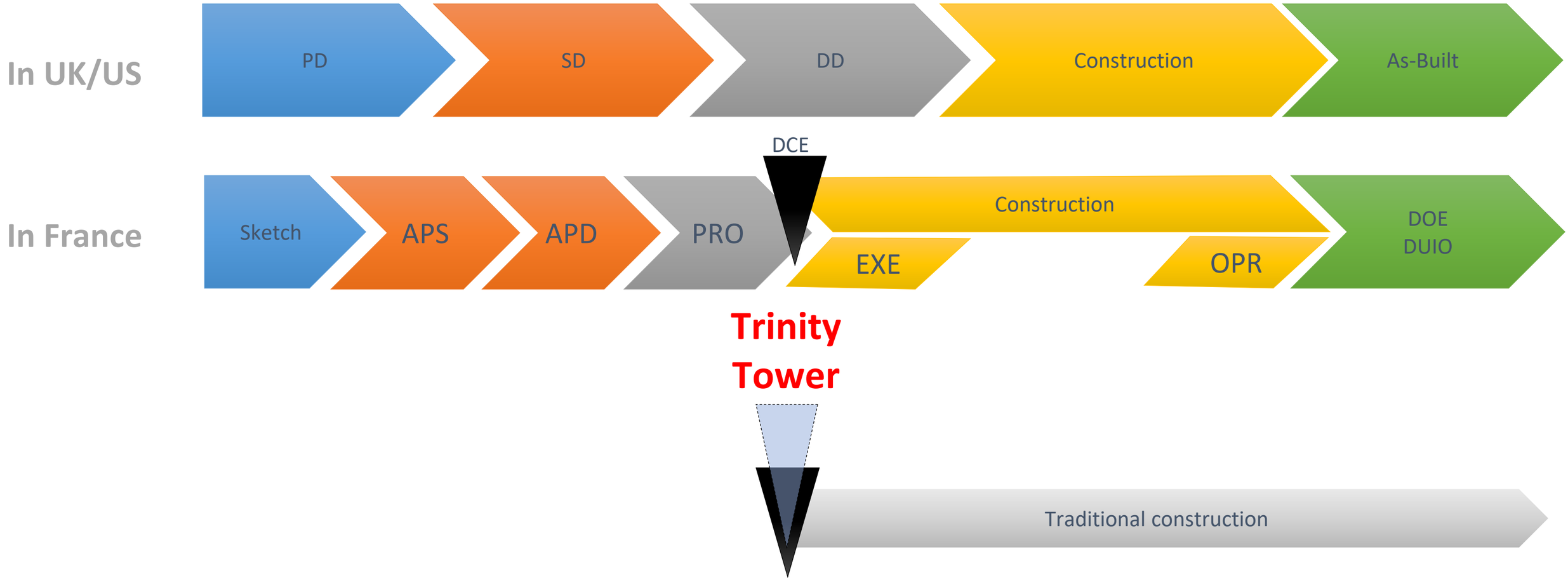
Duo
Delivery October 2020

Construction phase

Design phase

to site to BIM

Contractual differences



Project description

Bidding: 2015-11-25

173 300 K€ fixed no update price

- 5 650 K€ cafeteria option

Subsidiary :

BATEG and Chantiers Modernes Construction

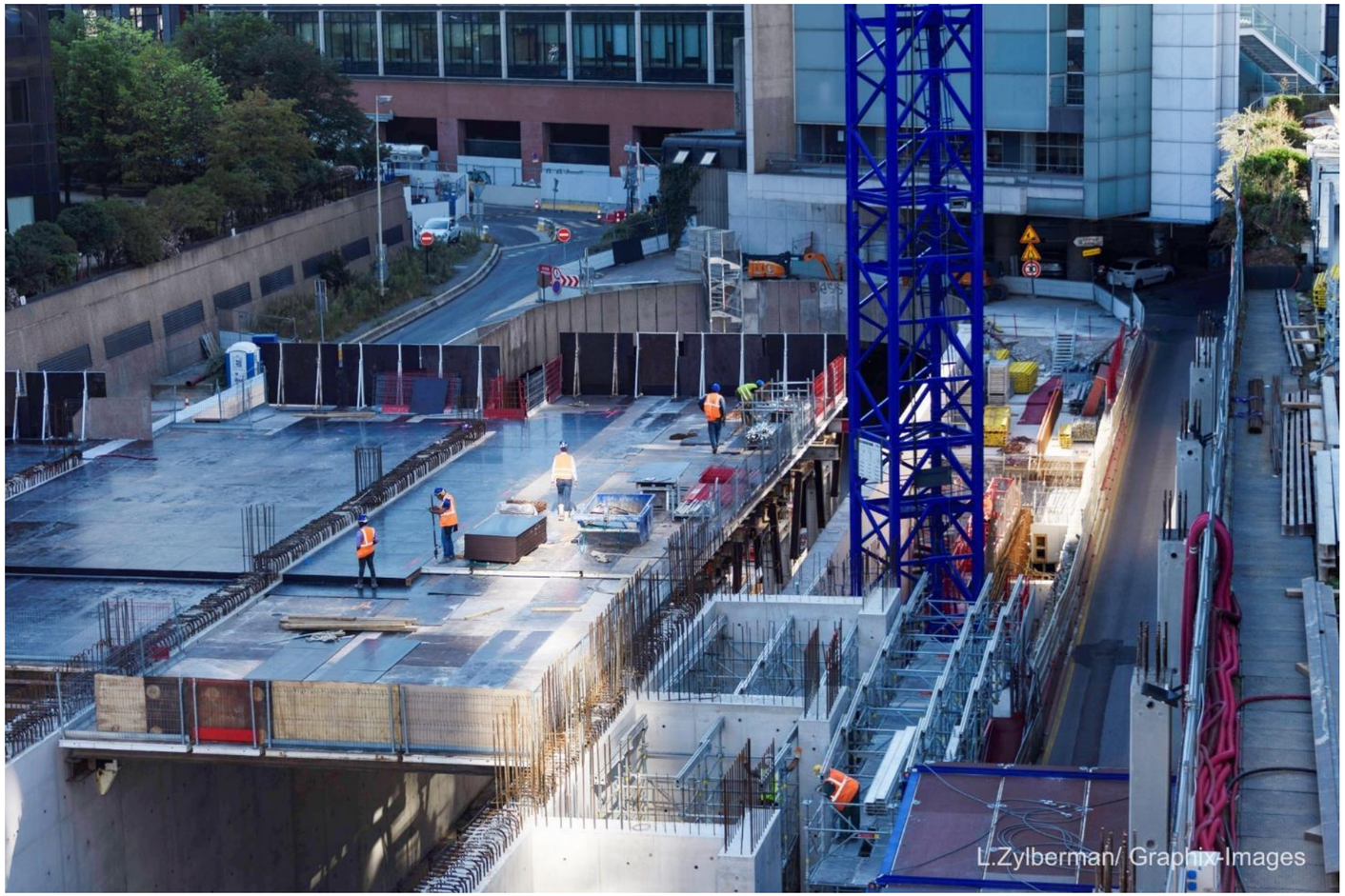
Construction site in the successive months

August 2016

Construction site in the successive months

December 2016

Construction site in the successive months



July 2017

Construction site in the successive months

31st October 2017

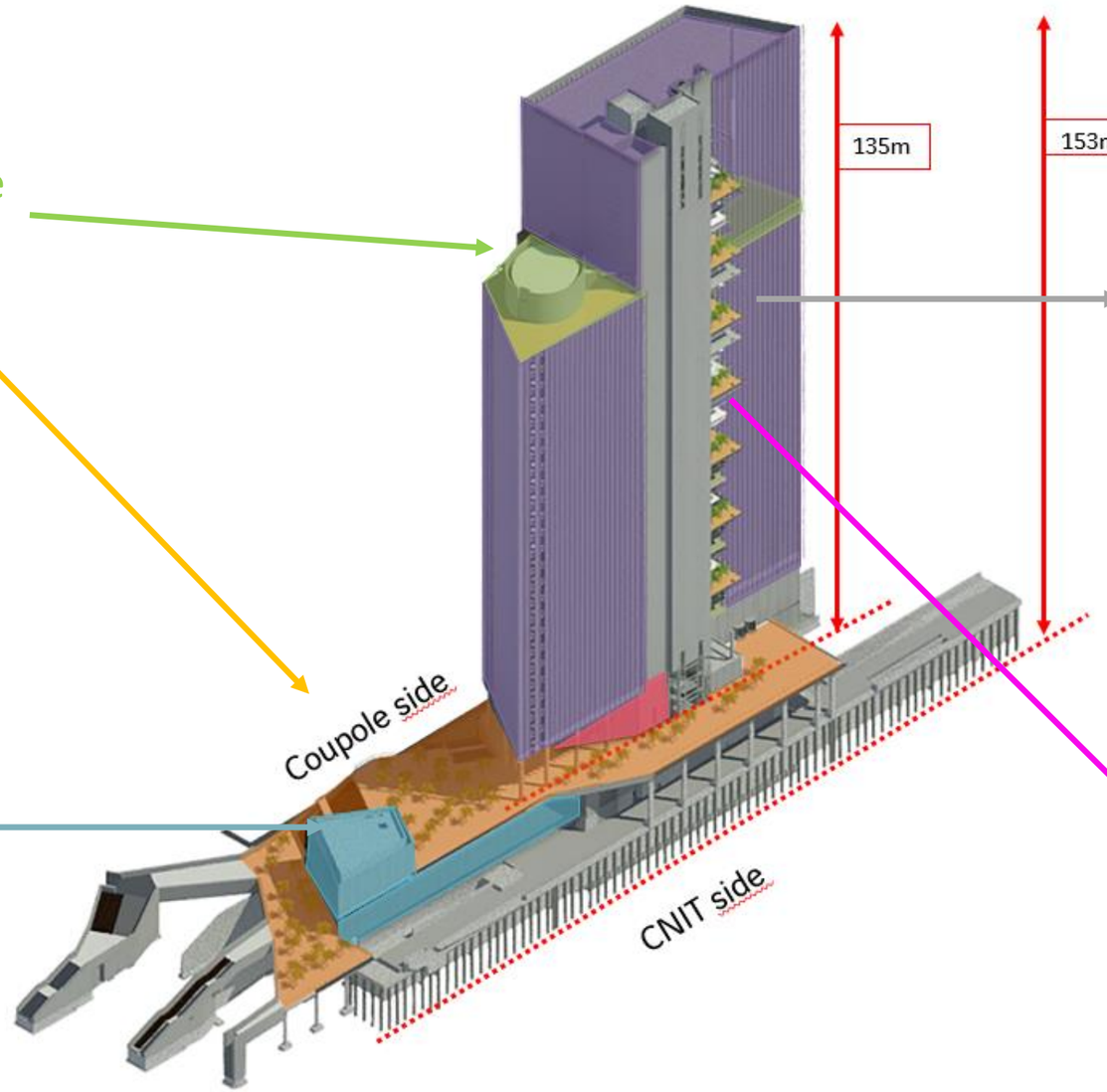
Construction site in the successive months

April 2018

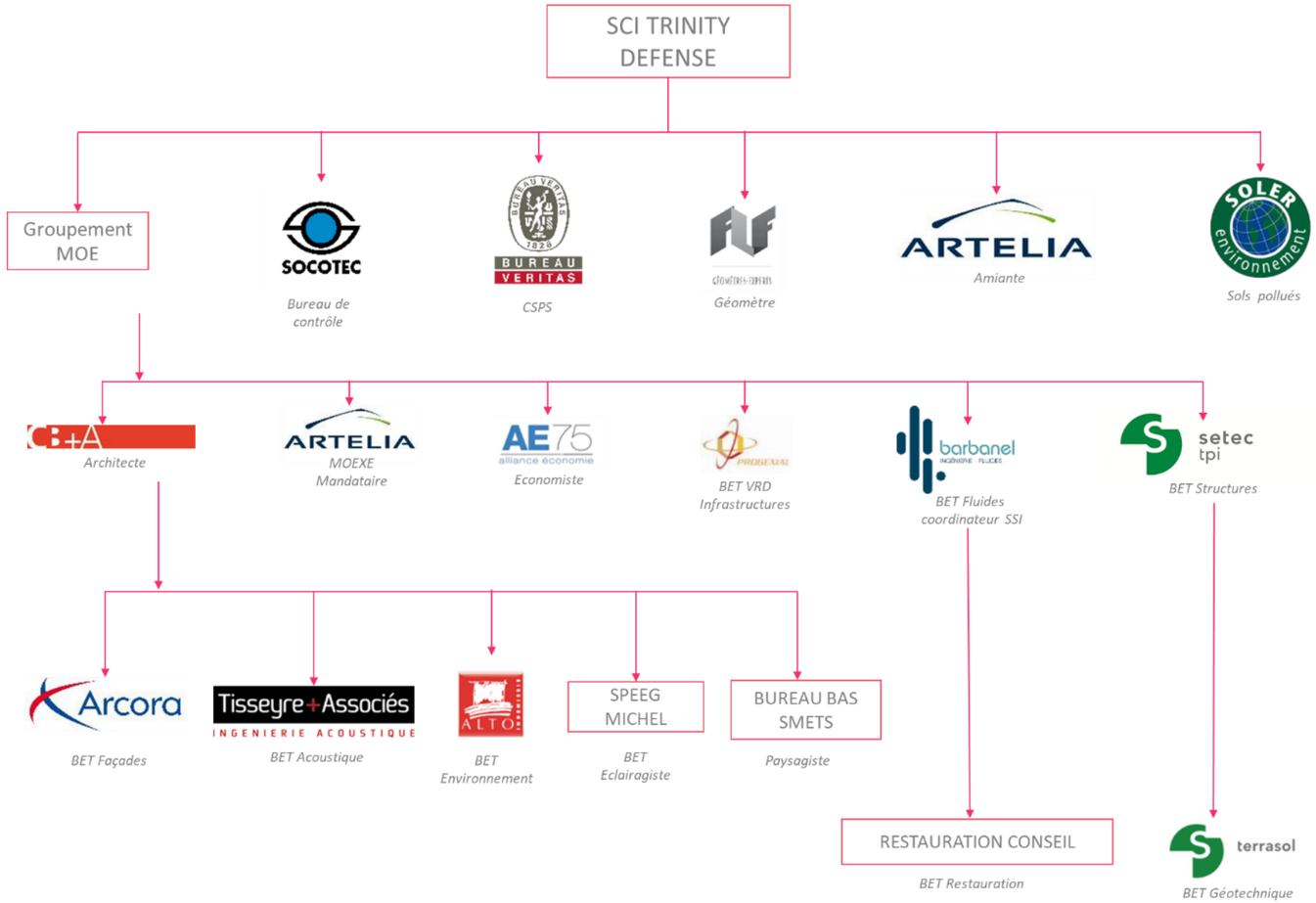
Trinity Tower (Unibail)

- 135 m from forecourt
- 31 levels – 50 000m² of offices
- Level 25 :
  - Multifunctional room with outdoor terrace
  - Auditorium / Business Center
- Urban link above highway acces (3 500 m²)

- 560 m² of shops
- 560 m² commercial + restauration



Project organization



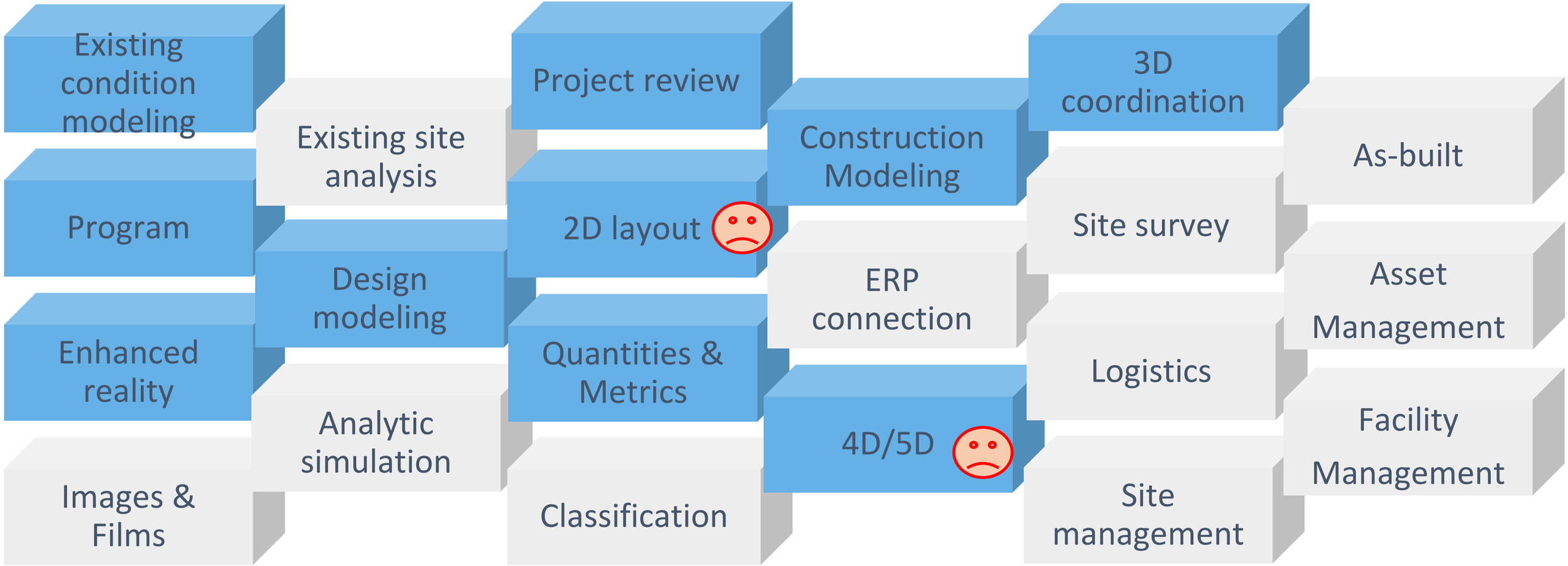
What a Construction Project needs?

- Documents : 2D/3D sheets + QTO’s
- Fixing: who administrates/modifies/sees/validates what.

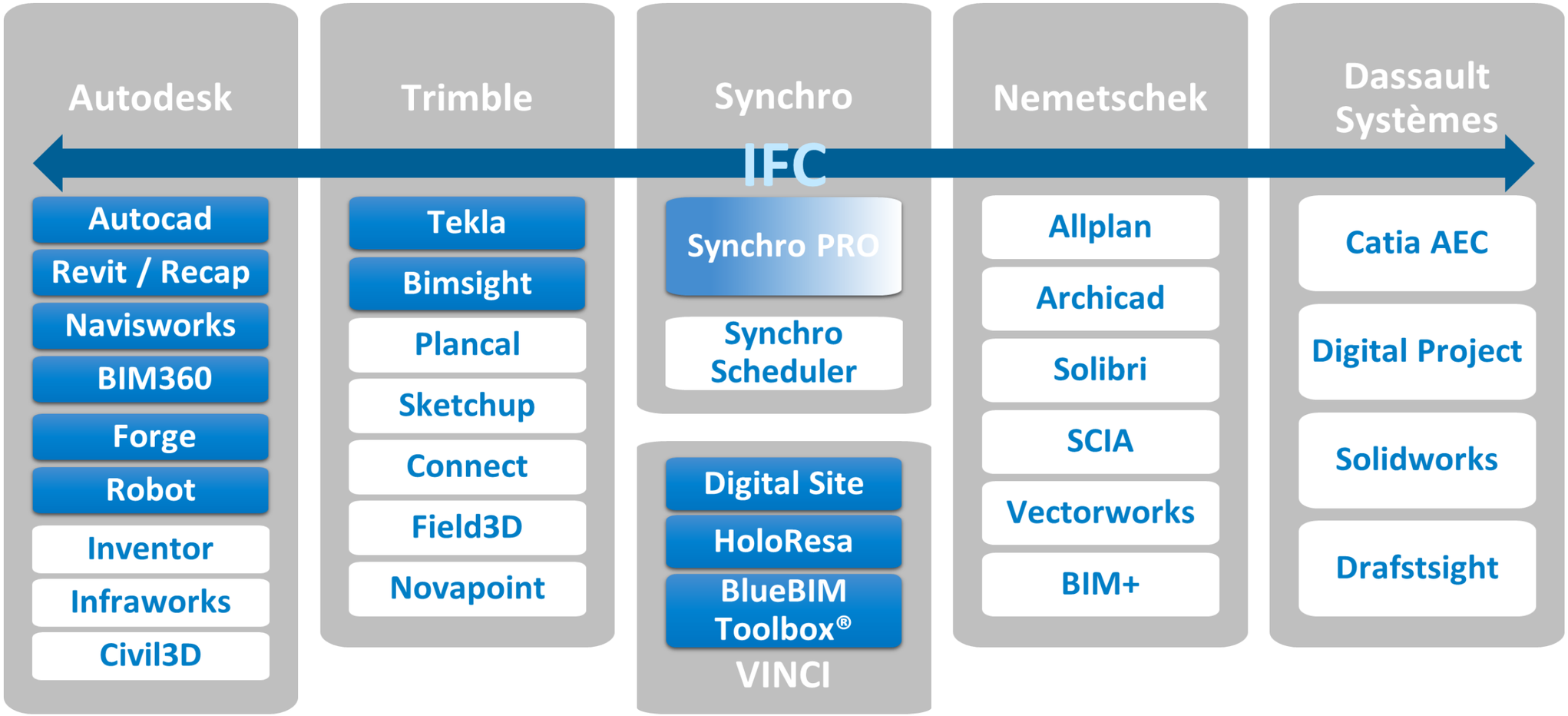
➔ LOI management + engineering management

- Then you can have fun with:
  - Forge and digital cabinet, Hololens site quality checking, onsite 4D

Trinity tower BIM Uses



The used software panorama

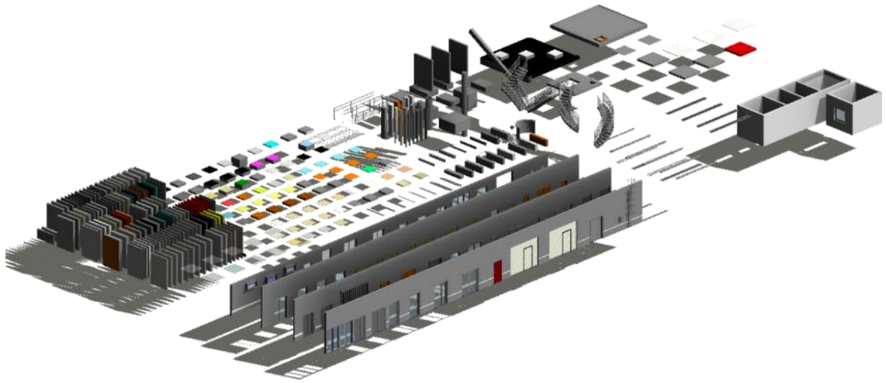


7 BIM Usecases

1. Scan + Modeling of existing conditions – VINCI
2. Formwork modeling / IFC Export – PERI
3. Design Collaboration – PERI
4. PERI Library+ for Revit – PERI
5. MEP Coordination – VINCI
6. BIM on Site through MR – VINCI
7. BIM on Site through Site Digital Totem – Itekube

VINCI Construction BlueBIM Toolbox : a common language for all projects

Qties & ARC	Methods	Structure	MEP
Detaillled Qties	Methods	Simulation	Terminals
Location plans	Crane rates	MEP interfaces	Networks
	Scheduling	CIP 2D	Coordination
	Equipment use	(Reinforcement)	

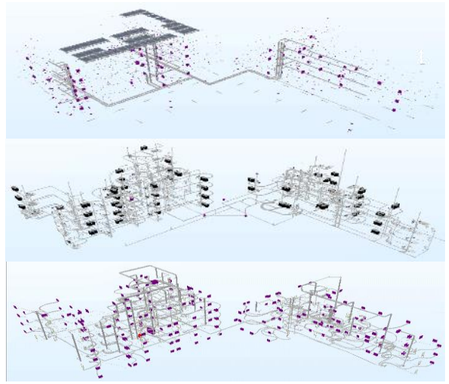


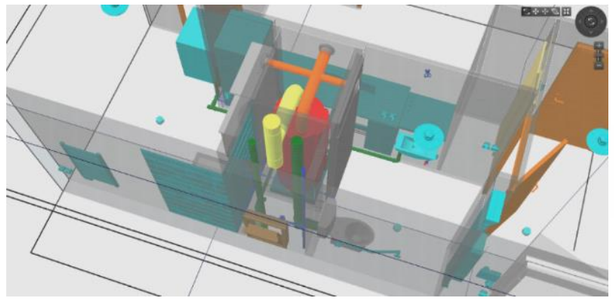
1. **Generic objects**
2. **Parametrics and properties**
3. **Layouts**
4. **VINCI Construction modeling rules**
5. **VINCI Construction BIM tools to fasten modeling and use of models**

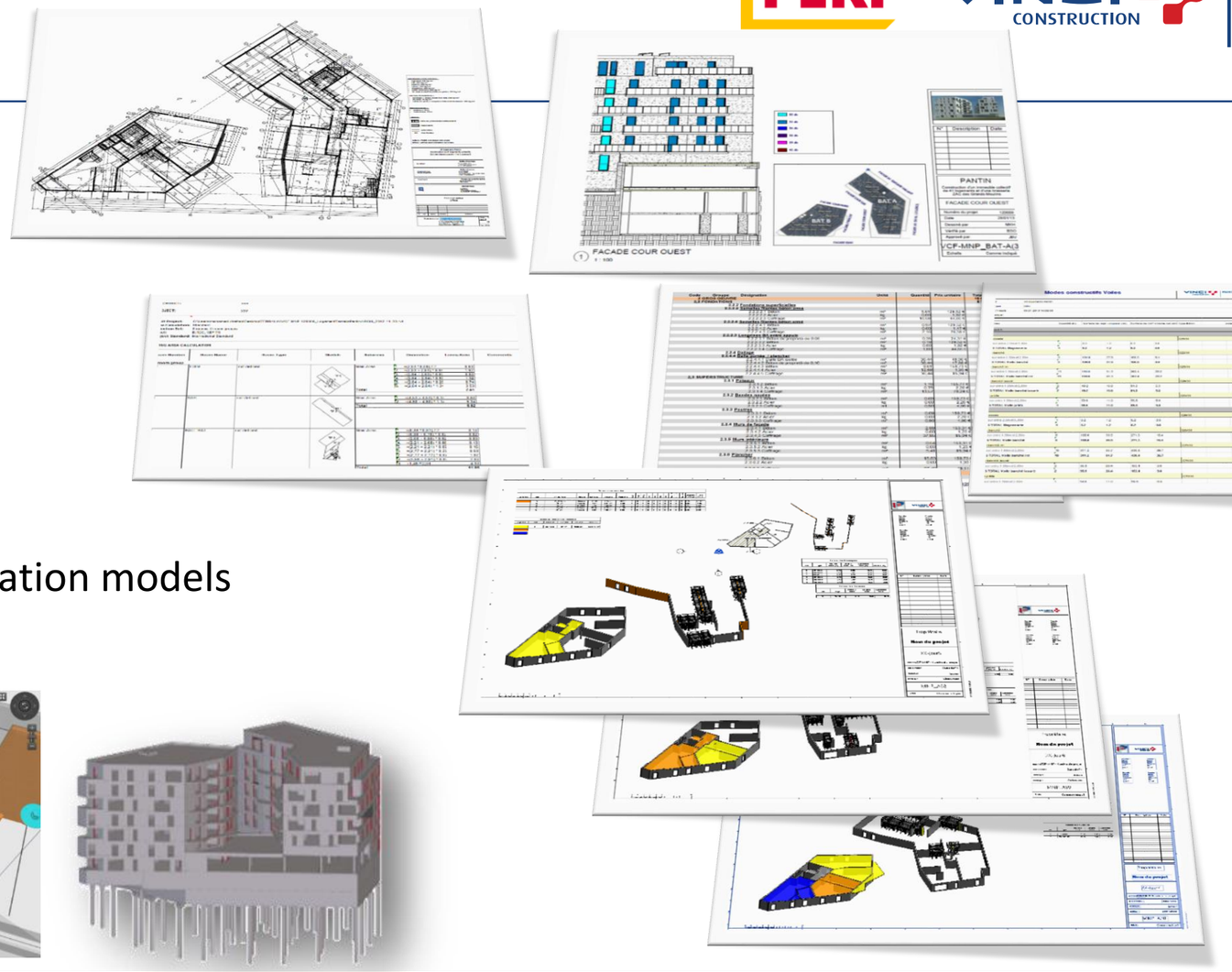
BIM Kit

The kit contains:

- ✓ Generic objects
- ✓ Their settings
- ✓ Templates
- ✓ Modeling rules of VINCI CONSTRUCTION
- ✓ Plugins to accelerate the modeling and operation models

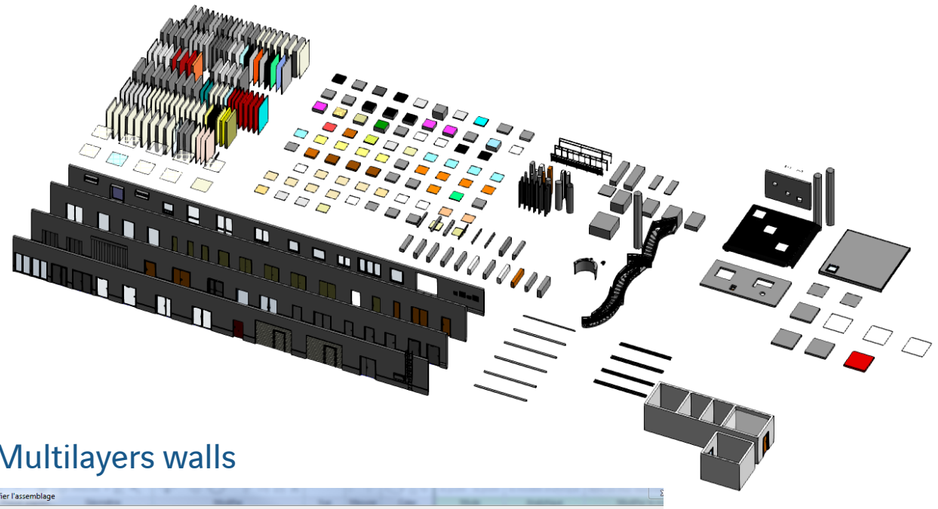




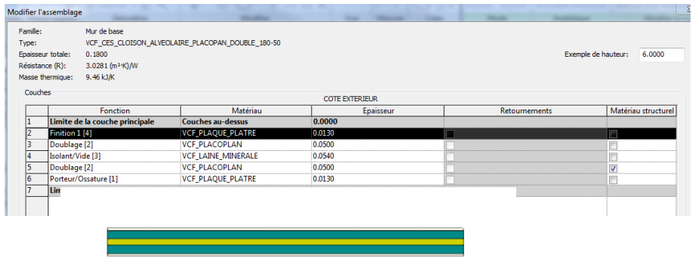


BIM Kit
Architectural template

- Families: walls, slabs, columns, finishes, doors, …



Multilayers walls



Shared parameters

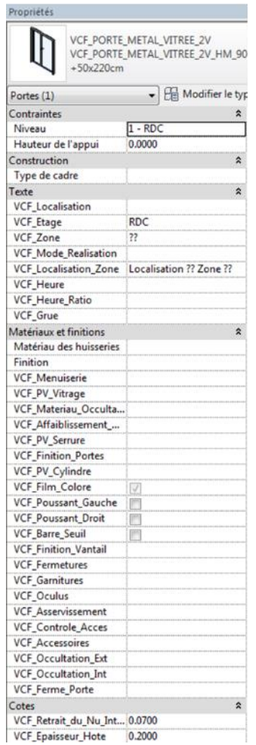
- Buildings
- Zone
- Level

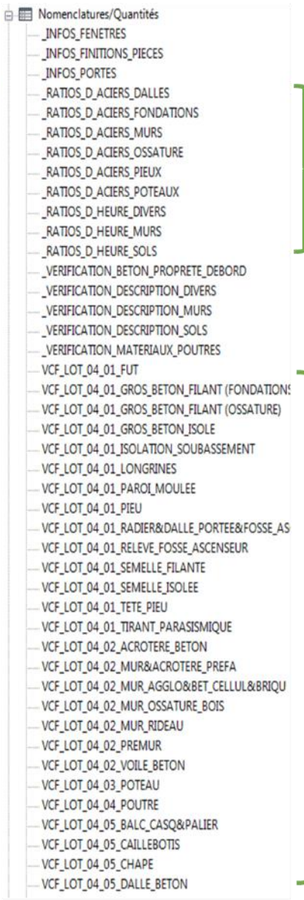
→ Localization parameters

- Acoustic performance
- Fire classification
- Type of lock
- Type of door leaf
- …

→ Door accessories

Information schedules about windows, doors and rooms



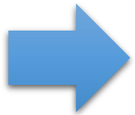


- Steel density ratio schedules: slabs, walls, funding, beams, columns
- Hour ratio schedules: walls, slabs, multicategories

→ QTO according French classification

Corporate BIM Execution Plan

- Document prepared by the BIM Manager
- It describes the roles, responsibilities, tasks and processes applicable to the project
- BIM production must comply with the BIM Execution Plan
- It is useful to all project stakeholders from design to AsBuilt, to ensure uniformity in the use of BIM
- Crucial documents which sets out:
  - roles, responsibilities,
  - Properties data,
  - construction tolerances,
  - file naming convention,
  - software,
  - origin and orientation



BIM tools and their uses are constantly changing, therefore this BIM Execution Plan is not frozen and is updated throughout the project

Level of Information

Revit category | Information | Parameter name | Description | Instance or type

CREATION DES MODELES BIM CEA											
Elément	Catégorie Revit	Niveau d'informations								PHASE	
		Nom de l'information	Nom du paramètre Revit	Description	Exemple	Type de paramètre	Groupes	Regrouper sous	Type/occurrence	EXE	DOE
Partition	Wall	Résitance au feu	VCF_Resistance_Feu	Caractéristique de résistance au feu	M0, M1, ...	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Réaction au feu	VCF_Reaction_Feu	Nombre d'heure coupe feu	CF1h, CF2h	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Affaiblissement acoustique	VCF_Affaiblissement_Acoustique	Isolation acoustique (RA en dB)	35 dB	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Résitance thermique isolant	VCF_Resistance_Thermique_Isolant	Isolation thermique, U en W/m².K	0,9 W/m².K	Texte	VCF_Generalites	Matériaux et finitions	Occurrence		X
		Nature de la cloison	VCF_Nature_Cloison	Type de plaque	BA13, BA15, ...	Texte	VCF_Cloison	Matériaux et finitions	Occurrence	X	X
		Nombre de plaques	VCF_Nombre_Plaques	Nombre de plaques constituant la cloison	1, 2, ...	Nombre entier	VCF_Cloison	Matériaux et finitions	Type	X	X
		Nombre de plaques haute résistance	VCF_Nombre_Plaque_Haute_Resistance	Nombre de plaques haute résistance	1, 2, ...	Nombre entier	VCF_Cloison	Matériaux et finitions	Occurrence	X	X
		Isolation	VCF_Isolation	Type de laine	laine de verre, ...	Texte	VCF_Cloison	Matériaux et finitions	Occurrence	X	X
		Epaisseur laine minérale	VCF_Epaisseur_Laine_Minerale	Epaisseur de l'isolant	10cm	Nombre	VCF_Cloison	Matériaux et finitions	Type	X	X
		Nombre de parements hydrofuge	VCF_Nombre_Parements_Hydrofuge	Nombre de plaques hydrofuge	1, 2, ...	Nombre entier	VCF_Cloison	Matériaux et finitions	Type	X	X
		Chapitre CCTP	VCF_Chap_CCTP	Chapitre du CCTP correspondant	§4.2.2.2	Texte	VCF_Generalites	Matériaux et finitions	Type	X	X
		Hauteur maximum d'emploi	VCF_Hauteur_Maximum_Emploi	Hauteur maximun d'emploi	3,1m, ...	Hauteur	VCF_Cloison	Matériaux et finitions	Occurrence	X	X
		Matériau	Matériau	Matériau	Placoplatre, laine de verre, ...	Matériau	-	-	Type	X	X
Glass wall	Wall	Résitance au feu	VCF_Resistance_Feu	Caractéristique de résistance au feu	M0, M1, ...	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Réaction au feu	VCF_Reaction_Feu	Nombre d'heure coupe feu	CF1h, CF2h	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Affaiblissement acoustique	VCF_Affaiblissement_Acoustique	Isolation acoustique (RA en dB)	35 dB	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Nature du bâti	VCF_Nature_Bati	Matériau du bâti	Placoplatre, bois, ...	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Nature du vitrage	VCF_Nature_Vitrage	Type de vitrage	Simple vitrage, verre feuilleté, verre trempé	Texte	VCF_Generalites	Matériaux et finitions	Occurrence	X	X
		Matériau	Matériau	Matériau	Placoplatre, laine de verre, ...	Matériau	-	-	Type	X	X

- ✓ One sheet per discipline: Finishings, Structure, HVAC, …
- ✓ VINCI Construction France database for As built

BIM Management makers

BIM Management

Structure
Architectural interior

MEP

BIM Coordinators

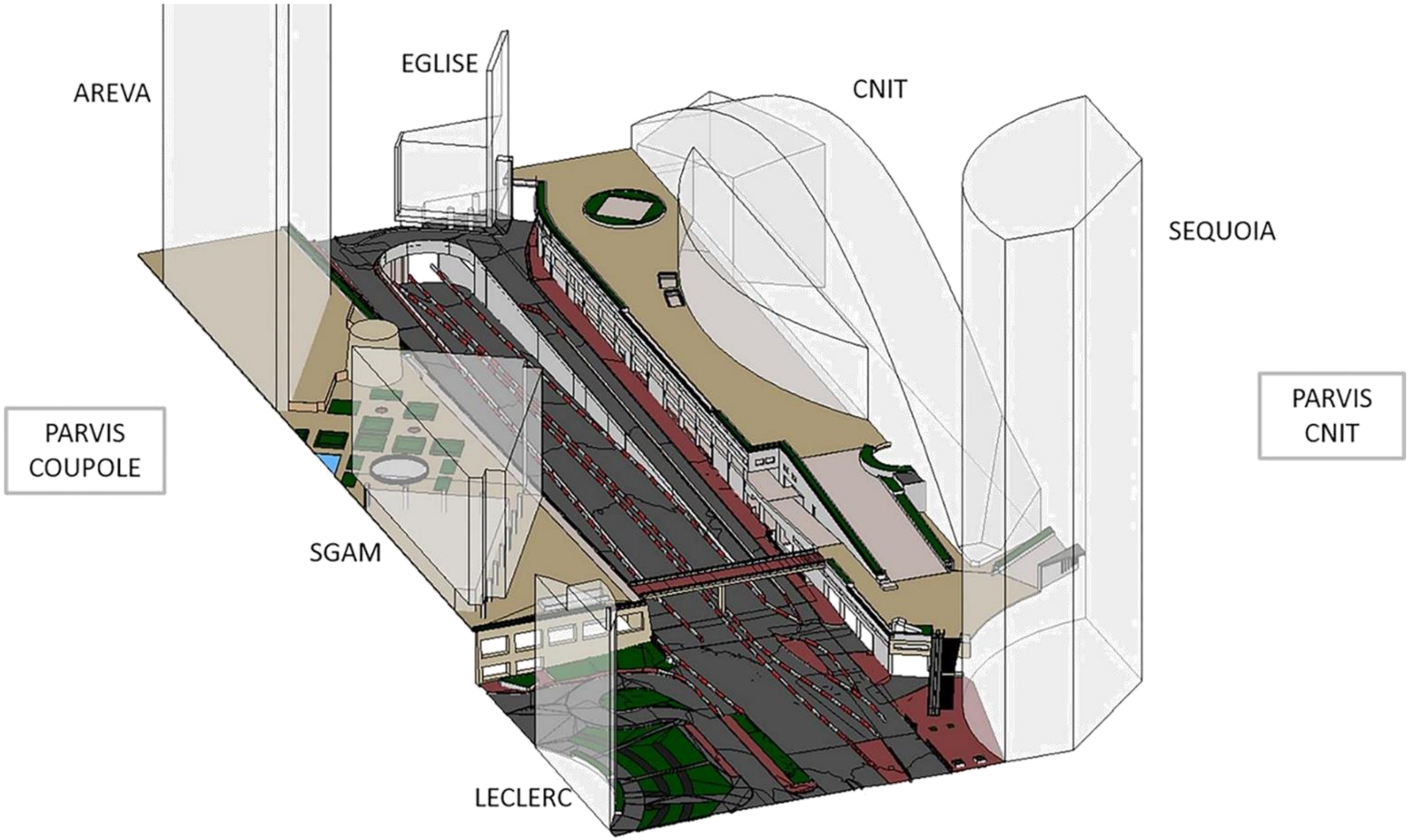
Facade

Interior finishings

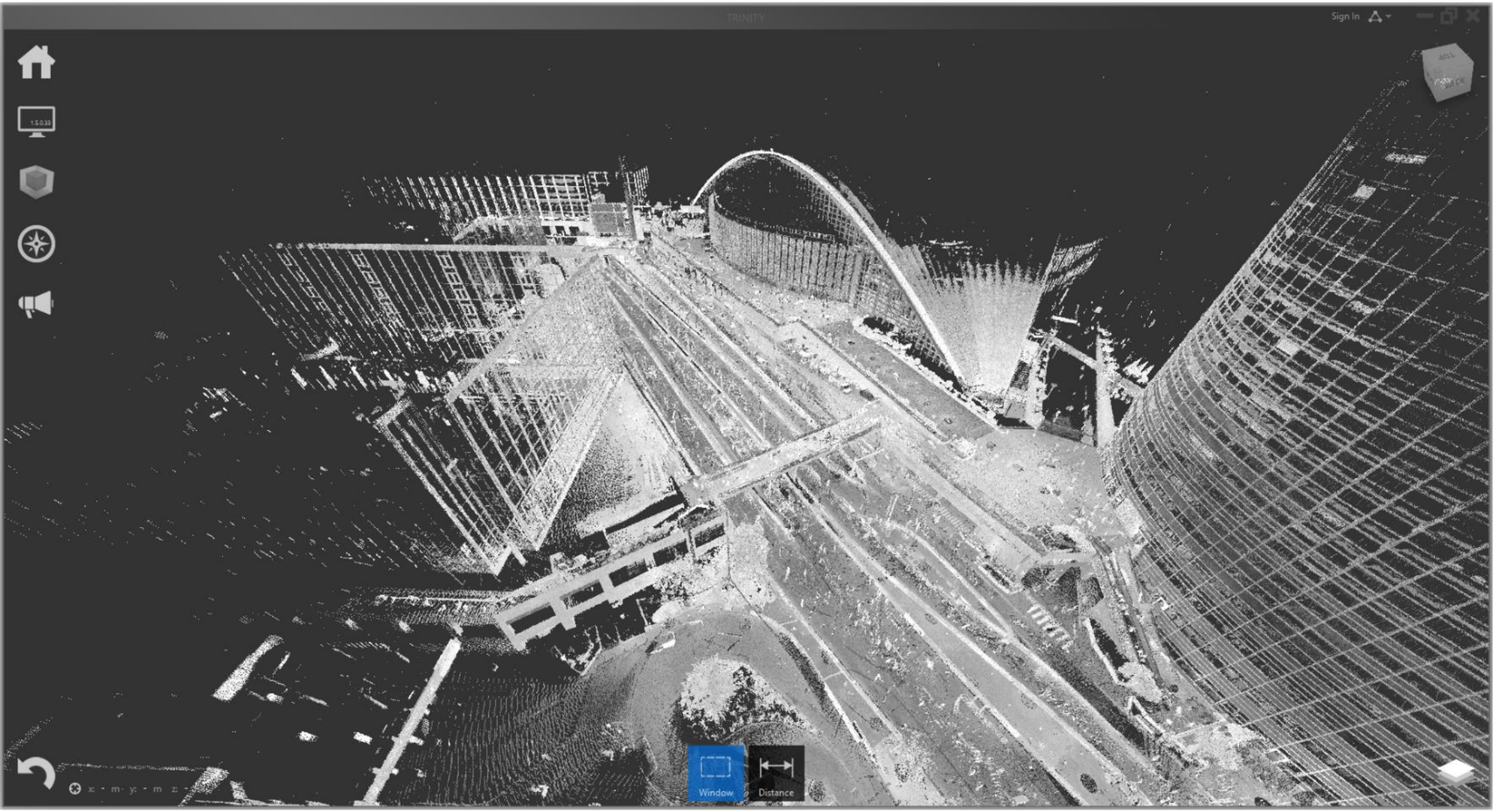
1. Existing condition modeling

1. Existing condition modeling

Laser scan survey:
modeling environment
point cloud based



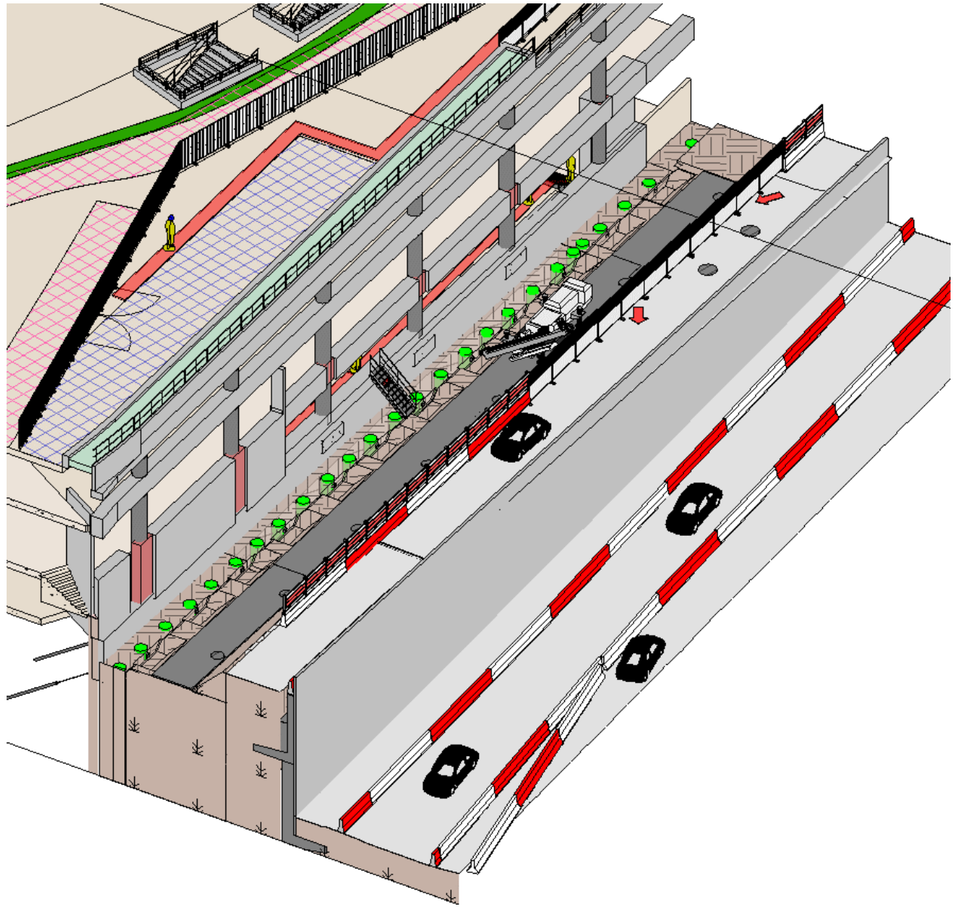
1. Existing condition modeling



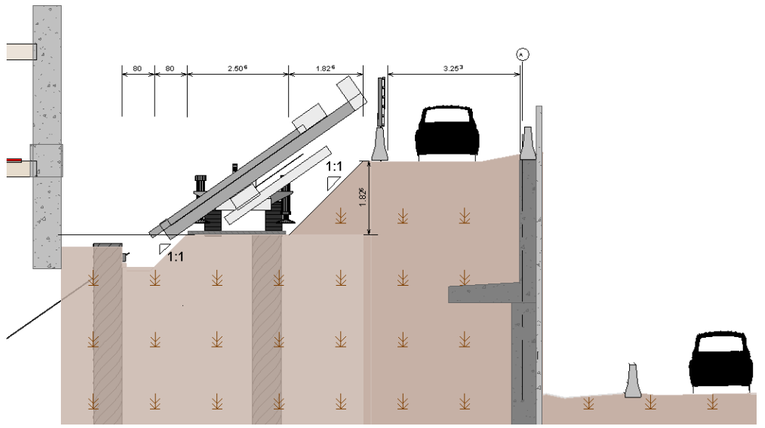
170 scan stations

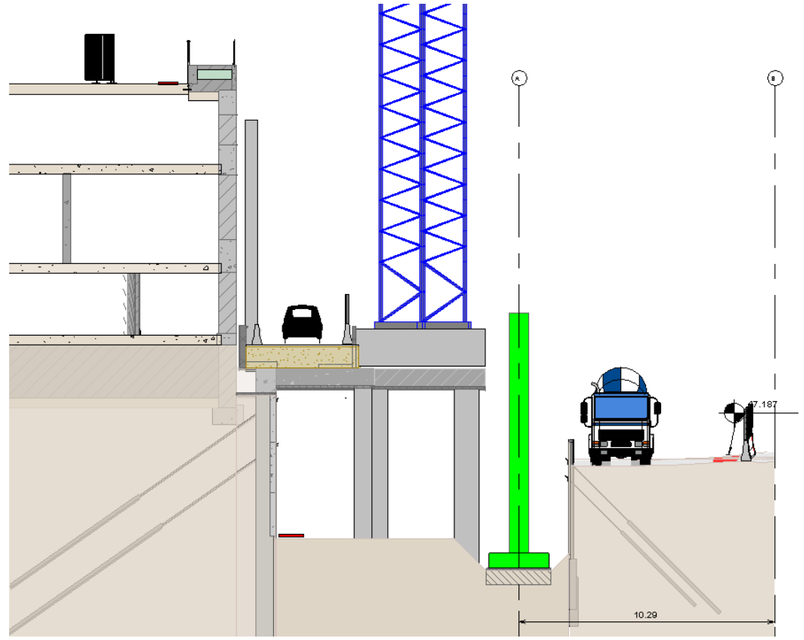
2. Formwork modeling / IFC Export – PERI

2. Sequencing preparing Formwork modeling



- ✓ 90 bored pile
- ✓ 25 temporary pile
- ✓ IGU Ground anchor (diameter 130mm, 10 meter long on 2 or 3 levels)





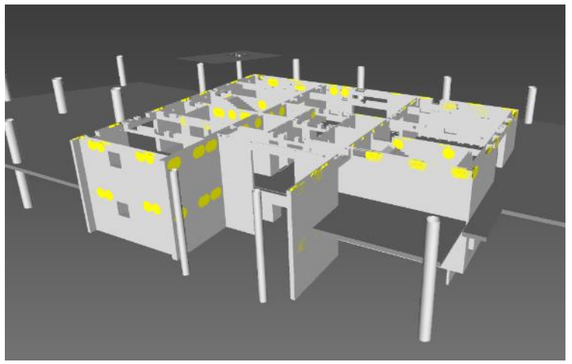
2. Formwork modeling / IFC Export – PERI

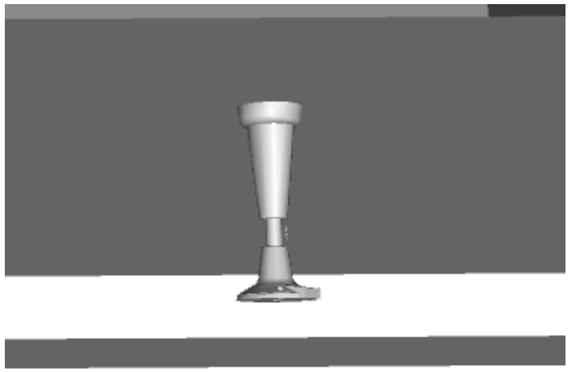
- **Lesson learned – Need for IFC Export:**
  - → solved after the project by developing improved IFC Export – PERI CAD to IFC

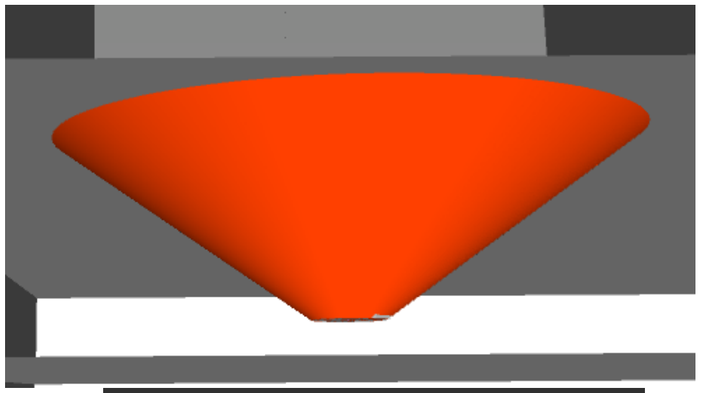
3. Design Collaboration – PERI

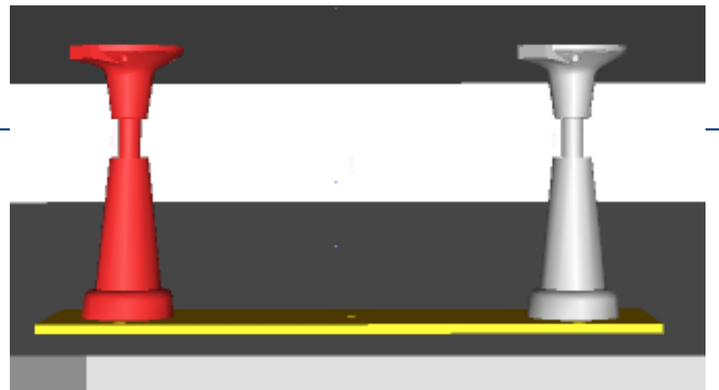
3. Design Collaboration – PERI

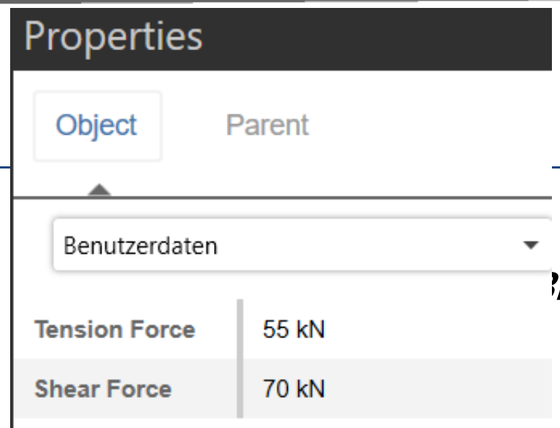
- **Example Climbing Cone possition**
- **Goals:**
  - Early Access to the possition of the needed climbing cones of the hydraulic climbing units
  - Visual View of the affected concrete area of the cone for structural analysis purposes
  - Adding properties to the cones like shear- and tension force







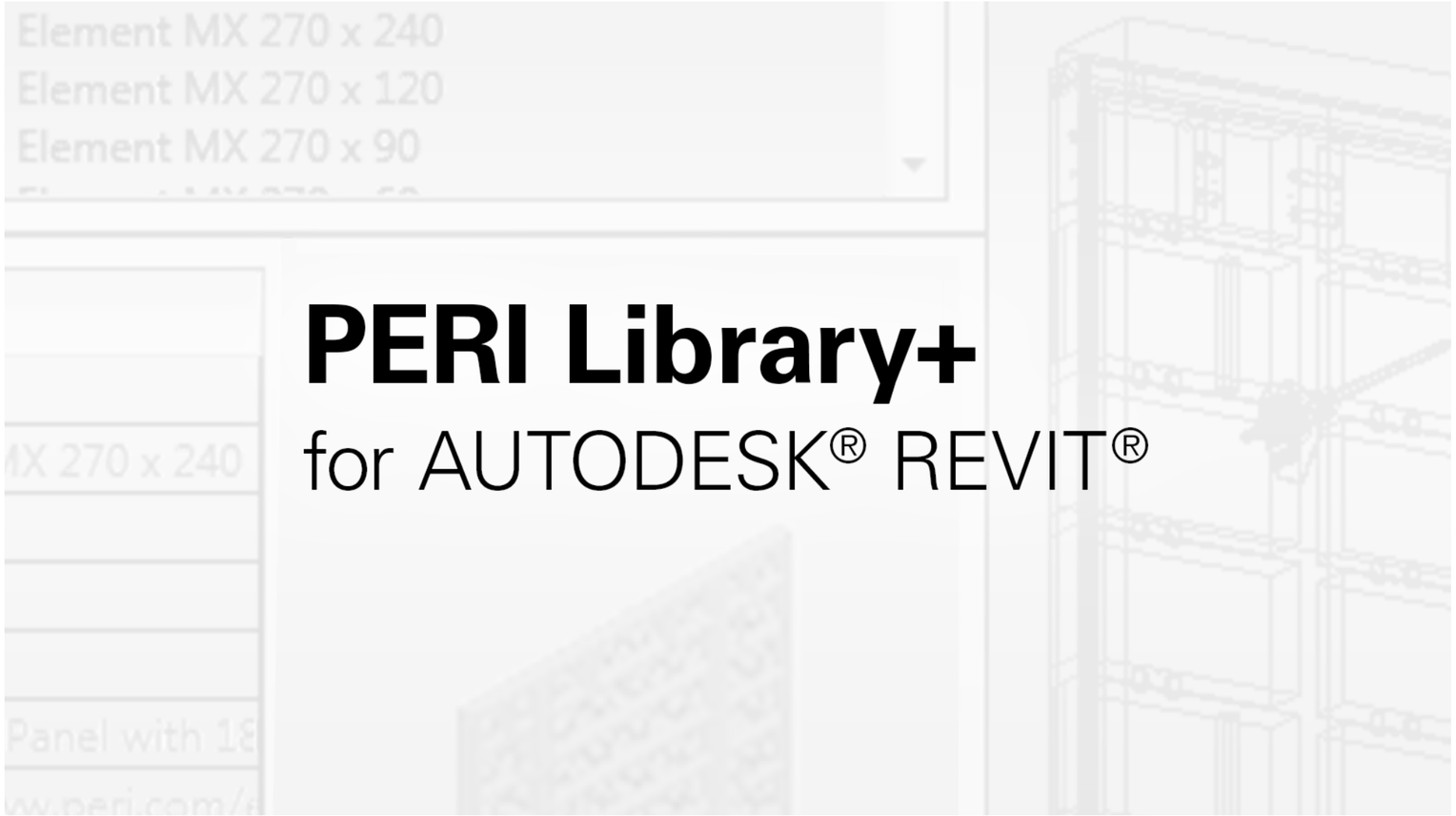




4. PERI Library+ for Revit – PERI

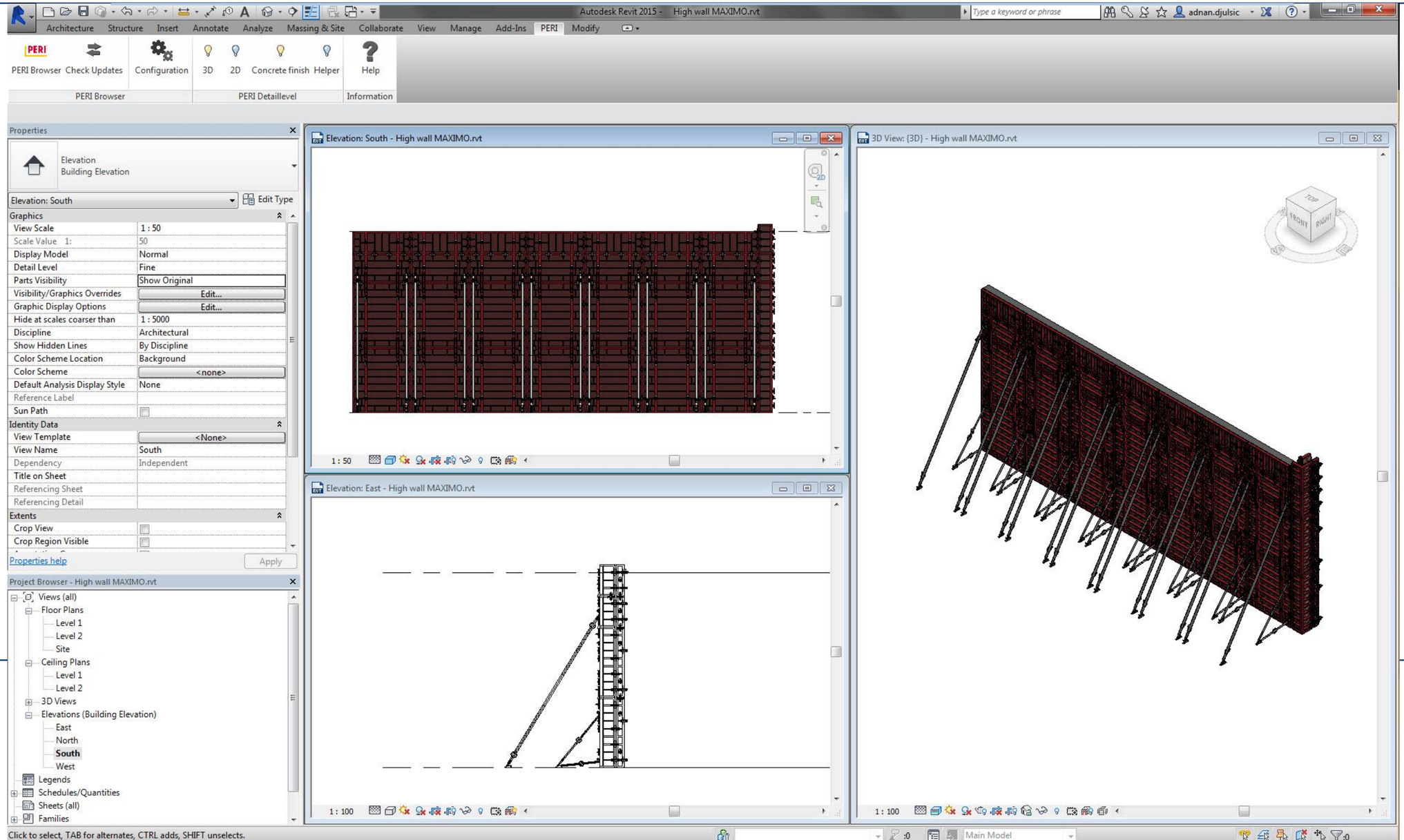
4. PERI Library+ for Revit – PERI

- **Lesson learnd – Need to provide families in REVIT:**
  - → solved by developing a PERI Library+ for REVIT
  - Actual:
    - MAXIMO Wallformwork
    - SKYDECK Slabformwork
    - All needed accessories like props, anchors, …
    - Semi automated functionalities



4. PERI Library+ for Revit – PERI

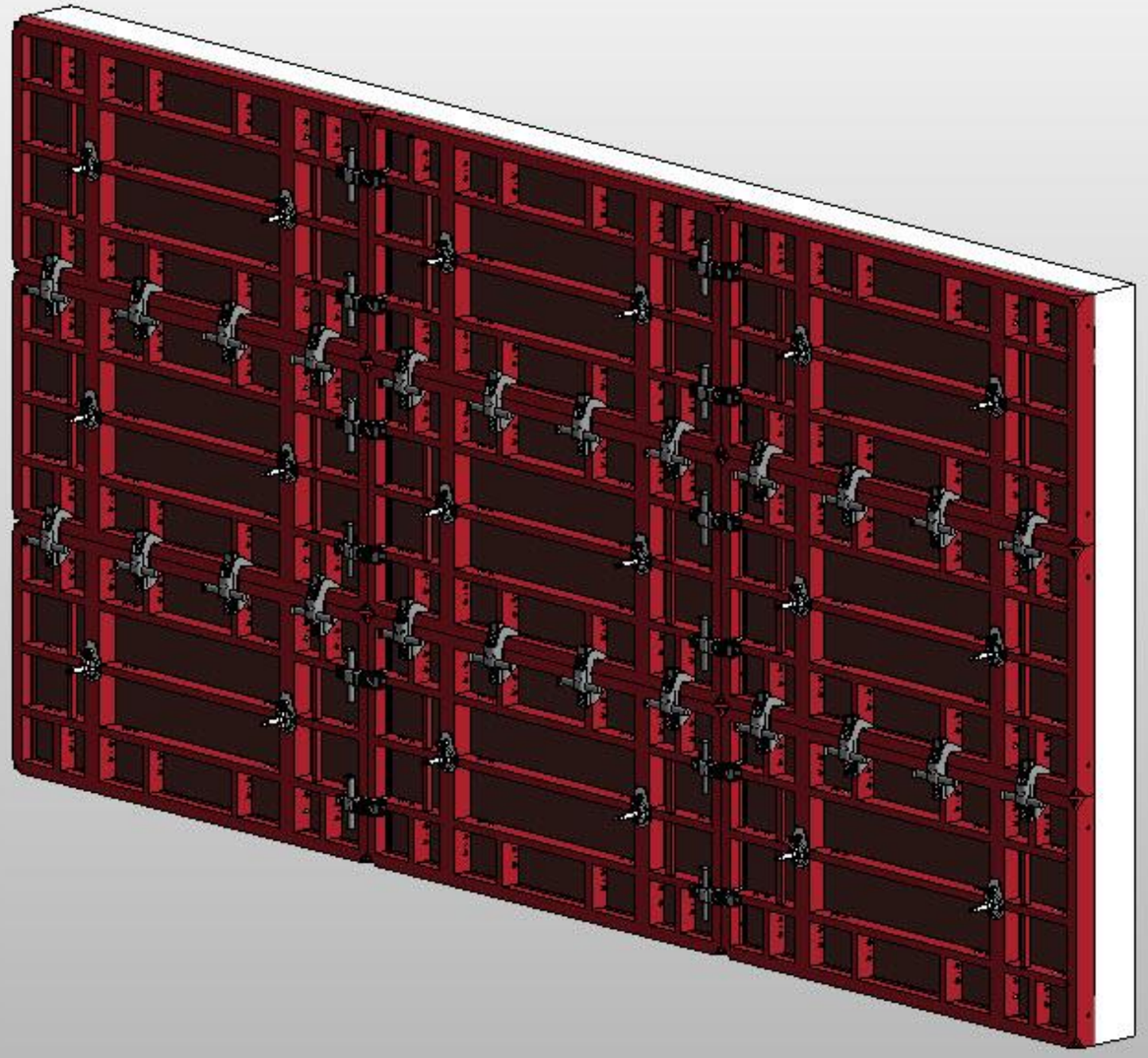
- **REVIT**

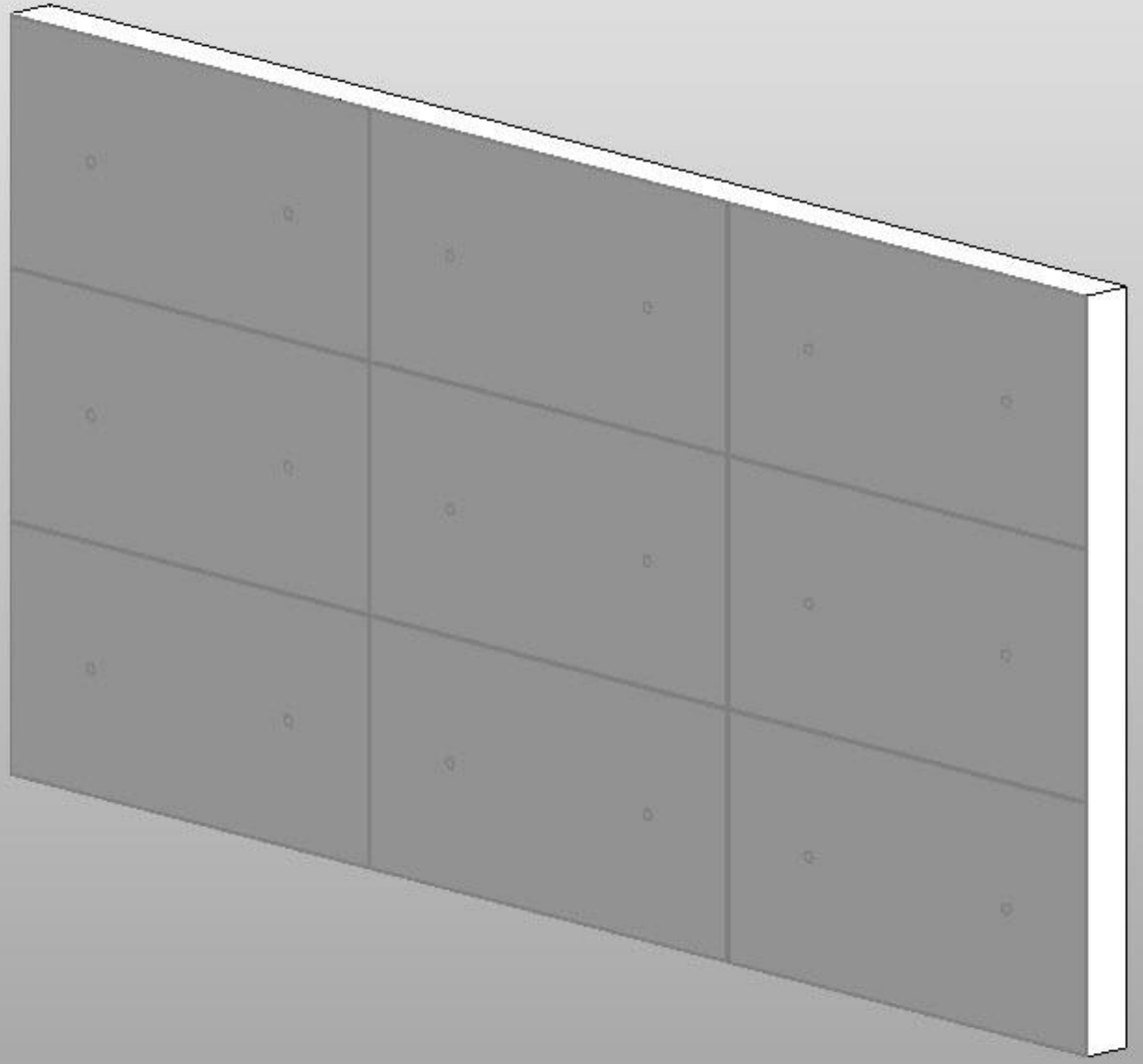


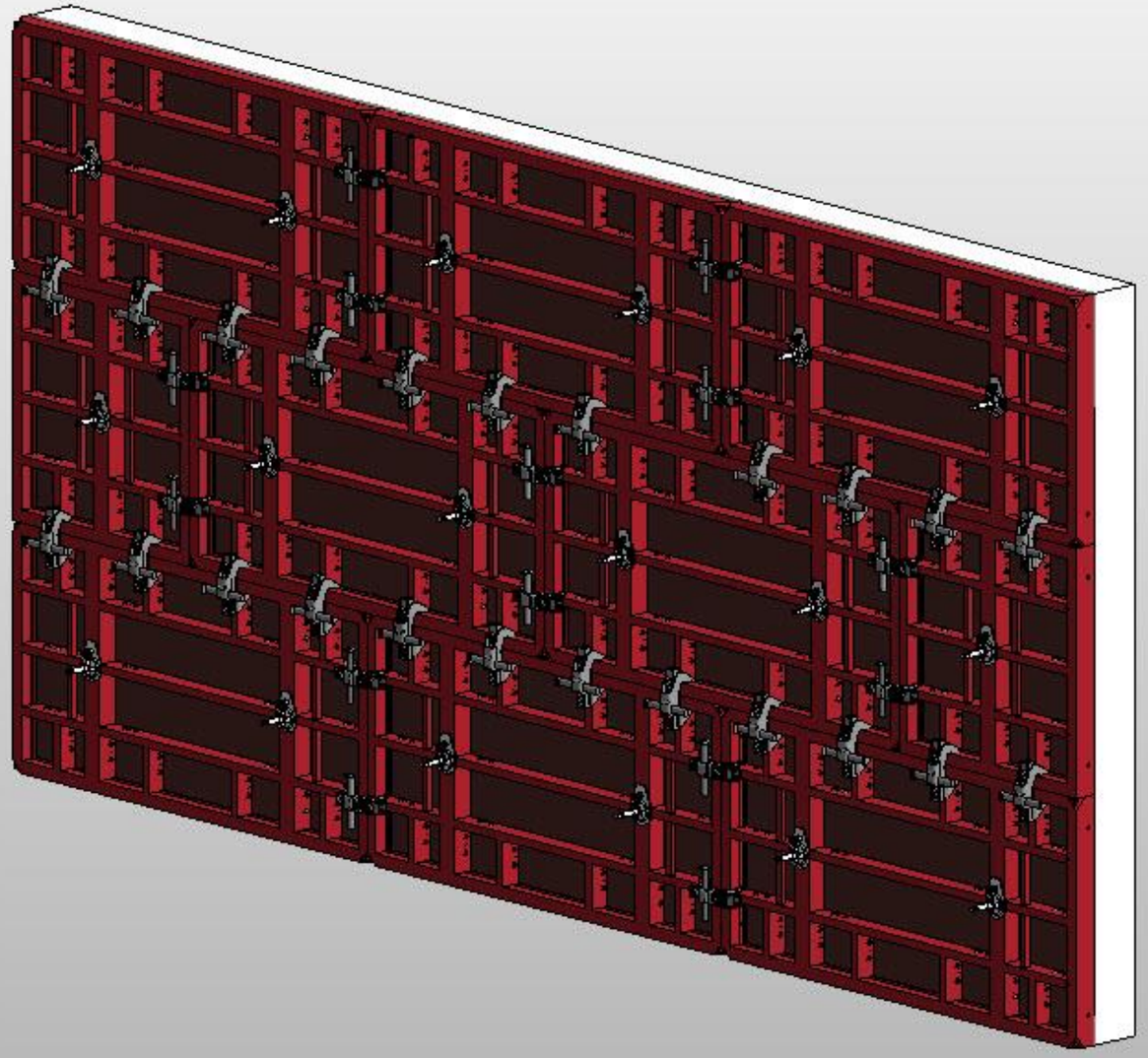
4. PERI Library+ for Revit – PERI

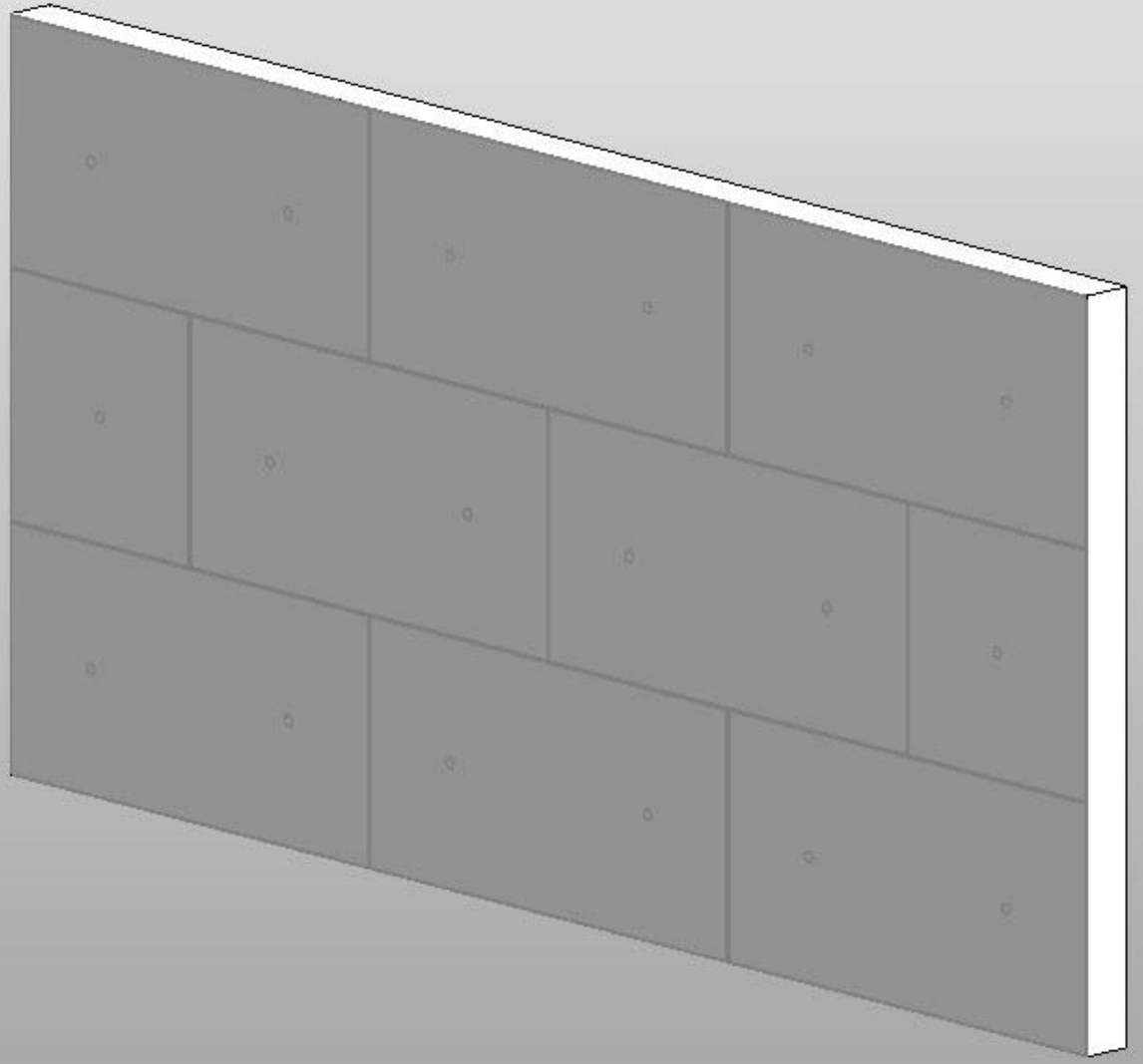
- **PERI Families**

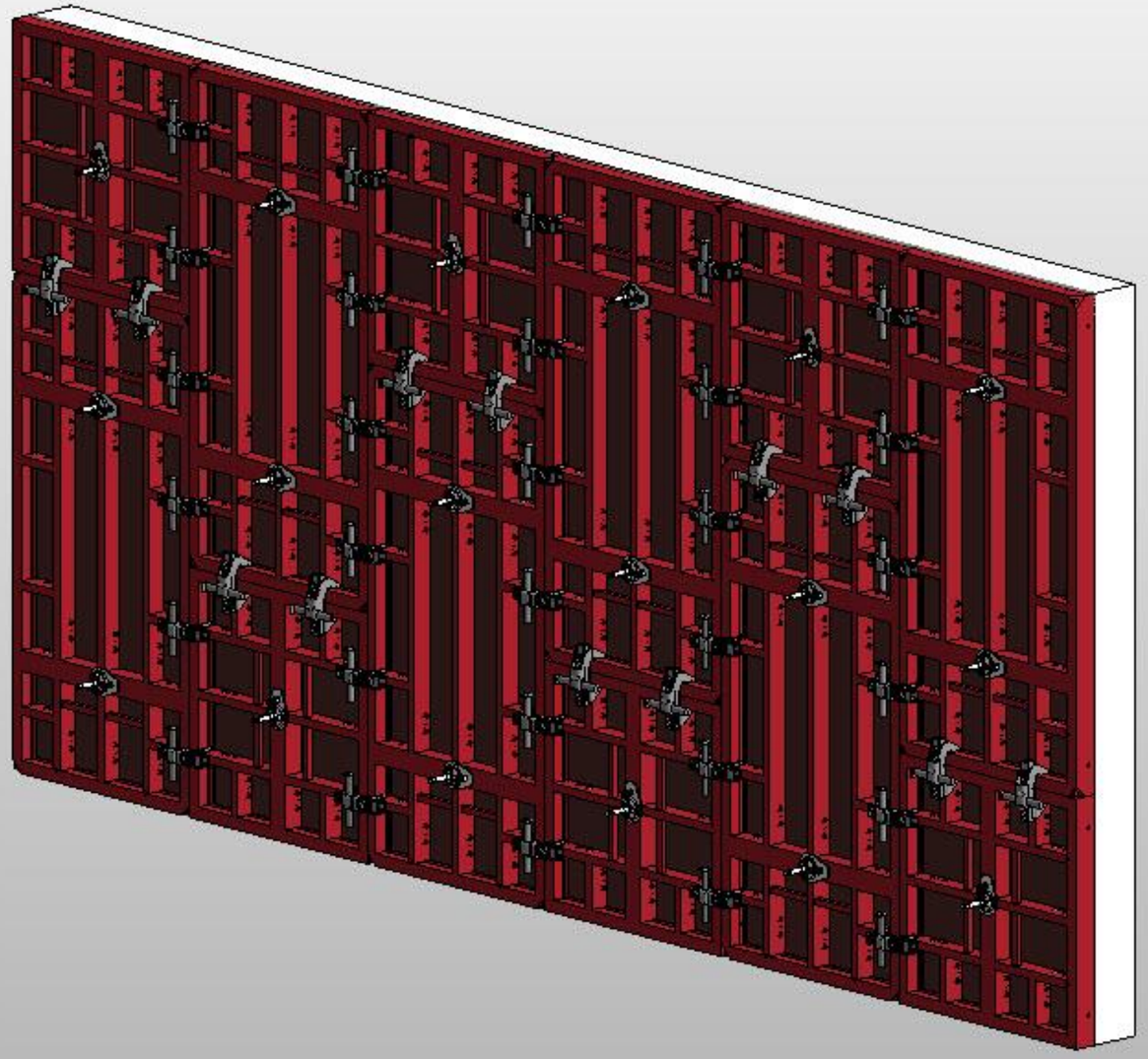
Item Number
Description
Formworksystem
Weight
Price
Width
Height
Area
Rental
Own Material
Curancy
Priceunit
Item status
Online Information
Watermark
Version Data
Version Geometry
.....

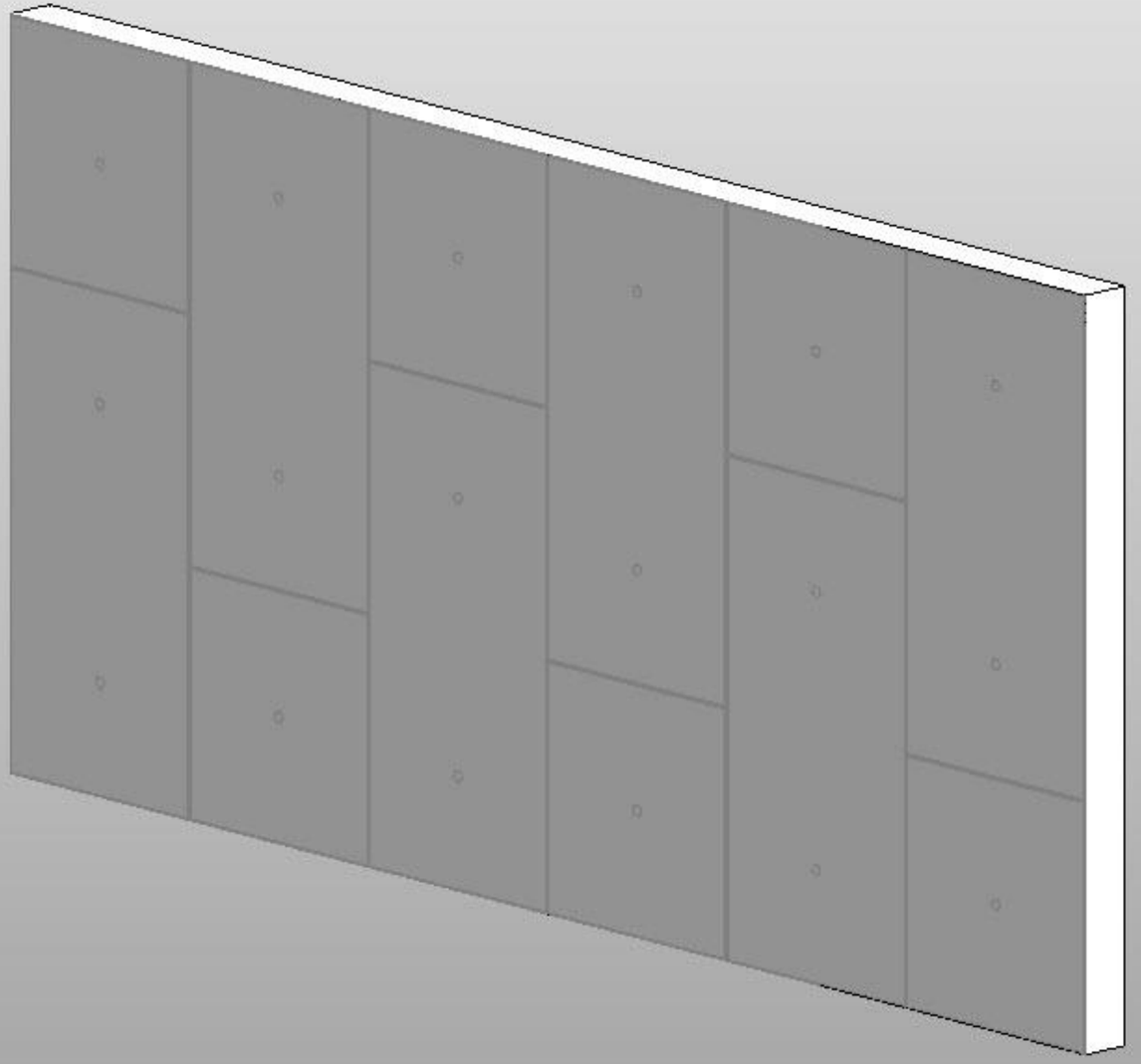


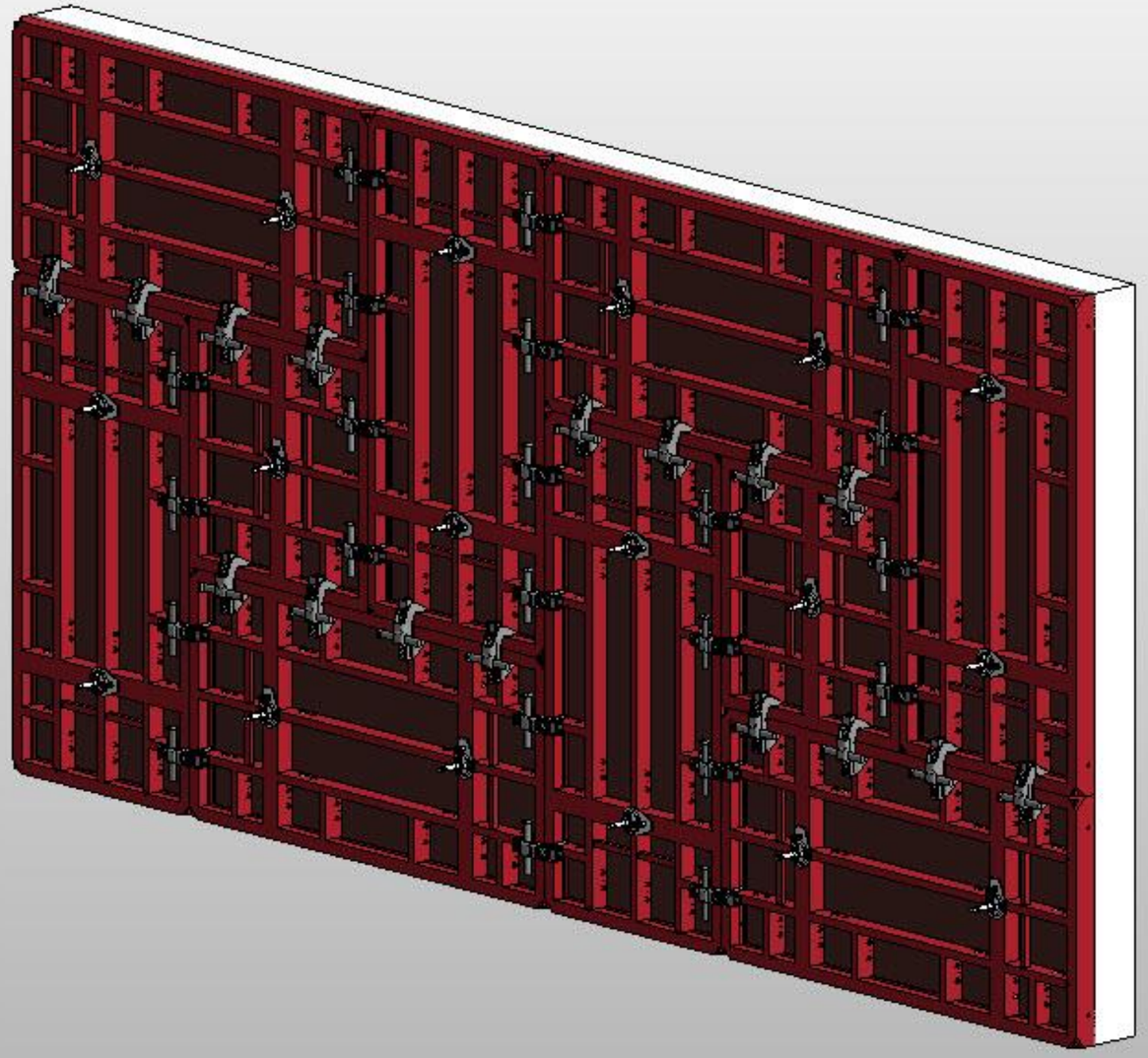


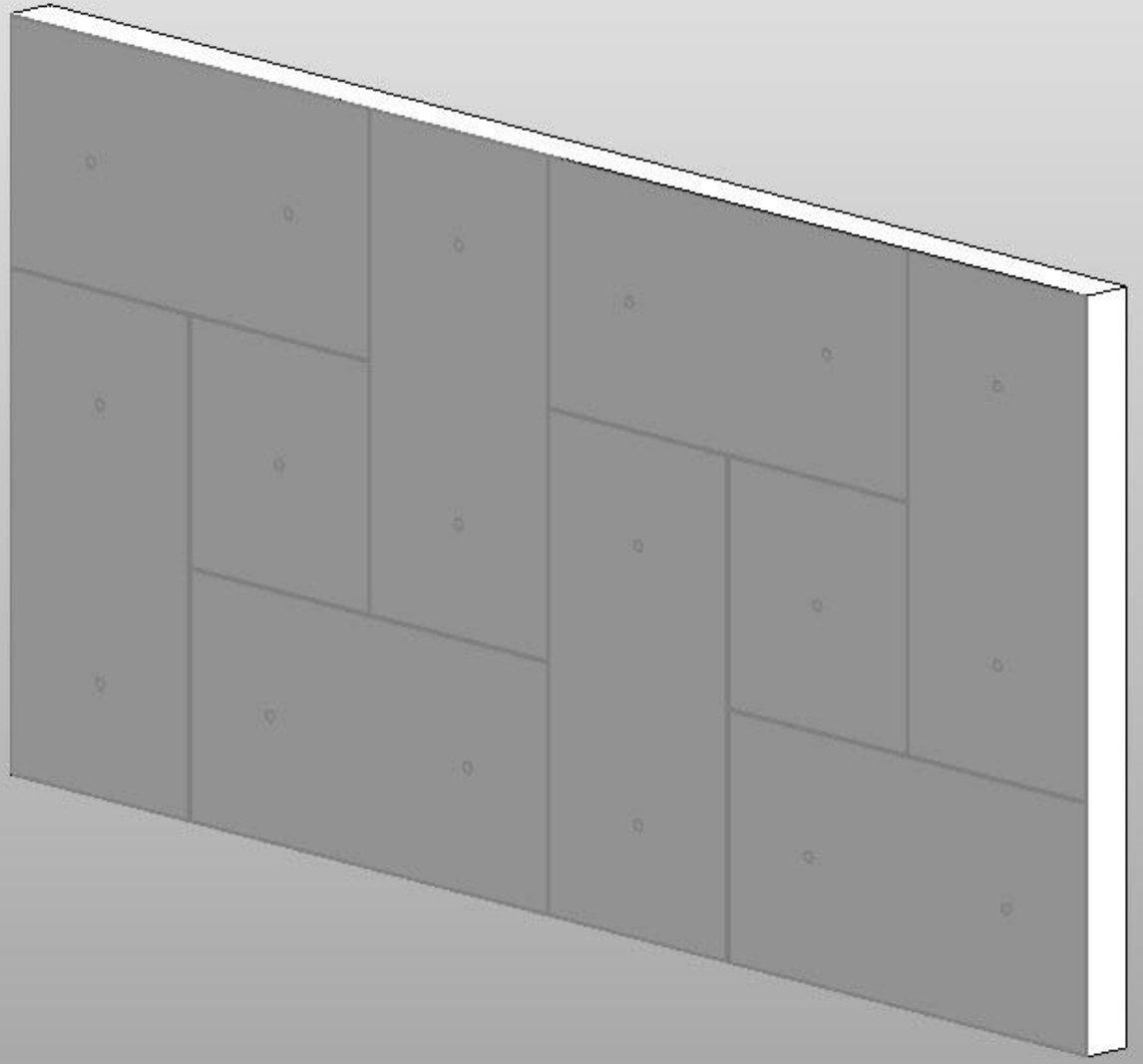






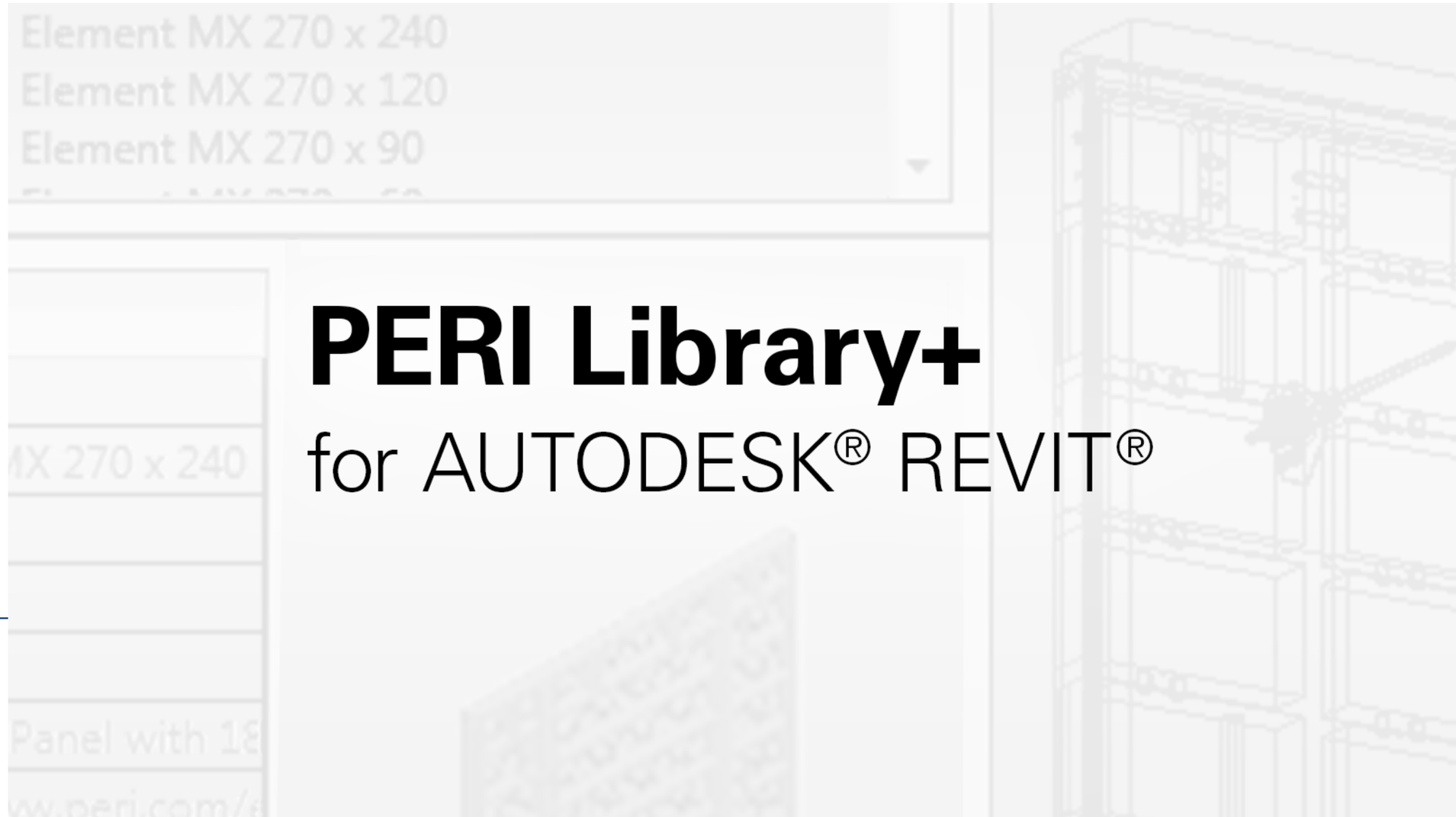






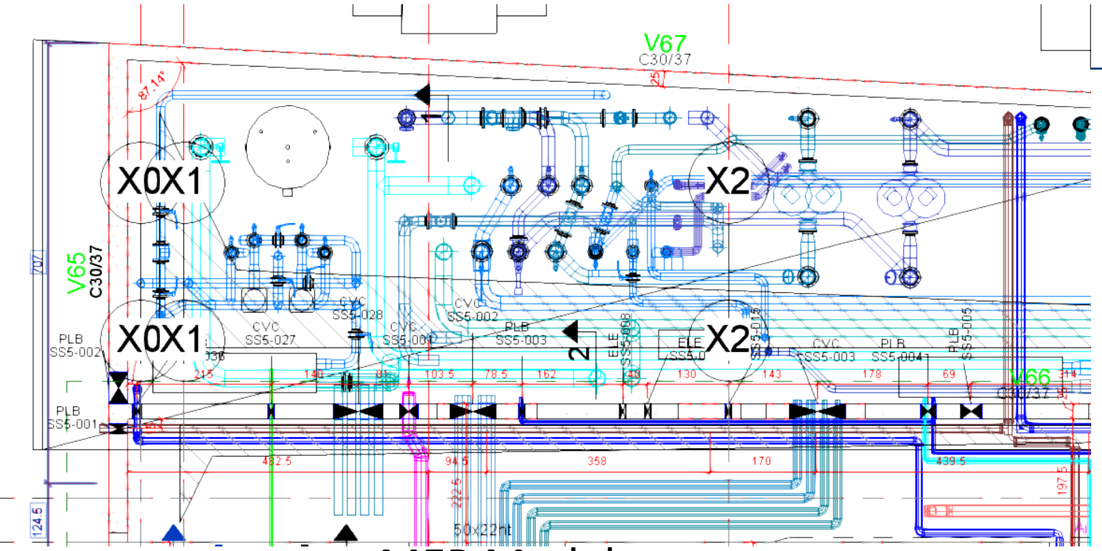
4. PERI Library+ for Revit – PERI

- **Download:**
  - https://www.peri.com/en/products/software-and-apps.html



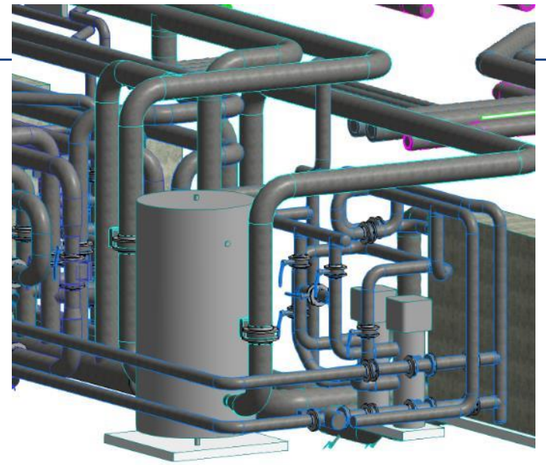
5. MEP Coordination

5. MEP Coordination

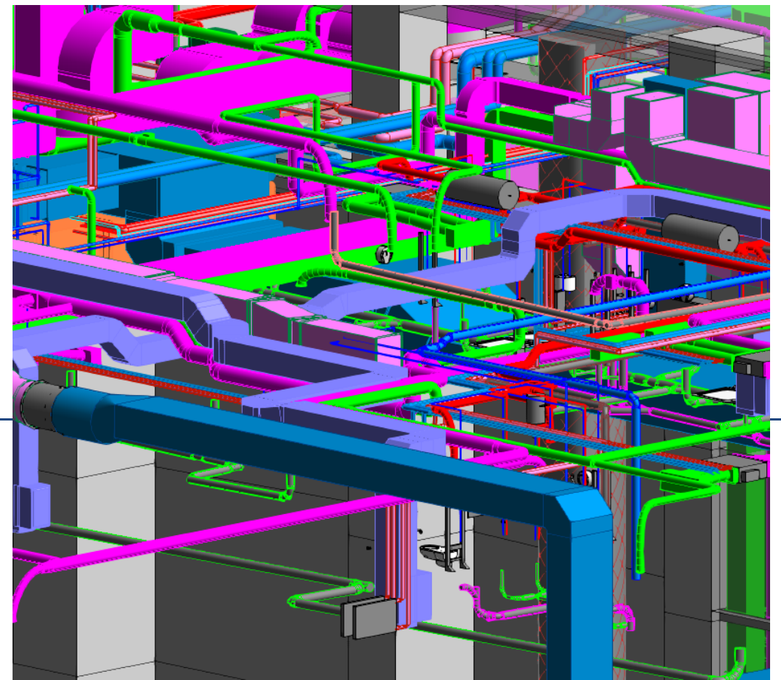


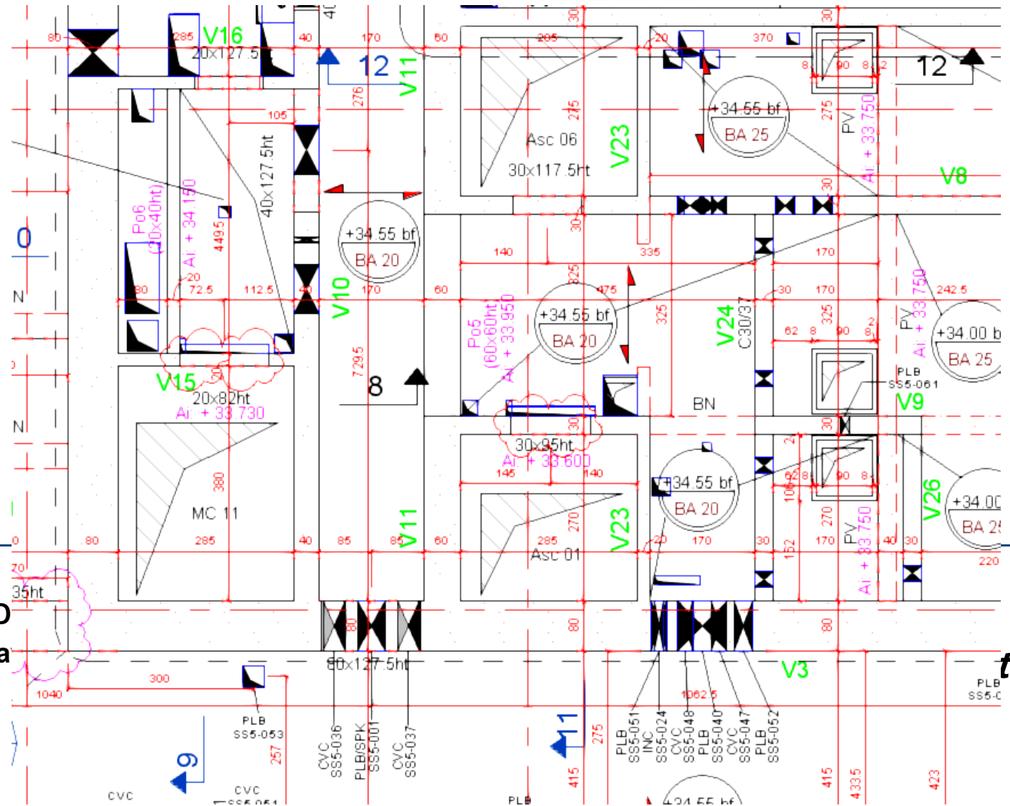
MEP Model

Coordination drawings



HVAC BIM-model





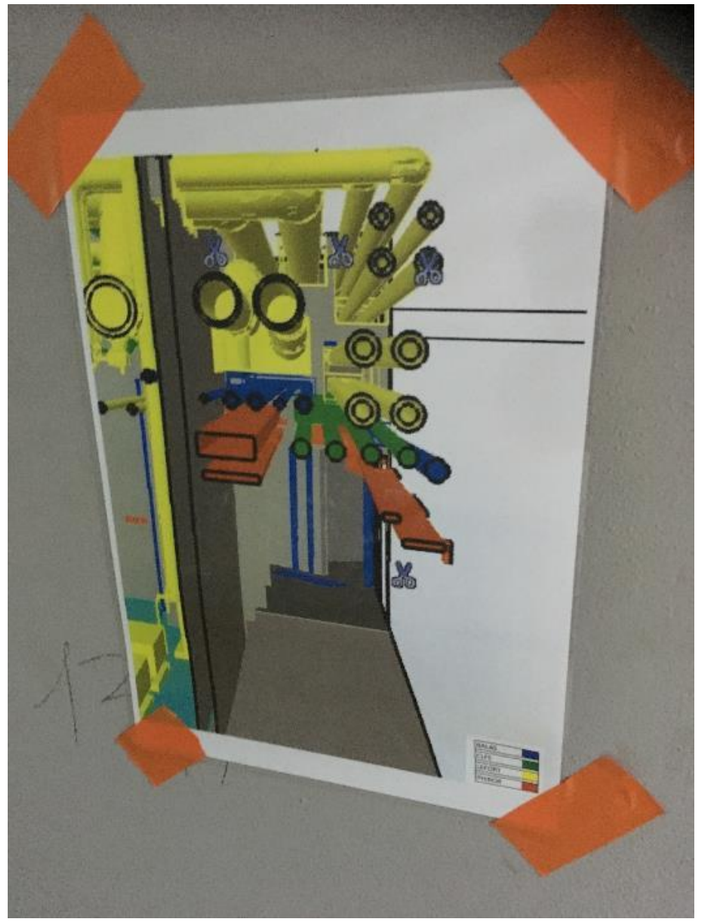
Formwork drawings

5D Ma

to BIM

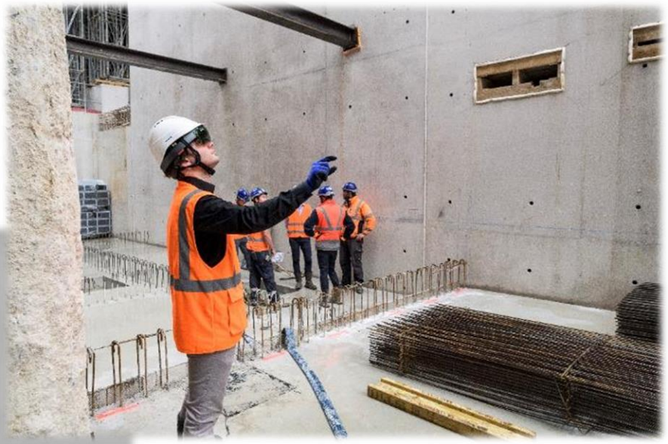
5. MEP Coordination

- The BIM model goes down to the site.
- The 3D views and elevations are used for the LEAN sequencing of MEP subcontractors installations during LPS meetings and then on site.



6. BIM on Site through MR

6. Connected BIM with Hololens MR :
“to get BIM at fingertips”



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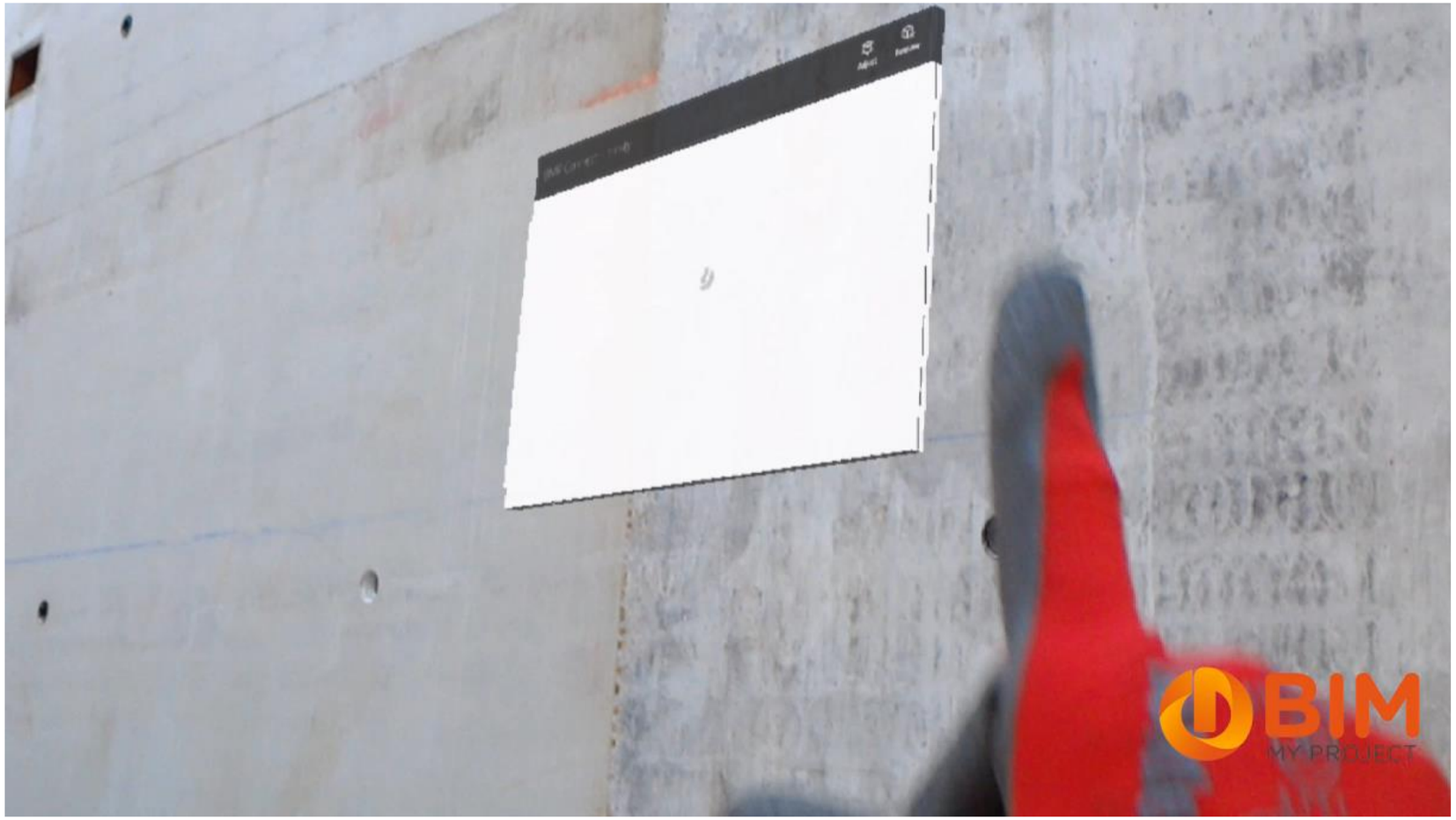


on site MEP holes control

7. BIM on Site through Site Digital Totem

7. BIM on Site through Site Digital Totem

It brings digital next to production in total safety and conviviality. It is smart, touch, connected, but robust and powerfull. An idea from VINCI Construction France, engineered by Itekube, improved with users.

➔ 30 are on our sites.

3.0 Site manager office with Itekube

7. BIM on Site through Site Digital Totem

Helping people interact with complex information

2018 and beyond

itekube

7. BIM on Site through Site Digital Totem

Multitouch 3.0

Itekube Hardware

High Performance Multitouch Devices for Professionals

Combine high-end components and ergonomic design into efficient products

7. BIM on Site through Site Digital Totem

Indoor devices

- ✓ 55 inch 4K Screen / 40-inch 4K screen
- ✓ Powerful integrated computer (i7+ 1070 up to Xeon+64G RAM+2xP6000 GPU - Windows 10)
- ✓ Every single component upgradable over time
- ✓ Can accommodate VR (HTC Vive, Microsoft, etc)

Model E

Model R

Outdoor device : Model B

- ✓Ruggedized / 49-inch touch screen
- ✓UPS, Battery, 4G antenna+router, etc

3 versions:

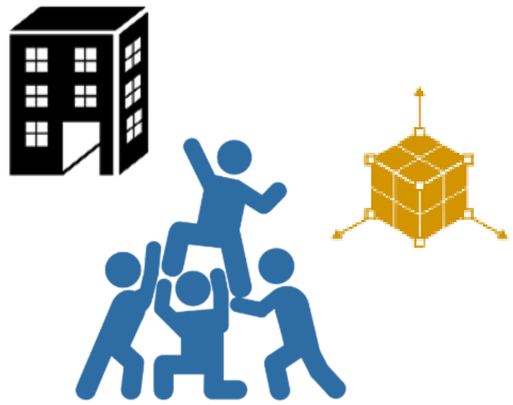
1. Outdoor
2. Shelter
3. Core for integration

Conclusion

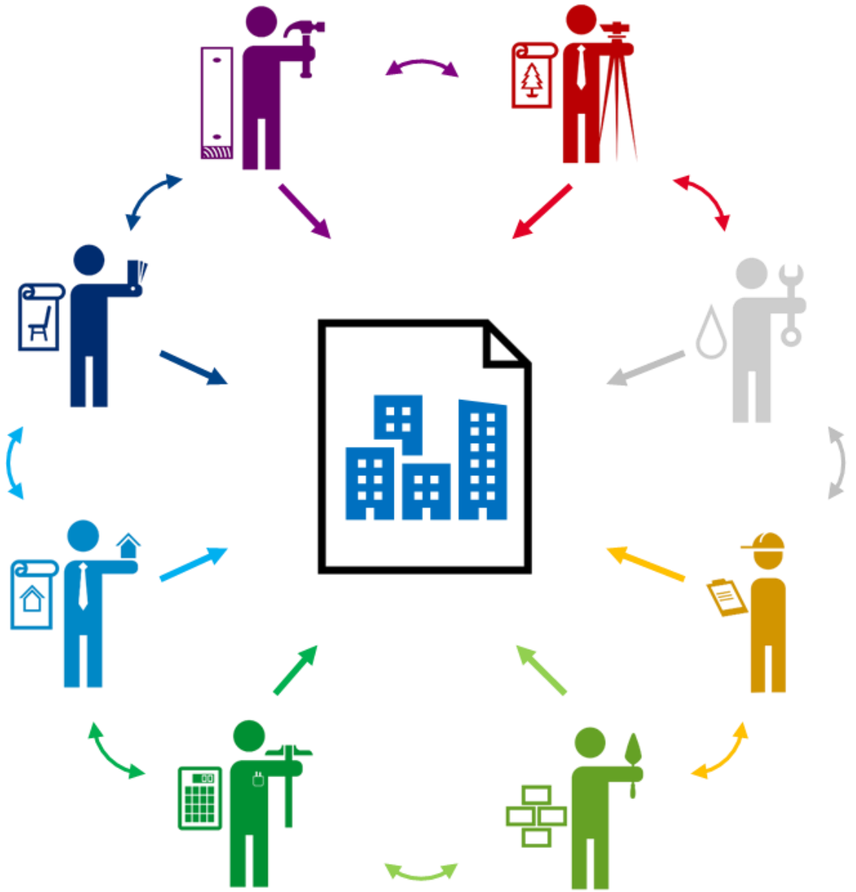
How to make BIM a success on site ?

1. Share BIM
2. Make BIM Project centric : BIM is done by and for everyone
3. Bring BIM really « on » site

VINCI Construction France's role in the market evolution



Each stakeholder has to adopt and participate to the BIM evolution. VINCI Construction France has to **lead the way**.



REAL SUCCESS IS THE SUCCESS YOU SHARE