

CitA
BIM GATHERING



Building Capabilities in Complex Environments

CitA BIM Gathering 2017, Croke Park, November 23rd & 24th, 2017

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EUROPE'S BEST KEPT SECRET!

Jonathan Croft - Technical Consultant

ALLPLAN
A NEMETSCHek COMPANY

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INTRODUCTIONS

ALLPLAN
A NEMETSCHEK COMPANY



\ JONATHAN CROFT

- Started as a Structural Apprentice at 16 years old
- Worked with a number of global engineering firms.

- +10 Years in the AEC and Oil/Gas industries
- Structural Detailing, Software Implementation and Tech. Sales
- Studied Construction Management & Civil Engineering

- Experience of many leading BIM Solutions at user level.
- Presented & Implemented BIM software all over the world

- Joined ALLPLAN to bring Digital technology from Europe to the UK
- Promoting Digital workflows for Architects & Engineers



\ WHO ARE NEMETSCHek? Building all over the world

- Founded in 1963, (Munich, Germany)
- OpenBIM pioneer with solutions for the AEC and media industry
- €337.3 million sales revenue (2016)
- 2.3 million users in 142 countries
- Listed on the TecDax
- 15 Strong brands

ALLPLAN

BLUEBEAM

CREM SOLUTIONS

DATA DESIGN SYSTEM

SDS/2

dRofus

FRILO
Software

IRISA
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GRAPHISOFT

MAXON

NEVARIS

PRECAST SOFTWARE
engineering

SCiA

SOLIBRI

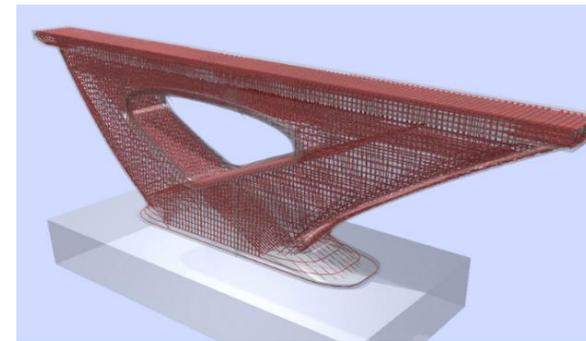
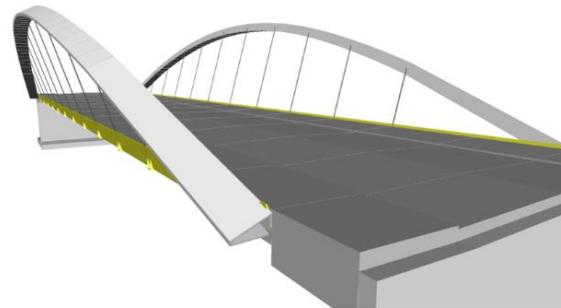
VECTORWORKS



\ WHO ARE ALLPLAN?

Building all over the world

- The original software solution of the NEMETSCHEK GROUP
- BIM Solution for Architecture, Engineering & Contractors
- >400 Employees in 9 Countries
- >190,000 users in 41 countries & 20 languages
- New UK Office in Ashby-de-la Zouch, Leicestershire





\ AGENDA

1. Looking back – The Journey to BIM
2. BIM in Engineering
3. Are we still making compromise?
4. BIM for Reinforcement – How is it done in Europe?
5. Collaboration for BIM Level 3
6. Closing Thoughts

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LOOKING BACK...THE JOURNEY TO BIM

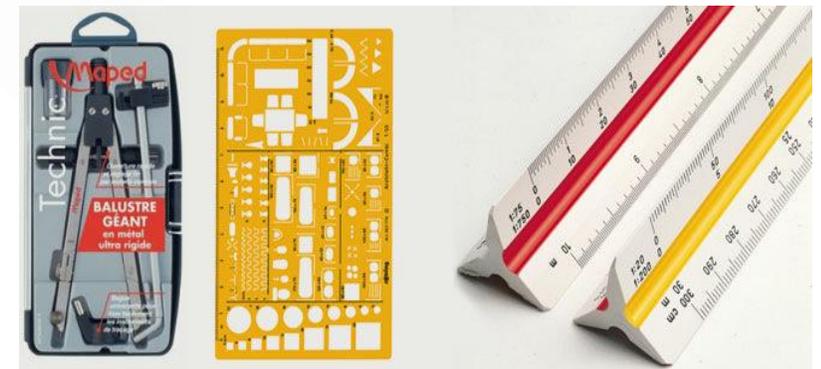
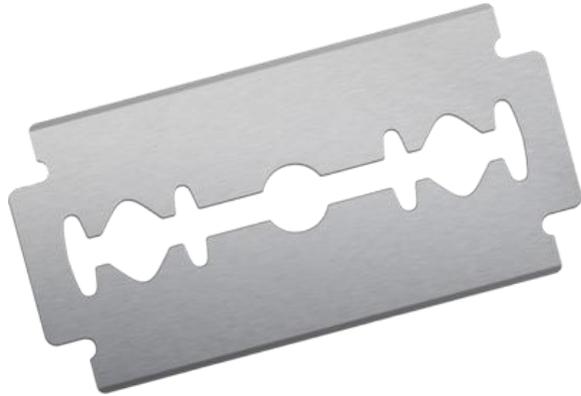
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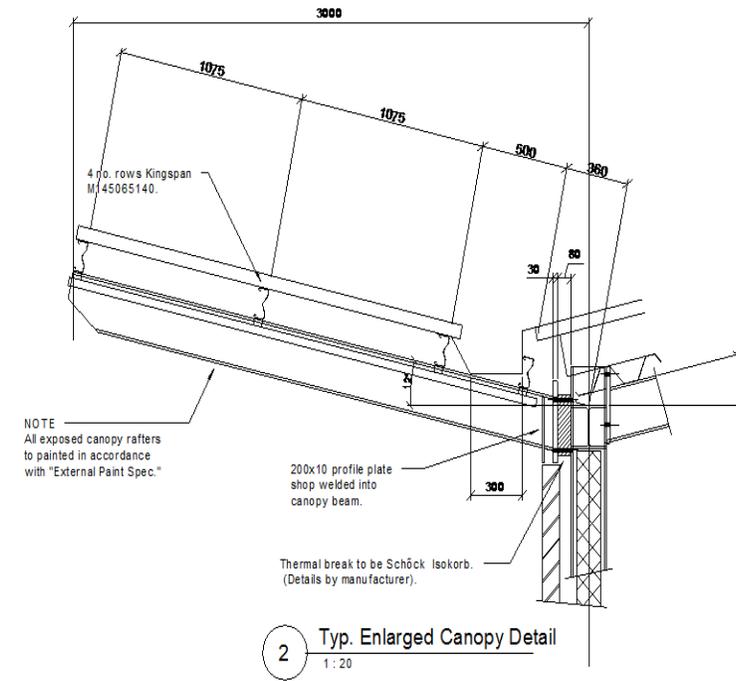
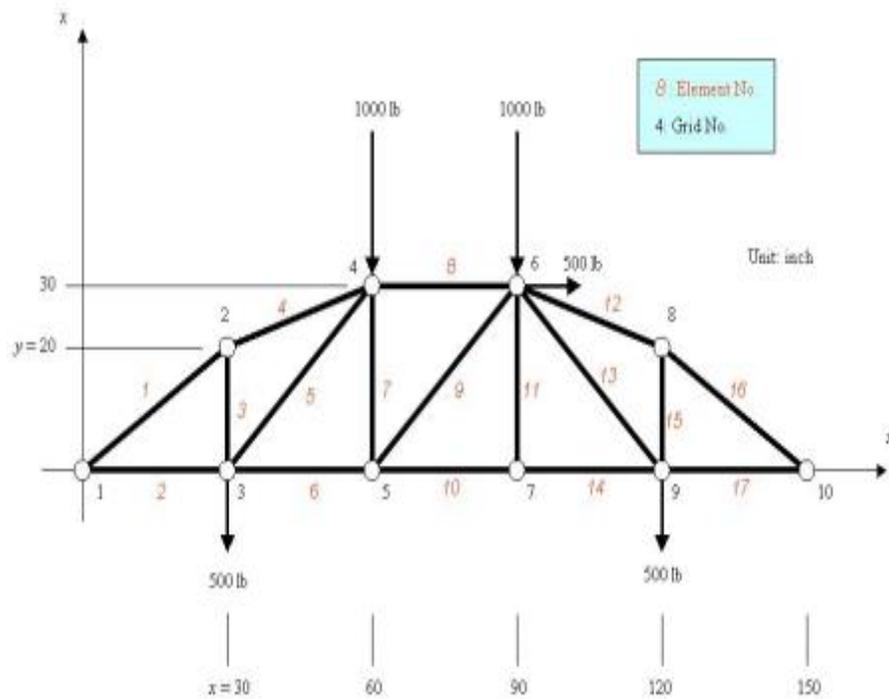


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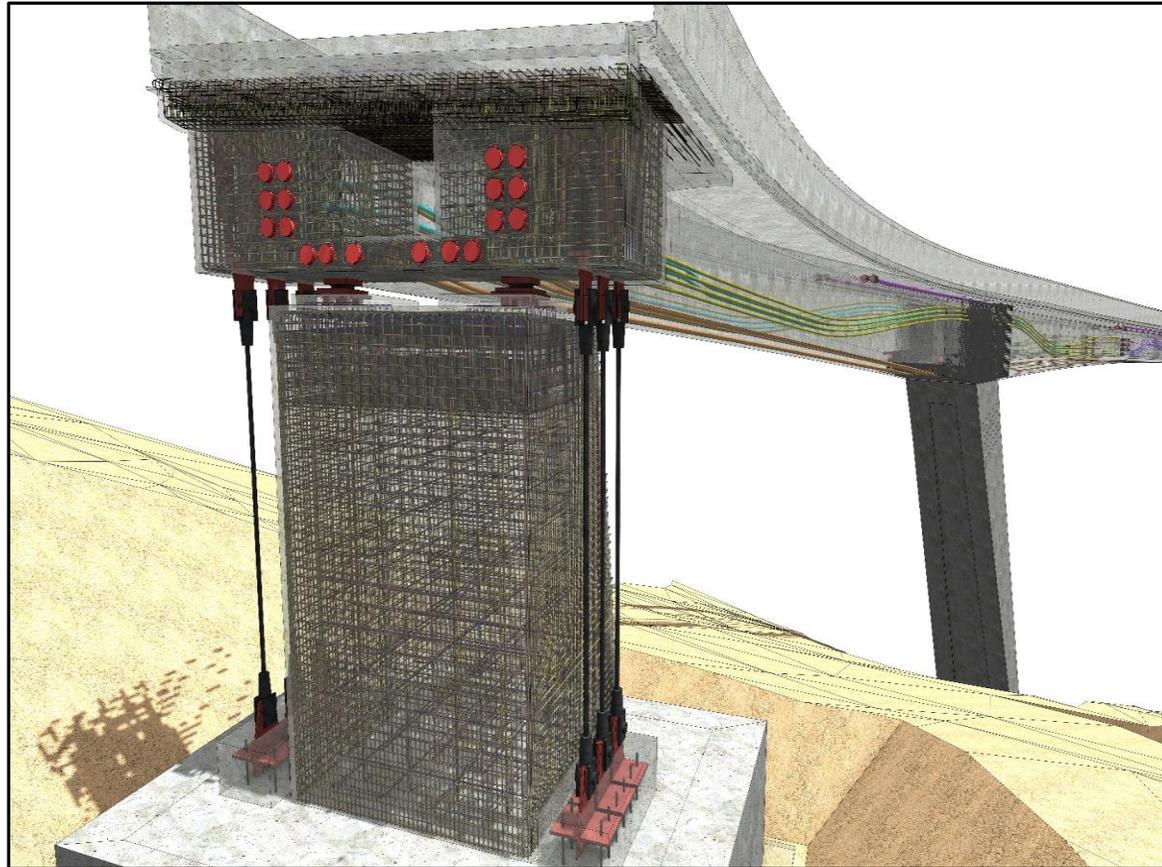


\ 2D ANALYSIS & DRAWINGS OF ELEMENTS





\ DIGITAL PROTOTYPING



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BIM IN ENGINEERING

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\ BIM IN ENGINEERING



Bridges



Tunnels



Dams



Buildings



\ ENGINEERING PROJECTS



Architecture & Engineering

<u>Type of Project</u>	<u>Average Cost Overrun¹</u>
Bridges	11%
Roads	27%
Railways	30%
Buildings	39%
Airports	56%
Waterways	68%
Tunnels	149%

Sources:

¹ Herite School of governance (2015), 170 infrastructure projects analyzed

² Flyvbjerg et al. (2013): Underestimating Costs in Public Works Projects: Error or Lie?

→ COST AND TIME OVERRUNS OCCUR IN 90% OF THE PROJECTS



\ WHY COST AND TIME OVERRUNS

- Large-scale projects are **INHERENTLY RISKY**
- Long-term planning is **COMPLEX**
 - Alignment of roads through complex terrain
 - Sensitive areas – (residential or ecologically)
 - More **COMPLEX GEOMETRY**
 - **MULTI-DISCIPLINES** involved
 - **DIFFERENT TOOLS** used
 - Project **SCOPE** typically **CHANGES** over time



\ HOW A DIGITAL PROCESS IMPROVES PROJECT OUTCOMES



65% see a positive ROI from BIM investment
25% believe an ROI is >25%

Source: Dodge Data Analytics / The Business Value of BIM for Infrastructure 2017



\ TWO EXAMPLES OF SUCCESSFUL DIGITAL WORKFLOW

- Why successful?
 - **VISUALIZATION**
 - Successful modelling and documentation of **REINFORCEMENT**
 - Reduction of **ERRORS** & RFIs
 - Full **COLLABORATION** with the design team
 - Complete **TRANSPARENCY** of the design process
 - **CONCISE** design **DOCUMENTATION** (incl. drawings & material lists)



\ TAMINA BRIDGE 2013-2017

- › Arch bridge over the Tamina Gorge in Switzerland, (417m superstructure & 265m span)
- › Close collaboration between engineers & contractors

*“Extensive **visual representations** regarding the placement of **pre-stressing tendons and reinforcement** became necessary to convince the awarding authority of the **constructability** of the design and to make the bidding construction companies **aware of the challenging conditions.**”*

Leonhardt, Andrä and Partners



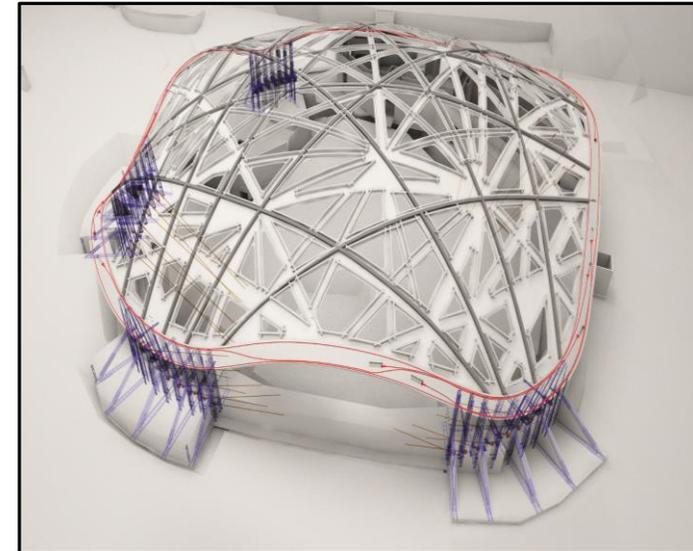


\ ELEPHANT PARK ZOO ZURICH

- › **Wooden, double-curved shell structure, spans 80m**
- › **Complex reinforcement & pre-stressing requirements**
- › **Complex geometry**
- › **Reinforcement data digitally transferred to rebar bending company**

“Thanks to Allplan Engineering we are able to design and build such challenging structures **fault-free in a very short time.**”

WaltGalmarini, Zurich, Switzerland

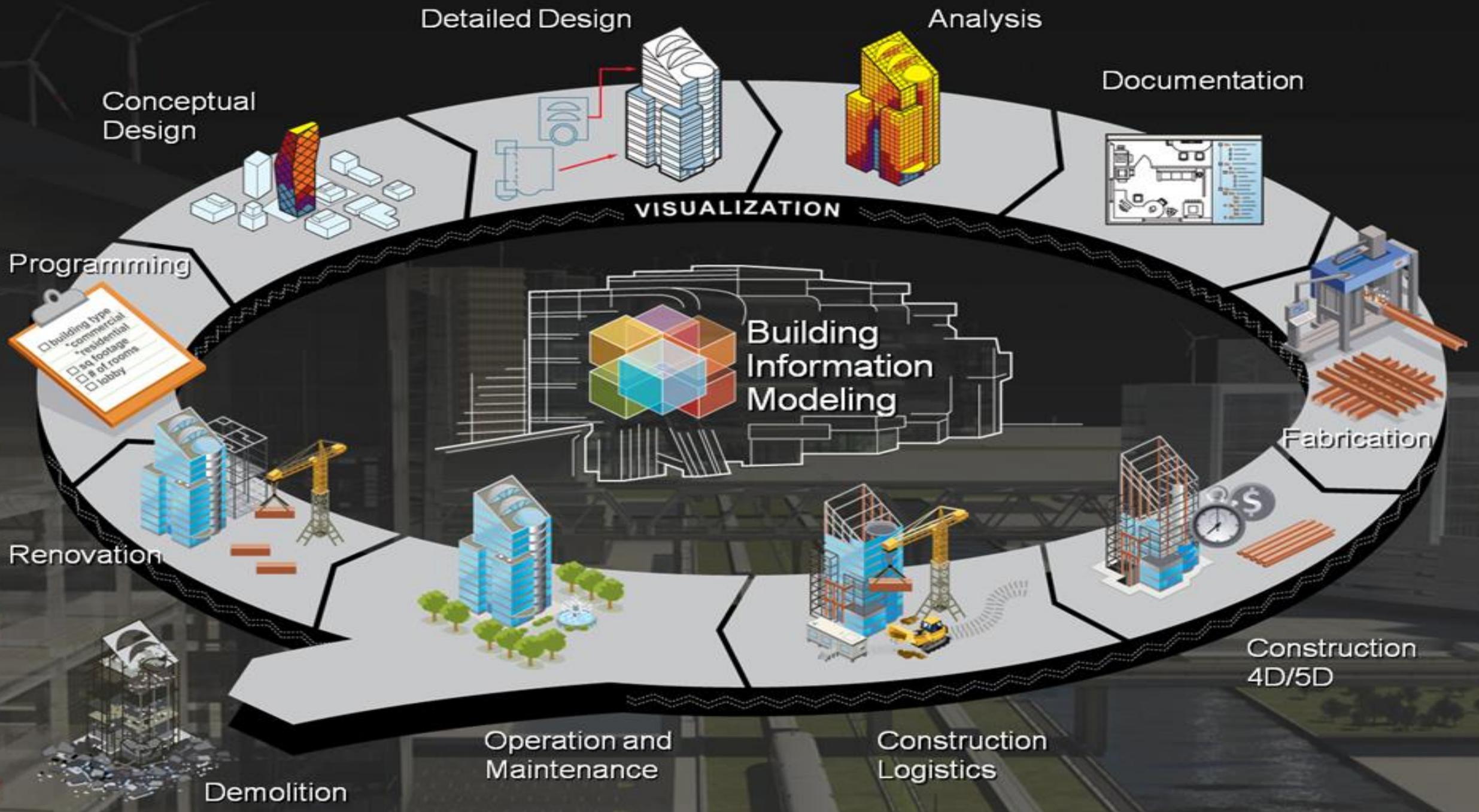


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ARE WE STILL MAKING COMPROMISE

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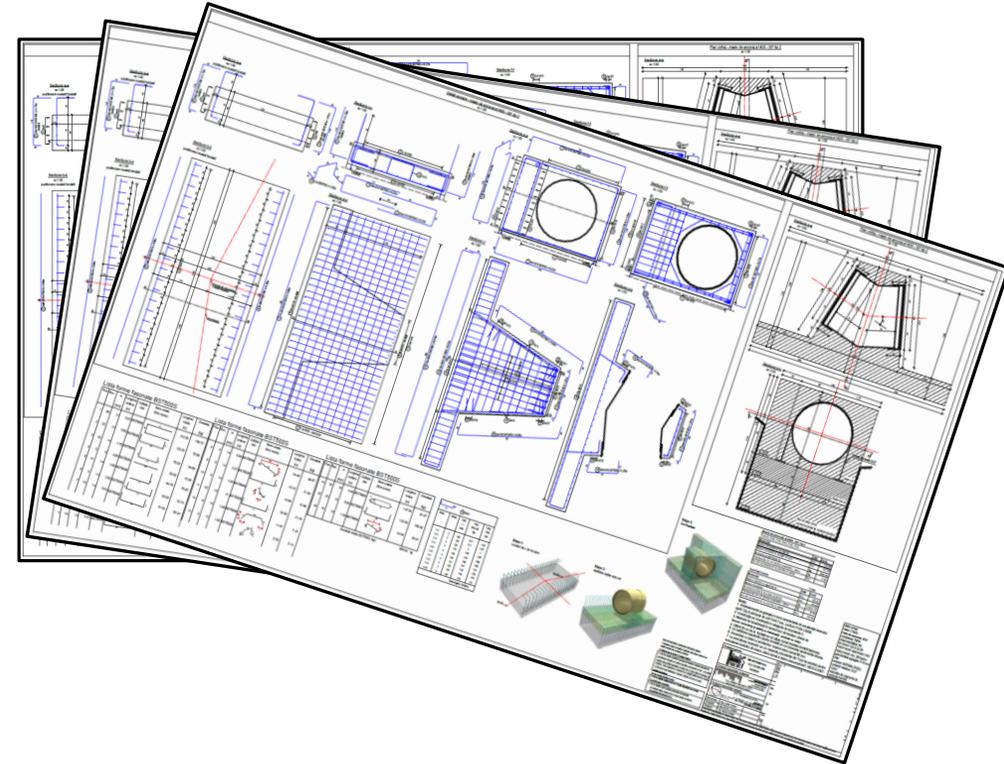




\ ENGINEERS DELIVERABLES

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- The **main deliverable** for an Engineer is still the construction drawings.
- However:-
 - Are drawings to a **standard** expected?
 - How much **editing work** do we have to do?
 - Is this **cost effective**?
 - Is providing 3D model data alone **enough**?

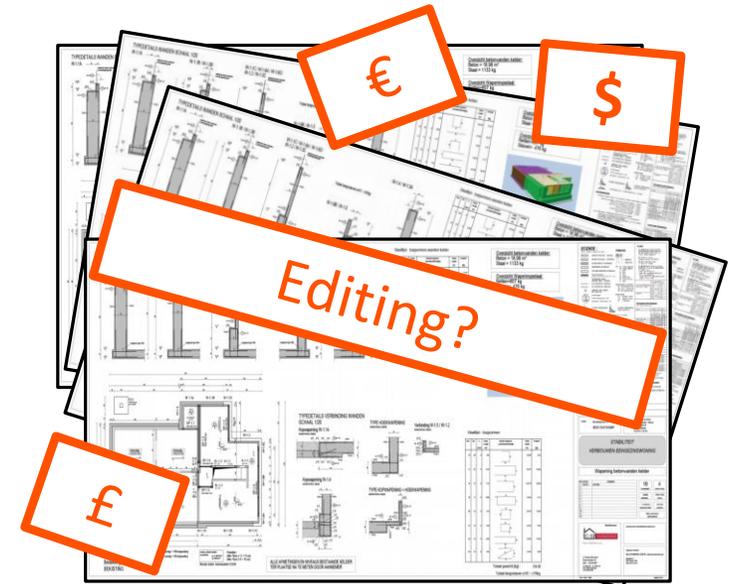




\ TRADITIONAL BIM WORKFLOW

3D > 2D

- Drawing creation automatically from a 3D view

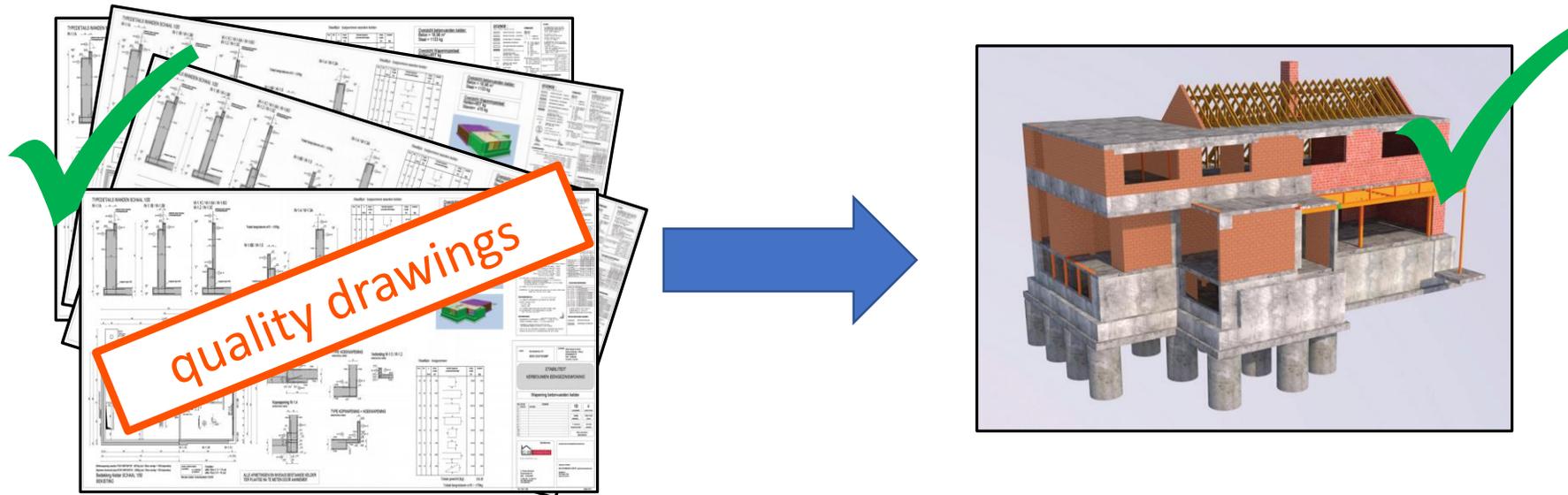




\ ALLPLAN WORKFLOW

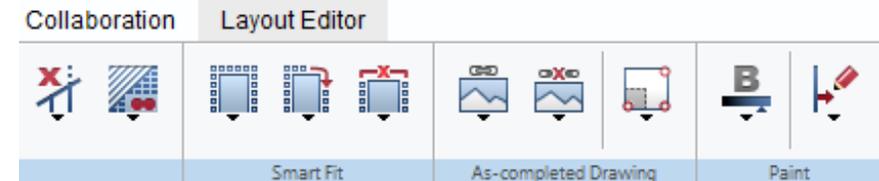
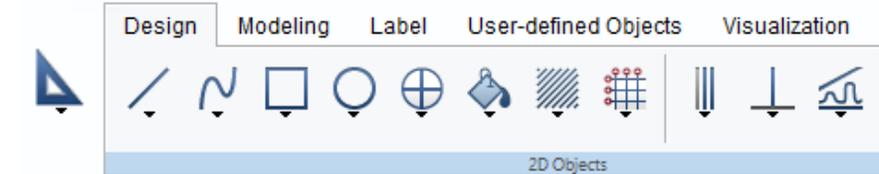
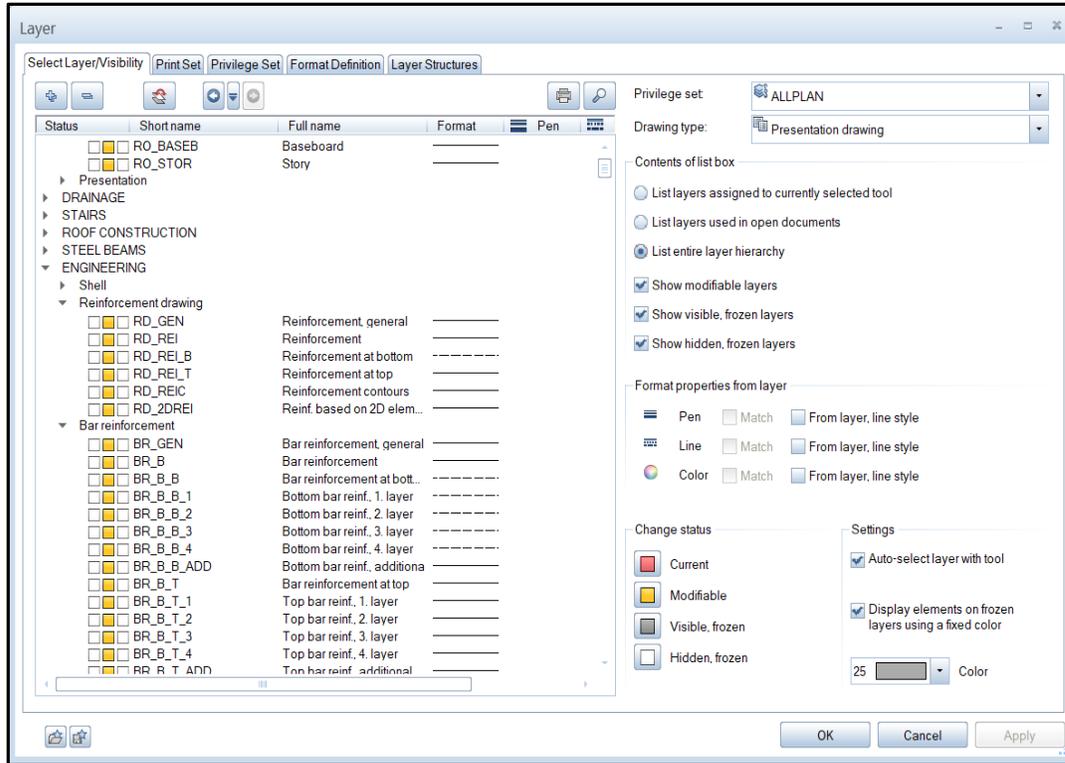
2D > 3D

- Allows BIM data to be created in 2D views and populates the 3D model



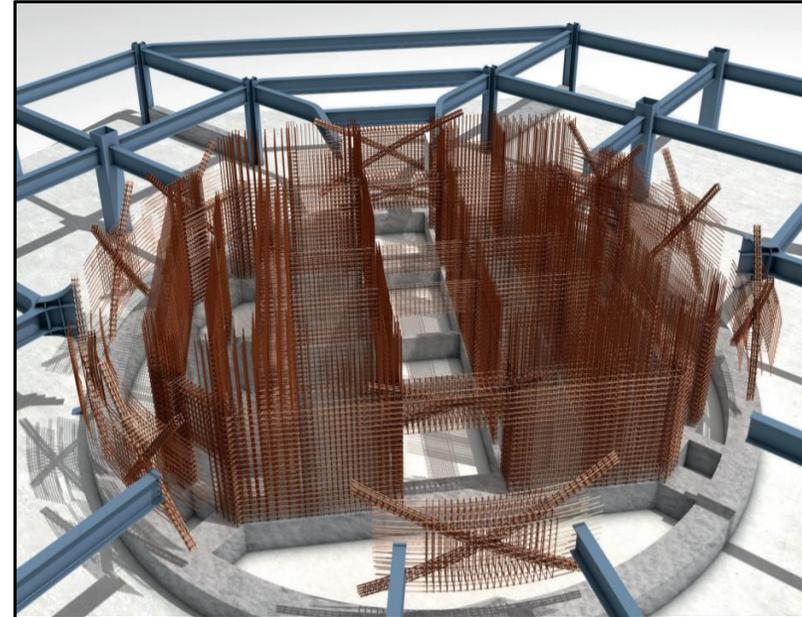
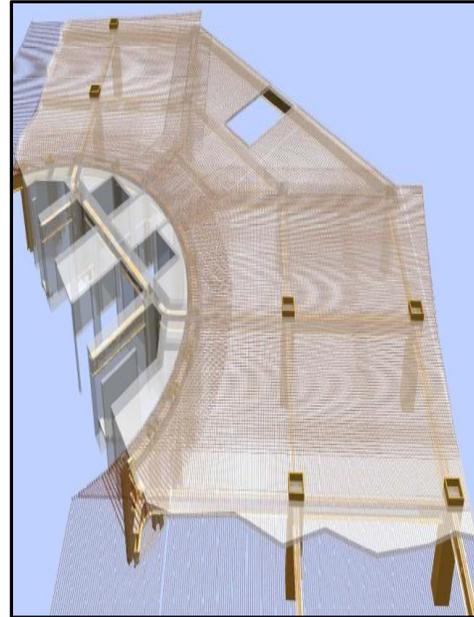


\ COMPLETE DRAWING CONTROL





\ DRAWINGS & BIM MODEL FROM THE SAME DIGITAL PROCESS



Anchor Plaza Office Building, Bucharest

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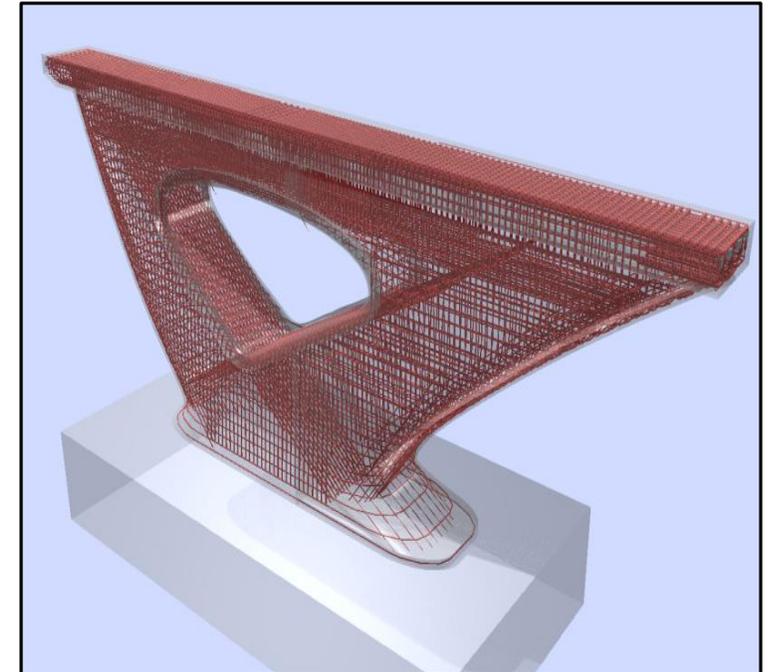
BIM FOR REINFORCEMENT- HOW IS IT DONE IN EUROPE?

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\ REINFORCEMENT DELIVERABLES

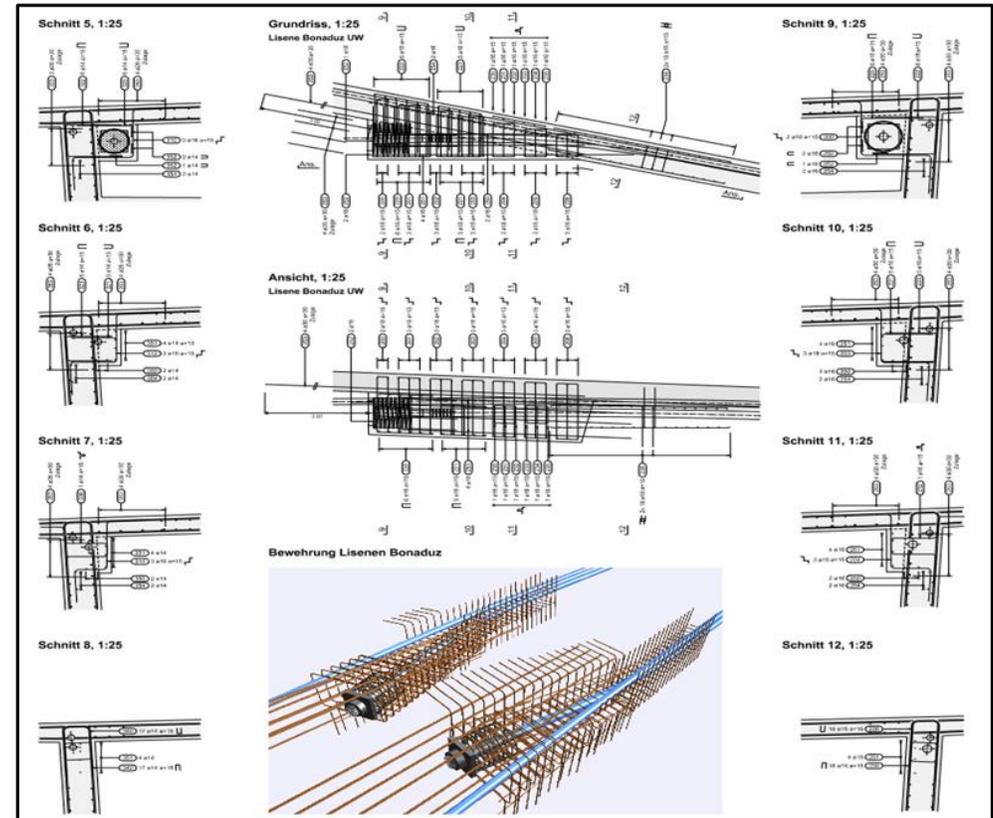
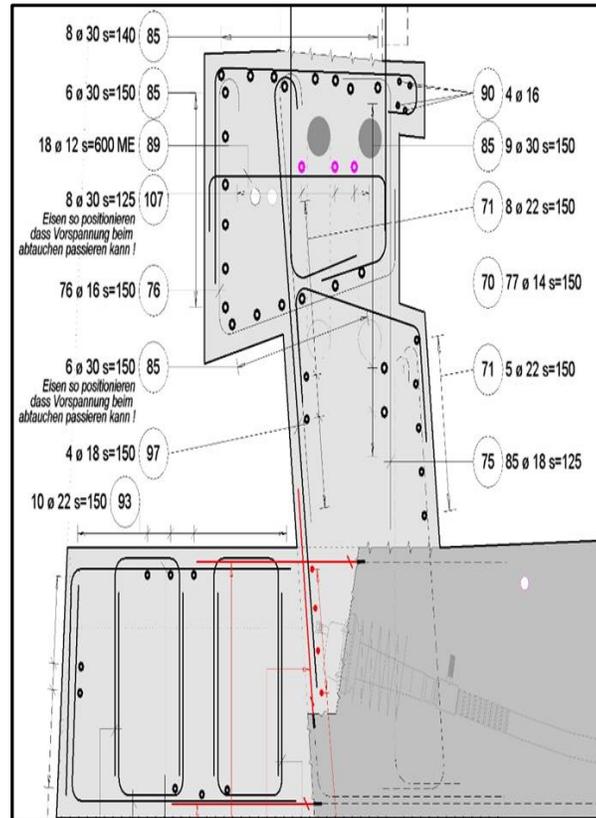
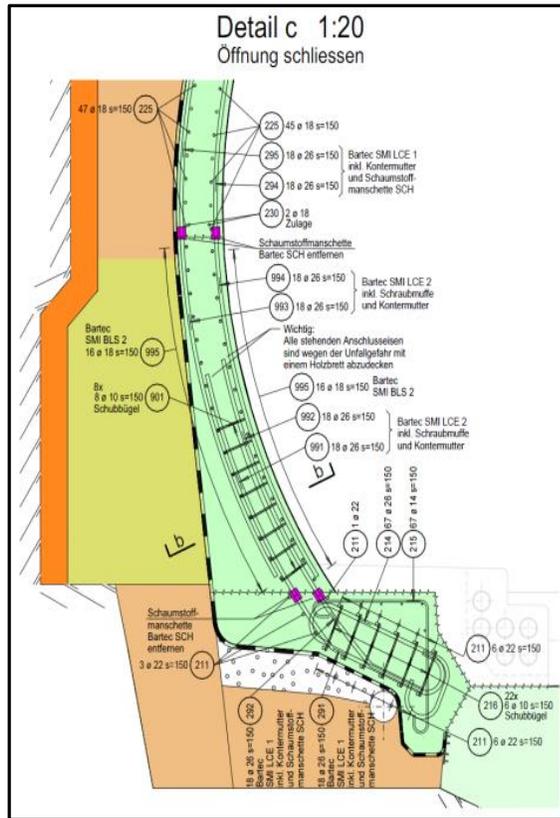
- The engineer is responsible for providing **construction documentation**
- Significant cost and delays are present if :-
 - **Information is incorrect**
 - **Errors are present**
 - **not constructible**
- This is exaggerated greatly **with RC structures**
- **Structures have more** complex geometry
- **Placing rebar is very challenging**
- It is a BIM problem in its own right





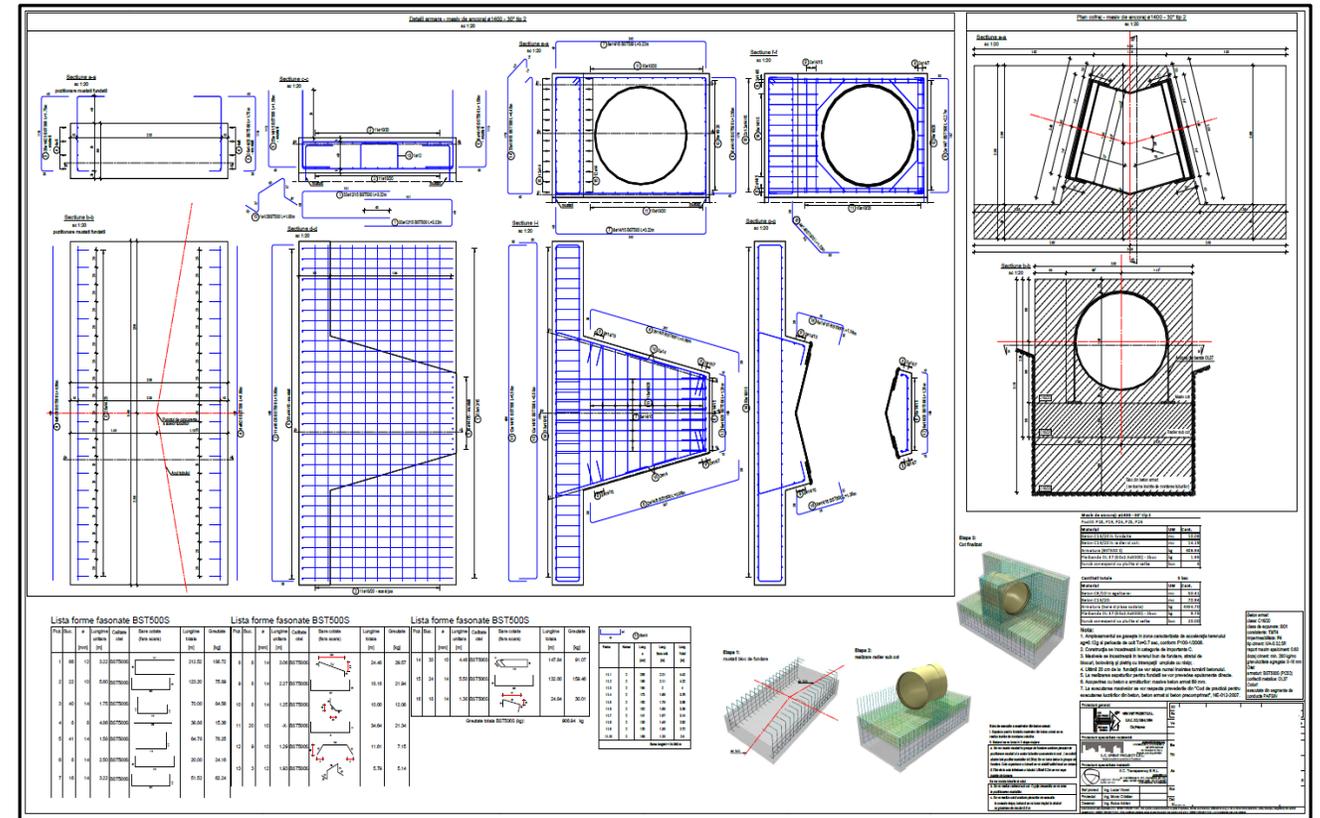
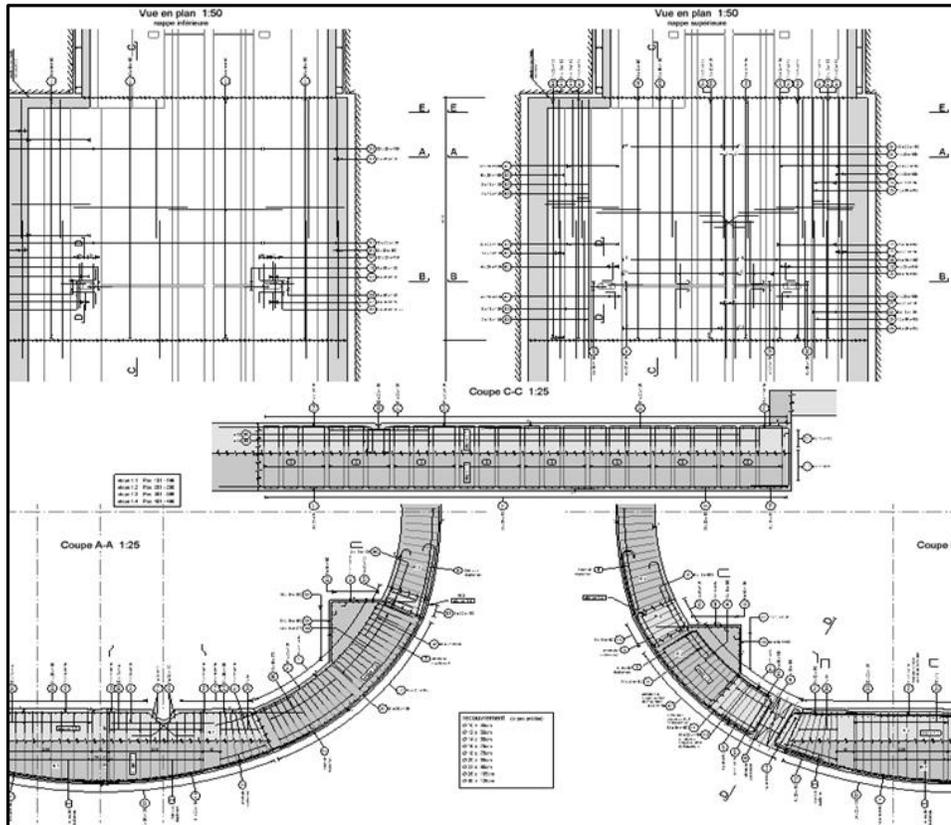
\ REINFORCEMENT DETAILS

- ALLPLANS workflow provides far superior drawings that support the BIM process





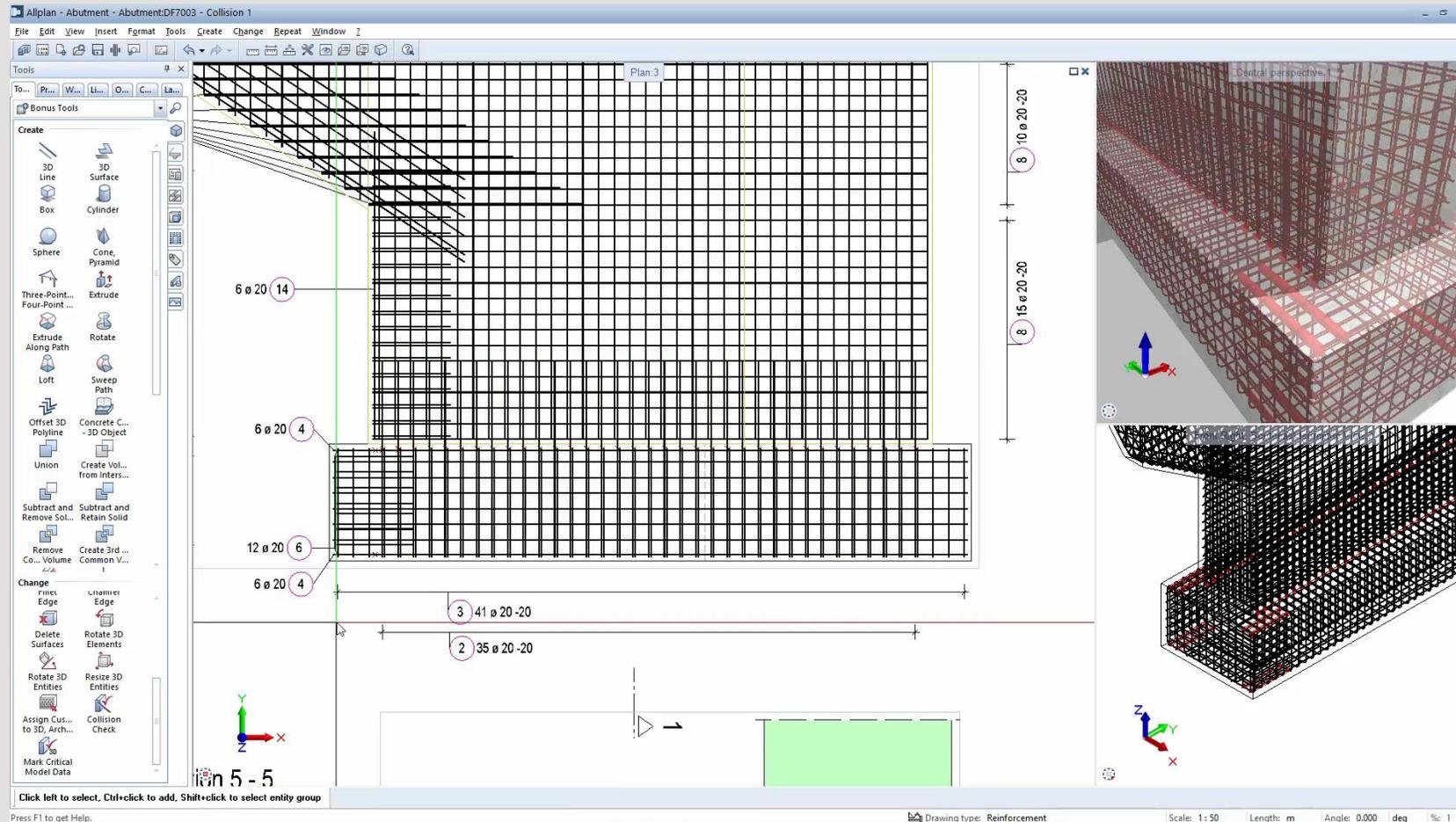
\ REINFORCEMENT DETAILS





\ REINFORCEMENT CLASH DETECTION

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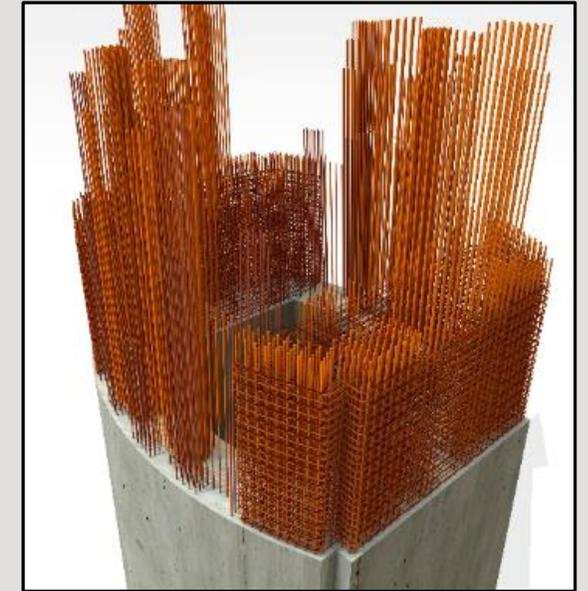


\ BRIDGE EXAMPLE

QUEENSFERRY CROSSING, EDINBURGH - UK

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- Longest cable stay bridge in the world total length of 2638m



“Thanks to **Allplan** there have been **zero issues** with the **reinforcement detailing**.
The complete rebar has been delivered with **precise dimensions, collision-free and on time** to the construction site.”

Model courtesy of Leonhardt Andrä & Partner, Stuttgart, Germany

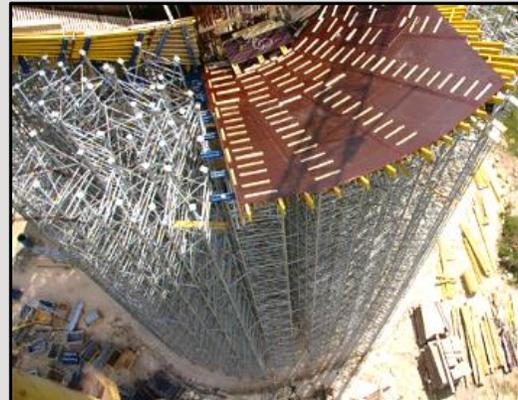


\ HEAVY CIVILS - WATER

WATER TOWER, BUDAPEST, HUNGARY

- 42m high water tower with 3000m³ capacity

*“For such an unconventional building it was **impossible to create appropriate plans without the Allplan 3D model**”*



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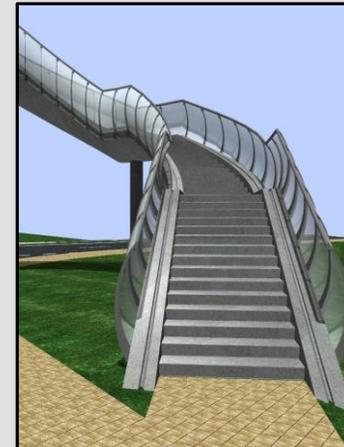
VISUALIZATION

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\ VISUALIZATION

- Traditionally engineers view rendered models as
'Pretty pictures' with no value to engineering
- In Europe the visualization is **key to aiding communication**
- An **integral part of the deliverable**



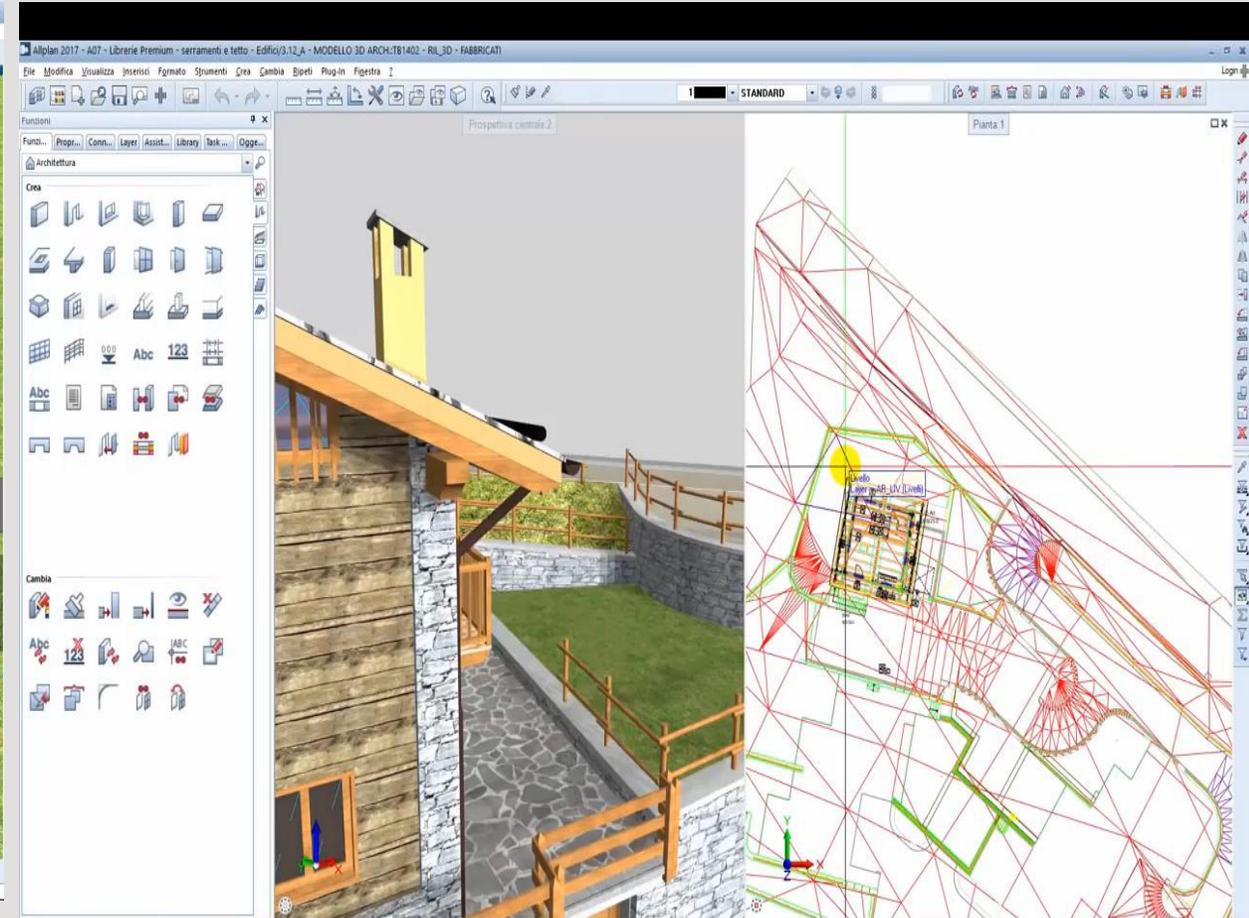
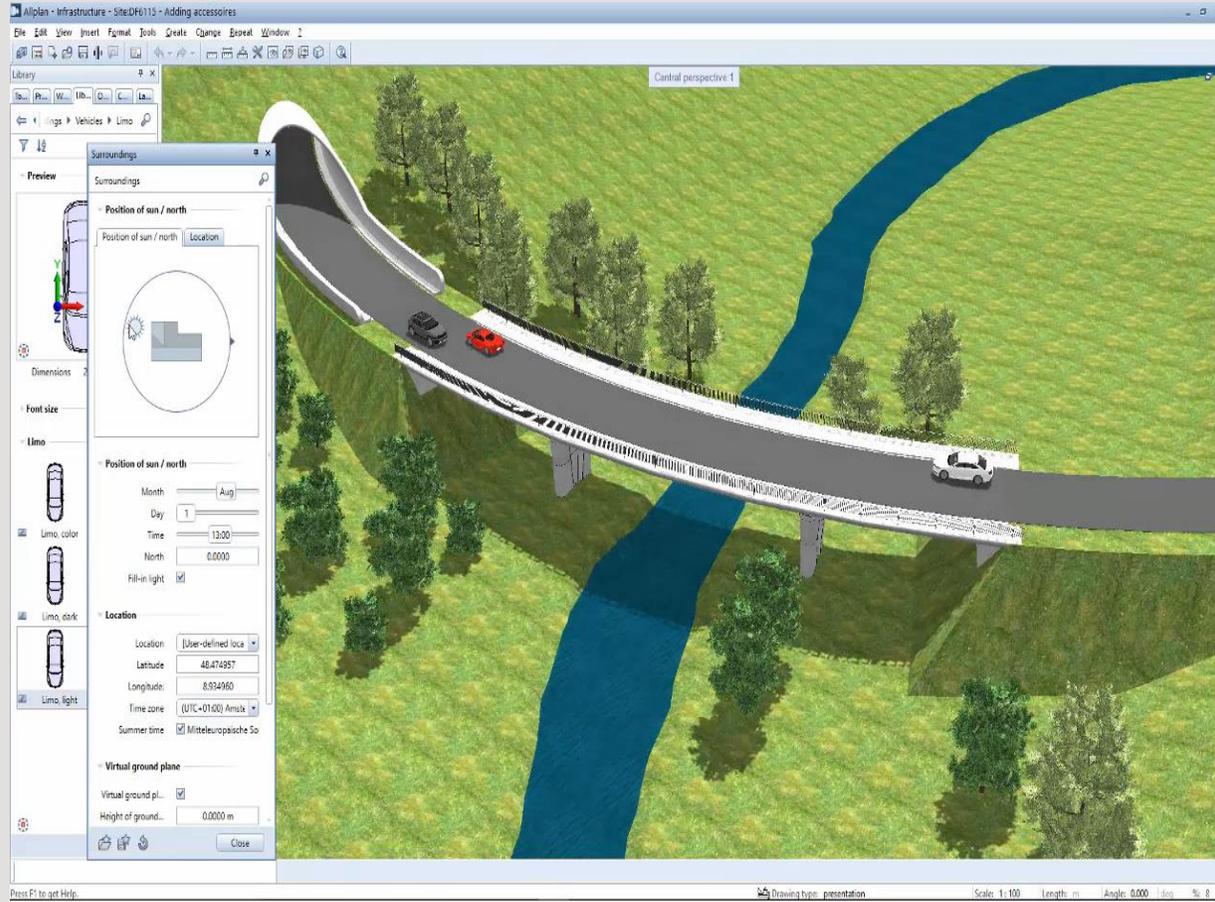
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\ DEMONSTRATION

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COLLABORATION - BIM LEVEL 3

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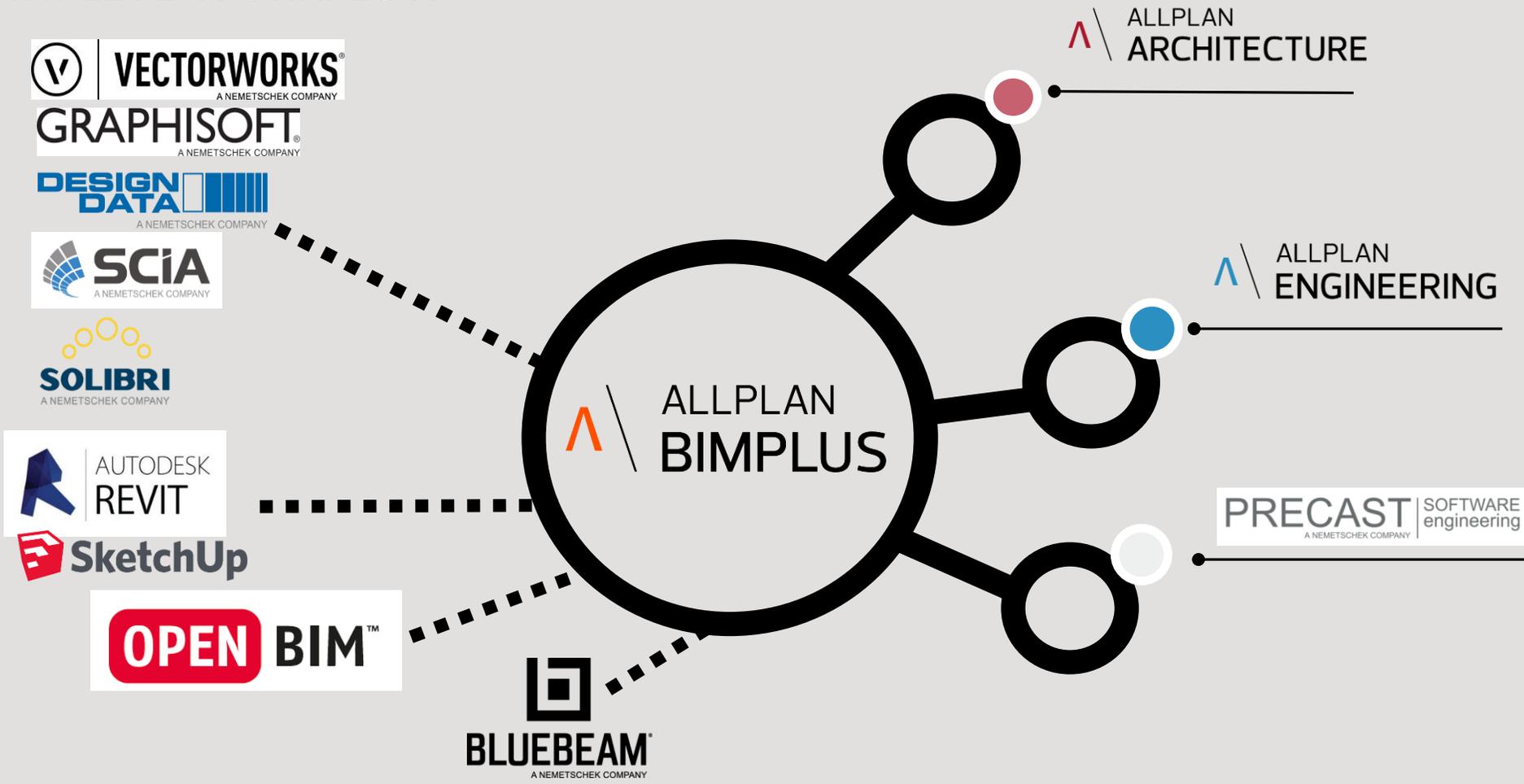
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\ THE COMPLETE WORKFLOW

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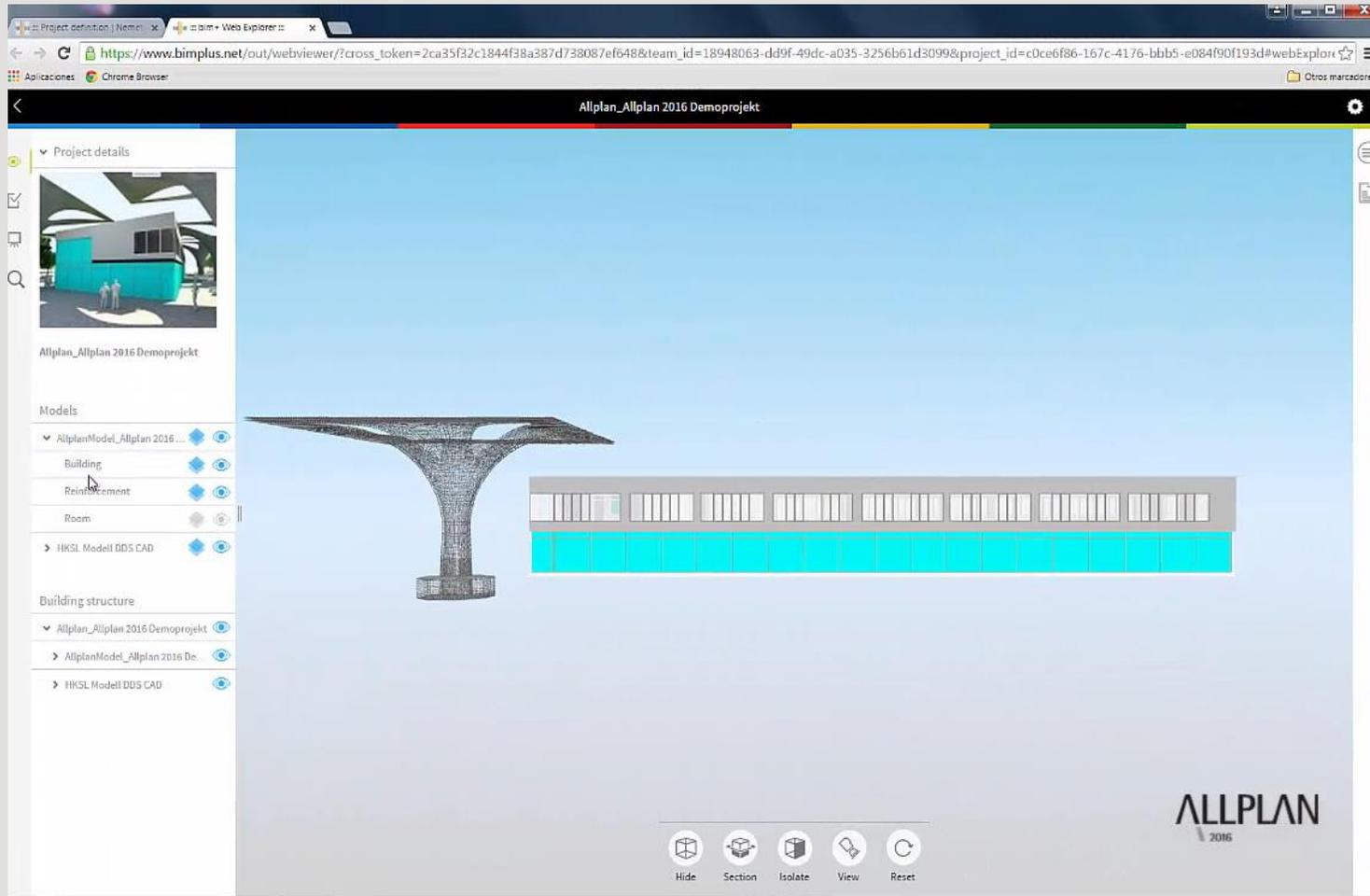


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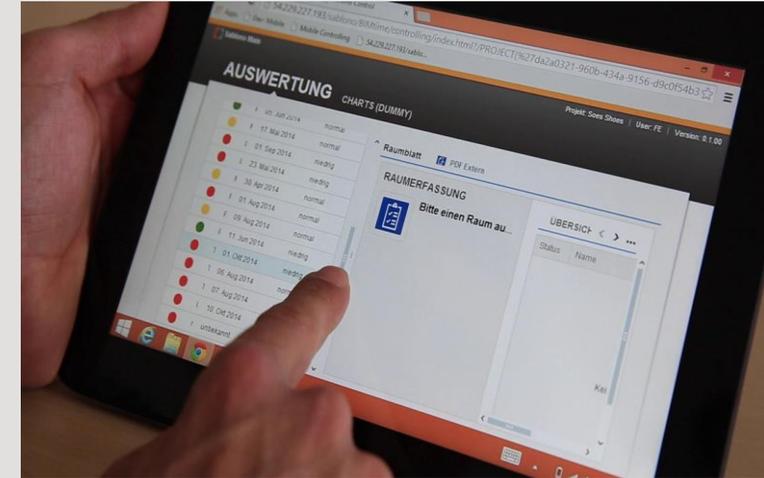
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\ CLOUD BASED COLLABORATION



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Markus Kiefl
Architecture and Visualization,
BMW AG

“BMW building projects is becoming **independent of software interfaces** with Bimplus. Delivering **collision-free** models at coordinated milestones
Integrates **all team members** in the process.”

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BIMPLUS





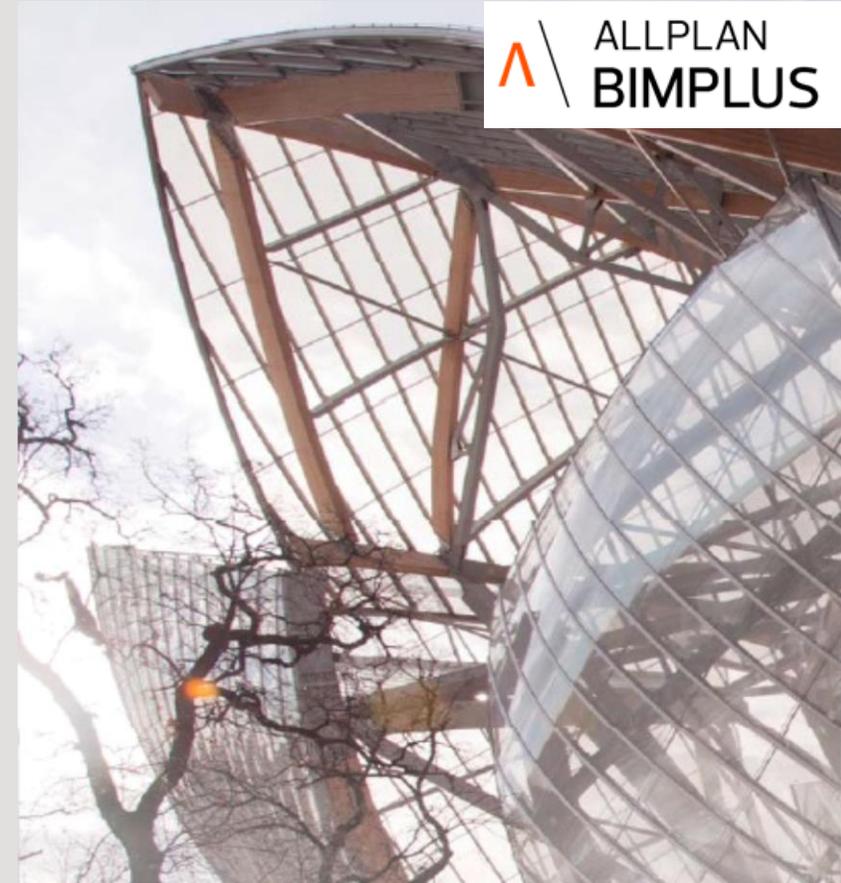
Peter Tooth
CE-N Bochum

“Bimplus helps us to **involve our clients from the beginning**.
Issues can be raised, discussed, and closed fast.

Usage of **Bimplus is an efficient way to exchange information** and make your
daily work easier!”

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BIMPLUS



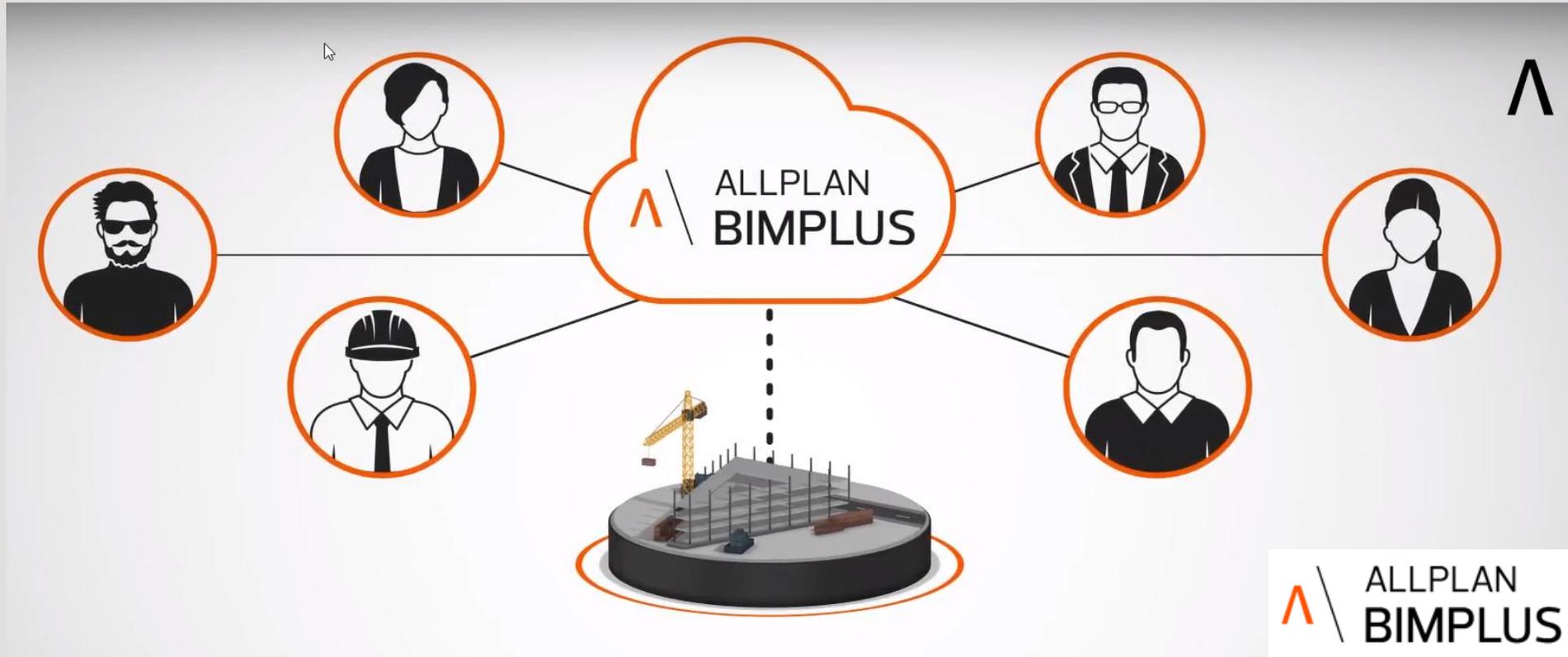
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\ BIMPLUS – CLOUD COLLABORATION

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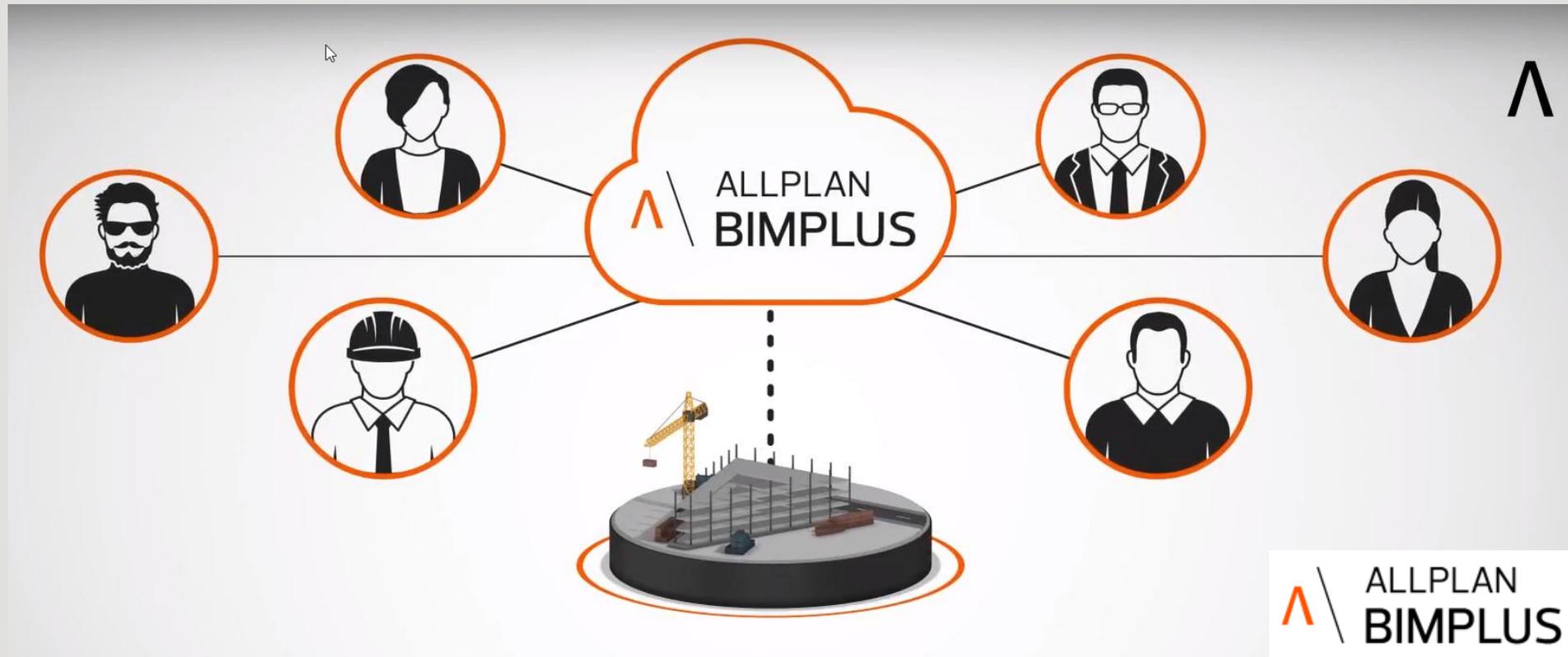
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IN CLOSING

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\ IN CLOSING

- Knowledge of BIM Level 3 processes used across Europe can help our objectives to move to a more efficient **BIM Process**
- For Engineers to truly be effective in BIM we must start to use **the right tools for the right job**
- The BIM process for **rebar detailing** is well established in Europe – in UK & Ireland we still mainly use **unintelligent 2D drawings** – why?



\ IN CLOSING

- If the industry is to move forward & engineers want to be more cost effective

- Education must be invested in:-
 - At a senior management level
 - At a user level
 - At an industry awareness level

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Thank you

Jonathan Croft - JCroft@allplan.com