

PLANNING THE FUTURE

Data. Facts. References.

1. Our company
2. What is BIM and why using it ?
3. BIM History within OBERMEYER.
4. Digital design process (examples)
5. BIM at site.

“Give me six hours to chop down a tree and I will spend the first four sharpening the axe.”

Abraham Lincoln



COMPANY DATA AND FIGURES

Locations. History. Facts.

BUSINESS FIELDS



- Architecture & Urban Development
- Industry & Trade
- Airports
- Healthcare
- Education & Research
- Security Engineering
- Structural Engineering
- Technical Equipment
- Energy Efficiency
- Building & Room Acoustics
- Construction Management



- Traffic Planning
- Roads
- Railways
- Traffic Structures & Bridges
- Tunnels & Underground Engineering
- Construction Management

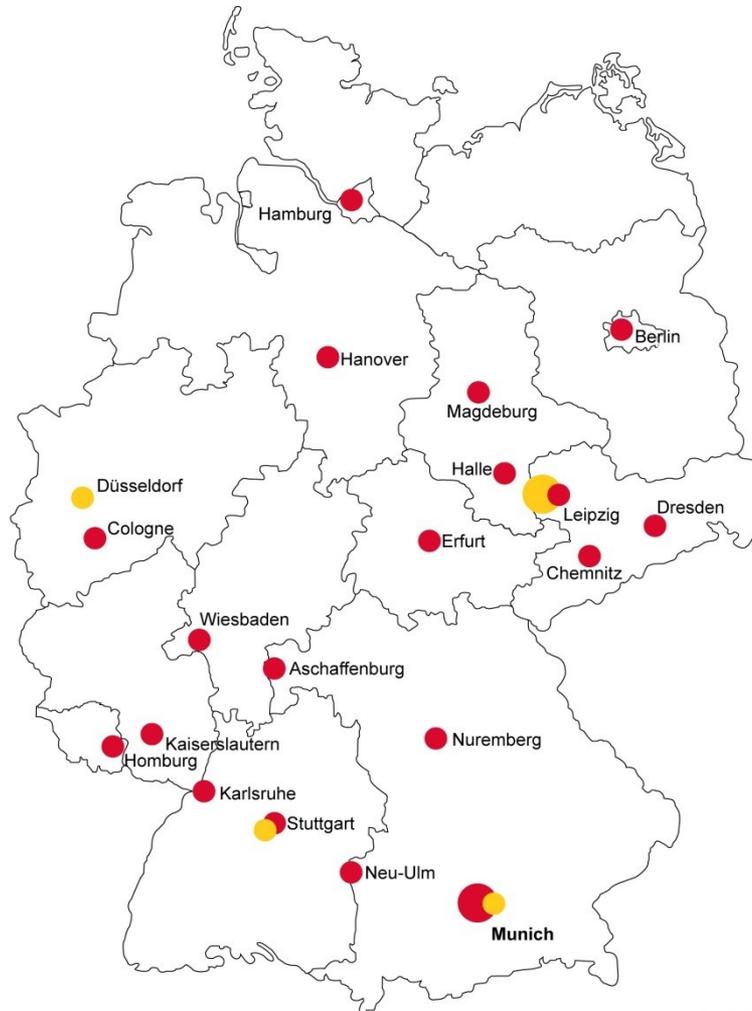


- Energy Systems
- Water & Waste Management
- Immission Protection
- Building & Area Recycling
- Site Development Planning

- **Independent design** and advice in the business fields buildings, transport and energy & environment
- Integrative **overall planning** with extensive technical know-how
- Tailor-made and customer-oriented solutions for **complex construction projects**
- Coordination and control of **interdisciplinary** projects
- Implementation of the **latest scientific findings** from research and development
- International activities, regional presence

OBERMEYER GERMANY

Locations branch offices and subsidiaries



- OBERMEYER Planen + Beraten GmbH
- OBERMEYER Project Management GmbH

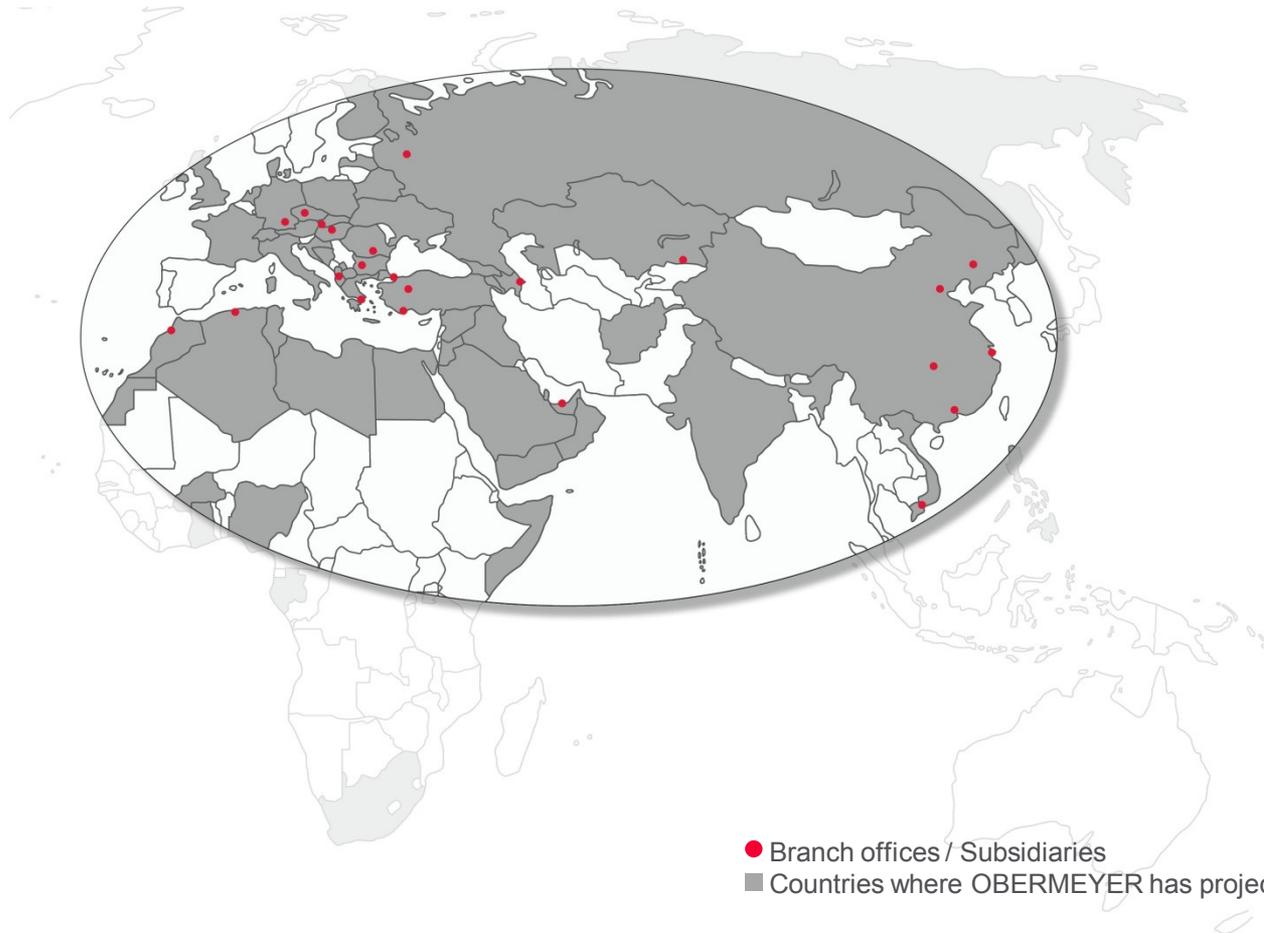
OBERMEYER INTERNATIONAL

International branch offices and subsidiaries



Abu Dhabi
Algiers
Almaty
Ankara
Antalya
Athens
Baku
Beijing
Bratislava
Budapest
Bucharest
Guangzhou
Ho Chi Minh City

Istanbul
Moscow
Munich
Prague
Rabat
Shanghai
Shenyang
Sofia
Tirana
Wuhan



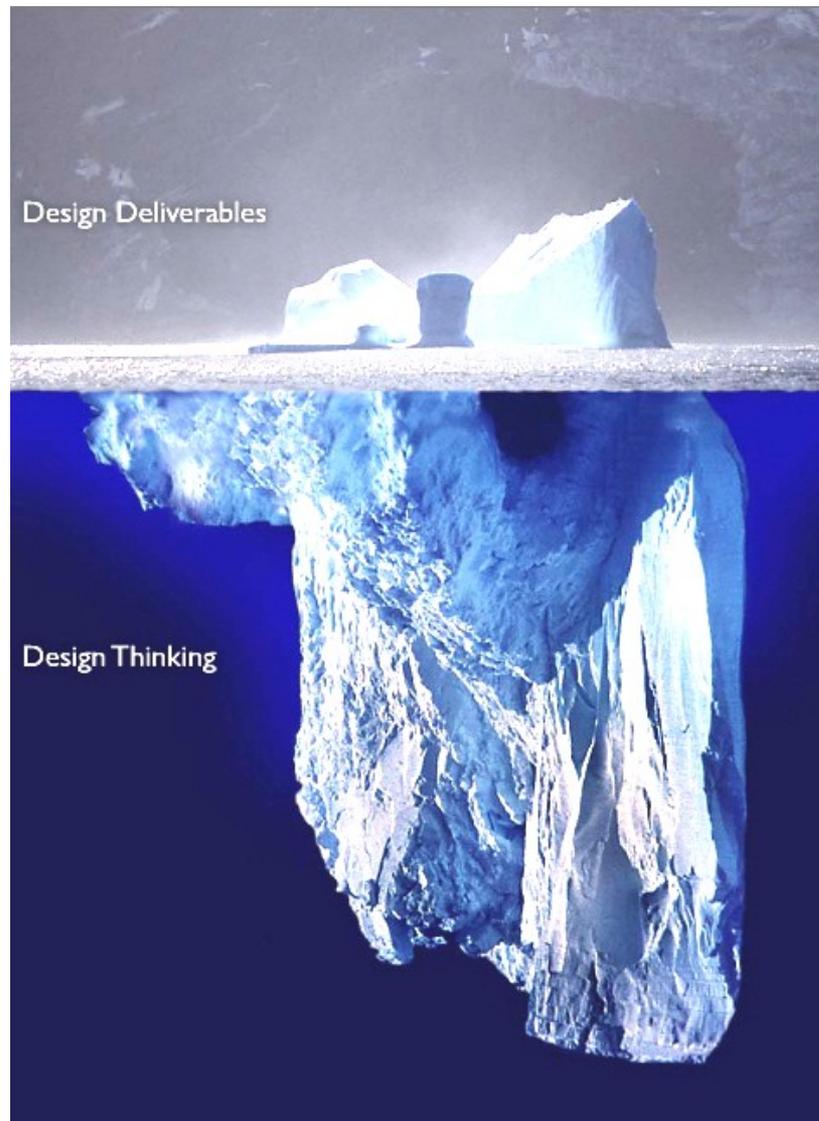


WHAT IS BIM?
Ideas. History. Development.

BIM (BUILDING INFORMATION MODELING)
IS A
WORK METHODOLOGIE
IN THE CONSTRUCTION BUSSINES
IT IS NOT AN IT-PROJECT.

THE MAIN FOCUS IS THE CENTRIC
MANAGEMENT OF
PROJECT INFORMATION
AND THE COHERENT
PRODUCTIVITY AND **QUALITY** INCREASE

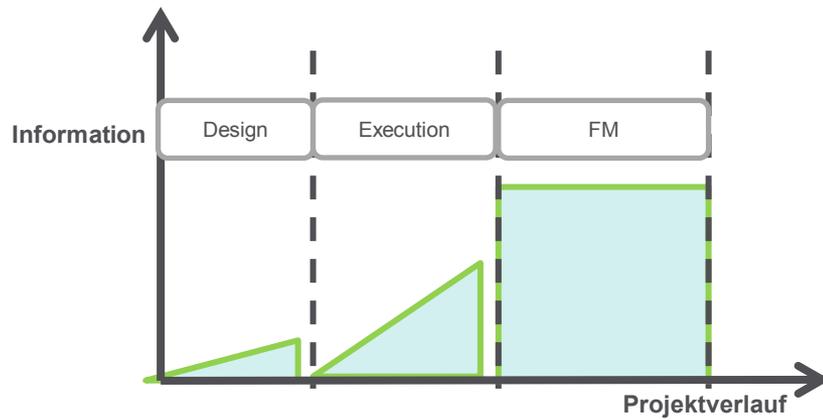
Main challenge of a traditional design approach



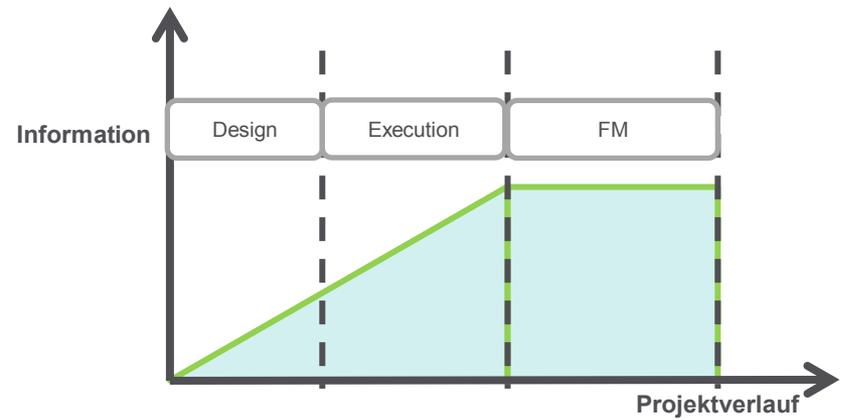
this information
reaches the site

lost information

Concept – continuity of information



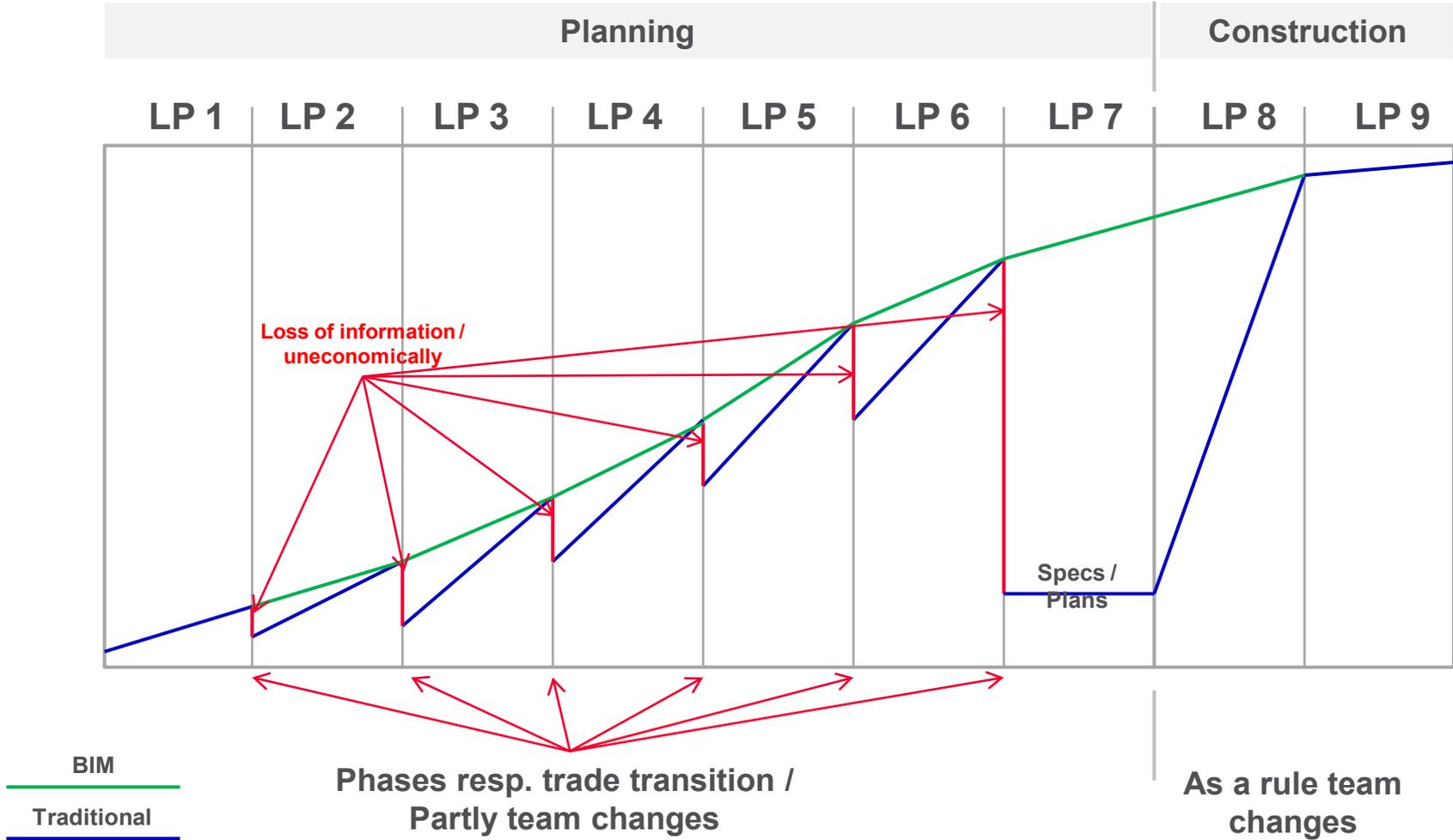
TRADITIONAL

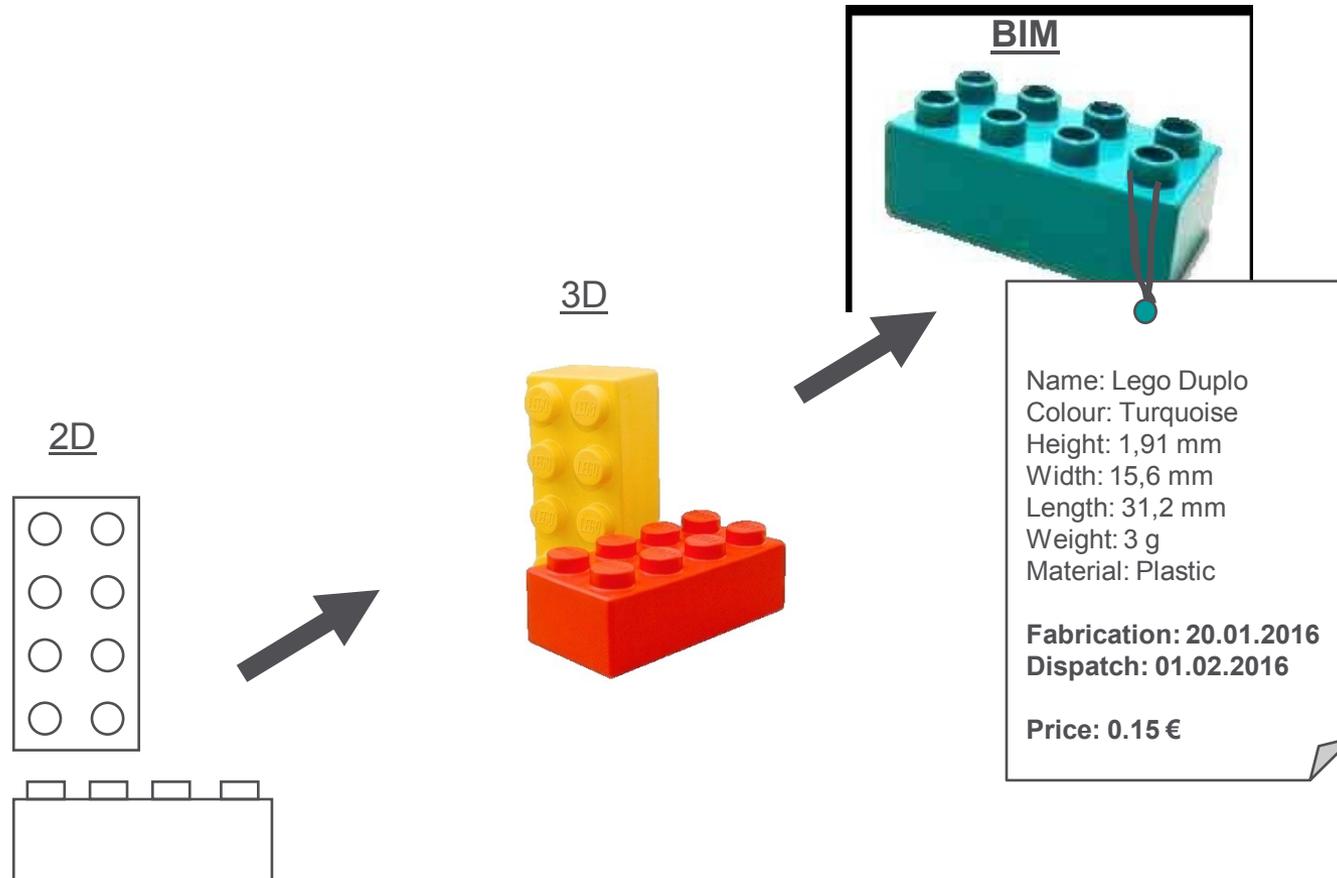


BIM

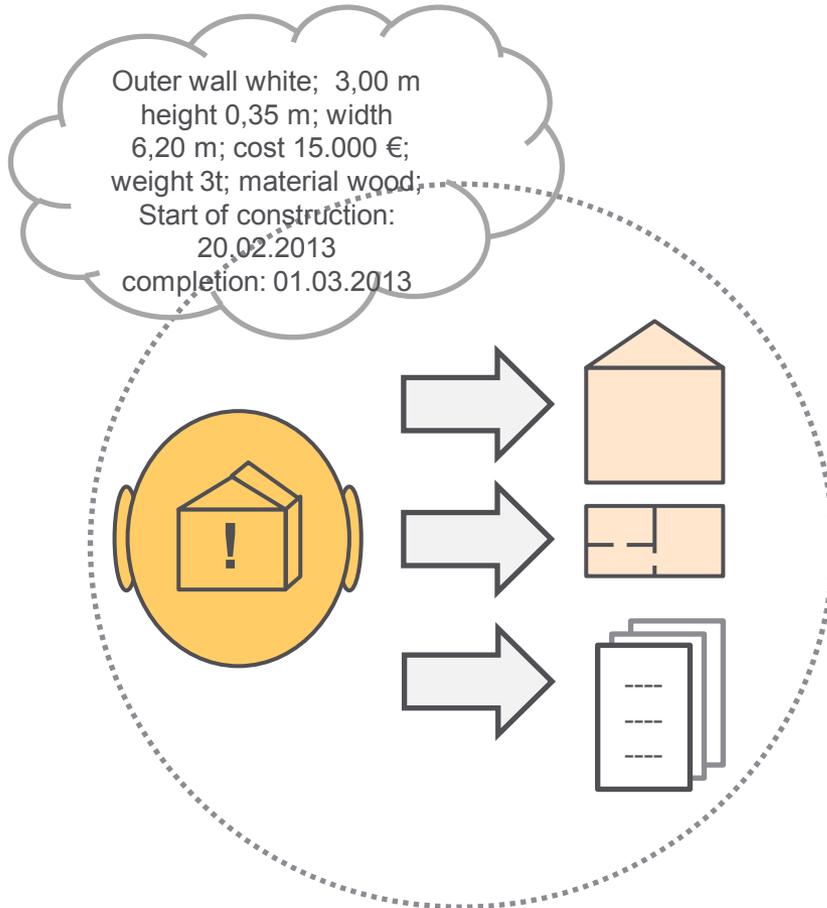
... AND THIS IS SO IN PLANNING TOO...

Qualitative description of the Information level in the planning process





... Where does the following come from...

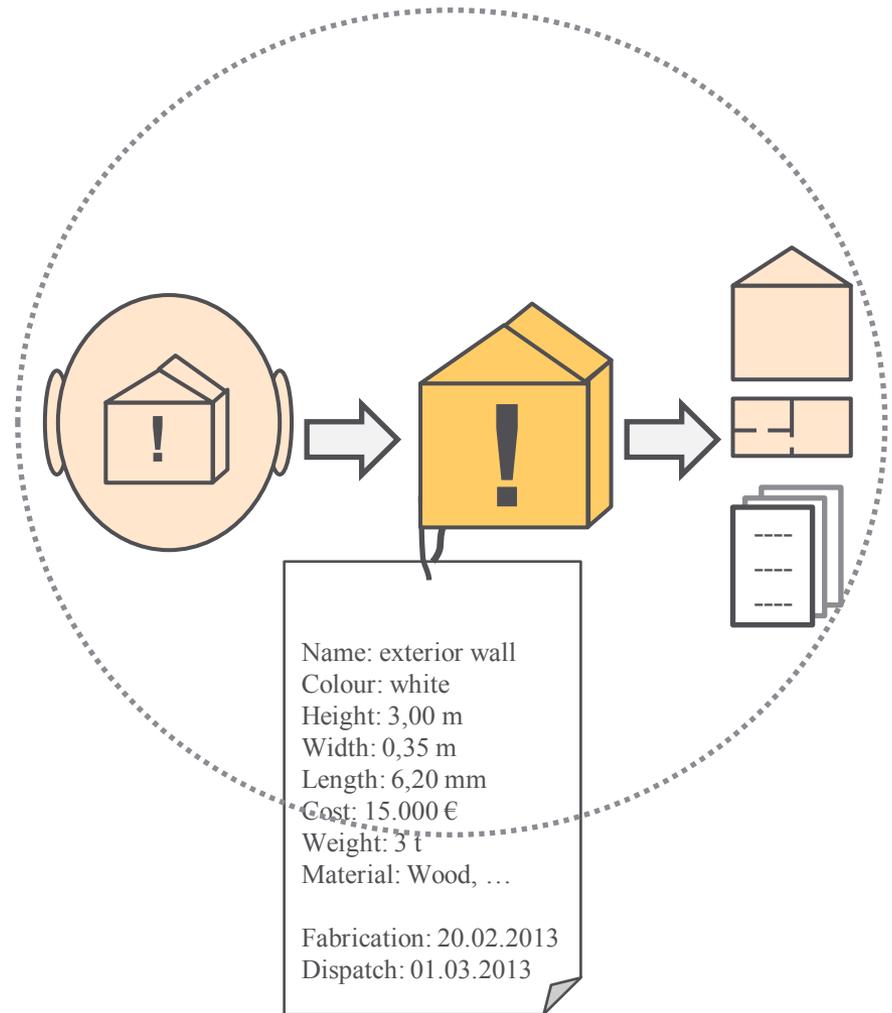


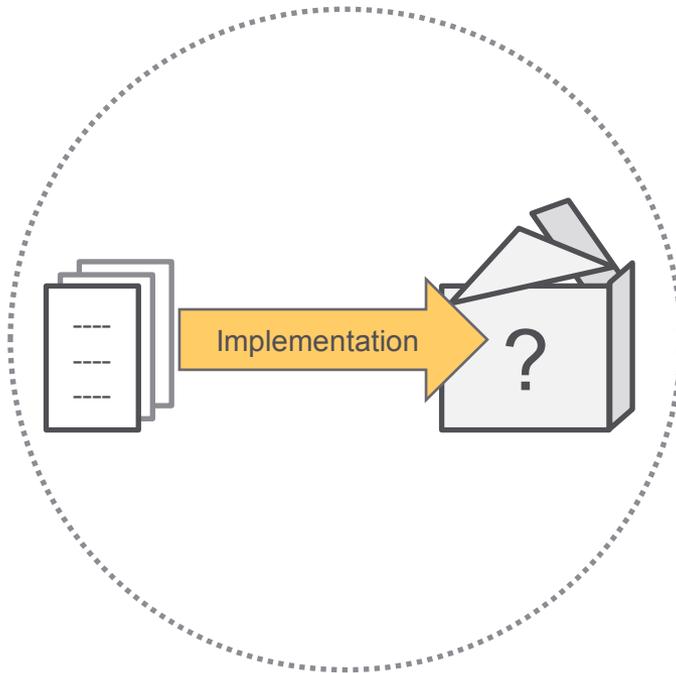
TRADITIONAL

Spatial idea becomes plans and LVs.

BIM

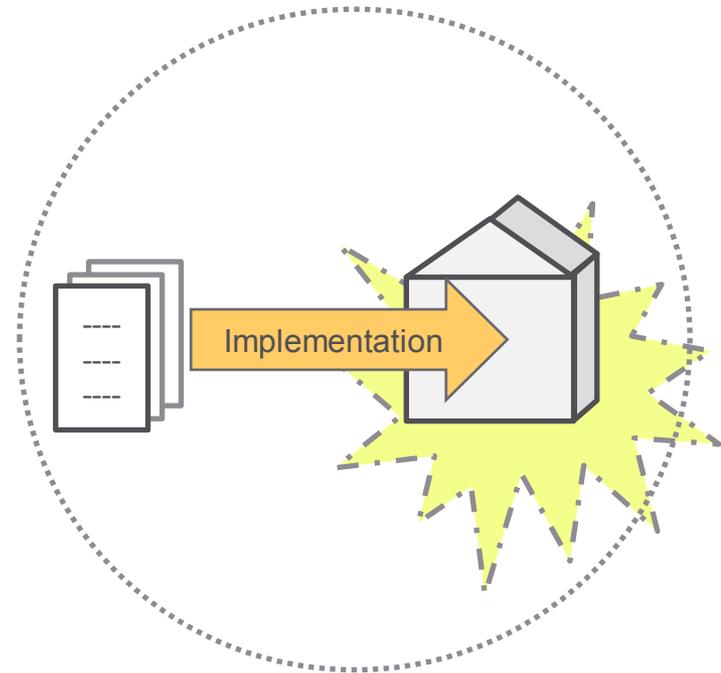
Spatial idea becomes model with information.





TRADITIONAL

The idea of designing is “put together” for the first time on the spatial level.



BIM

The spatial fit has been simulated in the model.

CLASSICAL SEQUENTIAL DESIGN PROCESS

Design of
Infrastructure
XXX



Design of
Structure
XXX



Design of
Fire Protection
XXX



Design of
MEP
XXX



Design of
Interiors
XXX



Additional
Specialists
XXX

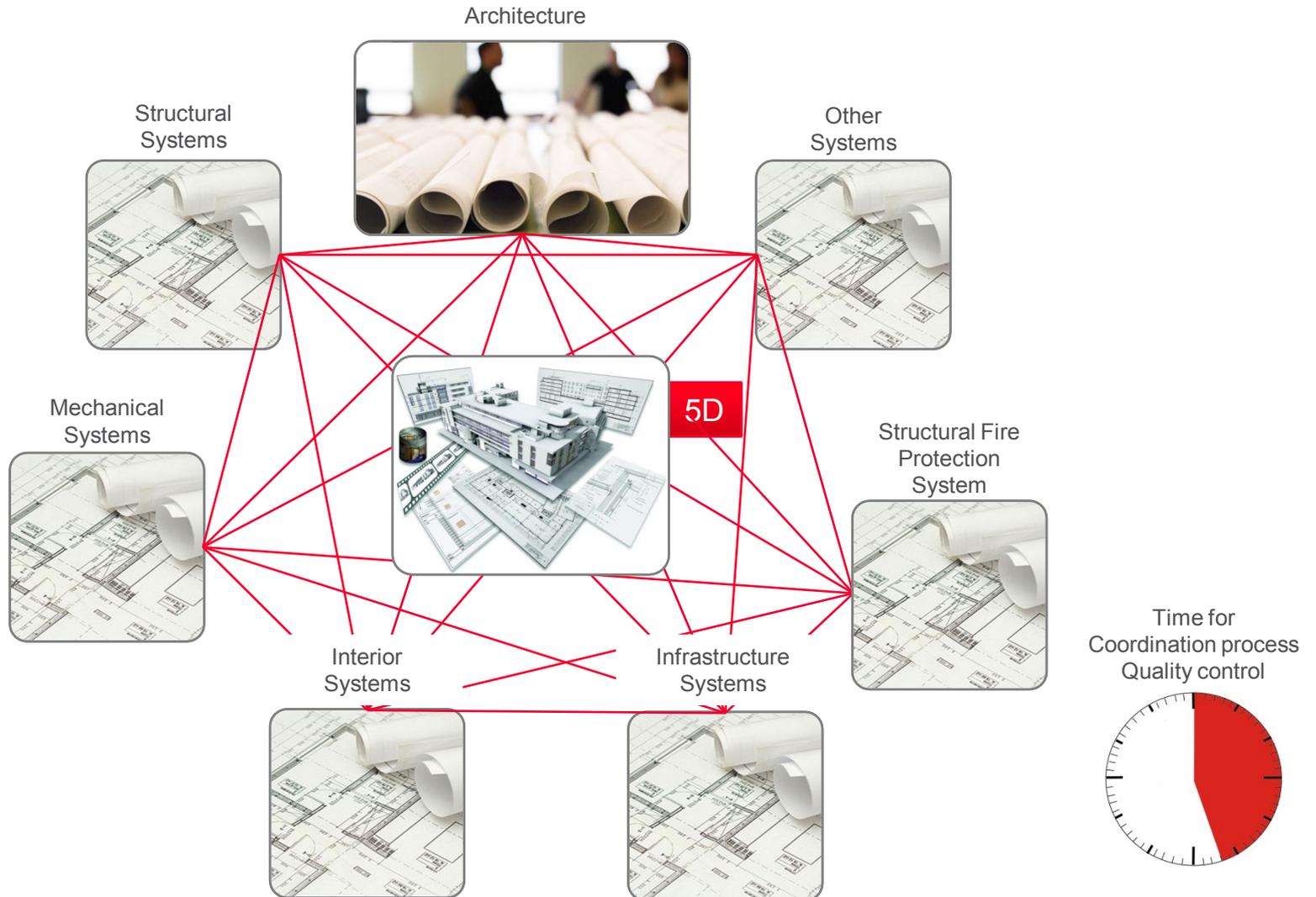


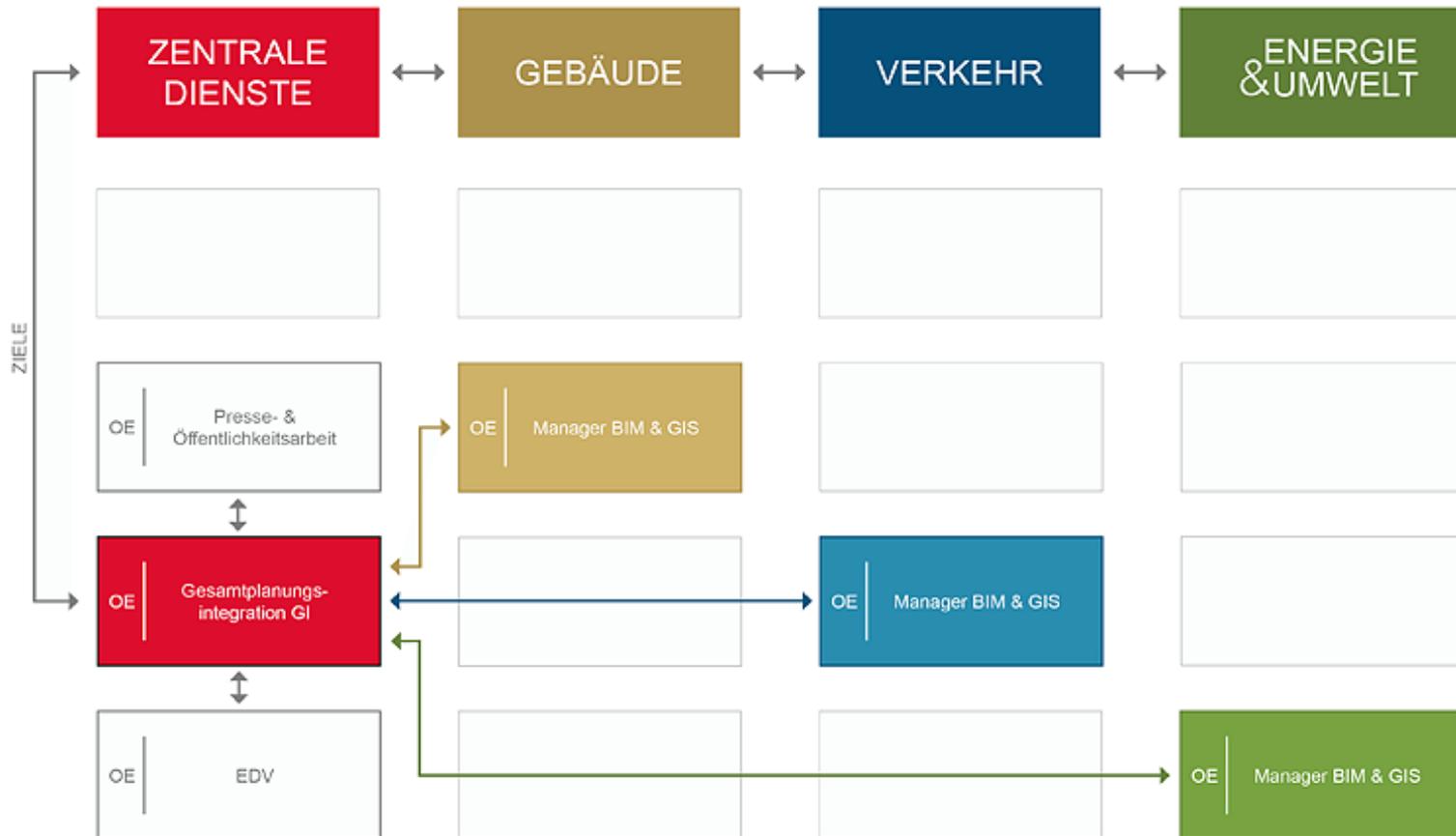
Time requirement
for coordination

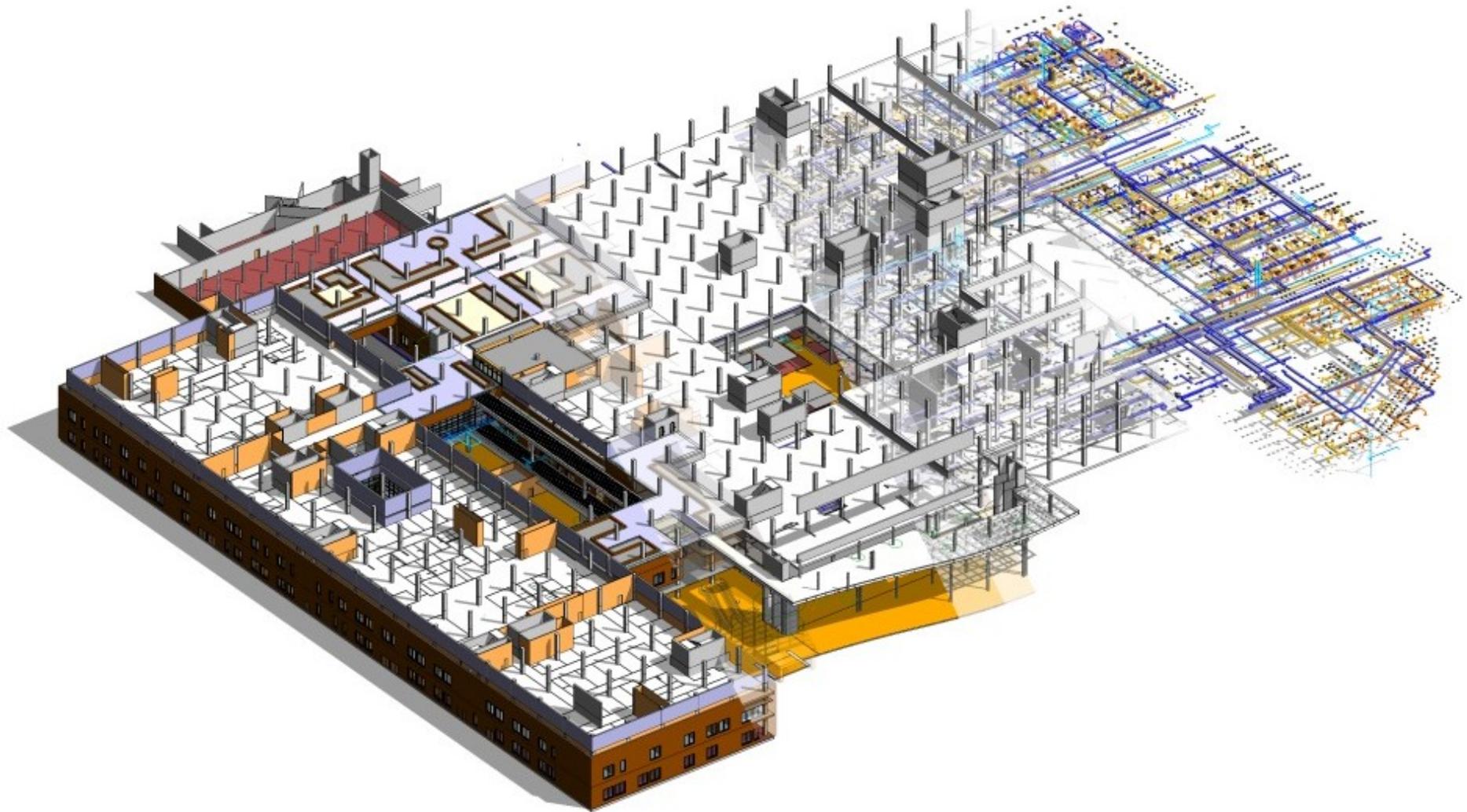
> **High risk for
mistakes!**



IMPLEMENT BIM









„... for the continuous usage and development of BIM since 2005 for integrated planning, analysis and documentation ...“



HISTORY OF BIM / IT WITH OBERMEYER

Motivation. Objectives. Advantages.

MILESSTONES OF DEVELOPMENT

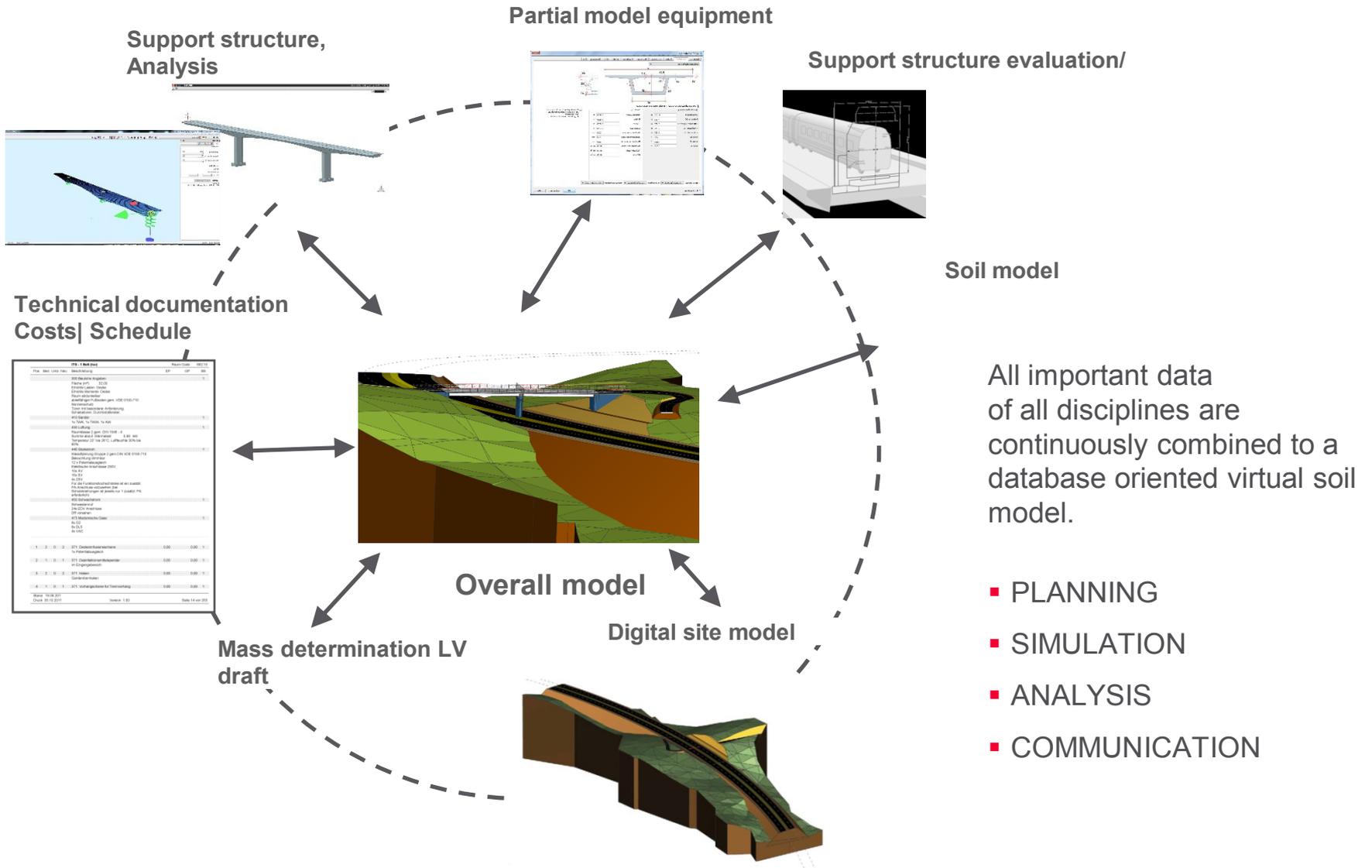
- 1958 Obermeyer foundation
- 1967 First computer, ½ m deutschmarks, IBM 1130
- 1975 Company headquarters at Hansastrasse, Munich, IBM 370/145 & additional equipment, 8 m deutschmarks
- 1985 Initial application of **object-oriented software** on a project
- 1990 Introduction of a **geographical information system** with OPB under operating system of Unix
- 1995 BuildingSMART e. V. foundation member
- 1997 **3D model concept** - Route as parametric model
- 2001 Working with competition Xiangjang
With GIS and CAD in predetermined frames
- 2003 Joint work of GIS and CAD
Projects in standardized coordination system
- 2004 Initial BIM large **building project** with OBERMEYER
- 2005 Planning for about **1 000 km high speed railway** line
Wuhan–Guangzhou, China

- 2006 Introduction of a **project database**
- 2006 Introduction of the **mobile GIS** with a railway project in Algeria
- 2008 Master planning for the city expansion (34 km²) and Trade Fair Fuzhou, China
- 2008 Beginning of **Al Ain Hospital** (Large project, structural engineering 0.9 bn. €)
- 2008 Introduction of **project presentation with GIS** with real Project data
- 2011 **Professional BIM team**
- 2012 Planning of Metroline 2 (about 11 km) Ho-Chi-Minh City, Vietnam
- 2013 Interface bridge construction to iTWO
- 2013 Foundation of **LOC “Leonhardt Obermeyer Center”** at TUM
- 2014 Bringing together GIS area with BIM area into the newly founded overall planning integration.
- 2014 Strategic overall transition of the company to BIM techniques.



INTEGRATED PLANNING PROCESS

Challenges. Solutions. Experience.



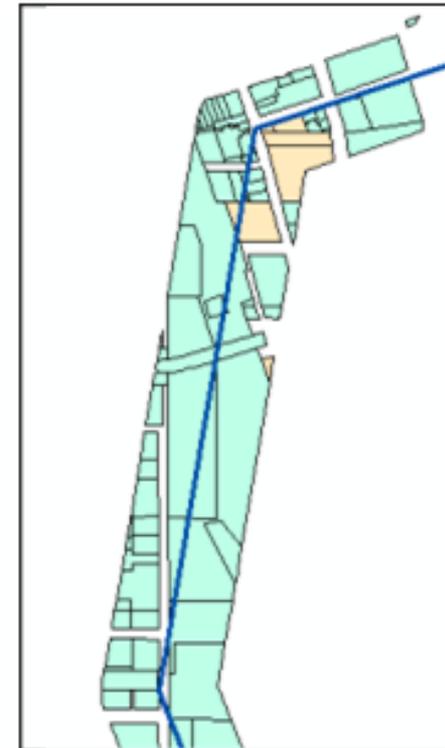
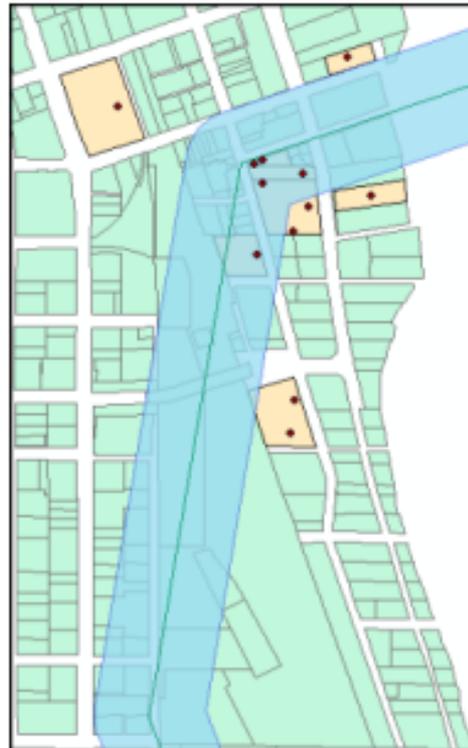


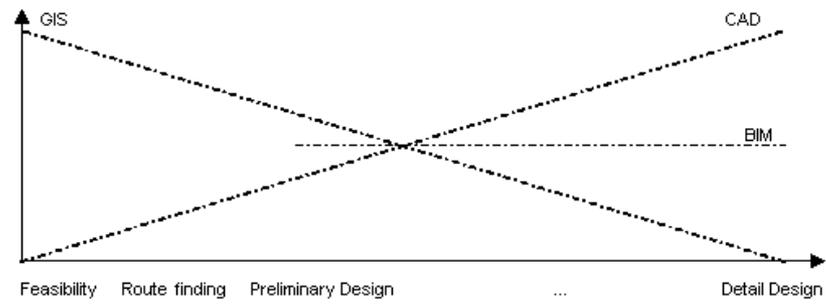
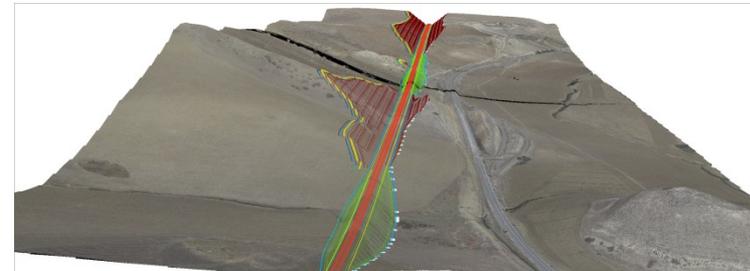
GIS - TRACK SELECTION

Challenges. Solutions. Experience..

What is GIS?

- 3D Analyst
- Data Management
- Geocoding
- Geostatistical Analyst
- Network Analyst
- Spatial Analyst
- Tracking Analyst
- Hydrological Analyst
- Data Interoperability
- Statistics
- Raster Analysis

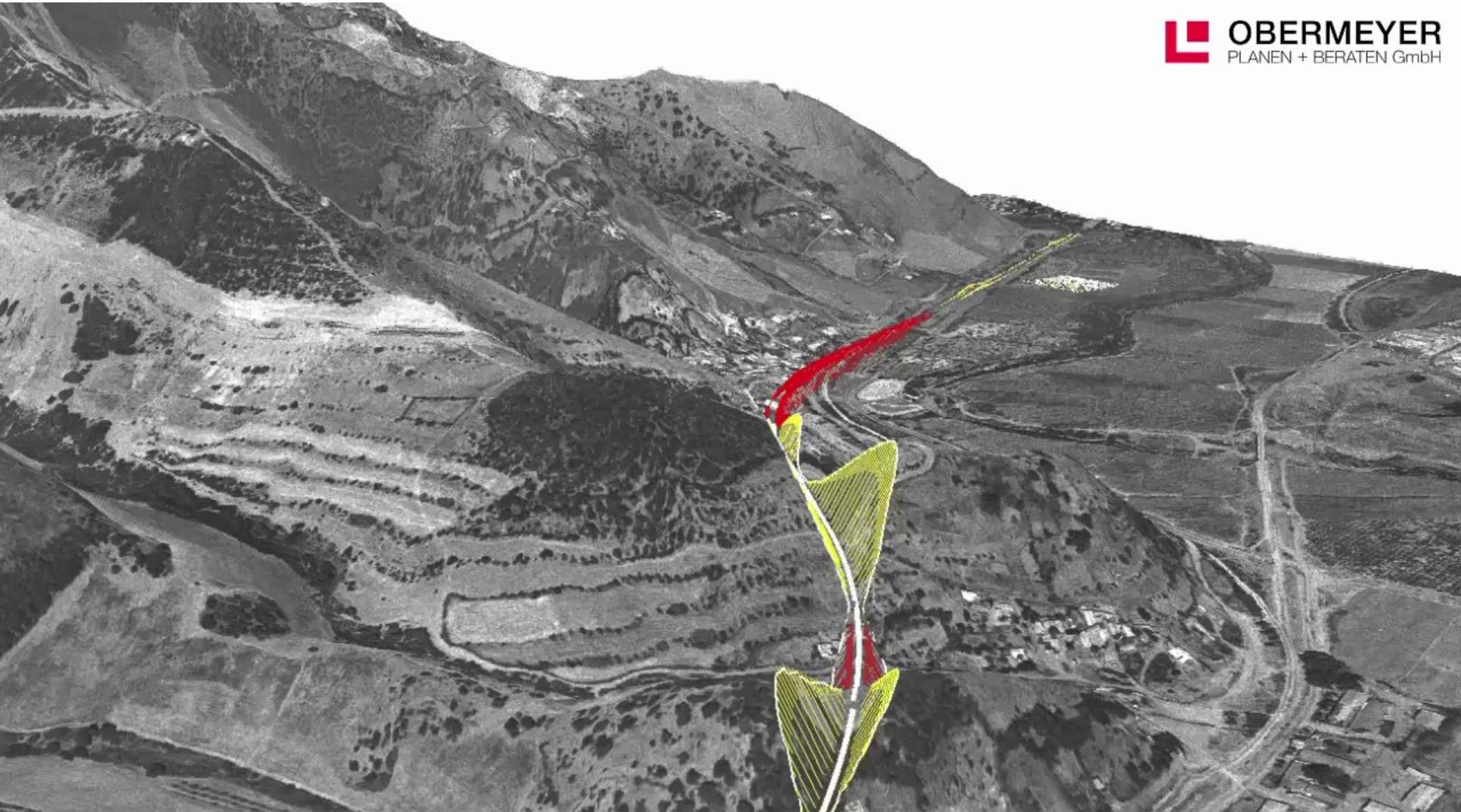






BIM - TRACK DESIGN (PROVI)

Challenges. Solutions. Experiences.



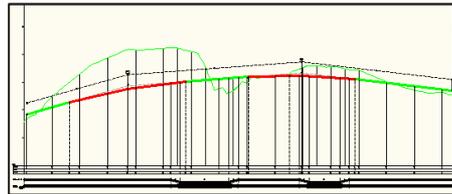
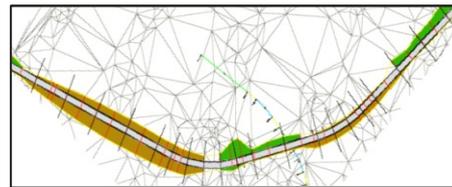
GIS / BIM Integration



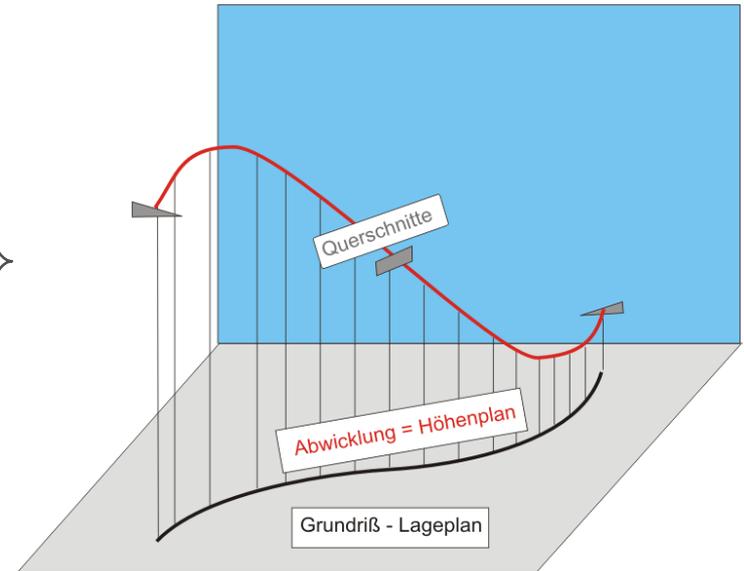
BIM - INTEGRATED BRIDGE DESIGN

Motivation. Objectives. Advantages.

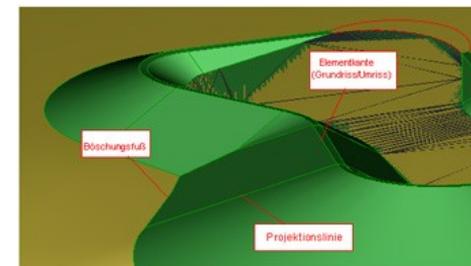
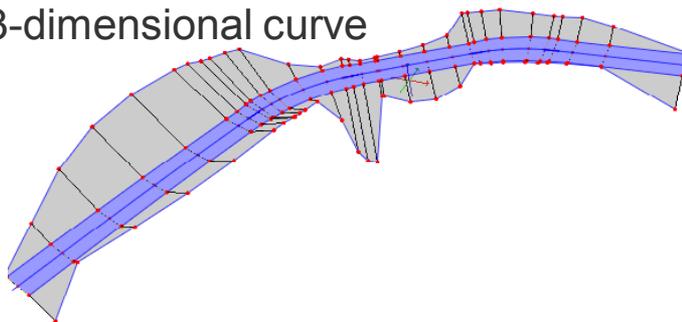
- Top view
- Longitudinal section
- Cross profile



3D 3-dimensional curve

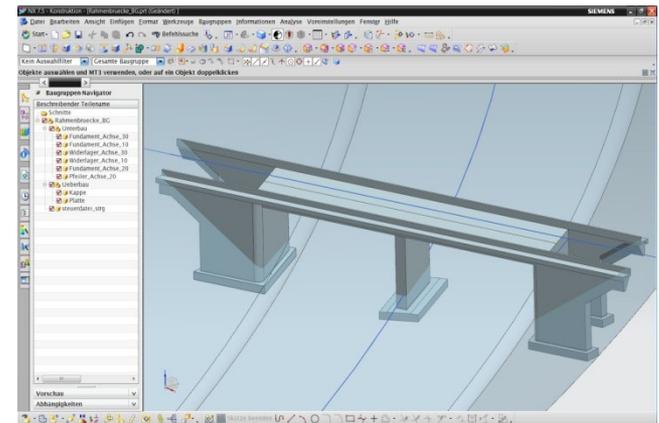
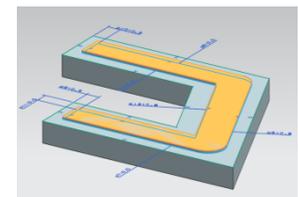
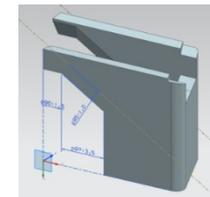
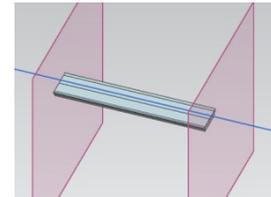
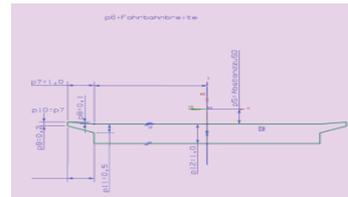
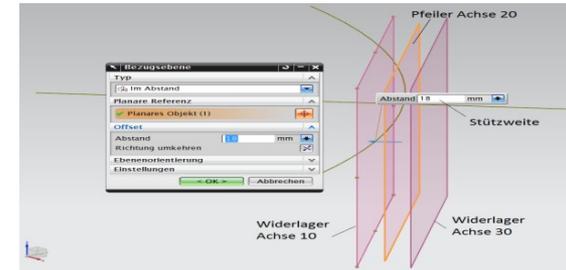
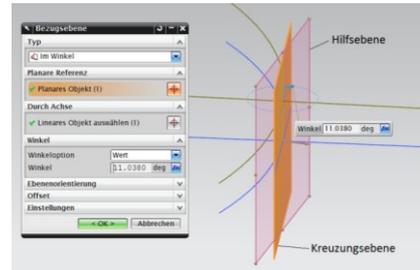
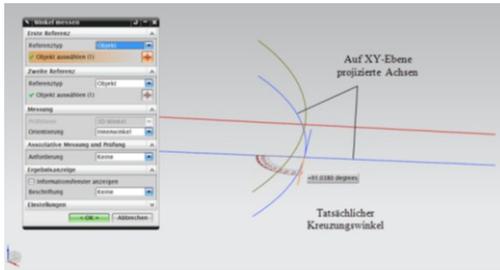
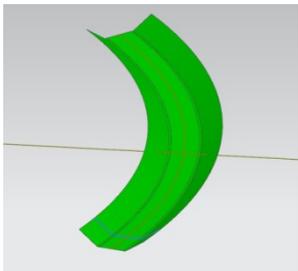


3D 3-dimensional curve

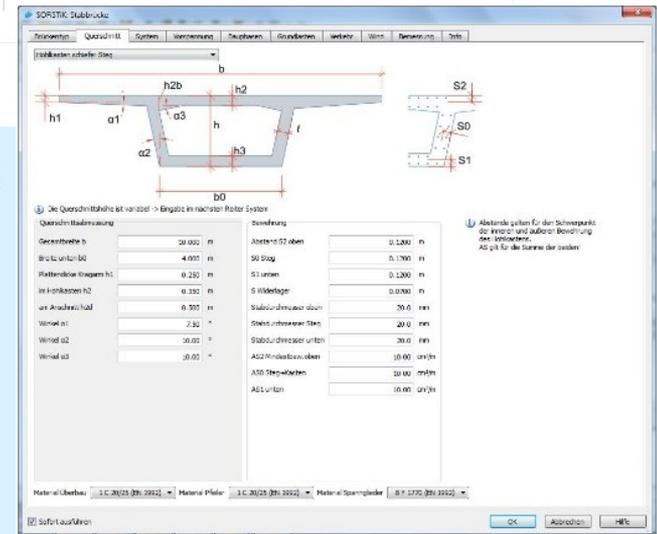
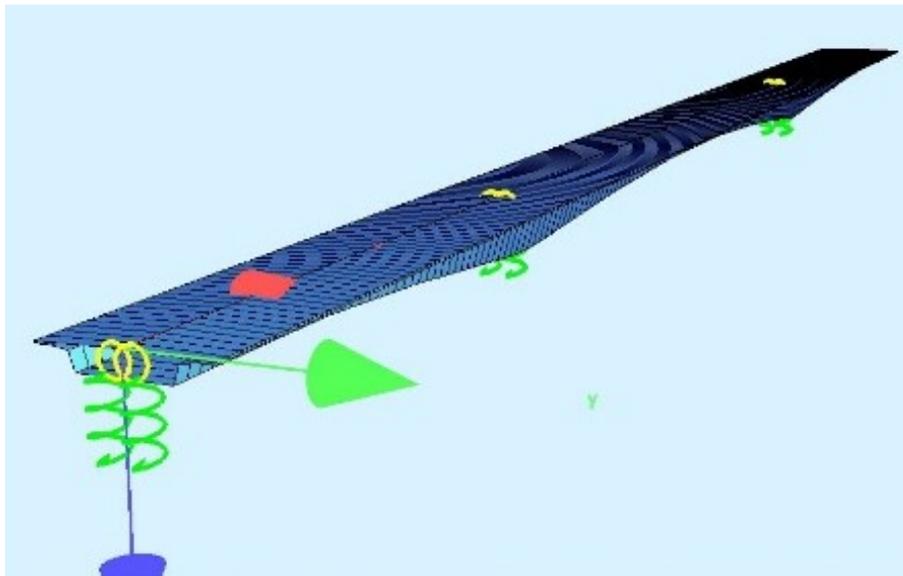
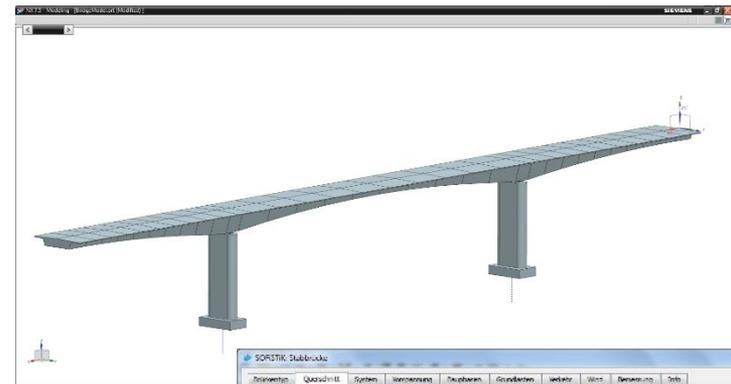


Automated modelling of a bridge

Generation of initial fully parametrical bridge basis model

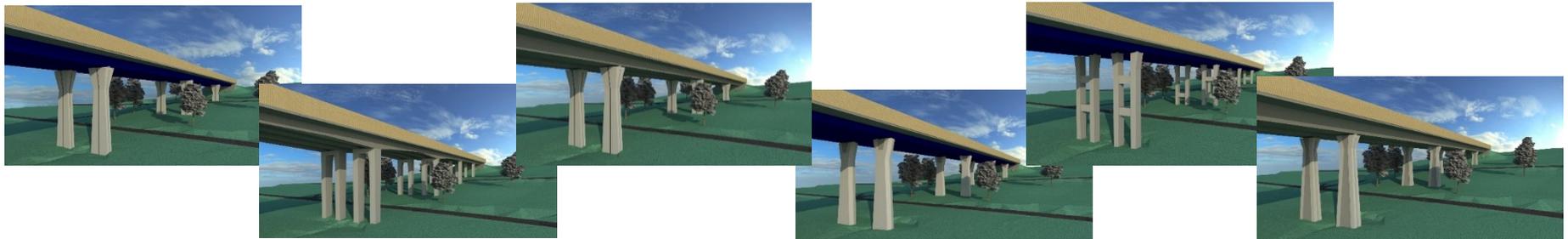
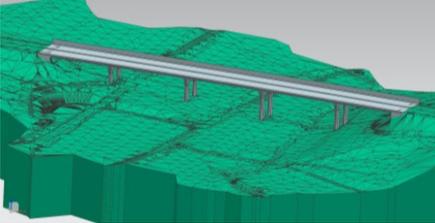
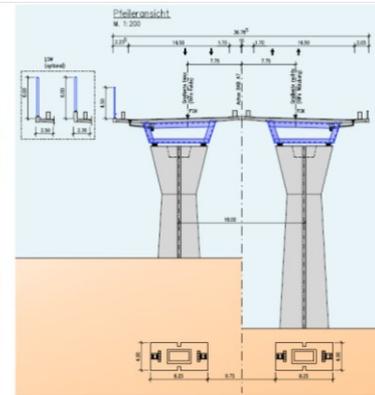
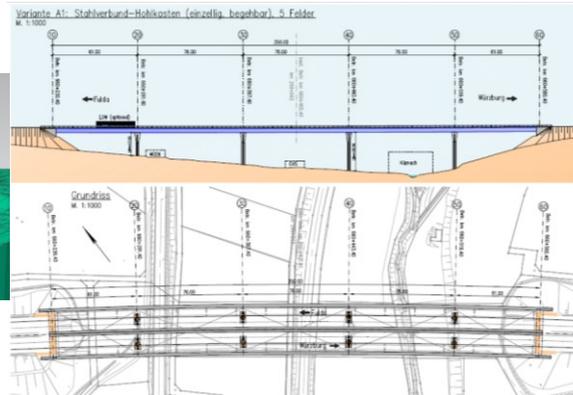
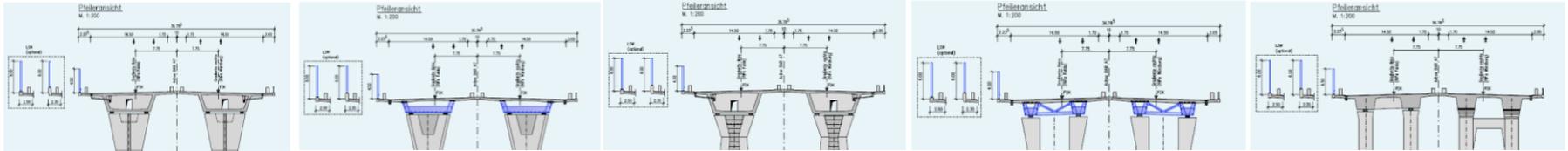


- Linking models to SOFiSTiK via CADINP-interface
- Quick generation and calculation of an easy associative calculation model in NX
- Direct interface, consistent data use
- Structure specific loads, standards and issue



10% design

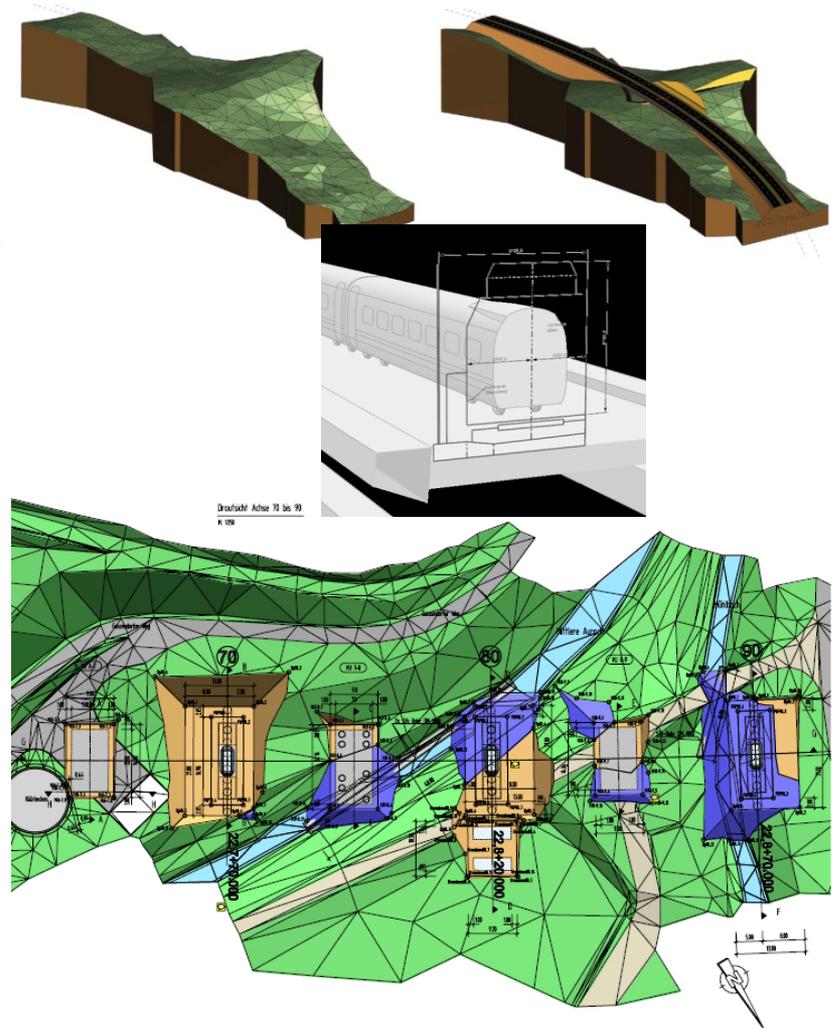
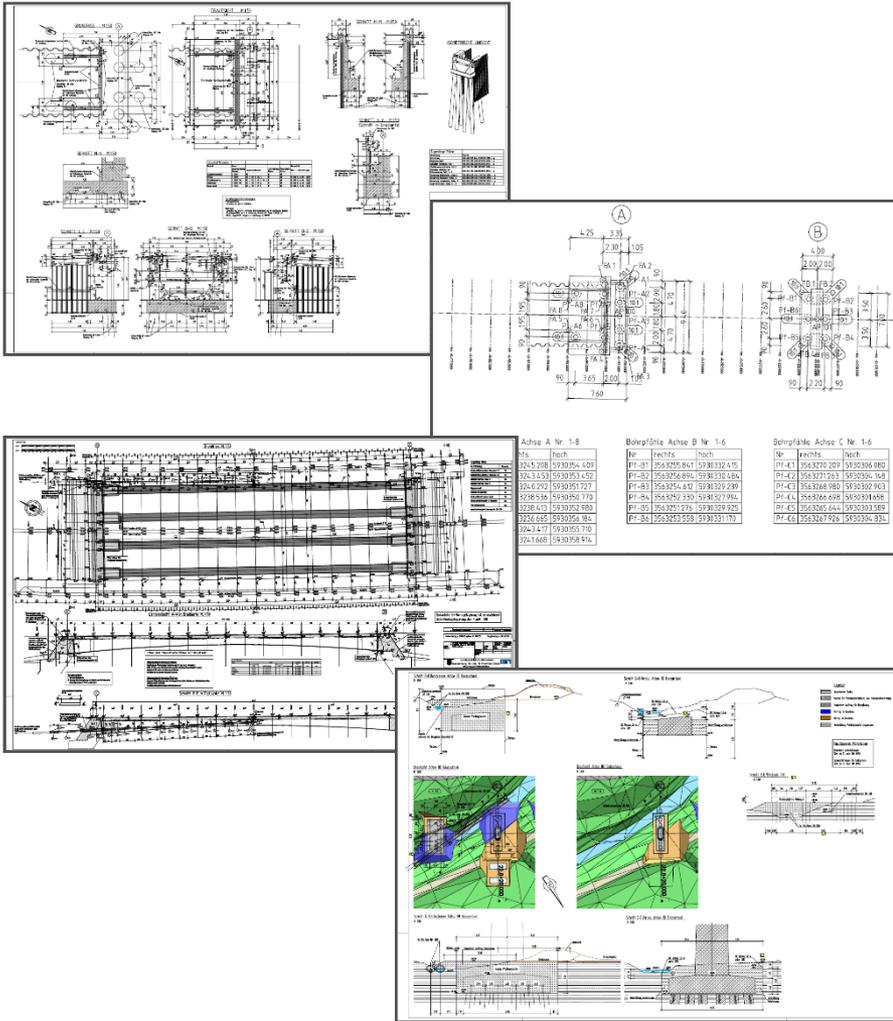
Starting with the cross section variant -> by using a DGM -> Visualization on-site in Google Earth



Visualization of individual variants, cost estimate, variant matrix in model with an integrative process

100% design

Construction of the structure-> digital site model-> Cut or dam-> structural clearance review-> drawing creation

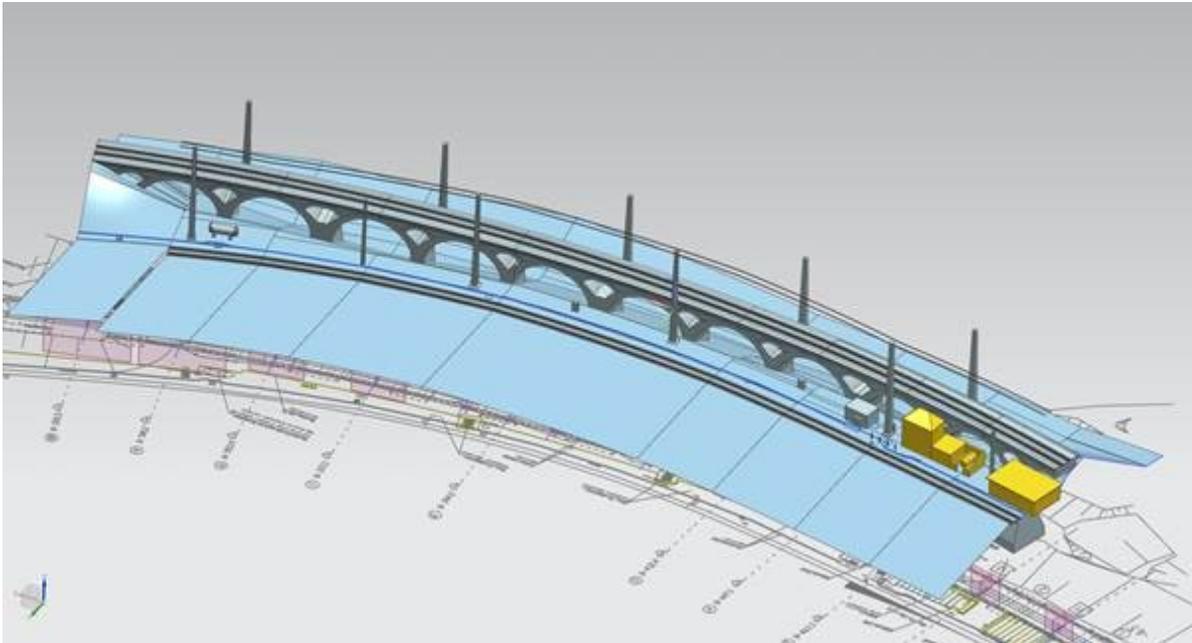


Construction substitute planning-> construction plans all in one model with an integrative process



EXCURSION RETROFIT PROJECTS

Challenges. Solutions. Experience.

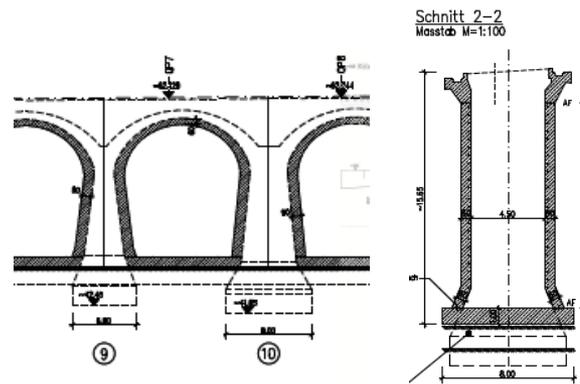


EÜ vault row Innere Kanalstraße

DB-route 2630 Köln Hbf. main station.-Koblenz-Bingen (Rhein) Hbf. main station

Production of 10 flat founded reinforced concrete arch shells-separated from each other via expansion joints.

By means of the selected solution of a surface foundation the existing support structure is put into operation through longitudinal forces via the “rigid compression” in longitudinal track direction.



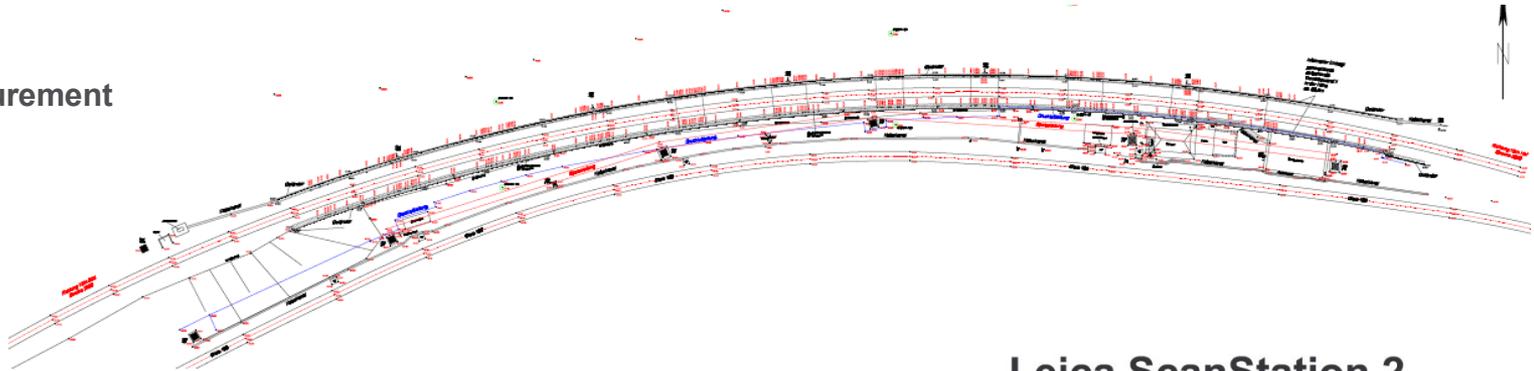
The individual “arches“ are independent for themselves as well as stable in their portfolio structure.

3D Scan extension of the support structure

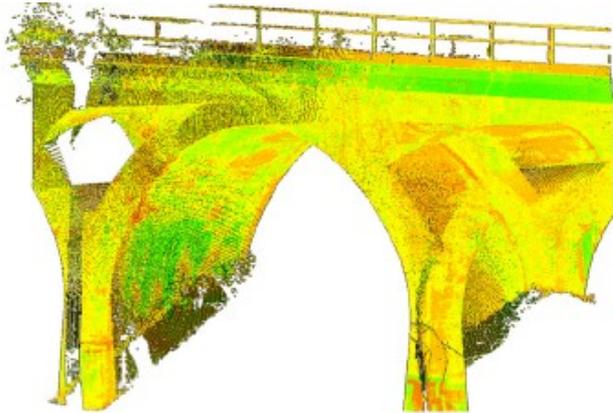
3D Planning of the new vaults
Discharge of the sound planning form a 3D model

Geometry taking

Measurement



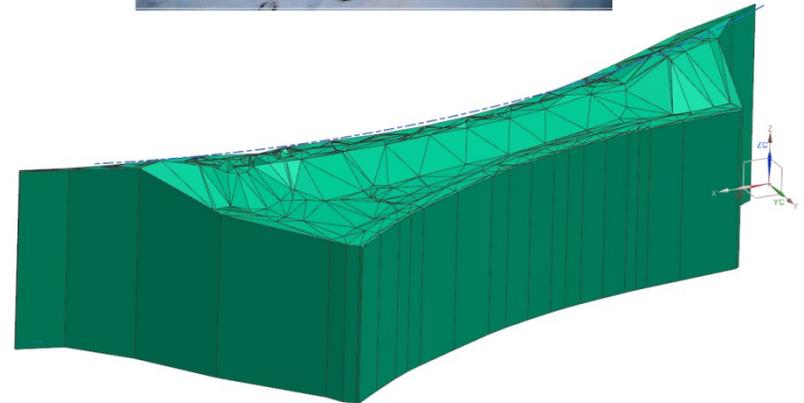
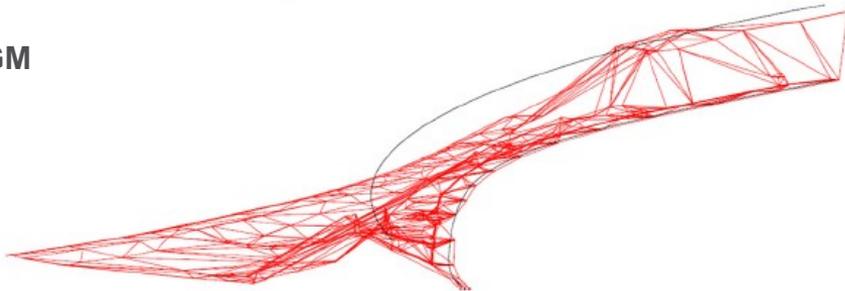
3D Scan

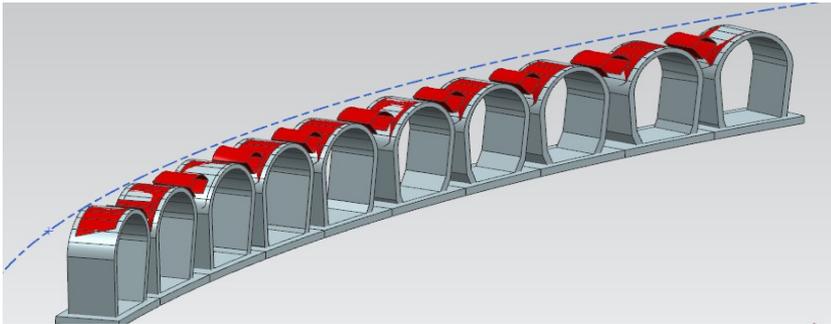


Leica ScanStation 2

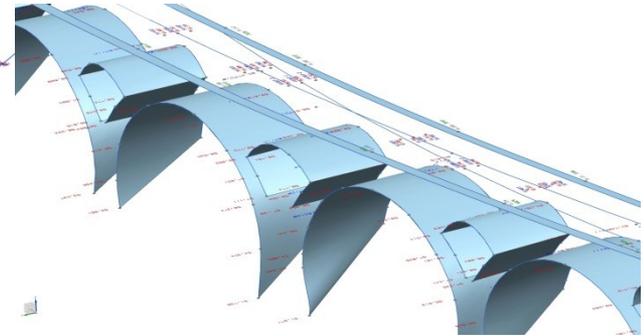


DGM

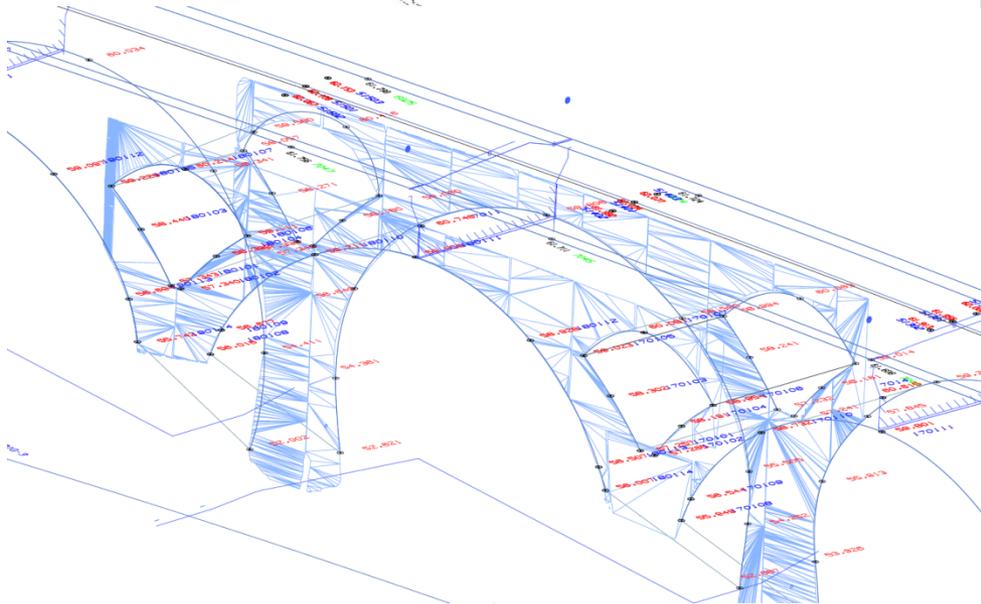




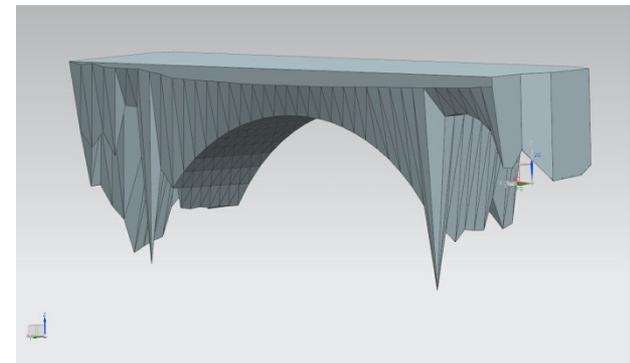
Comparison (read) portfolio tp new building

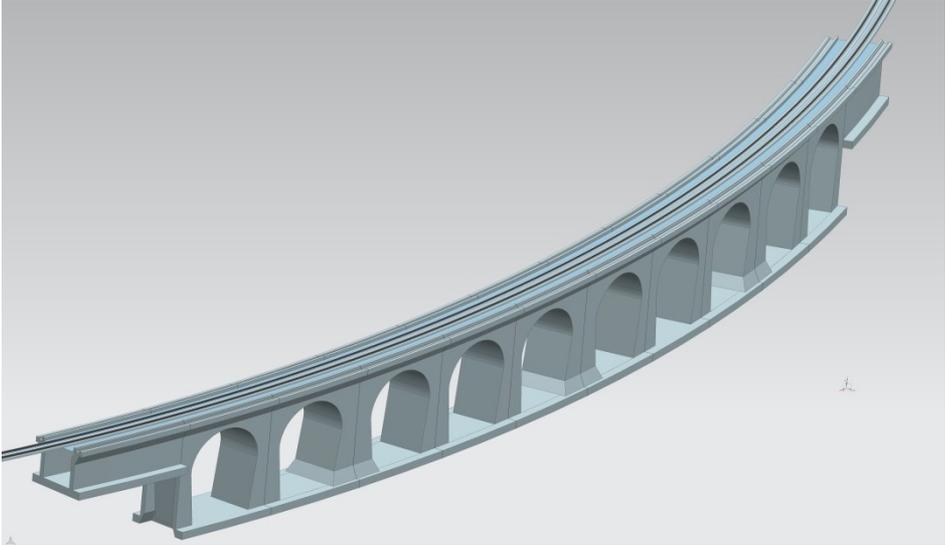


Result: measurement portfolio vault

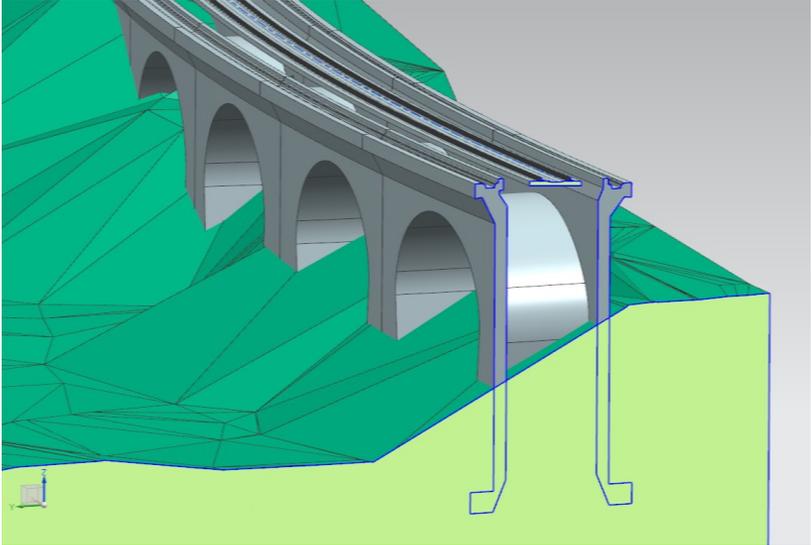


Comparison 3D Scan with measurements

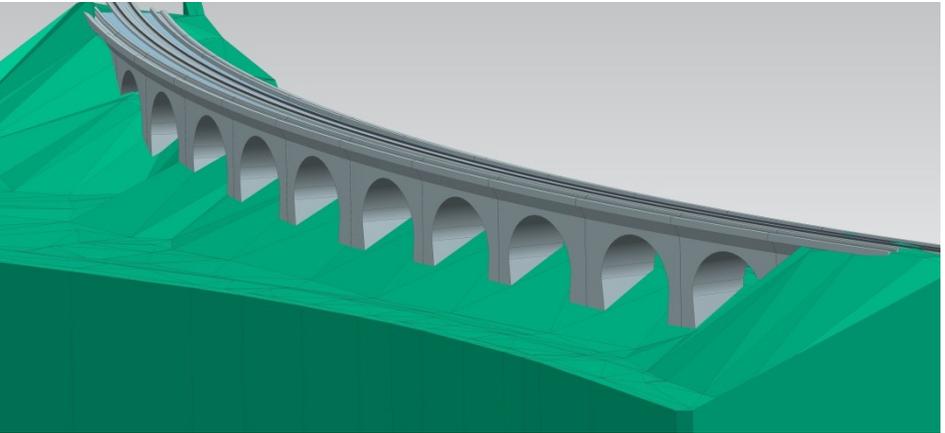




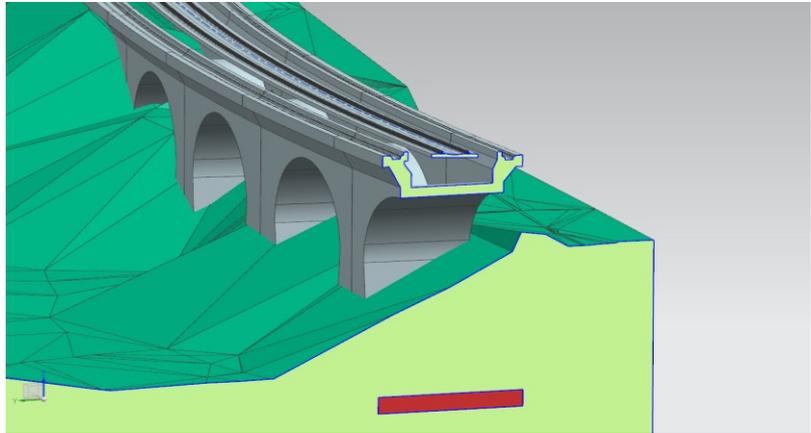
3D model of new bridge construction



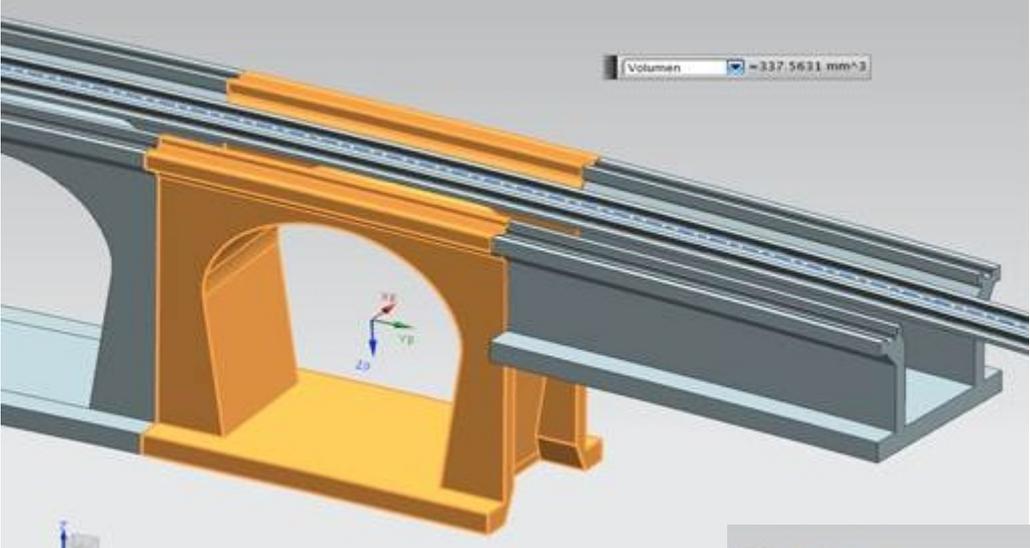
3D model cross section of expansion joint



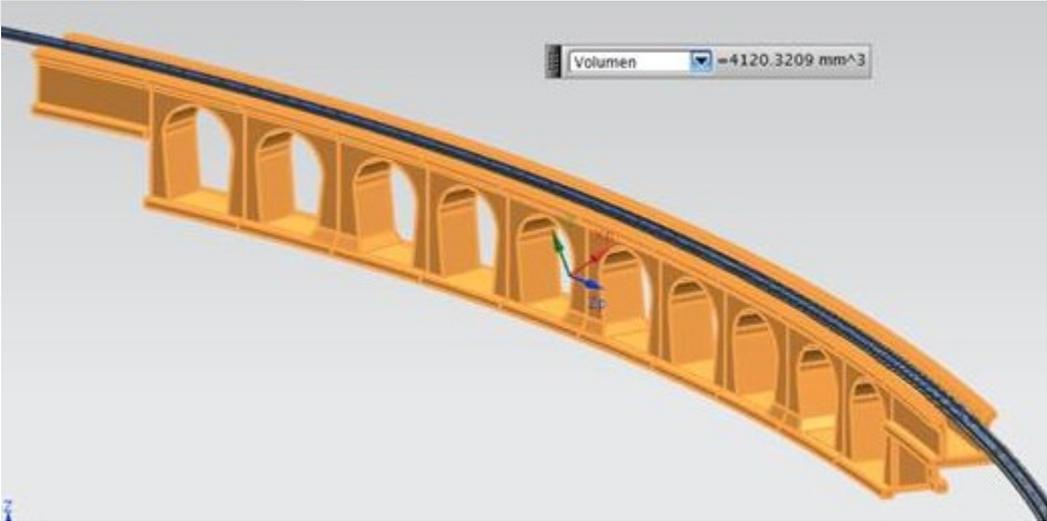
3D model of new bridge construction incl. DGM



3D model with cross section of center of the sheet



3D Model quantity survey arch12

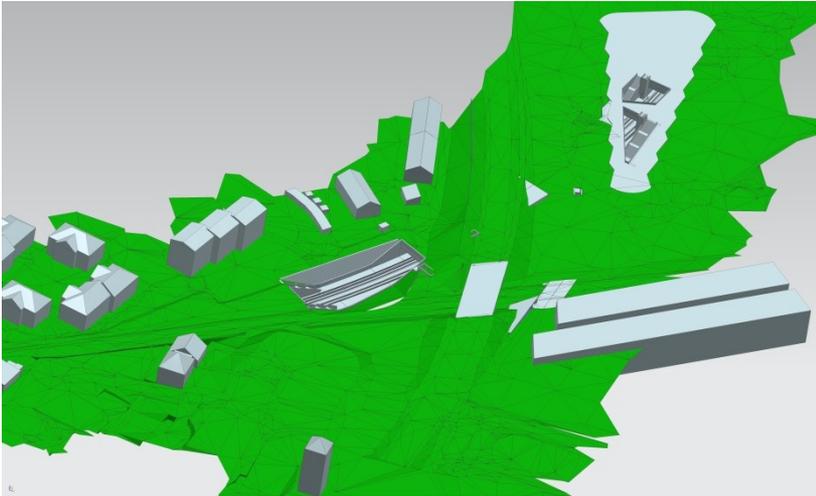


3D Modell quantity survey of overall bridge construction

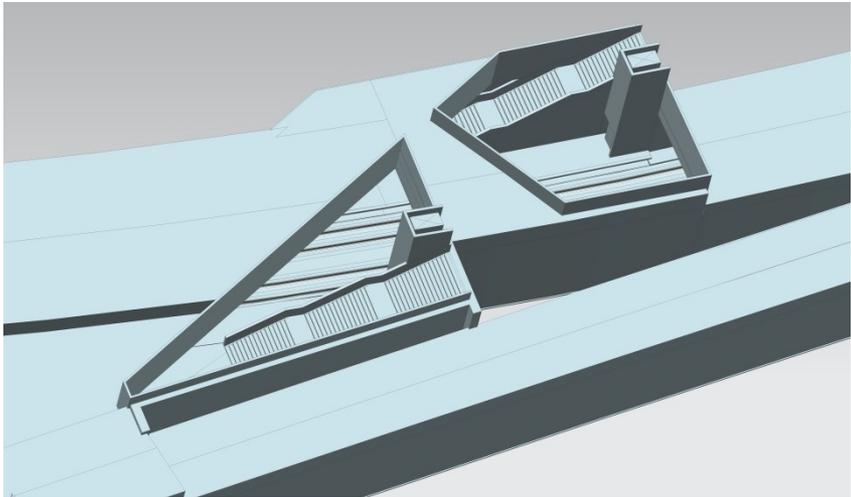


FROM LINE TO STATION

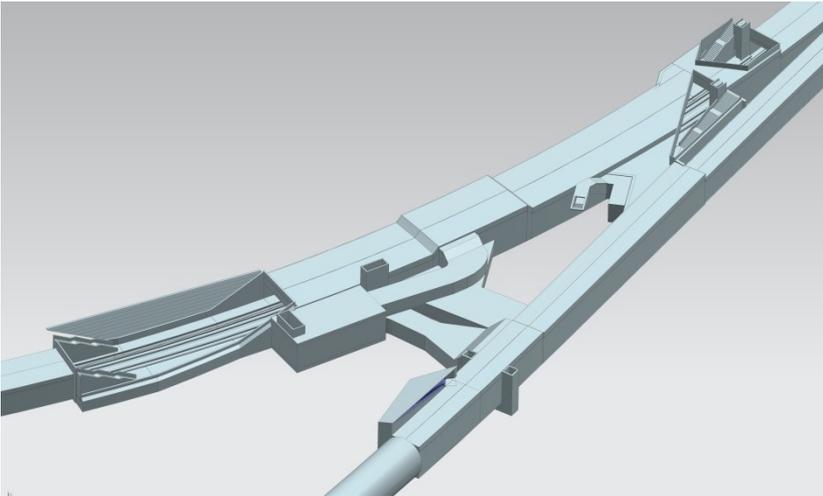
Challenges. Solutions. Experience.



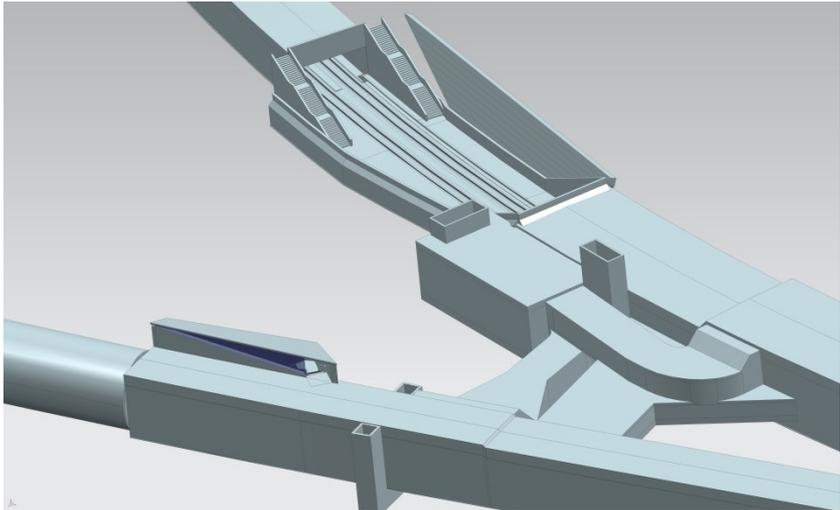
Station without building development and DGM



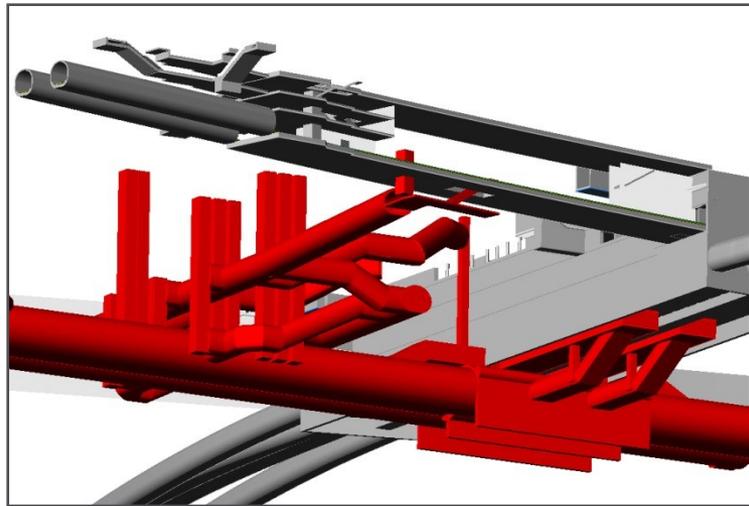
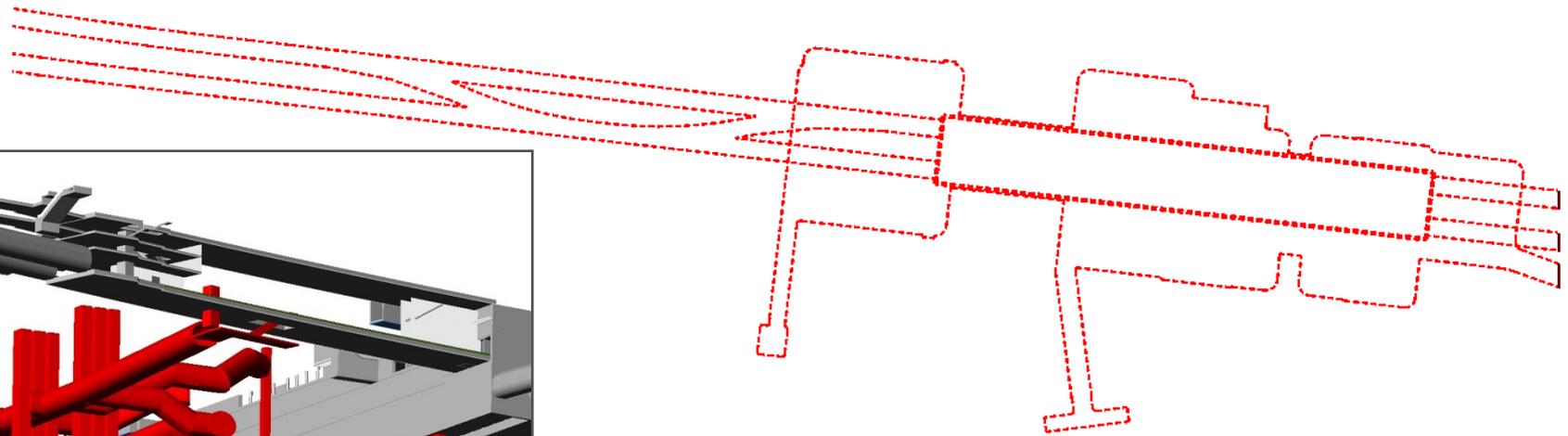
Detail access 1



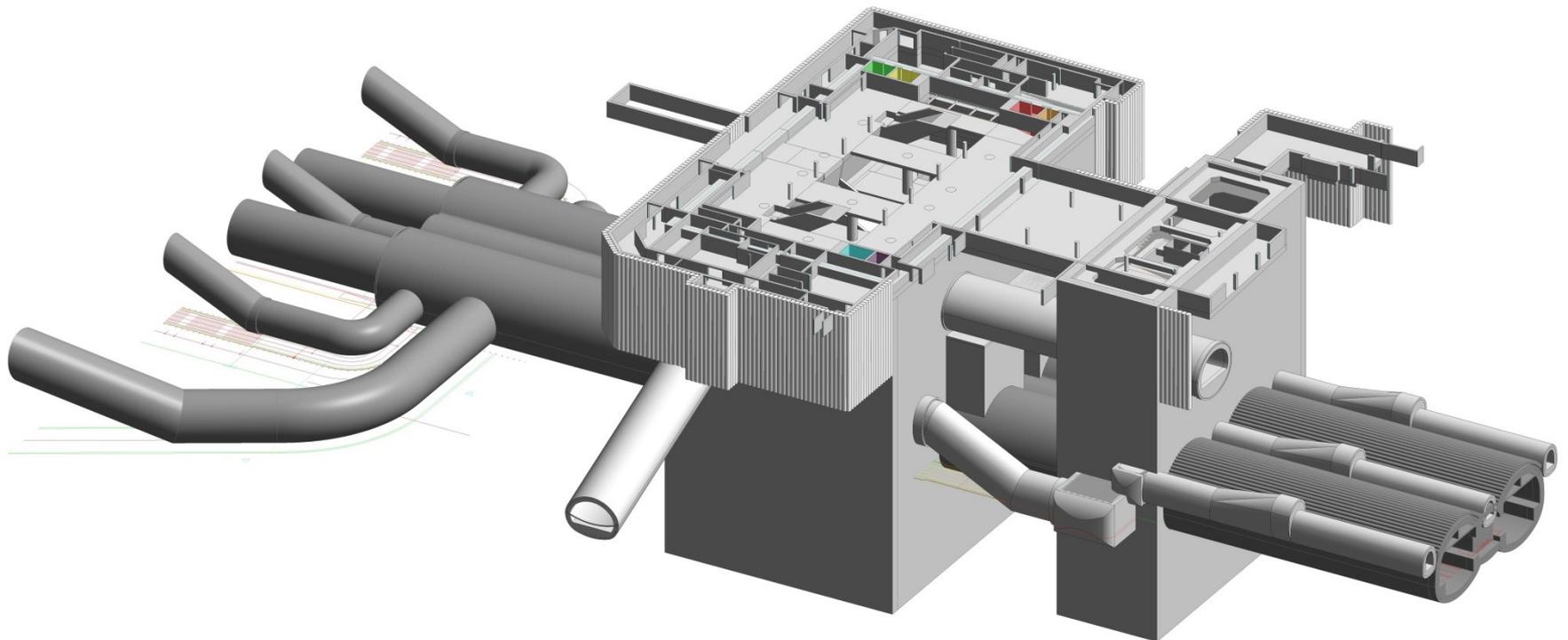
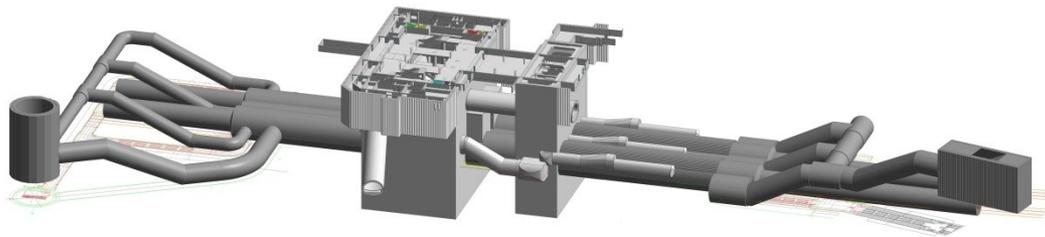
Station with previous building development and DGM



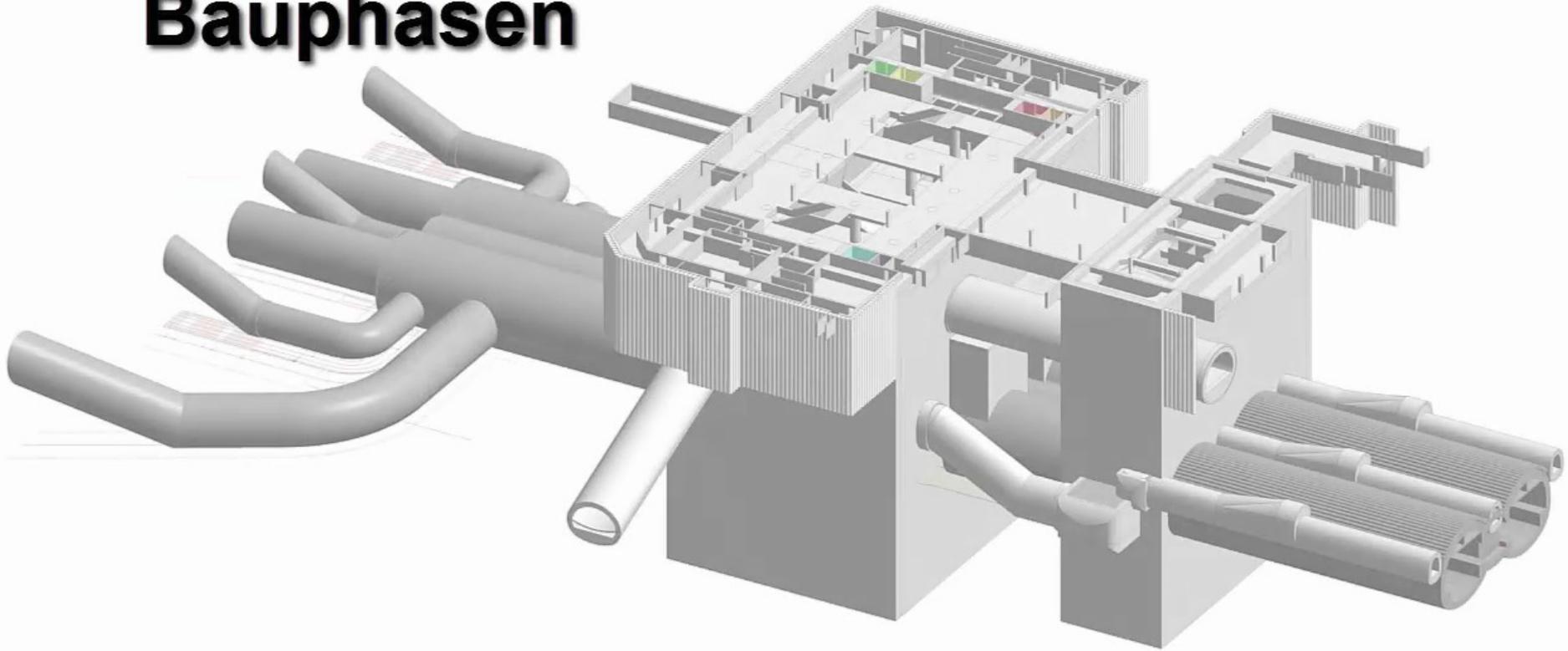
Detail access 2



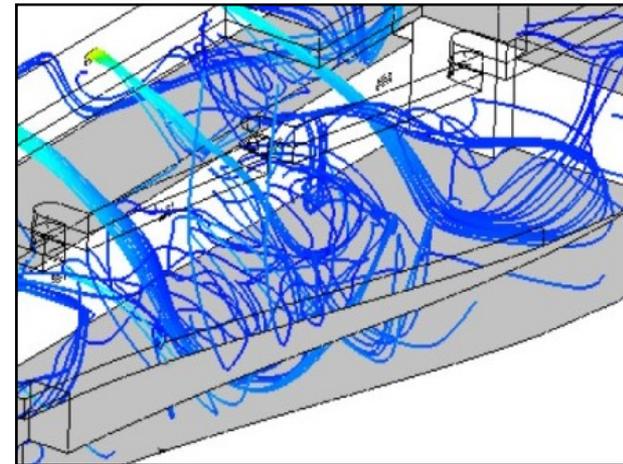
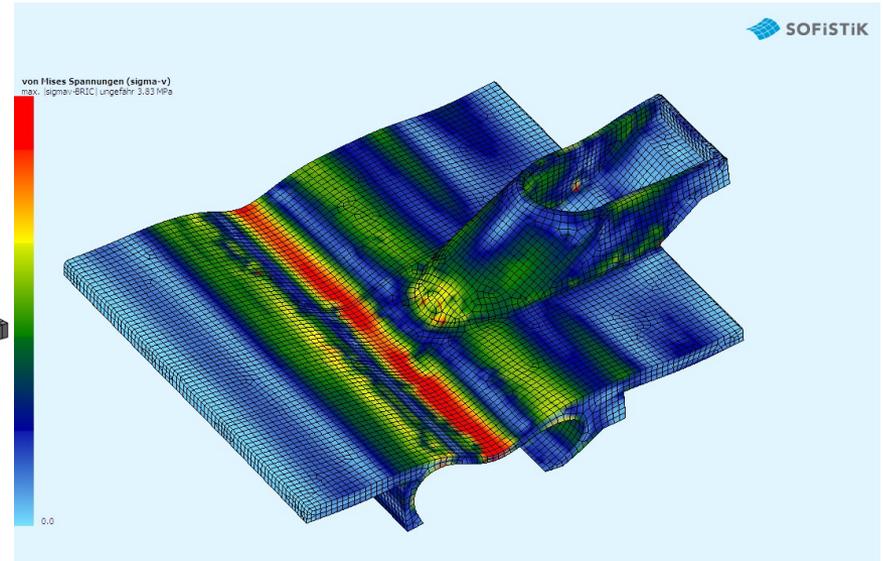
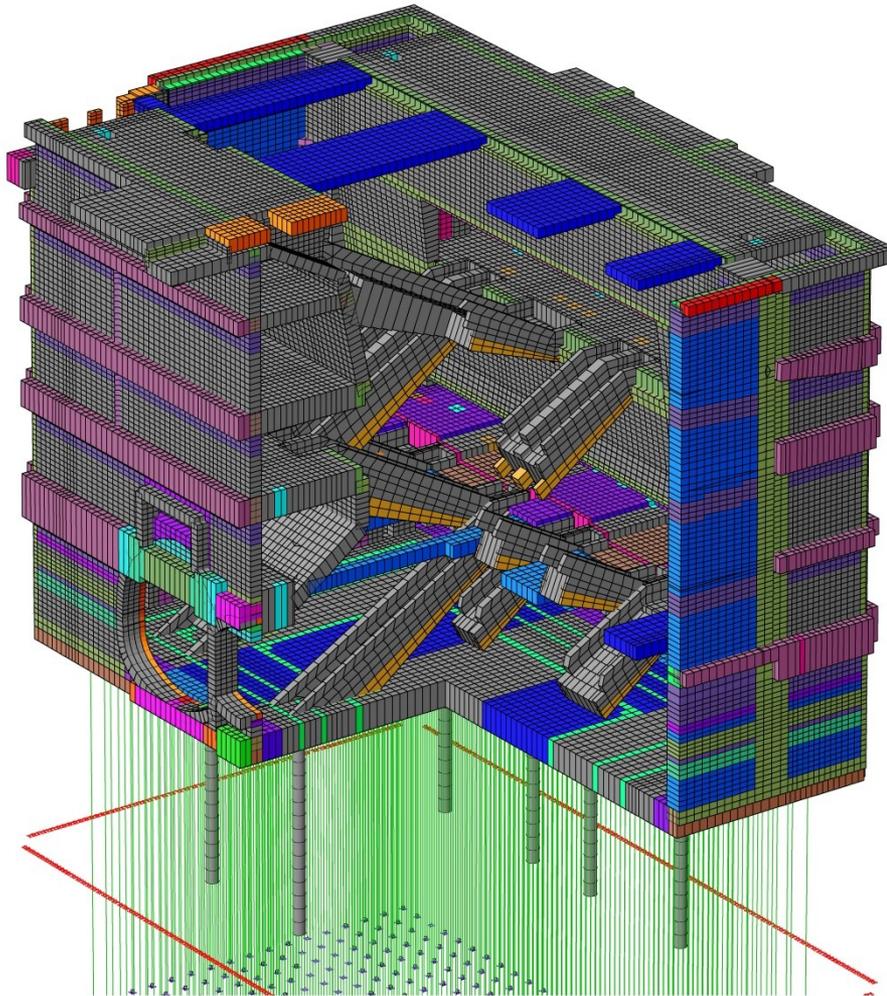
STATION (REVIT)



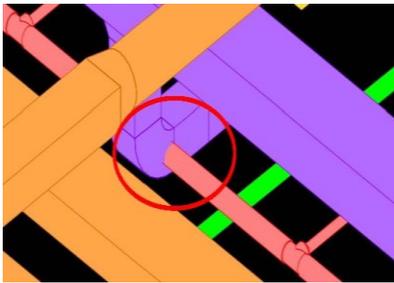
Hauptbahnhof Bauphasen



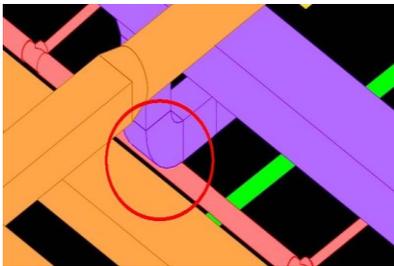
Construction Course Simulation



CLASH DETECTION



vorher



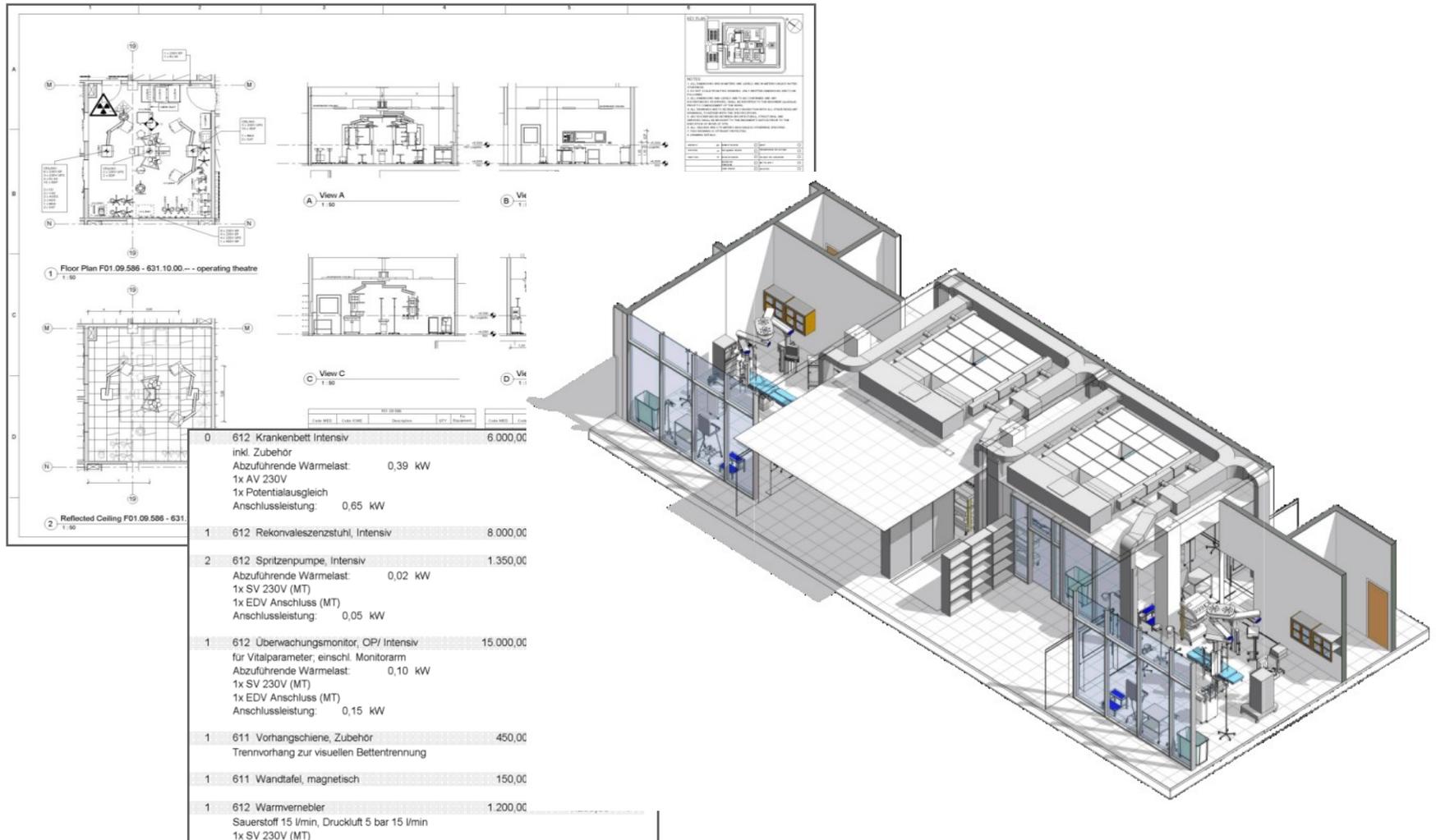
nachher



- Geometrical coordination during the planning process
- Software supports to handle critical interfaces = “collision test“
- Collision solution for all trades
- Harmonization in the future maintenance and in operation – revision openings (geometrical) and downtimes (facility management)
- **Testing collision solution/ coordination process**

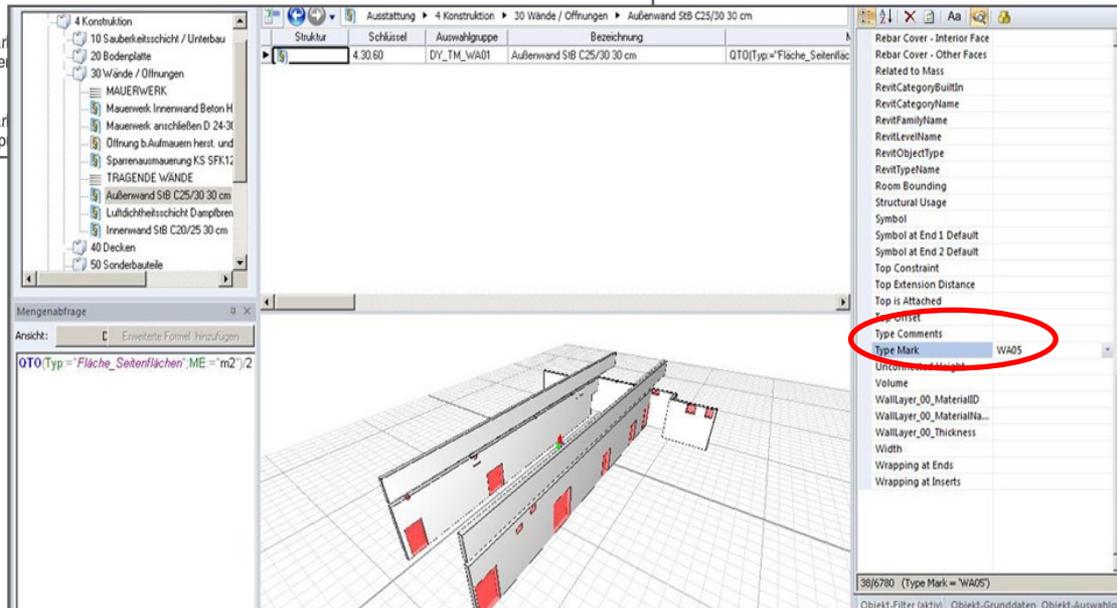
CLASH DETECTION MATRIX		ARC	STR	MECHANICAL																PLUMBING					ELEC	MED							
		Special walls (fire, lead, MRI cage, cold room), Suspended Ceiling	All structural elements	Chilled water pipework 100mm or above	Chilled water pipework below 100mm above	Heating pipework	Refrigerant pipework above 20mm	Fuel pipework above 25mm	Medical gas pipework above 20mm	Supply ductwork	Return air ductwork	Extract ductwork	Exhaust flues	Fan coil units	Extract fans	Air handling units	Air Tube Pipework and equipment	Sprinkler pipework 100mm or above	Sprinkler pipework below 100mm and wet risers	Domestic hot and cold water pipework	Irrigation pipework above 20mm	Rainwater pipework above 20mm	Cable tray above 100mm	Cable trunking above 100mm	Special control panels / distribution boards	Ceiling mounted Elements (Service lights, exhaust canopies incl							
ARCHITECTURE	01	Architectural Elements	no CR																														
	02	Special walls (fire, lead, MRI cage, cold room)	n																														
	03	Suspended Ceiling	CR01	no CR																													
STRUCTURAL	04	Structural Elements	CR01	CR02	CR05	CR09																											
	05	All structural elements	001-c	002-c																													
MECHANICAL	06	Chilled water pipework 100mm or above	003-b	017-b	047-b																												
	07	Chilled water pipework below 100mm above 20mm	004-c	018-c	048-c	071-b																											
	08	Heating Pipework	005-b	019-b	049-b	072-b	084-c																										
	09	Refrigerant Pipework	006-b	n	050-c	073-c	n	n																									
	10	Refrigerant pipework above 20mm	007-c	029-c	051-b	074-c	085-c	083-b	n																								
	11	Fuel	007-c	029-c	051-b	074-c	085-c	083-b	n																								
	12	Fuel pipework above 25mm	007-c	029-c	051-b	074-c	085-c	083-b	n																								
	13	Medical Gas	008-b	021-c	052-b	075-c	086-c	084-c	n	n																							
	14	Medical gas pipework above 20mm	008-b	021-c	052-b	075-c	086-c	084-c	n	n																							
	15	Ventilation	008-b	022-b	053-a	076-a	087-b	095-a	102-a	107-b	115-a																						
	16	Supply ductwork	010-b	023-b	054-a	077-a	088-b	096-a	103-a	108-b	116-a	123-a																					
	17	Return air ductwork	011-b	024-b	055-a	078-a	089-b	097-a	104-b	109-b	117-a	124-a	129-a																				
	18	Extract ductwork	012-b	025-b	056-a	079-a	090-b	098-a	105-b	110-b	118-a	125-a	130-a	134-a																			
	19	Exhaust flues	013-c	026-c	057-a	080-b	n	089-a	n	111-b	119-a	126-a	131-a	135-a	138-a																		
	20	Equipment	014-c	027-c	058-a	081-b	091-b	100-a	n	112-b	120-a	127-a	132-a	136-a	139-a	141-b																	
	21	Fan coil units	015-c	n	n	082-a	n	n	n	113-b	121-a	n	n	n	142-c	144-c																	
	22	Extract fans	015-c	n	n	082-a	n	n	n	113-b	121-a	n	n	n	142-c	144-c																	
23	Air handling units	016-b	028-b	059-b	083-b	092-c	101-c	106-c	114-c	122-b	128-b	133-b	137-b	140-b	143-b	145-c	146-c																
24	Air Tube Conveyance	CR03	CR06	CR06	CR10																												
25	Air Tube Pipework and equipment	016-b	028-b	059-b	083-b	092-c	101-c	106-c	114-c	122-b	128-b	133-b	137-b	140-b	143-b	145-c	146-c																
PLUMBING	26	Sprinkler / Fire Fighting Pipework	CR03	CR06	CR06	CR10																											
	27	Sprinkler pipework 100mm or above	029-b	036-b	060-a	147-a	154-b	160-a	167-a	173-b	178-b	185-b	192-b	199-b	206-b	212-b	218-b	224-b	230-b														
	28	Sprinkler pipework below 100mm and above 20mm	030-c	n	061-b	148-c	n	161-c	n	n	186-c	193-c	200-c	n	n	n	n	n	n														
	29	Dry risers and wet risers	031-b	037-c	062-a	149-b	155-c	162-a	168-c	174-c	180-b	187-b	194-b	201-b	207-c	213-b	219-b	225-b	231-b	283-b	n												
	30	Domestic water	032-a	038-b	063-a	150-a	156-c	163-a	169-c	175-c	181-b	188-a	195-b	202-b	208-c	214-b	220-b	226-b	232-b	284-a	289-b	292-a											
	31	Domestic hot and cold water pipework	032-a	038-b	063-a	150-a	156-c	163-a	169-c	175-c	181-b	188-a	195-b	202-b	208-c	214-b	220-b	226-b	232-b	284-a	289-b	292-a											
	32	Irrigation	033-c	039-c	064-a	151-b	157-c	164-a	170-c	176-c	182-b	189-a	196-b	203-b	209-c	215-b	221-b	227-b	233-b	285-a	289-b	293-a	296-b										
	33	Irrigation pipework above 20mm	033-c	039-c	064-a	151-b	157-c	164-a	170-c	176-c	182-b	189-a	196-b	203-b	209-c	215-b	221-b	227-b	233-b	285-a	289-b	293-a	296-b										
	34	Rainwater Pipework	034-c	040-c	065-a	152-b	158-c	165-a	171-c	177-c	183-b	190-a	197-b	204-b	210-c	216-b	222-b	228-b	234-b	286-a	290-b	294-a	297-b	299-b									
	35	Rainwater pipework above 50mm	034-c	040-c	065-a	152-b	158-c	165-a	171-c	177-c	183-b	190-a	197-b	204-b	210-c	216-b	222-b	228-b	234-b	286-a	290-b	294-a	297-b	299-b									
ELECTRICAL	36	Plumbing	035-c	041-c	066-a	153-b	159-c	166-a	172-c	178-c	184-b	191-b	198-b	205-b	211-b	217-b	223-b	229-b	235-b	287-a	291-a	295-a	298-b	300-b	301-b								
	37	Plumbing pipework above 50mm	CR04	CR07	CR04	CR11																											
	38	Tray	042-c	045-c	067-a	156-b	162-c	168-c	174-c	180-b	186-b	192-b	198-b	204-b	210-c	216-b	222-b	228-b	234-b	288-a	292-a	296-a	300-b	301-b									
ELECTRICAL	39	Cable tray above 100mm	043-c	046-c	068-b	157-b	163-c	169-c	175-c	181-b	187-b	193-b	200-b	206-b	212-b	218-b	224-b	230-b	289-a	293-a	297-a	301-b	302-b										
	40	Trunking	043-c	046-c	068-b	157-b	163-c	169-c	175-c	181-b	187-b	193-b	200-b	206-b	212-b	218-b	224-b	230-b	289-a	293-a	297-a	301-b	302-b										
ELECTRICAL	41	Cable trunking above 100mm	043-c	046-c	068-b	157-b	163-c	169-c	175-c	181-b	187-b	193-b	200-b	206-b	212-b	218-b	224-b	230-b	289-a	293-a	297-a	301-b	302-b										
	42	Steel Wire Armoured (SWA) cables	044-c	n	069-b	158-b	164-c	170-c	176-c	182-b	188-b	194-b	201-b	207-c	213-b	219-b	225-b	231-b	283-b	n													
MEDICAL EQUIPMENT	43	Electrical control panels / distribution boards	044-c	n	069-b	158-b	164-c	170-c	176-c	182-b	188-b	194-b	201-b	207-c	213-b	219-b	225-b	231-b	283-b	n													
	44	Elements	no CR	CR08	CR12																												
45	Ceiling mounted Elements (Service pendants, exam lights, exhaust canopies incl lab + kitchen)	n	n	070-b	271-b	272-c	273-b	274-c	275-c	276-b	277-b	278-b	279-b	n	280-b	281-b	n	282-b	323-b	324-b	325-b	326-b	327-b	328-b	329-b	331-b	332-b	n					
COUNT		332																															

- Predefining the matrix and the criteria for collision testing
- Coordination of all trades
- Monitoring progress



Kurztext Leistungsverzeichnis							
Projekt:	19427	Kunduz Rettungszentrum					
LV:	1	OP Anbau an RZ Kunduz					
OZ	Leistungsbeschreibung	Menge	ME	Einheitspreis in EUR	Gesamtbetrag in EUR		
04.03.0020.	DIN276 Type Mark WA03 Nichttragende Innenwände Wand Mauerwerk 25 cm Mauerwerk anschließen D 24-30cm	342		24,775	m	9,20	227,93
04.03.0030.	DIN276 Type Mark 794 Öffnung b.Aufmauern herst. und überde..	344		1,000	St	77,29	77,29
04.03.0140.	DIN276 Type Mark WA05 Innenwand StB C20/25 30 cm	344		414,098	m2	125,20	51.845,07
04.03.0150.	DIN276 Type Mark Öffnungen						
08.01.0030.	DIN276 Type Mark Trockenp						

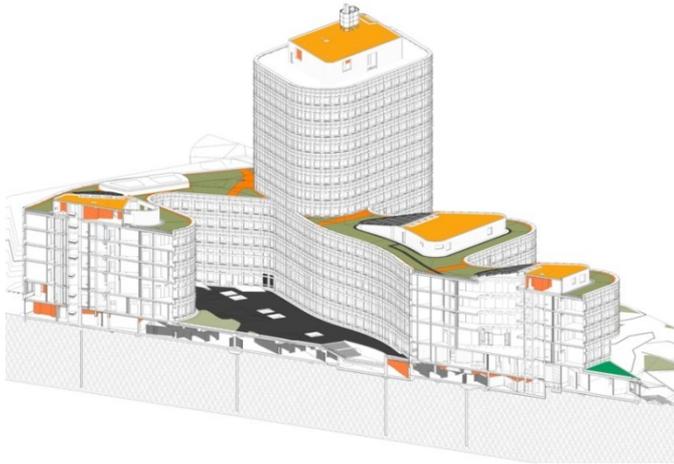
- Examining final design
- Direct connection of qualities and their characteristics
- Evaluation of tender documentation



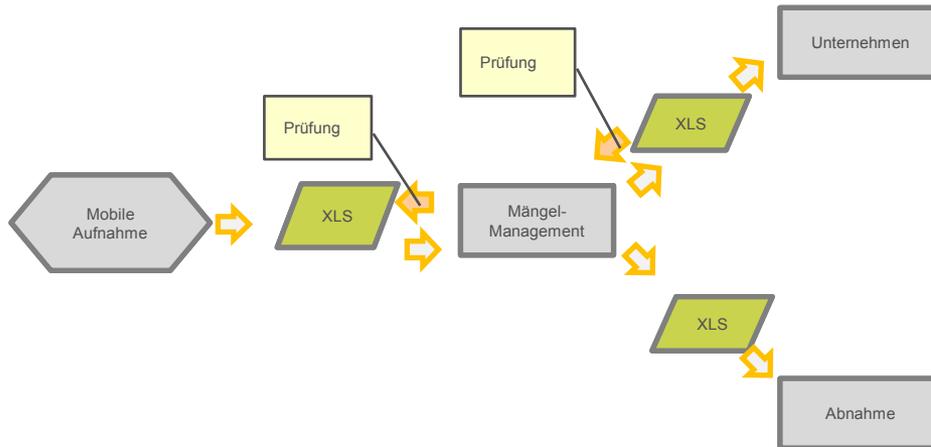


BIM AT THE BUILDING SITE

Challenges. Solutions. Experience.



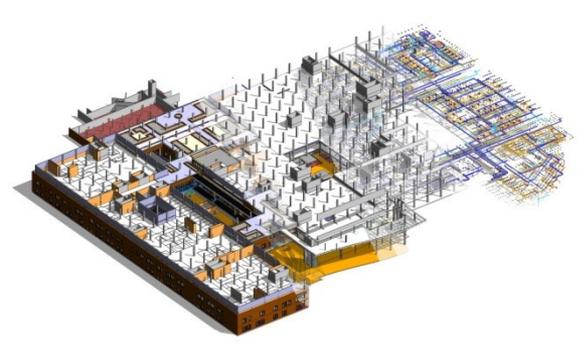
Mängelaufnahme auf der Baustelle, Tablet und OPB App



Defect Management Process



Analysis, evaluation



East Elevation photograph



QUESTIONS?

Challenges. Solutions. Experience.