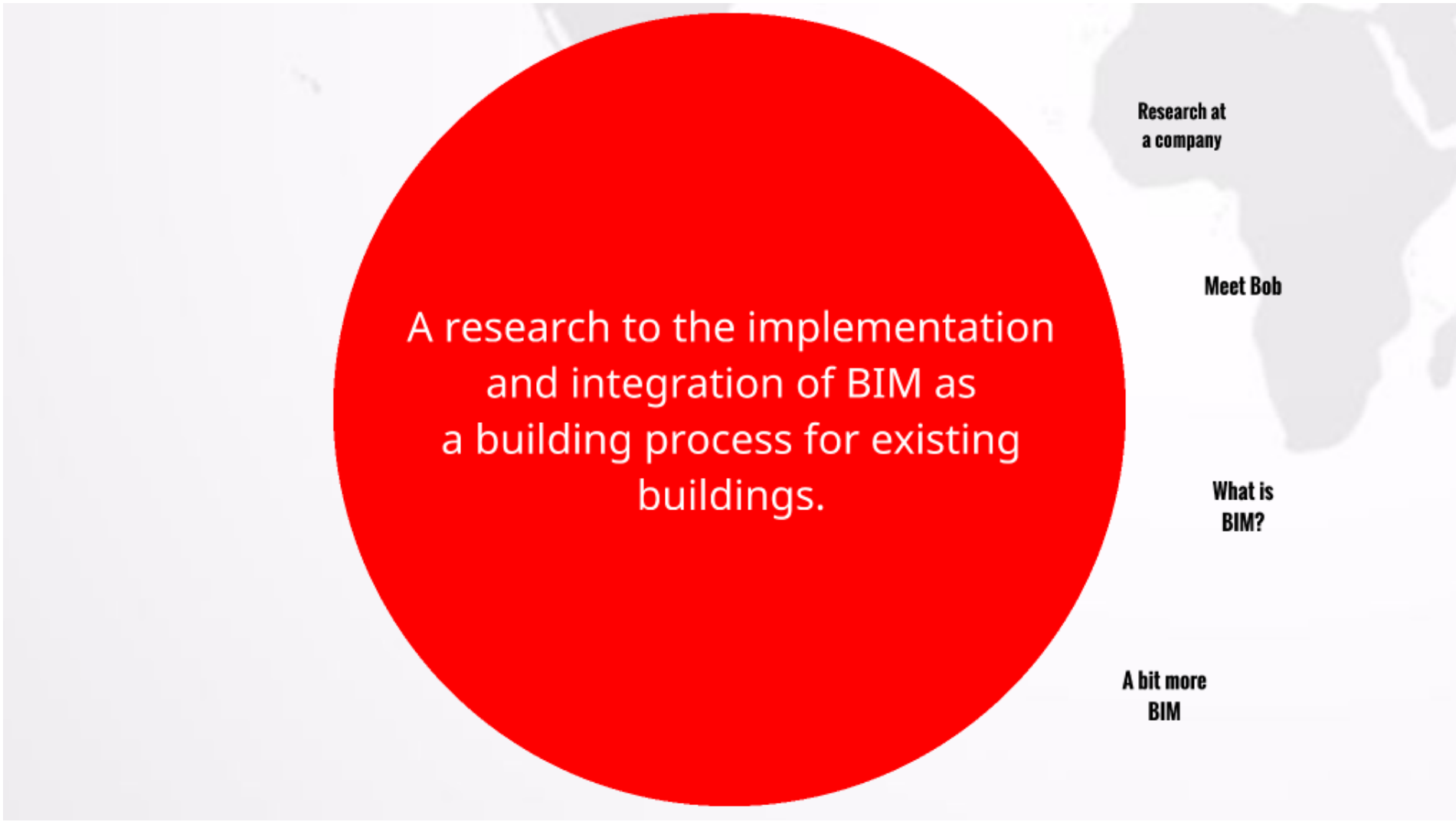
BIMplementation BIMtergration

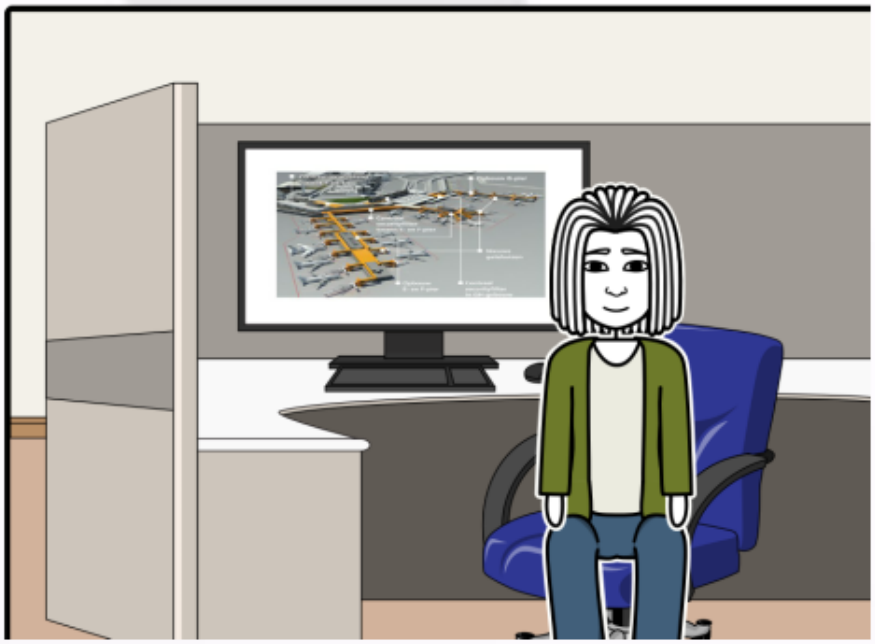
P5 Presentation
Paul J van Berkel


A research to the implementation and integration of BIM as a building process for existing buildings.
Research at a company
Meet Bob
What is BIM?
A bit more BIM

Research at a company

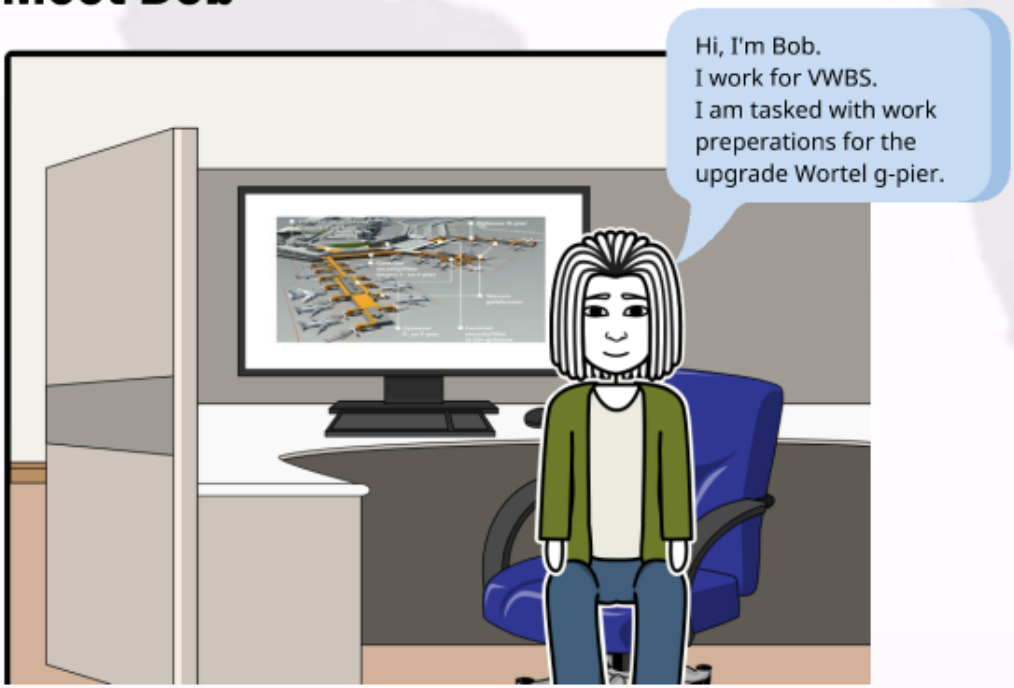
Fascination with airports
Largest building in the Netherland
Round the clock operation
VolkerWessels Bouw Schiphol
Upgrade Wortel g-pier

Meet Bob



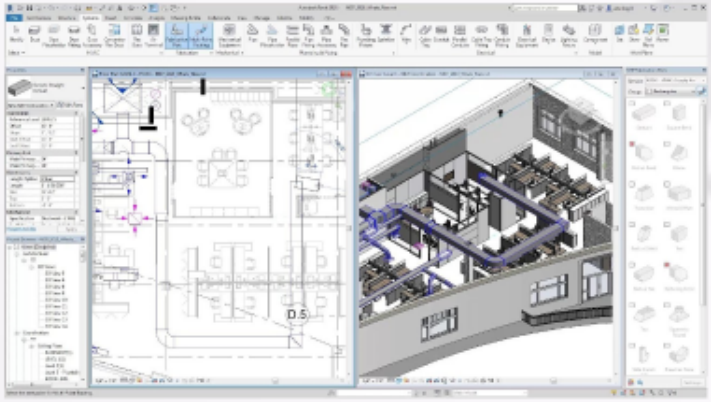
Meet Bob

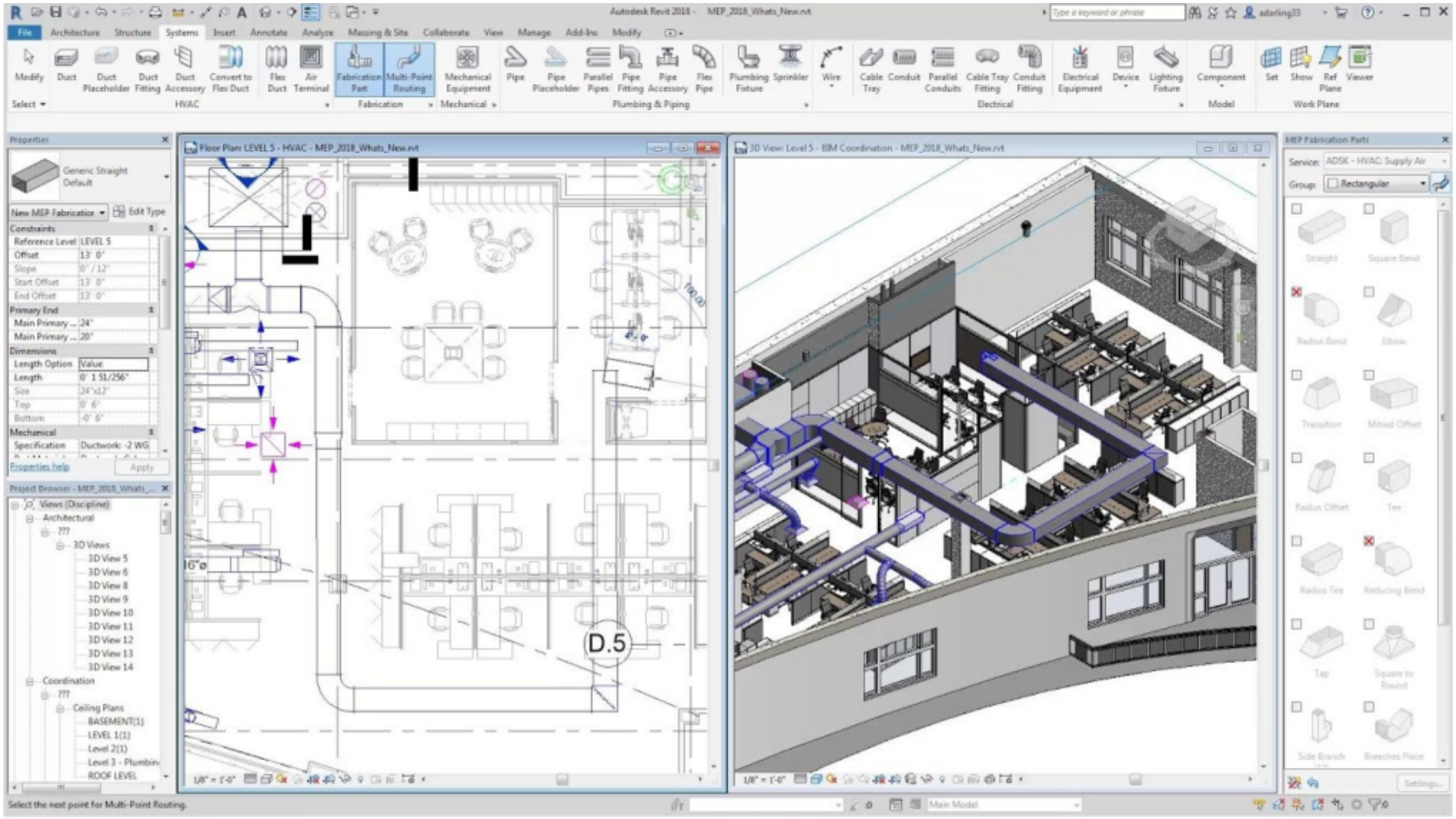
Meet Bob

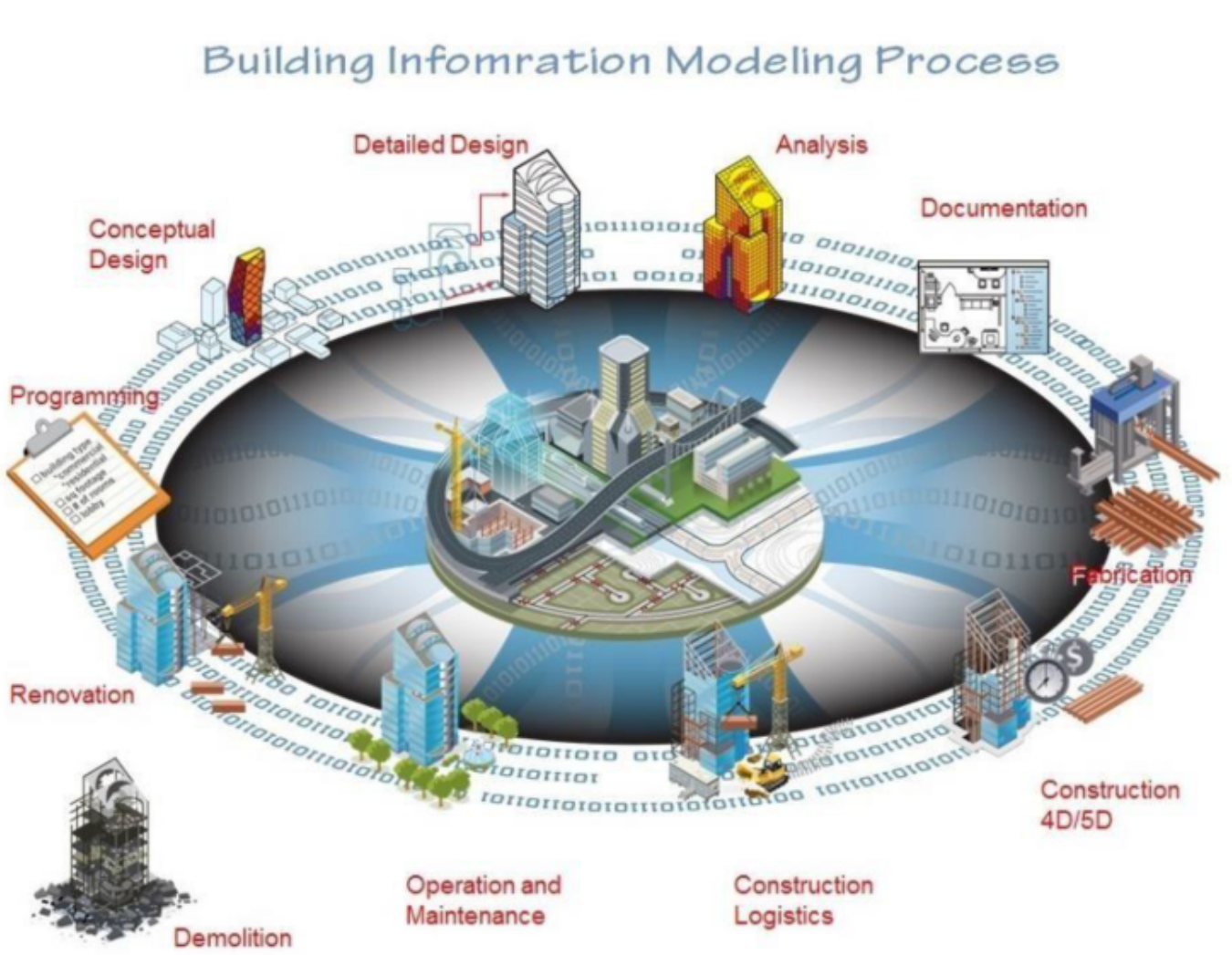

Hi, I'm Bob.
I work for VWBS.
I am tasked with work preperations for the upgrade Wortel g-pier.

What is BIM?

- Building Information Modeling
- Technology versus Social
- Modern method of project management




Autodesk Revit 2018 - MEP_2018_Whats_New.rvt
File
Architecture
Structure
Systems
Insert
Annotate
Analyze
Massing & Site
Collaborate
View
Manage
Add-Ins
Modify
Modify
Duct
Duct Placeholder
Duct Fitting
Duct Accessory
Convert to Flex Duct
Flex Duct
Air Terminal
Fabrication Part
Multi-Point Routing
Mechanical Equipment
Pipe
Pipe Placeholder
Parallel Pipes
Pipe Fitting
Pipe Accessory
Flex Pipe
Plumbing Fixture
Sprinkler
Wire
Cable Tray
Conduit
Parallel Conduits
Cable Tray Fitting
Conduit Fitting
Electrical Equipment
Device
Lighting Fixture
Component
Set
Show
Ref Plane
Viewer
HVAC
Fabrication
Mechanical
Plumbing & Piping
Electrical
Model
Work Plane
Properties
Generic Straight Default
New MEP Fabrication
Edit Type
Constraints
Reference Level LEVEL 5
Offset 13' 0"
Slope 0" / 12"
Start Offset 13' 0"
End Offset 13' 0"
Primary End
Main Primary ... 24"
Main Primary ... 20"
Dimensions
Length Option Value
Length 0' 1 51/256"
Size 24"x12"
Top 0' 6"
Bottom -0' 6"
Mechanical
Specification Ductwork: -2 WG
Properties help
Apply
Project Browser - MEP_2018_Whats_...
Views (Discipline)
Architectural
???
3D Views
3D View 5
3D View 6
3D View 8
3D View 9
3D View 10
3D View 11
3D View 12
3D View 13
3D View 14
Coordination
???
Ceiling Plans
BASEMENT(1)
LEVEL 1(1)
Level 2(1)
ROOF LEVEL
Floor Plan: LEVEL 5 - HVAC - MEP_2018_Whats_New.rvt
D.5
3D View: Level 5 - BIM Coordination - MEP_2018_Whats_New.rvt
MEP Fabrication Parts
Service: ADSK - HVAC: Supply Air
Group: Rectangular
Straight
Square Bend
Radius Bend
Elbow
Transition
Mitred Offset
Radius Offset
Tee
Radius Tee
Reducing Bend
Tap
Square to Round
Side Branch
Breeches Piece
Settings...
Select the next point for Multi-Point Routing.
Main Model


Building Infomration Modeling Process
Detailed Design
Analysis
Documentation
Conceptual Design
Programming
Fabrication
Renovation
Construction 4D/5D
Demolition
Operation and Maintenance
Construction Logistics

What is BIM?

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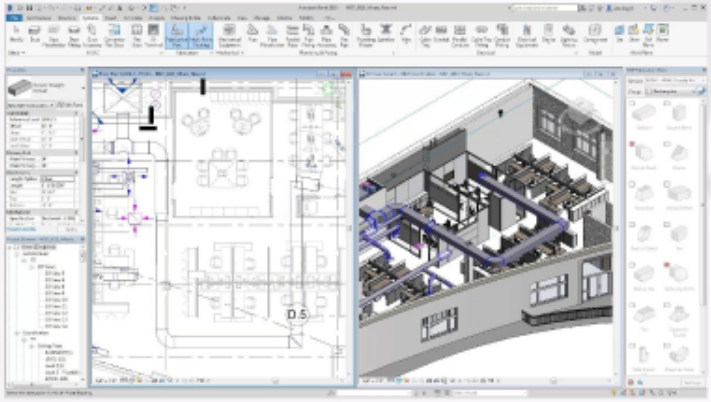
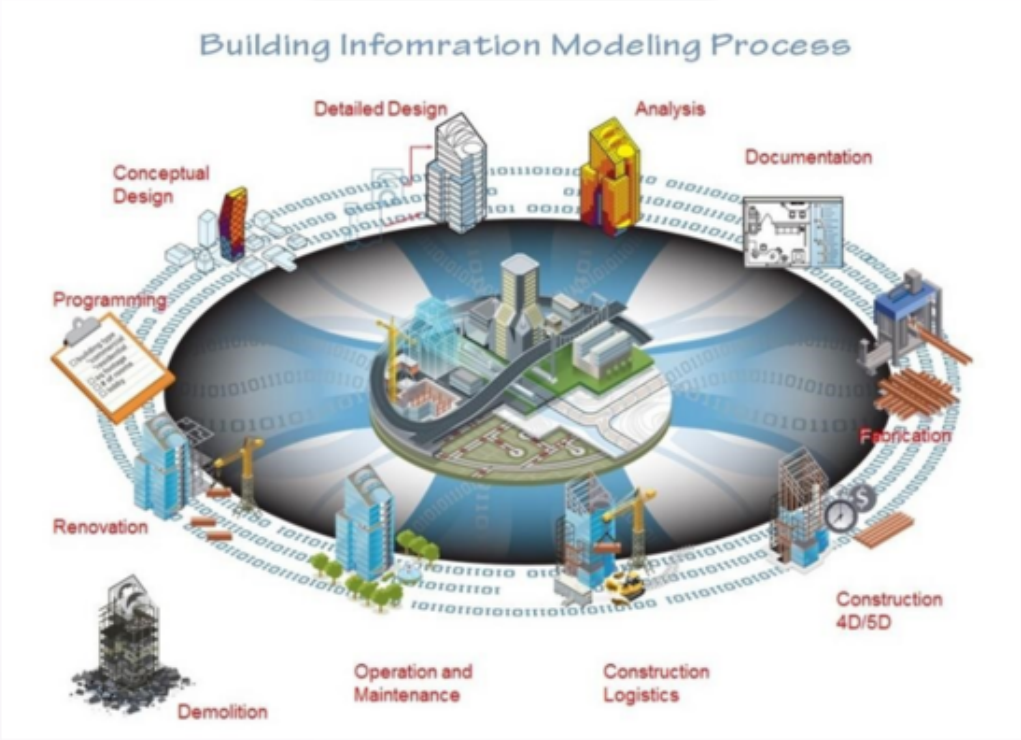
- Technology versus Social
- Modern method of project management



A bit more BIM

- Building Information Modeling (BIM) is **the process of creating and managing** 3D building data during its development. BIM is a complex **multiphase process** that gathers input from team members to model the components and tools that will be used during the construction process to create a unique perspective of the building process.

- The 3D process is aimed at achieving savings through **collaboration and visualization** of building components into an early design process that will dictate changes and modifications to the actual construction process. It is a very powerful tool that when used properly will **save money, time and simplify** the construction process.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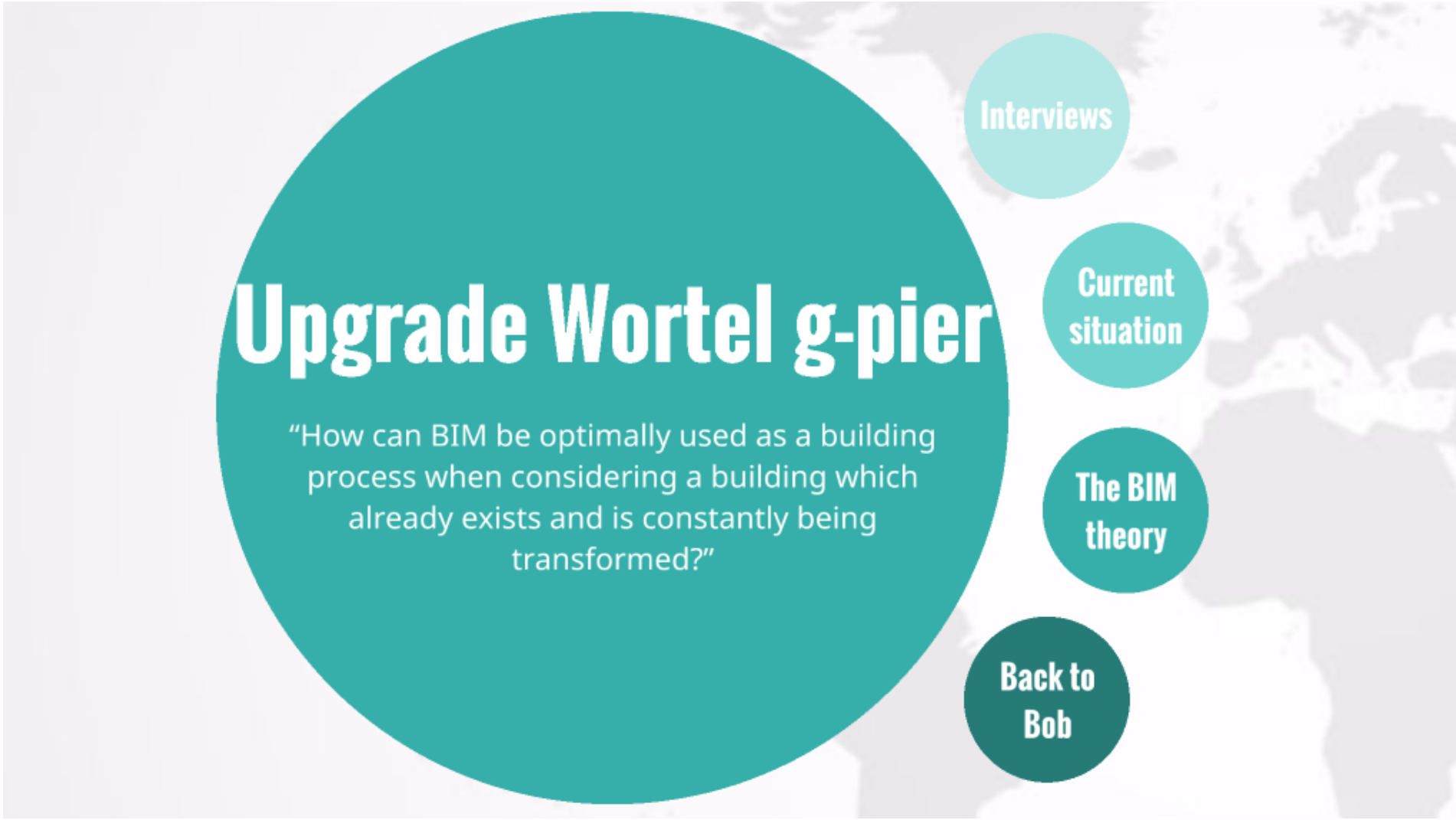
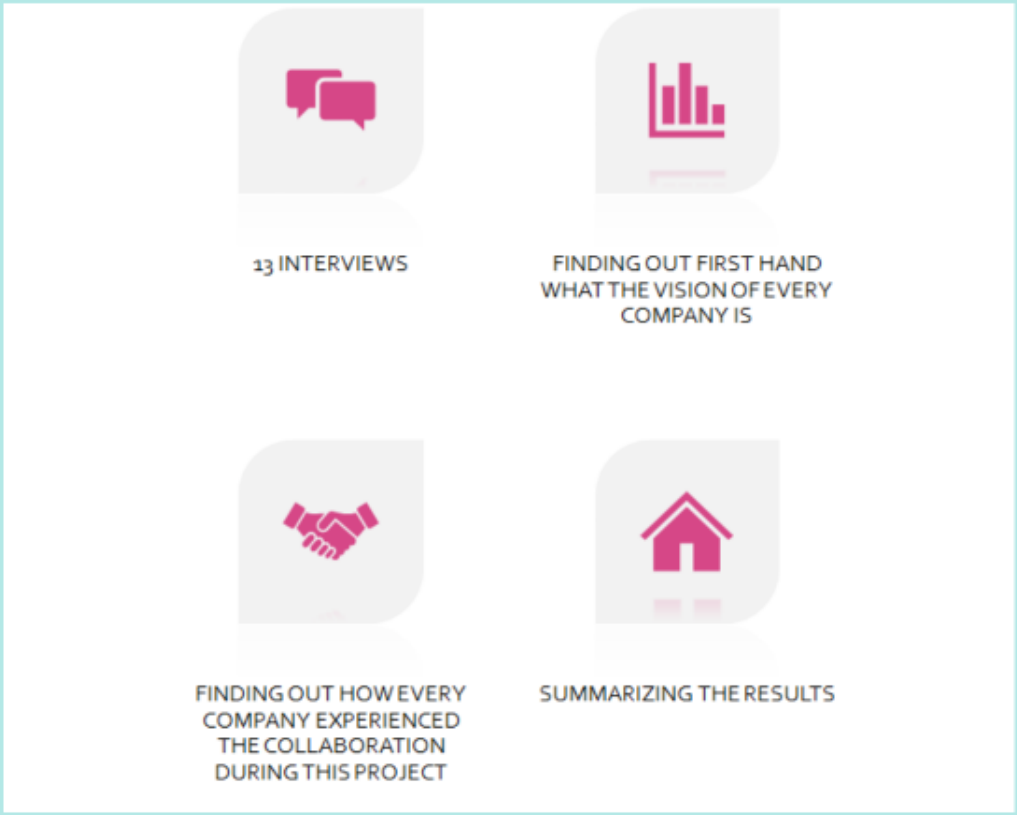

Upgrade Wortel g-pier
"How can BIM be optimally used as a building process when considering a building which already exists and is constantly being transformed?"
Interviews
Current situation
The BIM theory
Back to Bob

Interviews

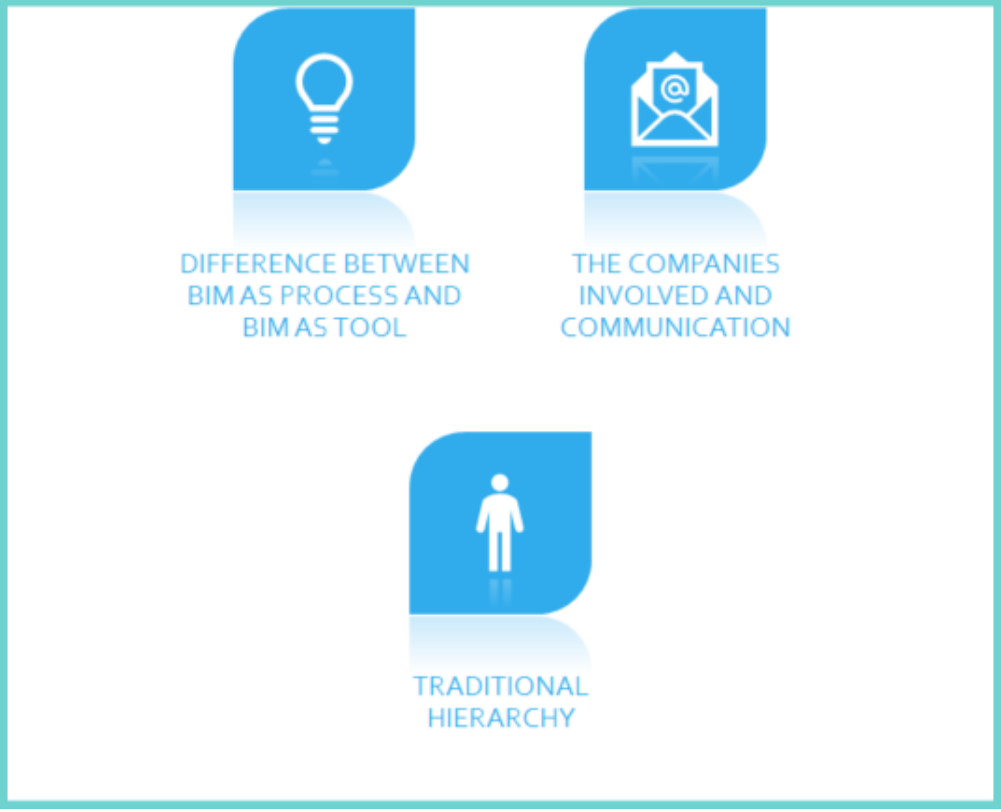

13 INTERVIEWS
FINDING OUT FIRST HAND WHAT THE VISION OF EVERY COMPANY IS
FINDING OUT HOW EVERY COMPANY EXPERIENCED THE COLLABORATION DURING THIS PROJECT
SUMMARIZING THE RESULTS

The interviewed companies

Company versus BIM

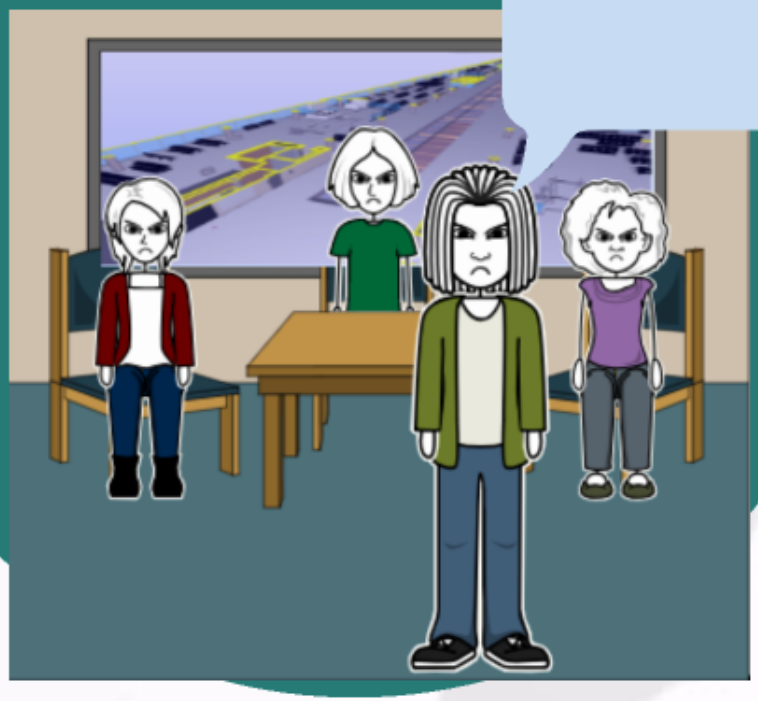
Company Name	Willingnes to work in a BIM environment	General BIM knowledge
Schiphol ASM	HIGH	HIGH
Schiphol Consumers	-	NONE
Schiphol Security	-	NONE
Schiphol Operations	-	NONE
PLuS	LOW	MEDIUM
BenthemCrouwell	LOW	HIGH
DEERNS	HIGH	HIGH
ABT	MEDIUM	HIGH
RHDHV	MEDIUM	HIGH
VWBS	HIGH	HIGH
ENGIE	MEDIUM	HIGH
BAM	LOW	MEDIUM
KONE	LOW	LOW

The current situation

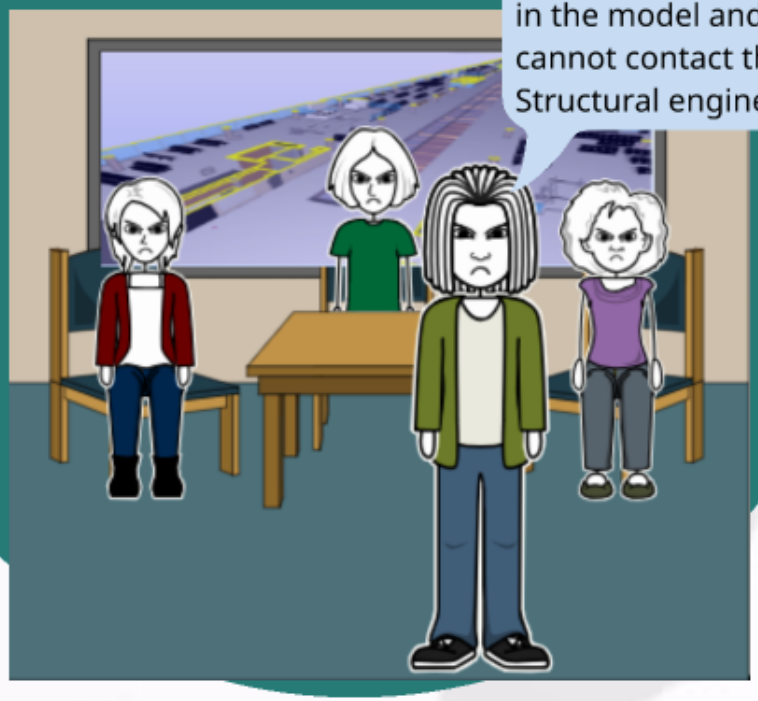


The BIM theory

Back to Bob



Back to Bob


There are problems in the model and I cannot contact the Structural engineer

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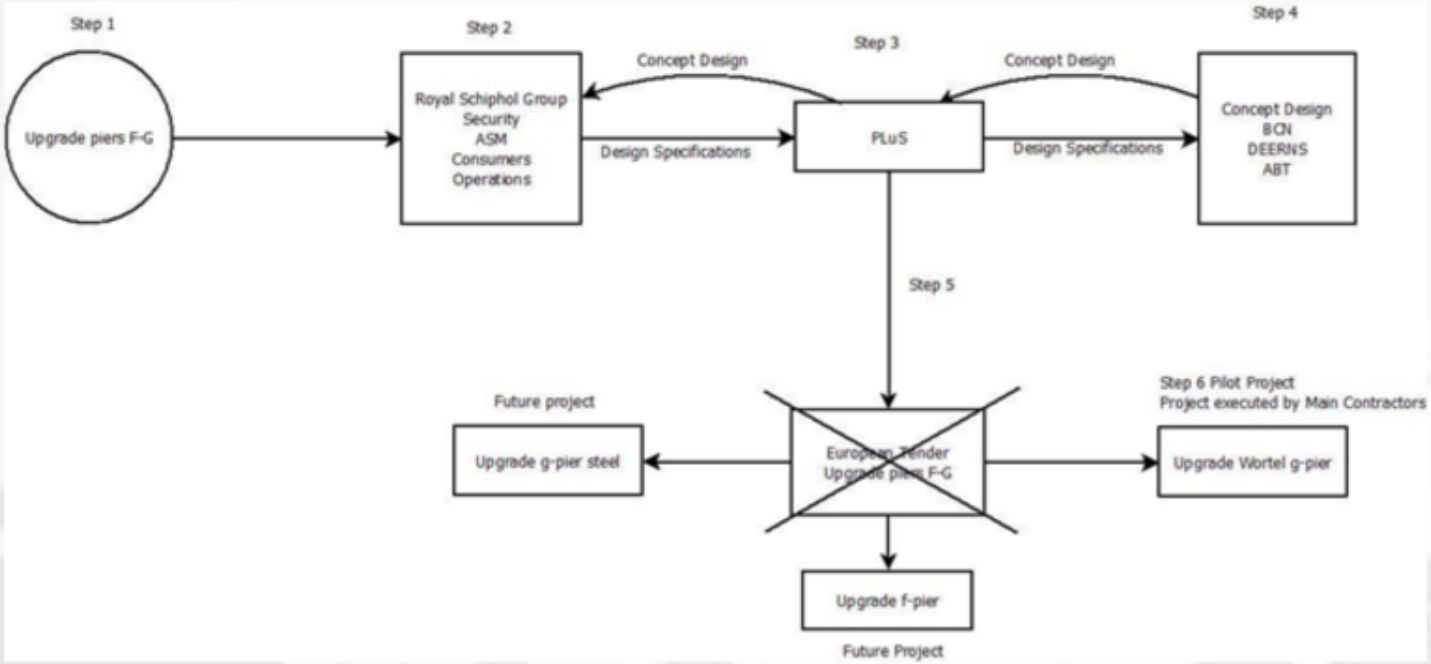
The actual situation

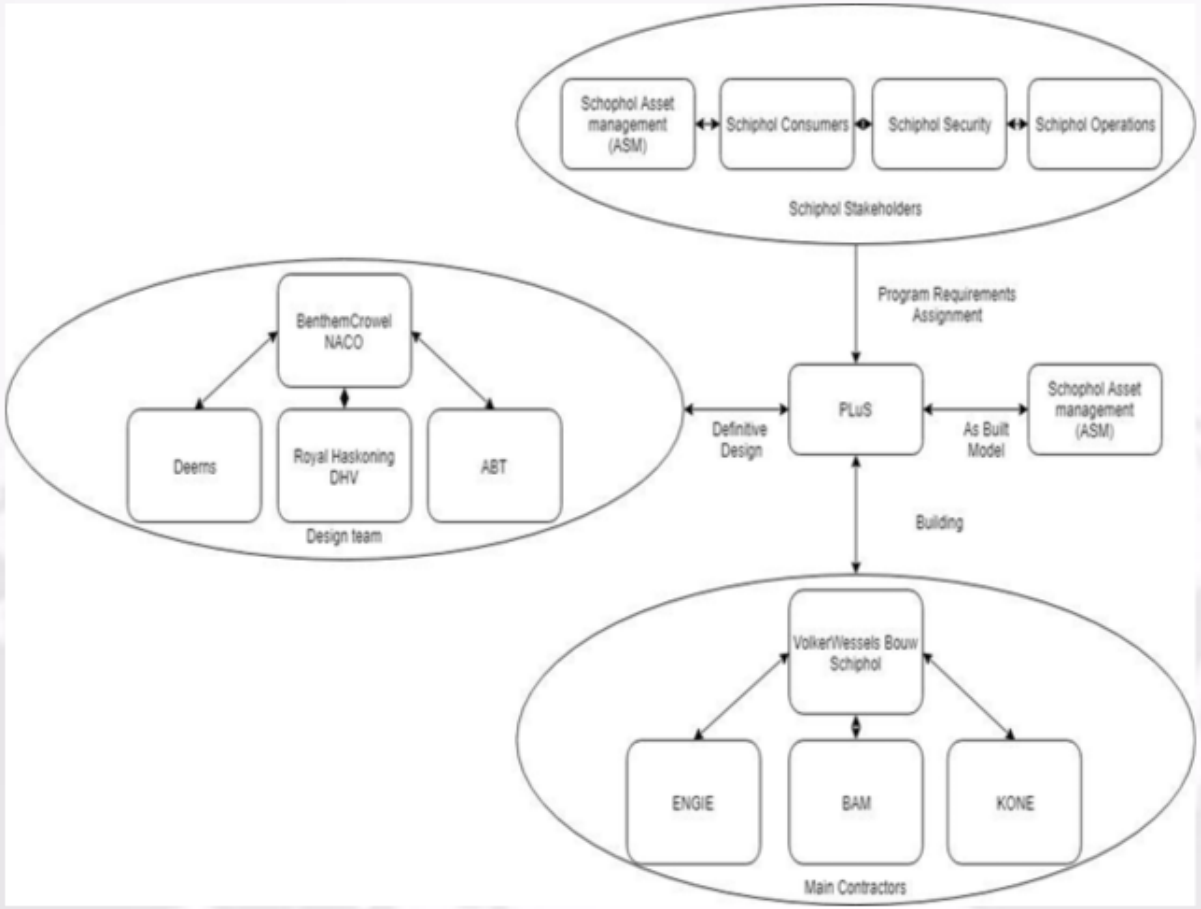
The design phase

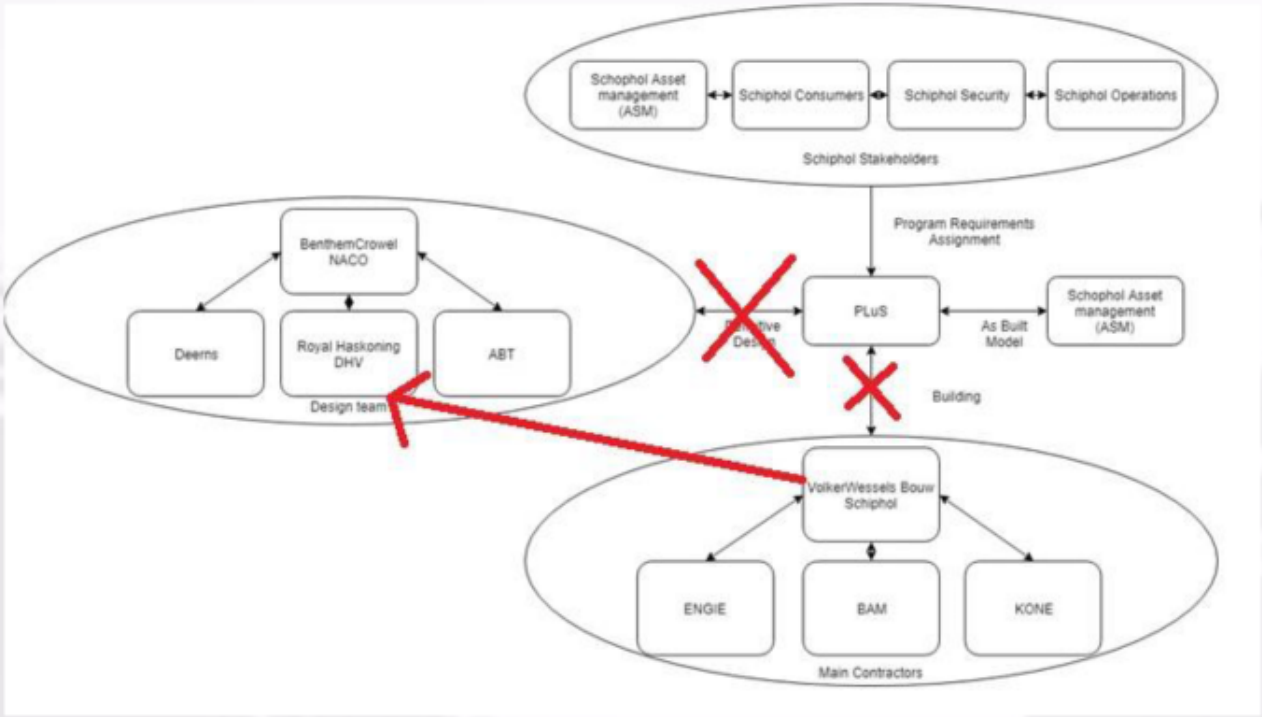
The building process

Why is Bob mad?

The design phase




Schophol Asset management (ASM)
Schiphol Consumers
Schiphol Security
Schiphol Operations
Schiphol Stakeholders
Program Requirements Assignment
BenthemCrowel NACO
Deerns
Royal Haskoning DHV
ABT
Design team
Definitive Design
PLuS
As Built Model
Schophol Asset management (ASM)
Building
VolkerWessels Bouw Schiphol
ENGIE
BAM
KONE
Main Contractors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What should have been

The BIM circle

PLuS

The benefits of BIM

A new project manager

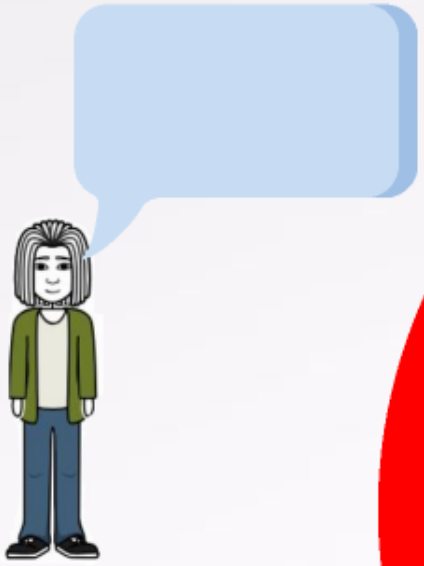
What should have been

The BIM circle

PLuS

The benefits of BIM

A new project manager



What should have been

The BIM circle

PLuS

The benefits of BIM

A new project manager

When companies work together problems can be solved before the actual building stage.

What should have been

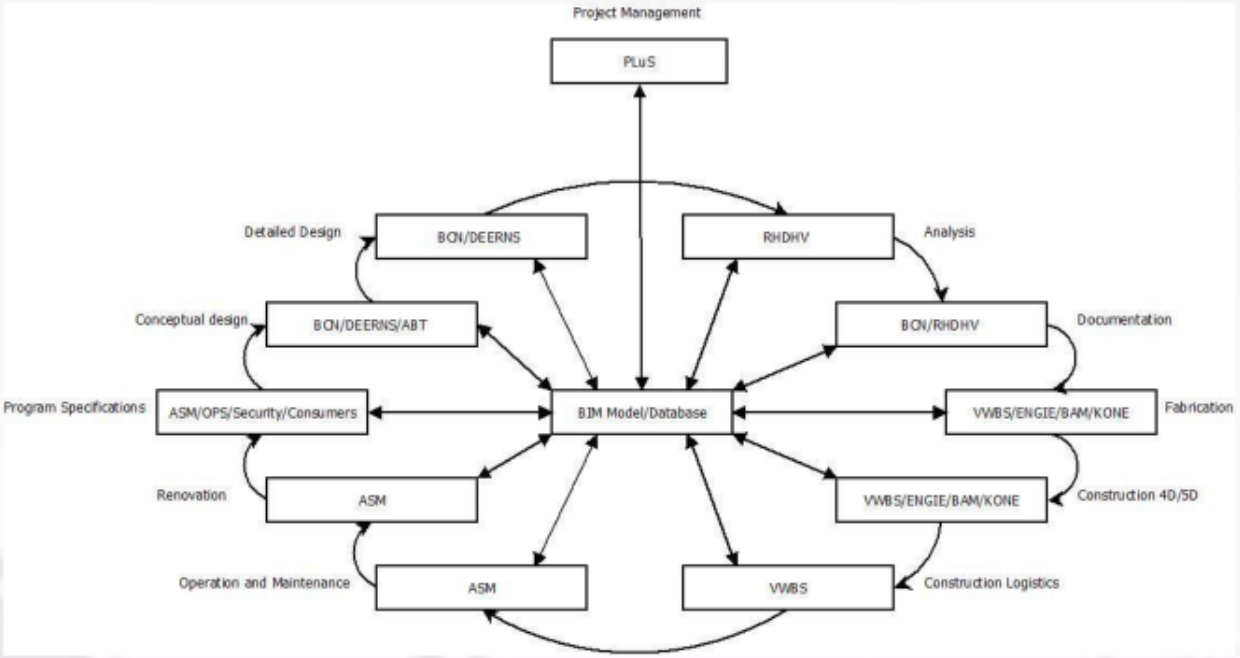
The BIM circle

PLuS

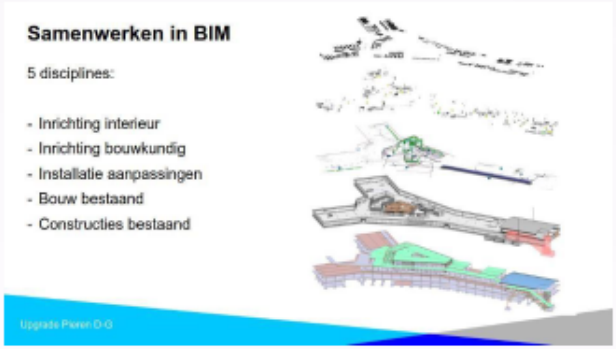
The benefits of BIM

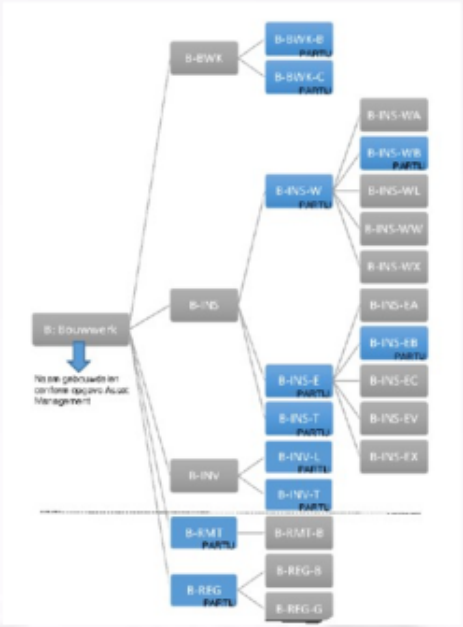
A new project manager

The BIM circle



PLuS


Samenwerken in BIM
5 disciplines:
- Inrichting interieur
- Inrichting bouwkundig
- Installatie aanpassingen
- Bouw bestaand
- Constructies bestaand
Upgrade Plein D-G


B-BWK
B-INS
B-INV
B-RMT
B-RFG
B-INS-W
B-INS-E
B-INS-T
B-INV-L
B-INV-T

Samenwerken in BIM

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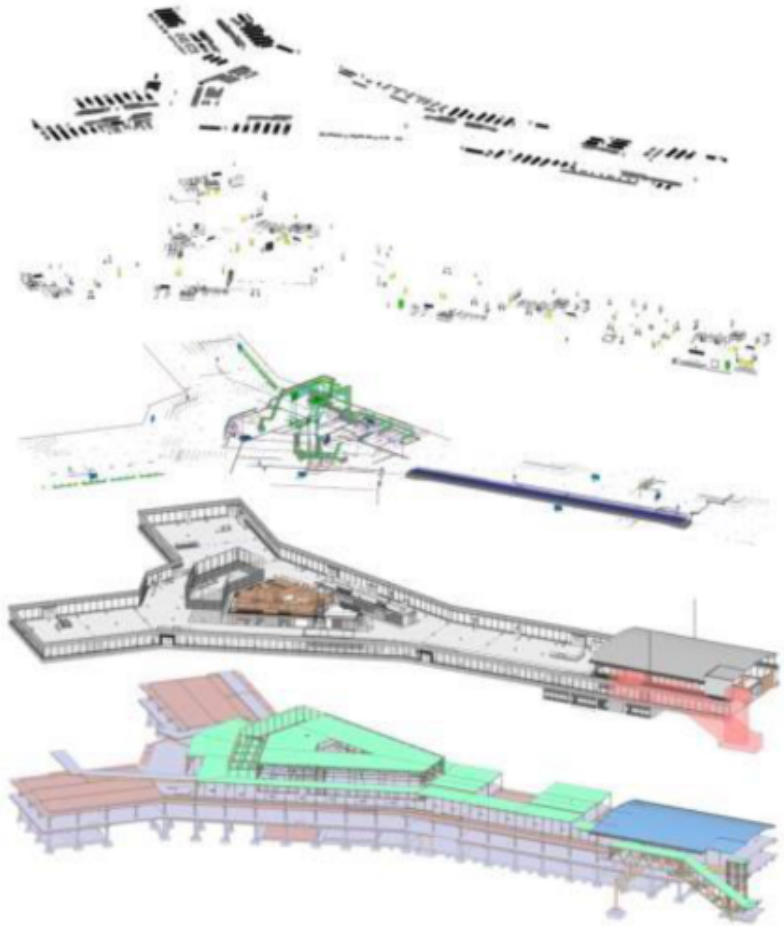
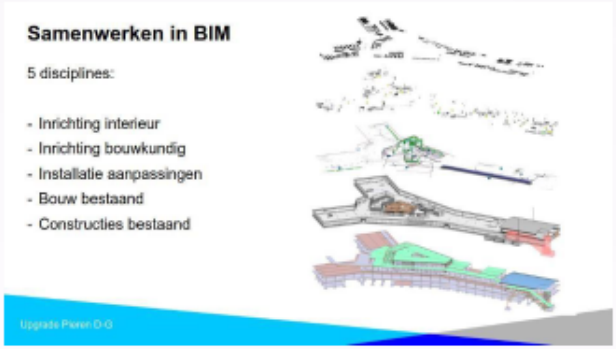


PLuS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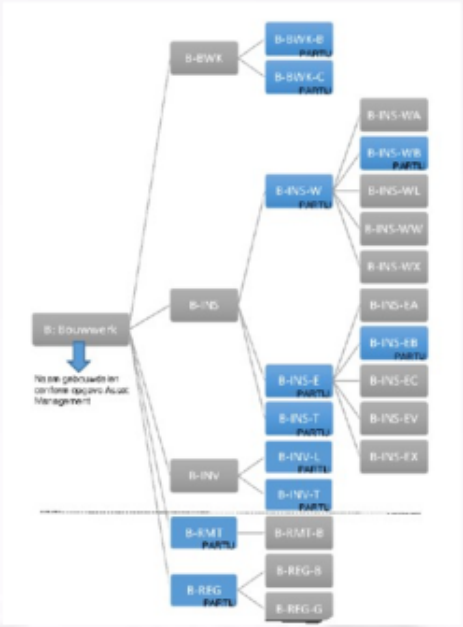
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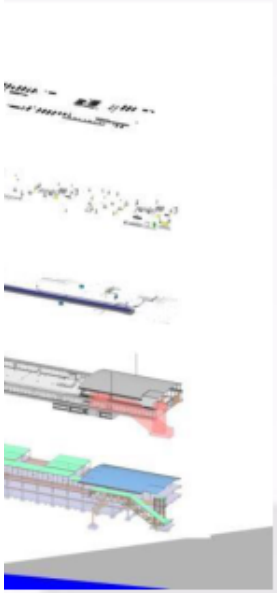
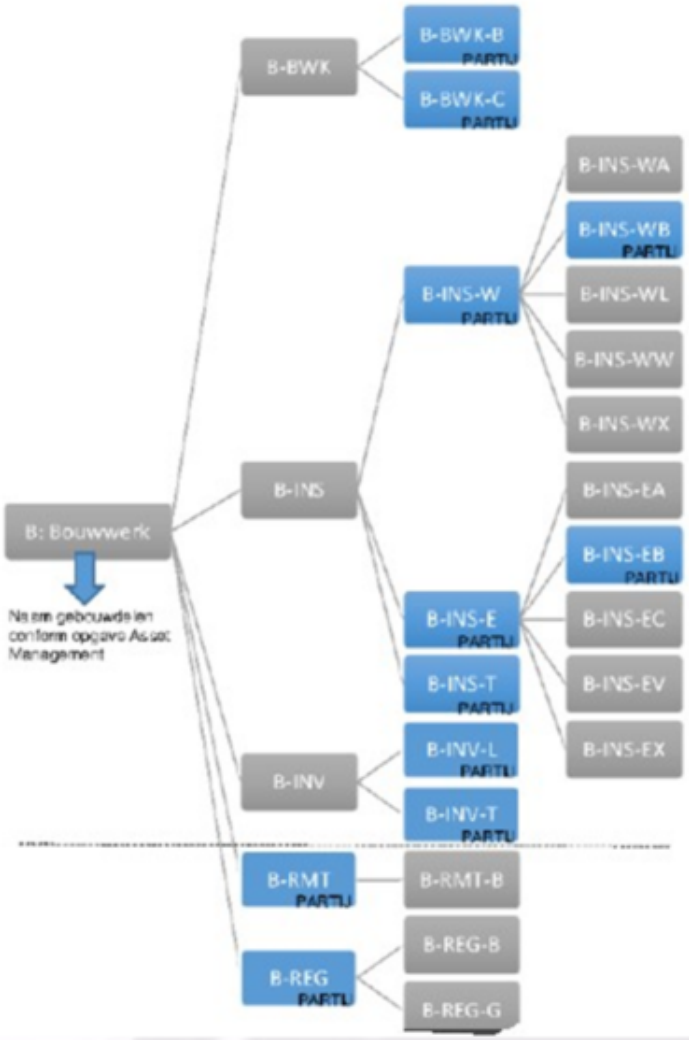
B-RMT-B
B-RFG-B
B-RFG-G




B: Bouwwerk
Naam gebouwdelen conform opgave Asset Management
B-BWK
B-BWK-B
PARTIJ
B-BWK-C
PARTIJ
B-INS
B-INS-W
PARTIJ
B-INS-WA
B-INS-WB
PARTIJ
B-INS-WL
B-INS-WW
B-INS-WX
B-INS-E
PARTIJ
B-INS-EA
B-INS-EB
PARTIJ
B-INS-EC
B-INS-EV
B-INS-EX
B-INS-T
PARTIJ
B-INV
B-INV-L
PARTIJ
B-INV-T
PARTIJ
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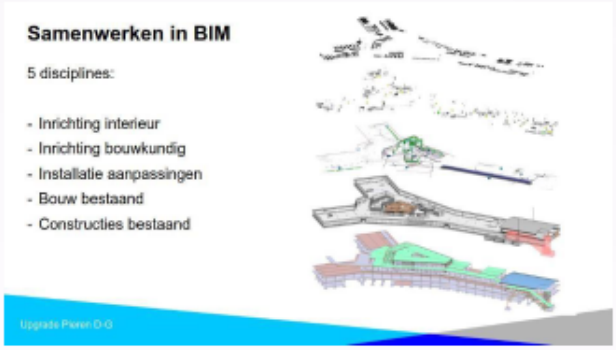
PARTIJ
B-RMT-B
B-REG
PARTIJ
B-REG-B
B-REG-G

PLuS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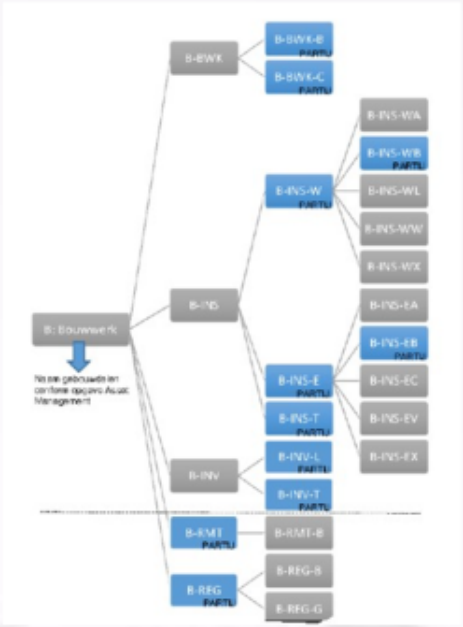
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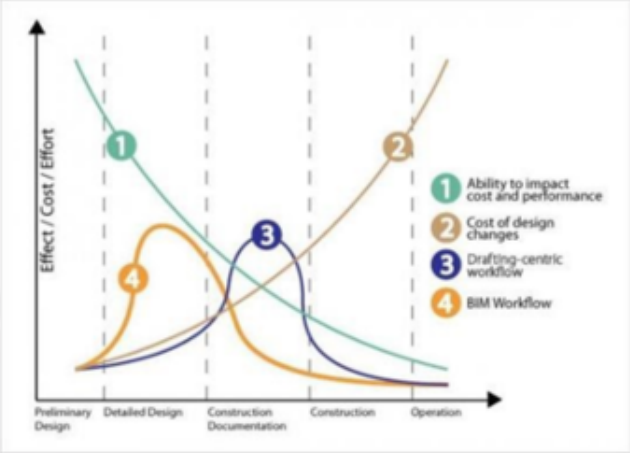
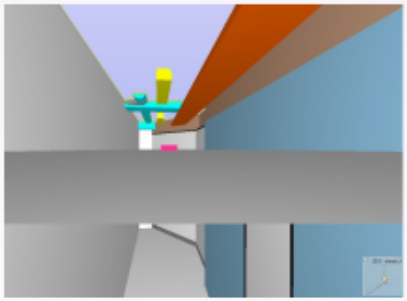
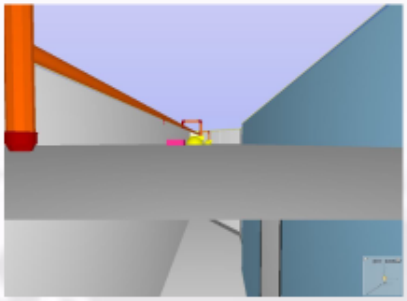
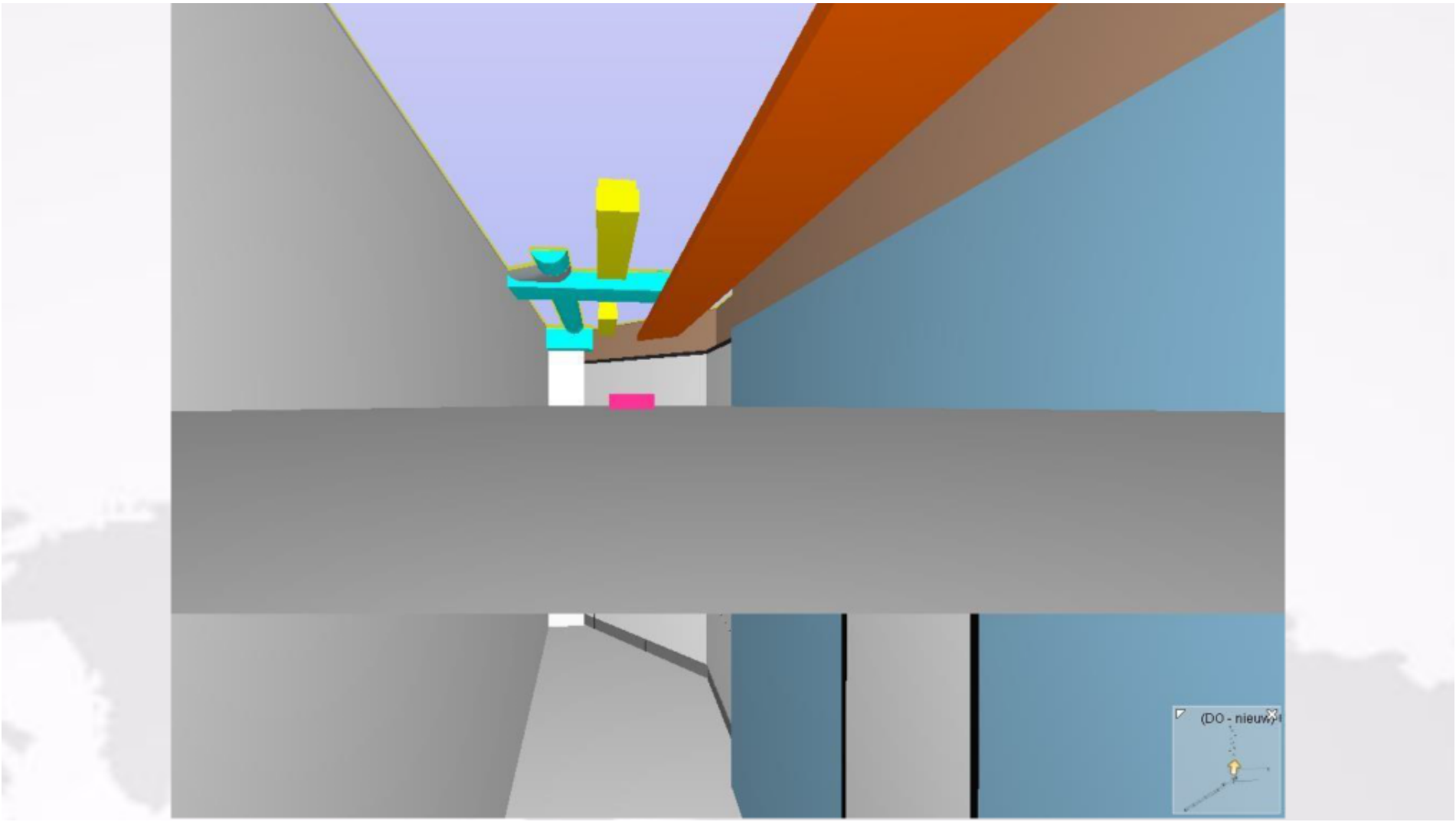
The benefits of BIM





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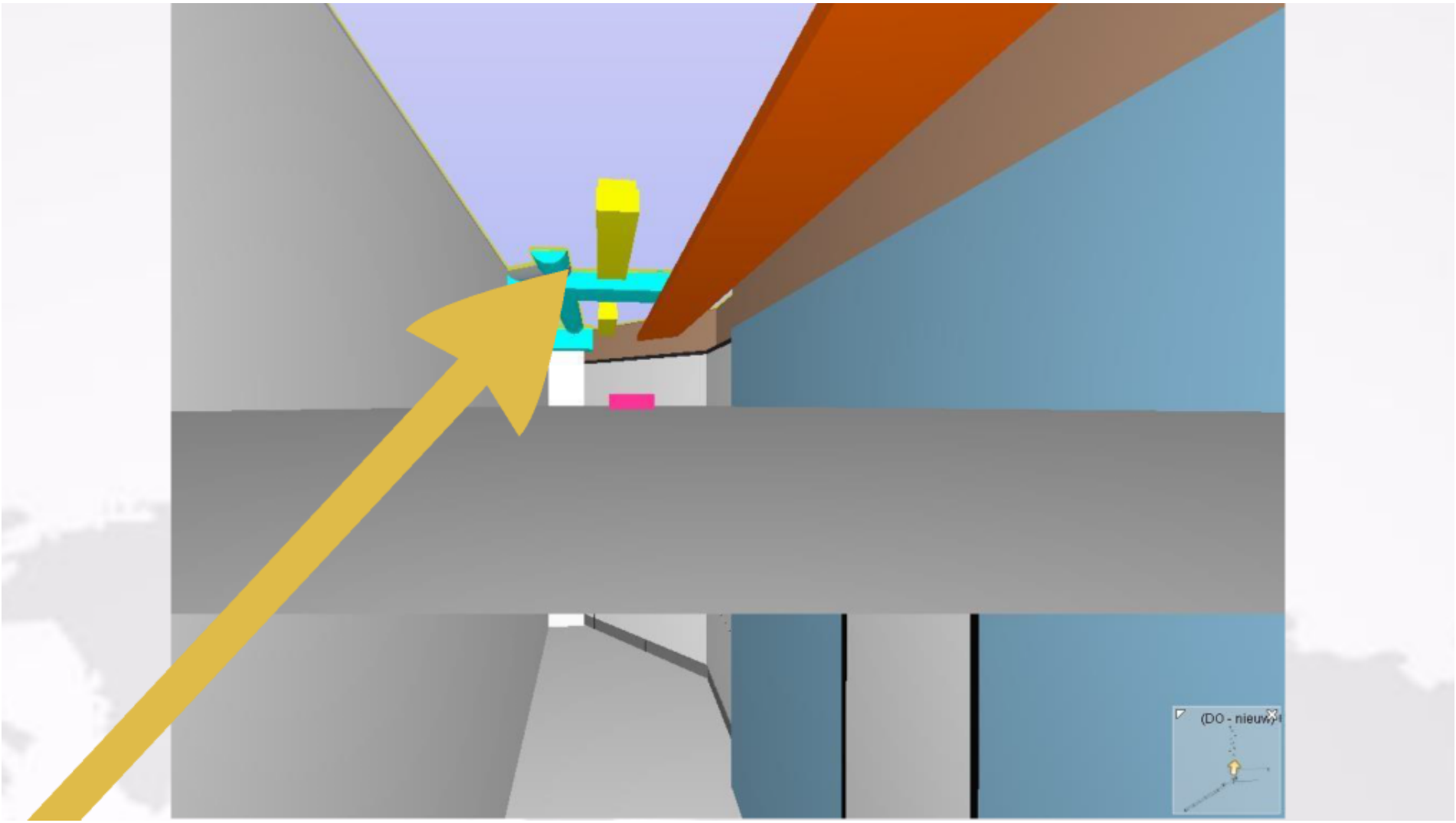
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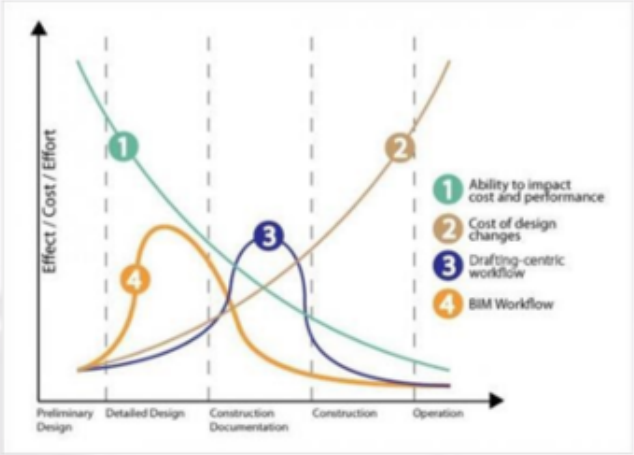
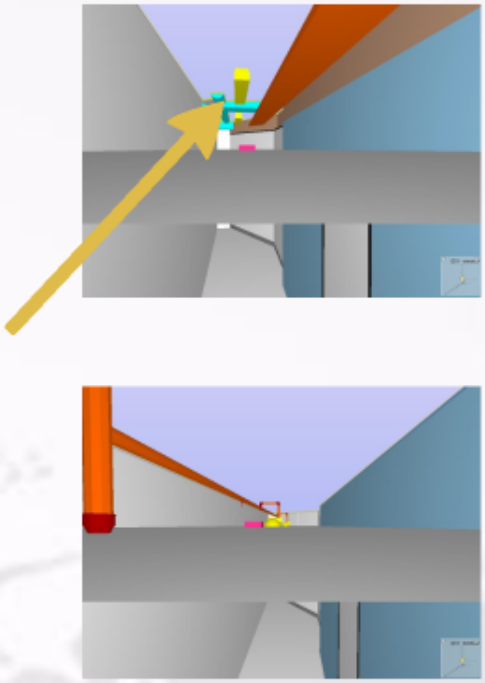
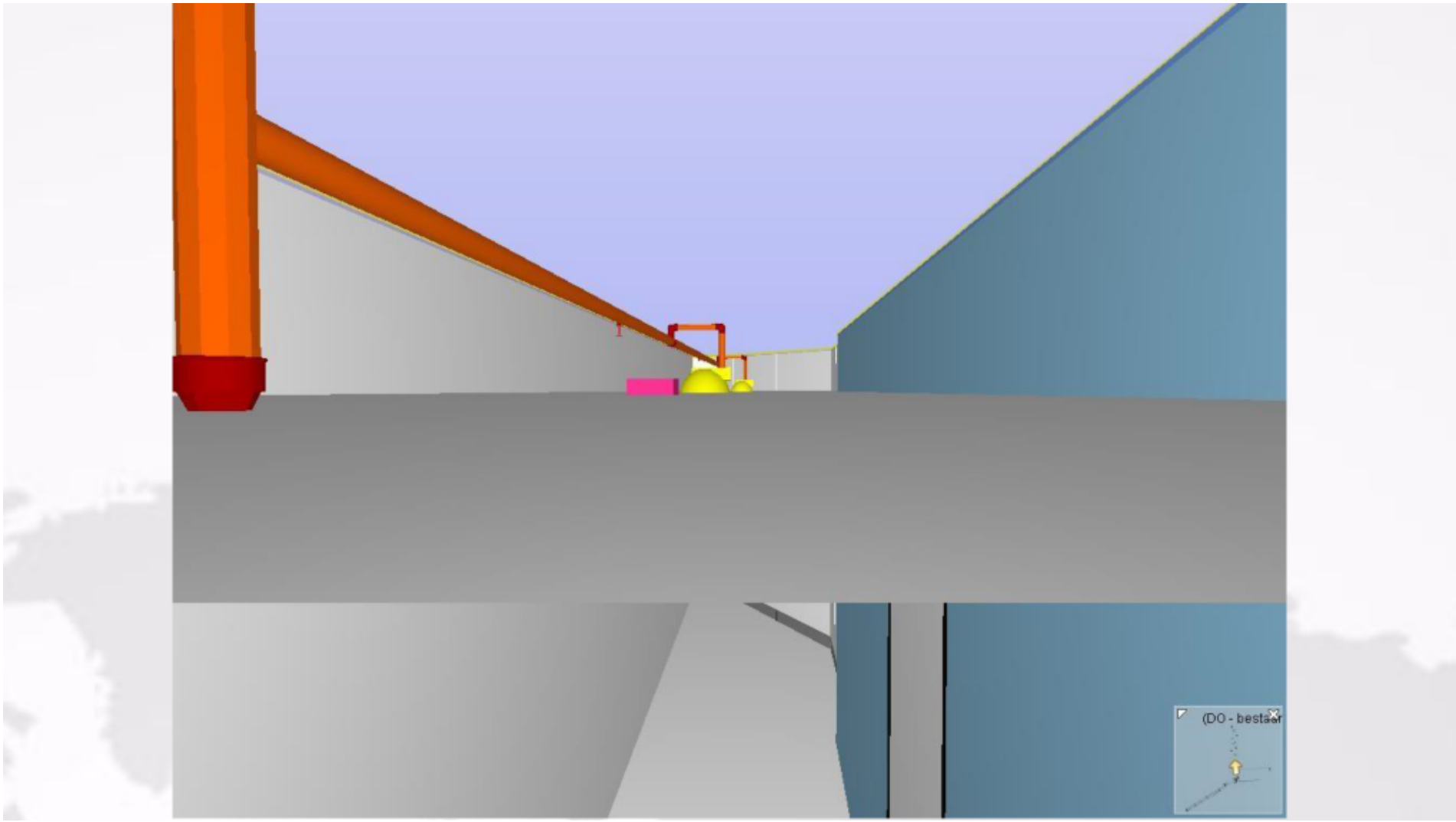
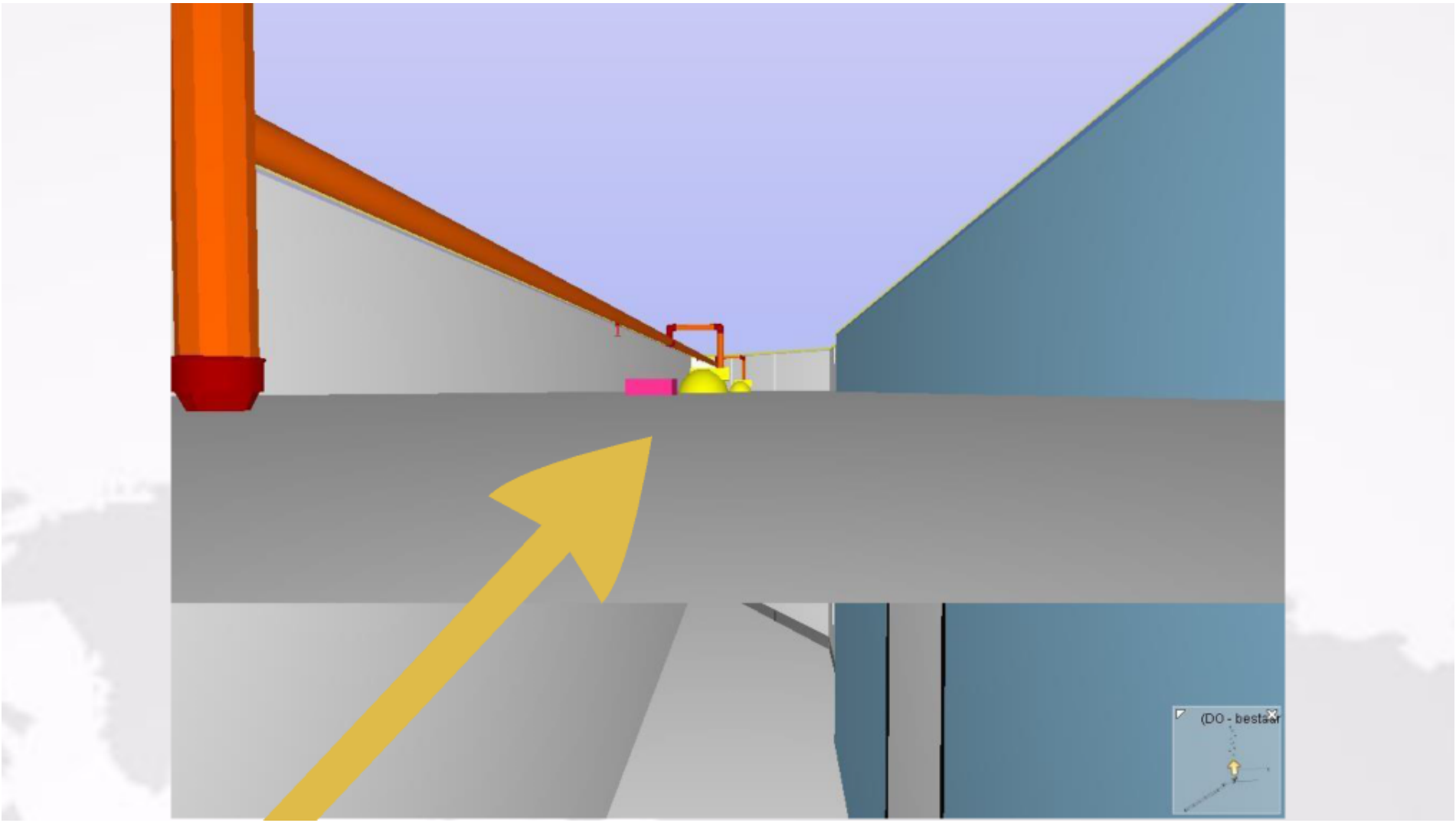





(DO - bestaa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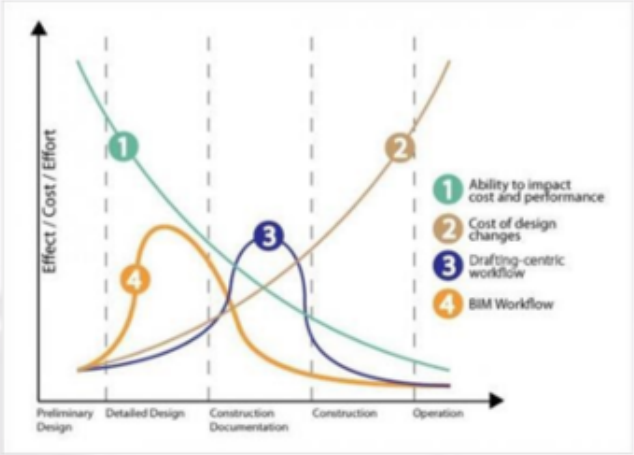
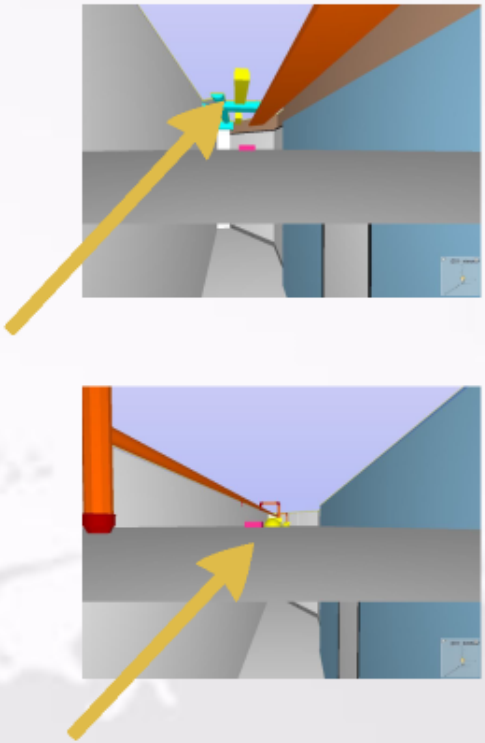
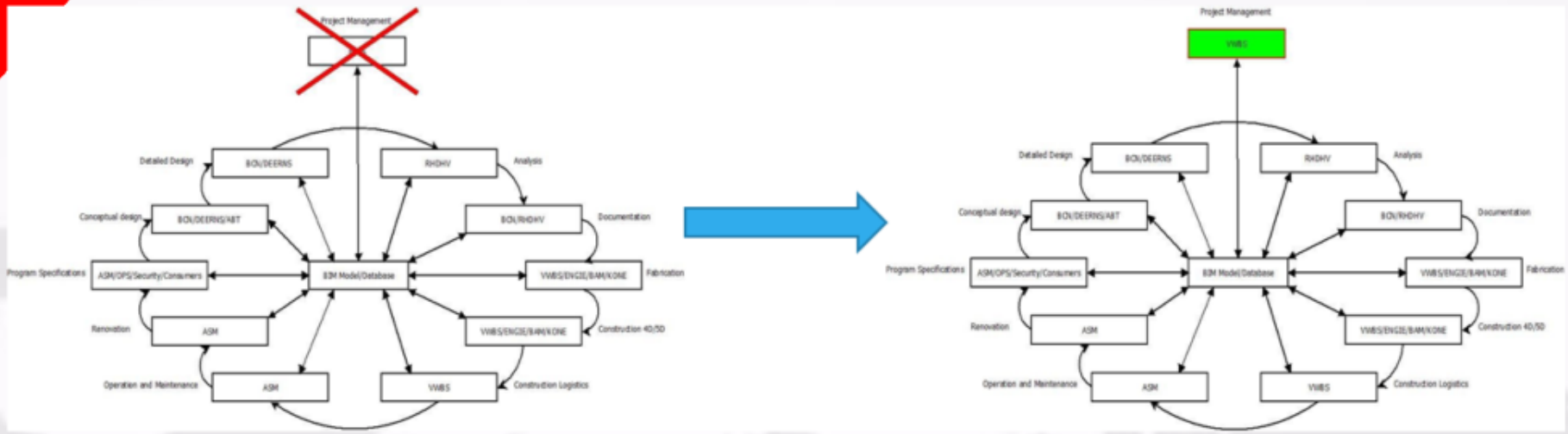




A new project manager



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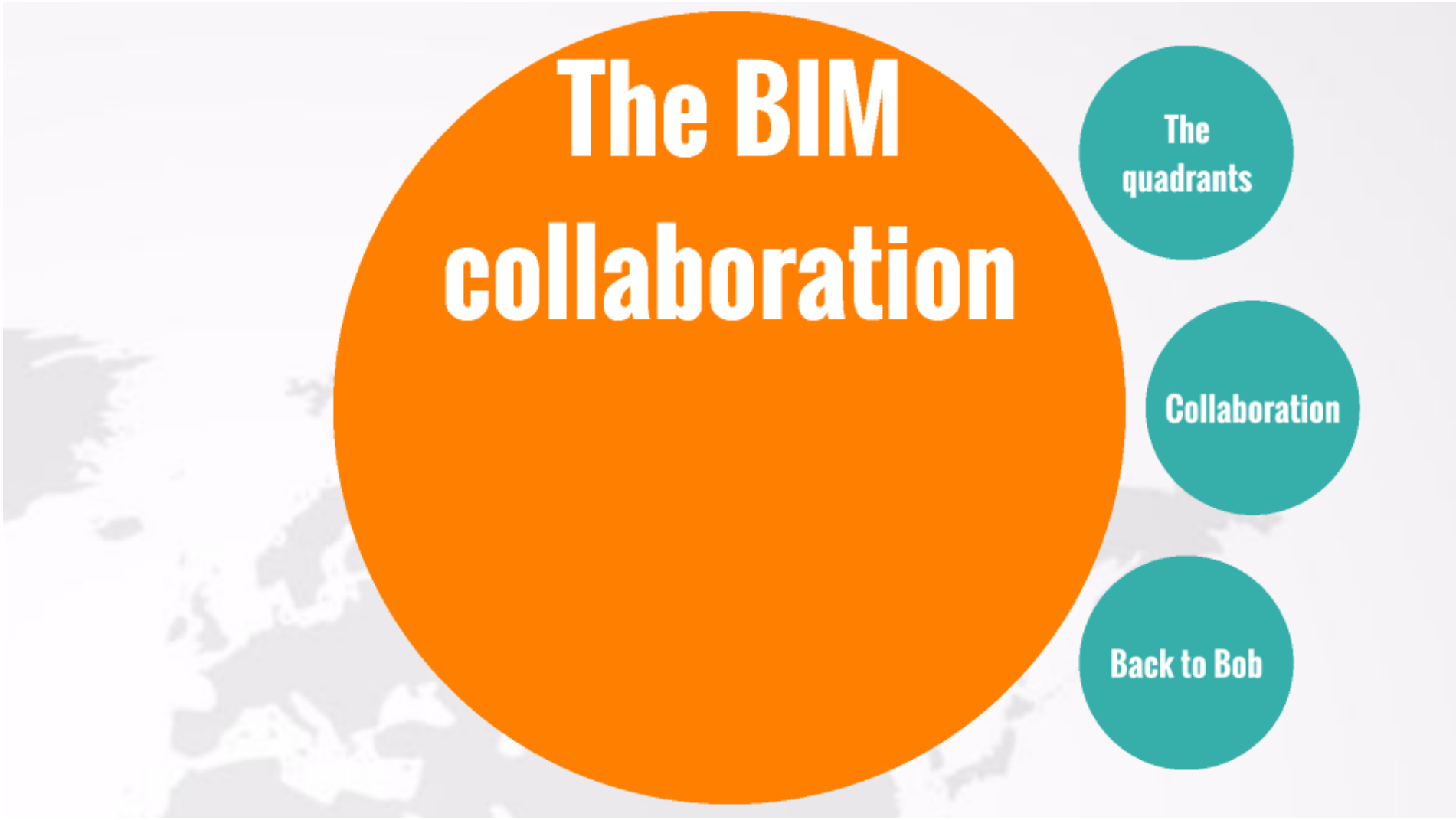
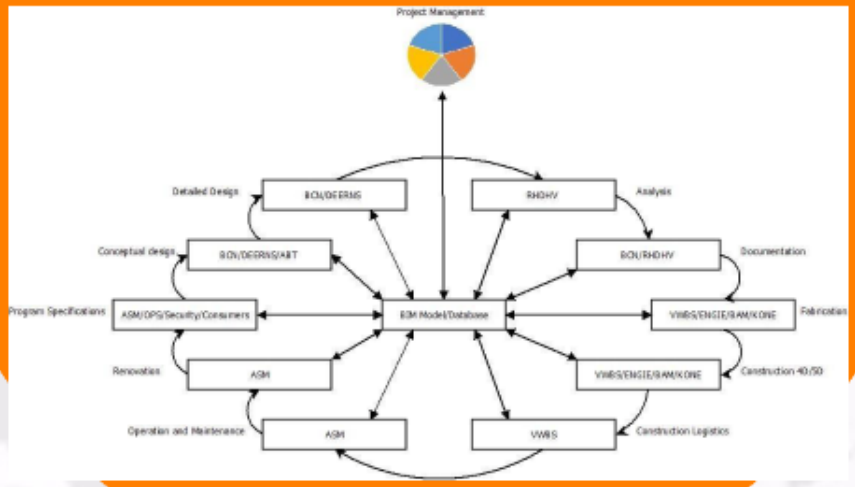

The BIM collaboration
The quadrants
Collaboration
Back to Bob

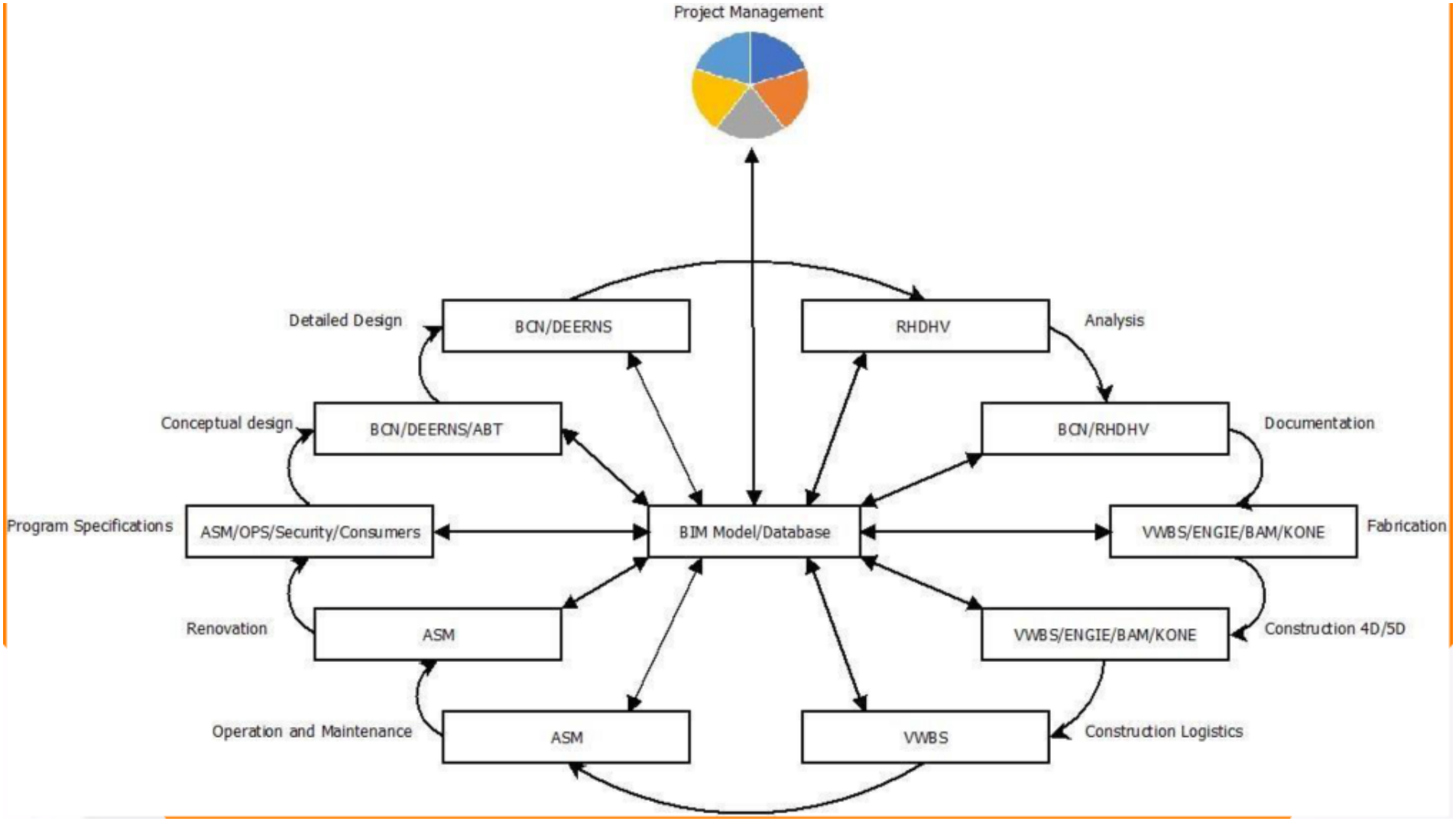
The BIM collaboration



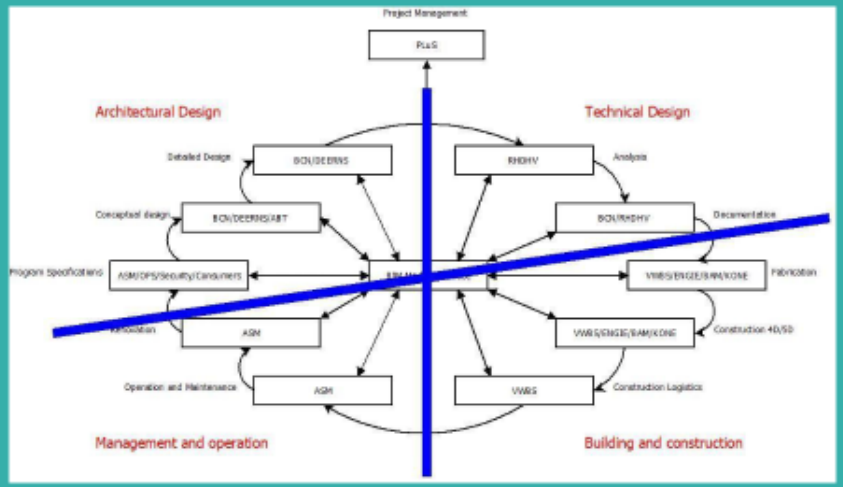
The quadrants

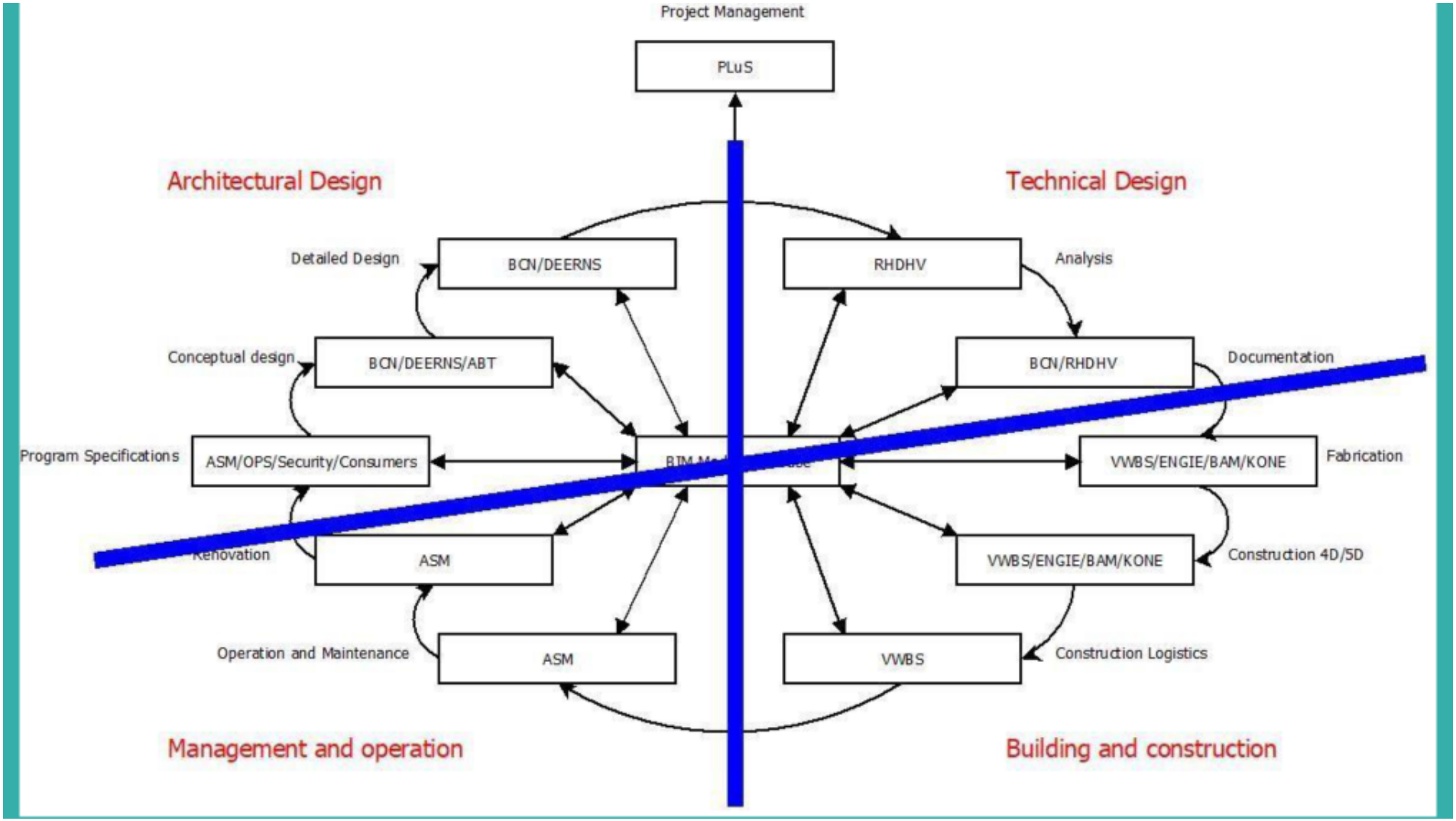
Collaboration

Back to Bob

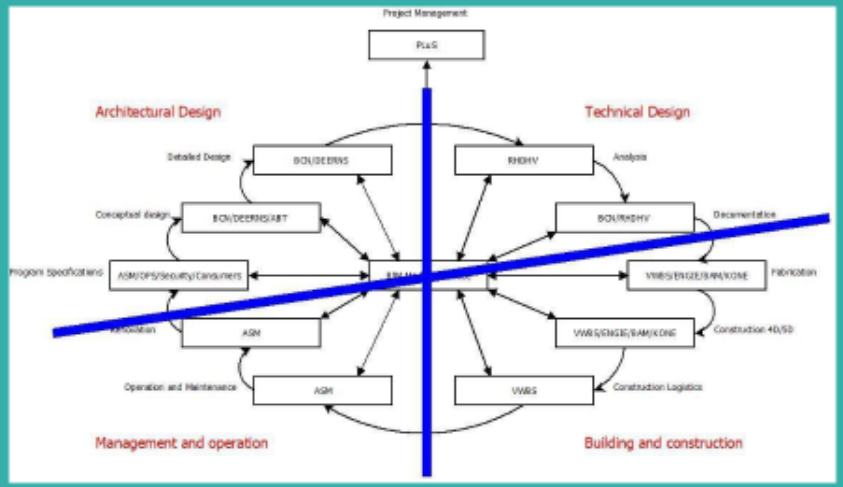

Project Management
Detailed Design
BCN/DEERNS
RHDHV
Analysis
Conceptual design
BCN/DEERNS/ABT
BCN/RHDHV
Documentation
Program Specifications
ASM/OPS/Security/Consumers
BIM Model/Database
VWBS/ENGIE/BAM/KONE
Fabrication
Renovation
ASM
VWBS/ENGIE/BAM/KONE
Construction 4D/5D
Operation and Maintenance
ASM
VWBS
Construction Logistics

The quadrants




Project Management
PLuS
Architectural Design
Technical Design
Detailed Design
BCN/DEERNS
RHDHV
Analysis
Conceptual design
BCN/DEERNS/ABT
BCN/RHDHV
Documentation
Program Specifications
ASM/OPS/Security/Consumers
VWBS/ENGIE/BAM/KONE
Fabrication
Renovation
ASM
VWBS/ENGIE/BAM/KONE
Construction 4D/5D
Operation and Maintenance
ASM
VWBS
Construction Logistics
Management and operation
Building and construction

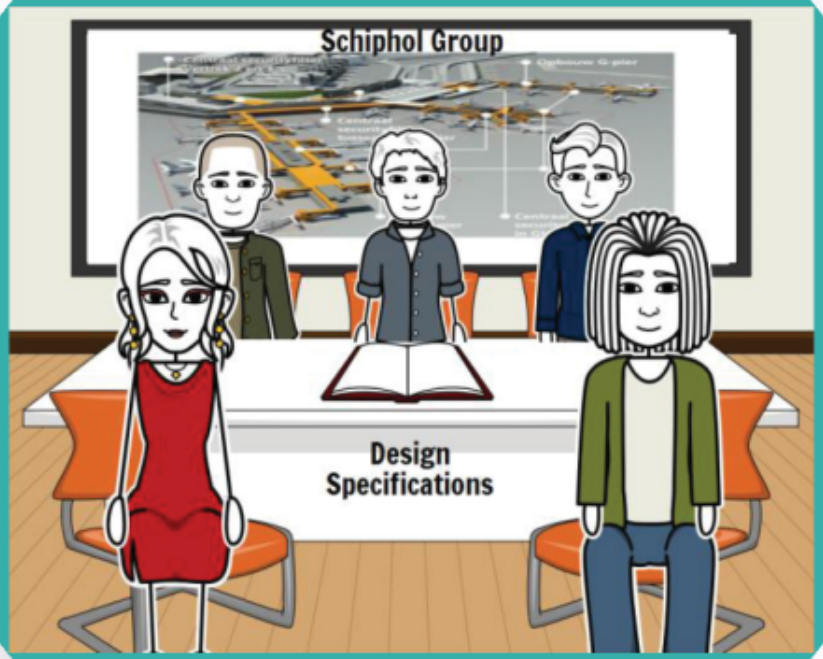
The quadrants



Collaboration

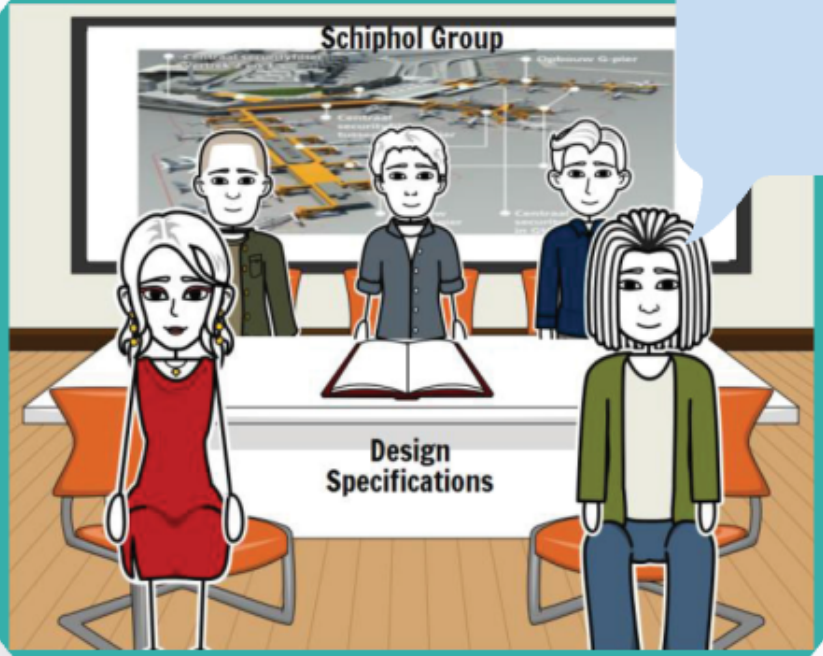
- Project Manager
- BIM expert architectural
- BIM expert technical
- BIM expert building and construction
- BIM expert management and operation

Back to Bob



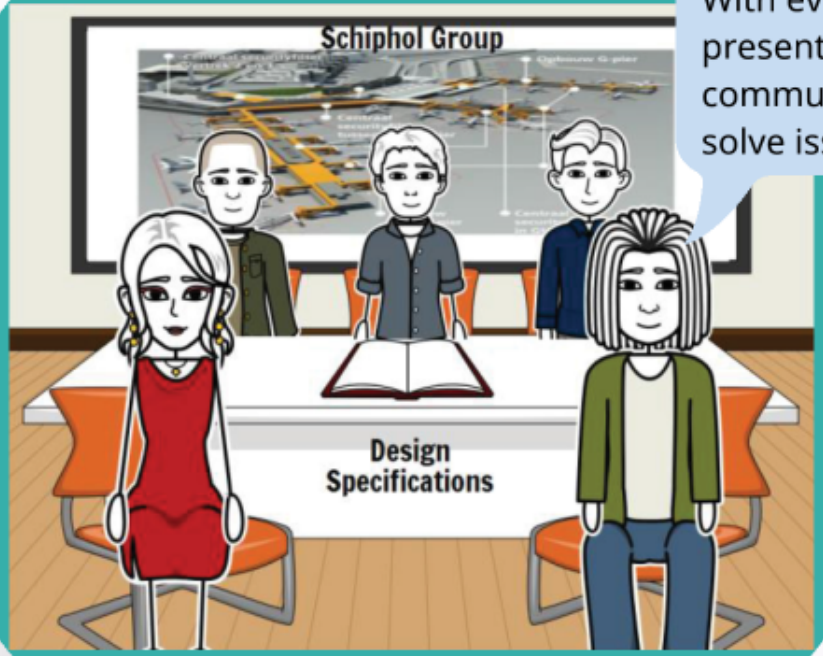
Collaboration environment

Back to Bob



Collaboration environment

Back to Bob



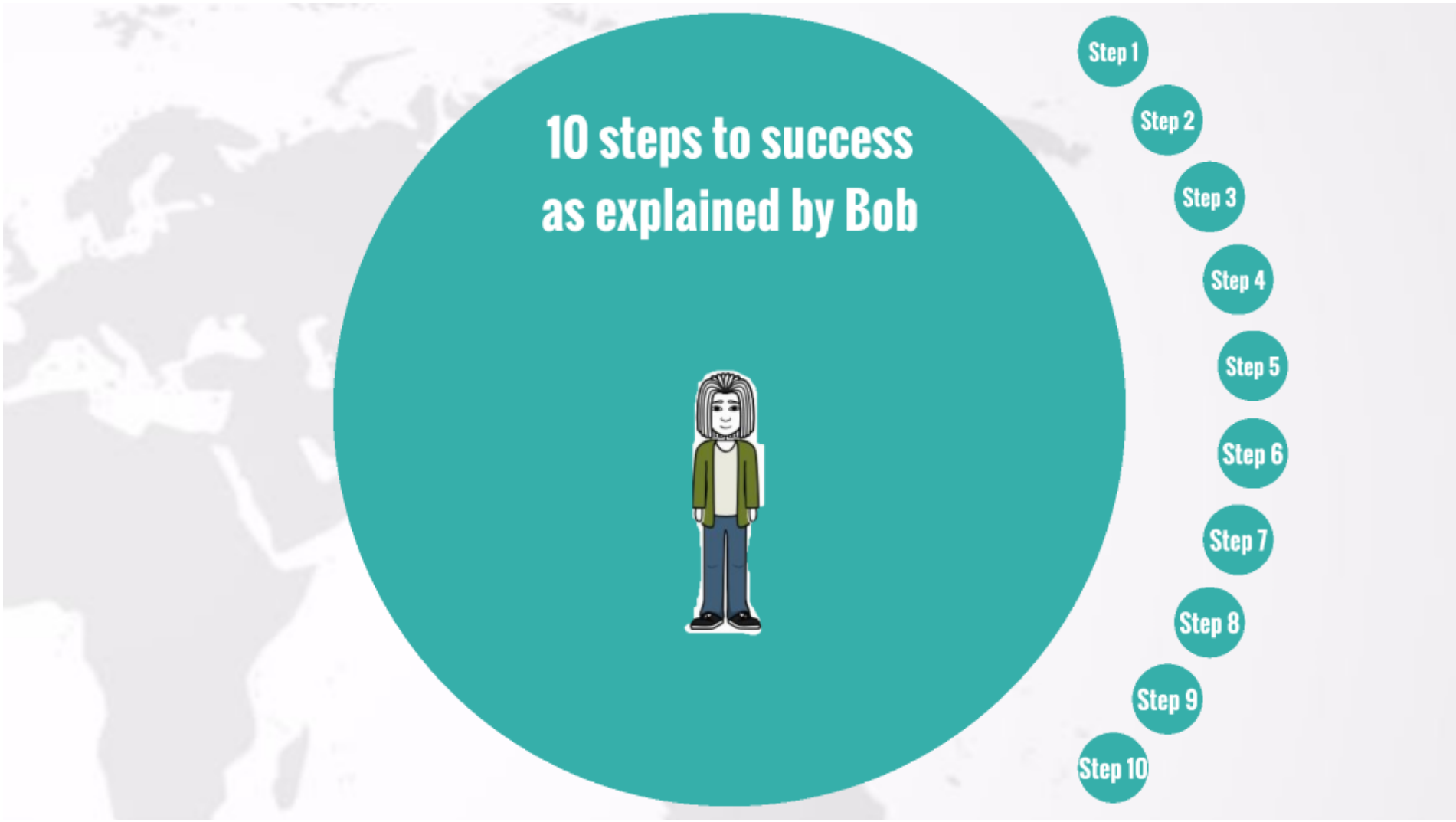
With everyone present we can now communicate and solve issues.

Collaboration environment


Centralized BIM Collaboration

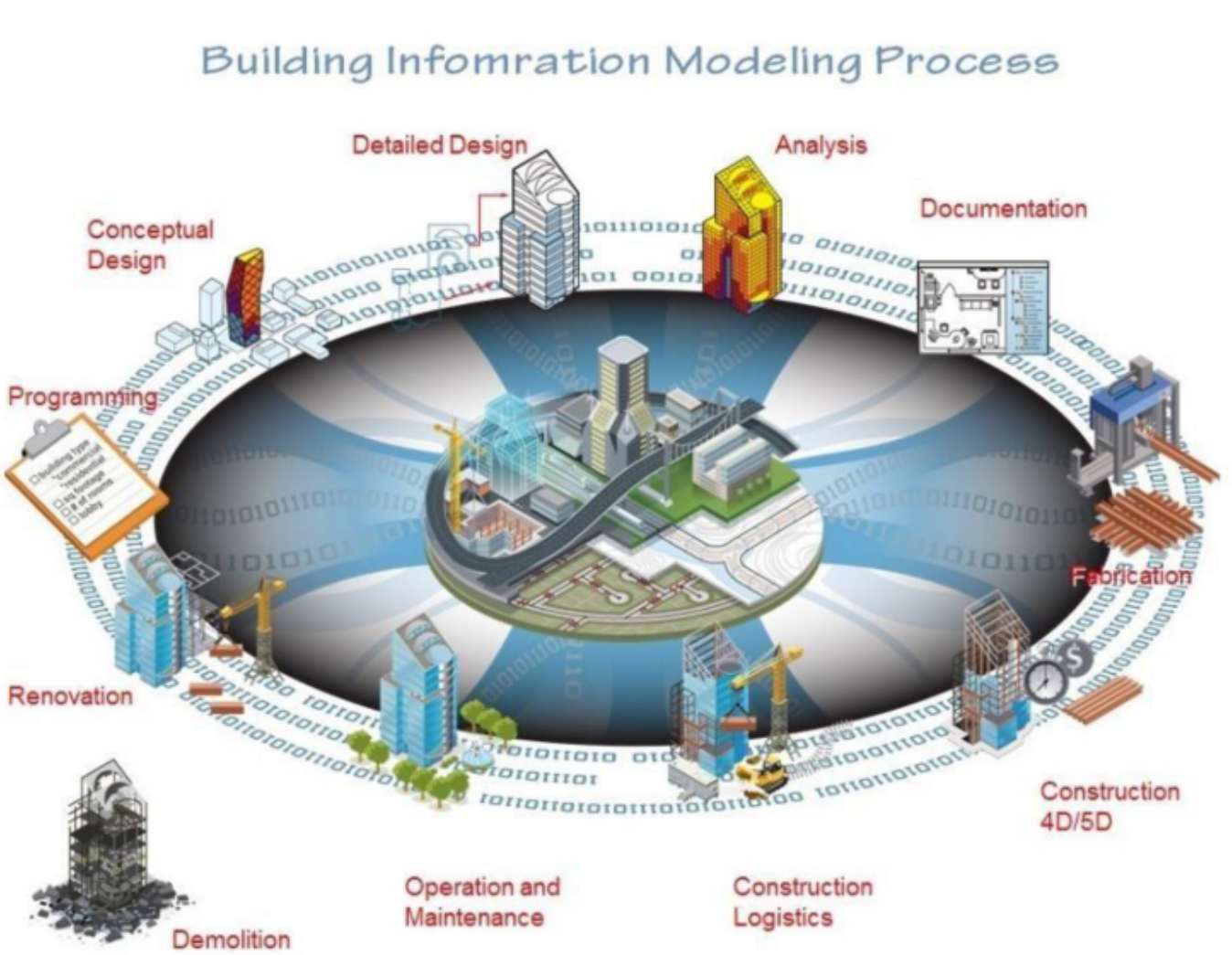
BIMplementation BIMtergration

P5 Presentation
Paul J van Berkel


10 steps to success
as explained by Bob
Step 1
Step 2
Step 3
Step 4
Step 5
Step 6
Step 7
Step 8
Step 9
Step 10

Step 1

Find teams for every step of the BIM circle. For every step of the BIM circle below there should be at least one, or more companies which oversee each step. These companies should have a good amount of knowledge in working in BIM and should also be willing to work in a BIM organization.


Building Infomration Modeling Process
Detailed Design
Analysis
Documentation
Conceptual Design
Programming
Fabrication
Renovation
Construction 4D/5D
Demolition
Operation and Maintenance
Construction Logistics

Step 2

Assign a BIM expert from every quadrant of the BIM circle led by a project manager with ample BIM experience. These BIM experts can be part of the companies which are part of the teams of the BIM circle. It is important to have an expert of each quadrant, because this way the conditions of every quadrant and the complete process can be guaranteed.

- Project Manager
- BIM expert architectural
- BIM expert technical
- BIM expert building and construction
- BIM expert management and operation

Step 3

Write contracts which are in line with the BIM process. All companies in every quadrant should get contracts with the same conditions in them. This step is also the first step where the existing building is mentioned. It is important that the contracts include clauses for modeling the current state of the building. This can be set up in a way that every team models the current situation based on its expertise.

Step 4

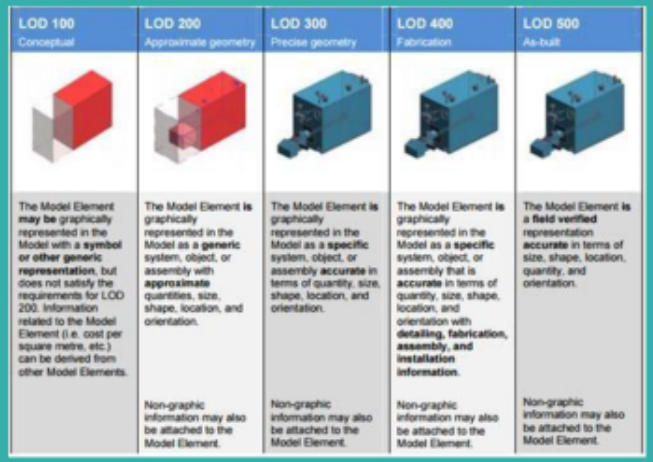
Make sure that every team understands their responsibility as an adviser when the project is at another step. This is very important because this advice makes the overall design stronger. Making sure costly mistakes during the building and construction phase are prevented.

Step 5

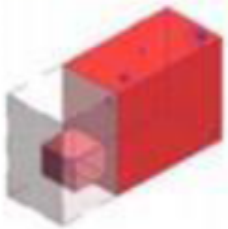
Create a BIM coordination model and database which is updated in real-time and includes communication possibilities. This way all data can be viewed real time, preventing teams working for extended periods of time on objects or parts of the design which then prove to be impossible due to clashes. The including of the communication possibilities make sure that everything is available in one environment. This way no team can fall back on “other” methods of communication which possibly cannot be retraced. The more dimensions are integrated in the BIM environment the better the results will be.

Step 6

The project manager (collaboration) continuously monitors progress and makes sure deadlines are kept and the quality of the coordination model is up to spec during the BIM process. The quality of the coordination model can be monitored according to the expected level of detail (LOD). This LOD is also part of the contracts and the IDM.



LOD 100 Conceptual	LOD 200 Approximate geometry	LOD 300 Precise geometry	LOD 400 Fabrication	LOD 500 As-built
The Model Element **may be** graphically represented in the Model with a **symbol or other generic representation**, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square metre, etc.) can be derived from other Model Elements.	The Model Element **is** graphically represented in the Model as a **generic** system, object, or assembly with **approximate** quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.	The Model Element **is** graphically represented in the Model as a **specific** system, object, or assembly **accurate** in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.	The Model Element **is** graphically represented in the Model as a **specific** system, object, or assembly that is **accurate** in terms of quantity, size, shape, location, and orientation with **detailing, fabrication, assembly, and installation information.** Non-graphic information may also be attached to the Model Element.	The Model Element **is a field verified** representation **accurate** in terms of size, shape, location, quantity, and orientation. Non-graphic information may also be attached to the Model Element.

LOD 100 Conceptual	LOD 200 Approximate geometry	LOD 300 Precise geometry	LOD 400 Fabrication	LOD 500 As-built
				
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Step 7

Build the project according to the coordination model and BIM database making sure all aspects of the model and the database are produced as intended by the documentation

Step 8

Update the coordination model with as-built information. As-Built data is added to the coordination model to document discrepancies between the execution model and the actual placed object. This way when handing over the model and database to asset management the data is up to date.

Step 9

Operate and manage the building with the coordination model including the BIM database and as-built information updating the model continuously if any changes are made.

Step 10

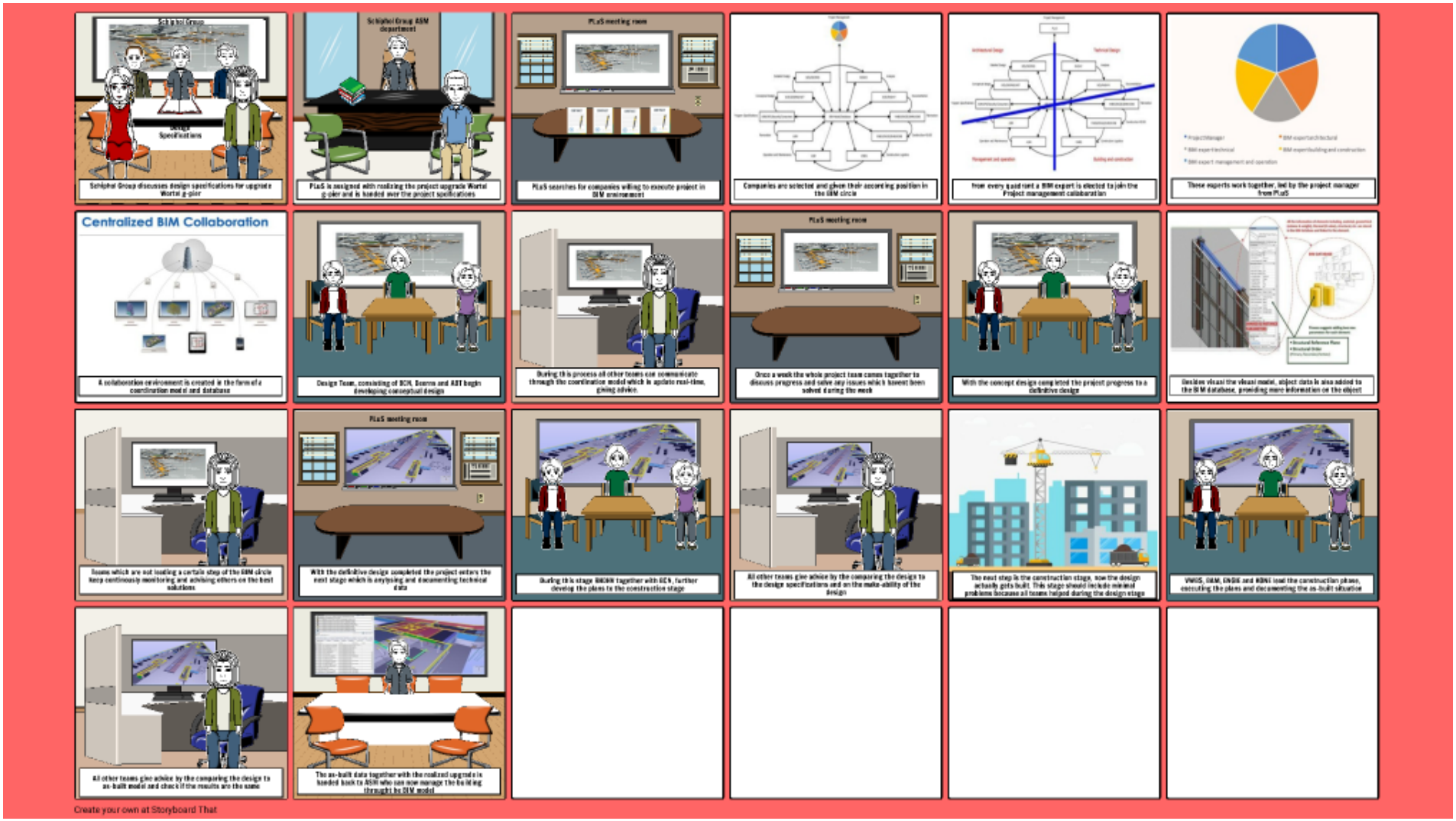
Start a new renovation and/or upgrade project with the coordination model and BIM database intact eliminating the need to first document the current situation as that has continuously been done.

BIMplementation BIMtergration

P5 Presentation
Paul J van Berkel

What should it have looked like at Schiphol

Story



Create your own at Storyboard That

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Question Time?

Thank You For Your Time!

Drinks in the Bouwpub!

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