

Create and Manage Digital Factories

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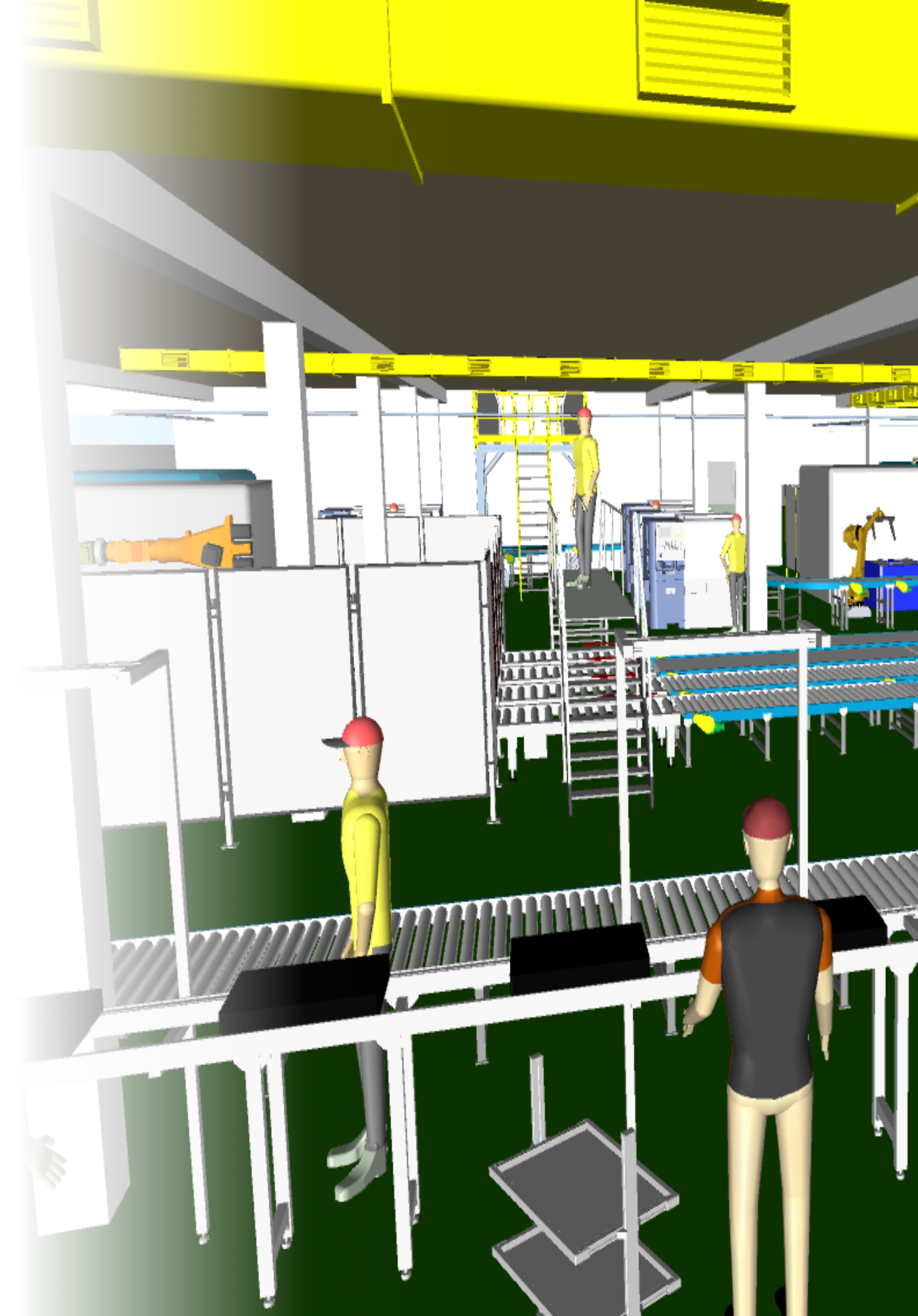
Why we need Digital Factories?





Why Digital Factories?

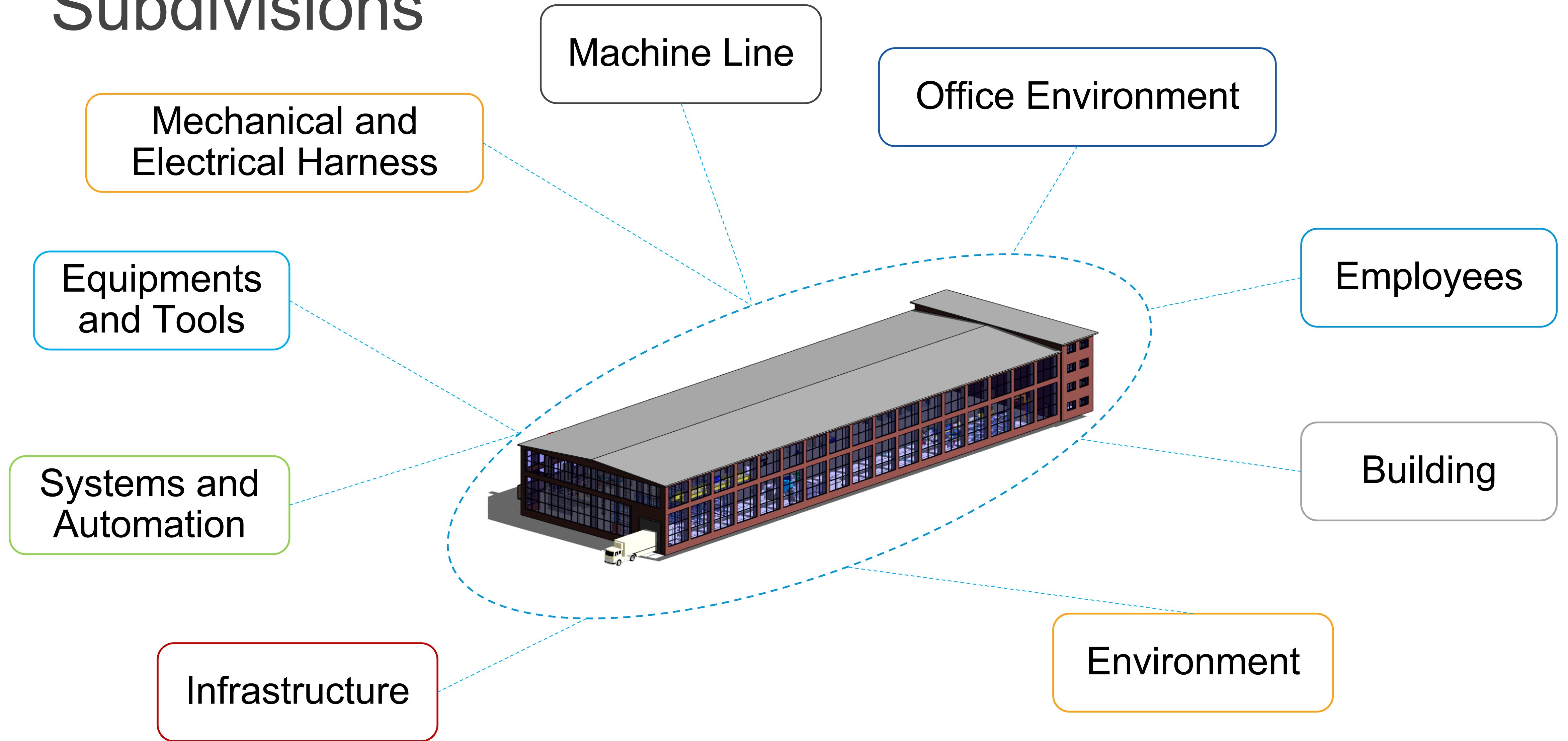
- Increasing operational efficiency
- Managing layout digitally
- Establishing new production workflows
- Defining risky places in line
- Production flow simulation
- Tracking production via IoT



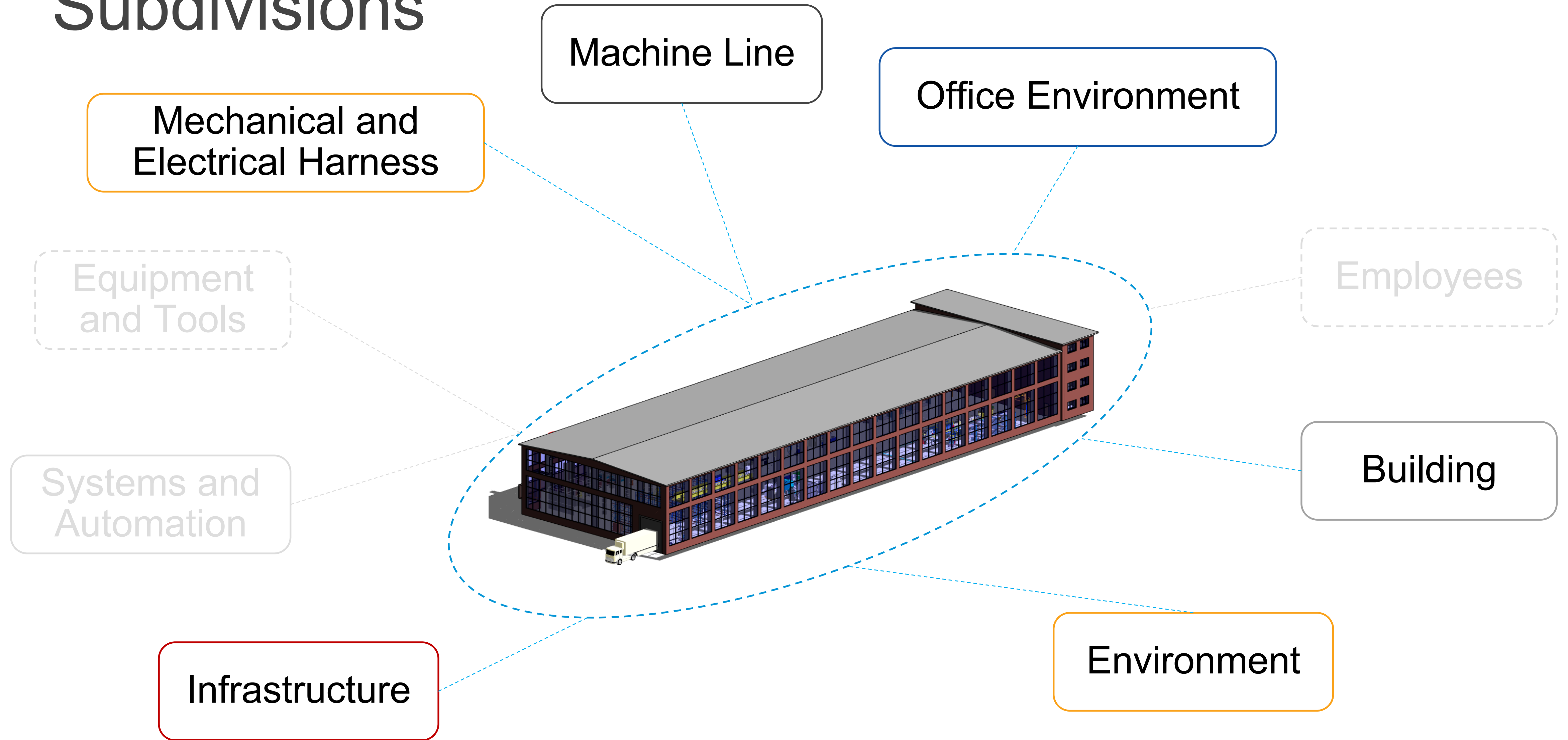
Processes



Subdivisions



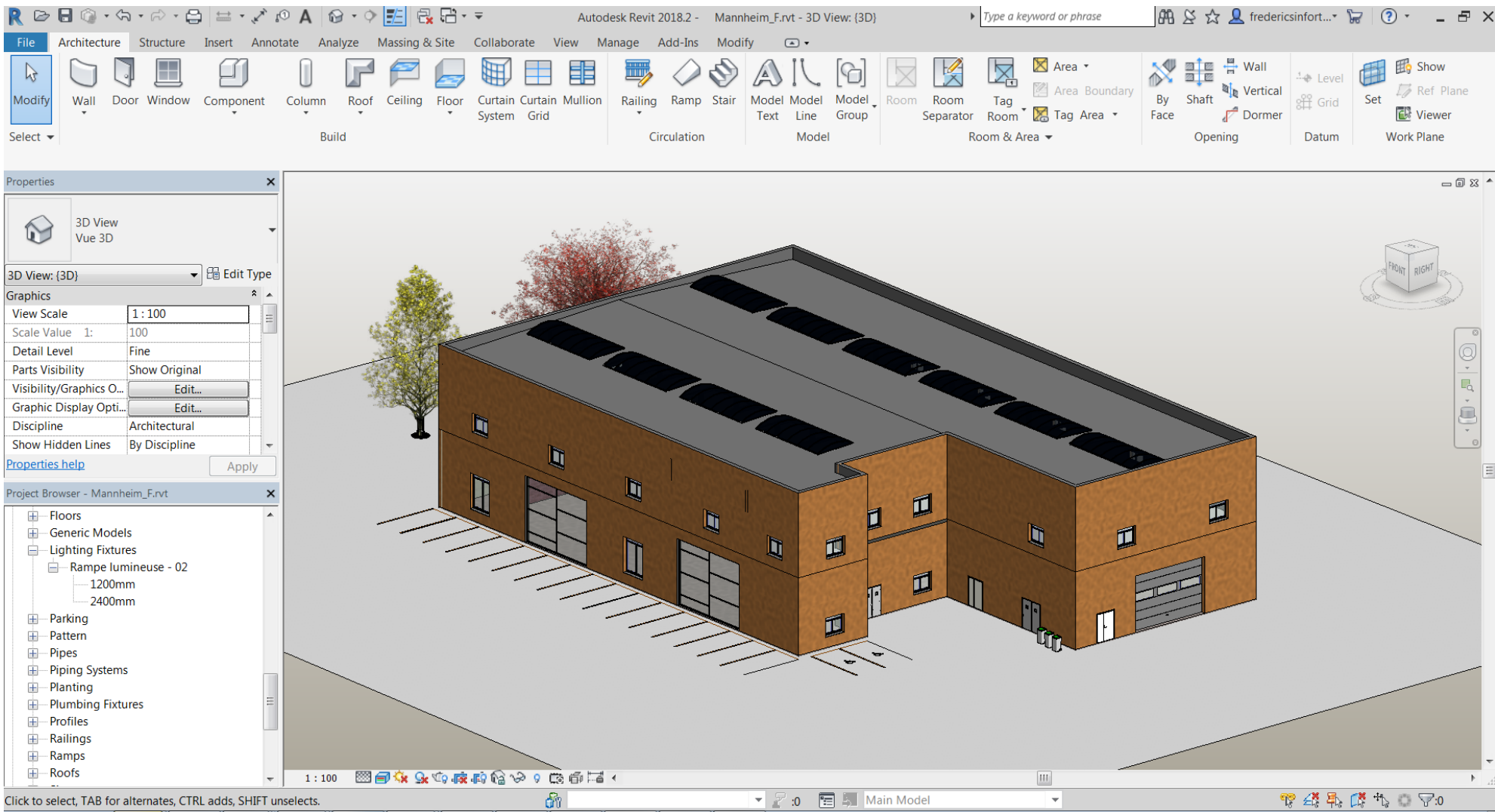
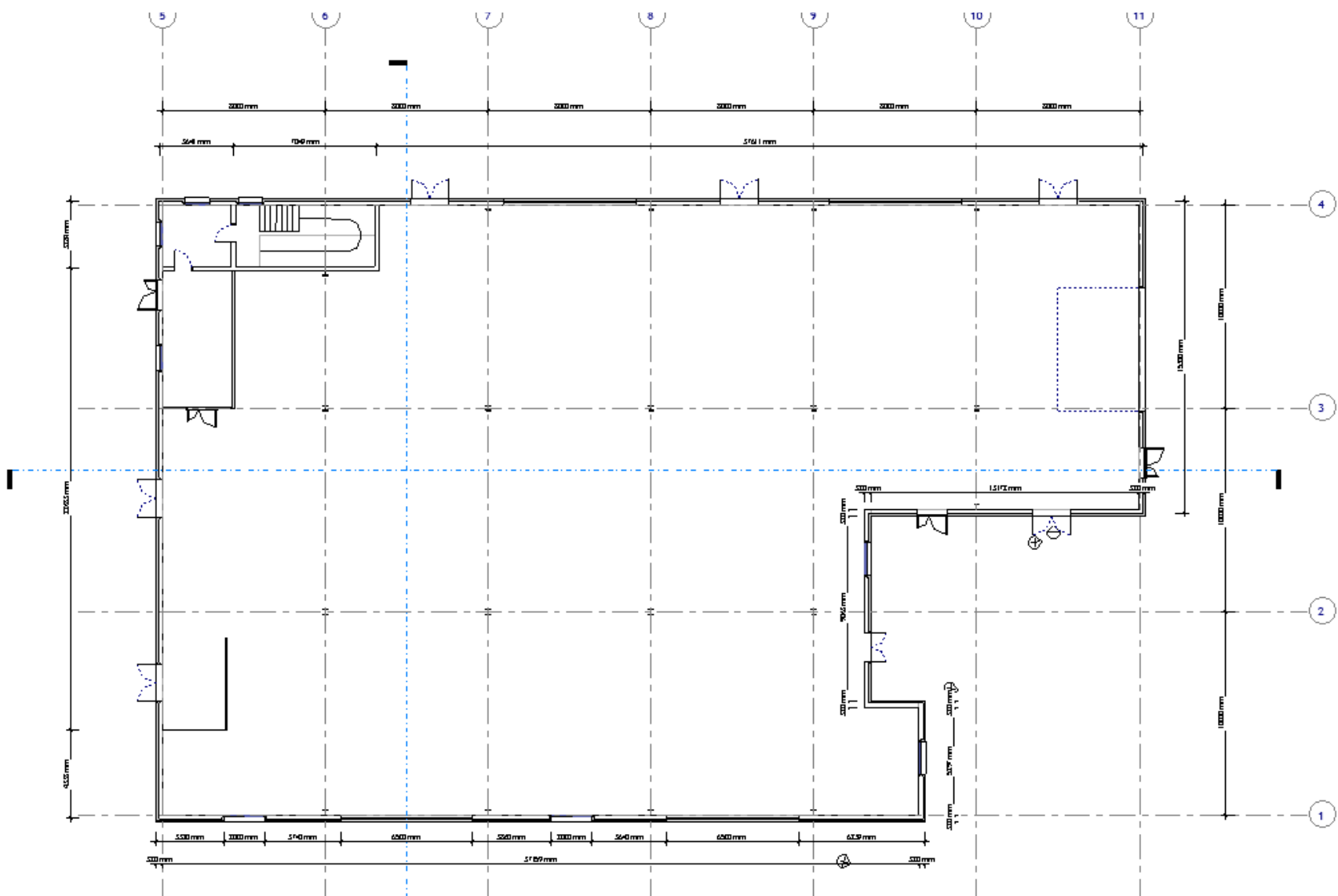
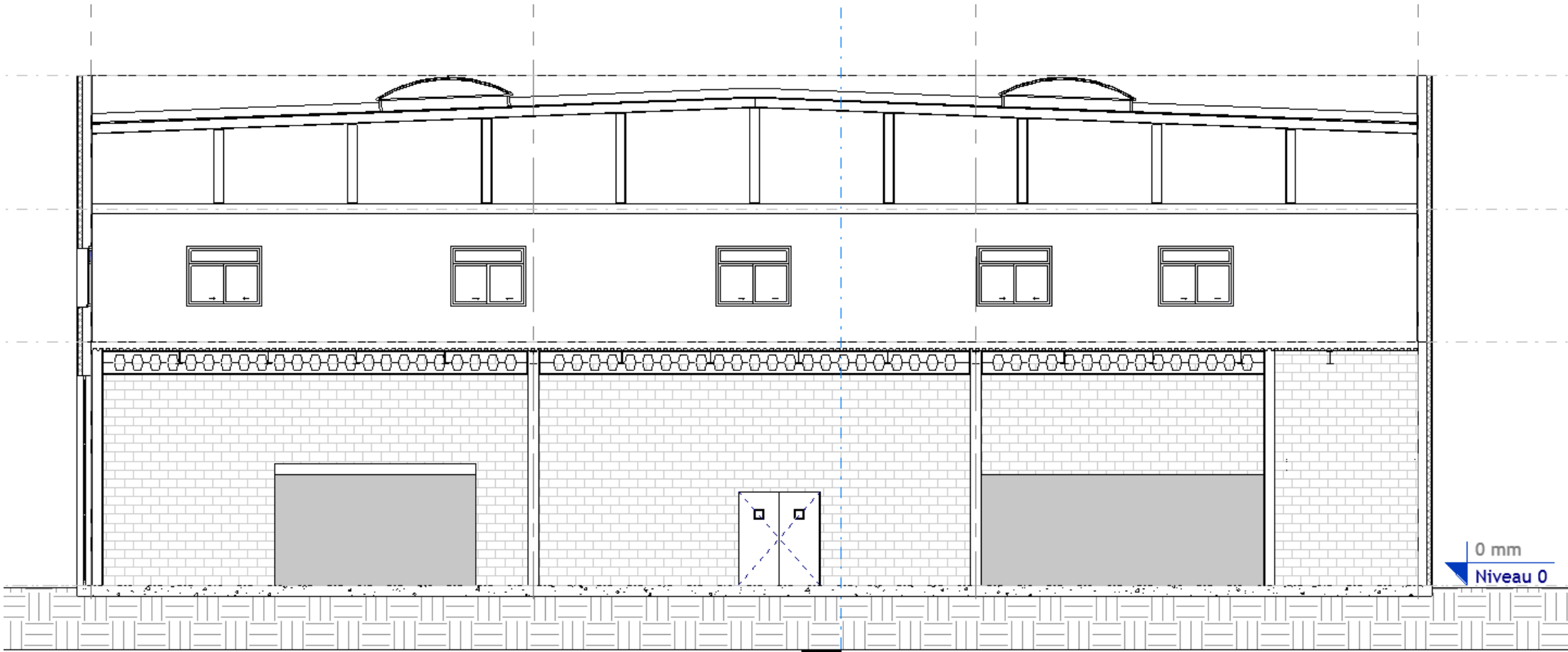
Subdivisions



Milestones for Digital Factories



Using BIM for Buildings



Home Viewpoint Review Animation View Output Item Tools Factory BIM 360 Render

Navigation Bar View Cube HUD Reference Views Show Grid Mode Building.rvt Level 1 Full Screen Split View Background Window Size Windows Load Workspace Save Workspace Help

Navigation Aids Grids & Levels Scene View Workspace Help

Selection Tree

Standard

- pipng.dwg
- Implantation.dwg
- Civil_Grading_Finished.nwc
- Frontloader Factory.nwd
- ASD structure.nwc
- Bottle Factory Building.nwd
- NdP local Faro.nwd
- Ligne de production.nwd
- New Cell.dwg
- New Cell.iam
- Mannheim_Revit.rvt
- Production_A-New.iam
- Production_A-New.dwg
- Production_B-New.iam
- Production_B-New.dwg
- Bestand_3.rcs
- Mannheim_G finished.nwc**



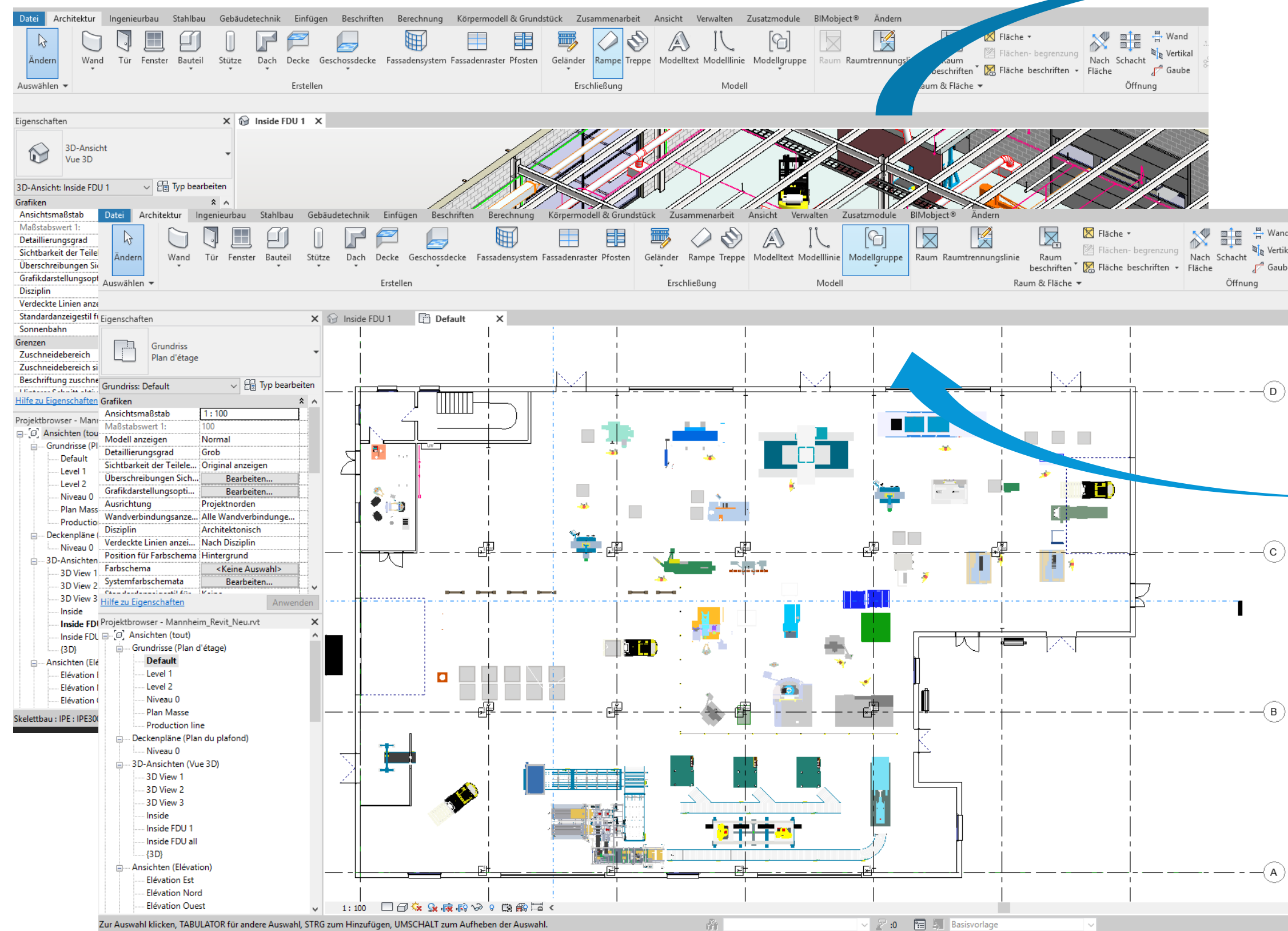
Properties

Item	Summary	Project	TimeLiner	Material
Property	Value			
Rotation Angle	270.000°			
Rotation Axis.X	0.000			
Rotation Axis.Y	0.000			
Rotation Axis.Z	1.000			

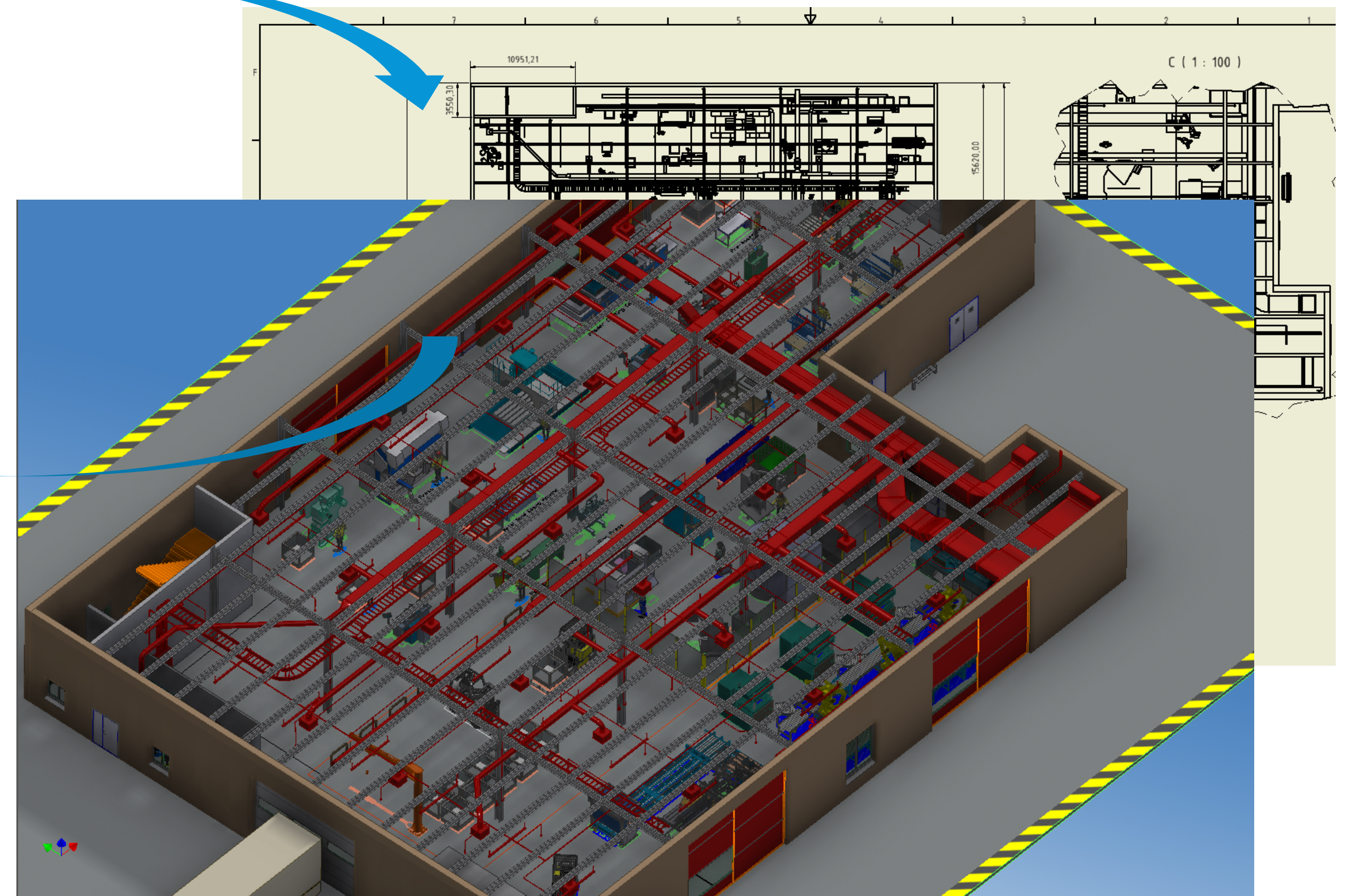
Saved Viewpoints

- Général
- Toto du terrain
- Bâtiments : Vue en coupe
- Bâtiments : Factory2 entrée
- Structures : Factory1_1
- Structures : Factory1_2
- Structures : Factory 4
- Piping : Factory1_1
- Piping : Factory4_2
- Espaces : Factory4 montage frontloader
- Espaces : Factory4 offices
- Espaces : Factory4 atelier de soudure
- Espaces : expedition Frontloader
- Equipements : Factory2_1
- Equipements : Factory2_2
- Equipements : Factory4_1
- Transitique : Factory2_1
- Collisions : Factory1_1
- Collisions : Factory1_2
- Collisions : Factory2_1
- Capture existant : Nuage de points
- Capture existant : Nuage de points 1
- New work sell
- Manheim entrée
- Manheim : atelier
- Manheim : atelier 1
- Coupe Mannheim
- View

BIM and Revit are key for digital factories



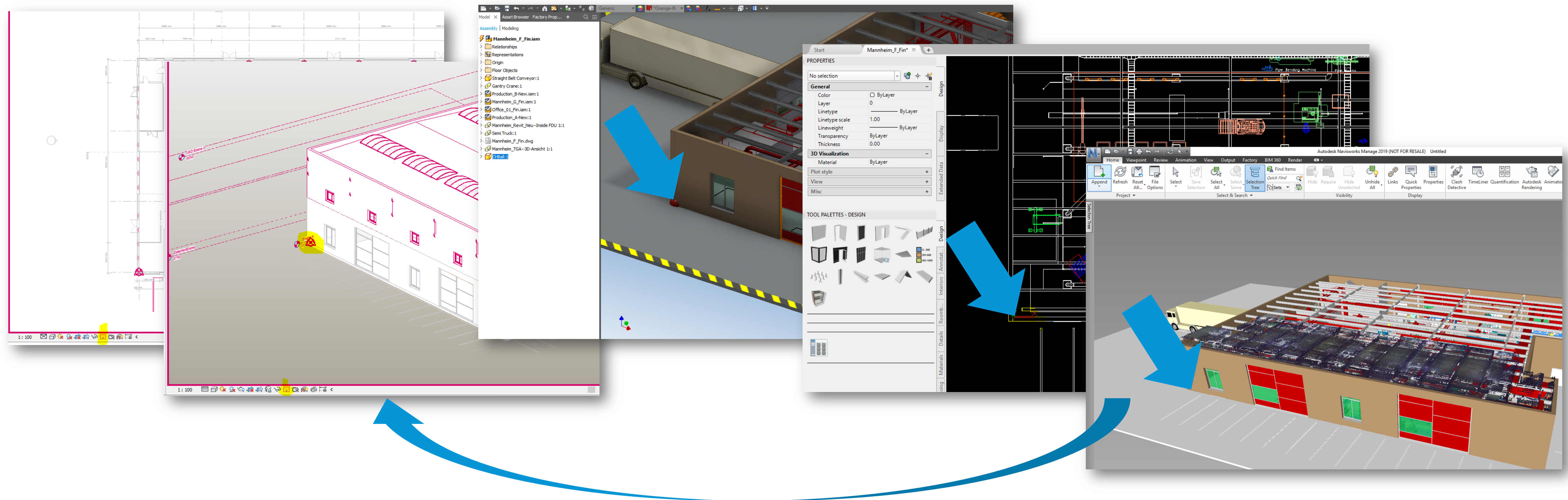
Revit = Coordination Model



Inventor = Import

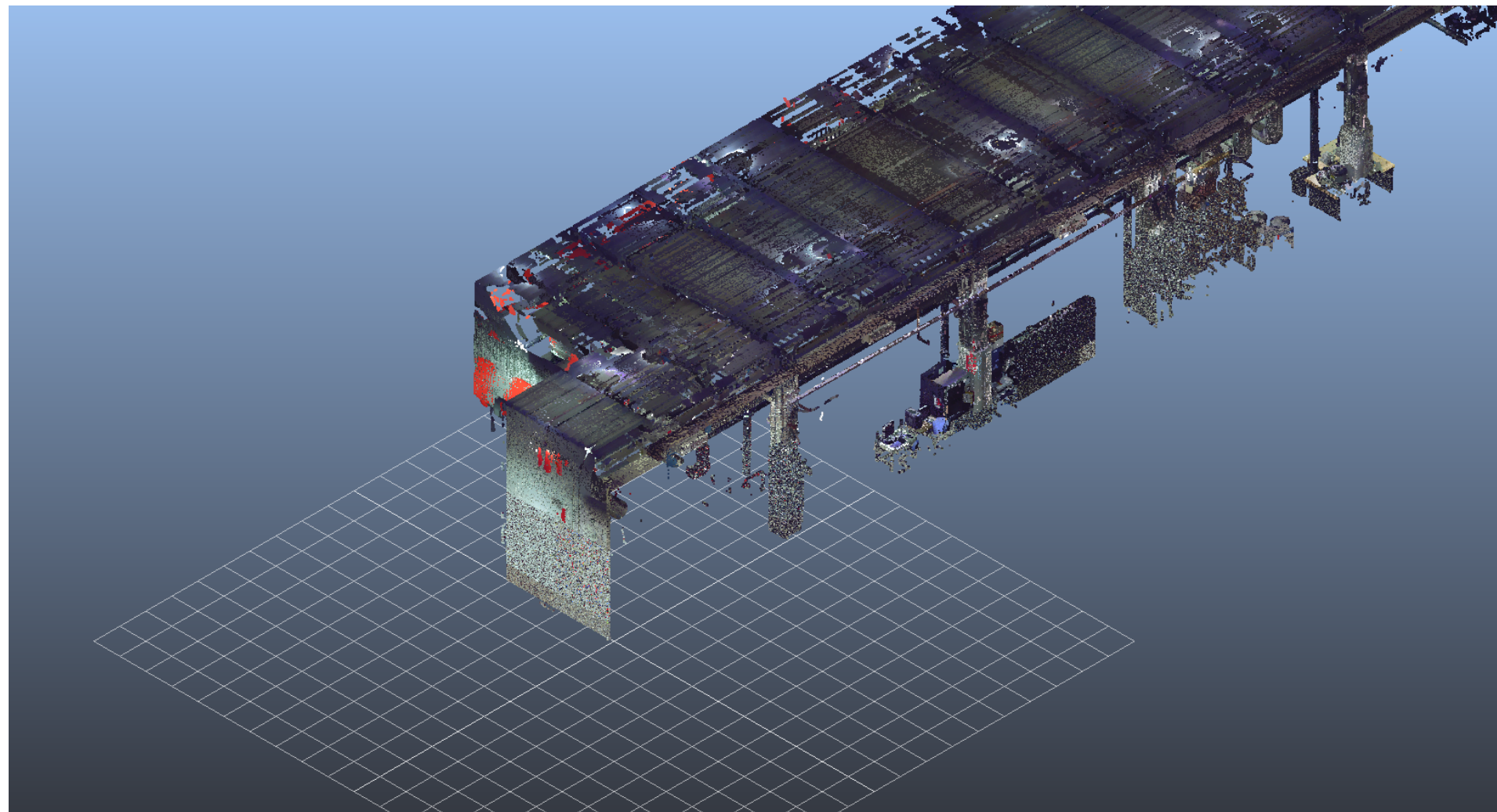
BIM and Revit are key for digital factories

- Revit model is a center for coordination of all factory
- All sub layouts and lines use same coordination



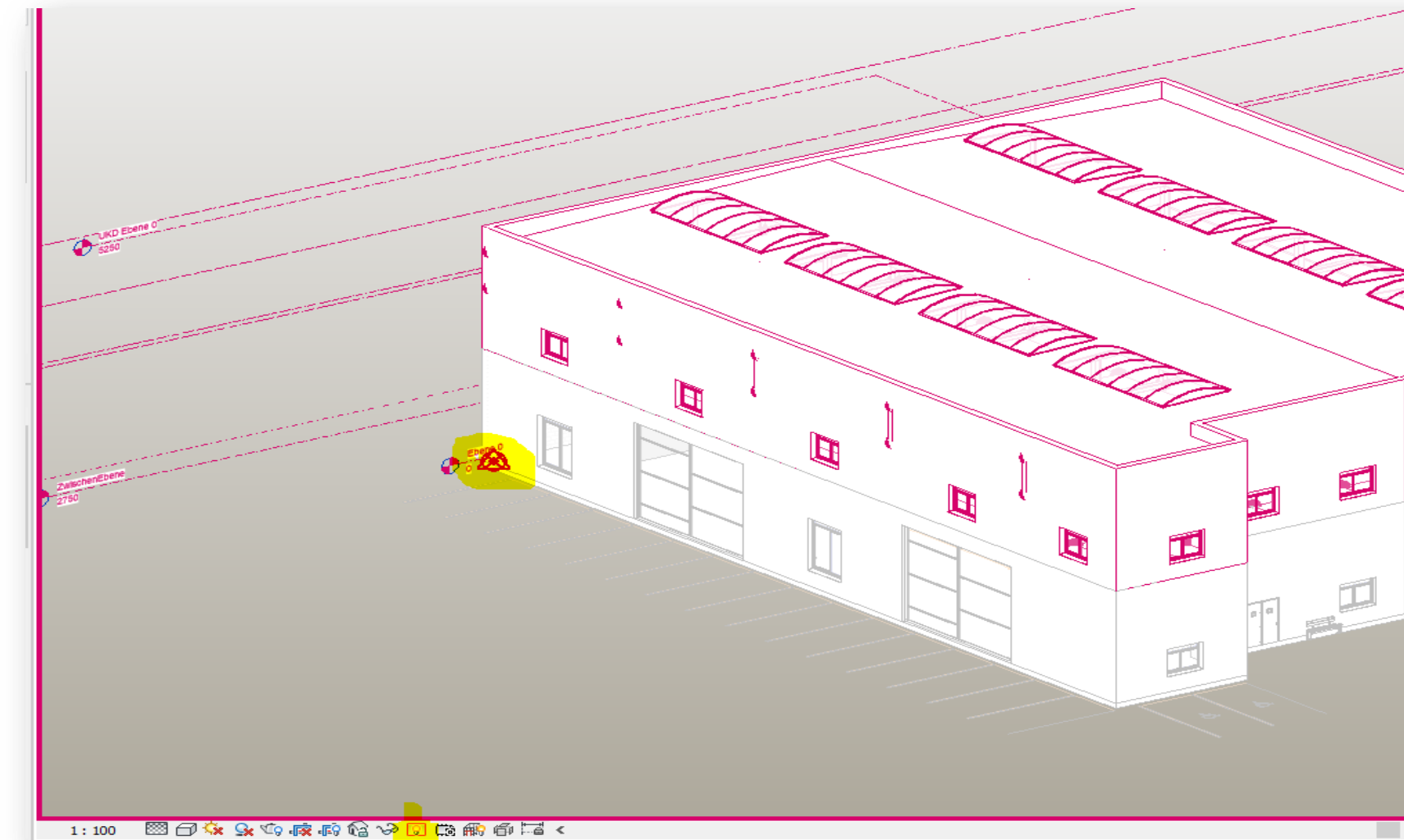
BIM and Revit are key for digital factories

- Point Cloud– Origin



- Scanned point was origin

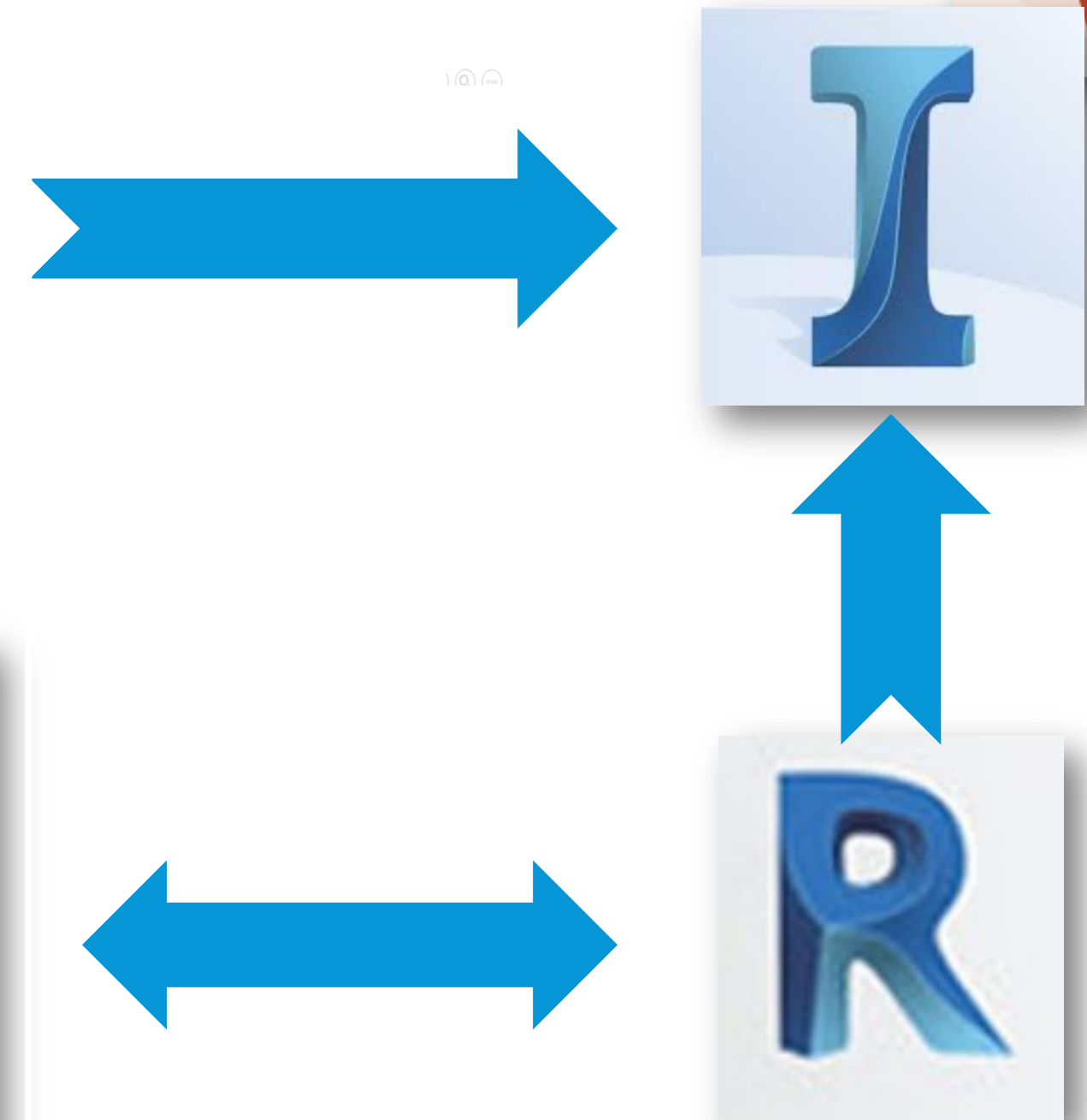
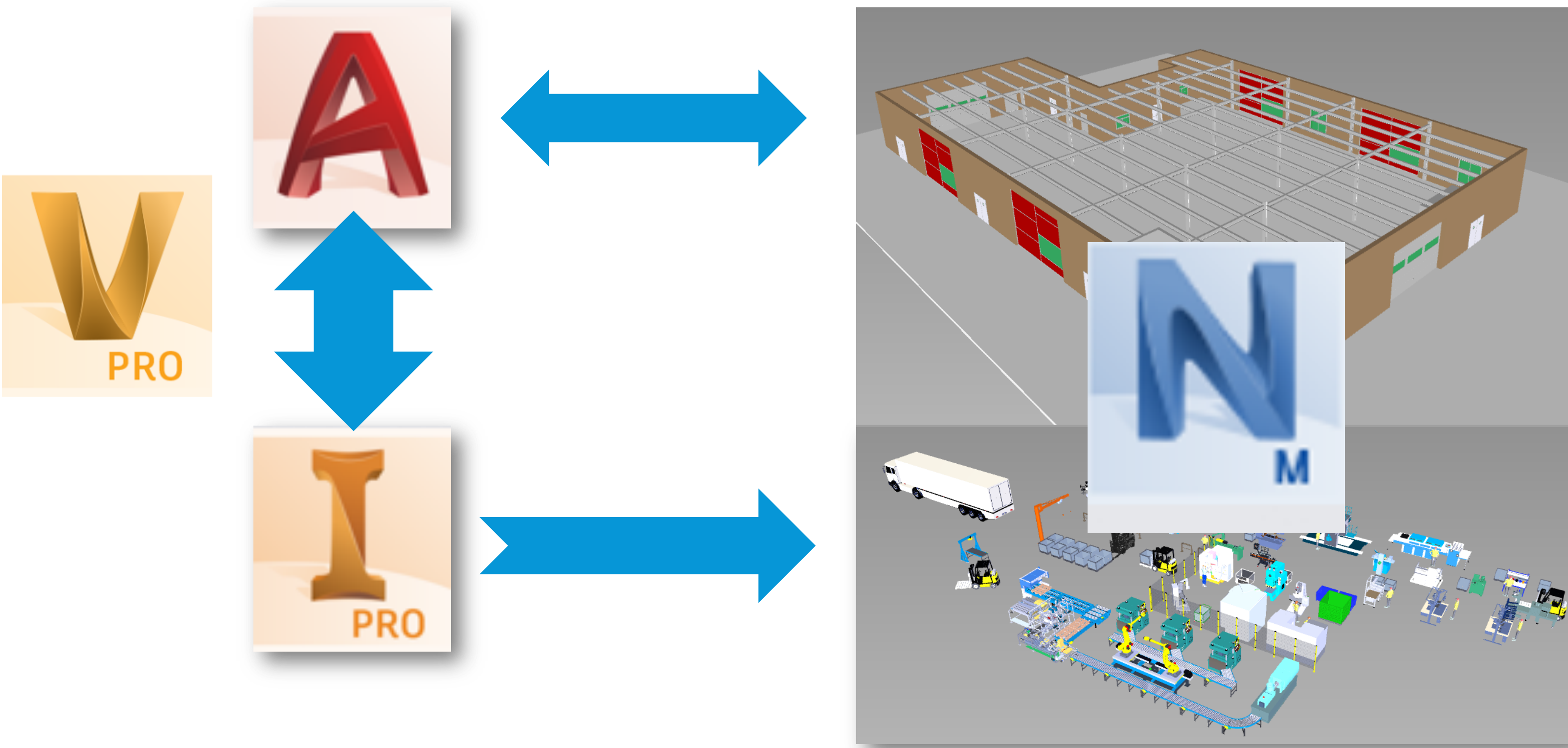
- Revit – Origin



- In Revit model design base point was origin

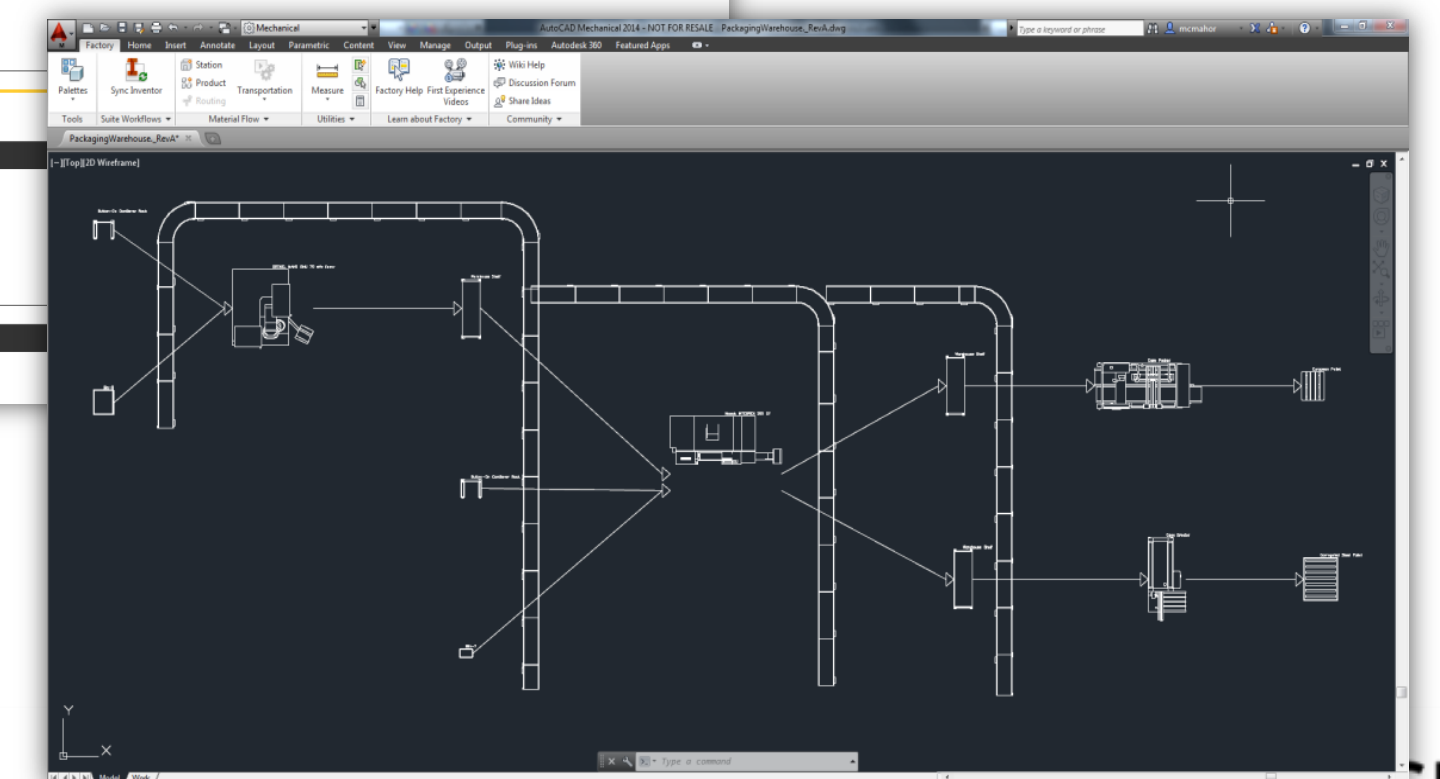
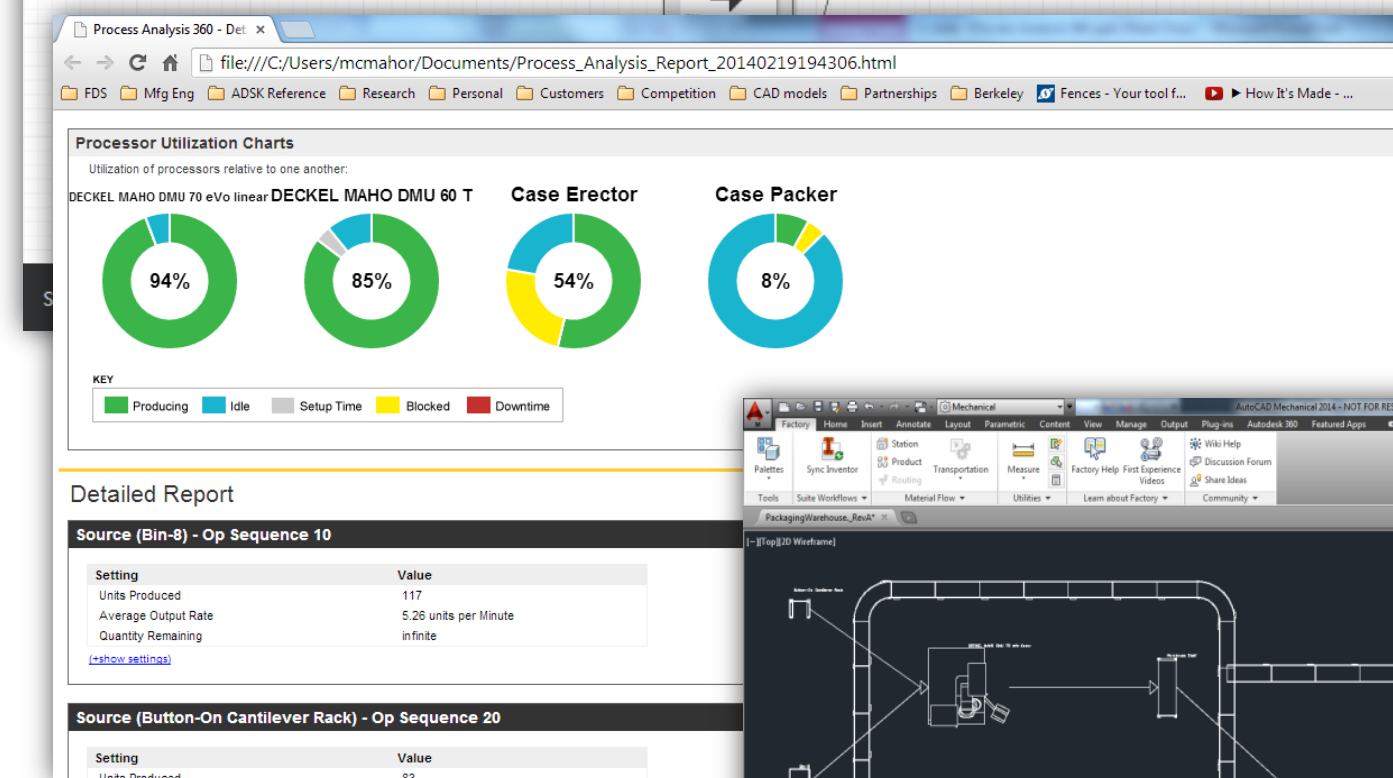
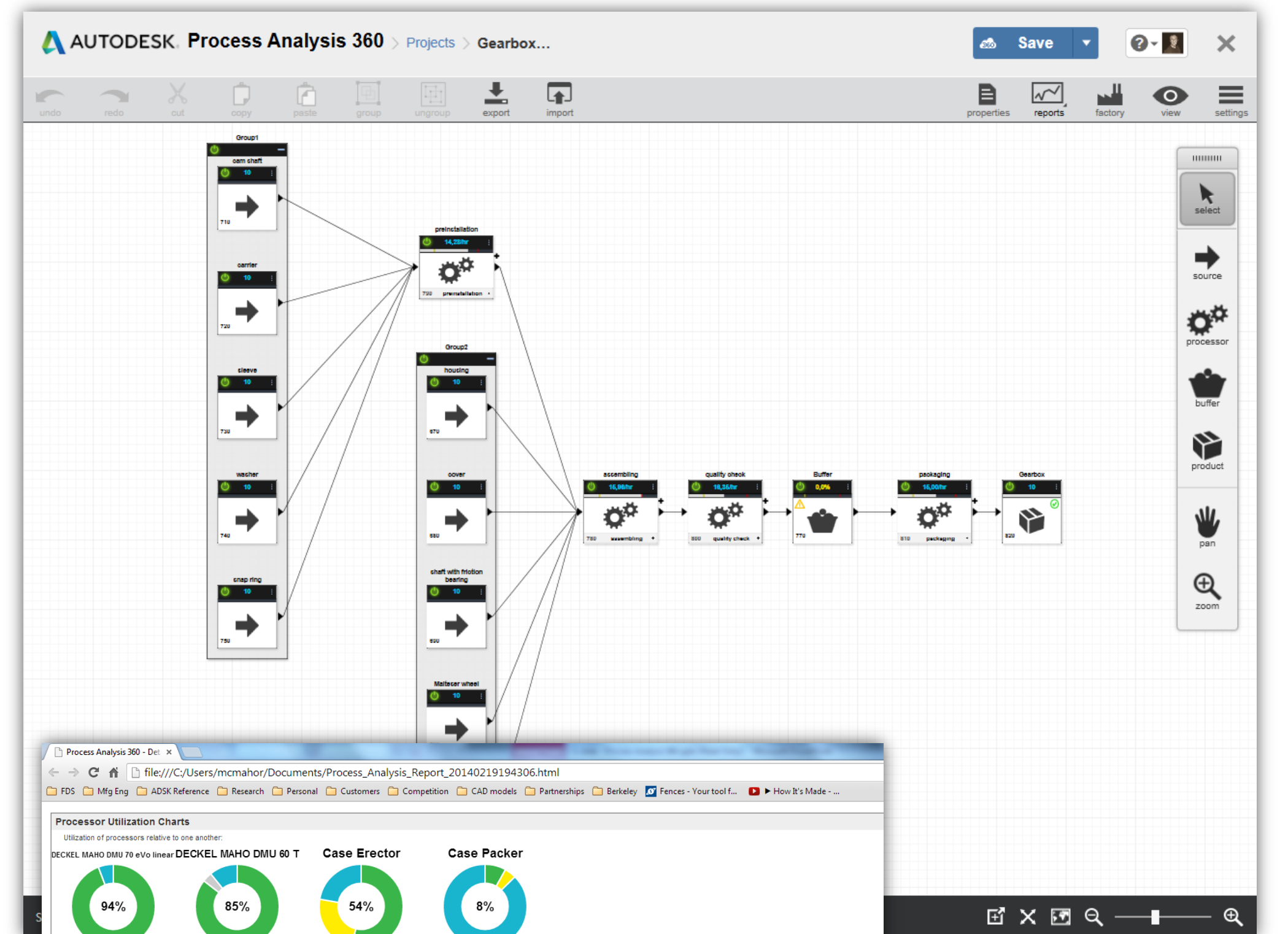
Collaboration through diciplines

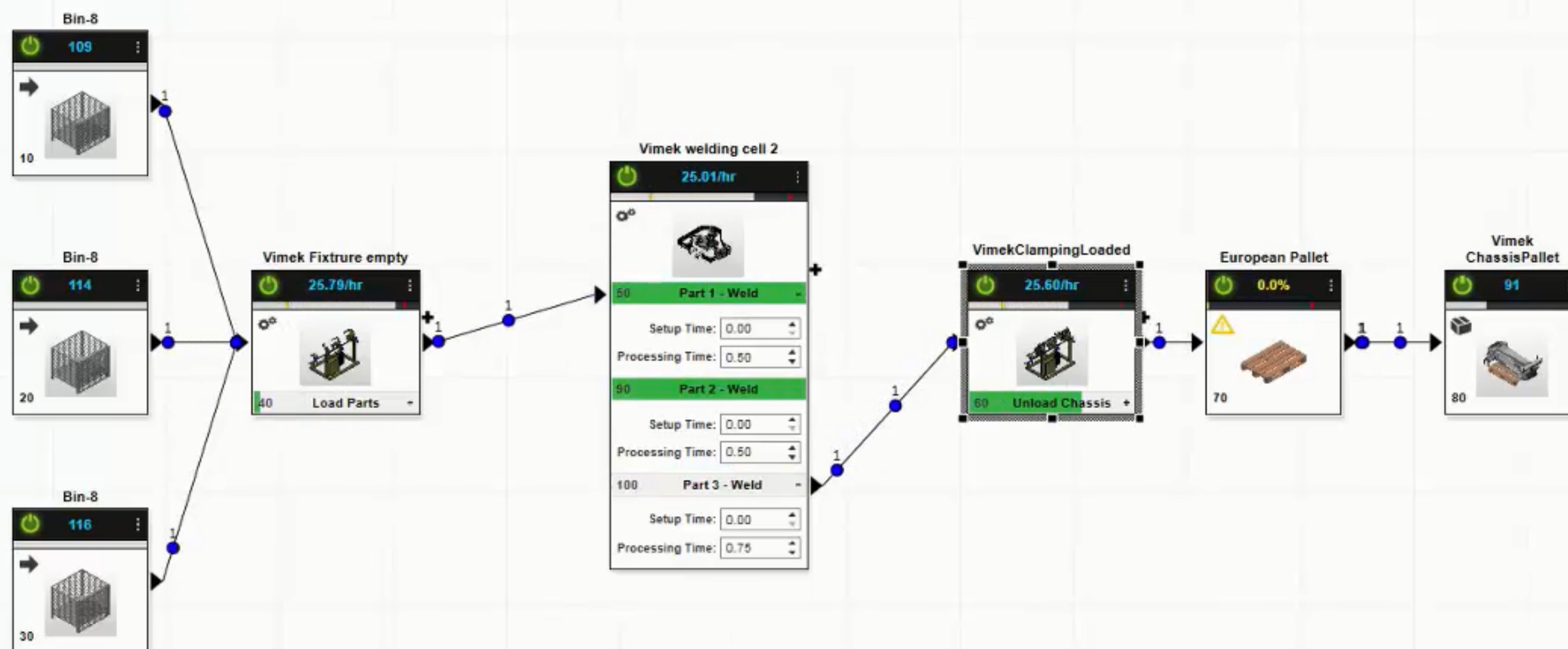
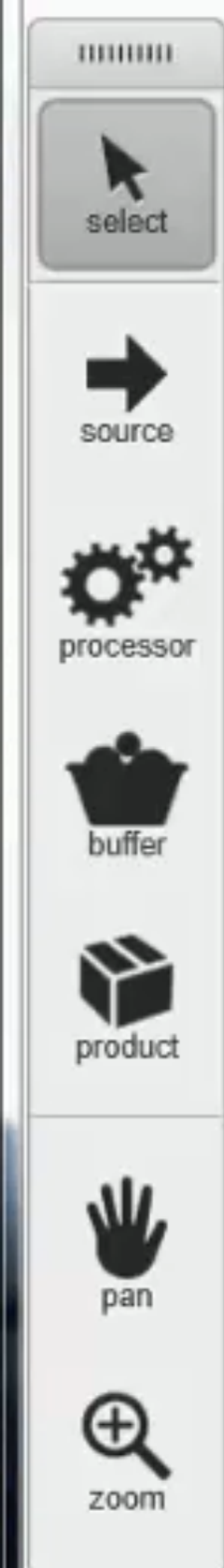
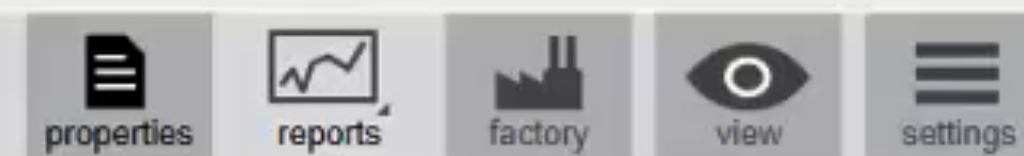
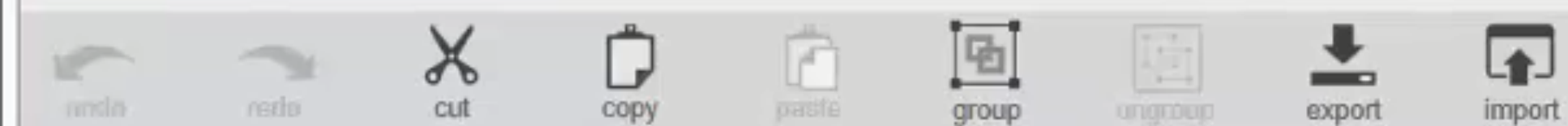
- Collecting all data via Navisworks for comparision



Defining Process

- Design and simulate
- Find bottlenecks
- Calculate late time
- Improve your processes
- Export as dwg





Properties

Processor Settings

Name	VimekClampingLoaded	
MTBF	80	hr
	50	Variability(%)
MTTR	60	min
	80	Variability(%)
Scheduling	Fixed Priority	
	<input checked="" type="checkbox"/> Ignore when unavailable	
Utilization Alarms	20	Min(%)
	92	Max(%)
Operation Sequencing	<input type="checkbox"/> Sequential	

Unload Chassis

Op Sequence #	60	
Setup Time	0.25	min
	0	Variability(%)
Processing Time	1.5	min
	0	Variability(%)
Minimum Quantity	1	
Production Rate	40	/ hr

Pause simulation

Factory Assets Properties View Settings Settings

●.....➔ Machine Mapping

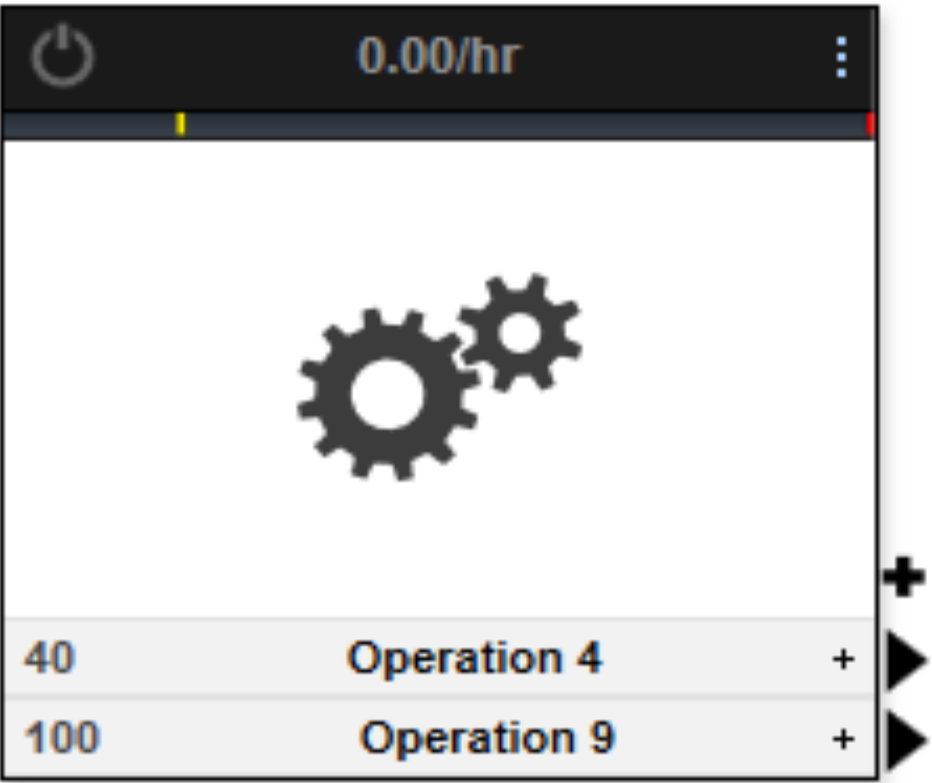
●.....➔ Operation Mapping

Machine
Mill-400






MTTR: 1041ms
MTBF: 1066ms

Processor2



PA360 Processor

Operation	Part Kind	Processing/Setup Time (average)	
0010 	• Y2115A-2	PT:4587ms	ST:9326ms
	• X696SX-FOLD		PT:1518ms
	ST:622ms		
	• MS580-1	PT:25402ms	ST:1836ms
0020 	• A4065UU-2	PT:123678	ST:46828ms
	• ...		
	• A1559-1	PT:534357ms	ST:34326ms
	• M307N-1	PT:34518ms	ST:6232ms
0030 	• XXL600-2	PT:3224ms	ST:3421ms
	• P197N-1	PT:76913ms	ST:0ms
	• ...		
	• A1559-1	PT:136109ms	ST:26395ms
	• Z425-3	PT:335415ms	ST:68988ms
	• ...		

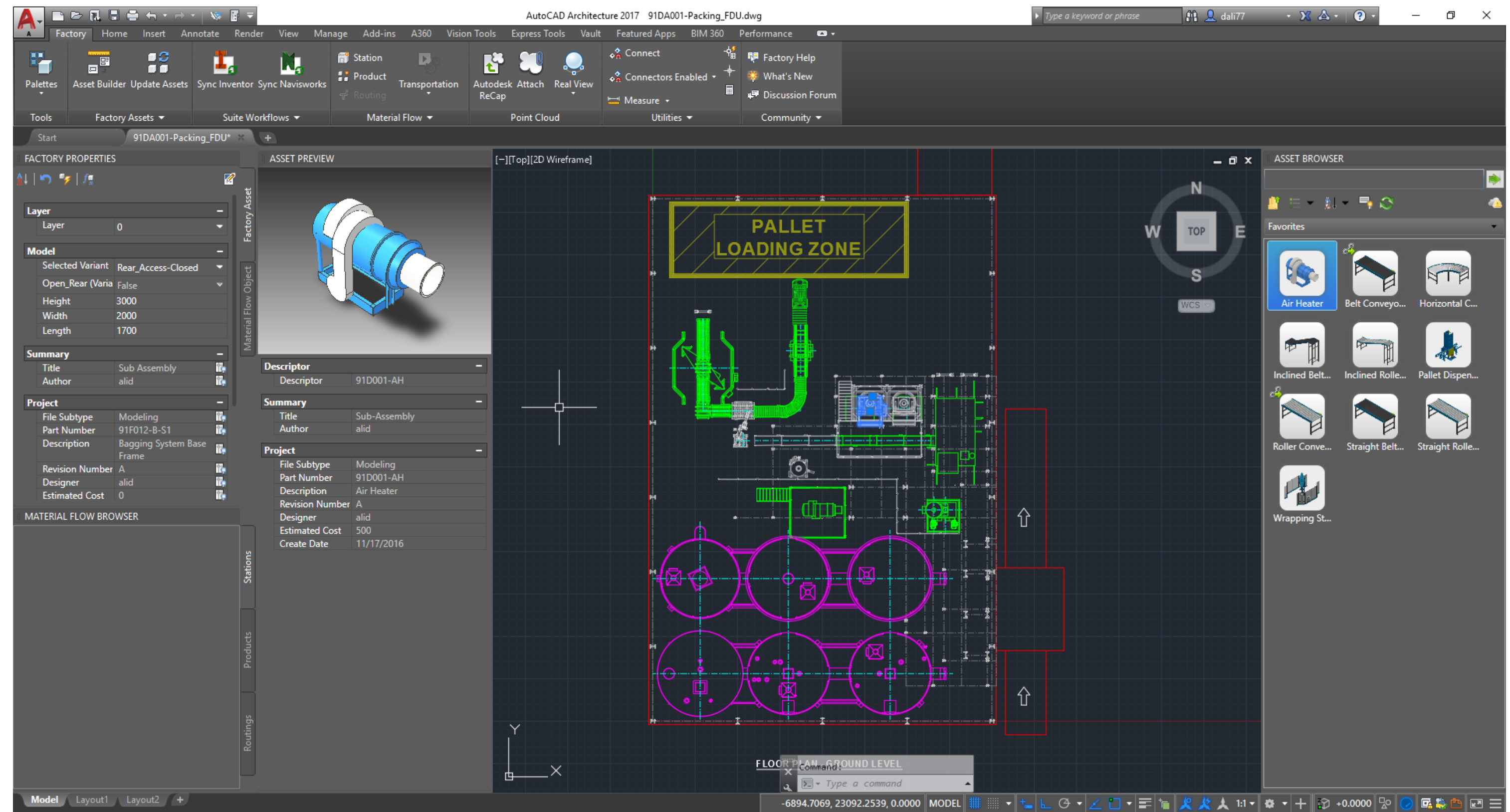
Layout Management

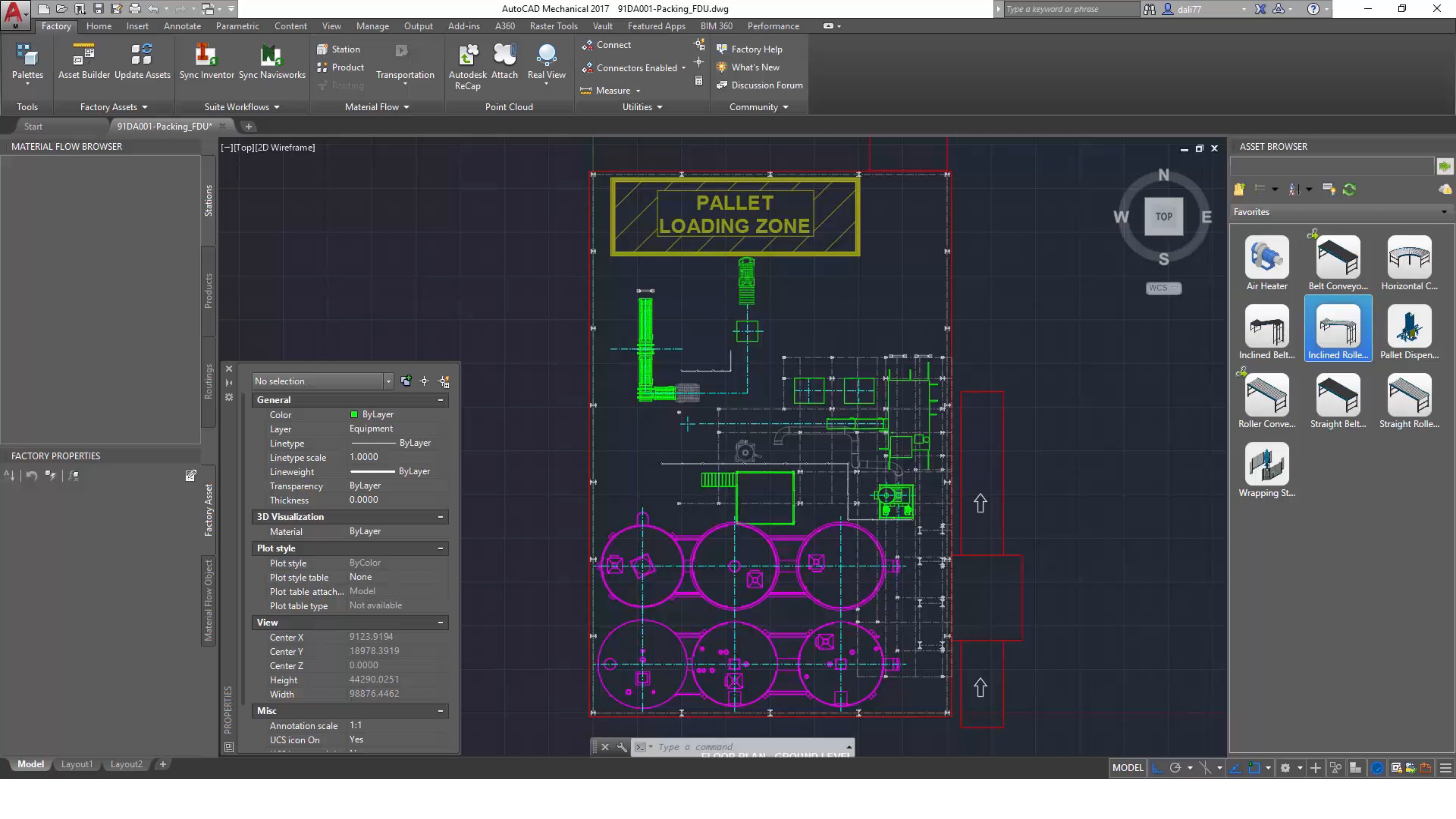
Prodactivity Tools

- Factory Assets
- Material Flow Simulation
- Smart Connections

Before to study

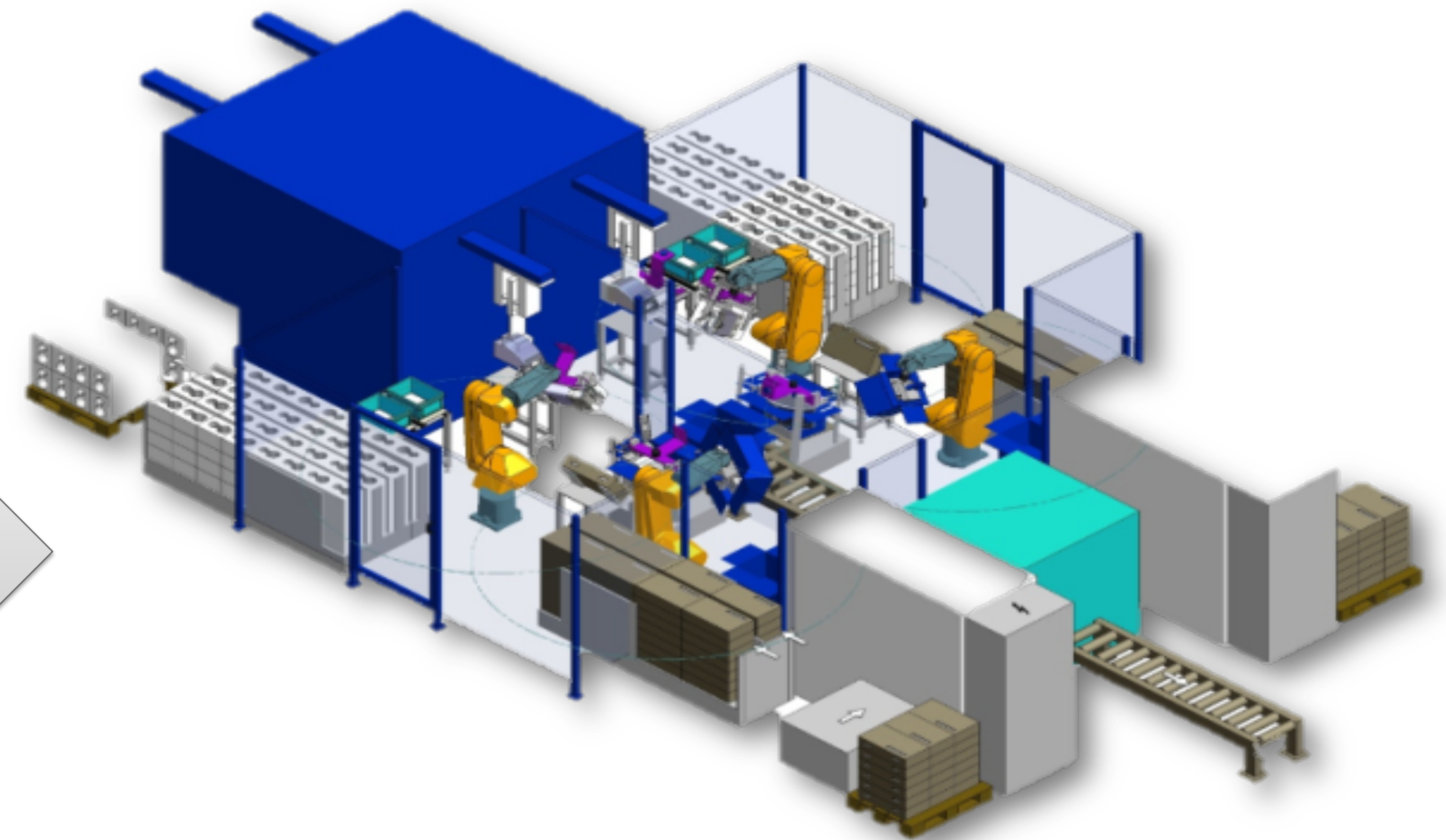
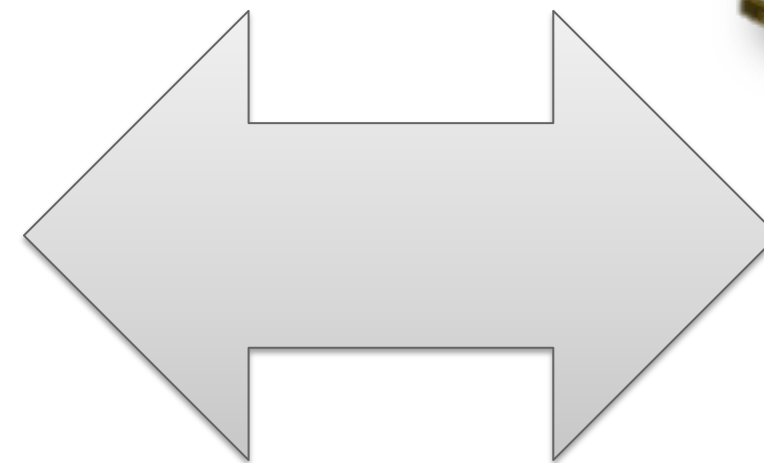
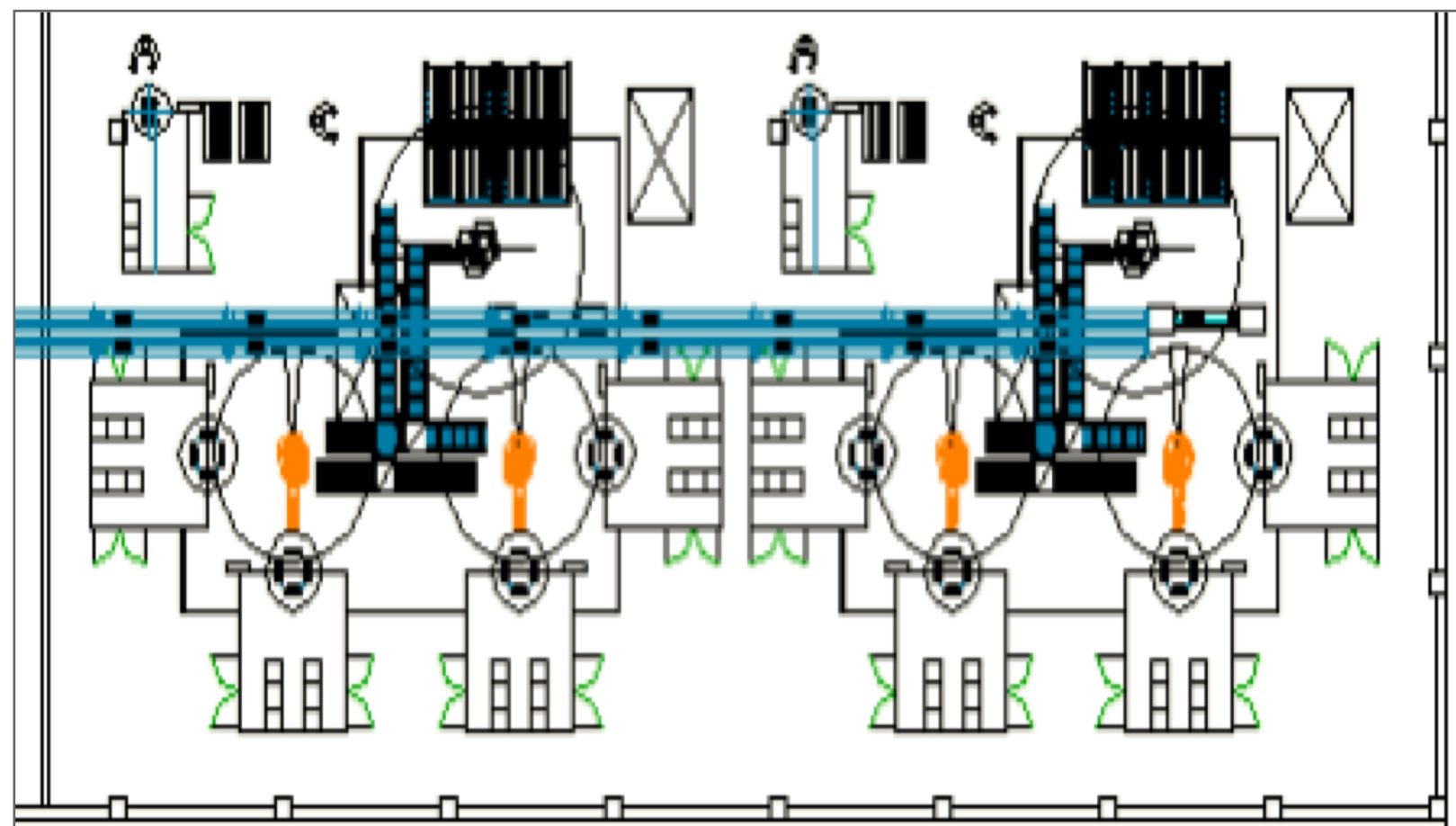
- Import layouts
- Convert files
- Create assets from blocks

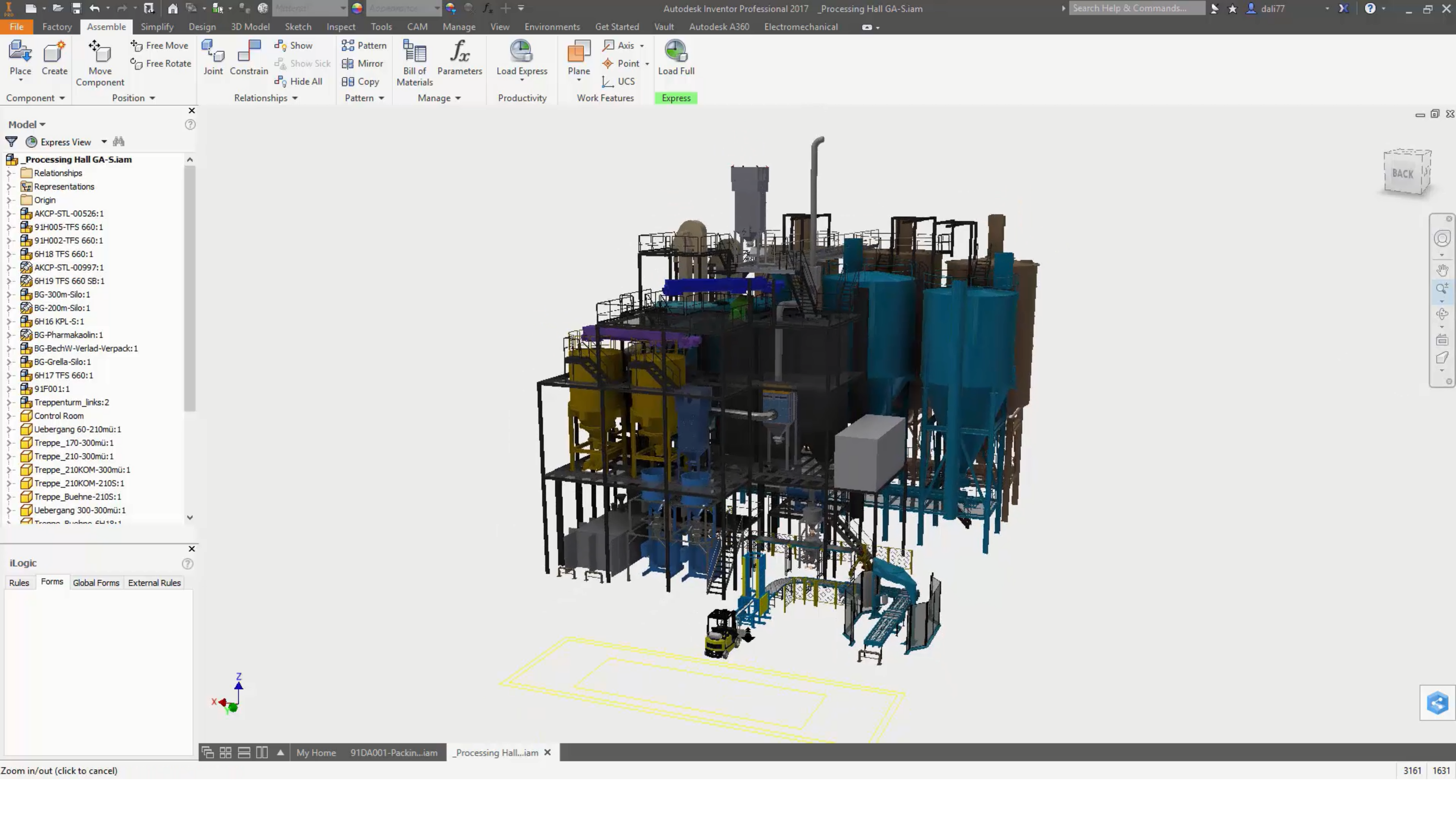




3D Modeling

- 2D layout to 3D modeling
- Smart connection and link
- Review positioning
- Working with BIM

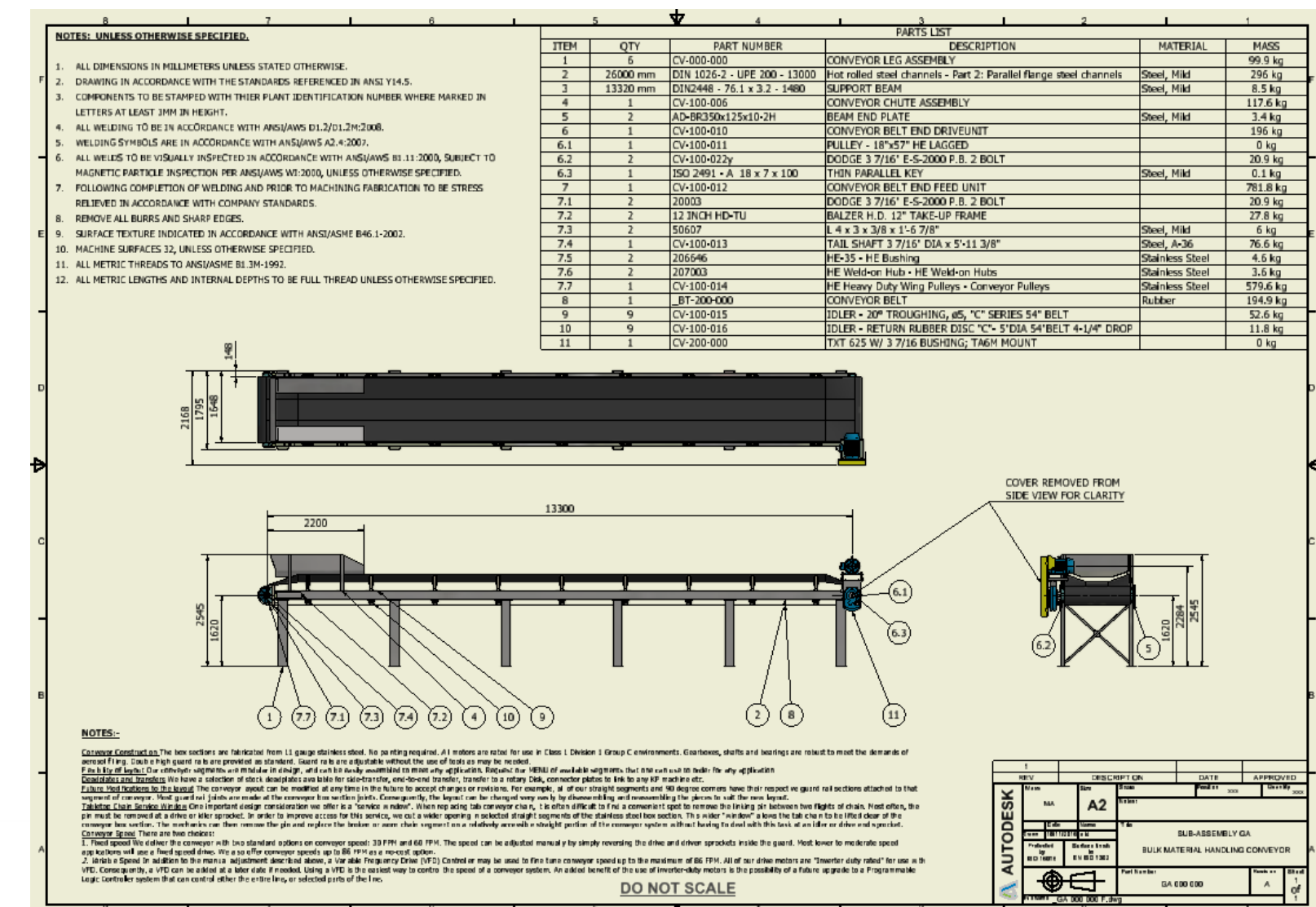






Creating Engineering Documents

- Creat complex technical drawings
- Assembly guides, maintenance documents and others



iLogic

Rules Forms Global Forms External Rules

Model

ADSK-100-00072.dwg

Drawing Resources

Sheet: 1

Default Border

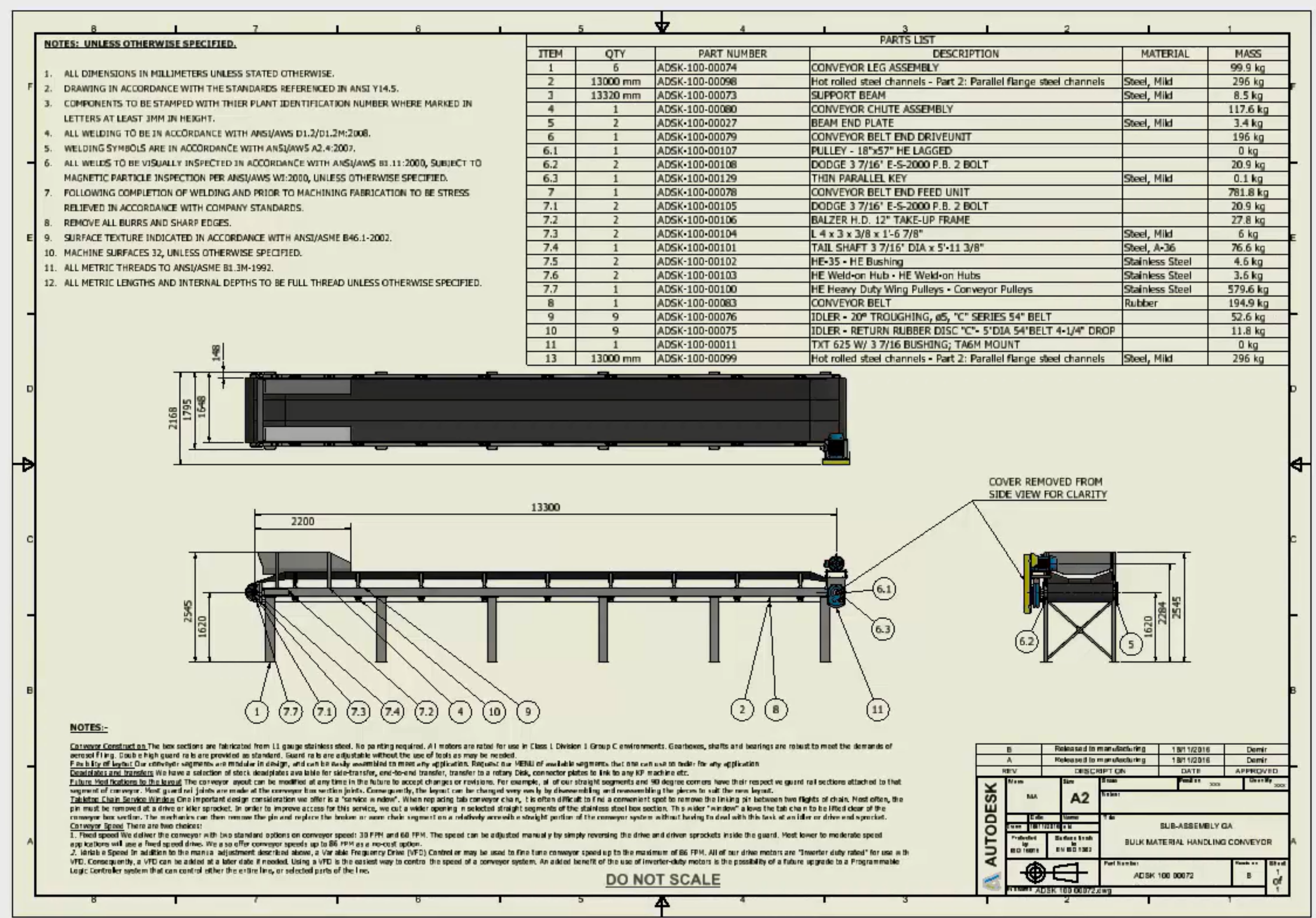
ADSK

Sketch Symbols

PARTS LIST:ADSK-100-00072.iam

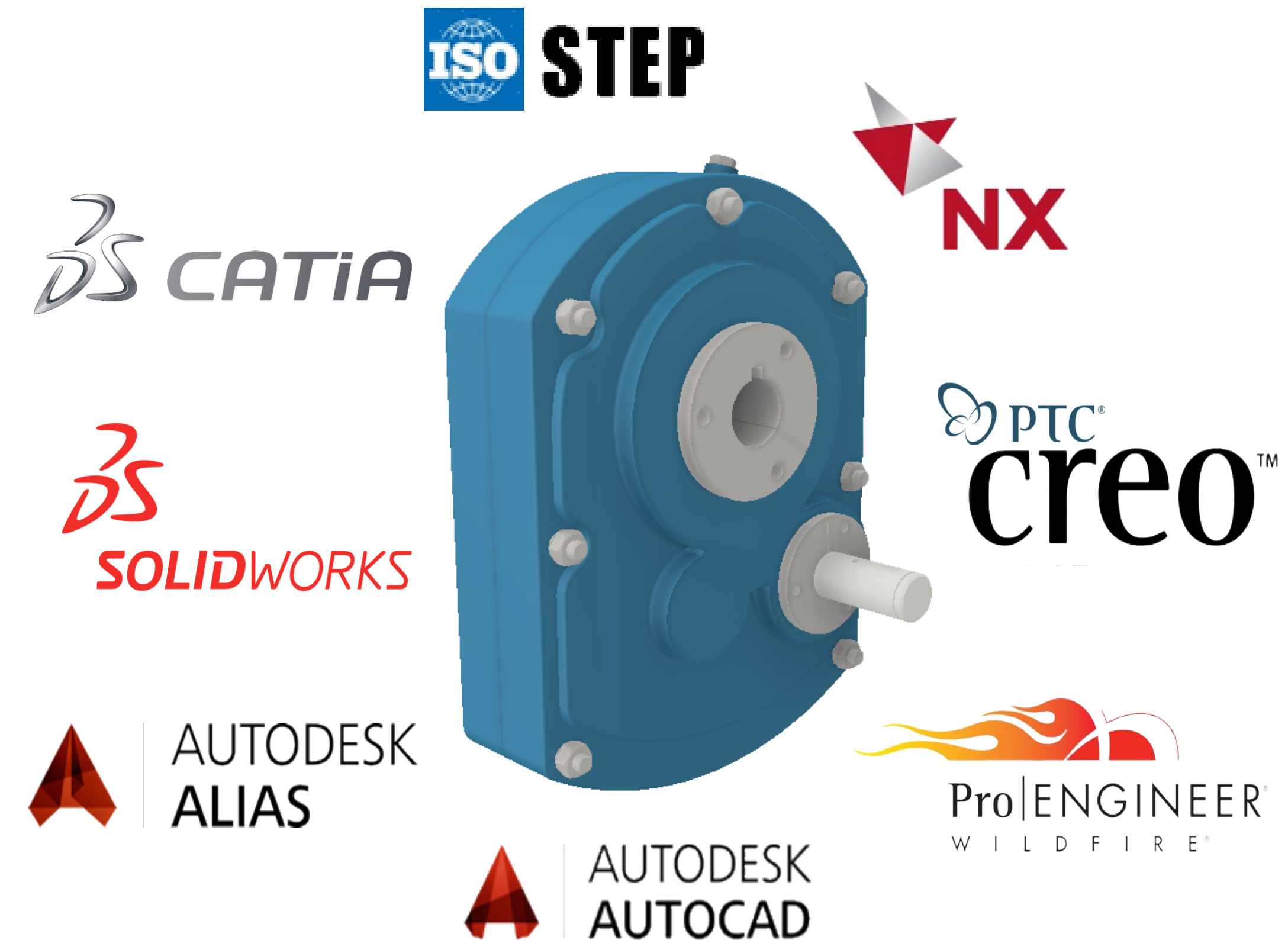
REVISION HISTORY

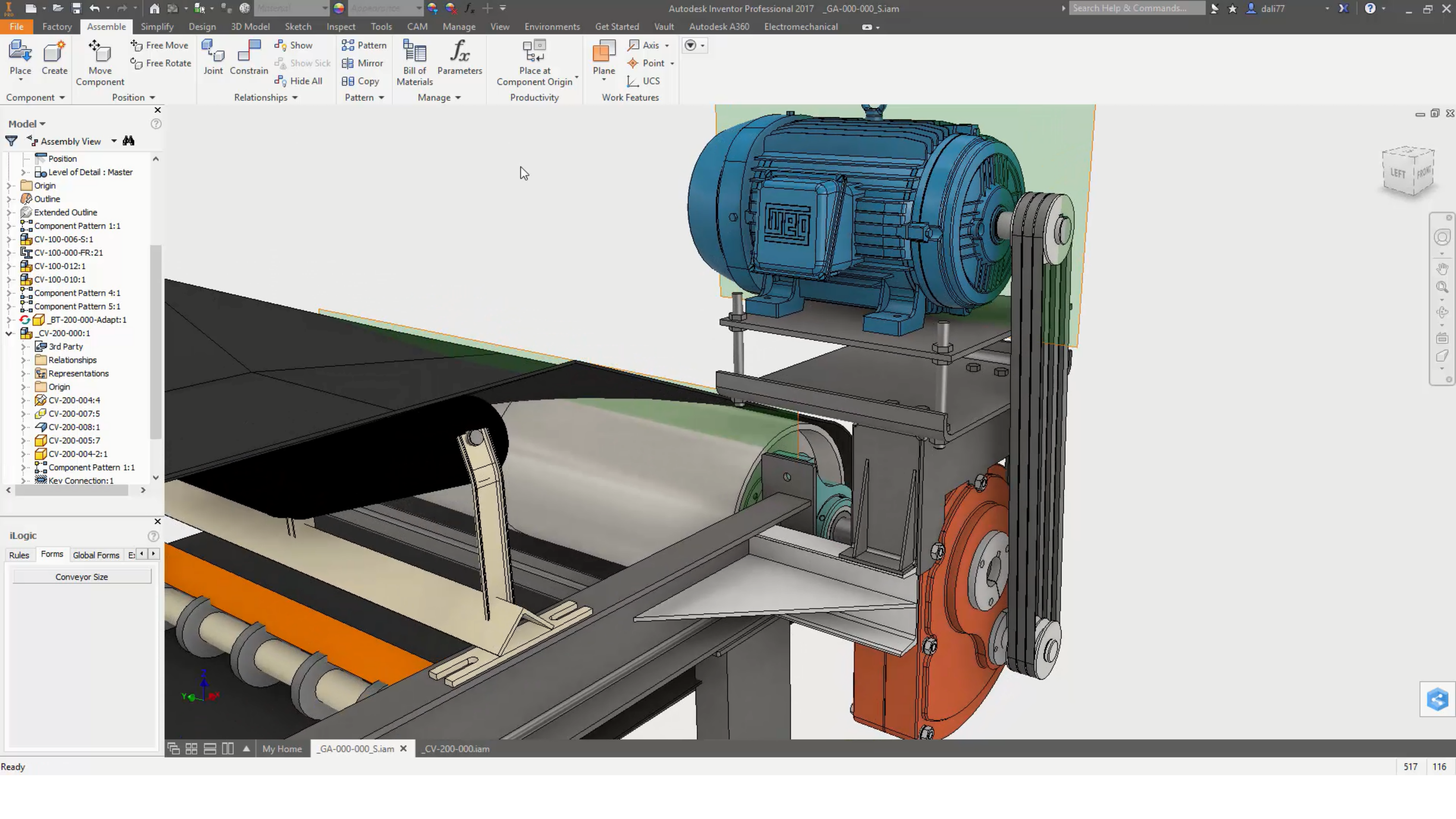
VIEW 1:ADSK-100-00072.iam



Different File Extensions

- Reduce manual file sharing
- Increase BOM





Clash Detective

Test 1

Last Run: 17:57:27 04-12-2017

Clashes

	Name	Status	Clashes	New	Active	Reviewed	Approved
	Test 1	Old	12	12	0	0	0

Add Test

Reset All

Compact All

Delete All

Update All

Rules

Select

Results

Report

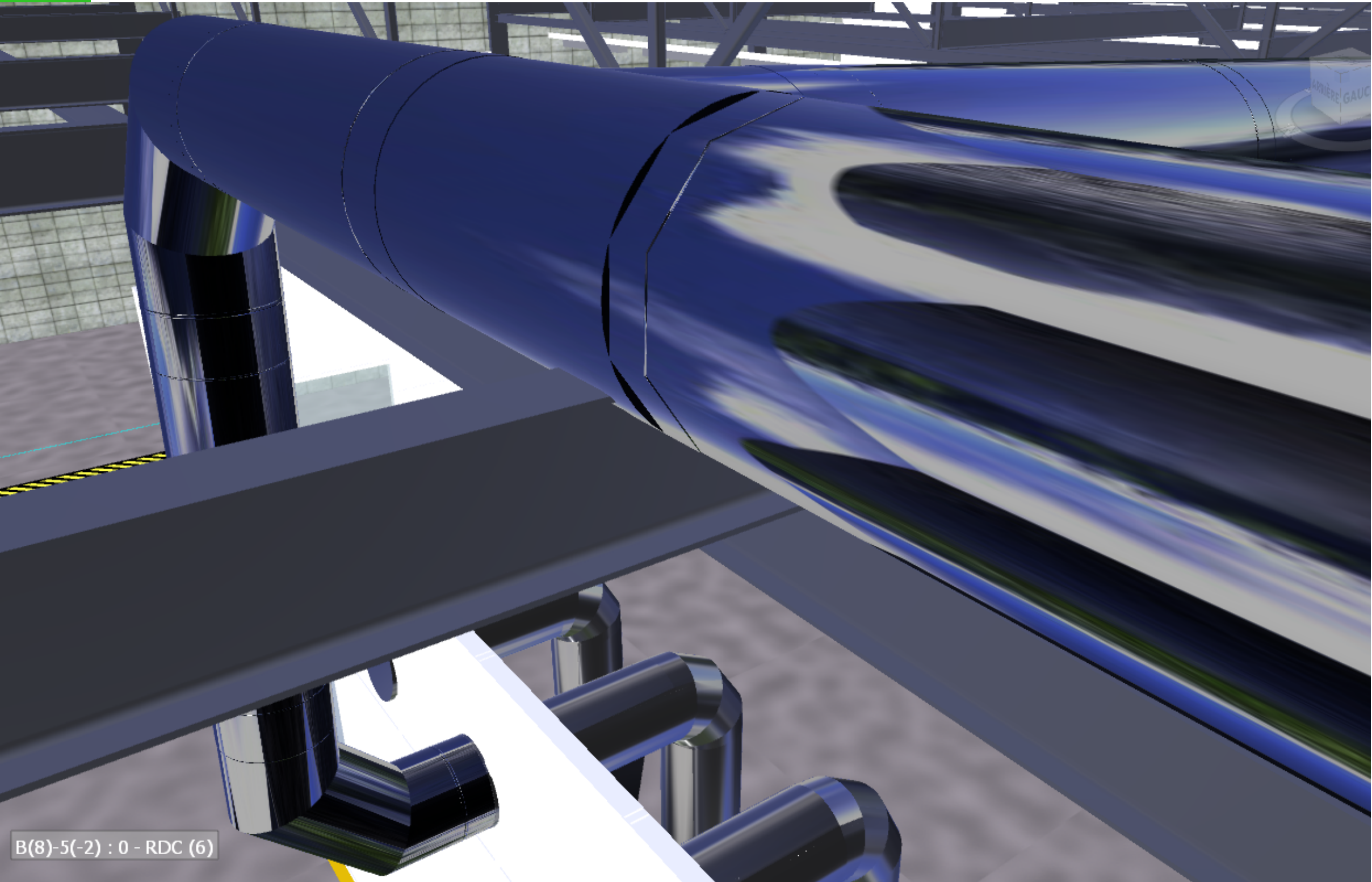
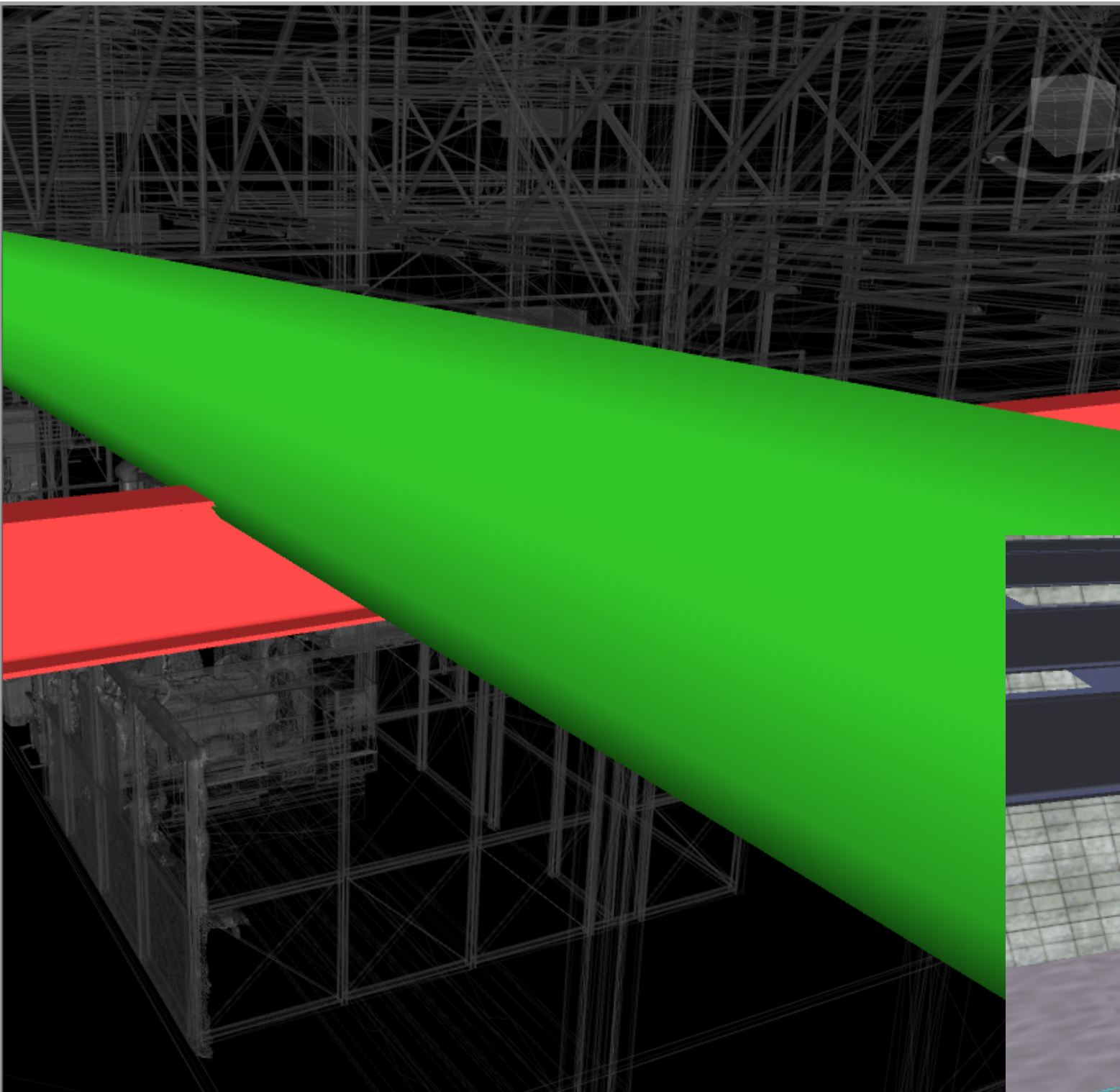
New Group

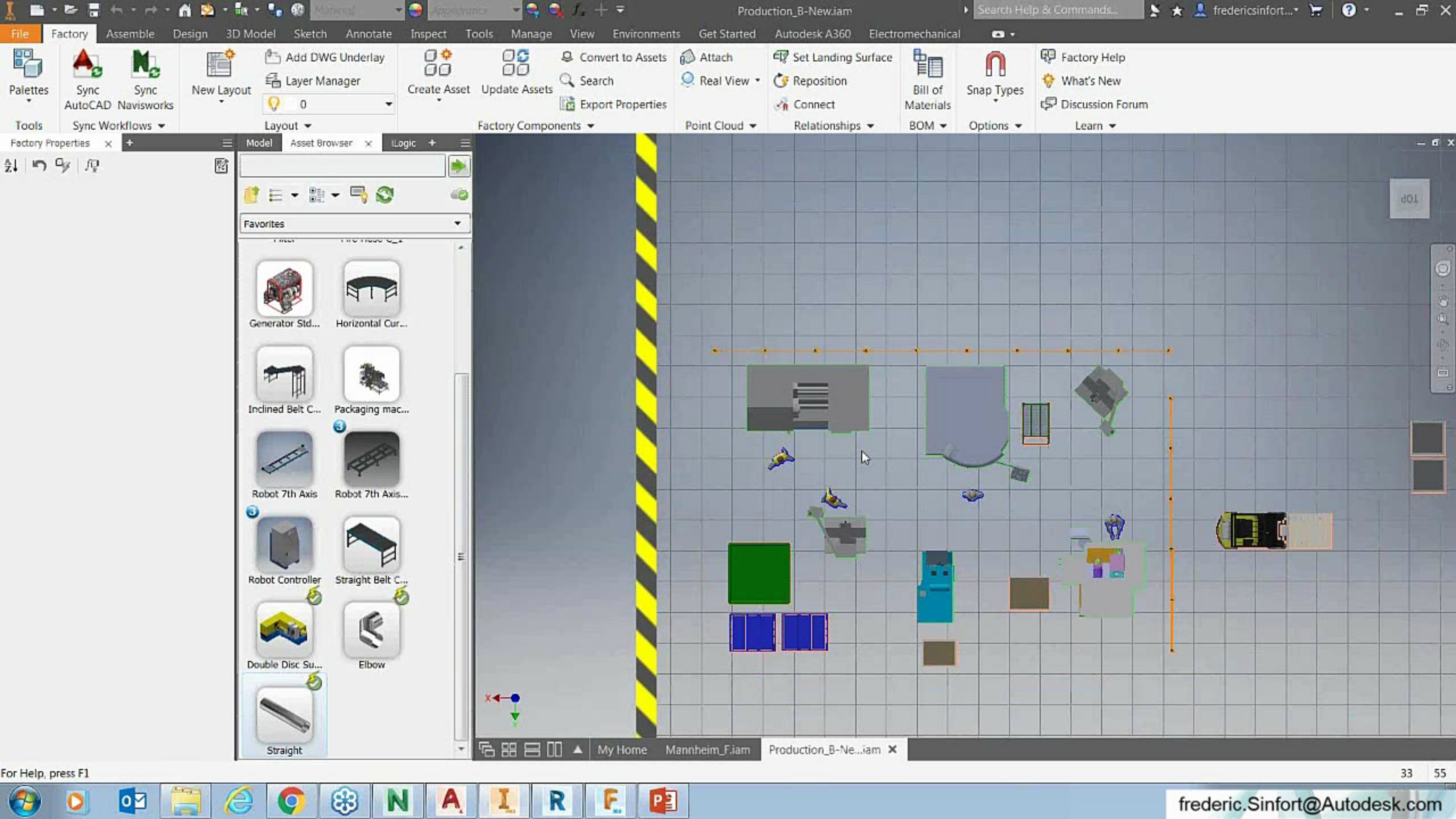
Assign

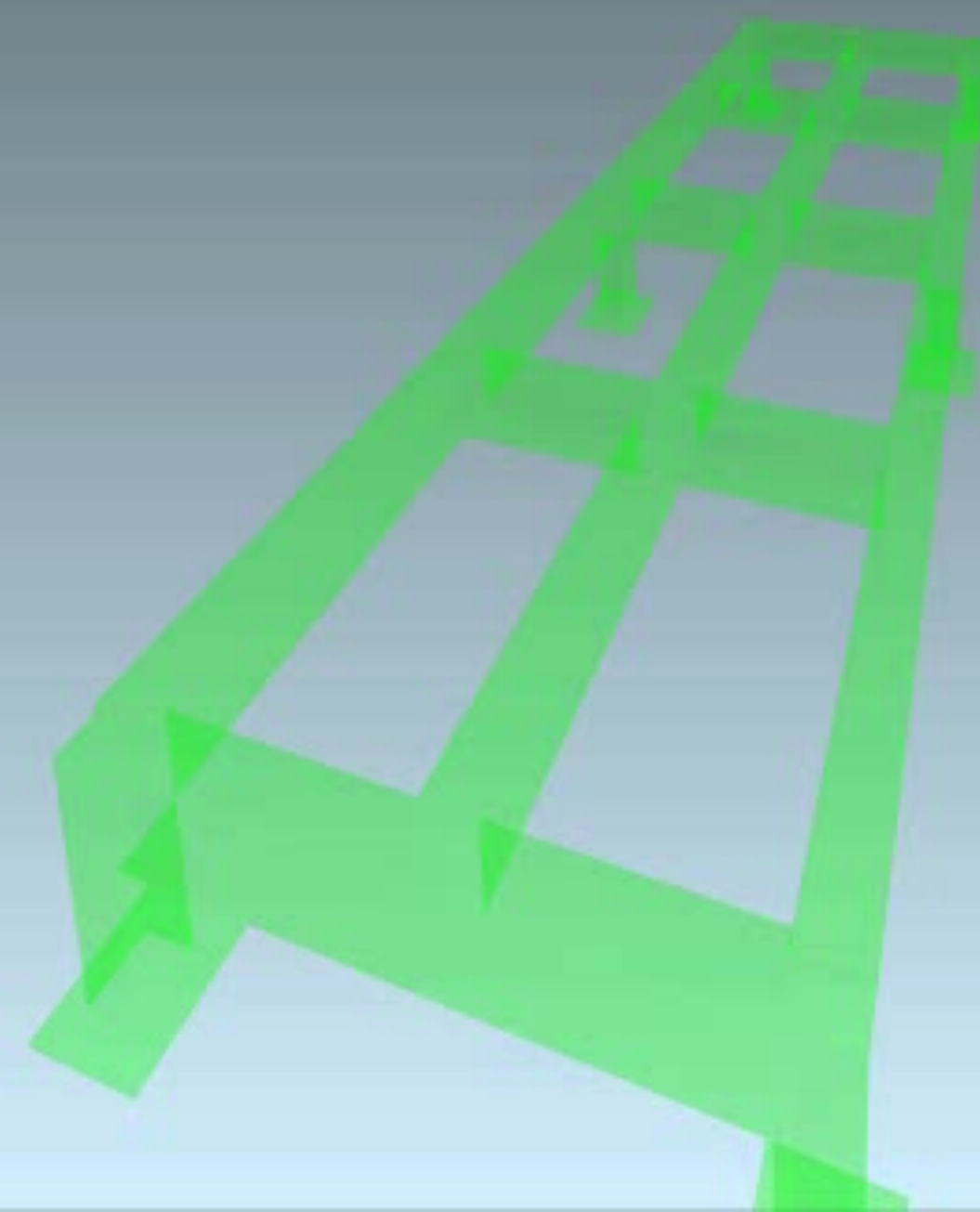
No

Name	Status	Level	Grid Int...	Found	Appr
Clash1	New	1- R+1	B(-12)-6...	17:57:27 04-12-2017	
Clash2	New	1- R+1	B(-9)-6(1)	17:57:27 04-12-2017	
Clash3	New	1- R+1	B(3)-6(1)	17:57:27 04-12-2017	
Clash4	New	0 - RDC...	B(11)-6(1)	17:57:27 04-12-2017	
Clash5	New	0 - RDC...	C(-12)-6...	17:57:27 04-12-2017	
Clash6	New	0 - RDC...	B(12)-6(1)	17:57:27 04-12-2017	
Clash7	New	1- R+1	B(-3)-6(2)	17:57:27 04-12-2017	
Clash8	New	1- R+1	B(9)-6(2)	17:57:27 04-12-2017	
Clash9	New	0 - RDC...	B(10)-6(1)	17:57:27 04-12-2017	
Clash10	New	0 - RDC...	C(-12)-6...	17:57:27 04-12-2017	

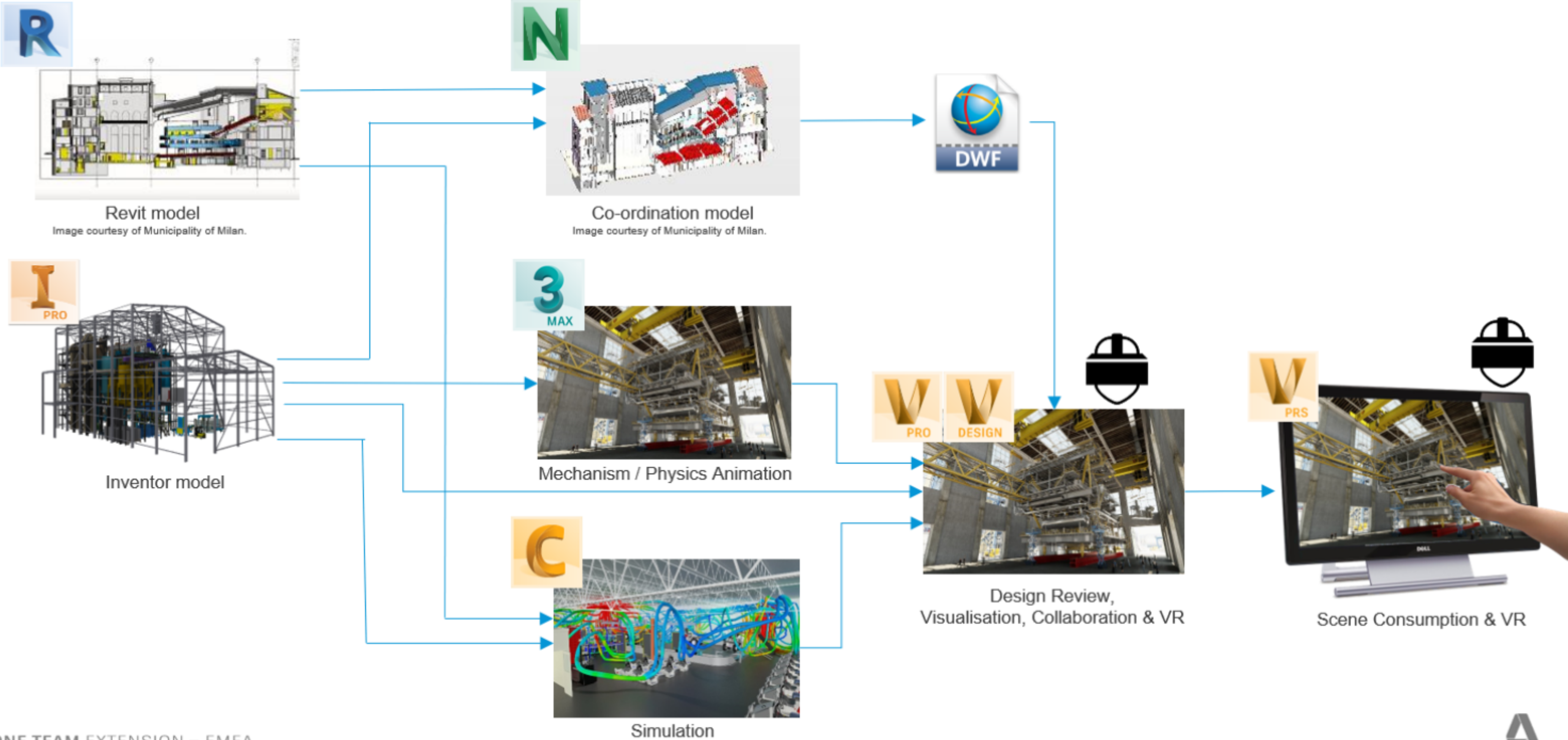
Items



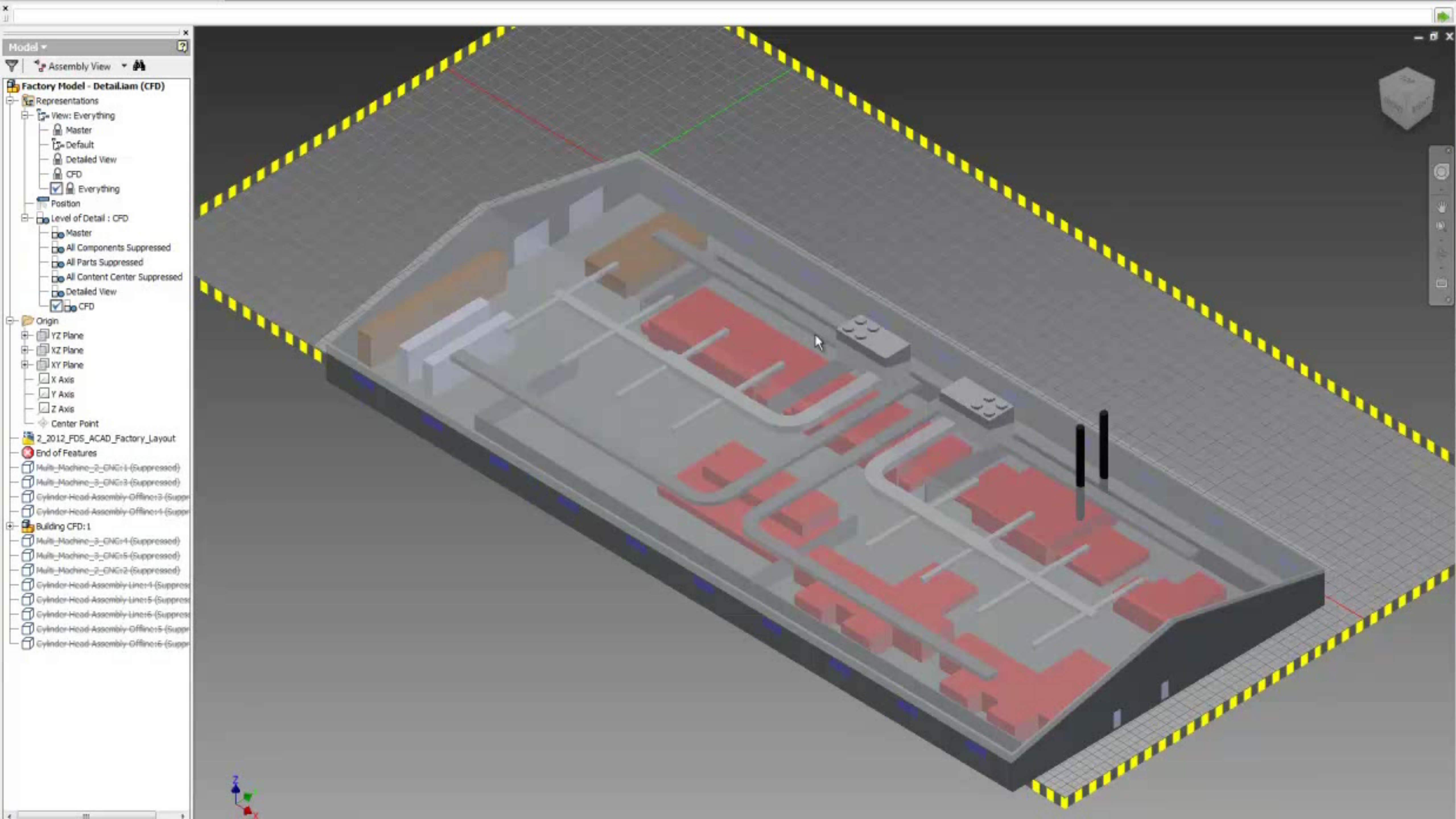




Virtual Reality





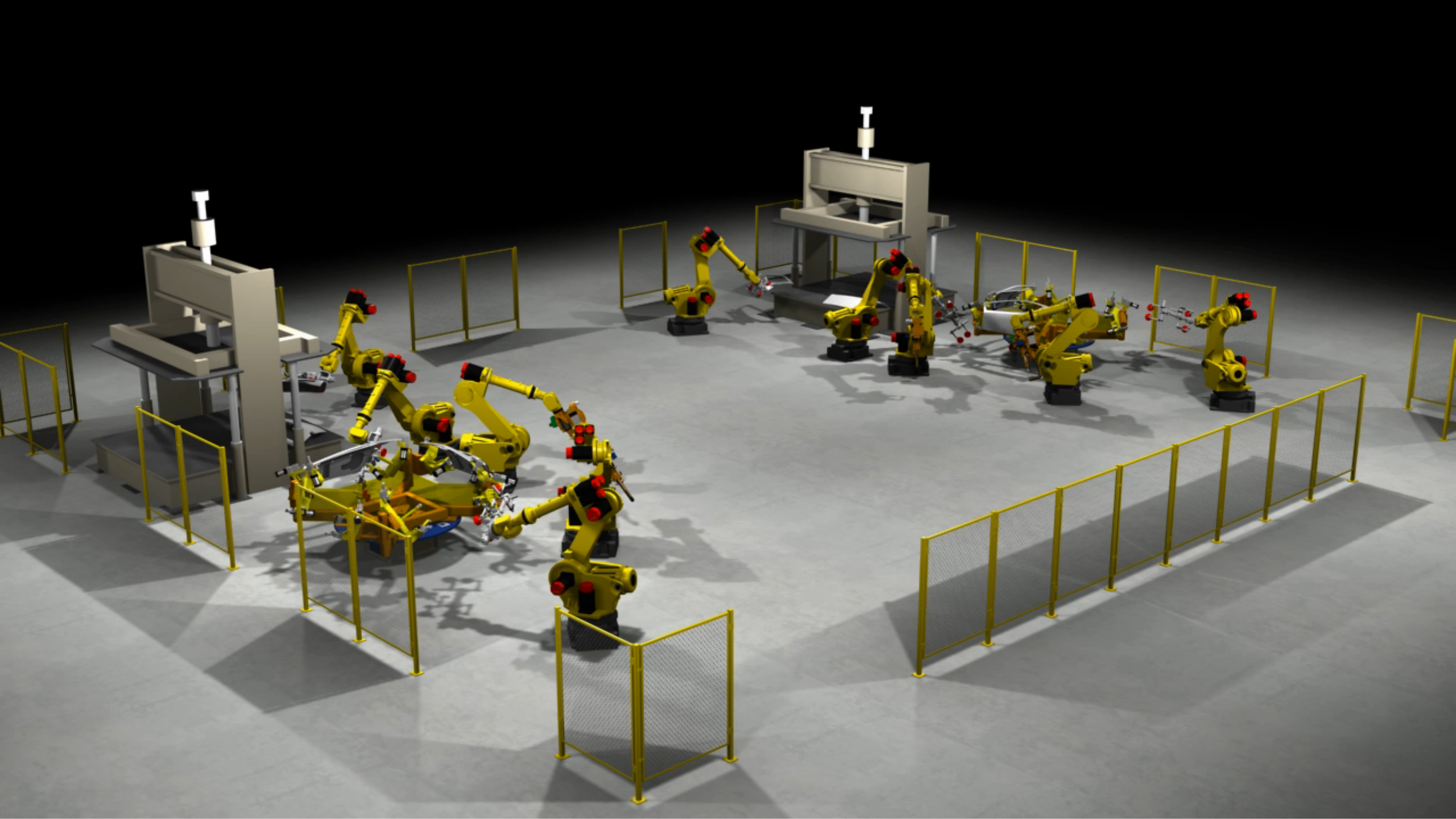


- Model
- Assembly View
- Factory Model - Detail.iam (CFD)
- Representations
- View: Everything
 - Master
 - Default
 - Detailed View
 - CFD
 - ☒ Everything
 - Position
 - Level of Detail : CFD
 - Master
 - All Components Suppressed
 - All Parts Suppressed
 - All Content Center Suppressed
 - Detailed View
 - ☒ CFD
- Origin
- YZ Plane
 - XZ Plane
 - XY Plane
 - X Axis
 - Y Axis
 - Z Axis
 - Center Point
- 2_2012_FDS_ACAD_Factory_Layout
- End of Features
- Multi-Machine-2_GMG-1 (Suppressed)
 - Multi-Machine-3_GMG-3 (Suppressed)
 - Cylinder-Head-Assembly-Offline-3 (Suppressed)
 - Cylinder-Head-Assembly-Offline-4 (Suppressed)
 - Building CFD:1
 - Multi-Machine-3_GMG-4 (Suppressed)
 - Multi-Machine-3_GMG-5 (Suppressed)
 - Multi-Machine-2_GMG-2 (Suppressed)
 - Cylinder-Head-Assembly-Line-1 (Suppressed)
 - Cylinder-Head-Assembly-Line-5 (Suppressed)
 - Cylinder-Head-Assembly-Line-6 (Suppressed)
 - Cylinder-Head-Assembly-Offline-5 (Suppressed)
 - Cylinder-Head-Assembly-Offline-6 (Suppressed)

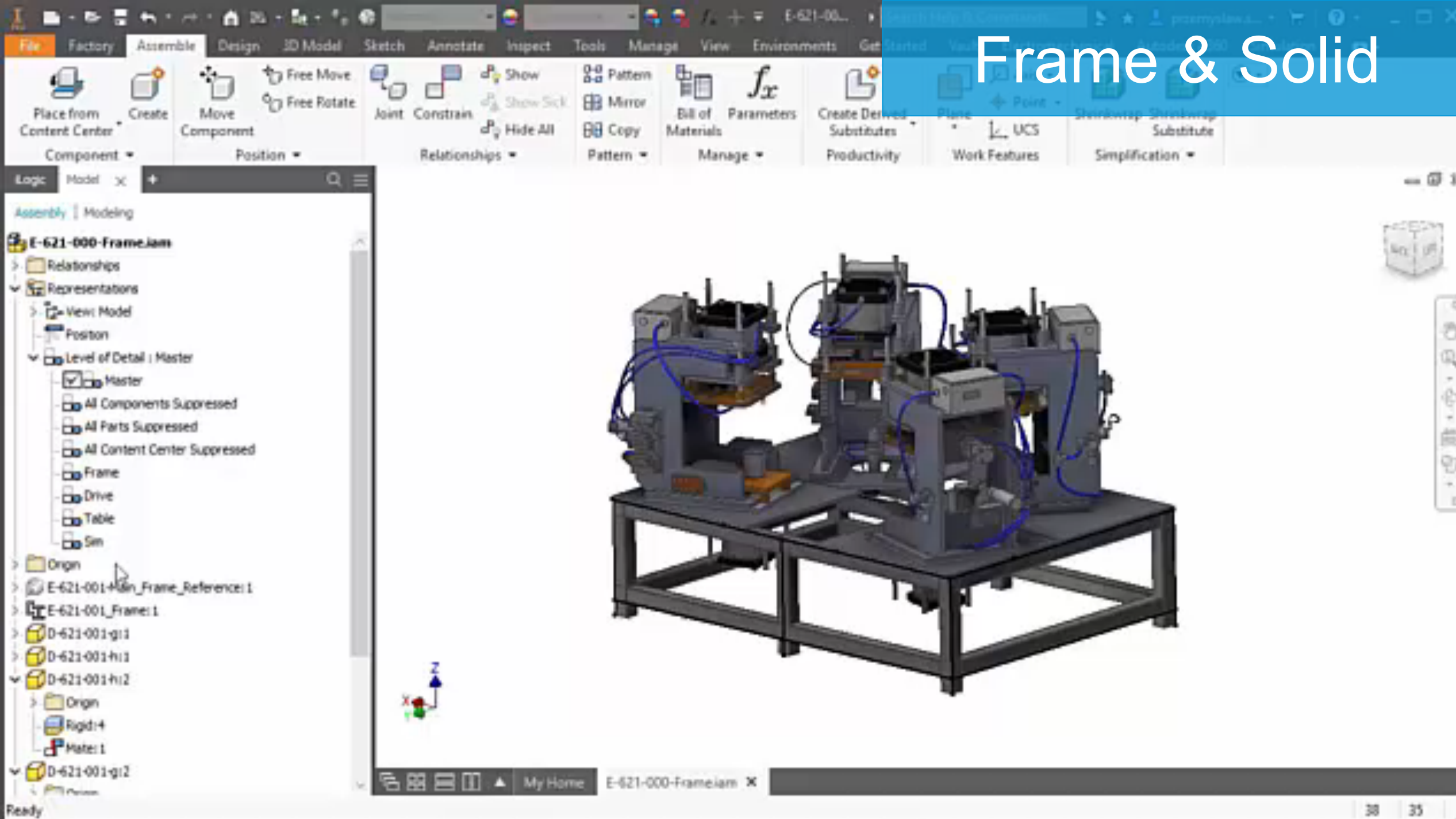


Increase Value of Data

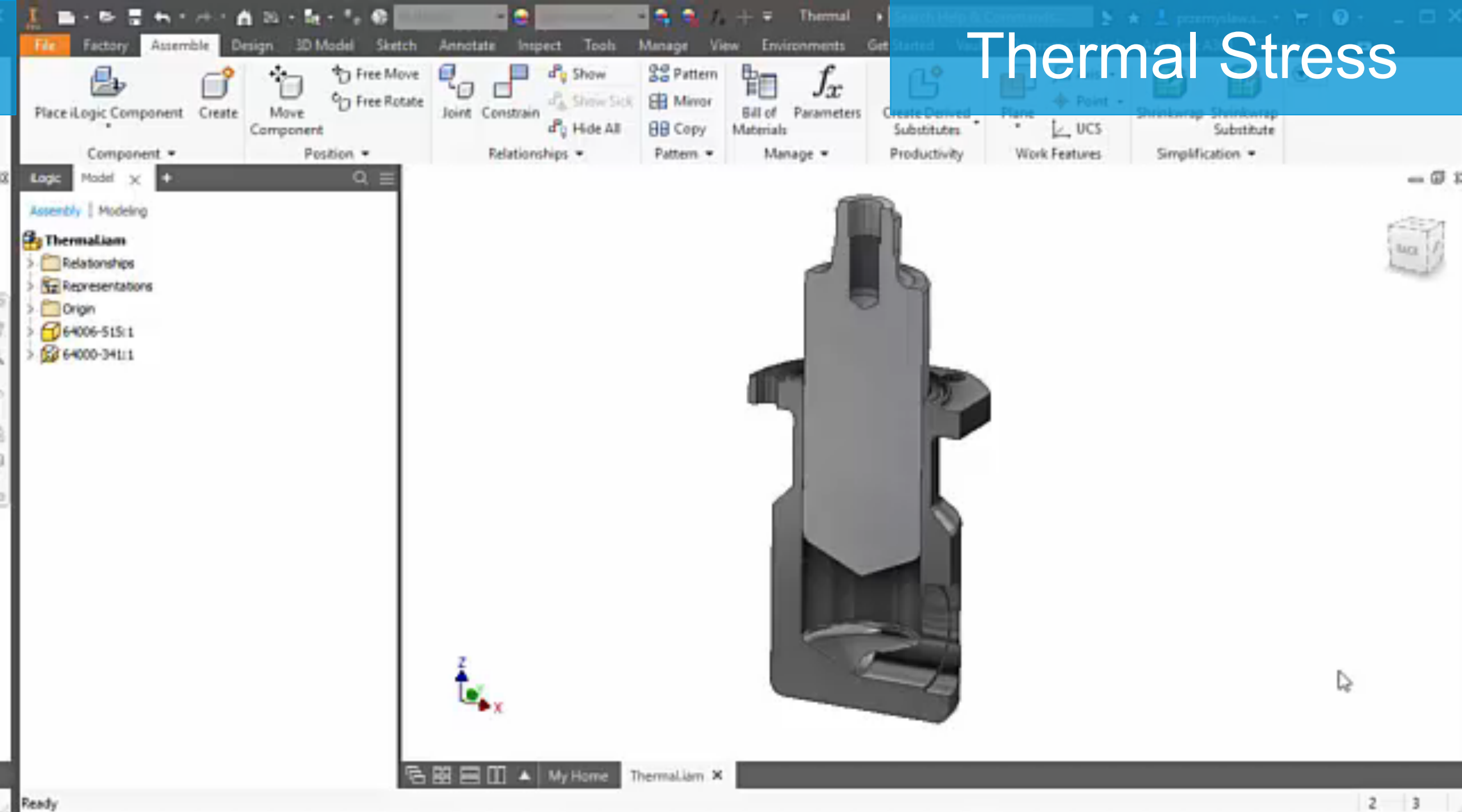
- ✓ Fast decisions
- ✓ Experiance likewise real



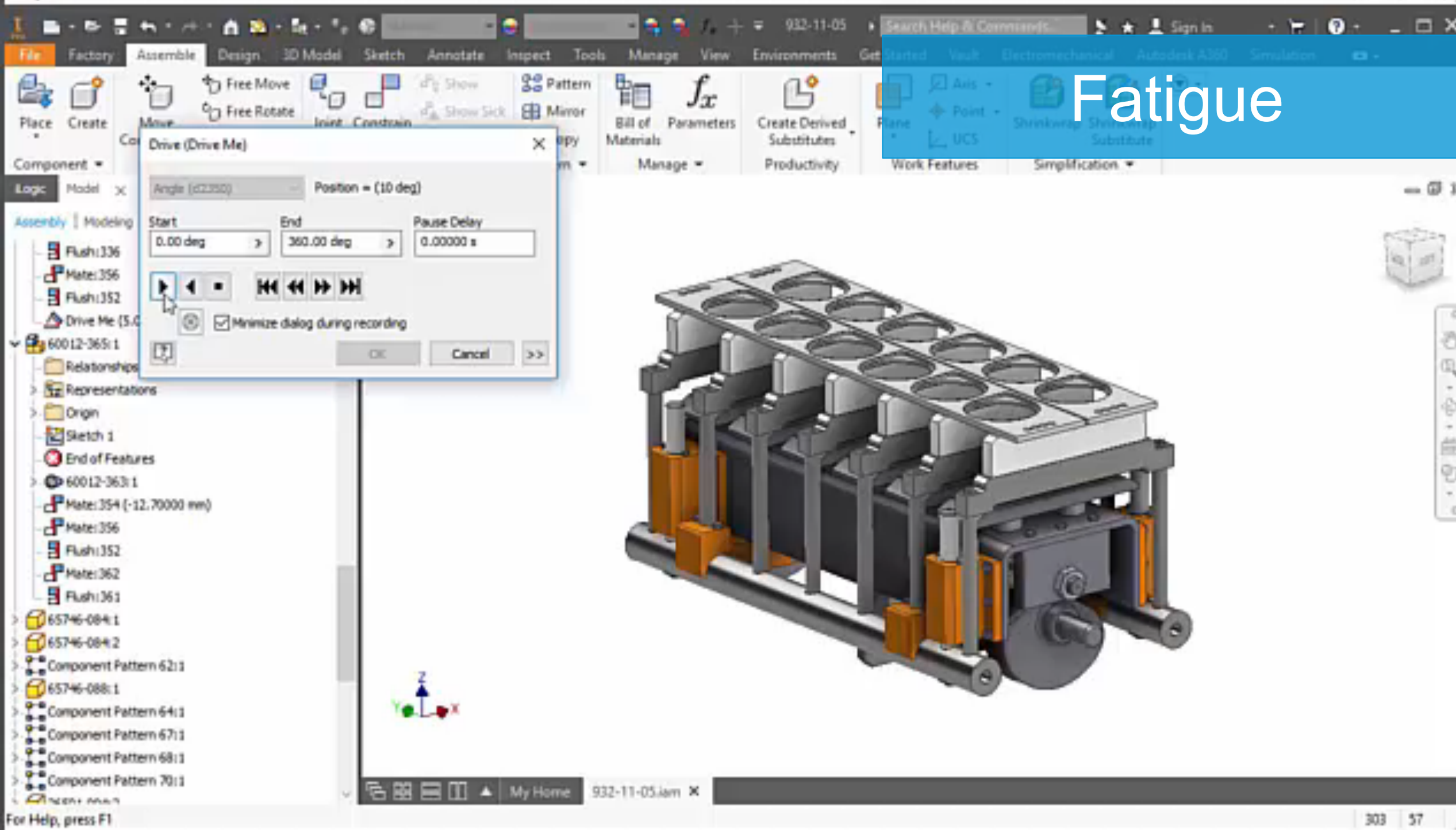
Frame & Solid



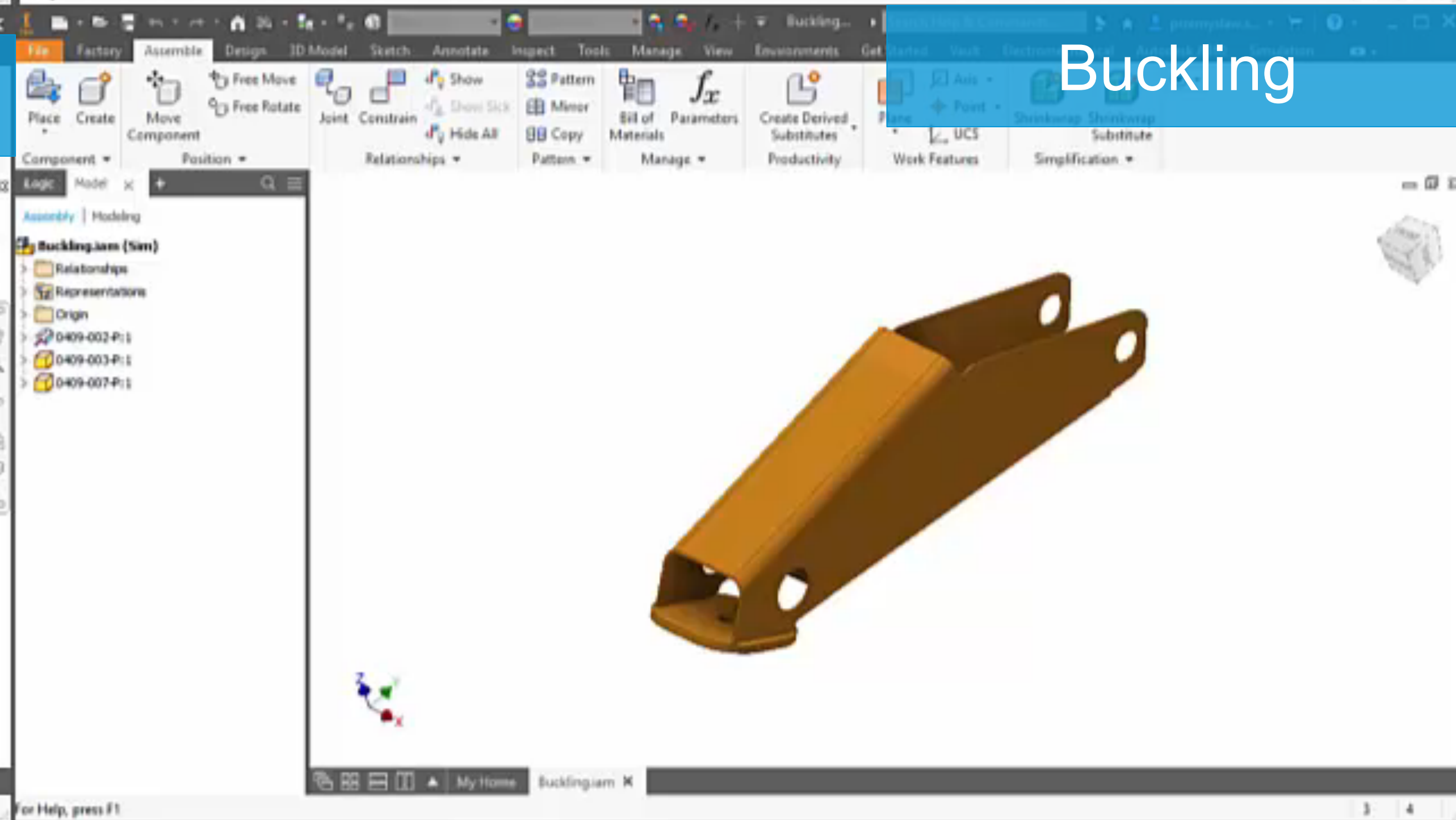
Thermal Stress

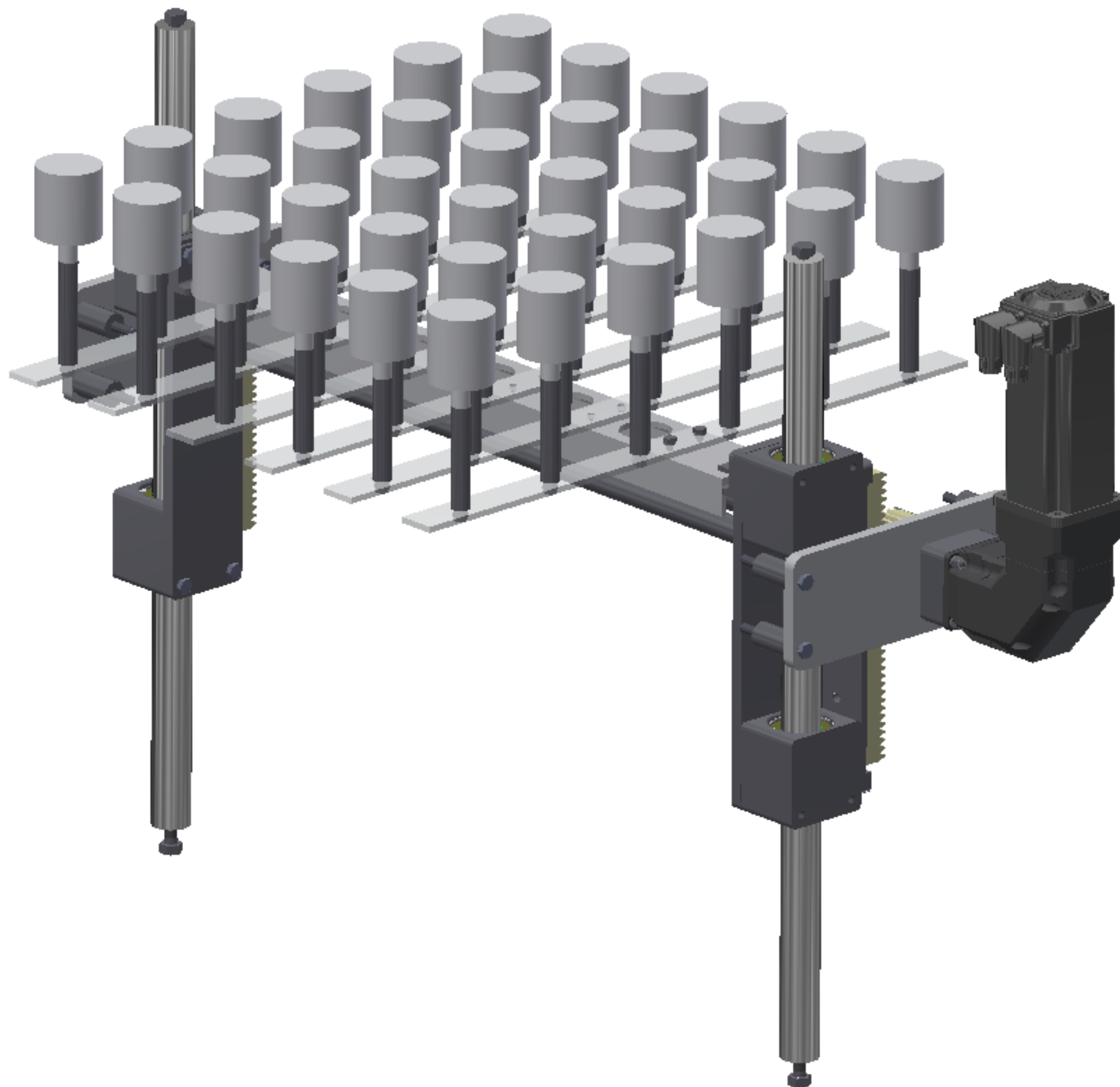


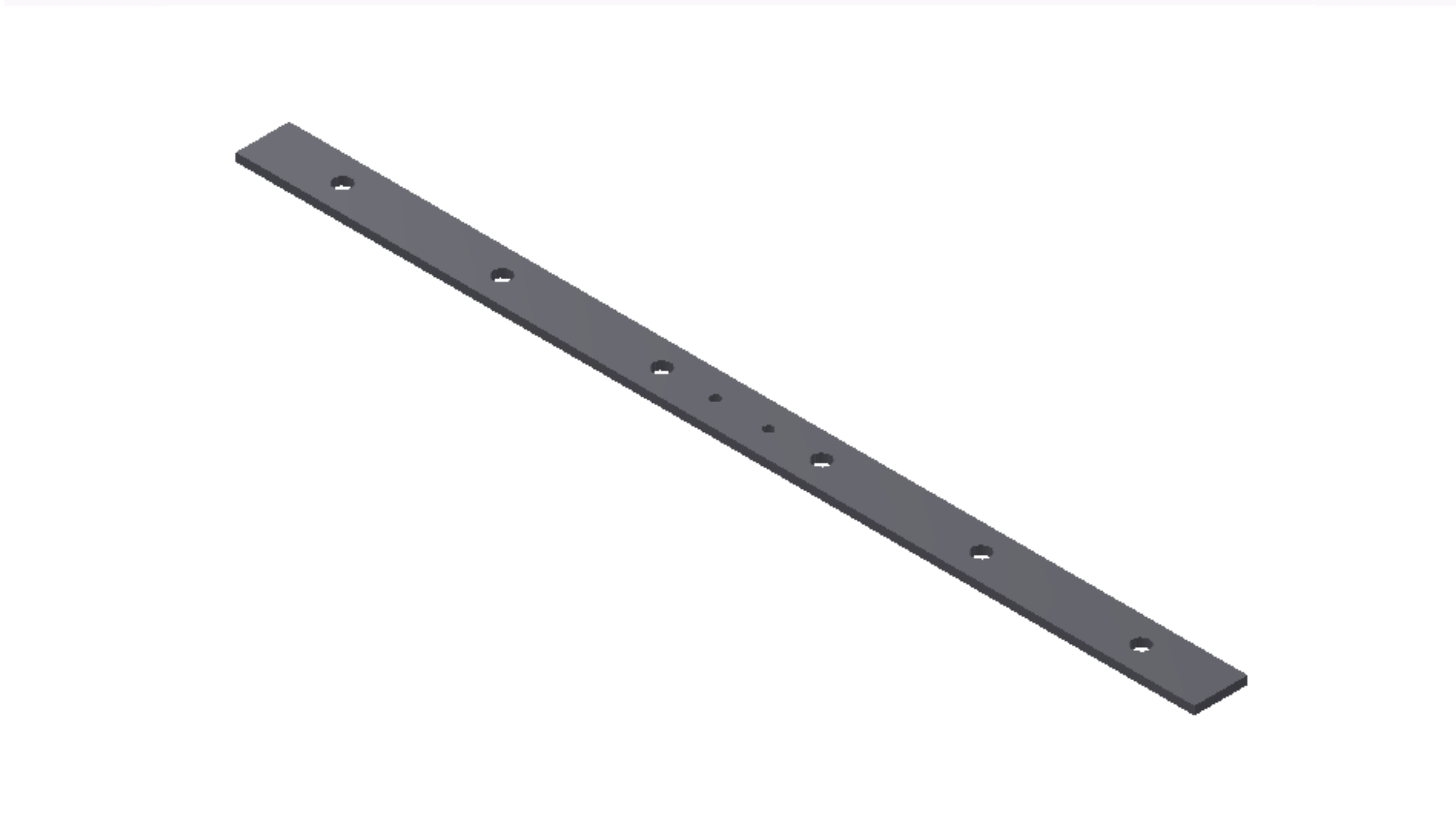
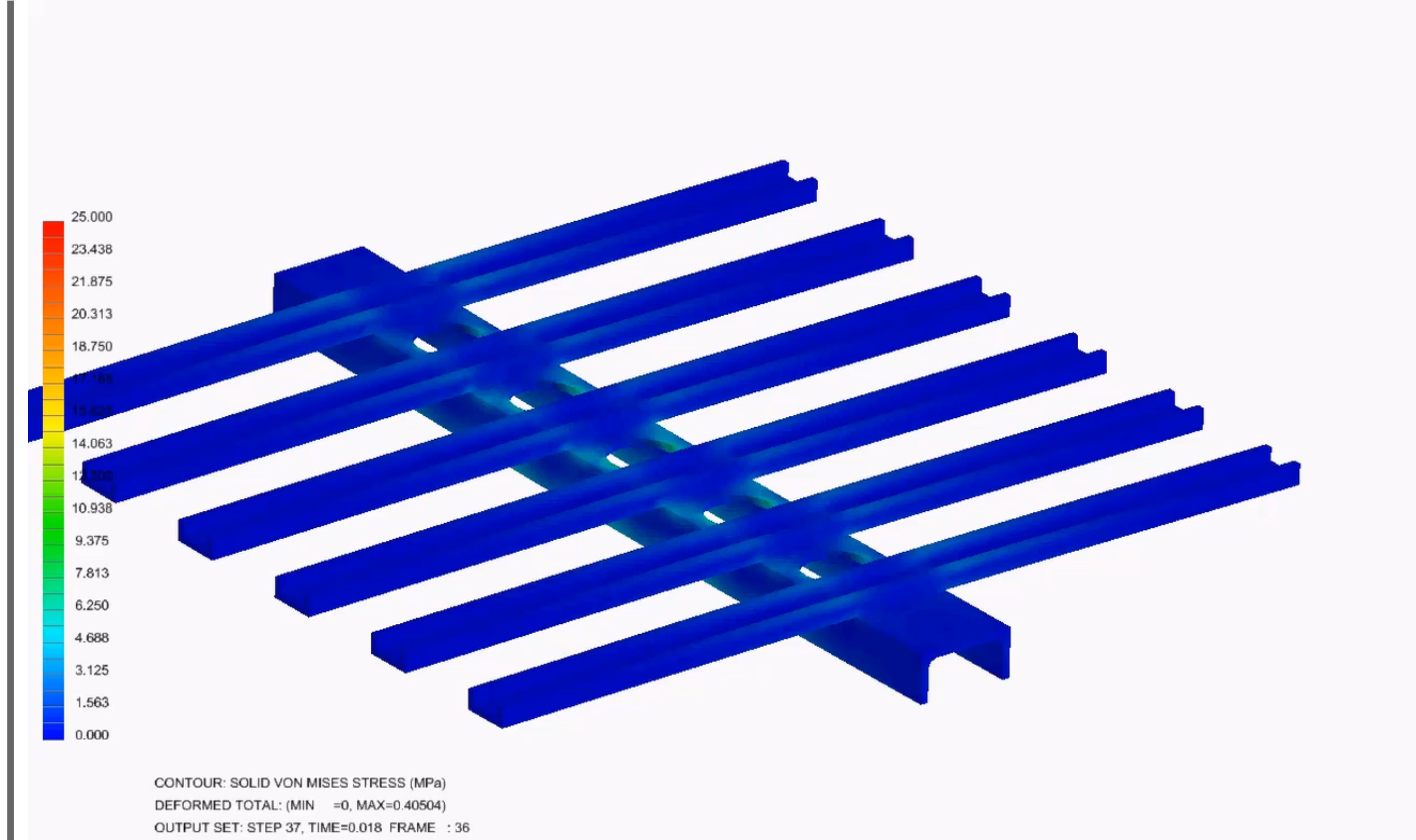
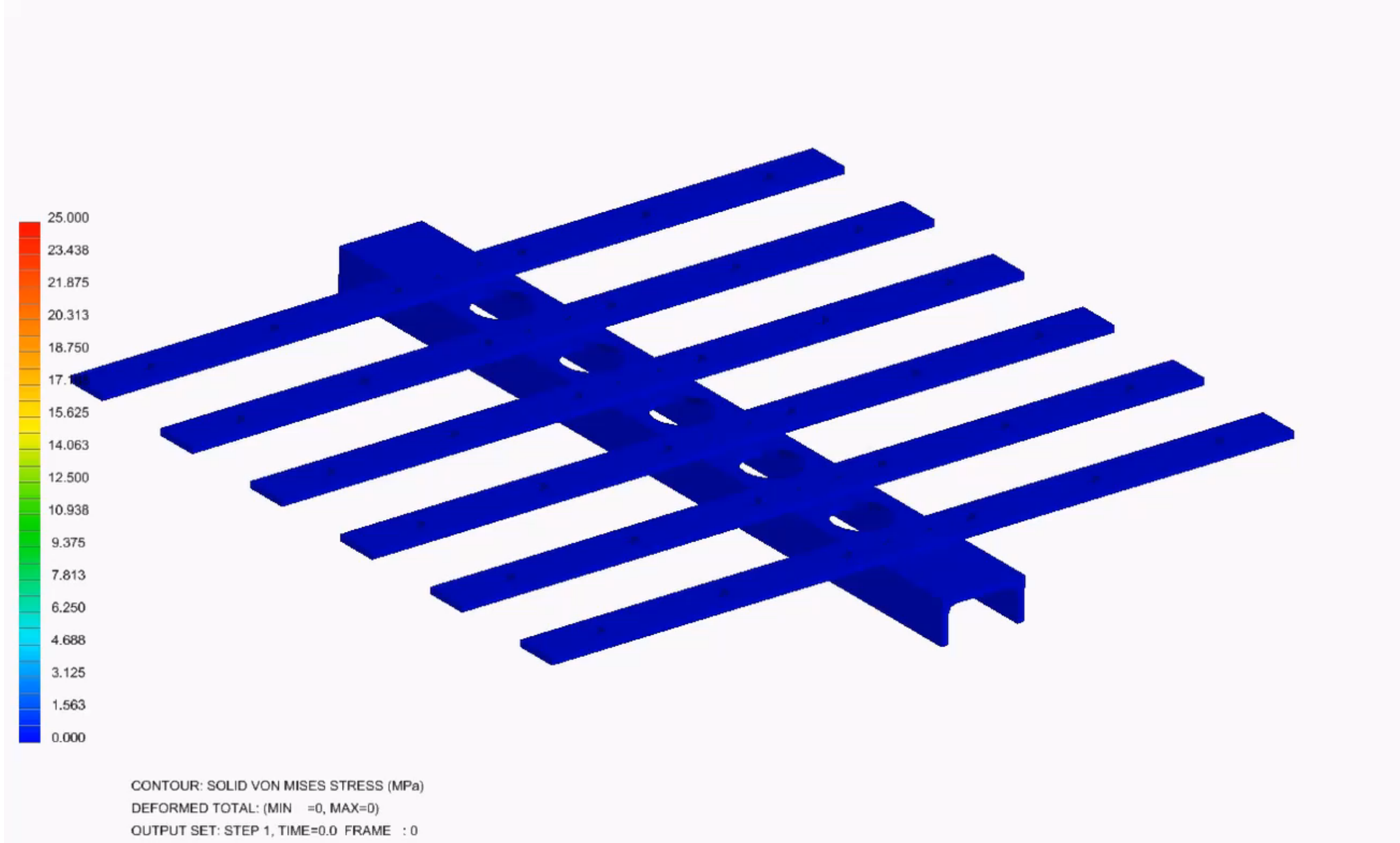
Fatigue



Buckling







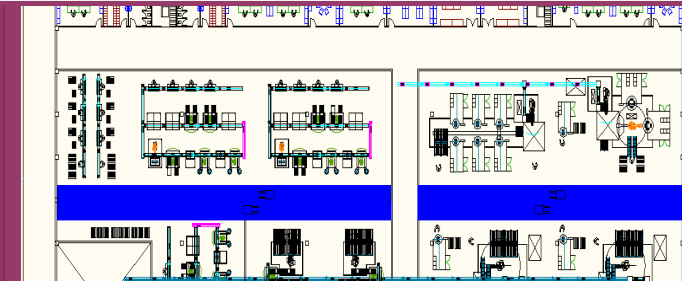
Digital Workflow

01 Process Design



Define production process

02 Layout Plan



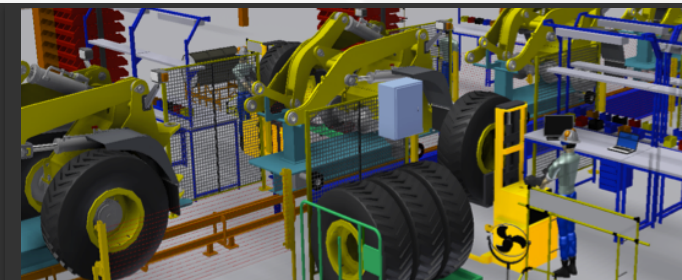
Design layouts

03 Detailed Review



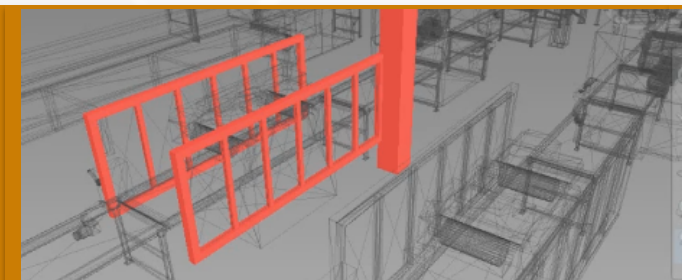
Detailed design of production area

04 Data Management



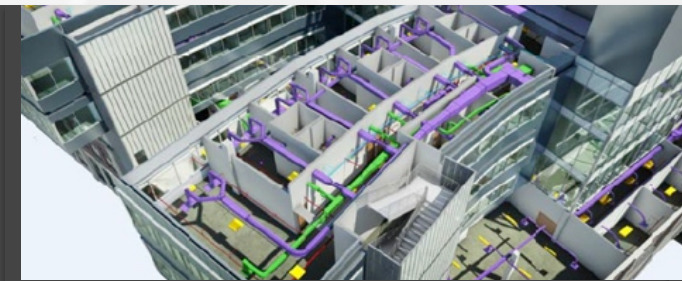
Find errors and review

05 Review and collaboration



Verify before production

06 Technical Communication



Share plan and get feedback

Products



Software Solutions

 **FACTORY DESIGN UTILITIES**

 **AUTOCAD**

 **REVIT**

 **INVENTOR**

 **NAVISWORKS**

 **VAULT**

 **AUTODESK CFD**

 **RECAP PRO**

 **3DS MAX**

 **AUTODESK[®]
PROCESS ANALYSIS**

 **AUTODESK[®]
INVENTOR[®] NASTRAN**

 **AUTODESK[®]
VRED[™]**



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