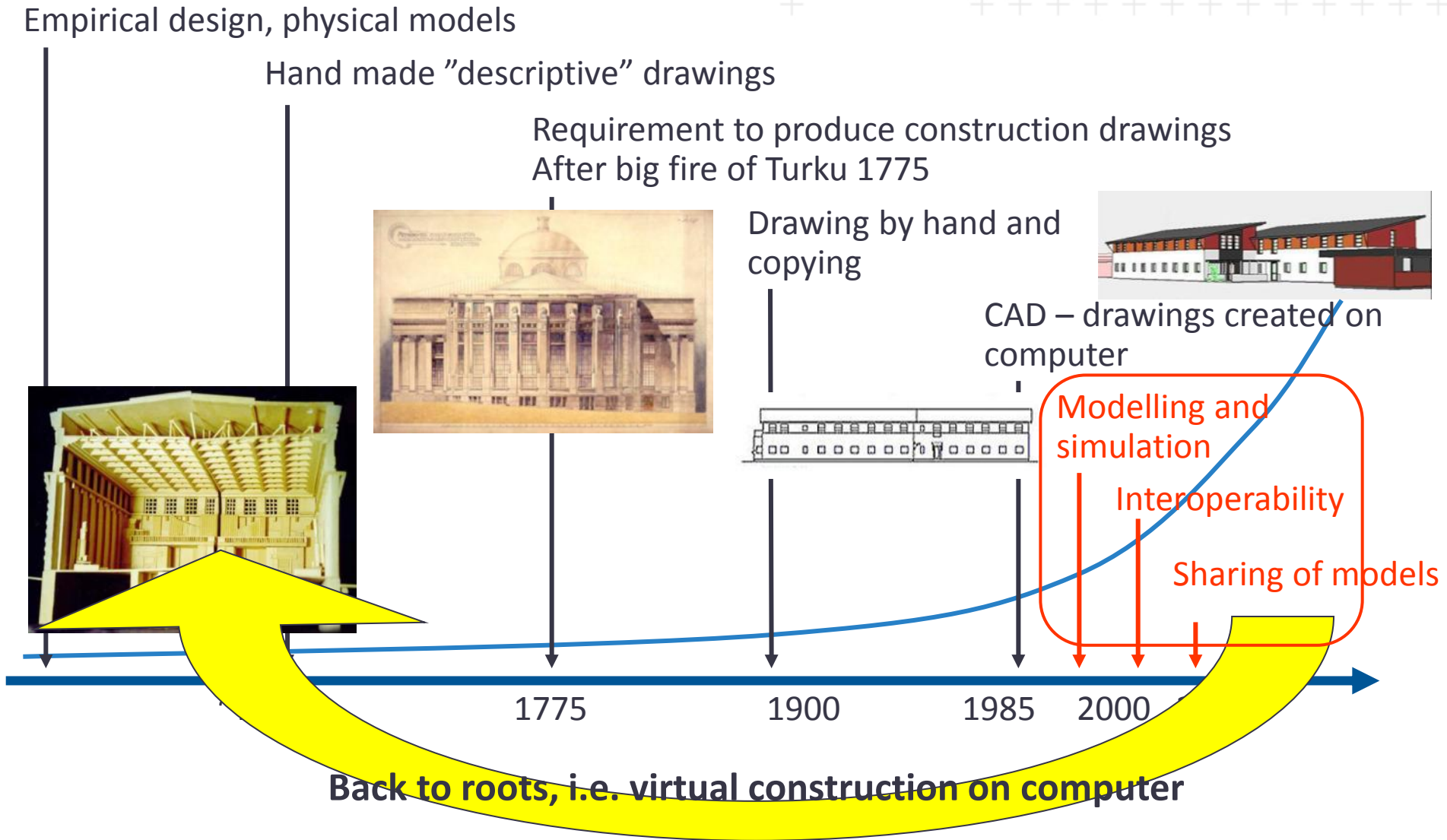


Leif Granholm, BIM Ambassador, SVP
Digital delivery



 **Transforming the way the world works**

Development of information processing



What is BIM?

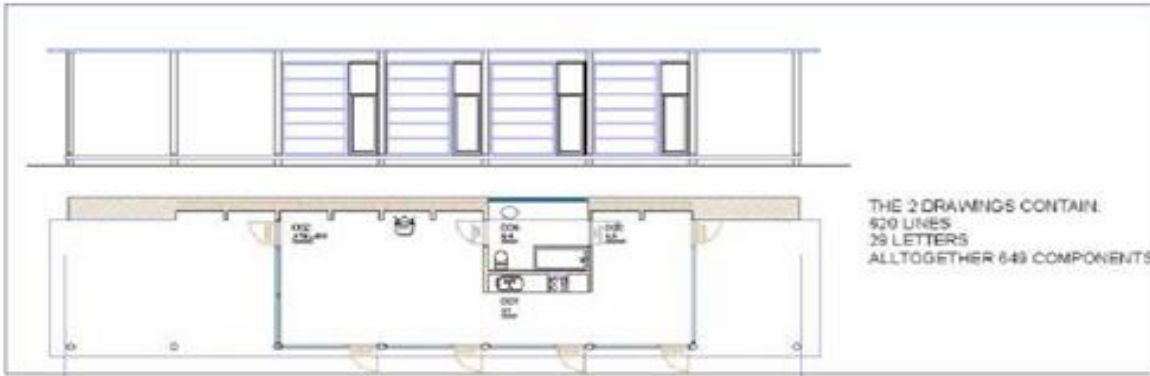


BIM, software, process, technology or what?

- No practical consensus of what BIM is
- Every presenter still today includes a what is BIM section
- Most common perception of people in the industry is that BIM is software.
- Other often used: Process, Model, Populated Database describing facility
- My favorite: BIM is a Technology

BIM Graphics to objects and geometry

Drawings are graphics (appearance important)



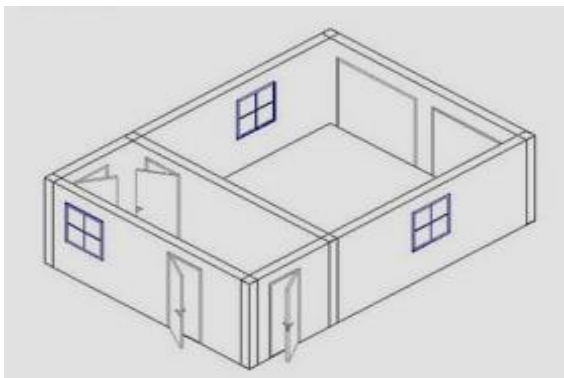
A BIM consists of objects that
may contain geometry and/or
attributes
(structure important)



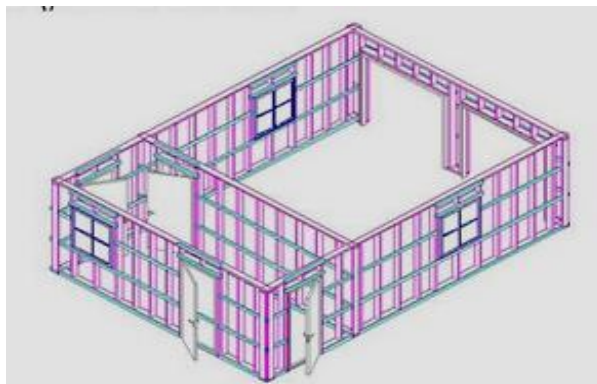
BIM – Structured semantic data

Objects describing building

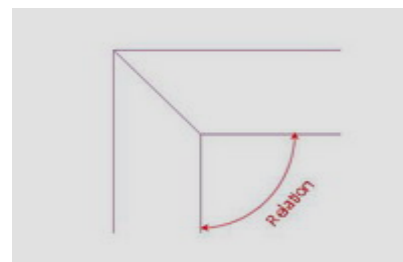
Functional objects



Physical objects



Logical objects

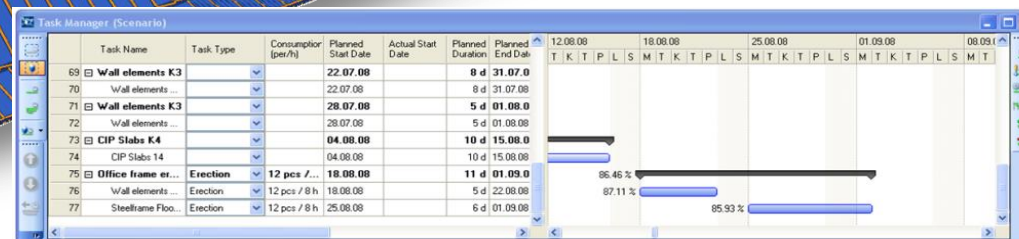
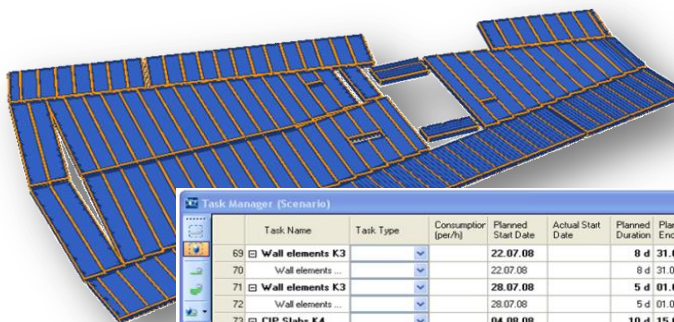


Abstract objects



Objects describing process

- Schedules
- Resources
- Costs
- Quality assurance
- Tasks
- Work
- Approvals
- RFI:s
- Submittals
- ...



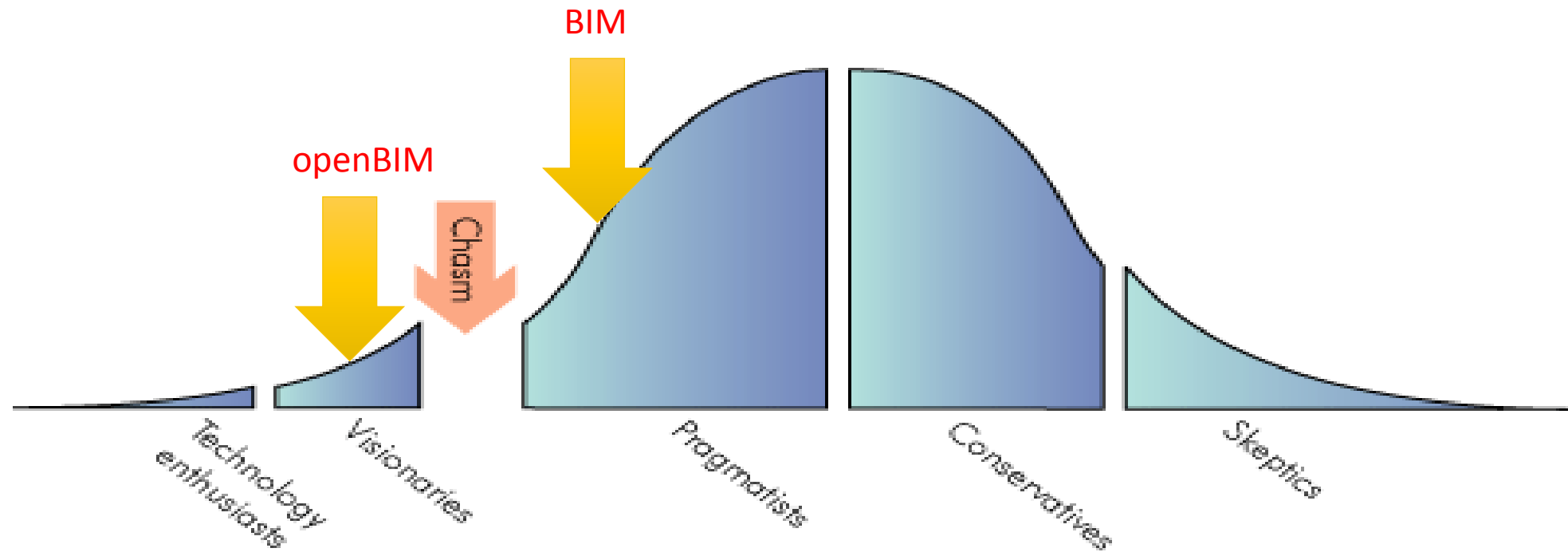


openBIM definition



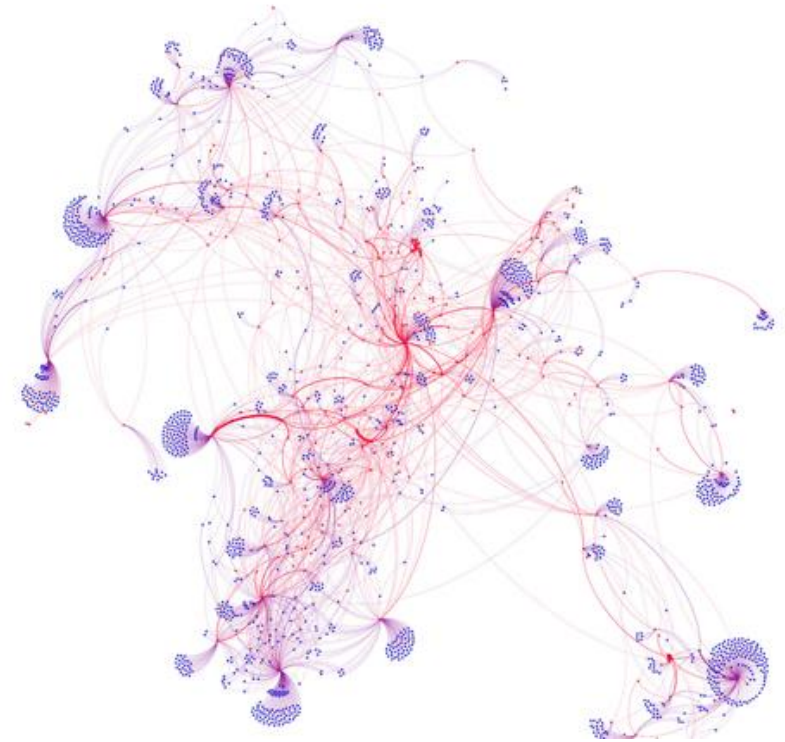
- openBIM means that BIM operations and BIM data is not tied to any specific tool, software or vendor.
 - Freedom to choose the tools best suited for the purpose.
 - Freedom to transfer data between tools.
 - Freedom to develop very purpose specific tools independent of any platform.
- Open standard data formats (IFC, CityGML, KML...) are used for communication

BIM and openBIM adoption



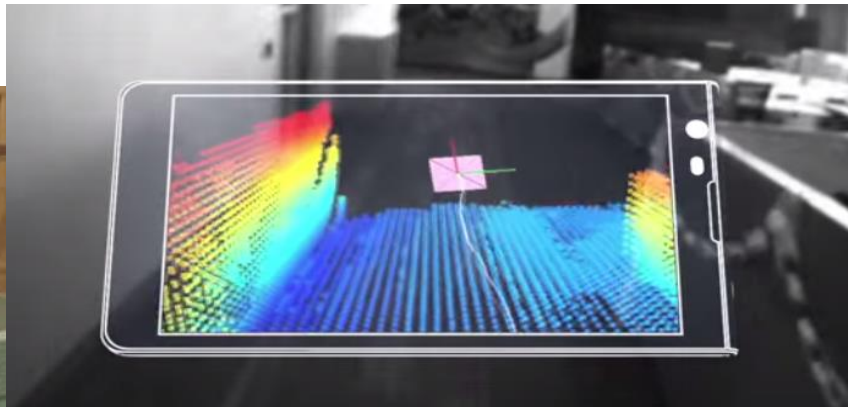
Information will reshape construction industry

- Falling transaction cost to deliver information and goods will radically transform supply chains
- Industry will consolidate and at the same fragment more
- Industry will become more people and process centric and less organization centric



Why semantic data?

- Technology development enables automatic use of data
 - Robots (good example ping pong playing robot)
 - Augmented reality taken to next step by Google Tango project
 - Drones used for many purposes



Augmented reality & wearable computers...



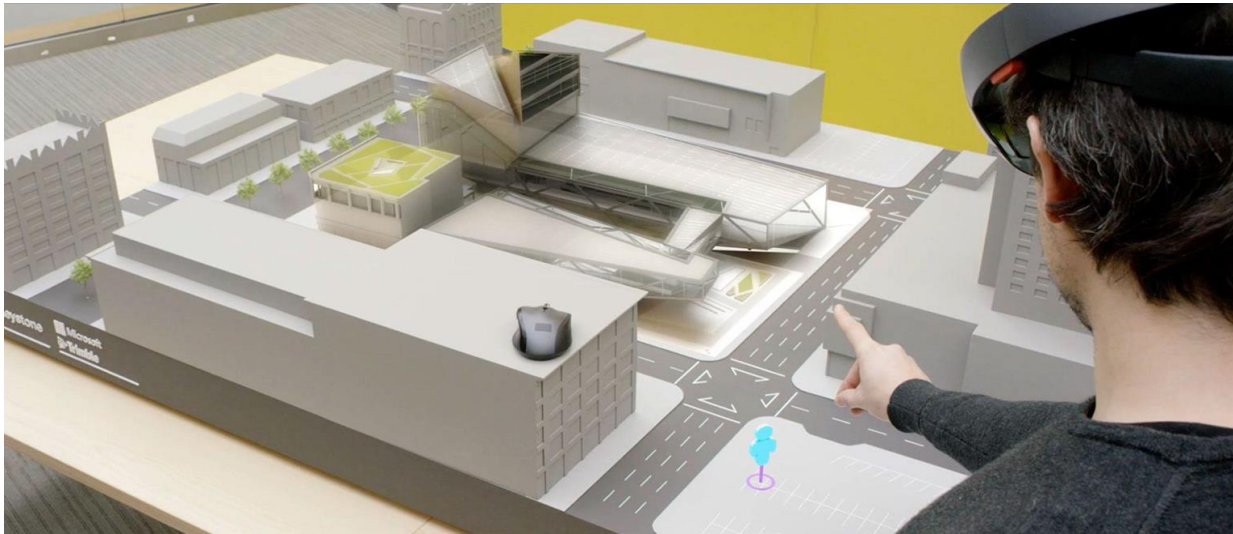
Google Glasses use an automatic connection to the cloud to provide access to enormous amounts of information, data and applications...



Trimble and Mixed Reality – Microsoft HoloLens

Partnered with Microsoft

AEC inspired proof of concept



Mixed Reality

Overlaying digital information on the physical world in real time.

The Reality Virtuality Continuum

Mixed Reality

Real

World
Unmodelled

Augmented
Reality

World Partially Modelled

Augmented
Virtuality

Virtual

Completely
Modelled



HoloLens
MR



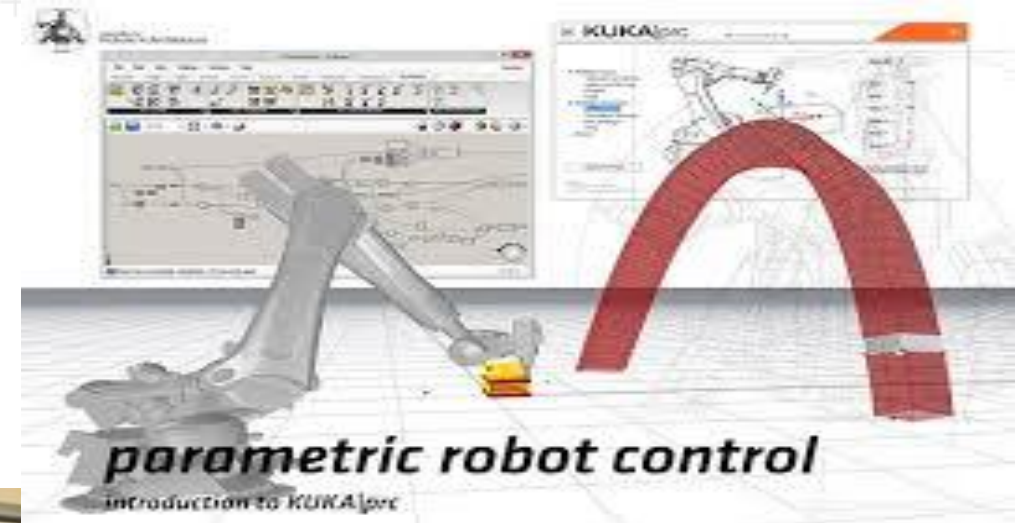
Tango
AR



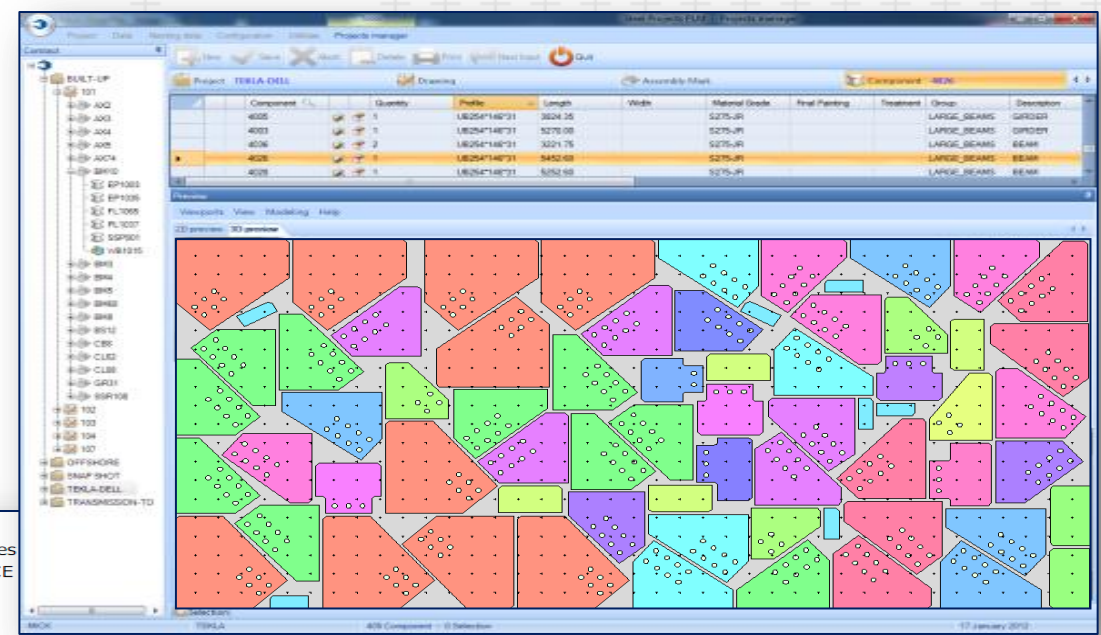
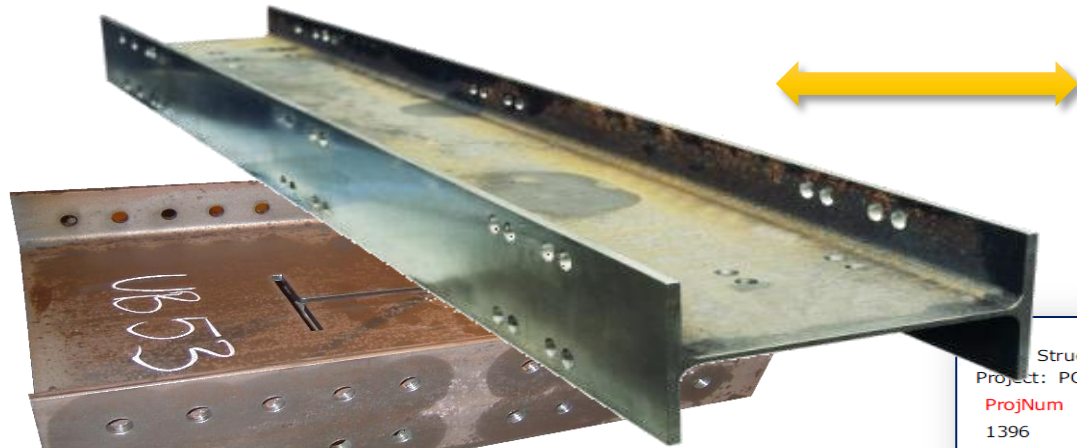
Oculus
VR



Robots in production...



Fabrication BIM



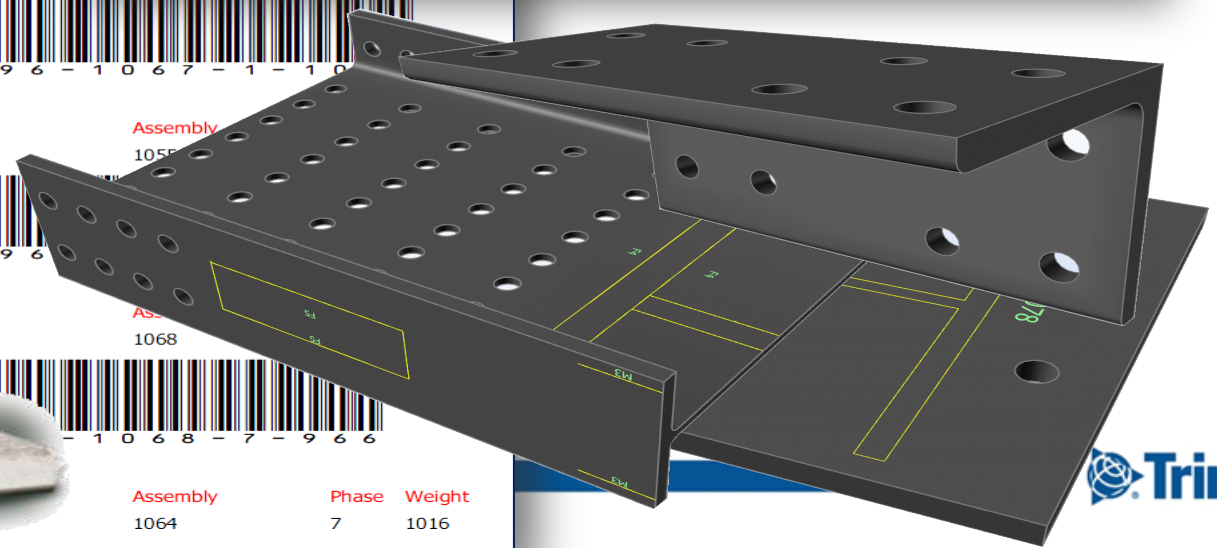
Structures
Project: POLICE
ProjNum
1396



ProjNum
1396



ProjNum
1396



ProjNum
1396
Assembly
1058

ProjNum
1396
Assembly
1068

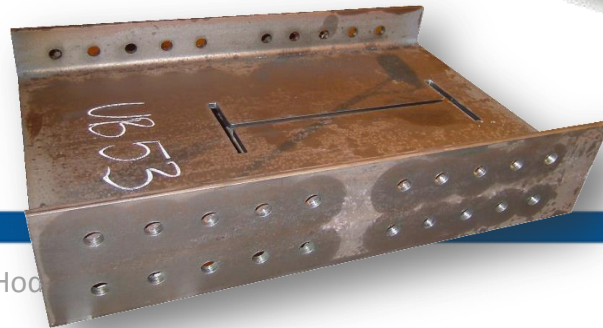
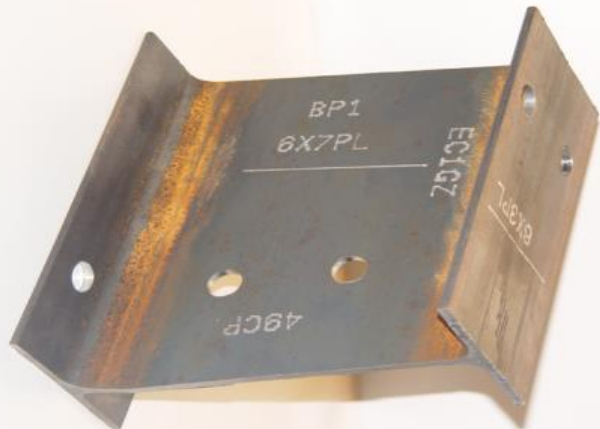
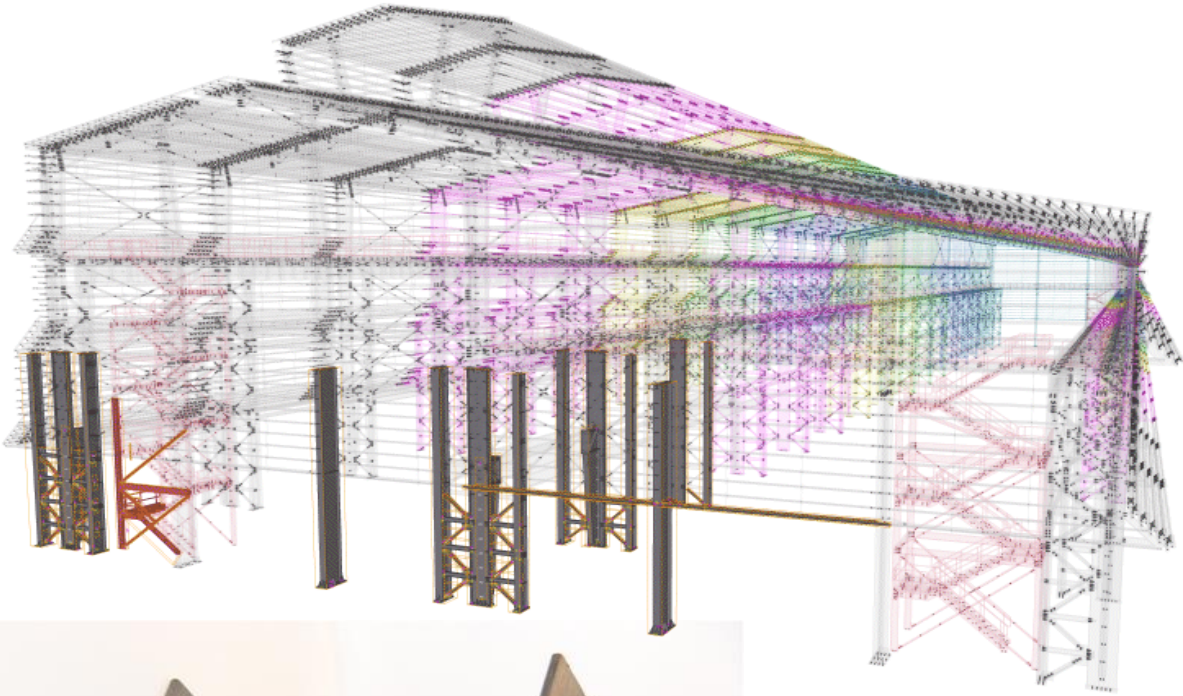
Assembly	Phase	Weight
1064	7	1016

TRANSFORMING THE WAY THE WORLD WORKS



Delivery to fabricator

- Flat pack Steel Delivery ready for assembly



What's coming in BIM Fabrication ? Assembly Robotic Welding



> IFC the latest project now

TRANSFORMING THE WAY THE WORLD WORKS



Using IFC for machine and ERP communication

- Current formats used are 2D (DSTV, dwg)
- Assembly automation using industrial robots is coming
 - 3D information required
- Project by AISC, Georgia Tech, Tekla, FICEP, Steel Projects and others to create MVD:s to be used in fabrication
- See <http://www.aisc.org/BIMsteel.aspx> for more info specially Automating Steel Fabrication section.

Paradigm shifts in Information Processing

- Information and Information Technology becoming a utility, everything in the cloud, user does not need to care where it comes from
- Information transforming from human readable documents to structured semantic data that can be processed automatically
- H2H, borders between humans coming down, countries, organizations, projects. Humans as the top of hierarchy, participating in several structures, Enterprise, Public organizations, Projects...



No more drawings or tape measures at site

Thank you!

