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Progress is built on ideas.





Design to Prefabrication

Key Software Requirements from Precast 5Di Use Case

Corporate Development | Technical IT Applications

Dr.-Ing. Marcus Schreyer | May 22nd 2012

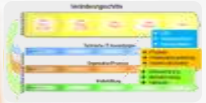
BIM History @ Max Bögl Group

Expanding Prefab Production

MB Vision "Future of Building"

RIB C-Suite Implementation

Infrastructure



BIM Change Management Concept

Autodesk BIM Award

Process Management

Wind Energy

Steel and Plants

Collaboration TU Munich & CIFE Stanford

Start of MB BIM Team

Buildings

InPro

Revit Architecture

NX TEKLA

Forbau + Mefisto

BIM Training

Tekla Precast

RIB iTWO

1995 2000 2005 2010

May 2012:
BIM currently used in
> 34 projects

Precast Production Locations & Key Figures


Liebenau


Linthe


Hamminkeln


Gera


Bachhausen


Neumarket

- 6 Production Plants in Germany + 1 mobile Plant
- Turn-around 2010 ~ 160 mio€
- Wide Prefab product range


Buildings & Façades


Bridges


Noise Protection


Tubbings

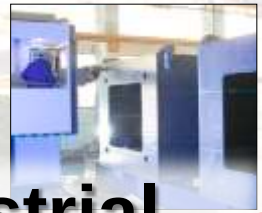

Guide Ways


Wind Energy Towers


Mechanical Parts

Industrial Prefabrication & Construction Site - Benefits





Concrete Technology

Industrial Production


High-Tech production plants


benefits

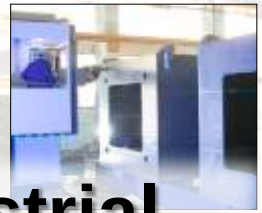
- Faster on-site assembly
- Stabilization and acceleration of project delivery
- Highest quality levels (tol. << 1mm)
- Less on-site staff & craftsmanship qual‘s required

Craftsman’s skills & know-how


Site Construction


Industrial Prefabrication & Construction Site - Demands





Concrete Technology

Industrial Production


High-Tech production plants


- Less flexibility for short-time design changes
- Integration of production and transportation logistics
- Co-ordination of an instationary project organization with the continuous industrial stationary production process

demands

aftsman's skills & know-how


Site Construction


Industrial Prefabrication & Construction Site - Conclusions



Concrete Technology

Industrial Production


High-Tech production


- Embedding transportation logistics
- Production automation
- Industrial high-tech processes including robotics
- Highly integrated IT-environment



Logistics

Craftsman's skills & know-how

Site Construction


Key Requirements Overview in Precast Design

- High level of parametric CAD functions
  - ⇨ Efficiently create & use part libraries
  - ⇨ Adapt to building geometry
- Fully model-based drawing generation according to local market standards
- Support CAM-based Production Technologies
  - ⇨ Automated circulation production
  - ⇨ Rebar bending automats
  - ⇨ Welding robots
  - ⇨ NC-controlled formwork saws
  - ⇨ High-precision concrete grinding
- Scalable LoD (Level of Detail)
  - ⇨ Overall coordination view
  - ⇨ Detailed production view
- Considering transportation issues

Segmentation of walls & slabs

Precast Wall Elements
(Solid/Sandwich/double-Layer…)

Precast Slab Elements

Situation

- Mass production elements
- Very low prices for design work
- Very efficient 2D software on market

➔ Efficiency is the killer criterion

"Acceptance of the draftsman can only be attained when the product performs in a shorter time to high-quality results. The drawing is the work result which is paid for."

➔ Parametric import of previous model geometries

➔ Segmentation algorithm required

- creating seam components for vertical and horizontal connections
- creating detail components for rebar and steel parts
- Identification of equivalent/similar parts

Typical Software Interfaces in the Design Process

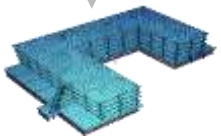
CAD System XY

IFC et al

Import estimation model
- Take-over properties
- Segmentation of walls

Structural Precast Design System

IFC/XML et al



Structural Analysis

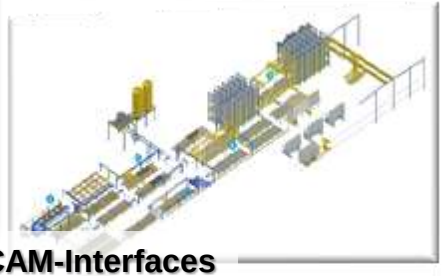
Export precast element data
- Materials, surfaces, quantities
- Positioning No
- SAP reference No

Update model data for
- quantities
- cost controls
- project tracking

Export precast element data
- Element geometry & concrete type
- Rebar geometries
- Embedded parts
- Positioning No…

Production Management

5D Project Management



CAM-Interfaces

Concurrent Design & Modeling Process

5D Project Management

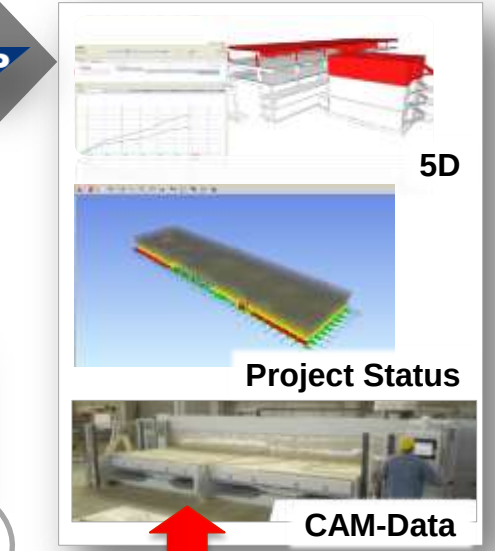
Construction Management

5D Data Management

- Consultant provides design model
- Construction Management contributes site and production information (schedule, qualities…)

➢ Model sharing required to co-ordinate
  - model changes & review
  - access rights on element level
  - the design progress (Δ) among design team members

Joint Model Viewer



Structural Consultant

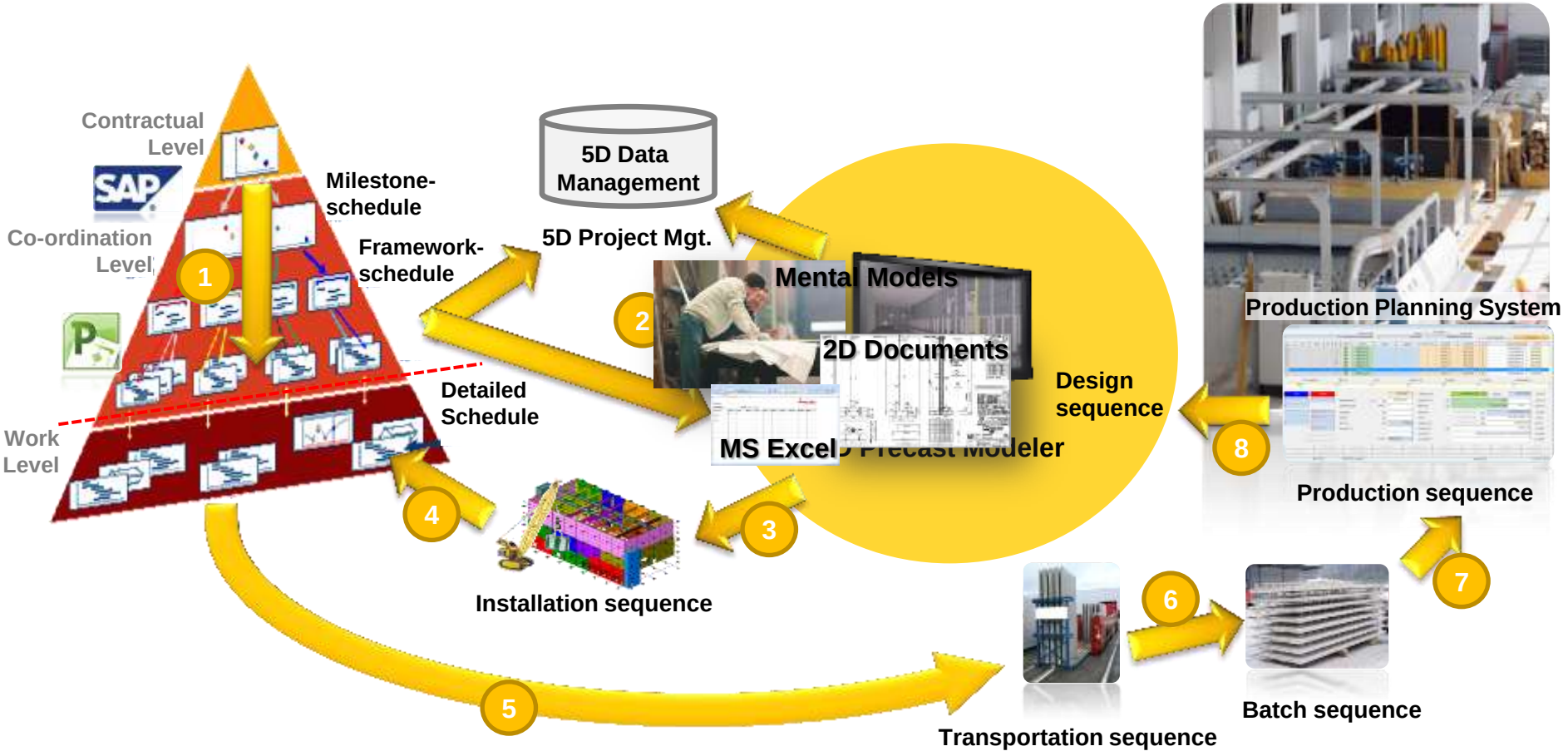
Structural Detailing

5D Precast Modeler

2D Structural Drawings

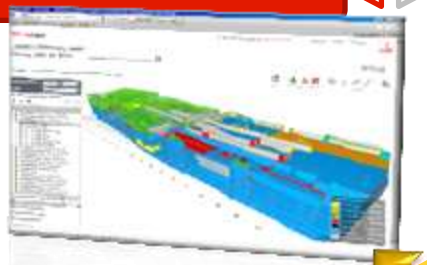
Project & Production Planning Schema

Project | **Production**



Project & Production Status Tracking

Project ◁▷ **Production**



5D Project Viewer

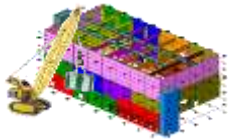
5D Data Management

Design sequence

5D Precast Modeler

Production Planning System

Production sequence

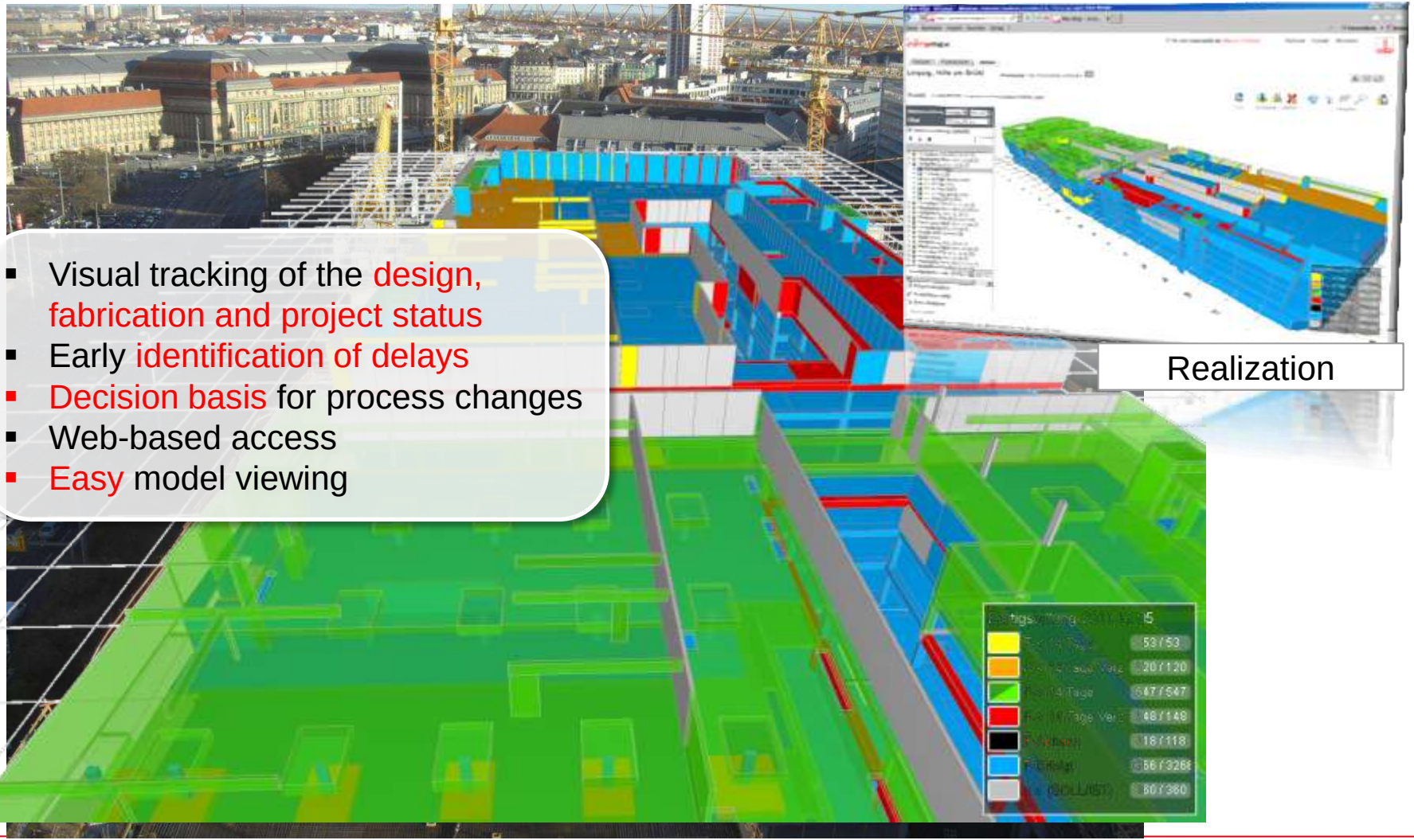


Installation sequence

Transportation sequence

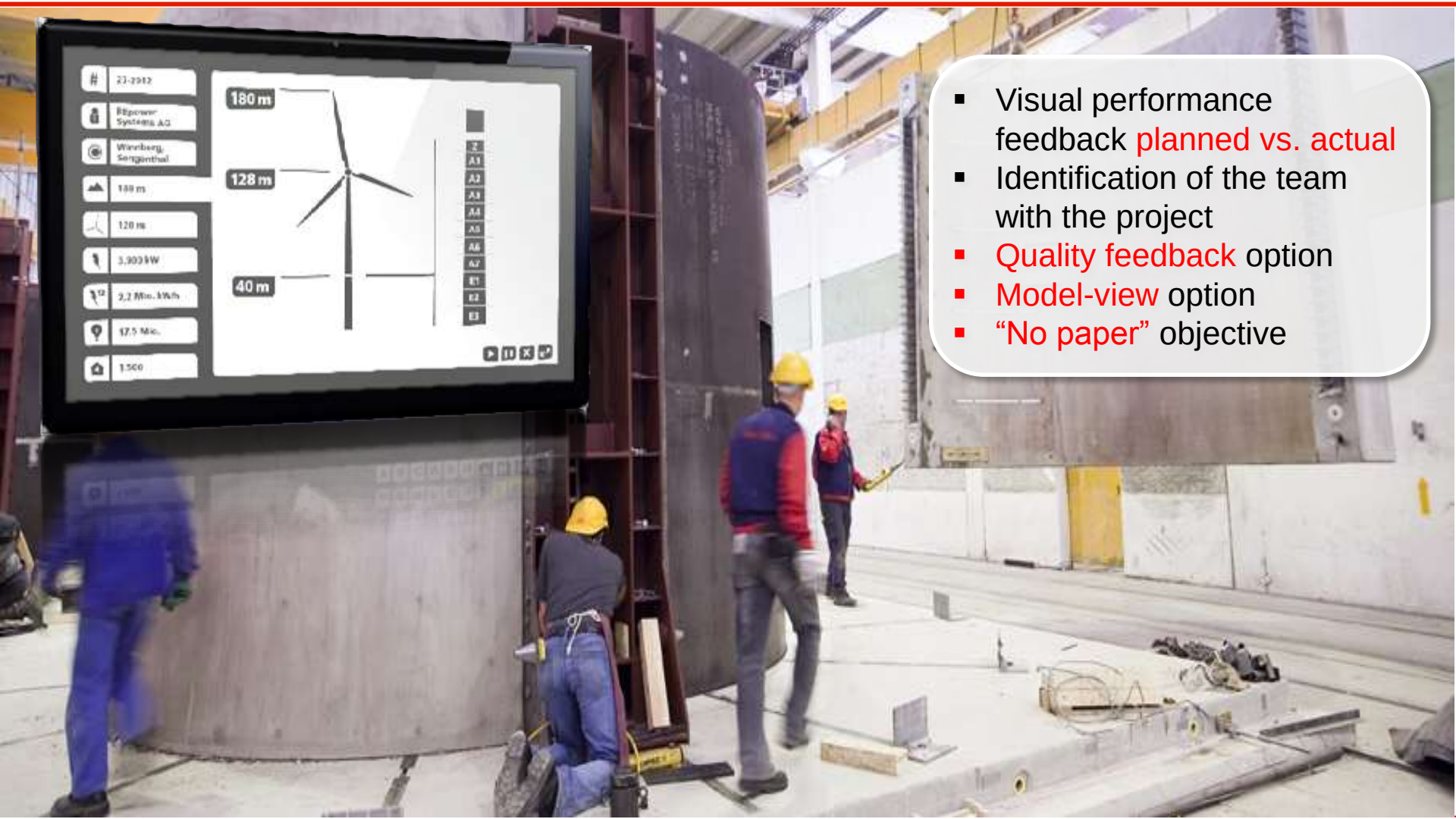
Batch sequence

Visualized Status Tracking for Projects



- Visual tracking of the design, fabrication and project status
- Early identification of delays
- Decision basis for process changes
- Web-based access
- Easy model viewing

Visual Performance Tracking for Production

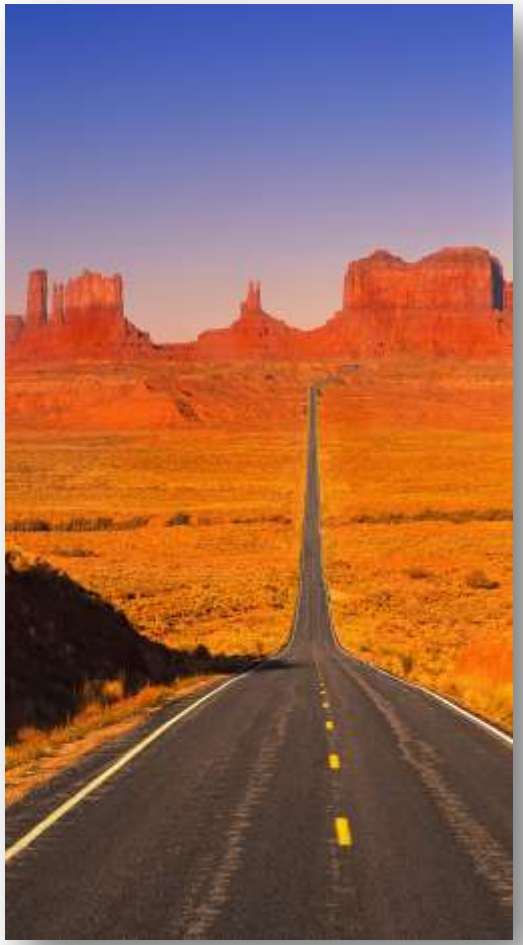


- Visual performance feedback planned vs. actual
- Identification of the team with the project
- Quality feedback option
- Model-view option
- “No paper” objective

Expectations from 5Di so far…

- Improved software functions for prefab design from AEC CAD vendors
  - ⇨ Continuous improvements and implementations since the beginning of 5Di work
- Motivating high-quality data interfaces between the “classical” AEC vendors and ERP & PPS
  - ⇨ Siemens PLM Software and Dassault just joined the 5Di
- Provision of integrated process and quality monitoring soft- and hardware
  - ⇨ Ensuring highest quality levels while continuously optimizing processes

Staying competitive - globally !



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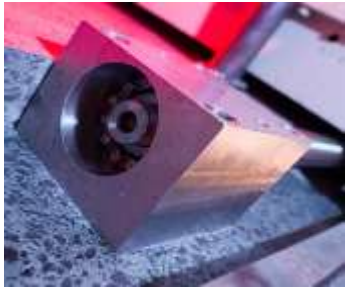

Thank you!

Contact: mschreyer@max-boegl.de
Phone +49 9181 909 11229

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