Status Quo 5D

Building Design / BIM
5D-Design
Definition of 5D-Design

**Geometry**
- Object-based 3D model with user-defined attributes
- What you see is what you build

**Sequence**
- Construction sequencing by linking the geometric model to a chart programme
- What you see is how you build it

**Data / Processes**
- Quantity take-off from the 3D model
- What you see is what you calculated

**BIM**
- Building Information Model, managing all relevant data in a central database

**virtual construction site**
- Dynamic construction process
- „virtual mock up“

**Data- & process management**
- company-wide logistics
- connecting all business processes to the 3D model and the work flow
Current services – 5D-Design

- presentation of STRABAG|ZUEBLIN|DYWIDAG solutions in the tender phase
- a 3D-model to achieve coordination of trades in an early design phase
- clash detection and the coordination of correcting clashes
- fast and reliable design of complex structures

- depicting the construction process by connecting bar chart to 3D-model
- clash detection of moving parts / preparation of site instructions

- quantity take off for defined quantities
- estimating on model based quantities
- design to production. 3D-model is used for computer assisted manufacturing

These services are being continuously expanded. Some typical examples are listed in the following
References – 5D-Design

Steel construction / Plant construction
• Power plant at Luenen, Germany
• Hazardous waste site at Koelliken / Switzerland
• Hazardous waste site at Bonfol / Switzerland

Structural engineering
• Hotel Baku, Azerbaijan
• Opernturm Frankfurt, Germany
• Tower 185 Frankfurt, Germany
• Proton Therapy Centre

Offshore
• Offshore Foundation North Sea

Geotechnical engineering
• Desy Hamburg, Germany

Tunneling
• Underground railway Amsterdam, Nederlands

Design to Production
• Mercedes Benz Museum Stuttgart, Germany

Stadium
• Khalifa bin Zayed National Stadium Abu Dhabi

Airport
• Airport Gate Frankfurt, Germany
Project: **Power plant Luenen, Germany**

Description: 3D-steel construction and detailing, clash detection, design to production.

Steel structure model provided by our Technical Head Office and plant design provided by subcontractors.
Project: Hall over the hazardous waste deposit Koelliken, Switzerland
Description: 3D-detailing of steel and concrete, clash detection, design to production
Steel structure model provided by our Technical Head Office, used for CAM assisted production at ZUEBLIN STEEL BRANCH
Project: Hall over the hazardous waste deposit Bonfol, Switzerland
Description: 3D-detailing of steel and concrete
Steel structure model provided by our Technical Head Office, used for CAM assisted production by subcontractor
Project: Marriott Hotel Baku, Azerbaijan
Description: 4D-Scheduling
3D-model provided by 5D-Design department to display construction sequencing, connecting scheduling to model
4D-model used to plan and discuss constructability

für mehr Infos LOGISTIKUNTERSTÜTZUNG 5D siehe Filmbeitrag
Project: Opernturm Frankfurt, Germany

Description: Clash detection
3D-model provided by 5D-Design department to check possible clashes
HVAC ↔ structural
3D-model quality is chosen to display formwork drawing outline
Project: Tower 185 Frankfurt, Germany
Description: Quantity take off, estimating 3D-model provided by 5D-Design department for quantity take off
Project: Proton rehabilitation centre Essen, Germany
Description:
3D-detailing, drawings
3D-model provided by our Technical Head Office to generate formwork and pre-cast drawings for execution
References – 5D-Design

Project: Khalifa Bin Zayed National Stadium Abu Dhabi
Description: 3D-precast planning, scheduling, estimating, precast-design. 3D-model for precast and in situ concrete provided by 5D-Design department to design precast structure. Quality of 3D-model to derive 2D-fabrication drawings. Model is the basis for clash detection.
References – 5D-Design

Project: Airport Gate Frankfurt, Germany
Description: 3D-BIM, Scheduling / displaying contractual content
3D model provided by our Technical Head Office and 5D Design
<table>
<thead>
<tr>
<th>Project:</th>
<th>Offshore, Germany</th>
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| Description: | 3D-BIM, design to production, rendering  
3D-model provided by our Technical Head Office and 5D-Design |
<table>
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<tr>
<th>Project:</th>
<th>DESY Hamburg, Germany</th>
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<tbody>
<tr>
<td>Description:</td>
<td>3D-BIM, clashes, quantity take off</td>
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<td>3D-model provided by tunnelling division ZUEBLIN</td>
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<tr>
<td>Project:</td>
<td>Various Tunneling Projects, Europe</td>
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<tr>
<td>Description:</td>
<td>Design to production, precast-design</td>
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<tr>
<td></td>
<td>3D-model provided by tunnelling division ZUEBLIN</td>
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</tbody>
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Projekt: Mercedes Benz Museum Stuttgart, Germany
Description: Design to production
The shape of UN Studio’s Mercedes Benz Museum in Stuttgart is defined by two intertwining ramps spiraling around three cores. They create a unique spatial experience for the visitor, but are nearly impossible to describe in traditional floor plans and sections. This 3D model was the basis for computer assisted manufacturing and coordination of all participating trades.
Detailed example of 5D-Design

**Project:**
Mercedes Benz Museum Stuttgart, Germany

**Description:**
Design to production
The shape of the building is formed by the bearing structure of concrete and steel. The challenge was to build a double curved 3D building with this bearing structure being visible.

Mechanical engineering software was used to be able to design a 3D model which was used for parametrically designing the formwork and scaffolding needed.

This mechanical 3D model was a basis for a direct production of formwork and sheeting on computer controlled machines.

2D planning for construction site were based on the 3D model. The 3D model was used on site for overview and coordination.

Without using a 3D model planning and construction would not have been possible.
Detailed example of 5D-Design

Project: Mercedes Benz Museum Stuttgart, Germany
Description: Design to production
Detailed example of 5D-Design

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Detailed example of 5D-Design

Project: Mercedes Benz Museum Stuttgart, Germany
Description: Design to production
Züblin has extensive in-house engineering capacities. The Technical Head Office (Zentrale Technik, ZT) is the STRABAG|ZUEBLIN|DYWIDAG center of technological competence. It supports the Group's operating units in geotechnical engineering and tunnelling, structural engineering and turnkey construction. The services rendered cover the entire construction process, from the early acquisition stage, through tendering and construction design, all the way to site management.

ZT currently has about 500 personnel all working in one of the following three main business fields: Turnkey Construction (SF), Structural Engineering (KI), or Geotechnical Engineering and Tunnelling (TT). The following picture provides an overview.

The ZT covers technical assistance for the operating units in:
- acquisition
- tendering
- construction design
- design management
- expert site management

Further super ordinate tasks include:
- research, development and innovation
- maintenance and development of tools for design and construction
- patent office
- human resources development
- in-house training
With a view to strengthening the company’s future competitiveness, Zentrale Technik also carries out specialised and interdisciplinary research, development, and innovation. Other important tasks of ZT are to maintain and refine tools for planning and construction such as software tools for design, cost estimation and construction site management.

Building Information Modelling is an integral part of this work carried out by ZT: Efficient building calls for efficient tools and lean processes and the 5D Design department is ZT’s answer to this challenge. Model-based, integrated cooperation of all project participants covering all phases and works on a joint basis (3D geometry, 4D construction schedule and logistics design, 5D data and process management) is the quintessence of the work of this innovative group.

The 5D Design core group has been active since 2001 and acts as the coordinator for engineers and draftspersons throughout Züblin and the entire STRABAG Group, able to fall back on the expertise of over 400 ZT engineers, hundreds of engineers & draftspersons in the operational units and extensive in-house IT support.

A steering group with representatives from all ZT departments and all major operational units coordinates BIM activities. In regular meetings this group of over 40 engineers exchange project experience and study best practice examples.

http://www.5d-initiative.eu
5D-Design – Software in use

As BIM can be used in different processes, applications have to be used according to the specific required purpose. Today’s applications for construction all partially support BIM – and design applications from mechanical engineering can be used to support BIM for production.

The below mentioned software is used in-house to support the required BIM request of the individual building structure, site and customer.

**AEC based software:**

- Autodesk Revit Architecture 2009
- Autodesk Revit Structure 2009
- Autodesk Revit MEP 2009
- Autodesk Autocad Architecture 2009
- Autodesk Navisworks 2009
- Autodesk Inventor 2009
- Bentley Microstation
- BoCAD
- Nemetschek Allplan BIM 2009
- Syncro
- Tekla Structure

**MECHANICAL ENGINEERING based software:**

- Dassault Systemes Solidworks 2009
- Dassault Systemes 3DVia Composer
- Autodesk Inventor 2009
- Gehry Technology with partners

**SCHEDULING software**

- Primavera P6
Contact

Thank you!
What can we do for you?

Konstantinos Kessoudis
(Department Manager 5D-Design)
Tel. +49 711 7883 345
konstantinos.kessoudis@zueblin.de

Dr. Ian Quirke
(Deputy Department Manager 5D-Design)
Tel. +49 711 7883 601
ian.quirke@zueblin.de