

## by Baden-Württemberg Enablers (BWE)



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#### Digitization – What do we experience? Deficits!!! Bundesministe für Wirtschaft und Energie Branchenindex DIGITAL: Stand 2011 und Entwicklung seit 2003 Differenz 2011 2003 - 2011 Branchen (in Punkten) (in Punkten) **Monitoring-Report** Digitale Wirtschaft 2013 Telekommunikation 83,0 20.6 Digitalisierung und neue Arbeitswelten Verlagswesen, audiovisuelle Medien und Rundfunk 77.5 23,9 IT- und Informationsdienstleister 76.6 12,7 Finanz- und Versicherungsdienstleister 76,6 35,7 Datenverarbeitungsgeräte, elektronische und optische Produkte 76.5 28.5 Fahrzeugbau 72,2 26.7 Handel 66,4 34.8 Elektrotechnik und Maschinenbau 66.1 27.8 Freiberufliche, wissenschaftliche und technische Dienstleister 65,7 23,2 Chemie- / Pharmaindustrie sowie sonstige Grundstoffe 32,0 63,0 Textil-, Bekleidungs- und Lederindustrie 62,8 40,2 Metallindustrie 60,9 31.3 Energie- und Wasserversorgung 60,5 25,4 Holz- und Papierindustrie, Druckerzeugnisse 60,4 37,2 Sonstige Warenherstellung, Reparatur / Installation von Maschinen 58,6 34,0 Grundstücks- und Wohnungswesen 56,4 25,1 Gastgewerbe 56,2 38,3 Verkehr und Logistik 50.3 34.5 Sonstige Unternehmensdienstleister 49,6 32.8 Nahrungsmittel-, Getränke- und Tabakindustrie 45,4 34.8 Baugewerbe 36,6 27.1

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### **BIM in History and Definitions**

1994-1998 Latham and Egan Reports (UK) – Lack of collaborative working and 50% site time waste because of Info Mismanagement	1997 Charles River: parametric 3D- Model-Software Revit 1995 Industry Alliance for Interoperability (IAI) – predecessor of buildingSMART	2002 Autodesk buys Revit 2002 Laiserin Letter "Comparing Pommes and Naranjas" – Building Information Modeling	2007 First German Wikipedia- Entry of BIM 2006 First English Wikipedia- Entry of BIM	2010 Open Sour BIM Servei Uni Utrech	2014 Industry Foundation Classes (I 4.0	n IFC) 2016 UK BIM Level 2 obligatory !!!
<mark>1990</mark>	1995	2000	2005	2010	)	2015
		2002 Industry Foundation Classes 1.0	2007 UK PAS 1192 L	S I 2010 f JK BIM G Task Group I	2014 SO charters BIM Norming Commitee or Info Mgmt over Asset Life Cycle – SO19650	2015 DIN charters BIM Norming Commitee German Construction Industry charters Planen Bauen 4.0 GmbH German BIM Task Group

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BIM is synonym for ....

- Building Information Modeling
- Digitization of Value Chain in Asset Design, Asset Construction and Asset Management
- Building Industry 4.0
- BIM is therefore
- (Change of) Methods
- (Change of) Tools
- (Change of) Point of View (Paradigm Shift)





### BIM – The international Norming...



## European Commiteê for Standardization Comite Europeen de Normalisation Europäisches Komitee für Normung

#### ISO TC59/SC13 Home of BIM at ISO

...Business

ISO 16739 "IFC - Industry Foundation Classes" WG11 - ISO 16757 "Product Data"(from VDI 3805) (V.Krieger) WG13 - ISO 19650 "Information Management on Asset Life Cycle" (from PAS1192) (VK, DC) ISO 29481 "IDM - Information Delivery" Task Force 1 (Terminology) Task Force 2 (Business and Strategy)

Founding Report WG215 (Norway Jan2015) CEN TC442 Home of BIM at CEN (Sept 2015) CEN TC442 WG1-4 Paris (April 2016) Mirrors to ISO Working Groups (UK, DE, AT, FR) WG3 TC442 "Information Delivery Specification" (V.Krieger)



DIN NABau-AA 39 Home of BIM at DIN (Dec 2015) DIN NHRS-NABau Mirror to ISO16757 / VDI 3805 (V.Krieger) DIN NABau Mirror AK03 to ISO19650 (V.Krieger) (DIN EN ISO 16739 "IFC v2.3" is already Standard )



BIM – The Value Chain of our Business ... is a cycle!







#### **BIM Basics**



- The Common Data Environment(CDE) encloses all the other "Components" (Volker Krieger)
- The Employers Information Requirements (EIR) lists the "Requirements" that the "Employer" puts as a contract base for the project asset. (David Churcher)
- The BIM Execution Plan (BEP) is a continously worked on ("living")Document telling how to execute the contracted tasks based on the EIR. (Alexander Malkwitz)
- The Master Information Delivery Plan (MIDP) organizes the Delivery of Information throughout the project participants and phases.



Bicommon Data Environment (CDE)

Employers Information

Requirements (EIR)

### BIM Common Data Environment (CDE) – General Technical Conformity Rules

BIM System (techn)	Conformity Criteria					e.g.	E	
	Client- Server	Online Ontime	Web- GUI	Data- Base	Object orient.	Copy- left		
Applikator				+	?		Autodesk Revit, Bentley Microstation, Nemetschek	
Aggregator	+		+	+		?	ONUMA System	
Coordinator	+	╉		+			Oracle Primavera	
Configurator	+	╉	+	+	?	?	Fact TGA MEP Configurator	
BIM Viewer proprietary	+	╉		+	+		Nemetschek Solibri Model Checker	
BIM Aggregator open source	+	+	+	+	+	+	Open BIMserver Oracle, TNO, TU Eindhoven	
BIM Editor open source	₽	+	+	+	+	+	Open BIMeditor from	

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EUROPÄISCHE UNION Europäischer Fonds für regionale Entwicklung



Investition in Ihre Zukunft.





## bw-engineers Open House Riyadh 18.08.2016

## **Summary – The benefits for clients**

## **David Churcher**

Managing Director Hitherwood Consulting, UK Consultant to bw-engineers UK BIM Alliance Steering Group Author of UK BIM standards and guidance UK expert on ISO 19650 Working Group

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# How does BIM benefit clients?

- Reduce project delivery cost
  - Improving the quality of design
  - Removing clashes before they get to site
  - Delivering operation-ready asset information
- Reduce project delivery time
  - Avoiding rework on site
  - Eliminating duplicated design work



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## To get these benefits



- Clients have to provide the environment for collaborative working
- Clients have to know what information is important to them and to their control of the project
- Clients have to engage consultants and contractors who know what they are doing

## Employers Information Requirements

- The Specification for information deliverables
  - What information the client needs the supply chain (designers, contractors) to provide
  - When the information is to be delivered
  - How much detail is needed
  - What format or technology does the client need the information supplier to use
  - What information management processes the supplier will need to use or define
- A document that forms part of the invitation to tender



- Define the EIRs for their project
  - Consult with all stakeholders (project delivery, finance, operations, maintenance, …)
  - Find out what information helps them
- Really understand their own project procurement and governance processes
  - So they really know what information is valuable to them
  - In project delivery AND in asset management

## UK example EIRs and templates







## Thank you

**David Churcher** 

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## **BIM Execution Plan**

Open BIM Day

Riyadh, August 18 Alexander Malkwitz



### Management of hospital project with the method BIM, will result in better quality and lower costs





# BIM during design phase – Additional value trough identification of design clashes and mistakes already during design

#### Tradional Design work vs. BIM clash detection



Traditional design with only limited possibilities to identify mistakes/clashes



BIM clash detection, early identification of clashes in the phase of design and not on site!



# BIM during design phase – Cost planning and capex planning improvement through model based costing



Lack of consistent cost model

#### Calculation of cost on the basis of "real" virtual quantities based on the model



# Design Reviews enables an real- time evaluation of different design aspects to speed up the project duration

#### **BIM Use Design Reviews (Model Check)**



#### Description of Design Reviews

 stakeholders view the 3D model with specific software and could provide their feedback on design aspects

#### Value for

- The team can evaluate different design options and can choose a profound solution meeting the design requirements
- The virtual feedback loops creates an shorter design review process, which might be very valuable remembering the tough timeline during the entire roll out
- It's easily to communicate design changes to construction teams, which becomes valuable when a high scale of suppliers are involved in a project



# BIM is the method for transparent, comprehensible and low risk project execution



#### BIM method

Project example

- Building Information Modeling (BIM) is a process of creating and managing building data during its development
- The BIM procedure interconnects the building geometry, quantities and specific properties (position, material,...) with the related building components
- An 3D real- time and dynamic Building Model is the basis for working with BIM
- BIM is a single source information- and data base for all BIM project participants



# In we will follow international best practice standards for using BIM in construction projects

#### Standard method and procedure - Best Practice Standards used for BIM

- PAS 1192-2 (2013) describes the method for the preparation, allocation and for quality assurance of construction information
  - Defines specific issues and documents to be prepared and followed up during project planning and execution
- Pennsylvania State University: Project Execution Planning (BEP) Guide
  - Gives a best practice procedure for creating and implementing a BEP
- BIM Stufenplan
  - Guideline to incremental implement BIM in Germany
- BIM Experience from the BIM Cluster Rhein- Ruhr
  - >100 firms experienced in using BIM
  - Proven BIM use cases

