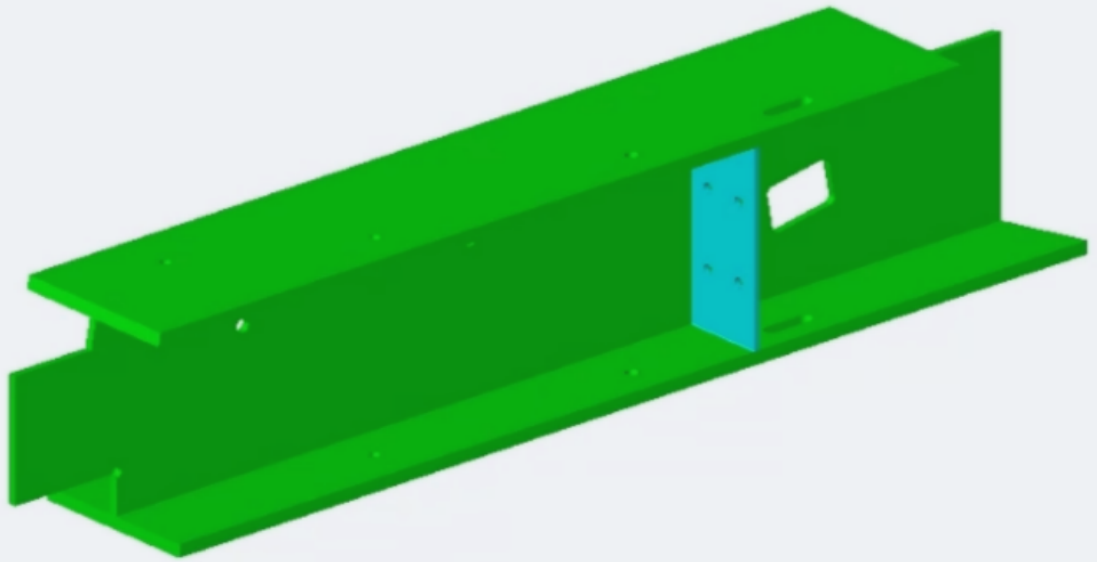
Interoperabilität im Stahlbau - Neue Konzepte für die Nutzung von IFC in der Stahlbaufertigung



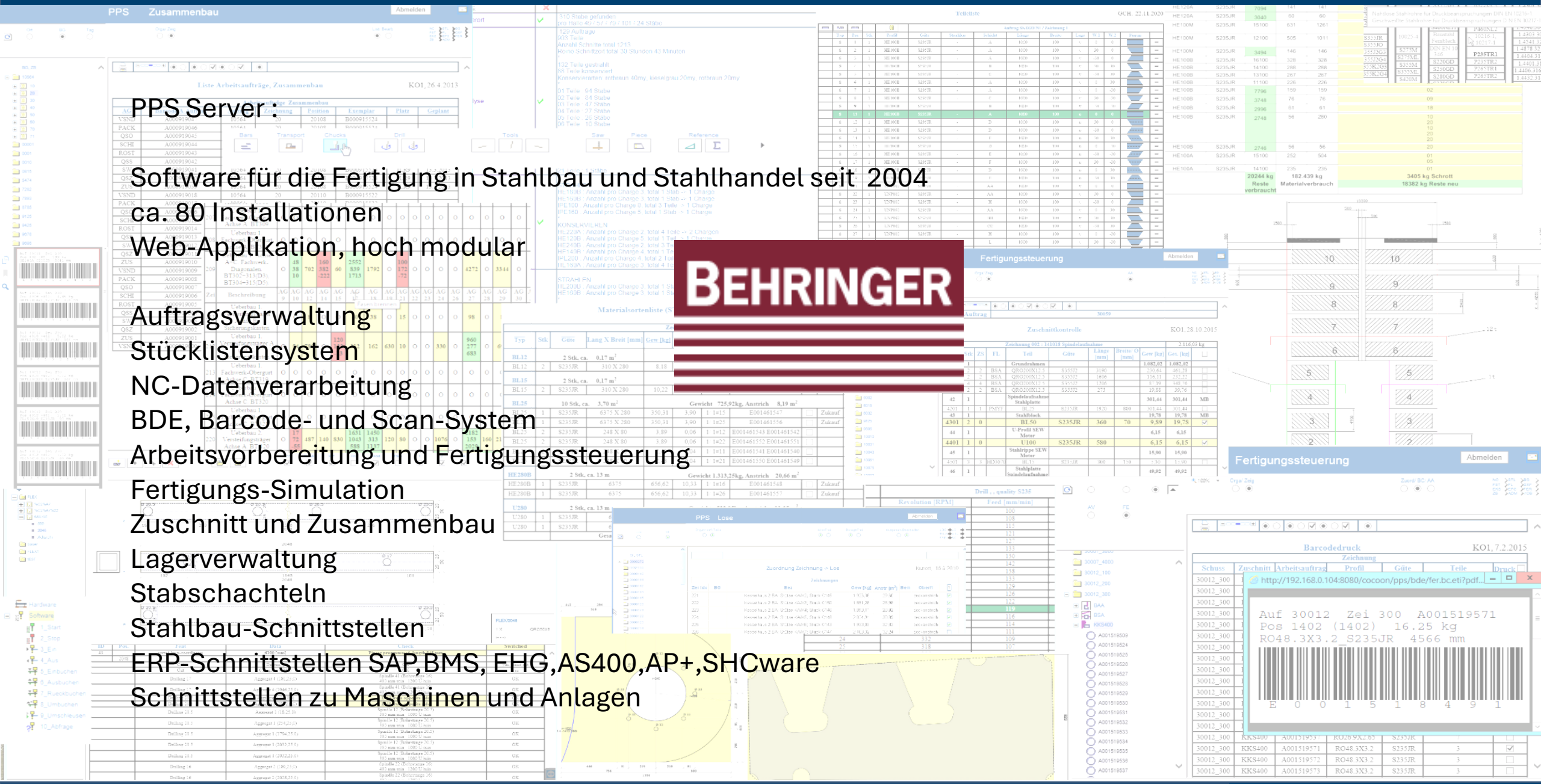
Dr.-Ing. Michael Huhn

Huhn EDV Beratung

mh@huhn-edv-beratung.de

Bildnachweis : BuildingSmart, Trimble, RWTH Aachen, KIT Karlsruhe, Kaltenbach, Behringer-Vernet, Huhn EDV

Der lange Weg zu den IFC



PPS Server :

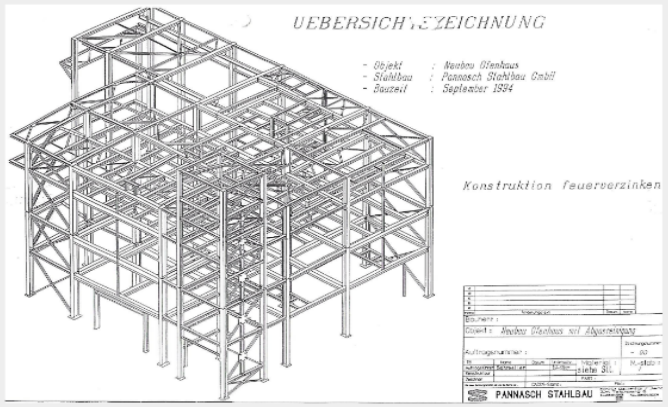
Software für die Fertigung in Stahlbau und Stahlhandel seit 2004

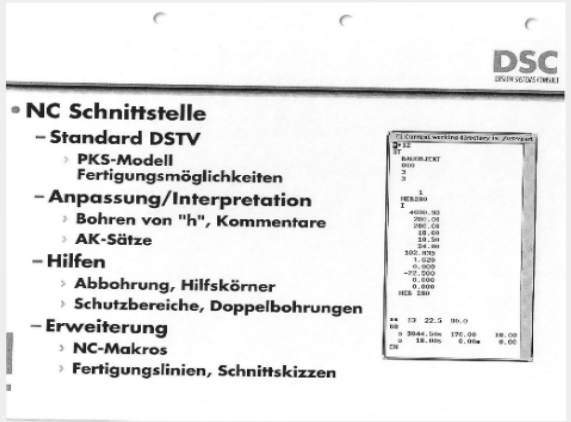
ca. 80 Installationen

Web-Applikation, hoch modular

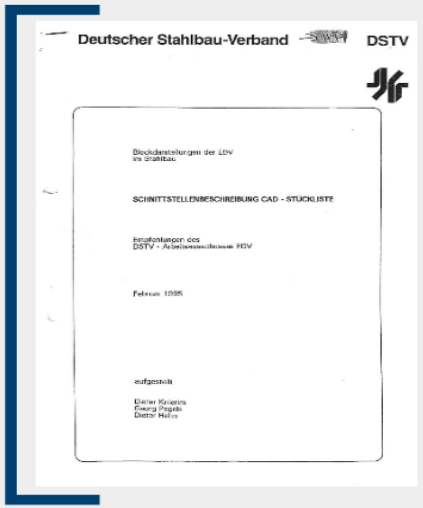
- Auftragsverwaltung
- Stücklistensystem
- NC-Datenverarbeitung
- BDE, Barcode- und Scan-System
- Arbeitsvorbereitung und Fertigungssteuerung
- Fertigungs-Simulation
- Zuschnitt und Zusammenbau
- Lagerverwaltung
- Stabschachteln
- Stahlbau-Schnittstellen
- ERP-Schnittstellen SAP,BMS, EHG,AS400,AP+,SHCware
- Schnittstellen zu Maschinen und Anlagen

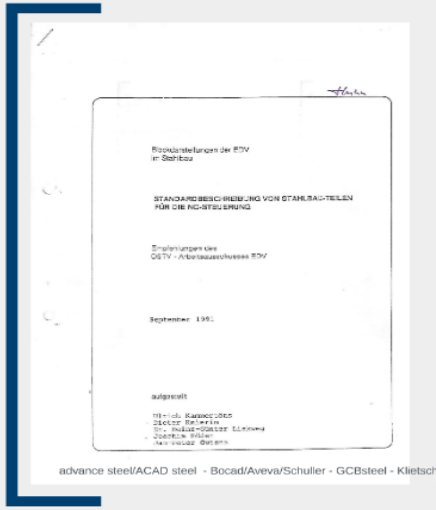
Stahlbaufertigung vor 30 Jahren

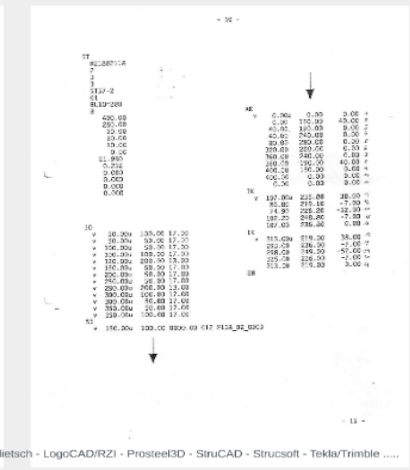




3D CAD Modell -> Fertigungsdaten -> Maschinensteuerung







advance steel/ACAD steel - Bocad/Aveva/Schuller - GCBsteel - Klietsch - LogoCAD/RZI - Prosteel3D - StruCAD - Strucsoft - Tekla/Trimble .....

Project Overview

Project Pontsteiger

Location:

Amsterdam, Netherlands

Objectives:

Inspire design collaboration, integration and alignment; reuse information throughout the whole supply chain and stimulate forward integration of knowledge from suppliers and producers

Software used:

Allplan, ARCHICAD, BIMcollab, Docstream, Solibri Model Checker, Tekla Structures, Vectorworks

buildingSMART tools:

IFC 2x3 and BCF

Highlights:

- 85 project participants worldwide
- 75% of all concrete and 100% of all steel structures produced off-site
- 3000+ versions of IFC models
- 6000+ BCF issues to be managed

Pontsteiger's Innovative use of openBIM® Sets a New Standard for Construction

Pontsteiger Residential building "Pontsteiger" is the tallest of its kind in Amsterdam, Netherlands, rising 90 meters out of water in the IJ canal. This project hosts 366 apartments, 1400m² commercial real estate, 500 underground parking places, and a marina for 40 yachts. The planning, development and construction was done by De Nijs and Dura Vermeer and an extensive list of architects, designers, engineers, co-makers, sub-contractors and suppliers. The project made extensive **use of openBIM processes** and collaboration and set a new standard for construction engineering by **developing a strategy for the use of Industry Foundation Classes** (IFC).

One of the project challenges was that **all building information** needed to be available **before production. No cutting and drilling on site** would occur. For building speed, the project had to make use of prefabricated materials as much as possible. **Demand models were developed** to look at all disciplines to a level at which **production** could participate in **making their own supply models.**

Working with Solibri Model Checker and IFC models, **several** coordination models were **built to allow for coordination and checks.** BIM coordinators kept these models up-to-date and added new supply aspect models as they came in. In the coordination models, the demand models were completely classified with the project's classifications in order to have a good overview and make automatic and visual checks between aspect models easier. **All clashes and issues where kept digitally, using BCF zip files.** Final models formed a base for other partners to confirm their aspect models to.

Managing remarks on hundreds of dynamic models with many project members was very difficult. An issue management workflow was developed to resolve this using IFC, BCF and BIMcollab. The issue management workflow made it possible to manage, engineer and coordinate this very difficult project, resulting in a coordinated model within time and budget. **By using only IFC and BCF, the use of paper was minimized,** and a highly integrated BIM coordinated model was created. The demand and supply models substantially reduced costs.

This project proved that highly complex multidisciplinary design and production coordination through IFC is possible. **It entailed more than 50 disciplines delivering IFC, over 350 unique IFC's, and over 3500 different versions of IFC.** By effectively managing a strategy for the use of IFC information, all teams benefited from having access to the right data to manage change throughout design and construction.

The project was realized through the use of open standards, working together and sharing knowledge, being process oriented and focusing on information delivery. It established a new standard for digital construction in the Netherlands, known as 'BIM Basic IDM'. **This project was delivered on time and on budget.**

Best practise

Current implementations based on IFC 2x3 „**steel fabrication view**“

CAD
- Advance Steel
- Tekla Structures

PPS/MIS
- Steel projects

Development stopped caused by lack of information and missing update for IFC 4.0.

The information from different CAD systems weren't congruent.

MVD steel fabricatrion doesn't include all fabrication relevant information.

Quelle: Ingo Schnock

- guter Startpunkt
- zu wenig Teilnehmer
- intransparent
- keine Zusammenarbeit der Wettbewerber
- technologisch < CIS
- einstufiger workflow

buildingSMART Deutschland

Kontakt Newsletter

Startseite » buildingSMART Deutschland » Aktuelles » IDM/MVD für den Stahlbau - Aufruf an Experten aus der Branche

IDM/MVD für den Stahlbau - Aufruf an Experten aus der Branche

19.08.2021

Das Standard Committee von buildingSMART International (bSI) hat einen sogenannten **Activity Proposa**l für IDM/MVD für den Stahlbau genehmigt. Nun werden weitere Experten gesucht, die sich dem Projekt anschließen möchten. Aus Deutschland sind bereits die gemeinsame Arbeitsgruppe von buildingSMART Deutschland und dem bauforumstahl "BIM im Stahlbau" sowie weitere Mitglieder von buildingSMART Deutschland vertreten. Interessierte melden sich bitte direkt beim Projektkoordinator **Mirbek Bekboliev.**

Die Projektinitiatoren haben ihre Präsentation zu diesem Projekt im Rahmen des letzten bSI Summit vorgestellt. Die **Aufzeichnung der Präsentation ist hier verfügbar.**
Auf Initiative von Ingo Schnock (Trimble Deutschland) und Luke Faulkner (American Institute of Steel Construction - AISC) und mit direkter Unterstützung von buildingSMART Deutschland wurde ein Projekt zur Aktualisierung der 2012 veröffentlichten "MVD for Steel Fabrication" auf Basis des IFC2×3 Schemas gestartet.

buildingSMART International

buildingSMART International

Detailed Project Plan

Project Name:

openBIM for Steel Construction Fabrication

AKA “openBIM for Steel Construction”

General Information

Domain Governance:

Building Domain (BD)

Contact Information Work Plan Initiator:

Last name: **Luke**
First name: **Faulkner**
E-mail: faulkner@aisc.org
Org: AISC

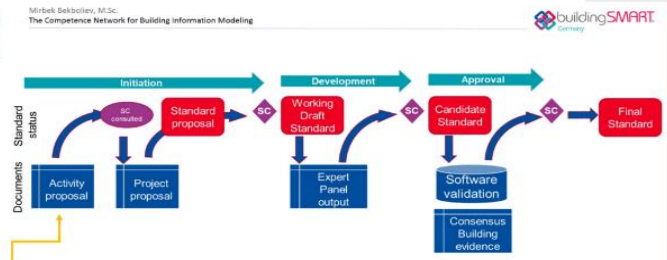
Last name: **Mirbek**
First name: **Bekboliev**
E-mail: mirbek.bekboliev@buildingsmart.de
Org: buildingSMART Germany

Document Informati

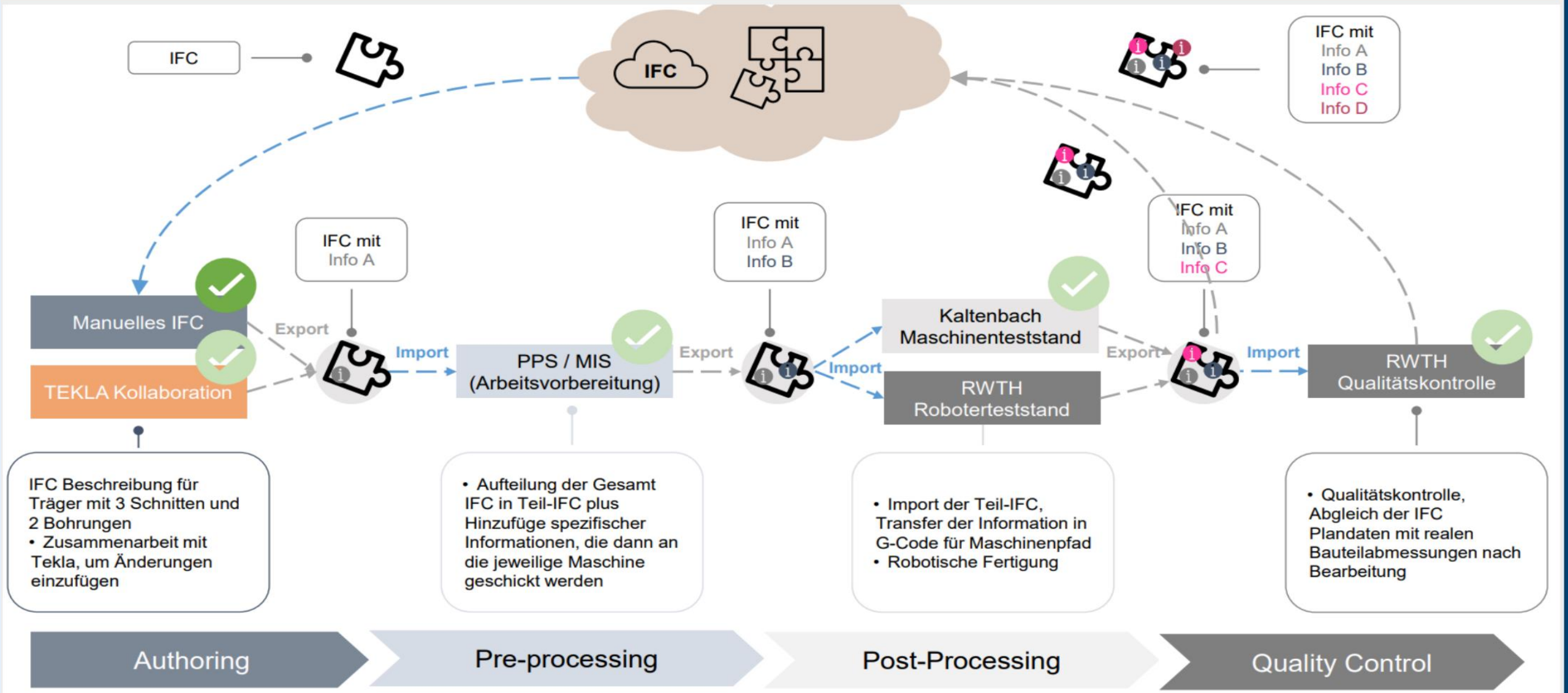
Document/Proje

Date:

Version:



Quelle: Mirbek Bekboliev



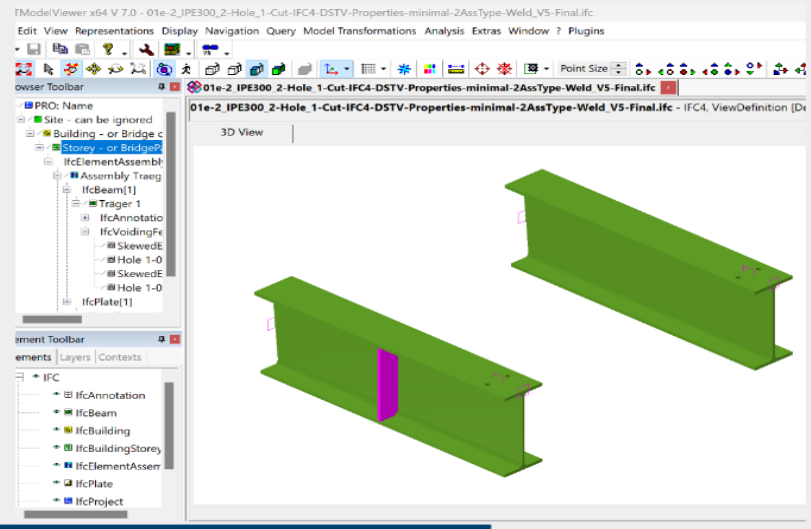
Tekla -> KIT -> HEDV -> Kaltenbach

Abb. : Victoria Jung, RWTH Aachen

„Demonstrator“ in Bildern

adhoc-Gruppe "NC"

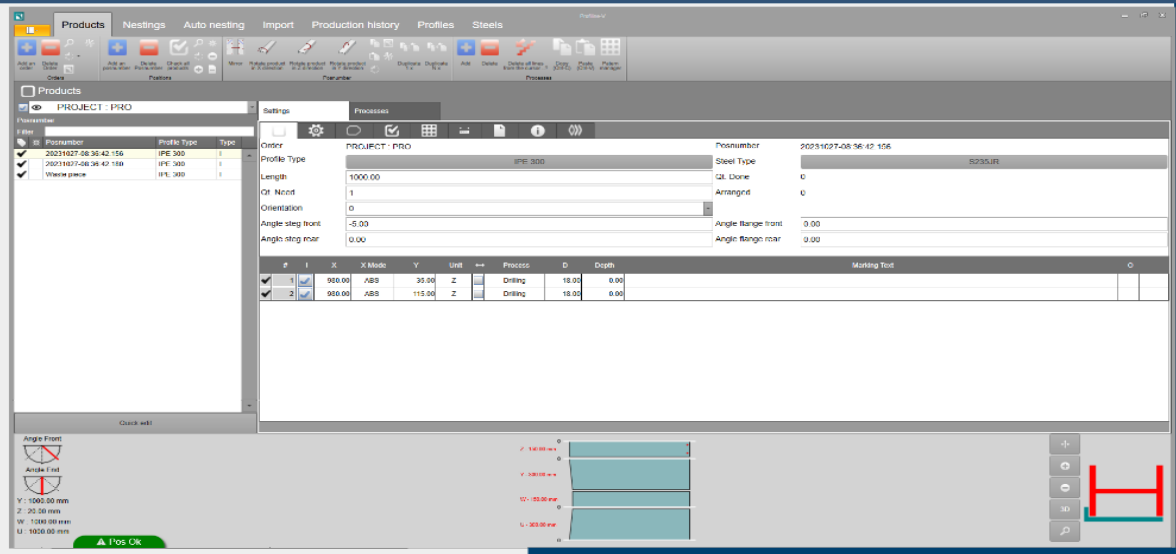
bauforumstahl



IFC Viewer (KIT)

IFC Export

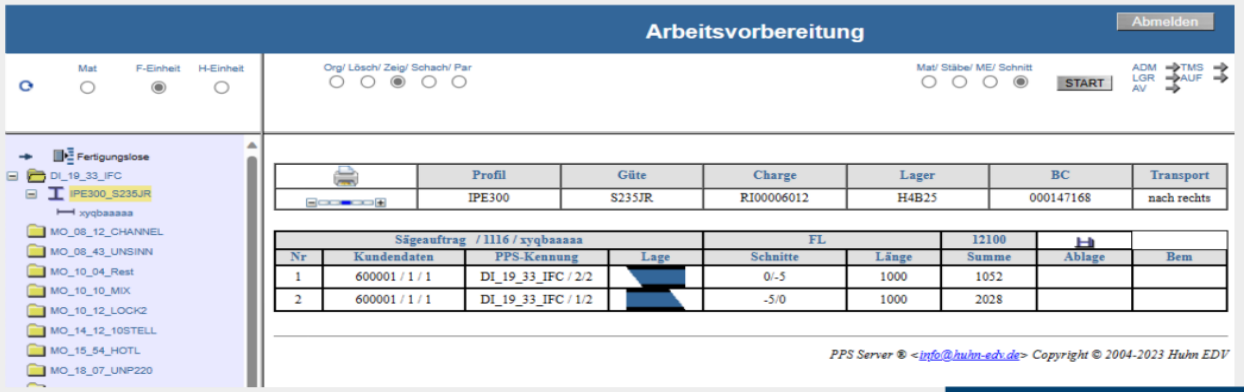
IFC Import



IFC Import

SBA (Kaltenbach)

IFC Export



Profil	Güte	Charge	Lager	BC	Transport
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Sägeauftrag / 1116 / xyqbaaaaa				FL		12100		
Nr	Kundendaten	PPS-Kennung	Lage	Schnitte	Länge	Summe	Ablage	Bem
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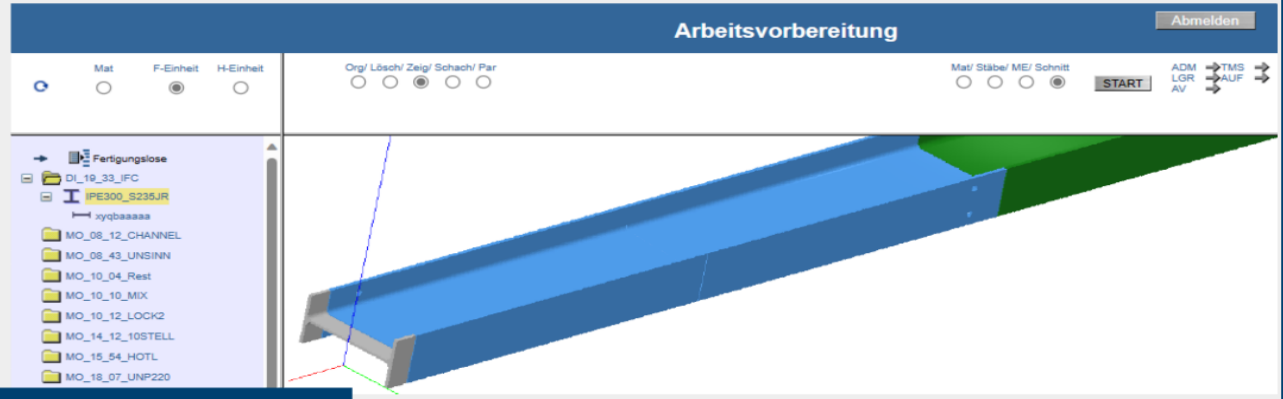
2	600001 / 1 / 1	DI_19_33_IFC / 1/2		-5/0	1000	2028		



PPS Server (HEDV)

Use case 1 "CAD -> Produktion"

Konstruktion + Strukturen + Anforderungen :
Teilsysteme, Baugruppen, Abrufe ...
Ex Class, Brandschutz, Korrosivität, Termine ...

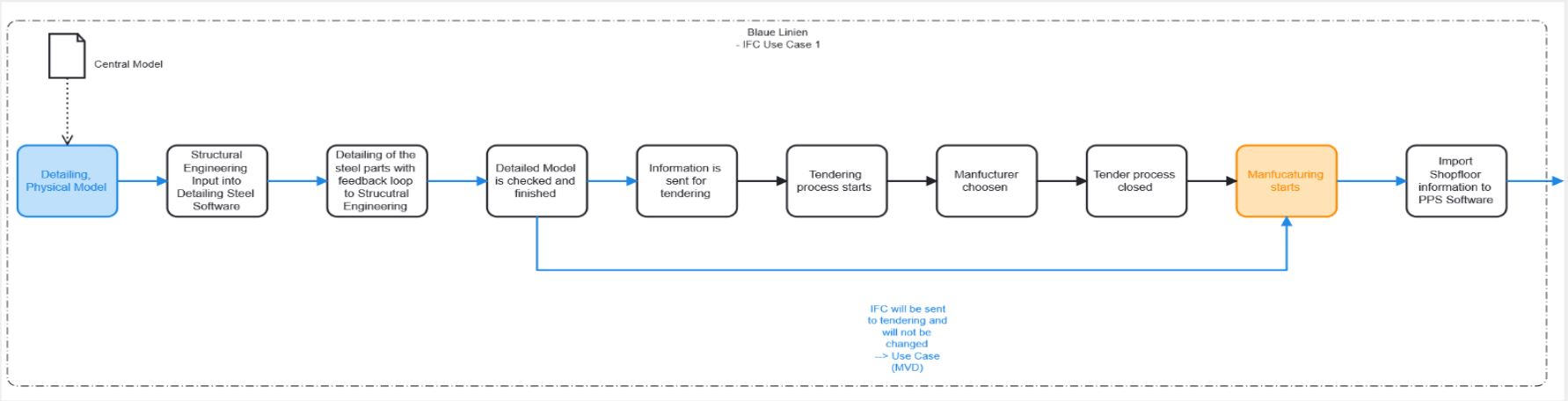
CAD -> Ausschreibung Fertigung
CAD -> Fertiger

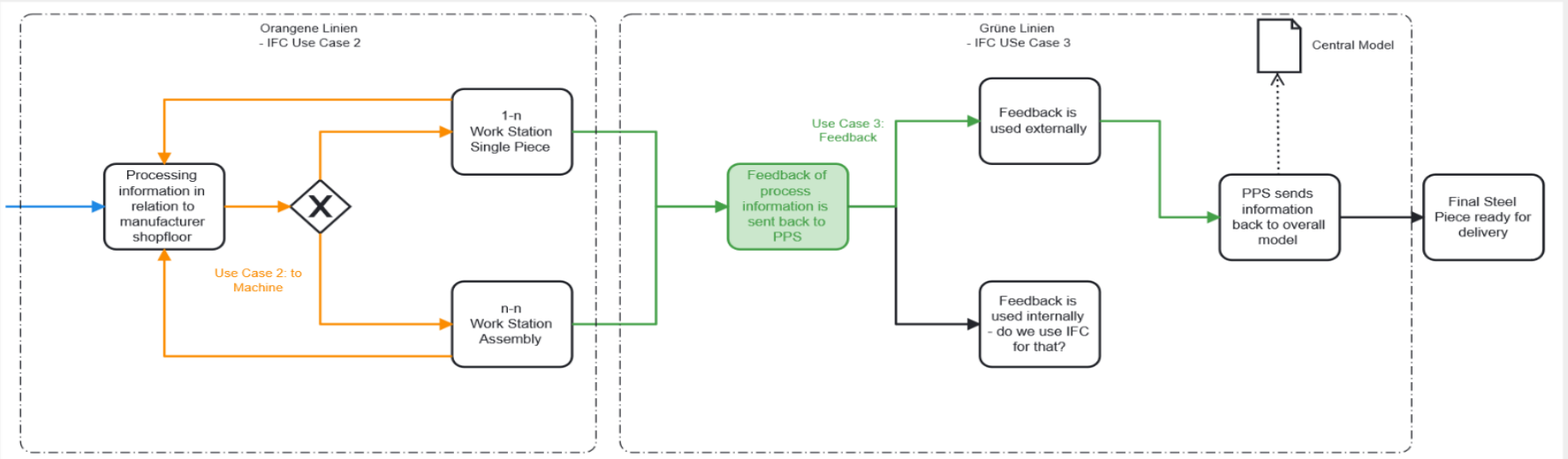
Use case 2 "in der Produktion"

Halbzeuge, Material
ZS,ZB,Handarbeit
Fertigungszustände
Hilfskonstruktionen
Prozesse projektübergreifend
Ressourcen

Use case 3
"Rückmeldungen -> CAD / Koord.modell"
Feedback Maschinen ... AP
Gebäude / Shop / Site
Dokumentation "as built"
Verbräuche
Nachkalkulation

Use case 0 "Architekt -> TB <-> Statiker"
hier NICHT betrachtet





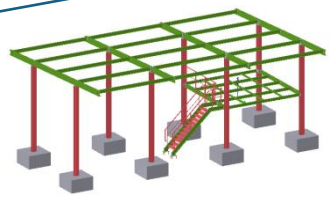
KIT Forschungsschwerpunkte

3D-Visualisierung
- Gebäude- und Bauteilstruktur
- Thematische Einfärbungen
- Virtual Reality

Prüfung
- Syntax und Semantik
- Geometrie
- Vollständigkeit

Weitere Standards
- bsDD
- mvdXML / IDS
- BCF

IFC



Konvertierung
- IFC → CityGML
- IFC → DXF, STEP AP214
- IFC → Google Earth

Interaktive Statistiken
- Bauteile
- Eigenschaften
- Beziehungen

Applikationen
- Energieberechnung
- 3D Druck
- Navigation

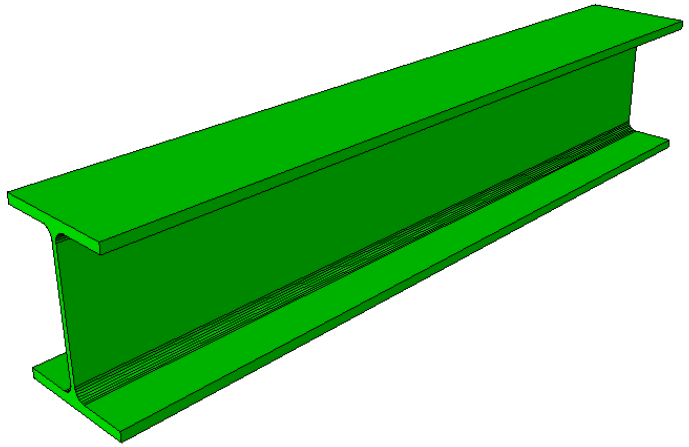
bsDD = buildingSMART Data Dictionary; mvdXML = Model View Definition XML; IDS = Information Delivery Standard; BCF = BIM Collaboration Format

Dipl.-Ing. Karl-Heinz Haefele
Dr.-Ing. Andreas Geiger

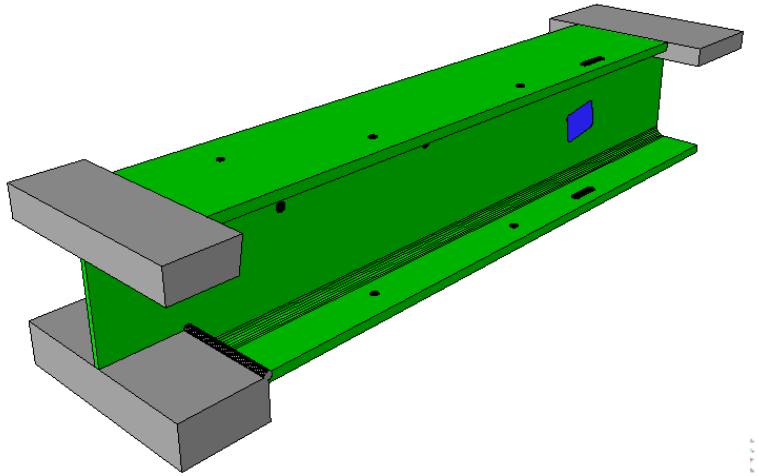
Institut für Automation und angewandte Informatik

Karlsruher Institut für Technologie

Fertigungsschritte mit IFC

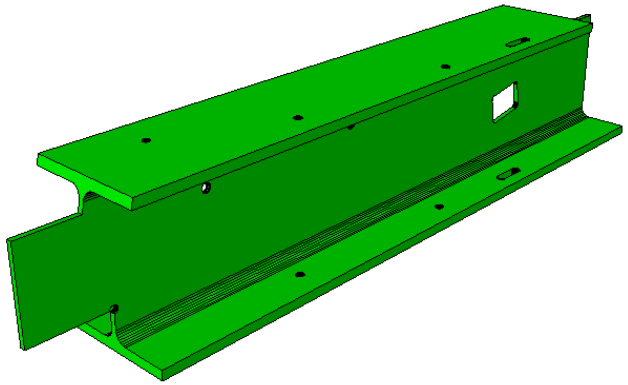


Unbearbeitetes Profil



Fertigungsschritte:

- Grau = Ausklinkungen
- Blau = Ausschnitte
- Schwarz = Bohrungen



Fertiges Profil

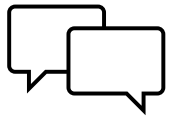
Dipl.-Ing. Karl-Heinz Haefele
Dr.-Ing. Andreas Geiger

Institut für Automation und angewandte Informatik

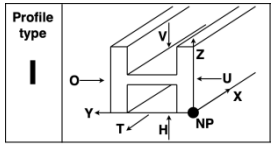
Karlsruher Institut für Technologie

Herausforderungen im Stahlbau

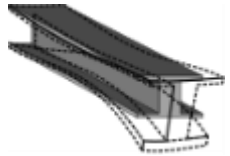
- Informationsbrüche in der Wertschöpfungskette



- Keine Einheitliche Sprache zum Informationsaustausch



- Limitierte Möglichkeit Informationen im dstv Format zu speichern



- Toleranzen der Stahlerzeugnisse sind zu groß, um von Roboteranlagen verarbeitet zu werden

Unsere Motivation

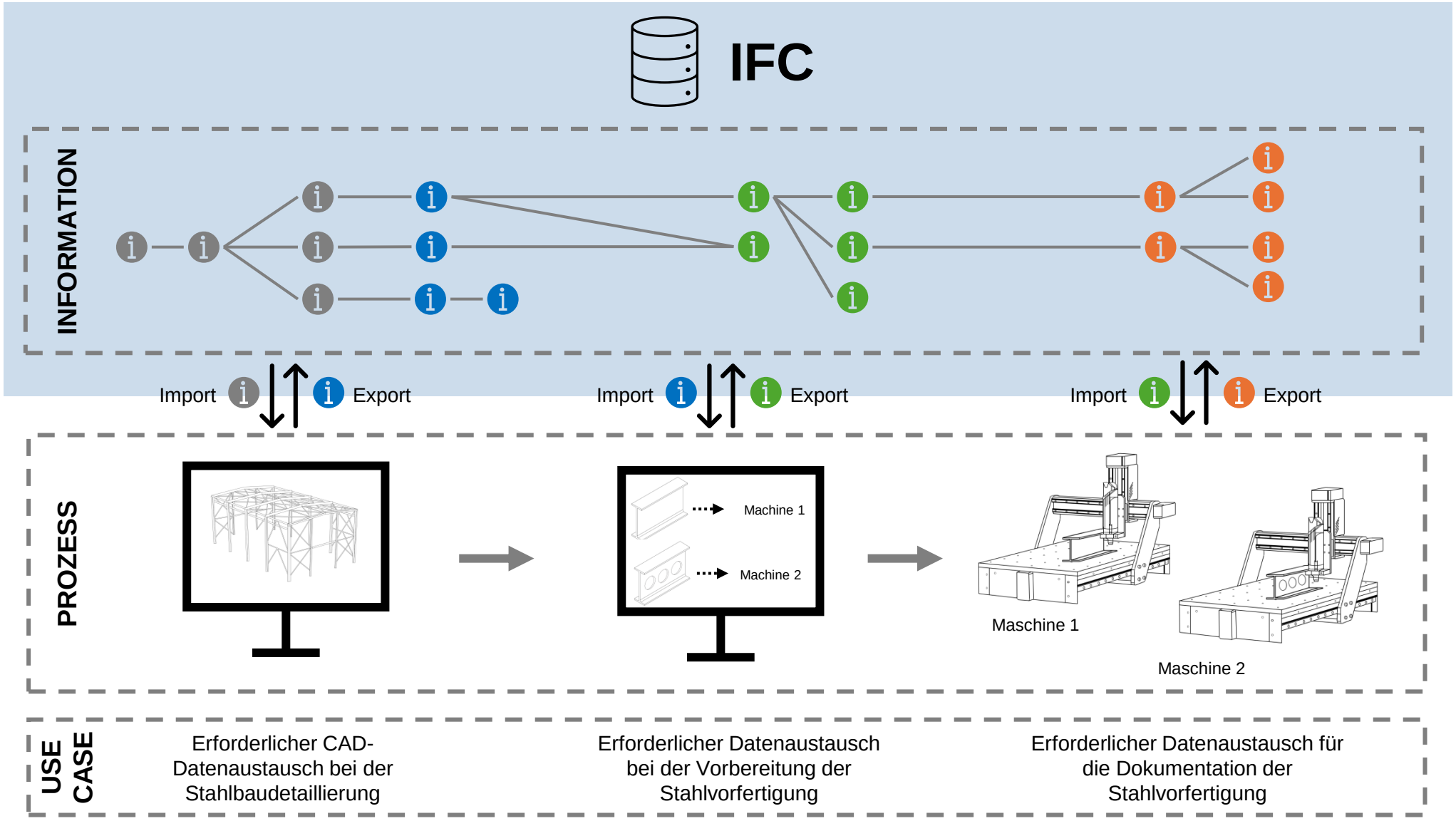
- Anbindung Fertigungsprozesse in Wertschöpfungskette

- Standardisierung des bi-direktionalen Informationsaustausches

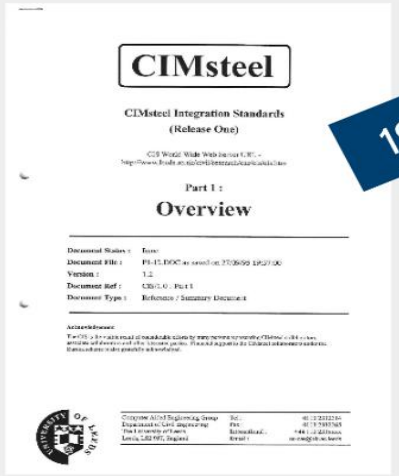
- Erweiterung DSTV-NC Format mit Prozess- und Toleranzparametern

- Einsatz flexibler Roboter durch dynamische Bahnplanung

Interoperabilität im Stahlbau



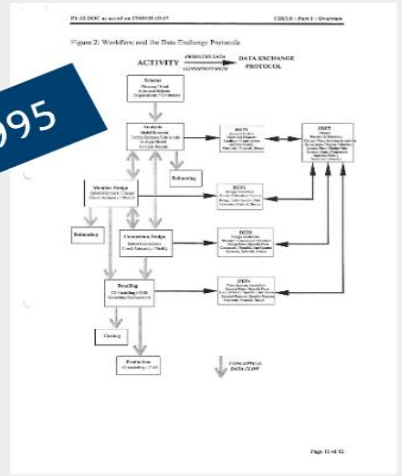
Europa: CIMsteel Views Fertigung

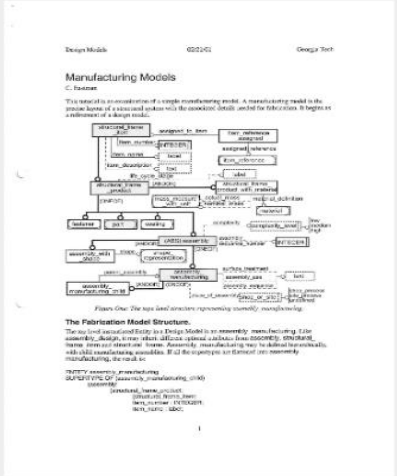

CIMsteel

CIMsteel Integration Standards
(Release One)

Part 1 :
Overview

1995


ACTIVITY
DATA EXCHANGE PROTOCOL


Manufacturing Models

The Fabrication Model Structure.

Deutschland: PSS (Stahl), Holzbau, Komplettbau


Deutscher Stahlbau-Verband DSTV

Blockdarstellung der EDV in Stahlbau

STANDARDBESCHREIBUNG PRODUKTSCHNITTSTELLE STAHLBAU - TEIL 2:

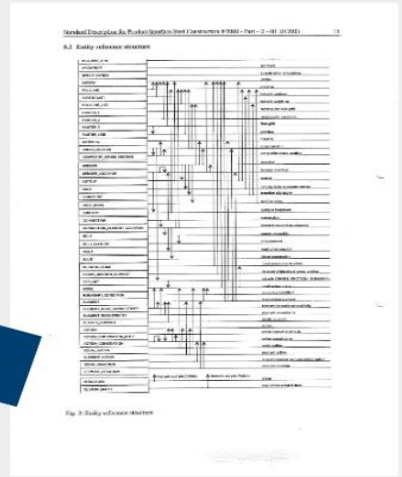
DATENMODELL

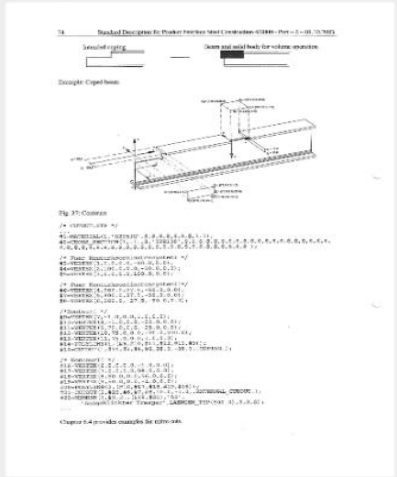
DSTV-Arbeitsausschuß EDV

März 1999

Aufgestellt von:
B. Bacior
U. Braito
G. Diabal
M. Falck
H.-W. Haller
O. Hönnebeum
M. Huhn
H.-D. Koch
J. Rohrbach

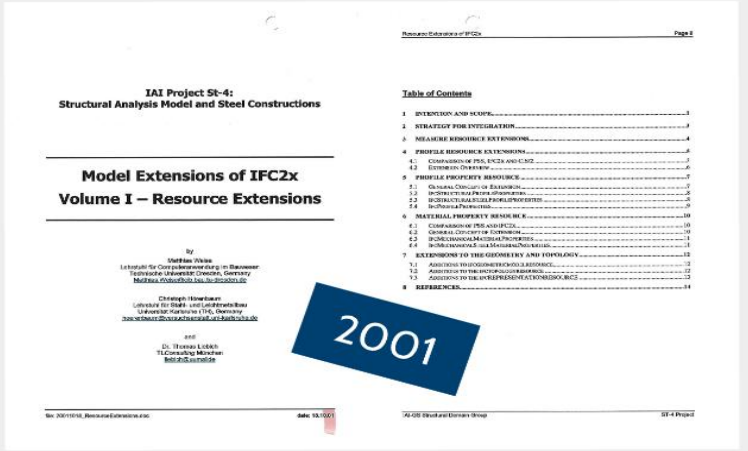
1999





Autodesk et.al 1994
IAI

IFC 1996


IAI Project St-4:
Structural Analysis Model and Steel Constructions

Model Extensions of IFC2x
Volume I – Resource Extensions

Table of Contents

2001


INDUSTRIEALLIANZ FÜR INTEROPERABILITÄT E.V.

Integration mit IFC™

die branchen- und systemübergreifende Lösung für integrierte Planung

Beispiel Architektur – Haustechnik – technischen FM

2005

Georgia Tech Uni
Digital Building Lab

2012

EM11. Final Steel Detailing

Final Steel Detailing is to define an open standard for supporting data exchange from steel detailing software to CNC fabrication in order to enhance productivity of cellular robotic fabrication and assembly.

It aims to specify detailed Model View Definition on a specific exchange scenario in fabrication detailing and cellular robotic fabrication, and to provide a baseline for future extension and development for steel construction industry specific open standard IFC implementation specification and guideline.

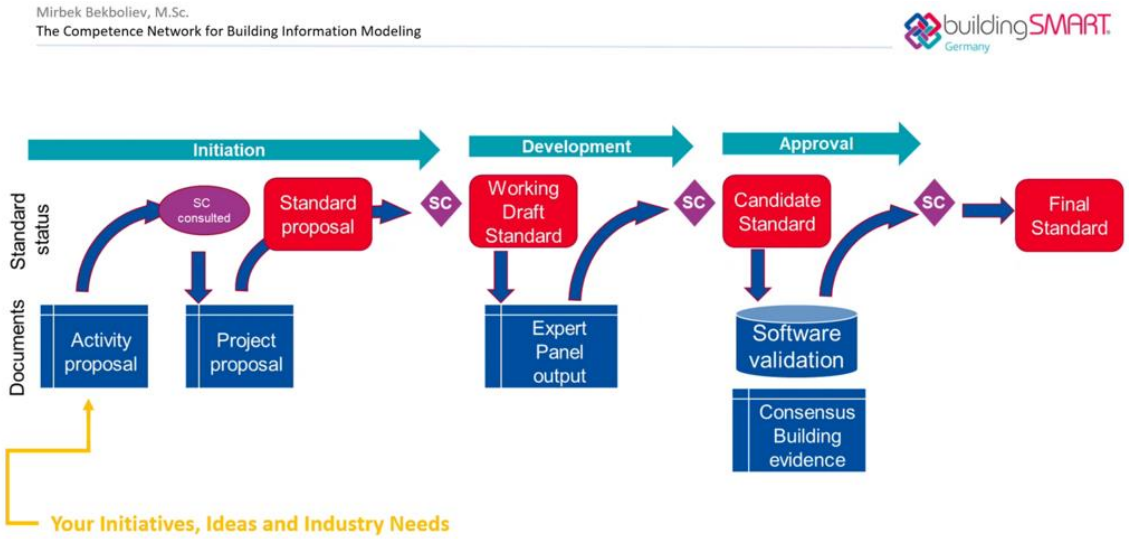
The target is to define an exchange case. It will serve as an example for the full adoption of open standards using IFC in the steel construction industry.

Die IFC werden bleiben ...

- Momentum
- Druck von Auftraggebern
- Internationalität

Machen Sie mit !

- Unterstützen Sie IFC Arbeitsgruppen
- Informieren Sie sich über die aktuellen Entwicklungen
- Starten Sie Projekte
- Wählen Sie Anbieter, die IFC unterstützen
- Fördern Sie die Zusammenarbeit der Wettbewerber
- Unterstützen Sie neue Ideen der Anwendung der IFC
- Nutzen Sie vorhandenes Knowhow in Universitäten und Instituten



bauforumstahl

KIT Karlsruher Institut für Technologie

BEHRINGER

mh@huhn-edv-beratung.de