

# FIG Working Week 2016

CHRISTCHURCH, NEW ZEALAND 2-6 MAY 2016

Recovery

from disaster

Organised by



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## Teaching BIM to Geomatics Students

Paper #8384

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## Why BIM ?

- BIM is cool
- Government and construction industry have high demands on BIM professionals

## Why BIM for geomatics ?

- **Measured surveys** are a big part of BIM
- Reliable **as-built** surveys and monitoring
- Managing **TLS** and Photoscanning
- Geodata-Management, **Coordinates**
- Legal Boundaries, Utilities and Infrastructure





## How did we prepare as teachers?

- Textbooks and software Manuals are **NOT** enough, there is no traditional BIM curriculum yet.
- Realising BIM projects with **industry** partners
- Liaisons with other **faculties** (e.g. civil engineering faculty)
- Visiting other **universities** (e.g. DIT)
- Attending and helping standard organisations (DIN, DVW, FIG)
- Offering “off the job training”





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## What did we learn in Dublin?

- importance of **interdisciplinary** work
- **pointcloud** management with BIM software
- BIM **softwaretools** for engineering surveyors

## BIM at Dublin Institute of Technology

- development of a suite of cross-disciplinary, collaborative, **postgraduate programmes in BIM** from 2014
- **Geomatics for BIM** module for MSc Geospatial Engineering



Mc Govern, E. , Behan, A. , and Furlong, K., FIG Congress 2014, *Geomatics and Developments in BIM Education in Ireland*. Kuala Lumpur, Malaysia



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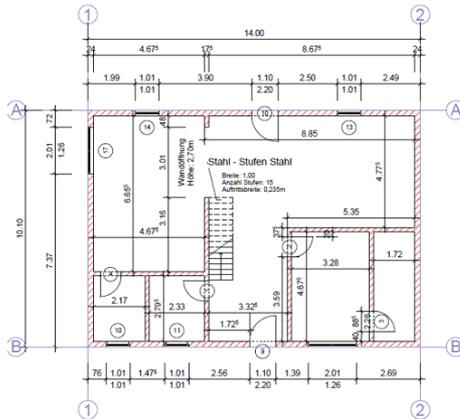
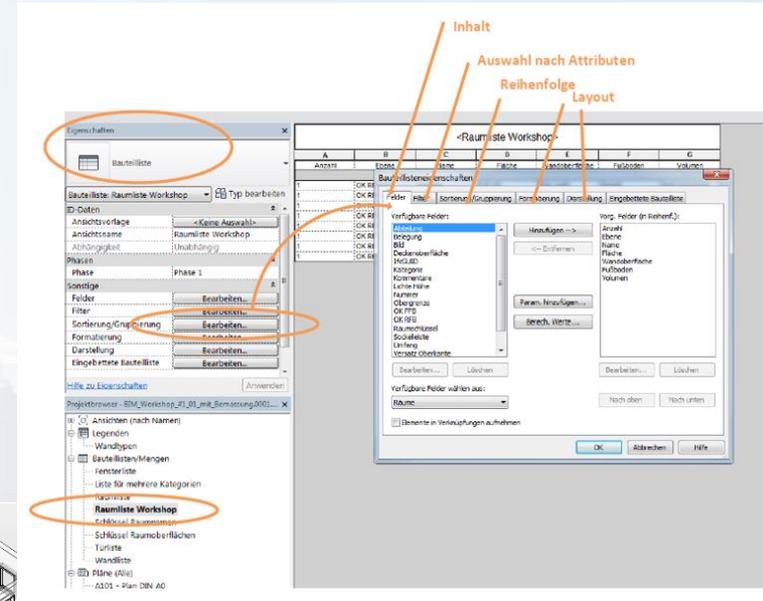
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## Recovery

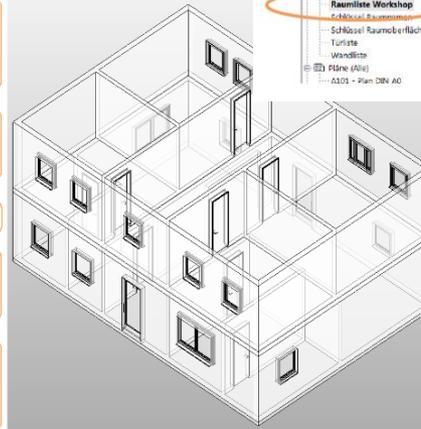
from disaster

## Practice #1 BIM basics

- BIM as **database** – not drawing
- **precise modelling with building objects**
- From floorplans, and sections to semantic 3D model with given drawing and workflows



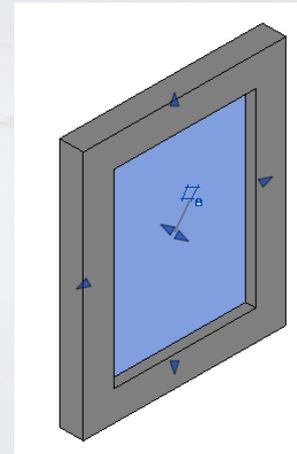
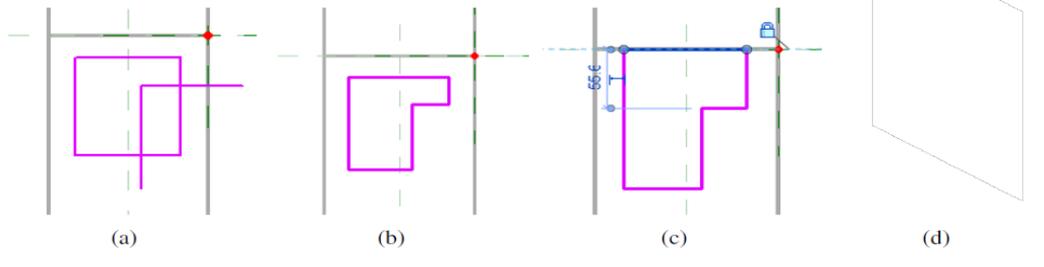
- outer walls**
  1. Select Type
  2. Sketch
  3. Align/fix to grid
- inner walls**
  1. Select type
  2. Sketch
  3. Fix and check dimensions
- ground plate and ceiling**
- openings**
  1. Sketch
  2. Set height parameter
  3. Fix and check dimensions
- windows & doors**
  1. Load or create family
  2. Select family, set parameters
  3. Sketch, consider orientation
  4. Fix and check dimensions





## Practice #2: Creating Types for Object Libraries

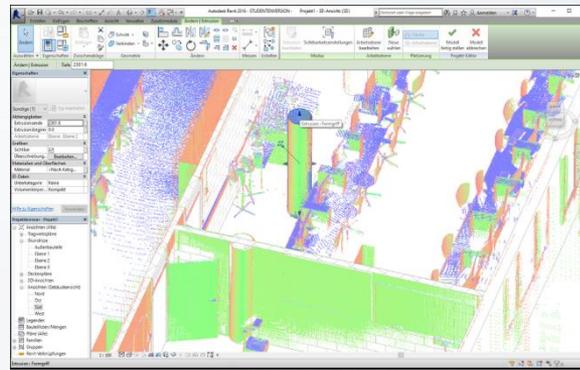
- Creating and managing **building elements** (objects) with Autodesk Revit Family Editor
- **Parameterisation** of dimensions and materials
- Showing the importance of **object libraries** also for measuring existing buildings
- Reference-plane and topology of building elements





## Practice #3: Pointclouds – native support

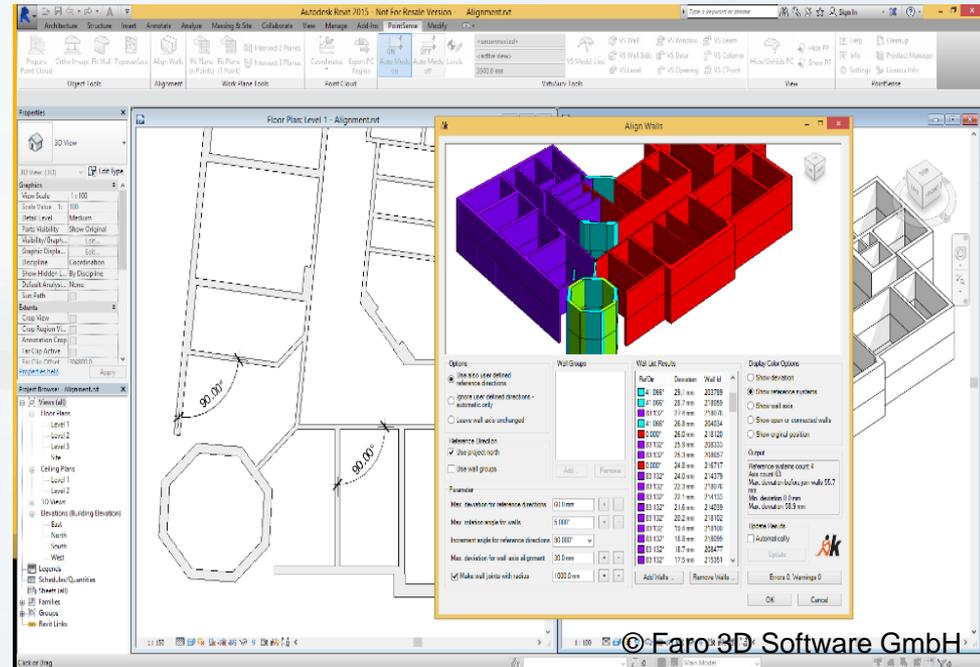
- **preparation** of the point cloud for Autodesk Revit
- pointcloud as **reference** for the **digitalization** of building elements
- **as-build comparison** between an existing model of the building and the point cloud





## Practice #4: Pointclouds – professional tools

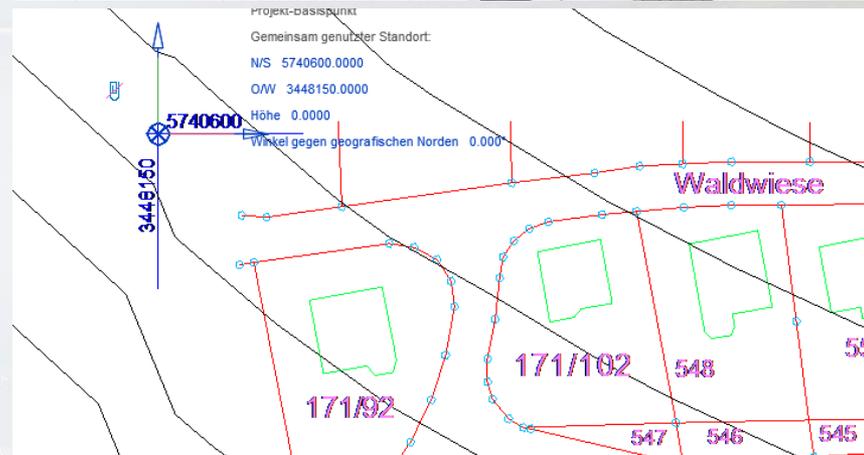
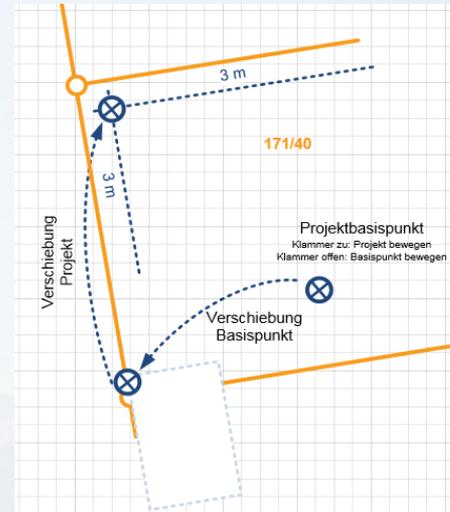
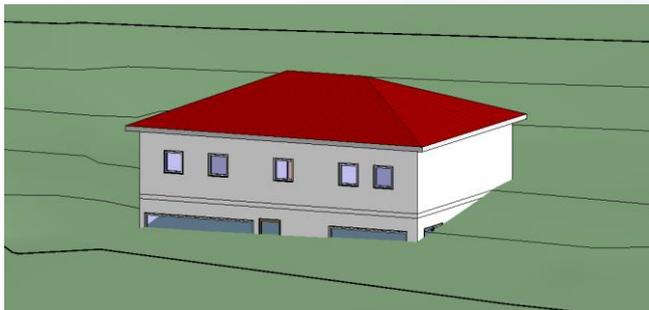
- PointSense for Revit, Faro 3D Software GmbH (Dresden)
- Point cloud in family editor
- **Semiautomatic detection** and placing of building elements
- BIM-Beautification (89,9° vs. 90°)





### Practice #5: Coordinate Systems

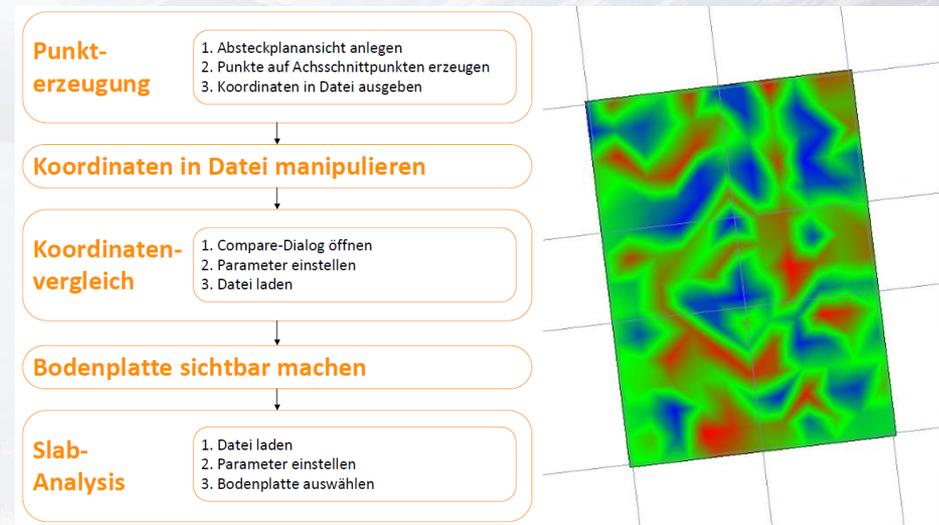
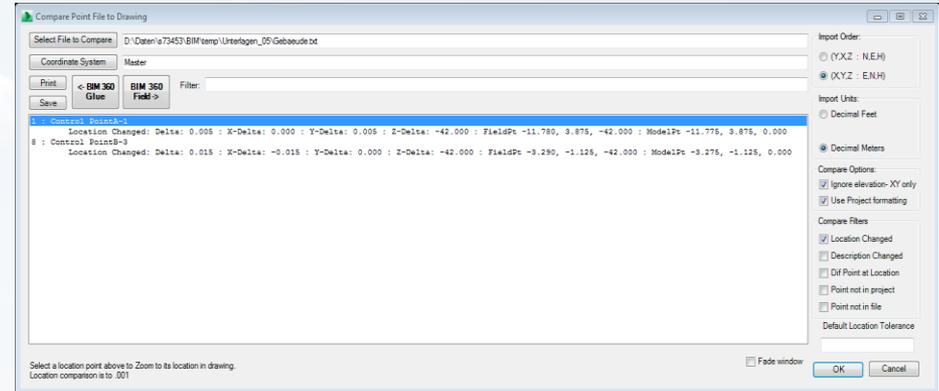
- **Concepts and limitations** of internal, project, shared coordinate system
- Working with **georeferenced** CAD-files
- **Adjusting** a planned building to a parcel boundary
- Digital **Terrain Models (DTM)**





## Practice #6: Setting out

- managing **surveying points** with Autodesk PointLayout
- **comparing** points as-planned vs. as-built
- **slap analysis**
- setting out **reports**
- best-practice **workflows**





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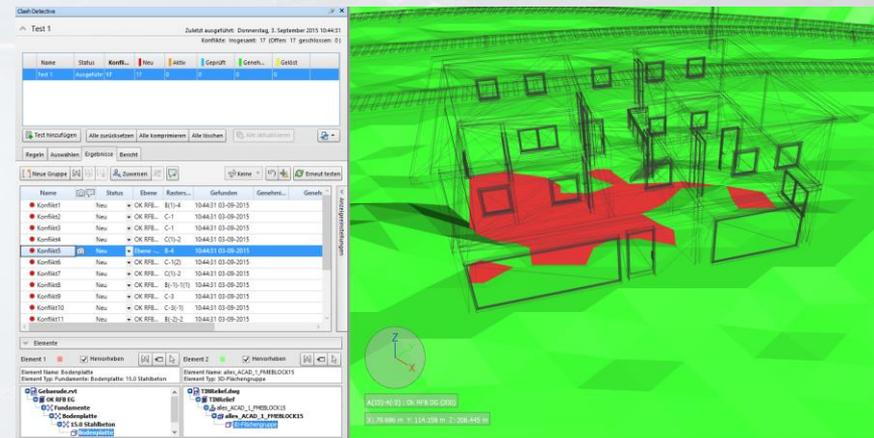
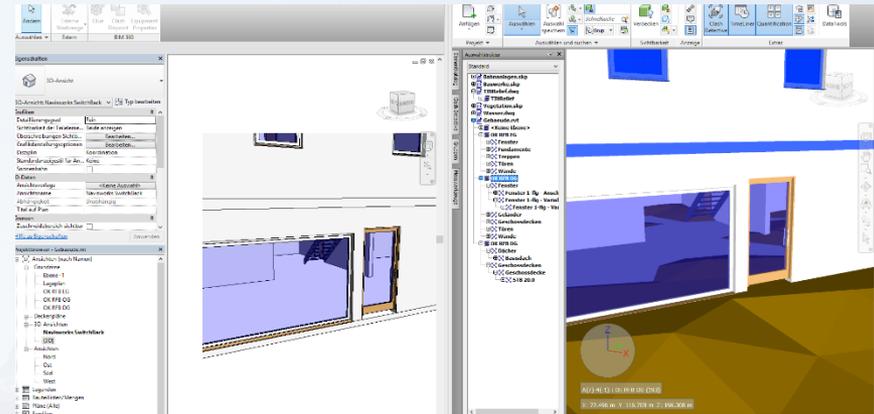
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## Practice #7: BIM to GIS

- **GIS:** Set up a coordination model with building, DTM, tunnel, railway, vegetation, lake, ... (example taken from CityGML Homepage)
- **Management:** Importing and managing diverse models with Autodesk Navisworks
- **Analysis:** Clash detection
- **Visualisation:** Export to Google Earth Viewer (kml)





## Open questions

- Is Autodesk Revit the right choice?
- How to find the balance between practical knowledge (“buttons”) and theoretical concepts?
- Should Software development for BIM (e.g. DYNAMO, C# API) be part of the education?
- **What to leave out in traditional curriculum due to limited time?**



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Technik und Wirtschaft  
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