

Walk-in Slide: AU 2014 Social Media Feed

1. Click on the link below, this will open your web browser

<http://aucache.autodesk.com/social/visualization.html>

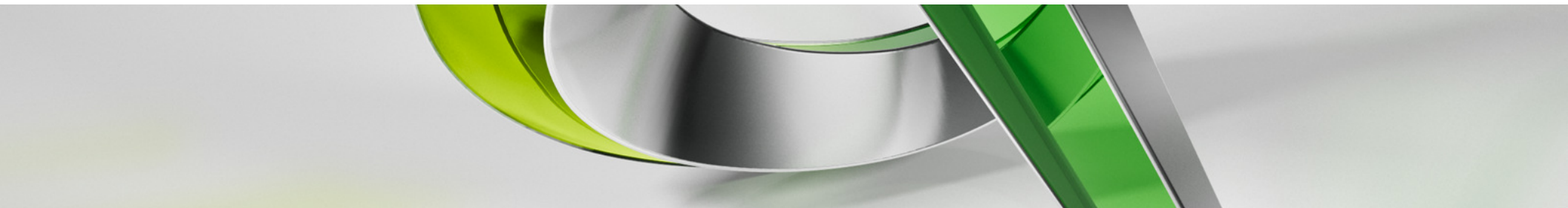
2. Use "Extended Display" to project the website on screen if you plan to work on your computer. Use "Duplicate" to display same image on screen and computer.



Implementing Advance Steel within a BIM Workflow

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Technical Consultant – Autodesk



Class summary

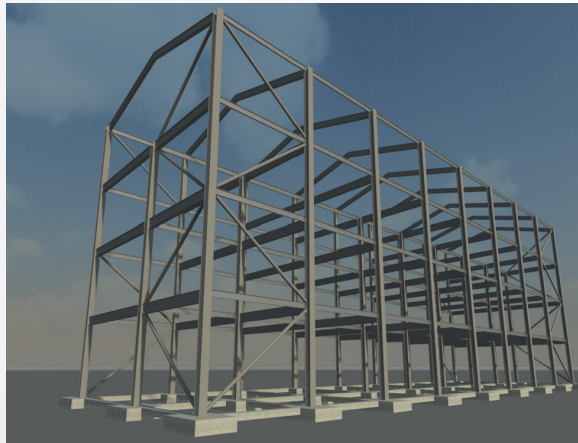
- Implementation of Advance Steel software for connection design and fabrication modeling within an existing Building Information Modelling (BIM) workflow based in Revit software.
- Integration of model data from Revit into Advance Steel and on into Navisworks for construction coordination.

Key learning objectives

1. Discover the most efficient practices for getting started with Advance Steel software
2. Learn how to use Revit software model export functionality to populate an Advance Steel software model
3. Understand the various features & limitations of Advance Steel
4. Learn how to generate models for fabrication

Worked Example

P387: Steel Building Design: Worked Examples for Students Published by The Steel Construction Institute 2011



www.tatasteelconstruction.com/static_files/StaticFiles/Construction/p387.pdf

Steel Building Design Worked Examples for Students

Page 1 of 2

Rev. C

Revised by DGI, April 09

Example No. 00

Subject: Structural layout and actions

Client: MED

Made by: MED

Date: Sept 2006

Checked by: DGI

Date: Jan 2008

CALCULATION SHEET

Unless stated otherwise, all references are to BS EN 1991-1-1: 2002

Structural layout and actions

The various structural arrangements used in the national building considered in this publication are not typical of building design. This is because the structural solutions have been chosen to demonstrate a range of design situations. This example defines the characteristic values of the actions that act on the building shown in Figure 0.1.

Characteristic actions – Floors above ground level

Permanent actions

Self weight of floor 3.5 kN/m²

Self weight of ceiling, raised floor & services 0.2 kN/m²

Total permanent action is $s_k = 3.5 + 0.2 = 3.7 \text{ kN/m}^2$

Permanent action, $s_d = 3.7 \text{ kN/m}^2$

Variable actions

NA2.4 Table NA.2 Imposed floor load for offices (category B1) 2.5 kN/m²

Imposed floor load for movable partitions of less than 2 kN/m² 0.6 kN/m²

Total variable action is $s_k = 2.5 + 0.6 = 3.1 \text{ kN/m}^2$

Variable action, $s_d = 3.1 \text{ kN/m}^2$

Imposed roof actions

Permanent actions

Self weight of roof construction 0.75 kN/m²

Self weight of ceiling and services 0.15 kN/m²

Total permanent action is $s_k = 0.75 + 0.15 = 0.9 \text{ kN/m}^2$

Roof Permanent action, $s_d = 0.9 \text{ kN/m}^2$

Variable actions

NA 2.10 Table NA.7 The roof is only accessible for normal maintenance and repair

Imposed roof load 0.6 kN/m²

The imposed roof load due to snow obtained from EN 1991-1-3 is less than 0.6 kN/m², therefore the characteristic imposed roof load is taken from EN 1991-1-1.

Roof Variable action, $s_k = 0.6 \text{ kN/m}^2$

Roof Variable action, $s_d = 0.6 \text{ kN/m}^2$

not force acting (the length of the ridge is = 1525 m)

Section is Class 1

21

22

25

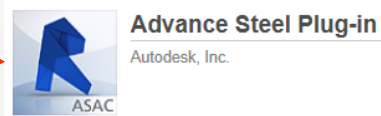
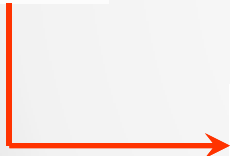
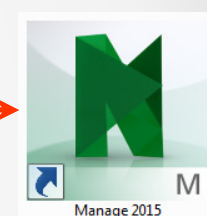
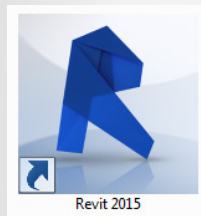
Software Used

Autodesk Revit 2015 R2
build: 20140223_1515

Autodesk Robot
Structural Analysis 2015

Autodesk Advance Steel
2015.1

Autodesk Navisworks
Manage 2015



<https://apps.exchange.autodesk.com/RVT>

BIM Uses and Workflow

Penn State BIM Uses



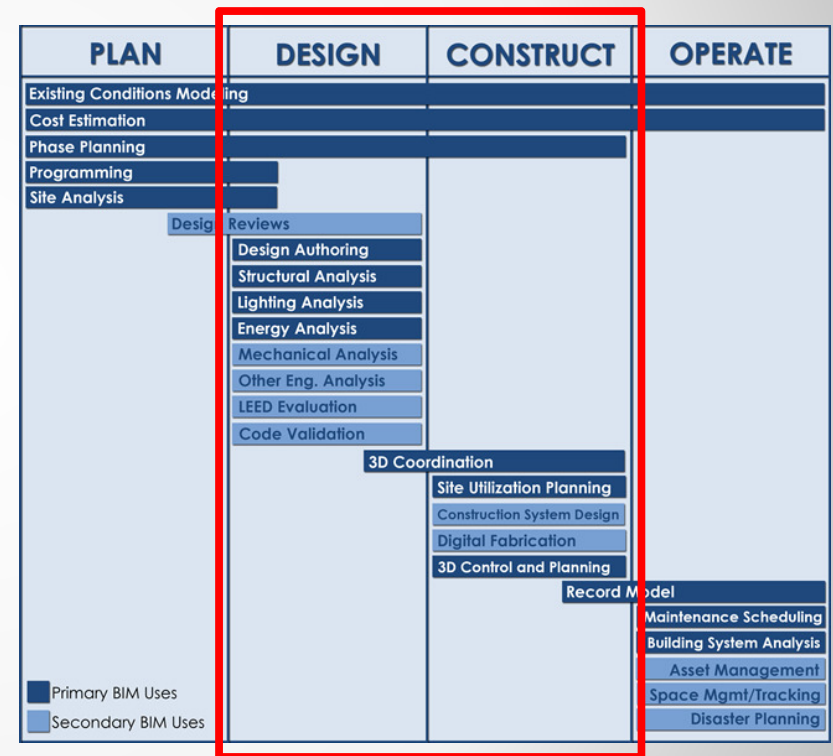
- 3D Coordination
- Design Review
- Design Authoring
- Construction System Design
- Existing Conditions Modelling
- 3D Control and Planning
- Programming
- 4D Modelling
- Record Modelling
- Site Utilisation Planning
- Site Analysis
- Structural Analysis
- Energy Analysis
- Cost Estimation
- Building System Analysis
- Code Verification
- Asset Management



BIM Uses and Workflow

■ BIM Uses Considered:

- 3D Coordination
- Design Authoring
- Drawing Production
- Schedule Production
- Design Review
- Design Analysis



Efficient practices for getting started with Advance Steel

Getting Started

Maintaining traditional Design Authoring processes

- Modelling Starting in Revit
- Analysis in Robot
- Revit model updated
- Pushed to Advance Steel
- Fabrication model generated
- Coordination model updated

Getting Started

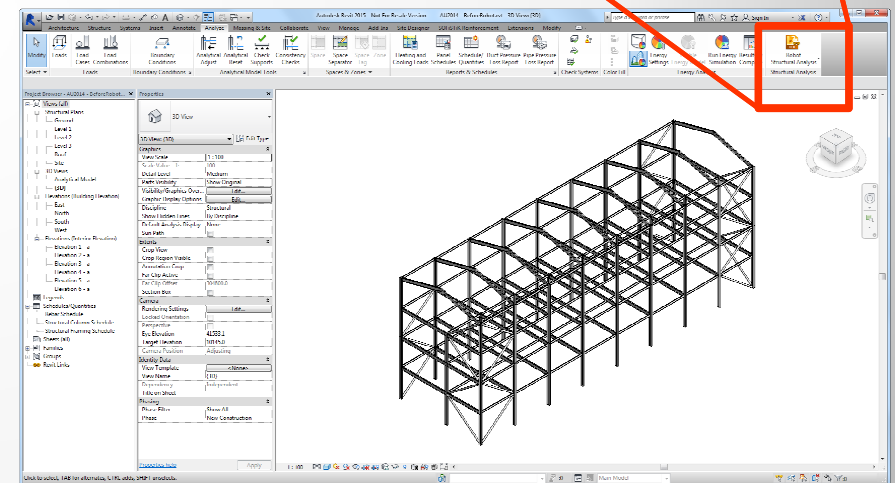
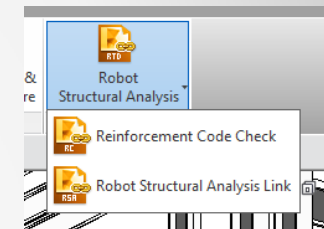


Model Created with:

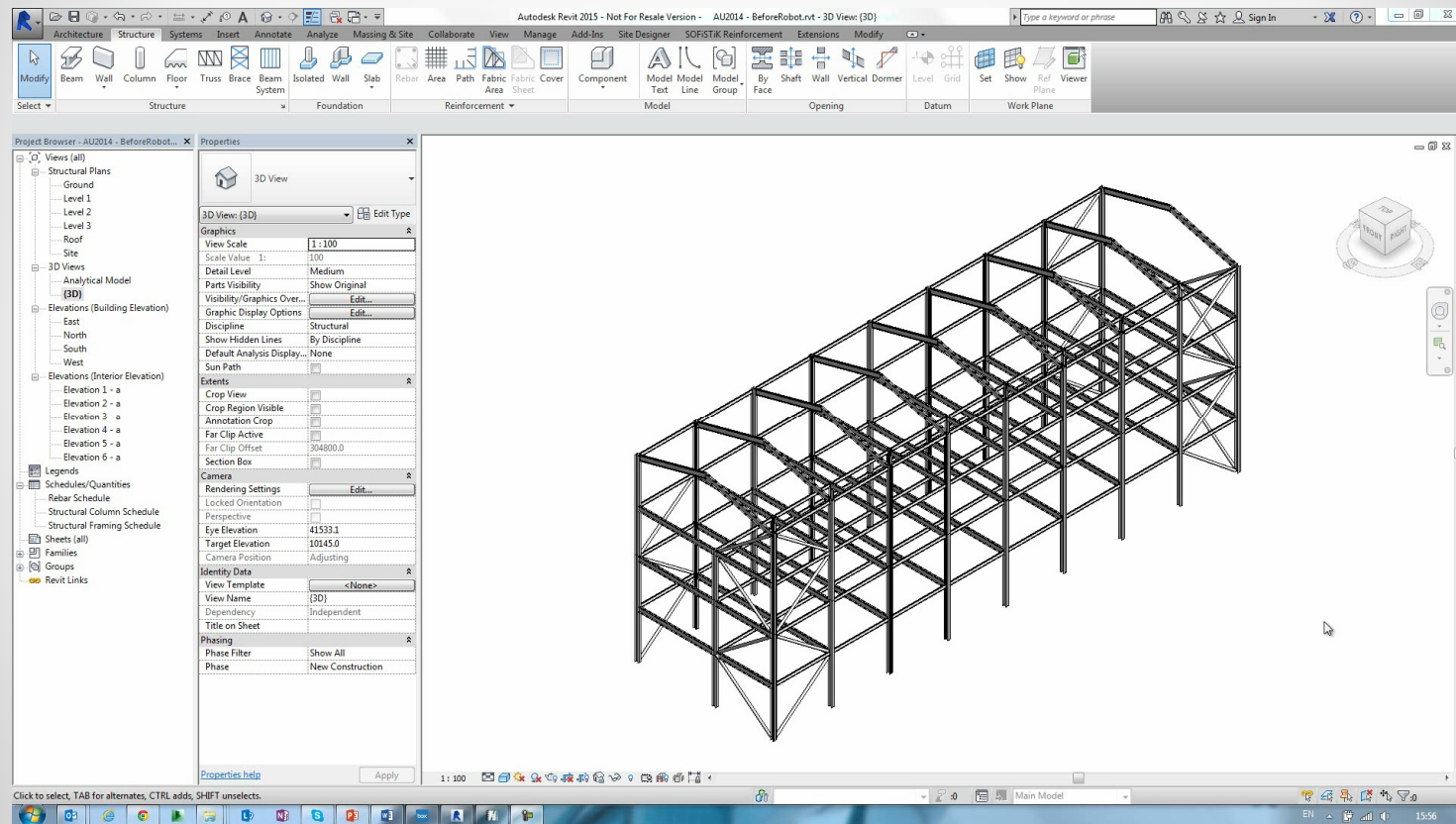
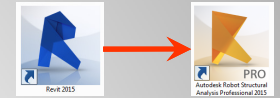
- Columns (Universal Columns)
- Beams (Universal Beams)
- Bracing (Circular Hollow Sections)

There are no:

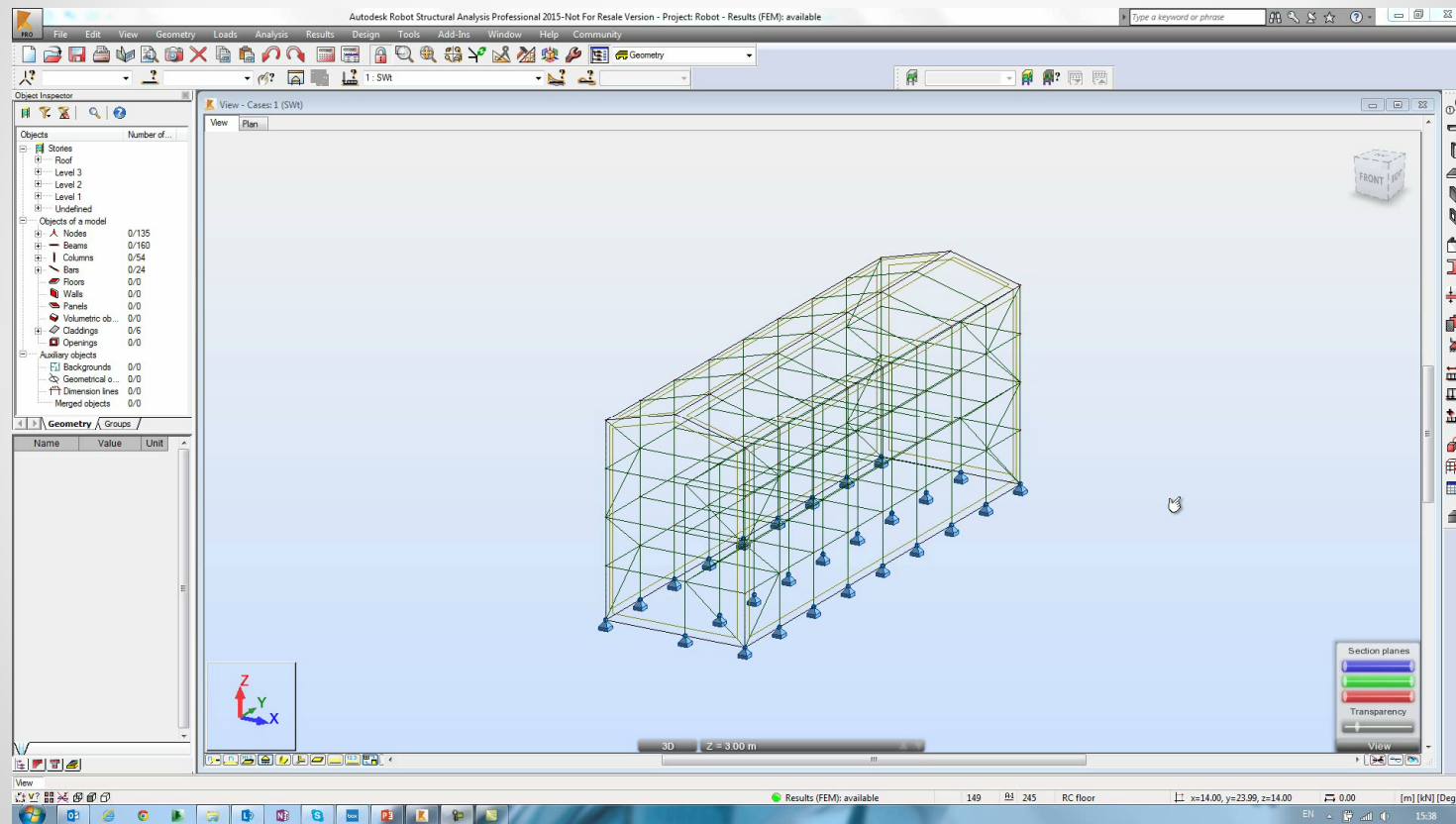
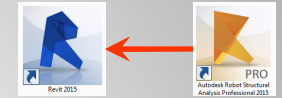
- Floors
- Foundations
- Walls
- etc...



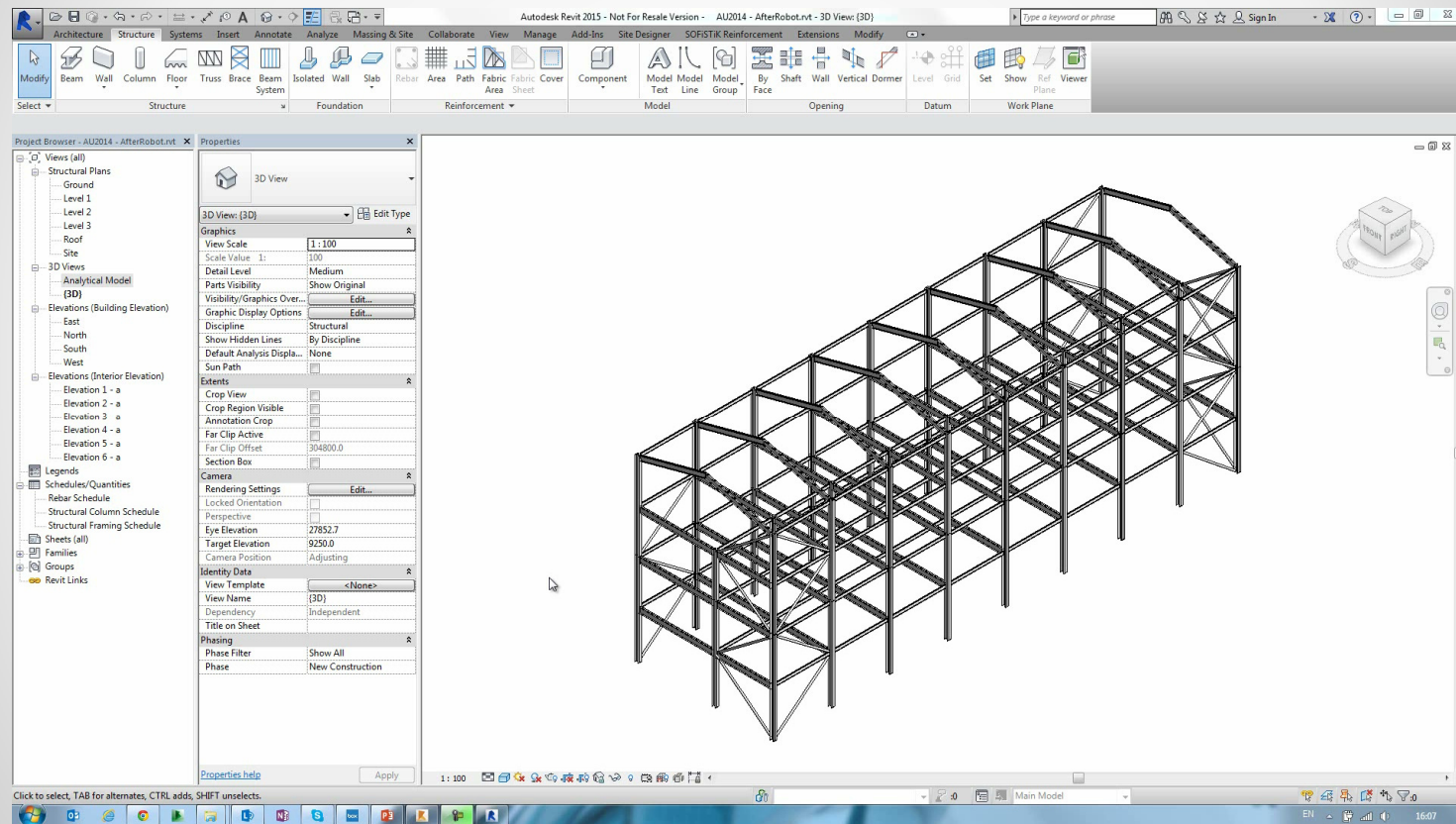
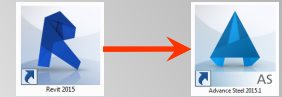
Revit to Robot



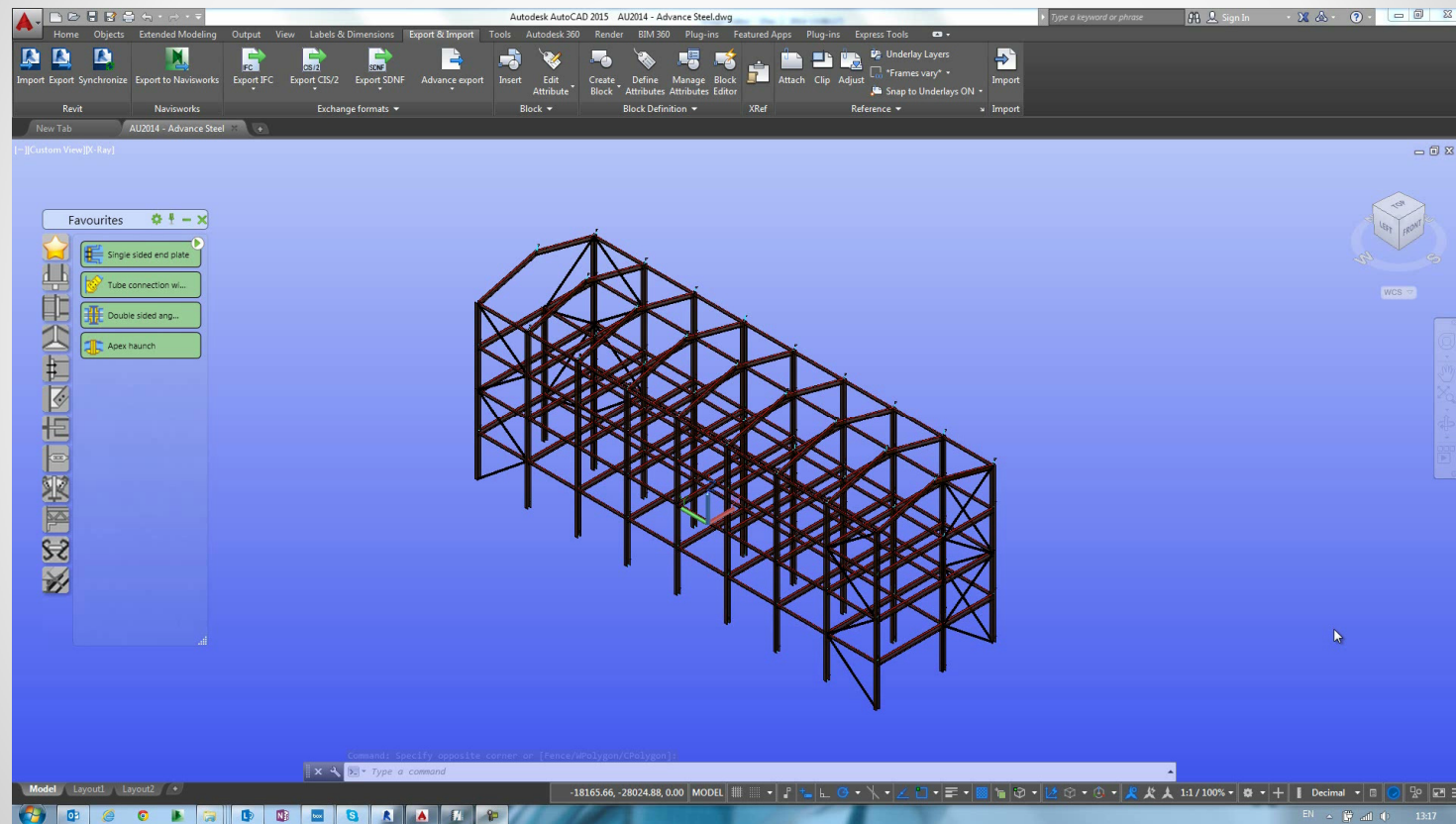
Robot to Revit



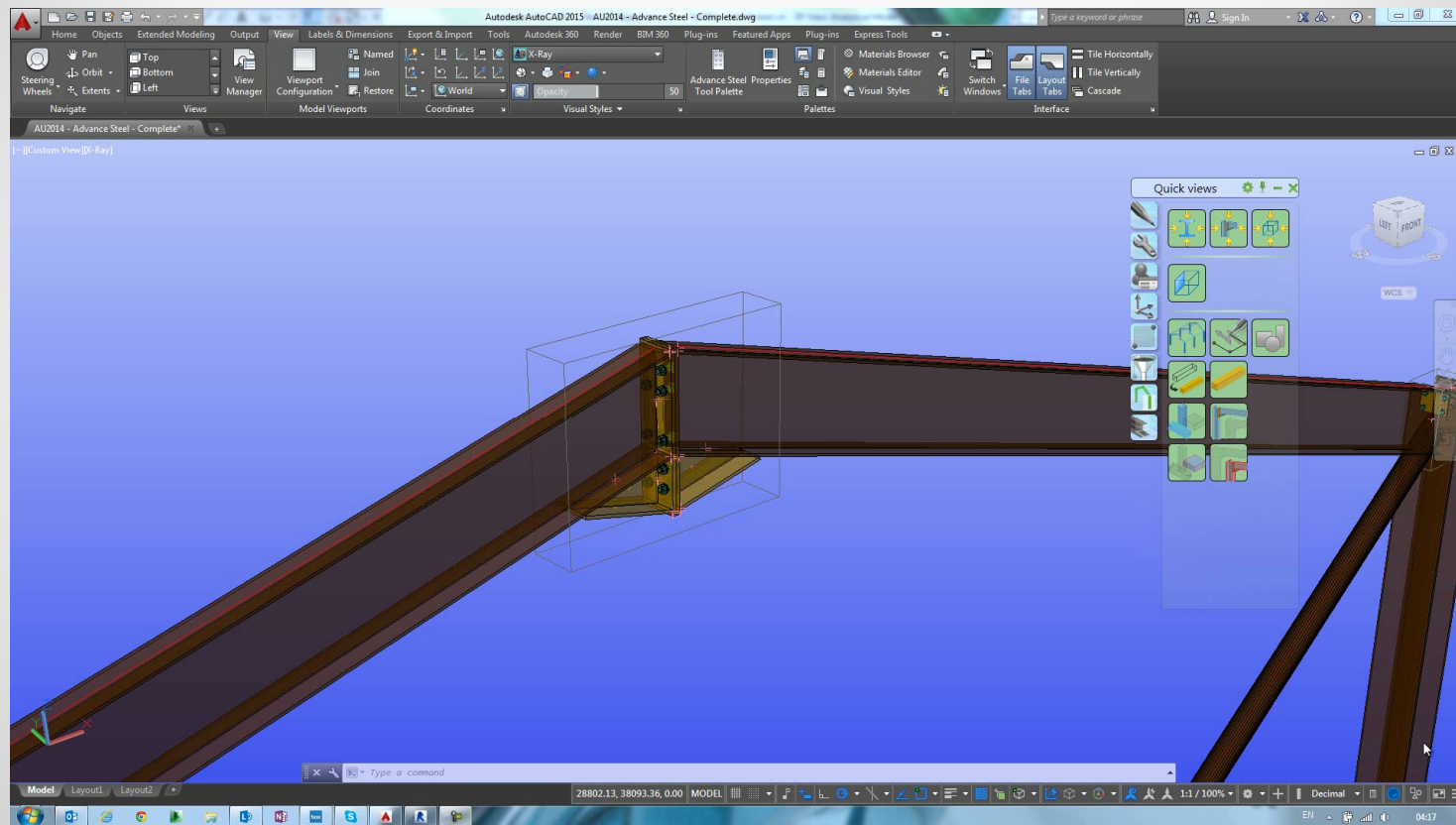
Revit to Advance Steel



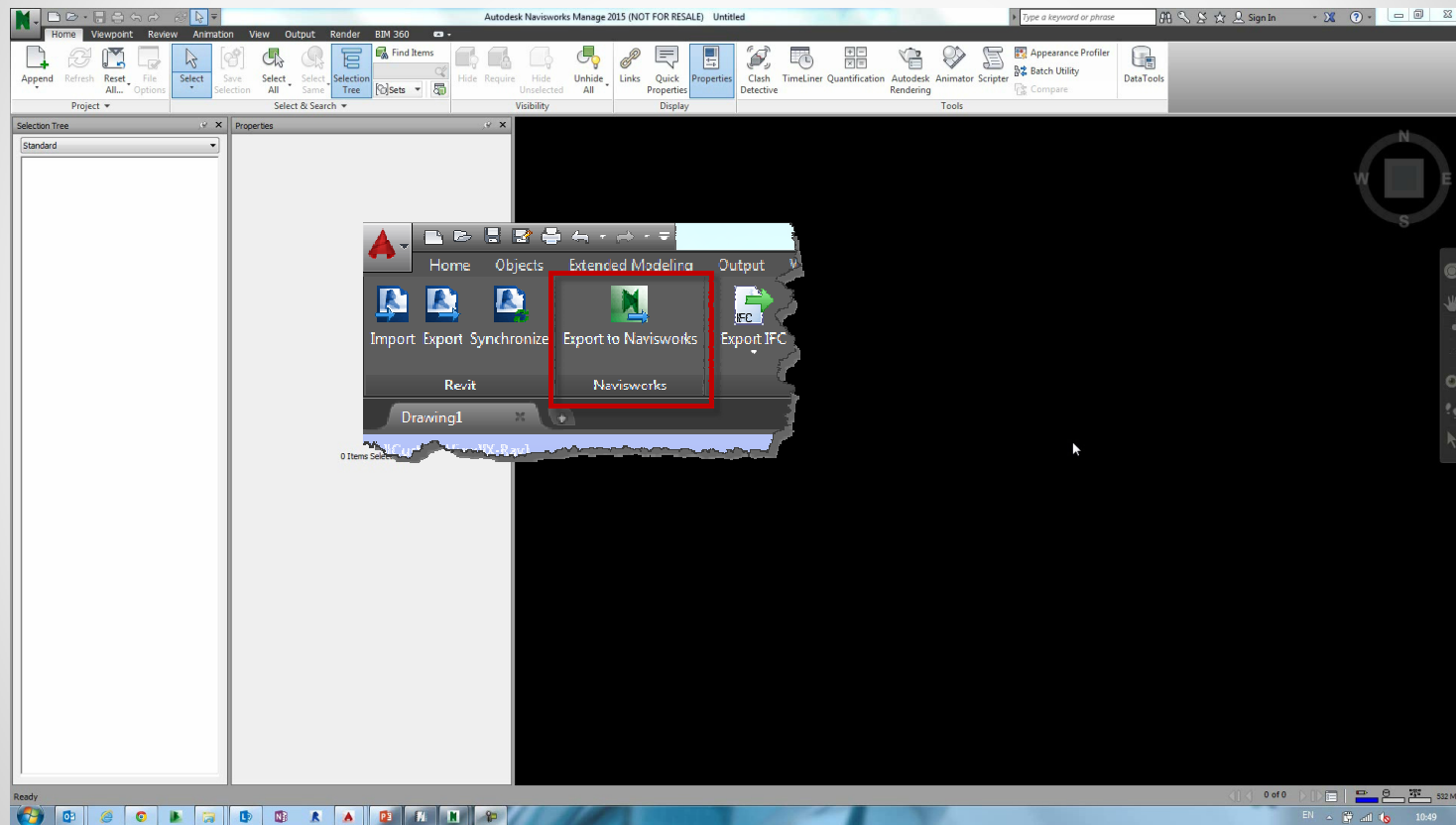
Advance Steel



Advance Steel



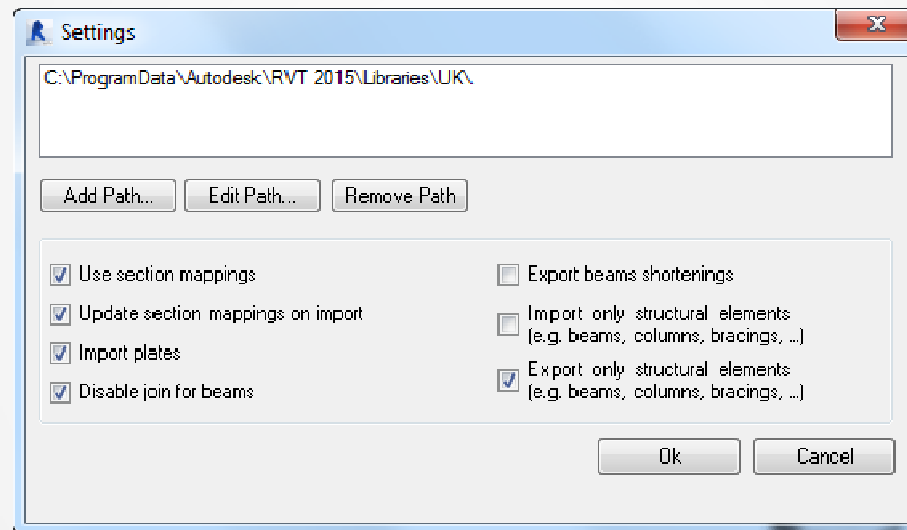
Advance Steel to Navisworks



Revit software export functionality to populate Advance Steel models

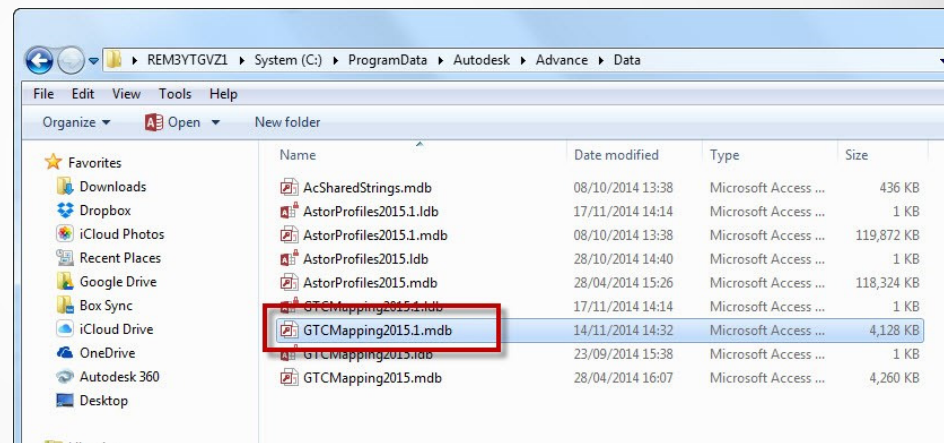
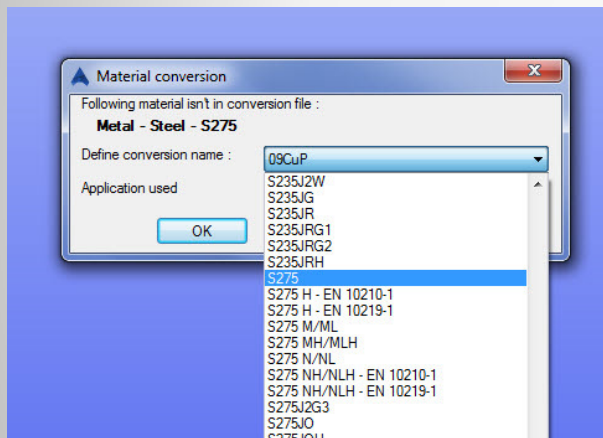
Export Functionality

Options with Revit:



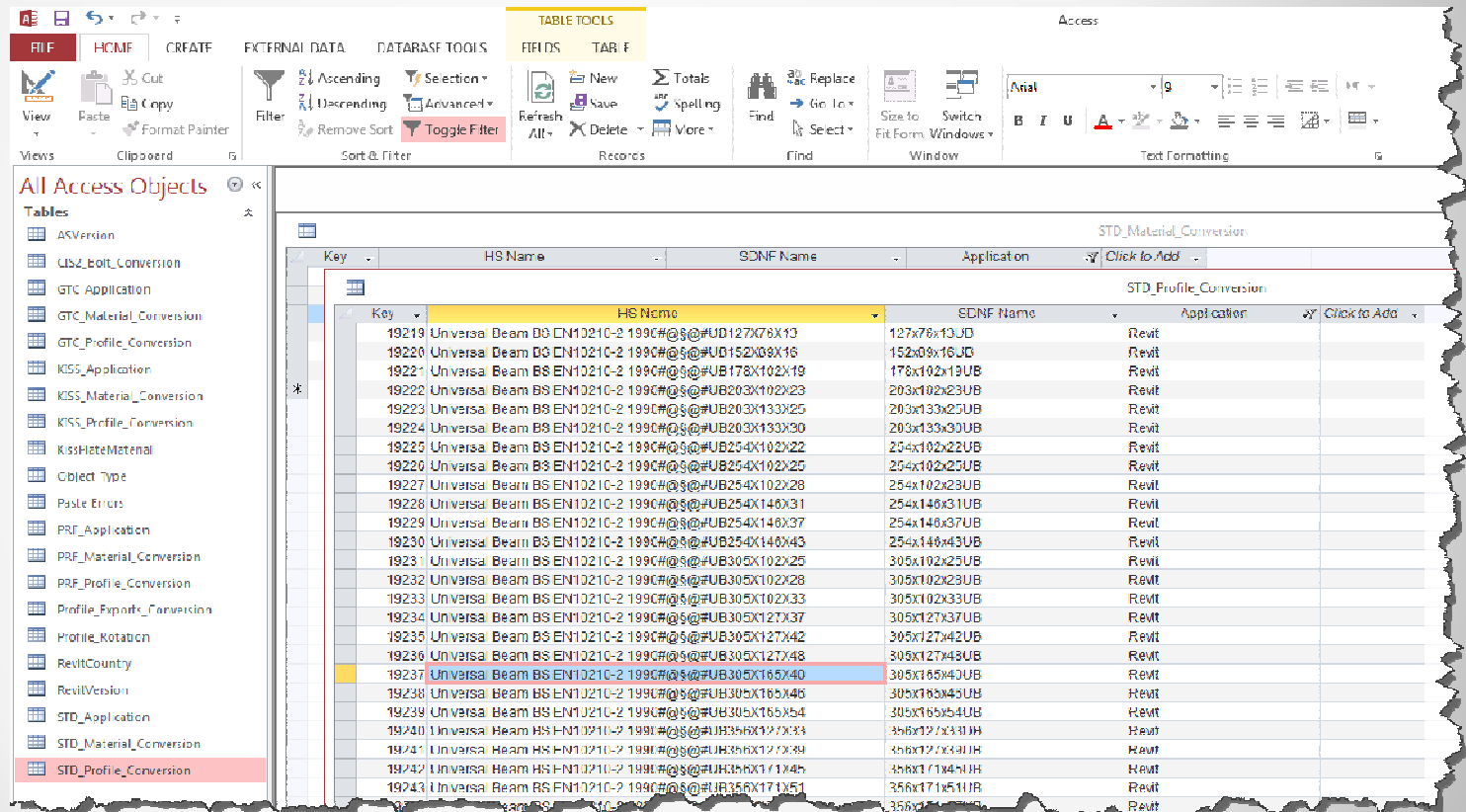
Export Functionality

Mapping of Sections and Materials



Export Functionality

Mapping



The screenshot shows the Microsoft Access interface with the 'STD_Profile_Conversion' table selected in the 'All Access Objects' pane. The table contains the following data:

Key	HS Name	SDF Name	Application
19219	Universal Beam BS EN10210-2 1990#@#@#UB127X78X13	127x78x13UB	Revit
19220	Universal Beam BS EN10210-2 1990#@#@#UB152X89X16	152x89x16UB	Revit
19221	Universal Beam BS EN10210-2 1990#@#@#UB178X102X19	178x102x19UB	Revit
19222	Universal Beam BS EN10210-2 1990#@#@#UB203X102X23	203x102x23UB	Revit
19223	Universal Beam BS EN10210-2 1990#@#@#UB203X133X25	203x133x25UB	Revit
19224	Universal Beam BS EN10210-2 1990#@#@#UB203X133X30	203x133x30UB	Revit
19225	Universal Beam BS EN10210-2 1990#@#@#UB254X102X22	254x102x22UB	Revit
19226	Universal Beam BS EN10210-2 1990#@#@#UB254X102X25	254x102x25UB	Revit
19227	Universal Beam BS EN10210-2 1990#@#@#UB254X102X28	254x102x28UB	Revit
19228	Universal Beam BS EN10210-2 1990#@#@#UB254X146X31	254x146x31UB	Revit
19229	Universal Beam BS EN10210-2 1990#@#@#UB254X146X37	254x146x37UB	Revit
19230	Universal Beam BS EN10210-2 1990#@#@#UB254X146X43	254x146x43UB	Revit
19231	Universal Beam BS EN10210-2 1990#@#@#UB305X102X25	305x102x25UB	Revit
19232	Universal Beam BS EN10210-2 1990#@#@#UB305X102X28	305x102x28UB	Revit
19233	Universal Beam BS EN10210-2 1990#@#@#UB305X102X33	305x102x33UB	Revit
19234	Universal Beam BS EN10210-2 1990#@#@#UB305X127X37	305x127x37UB	Revit
19235	Universal Beam BS EN10210-2 1990#@#@#UB305X127X42	305x127x42UB	Revit
19236	Universal Beam BS EN10210-2 1990#@#@#UB305X127X48	305x127x48UB	Revit
19237	Universal Beam BS EN10210-2 1990#@#@#UB305X165X40	305x165x40UB	Revit
19238	Universal Beam BS EN10210-2 1990#@#@#UB305X165X45	305x165x45UB	Revit
19239	Universal Beam BS EN10210-2 1990#@#@#UB305X165X54	305x165x54UB	Revit
19240	Universal Beam BS EN10210-2 1990#@#@#UB356X171X33	356x171x33UB	Revit
19241	Universal Beam BS EN10210-2 1990#@#@#UB356X171X39	356x171x39UB	Revit
19242	Universal Beam BS EN10210-2 1990#@#@#UB356X171X45	356x171x45UB	Revit
19243	Universal Beam BS EN10210-2 1990#@#@#UB356X171X51	356x171x51UB	Revit

Current Advance Steel Features & Limitations

Features

- Advance Steel is AutoCAD based platform
- Object Enablers allow for native incorporation of:
 - Civil 3D
 - Plant 3D
 - Other AutoCAD verticals...
- Intuitive Software
- Rapid Development

Limitations within Navisworks

Selection Tree

- Standard
 - Revit to Navisworks.nwc
 - Ground
 - Level 1
 - Structural Framing
 - UB-Universal Beams
 - UB305x102x25
 - UB-I-sections (with constant flange)
 - UB 533x210x92
 - UB 457x191x67
 - CHS-Round tubes-Beam
 - CHS 168.3x3.2
 - Level 2
 - Level 3
 - Roof

Properties

Property	Value
Name	UC 356x368x153
Type	UC 356x368x153
Family	UC-I-sections with wide flanges-Column
Category	Structural Columns
Id	390549
Area	0.000 m²
Level	Level "Level 2", #381526
Moves With Grids	1
Base Level	Level "Level 2", #381526
Family	FamilySymbol "UC 356x368x153", #391...
Type Id	FamilySymbol "UC 356x368x153", #391...
Base Offset	0.000 m
Top Offset	0.000 m
Top Offset	0.000 m
Base Offset	0.000 m
Length	9.000 m
Volume	0.174 m³
Top Level	Level "Roof", #381750
Base Level	Level "Level 2", #381526
Type	FamilySymbol "UC 356x368x153", #391...
Top Level	Level "Roof", #381750
Column Location ...	A-3
Volume	0.174 m³
Phase Created	Phase "New Construction", #0
Column Style	0
Enable Analytical...	1
IdGtcParameter	12804
Family and Type	FamilySymbol "UC 356x368x153", #391...
Structural Material	Material "S275", #391906
IdGtcParameterC...	1415972605
Length	9.000 m

From Revit

Selection Tree

- Standard
 - AU2014 - Advance Steel.dwf
 - Anchors (27)
 - Beams (1423)
 - ASTBEAMHOLEPATTERN [60D5]
 - ASTBEAMHOLEPATTERN [60D1]
 - ASTBEAMHOLEPATTERN [60C6]
 - ASTBEAMHOLEPATTERN [60C2]
 - ASTBEAMHOLEPATTERN [60BE]
 - ASTBEAMHOLEPATTERN [60B7]
 - ASTBEAMHOLEPATTERN [60B3]
 - ASTBEAMHOLEPATTERN [60A8]
 - ASTBEAMHOLEPATTERN [60A4]
 - ASTBEAM [609A]
 - ASTBEAM [6098]
 - ASTBEAM [6096]
 - ASTBEAM [6094]
 - ASTBEAMHOLEPATTERN [6062]
 - ASTBEAMHOLEPATTERN [605E]
 - ASTBEAMHOLEPATTERN [6053]
 - ASTBEAMHOLEPATTERN [604F]

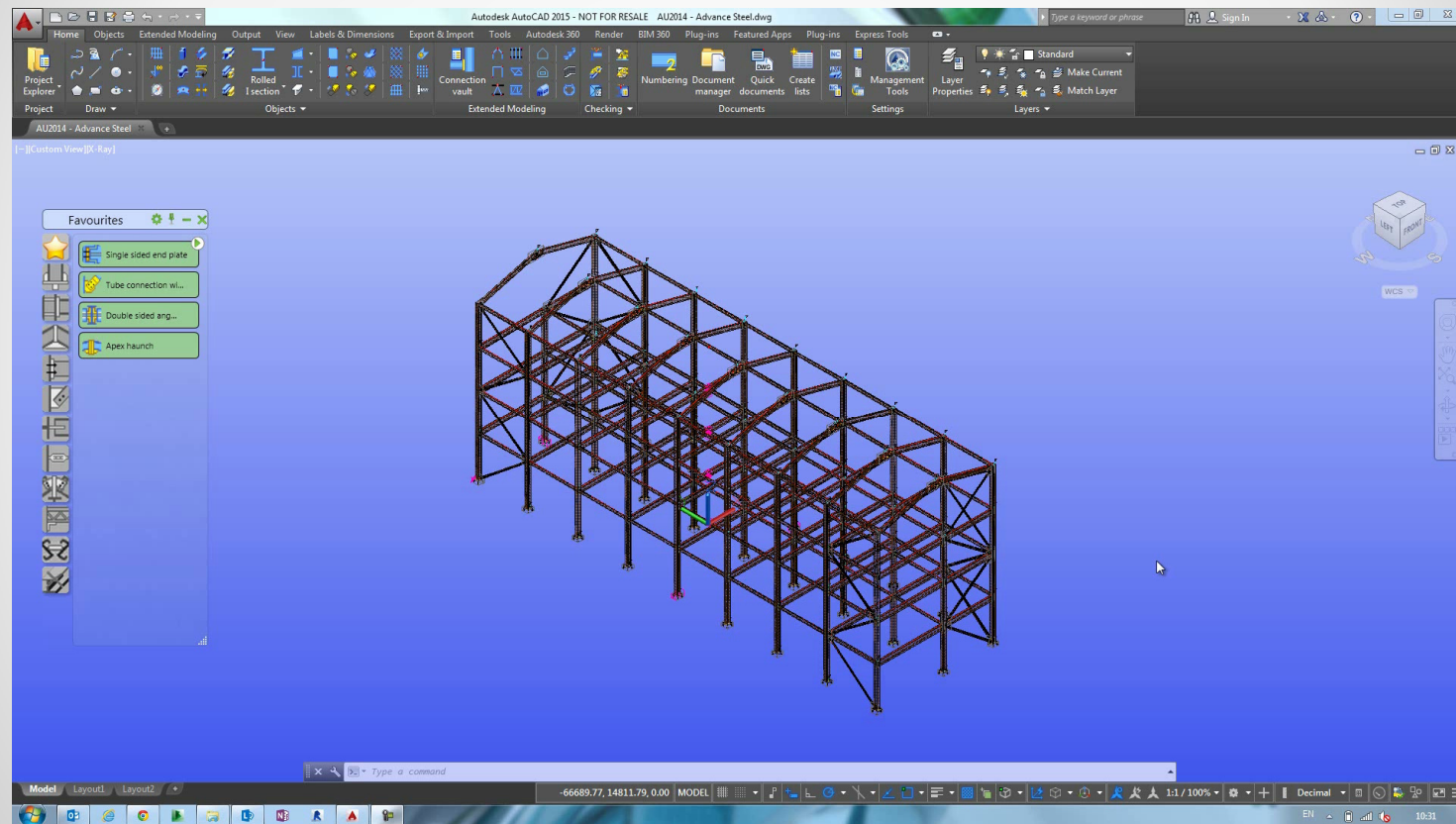
Properties

Property	Value
Profile	UC356x368x153
Section class	UK Universal Column

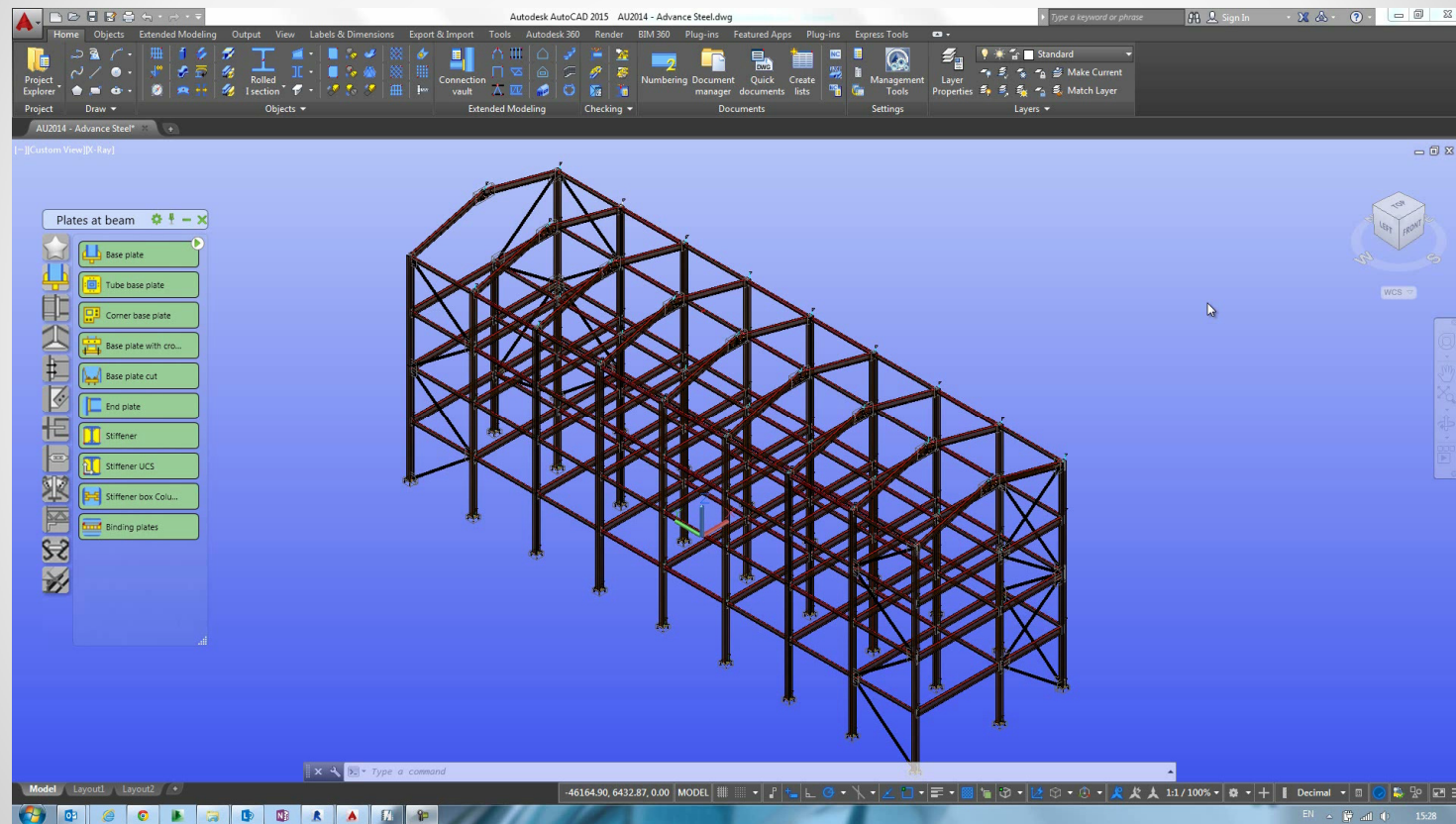
From Advance Steel
(DWF)

Modelling Fabrication

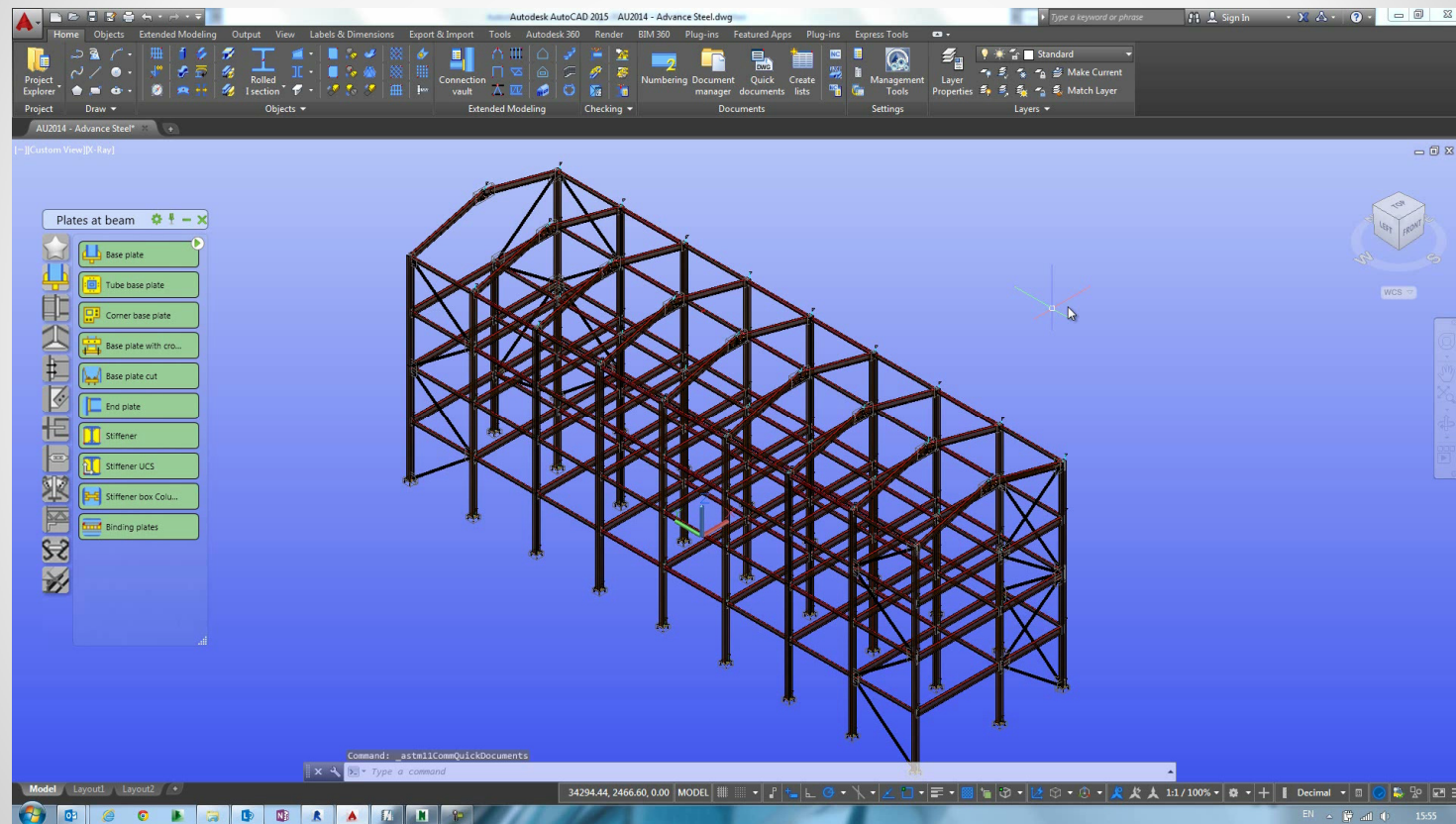
Modelling Fabrication – GA and Elevations



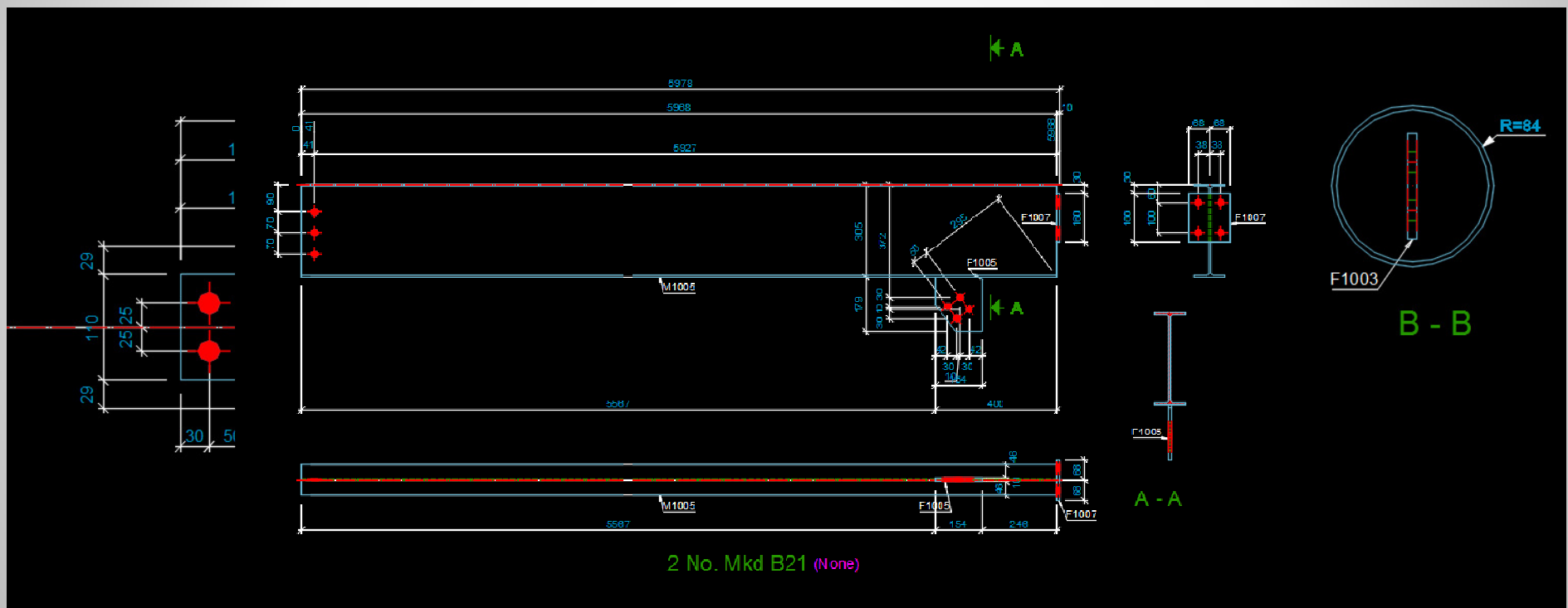
Modelling Fabrication – Parts List



Modelling Fabrication – Saw List

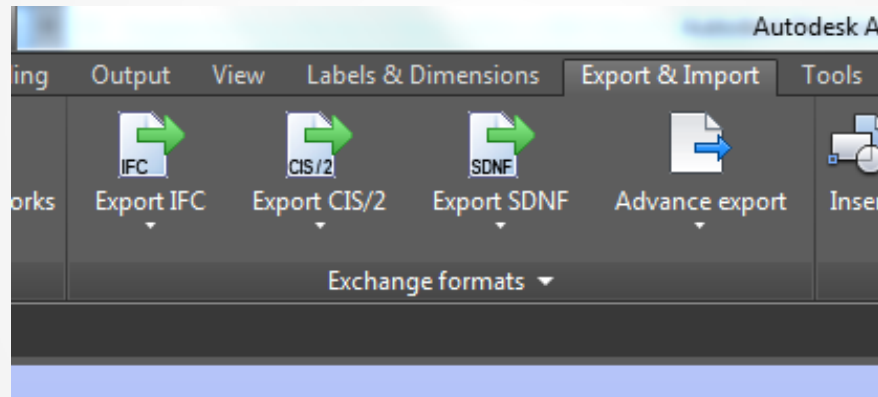


Modelling Fabrication – Detail Drawings



Modelling Fabrication

Number of industry recognised export formats available from Advance Steel



Modelling Fabrication

Industry Foundation Class format - IFC2x3

Further information about this classification can be found through the BuildingSMART® group

Modelling Fabrication

CIS Interface (CIMsteel Integrated Standard)

- Developed to enable a model based data exchange between different domains (construction, detailing and fabrication) dedicated to steel construction.
- Exchange format is mainly driven by the AISC.
- Export for Fabrication or Analysis and this depends largely on the downstream intended use by the steelwork fabricator.

Modelling Fabrication

SDNF (Steel Detailing Neutral Format) Version 3.0

- Standard format for data exchange of steel elements (sections, plates etc.).
- SDNF offers a system neutral method for the import and export of structural model data.
- Bidirectional process allows the import and export of SDNF files from structural models.

Questions



Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2014 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time





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