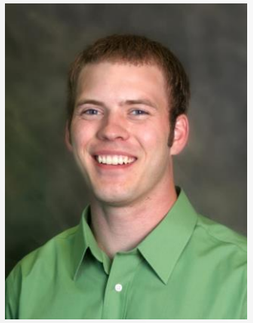
SE2080 Autodesk® Revit® Structure: Model, Design, Connect, and Fabricate Steel Buildings

Kevin Lea – Product Manager, CSC

David Zabka - Customer Support Specialist, Design Data

Your presenters

Kevin Lea
CSC Inc.
Product Manager – Building Design Solutions



David Zabka
Design Data
Customer Support Specialist

Key learning objectives

At the end of this class, you will be able to:

1. Implement integration between Revit, Fastrak, and SDS/2 Connect
2. Realize productivity gains through a combined workflow
3. Share Revit/Fastrak models downstream with steel fabricators
4. Capitalize on the full potential that structural BIM offers steel building design

Introduction to CSC

About CSC

We develop innovative software for structural engineers.

Specialism in code compliant design software for steel and concrete structures.

We are a global leader in the development of Structural BIM technology.

We offer quality training and support to our clients worldwide

- **Established over 35 years ago**
- **120+ staff worldwide**
- **Chicago, UK, Malaysia, Singapore, South Africa, India, Australia**
- **We support small, medium and large structural engineering businesses**
- **Strong industry relationships – AISC, BCSA, SCI, BCA, MSSA, Autodesk**

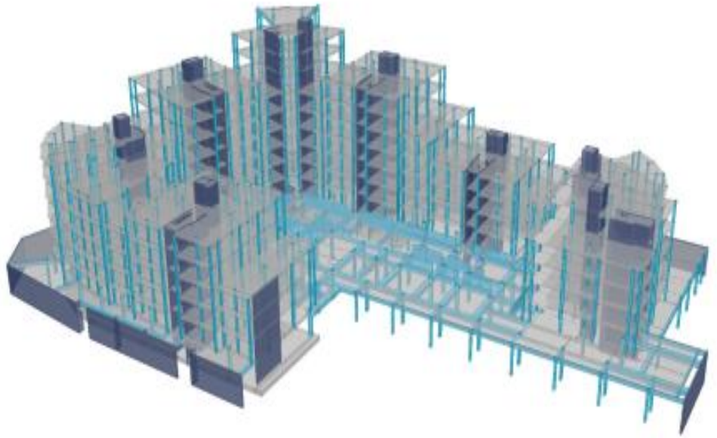
CSC's Software Solutions

Fastrak

Steel building design
AISC, EC3, BS5950

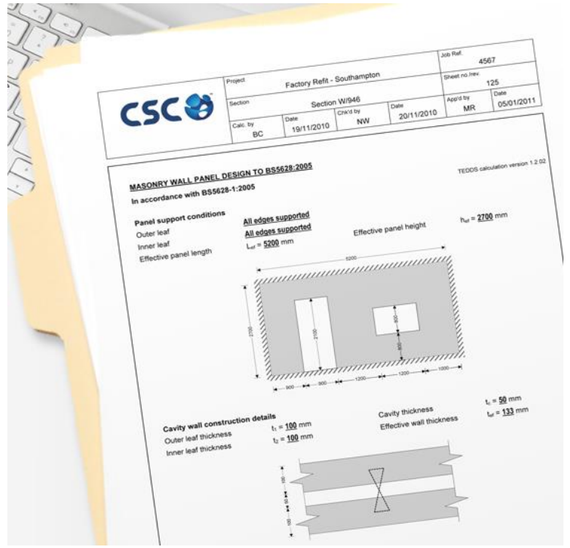
Orion

Concrete building design
EC2, BS8110, CP65, Malaysia, Hong Kong



Tedds

Software to automate daily structural calculations



Introduction to Design Data

SDS/2 DESIGN DATA

Design Data

We develop an array of innovative software solutions for the manufacturing component of the steel industry.

Main output of our products is structural details.

Our most noted aspect of our software is the built-in code based connection design.

As BIM evolves there continues to be more uses of the SDS/2 model.

We are heavily involved in the development of BIM products and have been an Autodesk strategic industry partner for over a year.

- **Established over 30 years ago**
- **Product installed worldwide – Heavily used in North and South America**

SDS/2 Software Solutions

- SDS/2 Detailing
- SDS/2 Modeling
- SDS/2 Drafting
- SDS/2 Engineering
- SDS/2 Erector
- SDS/2 Connect
- SDS/2 Approval
- SDS/2 BIM
- SDS/2 BIM+
- SDS/2 Fabricating
- SDS/2 Viewer

Collaboration

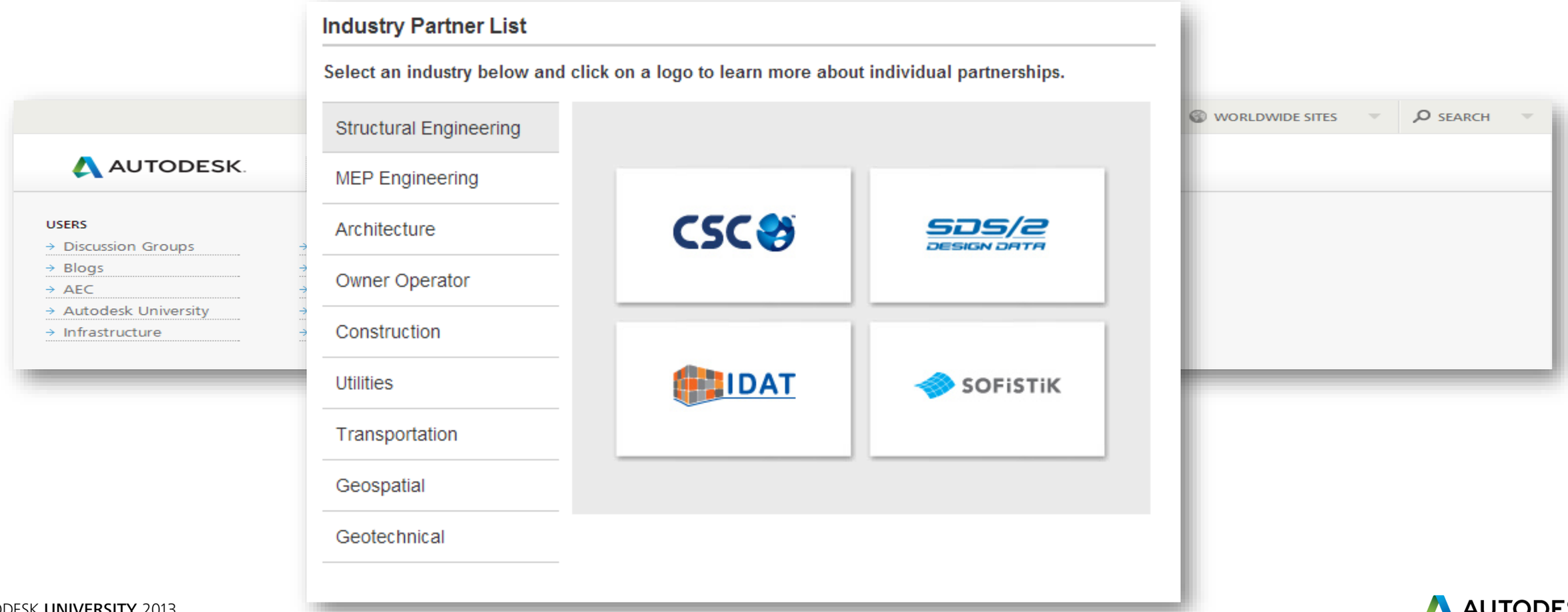
Autodesk Industry Partners

- CSC and Design Data are Industry Business Partners
- Only sixteen AEC partners globally
- Bespoke partnering agreements to promote and enhance Structural BIM solutions for the structural community

CSC | AUTODESK | SDS/2 CONNECT

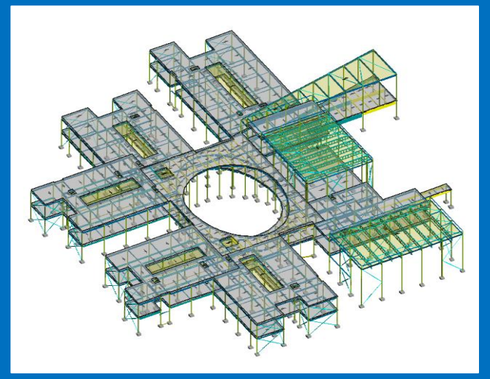
Structural Industry Partners

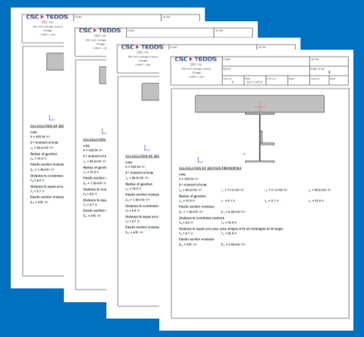
- www.autodesk.com



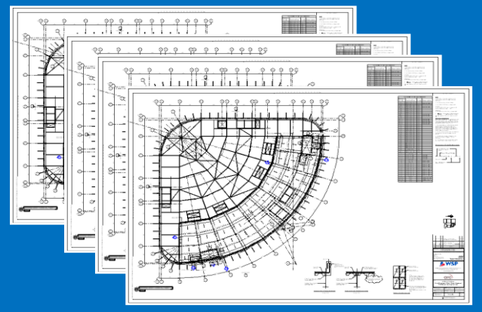
Using BIM for Steel Building Design

Design Process for steel structures

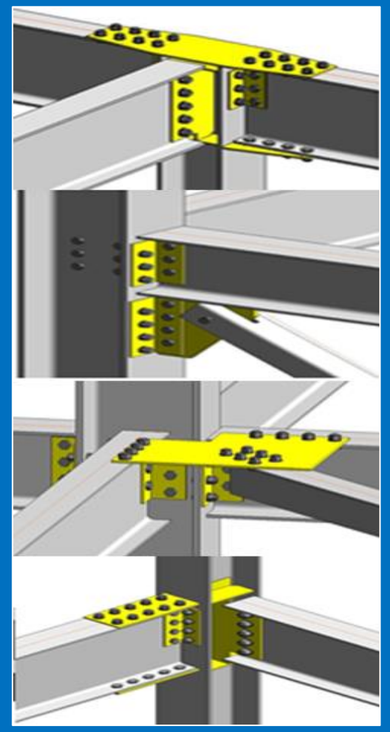




Structural Analysis/ Design



BIM Documentation

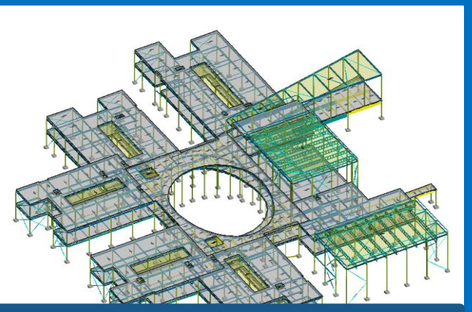


Connection Design

Fabricator

- Estimating
- Ordering
- Fabrication
- Construction Sequencing

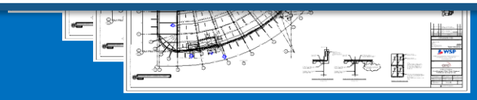
Design Process for steel structures



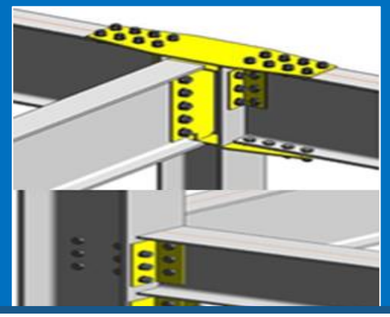
Fastrak Building Designer

Structural Analysis/ Design

AUTODESK REVIT



BIM Documentation



SDS/2 CONNECT

Connection Design

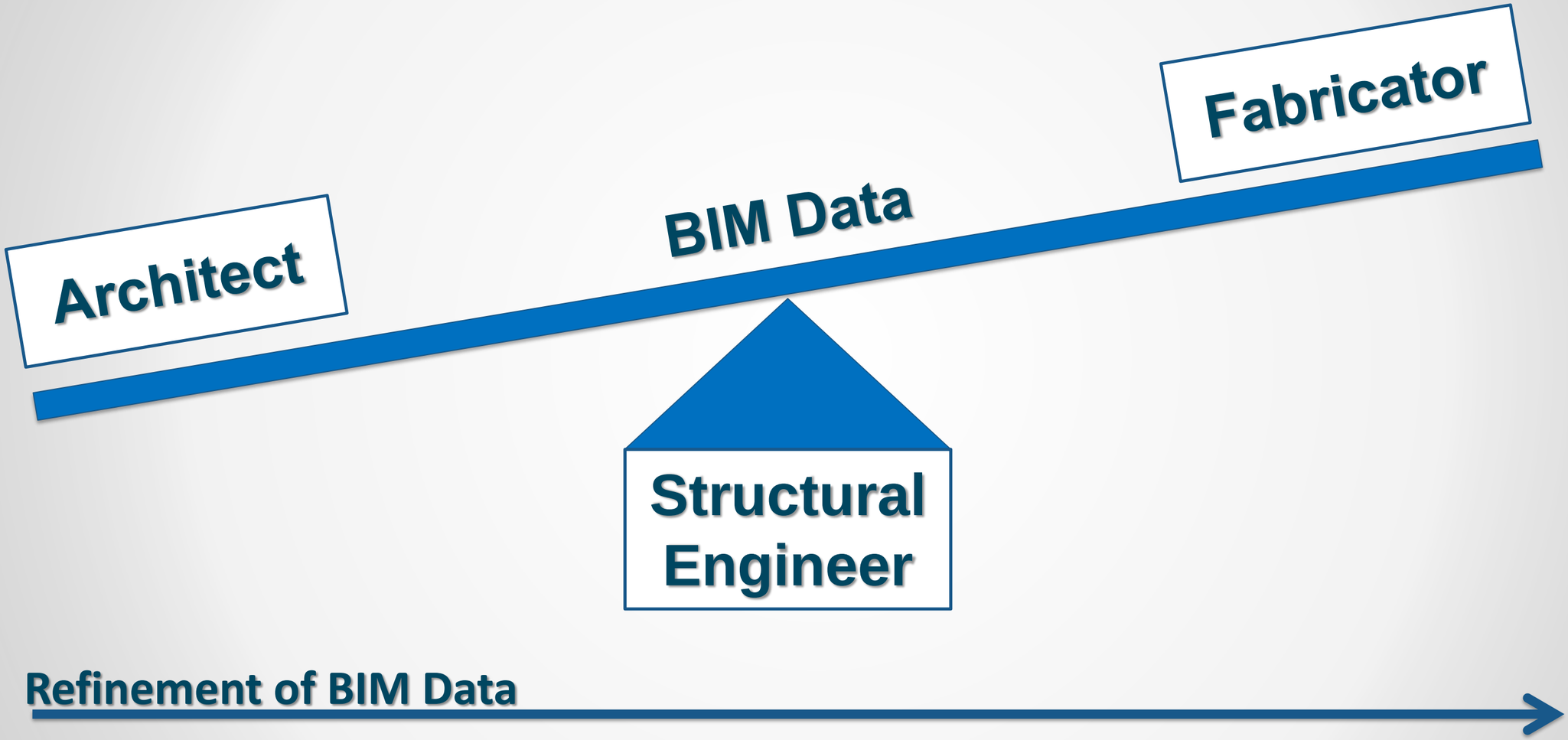
Fabricator

SDS/2 DESIGN DATA

Fabrication

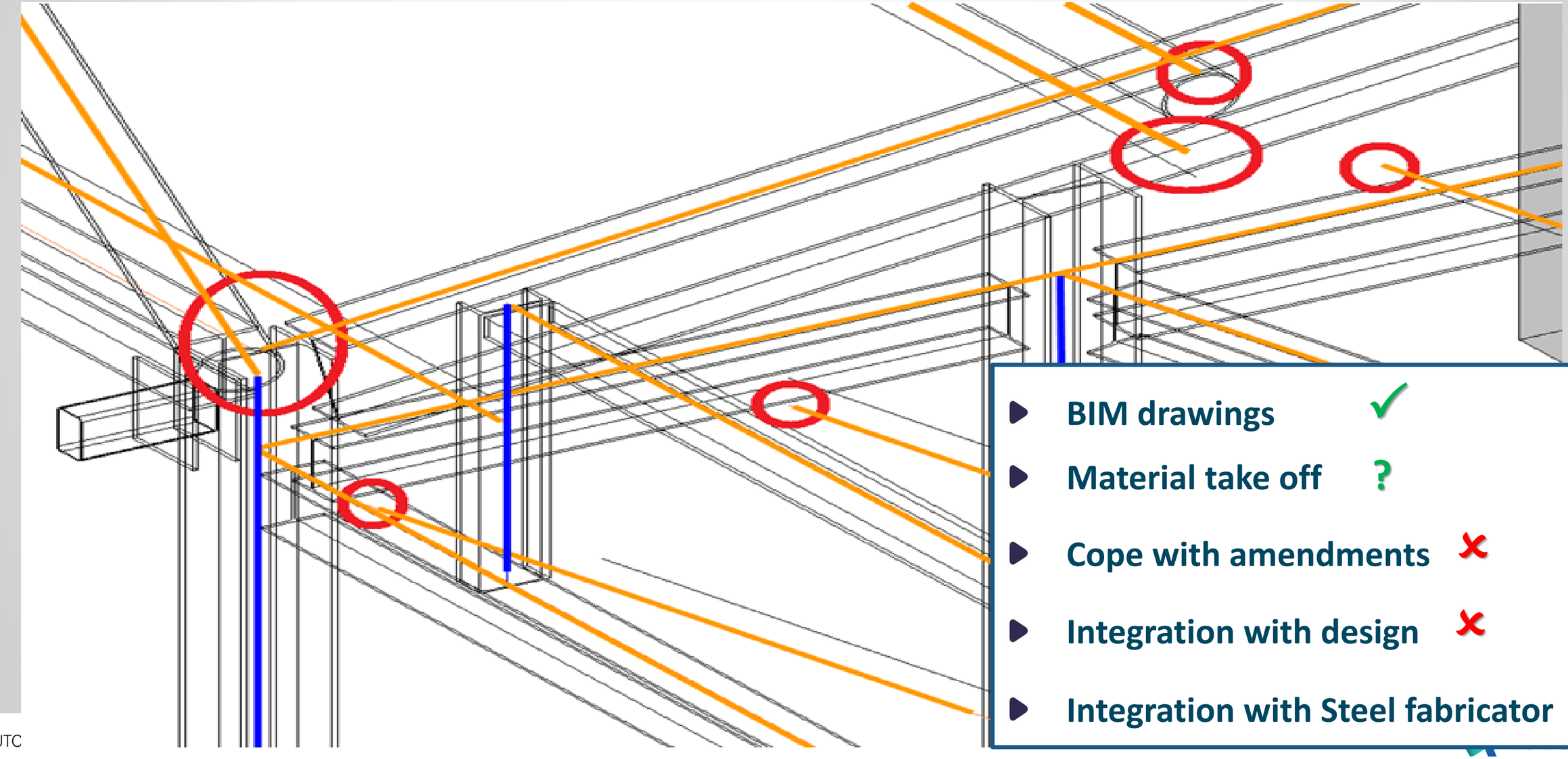
Construction Sequencing

Engineers have a key role in BIM



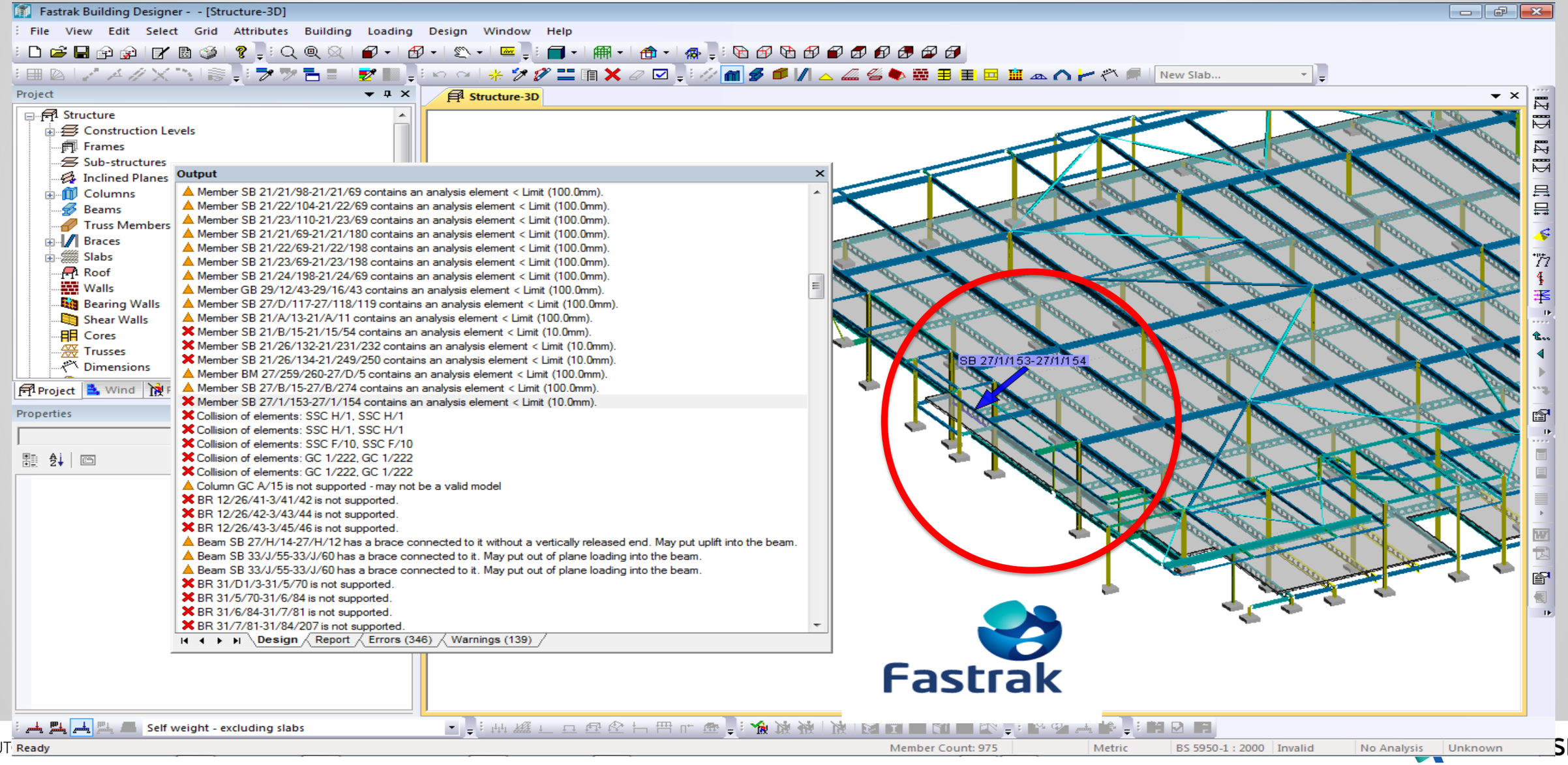
Refinement of the BIM data

- Engineers - connect as you go!

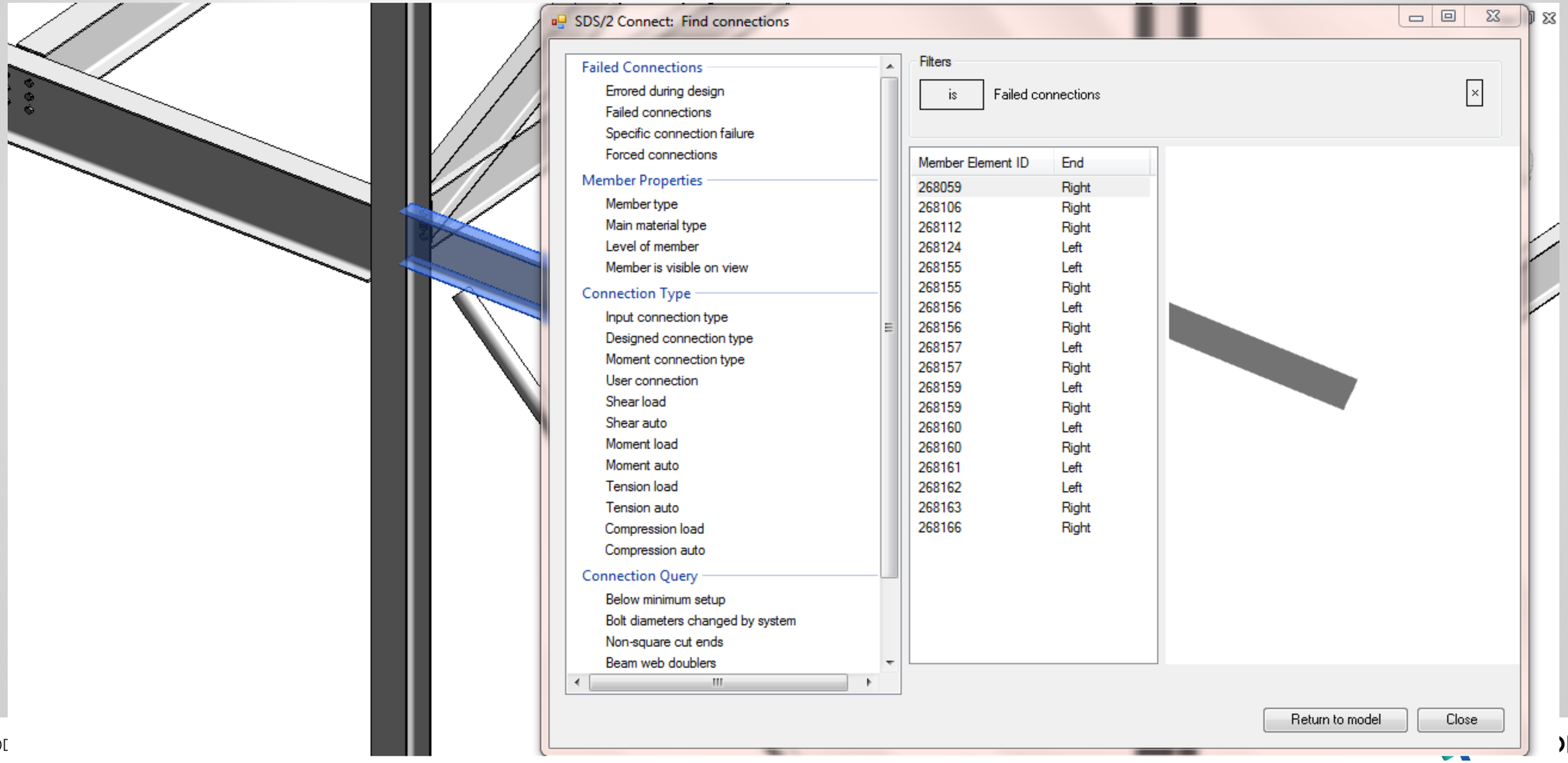


- BIM drawings ✓
- Material take off ?
- Cope with amendments ✗
- Integration with design ✗
- Integration with Steel fabricator ✗

BIM tools can help/Fastrak



BIM tools can help/SDS2Conect



Introduction to CSC's Fastrak

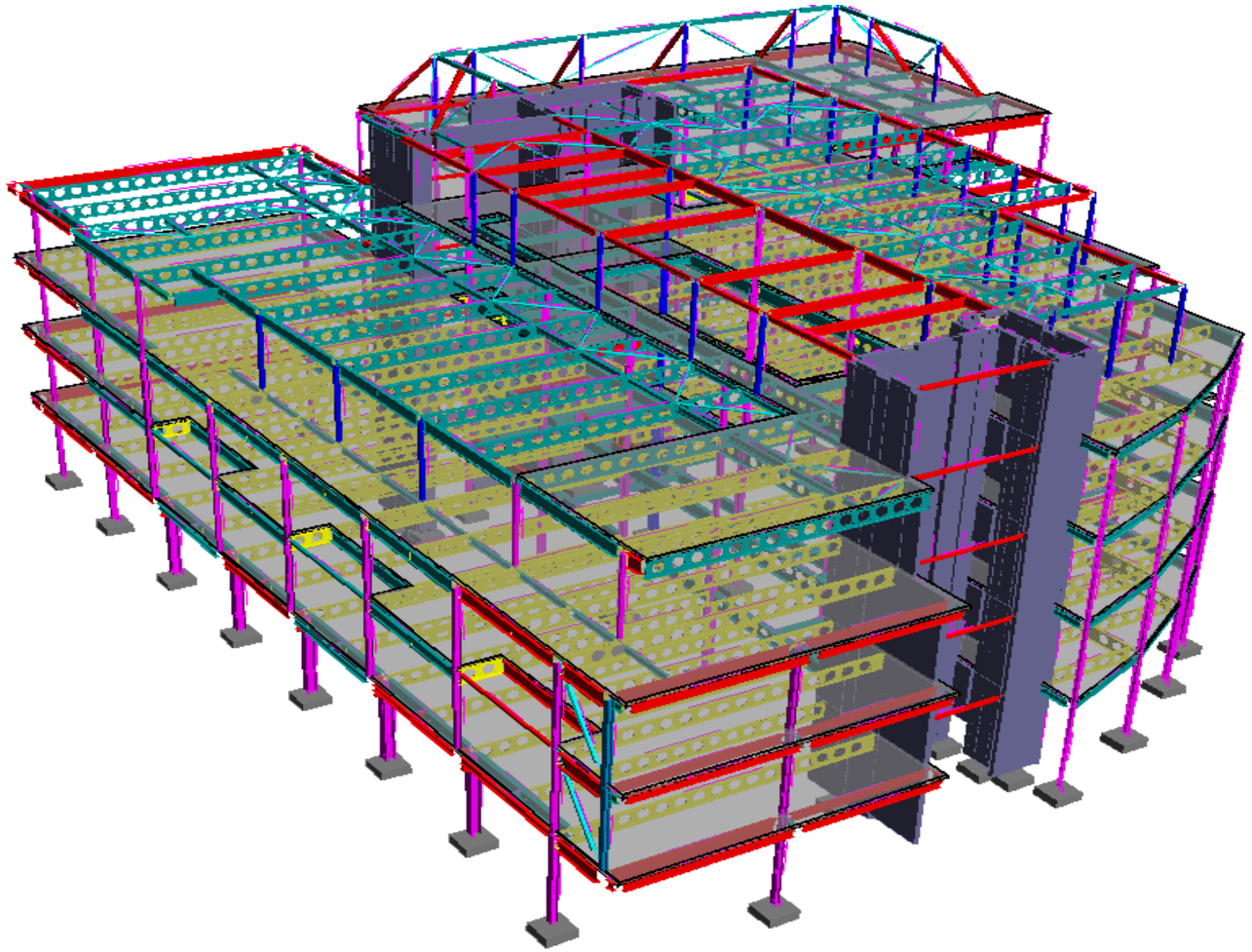
Code-compliant design modeling

Fastrak
Building Designer

Comprehensive building design to International codes of practise

EC3,BS5950, AISC

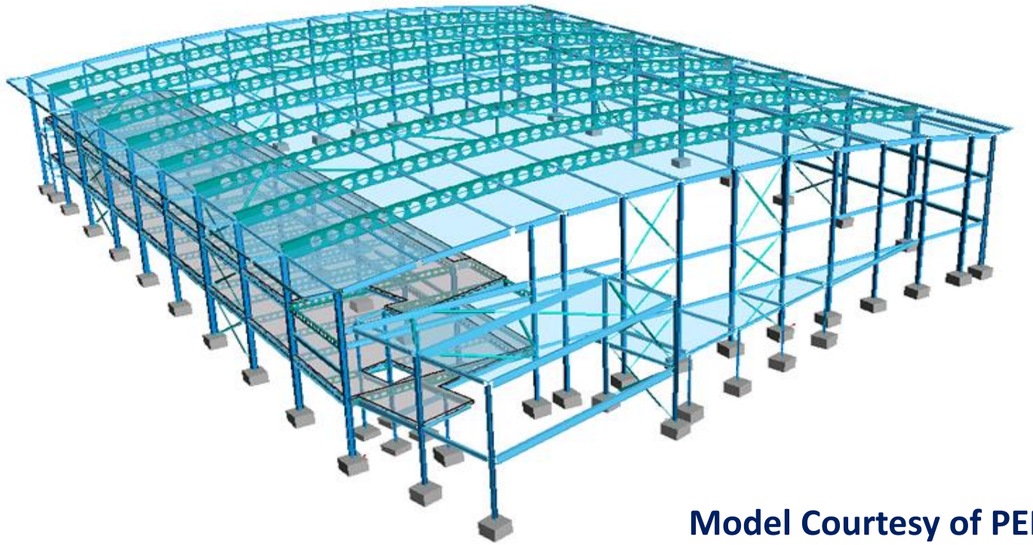
EC1, BS6399, AISC/SEI



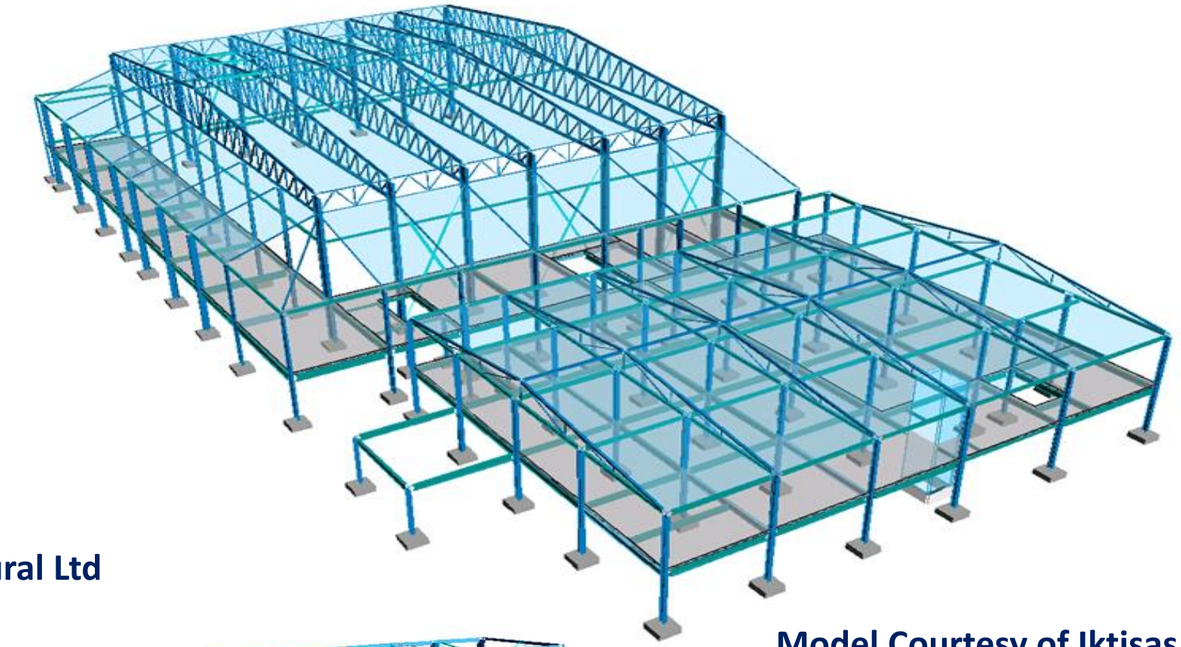
Code-based modeling

A *single* structural model that contains all data required to analyze and design a structure in strict compliance with a chosen code of practice.

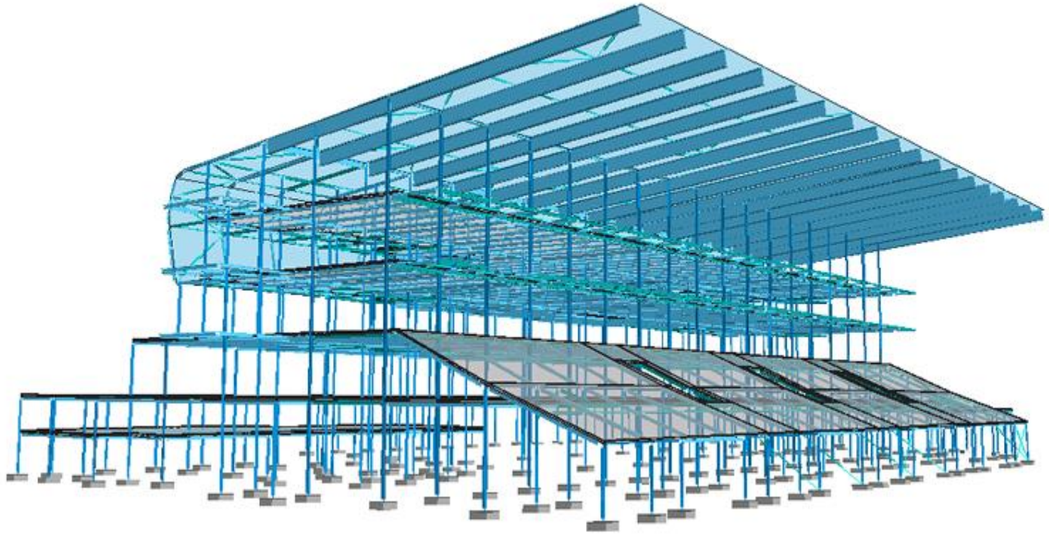
Example Fastrak models



Model Courtesy of PEP Civil & Structural Ltd



Model Courtesy of Iktisas

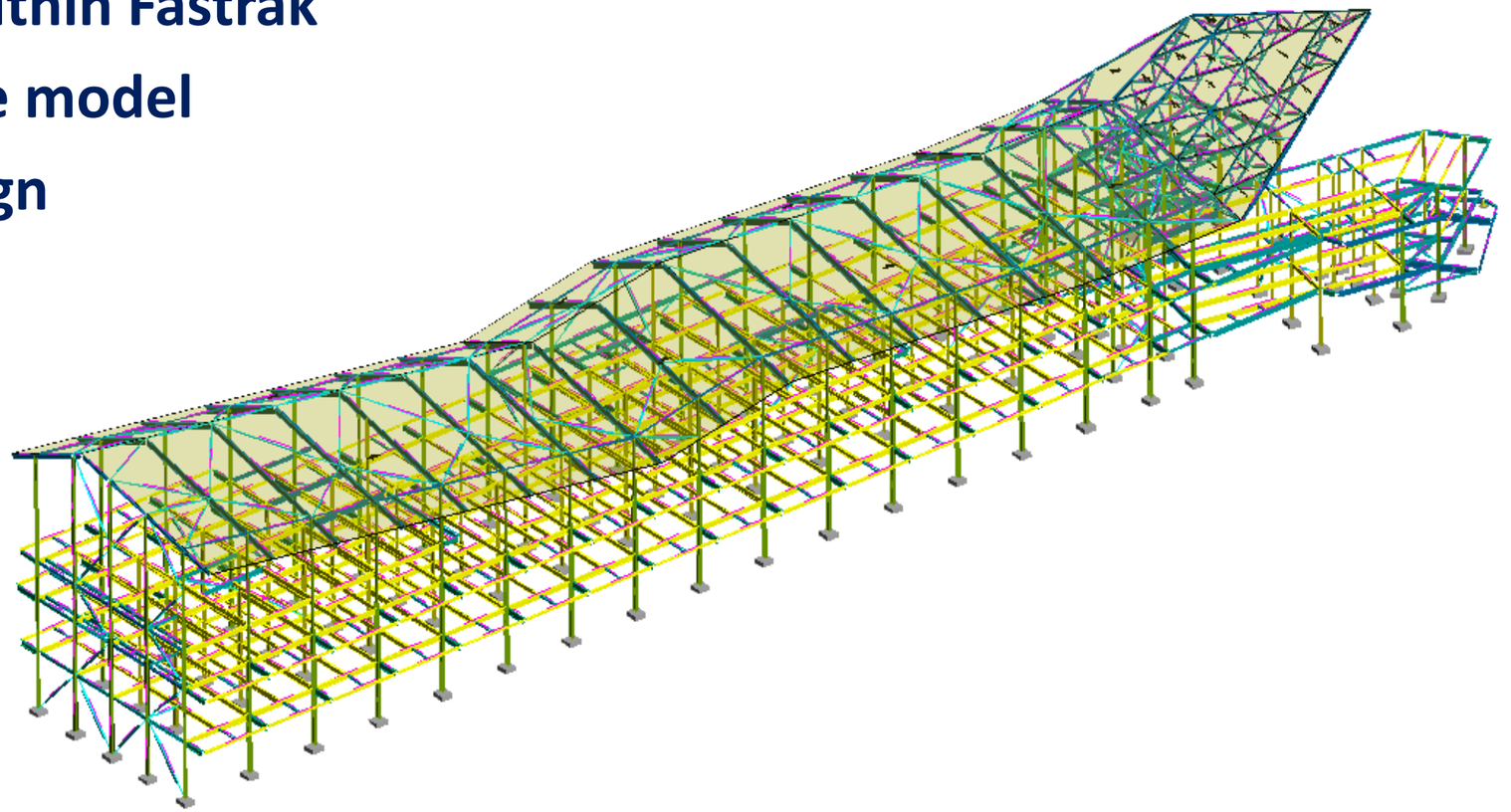


Model Courtesy of TRP Consulting

Model Courtesy of Hallmason Design

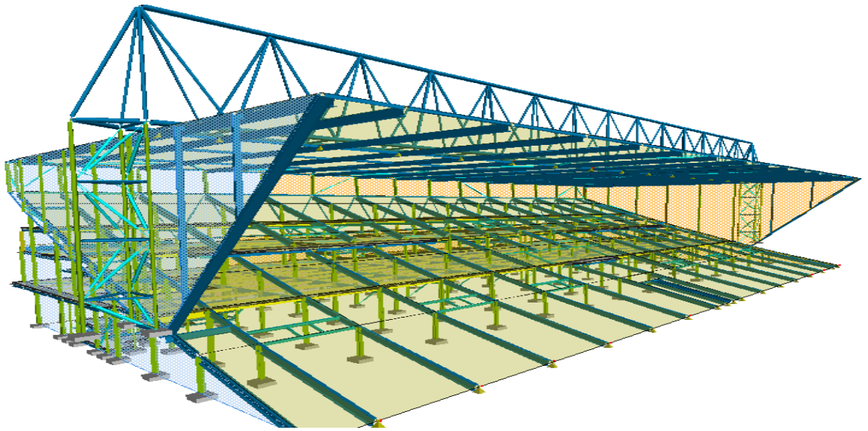
Fastrak
Building Designer

- A BIM model focused on code compliant design of steel buildings
- Structural analysis embedded within Fastrak
- Gravity and Lateral design in one model
- Steel & Composite building design
- No geometric limitations

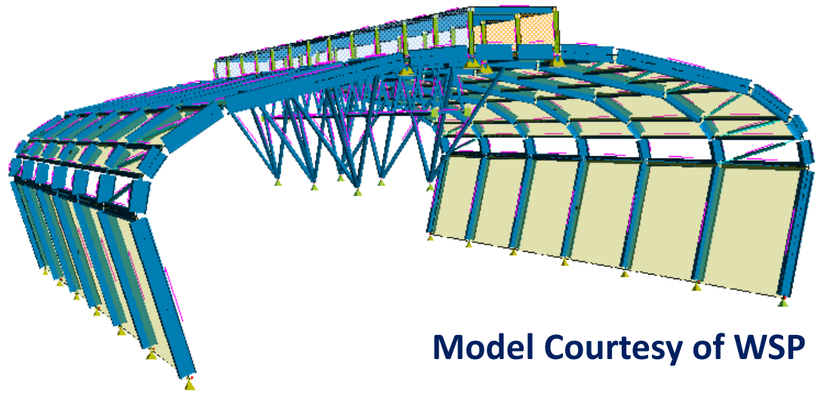


Fastrak
Building Designer

- **Fastrak design gives the engineer:-**
  - **Automatic member selection**
  - **Automatic notional horizontal forces**
  - **Automatic effective lengths between restraint points**
  - **Automatic live load reductions**
  - **Automatic wind load**
  - **Automatic seismic loading**
  - **Automatic stability checks**
  - **Automatic drift checks**
  - **Automatic floor vibration checks**

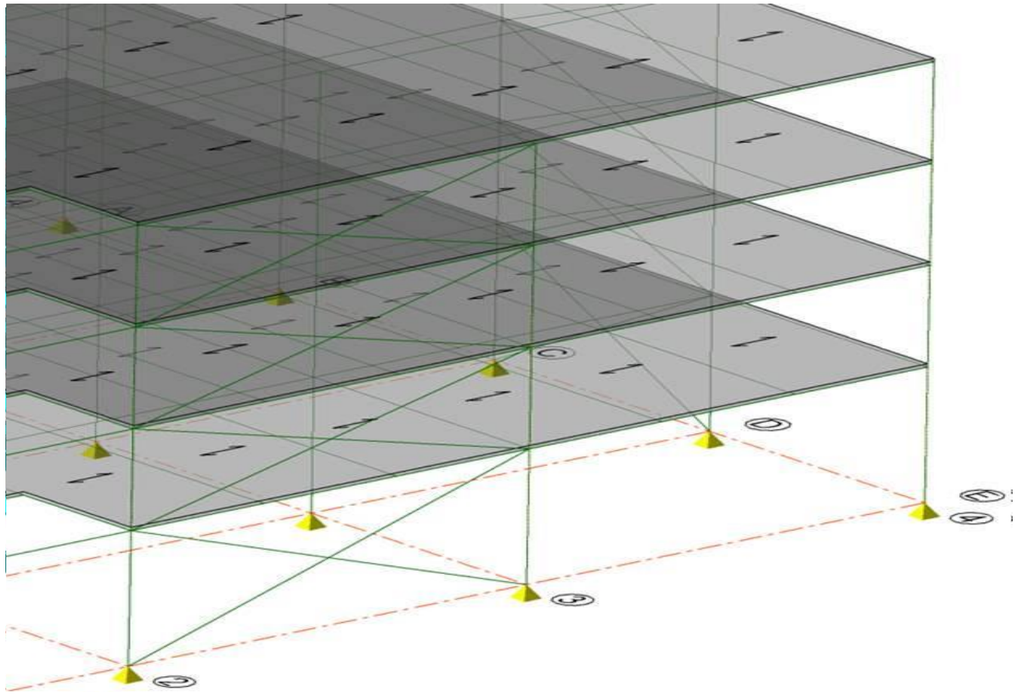


Model Courtesy of URS



Model Courtesy of WSP

Physical and wireframe models



Physical data

Drawings, material takeoff, code compliant design

Integration with BIM platforms

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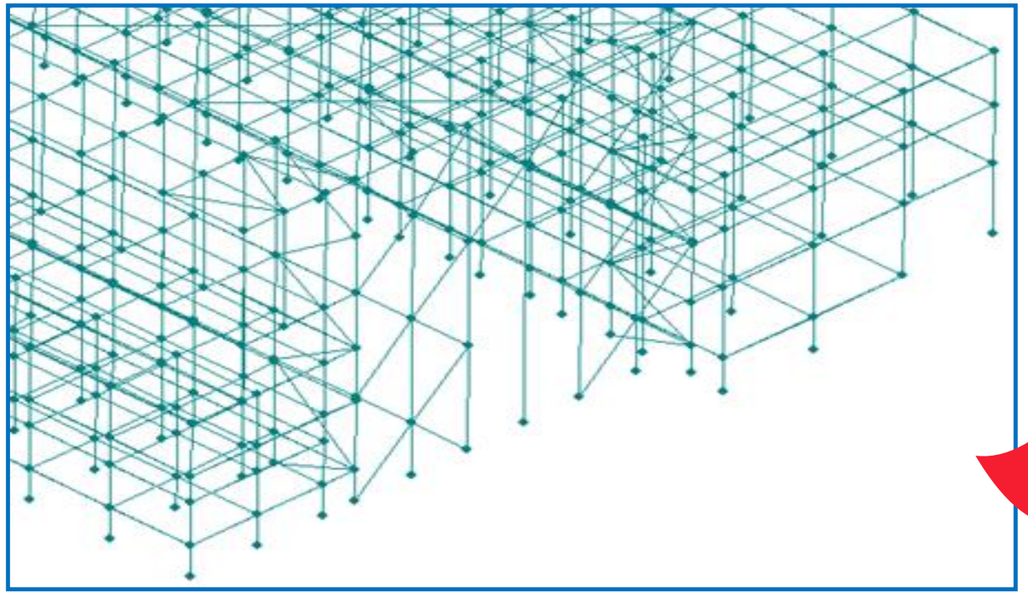
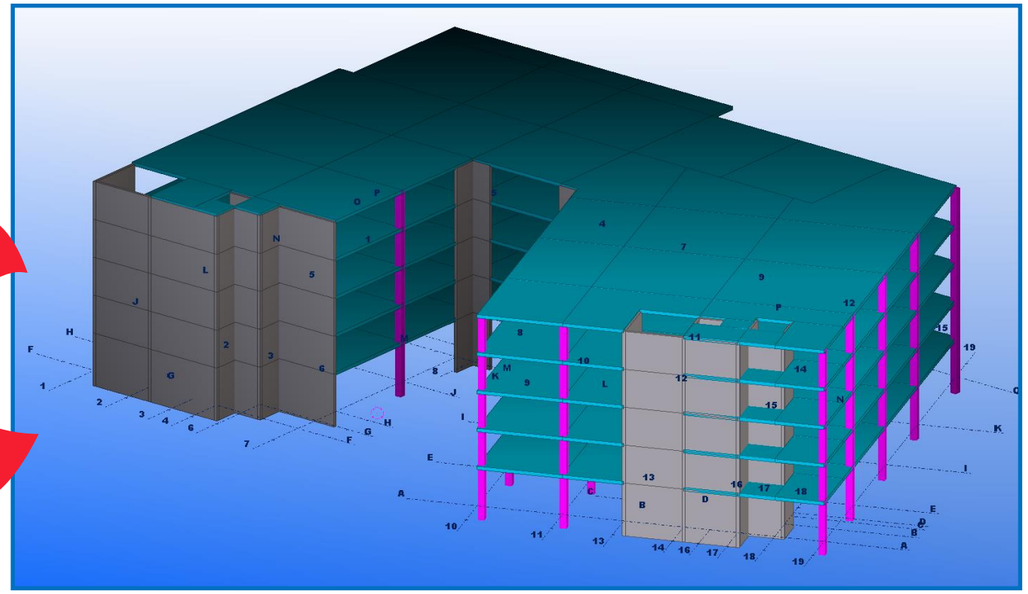
Wireframe data

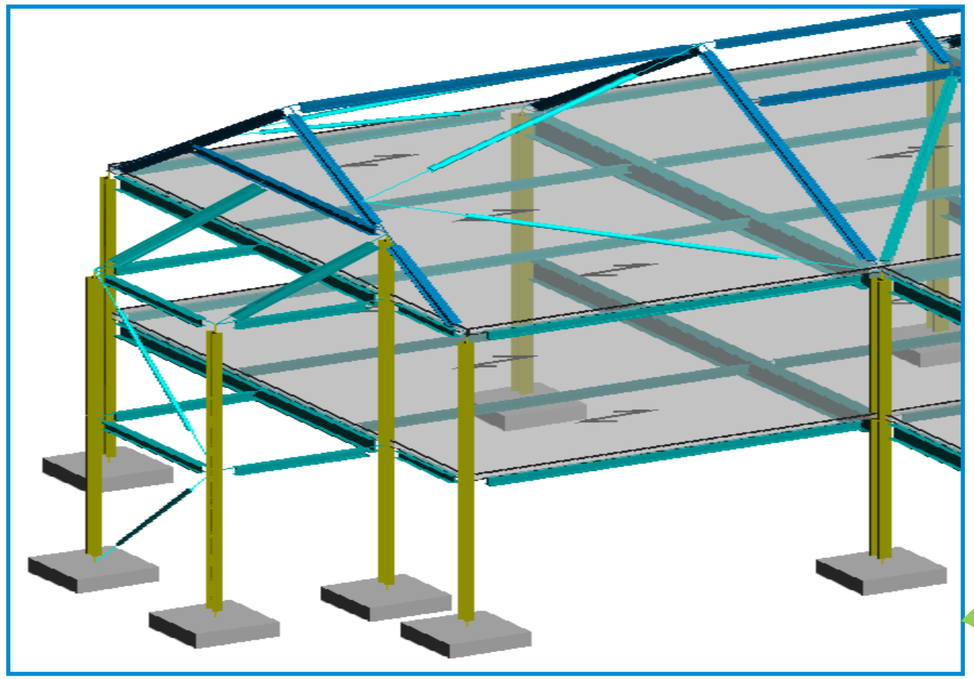
Structural analysis, to predict how the building will behave.

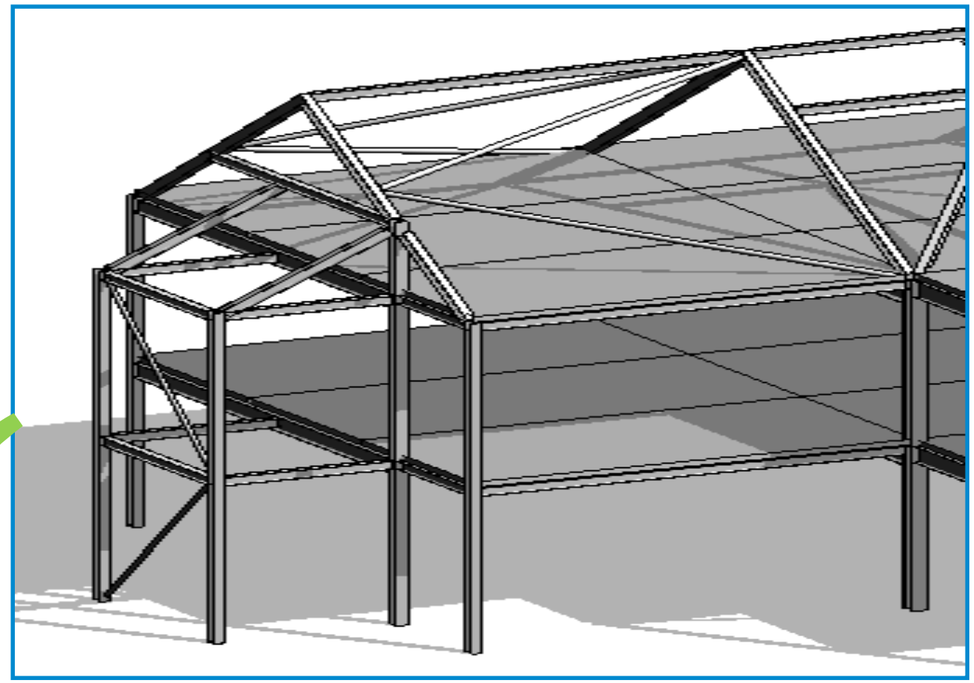
Traditional wireframe modelling





Physical modelling





Fastrak

AUTODESK
REVIT

Code-based modeling

Additional benefits

- Provides assurance that the structural design is fully code compliant.
- Verifies the structure as the engineer works.
- Provides ‘code-based’ hints to assist the engineer.
- Warns the engineer where additional engineering maybe required.

Maximum integration

Models synchronized with Revit Structure

Fastrak Orion Solve

AUTODESK REVIT

Introduction to SDS/2

Demonstration - Fastrak to Revit

Demonstration – SDS/2 Connect

Demonstration – SDS/2 Connect to SDS/2

Benefits

Benefits for the Engineer

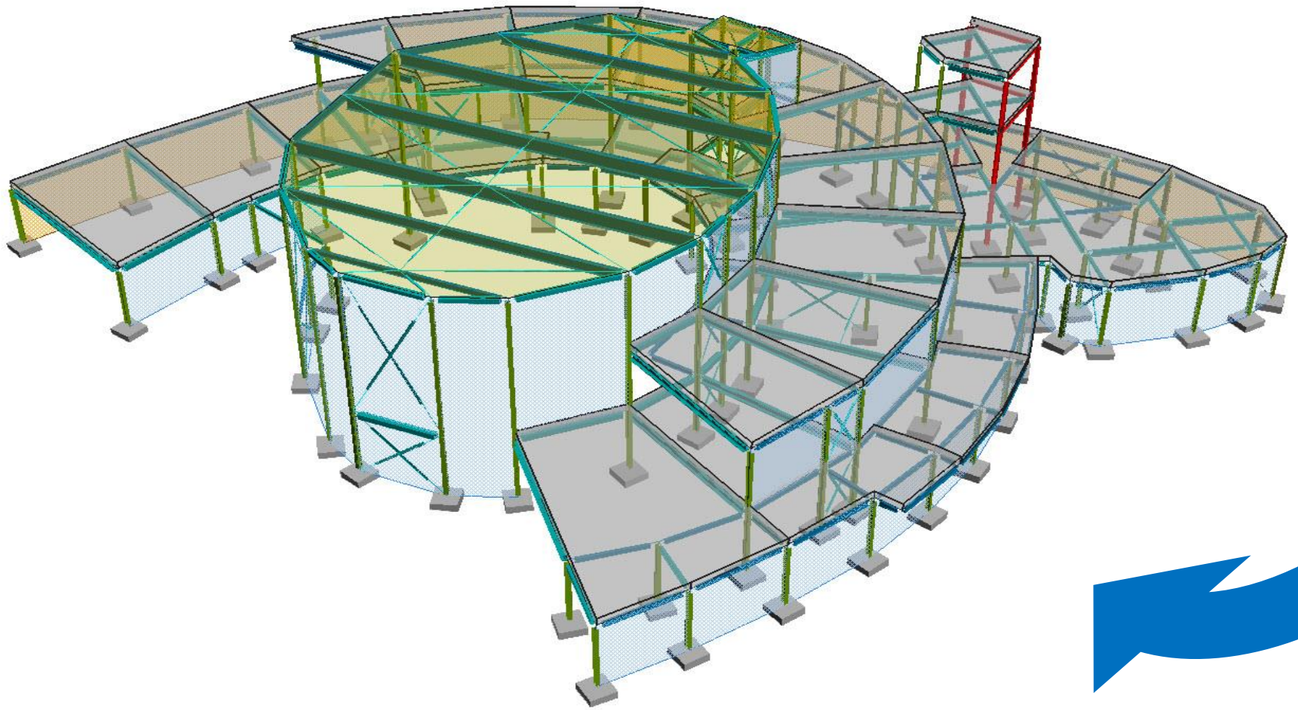
- Code compliant structures and connection design integrated with Revit
- Automated sharing of connection forces
- Improves accuracy, communication and efficiency
- Reduces effort, cost and time
- The latest technology from the leading software vendors
  - CSC
  - Design Data
  - Autodesk

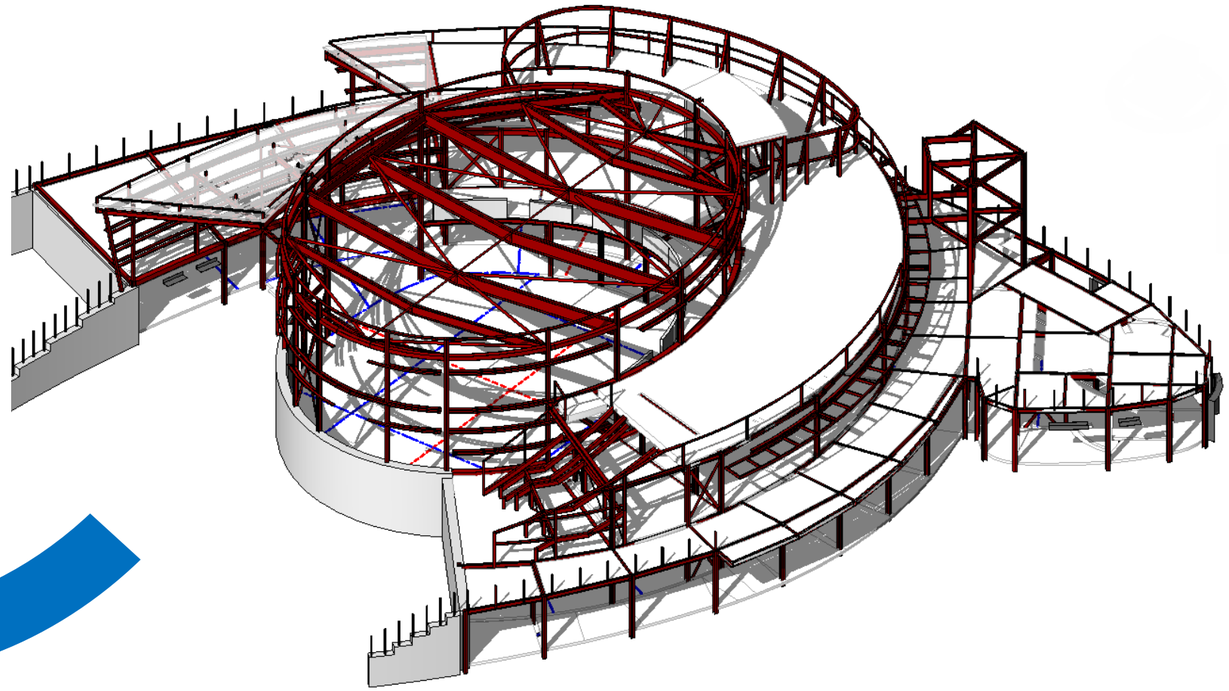
Benefits for the Engineer

- Reduces repetition - Geometry efficiently shared
  - For structural design
  - For structural BIM documentation
  - For Fabrication
- All for the same effort
- React to changes/ variations quicker

Fastrak

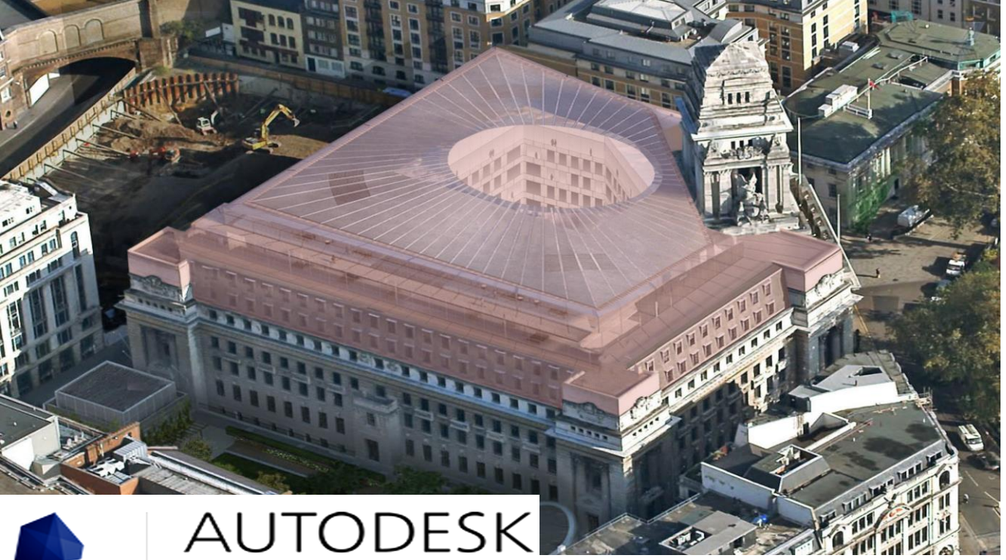
AUTODESK REVIT



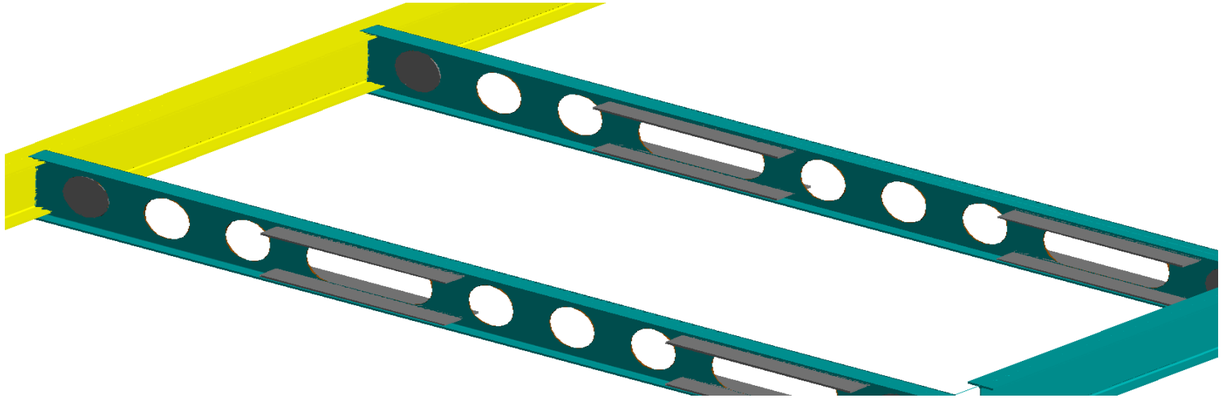


The Welsh Sailing Academy

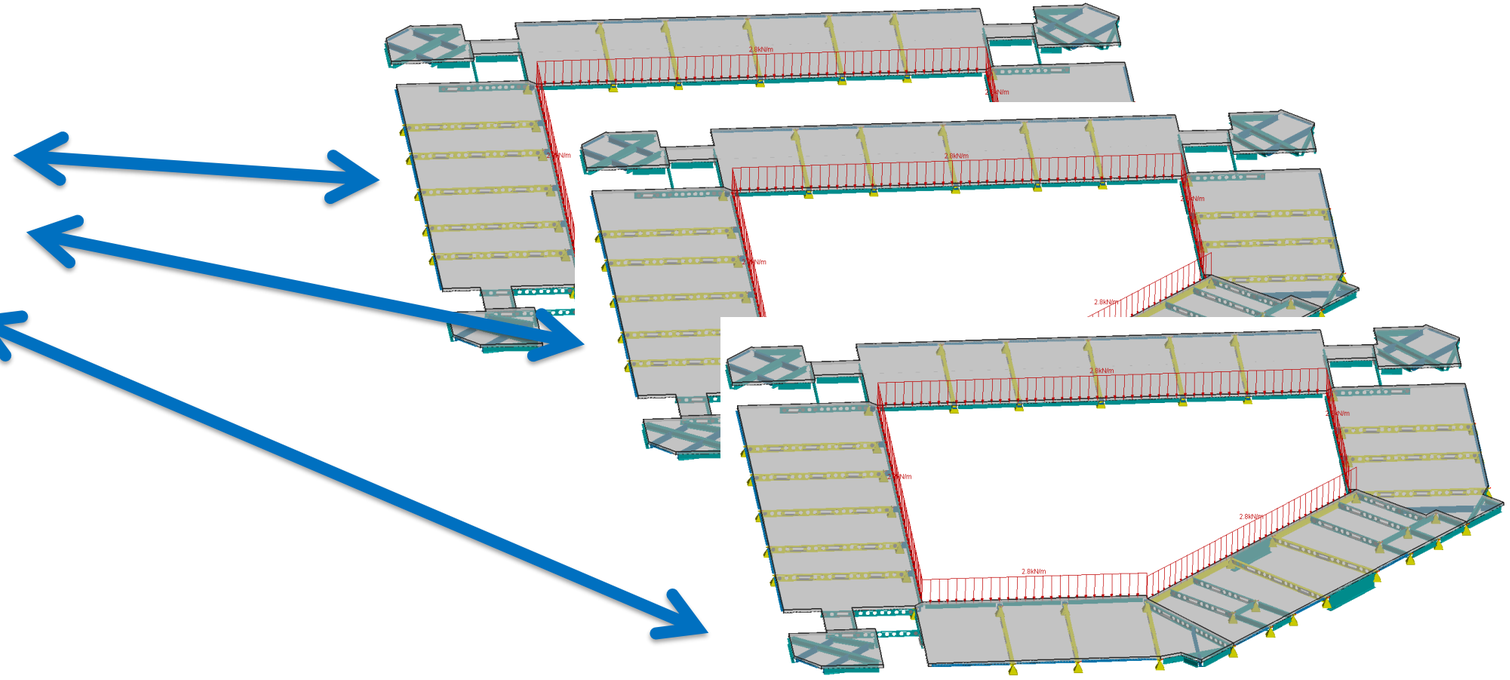
Courtesy of wyg.



AUTODESK
REVIT



Fastrak



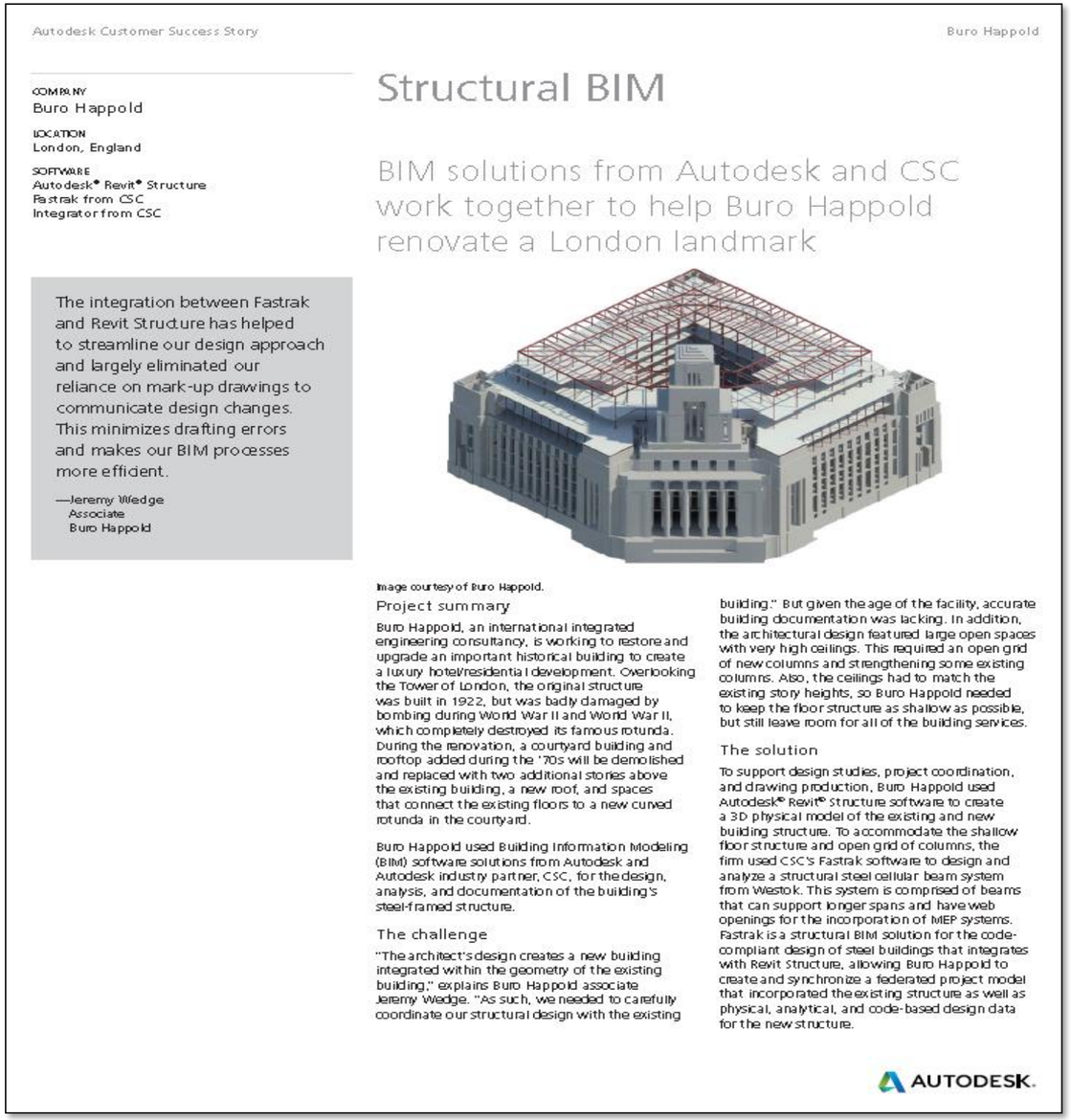
Buro Happold

Buro Happold

"…eliminated our reliance on mark-up drawings to communicate design changes. "

"….minimizes drafting errors and makes our BIM processes more efficient"
…the design made the roundtrip between Fastrak and Revit Structure at least 40 times…

…estimate our productivity gains to be 35-40 %."



Autodesk Customer Success Story

Buro Happold

COMPANY
Buro Happold

LOCATION
London, England

SOFTWARE
Autodesk® Revit® Structure
Fastrak from CSC
Integrator from CSC

The integration between Fastrak and Revit Structure has helped to streamline our design approach and largely eliminated our reliance on mark-up drawings to communicate design changes. This minimizes drafting errors and makes our BIM processes more efficient.

—Jeremy Wedge
Associate
Buro Happold

Structural BIM

BIM solutions from Autodesk and CSC work together to help Buro Happold renovate a London landmark

Image courtesy of Buro Happold.

Project summary

Buro Happold, an international integrated engineering consultancy, is working to restore and upgrade an important historical building to create a luxury hotel/residential development. Overlooking the Tower of London, the original structure was built in 1922, but was badly damaged by bombing during World War II and World War II, which completely destroyed its famous rotunda. During the renovation, a courtyard building and rooftop added during the '70s will be demolished and replaced with two additional stories above the existing building, a new roof, and spaces that connect the existing floors to a new curved rotunda in the courtyard.

Buro Happold used Building Information Modeling (BIM) software solutions from Autodesk and Autodesk industry partner, CSC, for the design, analysis, and documentation of the building's steel-framed structure.

The challenge

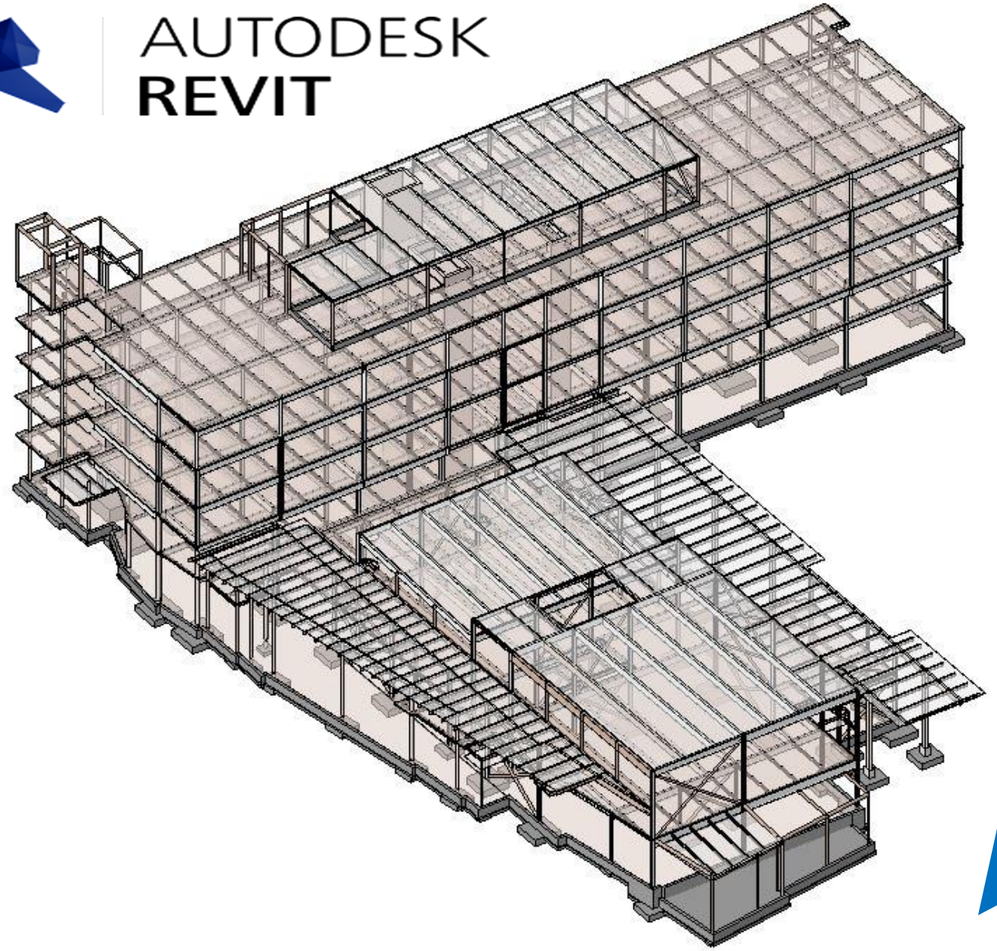
"The architect's design creates a new building integrated within the geometry of the existing building," explains Buro Happold associate Jeremy Wedge. "As such, we needed to carefully coordinate our structural design with the existing building." But given the age of the facility, accurate building documentation was lacking. In addition, the architectural design featured large open spaces with very high ceilings. This required an open grid of new columns and strengthening some existing columns. Also, the ceilings had to match the existing story heights, so Buro Happold needed to keep the floor structure as shallow as possible, but still leave room for all of the building services.

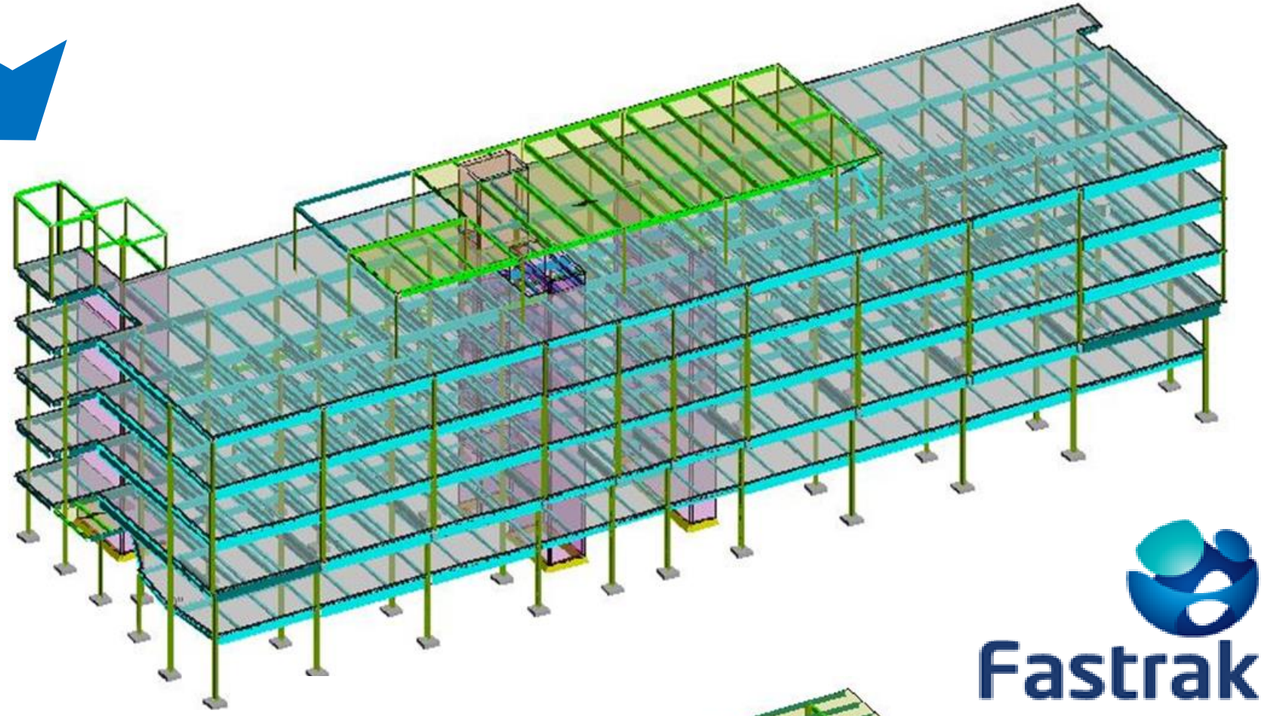
The solution

To support design studies, project coordination, and drawing production, Buro Happold used Autodesk® Revit® Structure software to create a 3D physical model of the existing and new building structure. To accommodate the shallow floor structure and open grid of columns, the firm used CSC's Fastrak software to design and analyze a structural steel cellular beam system from Westok. This system is comprised of beams that can support longer spans and have web openings for the incorporation of MEP systems. Fastrak is a structural BIM solution for the code-compliant design of steel buildings that integrates with Revit Structure, allowing Buro Happold to create and synchronize a federated project model that incorporated the existing structure as well as physical, analytical, and code-based design data for the new structure.

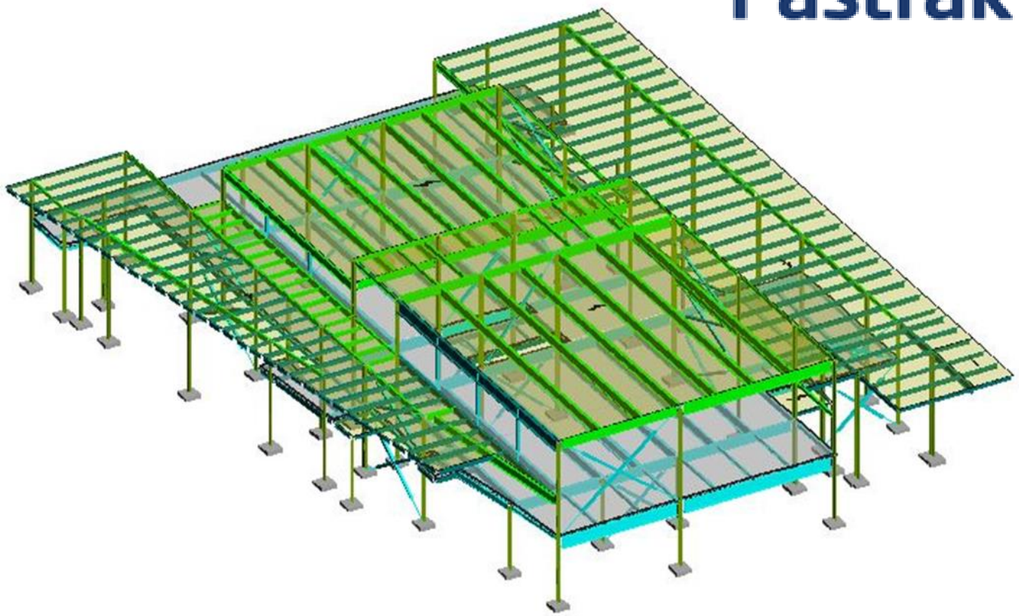
AUTODESK.

AUTODESK
REVIT





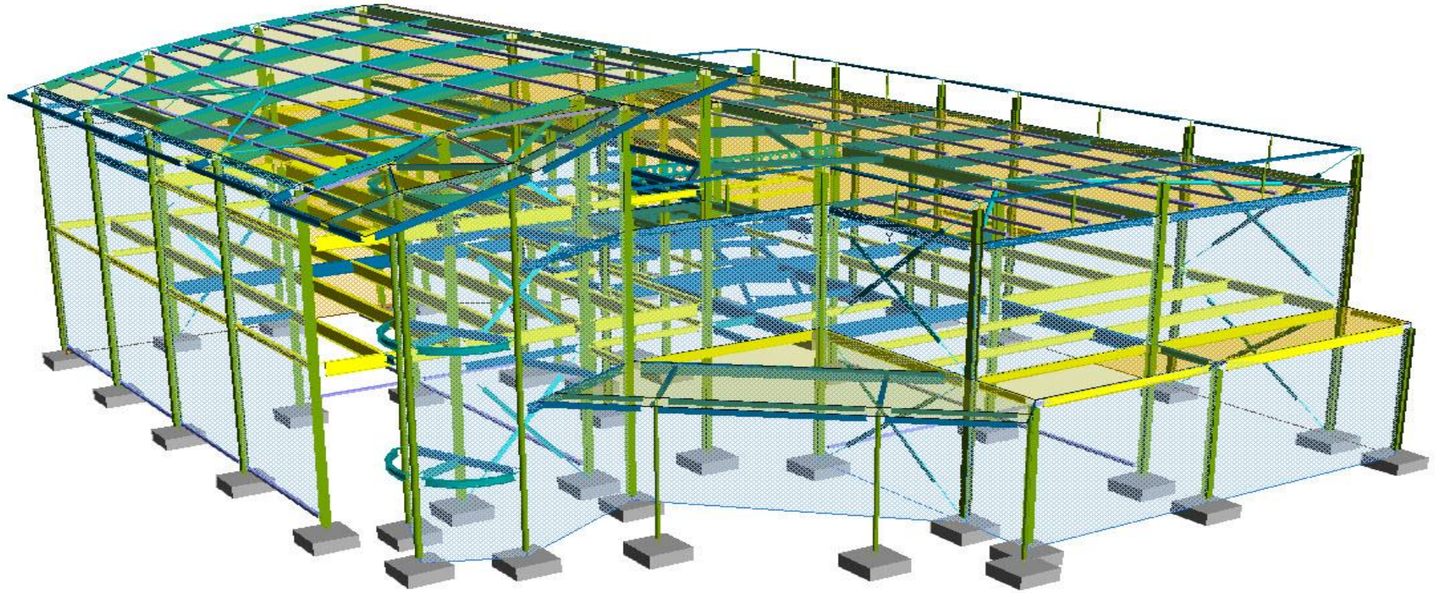
Fastrak

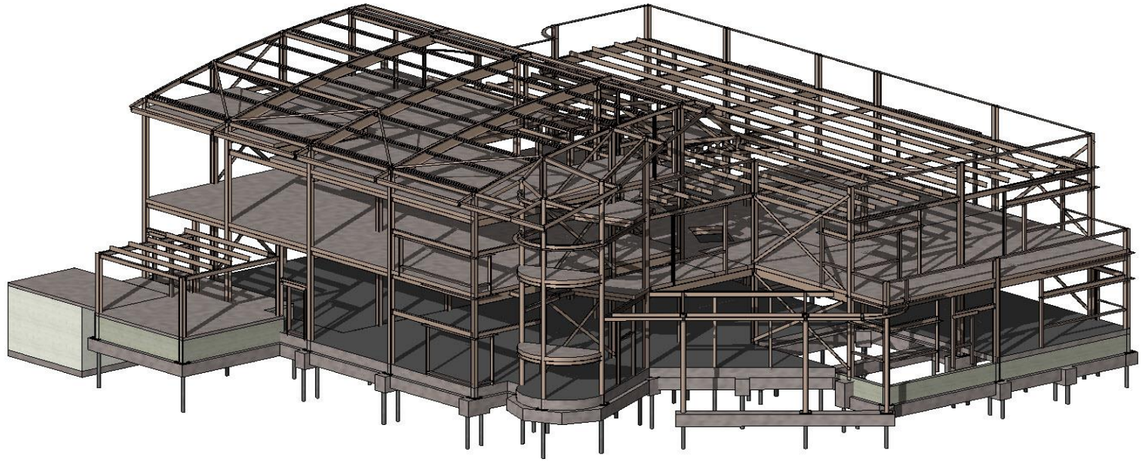


Courtesy of MARTIN / MARTIN CONSULTING ENGINEERS

Fastrak

AUTODESK
REVIT





PICK EVERARD

Benefits for the Fabricator

- Accurate project data earlier
- Leads to accurate costing
  - Tender/ Bid
  - Project
- Reduces project variations – increases consistency
- Helps with pre-ordering steel from rolling mills
- Often on the critical path
- Improves communication up and down stream

Benefits for the Fabricator

- Clearer communication
- Reduce the number of RFIs
- Allows manufacturing input in design decisions
- Enables the sharing of workload

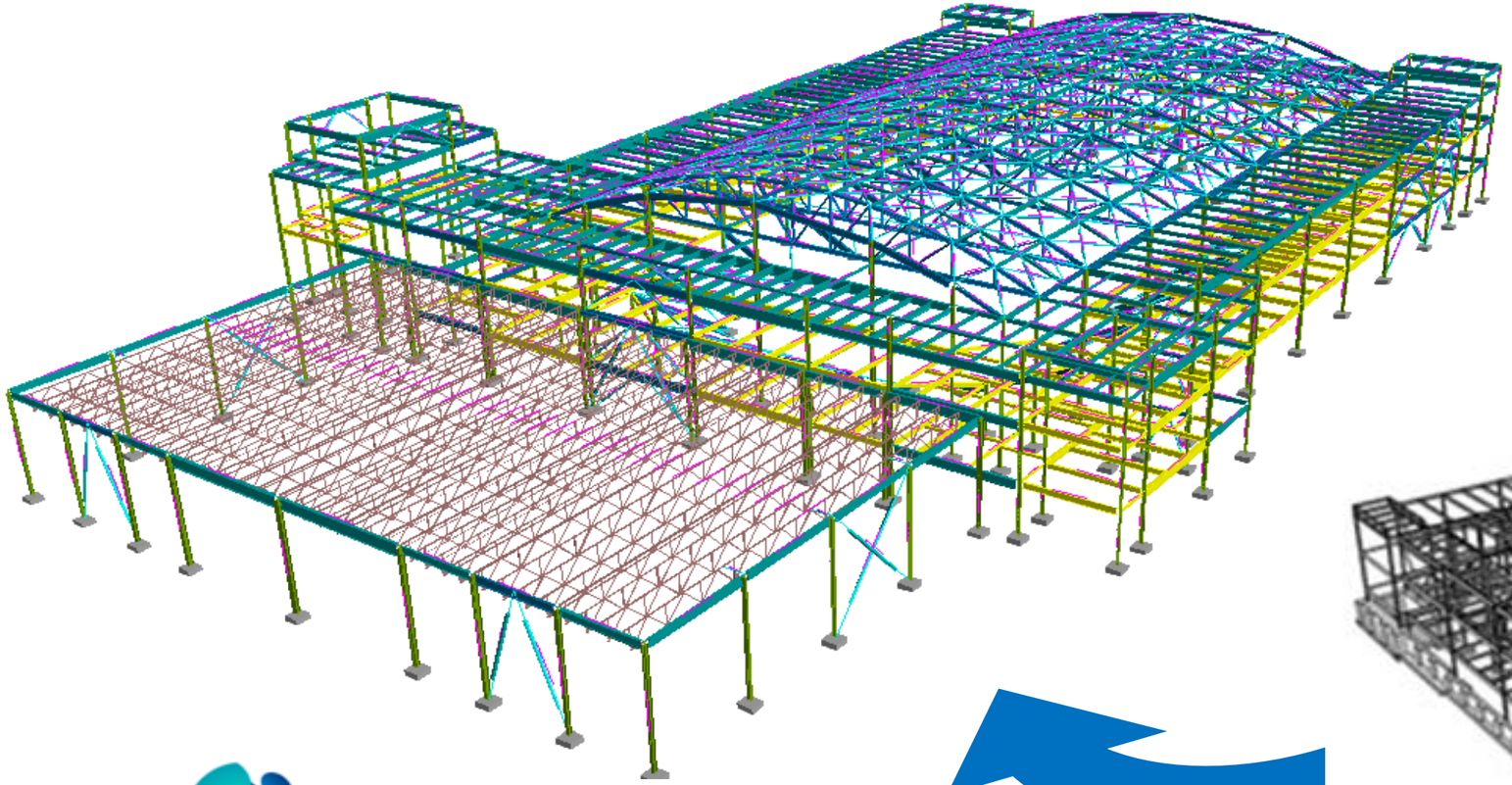
Benefits for the Client

- Significantly improved communication between project members
- Maximum use of BIM data on the project
  - Therefore maximum efficiency
  - Enhanced design data earlier
  - Reduction on cost
  - Reduction in waste
  - Reduction in carbon
  - Improved project deliverable

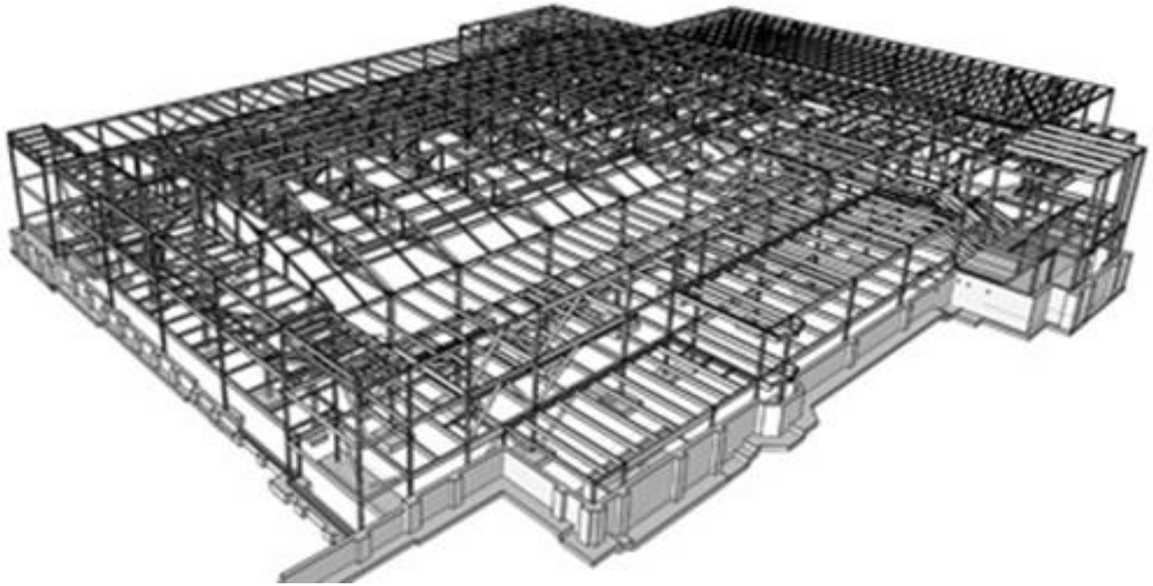
sdi structures

Notre Dame Ice Hockey Arena

USA



AUTODESK REVIT



Fastrak

We can help…

- Both CSC and Design Data offer
- Training and support services
- Structural BIM Consultancy
- Please speak with us if you need further advice

Thank you

Please visit us in the Exhibition Hall:

CSC - Booth #16

Design Data - Stand #2217

For more information:

CSC - www.cscworld.com

Design Data - www.sds2connect.com