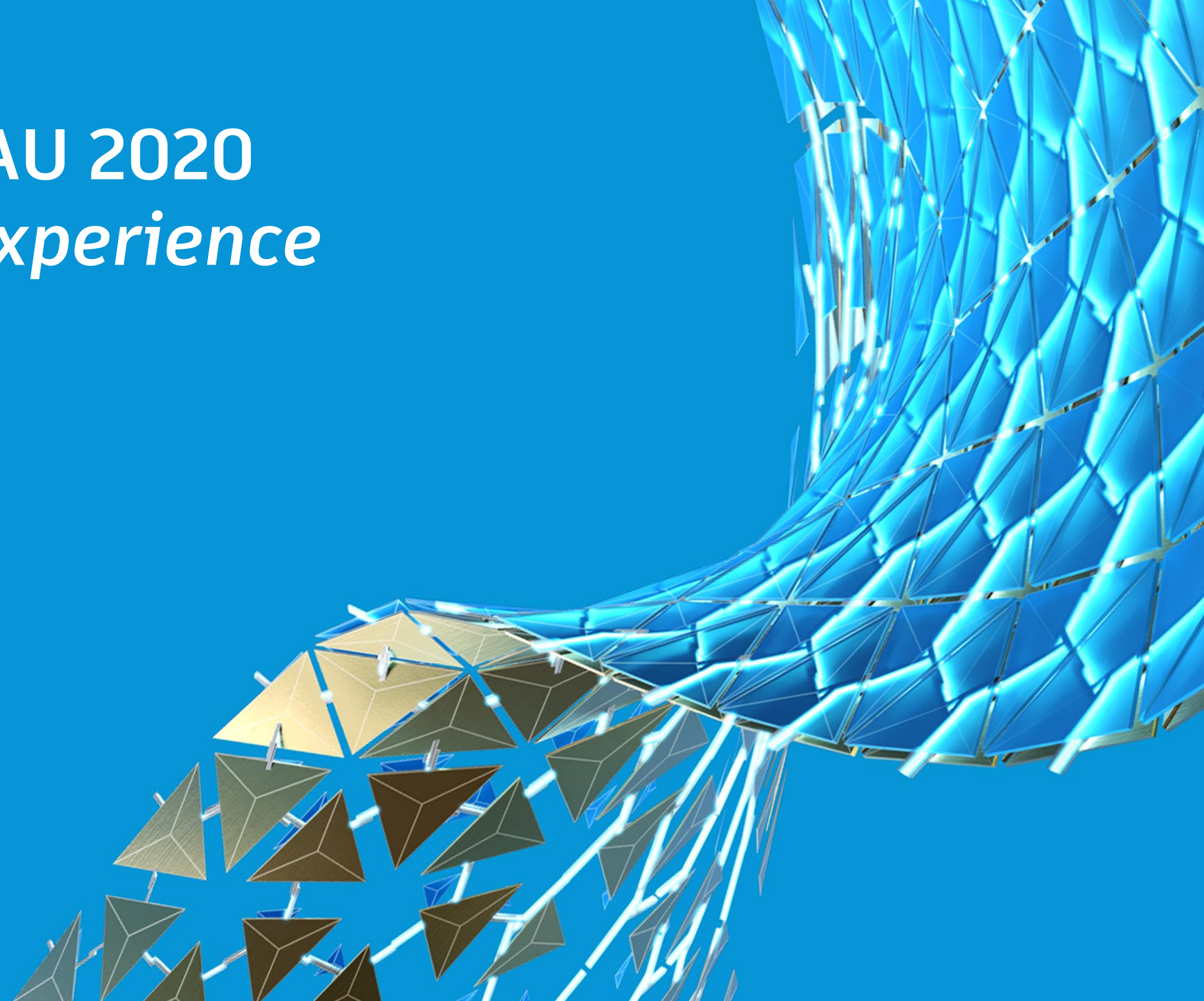
AUTODESK. UNIVERSITY

Structural Design to Fabrication: Revit and Advance Steel - Buddies for Life

Deepak Maini

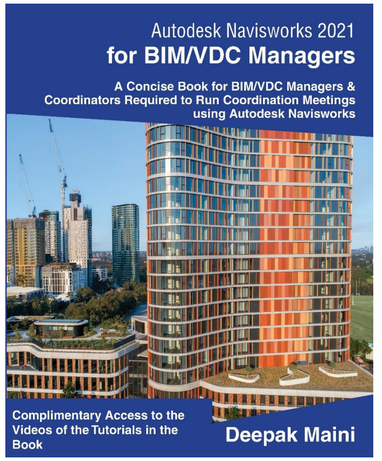
National Technical Manager, Cadgroup Australia

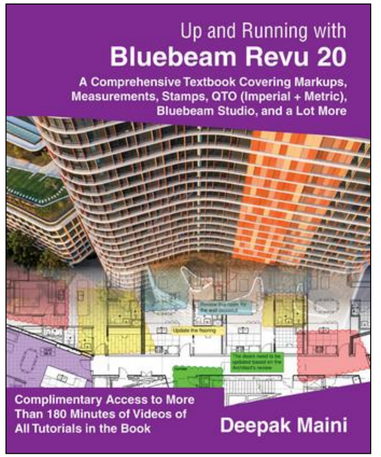
Welcome to AU 2020
The Digital Experience



Deepak's Introduction

- National Technical Manager – Named Accounts, Cadgroup Australia
- Qualified Mechanical Engineer
- Around 21 years of experience in the industry
- Autodesk Expert Elite, Autodesk BIM 360 Certified Consultant, Bluebeam Certified Consultant and Instructor
- Awarded the "Best Autodesk University Speaker" two years in a row at AU2018 and AU2017 in Las Vegas
- Voted "Top Speaker" at the Bluebeam XCON 2019 in Washington DC
- Author of the Up and Running with Autodesk Navisworks, Autodesk Navisworks for BIM/VDC Managers, Up and Running with Autodesk Advance Steel and Up and Running with Bluebeam Revu series of books
- Guest lecturer at the University of Technology Sydney (UTS) and University of New South Wales (UNSW), University of Salford UK, Virginia Tech University





My Aim: Have Lots of Fun as we Learn

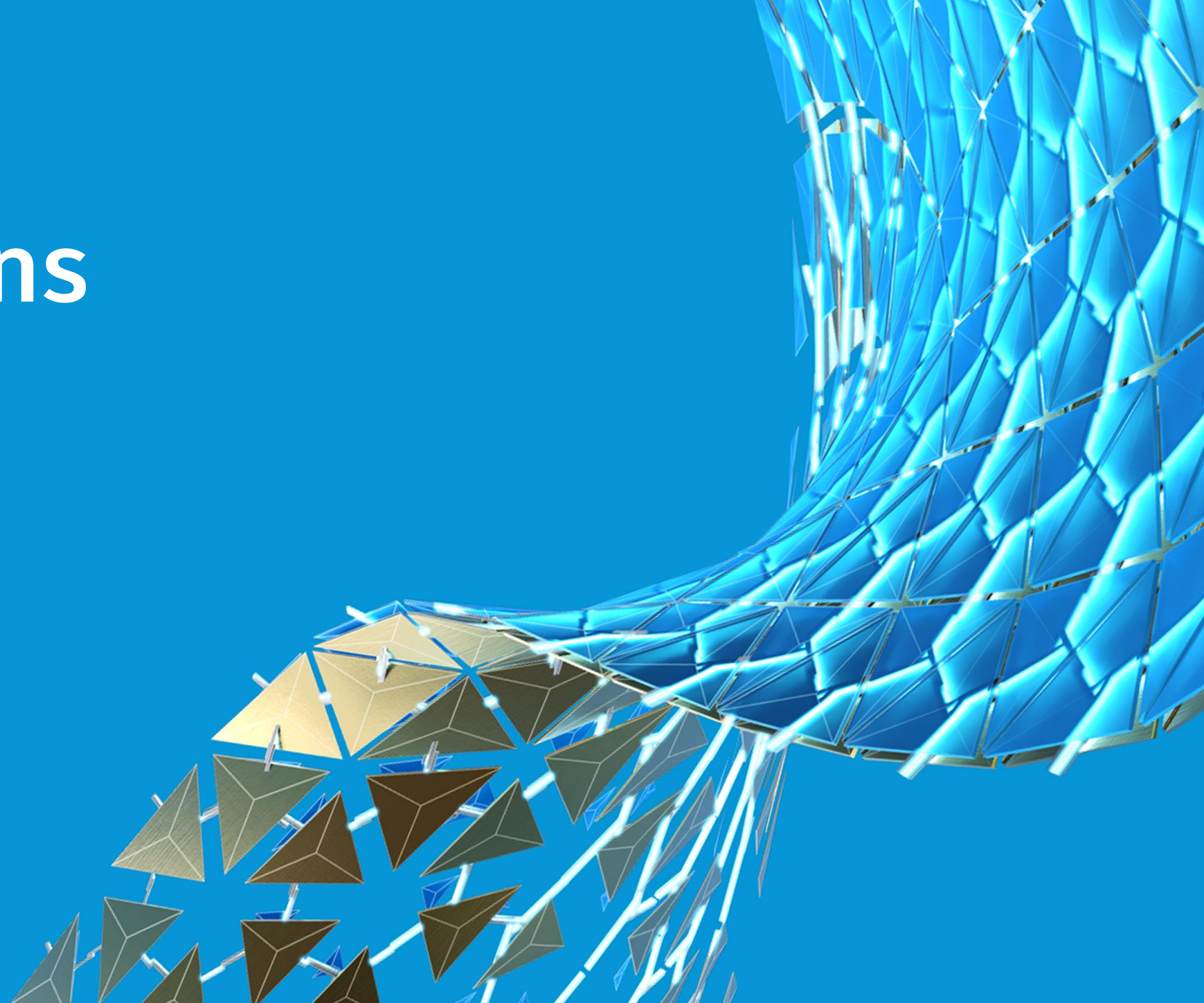
Acknowledgements

- Janice Miller-Kellerman and Adam Sopko from the AU Team
- Patricia Lundberg and Lauren Ames from the AU Speaker Management Team
- Pier-Andre Maynard, Nicolas Martineau, Joël St-Pierre and Autodesk Technical Crew

Learning Objectives

- Learn how to export a Revit Structure model and import it into Advance Steel.
- Learn how to create automated steel connections between the members imported from Revit.
- Learn how to generate automated fabrication drawings, BOMs, and DXF/NC files.
- Learn how to use Sync to review and import any Revit changes into Advance Steel or validate the Advance Steel model in Revit.

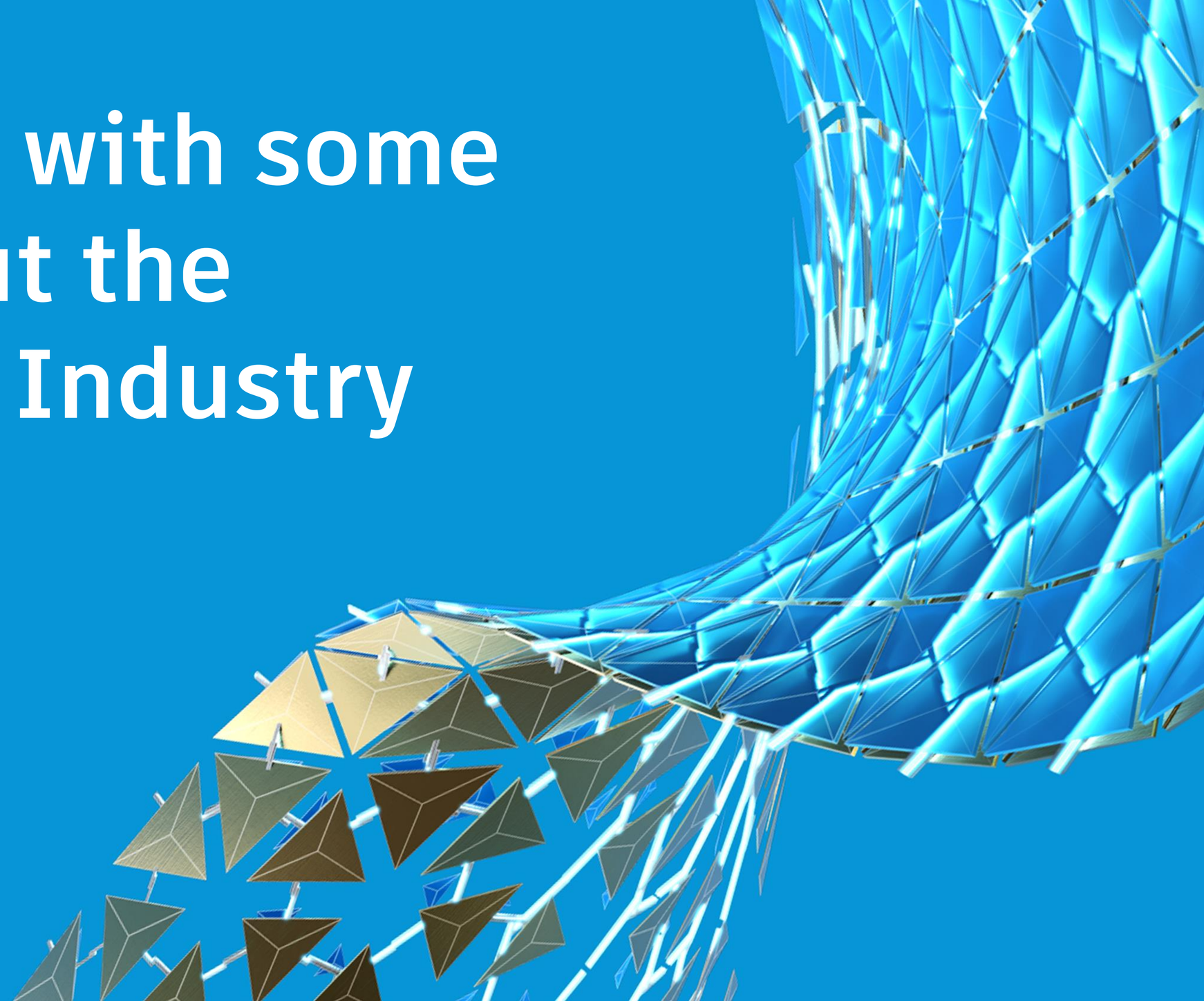
Inspirations



Story of Kendel Inverarity, Western Australia

- A 45 years old born and bred on the farm and grew up helping dad in the shed creating steel trusses, gates, fences, yards, you name it.
- Has a side business called The Pig Poo Lady which is basically selling bags of shit. Variety is the spice of life not to mention beer money.
- Was on 4wd motorbike chasing sheep. It was below 4° C (39F), the dog had jumped in the dam then on the bike, the sheep had gone in the wrong direction, she hurt herself opening a cocky gate.
- Decided to use the Pig Poo Sales and put herself through the Drafting studies as she wanted to be independent from our farming business.
- Plans for the immediate future: Learn Dynamo, Pyrevit, Rhino 3D, Navisworks and “your Advanced Steel”.

Let’s Start with some Stats about the Structural Industry



MOST Critical Part of Design

For Ensuring Safety of the Occupants

Only 10% Construction Cost

Relates to the Structure

Source: McGraw Hill Smart Market Report, World Economic Forum, Statistica, ENR

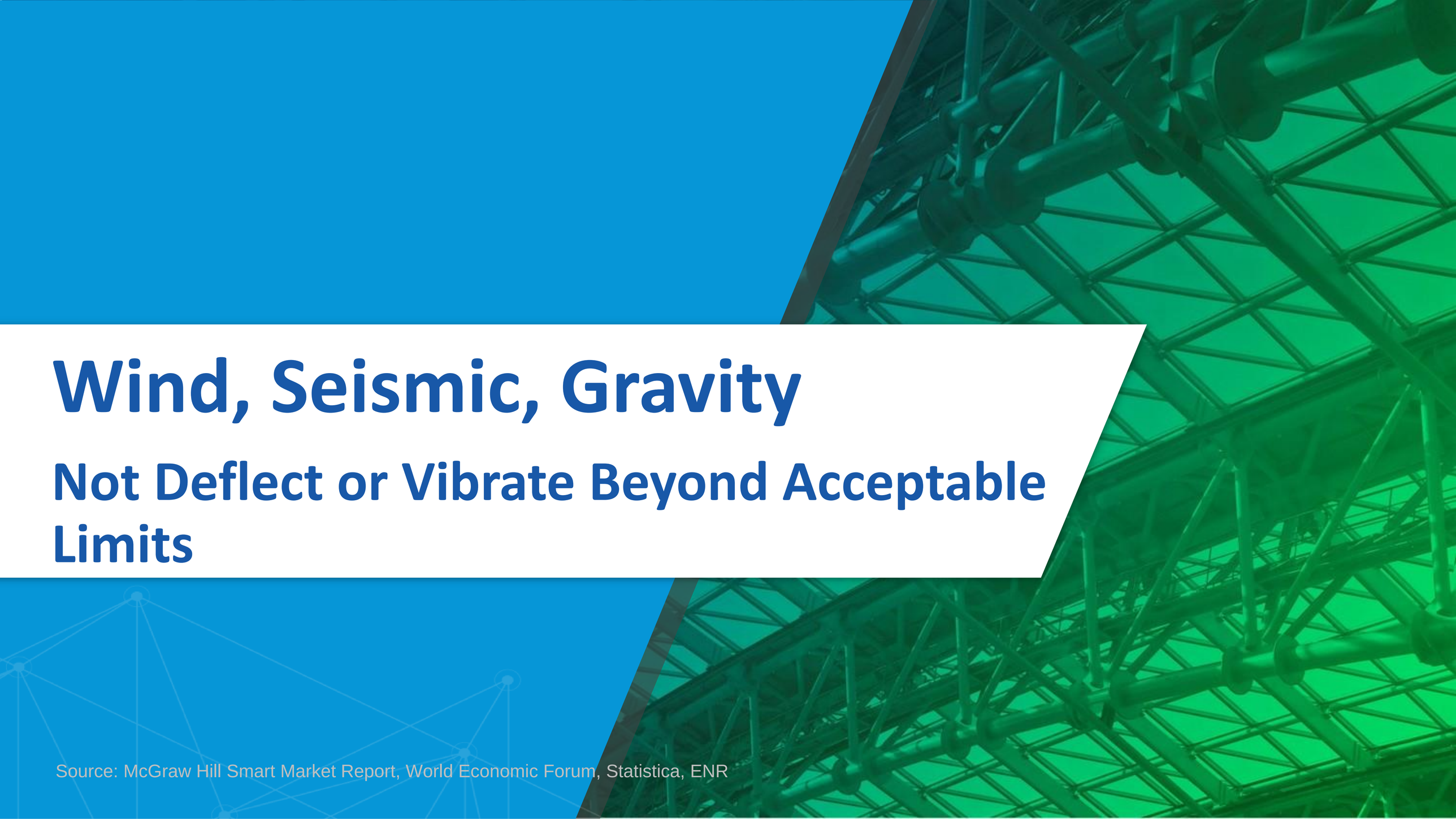
1st on Site

Build Foundations, Core, Skeleton

Source: McGraw Hill Smart Market Report, World Economic Forum, Statistica, ENR

Wind, Seismic, Gravity

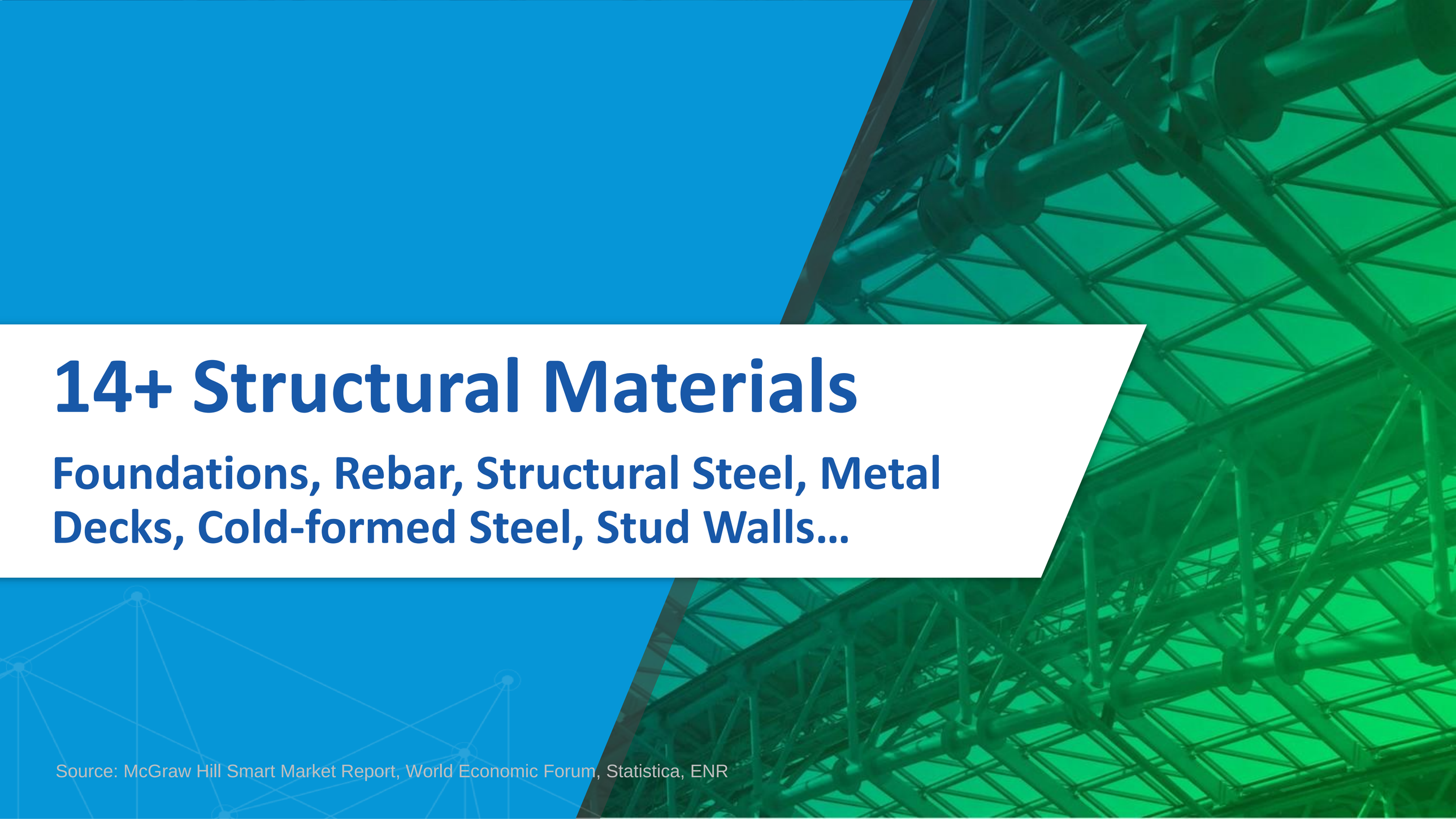
Not Deflect or Vibrate Beyond Acceptable Limits



Source: McGraw Hill Smart Market Report, World Economic Forum, Statistica, ENR

14+ Structural Materials

Foundations, Rebar, Structural Steel, Metal Decks, Cold-formed Steel, Stud Walls…



Source: McGraw Hill Smart Market Report, World Economic Forum, Statistica, ENR

Offsite and Prefab

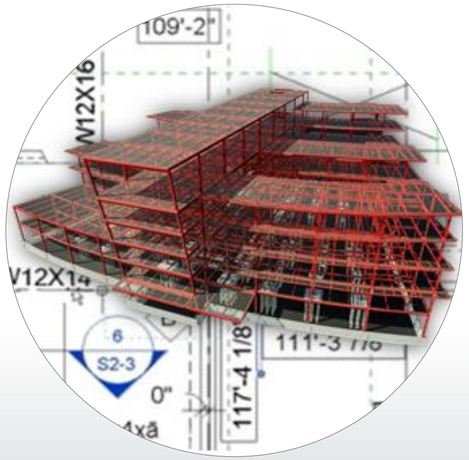
Precast and Timber

Source: McGraw Hill Smart Market Report, World Economic Forum, Statistica, ENR

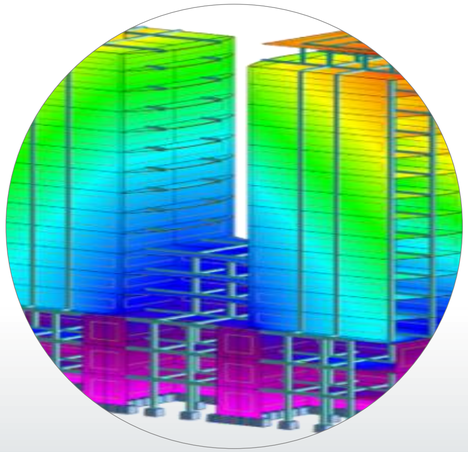
One of the Most Disconnected Industries

Understanding the Structural Industry

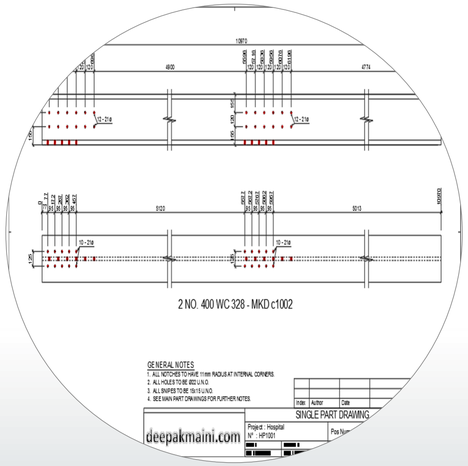
Structural Design



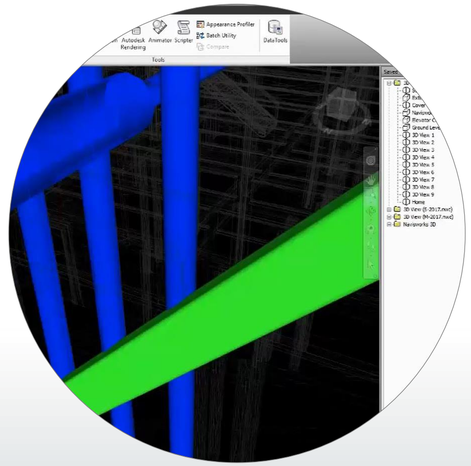
Simulation & Verification



Detail Documentation

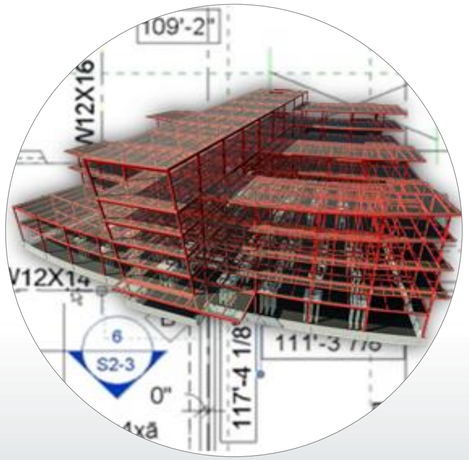


Fabricate & Install



Understanding the Challenges

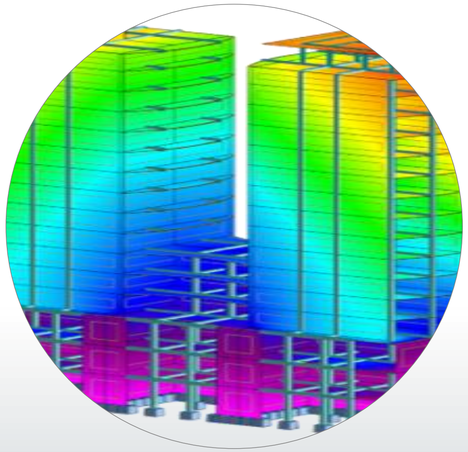
Structural Design



Engineers aren’t Engaged Early Enough in Design

Impact of Poor Design Decisions

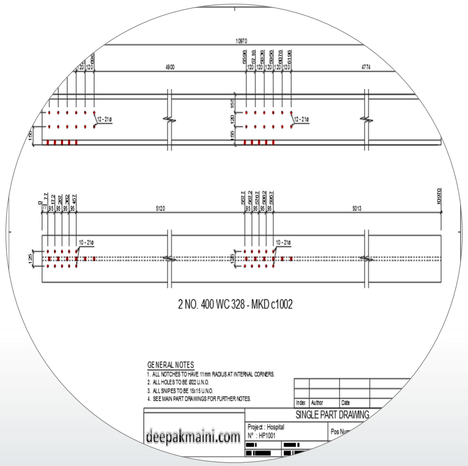
Simulation & Verification



Lack of Coordination

Changes Not Communicated

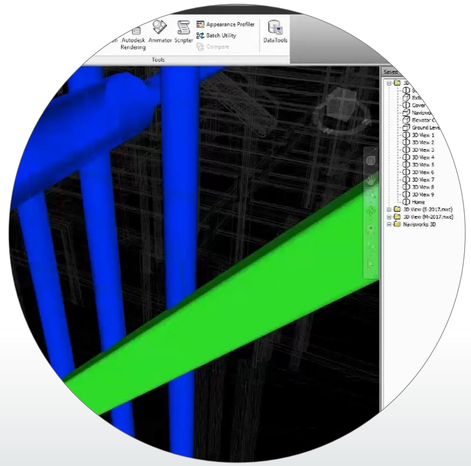
Detail Documentation



Disconnect between Coordination & Detailed Models

Incomplete/Incorrect Installation Instructions

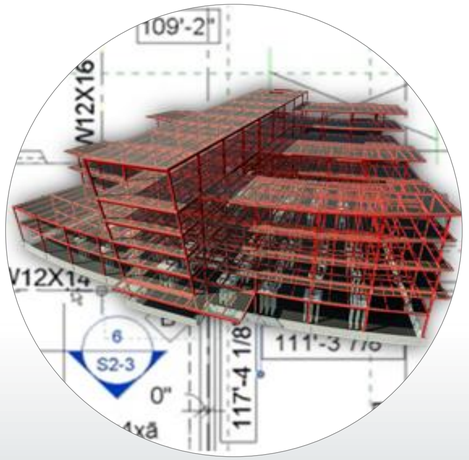
Fabricate & Install



Owner Receives Incomplete As-builts

Understanding the Challenges

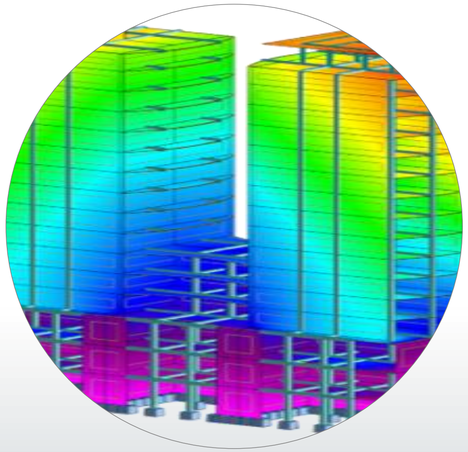
Structural Design



Engineers aren’t Engaged Early Enough in Design

Impact of Poor Design Decisions

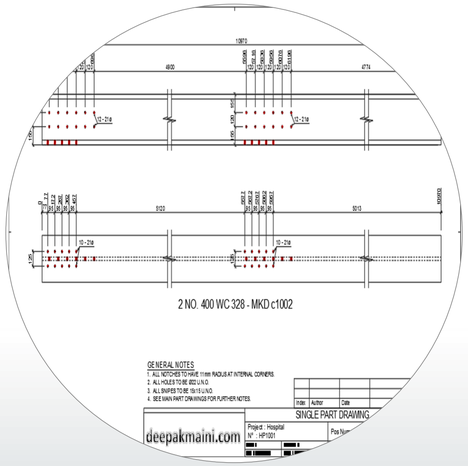
Simulation & Verification



Lack of Coordination

Changes Not Communicated

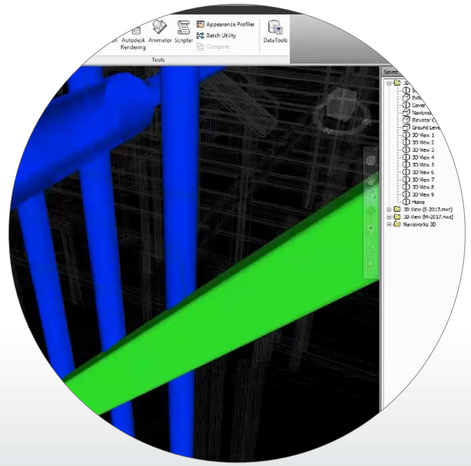
Detail Documentation



Disconnect between Coordination & Detailed Models

Incomplete/Incorrect Installation Instructions

Fabricate & Install



Owner Receives Incomplete As-builts

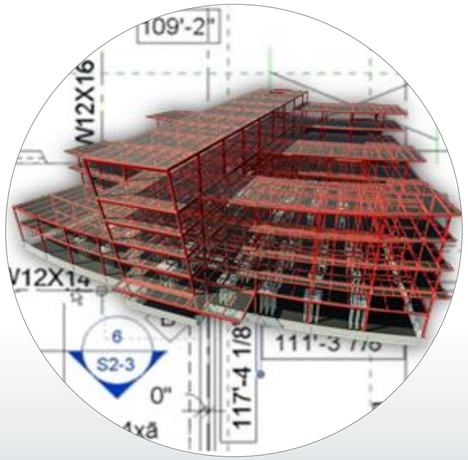
So what’s the Solution???

The Solution is… Connected BIM

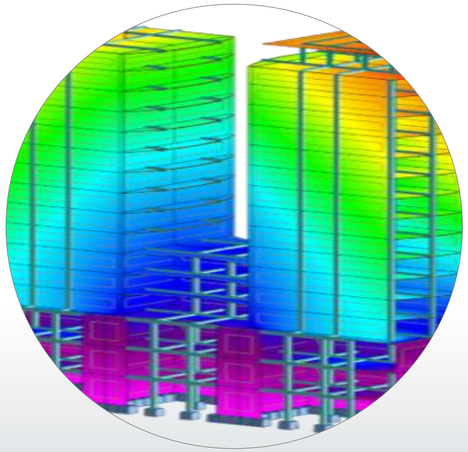
- A workflow in which we have a fully synchronized model from design to simulation to documentation to installation and erection
- Help reduce project complexity
- Interoperability to avoid errors and redundancies
- Result in improved productivity
- Better project coordination

Connected BIM

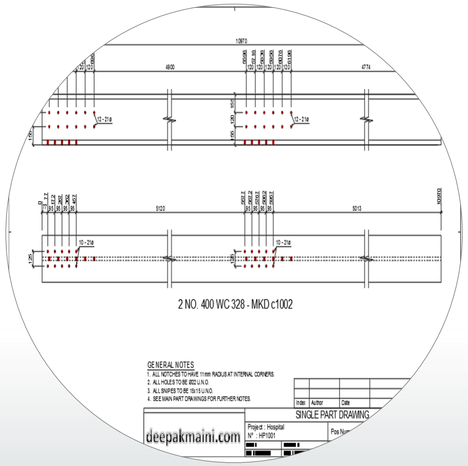
Structural Design



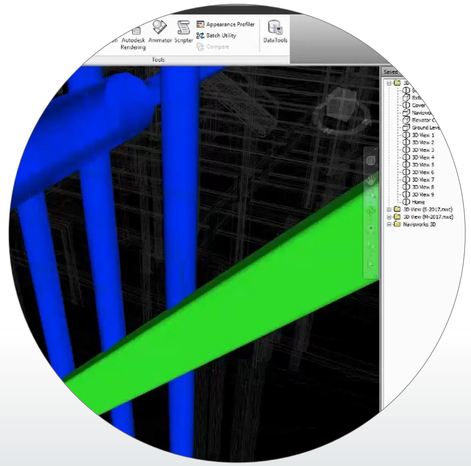
Simulation & Verification



Detail Documentation

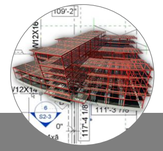


Fabricate & Install

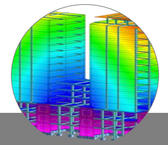


DESIGN **CONSTRUCTION**

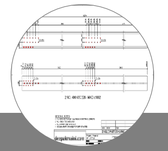
Connected BIM



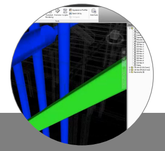
Structural Design



Analyze & Verify



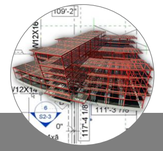
Detail Documentation



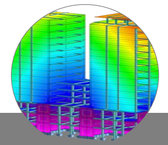
Fabricate & Install

AUTODESK **ARCHITECTURE, ENGINEERING & CONSTRUCTION COLLECTION**

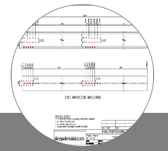
Connected BIM



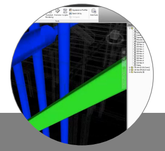
Structural Design



Analyze & Verify



Detail Documentation



Fabricate & Install

AUTODESK® REVIT®

AUTODESK® ADVANCE STEEL

AUTODESK® ROBOT™ STRUCTURAL ANALYSIS PROFESSIONAL

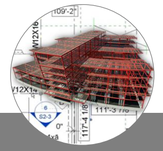
AUTODESK® NAVISWORKS®

AUTODESK® RECAP™

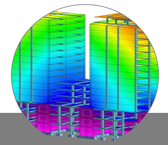
AUTODESK® STRUCTURAL PRECAST EXTENSION FOR REVIT®

DYNAMO FOR REVIT®

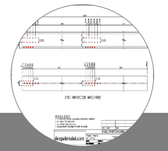
Connected BIM



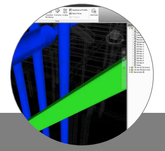
Structural Design



Analyze & Verify



Detail Documentation



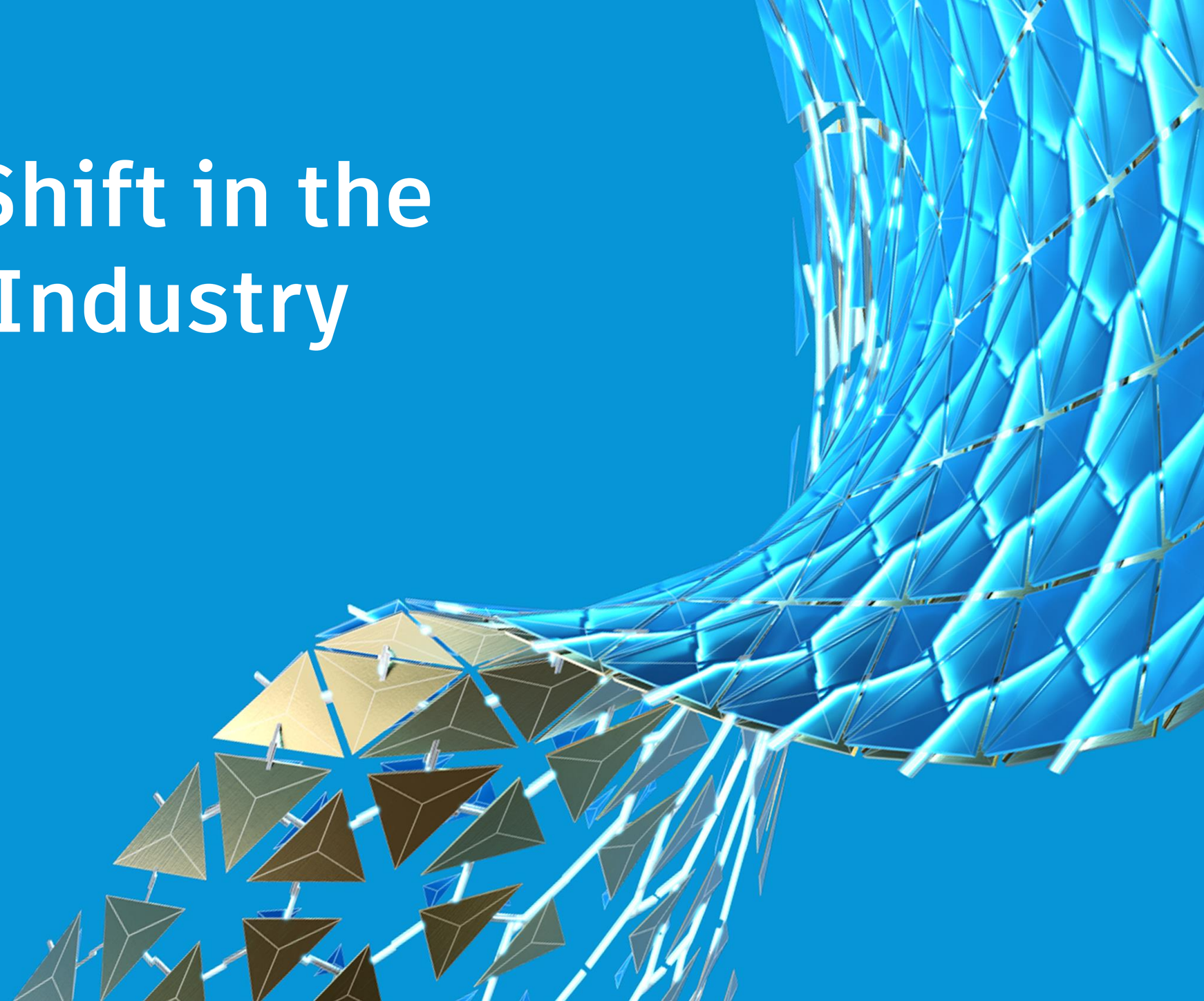
Fabricate & Install

AUTODESK® REVIT®

AUTODESK® ADVANCE STEEL

AUTODESK® ROBOT™ STRUCTURAL ANALYSIS PROFESSIONAL

Paradigm Shift in the Structural Industry



Paradigm Shift in the Structural Industry

- Structural Engineers working on jobs requiring LOD 400 or above elements need to deliver fabrication level structural model.
- Especially, the projects in high seismic regions.

© AFP/Getty Images

267
enjoy
CLOSED
TF1
CLEAR
NSW TF1
1/3
TF1
CLEAR
Shoe Repairs
McCAMMON & CO

Paradigm Shift in the Structural Industry

- Structural Engineers working on jobs requiring LOD 400 or above elements need to deliver fabrication level structural model.
- Especially, the projects in high seismic regions.
- Historically, only the structural detailers working under the fabricators were capable of working on the fabrication level model.
- Now Structural Engineers are starting to deliver models with LOD 400 elements.

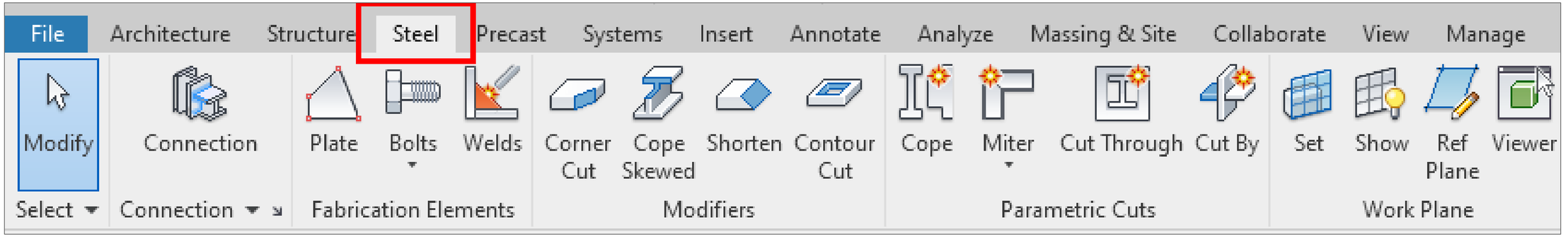
taylor devices inc.
VISCOUS DAMPING DEVICE

Paradigm Shift in the Structural Industry

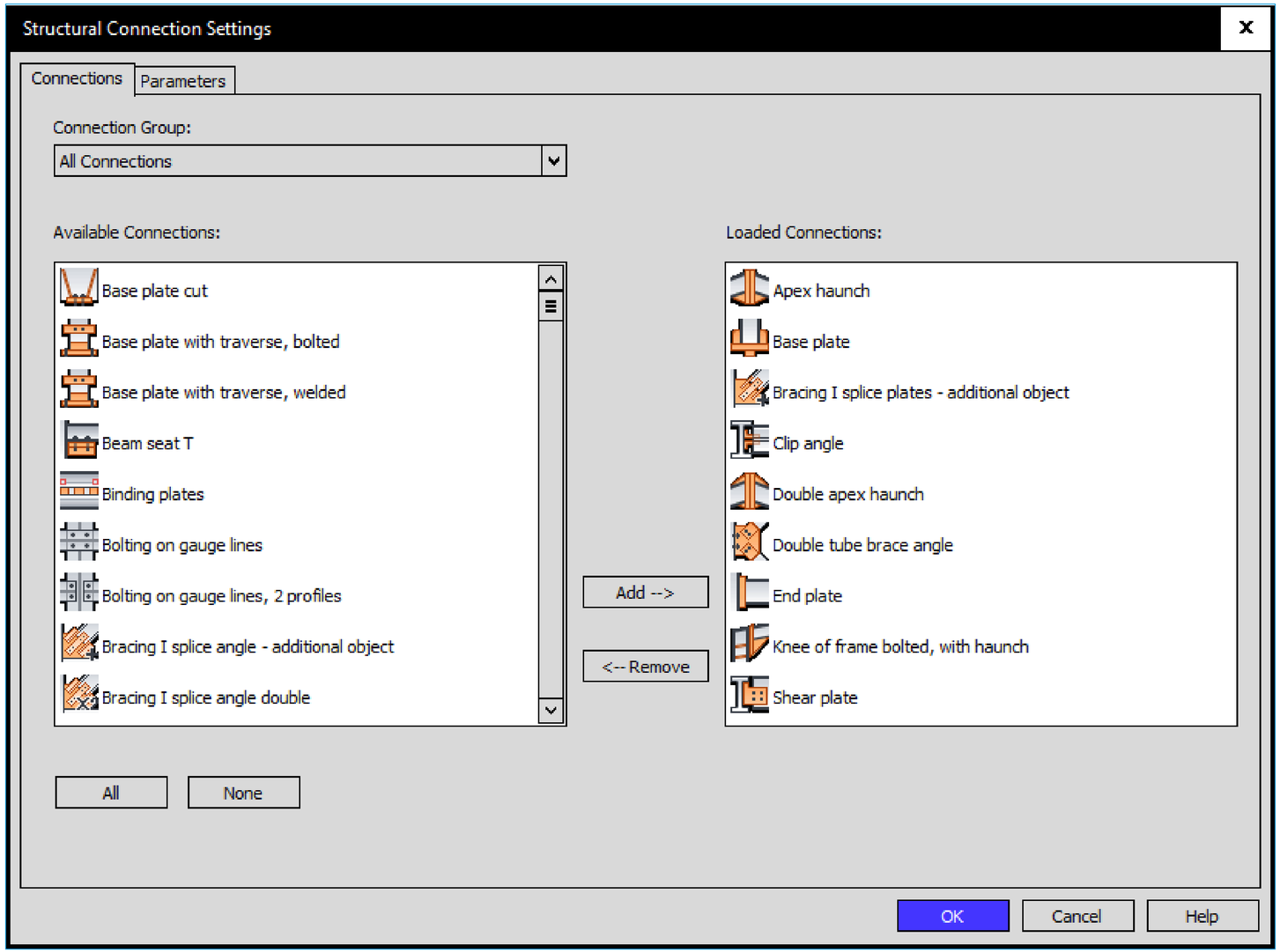
- Structural Engineers working on jobs requiring LOD 400 or above elements need to deliver fabrication level structural model.
- Especially, the projects in high seismic regions.
- Historically, only the structural detailers working under the fabricators were capable of working on the fabrication level model.
- Now Structural Engineers are starting to deliver models with LOD 400 elements.
- Autodesk Revit allows you to create steel connections inside Revit. Alternatively, you can import the structural connections from Advance Steel straight into Autodesk Revit.

Autodesk AEC Collection Empowering the Structural Industry

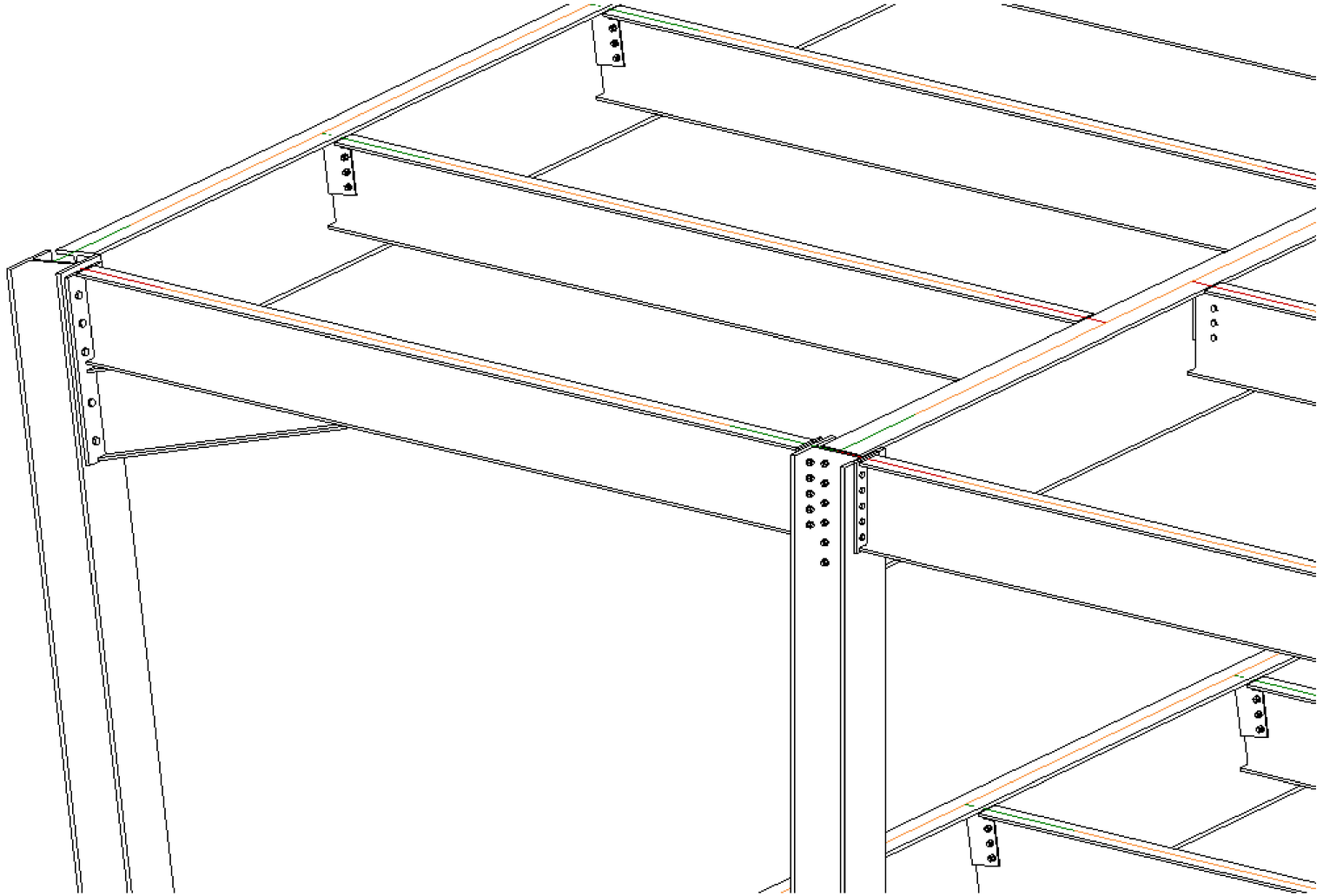
Steel Tab for Structural Connection, Elements, and Features



Structural Steel Connections for Autodesk Revit 2021



Structural Steel Connections for Autodesk Revit 2021



Live Demo

Inserting Structural Connections in Revit

Leveraging Autodesk Revit Model (BIM Data)

for Steel Detailing and Structural Analysis

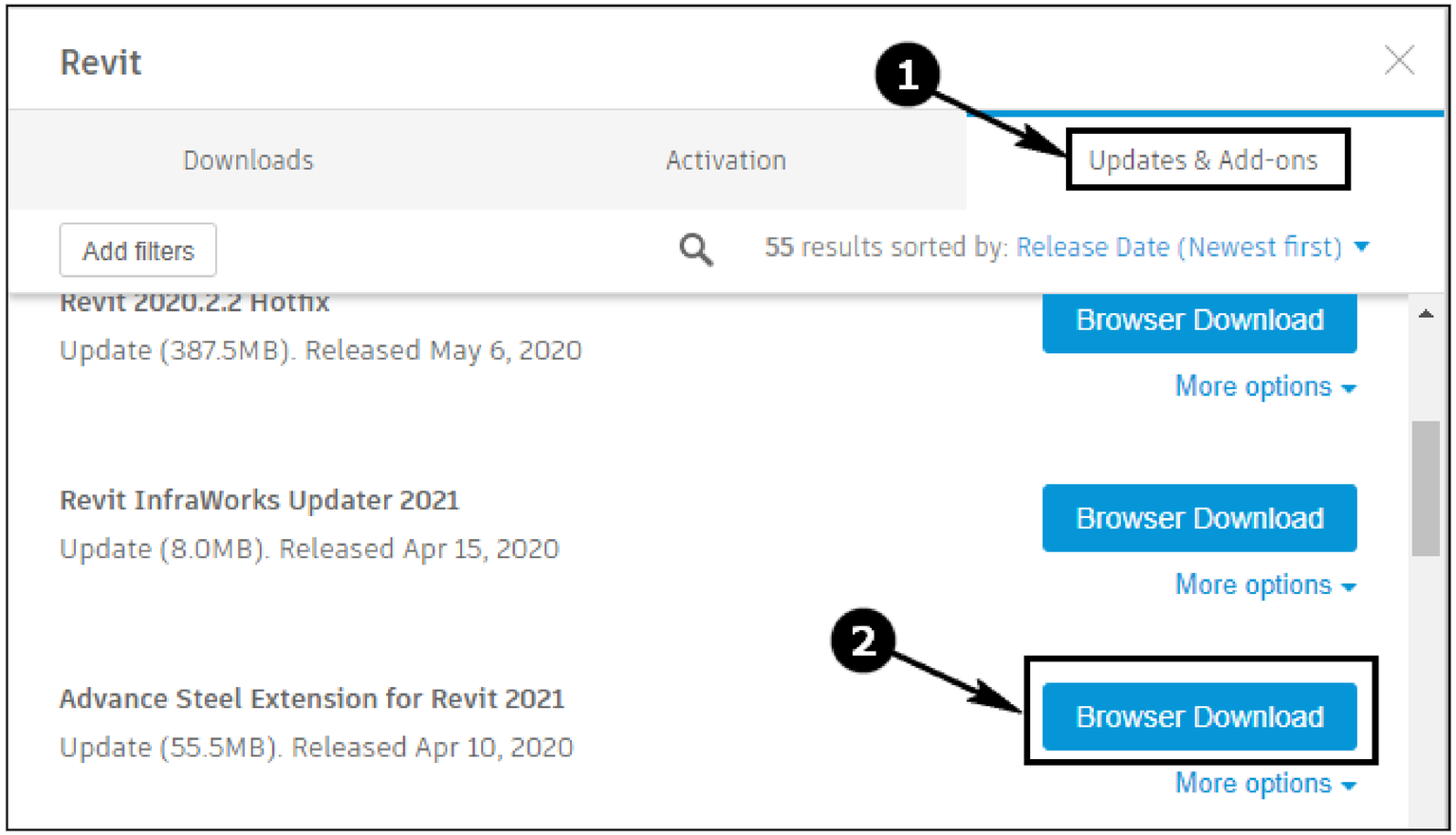
Autodesk Advance Steel

Advance Steel is a software specifically designed for structural engineers and steel detailers who need an easy-to use steel detailing application.

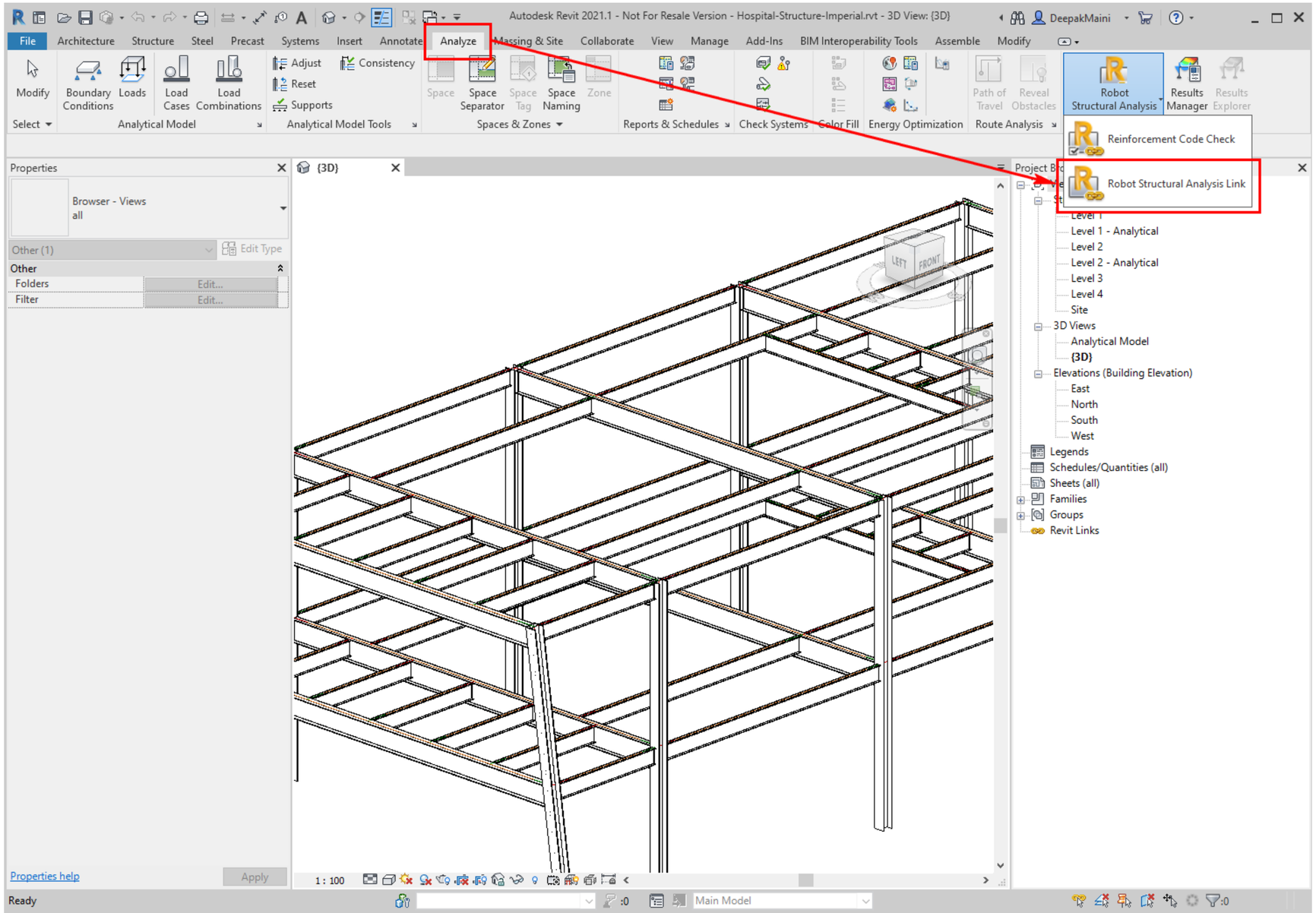
- Allows Bi-directional data interoperability with Autodesk Revit
- Automates the creation of complex structural models and connections that would be too tedious to manually model
- Increases productivity during the creation of detail documentation, fabrication drawings, bills of material (BOMs), and NC files

Advance Steel Add-In for Autodesk Revit

One of your Autodesk Subscription Benefits



Robot Structural Analysis link with Autodesk Revit



Live Demo

Leveraging Autodesk Revit Model (BIM Data) for Steel Detailing and Structural Analysis

My Aim: Have Lots of Fun as we Learn

Autodesk and the Autodesk logo are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document.

© 2020 Autodesk. All rights reserved.