



# Combining the Speed of Conceptual Modeling Tools with BIM Detailing and Documentation

Gustav Fagerström – Buro Happold

**SE3240** In the contemporary AEC industry, it is as crucial to be able to quickly conceptualize and visualize a design as it is to document and, ultimately, materialize it rapidly and reliably. This class covers the use of specialized tools and methods for conceptual early stages modeling and their integration into a BIM environment (Autodesk® Revit® Structure software) that enables reliable material assignment, quantification, and documentation.

## Learning Objectives

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

- Describe the usefulness of interoperability protocols
- Draw on strengths from multiple modeling platforms
- Describe practice-based examples of conceptual design combined with detailed documentation
- Use Revit add-ins

## About the Speaker

*Gustav Fagerström is a registered architect and Associate with Buro Happold New York where he leads the structural BIM and advanced modeling team. Specializing in design computation he operates at the intersection of architecture, engineering and computer science. He has experience in all stages of projects in over 10 different countries, having practiced architecture with Urban Future Organization, Kohn Pedersen Fox Associates and UNStudio. Work of his has been exhibited and published in Europe, the Americas and Asia as well as presented at venues such as the Venice Architecture Biennale, CAADRIA, ACADIA and the SmartGeometry conference. Frequently engaging with academia he has sat on design juries, given workshops and lectures at UPenn, Yale, the AA London, UCL Bartlett, the Royal Institute of Technology and the Royal Academy of Fine Arts in Stockholm.*

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## Describe the usefulness of interoperability protocols



AUTODESK  
REVIT

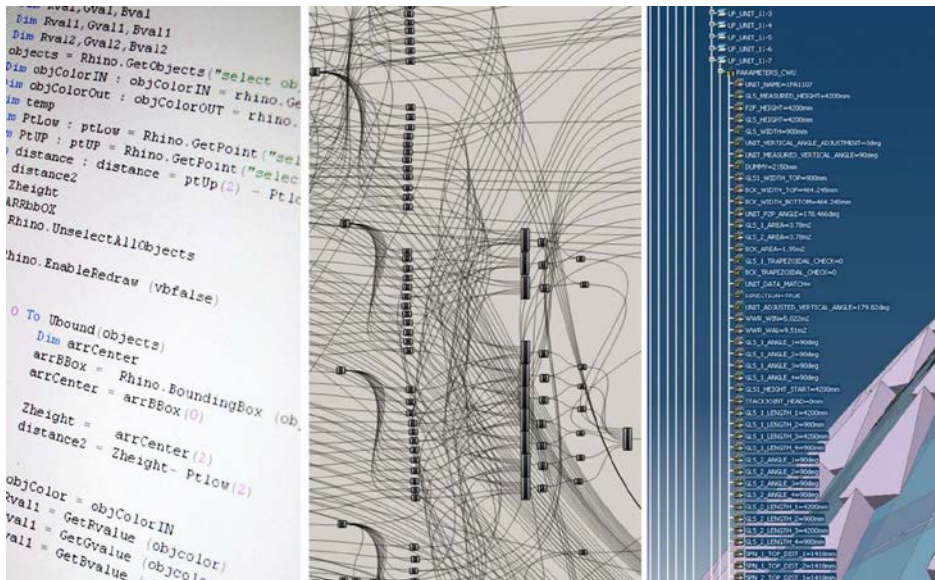


Autodesk® Revit® Server

GRAPHISOFT  
ARCHICAD

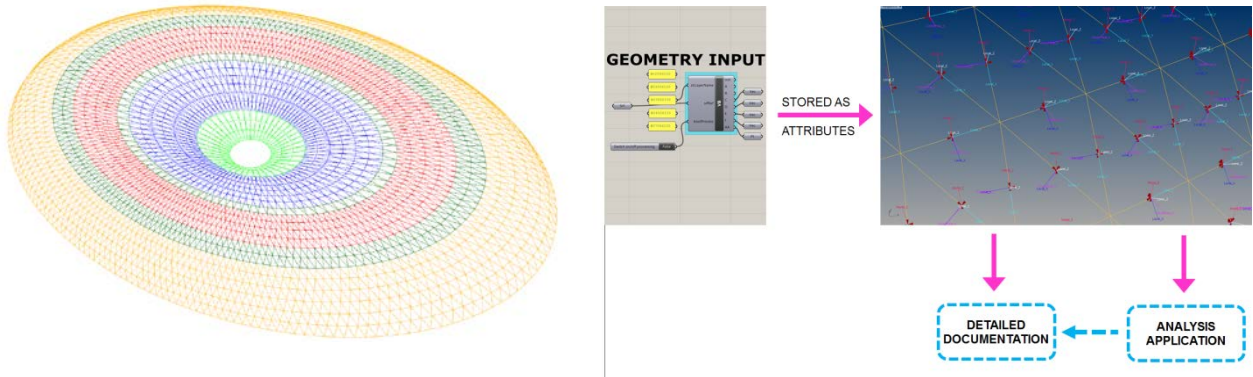
Buro Happold as a practice prides itself not only on being able to offer full interdisciplinary services in engineering, but equally being able to execute projects in a range of software platforms for modeling, documentation and information sharing.

With Revit as a strong central information repository for any project, we acknowledge the need for remaining, to a degree, software agnostic. This means deploying the right tool at the right time and let each platform do what it does best, developing effective and efficient interoperability protocols to bridge between each platform.

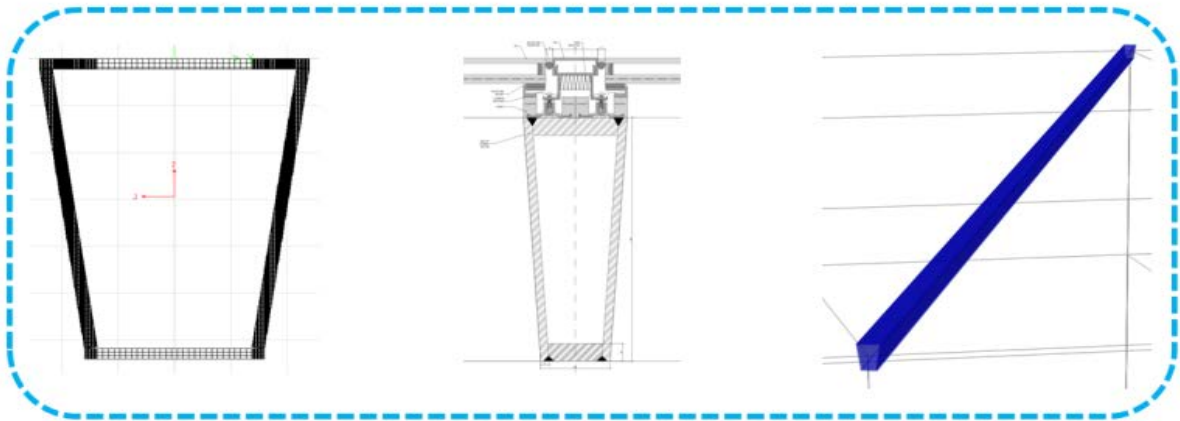


## Draw on strengths from multiple modeling platforms

The case study presented is a long span structure realized as a grid shell. A tight integration between structural and façade designs enables us to rely on a single geometry repository for set out with offsets between front of structure and front of glass. At a still early stage, design wise, we already need to present a certain level of detail in structure and façade drawings. The project will also be tendered in BIM, making an early detailed Revit model of the essence.



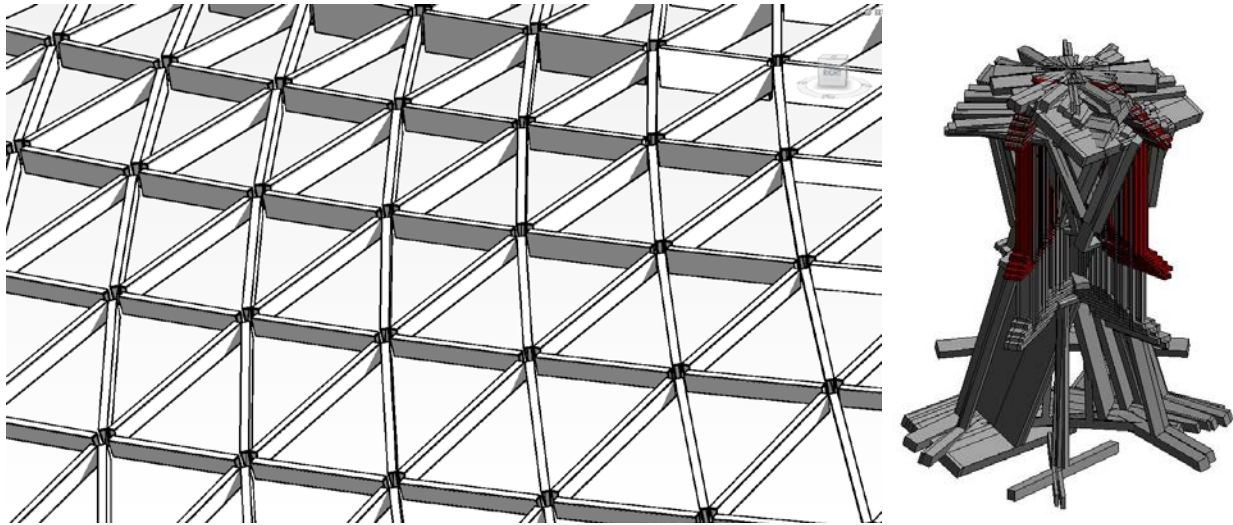
## Custom Section Database Parametric Modeling



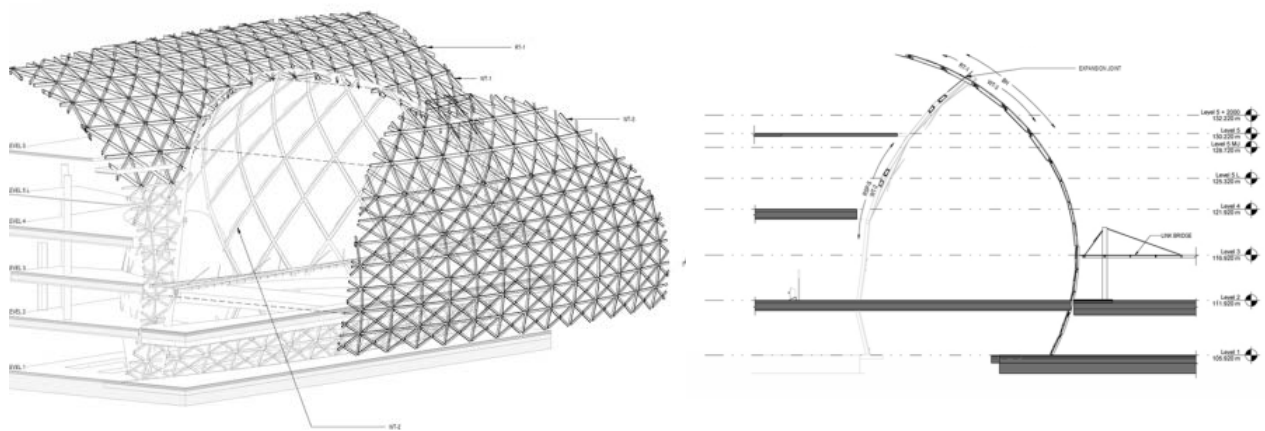
Record	Geometry_ID	Grade	Section_Typ	Section_Nam	Total Depth (mr)	Top Flange Width (mn)	Top Flange Thi
113	BU_200_150_7_100_7_7	A992FY50	BU	BU_200_1	200	150	
114	BU_200_150_10_100_10_7	A992FY50	BU	BU_200_2	200	150	
115	BU_200_150_13_100_13_7	A992FY50	BU	BU_200_3	200	150	
116	BU_200_150_16_100_16_7	A992FY50	BU	BU_200_4	200	150	
117	BU_200_150_19_100_19_7	A992FY50	BU	BU_200_5	200	150	
118	BU_200_150_22_100_22_7	A992FY50	BU	BU_200_6	200	150	

## Describe practice-based examples of conceptual design combined with detailed documentation

There are multiple ways of transferring geometric and non-geometric information back and forth between platforms. Oftentimes one method may work better for certain situations (e.g. geometry type, information type, batch size, material, units) than for others.



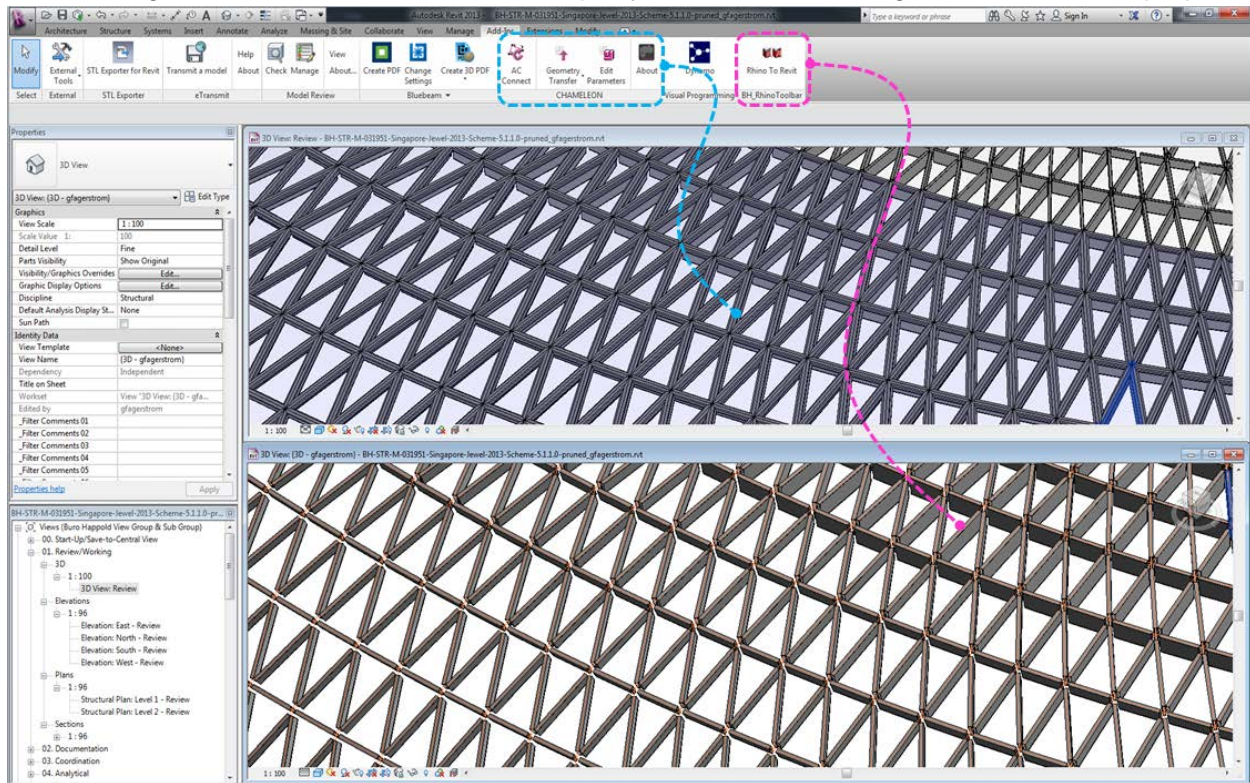
Experience tells us that the quality of the outcome ultimately always comes to rely on a combination of factors inherent to the transfer protocol itself on the one hand, and the idiosyncrasies of the case in point on the other.





## Use Revit add-ins

Buro Happold is heavily invested in custom in house Revit add-in development for anything from sheet management to geometry and energy data interoperability. While in most of cases it proves more practical to develop and maintain in-house software plugins, we always acknowledge the usefulness of stable third-party tools and encourage their use within projects.



One such tool which will figure in this class is Chameleon written by HiJac / Hiroshi Jacobs, founder of RevitCity.com. The Buro Happold in-house add-in described in the class translates centerline geometry into Revit Structural families, either custom/adaptive or stock sizes, and extracts dimensional and orientation information in the process (the process itself for writing and compiling a simple add-in and registering it with Revit will not be described in the class as this is covered plentifully in the printed and online literature resources available).