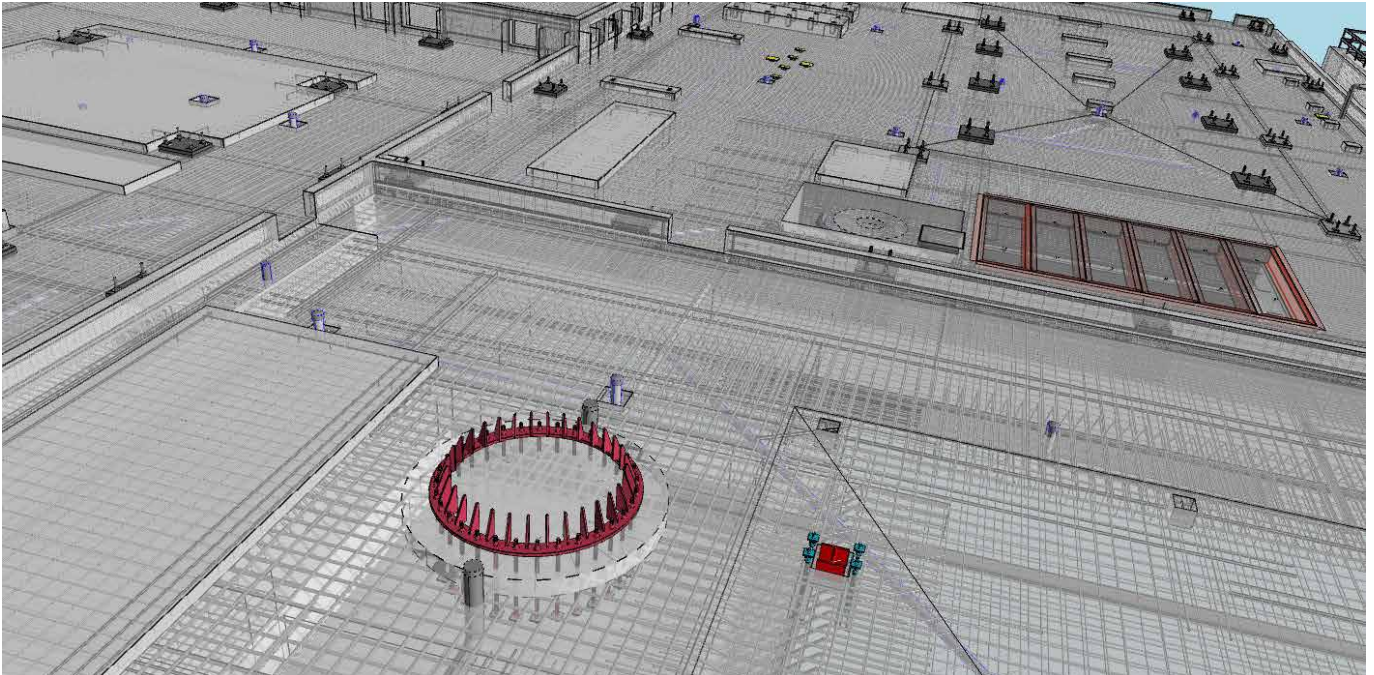SOFiSTiK

The faster path to accurate reinforcement

Engineering firm Melia Smith & Jones uses SOFiSTiK software
for 3D rebar modelling in Autodesk Revit

Boiler House RC Raft Slab

"SOFiSTiK Reinforcement Detailing, in our opinion, is essential and the most valuable benefit it brings to the table would be the speed increase in creating reinforcement drawings. We would say that in most cases it approximately halves the time spent creating an RC drawing compared to using the Autodesk software alone."

Craig Larkin
Senior Technical Manager,
Melia Smith & Jones

It all started when Craig Larkin visited the Autodesk® Exchange Apps Store looking for a reinforcement app. Larkin is the Senior Technical Manager at Leeds, UK-based engineering firm Melia Smith & Jones (MSJ). MSJ specializes in civil and structural engineering consultancy and services. "When we first started modelling reinforcement in Revit, we found that the modelling side was 'almost there' but the annotation side — tagging bars, generating views on sheets, creating bar bending schedules — didn't really exist." So Larkin set out to look for a solution — and found it in SOFiSTiK Reinforcement Detailing.

Pioneers in 3D rebar modelling

3D rebar modelling in Autodesk® Revit® is a rather new approach in the UK. Most engineers still produce classic 2D reinforcement drawings using programs such as AutoCAD® combined with CADS RC. MSJ is in this respect one of the pioneers in 3D rebar modelling, Craig Larkin is certain: "Due to all the benefits of 3D reinforcement modelling, Revit/SOFiSTiK greatly reduces the risk of on-site problems that can result in missed deadlines and cost overruns."

MSJ started using SOFiSTiK software in 2013 as a replacement for their prior method of doing reinforcement drawings in 2D, using Autodesk AutoCAD. Today at MSJ, SOFiSTiK handles the detailing of reinforcement in reinforced concrete (RC) structures modelled in Autodesk Revit. SOFiSTiK involves the annotation side when creating reinforcement drawings in Autodesk Revit. MSJ mainly uses the following four features of SOFiSTiK Reinforcement Detailing, which all integrate seamlessly into Autodesk Revit:

Assign to sheet: a very functional tool to separate reinforcement bars into different bar bending schedules.
Set bar marks: a command that automatically assigns bar marks to all reinforcement bars assigned to a specific sheet.
Reinforcement layers: a command that automatically assigns layers to all reinforcement bars assigned to a specific sheet.
Hide & tag rebar: a tool that enables users to tag and call up all the reinforcement in any specific view at the click of a button.

"The functionality SOFiSTiK Reinforcement Detailing adds to Revit is amazing", Craig Larkin says. "If any other company is planning to move into 3D modelling of reinforcement using Revit, I definitely recommend the SOFiSTiK reinforcement add-on. It is an essential tool for RC detailing in Revit, making it faster to generate drawings and increasing their quality while also reducing errors. This software provides automated bar marks, layers, bending schedules and more."

## Clear drawings mean fewer problems on site

How does this impact MSJ's day-to-day operations? On a biomass CHP plant project in Scotland for example MSJ created numerous RC drawings. General arrangement drawings were created along with the RC drawings using Revit/SOFiSTiK. Each RC drawing that was created had its own 3D views of complex reinforcement cages to help guide the steel fixers and specify exactly what needs to be installed on site. Numerous concrete structures have now been reinforced and built for the project with minimal problems. "We have had very positive feedback regarding our RC drawings since modelling them in 3D, not just from this project but others that we have worked on as well", Larkin says.

A matter of speed and quality

In terms of IT infrastructure, Autodesk Revit and SOFiSTiK fit perfectly in MSJ's software landscape. MasterSeries is the main design software the firm uses for steel frame buildings, steel connections, reinforced concrete, foundations and masonry. Autodesk Revit is an important component for generating engineering drawings and details. SOFiSTiK completes this toolset very effectively while providing outstanding usability.
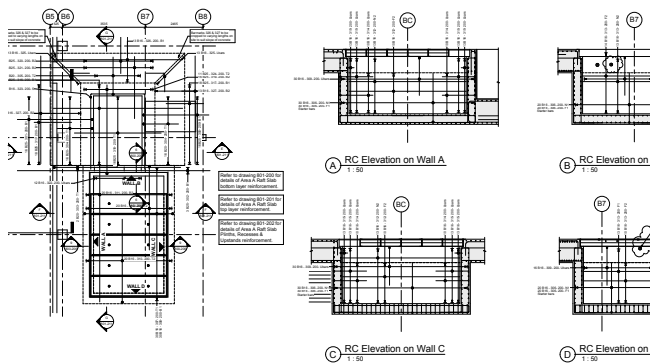
Compared with the old method of doing rebar modelling in 2D, the combination of Autodesk Revit and SOFiSTiK offers MSJ numerous advantages.

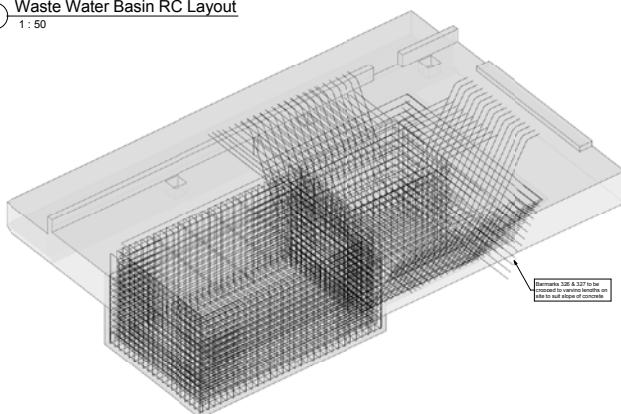3D view through the RC Raft Slab at stack holding down bolt location
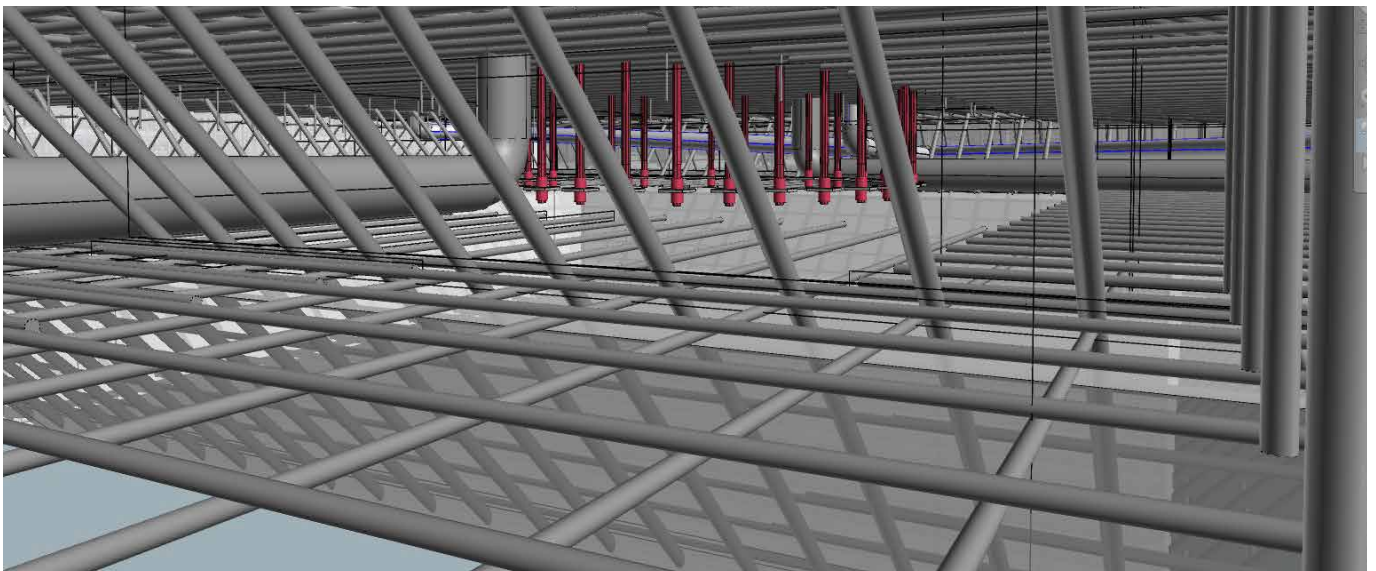
"There are two main aspects," Larkin says, "speed and quality." He emphasizes that creating reinforcement drawings using Autodesk Revit/SOFiSTiK is far quicker than the conventional method. This is due to the way views update automatically whenever changes are made in the model. And since calculating bar lengths, numbers, bar marks, layers etc. is all automated in Autodesk Revit thanks to the SOFiSTiK software, manual calculations are no longer required.

In terms of quality, Larkin appreciates how SOFiSTiK opens the way to reinforcement modelling that makes engineers physically see how the cage fits together and also check if the reinforcement clashes with any other modelled items. "Think about in-slab drainage, for example", he says. "In a previous model we created at MSJ, we reinforced a large raft slab which also had the in-slab drainage modelled. We could then fly around the cage to ensure no reinforcements clashed with that drainage. You cannot do this with the traditional 2D method of detailing, making it quite difficult to predict if or where these collisions occur."

SOFiSTiK unlocks hidden potential of Autodesk Revit

These advantages of the Autodesk Revit/ SOFiSTiK combination directly lead to distinct competitive advantages for MSJ. In addition to their other work, MSJ designs large industrial energy from waste (EfW) plants, combined heat and power (CHP) plants, waste transfer stations (WTS), composting tunnels, and more for the power and waste sectors. These types of projects involve large amounts of RC detailing and usually have various types of "cast-in items" within the concrete structures. As a result, the 3D modelling of reinforcement comes into its own to ensure none of these cast-in items clash with the reinforcement. "When you are bidding for a project and can describe this advantage of eliminating on-site problems to a client, in our opinion this gives us a huge competitive advantage", Craig Larkin concludes. The same benefit also applies to the commercial, residential and education projects that MSJ are currently working on.

Larkin says: "The SOFiSTiK reinforcement add-on for Revit lets us to unlock the full potential of Revit's 3D reinforcement modelling tools. This has allowed MSJ to produce reinforcement detailing more effectively with the added bonus of a 3D model to help visualize the reinforcement cage and its relationship to other elements of the building." Facing an industry that has headed down an irreversible path towards Building Information Modeling (BIM), Larkin sees no other option than switching to 3D modelling for concrete reinforcement. "We expect the entire industry to move into this type of reinforcement modelling since it provides huge advantages over the conventional 2D method of RC detailing. It's the only way forward."

(1) Waste Water Basin RC Layout
1 : 50

(2) 3D View - Waste Water Basin Rebar

Boiler House Waste Water Basin RC Details

About Melia Smith & Jones

Melia Smith & Jones provides a broad-based civil and structural engineering consultancy service to a wide variety of clients. MSJ engineers carry out work on projects as diverse as designs for self-build eco-housing through to design and supervision of civil and structural work on multimillion-pound developments.

www.msj.co.uk

About SOFiSTiK

100% CONTINUOUS BIM-WORKFLOW FOR STRUCTURAL ENGINEERING
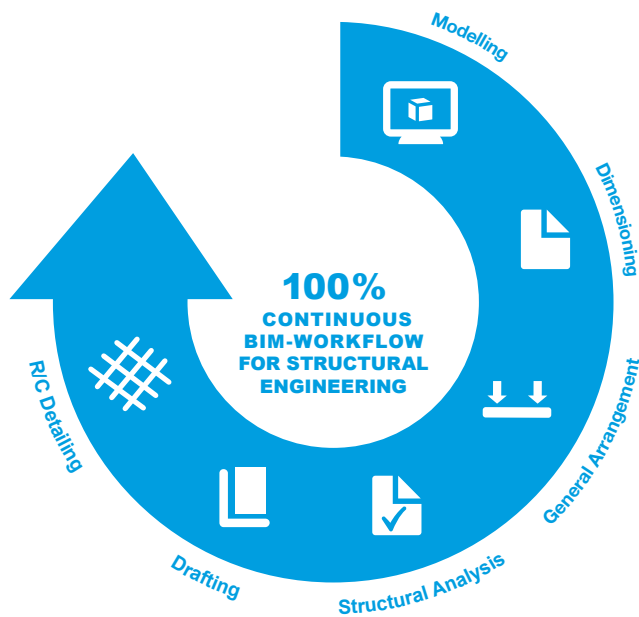
Based in Germany, SOFiSTiK is one of the leading European suppliers of cutting-edge FE structural analysis software and BIM software solutions. SOFiSTiK has been an Autodesk® Industry Partner for structural engineering for years.

3,000 active customers are a testimony to the value SOFiSTiK adds to both routine and highly complex engineering projects. SOFiSTiK software solutions range from the BiMTOOLS toolset for enhanced Revit® modelling productivity through to full 2D FE design systems and 3D analysis suites used in bridge design, earthquake engineering, and geotechnics. The company employs state-of-the art technologies for importing and post processing content from Autodesk® Revit® and AutoCAD®. Design and verification according to Eurocodes, BS, and ACI/AASHTO are tightly integrated into the SOFiSTiK application suite.

A number of SOFiSTiK apps for reinforcement detailing and drafting are available from the Autodesk Exchange Apps marketplace (https://apps.exchange.autodesk.com/ RVT/en/Home/Index). The BiMOTiON authorized training center seeks to provide outstanding user support while offering custom training and advising for every aspect of BIM workflows.

For more information, visit www.sofistik.com or send an e-mail to info@sofistik.com.

Modelling
Extensions for Autodesk® Revit®
SOFiPLUS for AutoCAD®
SOFiPLUS-X with AutoCAD® OEM
Rhinoceros® Interface
Parametric Text-Input

Dimensioning
Finite Elements (2D)
COLUMN
FOOTiNG

General Arrangement
BiMTOOLS for Revit®
SOFiCAD for AutoCAD®

Structural Analysis
Finite Elements (2D/3D)
COLUMN
FOOTiNG

Drafting
SOFiCAD for AutoCAD® (2D)
BiMTOOLS (3D)

R/C Detailing
SOFiCAD for AutoCAD® (2D)
Reinforcement Detailing (3D)