



# Dipl.-Ing. Dr. techn. Georg Trauner

**Company:** Porr Bau GmbH – Innovation and technology

**Position:** Technology manager - structural engineering

**Responsibilities:** Prozess and design optimization

## What projects are you using SOFiSTiK for?

Mostly structural engineering projects.

## Please give some insight into your current project.

Right now, I am working on a research project about estimating the load-bearing behavior of skyscrapers. The goal is to minimize the weaknesses of conventional modelling approaches. The results of the extensive measurement program, applied on two skyscrapers, will show how close static calculations get to the values of the real structural behavior.

## What makes your project special?

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We achieved this by placing around 200 sensors in structural concrete components of the two skyscrapers. The objective of this intense research project was to subsequently modify the simulation approach to receive identical data with the measured results.

## What calculation types and methods did you use?

We used „**3D FEM premium**“ for the scientific realization of the project. It has great advantages, especially regarding nonlinear simulation approaches. Additionally, the open interface (TEDDY) allows for text-based programming.

We also used the CSM-module, as well as the PARDISO solver, the Revit-interface (FEA) and the SOFiPLUS-module for the research project.

## What insights have you gained?

The results of the research project are sensational! For the first time we measured and documented the complex behavior of a building throughout the construction stages. The comparison of these

results to the linear simulation approach showed immense potential for optimization. The existing (linear) assumptions for calculations can be significantly reduced with this new information. A follow-up project, based on another skyscraper, will give further information.



*“In the end we developed a nonlinear calculation approach, that maps the real load-bearing behavior very accurately. This reduces the amount of necessary concrete – while supplying the same amount of structural safety.*

*We assume that around 15 % of the total concrete volume can be saved (subsequently also CO<sub>2</sub>) with this method.”*

#### **What would you change, or do the same way in your next project?**

There is no way I would do the determination of cutting forces (load transfer) with the conventional (linear) modelling approaches! The improved simulation approach could already be successfully used in a follow-up project. Not all the data is analyzed yet, so we are still thrilled to see how much volume of concrete can be saved. We are hoping for at least 15 %!

#### **Would you recommend SOFiSTiK to your colleagues and why?**

Of course! SOFiSTiK is an open program that, because of its versatile use, offers all kind of possibilities for (nonlinear) construction simulation. I already appreciated this advantage during my time at university.

#### **Implementing into a BIM-workflow worked out very well.**

#### **What is your vision for BIM in structural engineering from the view of a construction company?**

I see great opportunities, especially in the field of structural engineering. Nowadays conventional static calculations nowadays are based on linearizations (simplifications). This distorts the results. Using information, coming directly from a BIM-workflow, improves the accuracy of the calculation results. I think that calculations, done directly in the BIM-model, without any previous data (IFC) export are a first step in the right direction. A wish for the future is (fully) automated component(-thickness) optimization.

**Thank you for the pleasant and informative interview. We wish you all the best and continued success Mr. Trauner.**

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