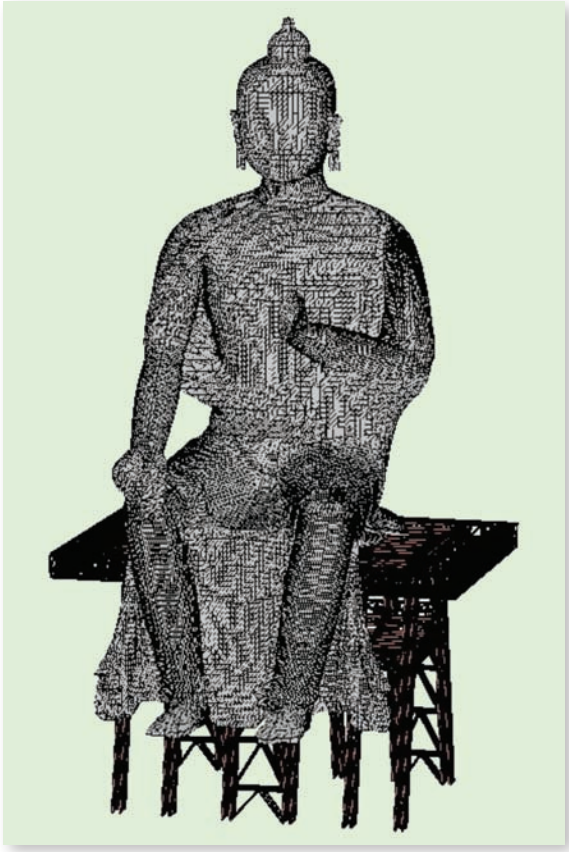
The Buddha: Structural Group Technology Enlightens Engineers in 3 Minutes

STAAD.Pro's Advanced Analysis Module analyzed the Maitreya Buddha statue in 3 minutes.



The Maitreya Buddha statue and its throne building will provide the public with temples, exhibition halls, a museum, library and a theatre.

In the past, engineers would not have the technology to model their structure in a manner that would properly reflect real conditions. With the incessantly increasing speeds of computers coupled with sophisticated analyses techniques, structural engineers can create models that are more accurate however but complex. For example, today, a slab analysis can be performed by meshing the slab into thousands of finite elements for more accurate results. The downside to creating these accurate and complicated models is that the run times can become long.

Bentley's Structural group of STAAD®, RAM™ and ProSteel® has invested time and effort into implementing a new Advanced Analysis Module whose primary focus is to reduce the time it takes for our users to handle complicated models and enables them to investigate more variations in less time. The new advanced solver can now solve problems in a matter of minutes that previously took days in STAAD.Pro.

So what does this all have to do with a Buddha? A STAAD.Pro user is designing the largest Buddha statue in the world (and one of the largest statues in the world) in India. The Maitreya Buddha statue and its throne building will provide the public with temples, exhibition halls, a museum, library and a theatre. Besides being over 500 ft tall (making it over three times larger than the Statue of Liberty), other engineering challenges were encountered including designing the structure for a 1000 year lifespan. The structure must be designed to withstand high winds, extreme temperature changes, seasonal rains, earthquakes and floods for at least 1,000 years. This requires a design that can withstand the most challenging conditions that could conceivably arise. As you can see from the picture below, engineers were able to precisely model the Buddha right down to the earrings hanging from the ears which created a model with over 120,000 elements! This allowed engineers to accurately depict stresses in the Buddha and meet the engineering challenges required by the intense environmental factors. Running it in the old solvers in both STAAD.Pro and RAM Elements took almost 11 hours. However with the new Advanced Solver, it took just a little over 3 minutes! This provides a huge gain in efficiency to our users enabling them to investigate various "what-if" scenarios. For more information on the Maitreya Buddha visit www.MaitreyProject.org.

In the second phase of our development, we are investigating the addition of this engine into other products like the RAM Structural System, RAM Elements and RAM Concept as well as non-linear features like base isolators and non-linear dynamics. In addition, we will be introducing new finite element types like hexahedron and tetrahedron solids which will allow more realistic models in civil structures like dams, slurry walls and soil/water-structure interaction.