



BUILT FOR THE FUTURE

SOM ACHIEVES SUSTAINABILITY OBJECTIVES THROUGH INNOVATIVE DESIGN

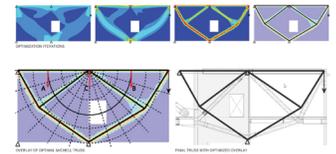
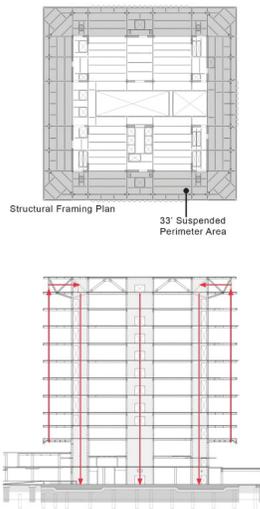
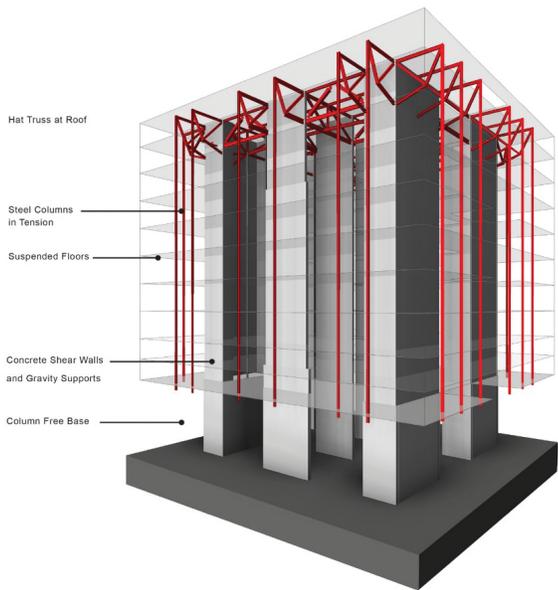
About the Customer

Skidmore, Owings & Merrill (SOM) is a renowned global architectural, urban planning, and engineering firm. Known for some of the world's most technically and environmentally advanced buildings, SOM applies creativity and emerging technologies to design buildings for the future. The firm has won more design awards than any other architectural practice, and is known for buildings such as the Burj Khalifa (Dubai), Willis Tower (Chicago) and many more. With its eyes set on a sustainable future, SOM leads the way in building the impossible.



OptiStruct provided many design options for our team and we were able to use the analysis results to inform our final design. This project had many architectural requirements and structural challenges, but by working with Altair and other optimization software we were able to succeed efficiently.

Alessandro Beghini,
Ph.D. PE, SE, LEED,
Associate Director, SOM



Their Challenge

SOM designed the New United States Courthouse in Downtown Los Angeles to be an open and transparent public space. To comply with regulations from the General Services Administration's (GSA) 2020 objective, the building includes many sustainable design features. SOM's structural engineering team delivered a timely a creative structural system to suspend the perimeter of the building above the civic plaza incorporating the appropriate setbacks from the street.

Our Solution

Designers and engineers at SOM are constantly considerate of the materials used in projects and aim to create designs that use less materials to reduce cost and environmental footprint. **With this in mind, a perfect addition to enhance their design workflow was Altair OptiStruct™.**

Starting from a blank slate, SOM improved the roof's structural design, exploiting advanced optimization techniques in a two-phase approach. SOM's team utilized OptiStruct Topology Optimization to create design options by applying loads and constraints with the goal of generating an initial organic-like optimal load path, and then as a second stage beam optimization phase to individuate the best type of steel sections. A great synergy between OptiStruct technology and SOM's expertise allowed the team to create the best iteration for the final design.

Results

The structural design specialists at SOM used OptiStruct to generate an ideal project plan that considered sustainable regulations and manufacturing constraints. With this unique design, SOM was able to minimize the weight of the building and use fewer materials, resulting in reduced cost for both the client and contractor. Specifically, the SOM team reduced the steel needed by 10 percent while improving the global performance of the structural system.

The building received LEED® Platinum certification and reached the GSA's 2020 energy objective. It has also won more than 35 awards for its creative and timeless architectural and structural design.

LEFT: Structural system and framing layout. Photo courtesy of SOM. **TOP:** Optimization iterations and final optimized truss. Photo courtesy of SOM. **BOTTOM:** Construction phase. Photo courtesy of SOM.