DANISH NATIONAL OPERA HOUSE
COPENHAGEN, DENMARK

In 2000, the A.P. Møller and Chastine McKinney Møller Foundation donated funds to build an opera hall in Copenhagen. Five years later, in January 2005, this state of the art performance venue was officially opened on the historic island of Dokoen, in Copenhagen harbour. BuroHappold Engineering supported Henning Larsen Architects and Danish engineers Ramboll in creating this modern masterpiece.

Working across structural, mechanical and electrical aspects of this project, our team was presented with a variety of challenges. These included realising the 32 metre long cantilevered roof that soars out over the arrival plaza, and ensuring optimum acoustics and visitor comfort levels inside the foyer and main 1800 seat auditorium.

Our engineers liaised closely with the Ramboll team to develop a design for the complex cantilever roof. Based on a similar concept to that of an airplane wing, the final design combined a relatively small structural depth with an extensive span, allowing the roof to appear to effortlessly float above the plaza below.

Within the main auditorium, we conducted a number of simulations using computational fluid dynamics in order to find a building services strategy that ensured visitor comfort without compromising the quality of the acoustics. Our engineers then worked alongside the wider design team to coordinate the installation of these services and other technical elements, within the in situ concrete superstructures.

This attention to detail resulted in an experience akin to sitting inside a giant stringed instrument, with the beautiful balance of the acoustics matching the exquisite craftsmanship of the solid maple and smoked oak interior.

By working collaboratively with the wider design team, we helped to realise one of the largest and most innovative buildings in Denmark. Visible from across Copenhagen harbour, this inspirational structure completes an architectural trinity with the magnificent Marble Church and Amalienborg castle.

CLIENT
AP Moller Foundation

ARCHITECT
Henning Larsen Tegnestue

PROJECT VALUE
£100 million

SERVICES PROVIDED BY BuroHappold
Structural engineering, building services engineering, facade engineering, fire engineering design and risk assessment, CoSA

Images © Henning Larsens Tegnestue