

## SPECIAL STRUCTURE

### INTRODUCTION

ICEMM has participated in the calculation of special structure in compliance to the client's requirements. It is a movable ceiling, capable of rolling along horizontal rails to change between open and close configurations. Moreover, an independent mechanical system allows the ceiling folding and unfolding, so that it can be stored in a confined space.

### COMPLETED PROJECT

Client: THYSSEN

Date: 2014

- Analytic calculations and global and detailed FEMs of structure.
- Mechanisms selection.
- Direct interaction with suppliers.



Source: Emaar properties

Figure 1. General zone

### COMPLETED ACTIVITIES

- Detailed FEM modifications in Abaqus.
- Static analyses.
- Bolted joints static analyses: bolted joints were calculated in compliance to EuroCode 3 and CTE.
- Selection of required motors, shafts, screw jacks, gears involved in lifting and rolling mechanisms.
- Buckling analysis.
- Documentation.

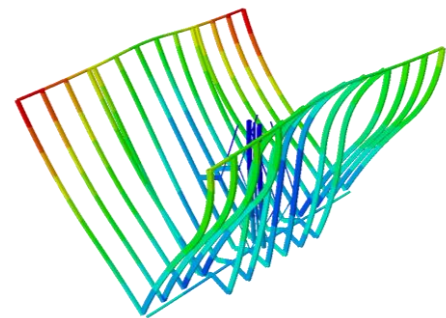


Figure 2. Folded configuration

### TECHNOLOGY

Project has been analyzed with hand methods, by means of Excel sheets, based on EC3 and CTE methodologies for joints design and wind loads calculations. Finite Element Solver and the pre/post processing was performed using Abaqus CAE for DFEMs. Nastran Finite Element Solver and Patran pre/post-processing tools were used for GFEMs.

- Strength and Stability analysis.
- Static Linear analysis.
- Design optimization
- Weight reduction.
- Power calculation for lifting/rolling mechanisms.
- Gears, shafts and other components pre-design.
- Cinematic analysis.

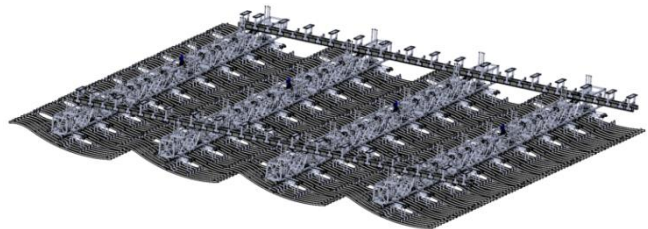


Figure 3. CAD model