

## Post-Tensioned Stress Ribbon Systems in Long Span Roofs

### Samih Ahmed

Structural Engineer

Tyréns AB

Stockholm. Sweden

Samih.ahmed@tyrens.se

MSc from KTH/TU-Delft, teaching assistant previously and currently structural engineer at Tyréns. Interested in numerical simulations and design of complex structures.

### Guayente Minchot

Structural Engineer

Tyréns AB

Stockholm. Sweden

Guayente.minchotballarin@tyrens.se

MSc from KTH, with international education and working experience. Currently structural engineer. Focusses on FE modelling and structural mechanics.

### Anders Eriksson

Professor, PhD

Tyréns AB, KTH

Stockholm. Sweden

Anders.eriksson3@tyrens.se

Professor emeritus of Structural Mechanics at KTH, Stockholm. Activities have always been concerned with numerical structural simulations.

### Fritz King

Structural Engineer

Tyréns AB

Stockholm. Sweden

Fritz.king@tyrens.se

40 years of international experience in the analysis, design and construction of complex steel and concrete structures.

### Mikael Hällgren

Professor, PhD

Tyréns AB, KTH

Stockholm. Sweden

Mikael.hallgren@tyrens.se

IABSE member, professor in Structural Concrete at KTH in Stockholm and lead structural engineer at Tyréns.

**Contact:** samih.ahmed@tyrens.se

## 1. Abstract

Cable systems have numerous advantages, such as: large column-free areas, and reduced materials consumption, which reduces the load and the cost. Nevertheless, they are rarely used in long span roofs due to large deflections, and the insufficient space for end supports, or/and back-stayed cables. This work suggests the use of post-tension stress ribbon system in long span roofs in order to reduce the pull-out forces, deflections and concrete stresses compared to a conventional cable system. A comparison is carried out through meticulous and accurate finite element simulations, using SAP2000, implemented for the new +200m roof of Västerås Travel Center (Sweden), which will become one of the longest cable suspended roofs in the world, if not the longest. Results confirm the suitability and superiority of stress ribbon systems as it reduces concrete stresses, deflections, pull-out forces and vertical reactions. These reductions are found highly correlated to the applied prestressing forces.

**Keywords:** cable suspended, stress ribbon, roof structure, post-tensioned concrete, SAP2000.

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