Case Study of the Longest Single Span Timber Bridge for Highway Loads in Sweden

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Background

- Proposal drawing, Aug 2010
- Trafikverket (owner) → Svevia (contractor) → Moelven Töreboda (manufacturer) → WSP Bridge & Hydraulic Design
- WSP worked with design and analysis, mid 2012 – mid 2013
Loads and design standards

**Loads**
- Dead loads (Wood, Steel and Asphalt)
- Vehicle loads
  - Load Models (EN 1991-2)
  - Classification vehicles in Sweden
- Wind loads
  - Dynamic wind analysis →
  - Quasi-static load
- Temperature load
- Accidental load

**Design standards**
- Swedish standards
  - TK Bro
  - Glulam specifications for CE L40c
- Eurocode
  - EN 1990
  - EN 1991-1-1
  - EN 1991-1-4
  - EN 1991-1-5
  - EN 1991-2
  - EN 1995-1-1
  - EN 1995-2
Structural system of bridge

- Three hinged arch
  - Glulam arches
  - Steel tension strut
- Continuous SLT deck
- Stabilizing frames
  - Vertical hangers
  - Transverse girders

Low stiffness

High stiffness
Numerical model and Design model

Brigade/Plus model

Tekla Structures model
Steel-wood connections

- Slotted-in plates with dowels
  - Glulam arch – bearing
  - Glulam arch – glulam arch
  - Glulam arch – vertical hanger
- Slotted-in plates without dowels
  - SLT deck – transverse girder
- Bolted connection
  - SLT deck – transverse girder
Pre-assembly of arches
Transportation from factory to construction site
Manufacturing of transverse girders and vertical hangers
Assembly of arches using cranes
Assembly of stabilizing frames (hangers + girders)
Almost done, mid August
Durability details
Thank you for your attention

Questions?