

**Zeitschrift:** IABSE structures = Constructions AIPC = IVBH Bauwerke  
**Band:** 12 (1988)  
**Heft:** C-44: Structures in Finland

**Artikel:** Kemijoki River Bridge at Rovaniemi (Finland)  
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**DOI:** <https://doi.org/10.5169/seals-20903>

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### 3. Kemijoki River Bridge at Rovaniemi (Finland)

**Owner:** Finnish Roads and Waterways Administration (RWA)  
Roads and Waterways District of Lapland

**Engineering:** Suunnittelukortet, Consulting Engineers

**Work duration:** 30 months

**Service date:** July 1989

#### Size and quantities

Spans (12) + 41 + 42 + 126 + 42 + 42 m

Effective width:  
 $4,0 + 7,25 + (3,0) + 7,25 + 4,0 = 25,5$  m

Pylon height above deck 47 m

Twin pylon column diameter 2,3 m

Stay cables, strands 1550/1770 125000 kg

#### The Lumberjack's Candle

One of Finland's most outstanding and original bridges is planned for completion in the autumn of 1989. It is situated in the town of Rovaniemi at the Arctic Circle.

The bridge spanning the Kemijoki river will decisively improve the flow of traffic in the center of Rovaniemi.

The aptly named «Lumberjack's Candle» bridge will span the river in the center of Rovaniemi, on the final stretch of the heavily trafficked entry road, highway no. 78.

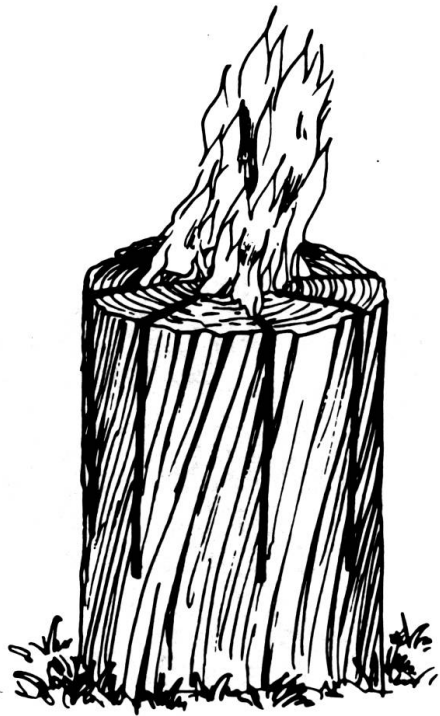


Fig. 1 At the top of the pylon there will be an electric flickering representing Lumberjack's Candle

Particular attention has been paid in designing the bridge to ensure that its outward appearance blends with the landscape.

«Lumberjack's Candle» is the result of an idea competition decided in 1983.

#### The structure of the bridge

The «Lumberjack's Candle» is an asymmetric, single pylon, twin column, cable-stayed bridge. The cablepairs are in one plane along the centerline of the bridge.

The bridge is 323,5 m long and its effective width is 25,5 m. Traffic is carried in four lanes and there are pedestrian and cycle lanes on both sides. The pylon rises 47 m above deck level and from it the steel cables which support the 126 m central span fan out in eight pairs. The backstay cables form a six parallel cablepair bunch.

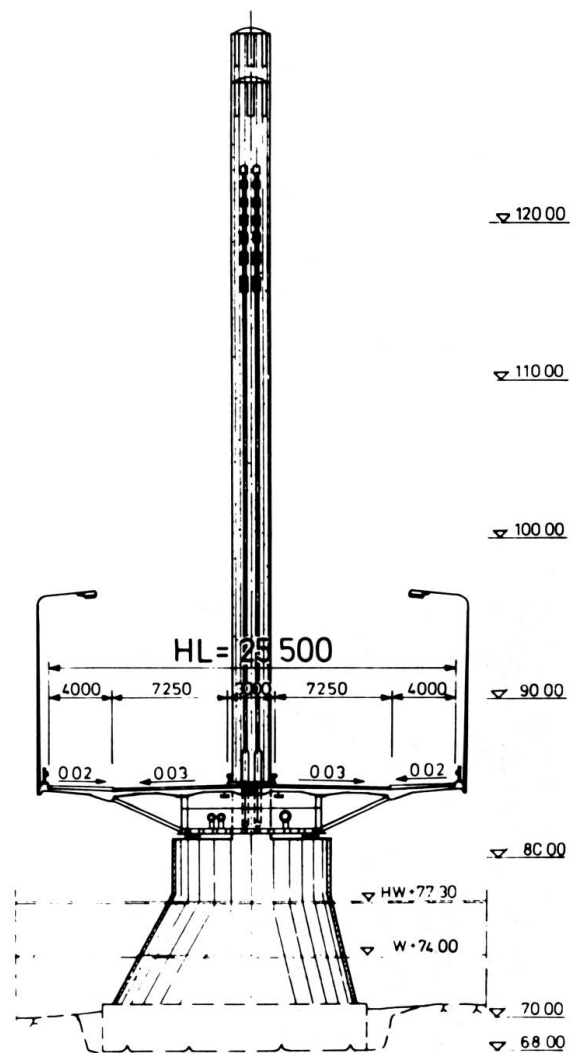


Fig. 2 Cross-section of the bridge

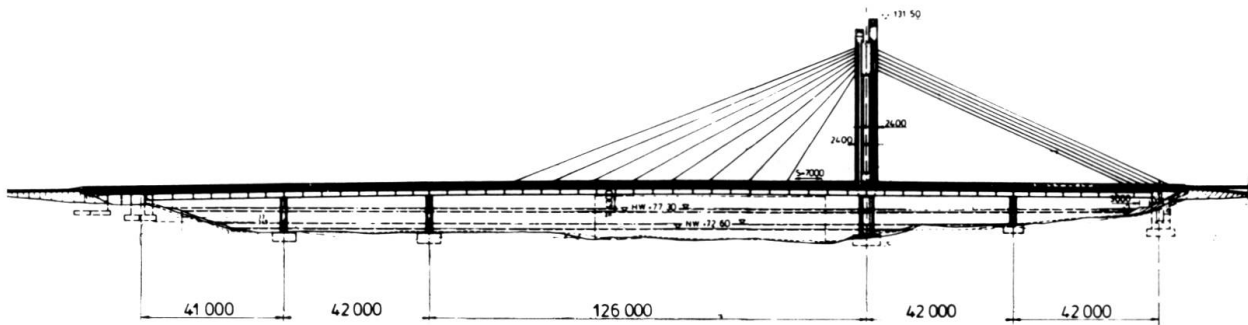


Fig. 3 Side elevation of the bridge

### Deck structure

The deck structure is of the box-beam type. The steel beams and concrete deck form a composite structure. The width of the steel structure is 8,8 m. The broad cantilevers of the deck slab are supported by struts outside the box.

The deck slab is cast onto the steel girders in 11,3 m wide sections and the composite structure develops as the casting proceeds.

The pylon goes through the deck. The backstay cables are anchored in the abutment on the rock bed. In the tender stage the use of concrete box girder constructed by launching was considered as an alternative. The price difference between the composite type was not significant.

### Stay cables

The stay cables are designed so that they can easily be adjusted and can also be changed.

The main span cable's active anchorage is in the head of the pylon and the back stay cable's is in the abutment. In the head of the pylon there is a steel anchor chamber.

The strands of the cable are unbonded, individually coated. The strand bundles are contained in a PE-pipe which is then grouted. The exterior of the PE-pipe is covered with white tape and the cables are illuminated.

### External appearance of the bridge

The bridge is located in the center of Rovaniemi at a site of natural beauty and it was not possible, for this reason, to construct the cheapest possible bridge. A design competition was arranged with the purpose to find a bridge which would further the image of Rovaniemi. This competition method can be considered to have succeeded here. The external appearance and technical solutions can be implemented in accordance with the owner's wishes, because the essential factors affecting price level were settled before the contract competition.

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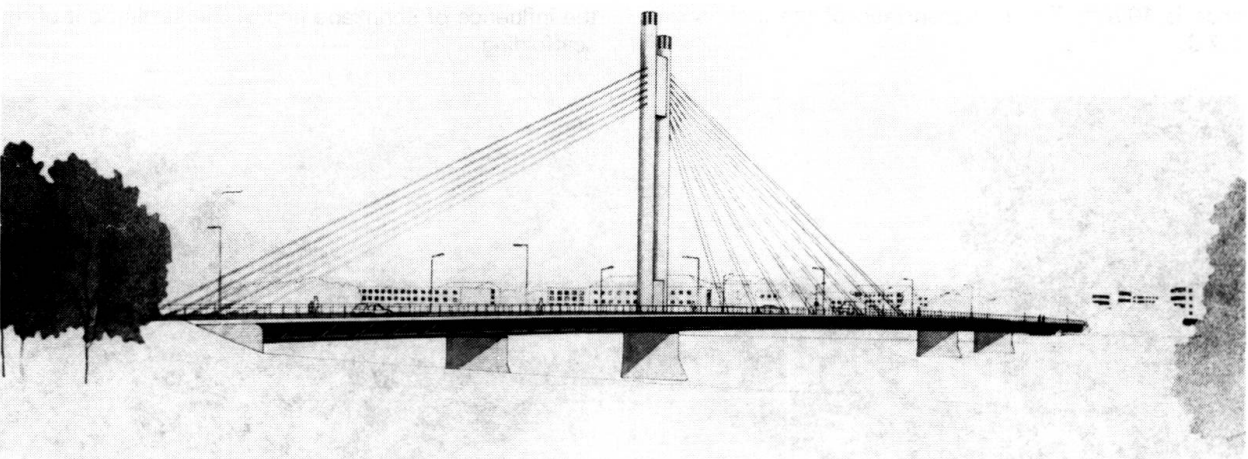


Fig. 4 Perspective view of the bridge