



APRIL / 2014

MOVABLE SCAFFOLDING SYSTEM

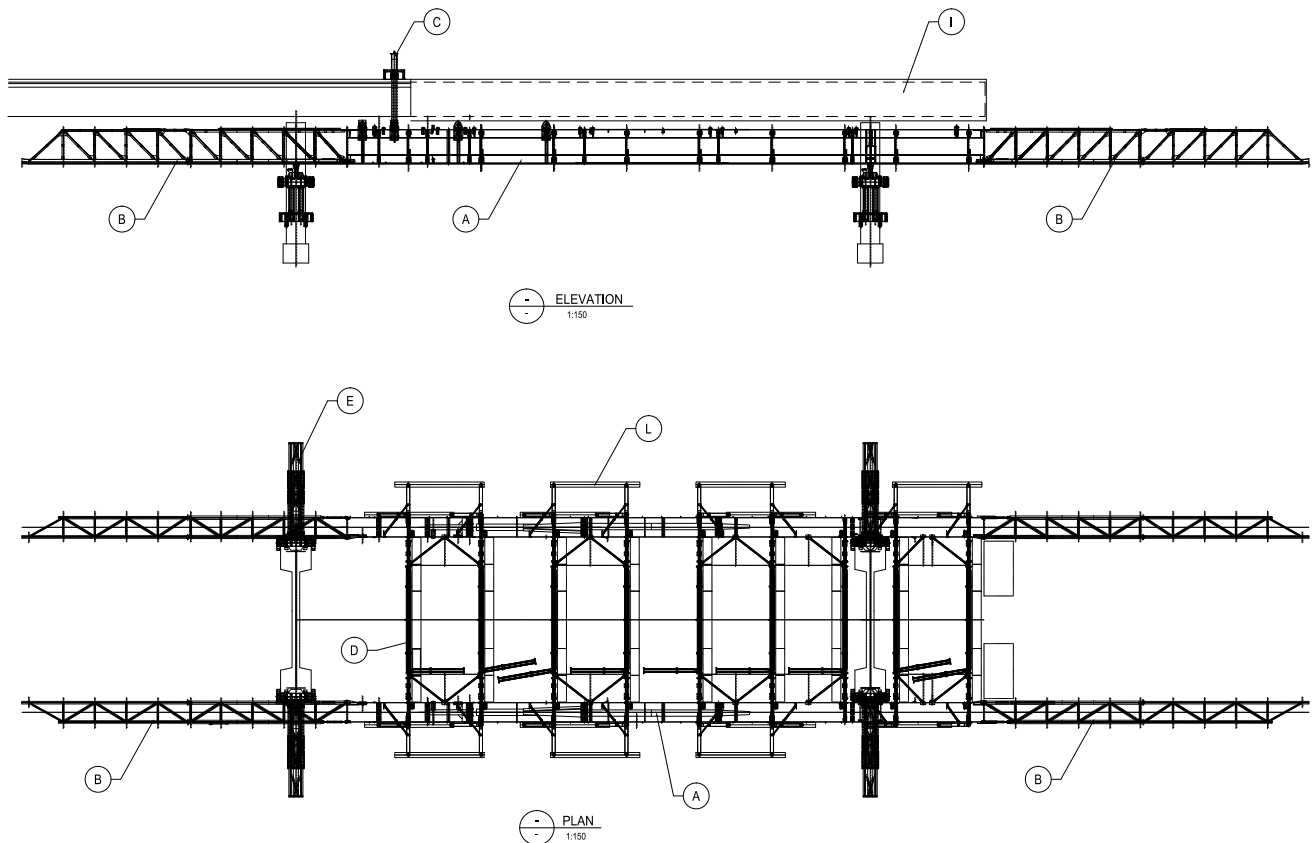
UNDERSLUNG SOLUTION



[**www.struktur.com**](http://www.struktur.com)

The MSS is a modern equipment designed to allow in situ casting of full viaducts and bridges spans, with double beam or box decks cross sections, built as a prestressed concrete structure. The concept was developed after appearance of the pre-stressing technology used at the concrete decks construction, with the goal of increasing productivity, in the construction of bridges and viaducts, mechanizing some phases of the construction cycle.

The MSS includes: a steel structure, working platforms and ladders, internal and external formwork and a set of hydraulic systems that allows to operate the formwork, launch the MSS and transmit the reactions to the columns and deck already castel.



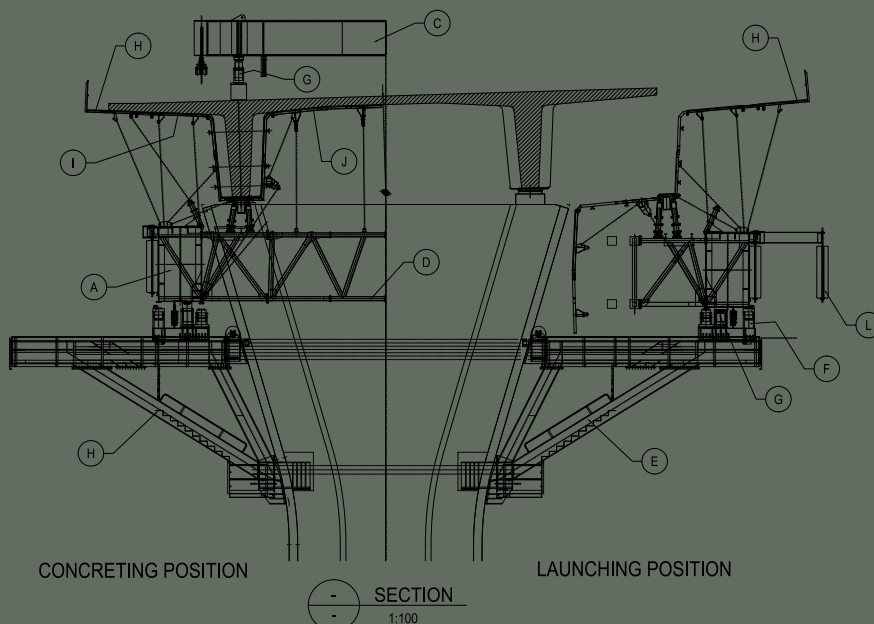
TT cross section deck solution

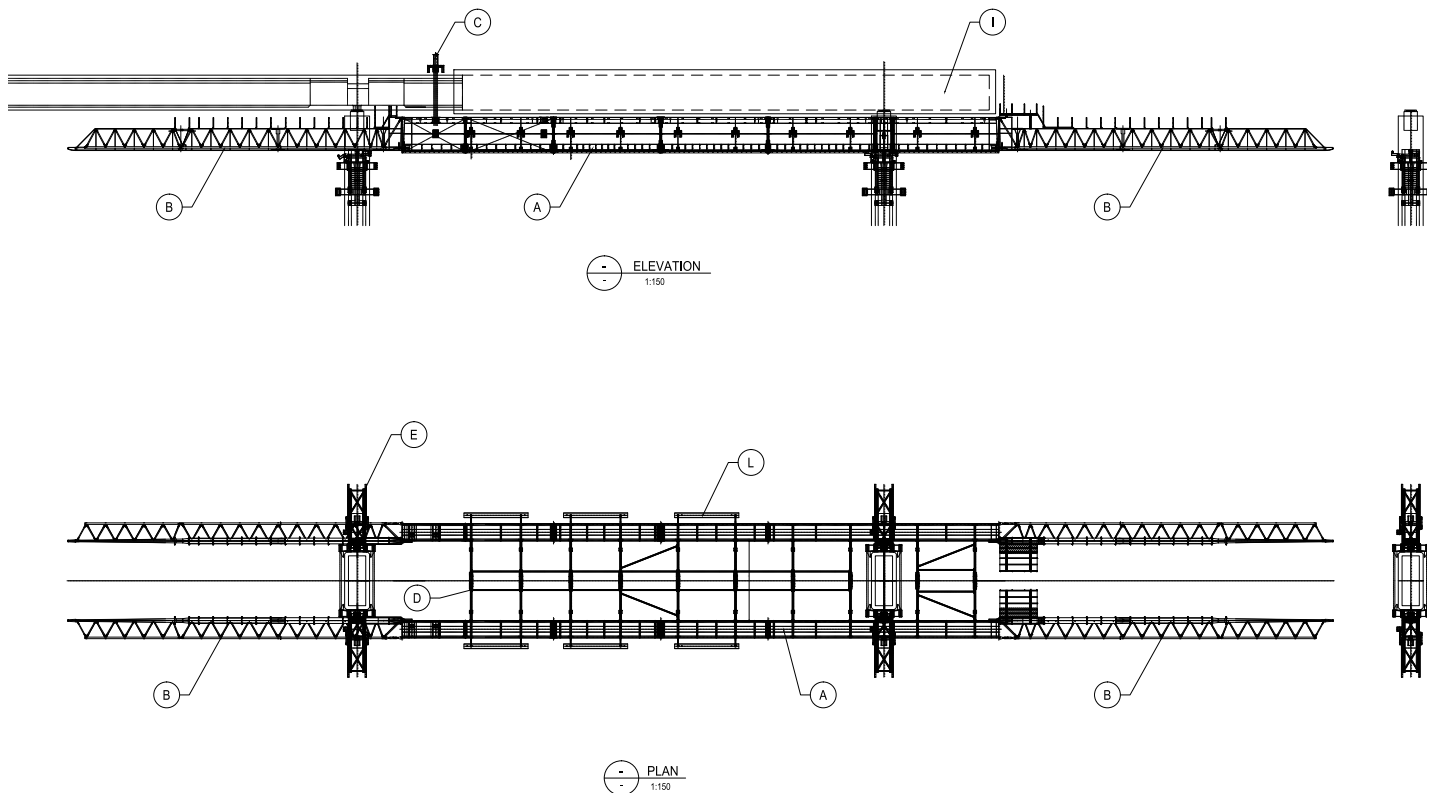
Solution currently used on road decks for spans up till approx. 55m (in between columns center).

The internal formwork is launched together with the MSS main structure, in a folded position. The opening and closing internal formwork folding movements is hydraulic operated, moving all panels together as one set.

Main components:

- A- Main girder
- B- Noses
- C- Suspension gallows
- D- Transverse beams
- E- Supporting brackets
- F- Launching wagons
- G- Main cylinders
- H- Plataforms and ladders
- I- External formwork
- J- Internal formwork
- L- Counterweight

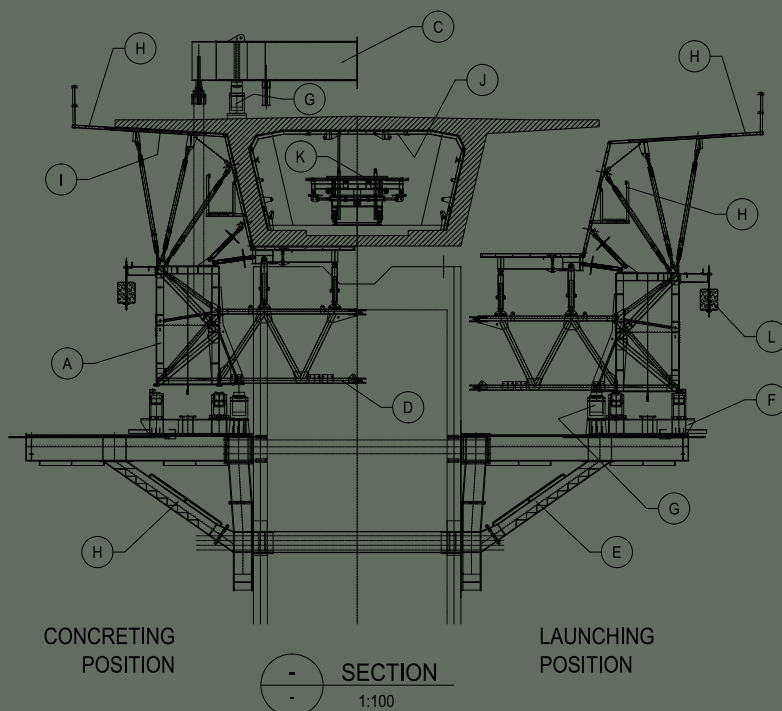




Box cross section deck solution

Solution currently used on road and railway decks for spans bigger than 55m (in between columns center).

The internal formwork doesn't move together with the MSS main structure. The opening and closing internal movements are made hydraulically through an internal formwork transport trolley. The internal formwork panels are transported one at a time.



Main components:

- A- Main girder
- B- Noses
- C- Suspension gallows
- D- Transverse beams
- E- Supporting brackets
- F- Launching wagons
- G- Main cylinders
- H- Plataforms and ladders
- I- External formwork
- J- Internal formwork
- L- Counterweight
- K- Transport trolley



Simple and effective!

The demand for simple but effective solutions has guided the STRUKTURAS efforts over all these years.

Construction companies recognise our efforts by being able to minimize the labor.

We try not only to find engineering solutions, but finding the simplest!



A little bit of the history of the MSS!

STRUKTURAS was founded in 1991 in the continuity of Olav Opedal AS project, an AKER group company specialized in mechanical engineering. Engineer Tore Gjolme still active in STRUKTURAS, developed at Olav Opedal AS the MSS concept, the first equipment was used in 1971 in Norway.

STRUKTURAS company in recent decades became norwegian leading provider of this type of equipment, being present in more than 200 projects worldwide.

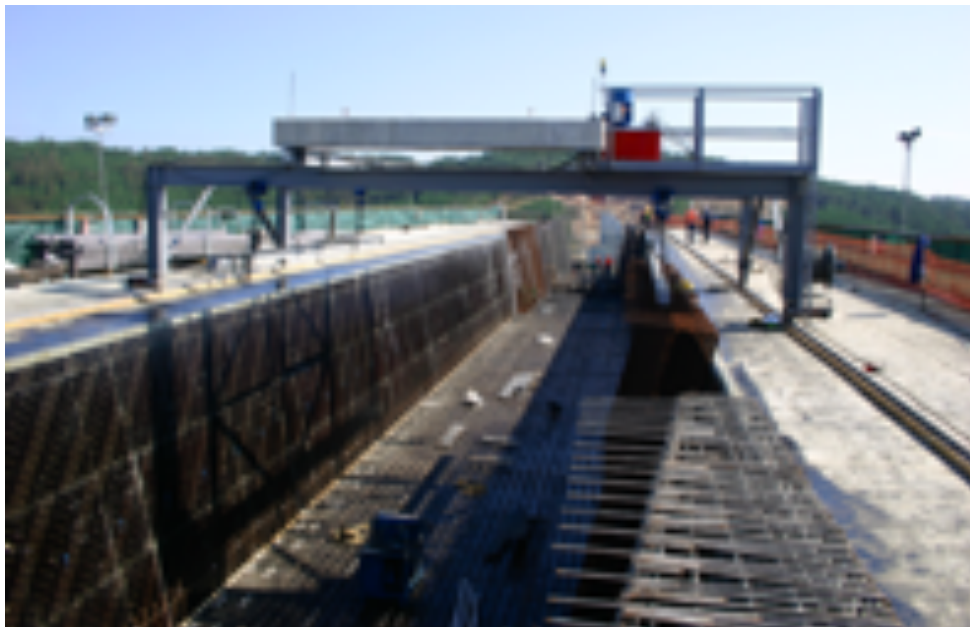
We strive for creating solutions that exceed the expectations of our customers.

The STRUKTURAS MSS put the bridge construction in a new era!

The MSS is easily adaptable to cross sections ranging from double T to single box and span lengths from 20m to 70m.

Special design solutions from some of our most challenging projects:

- Splitting of the Main structure into three sections (Front Nose – Main Girder – Rear Nose) and design of a unique hinged connection between the parts has made it possible to build superstructures with a horizontal radius as small as 200m.
- A rebar trolley and portal crane can be integrated onto the MSS system for prefabricated reinforcement cages.
- Placement of concrete pumps and cranes onto the MSS system.



The accumulated experience in recent decades has allowed STRUKTURAS meet special requirements of different projects, developing customized solutions.

We are also proud to have designed, engineered and delivered the largest ever used MSS's.

Some of our largest MSS's!

- RING ROAD-Thailand; Span 67,5m; deck weigh 67,5ton/m; deck width 30,5m
- GERALD DESMOND BRIDGE, Long Beach USA; Span 70,1m; Deck weight 47,0ton/m; Deck width 24,6m (currently in manufacture)



Hydraulic Systems

Operations such as opening / launching of internal formwork, lift and lower the MSS between the concreting and launching positions, side shift and longitudinal launching to the next span, are preformed by different hydraulic systems powered by electricity.

Typical MSS cycle

- Lower the system after prestressing is installed
- Side shift boxh MSS halves
- Launch boxh MSS halves to the next span
- Close boxh MSS halves
- Lift the MSS to the concreting position (close the internal formwork if the cross section is a TT one. If the cross section is a box then the internal formwork will be launched to the next span just after rebar cage of the boxtom slab and webs is installed.)
- Concreting
- Relocate supporting bracket front rear column to the front column





View of the box bottom slab and webs rebar partial installation. Internal formwork still awaiting at previous span.



View from the internal formwork front panel towards the new span to be built. Assembling stage of the box bottom slab and web rebar at the new span.



Internal formwork rolling wagon starting the rails transport



Rails installation on top of precast concrete blocks



Installing rebar cage deck elements using a mobile crane



Transport of an internal formwork panel using the rolling wagon hydraulic operated



Arrival of the panel do its opening and fixation position



General view of the internal formwork and its transport rolling wagon.



Detail of the diaphragm opening above column alignment to permit to pass with the internal formwork panel and its transport rolling wagon



Launching wagon detail



External formwork and rails



Temporary suspension of the 1st supporting bracket awaiting for the 2nd supporting bracket of the pair



View from the MSS rear



View from the MSS front



Deck TT cross section without concrete diaphragms



Overview showing two MSS's



Internal formwork of a TT deck cross section



MSS during launching process



Overview of an MSS



Detail of the formwork plywood fixation



Internal formwork folding cylinders



Supporting brackets installed of columns



Rear suspension



Launching wagon



Front nose



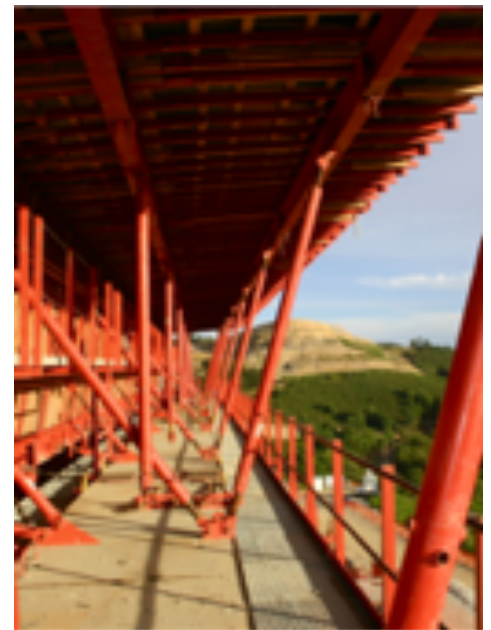
Front support



Suspension gallows

The cambering adjustment

STRUKTURAS developed a simple system of adjustable mechanical screw jacks and adjustable struts that serve boxh do allow transverse adjustment due to the deck transverse slope and cambering adjustment to compensate for the elastic deformation of the MSS due to the span casting.



Our services include:

- tender stage quotation preparation
- design, fabrication, delivery and technical assistance to the new equipment
- rebuilt design regarding existing equipments delivered by us, for use in different conditions of the original

Ask for out reference list!



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