Bosphorus Bridge, Turkey

Description
The Bosphorus separates the European and the Asian continent. As part of the new Northern Marmara Motorway’ highway, the third bridge over the Bosphorus is realized. The world’s widest bridge as combined cable-stayed suspension bridge was built by order of the Turkish government during the years 2013-2016.

Over a bridge width of 59 meters, there are 8 traffic lanes and 2 railway lines. The span of the bridge is about 1,400 meters. On both sides within the shore area of the strait, pylons of a height of 325 were erected which form the main structural system with the supporting cables.

The company Hebetec Engineering AG has lifted a total of 17 bridge elements by specially developed gantry cranes. The elements with a weight of 1,000 tons were delivered by ship pontoons in position and were lifted 80 meters approx. with mobile cranes which were fixed to the bridge support cables.

Facts
- Bridge length: 1,400 m
- Bridge width: 59 m
- Dimensions bridge elements: 59.00/24.00 m
- Weight bridge elements: 1,000 to
- Lifting distance from water surface: 80.00 m
- Number of elements lifted: 17 pcs
- Duration of the liftings: 8 we

Handling equipment
- Lifting gantrys: 4 pcs
- Lifting jacks HA-400: 16 pcs
- Capacity per gantry: 1,600 to
Lowering, sliding SBB bridge on the A2 in Bellinzona, Switzerland

Description
The operation formed part of the AltTransit project to build a New Railway Link through the Alps (NRLA). Significant modernisation work is underway to prepare for the high-speed line, with the aim of improving public transport and transferring as much goods traffic as possible from road to rail.

Hebetec was therefore called in to slide the Cavelcavia Bridge, which lies on the path of the future railway line. The structure, weighing 6,000 tonnes during the sliding phase, was moved on X-slide pads using Hebetec H-200 and H-400 jacks. It took four hours to cover the 14.5 metre distance.

The Gotthard axis of the NRLA is Switzerland's largest-ever construction project. By building the new Gotthard line, Switzerland is undertaking one of the largest environmental protection projects in Europe, as the flat route helps to protect the Alpine region.

Facts
Weight: 6'000 to
Lowering distance: 2 m
Moving distance: 14.50 m

Handling equipment
DSP-310-200 (absenken): 30 pcs
Strand jack H-200 (verschieben): 4 pcs
Strand jack H-400 (verschieben): 4 pcs
Puente El Carrizo, Mexico

Description
In the Mexican state of Sinoa, bordering the Pacific Ocean, numerous bridges and tunnels for the new construction of the Durango-Mazatlan highway were built.

For one of the bridges, the PEC bridge, Freyssinet Mexico together with Hebetec lifted multiple bridge segments to approximately 200 meters above ground.

The single segments weighing between 60-80 tons had to be turned by 90° at the top before they could be positioned.

Facts
Maximum lifting height: 200 m
Weight per Element: 60-80 to

Handling equipment
Strand jack H-140: 4 pcs
Forth Replacement Crossing / Queensferry Crossing Bridge

Description
Six traveller steel frames are being used to lift bridge decks from barges into position at the construction of the world wide longest three-tower cable-stayed bridge over the Firth of Forth in Scotland.

Hebetec provided independently working strand jack- and hydraulic systems and control units for the liftings and traveller moving. Hebetec further supervised installation and executed the system operation.

The lifting system had to reach high lowering and lifting speeds to comply with the local conditions, as well as the control system needed to be executed with pressure- and distance variation monitoring.

Facts
- Total bridge length: 2'700 m
- Bridge decks: 109 pcs
- Weight per deck: 266 - 784 t
- Total segment length: 1'692 m
- Required lowering speed: 35 m/h
- Required lifting speed: 20 m/h

Handling equipment
- H-580 with CP: 12 pcs
- PA-4-30/FU: 12 pcs
- Strand-recoiler: 12 pcs
- Double acting hydraulic cylinders with 35 – 225 t capacity and 150 – 1200mm stroke: 72 pcs
- Independent control systems: 6 pcs
**Hardanger bridge, Norway**

**Description**

The Hardanger bridge which is located in the south west of Norway is a new built suspension bridge with a length of 1310 m.

The bridge consists of 23 elements with 380 tons which were produced on land and then loaded onto a transport ship. The elements were lifted and assembled with strand jacks HA-140 and strand coilers.

**Facts**

- Bridge length: 1310 m
- Weight: 8740 to
- Number of elements lifted: 23 pcs
- Weight bridge elements: 380 to

**Handling equipment**

- Strand jack HA-140: 8 pcs
- Hydraulic power pack: 4 pcs
- Strand Coiler: 8 pcs
Oakland Bay Bridge Demolition in San Francisco, USA

Description
In collaboration with Freyssinet USA, Hebetec Engineering Ltd lowered 5 bridge trusses during demolition works of the Oakland Bay Bridge at San Francisco Bay.

The lowering onto barges from heights of about 42 to 50m was carried out by using 8 type H-600 strand jacks.

The biggest challenge managed during lowering was to find correct load balance between bridge’s support towers in order to avoid loss of stability while reaching lowering speeds of up to 14 m/hr.

Facts
- Number of steel trusses: 5 pcs
- Length of truss: 154 m
- Weight per steel truss: 1’600 tons
- Lowering distance: 42-50 m

Handling equipment
- Tye back strand jack H-600: 4 pcs
- Lowering strand jack HA-600: 4 pcs
- Strand guidance/recoiler: 4 pcs
Bracing of the Odertal Bridge (Germany)

Description
During the construction of the Odertal bridge a certain part of the terrain was not allowed to be strained by auxiliary constructions, because of environmental reasons. Therefore the 1'030t steel structure was assembled by using the free cantilever method.

The necessary temporary anchor poles took place partly within the bridge construction and partly over two 26 meter high pylons. 32 stand jacks were called into action to take on the load of the anchor poles.

The construction of the devices took place in two stages. Special requirements: due to the change of the loads during the proceeding installation, the anchor pole had to be continuously adjusted according to the appointed surveyor.

Facts
Bracing capacity: 3'000 t

Handling equipment
Strand jack H-70: 4 pcs
Strand jack H-140: 20 pcs
Strand jack H-200: 8 pcs
Dismantling old Port Mann Bridge, Vancouver Canada

Description
With the expansion of the British Columbia Highways, a new cable-stayed bridge over the Fraser River in Vancouver was built during the years 2009-2012. Due to this fact, the 50 years old Portman Bridge could be dismantled.

By means of auxiliary steel constructions, the steel structure was dismantled with strand jacks and lowered 40 meters partly. Altogether, 18'000 tons of steel were dismantled.

Facts
Total tensioning loads: 15000 to
Bridge length: 2093 m

Handling equipment
Strand jack H-400: 40 pcs
Lifting of bridge segments Ulyanovsk, Russia

Facts
- Weight bridge segments: 4'200 t
- Number of segments lifted: 5 pcs
- Length bridge segments: 221 m
- Lifting height: 45 m
- Sliding distance: 4 m

Handling equipment
- Stand jack H-400: 16 pcs
- Stand jack H-70: 4 pcs

Description
Hebetec Engineering Ltd. received the assignment to lift five bridge segments into final position for the completion of the Volga Bridge at Ulyanovsk in Russia.

The segments were transported by barges to the bridge piers. In reason of the spans length being larger than the distance between the piers the lifting took place offset.

The action was followed by a displacement in axis direction and final positioning on to the permanent bearings.
Slide in of a deck over the existing arch in Montreux, Switzerland

Description
The slide-in of a new concrete deck at the Swiss Simplon railway line was realised during a just two days lasting rail traffic interruption.

In order not to stress the existing vault by eccentric loads, the new deck was slid on an entirely independent temporary steel structure before being lowered in final position.

Several weighings at intermediate positions allowed verification of the appropriate distribution of the load pressure during the slide-in operation.

Facts
- Dimensions: 29 x 12 m
- Weight maximal: 900 t
- Moving distance: 12.8 m
- Moving Time (Weighing included): 2 h

Handling Equipment
- MegaSteel Towers: 12 pcs
- Hydraulic jacks DSP-310-200 (lifting/lowering): 12 pcs
- Strand jacks H-40 (traction): 4 pcs