



## **Case Study: Bergen Bybane, Norway Train Lift in a Tunnel**

Heavy Rescue Germany  
Industrial Damage Control

### **Summary**

Heavy Rescue Germany delivered a solution for a complex lifting / rescue scenario involving a trapped person under a tilted train in a tunnel. The project also includes product familiarization, as well as training of the Fire Department of the City of Bergen (Norway) in securing, shifting and lifting techniques.

This case study is based on a project run in conjunction with BRACO AS, Bergen Bybane (Bergen Light Rail) and Bergen Brannvesen (Bergen Fire Department).

This project was initiated in April 2011 with the planning phase, and was concluded in October 2012 with training on site.





## Situation / Requirement

The City of Bergen started operating its *Bybane* Light Rail system in 2010.

Bergen Brannvesen (Fire Department) is responsible for responding to emergencies within the Light Rail system.

The system includes several tunnels in which the trains reach speeds up to 70 kph. The tracks in some tunnels are slanted at a 15° angle to allow for the required speed.

One standard accident scenario as defined by the operators and Bergen Brannvesen involves a person pinned under a stationary train in exactly such a spot as described above.

Bergen Brannvesen is required to perform a lift in order to extricate or recover the injured or deceased person.

Due to the angle of the tracks, a system must be set in place to enable a straight lift, preventing the train from jumping off the tracks due to gravity.

Without a supporting system, a lift is impossible and will result in derailment of the train. It also creates substantial risks both for rescue personnel and the trapped person(s), and generates immense costs due to standstill of the system.

Bergen Brannvesen typically responds to such a call with 6-8 firefighters. This requires a light, fast and simple to install rescue system.

Further, Bergen Brannvesen requested a generalist Heavy Rescue training program which would include the use of the rescue equipment, as well as achieve a foundation for necessary personal and organisational skills to perform a range of related rescue tasks.





## Solution by Heavy Rescue Germany

HRG implemented the project in two phases:

1. Planning phase
2. Implementation phase

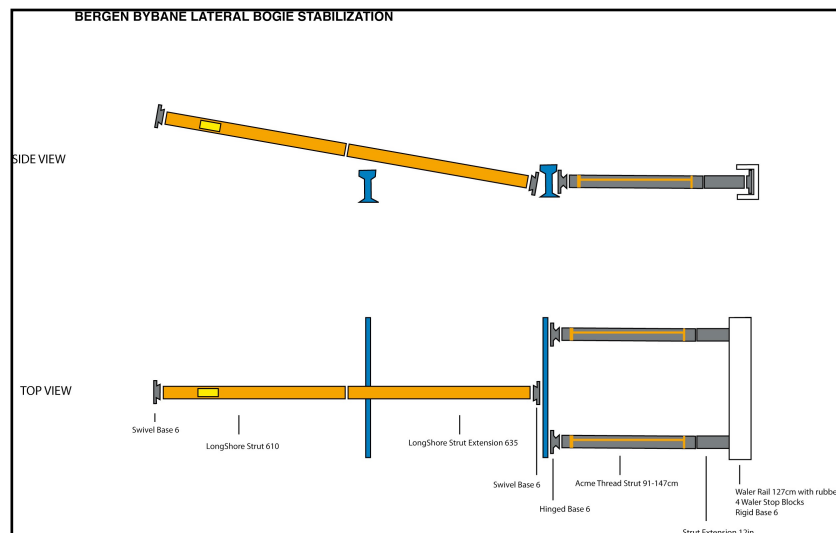
### Phase one: Planning Phase

In order to define the equipment specifications, on-site trials were held in Bergen by the involved parties in April 2011 .

During non-operational hours at night, a Bybane rail unit was placed in an adequate spot such as defined in the scenario.

There, various setups were tested using Paratech products brought to the site, until a satisfactory solution was defined. This included:

- Two vertical stabilization systems („Vertical Carriage Stabilization” equivalent to an adapted „Flying Raker Shore“)
- Two horizontal bogie stabilisation systems (“Lateral Bogie Stabilization”)
- Tunnel wall anchor points







The solution was achieved with standard Paratech equipment, with only two necessary minor modifications.

The Planning phase was concluded with delivery of a document including setup description as well as an items list.



## Phase two: Implementation Phase

In order to introduce the equipment into service, the Implementation Phase included the following requirements:

- Product familiarization
- Finalization of required items list
- Achievement of required personal and organizational skillsets

The content, format and length of the training workshop was defined together with BRACO and Bergen Brannvesen during Summer 2012.





A four day Training was held by two Heavy Rescue Germany instructors on site in Bergen in October 2012, with the following program:

#### Day 1

- Theory of Heavy Lifting and tactics (BigLift module)
- Advanced training with lifting airbags (BagTime module)



#### Day 2

- Paratech product familiarization
- Closed lifting systems (BigLift Module)
- Stabilising, Lifting and Shifting of concrete blocks (USAR)



#### Day 3

- Anchoring and Lifting in a rubble pile (R in RescueEngine Module)
- Basic bus lifting techniques (BusLift module)

#### Day 4

- Advanced Heavy Rescue scenario (BusLift module)
- Tripod setup

All training was performed with Bergen Brannvesens own equipment.



## Result

Bergen Brannvesen was presented with a turnkey solution addressing the specific initial requirement on a technical level. Further, they were issued with a fundamental skill set in order to employ the ideal tactics in a „secure/lift“ rescue scenario.

## Project referee

Jørn Davidsen, Bergen Brannvesen. (Contact on request)

## Heavy Rescue Germany (HRG)

Heavy Rescue Germany is a leading provider of specialist training and consultancy since 2009. Also, HRG is an appointed dealer of Paratech rescue products in Southern Germany.

Our underlying principle is mastering the *Art of Basics* and our position is best described as *USAR meets Fire Departments*. We enable first responders to initiate the correct first steps in rare and demanding scenarios, and to handle more of a given situation before requesting further units.

It is our belief that rescue work requires a balance of suitable equipment, tactics and training - HRG is your solution partner for all three elements.

We have developed a range of standardized modules, which are building blocks for bespoke solutions addressing clients' needs.

Not only do we offer training, but also documentation, develop Standard Operating Procedures and help with Quality Management (eg. training programs, training levels etc.).

Our field of expertise includes:

- Securing, Lifting and Shifting of heavy loads
- Heavy Vehicle emergency lifting
- Trench Rescue
- Shoring
- Technical Search
- Forcible door entry

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