

In the Åland archipelago between Finland and Sweden, it is impossible to build roads without bridges and causeways. However, when building causeways, it is vital to ensure that the structures intended to secure transport links for local residents and holiday-home owners do not cause any damage to nature. The inlets cut off by the causeways need fresh water so that they can support life and maintain their recreational value. In many cases, sheet metal culverts have been used to ensure water circulation between the inlet and the surrounding sea area.

Dick Mattsson from the provincial road maintenance unit points out that the seawater around the Åland islands is fairly aggressive. According to him, this had caused the Åvabro culvert, built to ensure water circulation in a small inlet with several holiday homes, to rust so much that it had to be replaced. Mattsson says that after this had been noticed, the process of considering different repair alternatives began. While sheet metal is a common material for big culverts, the small size of the Åvabro culvert (only two metres) made several options possible.

“The inconvenience the work caused to road users was a major consideration,” says Dick Mattsson. “No alternative rout-

ing was possible, so a quick and low-cost way of fixing the culvert was needed. Replacing the culvert with a similar new one would have kept the road closed for 2–3 days, as this would have been the time required to excavate the old culvert and lay the new one.”

It was clear that in a small inlet the flow of water would not be affected even if there was a slight shrinkage in the diameter of the culvert. So the road maintenance unit began planning a solution in which a new pipe would simply be inserted into the existing one. After the decision had been made, a solution that would be low-cost and lend itself to relining had to be found. For example, pipes with joints requiring external clamps were rejected and in the end the choice fell on a plastic pipe with a smooth outer surface and threaded joints. Consequently, it was decided to go for a solution based on Weholite 1,600 mm SN4 pipe.

“In the end, it became clear that only KWH Pipe was able to offer the type of product we wanted,” says Mattsson. The choice was made easier by the fact that the provincial government had already carried out similar jobs in the past. The relining on the Vårdöbro construction site had gone without a hitch.

photo: Kivapössi



Constructing roads in the Åland archipelago requires a large number of bridges and causeways. At the same time, it is vital to ensure that there is no environmental damage and to secure the flow of water to the inlets behind the causeways.

# Relining

## allowed road traffic to flow unhindered

**The sheet metal culvert through the Åvabro causeway was no longer able to withstand the aggressive impact of the Åland archipelago seawater. Building a new culvert would have meant a road closure lasting several days. The problem was solved by inserting a plastic pipe into the existing culvert.**

### COMPLETED IN ONE DAY

The provincial government of Åland ordered five six-metre Weholite sections for the project. A total of 30 metres of new culvert was sunk into the sea.

According to Mattsson, the sections were brought to the site by lorry and hoisted to the installation point using an excavator. The work was carried out under water by pushing the pipe through the sheet metal culvert. “The sea had to be calm for the duration of the work, so a day with very little wind was chosen.”

The installation work was over in about eight hours and involved two machines, a diver and two fitters. The traffic on the road was not affected.

“The diver went through the old culvert



## THE PIPES

○ Weholite DN/ID 1,600 mm SN4,  
total length 30 metres.



using fire-fighting equipment to remove all sand, rocks and other litter from inside the pipe,” says Mattsson. “The next stage was the most difficult phase of the work as it involved bringing the first new pipe section to the mouth of the culvert. Sinking a large pipe under water was not easy, as it had considerable buoyancy, but in the end the fitters managed to push the pipe inside the culvert using iron bars. This is the kind of work where new solutions are needed every time.”

The remaining pipe sections did not pose any problems. As the new pipe has a smooth surface and is smaller than the old one, pushing it through the existing culvert was easy. One excavator was used to lift the sections, while the other helped

to join the pipes and push them into the culvert. A boat was also used.

Connecting the sections with threaded joints is more difficult on water than on the ground. The danger is that the pipes start rotating because supporting a pipe ready for laying is more difficult on the water than on the ground. So, the supporting work was carried out with the help of an excavator and iron bars.

### THE SEA WILL TAKE CARE OF THE REST

It was decided not to fill the space between the new and old culverts or to secure the new pipe to the bottom of the sea.

As there was already a layer of sand and rocks at the bottom of the old culvert,

the assumption is that the sea will take care of the job on behalf of the contractors. The road maintenance unit will, however, keep an eye on the structure and should the assumption prove false, appropriate measures will be taken. In that case, one option would be to fill the space between the two pipes with lightweight concrete.

Another development that will be closely monitored is the sinking of the road surface. If the old culvert rusts right through, it is theoretically possible for the road surface to sink by 20 cm (the space between the new pipe and the old). However, the solid and durable structure of the plastic pipe inside the metal culvert should provide sufficient support. ●