

# Railway culverts are quicker and safer to repair using the Inpipe method

*Disintegrating culverts that cause track subsidence has always been a headache for the National Swedish Rail Administration (Banverket). But repairs can now be carried out quicker and easier without disrupting rail services. Skelleftehamn-based Railcare lining is using the Inpipe method to repair hundred-year-old railway culverts.*

The partnership between Inpipe and Railcare began two years ago: “Banverket were planning to renovate railway culverts and contacted us about the Inpipe method as a solution,” explains Inpipe’s CEO Olle Karlsson. Olle contacted Railcare, one of Banverket’s long established contractors, and a development project got underway. Railcare’s newly formed company, Railcare lining, Inpipe and Banverket pooled their resources to find the ultimate solution. “The first step was to find a system that was offroad and wouldn’t disrupt normal rail services with underground work,” continues Olle Karlsson. “The solution was to mount all the installation equipment with Inpipe’s unique components onto a tracked vehicle, which enabled us to drive deeper into wooded areas.”



**Equipment mounted on a tracked vehicle enables the work to be carried out offroad.**

**The fibreglass lining adapts perfectly to the shape of the culvert and when UV cured holds the stones firmly in place. The existing culvert can also be extended to the required length by letting the liner continue outside the opening.**

For Railcare lining, who are carrying out the work, the vehicle makes it easier to navigate through rough terrain and improves accessibility during winter.

## Shifting stones are stabilised

According to Production Manager Emil Burén at Railcare lining, Swedish

railway culverts have a unique character. They are not round like ordinary pipes but rectangular and built from various sizes of roughly hewn granite. Many of the culverts are over a hundred years old.

The railway was originally dimensioned for a 5-tonne axle load, but this has gradually increased to 20-25 tonnes. Emil Burén:





“At increased load, the granite stones glide apart and the sleeper chippings penetrate the culverts, causing depressions in the track bedding that could lead to derailment. The Inpipe method creates a tight-fitting culvert and holds the granite stones in place. When tracks were lifted to level out depressions, the culverts were also extended with concrete pipe at both ends, but the concrete did not set easily in the old stone culverts. That’s not a problem anymore because we now have one length of solid pipe that can’t be pulled apart.”



The culverts are in great need of repair. The Inpipe method has already been used in hundreds of railway drainage culverts.

### New markets

Railcare lining has carried out around 200 installations using the Inpipe method, chiefly in northern Sweden. They repair a culvert a day at an average length of 20 metres. “This is a new concept for the railways. We are marketing the Inpipe method, for which we see an enormous potential,” continues Emil Burén. “Up to now it is mainly Banverket’s Northern Region that has begun relining, but others are starting to show increased interest.” For Inpipe, the partnership with Banverket and Railcare is a venture onto a whole new market: “The development project means we can now provide our normal wastepipe market with larger dimensions,” adds Olle Karlsson.

“Banverket’s culverts vary a great deal in size and require a flexible product. Our previous maximum diameter of 700 millimetres has now been expanded to 1,200 millimetres, a size exclusive to Inpipe.”

**Because the plastic expands out at the opening, the new liner also functions as an anchor point for the culvert.**



The Inpipe method works for most types of pipe and culvert, and manages diameters of up to 1,200 millimetres.

## BANVERKET VERY SATISFIED WITH THE INPIPE METHOD

“Soil from the bank penetrates the culverts and causes subsidence, which is a great problem. Traditional cement mortar holds for a maximum of twenty years,” explains Geotechnical Engineer Torgny Nilsson at Banverket’s Northern Region. “We have discussed the fibreglass concept a few times and decided to put it to the test. We worked out the

requirements as we went along. Getting a tight fit was first priority followed by material requirements. Tests show that the new material will last for 60 years.” According to Torgny Nilsson there is a culvert about every five hundred metres along the track, so the need for repair is enormous. In the Northern Region alone, Banverket estimates a repairing

50–60 culverts a year for fifty years! “But it is vital for us to be able to work well away from the track area so as not to disrupt rail services. Railcare lining has managed very well in this respect. We are very satisfied with their work.”