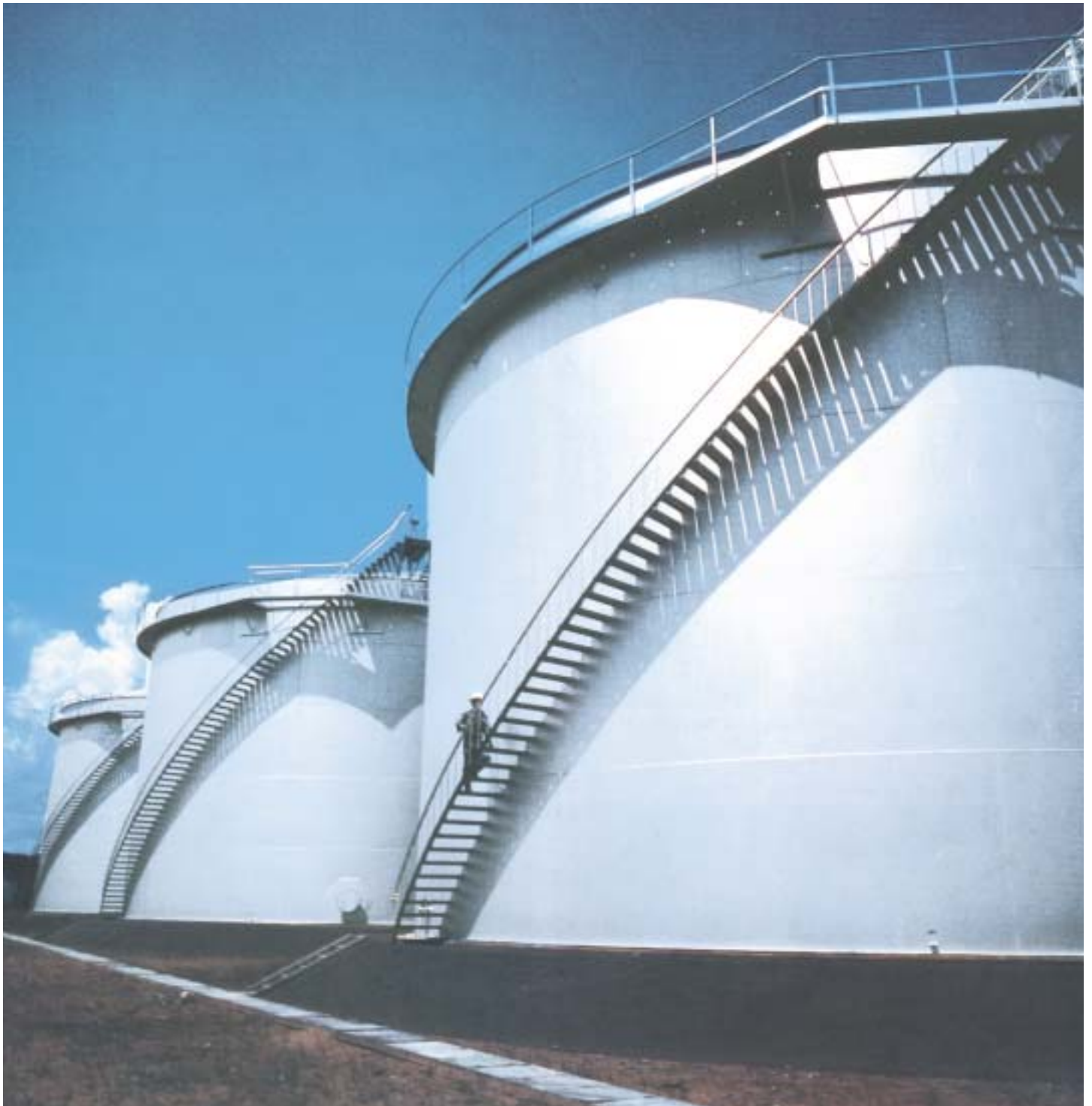


Repair of Shell tank by laminating with LEYCO-POX 171 S resins (case histories)

LEYCO-POX 171 S Technical Manual



Tank No. 3018 on Europort storage site in the Netherlands has been in service for 20 years, for most of that time storing corrosive condensate liquids, essentially crude oils containing high proportions of salt water. During 1979/80 it became apparent that a major repair operation for the tank bottom was necessary.

Tank 3018 is made of steel, of welded construction with a floating roof. Its dimensions are: diameter 36 metres, height 34 metres, volume 35,000 cubic metres.

The conventional method of repair is to replace the tank bottom with new steel plates. However, it would first be necessary to lift the tank to avoid possible hazards during welding which could arise if residual inflammable materials were present. As lifting such a tank is a costly and time-consuming operation, it was decided to repair the bottom using the LEYCO-POX 171S laminating technique. This method has been used successfully for a number of years and has proved to provide a mechanically strong, corrosion-resistant repair membrane for tanks of this kind. The fact that the laminate, which consists of an LEYCO-POX 171S resin binder reinforced with glassfibre, hardens without the application of external heat is particularly important in the case of tanks used in hydrocarbon service.

External view of tank



Close-up view of repair of corroded tank bottom



Grit blasting



The method of repair adopted was as follows:

- Through holes in the steelplate were covered by bonding on small pieces of new steelplate, using the laminating binder described below as the adhesive.
- The entire tank bottom and the walls to a height of approximately 1 metre were grit blasted to Swedish standard SA 2 1/2
- Immediately after blasting an iron oxide pigmented LEYCO-POX 171S resin (solvent-borne) primer was applied and allowed to cure.
- Hollows (as opposed to holes), weld lines and any irregular steps caused by bonding steelplate over holes were then covered with an LEYCO-POX 171S resin mortar (sand filled) so that a continuous smooth surface was obtained over the entire tank bottom. It is essential that any abrupt irregularities in the surface are removed before laminating.
- The LEYCO-POX 171S laminate was then applied. This was carried out by spreading the LEYCO-POX 171S resin binder on to the surface immediately followed by a layer of woven glass cloth (approximate weight 500g per square metre) which was then rolled (with a split washer roller) to remove entrapped air and to ensure good wetting of the glass. A second layer of resin binder was then applied followed by a second layer of glass cloth, care being taken to overlap half of the second glass layer on to the first layer, again with rolling. The laminate was allowed to harden (3 days) after which the final application of resin binder and one layer of glass surfacing tissue was made.

Through hole covered by bonded steel plate



Smoothing irregularities with LEYCO-POX 171S mortar



Rolling out glass cloth



Spreading LEYCO-POX 171S resin binder



Applying laminate to edge of bottom/wall corner



View of repaired tank bottom



The total laminate thickness after cure was 3-4 mm. The cost of repair was less than the estimated costs of lifting, re-bottoming with steel and external protection (by painting) of a new steel bottom.

With an LEYCO-POX 171S laminated bottom the need for future corrosion protection no longer exists.