



### Project Title

## Reinforcement of corroded oil tanks using composites technology

### Researcher

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### Abstract

Oil storage tanks and oil and gas transmission pipelines are damaged and corroded over time, and therefore major repairs should be made on them. Traditional repairs in oil reservoirs include changing the sheets of oil reservoirs. In the traditional method (re-bottoming), the sheet of the tank floor is cut and new metal sheets are replaced. In the traditional repairs, neutral gas must be injected into the bottom of the tank so that no fire occurs inside the reservoir. The wall of the tank must also be cut to enter the equipment and metal sheets into the reservoir. This increases the buckling of the tank body. Meanwhile, the flow of fluid into and out of the tank must also be stopped so that the corroded pipes can be replaced or welded. In the present design, by composite laminating, the metallic corroded tanks can be strengthened without cutting or applying the hot work on the tank floor. Also, using the composites technology, for reinforcement of the corroded pipes, cutting the fluid flow and hot works are not needed. After repairs with advanced composites technology, in the event of complete destruction of the metal sheet of floor of the reservoir, composite coating will continue to tolerate the weight of the fluid inside the reservoir. This technology is used in industrialized countries as an advanced technology. But due to sanctions imposed, foreign companies are not willing to operate in Iran. However, if the foreign companies are willing to implement in Iran, the costs are non-economic and non-optimal. Using the academic research, the present technology was developed by Iran Composites institute. Then by spinning-off the Takin, Advanced Strengthening Co. in 2005, this new technology was commercialized in Iran. So far, Takin Co. has reinforced up 9 large corroded oil reservoirs and 8 pipelines in the country, with this advanced technology.

Advantages of using composite laminating in comparison with the traditional method of re-bottoming:

- Very low repair time in comparison with the re-bottoming of the tank floor.
- No need for hot work inside of the tank.
- No need for cutting in the body of the tank.
- No buckling of the tank body due to non-cutting on the tank wall.
- No corrosion in composite coatings compared to metallic sheets.
- Easier repairs of composite coating (if needed in future) in comparison with metallic sheets.
- Non-corrosive against petroleum products.



▲ The implementation of composite coatings on the floor of a corroded tank



▲ Petroleum storage tank after reinforcement by laminated composites