

## 3X Engineering's composite repair

### Overview

The objective of the repair performed in August 2015 by **3X Engineering** and its local exclusive distributor **TAVANA Pipeline Engineering** was to reinforce and stop corrosion on localized area of the 20" gas pipeline that had several external corrosion spots and one 1mm diameter hole. The pipeline is in Iran and has a maximum operating temperature of 60 °C and a design pressure of 172 barg.

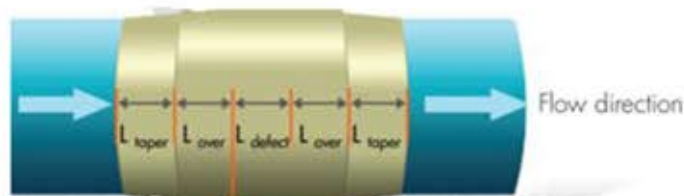
### Scope of work

- After calculations and Finite Elements Analysis (FEA), 68 layers have been determined to perform the repair.
- Because of the leaking defect the repair was performed offline. An initial sandblasting was made prior to 3X intervention to get a rough surface (75-micron surface profile).
- Before wrapping, climatic conditions had been checked and the surface had been cleaned and degreased.
- The wrapping repair was performed as follows:

- 1/ Special filler (F3XS1) application to rebuild the surface.
  - 2/ Metallic steel plate (with filler), fixed with straps during curing time, installed over the defected area.
  - 3/ Second filler application performed to ensure the proper impregnation of the first layer.
  - 4/ Wrapping using Kevlar and R3X1080 resin. 68 layers of composite (over 88cm) were applied to reinforce the pipe i.e. 34 passes (50% overlap).
- Identification plate for traceability was positioned on the pipe. Curing time of the composite system required 50°C during 3 days. This curing process was initiated with heating blanket during 72 hours.

### Results

Thanks to the efficient collaboration between 3X and its local distributor, the pitted areas have been repaired using the REINFORCEKIT 4D-ECHT and the pipeline is now protected from external corrosion. The pipe integrity has been restored and the pipeline has been pressurized successfully back up to 153 barg.



## Enduro's 3-Step Solutions



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