



## An efficient solution to a mysterious case of corrosion

An apparently inexplicable hole in a pipe caused an environmental disaster, polluting 3 square kilometres of coastline. 2,000,000 Euros were spent to clean up the area, taking five years of labour. With our scrupulous technical consultation, it would have been possible to avoid the disaster, saving the environment and 1,500,000 Euros.

## In Brief

### Sector:

Crude oil refinery

### The Problem:

Sludge leaks cause an environmental disaster involving three square kilometres of coastline

2,000,000 Euros and 5 years of man-labour spent to clean up the spill

Per la bonifica sono necessari 2.000.000€ e 5 anni di lavori

### The Challenge:

Finding why the hole formed

Proposing simple corrective solutions

Avoiding new leaks

### The Results:

Cause found: corrosion due to stray currents

No more new leaks thanks to a generated current around the pipes

Further clean-ups avoided, with savings of 1,500,000 Euros

**We often think there is no remedy to failure tied to corrosion. The truth is that there are numerous techniques to solve these problems.** Some of the things we have the knowhow to accomplish are:

- On-site or laboratory evaluation of cisterns, tanks, and pressurized containers, refinery structures and machinery, chemical plants, petro-chemical or gas distribution plants;
- On-site or laboratory analyses of painted and lined structures having chipping or scaling problems;
- Evaluation of the resistance to corrosion and improvement of internal prostheses: hip and knee replacement parts, stents, metal plaques, etc.
- Evaluation of the resistance to corrosion in steel, zinc-plated or painted structures, either underground or above ground: underground conduits, high-tension towers, smokestacks, etc..

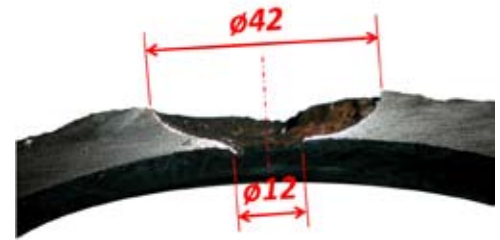
Any doubts will vanish after reading this Case History concerning a sludge drain pipe in a refinery.

There was a hole on a piece of pipe which was leaking sludge, polluting a 3-square-kilometre area. The 13mm carbon steel pipe, along with 8 other pieces, was set in a trench of reinforced concrete filled with dirt. The hole was cone-shaped (D max = 42mm, D min = 12mm).

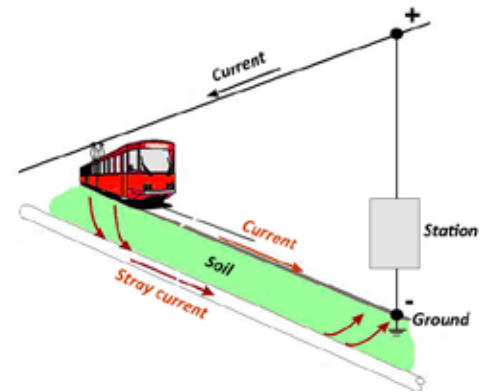
**The morphology of the damage induced us to classify it as a corrosion phenomenon due to stray currents**, which happens when an electrical current accidentally passes through a component. The corrosion takes place in those spots where the electrical current "leaves" the component to "return to" the original power line. In this specific case, the electrical current had entered the pipes near a railway line that crossed the refinery.



Piece of damaged pipe. The cone-shaped hole is evident in the centre of the pipe.



Side view of hole (D max = 42mm, D min = 12mm).



electrical scheme illustrating the damage from corrosion due to stray currents.

The flow of the current exited the pipe at the end of the cement saddle, the last point in which the electrical current could "close in" on the metal structure of the reinforced concrete. The chemical analyses, the metallographic tests and the tests for micro-hardness confirmed that the damage had nothing to do with the steel itself and was a problem of stray currents.

**The proposed solutions led to the insulation of the damaged pipe and those adjacent to it.** To isolate them, the following methods were implemented:

- The reinforced concrete trench was re-established
- The dirt in the trench was removed
- An electrical protection was adopted.

These solutions led to:

- **The elimination of the corrosive phenomenon**
- **No more environmental disasters, with savings superior to 1,500,000 Euros**

**Don't wait for a fracture to happen..solve your problem now!**  
Call us at 02/23998225 or visit our website at [www.fa-fe.com](http://www.fa-fe.com)



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