Breakdown in a Reverse Osmosis desalination plant due to entrance of fine particles

Type of Insurance:

Machinery Insurance, no BI cover

Description of damaged item:

Turbo Pump in a Reverse Osmosis Desalination Plant

Cause of Loss:

(2) Faulty workmanship during maintenance (?)

Claim Cost

PD 130,000 EUR

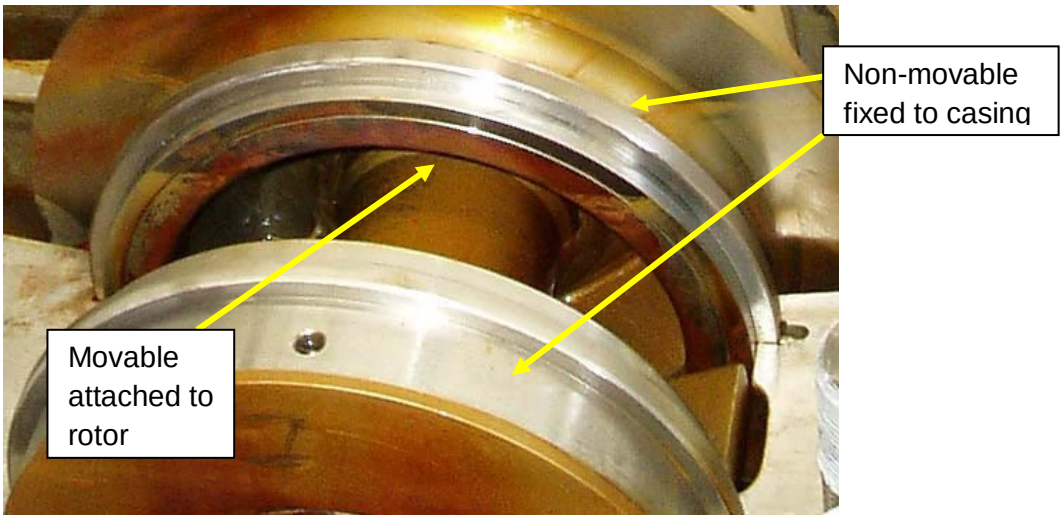
DSU not covered

The design of the RO plant in Southern Europe was based on latest achievements, among them recuperation of energy and blending the resulting brine with waste water from a neighboured thermal power plant in order to reduce the impact to the environment. It produces some 12,000 m^3/day fresh water. The water is filtered through sand filters and fine filters, which retain particles exceeding 20 micrometers, pre-treated and then pumped by 12 turbo pumps, each one with a capacity of more than 900 m^3/h through more than 12'000 membranes in 12 frames.

The turbo pumps were running at 3.000 rts/minute and produced a pressure of 100 bars.

During a routine maintenance process the individual lines were switched off, maintained and then restarted. After de-aerating, refilling and restarting one individual line according to the manuals, the operations team noticed abnormal overheating in the corresponding turbo pump, started checking the system and within short noticed a total blockage of the rotor. The production line had to be stopped and the pump was opened.

Rotor and interior of turbo pump after opening of casing



The rotor was displaced, grooves and flutes testified to foreign objects, most probably sand particles, having entered the pump. As this damage only occurred to this single pump a failure of the sand and fine filters could be discarded and it was concluded that some sand particles had been hidden in the system, probably having entered there in the past and now flushed into the pump as a consequence of the restarting and the corresponding turbulence.

As a preventive measure and in order to prevent similar events the whole system was flushed carefully and cleaned again. No similar loss occurred thereafter.

The pump was transported to the manufacturer's premises, analysed and repaired, using spare parts already available in the RO plant.

No BI was covered.

The whole loss was estimated at approx. 130.000 Euro.

Conclusions: in spite of filter systems working correctly foreign objects may enter the system during construction or during temporary removal of elements.

Therefore losses of this type also may occur in the maintenance period after construction.

Source:

Desalination Plants – Technological development, Risks affecting Engineering Insurers and Claims Experience – IMIA Paper WGP57 (08):
Typical Loss Examples

http://www.imia.com/wp-content/uploads/2013/05/IMIA-WGP-57-08-Desalination-Plants-final.pdf