



CASE STUDY

Increased heat transfer of process heaters at SAMIR's Mohammedia Refinery, Morocco

The situation

Mohammedia Refinery is located on Morocco's Atlantic coast about 30 kms north of Casablanca with a capacity of 125,230 barrels per day. The refinery is operated by SAMIR, one of the largest companies operating in Morocco and the owner of Morocco's only two oil refineries.

An independent benchmarking process carried out at the refinery identified several opportunities to improve efficiency and reduce operating costs. One of the areas highlighted in the study was the potential for fuel savings on the process heaters through improved heat transfer by eliminating heavy fouling. This would involve upgrading the original on-load cleaning systems to the latest technologies available in the market today.

Phase one of their modernisation programme involved the replacement of on-load cleaning technology on two identical atmosphere distillation heaters. It was decided that each heater would be undertaken as two separate projects by the refinery, the second of which would be dependent on the results of the first.

Our solution

Following an on-site survey of the first heater, Clyde Bergemann Ltd, Scotland (CBS) proposed 36-off D92 rotating element steam sootblowers to ensure the most effective cleaning of the heater tubes.

Adopting Clyde Bergemann design parameters and cleaning philosophy would dramatically reduce the level of fouling on the heater to ensure maximum heat transfer and reduce fuel consumption.

SAMIR awarded CBS the contract to provide the first heater with 36-off D92 sootblowers in January 2003 and following the positive outcome of the first installation, the contract for the second heater was also received by CBS in February 2007.





On-load cleaning reduces fuel consumption by 3% per annum

The results

Following the installation of sootblowers on the second heater, the refinery carried out a survey to determine the effectiveness of the D92's on the second process heater. This project also included 12-off D92's on six additional heaters (2-off per heater) which were also included in their upgrade programme.

As a result of increased heat transfer on the convection zone, fuel consumption was reduced by 3% per annum from 4,745 tonnes to 4,603 tonnes providing an overall fuel saving of US \$1.48 million.

The result breakdown was as follows:

	(US \$ per annum)
Investment	1.29 million
Fuel saving	1.66 million
additional consumption:	
- electrical (motors)	0.13 million
- steam	0.05 million
Fuel saving after deduction of additional consumption	1.48 million
PAYBACK PERIOD - 11 MONTHS	

Highlights

- Significant reduction in fouling on the studded convection zone tubes
- Increased heat transfer as a result of reduced fouling
- Lower fuel costs through reduced fuel consumption
- Process throughput increase of 20%
- Increased sootblower availability with periodical planned maintenance programmes
- Robust, proven technology system supplied by global leader in on-load cleaning solutions



Above: The image on the left illustrates the previous extent of the fouling on the heater tubes and the image on the right shows the effect of Clyde Bergemann's on-load cleaning solution



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