3D TRASAR™ Technology for Boilers reduces the total cost of operation and improves the production reliability for a major tire manufacturer in India

NALCO Water
An Ecolab Company

CASE STUDY - MANUFACTURING

CH - 1386AP

BACKGROUND

A leading Indian tire manufacturer operates four major plants in India and owns overseas plants as well. This company is committed to delivering value through the reliability of its products and dependability of its relationships. One of the plants in Southeast India, which mainly produces truck and tractor tires, wants to extend the life of the bladder, decrease the tire scrapping rate which increases wastage, reduce manpower, and improve productivity. In some tire manufacturing plants, steam or hot water quality is a key factor that can directly impact the tire quality, the bladder life, and road safety. Bladder life will be shortened if the dissolved oxygen is not controlled and reduced without maintenance.

The client asked Nalco Water to make the following improvements:

- Increase bladder life
- Reduce rejects ratio due to bladder leaks
- Solve the bladder reversion/breakdown problems
- Reduce downtime cost
- Decrease scrap cost
- Reduce manpower

SITUATION

During the manufacture of tires, hot water is used in the curing process. However, the dissolved oxygen in hot water can lead to premature failure of the bladder, which results in high tire scrap cost and frequent downtime. Therefore, a deaerator is applied to remove the dissolved oxygen, and chemical oxygen scavenger is fed to remove the remaining dissolved oxygen.

The hot water system is operated differently, with boiler feedwater treatment under temperature of 170° – 180° and deaerator pressure around 7-8 kg/cm^2. Nalco Water 19Pulv was dosed into the storage tank of the deaerator to maintain 60-70 ppm residual based on the process requirement. It was difficult to maintain the residual of chemical due to fluctuated operation loads, which caused the following issues on the bladder curing system:

Customer Impact	eROI℠	Economic Results
Reduced excess of bladder consumption : 396 ea/year	ASSETS	Saving US$ 22,272/year for the bladder cost
Downtime for bladder replacement is reduced from average 693 minutes/month to 190 minutes/month		Saving US$ 875/year for the reduced downtime
The operator number for the bladder replacement is reduced		Saving US$ 333/year for the reduced man hour cost

eROI is our exponential value: the combined outcomes of improved performance, operational efficiency and sustainable impact delivered through our services and programs.

- The bladder curing frequency was operated only 170 to 180 cures while the design data is 300 cures or above.
- Downtime increased due to frequent changes of bladder (20 minutes required for each bladder change)
- High tire scrapping rate due to bladder failure (7 to 8 tires)
- Difficult to control the chemical residual (Sulphite) due to load fluctuation. (10 minutes of loading time is needed in each hour).
- Waste of chemical consumption during low load and no residual during overload.
- More manpower (three operators) required to take over the chemical dosing.
- No monitoring and control to maintain the accurate dosing rate for 24 hours and 7 days.

SOLUTIONS

The Nalco Water technical supporting team, industrial technical consultant, R&D
researchers and on-site sales team worked together to carry out a full Mechanical, Operational, and Chemical monitoring and site audit for plant operation. As the result, Nalco Water 3D TRASAR Boiler Technology including the Nalco Water Corrosion Stress Monitor™ (NCSM) was recommended. 3D TRASAR Boiler Technology provides continuous monitoring of dissolved oxygen with PID control of oxygen scavenger dosing in real time. NCSM can detect changes in oxidation/reduction stress, determine corrective action and respond in real-time by changing oxygen scavenger feeding to protect the system.

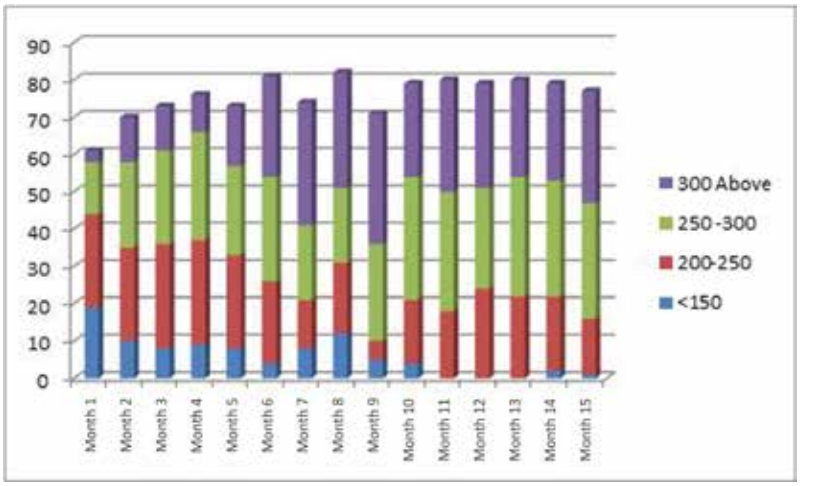

Figure 1 - *The bladder curing frequency is improved after 3D TRASAR Boiler Technology was applied.*

RESULTS

With real-time monitoring and chemical feeding, the customer made the following achievements:

1. **Increased bladder curing frequency:** The quantity of the bladders with curing frequency less than 150 cures is reduced from 19 to 0 (worst case), while the quantity with curing frequency higher than 300 cures is increased to 40 from 3 (worst case).

   The average excess bladder consumption is reduced from 46 ea/month (before 3D TRASAR Boiler Technology) to 13 ea/month.

   As the result, the bladder cost is reduced from US$ 2,553/month to US$ 697/month. Figure 1 show the improvement of bladder curing time after 3D TRASAR Boiler Technology was applied.

2. **Reduced downtime:** Downtime for the bladder replacement is reduced from average 693 minutes/month to 190 minutes/month.

3. **Reduced man-power:** The operator number for the bladder replacement is reduced due to bladder curing frequency increase.

High AT ORP means high dissolved oxygen, causing corrosion that can directly impact bladder life. In Figure 2, we can see AT ORP is closely monitored in real-time by NCSM, which controls the chemical dosing accurately, therefore reducing the downtime and manpower for the bladder replacement.

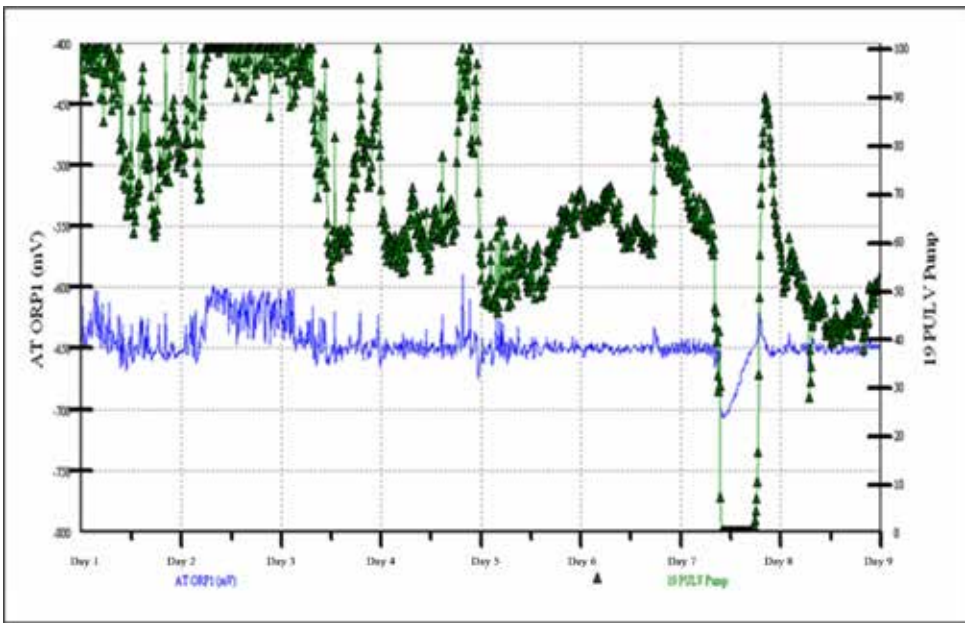

Figure 2 - *AT ORP is positively related to dissolved oxygen (DO)*

CONCLUSION

The implementation of 3D TRASAR Technology for Boilers has significantly improved the reliability of production for this customer and reduced the total operational cost. It has assured maximum production throughput and helped to improve overall plant profitability. This innovation is entirely in line with the commitment of the customer to use new technologies to further improve performance and cost management.

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