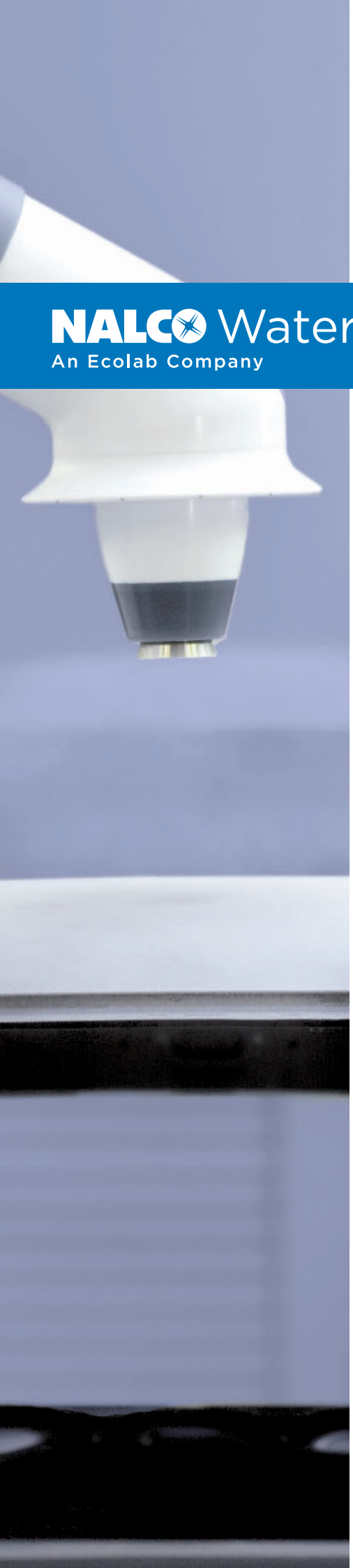


APEX™ Technology Improves Paint Detackification Performance and Delivers Major Cost Reduction

NALCO Water
An Ecolab Company

CASE STUDY – AUTOMOTIVE

CH-2057E

INTRODUCTION

This major Auto Assembly plant is one of two green flag designated customer sites in Europe and MEA. Nalco Water has managed all the water treatment on site for many years except for the paint coagulation application. With the development of Nalco Water's new APEX Paint Program, a calculation was made of the potential savings that could be delivered on three main areas of expenditure: cleaning time (frequency of cleaning), waste disposal (waste paint sludge kg produced per car) and total cost of operation.

SITUATION

The car manufacturer's paint process uses both solvent-based and water-based paint in Primer, Base Coat and Clear Coat applications on the main Assembly and Plastics plants. An established conventional detackification program with low efficiency was being utilized with flotation units for paint solids (overspray) removal from the circulating system water.

The sludge settling ratio in the booths and system tanks was high, which indicated that the systems were running with a greater paint load than designed. This meant that more frequent cleaning was needed and that the paint booth cabins were being supplied with dirtier water than was desirable.

CUSTOMER IMPACT	eROI℠	ECONOMIC RESULTS
2.000 m^3 of water saved by reduced dumps of system tanks	WATER	Saving of £3.600 per annum
950h Manpower hours and avoidable disposal cost reduced	PRODUCTIVITY	Saving of £12.700 per annum
135 to of waste reduced (21% reduction by produced car)	WASTE	Saving of £43.100 per annum
Estimated reduction on volume and cost of consumables	COSTS	Saving £140.000 per annum
Total Cost of Operation Savings		**£199.400 per annum**

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

High sludge settling means less paint sludge is removed from the systems, which results in reduced operation efficiency, risk of quality failure, lower productivity, and higher waste per car to be managed due to:

- Restricted pipes which cause poor water flow in essential paint production areas
- Poor paint transfers due to disrupted air balance
- Increases in waste removal costs
- Risks of exhaust paint in the environment (via the exhaust stack) due to poor water curtain in the paint booths
- Restricted potential production time and profitability due to increased cleaning frequency and cost.

GOALS

The company's sustainability commitments focused on environmental management including control of energy consumption, VOC emissions (volatile organic compound), waste generation, and use of less chemicals to improve overall sustainability performance at this facility.

SOLUTION

Each of the paint spray booths is a unique and complicated system which required a thorough mechanical, chemical, and operational (MOC) approach to optimize the booth. Nalco Water used a methodical approach to demonstrate the fit and capabilities of APEX Technology. With a thorough plant survey, jar tests and monitoring of the systems, Nalco Water proposed the APEX program for the best overall control of system operations, combined with a review of MOC application tailored to each system.

This was supported with some additional Key Performance Indicators and on-site support to better manage and reduce the quantity of recirculating paint overspray and increase the removal efficiency, whilst also producing a drier sludge.

APEX Technology features an advanced detackifier composed of a reacted blend of over 40% naturally sustainable material combined with inorganic polymeric materials. This program contains no hazardous ingredients and is completely formaldehyde free.

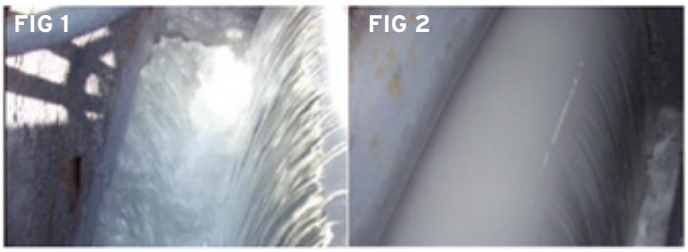
Over time, the APEX program was implemented on the seven production lines (four in the plastics and three in the assembly lines) providing the customer with superior operational performance, improved environmental benefits as it tied in with their sustainability goals, and reduced the total cost of operations compared with conventional programs.

RESULTS

After extensive trials the following results were achieved:

- Flood-sheets and underbooths run cleaner and stay clean for a longer time. This improves the air balance in the booth, contributing to fewer defects. Cleaner underbooths require less frequent booth cleaning.

IMPROVEMENT IN CIRCULATION WATER QUALITY

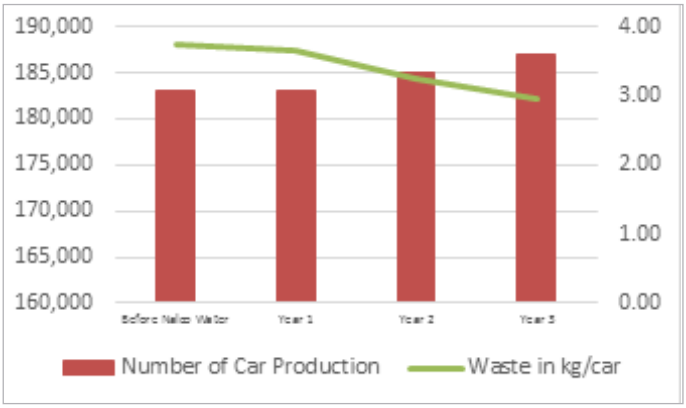


In figure 1, we can see the system return water quality on one of the plastics lines with the Nalco Water program, whilst in figure 2 we can see the typical water quality from an "optimized" competitor program. By running cleaner return water, the overall system maintenance has been reduced.

- During the first year Nalco Water was providing the paint detackification program, the number of system tanks on the main paint shop has been reduced to three systems. Operating the conventional detackification program, two Clear Coat systems were previously cleaned 4 or 5 times per year in total. Since implementation of APEX Technology, the single Clear Coat system has been cleaned twice and could have been left longer. The single Primer system was previously cleaned 5 times per annum and is now cleaned 2 times per annum. Base Coat will need only cleaning twice per annum at the higher level of production on one lagoon, compared to four cleans per annum on two lagoons before. Reduced cleans and dumps to the effluent plants means make-up water reduction by 2.000m^3/per annum and less waste water treatment, less tankers off site and reduced treatment costs at the effluent plant. Cleaning by the sub-contractor on site has been reduced, but the hours were not logged by the customer so an estimated total saving of 16.300 £/per annum has been calculated.

APEX
Paint Detackification Technology

- The sludge solids removed automatically is now at a far higher proportion to those removed by cleaning, with sludge dryness increased by 20-30% (some variability by paint type). The yearly total sludge disposed was reduced by 135 tons which represents a cost saving of £43.100 per annum. Total sludge waste per car (including plastics parts plant) was reduced by 21% from 3,75 kg to 2,95 kg per car.



Graph 1: While production increased by 2% over 4 years, Nalco Water enabled the customer to reduce waste generation by 20%

- A significant reduction in chemical costs has been captured by the customer compared to those borne with the previous supplier after several years of apparent optimization. Savings are estimated at £140,000 per annum compared to the prior year before Nalco Water started.

CONCLUSION

APEX Technology and Nalco Water's on-site service helped this customer achieve the following Key Performance Indicators (KPIs):

- Reduced operational maintenance time and costs, meeting the customer's requirement for a step change and continuous productivity improvement
- Improved sustainability and decreased site environmental footprint (waste per car)
- Significantly lower Total Cost of Operation (TCO).

Graph 2: APEX Technology achieved 53% TCO reduction

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