



FLOCMASTER™ Technology Delivers Superior Sustainability Performance and Major Savings in Operating Costs at a Paper Mill in Southern Europe

NALCO Water
An Ecolab Company

CASE STUDY - PAPER

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INTRODUCTION

A de-inking paper mill located in southern Europe uses raw materials in its process that come directly from the local environment. As a result, management at the mill are always focused upon the use of sustainable production practices, including the optimisation of water resource use efficiency, minimisation of waste production, and the efficient use of energy. The mill has its own wastewater plant, including sludge dewatering equipment, and this was one specific area of focus for management in trying to identify new techniques and technologies to help achieve commitments around environmental performance, as well as to lower the Total Cost of Operation (TCO).

BACKGROUND

The mill specialises in the production of paper from recycled sources. Wastewater from the paper production process is treated in the wastewater plant. Excess sludge from the wastewater plant, from primary and secondary treatment, is dewatered in two parallel screw presses. Filtrate is sent back to the wastewater plant, and dewatered sludge together with paper residues from the process are incinerated on-site. Approximately 95,000 tonnes of dewatered sludge are incinerated each year. This composite waste is a precious source for the mill: the sludge/paper mix co-fuels the incinerator, along with natural gas, and the vapour generated is

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ECONOMIC RESULTS

Use of FLOCMASTER technology for polymer makeup reduced fresh water demand by over 64,680 m³ per year, conserving precious water resources in a water-stressed area



Overall reduction in fresh water demand has reduced operating costs by over €1,000 per year, and safeguarded water supplies equivalent to the annual needs of over 1,100 people

Increasing dry solids by 6%, from 53% to 59%, in dewatered sludge reduced the volume for disposal by over 5,000 tonnes per year, and the demand for treatment consumables was reduced by over 70 tonnes per year



Reduction in treatment management costs of over €272,000 per year

Reduction in sludge volume for on-site incineration reduced fuel gas demand by over 330,000 m³ per year



Greenhouse gas emissions reduced by the equivalent of over 668,000 tonnes of CO₂ per year, with savings of over €122,000 per year in energy costs

Staff resources were able to be released for other duties, all data verified by the customer



Overall reduction in the Total Cost of Operation (TCO) of over €396,000 per year

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

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collected and recycled back to the process to dry the paper produced.

The dryness of the sludge is critical for the incineration process, since it directly impacts the caloric value of the material, and hence fuel usage and the cost-efficiency of incineration. The higher the residual water content in the sludge, the higher the heat requirements for combustion, increasing the demand for the more costly primary fuel needed to evaporate the residual water present.

The ability to achieve a higher dry solids content of the dewatered sludge was an important goal for the plant, since it offered the possibility to reduce fuel usage, greenhouse gas emissions, and overall costs.

WHAT WERE THE COMPANY'S GOALS

Key Performance Indicators (KPIs) for the company included:

- Safe, continuous and stable operation
- Continuous optimisation of water and energy resource use
- Reduction in the Total Cost of Operation without compromising operational practices and efficiency
- Improved sustainability and operational performance
- Outstanding supplier performance

ACTION PLAN

Staff from NALCO Water were asked by management at the plant to conduct a thorough plant survey, and to assess opportunities to improve the operation of the sludge dewatering operation, and in particular the screw presses. As a result, NALCO Water proposed the use of its new FLOCMaster technology. Management accepted the proposal, and FLOCMaster technology was installed on one of the two screw presses. The mixer was installed in-line with the sludge feed, and a polymer make-up system, which allows much higher solution strength than traditionally possible, was also installed. The polymer solution was made up at 1.20% as opposed to current practice of 0.16%. Both presses continued treating the same type and volume of sludge.

RESULTS

As a result of the introduction of the new FLOCMaster technology on one of the two screw presses, the sludge dewatering programme was able to deliver greatly improved system performance, which included:

- Increased dewatered dry solids by 6%, from 53% to 59%, representing a reduction of 5,000 tonnes per year in sludge sent for incineration. Reductions in fuel demand were equivalent to 330,000 m³ of natural gas per year, reducing greenhouse gas emissions by over 668,000 tonnes per year, and saving over €122,000 in annual energy costs (15%).
- Reduced fresh water demand used for polymer make-down by 64,680 m³ per year (95%), equivalent to the annual needs of over 1,100 people, and reducing water costs by over €1,000 per year.
- Improved filtrate quality with a 36% reduction in suspended solids, and a reduction in polymer dilution water contribution to the wastewater, equating to an overall reduction in solids loading of approximately 298 tonnes per year
- Improved treatment programme efficiency and usage, allowing a reduction in treatment consumables of 70 tonnes per year (64%), and delivering savings of over €272,000 per year.
- A 4% increase in the hydraulic capacity of the screw press treated as a result of the reduction in the volume of polymer added
- Smoother operation of the press due to automation of polymer based on sludge flow, and an improvement in press performance. This allowed less human intervention, and manpower to be allocated elsewhere.
- Improved overall sustainability performance of the plant as a whole.
- Overall reduction in the Total Cost of Operation (TCO) of over €396,000 per year.

CONCLUSIONS

FLOCMaster technology has again demonstrated the value this new innovation can deliver to customers in the paper and other industries. A major increase in sustainability performance has been seen, and at the same time a major reduction in the Total Cost of Operation. The combination of the NALCO Water problem-solving approach, on-site expertise, and the application of new innovative technology, delivered improvements in performance and production continuity. The customer is now assured of the improved reliability of key strategic assets whilst optimising water use and energy, and reducing costs, and is examining the next steps towards implementing the programme on the remaining screw press.

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