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Regional Activity Centre for Cleaner Production

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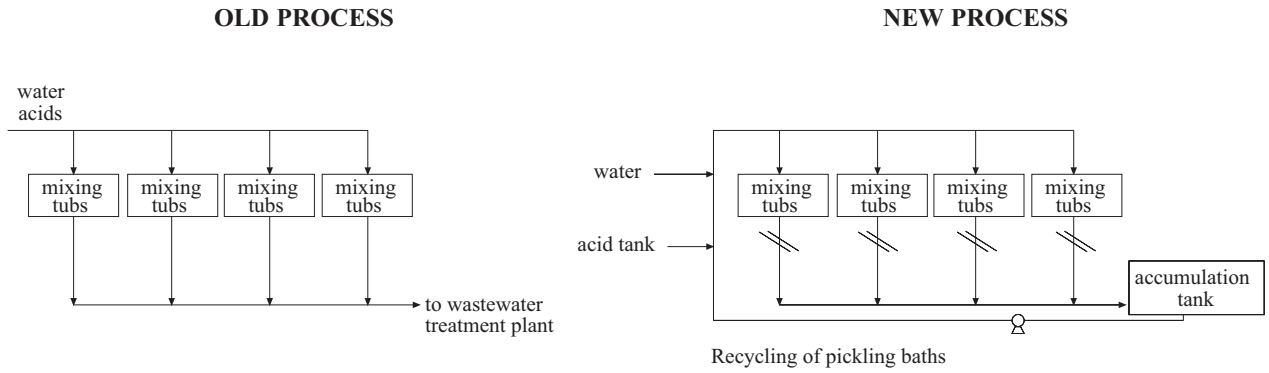
Generalitat de Catalunya
Government of Catalonia
Department of the Environment and Housing

No. 17 Pollution prevention case studies

# Recirculation of pickling baths in the leather-tanning sector

| | |
|---|---|
| **Company background** | Curtits Banyoles, S.A. (Spain) is a company which took part in a European demonstration project for the extensive introduction of cleaner technologies, conservation of raw materials and optimisation of the productive processes in the tanning industry. This project, led by the British Leather Confederation (United Kingdom), was coordinated in Catalonia by the Centre for Cleaner Production Initiatives. |
| **Industrial Sector** | Leather tanning industry. |
| **Environmental considerations** | The company does double-faced curing for makers of sheepskin clothing. In the pickling process the skins used to be introduced into four mixing tubs where they were treated with a mixture of formic acid, sulphuric acid and salt, which was dissolved in 12 $m^3$ of water per tub and process. When the process was finished, the pickling liquor was drained out at the bottom of the tubs, creating acid wastewater containing particles in suspension and remains of oils and fats, which was put through a final sewage treatment plant before being run off. |
| **Background** | By means of recirculating the pickling baths, the company saw the possibility of reducing the salinity of the effluents, reducing the consumption of raw materials, particularly the acids and salts of the pickling baths, reducing the consumption of water and reducing the amount of pollution in the wastewater runoff. |
| **Summary of actions** | The action carried out by the company consisted basically in recovering the pickling liquor at the outlet from the tubs and reintroducing it into the process, after having been filtered and the composition adjusted.<br><br>To filter the pickling liquor, a mesh filter was installed to remove the remains of skin, sand, etc., of any size greater than 1 mm. After filtration the liquor goes to a buried tank of 112 $m^3$ where it is stored and analysed for adjustment to the necessary specification for reuse, and where the oils and fats which accumulate on the surface of the tank can be removed. With these methods it is possible to reintroduce approximately 50% of the pickling bath recovered, without affecting the quality of the skins treated.<br><br>To make the treatment of the exhausted bath easier, the company also reduced the acids used in the process to one, eliminating the use of sulphuric acid altogether and only using formic acid. |

## Diagrams




## Balances

| | Old process | New process |
|---|---|---|
| **Balance of materials (per tub)** | | |
| Skin treated | 1,333 units | 1,333 units |
| Salt | 1,000 kg | 500 kg |
| Sulphuric acid | 12 litres | 0 litres |
| Formic acid | 70 kg | 100 kg |
| Water | 12,000 litres | 6,000 litres |
| **Economic balance** | | |
| Cost of raw materials | 61,303 €/year | 57,727 €/year |
| Purification cost | 8,173 €/year | 4,086 €/year |
| Sludge handling cost | 4,393 €/year | 2,247 €/year |
| **Total cost** | 73,869 €/year | 64,060 €/year |
| **Total savings** | | 9,809 €/year |
| **Investment** | | 21,456 € |
| **Payback period** | | 2.2 years |

## Conclusiones

Actions carried out for recovery of the pickling baths have enabled the company to obtain substantial savings in raw materials and water used in the process. In addition, the use of sulphuric acid has been completely eliminated. These results have not only improved the company's operations environmentally, but have also brought financial savings that have led to recovery of the investment in 2.2 years. The pollution load of chlorides, the conductivity and the soluble salts in the run-off water has all been reduced.

**NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.**

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