

Med *Clean* *Propre* *Limpio* **Mediterranean**



Regional Activity Centre
for Cleaner Production



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

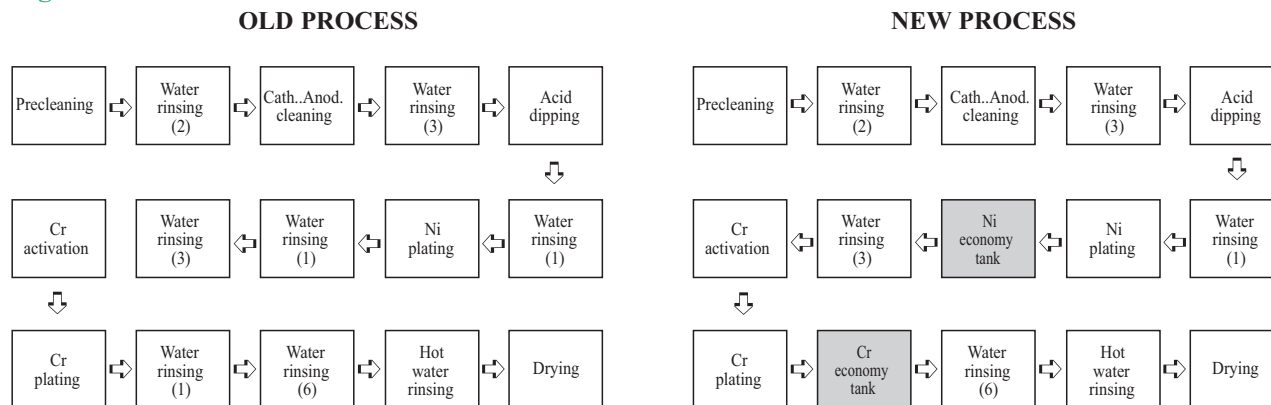
No. 11

Pollution prevention case studies

Cleaner production application in a sanitary fittings production plant

Company	Eczacibasi Yapi Gereçleri A.S. Artema Armatur Grubu (Turkey). Established in 1983, this company produces chromium and copper plated sanitary fittings.
Industrial sector	Electroplating sector.
Environmental considerations	Companies in the electroplating sector use excessive volumes of water in their cleaning and rinsing operations. They generate considerable volumes of wastewater to be treated. On the other hand, there is also an important use of chemicals, producing waste with considerable amounts of heavy metals that could be optimised.
Background	Since the electroplating process of this company was old and batch system, this caused many environmental pollution problems. There was an excessive use of cleaning and rinsing water and chemicals and an important volume of effluents containing excessive amounts of cyanide and heavy metal were generated.
Summary of actions	<p>In 1993 a new fully automated electroplating plant was installed. Some differences between the old and new processes were:</p> <ol style="list-style-type: none"> 1. In this new process cyanide copper plating was eliminated. 2. In plating and degreasing sections, solution vapours were collected by a push-pull system and were discharged into the atmosphere following wet filtration. 3. A water recirculation system was also included. This system cleans the polluted water by means of cation and anion exchange columns. Clean water is pumped to the plating line to be used in rinsing tanks and polluted water from rinsing tanks is collected and discharged in a recirculation tank to be cleaned and reused again in the plating line. With this action the amount of used water has been reduced by a sixth. 4. In 1997-1998, the cleaning tanks after chromium and nickel tanks were converted to economy tanks to reuse chrome and nickel solutions. With this modification chemicals carried by plated pieces from plating tanks were reduced by more than 80% and the quality of plated surfaces was not affected. 5. In this new process, a new filter press and sludge dryer system were also installed for the wastewater treatment section. Thus, the water content of filter press sludge decreased from more than 80% to less than 65% and the moisture content of dried sludge is less than 15%. <p>With all these modifications the amount of wastewater treated in the sewage treatment plant dropped to a minimum and the amount of used chemicals for waste treatment also decreased.</p>

Diagrams



Balances

Pollution prevention opportunities	Investment	Annual savings	Payback period
Fully automated plating plant	USD1,800,000	590,000 USD/year	3 years
Filter press and sludge dryer	USD120,000	50,000 USD/year	2.4 years
Chrome economy tank	USD2,000	20,000 USD/year	1 month
Nickel economy tank	USD2,000	23,000 USD/year	1 month
Total investment	USD1,924,000		
Total annual savings		683,000 USD/year	

Conclusions

With the introduction of these pollution prevention opportunities, the benefits achieved were:

- Efficiency and quality of the process were improved. Total surface area of plated parts was increased by 68% and quality improved by 80%.
- Reduction of the volume of effluents to be treated was achieved. Total wastewater treated in the sewage treatment plant was reduced by one sixth in comparison with the old plating process.
- Reduction of used chemicals and generated sludge was also achieved. Specifically, the total amount of used chemicals in the plating plant and in the sewage treatment plant was reduced by 50% and sludges were reduced by 70%.
- Total elimination of the cyanide copper plating process due to the risk to the environment and employees.
- Working and environmental conditions were improved by means of the collection and filtration of plating and degreasing solution vapours.

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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Dr. Roux, 80
08017 Barcelona (Spain)
Tel. (+34) 93 553 87 90
Fax. (+34) 93 553 87 95
e-mail: cleanpro@cprac.org
<http://www.cprac.org>