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Regional Activity Centre
for Cleaner Production



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Pollution prevention case studies

Reduction of re-dyeing in a textile company

Company background

The company is located on the European side of the region of Istanbul (Turkey). It is a relatively modern company, which operates as a commission dyer. Its main activity is cotton textile wet processing (up to 80-85% of its total production), although processes of manmade fabrics also take place.

Industrial sector Textile industry

Environmental considerations

It is crucial in dyeing operations to achieve the required shade and fastness on the fabric.

Fluctuations in the fabric quality and the quantity of production volumes that are handled require the proper adjustment of operational parameters (reaction time, concentrations of dyestuff and chemicals, etc.) to ensure the achievement of the desired quality. Failures in doing so result in dyeing errors, which require re-processing of the goods and thus additional chemical and resource consumption.

Therefore, the percentage of goods that require re-processing is an important parameter that influences the amount of water, energy and chemicals used in dyeing and subsequent washing stages.

Background

Before the improvement, several factors curbed the efficiency of the dyeing process thus requiring re-dyeing operations. One problem was that dyeing process was done with the doors of the machines open, which implied a loss in efficiency. Another was that the dyestuff was not mixed long enough with water in the dying process and the amount of steam used was insufficient.

The company's main aim was therefore to reduce re-dyeing operations by increasing the process efficiency in order to save water, energy and chemicals.

Summary of actions

In order to increase the process efficiency, the company made the following changes:

- It was ensured that doors were kept closed throughout the dying process through the control of machines.
- The parameters regarding dyestuff-water mixture were controlled to ensure the optimal process.
- The dispersant used to facilitate penetration of the dyestuff on the cloth was changed to improve the efficiency of the process and to reduce dyestuff in the liquor bath.

The results obtained from the implementation of these options were:

- Reduction in water consumption: 1.1%
- Reduction in thermal energy consumption: 0.8%
- Reduction in chemicals consumption: 1.7%

Balances

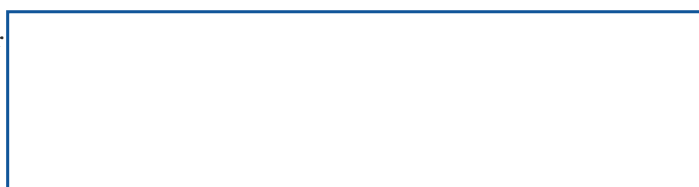
| | Old process | New process |
|--|-------------|-----------------|
| Material balances | | |
| Energy consumption (MJ/year) | 102,742,422 | 101,952,869 |
| Water consumption (m ³ /year) | 381,696 | 377,395 |
| Raw material consumption (t/year) | 3,549 | 3,487 |
| Wastewater generation (m ³ /year) | 316,808 | 313,238 |
| Waste generation (kg/year) | 72,832 | 72,832 |
| Economic balances | | |
| Energy (€/year) | 908,826 | 901,680 |
| Water (€/year) | 348,376 | 344,365 |
| Raw material (€/year) | 977,596 | 964,938 |
| Wastewater treatment (€/year) | 61,038 | 60,335 |
| Waste management (€/year) | 3,550 | 3,550 |
| Other costs | | |
| Total annual cost (€) | 2,299,386 | 2,274,868 |
| Investment | | non-significant |
| Annual savings (€) | | 24,518 |
| Payback period | | immediate |

Conclusions

By reducing the number of re-dyeing operations, the company has achieved significant savings without investing in costly machinery. Thus, by improving the dyeing process, the company has reduced its overall costs and achieved a €24,518 annual saving.

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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