

Energy Saving in Soap Production	Tanzania	1993	Full scale
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MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS # 46

Background

Shivji and Sons Ltd., located in Dar es Salaam, Tanzania, manufactures laundry soap. The soap is made from fat through a saponification process that utilizes caustic soda. After a separating process the so-called "neat soap" is taken to a crusher, where it is mixed with pigment, perfume and other additives. The soap is then transferred to an intermediate tank from which it is fed into a vacuum flash cooling system. The cooled soap is then extruded in the form of bars, cut into size and packed in cartons. Shivji has a capacity of five tons of bar soap per hour. The company has 45 permanent staff members and 20 seasonal employees.

Cleaner production initiatives at the industry were assisted by National Cleaner Production Center (NCPC)

Cleaner Production Principle

Housekeeping; Recovery, reuse and recycle

Cleaner Production Application

The principal source of process energy is steam, which is generated from the combustion of industrial diesel oil in the boiler furnace burners. Steam is used throughout the whole process and for materials handling (unloading of fat from truck tankers, fat storage heating).

The CP assessment revealed leakage of steam from some of the valves and inefficient use of steam. The unloading of fat delivered to the factory resulted in spillage of 3,000 kilos per annum. The spilled fat was absorbed by the soil.

In an effort to conserve steam energy and curb spillage of raw material, the project team recommended the implementation of the following CP options:

- Replace leaking steam valves and traps with certified products;
- Reduce the time required for heating the fat storage tank from the initial 6-7 hours to three hours;
- Incorporate the right amount of water during saponification, minimizing steam consumption during the cooling stage; and
- Recover the spilled, soiled fat at the material handling section by treatment with steam, followed by separation.

Environmental and Economic Benefits

The only option that needed some investment was the installation of steam valves, costing US\$ 830. All steam saving measures together resulted in annual savings of US\$ 185,700. The pay-back time was only two days. Recovery of the spilled fat requires virtually no energy input realizing a saving of US\$ 2,400 per year.

The boiler furnace consumption of industrial diesel oil was reduced by 54 percent to only 30 liters per ton of laundry soap produced, saving 415,800 liters per year. This measure also resulted in a considerable decrease in the emission CO_x, SO₂ and NO_x. The recovery of spilled fat also made a significant improvement to the direct environment of the factory.

Constraints

None mentioned.

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Review Status

This National Cleaner Production Center case study was presented in the document "NCPC Case Studies" available from UNEP IE or UNIDO (addresses above). It was formatted and edited for the ICPIK diskette in August 1997.

Subsequently the case study has undergone a technical review by Dr Prasad Modak at Environmental Management Centre, Mumbai, India, in September 1998.

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