



Case Studies



International
Labour
Organization

Factory Improvement Programme

Cutting Energy Use Heating Up Profits at Nguyen Hoang Exim Co.

Nguyen Hoang Exim Co was established in 1992 as a private company, located in Hung Yen Province outside of Hanoi, Vietnam. The company primarily produces work wear and some ladies wear for export and has its own well known brand of children's clothes for the domestic market, Kico Clothing.

The company employs 500 workers in the factory. The majority of production is exported to the EU (in particular Sweden and Denmark) and the USA.

Prior to joining the Factory Improvement Programme (FIP), management considered that the major issues concerned quality and (international) competitiveness and they hoped that FIP would address these areas. They were also particularly interested in Modules 1 (Workplace Cooperation) and 7 (Workplace Relations).

As a privately owned company that has grown rapidly, Nguyen Hoang faced a number of challenges concerning quality, productivity and labour conditions and management were very enthusiastic to join the FIP.

INITIAL SITUATION

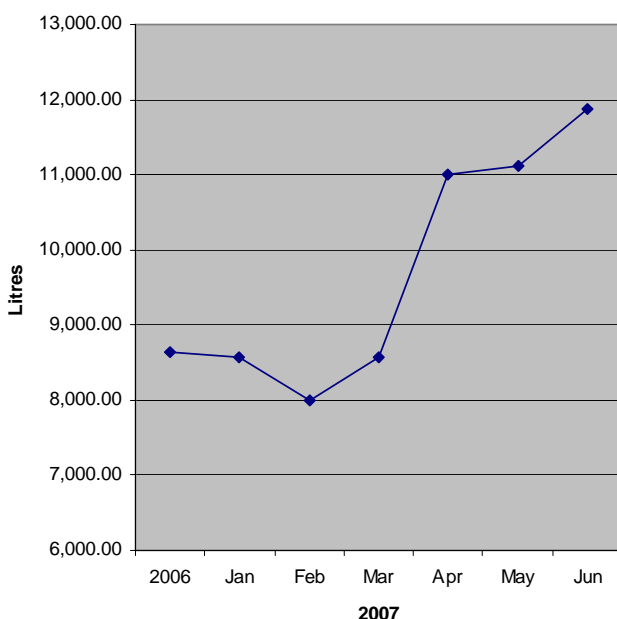
Nguyen Hoang uses great amounts of energy in all its production processes (see chart above). As such, energy is a significant cost component of overall expenditures. There is, therefore, a specific need to ensure that energy consumption is monitored and regulated accurately and that consumption is efficient.

The factory only had a single electricity meter that measured total consumption. It was not possible, therefore, to analyse electricity consumption by production and non-production usage nor to identify areas of inefficiencies or wastage. It was also not possible to allocate costs to departments or with regard to production. Basically, the factory had no real understanding of its electricity consumption.

Nguyen Hoang has a very large requirement for hot water / steam in its production process. Steam is primarily used for irons to press the garments during and at the end of the production process. In order to minimise costs and environmental impact it is important that the factory ensures the most efficient steam production system. The hot water / steam production system requires the steam generated by the system to be cooled and condensed again to water before being recycled.

There is also another potential benefit in this

Litres of Boiled Water per Tonne Coal



process; when steam turns back into liquid, it gives up energy (as heat), which can be captured and capitalised upon to make the overall efficiency of the water heating system greater. The more efficient the boiler is, the less fuel it uses, the less carbon dioxide it produces and the less it costs to run.

The system is quite simple in that the water in the boiler is heated by coal and as the water boils it is dispersed as steam through a system of pipes to various workstations in the factory. The system is a continuous one so that the steam is eventually returned to the boiler and the whole process starts again.

In consultation with the FIP expert, it was decided that the system in use at Nguyen Hoang suffered from high levels of sediment; insufficient insulation; the fan used to generate oxygen to feed the fire was inefficient and the heat transfer during the condensation process was not being capitalised on.

RECOMMENDATIONS BY THE FIP TEAM

The FIP expert suggested two options to cool steam to water at 600C. One option to consider was the introduction of cold water into the condensing tank and the other was to redirect the pipes carrying the hot water / steam through a preliminary cold water tank before reaching the condensing tank.

The first option is less beneficial in that it results in significant heat / energy wastage and the system has to use more fresh water. The second option has the benefit that the steam begins to condense whilst it travels through the pipes in the cold water tank, but the heat is transferred to the water in the condensing tank which can then be used for supplying hot water taps in the kitchen, bathrooms and even showers. This reduces the demand for water heated by electricity.

The expert's recommendations were:

- Installing electricity meters to measure and help regulate consumption in various parts of the factory's operations;

- Implementing a cleaning and maintenance programme in relation to the steam production system;
- Determining the optimal boiler fan speed and strength to ensure that the air inflow helps the coal to burn efficiently;
- Evaluating energy efficient options on how to cool the steam / water to 600C prior to recycling it back to the boiler and into the system again.

ACTIONS TAKEN BY FACTORY

The Factory Improvement Team considered the expert's recommendations and how they could best be implemented.

There are four different areas within the factory in which electricity meters could be installed; administration, production, warehouse and the groundwater pump station. The Factory Improvement Team wanted to ensure that the cost / benefit of installing new meters was positive. They agreed with the management that, initially, meters would be installed to cover the administration and production parts of the factory. The results could then be evaluated and, if appropriate, meters would be installed in other parts of the factory.

In evaluating the hot water system the first stage was to consider the form of heat generation – eg whether the system should be oil fired, electric or coal fired. Currently, in Vietnam, using coal fired boilers is the most cost effective method and this is what Nguyen Hoang has.

After discussing with management, the team implemented the following:

- The sediment that had collected at the bottom of the boiler and in the heat transfer pipes was cleaned out;
- The pipes carrying the steam were insulated to reduce heat loss;
- The boiler fan was reset to ensure that it provided the correct amount of air to allow the coal to burn efficiently;
- A regular programme of monitoring and cleaning the steam production system was designed and implemented.

Management of the company is also evaluating the two options recommended by the FIP team with regard to condensing the steam back to water.

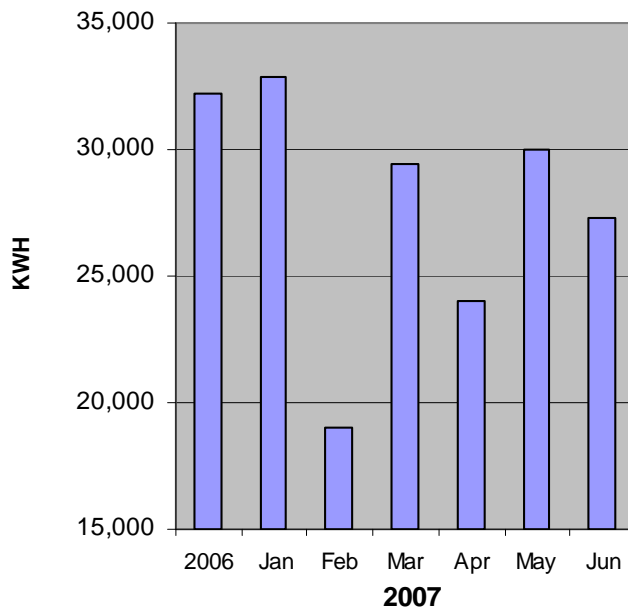
IMPACT OF CHANGES

The implementation of the two electricity meters has been successful, resulting in both a reduction of electricity consumption and changes in attitude and behaviour. The fact that the meters have been installed has made the staff and workers much more aware of how their behaviour has an impact on energy consumption. The administrative staff, in particular, is more conscientious about turning off lights, turning down the air-conditioning and using fans rather than air-conditioning.

The chart below shows the monthly electricity consumption at the factory. The 2006 figure is the average monthly consumption during that year. The average monthly consumption in 2007, to the end of June, is 27,108 kwh, a 16% reduction.

Having seen the savings that the first set of meters have made the company plans to install additional meters in the warehouse and groundwater pump station.

Electricity Consumption



The chart at the start of this case shows that the actions taken by the factory have substantially improved the efficiency of hot water / steam production. **The average monthly consumption of coal during 2007 has reduced by 24.5% against 2006** and the improvement in the last few months is even greater. Conversely, the output per tonne of coal burned is dramatically different to that achieved prior to the FIP - in June the boiler was producing 11,875 litres of boiled water per tonne of coal in comparison to an average of 8,641.98 litres per tonne in 2006. This is a **37.41% improvement in energy efficiency against the average for 2006**.