TECHNOLOGY BRIEFING

WASTE MINIMISATION

Generate profit and not waste

TANGRAM TECHNOLOGY Consulting Engineers

REDUCE WASTE AT SOURCE

Simple waste minimisation could save up to 1% of your turnover (or 10% of profit) and help you to achieve the goal of 100% production. 100% production is about using every piece of material that enters your factory to produce good and saleable products. This might appear impossible to achieve but the closer to 100% you get then the more profit you will make.

"Generate profit and not waste."

Waste minimisation will reduce costs, make your company greener and can be part of a drive to achieve ISO 14000 but the tools and techniques are simply aids to the process. Waste is a basic management philosophy and approach to achieve a more profitable business Many companies count the cost of waste disposal, but there are other hidden costs of waste. Instead of wasting raw materials, time and effort, and paying for effluent or landfill disposal, take steps to stop waste occurring in the first place and add to your bottom line.

Waste minimisation is the process of systematically reducing waste at source in all areas of the company such as:

- Raw materials and ingredients use
- Water consumption and effluent generation
- Packaging, factory and office consumables
- Energy consumption
- Wasted effort

HOW MUCH DOES WASTE COST?

The cost of waste is easily ignored and to make a business case for waste minimisation you need to start to put numbers on the actual costs. If you have never considered a waste minimisation programme then now is the time to start. Environmental legislation is raising the cost of waste disposal and rising costs of water supply and effluent disposal make it even more worthwhile to reduce costs.

TOP LEVEL COMMITMENT

Waste minimisation is not a technology "fix", it is a management issue and needs top level commitment to succeed. Commitment will only come when sound business reasons are presented for the actions. The business reasons for waste minimisation are simple:

- **Waste minimisation is good business**

Cost effective waste minimisation is a valuable *investment* with rapid payback times in the order of months. Your company is probably spending about 4-5% of total turnover producing waste. Up to 1% of turnover (or about 10% of profit) could probably be saved - often quickly and simply - through waste minimisation. The company profits could be significantly increased by cutting waste. To get an estimate of the potential for waste minimisation a general rule is:

Potential company waste minimisation savings = 5 x annual company waste disposal costs.

The "cost of waste" can be up to 20 times the disposal costs and up to 20% of the cost of production. When these levels are reached the "cost of waste" is likely to be higher than the direct labour costs - an item that is always measured and controlled in every company.

- **The true cost of waste is hidden – reduce waste to reduce costs**

Most companies do not realise the full cost of waste and only record the cost of disposal. Throwing out waste is throwing out materials that have been paid for. It is the same as throwing out money.

- **The legal consequences**

Companies, and especially key directors and managers, face stiff penalties for failing to comply with environmental legislation, which gets tougher and more complex every year.

- **The company reputation**

Customers, employees and suppliers have a growing interest in every company's environmental performance. Waste minimisation shows how effectively and efficiently operations are controlled.

WHERE IS THE WASTE?

Many companies think that waste minimisation consists of large “STOP WASTE” posters on the walls but the greatest waste in the waste that we do not see. Waste is not stopped by exhortation and in most cases the real challenge is to “FIND WASTE” and to do this a fresh pair of eyes is needed.

A “Walk Around” is the simplest way to initially identify where waste is occurring. Tools such as waste mapping, process flow sheets and cause and effect analysis help to assess and quantify the locations and cost of waste. These tools will help to identify the inputs and outputs of each process stage and give an estimate of the potential savings to be made.

An input-output diagram gives an estimate of the “cost of waste” and the main stages for producing this are:

- Examine the total company process inputs and outputs
- Add values for the inputs and outputs
- Identify the types of processes being carried out
- Calculate the true cost of wasted raw materials
- Set some cost reduction targets.

The result of this work should be a materials balance for the company where:

Materials In - Materials Out = Waste Generated

The 2 key numbers are the Mass Balance Yield (MBY) and the First Time Yield (FTY). These should give a good estimate of the efficiency of the process and the flow charts can be used to find the losses and the answers need to be reconciled to find the hidden losses.

BASE LINES AND ACCOUNTS

Management and reduction depends on measurement. Without measurement you cannot manage and you must start to measure the waste created so that the reduction programme can be seen to generate savings and improve profitability. Initial baseline measurements will also identify areas for cost effective investment and rapid improvement. One method is to use a waste account to measure the cost of waste to the business and to provide a measurement of the savings from the waste minimisation programme. A waste account will produce an annual waste balance sheet and an annual savings report to justify further investment to reduce waste and improve profits.

START WASTE MINIMISATION

The previous actions will have identified the areas for the quickest returns at the lowest cost or biggest savings but it is not wise to start too many projects at once. It is the projects you finish that will score points, not the projects you start! Use the waste tools and information to identify the easy targets.

Mass Balance Yield

Mass Balance Yield (MBY) measures how much raw material is converted into finished product.

$$\text{MBY (\%)} = \frac{\text{Weight of good production}}{\text{Weight of virgin material used}}$$

Can range from 99% down to 30%.

What is your MBY?

First Time Yield

First Time Yield (FTY) measures how much is produced right first time.

$$\text{FTY(\%)} = \frac{\text{Weight of good production}}{\text{Weight of total material used (including rework)}}$$

What is your FTY?

The Goal

The FTY is usually lower than MBY but the goal is to have:

FTY = MBY

CONTACTS AND SIGNPOSTS

Tangram Technology Ltd.:

Phone 01462 437 686

e-mail: info@tangram.co.uk

Web: www.tangram.co.uk

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