

GOOD HOUSEKEEPING – G2

Eco-efficiency resources for the food processing industry

Get your house in order

Good housekeeping refers to simple, practical and common sense measures to increase business productivity. These measures are often fast to implement and low in cost. The benefits of improved housekeeping include cost savings and improved management of environmental impacts.

There are often many other flow-on benefits of good housekeeping including improved organisational structure and better workplace conditions and safety. These types of improvements improve staff morale and lead to greater workforce productivity. Good housekeeping provides a strong foundation for the implementation of additional eco-efficiency initiatives.

Production plants that neglect good housekeeping are often visibly unclean, unsafe and disorganised. A walk through the site may find evidence of symptoms including:

- air and water leaks
- spills
- water running unnecessarily
- wasted raw materials
- evidence of unnecessary rework
- blocked drains
- unmotivated staff.



Good housekeeping ensures a tidy factory and avoids unnecessary loss of product.

IMPLEMENTING GOOD HOUSEKEEPING

Good housekeeping:

- does not usually require specific technical skills but does require a workplace that is motivated and willing to change for it to be truly successful
- needs committed and involved personnel at all levels to achieve a culture of productivity improvement
- is a continual process with the ultimate goal to integrate good housekeeping into daily operations of the company.



Reduction in raw material consumption

Consumption of raw materials can be reduced by:

- ensuring that supply of raw materials is in line with demand through effective monitoring of the business's raw material requirements
- limiting unscheduled down time through preventative maintenance:
 - can reduce the incidence of equipment failure and the associated costs (disrupted production schedules, workers made idle and product loss)
 - can be scheduled to avoid interfering with production and can include periodic inspections, condition monitoring, critical item replacement and calibration
 - should be the responsibility of production staff who operate the machinery, who are much more likely to pick up small signals that the maintenance is needed
 - by keeping maintenance manuals and schedules in a convenient location
- making production monitoring and control a priority:
 - repair leaks
 - prevent overflows and accidental spillage
- reducing use of cleaning chemicals.

TOTAL PRODUCTIVE MAINTENANCE (TPM)

This strategy is based on no longer regarding maintenance as a non-profit activity. Preventative and corrective maintenance is scheduled as part of processing with the aim of minimising unscheduled breakdown maintenance.

For more information visit: Plant Maintenance Resource Centre
www.plant-maintenance.com/articles/tpm_intro.shtml

SAVINGS FROM TIMER CONTROLLED DOSING

Golden Circle reduced the volume of lime used for effluent dosing by adding a timer to the dosing control system, which allowed for lag time in sensing effluent pH. Previously the lime was diluted to prevent excessive addition of lime and overdosing of effluent. In addition to reducing lime consumption, the initiative saves 5 ML of water annually or \$6,950. The cost of implementation was \$200, giving an instant return. (Golden Circle is an ecoBiz participant.)

Responsible management of waste

Responsible management of waste can be achieved by:

- providing induction or specific training to help alert staff to their role in effective waste management, as individual actions can make an enormous difference. Allocating responsibility to selected staff for monitoring specific waste areas (preferably volunteers) to ensure corrective action is taken promptly e.g. checking for water, air or steam leaks
- encouraging staff participation through suggestion boxes and incentive programs, and promoting progress through posters or newsletters
- examining major sources of waste to identify inefficiencies
- isolating relatively clean wastewater streams to enable reuse or onsite recycling (refer to *Water efficiency overview (W1)* fact sheet for more information)
- avoiding, reducing and reusing packaging to also reduce landfill disposal costs (refer to *Solid waste overview (R1)* fact sheet)
- segregating waste for recycling to reduce landfill disposal charges (refer to *Recycling solid waste (R4)* fact sheet). Make it easy and straightforward to segregate waste, allocate designated waste management areas and clearly label bins.



STAFF INCENTIVES BRING SAVINGS

Australian Food Corporation, a Queensland food processing company, encourages innovation and ownership of environmental responsibility from all staff. They provide staff training and increase awareness by displaying information in the lunchroom. Rewards are given to staff for the best environmental innovations. This has encouraged more than 50 suggestions in the past year. One suggestion was to use rechargeable batteries for equipment such as inspection torches and probes, saving approximately \$4,000 in 12 months. (Australian Food Corporation is an ecoBiz participant.)

LEAN MANUFACTURING

Lean manufacturing is a strategy to help plant operators identify waste in their processes.

The strategy identifies seven types of process waste:

- overproduction – producing more than is required
- transport – movement of product or materials that does not add value
- motion – excessive searching, walking, bending
- idle time – raw material, equipment, information or people not ready
- over processing – effort that does not add value
- inventory – more raw materials or information that is needed that costs to order, transport, store and dispose
- defects – mistakes requiring rework.

For more information visit QMI Solutions, www.qmisolutions.com.au

The *General overview G1* fact sheet provides more information on the services available to Queensland food processors through QMI Solutions.

IMPROVED PRACTICES REDUCE WASTE

Priestley's Gourmet Delights is reducing waste through staff training. For example, residue in mixing bowls that would become solid waste is being minimised. Cleaning staff monitor bowls sent in for cleaning. If insufficient mixture has been removed, the bowl is returned. The issue is also raised at the daily team meetings where bowls are brought into the meeting room as evidence to be discussed by the group in order to change staff practices. (Priestley's Gourmet Delights is an ecoBiz participant.)

Appropriate storage, handling and transport of materials

Appropriate storage, handling and transport of materials can reduce waste by:

- checking materials for damage when they are delivered and discussing recurring problems with suppliers
- minimising storage of materials and associated storage requirements by scheduling raw material delivery in line with production requirements
- organising warehouses to ensure that older materials are used before new materials
- following correct handling procedures and providing staff with adequate training
- using adequate handling equipment e.g. rubber-tipped lines, to minimise damage



- grouping compatible materials and carefully storing in a designated, secure and clean area under supplier/manufacturer recommended conditions
- replacing dangerous products with less hazardous alternatives
- improving and reducing material transfer to save time, storage requirements and waste.

ACCURATE WEIGHING SAVES MONEY AND TIME

Priestley's Gourmet Delights established a measuring room with staff designated to accurately weigh all the ingredients required for the batches in the next shift. They discovered this led to significant savings in ingredients, for example, saving 60kg of product in each batch on the strawberry slice line. (Priestley's Gourmet Delights is an ecoBiz participant.)

Water consumption and wastewater production reduction

Reduction in water consumption and wastewater production can be achieved by:

- monitoring and prompt repair of water leaks
- effective cleaning through good design and layout, such as:
 - smooth, light-coloured internal walls with an impervious coating which will also reduce lighting requirements
 - easy-to-clean and correctly-sized drains
 - intact, impervious and slip-resistant floors made of appropriate strength material. Floors should be smooth and sloped to drains
 - segregation of dry areas and stores from wet areas
 - easy-to-clean, self-draining equipment design with no dead legs.
- promoting dry cleaning by having cleaning tools in accessible, designated areas and allocating tools for specific tasks or routines
- scheduling production to reduce cleaning requirements, e.g. reduce the chance of food hardening on surfaces by minimising the number of product changes and limiting disruptions such as poor scheduling of raw materials and staff breaks
- maintaining and calibrating process controls to avoid spills and overflows on filling lines
- auditing clean-in-place and container wash systems (refer to *Clean-in-place (W5)* fact sheet)
- carefully selecting, continually monitoring and maintaining nozzles to improve effectiveness and lifespan (refer to *Water efficient processing (W2)* fact sheet)
- taking a holistic approach to chemical selection that considers the purchase price as well as hidden costs, e.g. relatively expensive non-toxic and biodegradable chemicals can be more cost effective when safety, maintenance and wastewater discharge costs are considered
- regularly monitoring, maintaining and cleaning water-using utilities (refer to *Cooling tower efficiency (U2)* and *Boiler efficiency (U3)* fact sheets)
- reusing blowdown from boilers and cooling towers or other applications around the site
- using conductivity probes that are regularly cleaned and calibrated to automatically control and minimise blowdown
- using softeners to enable the tower to operate at higher cycles of concentration
- installing process controls on water-using equipment such as conveyor lines to ensure the water supply is turned off when production stops
- using the minimum amount of water required when cooking or simmering – cover cooking vessels where possible to reduce steam losses
- optimising cooking times by installing alarms if necessary
- minimising the number of utensils used or alternatively use equipment that does not require wet-cleaning such as air knives.



5S

5S is a systematic framework for good housekeeping practices. The strategy was developed in Japan and is based on five words starting with the letter 'S'. The English equivalents are:

- Sorting – removing all items not needed
- Setting in order – placing items for easy access and return
- Shining – cleaning and inspection to keep items in good condition
- Standardising – standards and rules that are easily recognised (a lot of visual management)
- Sustaining – continuous improvement.

For more information visit 5S at QMI Solutions www.qmisolutions.com.au



BETTER MANAGEMENT THROUGH COLOUR CODING

Prepared Foods in Queensland has colour-coded its cleaning equipment and set up individual stations close to where the equipment is needed. The new system allows staff easy access and greater ownership of equipment. Having squeegees and scrapers readily available also helps to promote dry cleaning. (Prepared Foods is an ecoBiz participant.)

Energy consumption reduction

Reduction in energy consumption through can be achieved by:

- **Cooling towers** (refer to *Cooling tower efficiency (U2)* fact sheet)
- Increasing cycles of concentration in the cooling tower in conjunction with the water treatment service provider to reduce blowdown
- Monitoring for leaks, overflows and excessive splashing or drift
- Reducing the load on the refrigeration system such as switching off plant equipment at night or non-production days if possible
- Cleaning the cooling tower when required to ensure effective heat transfer
- Establishing performance contracts with cooling tower and boiler water treatment service providers and ensuring water and energy efficiency is a priority
- Reducing the load on cooling towers, including considering a temperature range closer to ambient temperature on air conditioning thermostats where possible.
- **Boilers** (refer to *Boiler efficiency (U3)* fact sheet)
- Tracking the combustion efficiency of boilers by monitoring flue temperatures and gases. Changes in flue gas temperature or composition can indicate that either the air-to-fuel ratio should be adjusted or that the boiler tubes should be cleaned
- Reducing scale in the boiler by ensuring effective feed water treatment and good water analysis
- Regularly cleaning boilers to remove scale and soot to ensure effective heat transfer in boilers
- Checking and repairing air leaks infiltrating the boiler, and water and steam leaks from the boiler system
- Maintaining steam traps
- Correctly sizing and installing boiler pipework including steam traps in areas where condensate will collect. Remove redundant pipework, ensure pipework is correctly sized and avoid pipes sloping upwards against the direction of flow
- Reducing hot water requirements by identifying where heated water is used and if it could be replaced by cooler water
- Starting up boilers as late as possible and shutting them down as early as possible
- Cascading heat for plants with several heating needs. Use the exhaust heat from one part of the process to heat another.



Regularly check level of cooling tower

- **Compressed air** (refer to *Compressed air efficiency (U4)* fact sheet)
- checking for air leaks and maintaining/cleaning air treatment components such as filters in compressed air systems
- only using compressed air where necessary – for lower pressure applications use a blower or fan.
- **Refrigeration** (refer to *Refrigeration efficiency (U5)* fact sheet)
- cleaning condensers on refrigeration units regularly to promote efficient heat transfer
- setting thermostats on cold rooms of freezers only as low as necessary
- regularly cleaning and defrosting evaporators and investigating if defrost water can be used elsewhere in the plant
- reducing heat ingress into the plant by encouraging good operator practice such as closing doors and turning off lights in unoccupied refrigerated space. Plastic strip curtains or swinging doors are important for frequently opened areas. Automatic door closure and light switches or alarm systems can be considered if this is not effective
- maintaining insulation and door seals
- using cold room space effectively and considering closing off unused space
- cooling down product before placing in refrigerated areas
- insulating all chilled and heated process lines and units including suction lines to the compressor
- checking levels of refrigerant to ensure it is not leaking from the system.

Workplace health and safety management

Workplace health and safety management can be improved by:

- supplying and properly maintaining personal protective equipment and providing training in proper use
- reducing health risks to workers such as controlling air emissions and lowering noise levels, including exhaust systems
- providing adequate staff training (operational and safety)
- minimising odour (see *Odour control (G3)* fact sheet)
- minimising the risk of an accident or fire including storing fuel in secure and appropriate locations
- creating a safe environment for employees such as non-slip floors, safety showers, adequate provisions in case of an accident or fire.

This series of fact sheets provide examples and suggestions to the modern food processor on how to achieve both economic and environmental benefits from eco-efficiency. Visit the project website www.ecoefficiency.com.au for more ideas and case studies.

The eco-efficiency for the Queensland food processing industry project is an initiative of the Department of Tourism, Regional Development and Industry and the Environmental Protection Agency with technical information provided by UniQuest through the UNEP Working Group for Cleaner Production.