January 2009

Article for European Baker

TAKING THE COST OUT OF CLEANING

Neil Brown, Hygiene Group

In the food sector, a clean environment is an essential part of safe and legal handling and processing. It can often represent a significant cost as it simply has to be got right to avoid physical or micro-contamination and other issues of quality and product life. Yet many food production and processing plants spend far more than they need to on both cleaning and wastage resulting from inefficiencies in production and cleaning processes.

Poorly maintained equipment contributes significantly to unnecessary extra cleaning. Engineering leakages and other mechanical problems, if not rapidly attended to, don't just result in production downtime, but extra work for cleaners. Oils and hydraulic fluids, for example, can be highly toxic and must be completely removed before equipment can be used.

However, a frequently far more time-consuming task is removing highly adherent, stubborn substances spilled into food handling areas.

Once congealed, thickening agents such as lecithin, and even common ingredients like malt or honey, result in a lengthy task to restore affected equipment to a clean, usable condition. With conveyors, for example, soiling that dries on links or slats makes them stiff. This greatly increases the power

required to keep the belts running and, on start-up, the additional loading can even cause motors to burn out. Yet it would be very simple, and cheap, to plan regular surface checking and light cleaning at break times or product changeovers.

Waste is also created indirectly when ingredients or even completed items are not cleared away and correctly stored at shift end. In some large-scale bakeries, for example racks of pork pies are left to cool next to ovens – sometimes for several hours after main production has finished. Also, it is far from unknown for sandwich manufacturers to store loaves for tomorrow's production adjacent to the lines. It is almost impossible to avoid these being contaminated, if not directly with water spray then with the aerosols from rinsing and cleaning, or with splashes from the adjacent floor. It is almost unthinkable that companies are prepared to accept these levels of waste as normal – and it is sadly not unthinkable that many do not regard these as unsound products.

As well as enhanced production processes, companies can do more to ensure the cleaning process itself works optimally. In some food processing environments which are cleaned overnight, available hot water typically only lasts until 1 or 2am. In fact, many factories do not provide sufficient hot water for the whole cleaning cycle – production facilities have grown but investment in water heating equipment has not always kept pace. Raising the temperature of any chemical reaction by just 10^0C doubles its rate; for the same reasons, raising the temperature of water used for cleaning by 10^0C can significantly reduce required cleaning time by increasing the rate at which the detergent works. There is, of course, a cost for heating the water, but it is invariably lower than the extra time needed to clean with colder water.

Properly maintaining equipment will also help reduce cleaning time, and hence costs. For example, many 'pressure-pot' foam generators commonly used in food production environments are illegal. They are air receivers, and it is a legal requirement that they, as well as the air compressors, are regularly

tested. Most, however, are not and in consequence they can fall off the engineers' radar and so lack basic routine maintenance.

It is common to find these machines with only one wheel, broken pressure gauges, or leaking hoses and lances. In addition, the valve for creating the foam is commonly stuck. Hence, the machine is almost impossible to move, leaking chemicals make it unpleasant and possibly risky to use, and the foam produced is either so thick that it cannot wet the surface or be rinsed away, or so thin that it hardly clings at all. This wastes time and delivers poor results – and all for the sake of simple, cheap, preventative maintenance.

Similarly, incorrect dosing - using detergents and other products at a lower or higher dilution than prescribed - again wastes both time and product, with the wrong concentration invariably impacting on cleaning effectiveness. Most detergents for manual use are designed to be used at around 5%. A slightly higher concentration may improve results a little, though possibly with an adverse effect on rinseability and consequent streaking, but above that, cleaning quality rapidly drops, as these products require significant water present to suspend removed soils and permit effective rinsing. Conversely, low concentrations may begin to remove soils but often cannot control water scale, and prove unable to keep the removed soils in suspension; complex soil components can be re-deposited and form scales and deposits. These can then trap further soils and provide harbourage for bacterial growth and infection - removing these deposits is difficult, time-consuming and expensive.

The same applies to disinfectants. An amphoteric which delivers a 5-Log kill at 1% v/v will commonly perform less well at 5 or 10% and, as a concentrate, may actually support growth of those same types of bacteria! For example, where material is allowed to partially dry around the cap of the stock bottle or sprayer, a thick deposit can accumulate; as well as growing its own bug culture, using a sprayer like this without cleaning it simply spreads the infection further afield.

Ignorance about product concentration and use also affects the health and safety of cleaning operatives. Unnecessarily high concentrations may lead to chemical burns from splashes, but the use of high-pressure equipment to apply disinfectants can generate aerosols that directly affect lung tissue, with effects ranging from light-headedness and coughing to localised tissue scarring, and has been implicated in more severe and longer-lasting conditions.

Simple measures to ensure correct dilution will save time and money in the long run. Measuring jugs are cheap, while all major chemical suppliers provide suitable kits to test and confirm product concentrations. But it is nearly as cheap and far more accurate to use simple product venturis costing well under a hundred pounds, while in-line dilution pumps cost just a few hundred pounds and deliver accurate, safe and long-lived product control that can pay for itself within a year.

Materials wastage isn’t helped by another common misperception - that having a lot of water around creates a cleaner working environment – meaning hoses are often left running unattended for hours on end. This wastes a precious and increasingly expensive resource - to say nothing of the risks posed to production staff and cleaning operatives by a permanently wet and slippery floor.

Many companies do not help their cleaning resource – whether in-house or a contract cleaning company - or indeed the overall process, by misplaced concerns about cleaning material safety, often quoting as justification the pH of the concentrate. Some even have policies restricting or banning materials with a pH of much below 4 or above about 9 or 10, assuming these pose a severe risk to the user. These can be still more restrictive where the product contains chlorine, pointing to a potential risk of this mixing with an acid and releasing chlorine gas. This approach costs money and time if it prevents a more cost-effective material being used – and does not necessarily reduce operator risks at all.

Strong acids, perhaps at a pH of around 0.5 to 1.0, are potentially hazardous and should be treated with respect, as should strong alkalis such as sodium hydroxide solutions above pH 13 or 14. But systems exist to ensure they can be handled safely and effectively and deliver cost-effective cleaning, so why not invest in these?

In fact, many common and domestic materials are already outside these supposedly ‘safe’ limits - citrus juices are acidic at pH 2 to 2.5 and beer comes in at around pH4.5, but neither is seen as a health risk, at least on pH grounds. Soaps and shampoos are mostly alkaline, often working best at between pH 8 or 9, while many people are surprised that sodium hydroxide (caustic soda) is often an ingredient of mouthwashes, and sodium carbonate (washing soda) is commonly an ingredient of toothpastes.

Concerns over safety are laudable and necessary, but what is needed is not a ‘knee-jerk’ ban based on a perceived risk, but decisions founded on facts from effective risk assessments, simple and practical training in safe and effective chemical handling, investment in appropriate dosing and dilution equipment and the provision of suitable PPE.

And should chlorine be used? As part of a formulated detergent, it provides a highly cost-effective approach to removing proteins or complex soils – and typically also delivers a significant microbiological kill. If used at the recommended concentration, there is seldom any measurable chlorine available by the time the detergent has reacted with the organic soils during the cleaning process, and none by the time it has been rinsed.

Cleaning is a necessity, and should be viewed as something that makes it possible to produce, and not a necessary evil, undertaken only after production has finished. Its cost can be reduced if companies are prepared to take a few simple steps in terms of integrating both production and cleaning - minimising both the time and resources used, avoiding unnecessary wastage of ingredients and end products, and using the right cleaning materials for the job.

Ends

Notes to Editors

Hygiene has grown from modest beginnings 25 years ago to become the largest and leading supplier of hygiene management in the UK. It can be visited at www.hygiene.co.uk.

For further information, please contact Luke Bull at Wyatt International:
Tel: 0121 454 8181 lbull@wyattinternational.com