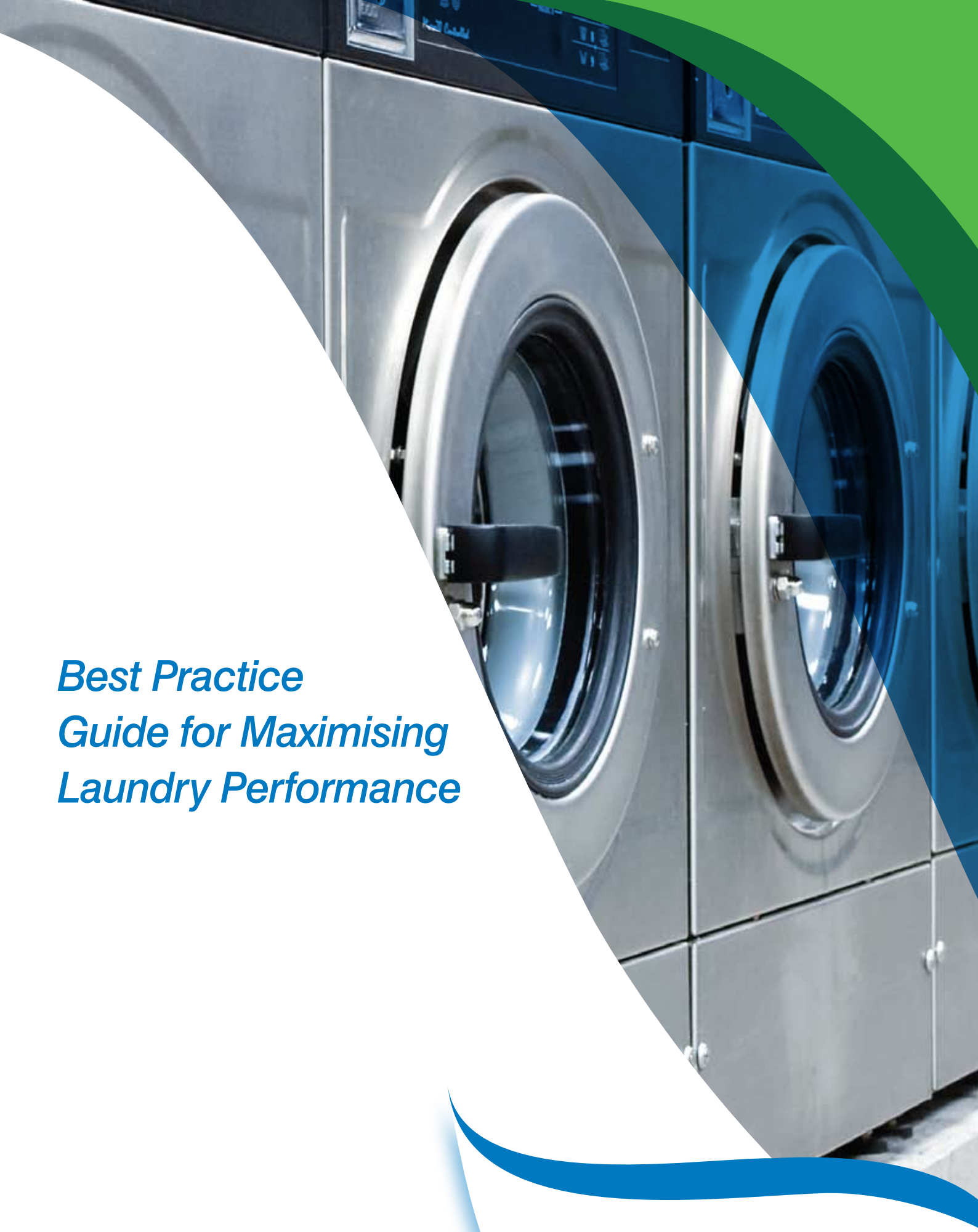

Best Practice Guide for Maximising Laundry Performance

State Government Victoria

Making Water Work
Laundries Water Efficiency Program

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Introduction

There is potential in every laundry to reduce operating costs, improve operating efficiencies, improve the results and - at the same time – reduce water, gas and energy use. To achieve these goals requires a detailed knowledge of the total operation of your laundry. Once the required information has been sourced and verified it will then be possible to implement better practice procedures to achieve the desired reduction in operating costs, lower utilities usage and improved overall performance.

The Laundries Water Efficiency Program has developed this best practice guide to assist the laundry manager assess their own operation and to provide a plan for practical changes that will save money whilst maintaining product quality.

Assessing the Efficiency of Current Laundry Practices

The first step to making any improvement to a laundry business is to know what the industry benchmarks are and for the laundry manager to complete an on-site survey to determine how their own laundry compares with those benchmarks (or 'standards'). Once this is established, the manager will then have a valuable blueprint to achieve significant improvements in their operation.

How much linen is processed each day?

The development of good production standards begins with knowledge of the quantity of linen processed in the laundry. ***This point cannot be over-emphasised and every effort should be made to establish this figure.***

Weigh your linen - hire digital scales and physically weigh the washed and dried linen before it leaves the laundry. This should be done for two weeks or more and averaged to gain an accurate record of kilograms processed per week.

Count your linen - count the number of articles according to type. The average weights outlined in Table 1 can be applied to gain a reasonably accurate picture of laundry output. (Personal clothing would still have to be weighed for the sake of accuracy.)

As the weight of laundry reduces by up to 25% after 6 months of continual laundering, the figures in Table 1 are to be interpreted as a guide. A more accurate representation can be created by obtaining the average weight of 8 sample items from each category.
Items such as linen bags, doonas, woollen blankets and other items used in the facility should also be weighed and added to the above table.

Table 1

Item	Weight (kg)
Sheet	0.8
Pillow slip	0.15
Towel	0.37
Hand towel	0.2
Face towel	0.05
Bath mat	0.25
Napkin	0.05
Table cloth	
Incont. pad (half)	0.5
Incont. pad (full)	1.0
Cotton blanket	1.0
Woollen blanket	
Doona cover	
Linen bag	
Mop	

The quantity of linen processed every week is the cornerstone of the laundry operation! Once this is accurately known, everything else in the laundry revolves around this information including laundry procedures, the staff hours, the size of machinery required, and ultimately the production costs per kilo of linen. These production costs are an aggregate of all laundry costs including wages, linen replacement, utilities, chemicals, maintenance, depreciation etc. When these individual production costs are itemised the laundry manager then has a benchmark to compare their costs and efficiencies with other similar laundries.

Is equipment correctly sized?

Equipment sizing is one of the most significant issues to impact on your costs. Undersized laundry machinery is the prime reason for high laundry costs and infection control risks. This results in staff:

- *having to work longer hours to get the washing done.*
- *taking shortcuts so they can finish within the hours allotted.*
- *tending to put a lot of the washing through on short cycles.*
- *forwarding the program through some of the steps, omitting a pre-wash, or rinse, or shortening the wash time.*
- *increasing the usage of domestic washing machines because of the backlog of washing, and the shorter wash times, which again is not the ideal situation.*

The ratio of dryers to washers is also very important. Working with undersized dryers is one of the biggest causes of bottlenecks in a laundry. Various methods are used to get around this with the most common being under-loading the washers to match the dryer size. This is not good for the machinery or the linen due to the increased action, and it is wasteful in energy, chemicals and water.

For medium speed washer machines the correct ratio for washer to dryer capacity is approximately 1:1.6. This is because the washing needs more room to revolve around the dryer drum so the hot air can dry the clothes efficiently. If a dryer is packed too tightly it will take considerably longer to dry the washing. For high-speed washing machines the washer/dryer ratio is 1:1.2, as the high speed spin removes considerably more water out of the linen. Some common matches are as follows:

Table 2

Washing machine: Medium speed	Matching dryer
12kg	18kg
22kg	35kg
32kg	50kg
40kg	64kg
50kg	80kg
Washing machine: High speed	**Matching dryer**
12kg	15kg
22kg	28kg
32kg	38kg
40kg	50kg
50kg	60kg

Are machines properly maintained?

It is very important (particularly in regard to aged machinery) to ensure the laundry machines are serviced by experienced laundry service contractors. For instance it is important to ensure pressure switches and/or fill gauges are working correctly. Laundry machines that are incorrectly calibrated may be using too high dip levels. Laundries could reduce their water use by another 5% or more when the laundry machines are functioning according to specification. Where flush manifold systems are used as part of the chemical injection system, it is advisable to work with your chemical supplier to reduce the amount of time used to flush chemicals into the laundry machine, or, adjust the fill level of the machine to compensate for the extra water from the flush manifold.

Are rewash levels at an acceptable level?

Every laundry should implement a strict classification procedure so that only very soiled linen is washed in heavy duty wash programs. Proper classification of linen is important. A strong relationship with your equipment and chemical suppliers will assist in ensuring classifications are correct.

Table 3

Linen Type	Acceptable rewash Level
Standard Linen	2-3%
Very Soiled Linen	Up to 10%
Restaurant Linen	Up to 30%

Rewash levels lower than 1%:

Indication of excessive concentrations of chemicals and high heat

Cause - All linen regardless of soiling levels processed using heavy soiling wash processes.

Result - Significant linen damage, high maintenance costs and sewerage pipe blockages.

Rewash levels higher than accepted levels:

Indication of incorrect linen classification or washing procedures

Result - Discoloured and unclean linen or increase in labour time to rewash for stain removal.

What is the production rate?
(Kilograms of linen processed per staff hour)

The production rate of linen through the laundry is calculated using all staff time associated with the laundry including distribution and despatch. This production rate will vary slightly depending on what is being processed and the methods used. Labour costs are always the highest overhead in any laundry. Maintaining efficient production rates will ensure economical running of the laundry.

Table 4

Laundry Type	Kilogram per staff hour
Small/Medium	30-40
Healthcare	30-35
Hotel	>35
Inefficient	Less than 30

What is the operating cost per kilogram of linen?

The operating cost per kilogram of linen includes all costs associated within the laundry including utilities, labour, depreciation of machinery, replacement of linen, chemicals and other sundry costs.

Note: a laundry washing large amounts of restaurant linen will have a higher operating cost due to the heavy duty programs required. A laundry washing mostly sheets and towels will have very low operating costs per kilogram.

Table 5

Laundry Type	Lightly soiled linen - $/Kg
Average On-Premise	$1.40
Commercial	$1.20
Laundry Type	**Heavily soiled linen - $/Kg**
Average On-Premise	$1.70
Commercial	$1.35

How many litres of water are used per kilogram of linen?

The number of litres of water used per kilogram of linen is dependent on the condition of the machine, the program used and the items being washed. Operator inefficiencies such as under-loading of machines also need to be recognised. Recycling rinse and rain water will also assist reducing the amount of potable water required.

Table 6

Machine Type	Litres water per Kg linen
Un-maintained machine	28-35
Standard machine	18-20
New efficient machine	12-15
Continuous Batch washer	<10

Increasing Production Rates

For on-premise laundries and smaller commercial laundries there are a number of operating procedures that should be examined. Once this has been done it will enable management to put in place a set of guidelines that will ensure optimum resource efficiency.
For larger commercial laundries the opportunity to reduce utility usage will depend largely on equipment efficiencies and the ability of management to explore the possibilities of implementing water and energy reduction technologies such as water recycling, heat transfer and ozone equipment.

Common problems resulting in inefficiencies

Staff Behaviour

There are a number of procedures that are influenced by staff behaviour that effect the use of water and other operational costs. For example:

Under-loading washing machines	Substantial waste of water and energy
Manipulating the wash cycle	Resulting in high reject rates which require rewashing
Using short cycles for heavily stained items	Resulting in high reject rates which require rewashing
Improper classification at the point of generation	Which means laundry staff have to stop and sort
Over loading washing machines	Resulting in high reject rates and requiring rewashing
Washing everything together instead of taking the time to pre-sort	Resulting in high rewash and infection risks
Over-drying of linen	Discolours linen and reduces the linen life, eg. ragged edges of towels while the middle is in good condition usually indicates over-drying.
Incorrect chemical dose	Resulting in high rewash and potential health risks where too much chemical is added.

Equipment Sizing

Equipment sizing is critical to a smooth operation. Wrongly matched equipment is one of the biggest timewasters in any laundry. For example:

Dryer capacity too small	Results in bottlenecks while staff wait for a dryer to become free
Washing equipment capacity too small	Results in staff having to do a lot of small washes, thereby extending laundry operating hours and using very large amount of water and energy. This is a very costly mistake for a laundry operation and if a proper evaluation was completed it would likely show that the cost of new equipment would be recouped within a year or two.

Laundry Hydraulics

Efficient laundry hydraulics is essential to keep down the running costs of a laundry. For example:

Hot water pipes not lagged	Heat loss
The hot water capacity is too small so the laundry quickly runs out of hot water	The laundry machine then takes longer to finish the cycle while the cool water heats up, thereby slowing production. This also increases maintenance costs as heater elements wear out faster.
The incoming water pipes are too small	Machines take too long to fill as per above
Steam valves leaking	Increased water and energy cost

The water pressure is too low	Laundry machines take too long to fill thereby extending the wash times (Water pressure should be at the maximum of the machinery specifications – usually around 80psi). An average size laundry machine should take less than one minute to fill to the correct level.
Hot water systems too far from laundry machines	Resulting in heat loss. Laundry machine heaters have to re-heat the water to the required temperature which extends the wash time and is expensive in energy.

Changing Work Practices

In many laundries, 80% of the linen washed is almost clean eg hotel sheets and towels, yet all linen is washed in an extensive program of hot water and chemicals. With proper classification the majority of washing can be completed with significantly reduced water, energy and chemicals while keeping rewash levels to a minimum.

A large amount of washing can actually be cleaned with unheated water in a short cycle and minimum detergent. Significant amounts of experimentation has shown that a short wash consisting of a main wash and two rinses in cold water, using neutral detergent and chlorine bleach will produce sparklingly clean and bug-free linen. The chlorine bleach is very safe to use in cool water and less damaging to clothes than peroxides in high heat. For white linen use 100ppm chlorine in the wash, and for colours use 50ppm chlorine. As there is no alkali used there is no requirement for softener or sour, therefore drying times can also be reduced by up to 20%. (This should be done in conjunction with your chemical supplier.)

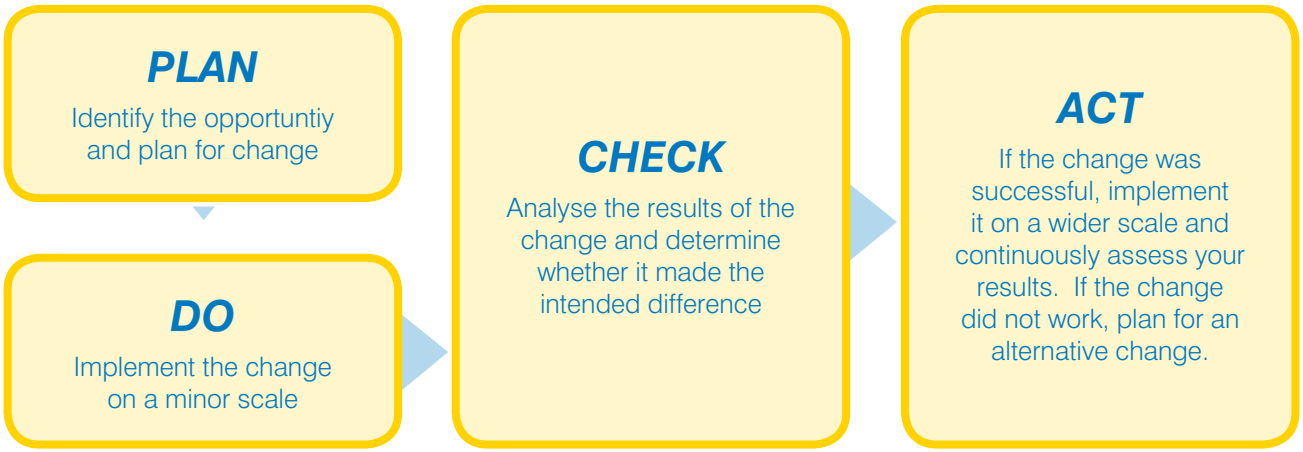
AS/NZS 4146:2000 allows for chemical disinfection as opposed to thermal disinfection and there are several chemical suppliers who will provide validation of chemical disinfection.

To successfully implement changes in washing practices it is important that procedures are put in place so that either only clean linen goes through the shortened cycles and stained linen is treated in a separate heavy duty cycle, or... all washing goes through the shortened cycles and stained linen is separated after the wash process and treated appropriately. (It is better if the stained linen is extracted prior to drying as drying tends to set stains more permanently.)

Implementing quality improvements

There are substantial variances in the procedures, quality and economic viability of on-premise laundries and commercial linen services. The linen services industry has been less regulated than other services such as food service, due to the lower risks to health and safety. As a result, there is significant opportunity to improve procedures to ensure that the laundry is and remains an area of low risk.

A quality improvement cycle is the documented process to undertake to improve an outcome



Establishing a quality cycle will result in your laundry being operated at maximum efficiency for minimum costs. The quality path can vary depending on your current level of operation, however, if performed properly, the journey to quality assurance is inevitably more profitable both in improved efficiencies and the opportunity to attract quality customers. In addition, the added benefit in the case of a laundry operation is the significant improvement to the environment in water and greenhouse gas reduction.