



Best Practice: Water Efficiency for Firefighting Training

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CITY: MELBOURNE

POLICY AREA: FIRE & EMERGENCY MANAGEMENT

BEST PRACTICE

The Melbourne Metropolitan Fire Brigade has designed a **water recycling pod**, which is a large container that can hold up to 5,000-6,000 liters (1,300-1,600 US gallons) of water, to capture and recycle water used during training. The use of the pod saves up to 60 mega liters (15.8 million US gallons) of water a year. Given Melbourne's 13-year drought, water recycling is imperative, the water recycling pod is an innovative way to reuse a high volume of water typically wasted during training exercises.

ISSUE

Firefighting training that simulates real life situations is critical to the safety of the public and to the success of firefighting and emergency services. This training requires the use of a large quantity of water which is normally discharged directly into the storm water system. In addition, because the water used for firefighting training is sourced from un-metered hydrants, it is difficult to measure the exact quantity used.

Water savings also helps mitigate the effects of Melbourne's thirteen year drought. The Minister for Water encourages Melbournians' to limit their water usage to 155 liters (41 gallons) per day. The Victorian government had also encouraged government agencies and emergency services to cut water consumption by 15%. As a responsible civic organization, the Metropolitan Fire Brigade (MFB) looked for ways to prevent wasting the scarce supply of water. For every hour of a firefighting drill, 70,000 liters (18,500 US gallons) of water may be used. The estimated average weekly household usage is 4,760 liters (1,200 US gallons). Thus, the MFB can save the amount of water used by 210 households weekly by using the new water recycling pod for just one hour.

GOALS AND OBJECTIVES

The MFB, in partnership with an engineering consultancy, developed the water recycling pod initiative to gain a greater understanding and awareness of its actual water use while reducing its water intake.

The immediate benefits of the project are twofold. First, the pod has the potential to save up to 60 mega liters (15.8 million US gallons) of water a year. Water from within the pod is assessed regularly for its suitability for secondary purposes. Such purposes include reuse within the fire service facility and community facilities such as parklands, sports fields and toilet flushing at public amenities. Secondly, the benchmarking of the amount of water used in firefighting training and ongoing recording and management of supply helps the MFB gain a better understanding of the supply and demand of the unmetered water used in fire skills training.

IMPLEMENTATION

Summary of the process from Concept to Construction

When the project concept was first raised in 2005, it was discussed as a means to make training on pump operations at fire stations easier and more practical, thereby reducing the strain on operational activities. It was noted that the pod also reduced the amount of water used by the Brigade. The concept was then brought before the MFB executive level who, after determining that the project was viable, approved moving forward. The pod was then designed by a committee represented by firefighters, technical staff, trainers and management in the following year. The Executive Management Team (EMT) approved the testing of a prototype recycling pod so that

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evaluation data could be obtained. Funding for the prototype came from the MFB along with a government grant of 150,000 AUD (\$155,640 USD) from the Smart Water Fund of Victoria.

The process of gathering bids started on December 30, 2005. A number of companies were selected to construct the pods. Currently, there are three pods completed and one being constructed.

Trials were conducted over a fourteen week period and over a thousand fire fighters had the opportunity to evaluate and provide input into the design and operation of the pod. The target was to save 20 million liters (5.3 million US gallons) of water.



The pod stores up to 7,000 liters (1,850 US gallons) of water and is connected to a closed loop training pump allowing water to be captured, recirculated and stored for up to four days before it needs to be replaced. Picture of Water Recycling Module in use

The pod is transportable by truck and is used at different training locations. Meters were installed initially at four training sites to measure water use: Thornbury, Oakleigh, Thomastown and Sunshine. This enabled the MFB to monitor how much water was used.

To assist with implementation and to ensure full integration of pod usage into the existing training program, training manuals were produced for the staff.

After four days in the pod, water is used for cleaning MFB trucks or facilities or is taken by various City Council's Parks and Gardens Departments to use to water green spaces and for a number of uses at community facilities.

The involvement of firefighters at station level to supply feedback to the project provided recommendations to be adopted which produced an improved final product. This feedback has provided an efficient transition from prototype to implementation of the Water Recycling Module Program. With 5 pods now servicing each of the four zones of Melbourne and the MFB Mechanical Engineering Department, the areas of training and pump testing have been serviced well and access to a pod in close proximity to all locations is achieved. The training departments are also regular users of the pods to supplement water supplies during peak pumper training with recruits.

The MFB's approach to scheduled skills maintenance revolves around the designated pump training stations where the water pods are situated. Twice a week skills maintenance sessions are scheduled and booking of the designated pump stations is ever increasing. With the influx of more new firefighters the dependency on these pods will increase, management will evaluate the introduction of future pods as required.

Proven durability of the pods is a factor with only minor maintenance and replacement parts required, regular servicing reduces costs to ensure there is little or no down time in their operation. Cost savings both with water and fuel make the pods cost efficient to the MFB and it ensures pump training can continue without interruption

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regardless of climate conditions. For the MFB this has been a very successful program both for firefighters and management, combining best practice, improvements to skills training and addressing environmental issues.



Photo of Water Recycling Module

COST

It cost 85,000 AUD (\$88,196 USD) for the MFB to design and build the first water recycling pod. Upgraded pods cost approximately 112,000 AUD (\$116,211 USD) to construct. Ongoing expenditures include diesel fuel and maintenance, which is performed approximately once every three months. Examples of maintenance of the pod are removing rust, checking filters, ensuring the diesel engine is serviced in line with manufacturers' requirements and making sure all gauges work properly. The unit is also inspected each time it is used.

RESULTS AND EVALUATION

The MFB, with an innovative approach to water conservation, such as the water recycling module program and other water saving initiatives was successful in reducing metered water consumption by approximately 23% last year. Initial estimates and projections, and overall goals for water savings were 60 Mega liters a year (15.8 million US gallons), and with all 5 modules running, data recorded shows that in the 2011 year 51.6 Mega liters (13.6 million US gallons) were recycled. Projected figures for 2012 are looking at recycling over 60 Mega litres (15.8 million US gallons), which puts the program on track to reach initial targets.

TIMELINE

Mid 2005	Approval from Metropolitan Fire Brigade (MFB)
Late 2005	MFB designed the first pod
September 2007	First pod unveiled
October 2007- June 2008	Trial Period
2009	The MFB is recognized by Smart Water Fund of Victoria



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2011	A recorded 51.6 Mega liters (13.6 million US gallons) recycled by the 5 modules in operation, reducing water consumption by 23%
2012	Projected recycling of over 60 Mega liters (15.8 million US gallons)

LEGISLATION

The Metropolitan Fire Brigade is a statutory authority and therefore has control over its budget expenditures, providing the expenditures cover operating costs and can be justified as expending funds in line with its core business and/or demonstrates cost savings and public benefit. The MFB complies with all government accounting procedures and policies.

The project is in compliance with following pieces of legislation or practices:

- Occupation Health and Safety Act
- Falls from heights
- Pool regulations
- Water quality management
- Contamination procedures
- Training requirements

LESSONS LEARNED

There were no major setbacks in the process of designing, constructing and testing the water recycling pod. However, a few minor design tweaks would have been helpful, such as stainless steel components and larger pumps.

Before using the recycle pod, firefighters were given a thorough briefing and demonstration on the use of the pod. Operating instructions were given to the fire stations and there is a laminated set of instructions attached to the pod. A training manual is in draft form and will be ready for general publication in late 2010. Involving firefighters in every step of the process, from design to testing and implementation, allowed for feedback that helped improve the final design of the Water Recycling Module.

This project also integrates well with other MFB projects, including the installation of rainwater tanks at most sites or use of storm water runoff collection to use for filling the pods. In fact, most facilities currently collect rainwater, treat it and use it for other purposes.

TRANSFERABILITY

A unique characteristic about firefighting in Melbourne is that transportable pods are often used in addition to fire trucks. Different types of pods can be transported to various locations. For example, the MFB has a transportable pod that can be used to accommodate firefighters' basic needs (food, shelter). Therefore, the MFB has a unique advantage over other fire departments given their design expertise.

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