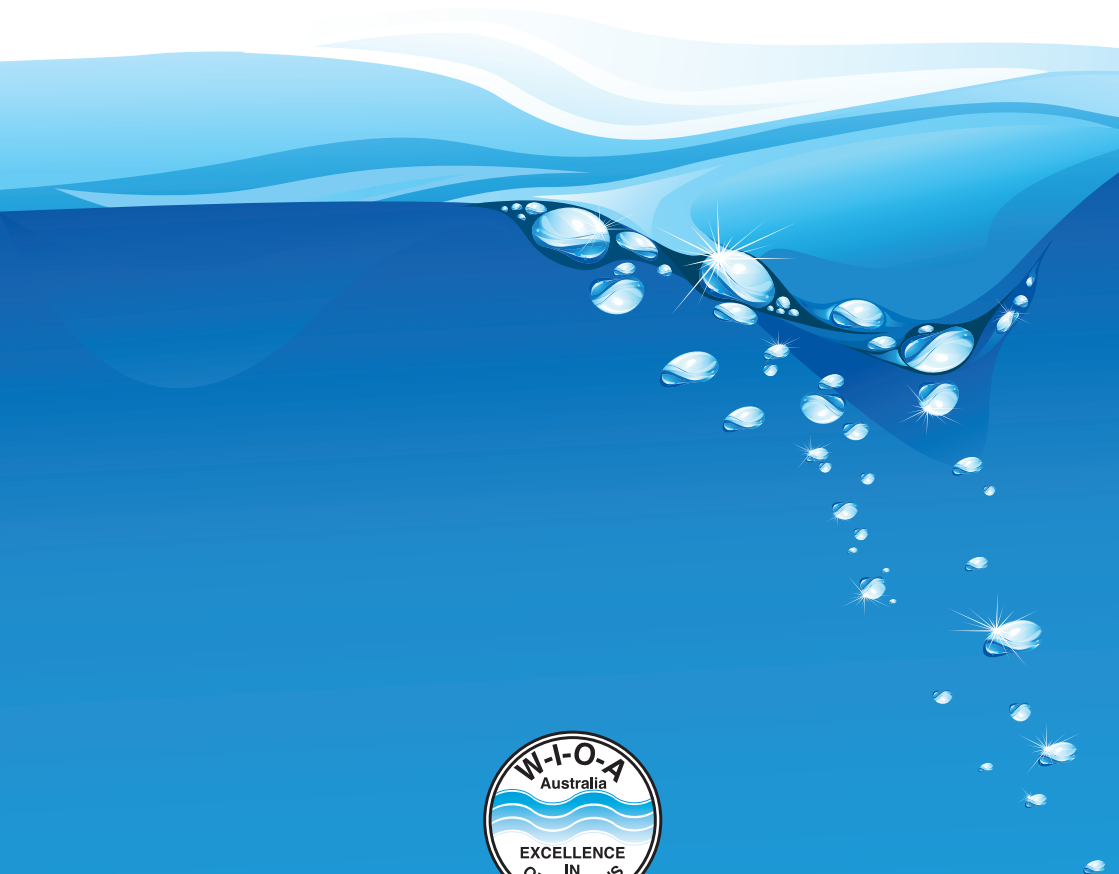


# a PASS

Problem Accepted - Solution Supplied



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## Objectives of the Award

- 1** To create an opportunity which encourages water industry operational staff to share their in the field innovations and/or fixes to problems so that others in the water industry can benefit.
- 2** To provide an application process which is easy to complete and utilises a standard template. This will give all water industry operational staff the same opportunity for presenting their innovation.
- 3** To provide the opportunity for operational staff to receive recognition for their innovation and efforts.
- 4** To encourage operational staff to become aware of and involved with the Water Industry Operators Association of Australia (WIOA).
- 5** To allow WIOA to share the good ideas and innovations with other Members through the Operator magazine and/or other publications.



Providing opportunity for water industry operational staff to share their in the field innovations & fixes to problems so that others in the water industry can benefit.





## ***The Process***

The PASS application Template and more details on the Award can be found on the WIOA web site [wioa.org.au/awards/PASS.htm](http://wioa.org.au/awards/PASS.htm) or can be obtained from the WIOA office.


## ***Judging***

All PASS applications received in the 12 month period ending 1st March annually, will be assessed by an independent panel on a number of criteria, including:

- Commonality of the problem
- Benefit to OH&S, Water Quality, and the Environment
- Financial and sustainability benefits
- Application to other industries
- Uniqueness, adaptability and simplicity

## ***Reward***

The person who submits the PASS application deemed best in that particular year will be announced the winner of the PASS Award at the WIOANSW Conference. Aqualift Pacific Pty Ltd, as the PASS Award sponsor, will provide sponsorship of \$2000 for the winner to join the WIOA team on their annual operational tour of New Zealand including attendance at NZ operations conference.



# 2010 Winner



I am not a young man anymore and it is a great boost to ones self esteem to pick up such an award. Although I have a mechanical background we are not all engineers and some of the best ideas come from grass roots. There are a lot of clever people working in this industry and this award gives those people a chance to put their ideas forward.

*Wayne Shaw*

## Measuring pH Problems Overcome

### *Wayne Shaw* Water Treatment Technician Gippsland Water

**What was the problem that you experienced?**  
Incorrect readings from online pH analyser measuring the pH of the dosed water at the Water Treatment Plant. I might add here that our inline meters / analysers are routinely checked and calibrated by our maintenance contractors.

**How did the problem impact you or your work situation?**

The result of the problem was a reportable high aluminium residual in the towns chemical analysis samples. This was not showing up in the lab testing at the plant but more so in the pipelines in the town as the dissolved aluminium came out of solution following pH correction.

**How long had the problem occurred?**

Not sure of the exact time but, consider it would have only been the amount of time between the normal quarterly retic. samples.

## the solution

**How did you come up with the solution?**

I checked the pH using the portable pH meter which indicated a pH of 5.3 compared to the online unit at 6.00 +/- 0.2. I decided to check it again using my old comparator using Bromo Cresol Purple reagent tablets. The tablets are getting old but still indicated a pH in the region of 5.3. Maintenance personal were brought in to recalibrate the online meter, after which the same tests were carried out with the same result. Another maintenance Technician was consulted and following another full calibration and checking his thoughts were that the flow rate through the online fitting was too fast. Therein lay the problem as a high volume of water through the meter was required to keep the loop delay times for dosing to a minimum. To prove this I removed the probe from the online fitting and put it into a small bucket that the drainage flow from the supply to the unit ran into. In a very short time the online meter was reading near enough the same as the portable meter. I put the maintenance Techs, that we need a vessel to be able to get a high volume low velocity flow.



#### Who helped work on the solution?

The two maintenance technicians who carried out the cleans and calibrations of the meter and probe and also verified the results that I was obtaining. Maintenance fitter Duane Kelly and I set about designing and building the vessel which is currently in place and keeping the coag pH on track due to reliable accurate readings.

#### Describe the solution.

The solution was to be able to keep up a high volume flow with a low velocity around the pH probe.

#### How has it helped you at work?

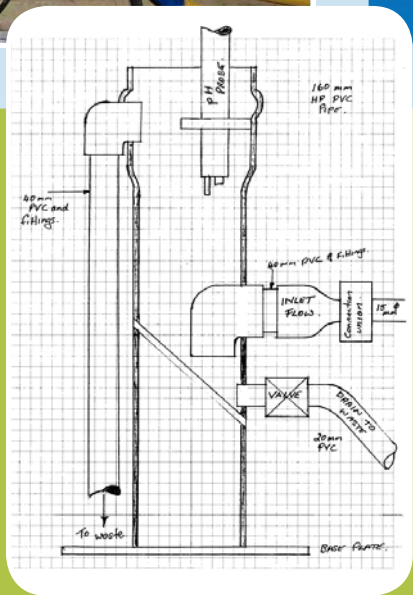
It has eliminated the worry of high aluminum residuals in the water supply leaving the Water Treatment Plant. Due to the reliable readings the chemical dosing is more accurate which translates to less chemical used to achieve the same result and so lower operating costs although small in the overall scheme but still a saving.

#### Suggest improvements.

Possibly work on having these units made to be able to install them as inline units. Haven't done this yet but I have an idea for what I would install at my plant. Design in the pipeline.

#### Any other comments you would like to make?

Since the first unit was built I have installed another one on the raw water pH unit and this has also led to much more stable readings.



# Stainless Band Fastner

*Allan Amos*  
**Water Service Operator**  
**Mid Coast Water - NSW**

**What was the problem that you experienced?**

Whilst doing up the stainless steel band on repair jobs, we are often bending over, down in the mud, and ditches. There was a safety issue with being in this position and the work was dirty, and your hand movements were often restricted, and hands would slip whilst trying to fully tighten the nuts.

**How did the problem impact you or your work situation?**

If you had a large number of bolts to tighten, then you were forced to be in the bent over position for some time, and you could suffer an aching back, as well as being down in the dirty work environment.

**How long had the problem occurred?**

This problem had always existed - whenever repairing mains etc.



Traditional method of tightening nuts.



SS Band Fastener

## THE SOLUTION

**How did you come up with the solution?**

Identified that there was a need to stand upright - if you had a sore back, then you were less likely to 'volunteer' to be down in the ditch!

**Who helped work on the solution?**

Just myself.

**Describe the solution.**

I welded a socket of the correct size (matching the SS band nuts) onto the end of a gal pipe. To the other end was welded a 25mm male attachment which fits into the female end of a 18 inch ratchet spanner.

We did try and use stillsons instead of a ratchet, but with the force needed to tighten the bolts, we ended up bugging the end!! So a ratchet spanner was bought, and has worked perfectly since.

**How has it helped you at work?**

It has been terrific, as you don't have to bend over in the ditch and get a sore back when fastening the bolts. You can tighten quite a few in the day without feeling the strain.

The 18 inch ratchet spanner allows you to get better leverage for tightening.

The ratchet mechanism also allows you better movement and standoff, if you are working in a restricted area such as up against walls etc.

**Suggest improvements.**

There are no improvements to suggest. It is OK as it is. Just that every maintenance truck should have one!





# Floc Paddle Strengtheners

*Phil Kellond*  
**Water Plant Operator**  
Lithgow City Council  
NSW

What was the problem that you experienced?

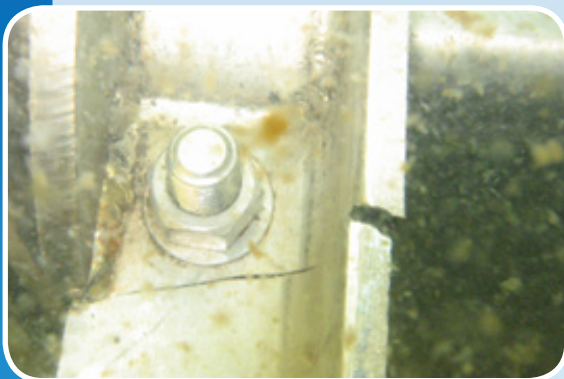
The Water treatment plant Floc paddle arms were cracking and breaking at welds close to the main hub area, due to the flexing of the paddles. With the arms being made from Stainless Steel, stress cracking is a common problem and not something that can be fixed by adding more welds to the already defective sections.

How did the problem impact you or your work situation?

The paddle arms had to be removed, or they had to be repaired by divers welding under water – only a temporary solution at best. The treatment plant floc formation was then impacted due to the lack of agitation.

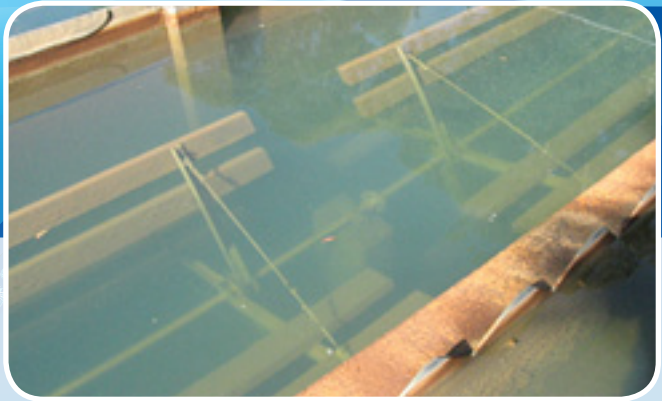
How long had the problem occurred?

Off and on (approximately every 6 months) for approximately 10 years.



Stress crack on paddle support hub





Floc paddles

## THE SOLUTION

### How did you come up with the solution?

To solve the problem, we had thought of using stainless steel (SS) bar to support the ends of the paddle arms, but this was going to be too heavy. We decided to go with SS cable as it was lighter but just as strong as the bar.

### Who helped work on the solution?

The Water Treatment Plant Operators and Supervisor, and a local welding contractor (Owen Mane Welding).

### Describe the solution.

A SS angled bracket was connected via 10mm SS cable, and tensioned using a SS turnbuckle to the floc paddles. The SS cable was then secured using a wire rope clip. These fittings allow the tension in the cable to be adjusted, and allows adjustment of the length and fit for different sized paddles.

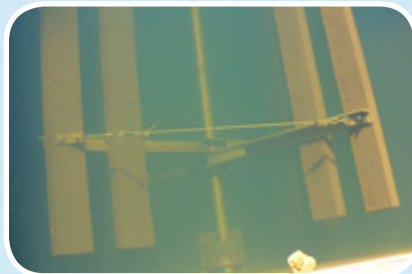
### How has it helped you at work?

It has meant that we have not had any floc paddle break down times, for approximately 2 years.

### Suggest improvements.

No improvements to suggest— because it works well!

Stainless steel fixtures



Strengthening brackets

# Innovation Design Engineering Addresses Manual Handling Concerns



## *Len Rochford* **Lead Systems Operator Barwon Water**

What was the problem that you experienced?

The new Angelsea bore field requires a rigorous and stringent program to monitor groundwater levels in and around Angelsea. Part of this monitoring is frequent visits to check 38 observation bores. A device (of considerable weight) is required to feed down varying depths up to 160 meters, which requires operators to manually wind up and hold on to the unit, during the test.

How did the problem impact you or your work situation?

Due to the physical nature and concerns about safety of this practice, I designed a specialized frame to reduce the need to manually hold onto the device and thereby reduced the physical stress and safety concerns for operators.

How long had the problem occurred?

About 4 weeks.



## THE SOLUTION

**How did you come up with the solution?**

I have a mechanical back ground, so it was easy to come up with a solution.

**Who helped work on the solution?**

The design was taken to Excell Engineering in Moolap Geelong and the frame was manufactured there.

**Describe the solution.**

The frame was designed to fit the top of the observation bores, and then the measuring device sits on top, into locating lugs. The tape is fed down the bore through a guide pulley so as not to damage the measuring tape.

**How has it helped you at work?**

The new frame has reduced the physical stress and safety concerns for operators.

**Suggest improvements.**

The frame is fine the way it is. A small electric winch could be fitted; however this would add more weight which could cause more problems with manual handling.

# Filter Penstock Extensions



The original working position for the actuators

*Phil Kellond*  
**Water Plant Operator**  
Lithgow City Council  
NSW

What was the problem that you experienced?

To manipulate the Water Treatment Plant filter penstock actuators, we had to bend down low, and reach around handrails etc, to access the controls. This was an OH&S risk for back injuries.

How did the problem impact you or your work situation?

It was a difficult working position to be in – reaching out over the railing, and often we were kneeling down on the walkway grating.

How long had the problem occurred?

Ever since the penstocks were installed at the Water Treatment Plant.



The penstock extension

## THE SOLUTION

**How did you come up with the solution?**

From an OH&S audit, we decided to elevate the actuators to a more reasonable working height.

**Who helped work on the solution?**

The Water Treatment Plant Operators and Supervisor, and Alto Valves.

**Describe the solution.**

The actuator was mounted on top of a 1m high bollard type pedestal. Inside the bollard is an extended drive shaft to control the penstock. The actuator was fitted with a 'plug and play' disconnection fitting, allowing easy isolation. There are 4 securing bolts at the top of the bollard which allows easy rotation and fixing of the actuator during maintenance time, as the actuator can be swung over the walk way area, rather than over the filter area.

**How has it helped you at work?**

We can easily manipulate the controls on the actuator from a standing position. The 'plug and play' fitting means that we don't need to call an electrician to isolate or perform maintenance.

**Suggest improvements.**

There are no improvements to suggest.

Once it was all set up, it was an easy system to work with.

Pedestal internal drive shaft



The 'plug and play' connection



# Converting Rectangular Concrete Manhole Lids

*Graham Thomson*  
**Sewerage Reticulation  
Technical Officer**  
**Barwon Water**

*What was the problem that you experienced?*

In some areas there are sewer manhole lids that are rectangular/square and are made entirely of concrete with either singular or twin components.

*How did the problem impact you or your work situation?*

The rectangular concrete lids are difficult to lift/reinstall and generally poor fitting. This creates manual handling issues for operators. The poor fitting allows runoff water to enter the sewerage system which contributes to excessive hydraulic loadings of the gravity sewer. In some cases the lifting lugs/points on lids are either nonexistent or rusted so they cannot be used for lifting thus contributing to the manhole not being easily accessible when required. Due to their poor design there have been some cases where the concrete lid has been damaged due to traffic loadings which has caused disruptions/blockages to the gravity system.

*How long had the problem occurred?*

Although ongoing, i.e. lids are still being found within Barwon Water's area of responsibility, most of the lids identified to date were generally installed in the 1970s.



Two panel concrete lid



Lid after conversion

## THE SOLUTION

### How did you come up with the solution?

Following discussions with various employees about these problems, we approached a local supplier who undertook a field trial.

### Describe the solution.

Construction of a frame that allowed converting the rectangular opening so that a cast iron round lid could be incorporated into the frame. The frames are designed to suit individual sites as there appears to be no uniform opening size in the different areas administered by Barwon Water. Frames are also designed to suit the different load carrying criteria, e.g. trafficable loads – class D type. The frame is installed so that it becomes completely sealed against any infiltration.

### How has it helped you at work?

Lids can now be lifted easily and are installed so that infiltration is eliminated. Since 1995 approximately 350 manholes have been converted using this method.

### Suggest improvements.

Undertake a proactive inspection program in known areas where rectangular concrete lids have been used in order to identify all lids that may exist. Then undertake a proactive program of converting all these lids.





Award sponsored by



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