

HYDROFLUX

WATER | SCIENCE | TECHNOLOGY

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NEWS FOR CUSTOMERS AND FRIENDS OF THE HYDROFLUX GROUP

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Maintaining Profitability & Growth in an Increasingly Challenging Environment

FEATURE STORY

BY JULIA SEDDON

The food industry is facing challenges on a number of fronts. Even without the far-reaching and significant impacts of COVID-19, operational conditions and supply chains are subjected to continual change and increasing uncertainty. The climate is getting hotter and drier and access to essential resources like water and energy are more frequently disrupted and less secure. The regulatory environment has also undergone significant change, water allocation and discharge quality are in the spotlight, and there is increasing pressure to meet greenhouse gas emissions targets.

As we adapt as a society to higher temperatures and reduced rainfall, food

“Working towards a more sustainable business model also offers opportunities to save costs and improve compliance, operational efficiency, performance and reputation.”

producers and manufactures can face unique challenges. Drought can impact on water supply and energy generation and increased storm activity can play havoc with sensitive supply chains. It is important to find ways of maintaining profitability and growth in a changing and increasingly challenging environment. Working with expert support can help you identify the risks, opportunities and the right solutions for your business, operation or supply chain.

Understanding the risks of

climate change and water scarcity can help ensure organisations can find options to help create a more resilient, sustainable future for their business. Working towards a more sustainable business model also offers opportunities to save costs and improve compliance, operational efficiency, performance and reputation.

The food industry can play a significant role in a more sustainable future by improving efficiency and increasing resilience to risks. Reducing water use and food waste are practical examples of opportunities to not only improve performance, meet targets and reduce operating costs but also to reduce greenhouse gas emissions and reduce the risks of decreased water availability.

Sometimes, doing this work can identify other pathways to becoming more self-reliant, and alternative options for power, water or waste management.

Whether you are in dairy, meat, produce, seafood, processed



food or beverage production there will be opportunities to become more efficient and less vulnerable. Specialists in clean manufacturing, sustainability, climate risk and water security can help identify opportunities for improvement. Having expert support helps you identify the material environmental, social and economic risks on, and impacts of, your business so you feel like you have the best information to make decisions.

A more efficient and less wasteful operation has multiple benefits including

a more streamlined process, as well as reducing the cost of goods. It can also help harness the knowledge and experience of your whole team. Investing in a thorough understanding of the specific sustainability risks, impacts and opportunities that affect you increases your resilience and ability to face the challenges.

Cress Consulting are sustainability, risk and water specialists, committed to finding the right solutions to help you secure a more sustainable, secure future.



Can the Food Industry Survive Drought?

FEATURE STORY

BY ANDREW MILEY

Droughts are becoming more frequent and more prolonged throughout Australia.

Drought cuts yields of the

crops we depend on, but our food and beverage processors are hit in two ways. Reduced yields mean increased prices of essential crop inputs, and the water, which is also essential for processing becomes more expensive and subject to supply

restrictions that can limit output, even where market demand for products is strong.

In most parts of Australia potable water is fairly cheap and of high quality, but the price of water becomes irrelevant if supply simply stops.

Drought Trends in Australia

Droughts are nothing new in Australia. There are anecdotal records describing the Settlement Drought of 1790 to 1793, which hit the early settlers trying to establish a foothold on a strange and harsh land.

[Continued on page 2.](#)

FROM THE CEO



Droughts, bushfires and now continued response to the constant challenges of living and working with a pandemic has taught us to pace ourselves. As we move forward and plan for a post COVID-19 future it's a good time to think about what business and industry should focus on next.

No doubt many crisis management plans have been dusted off, risk management frameworks revised and business continuity plans enacted to help organisations respond effectively during this time.

While COVID 19 may not have been specifically identified, a good risk management framework helps manage unforeseen as well as known risks. While the desire to get back to normal as quickly as possible is strong, there is possibly no better time to revise your risk management framework to make sure it captures recent lessons and includes an up to date assessment of your businesses climate risk.

While listed companies are required to assess and disclose their exposure to climate change, every company no matter what size or shape should have a robust climate adaptation plan in place addressing the climate risks most likely to impact their business, employees and supply chains.

If you need assistance, Cress Consulting are the Hydroflux Groups climate risk specialists and can help you conduct, review or update your climate risk assessment and adaptation strategy. Cress provide expert guidance to identify material climate risks, so you have the best information to make business decisions and the necessary support to uncover opportunities.

- ADRIAN MINSHULL

Julia Seddon Joins Cress Consulting Pty Ltd

BY JULIA SEDDON

I'm delighted to join Cress Consulting as CEO. Cress is a sustainability services business and part of the Hydroflux Group, a trusted and respected member of the Australian and New Zealand water industry.

It seems the perfect time to join the Hydroflux Group after spending almost 20 years with Inghams, leading the sustainability and water stewardship agendas and more than a decade with the Sustainable Agriculture Initiative and Alliance for

Water Stewardship working alongside some of the most experienced, skilled professionals in the food, water and sustainability field.

As an Alliance for Water Stewardship credentialed specialist and supported by more than 60 specialist engineers and scientists across the world, Cress has the expertise and knowledge to help you make more informed decisions and find ways to maintain profitability and continue to grow in an increasingly

challenging environment.

Our services include water stewardship, climate & water risk, sustainability strategy design & delivery, value transformation and issues management. Having worked with Adrian Minshull, Andrew Miley and John Koumoukelis on some of Australia's first advanced water treatment plants that reduced water use by more than 70% I'm confident that Cress Consulting will uncover further opportunities for sustainable growth, resource



efficiency and water security.

If you'd like to get in touch we would love to hear from you.

Cress Consulting are sustainability, risk and water specialists, committed to finding the right solutions to help you secure a more sustainable, secure future.



FEATURE STORY: CAN THE FOOD INDUSTRY SURVIVE DROUGHT - Continued

Weather records were only collected from the late 1800s but this limited data shows that the country has experienced prolonged periods of drought, most notably the Federation Drought (1895-1903), the World War 2 Drought (1939-1945), and more recently the Millennium Drought (1997-2009). Each of these droughts dealt a devastating blow to the agricultural sector, with broader economic impacts.

To get a clearer understanding of rainfall trends and the potential for prolonged periods of drought in Australia, we need long-term data to reveal the climatic context in

which these droughts occur. Our weather records do not go back far enough, but scientists have a few other tools to fill in the blanks.

In a study recently published on the Climate of the Past website, scientists examined ice cores, corals, tree rings and sediment records from sites around Australia, as well as from the adjacent Pacific and Indian Oceans, to help augment the limited rainfall records, extending these by 400-800 years. This extra data puts our recent variations in rainfall into a long-term context across the whole of Australia. The researchers found that the recent Millennium Drought affected a larger area than any previous drought that occurred over the last 400 years

in southern Australia. They also found that fluctuations in rainfall variability currently observed are unprecedented, particularly for northern Australia and southern Australia, which over the last century have been unusually wet and dry respectively.

Drought is called the "creeping disaster", because it starts gradually and by the time it is acknowledged its impact on agriculture and water supplies may already be devastating and it may be too late to take action to limit the fallout. Because of this, and Australia's long history of shifts in rainfall patterns, is critical that we prepare for drought, making ourselves more resilient to these fluctuations, especially considering that they are projected to grow even stronger in the future with climate change

Can Recycling Water Improve Water Security?

If we are to improve our resilience to drought, we must manage our water resources more sustainably. Beside conserving water through prudent water use, implementing water saving mechanisms and water-wise agricultural practices, we need to recycle wastewater back to potable water quality so that it can be reused.

According to the NSW Food Authority Water Reuse Guideline, it is acceptable for food businesses to use recycled

industrial wastewater in direct contact with food, provided it has been adequately treated

"Researchers found that the recent Millennium Drought (1997-2009) affected a larger area than any previous drought that occurred over the last 400 years in southern Australia."

to the quality specified in the Australian Drinking Water Guidelines for its microbiological, chemical and physical properties, and has been approved by the relevant water authority for use as drinking water.

The technology is already available to produce potable water from the wastewater generated from any food processing operation. It is proven technology and is becoming more economical. Despite the low cost of mains water it could become very expensive if the supply is cut off by water restrictions. It is not just farmers who need to think of 'drought proofing', processing facilities need to be 'drought proofed' too.

Recycling wastewater for reuse can significantly improve the country's water security and can help the food and drink industry to become more resilient to droughts in the future.

Engineered Anaerobic Lagoons & the Benefits of Combining Technologies

BY MANFRED BEYRER

Anaerobic treatment of wastewater has been a popular and very efficient method of wastewater treatment in many industries such as meatworks, rendering facilities, piggeries, poultry farms, daily processing, etc.

Anaerobic lagoons provide an effective method for reduction of COD and BOD in wastewater

Traditional anaerobic lagoons are not aerated, heated, or mixed and many of the existing anaerobic lagoons still in used remain uncovered. These uncovered lagoons are typically covered with a thick blanket of solidified organic matter and fats. This layer remains permeable to emissions of gases that are both odorous and contain greenhouse gases. Anaerobic lagoons depend on living microorganisms to perform at their best, but these are temperature sensitive.

Most anaerobic systems operate in the mesophilic range and produce optimal results in water treatment and biogas production at 35-40 Degrees Celsius and heating can significantly improve the reduction of COD & BOD in the lagoon and boost the output of methane.

Capturing the gas produced by the anaerobic process involves retrofitting a cover over an open lagoon or replacing it with an engineered Covered Anaerobic Lagoon [CAL]. A CAL prevents odour emissions from the anaerobic process, captures harmful greenhouse gases and provides an alternative energy source for your plant to reduce the use of coal, natural gas or electricity.

Utilising biogas as an alternative energy source for a boiler provides a simple and ready to use alternative to reduce the costs of coal or gas.

Installing a generator unit

which combines heat and power [CHP] gives the benefit of reducing your plant electricity purchases whilst creating a hot water source which can be used for heating plant water or heating the anaerobic lagoon to improve its efficiency.

Optimising anaerobic water treatment and harvesting biogas provides a great opportunity for your business to reduce its carbon footprint



and become more sustainable which is an ever-growing requirement in the current global and local market. Our team at Hydroflux is there to support you on this important journey and to build a tailor-made solution that gives you

not only state of the art water treatment solutions, but also the emissions reduction and energy solutions that can benefit your business.



Anaerobic lagoons provide a very effective means of wastewater treatment.

The Future Landscape of Biosolids Reuse

Up to 400,000 dry tonnes per annum of biosolids are produced from Australian and New Zealand sewage treatment plants.

Across the globe the last decade has seen a clear trend towards diverting as much biosolids away from landfill as possible, from some countries stopping the agricultural use of biosolids, to others considering alternative treatment to address public concerns over pollutants such as micro-plastics and PFAS.

In 2017 Germany banned the agricultural use of biosolids. This action has led to the construction of numerous advanced biosolids facility's, the majority of which are based on mono-incineration, a process that uses biosolids derived from sewage as a fuel source enabling the generation of power to not only power the incineration plants but

also to return energy back to the local domestic grid.

Other markets have looked at alternative solutions such as hydrolysis upstream of biosolids digestion in order to enhance biogas/ electricity production and ultimately produce a class A biosolid that can be reused without restriction.

"As the Australian and New Zealand agent for HUBER Technology, we are fortunate to have access to HUBER's global expertise in the field of biosolids treatment and the role it can play in generating renewable electricity by unlocking its energy potential.

After 10 years of operating their first mono-incineration plant in Straubing Germany, Sludge2Energy, which is a joint venture between HUBER and WTE has now built up its reference base and



currently has 6 facilities under construction. Their project at Hanover-Lahe which is due for completion in 2021 will process 130,000 tonnes per annum of biosolids and power up 5000 households.

Whilst mono-incineration and other similar processes are a topic amongst many Australian Water Authorities at a desktop level, lessons learnt into the design and operation of the drying step within the incineration process is something Hydroflux offers the ANZ market in addition to the Sludge2Energy process itself.

"Partial drying for example, which is producing biosolids with 40% dry solids, can be an ideal intermediate step that bridges the gap between business as usual practice and planning for resilience"

says John Koumoukelis, CEO of Hydroflux Epco Pty Ltd.

HUBER's biosolids drying technology includes RotaDry Disc Dryers, BT Belt Dryers and Solstice Solar Dryers.

These technologies rely on a heat source which is typically a waste gas produced within the treatment plant that can be reused. Solstice relies on the sun as the heat source.



Key benefits of drying include reduced transport costs and hence associated carbon emissions, the option for class A biosolids for unrestricted beneficial reuse and future planning for further advanced treatment.

Sludge2Energy is a mono-incineration process that uses a fluid bed furnace to produce renewable energy from biosolids.

Hydroflux Epco is a significant driver of ANZ's future resilience in biosolids handling and disposal with exclusive access to some of Europe's leading biosolids technology.

A Time and Place for Less Technology

BY JOHN KOUMOUKELIS

Ask a Conventional Activated Sludge (CAS) wastewater treatment plant supplier why CAS is better than a Membrane Bioreactor (MBR) wastewater treatment plant and they will be quick to point out that they use significantly less energy (alpha factor), don't require complex chemical cleaning processes and they don't need to have expensive membranes replaced every 5 odd years.

Ask an MBR wastewater treatment supplier the same thing and they will quickly point out that they need half

the space and can produce a higher quality effluent.

A quick summary - by Hydroflux EPCO who are both a CAS and an MBR supplier based around 600EP systems

Hydroflux EPCO supplies both CAS systems (RoadTrain®) and MBR Systems (Mena) throughout Australia, New Zealand and the Pacific Islands, which leads to a lot of location, access and support diversity.

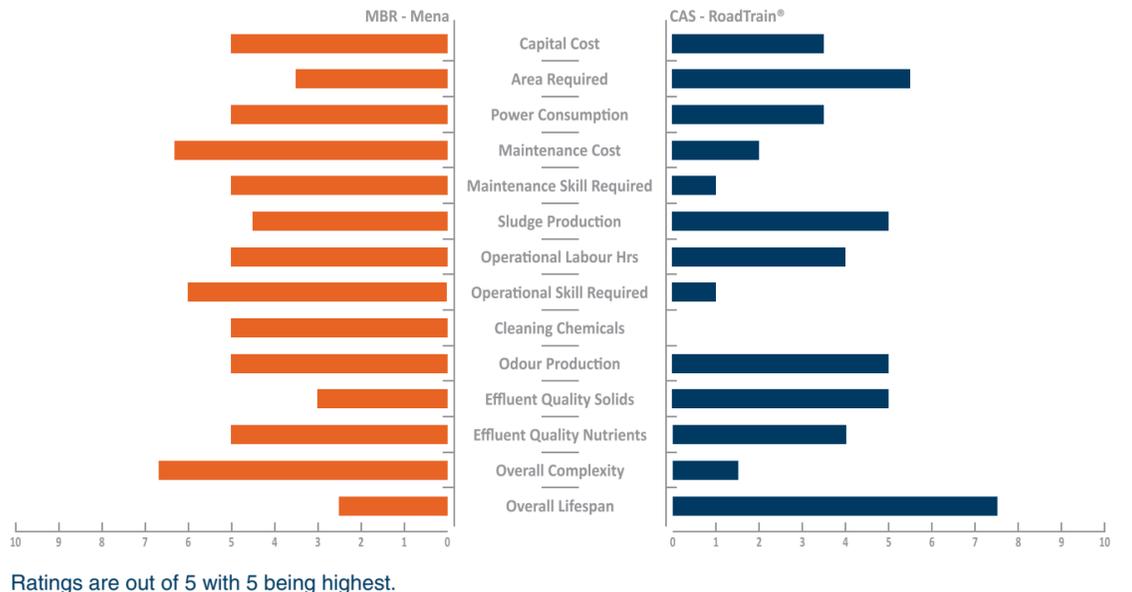
Remote tropical resort islands off the coast of Fiji and jungle mine sites in the middle of PNG require more robust

systems that can be assembled with simple hand tools and operated and maintained with unskilled labour. Available area is plentiful, and power generated locally via diesel generators is expensive. Technical support is often days or even weeks away. In these locations the CAS RoadTrain® is the obvious choice, as Hydroflux EPCO's 200 plus

RoadTrain® installations testify. However, when space is at a premium, operation and maintenance labour is semi-skilled and technical support is close by then the Mena MBR packages come into their own. The smaller sizes allow for the MBR systems to be fully containerised and preassembled, making deployment, installation and

commissioning faster and cost efficient, especially on semi remote greenfield sites.

Regardless of your location, from remote tropical island, back of Bourke mine site to suburban residential building estate, Hydroflux EPCO can unbiasedly tailor the most practical solution for your wastewater treatment needs.



A Jewel in the Crowne

BY PAUL COBBIN

Pride was the first thing that came to mind when I stayed at the Crowne Plaza in Muscat, Oman in June 2019. For at this hotel, thirty years ago, EPCO provided the then Gulf Hotel with a packaged sewage treatment plant (STP) to treat sewage for the guests and staff quarters of the hotel. The plant is still in operation to this day.

In 1989 this Road Train STP was one of twenty package plants installed by us in Oman during that period.

Like most companies, Hydroflux EPCO prides itself on providing robust solutions that have long life spans. Many companies promote the fact but few have the references to back it up. In our case, Hydroflux EPCO promises and delivers in bucket loads. Hydroflux has quite a long list of sites now moving in to their 30's and 40's.

Providing a long lasting robust treatment solution takes more than just our



efforts to supply a durable solution. Robust longevity also comes from tradesman like installation, and it follows on to consistent operation and well managed, appropriately scheduled maintenance.

Such operation and maintenance was clearly demonstrated in my short visit to the Crowne Plaza site. Afonso Tadeu, the maintenance manager of the Crowne Plaza, first started employment at the hotel thirty years ago as the operator of the STP and, over time, has worked his way up the ladder to now be in charge of all assets on the property.

Pride extends not only to returning to the site but also in the fact that the client still had the original drawings and installation manual in



Above: A picture of the plant now. Left: The original operator and the original fitter (Afonso and Paul).

mint condition. Both Afonso and myself took a moment to reflect on my own personal satisfaction to see the pipe work that I put together those many years ago when I was at the beginning of my own career. What was even better was the fact it was still working without any leaks.

Today's site visit reinforced the Hydroflux EPCO belief that having a robust quality design is not the only factor to ensure assets stand the test of time. It takes team work at all stages of the entire life cycle of an asset from quality construction through to installation, operation, maintenance and after sales support to create the formula for assets that last.



“Changing the image of wastewater treatment”



Commissioning of the Largest HUBER QPRESS® Installation in Australia

BY JOHN KOUMOUKELIS

Following the trend with numerous other water authorities around Australia, two of HUBER's largest Rotary Screw Presses were recently commissioned for TasWater at the Ti Tree Bend Waste Water Treatment Plant located in Launceston.

Hydroflux supplied these units to Aquatec Maxcon Pty Ltd who was the Head Contactor on the recent upgrade to the TasWater Biosolids

Facility at Ti Tree Bend plant.

The units supplied can each process up to half a tonne per hour of dry solids which is generated from the anaerobic digestion process. Each machine is fitted with a 3kW main drive with an operating speed of up to 0.8rpm, an equivalent sized centrifuge would consume in excess of 40kW per hour with speeds over 3500rpm!

Anaerobically digested sludge is dewatered to anywhere

between 20-22% dry solids which represents a volume reduction of 85 - 88%.

Hydroflux has applied the HUBER QPRESS® on a variety of municipal and industrial applications in Australia. Clients welcome the low energy usage, low noise, slow rotational speed, automatic unattended operation and low maintenance requirements.

The rapid uptake of HUBER's QPRESS has led HUBER to build a separate



Two Huber Q800 screw presses installed at Ti Tree Bend STP, TAS.

production line dedicated to these machines which has reduced manufacturing costs and lead times.

These HUBER QPRESS units complement the existing

HUBER SDRUM units which have been in operation since 2005. The SDRUM are thickeners which serve two purposes - WAS thickening and Recuperative thickening.



Information at your fingertips.

Introducing Hydroflux HyDATA®, A Simple Scan to a Wealth of Resources

BY ADRIAN MINSHULL

Hydroflux's team of water and wastewater professionals have developed the HyDATA® platform to provide our clients plant managers and operators with instant 24/7 access to their critical wastewater or sludge treatment equipment's historical documentation.

Accessing documentation has never been easier thanks to

the newly integrated HyDATA® platform. The user friendly, multi-platform software is being rolled out across all Hydroflux equipment and plants giving all our clients a revolutionary way of accessing documentation, drawings, manuals, photos, SDS's, spares and expert support and much more.

The platform has been

developed with the end-user in mind, based on field experience and customer feedback. HyDATA® is an intuitive & free tool to connect Hydroflux with its customers and supply them with project specific information.

How it works?

Every WWT item of equipment or complete plant supplied and/or installed by Hydroflux is being provided with an exclusive QR code label that with a simple scan on any smart mobile or PC interconnected device provides instantaneous secure access to all the essential documents that relate to their WWTP in a single location.

The Unmatched Longevity of AEROSTRIP® Diffusers – The Australian Experience

BY LUIS BASTOS

AEROSTRIP® is a fine bubble diffuser used in wastewater treatment that produces tiny 1mm bubbles which maximises oxygen mass transfer and hence utilizes less energy than any other diffuser.

Globally there are over 2000 references and here in Australia, there are 30+ references with a total of 15000+ individual AEROSTRIP® diffusers in operation.

The oldest Australian reference has been in operation for 11 years without the need for replacement. This is followed by two further references that are 9 years old, both

of which are still operating on the original diffusers.

Inspections have shown that less than 1% of the diffusers have failed and that the unique

proprietary polyurethane blend has proven its superior longevity over EDPM and Silicone. This is a significant cost benefit to the end users as circular type units require replacement every 4 - 5 years.

Diffuser fouling is controlled via the incorporation of a blow down cycle to relax and

then expand the membrane several times per day.

Chemical cleaning every 2 to 3 years with acetic acid cleans any organic fouling and returns the oxygen transfer efficiency to as new levels. This was seen at several sites that Hydroflux recently inspected.

Together with the energy saving benefits, AEROSTRIP® has proven to be the preferred choice by numerous water authorities and industrial clients around the world.

There are 2000+ references globally with over 30 in Australia



An aerial view of an AEROSTRIP® during the installation process

Designing Wastewater Treatment Systems for Effective Asset Management



BY MITCHELL HASTINGS

As the boom in Australia's infrastructure projects progresses there seems to be a competition between the States in Australia to build the longest tunnel, use the most local content, minimise energy usage and complete projects early and under budget. Spare a thought for those who must manage these assets when the dust settles and the backslapping stops.

The Hydroflux Group comprises several companies providing design and build

projects, equipment, processes and operational services to a variety of infrastructure projects requiring water and wastewater treatment. Our engineers and operators have been exposed all different types of wastewater treatment assets, both private industrial and municipal, and all with differing complexities of operation and equipment condition monitoring systems.

One of the great challenges when offering advanced equipment and processes for any project, whether for major infrastructure or small

private industrial clients, is the balance between the capital cost of the new project and the future cost to operate the plant. Most people acknowledge that spending more now will save costs in the long run, but when faced with a budget they must choose where to spend.

Equipment and processes that provide savings on power and energy, save water, allow water reuse, or use less consumables all add value that can be quantified in some way to justify spending a little more. It is much harder to show a return on investment for a design that

caters for the needs of operators in effective asset management.

In preparation for our regular presentation at the Wastewater Systems Design and Management Workshop, hosted by the Australian Sustainable Business Group, Hydroflux have canvassed engineering and operational staff and our clients for the greatest challenges in the operation and maintenance of treatment plants. Two surprising aspects of the design came up as critical:

- **Keep it simple**
- **Make it intuitive**

This is not necessarily what you think, and it does not mean that the plant should not be complex. The design should simply hide these complexities for day to day operation so that an operator can see what they need to see quickly and make fast and effective decisions.

Imagine getting into the cockpit of a plane and having all those instruments, switches and dials at your fingertips, but only really needing the throttle and stick when you are in the air. Some wastewater treatment assets are like this, and the intention is to allow a variety of conditions to be monitored and recorded, and to provide a full range of adjustable settings. But most

treatment plants, once they have been optimised, will only have one or two settings that need to be tweaked on a regular basis – if any.

The RoadTRAIN® is a pre-fabricated on-site sewage treatment system specifically designed for use in remote locations. It is the perfect example of a complex system that has been made to operate simply. By minimising the reliance upon instruments and drives the RoadTRAIN® is easy for operators to monitor for performance and maintenance requirements.

Much of this simplicity can be achieved by making the system smart and intuitive. Perhaps the best example of an intuitive system is the HySMART™ SBR. Rather than rely on an operator to identify that the aeration system is running too long, wasting energy and placing unnecessary wear on equipment, the HySMART™ SBR will intuitively adjust its cycle times for optimum performance.

These are only two examples of a variety of wastewater treatment and sludge management processes that can be designed for effective asset management.

Multiple Screw Press Projects Awarded to Hydroflux

With over 40 units in operation and another 20 under construction, Hydroflux were recently awarded a number of screw press units for wastewater projects in SA, NSW and Western Australia.

HUBER's QPRESS is low a

speed high performance sludge dewatering unit that can reduce offsite sludge disposal volumes by 85 – 90%.

Performance figures demonstrate similar cake solids to decanter centrifuges but with 90% less power usage.

QPRESS is available in a number of sizes and suits a variety of municipal and industrial applications. Standard containerised versions are available as plug and play solutions for remote sites that require a simple integrated

sludge management solution.



"I was recently in a remote location to commission a QPRESS operating in a sewage treatment plant. The operators were astounded by the low internal screw speed of the QPRESS. At less than 1RPM, the maintenance requirement is very low with a replacement of parts only required every 3 years or so, depending on the application."

Many councils, water authorities, mine sites and industrial clients are coming to Hydroflux for sludge dewatering solutions using the HUBER QPRESS.

A number of units have been recently been delivered to Papua New Guinea, Fiji and NZ, who are following the trend here in Australia"

- Daniel Potente, Business Development Manager for Hydroflux EPCO Pty Ltd.



Hassle Free Construction Water Treatment

BY ANDREW MILEY

The infrastructure boom along the east coast of Australia has been driven by government investment into road and rail developments. Significant projects in Brisbane, Sydney and Melbourne are all underway to improve sewer, road and rail networks within the region.

Much of this work involves tunnelling underground to generate routes for roadways, rail lines and piping systems. As with any construction work, tunnelling produces a wastewater on site which needs to be treated. Groundwater infiltration into the works, as well as the relatively high volume of water generated by road-headers and Tunnel Boring Machines (TBMs) combine to form a variable mixture of wastewater that can change from site to site.

Due to the large scale of the projects, large volumes of water need to be discharged to the environment, and treating to the traditional “Blue Book” values of pH 6.5 – 8.5, TSS < 50mg/L and FOG < 10 mg/L that may apply to smaller surface construction works is not sufficient. These sites must also comply with strict requirements for heavy metals, hydrocarbons, sulphides and nitrogenous compounds to comply with Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) 2000 guidelines for waters discharging into the environment.

Unlike general surface works, tunnelling presents a wide range of additional challenges for managing and treating the wastewater. Primarily, the water

generated by the tunnelling works is very heavily loaded with a wide range of solids in comparison with other types of construction. Heavy, rapidly settling silt and sand collect in sumps, sedimentation ponds and balance tanks which can then hold back the water flow. At the same time, high concentrations of colloidal clays, grout and bentonite fines do not settle without chemically conditioning the wastewater prior to a robust clarification process. Filtration is then required as a final protective barrier against residual solids passing through the treatment process, but these can become overloaded if upstream treatment steps are not correctly designed with optimum chemical conditioning and

appropriately robust clarifiers.

Construction wastewater generated from Tunnel Boring Machines (TBM) projects also have extremely high alkalinity levels. The cost for acid to reduce the pH on these projects down to <8.5 can equate to between 60% to 70% of the water treatment operating costs

Hydroflux engineers have successfully designed and built water treatment plants treating to ANZECC guidelines for the past three decades. Having worked on a variety of different tunnelling and supporting the tunnelling industry with tailored designs and ongoing operational support, a wide range of solutions have been used with great success even with the variability of conditions of the different sites.

From our experiences, the key to hassle free wastewater treatment on tunnelling projects are:

- **Simple, staged treatment processes that target specific issues one at a time;**
- **Conservative, robust designs to handle the variable and demanding conditions on site;**
- **Flexibility and modularity in the design to allow easy modification and upscaling;**
- **A high degree of automation to minimise operator input and further adapt to changing conditions.**

There are several risks to a poorly designed treatment plants. Operating costs on tunnelling sites rapidly spiral out of control when water treatment plants are

not able to cope with the challenges presented by the untreated tunnelling water. These costs can include;

- **Water treatment plants requiring 24/7 operator attention to keep them running.**
- **Excavator equipment on permanent hire to manage the solids depositing in ponds or tanks.**
- **High sludge disposal costs due to undersized or ineffective dewatering systems.**
- **High cost for spare parts for plants utilising Ultrafiltration technology, due to ongoing membrane replacements.**

Although tunnelling projects present challenges to water treatment companies, they also present rare opportunities. There is real potential to add value and save tunnelling contractors significant amounts of money across the lifecycle of the project. Involving a professional water treatment company such as Hydroflux in the tender stage also provides opportunities to scope out and present a strong environmental case for the bid. It also allows the bid team to quantify any groundwater remediation costs. Involving professional water treatment companies also allows the treatment plants to be designed to fit within confined spaces on city sites.

Investing in a robust water treatment solution provides peace of mind, which enables tunnelling contractors to get on with the job of connecting our ever-expanding cities.

CHEMICAL SUPPLY AND DISTRIBUTION

Hydroflux Utilities provides the key link to integrating the Hydroflux group by providing a comprehensive range of acids, alkalis, coagulants, polymers, antifoam, descaling agents and more





A leading Western Australian lamb producer who grows some of the world's finest quality lamb, has chosen Hydroflux Industrial to solve their Covered Anaerobic Lagoon (CAL) blocking problem.

Wanting to reduce their volume of heavy solids reporting to the CALs, prevent build-up of non-biodegradable solids and to recover renderable materials for further processing, they installed a HyDAF.

The HyDAF is fabricated in Australia in a range of sizes and is known for its ease of use. A unique feature of the HyDAF which is essential for performance and energy optimisation is that each dissolved air unit is matched to the specific solids load for the application.

The client installed a HyDAF HD100V system. The innovative HyDAF V-Bottom is the most advanced solution for the meat industry and is particularly well suited to applications where there are significant levels of grit, fast settling solids and other dense organic solids that won't float.

The HD100V replaces the Save-All and older generation DAF systems and often does not need chemical dosing.

The installation of this HyDAF V system enabled removal of 64% of the incoming suspended solids (TSS) and reduced the concentration of fats, oil and grease (FOG) to less than 200 mg/L in the discharge. This resulted in a greater return of feed to the rendering plant as well as the diversion of heavy grit away from the anaerobic lagoons.

New 9.8M BioCap® Digester Cover Lifted into Place for the Port Lincoln Wastewater Treatment Plant

SA Water's upgrade of its Port Lincoln Wastewater Treatment Plant, led by Guidera O'Connor, will see a new sludge management and processing facility installed at the site.

A new mesophilic anaerobic digester is included as part of the upgrade to enhance the plant's environmental impact and improve the quality of biosolids.

Recently, Hydroflux EPCO together with Guidera O'Connor, completed the installation of the 9.8 Metre diameter BioCap® Digester Cover.

A 100 tonne crane was used to lift the BioCap® Cover into place. With favourable weather conditions and thorough investigations prior to the lifting operation, the installation was successful.

The BioCap® Cover forms an integral part of the digestion process, providing storage of the biogas that is produced within the digester.

"We also provided ancillaries such as pressure and vacuum breakers, a sampling hatch, and a seal water tank" says Darren Price, Project Manager for Hydroflux EPCO Pty Ltd.

Hydroflux EpcO have delivered over 80 BioCap® covers for plants across Australasia. Turnkey systems can be provided inclusive of mixing, heat exchange & gas/cogen handling technology.



Direct Dewatering of Thin Sludges Made Possible With the HUBER Q-PRESS®

BY JOHN KOUMOUKELIS

The HUBER Q-PRESS® allows for thickening and dewatering to occur in a single machine!

This allows for cost effective dewatering of thin sludges with solids concentrations as low as 0.5% (5,000 mg/l). Typical dewatering results are in the range of 18 -25% which means

a sludge volume reduction of > 96 % in a single step.

The secret is in the design of the wedge wire basket having three treatment zones, with optimally adjusted bar spacings, combined with a tapered screw which gradually imparts increasing pressure on the sludge as it moves towards the discharge.

First stage: The free water is quickly removed by the pressure of the feed pump over a large free filter surface area. A pressure probe in the feed area controls the pressure thus ensuring a constantly high filtrate quality.

Second stage: The volume of material between the screw flights is reduced by

the conical screw and the sludge is pressed against the inner screen surface to release water from the sludge, with a continuous reduction of the filter cake thickness.

Third stage: The residual water remaining in the sludge is finally pressed out by the pneumatic counterpressure cone at the discharge. The dewatered sludge is pushed by the conveying screw against the pressure cone into the discharge chamber.

HYDROFLUX QUIZ - DIFFICULTY: MEDIUM

1			6			2	
				2			1
	4		1				5
9		3			8		6
		7	4		1	3	
	1		5			7	9
7					9		1
5				1			
	3				5		8

HYDROFLUX WATER | SCIENCE | TECHNOLOGY

The Hydroflux Group comprises eleven companies based in Australia, Fiji, New Zealand and the United Kingdom, providing design-and-build, equipment, process and operational services in water and wastewater treatment.

The group's skill and experience span across municipal and industrial water and wastewater treatment with full after sales support.

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