

HYDROFLUX

WATER | SCIENCE | TECHNOLOGY

April

NEWS FOR CUSTOMERS AND FRIENDS OF THE HYDROFLUX GROUP PTY LTD

2015

The Big Band Screen Theory

Full Story Page 4

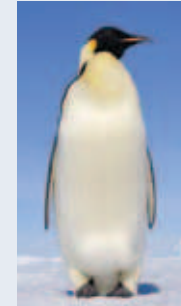


The Art of Attraction

Find out on Page 2

Why we copy Animals

Full Story Page 3



JB HI-FI

WIN A \$200 JB HI-FI VOUCHER!

Page 4 to enter

Why generate sludge when you can generate energy?

Feature story: High rate Anaerobic process.

BY ANDREW MILEY
HH HYDROFLUX HUBER

The Hydroflux Group recently increased its offer to Australian clients with the introduction of a superior anaerobic process that also saves on space and removes noise, odour, corrosion and maintenance issues.

The new product comes via European wastewater specialist HydroThane. It successfully uses organic content in wastewater

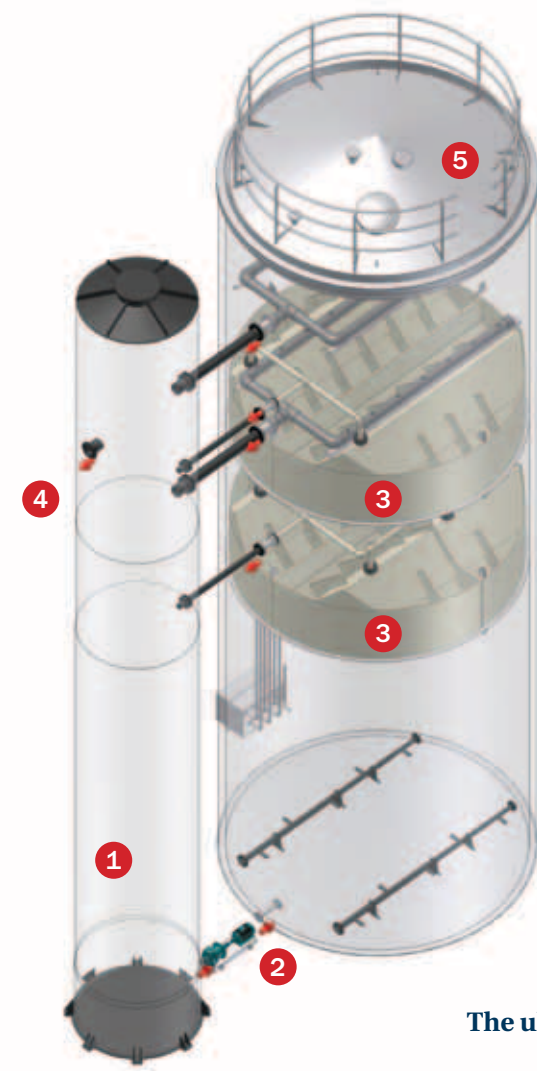
to generate green energy, but its vertical design also achieves this in a limited space.

The HydroThane system is an ultra-high rate anaerobic process. A common misconception of anaerobic processes is that they require a very long hydraulic retention time so a greater amount of space is required.

With HydroThane's External Circulation Sludge Bed (ECSB) and vertical design, the HRT requirement can often be as low as few hours and the tall vertical reactors means flows of up to 1ML per day can be treated within a diameter of a few meters.

The ECSB process involves conditioning the wastewater in a neutralisation tank and recirculating it via the main reactor. At the base of the reactor, the organic material comes into contact with the anaerobic granules and is converted to mostly methane and carbon dioxide. The reactor contains specially designed separators that retain the biomass in the tank and allow a clear supernatant to be discharged at the top of the vessel.

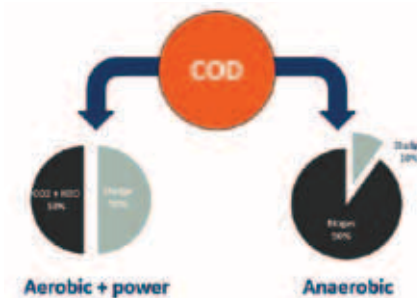
Typically 1Kg of COD will generate up to 0.35m3 of methane which can be used as an alternative fuel for boilers or



The ultra high -rate ECSB anaerobic process.



A compact HydroThane ECSB system treating 700Kg of COD per day.



if quantities are sufficient, it can be converted to electricity.

The HydroThane STP® ECSB design developed over many years offers unique features:

- Improved second generation design.
- Gas/biomass separators guarantee the highest possible granular biomass retention.
- A (bio) gas holder is not required due to the complete over pressurised design.
- All odours are controlled and fully integrated into the pressurised and closed biogas circuit removing the need for odour control systems.

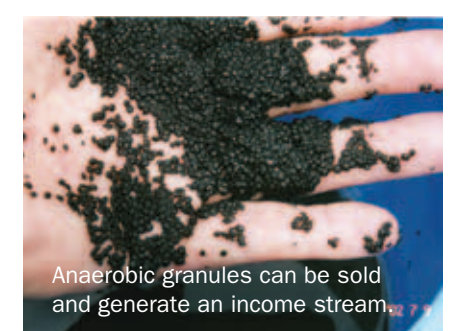
The Hydrothane ECSB system is an External Circulation Sludge Bed process.

1. Wastewater enters the neutralisation tank 1 where is conditioned with suitable chemicals and nutrients.
2. The wastewater is pumped at a high rate into the main reactor allowing recirculation of wastewater back to the neutralisation tank
3. Solids are separated and retained in the reactor by specially designed dual separators
4. The treated wastewater exits the system at 4.
5. Biogas is collected in zones 5 from where is flared or reused.

- No corrosion – the over-pressurised design prevents the entrance of air.
- No maintenance inside the reactor – there are no complex internals or rotating equipment.
- A dual layer separation design creates maximum process stability and capacity.
- The design includes fully controlled hydraulic mixing by means of an external circulation process.
- Loading rates of the ECSB reactor are typically in the range of 15 – 35 kg COD/

m3.day providing a very small footprint.

For more information on the HydroThane ECSB process please contact - www.hydroflux.com.au



Anaerobic granules can be sold and generate an income stream.

EDITOR COMMENTS



Dear Readers,

Thank you for your positive feedback about the previous edition of this newspaper. One reader replied, "Firstly, I completely agree with the opening statement about the need to have a paper copy to read. This also means I can leave material in the tea room for other staff to read over lunch or a tea/coffee." I was hoping that I wasn't the only person who enjoys reading a paper and clearly from the responses, I am not alone in this matter after all!

In this issue the main focus story is on the HydroThane ultra high anaerobic rate process. We have been busy developing new products and teaming up with international partners to offer you some of the world's best technology. HydroThane's anaerobic process along with the superb Organica system and all the HUBER equipment at hand certainly places us in a leading position as partners to the Australian industrial and municipal markets.

I was on a QANTAS plane recently, not exactly anything new, but on the way home I do find that the Sudoku puzzle in the in-flight magazine passes the time. On this occasion however the puzzle in the magazine in my seat pocket (and other pockets in close proximity) were spoiled so I ended up watching an entertaining episode of the Big Bang Theory. I am still struggling with the concept of the Qantas iPad, but on this occasion it did provide me with some inspiration for the story heading on this page.

Life in the Hydroflux camp is going well and 2015 is going to be an outstanding year. We have secured many projects for high profile clients in both the industrial and municipal sectors. The Organica system is generating an immense amount of interest so don't be surprised if you find one of our crew dropping into your office in the near future to talk about Organica or one of the many other quality products and services we offer.

We hope you enjoy this issue.

ANDREW MILEY
DIRECTOR

The Big Band Screen Theory

BY JOHN CARROLL.

HH HYDROFLUX HUBER

Headworks' screening in water and wastewater treatment plants has evolved throughout time from basic manual screens more than two hundred years ago to today's highly advanced, band screens with 84 per cent capture rate.

Although still not in use in all parts of the world, the band screen with its highly efficient perforated panels is gaining popularity to become the most evolved form of mechanical screen in the evolutionary path of screening technology!

At Hydroflux, we provide the full range of wastewater screens from German manufacturer

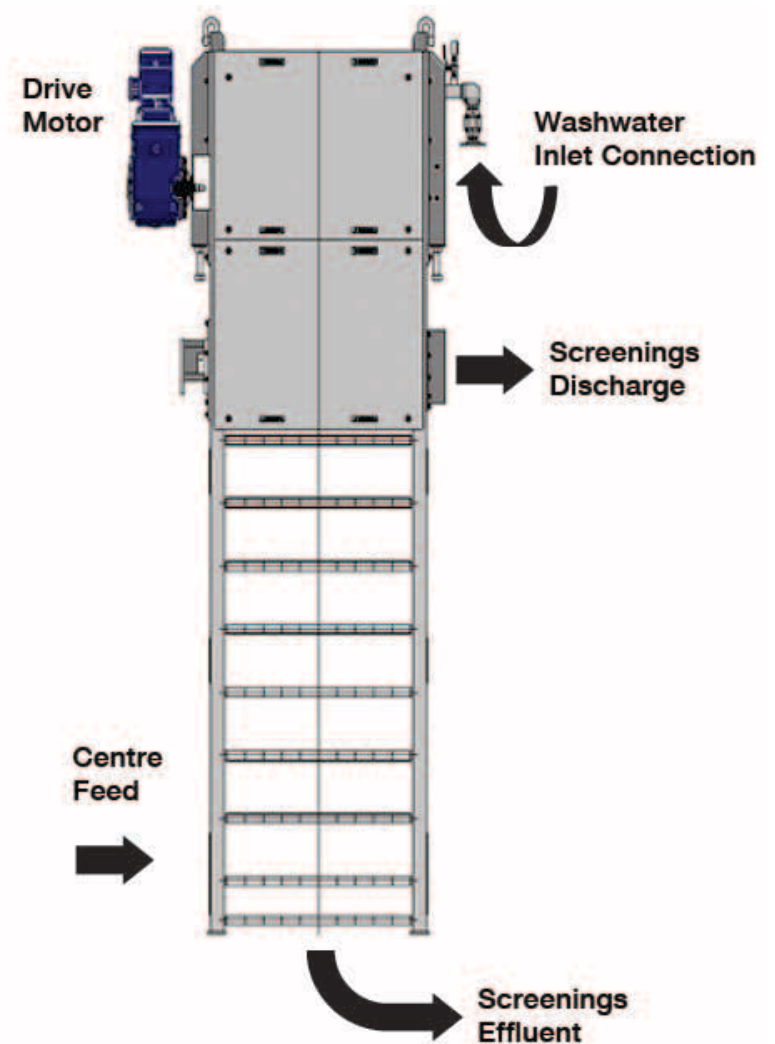
"The band screen with its high efficiency perforated panels is gaining popularity and has become the most evolved form of mechanical screen in the evolutionary path of screening technology"

HUBER Technology, who have installed some 18,000 screening machines around the world.

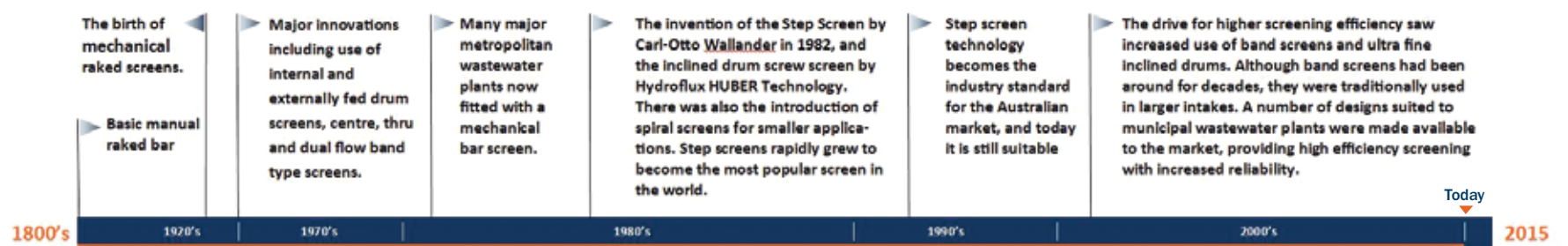
HUBER's Through Flow Band Screen has been verified for 84% screening capture, and our Hy-Band Centre Flow Screen includes a cleverly designed self tensioning band to reduce maintenance and increase the life of wear parts.

Visit www.hydrofluxhuber.com.au to learn about the wide range of screens we offer, and why the big band screen theory can help you!

HYBAND CENTRE FLOW BAND SCREEN



A BRIEF HISTORY OF SCREENING



Thickening up Queensland



JOHN KOUMOUKELIS.

HH HYDROFLUX HUBER

Hydroflux HUBER recently completed a highly successful installation of a sludge thickening system for Unity Water's Maroochydore Sewage Treatment Plant achieving a six per cent dissolved solids thickness with 97 per cent capture.

As part of an overall upgrade to facilitate better digester capacity and improved VSS, Hydroflux HUBER supplied three HUBER Rotary Screw Thickeners to give a higher degree of thickening and provide higher solids digestion capability than the existing anaerobic digesters. This processes the WAS from 0.5% to 6% DS.

This high level of thickening leads to better utilisation of the digester reactor volume, allowing for much higher sludge retention time. The end result is better VSS destruction, more biogas, higher bio-solids throughput and ultimately, the ability to do away with the construction of a new anaerobic digester.

Each thickening train can process up to 80 m³/h of WAS. Performance testing has shown the thickened sludge to be between 6.5 – 8%DS with filtrate capture in excess of 97%. This exceeded expectations.

Director of Hydroflux HUBER Luis Bastos said this equipment works well.

"The HUBER Rotary Screw Thickener a slow speed internal screw

with a stationary drum. The screw is very efficient at draining free water so it vastly improves on the thickening.

As with all HUBER machines, the entire machine is fabricated from stainless steel, providing superior resistance to corrosion and long life," he said.

The HUBER Rotary Screw Thickener is sludge thickening technology used in wastewater treatment plants to provide volume reduction of the various sludge streams produced. They are commonly used for primary and waste activated sludge thickening applications. It can outperform other thickening systems by 1 – 2% DS, whilst maintaining excellent capture with low washwater and very low energy demand.



HUBER Screw Thickener Facts

- highest sludge thickening performance.
- sludge volume reduction by up to 80%.
- sturdy design for high solids loads and coarse material containing sludge.
- maximum system availability due to the virtually wear-resistant and clog-free stain less steel wedgewire basket.
- high operational reliability due to the slow screw speed.
- low power and spray water consumption.
- no need for lubrication.
- completely enclosed.
- no vibration.
- low noise < 68 dB(A).

Maroochydore Sewage Treatment Plant is an advanced activated sludge facility on Queensland's Sunshine Coast that includes anaerobic digestion of primary and secondary bio-solids. It has a nominal treatment capacity of approximately 135,000 equivalent population.

For more information go to www.hydrofluxhuber.com.au

The art of attraction

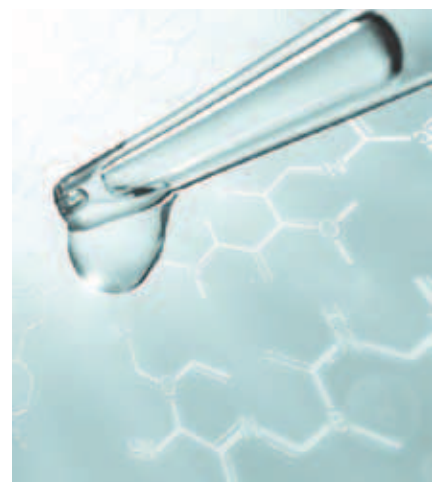
BY BRUCE WILLIS.

HI HYDROFLUX UTILITIES

Finding real attraction is an art form—according to Bruce Willis.

We all know how the laws of attraction work and are quite aware how strong an attraction sometimes can be. In wastewater, the most important aspect is the art of particle attraction and getting this right can improve your plant's performance.

For decades flocculants have enhanced separation in many areas of water and wastewater treatment. The chemistry used



is well established for hands-on people across a variety of applications, but too often the most appropriate chemistry is not well defined and there is plenty of scope for these forces of attraction and more importantly the performance of your wastewater treatment plant to be improved.

Poor attraction is most commonly found in industrial DAF applications and usually the problem lies with the choice of flocculant.

Before choosing DAF chemistry, many 'experts' take a sensible approach and conduct jar tests to determine appropriate chemistry and dose rates. Jar testing works well especially for sedimentation (clarifier) applications because, just like a clarifier, solids created in a jar test usually sink.

If the solids do not readily bind and sink in the jar, then separation by sedimentation is not a good approach – 'if it doesn't work in the jar then it won't work on a clarifier', is the typical rationale.

However, most jar tests show

(especially after the addition of a coagulant) that an anionic flocculant works best at the lowest dose rate – and herein lies the root cause of the poor choice of flocculant chemistry for the DAF.

Why does this happen?

There are three types of flocculants used in water treatment - anionic (negatively charged), non-ionic (no charge) and cationic (positively charged) flocculants.

Any of these may be deemed suitable for DAF, with the optimum choice coming down to dose rate and cost.

But, if the discharge water quality is important and you want the cleanest water possible to exit a DAF then only one type of flocculant will provide this – a cationic flocculant. This is the case in 95% of applications.

Why is this so?

It all comes down to charge. When dissolved air is dispersed into a DAF, the air bubbles have a predominantly negative charge. Colloidal particles in wastewater also predominantly carry a negative charge.

DAF systems work because the solid particles stick to the air bubbles via electrostatic attraction. Without any chemistry to help alter things, the

charges on the colloidal sized air bubble and on the colloidal sized particle are the same, the result being they do not stick to each other—in fact they repel each other.

Have you ever seen dirty water enter a DAF and the DAF surface looking crispy white or froth-like? If so then you have probably witnessed air and solid particle repulsion. The air (crispy white froth) has pushed its way past the solid particles and ended up on the DAF surface whilst the solid particles (floc, or sludge) is being held underneath this air layer.

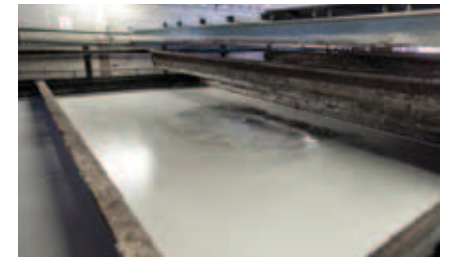
When this occurs a lot of the solids are carried out with the discharge, rather than being caught by the DAF. The best operating DAF systems have the sludge on the DAF surface and the air particles underneath.

So what are the tell-tale signs that the wrong type of flocculant is being used?

There are two simple signs to

look out for, and these revolve around looking for 'charge repulsion':

1. The surface of the DAF looking whitish, rather than the colour of the sludge,



2. The discharge water looking quite clear but there is lots of 'carryover'



If you are interested in gaining a better understanding of DAF and the best type of chemistry to use on your plant, why not give Hydroflux Utilities a call or visit

www.hydrofluxutilities.com.au



A Hydroflux HyDAF HD75 on its way to a dairy in Victoria

Animals have perfected it. So we did too!

BY CHRIS HALL.

HI HYDROFLUX INDUSTRIAL

Penguins, meerkats and wildebeests all know it is easier to survive in a group. The outside members of the group are always the most vulnerable but, as they say, someone has to take one for the team.

Bacteria in aerobic wastewater treatment systems is in a similar predicament, as simply floating around in an aerated tank is a highly vulnerable position if predators are around. The predators in this case are not actual-



ly seeking food and they usually just appear due to some sort of mishap. When this occurs, the entire biomass population can be wiped out very quickly with severe consequences.

The problem with shock loads is conventional aerobic systems, (where biomass is only maintained in suspension in the main aeration reactor), is that this kind of predator readily dilutes itself and it can easily have the strength and ability to attack all the bacteria species because they have no where to hide.

But there is a solution for bac-

teria in an aerobic environment to survive such attacks, just like this happy group of Emperor penguins, bacteria too can huddle together, with a sacrificial outside layer.

This small engineered piece of recycled plastic has a surface area of over 380m²/m³ and is a perfect place for bacteria to hide. Layers upon layers of bacteria survive on this media, thriving, populating and really not worrying about predators—unless of course you are the easy pickings on the outside of the group.

This media is the key to the Mov-

ing Bed Bioreactor's (MBBR) ability to handle shock loads far better than conventional aerobic systems. This is why the FlooBED MBBR, a Finnish-designed, robust and compact product, is ideal for situations where shock loads can often occur, such as in many industrial processes.

An additional advantage of MBBR is the total bacterial population within the reactor is extremely high, so a high level of treatment can occur in comparatively small volumes.

To find out more from Hydroflux on the FlooTech MBBR process, please visit

www.hydrofluxindustrial.com.au



Over 380m²/m³ of surface area



A Hydroflux HyDAF HD75 on its way to a dairy in Victoria

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SUDOKU
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\$200

For your chance to be in the draw for a \$200 JB-HI voucher simply complete the puzzle, scan and send this page to quiz@hydroflux.com.au
Entries close April 15th 2015

Hydroflux iChat



We are more than just Hydroflux

NSW WaterAid Ball raises \$280,000

Saturday 8 November 2014, the Hydroflux team including Directors Andrew Miley and John Koumoukellis attended the annual NSW WaterAid Ball to raise funds for WaterAid - an organisation providing safe water and sanitation in developing countries such as Papua New Guinea, Timor-Leste and Cambodia.

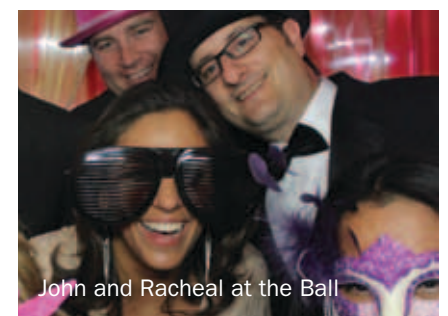
Held at the Westin hotel, this event brought together more than 550

people from across the water and wastewater industry for both a great night out and to support a worthy cause.

This year's sell out event raised over \$280,000 for WaterAid, bringing the NSW Ball's total fundraising efforts to \$880,000 in just four years.

The Hydroflux team were guests of Ball organiser, Rachael de Zylva, and got into the spirit of the Strictly Ballroom theme - especially in the complimentary photo booth!

www.nswwateraidball.com.au
or email -
hello@getthemessage.com.au



NEWS
Read more on these news stories from info@hydroflux.com.au

01 HYDROFLUX TO ACCESS CHINA THROUGH BSS (BEIJING) PETROCHEMICAL EQUIPMENT CO

Hydroflux will be marketing its industrial range of products specifically designed for the Petrochemical Industry in China.

02 ICONIC INSTALLATIONS

Hydroflux Industrial have secured contracts for groundwater treatment at both the Sydney Opera House and the new Barangaroo development on Sydney's harbour foreshore.

03 AUSTRALIAN BEEF

Hydroflux has supplied a complete wastewater treatment system to Yeeda Pastoral Company in WA for their new 300 head a day abattoir.

04 FOOD PROCESSING

Wiley's have engaged Hydroflux to design and construct a wastewater treatment plant for the new Beak and Johnston Food processing site in western Sydney.

05 SYDNEY WATER

Sydney Water's largest STP is currently being upgraded by 4Malabar Alliance (GHD, UGL, John Holland and Sydney Water) to improve reliability and performance. HUBER Strainpress®

Sludge Screens will be installed in the digester feed lines, to remove screenings and fibre from primary sludge settled in the primary sedimentation tanks.

06 AEROSTRIP INSTALLATION

Organic Environmental Solutions, part of the KS Environmental Group, awarded Hydroflux HUBER with a contract for the supply of AEROSTRIP® Fine Bubble Q-Type Diffusers at their liquid waste treatment facility in Victoria.

For further and more detailed news, please visit www.hydroflux.com.au

ABOUT THE HYDROFLUX GROUP

Hydroflux is an established, privately owned Australian business dedicated to water and wastewater treatment systems for both the municipal and industrial sectors.

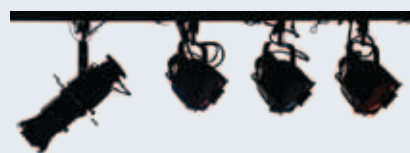
Via subsidiary companies, Hydroflux can manage design operations and construction as well as supply equipment and technology.

Level 26, 44 Market St,
Sydney NSW 2000
Phone: 1300 417 697

Email: info@hydroflux.com.au
www.hydroflux.com.au



SPOTLIGHT



CHRIS HALL

1. WHAT IS YOUR ROLE?

In between helping some of my less computer literate colleagues understand the mystery of "the cloud" I occasionally find time to project manage various EPC wastewater projects across Australia.

2. WHAT IS THE MOST UNUSUAL OR INTERESTING EXPERIENCE YOU HAVE HAD AT WORK?

I was once commissioning a plant at a chicken abattoir when it started raining chicken necks, wings and drumsticks. Considering there was nothing around me for 50 metres in each direction, it took me quite some time to work out it was crows finding scraps and occasionally dropping them as they flew overhead.

3. WHAT IS YOUR MOST EMBARRASSING MOMENT AT WORK?

I once introduced myself to an important client immediately after accidentally spraying myself in the crotch with a hose.

4. WHAT DO YOU LIKE TO DO WHEN YOU ARE NOT AT WORK?

I love spending time at the beach and taking day trips on my motorbike. The only problem is when I mix the two, I'll end up finding sand in my helmet weeks later.

5. WHAT ARE THREE WORDS THAT BEST DESCRIBE HYDROFLUX?

Knowledge. Commitment. Trust.

6. WHAT IS ON YOUR BUCKET LIST?

I was pretty good at flying a helicopter in Grand Theft Auto as a teenager. I expect I'm equally as gifted but would love to find out for certain.

