

[Home](#) ■ [HUBER Report](#) ■ [Sludge Treatment](#) ■ [New TOTEX solution for Sludge Dewatering at Plymouth](#)

New TOTEX solution for Sludge Dewatering at Plymouth

Background

Site operators at Plymouth Central STW wanted a more reliable and less labour intensive option to de-watering than a centrifuge.

South West Waters requirements were lowest WLC, low operator attendance and simple operation

South West Water had been looking at alternative dewatering technologies with lower TOTEX to potentially replace existing veteran centrifuge assets and tasked preferred contractor Kier to offer solutions for the Plymouth Central and Maer Lane WwTWs.

Plymouth Central serves a Population Equivalent of around 320,000 and, being on a coastal port receives higher proportions of saline and fat than other in-land works typically do. Maer Lane serves a small population on the outskirts of Exmouth

On site previously was a 2002 centrifuge unit with 45 kW main drive and 7.5 kW back drive which operates from around 6:30 AM to 9 PM as required, running at around 30 m³/h.

Kier undertook the process evaluation which compared Whole Life Costs, operational requirements and product support.

Solution



HUBER worked with Kier, undertaking trials to demonstrate the machine to SWW operations who wanted to touch and feel the machine and satisfy them that the machine was simple, robust and easy to operate. The trial data not only satisfied SWW that this - first of its kind in their region - was what they needed but provided hard data to confirm WLC in terms of power and chemical consumption as well as enabling accurate sizing.

HUBER Screw Press sludge dewaterers are designed to provide efficient, fully-automatic, mechanical dewatering of sludge once the diluted polymer dose into the feed sludge has been adjusted correctly to provide a suitable floc. The enclosed design serves to reduce the odours, noise and the potential requirement for operator attendance due to spills that can be associated with other dewatering technologies on some sites. The low operating speed of the screw presses reduces wear and energy demand.

For the trial to take place, a HUBER Screw Press 280 was tested on indigenous co-settled chemically-assisted lamella-settled

DensaDeg Primary and humus-like BAFF secondary sludges from the Plymouth Central site as well as imported similar sludges from the site at Maer Lane WwTW.

Machine type:		G-PRESS 100		
Site:		Plymouth Central		
Date:		18/09/18		
Time		08:55	10:05	11:05
Inflow setting on feed pump	m ³ /h	1.61	1.61	1.61
Supply sludge thickness	% DS	4.79	4.77	4.72
Instantaneous solids loading	tDS/hr	0.077	0.073	0.076
Dose poly dosing rate	l/hr	298	294	273
Average poly. DS concentration	%	0.251	0.253	0.253
Poly. active concentration from curve	%	0.137	0.138	0.138
Active polymer use	kg/tDS	3.09	3.44	3.73
Poly type				
Degree of mixing (weight size and position)		Sm. Max. / NA	Sm. Max. / NA	Sm. Med. / NA
Main drive rotation speed/frequency	%	95-99	95-99	95-99
Cone Hold Pressure (CHP)	Bar	0.75	0.75	0.75
Observed average approx. inlet pressure	mBar	~100	100-200	100-300
Observed average main drive current	A	~0.57	0.57	0.9
Duration between wash cycles	mins	10	10	10
Cake dryness	% DS	33.60	33.90	33.30
Fibre (Suspended Solids content)	mg/l	418	349	580
Fibrate % DS	%	0.0414	0.0349	0.058
Instantaneous Solids Capture Rate (SCR)	%	99.28	99.37	98.95



The feed sludge during the trial varied from 4.6 to 5.15% DS with an average active polymer usage of 4.7-4.8 kg/tDS with an average cake dryness of 33% and minimum of 28.6%.

As a comparison the existing centrifuge was using around 8-10 kg/tDS of polymer based on a throughput of 25-30 m³/day to produce cake at around 23%.

A sample of the trial results from a single day are shown in the adjacent table.

Following the successful trial Huber Technology were asked to tender for the supply of the permanent units for both of the sites at Maer Lane and Plymouth Central.

The sludge feed at both sites was specified as 4.5% DS with a feed rate at Maer Lane of 10.22m³/hr and at Plymouth Central a feed rate of 35.55 m³/hr.

The HUBER Screw Press 800.2 model was selected for both sites with a single unit required at Maer Lane and three units required at Plymouth Central.

Following a successful tender submission Huber Technology were awarded both projects in January 2019 with installation and commissioning due to take place in July 2019.

Client Benefits

SWW now have an alternative to centrifuges with a demonstrable WLC benefit together with Operators who have bought into the equipment and are supportive of the change.

- 50% polymer saving
- 80% power savings (typical)
- 6 fold maintenance savings are achieved

Related Products:

- [HUBER Screw Press Q-PRESS®](#)

Related Solutions:

- [HUBER Solutions for Sludge Dewatering](#)

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