

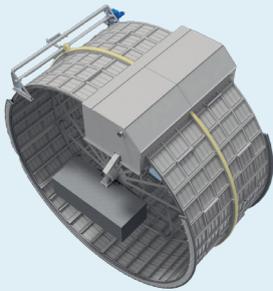
# Water Intake Systems

for industrial and power plants



# Case Study

## Saline Water Conversion Corporation (SWCC) Yanbu II and III



### Project Introduction

Hubert was awarded the contract for delivery of the marine package for a seawater intake filtration system. Hubert was responsible for ensuring that the specification was met for all deliveries in subcontracting.



## Hubert Supply

### Yanbu II

This project started in 2013 and included the construction of the complete seawater intake filtration system, consisting of four channels or intake 'trains'. The seawater intake filtration system is designed to completely remove such unwanted debris as sea grass/weed, general debris, plastic bags, wood chip, molluscs and jellyfish.

The four Hubert drum screens that were delivered have a diameter of 13 m, a width of 6.6 m and a capacity of 110,000 m<sup>3</sup>/h. Hubert bar screens are used to keep out large items. Bar screens are periodically cleaned by an automatic raking system, placed on a monorail construction. Hubert stoplogs permit rapid and secure closure of very large inlet channels and pump chambers, to make periodic inspection and maintenance of screening systems and pumps possible. Hubert was also responsible for supplying the water spray system, the cathodic protection facility and project-related electrical and instrumentation (E&I) work.

### Yanbu III

In 2015 Hubert started the Yanbu III project, which included 10 drum screens used to remove particles greater than 2 mm from the seawater. The drum screens have a diameter of 11 m and a width of 6.2 m in 316-grade stainless steel. The capacity is 124,000 m<sup>3</sup>/h.

The delivery included the design and production of the drum screens and all their accessories as well as supervision during on-site installation. Part of the scope was a full set of spare parts and the running of a performance test of a complete assembled drum screen at the Hubert premises in Stavoren, the Netherlands.

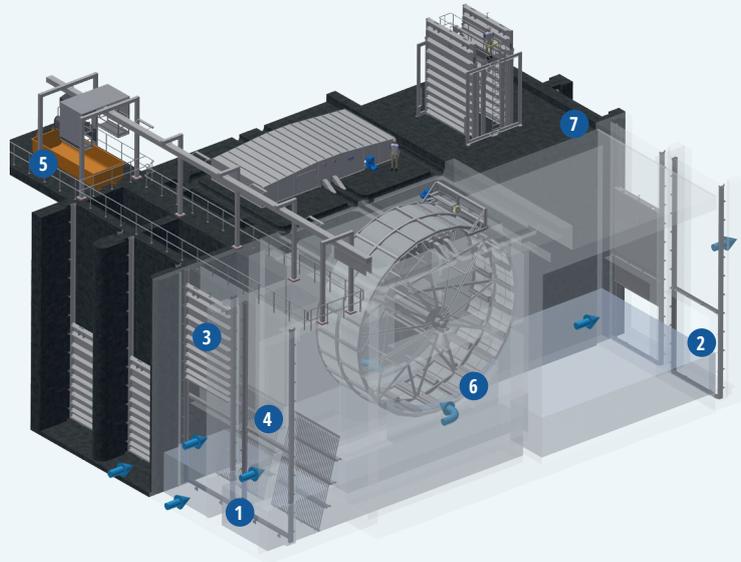
The project has been designed, manufactured, tested and packed within a very limited time of seven months to meet SWCC project schedule requirements.

## Key Figures

Location:	Yanbu region, Saudi Arabia
Hubert Products:	Yanbu II – drum screens, stoplogs, bar screens and monorail raking system
	Yanbu III – drum screens
Materials:	Duplex stainless steel
Year:	2013 -2016

## Features and Benefits

- 1 Inlet (unfiltered water)
- 2 Outlet (filtered water)
- 3 Sluice gate / stoplog
- 4 Trash rake gripper
- 5 Debris container
- 6 Drum screen
- 7 Intake structure



## Hubert Water Intake Screens

As a leading designer and manufacturer for efficient and reliable water intake systems Hubert has a wide range of screening equipment. With more than 140 years of experience in water purification systems and a professional and committed staff, we can assure highly sophisticated technologies with innovative materials for reliable and long operation time and low maintenance cost. To make water intake systems complete Hubert can design and supply the wash water system, electrical system and cathodic protection.

The Hubert water intake systems are used to mechanically clean or screen water extracted from the sea, rivers or lakes. Mechanical cleaning removes unwanted matter with screens or sieves. This protects the downstream process stages from build-up, clogging and abrasion. The aim is to protect suction pumps and other downstream equipment such as desalination membranes, heat exchangers / condenser tubes from the carry-over of coarse and fine debris.

Water intake screening systems are used for filtering:

- cooling water for power plants (combined cycle, nuclear, thermal and hydro)
- raw water for desalination and other potable and drinking water production plants
- process water for industrial production processes, such as petrochemical plants and refineries.

Other examples are food processing and mining, drainage channels, fire fighting channels and irrigation offtakes.

## Water Intake Screens Operation

The Hubert water intake screen system consists of a stoplog or sluice gate (3) for closing the inlet channel for maintenance or inspection (downstream). Next is a coarse screen and raking machine (4) for primary filtration, which removes large quantities of debris including high volumes of biological material (e.g. jellyfish, fish, seaweed). After that there is a drum screen (6) or a travelling band screen. This is the secondary/ fine filtration, which can filter debris to 2–3 mm. After the drum screen or travelling band screen another stoplog or sluice gate is placed to close the channel for maintenance or inspection (upstream).

## Lowest Operating Cost and Fish Friendly

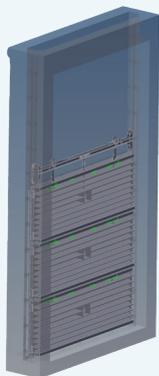
Our solutions are environmentally friendly and are used in both submerged passive water and open surface water intakes to deliver de-bris-free water. In addition, they can be supplied with a fish recovery system that allows trapped fish to be removed in a gentle and effective way, in line with applicable regulations.

The tailor-made design of our screening systems allows for the lowest possible operating and main-tenance costs, including maximum performance and reliability, effective design, and good quality and particle-free filtered water. Our cathodic corrosion protection systems (based on sacrificial anodes or an impressed current cathode protection (ICCP) system) provide corrosion resistance and longer lifetimes in seawater. Today, a lot of duplex and super duplex stainless steel (PREN > 40) is used for screens.

You will find our projects in both new construction (engineering, procurement and construction – EPC) projects and renovation/optimization of existing water intakes.

## Stoplog and Sluice Gate Technology

The stoplog and sluice gate are designed to provide a water seal that allows safe and easy inspection or maintenance of the screening intake. Hubert stoplogs and sluice gates are built to withstand design differentials for each application and are welded from steel plate and rolled steel sections, and are fitted with neoprene seals. A stoplog normally consists of one or a number of sections, which are lowered into channels. These segments are added or removed by using a lifting beam and a crane. A sluice gate is normally raised or lowered as one piece, so lifting and lowering can be motorized and possibly automated.



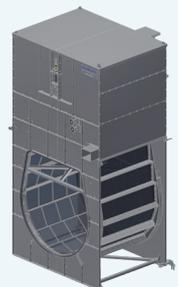
## Coarse Screen

Hubert coarse screens provide a cost-efficient way of cleaning and removing large quantities of debris, including biological material, from the intake water. The distance between bars is usually 20 mm to 100 mm. Hubert supplies various coarse screens tailored to every local situation. All screens are suitable for use in aggressive and extreme environments such as seawater. Hubert can also retrofit coarse screen and raking machines into existing intake systems.



## Travelling Band Screen

Hubert travelling band screens require only a small installation area due to the vertical construction. This type of screen is used in places where the construction area of the total cleaning installation is limited or where tidal differences occur. Flow rates vary from 1500 up to 50,000 m<sup>3</sup>/h per screen, but this depends on customer requirements and the local situation at the intake. Woven mesh with a diameter of about 2 mm to 10 mm is used as a relative fine filter medium. The travelling band screen operates on a conveyor belt principle. The conveyor belt is composed of mesh panels that are mounted between two endless heavy-duty transport chains. The chains are driven by a sprocket wheel. The debris trapped on the screens is removed by water spray jets and discharged through a flushed chute. The drive unit, flushing mechanism and debris hopper are located at deck level. The upper section above deck level is fitted with a metal or reinforced polyester composite cover. Hubert travelling band screens are available for different flow patterns. Special designs can be provided with facilities for removing and discharging other debris, such as jellyfish and seaweed.



## Drum Screen

A Hubert rotary drum screen is mainly used for seawater intakes as part of power plants and desalination plants, where very large amounts of water are required and where tidal differences can also play a role. Our definition of a vertical drum screen is that debris discharge takes place at the periphery of the filter at deck level. A drum screen is typically installed in water intake systems downstream from coarse bar screens. Flow rates are usually between 40,000 and 120,000 m<sup>3</sup>/h per screen, depending on customer requirements and the local situation at the intake. Woven mesh with a diameter of about 2–3 mm is used as a filter medium.



# History

Hubert, founded in 1880, has almost 150 years of experience in design and engineering, in-house manufacturing, installation and service of equipment for water purification and water intake applications. Our engineered products and technical expertise have enabled Hubert to become a major player in the global market for water treatment solutions. We focus on high-quality equipment with a long service life.

Over the years, we have gained an extensive number of satisfied customers and project references all over the world. Our machinery is a crucial part of every production facility and is usually continuous in operation. Our equipment has to operate efficiently and reliably in extreme weather conditions. Hubert's installed base comprises many thousands of installations that have recently been commissioned or that have been in operation for many years.

## Water Intake Systems

Hubert is market leader in water intake screening systems, used for mechanically clean water extracted from the sea, rivers or lakes. These systems can be found in power stations, petrochemical plants & refineries, desalination plants, drinking water & irrigation plants and industrial production plants requiring a huge demand for process water. We supply complete 'screening trains', including all additional equipment like controls and cathodic protection. We design, engineer, and manufacture our equipment in-house. You will find our projects in both new construction (EPC) projects and renovation and optimization of existing water intakes.



## Wastewater Treatment Machinery

Hubert wastewater treatment machinery and (sub) installations are applied in municipal and industrial wastewater treatment plants. Our installations are of high quality and offer a long service life. Clients range from water boards and authorities in the public sector to multinationals in many industries.



## Service and After Sales

Keeping your machinery operational, this is the daily work of our Service and After Sales division, which proves its importance by keeping Hubert installations operational anywhere in the world. Founded in 1880, the large amount of projects that Hubert has carried out over the years has resulted in a huge installed base of equipment. Many of these are still in operation! We supply parts but also provide optimization and renovation of your existing equipment.



## High-Spec Steel Assemblies

We have been supplying both components and assembled parts to the offshore industry and other applications within the shipping and dredging industry for many years. Complex machined welding constructions, (sub) assemblies and complete products are part of our program. For this market we work according to customer (mechanical) specifications. Our scope includes parts in single pieces, series as well as assembled products.



# Over 250 years of experience in water handling and treatment

From water intake systems to water cooling, from water management to wastewater treatment, pumping stations, hydropower and prize-winning innovations in the field of decentralised wastewater treatment. DeSaH, Hubert and Landustrie have joined forces. From Sneek in Friesland, our experts develop and manufacture future-proof solutions with an above-average lifespan.

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