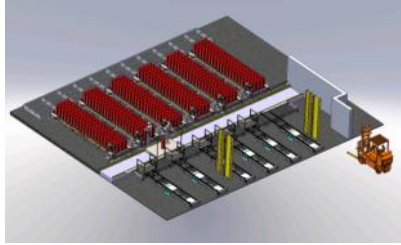


Dissolved Acetylene Conveying System



The Project

BOC Ltd were experiencing adverse manual handling issues and required a solution that increased acetylene bottle filling capacity while reducing manual and fork-lift handling and minimising OHS issues on the production line. To assist BOC to achieve their objectives, Australis provided the following services:

- Design, manufacture & install 6 x 6.5m **chain conveyors** to handle steel pallets containing acetylene bottles. These conveyors were located externally, in exposed conditions and were reversible to feed pallets in & out and were fitted with lift up ends to allow transfer of pallets to a common roller conveyor.
- Design, manufacture & install 6 x 6.5m, reversible **slat conveyors** to each handle acetylene cylinders. These conveyors were just 300mm above-ground with no part of the drive train above the top of the conveyor; and were required to work in a wet environment due to the water cooling of cylinders during filling.
- Compliance to Zone 1 hazardous gas area was achieved by eliminating all electrical items & replacement with hydraulics.
- Project completed to meet BOC's narrow maintenance shut-down window.

Acetylene Pallet & Cylinder Handling Solution Hazardous Area Compliant



The Result

Australis provided a turnkey solution minimising OHS and safety concerns thereby achieving BOC's project validation. By overcoming OHS and safety issues, BOC were able to increase throughput and all but eliminate manual handling of pallets & cylinders. Benefits of the solution include the:

- Provision of galvanised pallet conveyors condensed the time a forklift was required by allowing several pallets to be loaded or unloaded at one time. The operator could move pallets around with the aid of the pallet & roller conveyor which freed up the fork & driver for other jobs.
- The installation of the stainless steel slat conveyors reduced the distance travelled by operators to place cylinders to just 1.5m and the stainless construction improves longevity in the wet environment. This allowed the operator to handle a greater number cylinders in less time resulting in increased throughput while also reducing OHS concerns.

The following actions were taken to achieve compliance with Zone 1 (Hazardous Gases).

- Pallet & cylinder conveyors were driven by hydraulic motors via a central remote hydraulic power pack.
- The end lift on the pallet conveyor was also achieved using hydraulic jacks.
- Chain & slat conveyors were supported on wear strips with low electrical surface resistance to avoid the generation of static electricity.
- The conveyor shafts and bodies were earthed to ground to the BOC earth system.

Additionally BOC requested the ability to clean the water collection pits under each cylinder conveyor. To achieve this, Australis designed the chain supporting structure to be removable allowing BOC to simply

(Continued on page 2)

Client:
BOC Ltd

Location:
Wetherill Park,
NSW Australia

Chain conveyors

Slat conveyors

Roller conveyors

Pallet conveyors

Hydraulic motors

Hydraulic end lift

Conveyor shafts &
bodies earthed

Zone 1 compliance

Contact Australis
Engineering at:

25 Harley Crescent
Condell Park, NSW 2200
AUSTRALIA

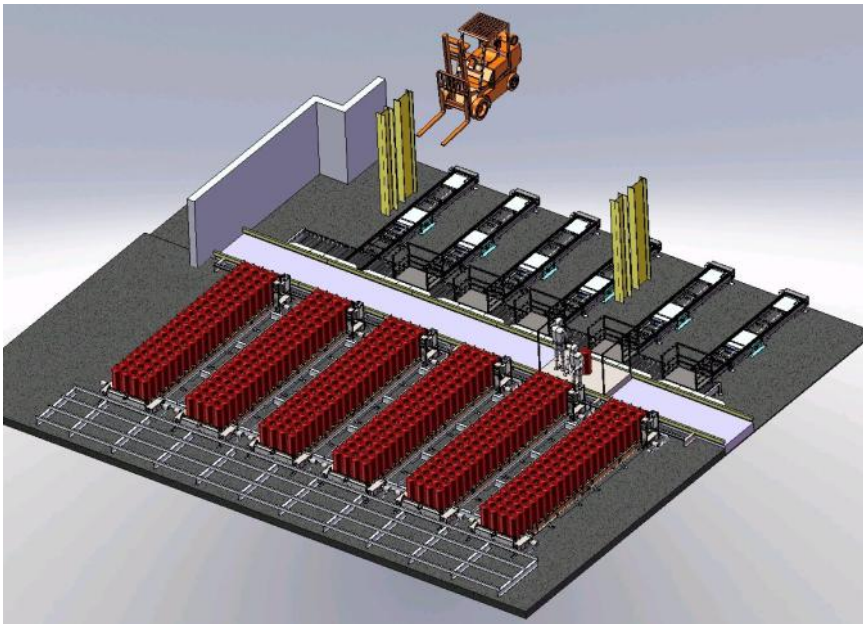
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(Continued from page 1)

break the chain/s, lay them back and unbolt and remove the chain support sections in the area required in order to access the water collection pits for cleaning. This approach presented a significantly easier option than to move the entire conveyor clear of the pits especially after BOC installed flooring around all the cylinder conveyors.



Innovation

The Australis design team were confronted with several potential problems, including some never before encountered, that required an innovative design approach.

During the design process for the pallet conveyors, the high point load on the chain rollers from the steel pallets exceeded the manufacturers limits. To overcome this Australis redesigned the chain and support. Chain attachments supported on wear strips allowed the pallet weight to be transferred to a larger area and overcame this problem by taking the load off the chain rollers.

Other issues that created unique design challenges included the slat conveyor being just 300mm off the ground and needing to have a centre underslung drive (to achieve reversing). Similarly the lift up end of the slat conveyor (at the roller conveyor end), coupled with the low height and closely spaced rollers also presented some very challenging design considerations.

Each cylinder conveyor has a capacity of up to 5,600kg this, together with a low height off the ground (300mm) meant large drives were not possible if the drives were mounted below the top of the conveyor. The fact that these conveyors must also be reversible created further design considerations.

To resolve these issues smaller shafts were used with a centre bearing support being fitted to eliminate shaft flex. Both the head and tail shafts were fitted with two hydraulic motors one at each end.

To permit the drives to be below the top of the conveyor, the motors were mounted lower and jack driven to the shaft. The small jack drive required a lubricated triplex chain to avoid overloading. Special *Aqua Chain* was used to handle the high loads and combat corrosion. As these conveyors were hydraulically driven it allowed Australis to overcome the reversing problem. As power was directed to one end drive set the other end drive was designed to simply freewheel.

Each of the six conveyor sets were controlled by a series of manual levers at a local panel adjacent each cylinder conveyor. Individual dump valves, which if activated dropped all hydraulic pressure from the system, are also located on these panels.

Best Practice

The research and development undertaken by Australis in order to overcome BOC's design requests has resulted in what we believe to be a **world's first in handling acetylene pallets and cylinders** and can arguably be described as representing best practice for all other acetylene pallet and cylinder filling facilities.

