CASE STUDY
Tempe Town Lake - Downstream Dam Hydraulic Sub System Replacement Project

Background
Hydrasun was approached in the Summer of 2016 by the Water Infrastructure Group of a major general construction contractor in the US buildings, civil, and heavy industrial market for a solution to a problem encountered in the fixed pipe hydraulics sub system for the flood gates on a recently built dam in the city of Tempe, Arizona, USA.

The area of the system being adversely affected was located directly below the floodgates in a permanently flooded service trench covered by heavy-duty black fiberglass panels. The water in the trench, along with being stagnant, has very high chloride levels naturally occurring from the dam’s watershed. It also experiences extreme temperature fluctuations being located in Arizona’s Sonoran Desert.

The original design used a low-grade stainless steel hydraulic pipe which had begun to fail within 5 months of installation. The project team began to investigate replacement alternatives to the pipe (both base material & hoses).

The customer’s Project Engineer discovered Hydrasun’s literature on Subsea BOP Hoses and was impressed by the base data on its proprietary heat & micro bacterial resistance properties and set in motion an RFI on the overall operating parameters of the product.

Customer Requirements
To be approved for use as a replacement for hard pipe by the City Engineering Department Design Engineers the hose had to meet specific criteria for the operation of the hydraulic sub-system with regard to:

• Fluid compatibility
• Operating pressure
• Abrasion resistance
• Flow rates
• Temperature range
• Available lengths (to mitigate as many potential leak paths as possible).
• Range of hose ID’s (needed to be available in 1” and 1 ¼” sizes)
• Expansion/contraction properties
• With the high chloride levels have a range of base materials for end connections and unions that had high corrosion resistance and were available for manufacture in specific orientations to assist in the routing of the hose assemblies along the existing channels currently housing the fixed hydraulic piping.

As this hose had not been previously utilized for this application before, Hydrasun also had to provide as much track record on its use as was available.

In addition, the cost and manufacturing lead times were a prime customer consideration as this was a replacement project and an unexpected cost.

Hydrasun’s Solution
Hydrasun worked with the customer’s Engineer and Project Manager on several recommendations (steel v aramid reinforced hose and super duplex v titanium base materials for the fittings) in addition to visiting the site and presenting the hose options to the City Engineering Department Design Engineers. Following this Engineering tour it was agreed that Hydrasun would manufacture bespoke aramid reinforced hydraulic hose assemblies with titanium connectors manufactured by our own Hydrasun Manufacturing Division (HMD) the components of which meet both the unique environmental challenges of the site location and the operational parameters required for the operation of the flood gates.

In order to monitor the corrosion resistant properties of the base materials of the fittings and hoses, the customer has both capped test hoses & titanium batch sample wafers in the trench for removal and 3rd party analysis at defined periods of time.

At a glance
Customer
Water Infrastructure Group, PCL Construction Inc.

Location
Tempe, Arizona, USA

Customer Requirements
Cost effective alternative solution to Hard Piping in challenging Environment.

Hydrasun Solution
The analysis, recommendation and manufacture of bespoke hydraulic hose assemblies and interconnects.

Benefits
• Significantly reduced cost versus the use of replacement hard piping
• Significantly reduced lead times versus the supply of hard piping
• Repairs & Maintenance - Hose sections can be easily replaced or on site repairs undertaken in the unlikely event of any localized failure as opposed to the removal & installation of large sections of hard piping
• Hose components proven to meet or exceed all the stipulated environmental and operational parameters of the project

The Result
Hydrasun successfully delivered the components for the hydraulic sub system, on schedule and on budget for assembly and installation by a local third party Hydraulics Sub contractor.

Utilizing this hose as a readily available and cost effective alternative to fixed piping has opened up the possibilities for its use in other similar applications for water and wastewater treatment plants, hydraulic dams, and pump stations.