Submarine HDPE Pipeline with Large length and Diameter

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ABSTRACT

In recent years, seawater system is more and more widely used in the construction of onshore desalination plants, sewage treatment plants, power generation blocks and refineries, etc. Open channel, Reinforcement Concrete (RC) box culvert, GRP pipeline are common types of seawater recycling system structure.

Compared with channels and other types of pipelines, submarine HDPE pipeline has significant advantages such as good flexibility, well foundation base adaptability, long durability and appropriate cost. CHEC (China Harbour Engineering Co.Ltd) has completed totally 49 sections of submarine HDPE pipeline with 15 kilometres length and 3 metres diameter successfully in Jazan Economic City, Saudi Arabia. It is believed that submarine HDPE pipeline could be applied in more projects in the future.

Main technology process includes welding and assembling, seabed preparation, launching, positioning, sinking, connecting and backfilling.

Single pipes will be chipped and welded and then assembled with RC ballast blocks and balloons on trolleys in launching line of onshore yard. The welding process includes internal welding and external welding. Ballast blocks will be prefabricated as per design. Total length could be as long as 560 metres for each pipeline.

The seabed preparation will be by cutter suction dredger and will be levelled by divers if needed. Both elevation and geological condition are reference parameters.

The pipelines will be launched along ramp slideway into sea by onshore winches and also on working flat barges.

The pipelines will be dragged and positioned by working boats to design position. The pipeline should be controlled within tolerant bending radius during whole process. Steel pipe piling and fixed length steel wires will be used during positioning process.

During sinking process, water valves of one end blind plate and air valves of the other end blind plate will be opened to allow water going inside and air coming outside. The pipeline will go down from one side to the other side. Crawler crane and working barge will be used during the process.

Adjacent pipelines will be connected by flanges after blind plates are removed. Pneumatic wrench is used to tighten the nuts of the flanges underwater by divers. For the final connection between two installed pipelines, 1 metres will be increased by welding. After one

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end connected and flooded, the other end will be lifted and suspending to be matched with adjacent suspending pipeline. Expansion Joints could also be adopted.
After installed into position, the pipelines will be backfilled with selected excavated or dredged materials as per design report. Nominal backfilling thickness is about 2 metres.

KEYWORDS: Submarine; Flexible; Welding; Launching; Sinking; Connecting.