



## Industry Case Study

**BELDEN**  
universal

### SUBSEA VALVE ACTUATION

Belden's Actuator Connection Shafts developed for an undersea oil valve actuator demonstrate a deep knowledge of marine applications. This specific installation was located on the sea floor, some 330 feet below sea level where valves were opened and closed by small submarines. To allow the submarines to perform this operation from a safe distance, the valves were fitted with articulated shafts to transfer the actuation movement and force it to other parts of the system. The shafts were constructed like telescopes to allow change in length to adapt to small movements and relocation of the equipment's position. The complete assemblies were also designed for easy disassemble, transportation and reassemble for refitting. Due to the extremely harsh underwater environment, Belden used a higher-grade stainless

steel for the universal joints. The yokes of the universal joints were made of extremely corrosion-resistant 316L stainless steel. To prevent galling and to improve the joints' friction properties, the yokes' contact surfaces were PTFE-coated. The pins and blocks were also manufactured from 316L stainless steel and protected with grease-packed boots. To provide higher strength and improved wear resistance, Belden's standard stainless steel joints have AISI 303 stainless steel yokes and AISI 416 steel pins and blocks. Standard single joints can be modified with a variety of stainless steel grades, including 304, 316, 17-4 and 15-5, to meet specific applications' requirements. Diameters range from 1/2 " (13 mm) to 6" (153 mm) with a standard operating angle of 35 degrees.



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