

Aramco licenses new LAPST valve testing solution

Editor's note: This story is part of an ongoing series on Saudi Aramco technologies that are being commercialized by Aramco's licensing arm, Saudi Aramco Technologies Company.

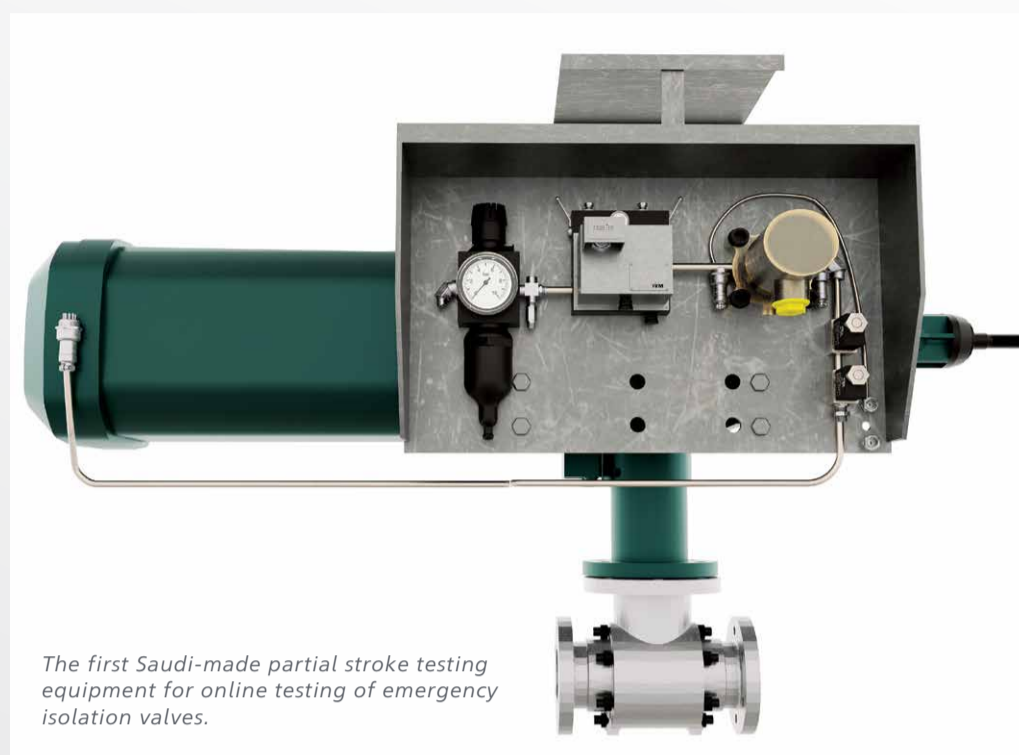
By Scott Baldauf

In the oil and gas industry, emergency shutdown valves are an essential safeguard in almost every plant for maintaining the safe production of energy that the world needs, as well as for ensuring the safety of people and facilities. Yet, shutting down an entire process or system to test isolation valves can be very costly and disruptive.

Partial stroke testing (PST) is a technique used to partially close the valve and test a percentage of the possible failure modes of an emergency valve without the need to physically and fully close the valve.

Aramco has recently licensed the patented Locally Actuated Partial Stroke Testing (LAPST) technology to Industrial Valve Manufacturers (IVM), a firm based in Dammam, to collaboratively develop and locally build LAPST — a simple and cost-effective solution for PST, which tests valves while keeping the process online.

"LAPST is another testament of Saudi Aramco's richness of talents and intellectual properties," said Thamer A. Al-Qarawi, director of Process and Control Systems Department (P&CSD). "The technology goes beyond safety and cost optimization to support local content as LAPST is the first partial stroke testing device, developed and



The first Saudi-made partial stroke testing equipment for online testing of emergency isolation valves.

manufactured locally in Saudi Arabia. The technology will benefit industries where partial stroke testing is needed to ensure online testing of emergency isolation valves."

How it works

The currently built and field-tested LAPST model is an entirely mechanical system with multiple safety contingencies and it functions by manipulating the air supply/venting to/from the actuator. During testing, the air supply is temporarily restricted from the actuator, which triggers the actuator to begin exhausting air through an exhaust port within the device. The device throttles the vented air from the actuator to precisely control the speed at which the valve is turning. Once testing is complete, the device returns the valve to its normally open or closed position.

Fawaz A. Al Sahan, the LAPST lead innovator with P&CSD, said that the

inspiration for LAPST came from his long career of working in plants, including Riyadh Refinery, and before that with SABIC. "Starting in 2017, we built a prototype which made use of existing materials and hardware and tested it at Riyadh Refinery, and received positive feedback from the refinery team," Al Sahan said.

Best of all, LAPST is manually actuated by the operator via a push button, taking visual feedback from the local position indicator. The operator may disengage the push button at any point, which will return the valve to its normally open or closed position. This feature prevents the common trips and faults that occur with existing automated PST technologies.

Pilot project testing

LAPST devices have been piloted on a number of emergency shutdown

valves at the Hawiyah NGL (HNGL) Recovery Plant and the Fadhilli Gas Plant (FGP) departments, with the first installation taking place in 2023. The performance of the technology was satisfactory and proved to be reliable after many tests were conducted.

Engineers who used LAPST at both HNGL and FGP praised the technology for its ease of installation and use, its zero power and air consumption, and its multiple safeguards to prevent valve failures during testing.

"LAPST technology has been piloted successfully at Fadhilli Gas Plant and was proven to eliminate the need of an electronic positioner to perform the partial stroking testing on ZVs (emergency shutdown valves) safely," said Faisal A. Alqahtani, an associate engineer who worked on the LAPST pilot testing at Fadhilli.

"To improve the plant's reliability, LAPST is being tested to perform partial stroke testing on safety valves, avoiding the frequent failure pertaining to conventional positioner's internal parts," said Khaled M. Alshammari, an associate engineer at HNGL's Specialty Engineering Unit.

"The increased reliability, simplicity, and cost-effectiveness of this technology makes it truly transformative. The licensee IVM is progressing well towards commercializing this product and we are excited about the possibilities that will arise as this technology is more widely commercialized," said Raed H. Abudawoud, CEO (A) of SATC.

For more information about this technology, please reach out to Subashini Asokan, head of Licensing, Saudi Aramco Technologies Company at subashini.asokan@aramco.com.



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