

Gap in the lower range

“It seems that the industry, by this I refer to valve suppliers, has scaled up in terms of sizing. As a result, it has become increasingly difficult to find internal parts for the lower (Cv, Kv) ranges in the control range. There are solutions which would enable to deviate, but these are suboptimal, at times forcing us to re-adjust the processing line.”

By Lucien Joppen



Marty van Tilburg: “We are trying to figure out which combinations and values are indicative of the status of the valve; whether it is fine to keep using it or whether preventive action is needed within a certain amount of time.”

Marty van Tilburg (age 41) has been working for Sitech (see box Sitech Services) for over seven years. Having studied mechanical engineering, he opted for a job that embodies both mechanical engineering and process control. He oversees Sitech’s valve park which encompasses more than 15,000 valves. These valves are stationed in and around the production facilities of Sitech’s clients - (petro)chemical companies on the Chemelot site (see box Sitech Services). It is van Tilburg’s job, and of his 15 colleagues, to keep this valve park in excellent running order. Van Tilburg states that the focus is first and foremost on only 1% of the enormous quantity mentioned before. These are mostly control valves and to a degree also on-off valves.

3D-printing of valve parts

Van Tilburg’s focus is mainly operational, but he’s also interested in developments regarding the development and use of control valves. When asked about trends in this area, he mentions 3D-printing as a revolutionary method in producing spare parts, both in metal, alloys and polymers. “3D-printing won’t replace the current supply chain”, Van Tilburg says. “But it will impact certain applications. I am thinking about difficult-to-get parts for engineered products. These parts could be manufactured and delivered faster than would be the case if it would be off the shelf. There is also a possibility that a certain valve and its part(s) are not in production anymore.

In such a case, 3D-printing could save the day. We are conducting a pilot with a German solutions provider as we speak. Ideally, these parts could also be printed close to our cluster. Bear in mind though that 3D-printers are not one-size-fits-all machines. Depending on the base material(s) and the application a different 3D-printer is required.”

Pilot at Sitech

Another promising area is the instrumentation on and around the valve, Van Tilburg says. “Data coming from the positioner provide valuable information and insights to operators and maintenance personnel. At Sitech we are working in a pilot in which we are gaining experience with this method.”

Ten control valves and fifty shut-off valves are involved in the pilot. These valves have been selected according to various criteria. First of all, the plants needed to have compatible software for our Asset Health Center (see text box) to read out relevant data. As for the control valves, these were considered performance killers or cost drivers.” According to Van Tilburg, the pilot has already led to operational gains. “In one case, we detected that the valve began to trip. As a precaution, we decided to inspect during a planned shutdown, and we found that there was something wrong with the electronics in the actuator. Of course, we don’t know whether this could have led to a short-term forced shutdown. Therefore it is hard to quantify potential gains, which in turn makes it hard for a business case to present to senior management.”



Chemelot harbors 60 production facilities. More than 150 companies are present on the site in the south of the Netherlands.

Predictive models

In the pilot, Sitech is looking at various data coming from the positioner. For example, with the control valves the company uses positioner data regarding the set point. Other parameters that are monitored and analysed are torque, vibration and the duration (opening-closing) time of the valve.

“We are trying to figure out which combinations and values are indicative of the status of the valve; whether it is fine to keep using it or whether preventive action is needed within a certain amount of time.”

3D-printing won't replace the current supply chain. But it will impact certain applications.

Sitech's Asset Health Center plays an important role. It has developed predictive models, based upon algorithms, for various pieces of equipment (pumps, valves etc.). These algorithms are designed to predict failures based on processing parameters and additional data (for example weather data, ed.).

Van Tilburg admits that data collection and analysis also requires valuable time, a scarce commodity in a factory environment. “Ideally,

you need to clear your schedule regularly to analyse and discuss these data. In practice, this is quite difficult to align schedules to make this work. Having said this, we have the data stored, and therefore there is always the possibility to retrieve particular data sets for analysis.”

Problematic

As for control valves themselves, Van Tilburg doesn't see ground-breaking product concepts on the market. “I haven't been surprised by market introductions. What is noteworthy though, is that suppliers have left the lower control ranges in globe valves (Cv 0 - 5) for what it is and have focussed their attention to the higher ranges. Frankly, I have no idea why but it can be problematic for us when we need to replace the interior mechanisms and experience difficulties with finding a suitable solution. I was pleasantly surprised that a German supplier presented a lower-range solution at the recent Valve World exhibition in Düsseldorf. In practice, we can deviate 3 per cent of the original Cv/ Kv values.

However, for safety reasons we need to recalculate the process line behind the valve because of higher throughput. We can compensate for a different flow coefficient with the control range of the valve. Instead of controlling

in the 60/70 per cent range, the valve would be 'pinched' in the 30/40 per cent range. It is feasible but not conducive to the operating life of the valve.”

Sitech Services

Sitech Services was established in 2008 at the Chemelot chemical site in Geleen, in the south of the Netherlands, but has a long track record as it originated from the service departments of former DSM's divisions.

At the moment, Sitech Services employs approximately 900 experts for more than 25 production facilities on the Chemelot-site. These experts assist companies in the process industry, the chemical industry and the energy sector, to grow and develop by supporting them with their unique services and the latest technologies, using expertise, innovation and extensive digitisation as tools.

In 2016, Sitech opened its Asset Health Center (SAHC). Within this centre, the company monitors more than 500 factory installations, analysing trends that provide information about the condition of these installations and ultimately provide insights that enable predictive maintenance.