For more than 40 years, the French company Sabatier, a member of the Swiss Soudronic Group, has been developing and producing machines for the manufacture of three-piece metal cans in Vitrolles (Bouches-du-Rhône), France. The metal cans – consisting of base, body, and lid – are used mainly for industrial products such as oils, solvents, lacquers, and paints.

**Electrical axes revolutionize production processes**

The ability to produce metal cans of this type requires the use of a large number of axes. Motion control is therefore a key factor for a machine producer like Sabatier. Due to the diversity of the containers, some of Sabatier’s machines have up to 60 numerically controlled axes. Although this guarantees great flexibility, it also means that motion control becomes a significant challenge. Originally, hydraulic actuators were used at Sabatier for forming the container body and for seaming. However, this required as many machines as there were operations – at that time the production line alone was around 60 meters long. Then 15 years ago, Sabatier started a small revolution with its decision to drive all the axes electrically. The improvements in the production sequence were noticeable immediately: from then on, a single machine could manage the different production stages on a line only 12 meters long. Nevertheless, it was still necessary to find a...
permanent solution for the axis control, because only in this way would it also be possible to achieve the required improvements in machine safety. As a result, Sabatier completely redefined its strategy for control of the electrical axes.

Centralized control intelligence thanks to Simotion D

To begin with, the architecture of the Simotion D motion control system and the Sinamics S120 inverters enabled the machine producer to centralize the program. Daniel Levert, automation engineer at Sabatier, explains, “At first each inverter connected to the direct current bus had its own control program, which meant that multiple programs had to be managed using an equal number of modules. Now, with Simotion D, we only need a single one." This has meant a significant reduction in development time and has also made it possible to design the machine so that maintenance is considerably more consistent, particularly when it comes to replacing the inverters. “In this case, it’s no longer necessary to reload the program. Replacement itself is sufficient to restart the machine,” says Levert. Improved safety and shorter downtimes

Thanks to this fundamental restructuring of the automation systems, Sabatier also had the opportunity to replace signal transmission via cable with an AS-i bus solution. In this case, 15 door-monitoring sensors are linked to a single bus, and the AS-i master integrates a Profisafe transition for the connection to Simotion D. Levert adds, “This solution matches our linear backup process precisely. The additional material costs have already paid for themselves due to the time saved on installation and the useful functions for operation and maintenance. Another positive effect we have noticed is the reduction in downtimes.‘ The continuous connection from safety sensor to motor controller means that it is also possible to use the SLS (Safety Limited Speed) safety function via Simotion D. Levert stresses, “Access to Safety Limited Speed via a dead man’s switch when a door is open radically alters the possibilities for control and maintenance.” Not only that, but the system also notes the address of the opened doors. As a result, the machine stops completely when a further safety protection circuit is interrupted. Thus the controllers also inherently offer the STO (Safe Torque Off) safety function.

Significant productivity increase

By choosing Simotion, Sabatier considerably improved the ergonomics of its machines and their functionality, with the end objective of a significant productivity increase. Levert confirms, “There are lots of advantages.” The Sinamics S120 inverters, for example, radiate appreciably less heat, which means there is no longer any need for air-conditioning of the control cabinet. They are also able to feed back electricity into the direct current bus or even into the mains supply. According to Levert, “This leads to a reduction in power consumption in the order of 10 to 20 percent.” Brake resistors become superfluous due to the feedback of the current. Last but not least, Simotion D guarantees smooth start-up of the machine during pilot control of the motion. Levert sums up: “The result is significantly less wastage during commissioning.”