F.LLI NAVA

Safety and continuity in the very deep drawing process

THE DEMANDING FOOD AND MEDICAL SECTORS REQUIRE VERY HIGH LEVELS OF QUALITY. THE SOLUTION PROPOSED TO ONE OF ITS CUSTOMERS BY F.LLI NAVA, IN CONJUNCTION WITH THE SUPPLY OF A DEEP-DRAWING PRESS, MAKES IT POSSIBLE TO MANAGE THE PROCESS AND SAFETY RISKS INVOLVED IN FORMING

Among its flagship products, F.lli Nava boasts a wide range of presses equipped with both conventional deep-drawing and deep-drawing from below. These also include the 2MI 1100/500 model for deep-drawing, with 11,000 kN maximum ram force, 5,000 kN bottom sheet-clamp, 800 kN third top action, and 2,500×1,800 mm working plates. This press was developed for an important customer with special requirements for deep drawing for stainless steel tanks intended for the food and medical industries, a demanding market segment where the quality of the press has a significant impact, both on the quality profile of the finished product and on competitive performance. The customer's critical issue lies in particular in the control of the forming process, which is taken to its technological limit and therefore very sensitive to variations in the quantities that control it.

Sheet metal flow control in the mould

Where deep-drawing is concerned, the heart of the problem is the sheet metal flow control in the mould, which must take place correctly by finding a narrow path between two opposing critical conditions: sheet metal failure due to excessive tensile stress, or the formation of wrinkles and surface defects due to excess free material that is not adequately retained. The press was implemented with two types of solutions: the first one achieves the best possible adjustment of the moulding cycle, the other monitors the cycle progress, with continuous monitoring of the process. For this purpose, F.lli Nava developed a lower blank-holder that can work both passively and actively: this latter possibility allows an extension of the range of parts that can be moulded with the same nominal press force, as it allows the use of a counterforce on the sheet metal equal to the maximum force of the ram, with an active force for deformation that is however considerable. With regard to monitoring, on the other hand, the software continuously monitors the process values read to ensure convergence with the values required in the work recipe, stopping the process and documenting the causes in the event that the set thresholds are exceeded.

Process and safety risk under control

The combination of these hardware and software solutions makes it possible to manage the process and safety risk involved in forming. This can range from the case of reject parts (process risk only, on business continuity) to the risk on the mould when forming defects overload the precise male-female coupling.

In this last case, in fact, the action of the part going into default can become very negative, creating a wedge effect.

In the least serious case, the mould blocks becoming a single body between all its parts, thus requiring delicate and sometimes risky interventions to first disassemble it from the press plates and then to open it in the tool room, releasing the interlocking created. In the case of moulds for small production runs, which are therefore less mechanically structured, the leverage effect created could compromise the integrity of certain parts of the mould, possibly creating severe risks for operators if it were to fail, projecting parts like projectiles.