Siemens is expanding its Press Line Simulation software package and is now offering modules for press operators, press manufacturers, and tool designers. The tried-and-tested curve generator has also been integrated for the creation of optimized ram motion profiles for servo-presses with Simotion. This results in shorter development, set-up, and tooling times; collision-proof operation; maximum cycle rates; and cost-efficient processes.
actual system, and advanced programming methods for complex kinematics. Direct communication with the Simotion press control system is possible.

The PLS Die Validation software tool carries out die kinematics verification. For this purpose, tooling data are imported into PLS from the user’s CAD pool, and kinematics are defined and analyzed for moving components (especially slides). Important functions here are the creation of speed, path, and acceleration curves; the programming of controlled movements (e.g., lifters); and the calculation of collisions in the tool. The results of the collision calculations can be transferred to an Excel-compatible format.

PLS Modeler is designed for the construction and testing of digital press models from the ground up. Based on data from the physical press, the user enters the press structure, dimensions, kinematics data, and press geometry and thus sets up the press in a sequential process. With standardized testing methods, the virtual model can be verified against the physical press. Core functions include the entry of basic information such as the number of press stations, the type and number of transfer components, logic data for the definition of higher-level objects, kinematics axes, and setting and programming values, as well as detailed object data for sheet-metal part and tooling interfaces for extensions. The result is a skeleton model with complete kinematics functions that can then be combined with the CAD geometry of the press. Once supplemented by the limit values of the kinematics axes, the finished model can then be tested.

**Automated for optimal ram guiding**

The curve generator for servo-presses, developed for Simotion controllers, is now also a component of PLS V9.0. This allows the operator to easily determine an optimized ram motion for every die set. After entering important basic data such as the die opening and closing angles, position, and stroke before and after the lower dead center, as well as the target stroke rate, the tool calculates the optimal ram motion curve for the current simulation scenario at the press of a button. The result is a traversing profile with smooth, flowing transitions that protect tools and materials and avoid excessive power and torque peaks – which keeps the drive power to be installed within the limits of what is actually required. The machine-specific maximum values – for example, for speed, acceleration, jerk, and power output of the heavy-duty Simotics torque motors; the ram speed and acceleration; and the optimum forming speed – are automatically taken into consideration. The permissible limits of the press and the drive-train are thus fully reached but not exceeded. Optimized traversing curves can be stored and imported again. All this makes setting up new tools (or die sets) very easy and convenient.

All simulation results from PLS V9.0 can be transferred to Simotion press control systems either manually, in the form of standardized files, or fully automatically – with the latter, of course, being the fastest and most fail-safe way.

**Proven in practice**

A German car manufacturer has been using PLS directly on its lines for many years, reducing production changeover times by well over 60%. Here, simulation and optimization are mandatory after even the smallest of changes to the processes, so the lines always start up at the press of a button without collisions. Thanks to prior simulation, almost all sheet-metal parts can be stamped at the presses’ maximum stroke rates, thus making full use of the presses’ potential.

INFO AND CONTACT
siemens.com/metalforming
ulrich.lorenz@siemens.com