ESI’s sheet metal forming solutions – building on an important legacy with new features and ambitious plans

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Abstract

In an era in which car development cycles are being reduced to less than one year, engineers are challenged to develop exciting styling and lightweight designs using new high strength materials. Lower formability, the requirement to control temperature precisely during complex stamping processes, and the need to design to compensate for increased springback, all contribute to the difficulty.

Importantly, smart decisions must be made fast and early in the product development cycle to assure future manufacture of high quality, defect free panels and parts at the required cost.

Evolved through 20 years of industrial and academic collaboration, ESI PAMSTAMP has a well established reputation for precision and the ability to address complex processes, including springback.

This presentation explains what has been developed in the last 12 months to enhance the capability, accuracy, speed and efficiency of the software and also to extend the scope of ESI’s sheet metal forming solutions all the way from concept and styling to try out and production. It also looks forward to what will be done in near future to satisfy the ever increasing demand for productivity, quality, and control of cost.

ESI Die Starter: A New Approach to Manage Early Feasibility in Sheet Metal Forming

Virtual stamping engineering is now used across the entire sheet metal forming process, from early feasibility of designs and initial cost estimation to final virtual try-out and inspection. Never-the-less, there remains a compelling need to shorten product development time and especially to accelerate the early stages of the process.

Die Starter, a new solution developed by ESI Group, allows a die tool engineer to drastically reduce the number of iterations needed to establish a feasible tool design. This innovative system automatically designs the first quick die face (“initial die face”) by generating binder and addendum surfaces (NURBS surfaces), including beads values and blank contour. Die Starter also improves on the initial die face using a mathematical optimization algorithm based on feasibility criteria (avoiding splits, wrinkles) to automatically generate geometrical modifications of the binder and addendum, and optimizes draw bead forces to achieve forming goals with minimal material usage.

This paper presents a description of the new approach and methodology of Die Starter. Some industrial examples are presented; from the part geometry to final die face (initial die face and optimization).