

AutoForm-Sigma[®]

Software for Robust Processes



- ▶ Determination of process capability and influence of parameter variations on production
- ▶ Identification of process instability issues and definition of the most appropriate parameters
- ▶ Digital prediction of process stability and rapid evaluation of correction measures during production
- ▶ Reduction of press line downtime and reject rate
- ▶ Enhancement of the process efficiency and reduction of overall production costs



AUTOFORM
Forming Reality

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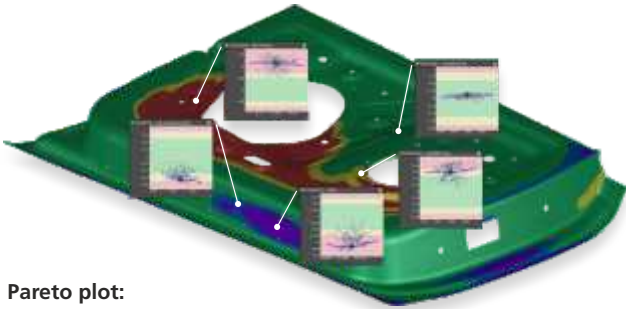
Efficient Correction Measures During Production and Robust Stamping Process

AutoForm-Sigma enables engineers to design efficient and stable stamping processes. The resulting reduction in downtime of press lines as well as reject rate ensure a cost-efficient manufacturing process. As AutoForm-Sigma allows for effective parameter adjustments during production, unexpected interruptions are limited and deadlines can be met.

Ideally, a stamping production line is set up according to engineering and runs in a perfectly matched simulated environment. However, in reality, parameters in engineering are not as constant as commonly assumed. The reason for this is that in practice there are unavoidable and uncontrollable noise parameters which affect the process conditions.

Material properties can vary from coil to coil, even within the same coil. Lubrication, tool and sheet roughness as well as friction coefficient may vary as well. Press forces, blank position, tool temperature and tool wear may also vary from stroke to stroke in the press.

AutoForm-Sigma takes into account the noise and variability that are inherent in the stamping process and provides a better reflection of the real state of manufacturing. With this software, the effects of noise and variability on the robustness of the stamping process are quantifiable and predictable. Engineers can select the appropriate correction measures in order to ensure a stable and reliable process.



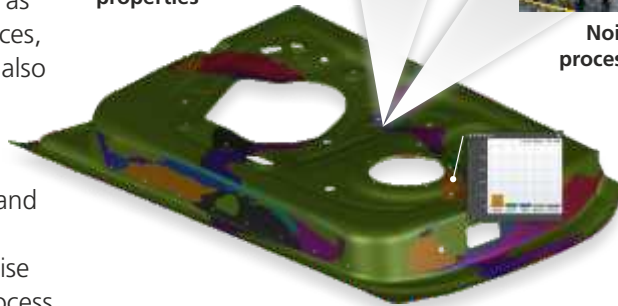
Pareto plot:
springback as dominant variable



Noise in material properties



Noise in forming process parameters



Variation of springback due to noise

In addition, the software enables them to determine the C_{pk} process capability, which is an indicator for process stability and reliability. Robust process definition is essential for the efficient production of stamped parts which meet quality standards.

The sensitivity analysis of control parameters, such as press forces or speed, carried out by AutoForm-Sigma enables operators to make effective adjustments that reduce both press line downtime and part rejection rate.

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Publication SIB-3-E

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