Sheet metal forming process and tools optimisation

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Sheet metal forming process and tools optimisation

From 1997-01-01 to 1999-09-30

**Project details**

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<th>Total cost:</th>
<th>Topic(s):</th>
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<tr>
<td>Not available</td>
<td>0101 - Incorporation of new technologies into production systems</td>
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<th>EU contribution:</th>
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<td>CSC - Cost-sharing contracts</td>
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**Objective**

The punch and die stamping process of thin sheet metal is a widely used forming process in modern industry, ranging from Automotive to Manufacturing to Aerospace. Modern alloys increase sheet formability, drawability and component strength allowing stamping of parts with complex geometry and high resistance.

The project proposal, included in the programme Area 1 Production Technologies addressing mainly to 1.1 (Incorporation of new technologies into production systems), consists of the following main research tasks:

- Detailed specification of the process requirements using a press machine tool.
- Development of measure and data acquisition devices for controlling parameters in the press.
- Development of monitoring and control devices for the press.
- Prototype design and development to be included in a standard press focusing on the following objectives:
  - Design and develop a control device for specific press parameters mainly related to the whole system (press & die) such as deformation of the tooling, force and pressure applied to the blankholder and sheet metal flow.
  - The device will subsequently be used for controlling a production forming system. This control device will be developed on the basis of:
    * Data acquisition using sensing systems.
    * Management and monitoring of the data obtained.

Resulting from the data obtained and processed with the above device, actions will be taken for:

1) Improving the quality of shearing and forming process.
2) Obtaining a continuous feedback for the process which allows an automatic correction in the subsequent stroke.
3) Obtaining a more flexible pre setting for reducing the

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time needed to manufacture a good quality part after a change of the tools.

4) Securing a statistical control of the process.

5) Increasing the production speed through a better control of the stamping process.

All the above actions will be achieved through the control of the different hydraulic and pneumatic systems of the presses such as the cushions and the blankholder. Reduction of cycle times in a 10%, minimisation of idle times up to a 30% and enhancement of part quality in a 20% should be direct and tangible achievements of this project.

A great innovation is the monitoring and control system to be fitted on the press that will allow locations and displacements to be measured even at extremely high punching speeds by using sensors, and act on the different elements of the press to correct the potential errors on next strokes. Noise reduction devices will be other innovative characteristics of the final product.

The elaborated prototype press with the new systems and peripherals is expected to be brought to the market within 12 months after project end and a fully industrial machine tool is expected to be available within the first 18 months of the exploitation period. The press will be available to all small, medium and large die stampers, enabling them to reduce cycle time and to enhance the quality of stamped parts. This will lead to an optimisation and cost and time reduction for the forming process and part, which will be of direct benefit for a very wide range of European industries.

Related information

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<th>Result In Brief</th>
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Subjects
Electronics and Microelectronics - Industrial Manufacture - Innovation and Technology Transfer

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