



The Tailored Steel Product Alliance (TSPA) comprising laser welded blank manufacturers, equipment suppliers and North American steel companies developed a computer-based model which will allow a deeper understanding and quantification of the costs and benefits of producing tailored blanks. The cost model is relevant in today's environment for assessing new manufacturing technologies for future vehicles.

In initiating the development of a cost model, several requirements were established:

- Costs must be derived from real world manufacturing/engineering requirements using a process-driven methodology.
- Cost Model must be user-friendly and, in light of this, a spreadsheet format was favored.
- Cost Model should have sufficient flexibility to:
 - easily accept 'what-if' scenarios for input data.
 - allow assessment of 'greenfield' and 'brownfield' manufacturing scenarios.
 - allow volume sensitivity analyses to be conducted.

To illustrate the capability of the TSPA Cost Model, three case studies were conducted; (1) Door Inner, (2) Front Rail and (3) Body Side Inner. In all cases, significant cost and part-weight benefits were identified. The reduced number of parts and fewer assembly spot welds contributed to lower tooling costs and assembly costs.

The results are summarized in the following table:

	<u>Baseline</u>	<u>Laser Welded Blank</u>
<u>Door Inner</u>		
No. of parts/vehicle	6	2
Part weight, kg	14.1 kg	13.1 kg
No. of assembly spot welds	50	0
Cost/part*	\$27	\$23
<u>Front Rail</u>		
No. of parts/vehicle	26	10
Part weight, kg	32.2 kg	23.4 kg
No. of assembly spot welds	562	320
Cost/part*	\$127	\$105
<u>Body Side Inner</u>		
No. of parts/vehicle	10	2
Part weight, kg	60.1 kg	43.8 kg
No. of assembly spot welds	116	0
Cost/part*	\$120	\$95

* based on 275,000 left and right assemblies

As the results from the case studies show, the newly developed TSPA Cost Model can be utilized in a user-friendly spreadsheet format to identify the cost benefits of tailored steel products or, more specifically, laser welded blanks.

Camano Associates (affiliated with MIT) developed the cost model and applied their Process-Based Cost Modeling methodology.



In structuring the cost model, Camano Associates used existing databases developed for stamping, roll forming of tubular hydroforming and assembly welding, which have been validated within the automotive engineering community. Input data on laser welded blank manufacturing costs (as a cost/inch of weld), were supplied by the blank-manufacturer members of TSPA. Material prices were supplied by American Iron and Steel Institute as average prices based on those used in earlier research studies. The cost model was developed in an Excel spreadsheet format and a Glossary of Terms and User Guide was developed to facilitate application of the model