Sections Used In Automobiles

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In this Twentysixth series of articles on Rollforming we will discuss about the sections used in Automobiles. We had already discussed in one of our previous article the Rollformed sections used in Bus-bodies. In this article we will discuss about some of the the Rollformed Sections used in two wheelers and motor cars.

The earliest rollformed sections used in motor cars were side trims and bumper sections. Since then a lot of development has taken place in the design of especially car bodies and it is continuously improving and developing. Bumper systems have changed drastically over the last 20 to 30 years. They have been designed to improve safety, structural integrity, make vehicles more fuel efficient and reduce manufacturing costs.

To withstand crash loads at high speeds in the advanced countries it is statutorily required to design the bumpers not to fail at specific maximum speeds and also simultaneously to absorb the shock loads. Each design is subjected to finite element analysis to know about the stress conditions during failure of the component. High strength and ultra high strength steels with superior formability characteristics are increasingly used in the automotive industries nowadays.

From the earlier press braked/stamped components ways and methods are being found that could improve the design, weight, lead time and cost of components by changing over to rollforming that allows secondary operations such as pre-punching and notching during rollforming itself.

Also finishing operations could be eliminated by rollforming pre-coated material. New spheres for roll formed products are still emerging, and the true potential of the process is only now starting to be realised. Rollforming process maintains a high degree of consistency and accuracy coupled with high rate of production.

Already new computer softwares are transforming the cold rollformed sections industry and making the market development more effective.

The advantage of rollforming is to be able to produce any shaped section having high strength to weight ratio which is what is required in automobiles. Less weight, greater strength and ease of handling has resulted in the use of precision cold roll formed components for automotive industry.

A new rollforming concept initially developed by a company called Dreistern, Germany promises to revolutionise the fabrication technology of automobiles. Rather than rollform the compli :ated profile out of one strip, simpler shaped rollformed sections are produced first and precision laser welded together into a composite section .These are called tailored- tubes.

Using tailored- tubes the number of forming stations could be reduced as much as 50 percent and thereby reducing the tooling cost. Here, individual sections can be provided with dissimilar alloys and with differing strip thicknesses for specific application requirements like high energy-absorption capability and high structural rigidity characteristics required by automotive designers. Fig.19 and Fig.20 are examples of tailored- tubes.

Safety has become one of the most important aspects of marketing a car, and safety-related bodywork parts are going to get increased attention in future. A recently developed section by Dreistern, Germay is an example of laser-welded side-impact-protection profile made out of high tensile, fine-grained galvanised steel. Shown in Fig. 18.

In two wheeler automotive area the most prominent rollformed sections used are wheel rim and mudguard sections. They are also called curved rollformed sections. Fig. 16 (Rim Section) and Fig. 17(Mudguard Section) are the typical examples of those sections.

Some of the typical Rollformed Sections used for automobiles are shown in Fig.1 to Fig.20. Fig.13 & Fig.14 are front bumper sections, Fig.15 are rear bumper sections, Fig.12 are door beam sections, Fig.9 are sections for power seat systems, Fig.10 are roof bow sections. Many more sections according to one's specific requirements could be rollformed. Some of these sections shown in Fig.1 to Fig. 9 - door and window sash sections(Fig.1 &2), side sliding rails section for doors in stainless steel (Fig.3) co-extruded weather strip sections (Fig.6) have been developed by Sedvik Industries, Bangalore.

With the increased demand for reduction in weight of the automobile bodies coupled with higher rigidity and strength, economical manufacturing cost and higher quality rollforming is going to be an increasingly popular manufacturing process for automotive body parts in the coming years all over the world.