Sections used in Structurals

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In this Twenty eight series of articles on **Rollforming** we will discuss about the Rollformed Structural Sections. In our previous articles we had touched upon this subject in a piece-meal fashion and also briefly here and there. The main purpose of using

Rollformed Sections for structurals is to save on material cost by going for high strength to weight ratio light weight sections with versatility, ease of mass production, speed of erection and simple connection to other structural members.

Structural sections should be able to carry higher loads and should be sufficiently rigid. By properly shaping the sections the stress distribution over the cross section of the load carrying members could be made optimum and by providing corrugations, ribs and lips the sections could be made more rigid. We had already discussed about these aspects in our tenth series of article. Also the purpose of using closed sections were discussed in our earlier article.

Lightweight structural products are used substantially in steel frames/ trusses, modular and refurb buildings, Z-Purlins, C-Purlins, columns, deckings, body building of buses, railway coaches, freight cars, mezzanine floors, floor and wall panels, door and window frames, scaffoldings, partition sections, storage racks, automobile bumpers, truck-chasis sections, load-body panel sections, container sections, highway guard rails, fence poles, piling and trenching support sections etc.

Thickness for framing members (beams, joists, studs etc.) generally ranges from 1.2 to 4.0mm; for floor and wall panels and for long span roof decks from 1.2mm to 2.5mm and for standard roof deck and wall cladding from 0.8 to 1.2mm.

Rollformed sections have been in use in the building industry for many years in the advanced countries and the number of applications are endless and continuously growing. Open web joists and box columns form the structural frame for many industrialised system. Large, open-web lattice joists/beams with CRF profiles as top and bottom chords span upto 35 metres. These are claimed to be 85% lighter than comparable concrete beams and only half the weight of traditional steel span design.

For a given load and length a column made from rollformed sections can be typically 15% lighter than a box column made from two hot rolled channels welded toe to toe. Similarly, a roof purlin formed from strip can be as much as 60% lighter than one made from a hot rolled angles or channels. Also the section shape can be designed to suit to the particular application.

The rollforming industry is now experiencing a trend to the wide use of high strength low alloy (HSLA) steels-particularly in products for the transportation industries. Potential weight savings could be achieved from 20 to 60%. This explains why the automotive industry is designing more and more parts fabricated out of HSLA.

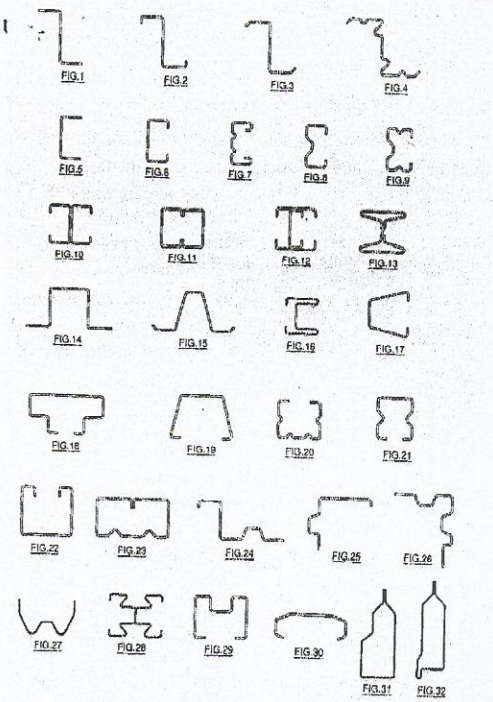
Automotive bumper bars can be satisfactorily produced from ultra high strength steel by the rollforming process. Some additional fabrication including the generation of a sweep in the bumper can be done in line with the rollforming machine.

From Fig. 1 to Fig. 32 are shown some of the typical structural sections. In our earlier articles we had discussed about the closed structural sections, decking and roofing sections, door and window frame sections, storage rack sections and bus-body sections which are not shown here. From Fig. 1 to 4 are different types of Z- Purlin sections. Fig. 5 is C-section. Fig. 6 is lipped C-section. Fig. 7 is called swage- beam section. Fig. 8 and 9 are called multi- beam sections. Fig. 10 to 13 are welded sections and are called compound sections.

Fig. 14 to 21 are some of the special sections used for various structural applications. Fig. 22 and Fig. 23 are stud sections. Fig. 24 to 26 are container sections. Fig. 27 is road crash barrier section. Fig. 28 is welded joist/girder section. Fig. 29 and 30 are truss member sections. Fig. 31 and 32 are special type of door frame sections.

Sedvik Industries, Bangalore has developed several structural sections for different applications.

From the above shown sections one could infer the limitless possibilities of using different shaped sections for different



structural applications. In India there is still some hesitancy to use lighter gauge structural sections which is soon going to be overcome with more awareness of material qualities, structural strengths and protective coatings.