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An appropriate material & cost saving Technology

"ROLL FORMING"

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It is rather intriguing to realize that in our country the best material and cost saving Technology for ferrous and Non-ferrous flat products i.e ROLL FORMING is still not widely known and used. Whereas in the advanced countries several lakhs of different shaped Roll Formed Sections are in use, in India that figure has touched hardly about two thousand mark so far. In countries like USA, JAPAN, GERMANY, FRANCE, UK, AUSTRIA, etc there are Several Industries producing over 25,000 different types of Sections under a single roof. Day by day these figures are multiplying at a tremendous rate. Of late, a number of Flat Steel products manufacturing units have come on stream and some more are under way. Soon they will find it very difficult to utilize their production capacities to their fullest unless sufficient downstream Roll Forming units are established.

Recently, some impetus has been received to this technology when our automobile industries, because of predominantly Japanese technical tie-ups were almost forced to adopt Roll Formed panel Sections for their LCV"s. Apart from Automobile Industries, building and construction industries, truck and bus body building Industries and electrical contrc! manufacturing Industries are yet to exploit this technology in a big way. Like in advanced countries, by using pre-engineered and prefabricated structures if we could reduce the lead time to build shelters, factory buildings, light weight trucks or bus bodies our economic activity would get a tremendous boost. The locked up capital could be released for other useful economic activities. In the advanced countries, building a house doesn't take more than three months at the most. In contrast, in our country, the time consumed for the above activities would be several times more.

DESIGN ASPECTS:

Engineers efforts all along from time immemorial has been to make the best use of the available building materials. If the members in a structure or the machine elements could be formed or shaped in such a way that the maximum area of their cross section could be subjected to the maximum allowable stresses, the material utilization is most efficient. In practice, pure tensile, shear or compressive loads are rarely applied. They are invariable combined with bending or torsional loads. As soon as bending or torsional loads are applied, it is well known in the field of STRENGTH OF MATERIALS that the distribution of stresses over the cross section of the member is not uniform. They are highest at the farthest portion of the area from the Neutral Axis and lowest or almost zero at the nearest portion of the Neutral Axis.

Hence if we could form or shape the Section in such a way that material near about the Neutral could be minimized, great economy in material utilization could be achieved. That is the reason why ways and means of producing I sections, Channel, Angle or hollow closed Sections are being encouraged. With these measures saving up to 60% in weight as compared to the use of solid, rectangular, square or round Sections are achieved.

Hot rolled Sections have certain production limitations i.e the depth of the Sections cannot be increased at will without a corresponding increase in the web thickness. Normally the minimum web or flange thickness that are available are 3mm or more. The minimum thickness being about 2mm. But here the depth of the section that could be produced is also restricted. Using Roll Forming Technology there is practically no limit to the shapes that could be produced. Here, the depth of Section could be increased without having to correspondingly increase the web thickness.

Let us take the recent developments in Structural Engineering. For placing the Roofing-sheets over the trusses a secondary supporting system called Purlins are required. Purlin is a roof member that runs at right angles to the lay of the roof sheeting and supports the sheets. Purlins are in the turn supported by trusses or portals which in turn rest on columns. Conventional practice used to be-to use Angles, I sections or Channel sections as purlins. By switching over Z-Purling which are Roll Formed sections as against hot-rolled sections a saving in weight up to 50% can be

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