# ROLLFORMING

## Cold Rollforming of Pre-coated & Pre-Painted Strips & Sheets

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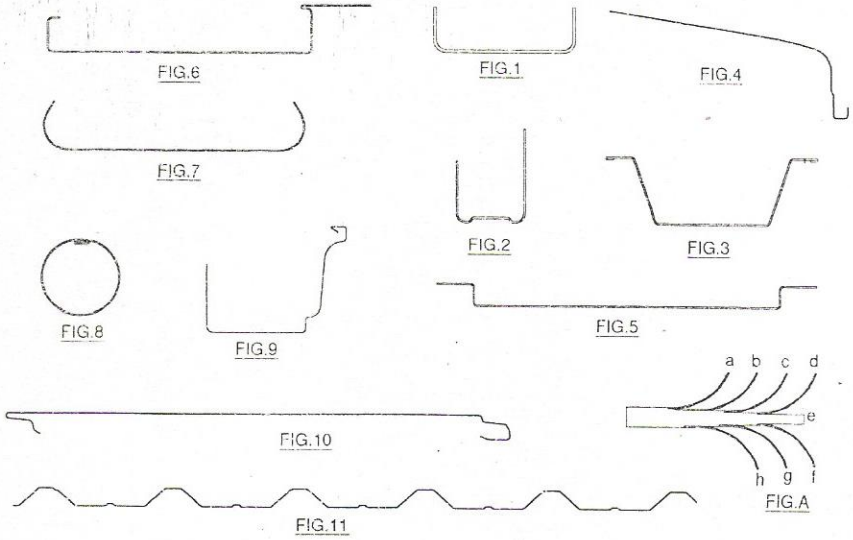
In this fourteenth series of articles on Rollforming we will discuss about Rollforming of Pre-coated and Pre-Painted Strips&Sheets which is increasingly going to be the future trend.We will also discuss very briefly about the required protective coatings. As the cost of steel goes up one of the effective ways of controlling the cost would be to go for high strength to weight ratio sections. By properly shaping and designing the cross section of the load carrying members stiffer and lesser thickness material could be used. But as soon as the section becomes thinner, proper surface treatment and protective coating would be required to avoid corrosion and rusting of the material.

Corrosion is nature's way of destructive disintegration of metals. Metal corrosion leads to huge economic, social and personal losses. Hence corrosion control measures are very necessary for the survival of our economy. India is far behind the western countries in corrosion consciousness.

If steel is kept moist it rusts rapidly. Wet corrosion which is the predominant type involves the flow of electricity between certain areas of metal surface known as anodes and cathodes, through a solution called electolyte capable of conducting electric current. The current results in corrosion of the anode areas.When corrosion occurs through dissimilar metals being coupled together and immersed in an electrolyte, the process is known as galvanic action or corrosion. Here, one of the metals in the couple becomes the anode and corrodes faster than it would all by itself, while the other becomes the cathode slower than it would alone. The sacrificial corrosion of one metal such as zinc or aluminium is a widespread method of cathodically protecting metallic structures.

As a coating metal, zinc can be applied by hot dipping and electroplating. A coating thickness of about 75 microns is necessary to protect steel for about five years in a industrial atmosphere. Aluminium coating is also as good as the zinc coating and in certain cases, offer protection superior to the latter. Zincalume or Galvalume metallic coating is a recent development where zinc and aluminium are first made into an alloy which is applied to steel to provide much better protection in a wider range of environment that can be offered by either zinc or aluminium. As a result zinc/aluminium coated steel requires for the same life span a much lesser coating thickness than only zinc coated steel. Prior to application of metallic coatings surface preparations like degreasing, descaling or derusting/ pickling are done.

Cathodic protection can be made more effective by the application of protective coatings like paints. Further, full benefit of painting is achieved with a phosphate coating on the steel surfaces which gives a good anchorage to the paint film and prevent rust-creep underneath the paint film. After phosphate coatings and rinsing iron and zinc surfaces are given a final passivating rinse with solution of chromic acid to improve their corrosion resistance.




Galvanised steel can be rollformed just as well as uncoated steel, but the zinc pick-up on tooling and damage to the coating must be prevented. This is achieved by proper design of the toolings and good lubrication. Zinc aluminium coated steel requires practically no lubrication. In the case of painted strips typically lubrication is not required because paints are relatively soft compared to metals. Paint is less flexible at low temperatures and may develop cracks during rollforming. The pre- coated sheets are available in three finishes i.e Al-Zn Alloy coated steel, Colour coated Galvanised steel and Prepainted Al-Zn Alloy Coated steel.Because of the choice of colours, long term life/durability and enhanced aesthetic appearance architects and building owners are increasingly changing over to prepainted metal roofing systems.

Fig.A shows the layers in a typical precoated and prepainted steel sheet.The different layers are as follows: a. Top finish coating. b. Primer coating. c. Chromate coating. d. Alu Zinc Coating e. Base metal. f. Alu Zinc coating. g. Chromate coating. h. Backing coat. The common specifications are: Painting thickness(top) : 25 microns, Painting thickness: 5 to 7 microns epoxy primer. Surface paint reflection: Glossy finish ( optional matt finish)

Zinc/aluminium alloy coated steel : 55% Aluminium ( 150 gm/m sq.) 45% Zinc: 200gm/m sq total coating on both surface.

Zinc coated steel: Coating of Zinc 275 gm/ m sq.

Fig. 1 to 11 show some of the sections developed by Sedvik Industries, Bangalore. Out of these, Sections shown in Fig. 1 to 5 are produced from pre-galvanized coils. And Fig. 6 to 11 are produced from pre-painted coils.Fig. 1 to 3 show some of the typical building interior sections.Fig 4 & 5 are the sections used in bus-bodies. Fig. 6 & 7 are ceiling sections.Fig. 8 is lock joint tube. Fig 9 is Roof - Gutter Section produced on a mobile rollforming machine which was specially designed and supplied for a company in Malyasia. Fig. 10 shows a section used for sandwich panel sections. and Fig. 11 shows a section used for Metal Roofing and side panels.

With the realization that in the long run the zinc coated steel rollformed products lasts longer, zinc aluminum alloy coating lasts still longer and ultimately precoated and prepainted products have the highest life the percentage of usage of these products will increase very fast in the years to come

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