

New Technology: Galvanising of Steel

Background

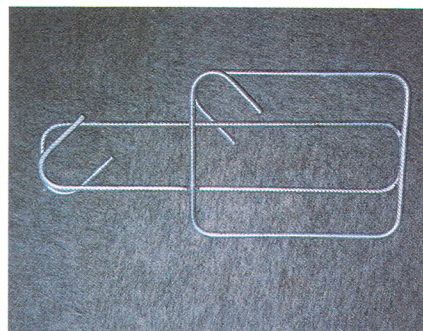
Galvanising is an anti-rust treatment for steel. The traditional technique consists of chemically pretreating the steel surface, then immersing it in 10–16 metre long baths of molten zinc at 450°C. The process involves large quantities of expensive materials, which increases the cost of the finished steel. In addition there are significant quantities of waste from the chemical and zinc baths. There is also the problem of fumes from these operations.

Cleaner Production

The company's objective was to galvanise steel products of constant cross-section, such as reinforcing and structural steel, tubes, wire, etc on a more compact production line, using up to two to three times less zinc, with reduced energy consumption and the suppression of all forms of pollution.

The raw steel is fed in automatically. The process can be operated continuously or in batches, depending on the material to be coated. The surface preparation is performed by controlled shot blasting. The steel is heated by induction and enters the coating chamber through a window profiled to match the cross-section of the steel. The zinc is melted in an inert atmosphere by an electric furnace and flows into the galvanising unit. The liquid zinc is held in suspension by an electromagnetic field. The speed of the production line is controlled by computer. Measuring the thickness of the coating using electromagnetic methods allows precise control of the process.

The first stage of the project has been to develop the technology for coilable material, ie wire and thin rod. The company are now developing the technology to handle rigid steel.

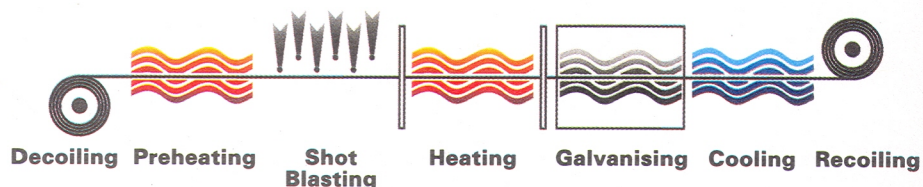


Enabling Technology

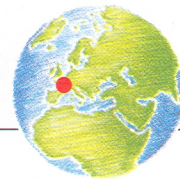
Induction heating to melt the zinc.

The use of an electromagnetic field to control the distribution of the molten zinc.

Modern computer control of process.



SKETCH OF THE PROTOTYPE LINE



Country

France

Industry

Metal Processing

Company

Delot Process S A is a company specialising in the development of new processes and services. It was founded in 1990 by Mr José Delot in partnership with Unimetal and Metaleurop, and has a staff of thirteen.

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Advantages

Total suppression of conventional plating waste.

Smaller inventory of zinc.

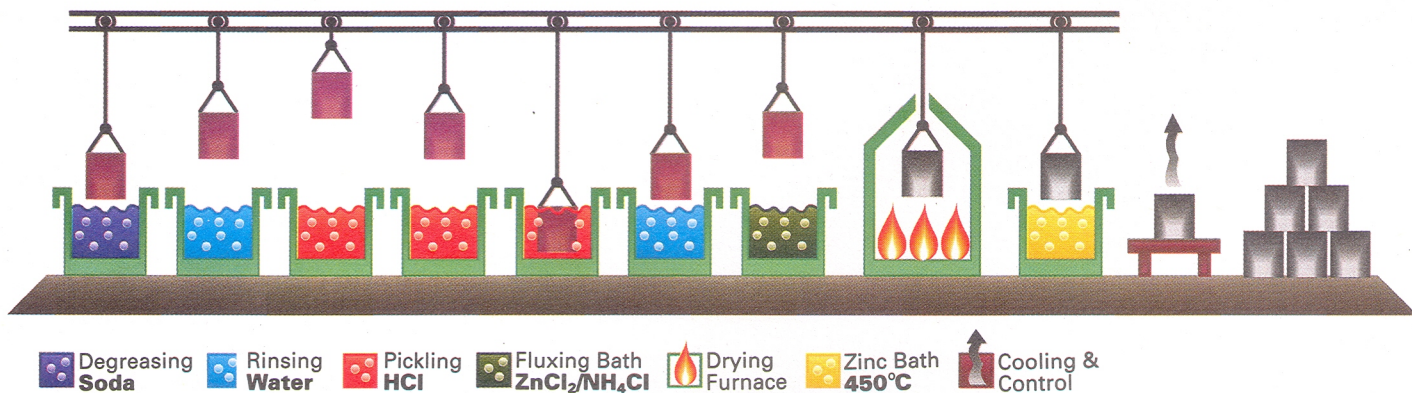
Better control of the quality and thickness of the zinc coating.

Reduced labour requirements. Reduced maintenance. Safer working conditions.

Economic Benefits

Capital cost reduced by two-thirds compared to traditional dip-coating process. Lower operating costs resulting in coating process being 18% of steel cost, compared to 60% with traditional methods.

Payback period three years when replacing existing plant.



SKETCH OF A CLASSICAL HOT DIP