Some Aspects of Bright Plating

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WITH the advent of the modern high speed automatic fully bright metal coating techniques, developments in the other branches of engineering followed as chain reactions, and today the designing and raw material specification of an engineering product is often tailored to suit the productivity in the metal finishing operations. Never before than now more stress was laid on the scrupulous methods of finishing techniques and testing procedures. Yet many held firm views that though the modern bright plated articles are more spectacular and better saleable, the matt plating employed in pre-war days had a better overall performance for the same money's worth. Is there any real ground to believe this?

Let us examine the conditions prevailing then and now. Towns and villages now have become more industrialised than before. Atmosphere has become more corrosive now than before. Economic structure of the world is gradually shifting towards masses and more of electroplated articles have now entered in the everyday life of men, and this in turn means a balance of pressure of quality against the ramrod of pound-shilling-pence. The cost of living has gone up; so also the cost of every commodity, and against this the industrialist is continuously struggling by employing better methods of productivity which eventually means automatic machines and high speed electroplating devices. This urge is responsible for the development of high speed bright electroplating techniques. It will not be fair to compare the old matt coatings against the modern bright ones simply from the records of memory. Under exactly same conditions if the two types of coatings are compared one may find reasons not to become unduly pessimistic about modern bright coatings. Extensive study on this has been made in U. K. and U. S. A., and it has been established that bright coatings can be used with better advantage than before, provided necessary precautions are taken during the applications.

It is true that when bright nickel is electrodeposited from certain groups of sulphur bearing organic brighteners or levellers, failures in the coating may be experienced when compared with matt nickel coating from ordinary Watts type of bath under similar exposures to service conditions. Bright nickel baths having no sulphur bearing organic compounds also at times caused similar failures. Even when the bright deposit is very fine grained, almost free from compressive or longitudinal stress, fairly ductile, with limited pores and with good adhesion, failure of coating is known to have occurred because of a particular service condition and atmosphere of corrosion. It is a task for the design engineer and the metal finishing technician to select the correct raw material and design it correctly to make suitable for the bright plated coating to withstand the particular service condition. In some cases the duplex nickel coatings finished with crack free and thicker chromium deposits give a decisively better service life than those finished by conventional matt nickel and cracked chromium plating. Hence there is no reason for disappointment and distrust in modern bright plating techniques. At the same time one should not use bright plating techniques too optimistically on an article of any basis metal and design for any service conditions.

Since the modern trend is for bright electrodeposits, many industrialists and technicians without having full experience had plunged into troubles by suddenly switching on to bright plating. Particularly in a country like India, where industry is growing fast under planned expanded economy the march against time may naturally attract industrialists to adopt such finishing processes as to make their products comparable with those of the highly industrial countries of the world. But before such steps are taken it will be advantageous to obtain impartial expert opinion on selection of raw material, designing of the article wedded with economically rationalized plant and equipment, and the suitable type of electrodeposited coatings depending on the service conditions of the country which eventually would use such commodity.

It is unfortunate that many technicians recommend to industrialists prototype plant and equipments and stereotyped proprietory bright plating chemicals without investigating the physical characteristics and designs of the fabricated articles to be handled, and the service conditions to which the finished products will be subjected.

Generally speaking six different factors are to be investigated before adopting bright plating techniques for an industrial product. They are listed below:

1. *Physical characteristics :* Basis metal, surface finish and condition of the raw materials. Whether articles are pressed out of cold rolled sheets, or of welded or brazed construction or of die castings or of alloy steel heat treated or of cast iron or of multimetal fabrication and the surface finish—whether smooth or of black mild steel sheet or highly ornamented or hot dipped metal coated or of hard drawn or extruded material.

2. *Design :* The shape and size of the article; whether tubular or having sharp faces or very small or huge or shaded structure or with odd design to entrap liquids or with high and low contrast for uniform current distribution.

3. *Volume* of production of the same type of articles.

4. *Financial resources* to buy adequate plant, equipment, maintenance and service facilities, jigs, chemicals and anodes.

5. *Well equipped laboratory* staffed with experienced personnel, and experienced plant engineer to control processes and maintain quality standards. Well planned installations to ensure trouble free economic production.

6. *Wide range of service conditions* to which the product is supposed to be exposed. Specification of deposits and the methods will have to be tailored and planned accordingly.

Bright electrodeposition of metals of almost all description can be successfully applied if proper care is taken in planning under expert technician's guidance. Under the stretch of expanding economy of our country the small scale industrial sector will face continuous demands of better productivity and better quality, and the impact with the organised sector of industry will signal early adoption of improved electroplating techniques. But, does this mean that a job plater or a metal builder by electroforming should also change to bright plating techniques ? In any case they should not be advised to do so. Apart from this the conventional matt plating will perpetuate in its sphere of special industrial applications where even semi-bright deposits would not make economic replacements. While remaining actively engaged in varieties of electrodeposition techniques in small scale and large organised industries over last two decades, one is even today unable to share the views of those who recommend in general a replacement of matt plating system by modern bright plating techniques.