ABSTRACT

Material selection is always made on economic considerations combined with good properties. When selecting materials to reduce the weight of a construction, the value of the weight reduction is balanced by the material price and the total cost of construction. This gives rise to merit number of types strength/(weight x price) by means of which the competitiveness of different materials can be evaluated.

Present study deals with the aging behavior of commercially produced sheet steels. The steel under investigation was subjected to solution treatment at 1000°C for 3 hrs followed by oil quenching. In order to study the precipitation hardening, the oil quenched steels was subjected aging treatment at 400°C and 500°C for various times ranging from 1 min to 100 hr (6000 min). Structural examinations revealed the segregation of precipitate particles along the grain boundaries. As the aging proceeds, the dissolution of pre-existing precipitation took place together with the formation of new fine/coarse precipitation within the grains as well as along the grain boundaries.

The variations in hardness values after various stages of thermal processing are attributed to the segregation of precipitates particles, along the grain boundaries, dissolution of pre-existing precipitate particles, and formation of new coarse fine precipitate particles within the grains as well as along the grain boundaries.