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A MODULE

Introduction to the problems of welding

Solidification of weld metal



Solidification of weld metal

- ▶ When the temperature drops the weld metal at the liquidus temperature crystallization starts weld metal.
- ▶ Way crystallization of the weld metal is affected by the type of material to be welded, the shape of the weld pool, the volume of molten metal, welding techniques and welding parameters.
- ▶ Way weld metal affects the crystallization nucleating cracks in the welds and the resulting mechanical properties of the weld metal.



Formation of the weld pool

- ▶ The weld pool produced by the heat source to the base material which melts or main and auxiliary material, is melted and the melted portions of the two materials are mixed.
- ▶ Share base material or filler material which is expressed by the mixing ratio depends on the shape of the weld pool, its size and also on the welding parameters and thermophysical the properties of the base material.
- ▶ Degree mixing the basic and additive material is the ratio of areas $A_z: A_p$, Expressed as a percentage.

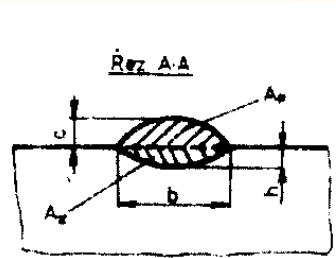
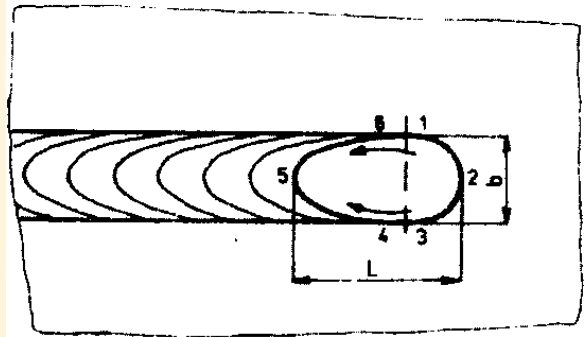
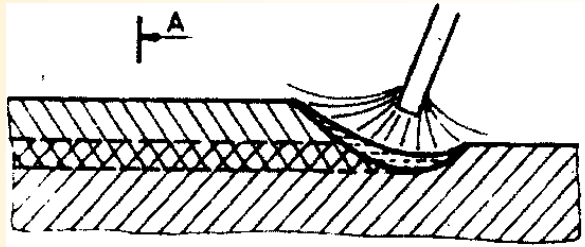


Formation of the weld pool

- ▶ In the weld pool as shown in the immediate vicinity of the heat source supplying heat prevails, i.e. The melting range, which is defined by points in figure 1, 2 and 3.
- ▶ In other areas of the weld pool dominates heat dissipation, which is most intense near the base of cold material surrounding the weld pool.
- ▶ This fact causes inward solidification of the weld pool, i.e. the area bounded solidification points 4, 5 and 6.



The weld pool during welding



- Ap* - surface cant;
- az* - penetration area;
- c* - the height of elevation;
- h* - penetration depth;
- l* - length of the weld pool;
- B* - width of the weld pool.



The weld pool during welding

- From the figure it is clear that due to the mechanical action of a heat source, the molten weld metal and extruded under heat source a crater.
- It the embossments formed in front of the weld pool. Melting depth (penetration) will be greater, the more intense heat source acting on a base material.
- Yippee then the fact that the level of molten metal in the front and back of the weld pool is not in the same plane, i.e. their height varies.



The weld pool during welding

- Melting depth (penetration) i.e. the depth of the weld pool is primarily intended intensity heat source, then the width of the weld pool depends on the horizontal movement of the heat source and the welding parameters.