

# High Current-High Speed-High Deposition Welding for Cheaper - Better-Faster Manufacturing.

**S M Vaidya**

Advisor - Technical  
Godrej and Boyce Mfg. Co. Ltd  
Email: smvgodrej@gmail.com

Welding is an important process of manufacturing, global competition, global market and global trade forced us to manufacture with highest quality and deliver as per customer demand. Other manufacturing processes like machining, forming, assembly improved a lot in last two decades, so also improvements in welding machines, manipulators and accessories. Advancements in materials and material processing technologies helped improving product design and its reliability. Similarly, improvements in welding consumables and NDT techniques are improving quality of the product.

Heat input in welding is necessary for melting of base material and welding consumable. It has to be just appropriate to ensure smooth transition and seamless properties of weld joint. If heat input is less, welding may not have sufficient bond strength and we may land up in defects as lack of penetration, lack of side wall fusion, insufficient reinforcement... whereas on the other side if heat input is more we may have undercuts, voids, unfilled areas... but these are visual defects, we also have metallurgical defects if heat input is more or less.

Manual welding gives choice of heat input to welder and based on his comfort to move around the weld speed and other welding techniques of weave or stringer bead, current is chosen. In Manual welding depending upon the process one uses speed up to 200-300mm/min. If we weave lengthwise speed comes down and depending on position of welding it is further adjusted.

More heat input means wider heat affected zone (HAZ), and distortion or deformation of joint.

Considering above we tend to choose just sufficient heat input. Manual welding or auto welding without today's available accessories will thus ask us to use current and speed combination that can be easily managed by welder or welding operator. However now using seam tracker, AVC, electronic weaving, anti drift rotators, servo controlled manipulators, video cameras, robots... tracking seam at higher speeds is no issue and even if job is of varying profile servo and AVC take care of manning arc length within close tolerances. Electronically controlled welding machines with pure DC and drooping characteristics gives the best output.

All this allows us to use speeds and current as we desire and best for the joint to achieve desired properties. Since current is directly proportional and speed is inversely proportional for calculation of heat input, we shall take advantage and use the best combination of parameters which will give conventional welding techniques to perform like Electron Beam Welding (EBW) or Laser Welding (LW). This will help us in achieving joint properties and also cost and very less distortion. I strongly recommend use of all the accessories and as high current as possible with good tracking and high speeds.

Happy Welding!!!