Dual Robot Synchronous Welding of a Model Beam

Weld distortion is a natural result of the welding process. Management of weld distortion through integration of principles of physics, precision measurement capability and computerized industrial process controls is the key to precision fabrication of metallic components. The illustration is an example of weld distortion management from a DoD sponsored work. Synchronous welding with dual computer controlled robots is used in the fabrication of model beams. The synchronous process of welding is utilized to balance the heat input to the steel structure and allow precise dimensions to be attained.

The goal of the precision fabrication processes that are being developed at the MAGLEV, Inc. R&D facility is to yield very high 'first-time-through' fabrication. The 'first-time-through' is a measure of the number of components that are initiated and proceed through the entire fabrication process without requiring removal for rework. Ideally, the goal is 100% 'first-time-through'. Currently, industry processes for fabrication of large steel structures in the U. S. shipbuilding industry yield a 'first-time-through' rating of approximately 60%-70% meaning that 30%-40% of the components must be reworked at some stage of the process. The rework costs can amount to one half of the cost of the original fabrication cost. Besides the direct cost of rework, the lack of a high 'first-time-through' rating causes an additional requirement for a high inventory to assure proper geometry product is available as needed. Inventory further adds to the cost, it slows the time-to-market and it extends schedules.

Precision fabrication processes that MAGLEV, Inc. is developing can reduce the cost of fabricated steel product by as much as 20%. The Navy has estimated that successful application of precision fabrication techniques to shipbuilding can save the Navy between $50 million to $100 million per ship. Effusing this technology into the existing fabrication industry will increase market share, profitability and competitiveness.