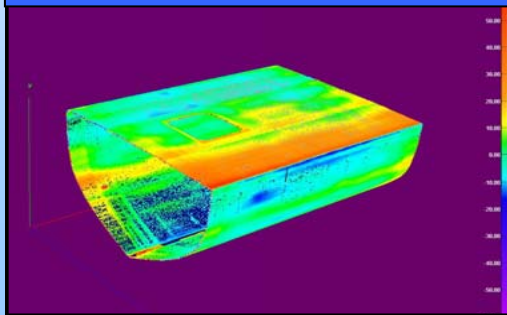




Coherent Laser Radar Scanning of a Composite Ship Hull



Verifying that a large complex curved structure has been precisely fabricated to design specification is a challenge in itself. MAGLEV, Inc. is utilizing a new coherent laser radar technology metrology system for precision measurement. This technology allows measurement accuracies to approximately 25 microns (0.001 inch) and it is applicable to very large structures of all materials. It operates somewhat like underwater sonar but with a raster array of the reflective signal or points being obtained. Using advanced computer software the exact scanned structure can be obtained digitally and modeled in 3-D while simultaneously providing the exact dimensional measurements.

Integrating this measurement system into the total fabrication process allows real time measurements and corrections to be obtained during the fabrication process.

MAGLEV, Inc. R&D Facility in McKeesport, PA



The MAGLEV, Inc. facilities are located east of the City of Pittsburgh in McKeesport, PA

Located on a 'brown field' site adjacent to the Monongahela River. MAGLEV Inc.'s facilities are in the heart of the "Mon Valley" in the former steel production region of Pittsburgh. The larger building is the R&D facility that is being utilized for the development and demonstration of a DoD sponsored automated precision fabrication technology program.

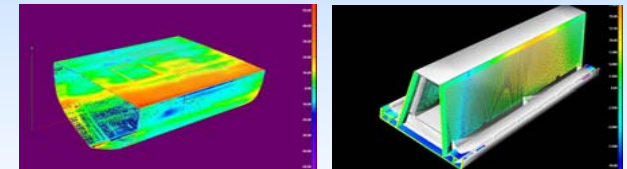
- Weld Distortion Studies
- FEA Validation Using As-Built Measurements
- Coherent Laser Radar Scanning – Metrology
- Robotic Welding of Large Plate Structures
- Curved Surface Alignments
- Reverse Engineering

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Precision Fabrication for Shipbuilding and Large Curved Plate Structures

An objective of MAGLEV, Inc. is to advance precision fabrication technology with specific application to large complex curved plate structures. Accomplishment of this objective will reduce the costs at existing plate fabrication industries such as shipbuilding, pressure vessel construction and maglev guideway construction. Success will produce large curves steel structures very precisely and with greatly reduced time to market. Precision fabrication processes are a key to production of the next generation of Navy ships and to other large fabrication requirements in the future.

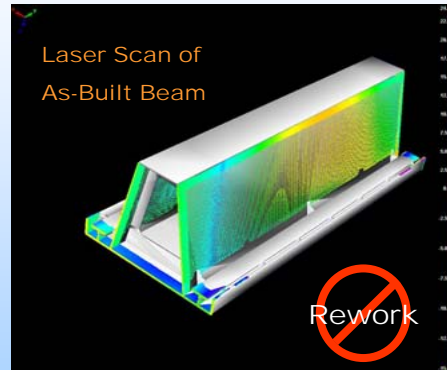


Office of
 Naval Research



Precision Fabrication For Shipbuilding and Large Plate Structures

Precision fabrication processes now being developed at MAGLEV, Inc. 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 to \$100 million per ship. Applying this technology in existing industry can lower costs and increase profitability and competitiveness.



The goal of the fabrication processes that are being developed at MAGLEV, Inc. is to yield very high “first time through” fabrication rates. This is a measure of the components that 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 about 60%-70% meaning that 30%-40% of the components must be reworked at some stage of the process.

Dual Robot Synchronous Welding of Model Beam



Lack of precision in fabrication of large steel structures is primarily attributable to distortion caused by the welding process. Dimensional distortion of steel is a natural result of the welding process. One approach to control distortion uses synchronous welding with multi computer controlled robots in the fabrication of model beam structures. The synchronous process of welding balances heat input to the steel structure and allows precise dimensions to be attained.

U.S. Navy Stealth Technology Requires Precision Fabrication



U. S. Navy Stealth Technology requires precision fabrication and control of weld distortion. Management of weld distortion requires the integration of principles of physics, precision measurement capability and computerized industrial process controls. DoD sponsored work at MAGLEV, Inc. is focused on demonstrating the management of weld distortion to achieve this objective. Precision processing is achieved through knowledgeable application of weld distortion characteristics and verification by precision metrology.

Coherent Laser Radar Scanning - Metrology



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. Successful implementation of precision fabrication processes can result in reduction of fabrication cost by as much as 20 percent. It offers strong potential for halting job losses to offshore industry.