Comparison of Laser Ablation to SSPC-SP Surface Preparation of Bare Steel

June 2026

Project Management and Execution

Extended Team
Provide Technical Oversight (PTR)
Assist with Technology Transfer and Implementation
Participation in Project Review Meetings

Project Team
Perform Technical Work; Complete Deliverables
Coordinate/Lead Technology Transfer and Implementation
Conduct Project Review Meetings

ATI
Ensure Project is on Schedule, Within Budget, Provide Contractual Oversight
Assist with Technology Transfer
Participate in Project Review Meetings

Background

- Laser ablation technology for coating removal and surface preparation has advanced greatly in the past several years
- Laser ablation devices are less costly and readily available
- Several shipyards now have laser ablation capabilities and are investigating beneficial use cases
- AMPP has recently released a laser ablation surface preparation guide for ferrous substrates (SP21511)
- Outstanding questions remain for laser effectiveness compared to traditional abrasive blasting and power tool preparation methods

Scope of Work

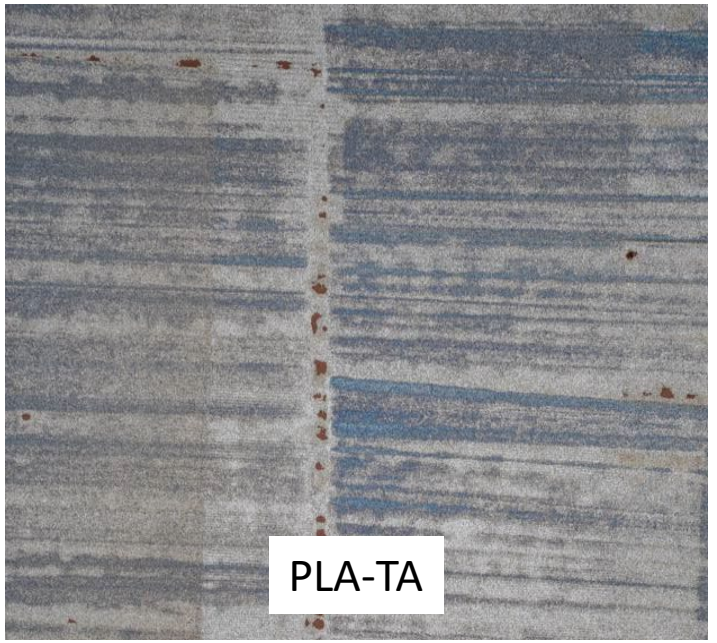
- Use current training and guidance AMPP and lessons learned from previous work to evaluate laser ablation use for coating removal and surface preparation compared to standard surface preparation methods
- Goals/Objectives
  - Gauge shipyard laser ablation equipment availability and usage.
  - Evaluate the production rate, surface profile, and degree of cleanliness produced in laser ablating steel in a shipyard setting.
  - Compare laser ablation to power tool and abrasive blasting surface preparation.
  - Evaluate additional benefits of laser ablation and specific applications where it will be a valuable preparation option.

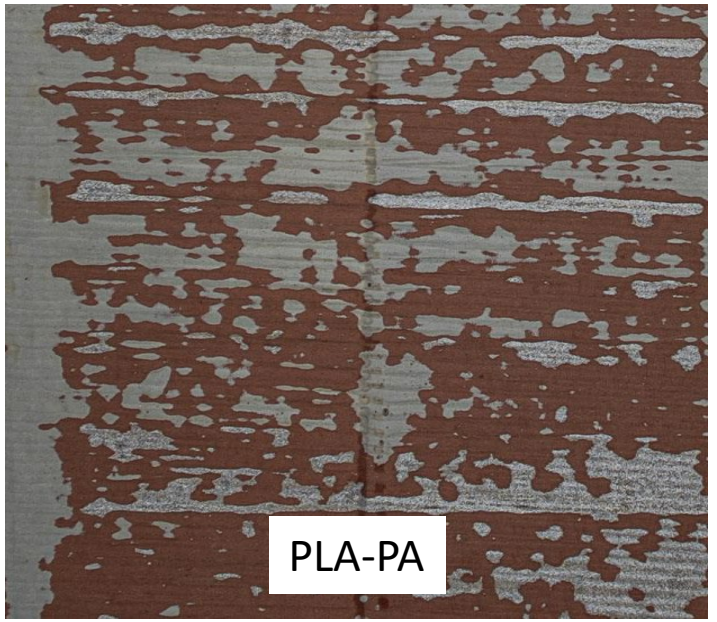
Tasks

- Identify Laser Ablation Equipment Currently Owned by Shipyards and Extent of Use
  - Discuss and define current laser ablation status quo with shipyards
  - GC-1000 most common
- Shipyard Laser Ablation Surface Preparation Comparisons
  - Prepare test samples with laser ablation, power tools, and abrasive blasting at a shipyard. Document production rate, profile, and level of cleanliness for each method.
- Coating Performance Testing and Shipyard Use Evaluation
  - Apply Navy Epoxy coatings to prepared samples and expose in cyclic corrosion and Cathodic Disbondment testing to evaluate coating performance over each type of surface preparation.
- Final Report
  - Evaluate data collected during testing and deliver a final report of results and conclusions

Testing Considerations

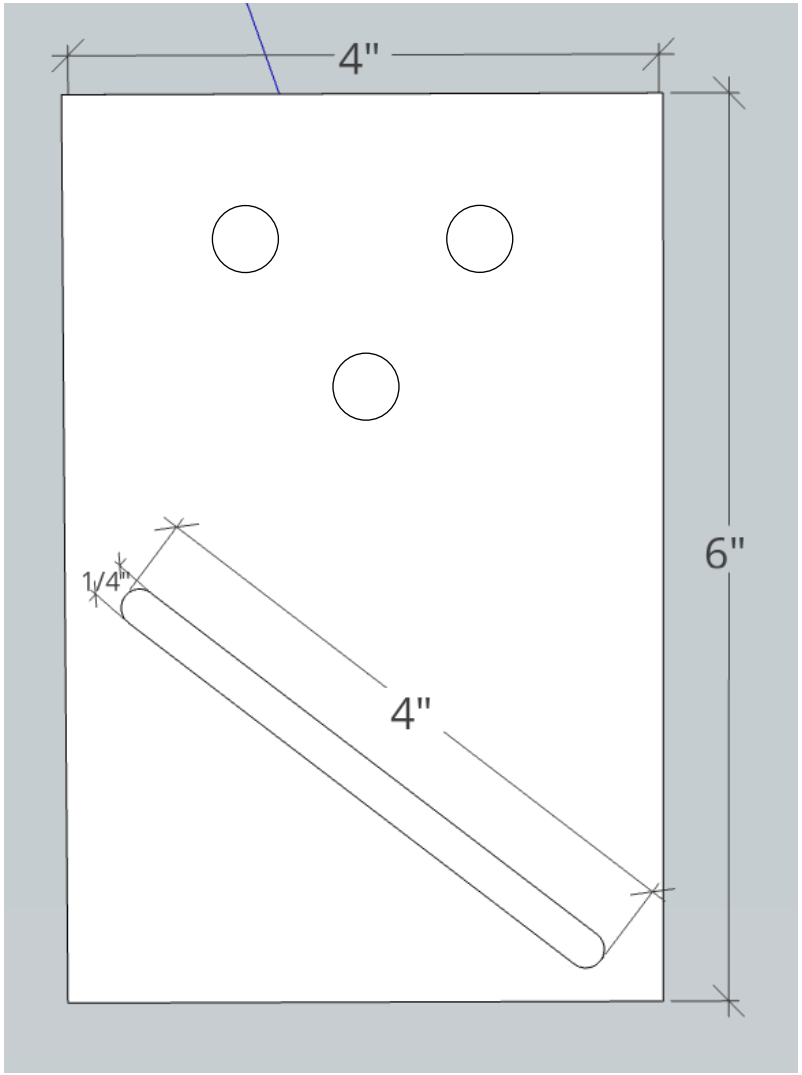
- Sample Initial Conditions
  - Pre-Construction Primer
  - Aged MIL-PRF-23236 Epoxy
- Intended Levels of Cleanliness
  - PCP
    - Thorough Pulsed Laser Ablation (PLA-TA)
    - SSPC-SP 10 – ABRASIVE
    - SSPC-SP 11 – TOOL
  - Epoxy
    - Partial Pulsed Laser Ablation (PLA-PA)
    - SSPC-SP 6 – ABRASIVE
    - SSPC-SP 3 – TOOL





Performance Evaluation

- Preparation Production Rate
- Cathodic Disbondment
- ASTM D5894 Cyclic Corrosion
  - ASTM G85 Annex 5 solution
- Dolly Pull Adhesion
- Scribe Cutback
- Rust Through and Blistering



Test Matrix

Condition	Preparation	Test	Sample Count
PCP	PLA-TA	Cathodic Disbondment	3
	SP 10	Cathodic Disbondment	3
	SP 11	Cathodic Disbondment	3
	PLA-TA	Accelerated Corrosion	3
	SP 10	Accelerated Corrosion	3
	SP 11	Accelerated Corrosion	3
MIL-PRF-23236 Touch Up	PLA-PA	Cathodic Disbondment	3
	SP 6	Cathodic Disbondment	3
	SP 3	Cathodic Disbondment	3
	PLA-PA	Accelerated Corrosion	3
	SP 6	Accelerated Corrosion	3
	SP 3	Accelerated Corrosion	3
		Total	36

Path Forward

- Coat and age test samples
- Perform surface preparation comparisons with HII laser ablation device and traditional techniques
- Perform coating performance testing
- Deliver analytical report on testing and results

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