

Laser ablation on refinery stabilizer tower and visbreaker equipment

Extrinite, subcontracting for Repcon, performed laser ablation on critical Stabilizer Tower and Visbreaker equipment to remove oxidation, hydrocarbons and chlorides with minimal heat, allowing inspection, coating and welding to proceed.

Results

Process equipment that carried heavy oxidation scale before laser ablation was returned to white metal on completion. Inspection, coating and welding proceeded. The project was completed within budget and ahead of the scheduled timeline.



Stabilizer tower head, before and after laser ablation.



Removed

Oxidation scale,
hydrocarbons,
chlorides.



Enabled

Inspection, coating
application and
welding.



Method constraint

Minimal heat input to
in-service process
equipment.



Outcome

The project was
completed within
budget and ahead of
the scheduled
timeline.



Tower head from deck level





Vessel shell



Process vessel and 12 in manway

The scope

Two pieces of critical process equipment required surface preparation in the field so that inspection, coating and welding could proceed: a Stabilizer Tower and a Visbreaker.

The surfaces carried heavy oxidation scale along with hydrocarbon and chloride contamination. All three had to be removed. The case study records that all three were removed with minimal heat input.

Why laser ablation was selected

Three reasons, in the order they mattered to the site.



01

Hydrocarbons and chlorides come off with the scale

Laser ablation removes hydrocarbons and chlorides from the surface in the same pass as the oxidation.

Salt levels on a prepared surface still need to be verified with the project-specified test method, such as Bresle, before coating.



02

No spent media

There is no abrasive to contain, recover, characterize or dispose of inside an operating unit.



03

Controlled heat and controlled area

The process is adjustable and line of sight, so the energy goes where the operator points it.

The case study records the work as done with minimal heat, allowing inspection, coating and welding to follow.

How safety was managed

Laser ablation in a refinery is a Class 4 laser operation inside a

hydrocarbon environment. Both sets of controls applied simultaneously.



Before mobilization

- ✓ JHA approval required before mobilization
- ✓ Coating and repair strategy agreed with the coating manufacturer and end user
- ✓ Work zones defined and secured against unauthorized entry



During execution

- ✓ Daily toolbox talks
- ✓ Site safety audits
- ✓ Continuous 4-gas monitoring
- ✓ Full PPE including respirators and FR coveralls

Coordination with the coating system

Extrinite aligned the repair and coating strategy with Carboline and the end user before work began. The coatings themselves were applied by a third-party contractor.

This is the part of the project most often skipped by surface preparation vendors. Surface preparation only has value if the coating that follows it will perform. Extrinite's starting point is the coating manufacturer's requirement for the specific product being applied, and the laser parameters are then set to meet it.

Coating strategy by asset		
Equipment	Coating system	Applied by
Stabilizer Tower	Carboline Carbomastic 15	Third-party contractor
Visbreaker	Carboline Thermaline Heat Shield	Third-party contractor

Where this applies

This project is representative of the field service work Extrinite performs: in-place cleaning of process equipment where media containment,

chemical cleaning or heat input make conventional methods difficult.



Coating removal

Localized removal and feathering into sound adjacent coating.

Coating removal



Rust & corrosion removal

Oxidation and corrosion product removal on process equipment.

Corrosion removal