

# Case Study:

## Repowering the *Master and Leader* Tugboats



### PROJECT OVERVIEW

Repowers are major investments, typically exceeding \$1 million. While not part of routine maintenance, they are essential during a tugboat's 30- to 40-year lifespan to extend service life, comply with evolving emissions regulations, and address engine wear that can impact performance and reliability.

To uphold its commitment to safety, efficiency, and environmental responsibility across its Ship Assist & Escort fleet, Crowley initiated repower projects for two key vessels: *Master and Leader*. The company turned to its in-house engineering services team to oversee the projects, leveraging their expertise from managing hundreds of new builds and retrofits across the maritime industry.

### PROJECT SCOPE

The repower scope covered both tugboats and focused on several key areas:

**Engine Replacement:** New EPA Tier 4-compliant, environmentally friendly engines replaced the older models.

**Auxiliary Systems:** Enhancements to cooling and exhaust systems to align with the new engines.

**Performance Testing:** Comprehensive testing to confirm the vessels met performance benchmarks.

**Regulatory Compliance:** Adherence to EPA, ABS, and Coast Guard standards.

**Timeline and Budget Adherence:** Efficient project completion within time and cost constraints.



Before



After



# ENGINEERING SERVICES' ROLE IN REPOWER OVERSIGHT

Crowley's engineering services team played a central role in the success of these projects by managing the following activities:

1

## PROJECT & GRANT PLANNING, COORDINATION

Collaboration with Crowley's operations and grants team to define project goals, locate available funding assistance, scheduling, vendor coordination and compliance reporting.

2

## ENGINEERING & DESIGN OVERSIGHT

Detailed assessments and technical drawings were reviewed to ensure optimal system design and compliance with best practices.

3

## PROCUREMENT & VENDOR MANAGEMENT

Managed procurement to ensure the timely delivery of high-quality components while addressing supply chain challenges.

4

## INSTALLATION & INTEGRATION OVERSIGHT

Supervision of engine installation and system integration to ensure compliance with engineering designs and schedules.

5

## QUALITY CONTROL & TESTING

Conducted thorough tests, including performance, emissions, and sea trials, ensuring all specifications were met.

6

## REGULATORY COMPLIANCE & DOCUMENTATION

Ensured full compliance with maritime regulations and facilitated documentation, including coordination with the **South Coast Air Quality Management District (SCAQMD)**.

7

## FINAL DELIVERY & HANDOVER

Upon completion, engineering services provided a final report confirming the tugboats were fully operational and met all project objectives.

## RESULTS

**Improved Vessel Performance:** Both tugboats now operate more efficiently with better fuel usage and reduced emissions.

**Environmental Compliance:** The repowered tugboats meet EPA Tier 4 emission standards.

**Minimal Operational Disruption:** The repower was completed on time and within budget, ensuring ongoing operations with minimal downtime.



Before



After

## CONCLUSION

By leveraging the company's engineering services team expertise, the *Master and Leader* tugboats were successfully repowered, achieving improved performance, sustainability, and regulatory compliance. This collaboration demonstrates the team's ability to manage complex maritime projects while minimizing downtime and ensuring operational continuity.

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