



**GRUNNERGY**  
ENERGY EXPERTISE



GRUNNERGY ENERGY EXPERTISE PROVIDES TECHNICAL EXPERTISE FOR DIESEL AND GAS ENGINES

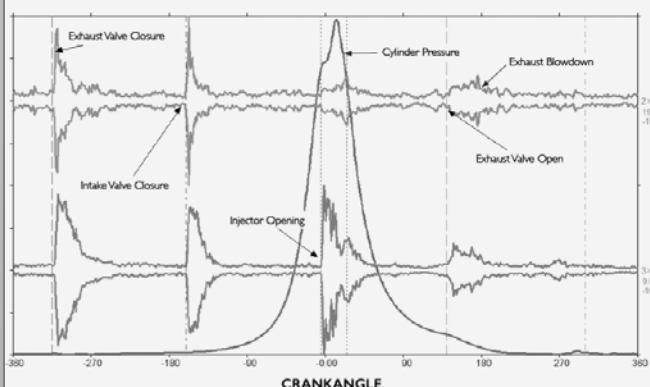
**We are a team of experts with long track records of power plant and maritime experience. Our goal is helping you reduce operational costs, increase installation reliability and safety plus lower the carbon footprint. Grunnergy Energy Expertise is Certified Service Partner of Windrock Inc. for providing equipment Analysis Services and Diagnostics at power plant and maritime installations worldwide.**



## ENGINE ANALYSIS SERVICES

Windrock analyzers combine traditional cylinder pressure measurements and calculations with phased vibration and ultrasonic vibration measurements to provide a comprehensive, non-intrusive examination of internal components. This offers complete new possibilities for determining the condition of your rotary equipment, finding component faults, scheduling overhaul (CBM) and improving engine performance.

*Crankshaft Referenced Measurements*

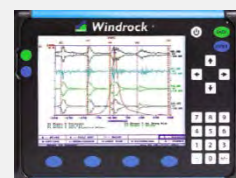


## DIAGNOSTIC CAPABILITIES

- Peak firing pressure
- Fuel injector and pump performance
- Valve timing and malfunction
- Liner and piston ring scoring
- Main and big-end bearing damage
- Turbo charger vibrations and bearing wear
- CW and lube oil pump malfunction
- Engine and base frame vibration
- Generator bearing wear
- Auxiliary rotating equipment malfunction

## COMMON PROBLEMS IDENTIFIED

- |                               |   |                                  |
|-------------------------------|---|----------------------------------|
| Uneven Engine Balance         | > | Increased Fuel Consumption       |
| Poor Quality of Combustion    | > | Excessive Emissions, High SFC    |
| Piston/Liner Scoring, Blow-By | > | Loss of Power, Piston Breakdown  |
| Bearing Worn, Malfunction     | > | Conrod, Crankshaft Breakdown     |
| Turbo Charger Unbalance       | > | Loss of Efficiency, TC Breakdown |



## ANALYSIS SERVICE LEVELS

The combination of high level engine expertise with state of the art Windrock analyzers is providing a new level of performance and costs improvements for Power and Marine rotating equipment. Two different set-ups of services are developed to help reaching the ever more challenging economical, operational and environmental goals.



### EQUIPMENT DIAGNOSTICS SERVICE

- Measurement of engines and auxiliaries by certified Expert
- Direct advice regarding abnormalities, adjustments or inspections
- Review of data by Technical Service Center and Engine Expert
- Analysis report with equipment condition, maintenance priorities advise and engine performance

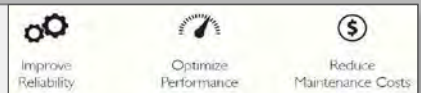


### REMOTE ANALYSIS SERVICE

- Crew training for data collecting with own analyzer(s)
- Advise on data collection scheduling
- Review of data by Technical Service Center and Engine Expert
- Analysis report with equipment condition, maintenance priorities advise and engine performance

### IN WHICH CASES

- Reduction of unplanned maintenance and major breakdowns
- Reduction of fuel consumption, emissions and operational costs
- Improvement of the installation power output
- Introduction of Condition Based Maintenance or improve your CBM method
- Detection of abnormalities as part of Root Cause Analysis investigations
- Determination condition equipment prior to change of ownership or O&M contract



### TYPICAL OCCASIONS DURING ENGINE LIFECYCLE



Contact us directly or via one of our associated partners

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