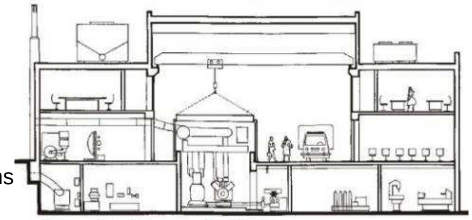
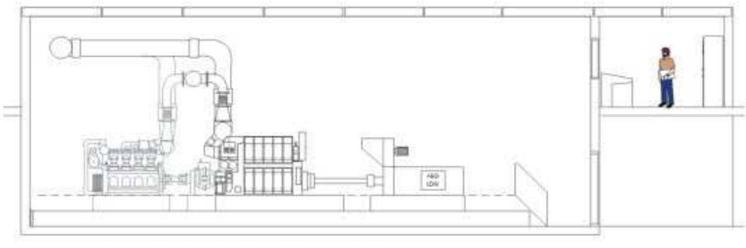
THE LABORATORY OF MARINE ENGINEERING

The **activities** of the **NTUA** Laboratory of Marine Engineering (**LME**) are focused on marine diesel propulsion system research with particular emphasis on:

- Experimental investigations of engine performance
- Analysis & control of propulsion systems
- Exhaust emissions measurements
- Field measurements of engine performance and emissions
- Propulsion system computer model development



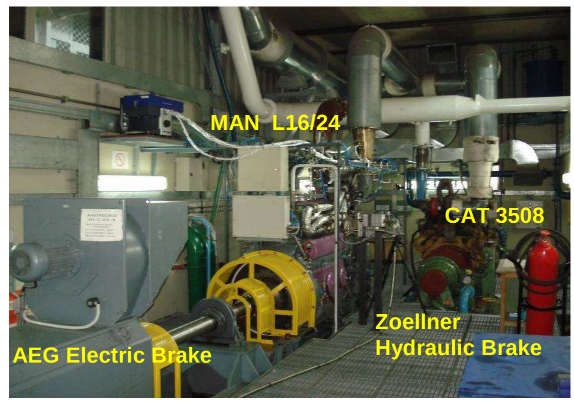


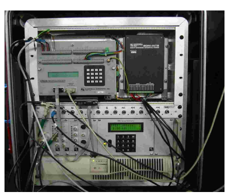
The Laboratory is equipped with a state-of-the-art engine testing facility, including electrical and hydraulic dynamometers, allowing complex transient loadings. The **test cell** is housed in a soundproof enclosure, which has also been especially designed so as to minimize the vibrational loading of the building. The **control room**, located one level above and overlooking the test cell, houses the monitoring, alarm and control systems for the facility.

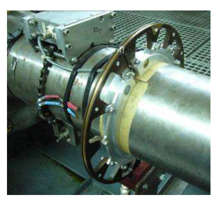
The **test cell** currently houses two engines:

The first engine is an MAN-B&W Holeby L16/24 5-cylinder, 4-stroke turbocharged diesel engine with 500 kW at 1200 rpm, coupled to an AEG DC dynamometer, which can be operated both as a motor or as a generator. This experimental configuration is used for the real time investigation of complex transient engine phenomena under any programmed loading scenarios.

The second engine is a Caterpillar 3508 V8-cylinder, 4-stroke turbocharged diesel engine, with 750 kW at 1800 rpm, coupled to a Zoellner hydraulic dynamometer with a rated absorption capacity of 1200 kW. This experimental configuration is used for propulsion system investigations and turbocharger matching studies.



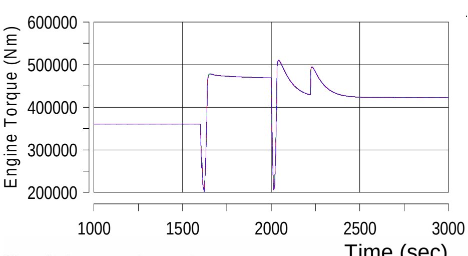




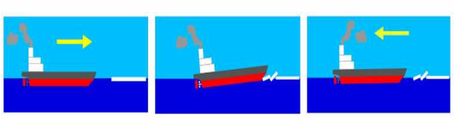
Field **measurement services** provided by LME:

A customized transportable unit for simultaneous **torque/thrust measurements** of ship propulsion and stationary power plants has been developed. The measurement system consists of strain gauge bridges and rotating transceivers employing digital PCM technology.

The extensive computing facilities of the Laboratory have been used in the development of advanced **Simulation codes** for engine design, performance optimization and emissions prediction, of marine propulsion plants, including engine-propeller-hull interaction in manoevring



Case 2: Ice ramming cycle



An emission measurement mobile unit has been developed for **Shipboard** and for **Stationary Sources** emission measurements **of NOx (NO, NO_2), HCs, CO, CO_2, SO_2, (and O_2) according to IMO/ MARPOL** and to **European directive** specifications**, respectively.** Additional measurements involve Smoke and Opacity. The unit is supported by a small chemical facility, where further analysis can be performed.

For more information:

Prof. Nikolaos P. Kyrtatos, Director, Laboratory of Marine Engineering, E-mail: nkyrt@lme.ntua.gr

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www.lme.ntua.gr