

## Low Speed Engine Room W-Xpert Simulator

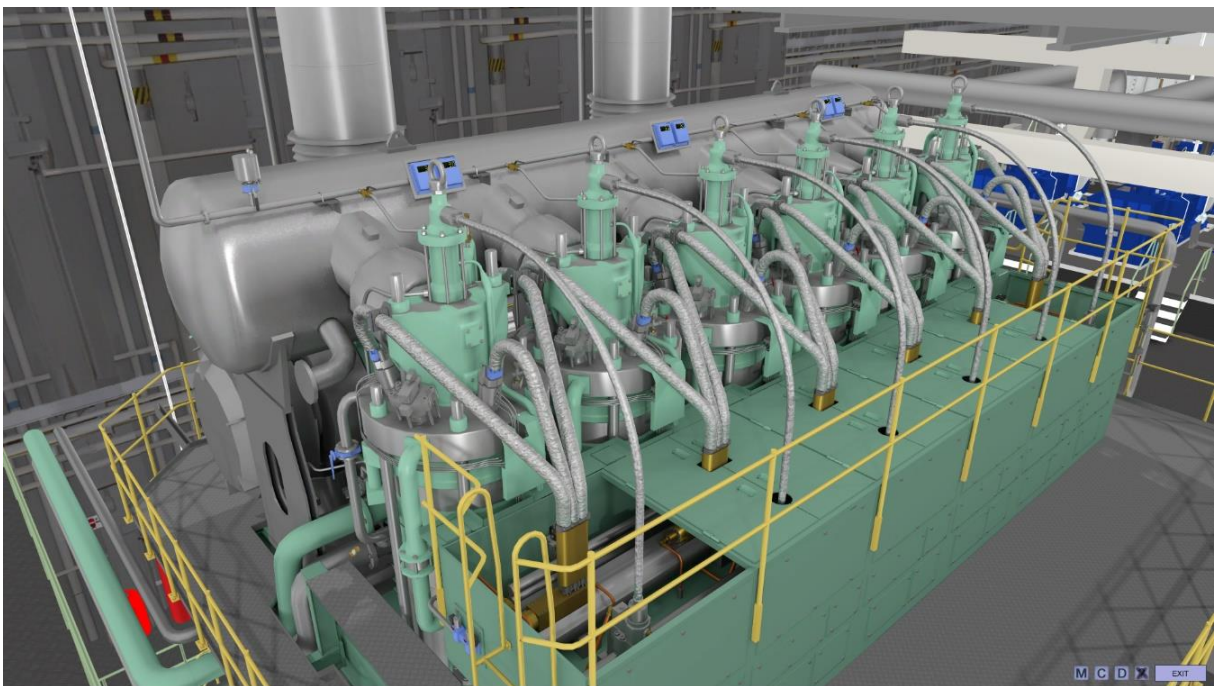
W-Xpert Engine Room Simulator is based on typical solutions and presently used in medium engine rooms such as Suezmax tankers, Capesize bulk carrier as well Panamax and Sub-Panamax container vessel. The propulsion machinery is based on Electronically Controlled Winterthur Gas and Diesel engine family.

W-Xpert Engine Room Simulator is available with four (4) different main engines:

- Winterthur Gas & Diesel 6W-X35 FPP-version
- Winterthur Gas & Diesel 6W-X35 CPP-version
- Winterthur Gas & Diesel 6W-X62
- Winterthur Gas & Diesel 6W-X72

The simulator is designated for training all Marine Engineers, students of maritime academies as well as for different types of marine vocational training centres. The simulator introduces 3D model of Engine Room, has universal features and gives realistic hands-on experience in ship environment. All diesel generator engines, propulsion plant and equipment behaviours are based on real respond.

Electric Power Plant is equipped with modern Power Management System which enables automatic control of generators according to actual power demand. The electric power plant includes three (3) Diesel Generator and one (1) emergency generator.

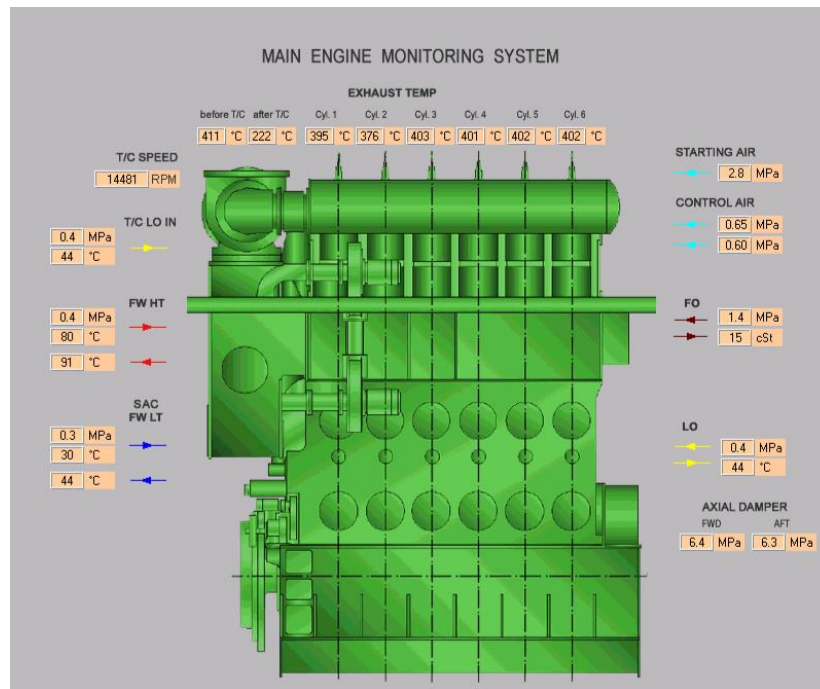


Winterthur Gas & Diesel W6X72 Main Engine top view

## Model description

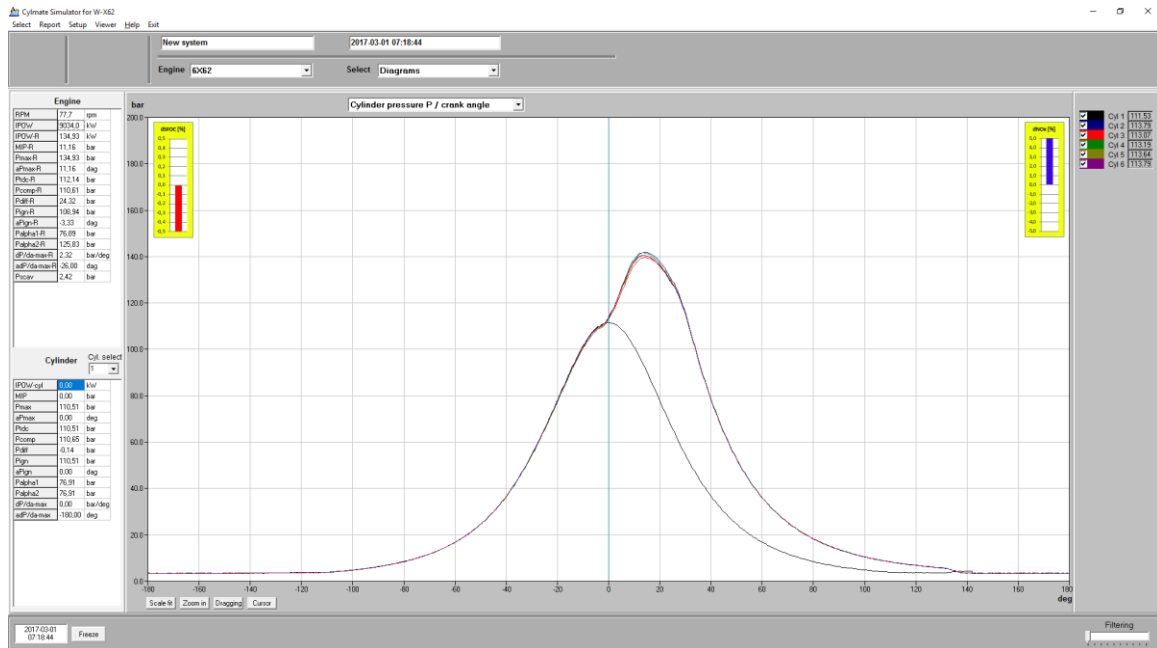
W-Xpert simulator offers detailed simulation of X-engine behaviour in regards to operational aspects, its functionality and performance. The simulator includes Power Management System which contains all standard functions, such as load dependant start/stop, load sharing, synchronising, and load shedding.

The Alarm and Monitoring System allows the operator to control all propulsion system equipment parameters.



Main engine monitoring system

The Intelligent Combustion Monitoring System (Cylmate) for continuous pressure measurement and analysis of NOx emission level and FOC (Fuel Oil Consumption) with primary features includes: graphic presentation of PT, PV and Balance Diagrams, together with Mean Indicated Pressure and Maximum Pressure deviation limits. Calculated values of Effective Power, Mean Indicated Pressure  $p_i$ , Compression pressure  $p_{comp}$ , Maximum pressure  $p_{max}$  and Scavenge pressure  $p_{scav}$  include values for fuel injection and exhaust valve adjustment.



Example view of the Intelligent Combustion Monitoring System (Cylmate) - the situation shows one cylinder not firing. Barographs are visualising calculated by the thermodynamic model specific fuel consumption and NOx emission deviation in relations to the reference conditions.

The simulation and scenario editor mode for training emergency operating procedures when faults occur on low-speed main engine, supporting systems and auxiliary machineries.

The main purpose of the simulator is the practical preparation of the trainee for engine room operation, and more particularly:

- familiarization with electronically-controlled common-rail technology and flexibility of the fuel injection and exhaust valve operations
- familiarization with the engine room installation (electric power plant system, compressed air system, fresh and sea water cooling system, lubricating and fuel oil system);
- acknowledgment with diesel generators and auxiliary equipment starting procedure;
- propulsion system manoeuvring;
- power management system operation PMS.

### To meet the requirements

W-Xpert W-X72 engine room simulator has been developed to comply with STCW Code:

Section A-1/12 and Section B-1/12

ISM Code: Section 6 and Section 8

**W-Xpert main features:**

- Highly realistic simulator for engine room training. All engines and propulsion plant behaviours are based on real respond. In order to create the impression of working in the real environment, it provides 3D sound which can be listened to on 2, 4 or more speakers.
- Familiarization with electronically-controlled common-rail technology and flexibility of the fuel injection and exhaust valve operations which allow users to improve the combustion process in various revolution ranges.
- The thermodynamic model offers visualisation of cylinder pressures, sfoc and emissions depending on virtual operating conditions.
- The mathematical model simulates ship's main propulsion plant, low speed, 6 cylinder, 2-stroke, turbocharged and reversible diesel engine.
- All vital auxiliary systems have been implemented.
- The user interface includes virtual controls and alarms that create a very realistic environment. The 3D virtual reality with active valves, tank level indicators and selected digital gauges enable comfortable engine room operation and monitoring. Zoom function allows navigation in 3D environment and easy access to details.
- Multichannel digitized sound provides a very realistic engine room feel. The sound effects include: engine sound correlated with engine speed, the sound of a diesel generator starting and running sound, alarm and machine telegraph buzzers. Emergency procedure training includes fire simulations.
- Operations related to drivers subsystems including valves operations and all auxiliary equipment (pumps, coolers, purifiers, etc.).
- Drives operations from following the stations:  
Control from bridge: Navigation bridge console panels allow for operating propulsion plant.  
Engine Control Room: Water mist system, Control of propulsion plant.  
Local Control of Engine Room equipment: Main Engine and Diesel Generator Local Operation Panels, Starting and Control air compressors, Fuel filters, Electric motors and Fan starters, Boiler and more..
- Learning engine room typical operating routines.
- Engine room operation training. The user will have the possibility to accomplish any operational task starting from different set-ups, both pre-prepared and saved by the user.
- Corrective action learning when faults occur. Different faults can be simulated and mixed in the run-time or loaded from disk.

**Main Engine Data****Type: Winterthur Gas & Diesel 6W-X35**

Rated power: 5220 kW

Cylinder bore: 350 mm

Piston stroke: 1550 mm

Stroke/ bore: 4.23

No. of cylinder: 6

No. of air coolers: 1

No. of Turbochargers: 1

Engine Speed 118-167 RPM

Mean effective pressure: 20,5 bar

**Type: Winterthur Gas & Diesel 6W-X62**

Rated power: 11680 kW  
Cylinder bore: 620 mm  
Piston stroke: 2658mm  
Stroke/ bore: 4.29  
No. of cylinder: 6  
No. of air coolers: 1  
No. of Turbochargers: 1  
Engine Speed 77-103 RPM  
Mean effective pressure: 20,5 bar

**Type: Winterthur Gas & Diesel 6W-X72**

Rated power: 21660 kW  
Cylinder bore: 720 mm  
Piston stroke: 3086 mm  
Stroke/ bore: 4.29  
No. of cylinder: 6  
No. of air coolers: 2  
No. of Turbochargers: 2  
Engine Speed 66-89 RPM  
Mean effective pressure: 20,5 bar