UNITEST ENGINE ROOM

Full Mission Engine Room Simulator

1 General

Unitest Engine Room (UER) simulates the main engine (ME) which drives a fixed pitch propeller and has a remote control system. The ME can run on DO or HFO during manoeuvring.
The technical data for the ME simulated in UER is given below:

- Type: 2 stroke, low speed, reversible
- No of cylinders: 7
- No of turbochargers: 2
- Nominal output: 19670 kW
- Nominal speed: 91 rpm
- Diameter of cylinder: 700 mm
- Length of stroke: 2674 mm

The ship power plant includes 2 medium speed diesel generators with the following specification:

- Type: 4 stroke, medium speed, non-reversible
- Number of cylinders: 6
- Nominal output: 600 kW
- Nominal speed: 1000 rpm

The power plant also includes a shaft generator (600 kW) with a static frequency converter. The generator is mounted at the front part of the main engine and is driven directly by the crankshaft. The turbo generator (600 kW) and emergency generator are also provided.

UER has the certificate of compliance with STCW requirements issued by the classification society PRS.

2 Hardware

UER hardware includes eight hardware consoles providing realistic look and feel on the ship engine room. Those consoles include also 7 (seven) build in personal computers connected in a Local Area Network.

The examples of the hardware consoles, similar to those which will be used in the UER simulator have been presented below.

Fig. 1 The set of control consoles.

Fig. 2 UER general view.

Fig. 3 Main Engine Console.

Fig. 4 Cooling Console.

Fig. 5 Power Plant Console.

Fig. 6 Fuel Console.

The above specified hardware creates a local area network. All computer systems are based on standard commercial-of-the-shelf (COTS) workstations equivalent to a minimum of Pentium 4 machine linked by a minimum 100 Mb/s network. Only brand computers (HP, Dell) are used. The operating system of the simulator is Microsoft Windows XP.

3 Software

The following engine room systems have been simulated:

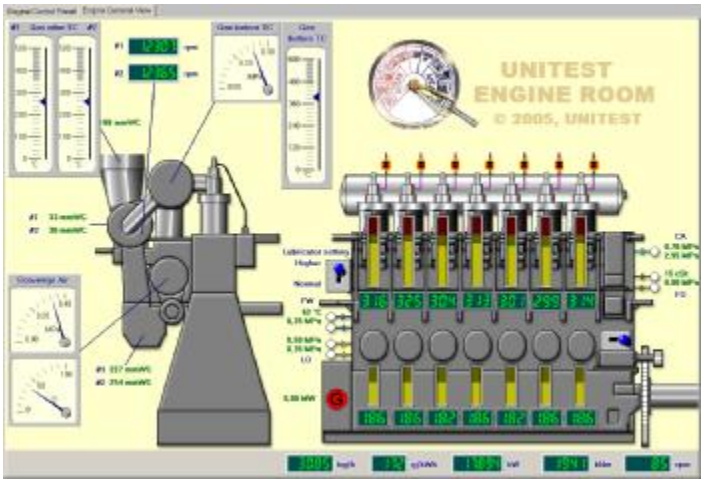

Fig. 7 Main Engine.

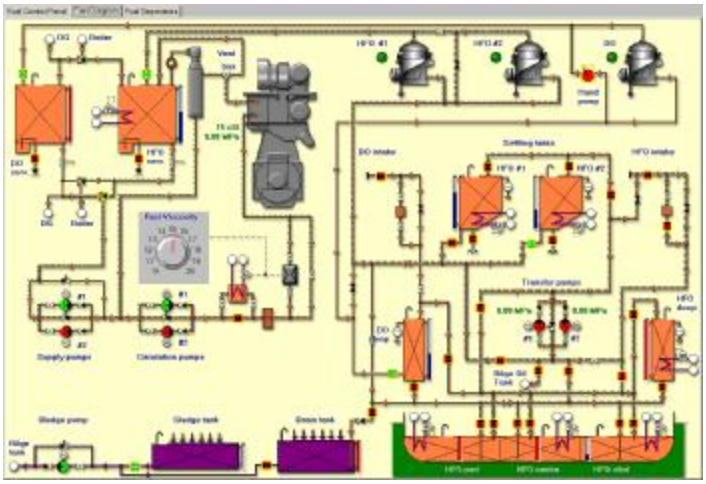

Fig. 8 Fuel System.

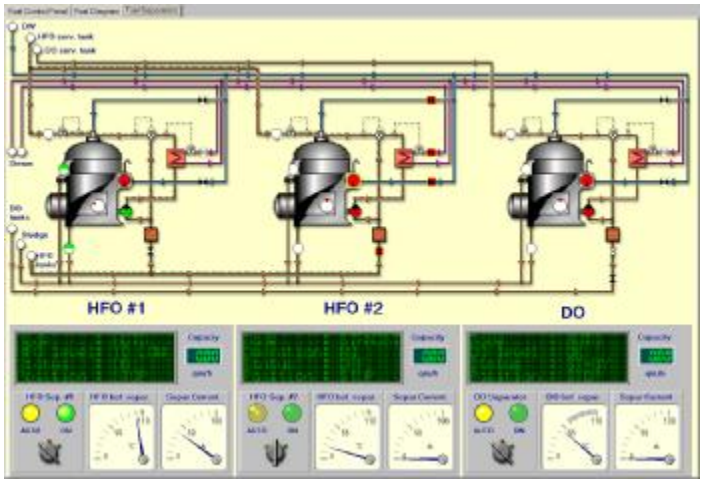

Fig. 9 Fuel Separators.

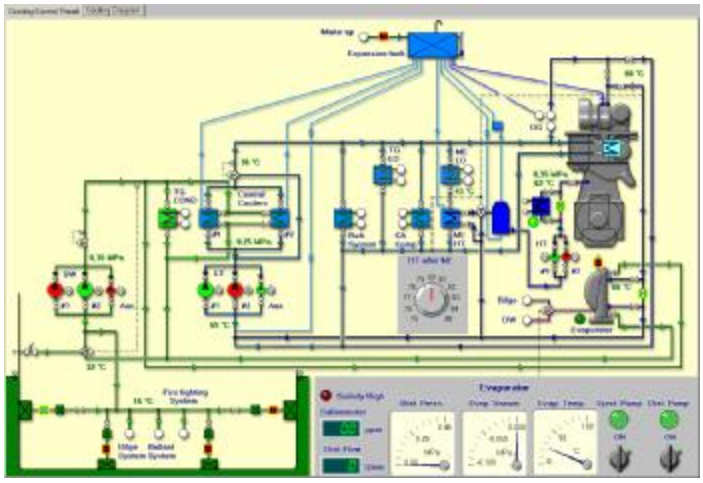

Fig. 10 Cooling System.

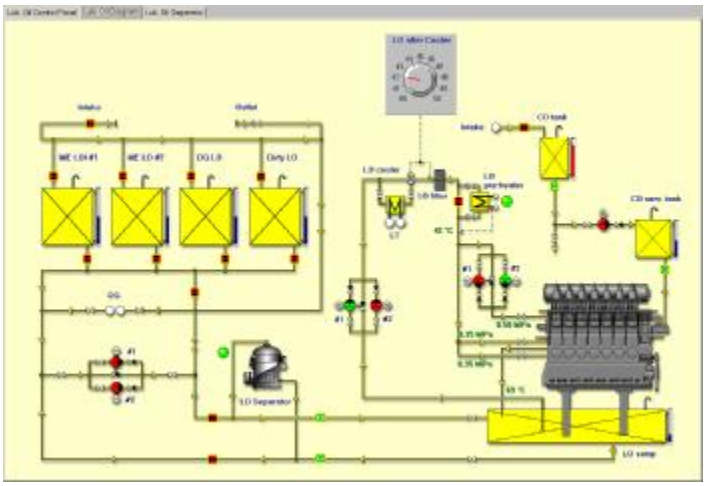

Fig. 11 Lubricating System.

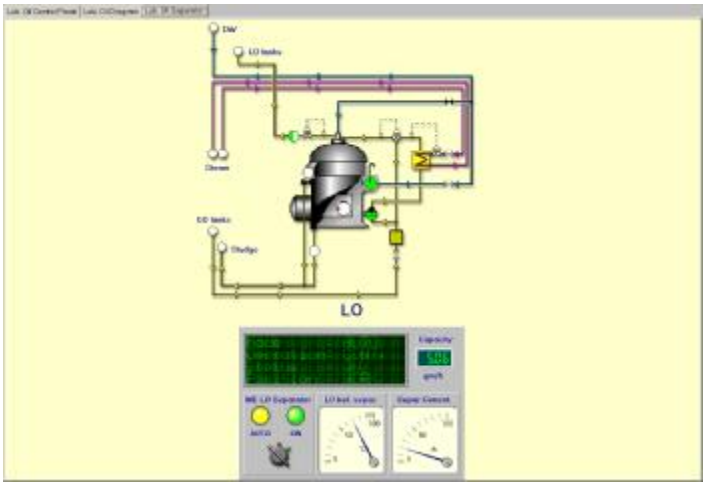

Fig. 12 LO Separator.

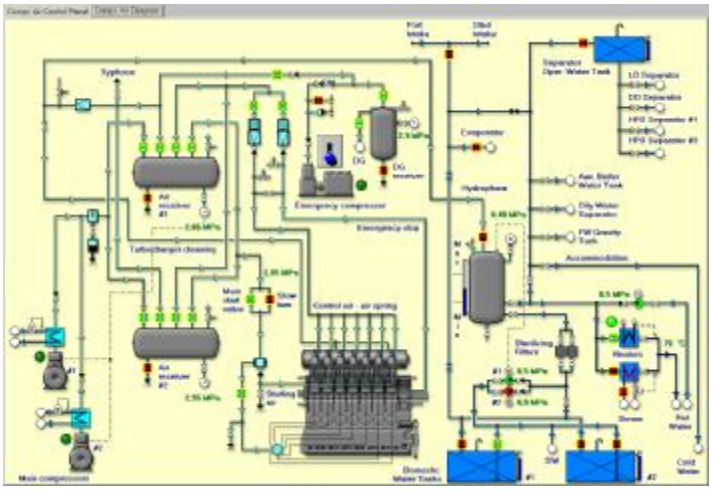

Fig. 13 Compressed Air System Diagram.

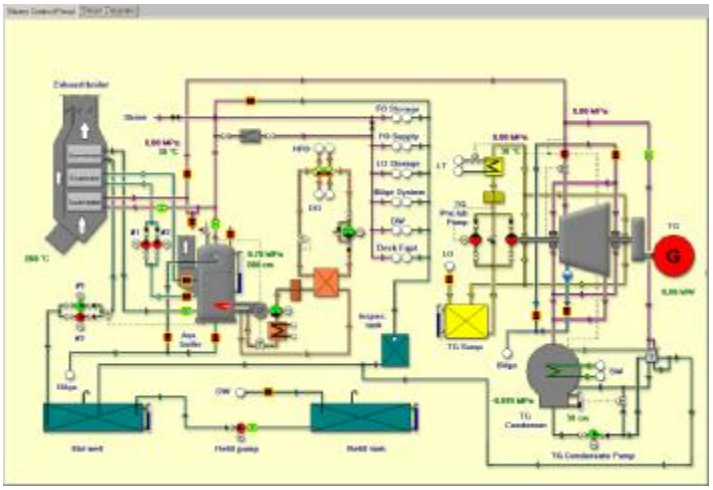

Fig. 14 Steam System.

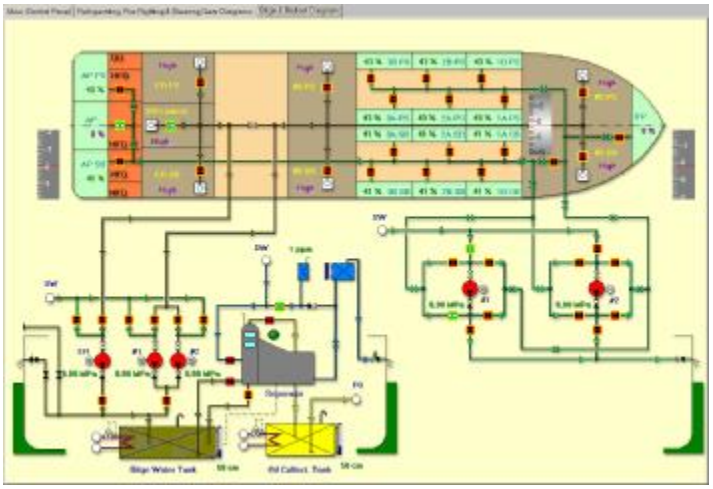

Fig. 15 Bilge and Ballast System.

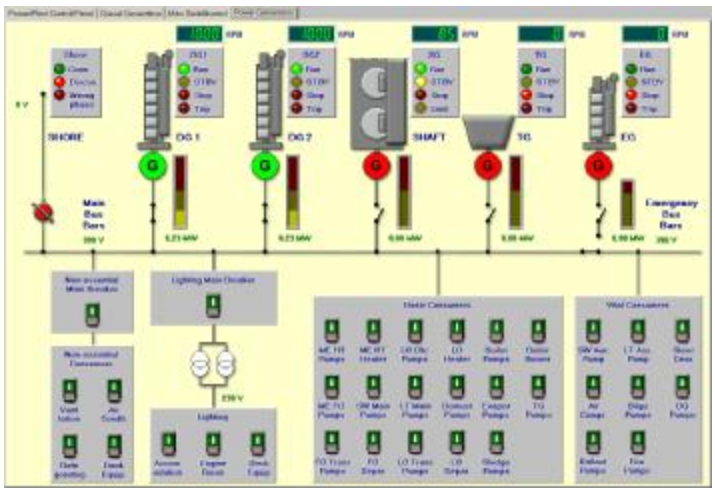

Fig. 16 Power Plant.

Fig. 17 Main Switchboard.

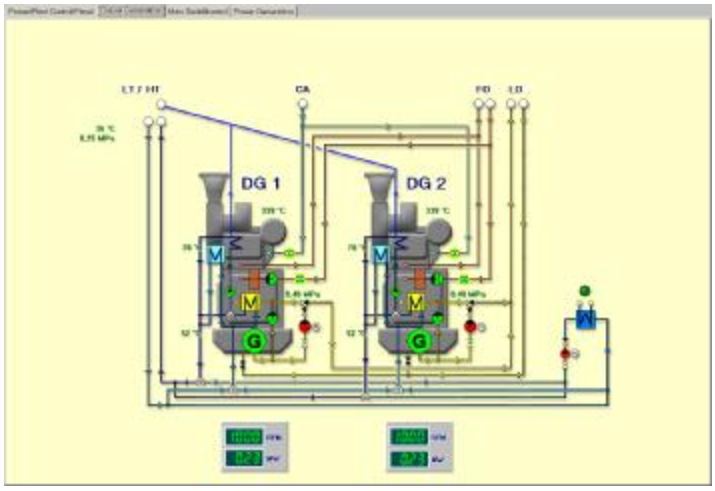

Fig. 18 Diesel Generators.

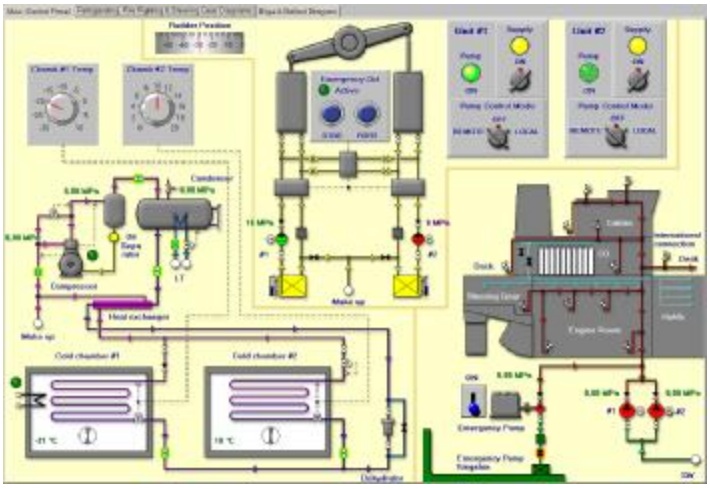

Fig. 19 Steering Gear, Fire Fighting and RefrigeratingSystem.

4 Instructor Workstation Software

The Instructor Workstation Software is installed in the computer integrated with the Instructor Console.

The Instructor Workstation allows the Instructor to perform simulation control, general system communication, introducing faults, setting/changing of operational and ambient conditions and evaluate the training.

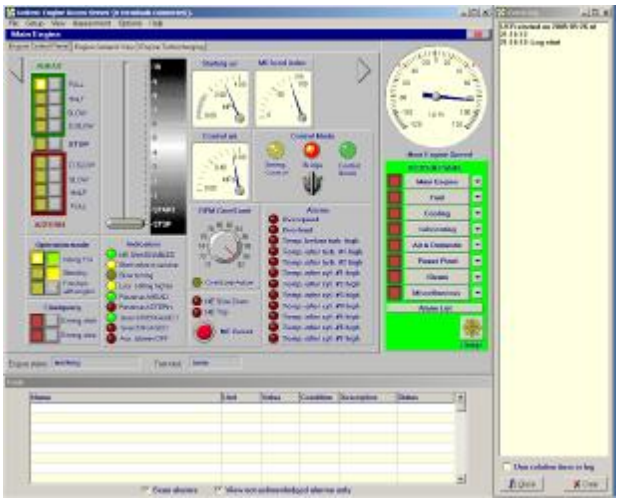

Fig. 20 Instructor Main Window with Event Log and Alarm List

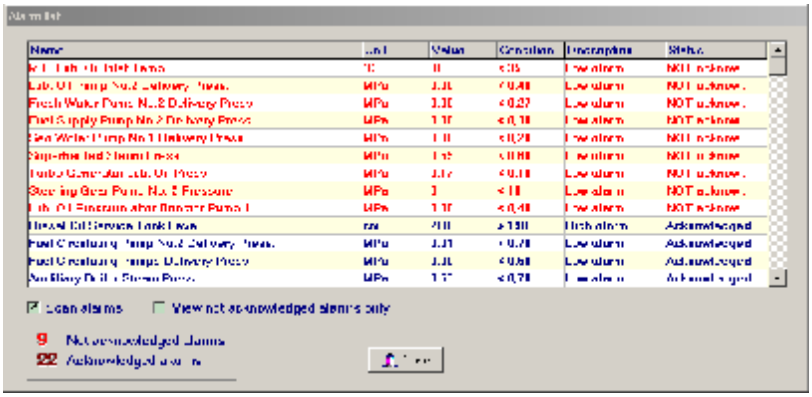

Fig. 21 Alarm List Window.

Fig. 22 Bridge Panel with ME Remote Control.

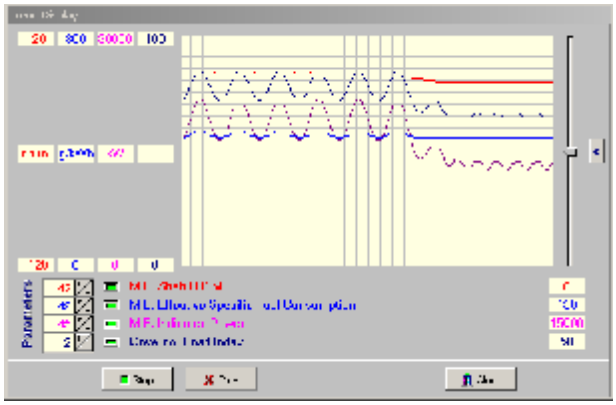

Fig. 23 Parameter Trend Display.

Simulator Control Functions:

- § Simulator start up
- § Simulator shut down
- § Simulator freezing
- § Sound mixer

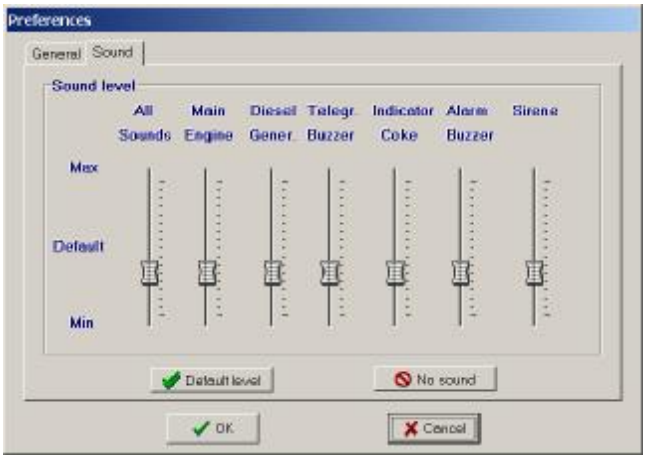

Fig. 24 Sound Mixer window.

Scenario Handling:

- § Scenario selection
- § Scenario load, start and stop
- § Scenario editing

Fig. 25 Scenario Editor Window.

Supervisor functions:

- § Engine room info overview
- § Fault introduction
- § Engine room resources manipulation

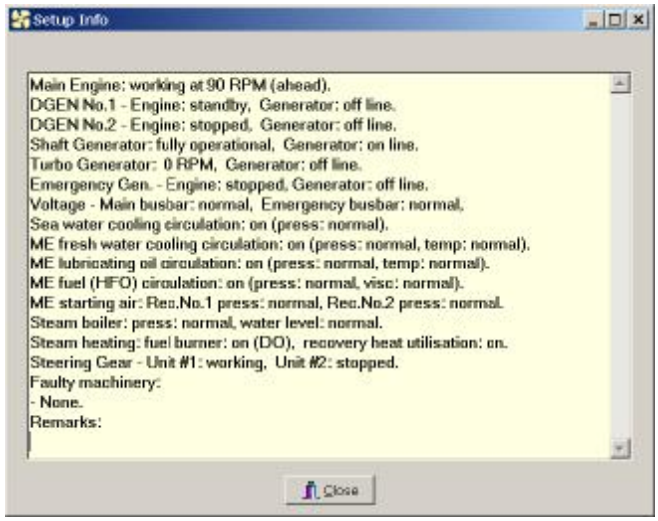

Fig. 26 Engine Room Info window.

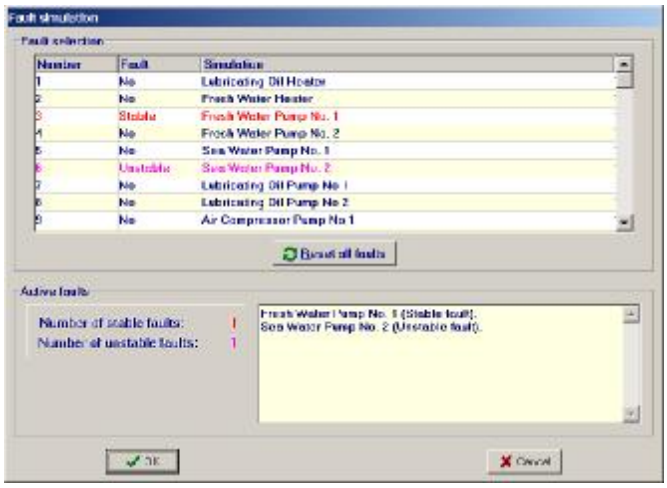

Fig. 27 Fault selection window.

Fig. 28 Resources manipulation window.

Monitoring Functions:

- § Event log.
- § Alarm information from the total system
- § Operation parameters inspection.

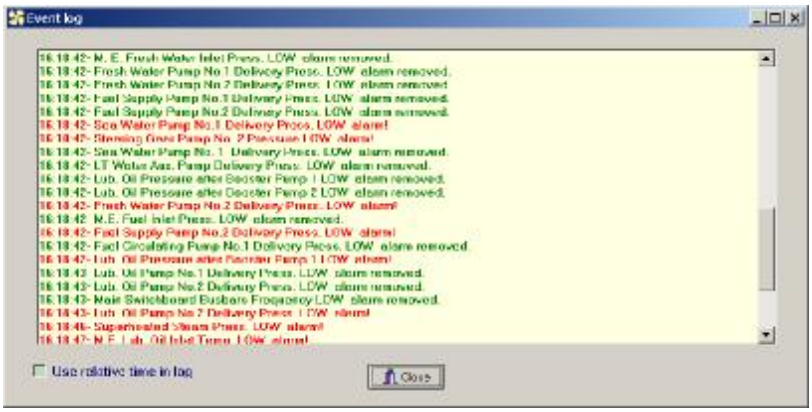

Fig. 29 Event log window.

Assessment Functions:

UER has build in a unique feature i.e. integrated assessment system and the test results are based on the state-of-the-art faults classification and the appropriate scoring system.

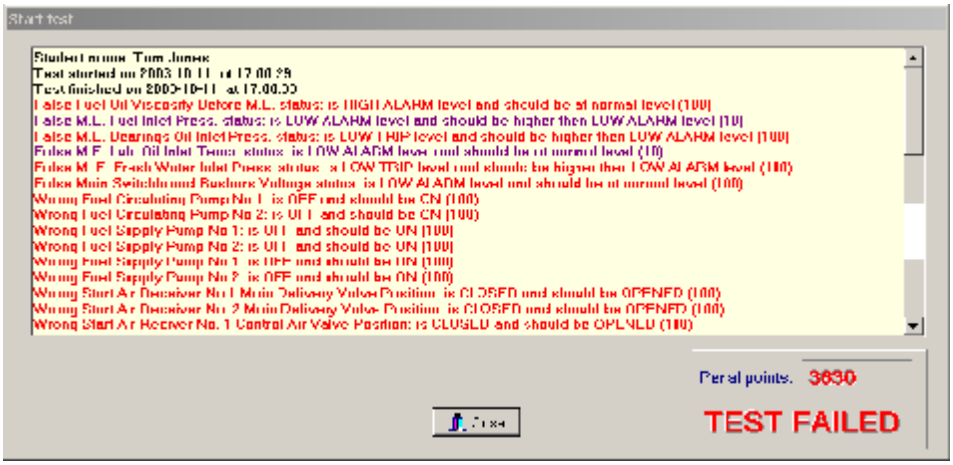

Fig. 30 Assessment window.