

Kyma Diesel Analyzer



MIP system to optimize the performance of diesel engines.

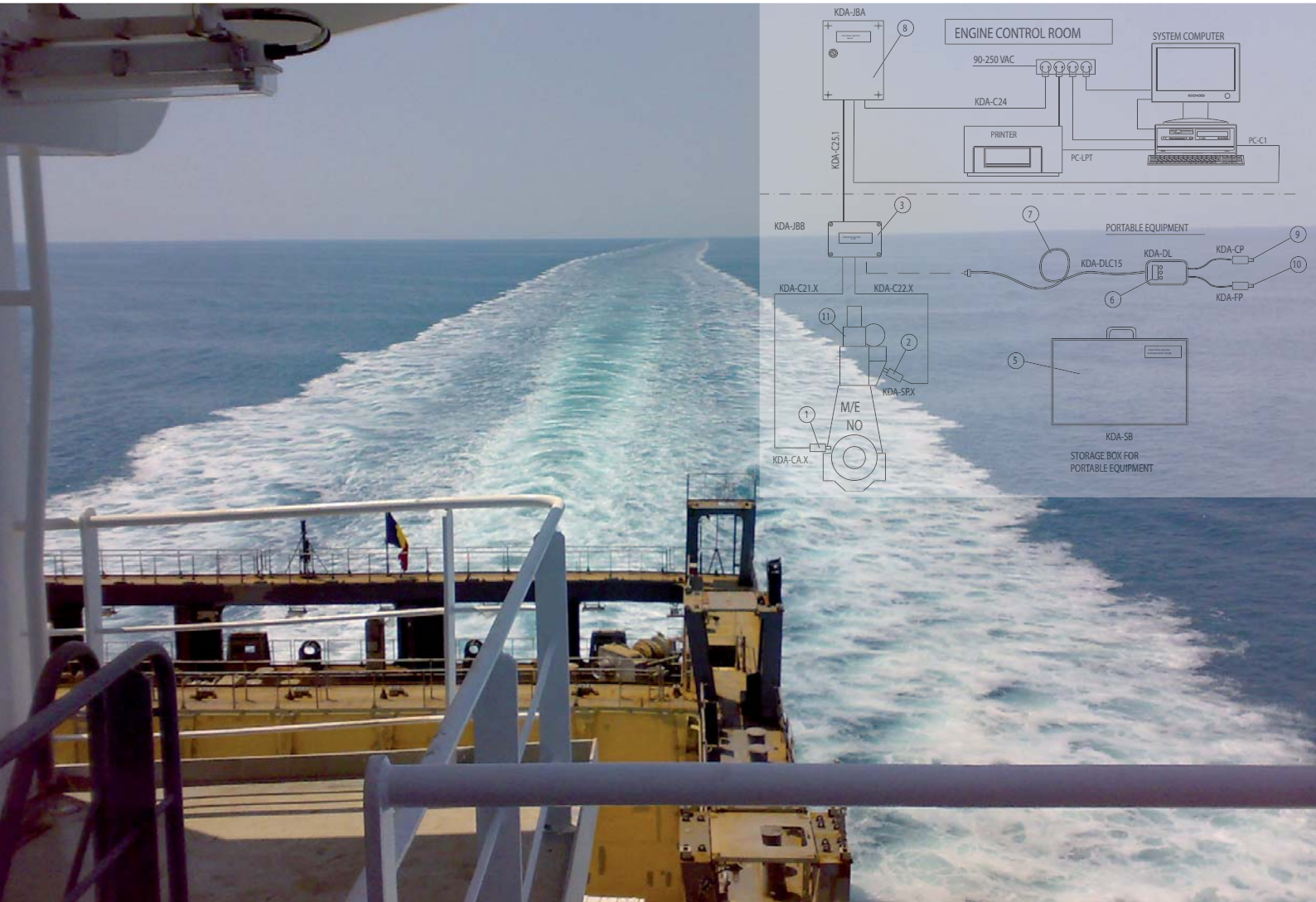
- Engine balancing
- Tuning of ignition timing
- Improved maintenance
- Overload protection
- Reduced fuel consumption
- Reduced spare parts consumption
- Reduced emissions
- Trending
- Ship to shore application



Kyma Diesel Analyser
Condition Monitoring
system for slow - and
medium speed diesel
engines.

Kyma a.s
Aasamyrane 88 B
N-5116 Ulset
Bergen, Norway
Tel. +47 55530014
Fax. +47 55530017
E-mail: mail@kyma.no
Web: www.kyma.no

Strengthen your Engine Performance



KYMA DIESEL ANALYZER

Kyma Diesel Analyzer is a computer based system for monitoring of cylinder and fuel injection system performance on diesel engines. The information can be used for tuning of engine balance, ignition timing, checking of cylinder overload, trending, checking of cylinder wear as well as maintenance planning.

The system can be installed on new buildings and on ship in operation.

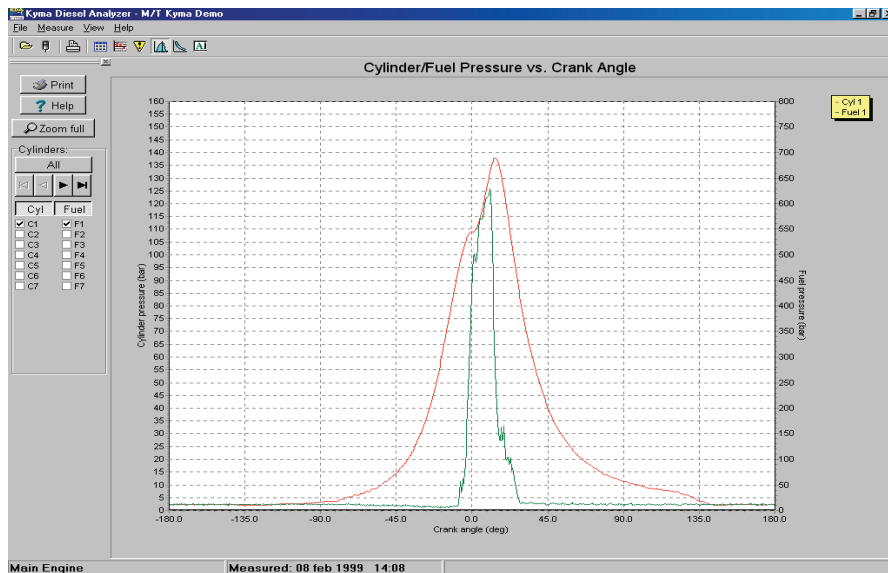
Measurements can be done on main engine and auxiliary engines. All measurements is done with a small hand held unit and the information is automatically transferred to the software.

The necessary hardware consists of a portable data logger, electrical junction boxes, sensors and shut-off valves in order to collect performance data form the diesel engines. Optional measurements of fuel injection pressure are available.

OUTPUT INFORMATION

Information about the engine's operation and condition is displayed both numerically and graphically in the user-friendly software. Curves and bar graphs are used in the presentations, where colors separate and highlight the data. An analysis, where data are compared to mean and reference values, provides the user with information about inefficient operation of the engine or cylinder wear.

A full-featured text editor included in the software enables the user to add his own comments to the measurements, for instance additional figures, special running condition etc. All information can be printed in the engine condition report and also sent on shore.



Cylinder and fuel injection pressures versus crank angle or cylinder volume can be shown simultaneously, so that injection and ignition points can be compared directly. Reference curves and curves from different cylinders can be presented together with these curves making it easy to find deviations.

For detailed analysis, any section of the curves can be zoomed.

Malfunction will be seen and corrective actions can be taken.

Numerical tabulation of recorded and calculated data for one condition:

Pmi	Mean indicated pressure
Pcomp	Compression pressure
Pmax	Maximum combustion pressure
Arnax	Crank angle at maximum combustion pressure
Pexp	Expansion pressure (pressure at 40. after TDC)
Pmax-c	Pressure rise due to combustion
Aign	Ignition timing
Pinjmax	Maximum fuel injection pressure
Ainjmax	Crank angle at max fuel injection pressure
Power	Indicated power in cylinder
Rpm	Speed of engine during measurement
Scav	Scavenging air pressure
Trending of all parameters is available	

Cyl #	Power (HP)	Rpm	Pmi (bar)	Pcomp (bar)	Pmax (bar)	Pmax pos (deg)	Pexp (bar)	Pmax-c (bar)	Aign (deg)	Scav (bar)	Pinj max (bar)	Pinj pos (deg)
1	4461	78.9	16.5	108.9	137.9	13.4	49.1	29.0	1.9	2.4	629.6	10.4
2	1744	78.8	6.4	116.4	117.8	1.0	39.2	1.4	3.5	2.4	429.4	0.5
3	-7053	78.8	-26.1	78.5	95.1	-27.9	18.4	16.7	10.1	2.4	297.5	-13.4
4	2040	78.7	7.5	118.3	125.0	2.4	38.7	6.7	10.4	2.4	502.8	-0.6
5	4337	78.8	16.0	109.3	137.0	13.7	48.5	27.7	1.2	2.4	653.0	10.2
6	4512	78.7	16.7	106.8	135.5	14.2	49.5	28.7	1.7	2.3	663.3	10.7
7	2078	78.2	7.7	116.5	122.5	2.1	39.2	6.0	-1.9	2.4	469.6	-0.9
Mean	1731	78.7	6.4	107.8	124.4	2.7	40.4	16.6	3.8	2.4	520.7	2.4

Bar graphs make it easy to check the engine balance, overload or deviation in operating parameters for the cylinders.

Parameters for relative or absolute presentation:

- Mean indicated pressure
- Max combustion pressure
- Compression pressure
- Expansion pressure.
- Ignition timing

The bar graphs are effective tools for tuning of the engine and for maintenance planning. This makes it easy to identify wrong ignition timing for one or more cylinders.

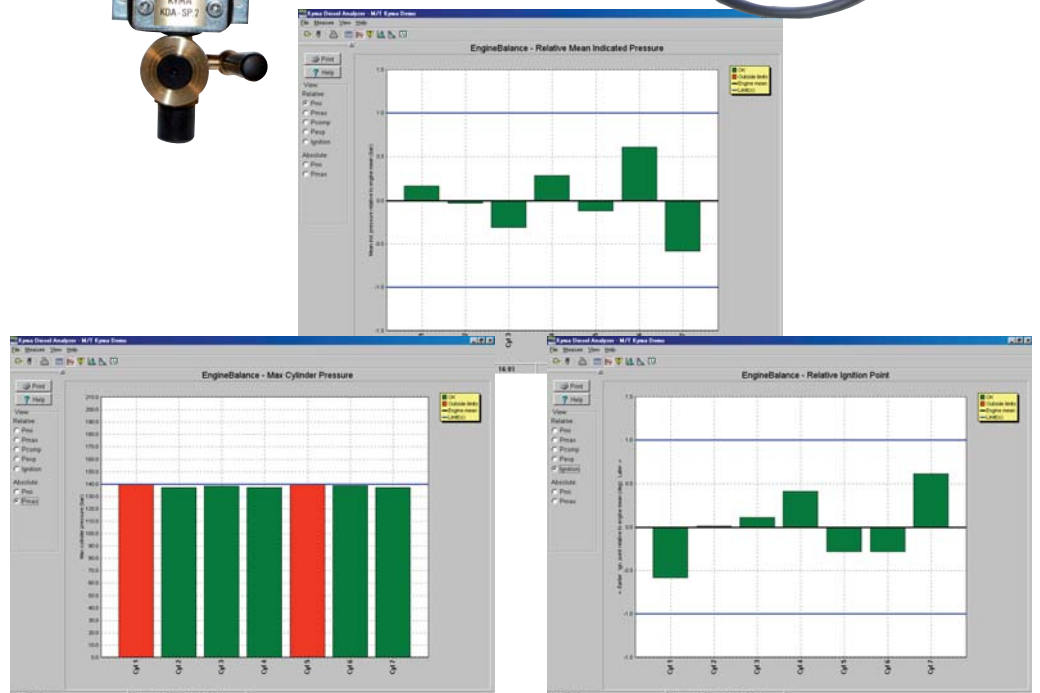




Figure shows the hand held unit with both cylinder pressure sensor and fuel injection pressure sensor.



Picture show the transportation suitcase with sensors.

TECHNICAL SPECIFICATIONS:

Cylinder Pressure	Sensor Kistler 7613C quartz transducer with Thomson adapter
	Connection: Standard indicator valves
	Range: 0 -250 bar
	Accuracy: $\leq 0,3\%$ FSO
	Operating tem. range: $\leq 350^{\circ}\text{C}$
Fuel Injection Pressure Sensor	Strain gauge based type
	Range: 0- 1400 bar
	Accuracy: $\leq \pm 0,4\%$ FSO
	Operating temp. range: $\leq 90^{\circ}\text{C}$
	Output signal: 4 -20 mA
Scavenging Air Pressure Sensor	Strain gauge based type
	Range: 0 -4 bar
	Output signal: 4- 20 mA
	Operating temp. range: $\leq 65^{\circ}\text{C}$
Crank Angle Sensor	High speed magnetic pickup type
	Operating temp. range: $\leq 85^{\circ}\text{C}$
Data Logger	Input voltage: 85- 250 VAC, 50- 60 Hz
	Power consumption: 10 W
	Output connection: Isolated RS-232

Specifications subject to change without notice



Measured date: 09 Feb 2006
time: 01:43

M/T Kyma Diesel
Main Engine
MAN B&W 7S80MC

Condition Report

Indicated power: 19408 kW

Engine speed: 74.5 rpm

Scav. air pressure: 2.0 bar

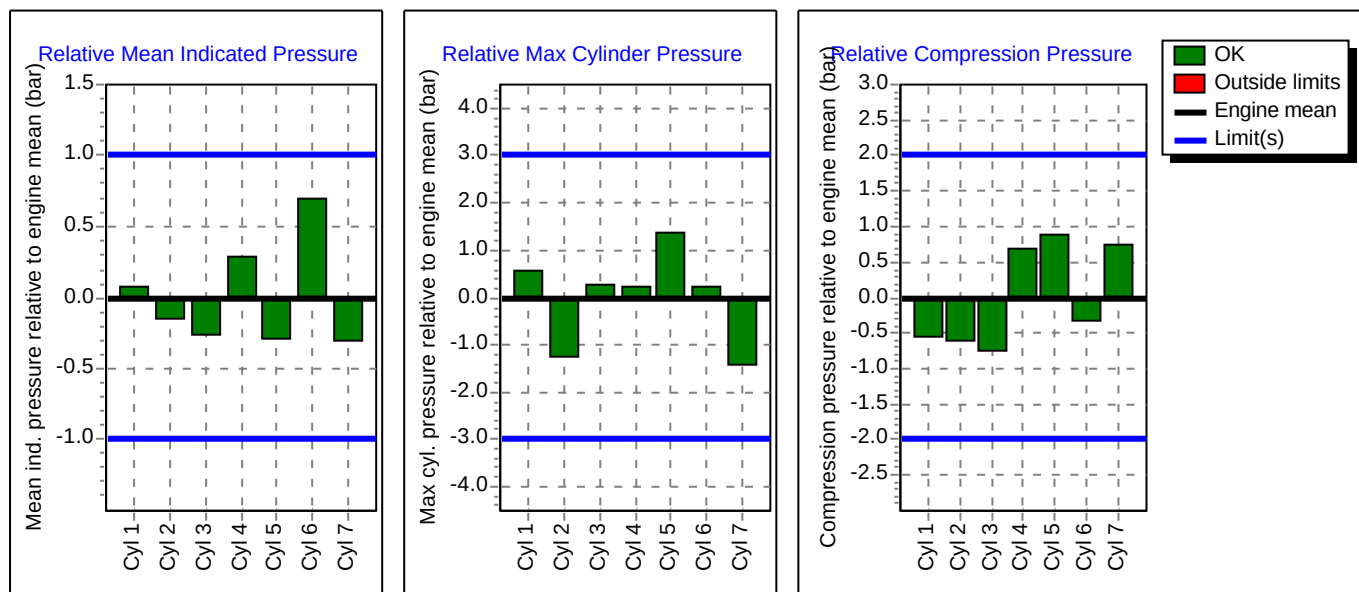
Cyl #	Power (kW)	Rpm (rpm)	Pmi (bar)	Pcomp (bar)	Pmax (bar)	Pmax pos (deg)	Pexp (bar)	Pmax-c (bar)	Ignition (deg)	Pinj max (bar)	Pinj max pos (deg)
1	2785	74.5	14.6	96.5	120.3	13.9	43.1	23.8	2.4	573.9	9.9
2	2748	74.7	14.4	96.5	118.5	14.0	44.0	22.0	4.0	579.6	10.0
3	2723	74.6	14.3	96.3	120.0	13.6	43.0	23.7	2.6	602.2	9.6
4	2826	74.5	14.8	97.8	120.0	14.4	44.2	22.2	3.4	603.5	10.4
5	2716	74.5	14.2	98.0	121.1	14.2	43.1	23.2	2.7	606.6	9.7
6	2904	74.5	15.2	96.7	120.0	14.7	45.2	23.2	3.7	609.7	10.7
7	2706	74.3	14.2	97.8	118.3	15.1	43.6	20.5	4.6	615.9	10.1
Mean	2773	74.5	14.5	97.1	119.7	14.3	43.7	22.7	3.3	598.8	10.1

User comments

Calm sea.

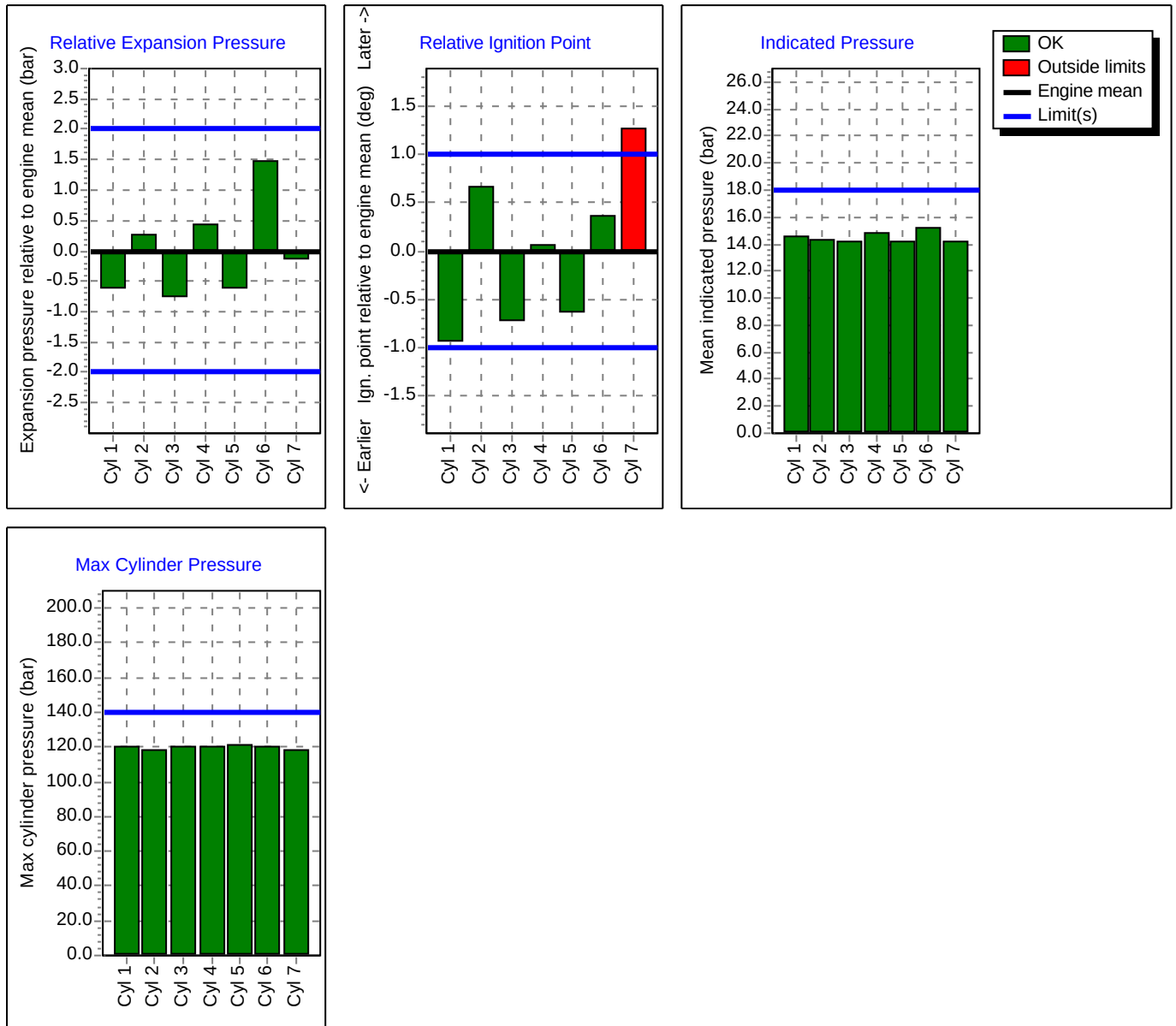
Ballast, 75 % load, leg # 2.

Engine Balance



Measured date: 09 Feb 2006
time: 01:43

M/T Kyma Diesel
Main Engine
MAN B&W 7S80MC



Data Analysis

Cylinder 1

No comments

Cylinder 2

No comments

Cylinder 3

No comments

Cylinder 4

No comments

Cylinder 5

No comments



Measured date: 09 Feb 2006
time: 01:43

M/T Kyma Diesel
Main Engine
MAN B&W 7S80MC

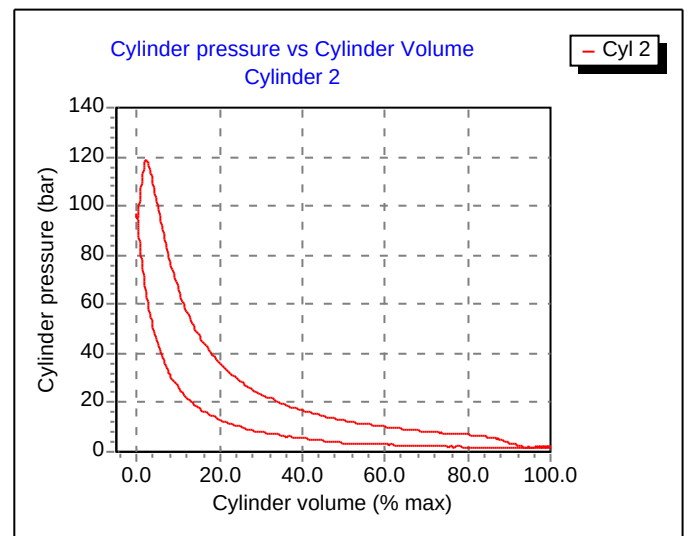
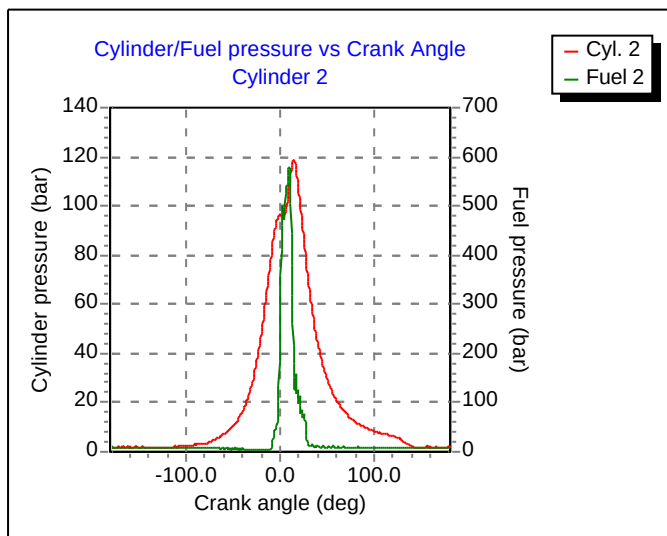
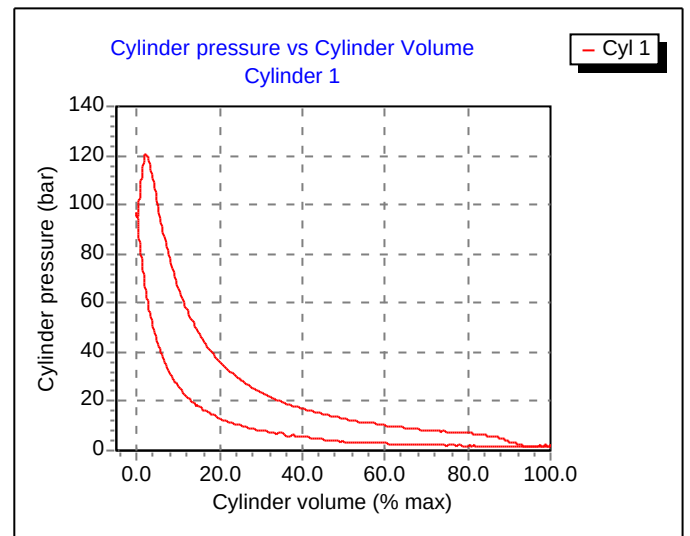
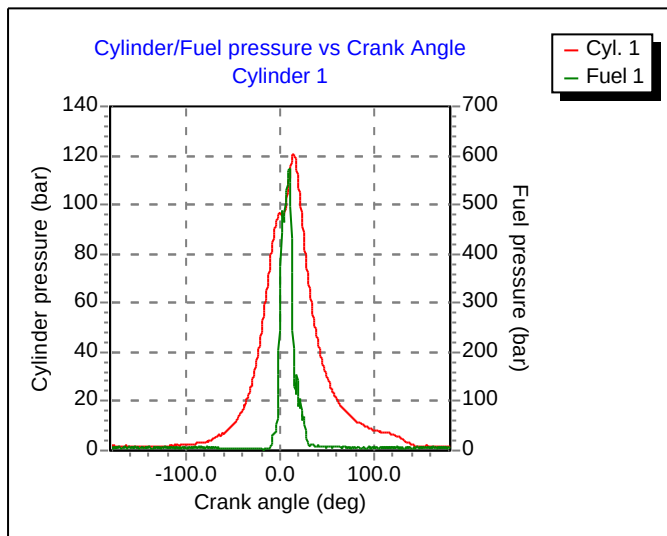
Cylinder 6

No comments

Cylinder 7

Ignition point is late compared to mean
Value: 1.3 deg Limit: 1.0 deg

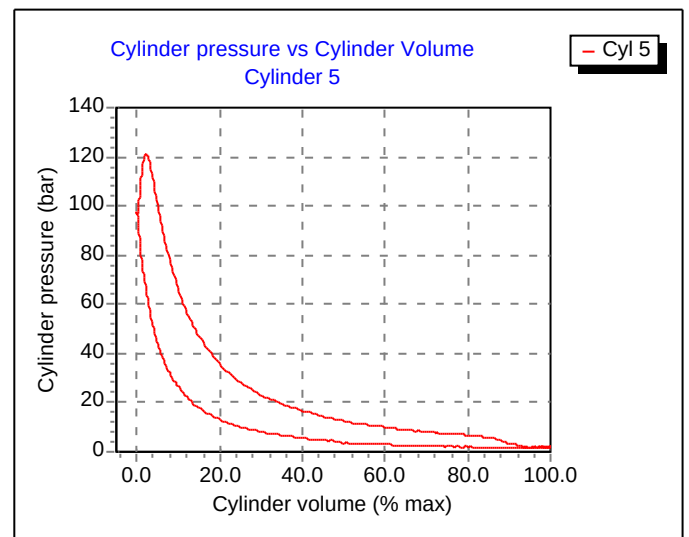
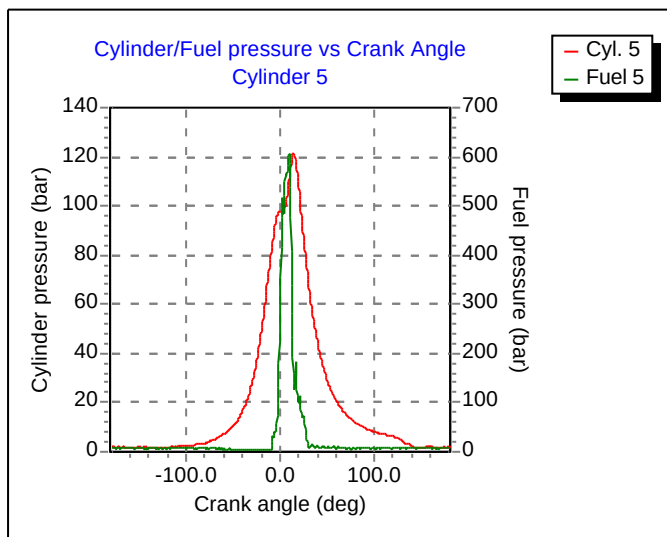
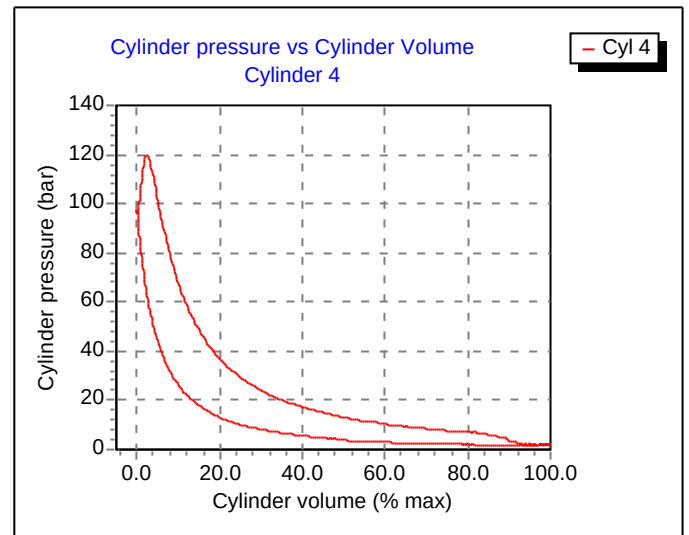
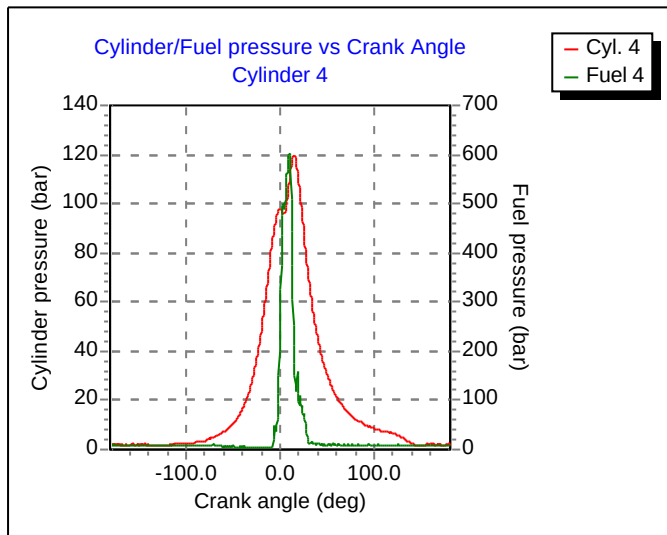
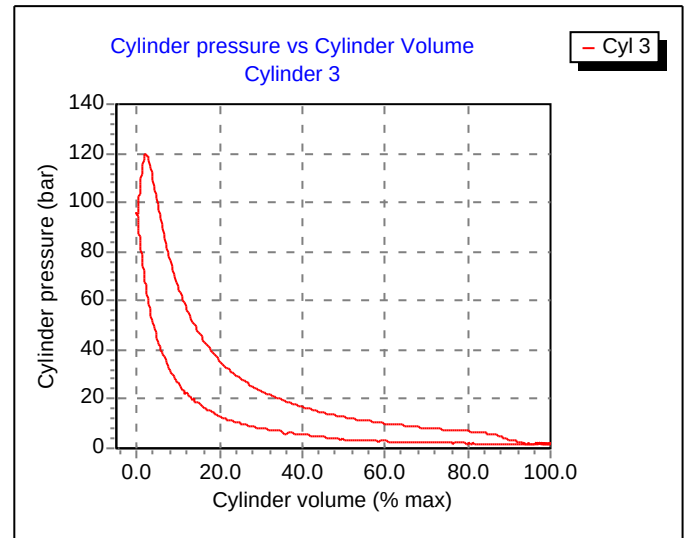
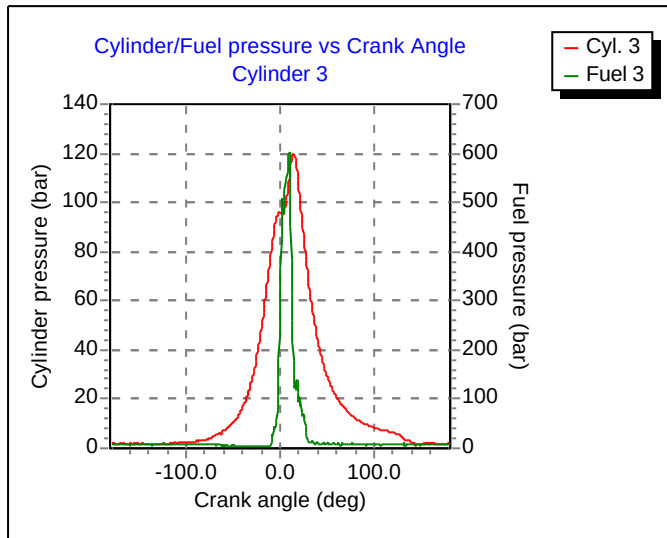
Pressure curves





Measured date: 09 Feb 2006
time: 01:43

M/T Kyma Diesel
Main Engine
MAN B&W 7S80MC



Measured date: 09 Feb 2006
time: 01:43

M/T Kyma Diesel
Main Engine
MAN B&W 7S80MC

