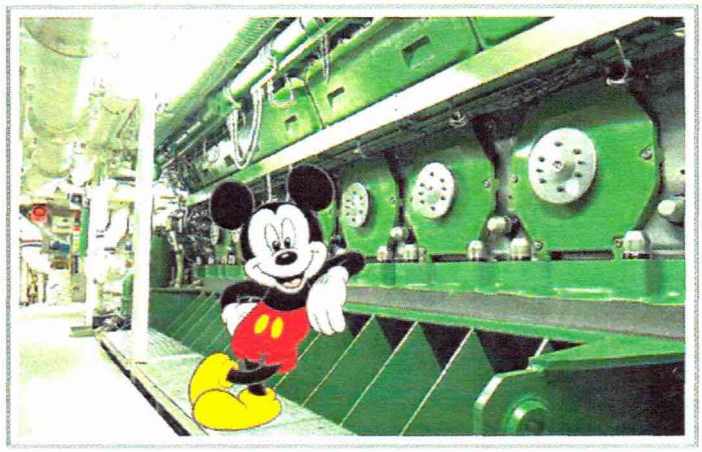
Disney WONDER

ENGINEERING TECHNICAL INFORMATION



DIESEL GENERATOR ENGINES

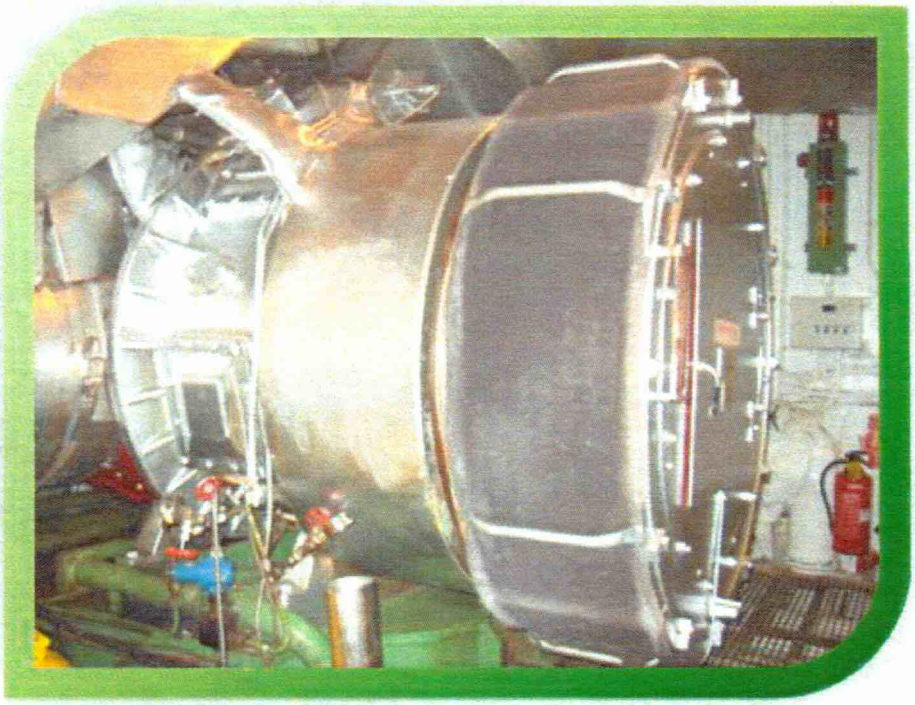
Five GMT/SULZER 16-cylinder, 400 mm bore, 560 mm stroke, medium speed, rotating piston, 4-stroke diesel engines type 16ZAV4OS. Each set turbocharged, intercooled, air started and direct coupled to an Ansaldo alternator. Direction of rotation is counter-clockwise.

Maximum Continuous Rating (MCR)	- 11,520kW -15,500 H.P.
Speed	- 514 rev/min
Mean effective press.	- 23.89 bar
Fuel consumption At MCR (OF)	- 185 gr/kWh

DIESEL GENERATOR ENGINE ACCESSORIES

Two ABB exhaust gas turbochargers per engine. Type VTR454.

Two two-stage air coolers per engine. One Governor type DEGO II with Actuator type ASAC 7 per engine.



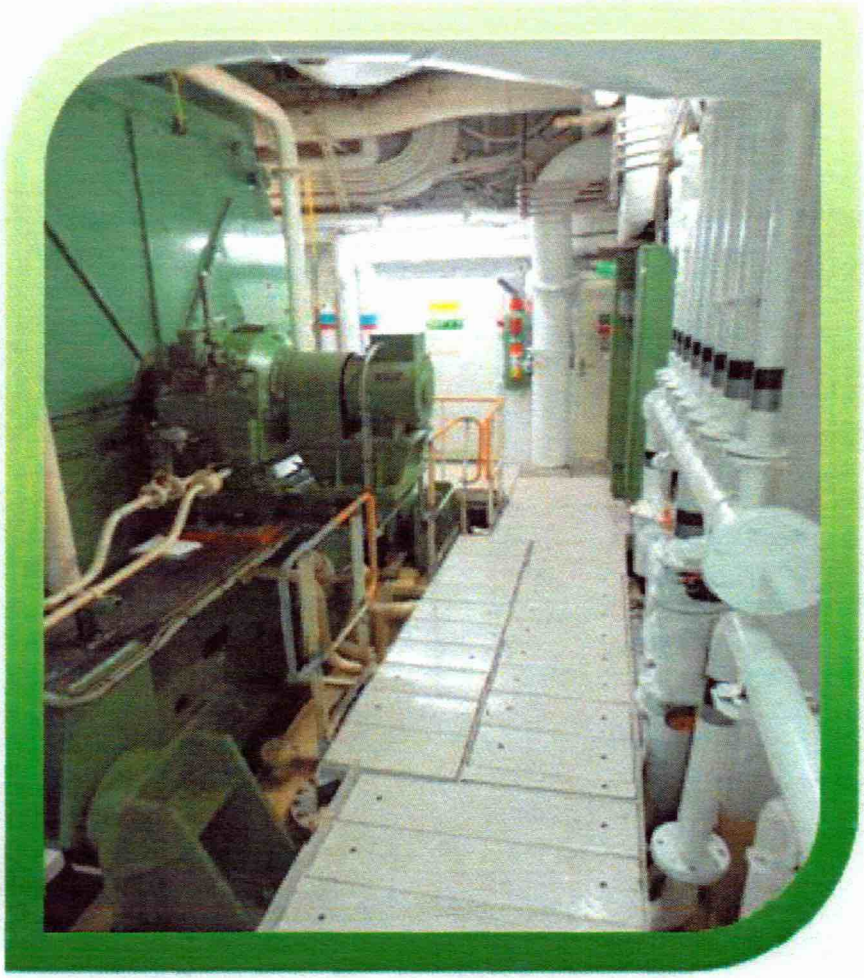
MAIN GENERATORS

Five Ansaldo a.c. generators with brushless excitation system and automatic voltage control.

Rating (each)	- 6.6kV/3-ph/60 Hz/p.f.0.8
Output	- 14,000 kVA/12,000 kV at 514 r.p.m.

MAIN GENERATOR ACCESSORIES

One air/water heat exchanger assembly per unit. Anti-condensation heaters are provided for each unit.



PROPULSION MOTORS

Two General Electric horizontal synchronous motors, 19 MW each for speed of 150 r.p.m., with two separate windings ("half motor") supplied at 4,000 V at variable frequency. The excitation field is common to both "half motors". One motor for each shaft.

PROPULSION MOTOR ACCESSORIES

Exciter assembly with thyristor controller for each propulsion motor, plus one as spare, comprising 1 440/230 V transformer, and power selector switch.

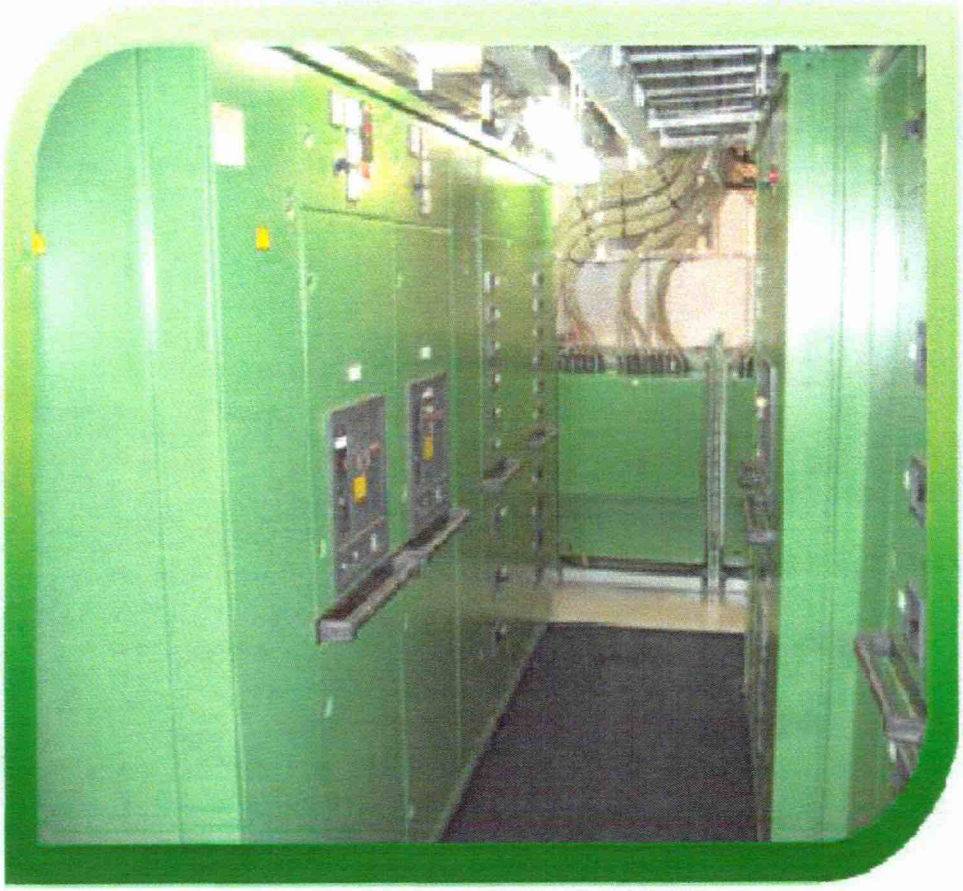
Two air/water heat exchanger assemblies with 4 electric motor-driven fans per motor.

The propulsion motors are rated at 19 MW which is 25850 horsepower, which is equivalent to about 210 full sized family cars.

These motors are coupled to shafts, which are 22" in diameter and 200 ft. long. These shafts then drive the propellers, which are 18 ft. in diameter and weigh 19 tons.

TRANSFORMERS AND CONVERTERS

Eight transformers each rated 6.6/2.1 kV – 6,600 kVA for supply to propulsion power converters, in moulded resin. Four transformers for each shaft. Air water-cooled.



EMERGENCY DIESEL GENERATORS

One Isotta Fraschini 12-cylinder in V, type V1712T3TE, 4-stroke, radiator cooled diesel engine direct coupled to alternator.

Maximum Continuous Rating (MCR)	- 1,200kW
Speed	- 1,800 rev/min
Fuel Consumption	- 207 g/kW/h

EMERGENCY DIESEL DRIVEN GENERATOR

Caterpillar 3512 - V-12. 4 strong cycle diesel alternator Leroy Somer

Rating - 440V/3-ph/60 Hz/ 2788 amp
Output - 2125 kVA/1,500 bhp at 1,800 r.p.m.

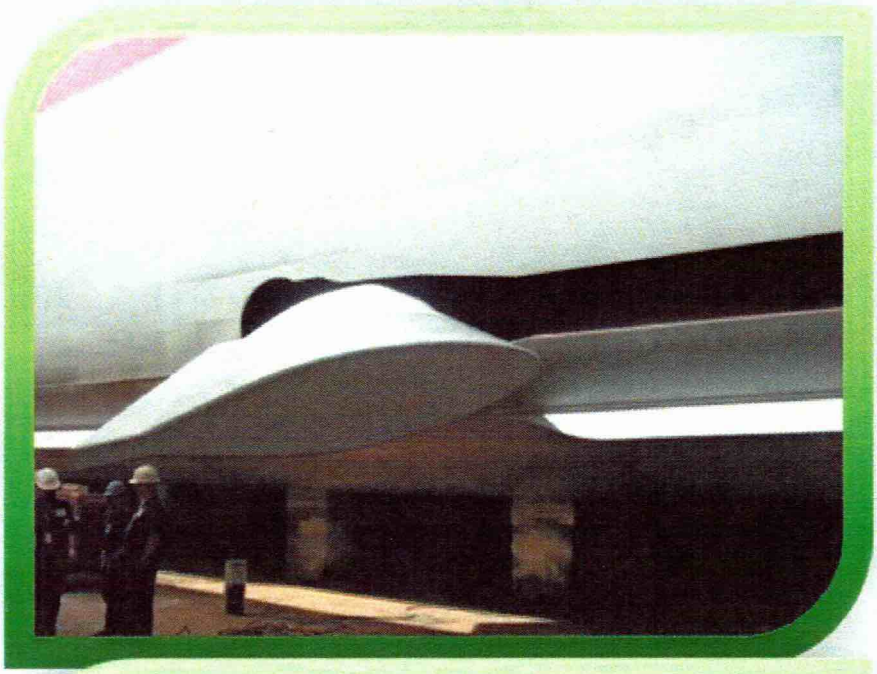
BOW AND STERN THURSTERS

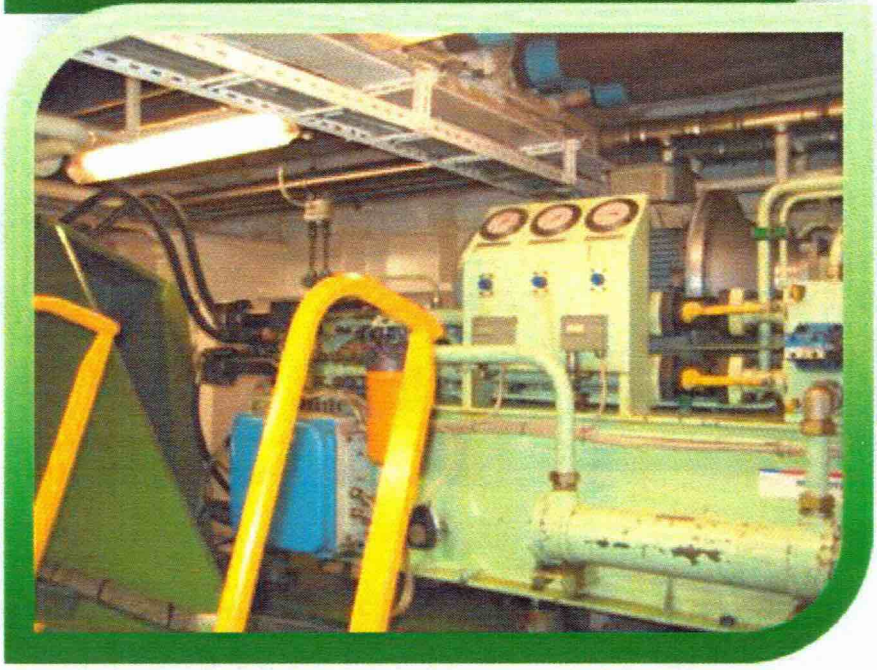
The ship can be turned about its midpoint or driven sideways by means of 5 lateral thrusters. Five Fincantieri electrohydraulic side thrusters, three in the bow and two in the stern. These thrusters are propellers fitted in tunnels across the ship, allowing water to be pumped from one side to the other.

Each propeller is 8' in diameter, weighs 6.6 tonnes and has 1.8 MW of power i.e. 2,450 H.P, about 20 full sized family cars.

STABILIZERS

Fincantieri type SRO-5-205 folding fin ship stabilizers. Comprising two folding fins, electric-driven hydraulic power units and a control system.



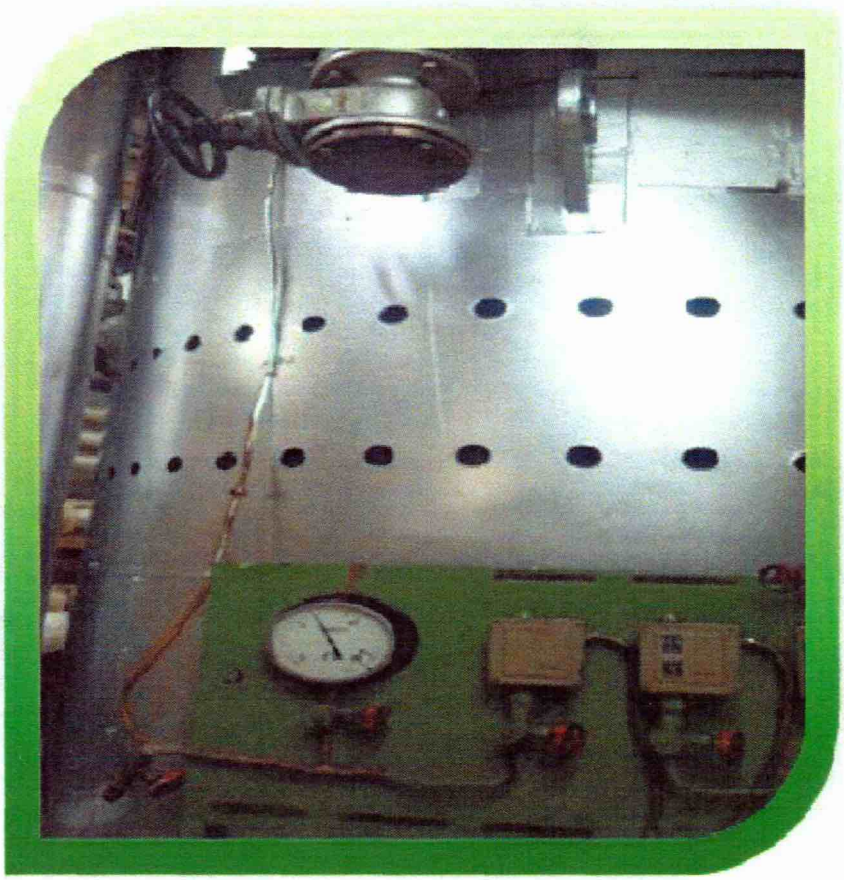


STEERING GEAR

Frydembo, rotary vane type. Comprising two electric-driven independent pumping units of the low pressure type. The steering gear is controlled by a Gyro-compass/autopilot and remote steering control.

OIL/OIL-FIRED BOILERS

Two Aalborg auxiliary steam boilers, type AQ-9, of vertical construction with natural water circulation. The tube bundle is a combination of smoke and water tubes with the hearth absorbing 50% total heat and the rest absorbed by convection in the tube bundle.



Boiler capacity	- 10tonnes/h
Working pressure	- 7 bar

Two combustion fans.

Air flow (max)	- 10,800Nm³/h
Static pressure	- 590 mmWG

OIL/OIL-FIRED BOILER ACCESSORIES

Two boiler burners, rotary cup with fuel/air regulator.

Fuel flow (max)	- 750 kg/h
Fuel flow (min)	- 110 kg/h

EXHAUST GAS BOILERS

Five Rizzi Energy smoke tube type, flooded design with forced circulation and without steam space or steam collection facilities. The two oil-fired boilers are utilized to provide steam separation.

Boiler Capacity at 100 % MCR :

Evaporation	- 5 tonnes/h
Max Working Pressure	- 9.5 bar
Exhaust gas quantity	- 79 tonnes/h@375°C

FUEL CONSUMPTION

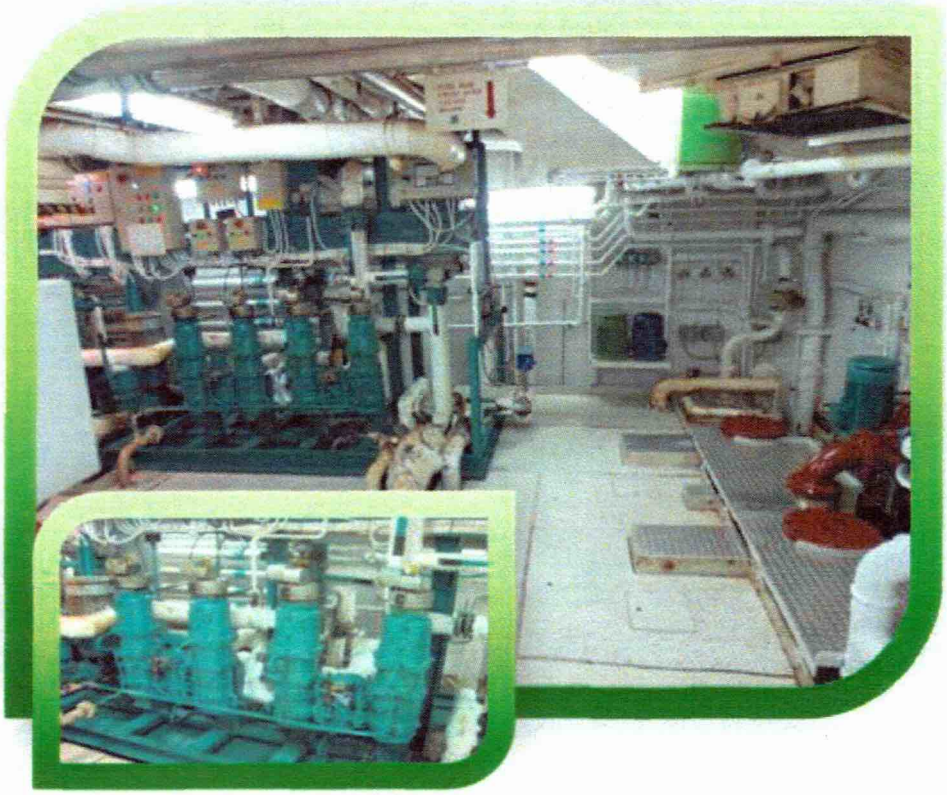
House Load is approximately 10 MW. – Standard.

This equates to fuel consumption of 50 tonnes/day, i.e. 13,200 gallons/day.

Then at 24 knots, consumption will be 66,000 gallons/day or 100 gallons/mile.

During a typical 7 day period, we burn 166,000 gallons of fuel.

Total storage capacity is 600,000 gallons.



LUBRICATION OIL CONSUMPTION

Is approximately 1 gram/KW hr.

This equates to 10 litres/hr at House Load of 10MW.
i.e. 240 litres per day.
i.e. 64 gallons per day.

Then at 24 knots – 320 gallons per day.

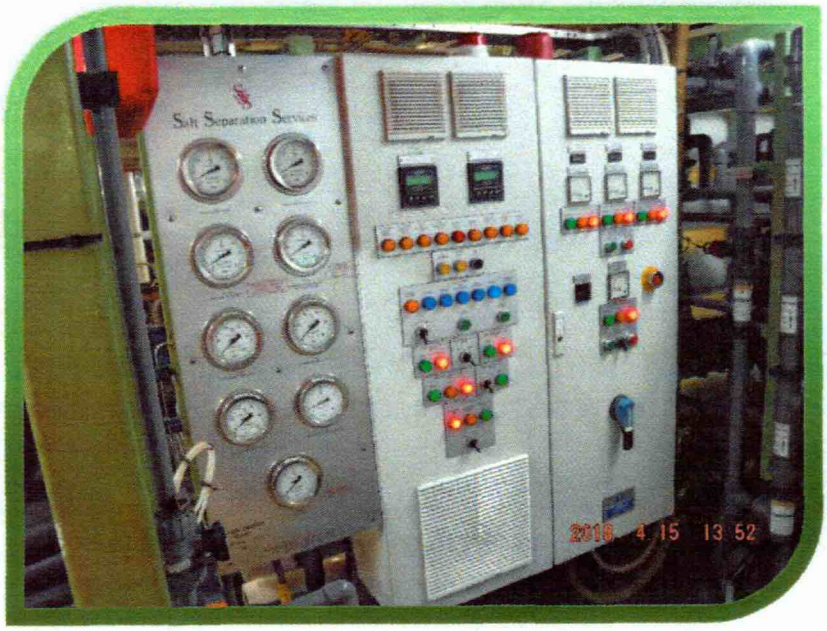
During a typical 7 day period we use 1,500 gallons of lube oil.

Total storage capacity is 52,000 gallons.

RO PLANT

S.W. Reverse Osmosis Plants

- 2 5.5.5 Units
- 18 membrane elements filtering process
- Production per day: 300m³ each



EVAPORATORS

Alfa-Laval D-TU-4-1600 distiller evaporator units of the flash, low pressure, multi-stage type. The units use main generator jacket water as the feed heating medium and low pressure steam as an additional healing medium as necessary.

Capacity of each evaporator unit approximately 600 tonnes/d.. Distillate quality to be equal or less than 4.3 ppm total dissolved solids.

Daily water consumption is approximately 1200 tonnes, about 1/3 tonnes/person/day i.e. 90 gallons/person/day.

During a typical 7 day period, we use approximately 2,250,000 gallons of water.

Total storage capacity is 800,000 gallons.

AIR CONDITIONING PLANT

Comprises a chilled water plant and hot water production unit supplying the vessel's air handling units. The chilled water plant comprises five centrifugal type motor-driven refrigerant compressors of 789kW, five chilled water pumps and five seawater pumps.

Hot water production unit comprises four steam/water heat exchangers and two hot water pumps.

PROVISION REFRIGERATION PLANT

York refrigeration machinery comprising three condensing units' type XJF120S. One unit designated for the freezing rooms at –33/+42°C, one unit designed for chilled rooms and one unit as stand-by. Each unit comprises a screw compressor with a step less type capacity regulation system. The refrigeration plant is designed for automatic operation with R404 A as the refrigerant.

HULL SERVICES AIR COMPRESSORS

Four Ingersoll-Rand type RS30i-A-125, rotary screw compressors 40 hp, contact cooled.

Capacity - 312m³/h at 8.6 bar

STARTING AIR COMPRESSORS

Two Sperre type HV2/220 twin-cylinder, two-stage, water-cooled air compressor sets.

Capacity - 223 m³/h at 30 bar

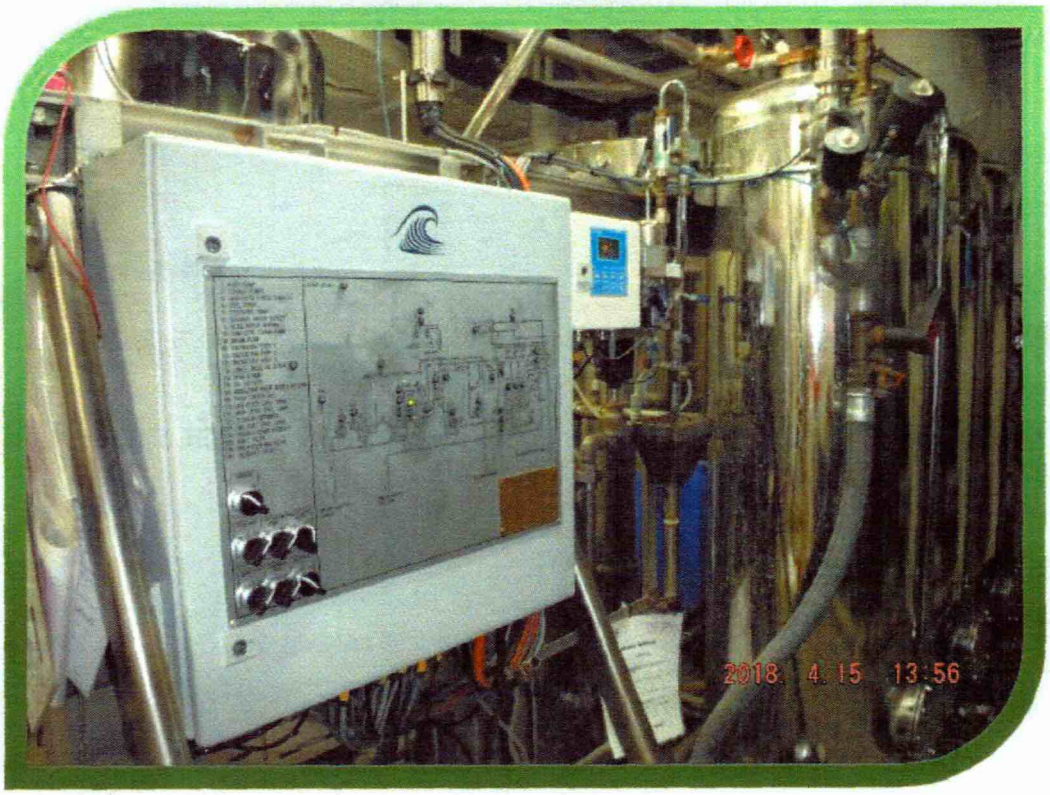
EMERGENCY DIESEL GENERATOR ENGINE STARTING AIR COMPRESSOR

One Sperre type HL2/77 diesel driven air compressor. Diesel engine type TS2 two cylinders, air-cooled.

Capacity - 25m³/h at 30 bar

BILGE WATER SYSTEM

Marinfloc Model CD 0.5
Capacity treated bilge water: max 500l/h
Oil monitoring system
Deck MA Alarm > 15 ppm oil content



FUEL OIL PURIFIERS

One set of two H.FO purifiers. H.FO purifier Alfa-Laval type FOPX 611 TFD.

Capacity - 6,100 liters/h of fuel oil.

DIESEL OIL / FUEL OIL PURIFIERS

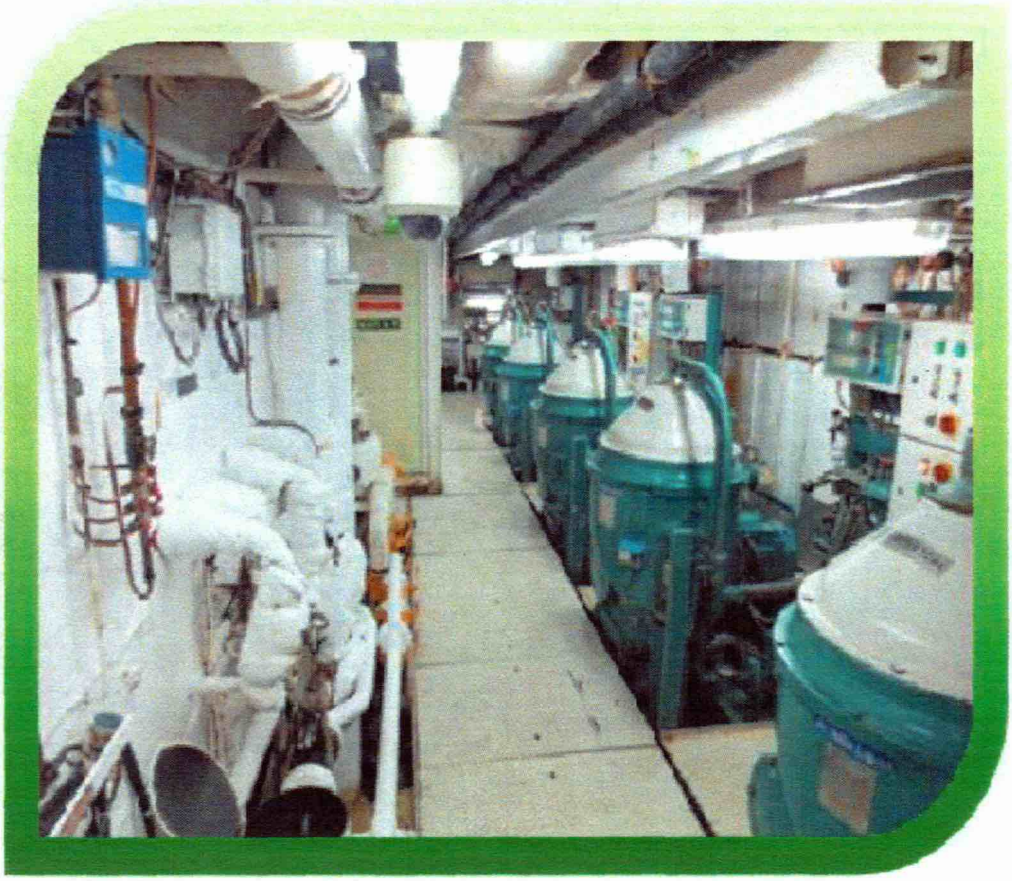
One set of one FO purifier, FO purifier Alfa-Laval type FOPX 611 TFD.

Capacity
- 6,100 liters/h of fuel oil
- 12,600 liters/h of D.O

LUBE OIL PURIFIERS

One L.O. purifiers Package single and two double. L.O. Purifiers, Alfa-Laval LOPX 710 TFD.

Capacity - 4,300 liters/h of lube oil



ENGINE CONTROL ROOM

All of the above is monitored and controlled from one space. The Engine Control Room (ECR) is manned 24 hours a day, 7 days a week. Engineering Officers run all technical aspects of the ship through this state-of-the-art equipment.

ADVANCED WASTE WATER SYSTEM

This system treats all black and grey water produced by the ships using bioreactors and membrane units to produce high quality effluent which exceeds the Alaskan standards.

ADDITIONAL EMERGENCY DIESEL DRIVEN GENERATOR

Caterpillar 3512
V-12, 4 stroke-cycle diesel alternator Leroy Somer
Rating: 440V/ 2,788A/ 3-ph/ 60 Hz/ pf 0.8
Output: 2,125 kVA/ 1,500 bhp at 1800 rpm

Disney Wonder Quick Facts Sheet

Builder	Fincantieri, Italy
Keel Laid	15th May 1997
Delivery Date	17th June 1999
Inaugural Cruise	1st October 1999
Ship's registry	Bahamas

Tonnage	84,130 register tons (Volume of
Length overall	300.10 m/ 968 .58ft (The height of the Eiffel Tower is 986 ft)
Width (Breadth)	32.25 m/ 105.8 ft
Draft at load line	8.15 m/ 26.74 ft
Cruising speed	21.5 knots = 24.7 miles per hour
Max speed	24 knots = 27.6 miles per hour
1 knot	1 nautical miles/ hour
1 nautical mile	6076.2 ft = 1852.3 m
Engines	5 engines 16 cylinder Sulzer diesel (11520 KW each)
Motors	2 propulsion motors 19 megawatts General Electric
Thrusters	3 bow & 2 stern thrusters (1800 KW each)
Stabilizers	1 pair fin stabilizer
Guest capacity	2835
Crew	940
Maximum People on	3754
Staterooms	875
Crew cabins	509

SEAWORTHY FACTS

The anchor of the Disney Wonder weighs 34,250 lbs (15569 kg) for each of the forward anchor - the same weight as three elephants.

The length of the forward anchor chain is 13 shackles (1170ft = 357.5m) A shackle equals 15 fathoms or 90ft (27.5m).

The Disney Wonder can make 500,000 gallons of fresh water from seawater everyday while cruising.

There are 5390 pillows on board the Disney Wonder. 2600 cups of coffee are served every day on board the Disney Wonder.

Over 5000 eggs are served every morning on board the Disney Wonder.

The 1367 miles of cable on board would be enough to run an extension cord between Texas and Michigan.

The 20,000 gallons of paint it takes to cover the Disney Wonder could paint 2,000 average American Homes.

Over 50 nationalities make up the 950 crew members on board.

Disney CRUISE LINE