

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-9 DIESEL ENGINE</p> <p>HIGH FRESH WATER COOLING TEMPERATURE</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. F.W. thermometers read high.</li> <li>2. High temperature alarm rings.</li> <li>3. Low F.W. pressure.</li> <li>4. Low S.W. pressure.</li> <li>5. High F.W. level in expansion tank and gas bubbles escaping.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. F.W. or S.W. pump failure.</li> <li>2. Low level in F.W. system.</li> <li>3. Air entrainment in either F.W. or S.W. system caused by air leak in suction side of pumps.</li> <li>4. Plugged or restricted S.W. or F.W. system.</li> <li>5. High compression leak into F.W. system from cylinders.</li> <li>6. Overload of engine.</li> <li>7. Temperature regulator failure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced load and/ or speed of engine.</li> <li>2. Check F.W. level and F.W. pump operation.</li> <li>3. Check temperature regulator, valve, by-pass regulator.</li> <li>4. Vent air from system and prime if necessary. Check for air leaks.</li> <li>5. Check S.W. and F.W. system for obstructions in suction and discharge sides.</li> <li>6. Check cylinders for cracks or gasket leaks between F.W. side and compression side.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced or loss of power output from unit.</li> <li>2. Overheating of engine.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-10 DIESEL ENGINE</p> <p>LOW SALT WATER COOLING PRESSURE</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Low S.W. pressure indicated on pressure gauge.</li> <li>2. F.W. Cooling Water and L.O. Temperature will rise above normal.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. S.W. pump failure.</li> <li>2. Sea chest and/or strainer obstructed.</li> <li>3. Pump air bound.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced load and/or speed of engine, preventing overheating.</li> <li>2. Cut in emergency S.W. cooling from fire main.</li> <li>3. Check operation and vent S.W. cooling pump.</li> <li>4. Check and clean S.W. strainer.</li> <li>5. Steam out sea chest if obstructed.</li> </ol>	<p>1. Overheating of engine.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-11 DIESEL ENGINE</p> <p>REDUCTION GEAR COOLING WATER AND LUBE OIL PUMP FAILS (LST-TYPE)</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. L.O. and S.W. cooling pressure gauges indicate low or loss of pressure.</li> <li>2. L.O. and S.W. reduction gear pump alarm rings.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Power failure to pump motor, fuses blown.</li> <li>2. Open circuit in motor controller or motor.</li> <li>3. Overload of motor causing overload protection device to drop motor circuit off line.</li> <li>4. Seizing of motor and/or pumps.</li> </ol>	<ol style="list-style-type: none"> <li>1. Put standby pump into service.</li> <li>2. Check power to controller of unit affected.</li> <li>3. Push reset button and restart pump.</li> <li>4. Check pump and motor for freeness in turning.</li> <li>5. Check for open in circuit.</li> <li>6. Operate speed of reduction gears at slow speed till proper L.O. and S.W. cooling pressure is restored.</li> </ol>	<p>1. Reduced power and maneuverability of unit affected.</p>

D-11

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-12 DIESEL ENGINE</p> <p>REDUCTION GEAR COOLING WATER AND LUBE OIL PUMP FAILS (AOG-TYPE)</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. L.O. and S.W. cooling pressure gauges indicate low or loss of pressure.</li> <li>2. L.O. and S.W. reduction gear low pressure alarm rings.</li> <li>3. Loss of excitation to propulsion motors of reduction gears affected.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Power failure to pump motor, fuses blown.</li> <li>2. Open circuit in motor controller or motor.</li> <li>3. Overload of motor causing overload protection device to drop motor circuit off line.</li> <li>4. Seizing of motor and/or pumps.</li> </ol>	<ol style="list-style-type: none"> <li>1. Bring throttle controls to stop position of unit.</li> <li>2. Put stand by pump into service.</li> <li>3. Check power to controller of reduction gear L.O. and S.W. cooling pump.</li> <li>4. Push reset button and restart pump.</li> <li>5. Check pump and motor for freeness in turning.</li> <li>6. Check for open in circuit.</li> <li>7. Operate unit not affected at reduced speed until L.O. pressure is restored to affected unit.</li> </ol>	<p>1. Reduced and/or loss of power of propulsion unit.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
D-13 DIESEL ENGINE  GOVERNOR FAILURE	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Engine racing or running away.</li> <li>2. Engine stops suddenly.</li> <li>3. Excessive hunting of governor.</li> <li>4. Governor fails to respond to load changes.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Low oil level in governor.</li> <li>2. Pilot valve stuck or leaking.</li> <li>3. Improper adjustment of needle valve.</li> <li>4. Governor actuating arms binding, loose or separated linkage.</li> <li>5. Dirty lube oil in governor.</li> </ol>	<ol style="list-style-type: none"> <li>1. If engine starts to overspeed secure engine by emergency stop control.</li> <li>2. Check governor oil level.</li> <li>3. Check setting of needle valve.</li> <li>4. Check pilot valve and actuating linkage.</li> <li>5. Flush out governor, and refill with proper oil.</li> <li>6. Check speed drop settings and correct as necessary in accordance to manufacturer's instructions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Excessive engine R.P.M.</li> <li>2. Less of power.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CAUSALITIES
D-14 DIESEL ENGINE  LOSS OF STARTING AIR	<p><u>SYMPOMS</u></p> <ol style="list-style-type: none"> <li>1. Engine fails to turn over on starting air available.</li> <li>2. Low air pressure alarm rings.</li> <li>3. Engine fails to reverse when reversing gear is actuated.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Air compressor failure.</li> <li>2. Air lines or system leaking.</li> <li>3. Excessive maneuvering or use of air.</li> <li>4. Defective or stuck starting air valves.</li> </ol>	<ol style="list-style-type: none"> <li>1. If maneuvering vessel, secure all but one air flask and start all available air compressors.</li> <li>2. Check air compressor for design volume output.</li> <li>3. Check for air leaks in system and air starting valve condition.</li> <li>4. If maneuvering, reduce air consumption by use of hand crank emergency reversing gear.</li> <li>5. Keep bridge informed as to condition.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced or loss of maneuverability.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-15 DIESEL ENGINE</p> <p>LOSS OF FUEL OIL PRESSURE</p>	<p><u>SYMPOMS</u></p> <ol style="list-style-type: none"> <li>1. Engine slows down and/or stops.</li> <li>2. Low or no pressure indicated on fuel oil gauge.</li> <li>3. Irregular operation of engine, unable to carry load.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Low F.O. in service tanks.</li> <li>2. Restriction in piping.</li> <li>3. Fuel oil pump failure.</li> <li>4. Water in fuel oil.</li> <li>5. Fuel oil filters/strainers dirty.</li> <li>6. Air entrainment in fuel oil system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check F.O. level in service tanks.</li> <li>2. Check valves and piping condition from service tanks to engines.</li> <li>3. Check condition of F.O. pump.</li> <li>4. Check F.O. filters and strainers for restrictions.</li> <li>5. Check for water in F.O.</li> <li>6. Bleed off air in F.O. booster pump avoid excessive pressure on system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced or loss of power of propulsion.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-16 DIESEL ENGINE</p> <p>WATER IN ENGINE CYLINDERS AND/OR CRANKCASE OR AIR INTAKE PORTS (BOX)</p> <p style="text-align: right;">D-16</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Water emitting from test cocks when engine is blown out or jacked over.</li> <li>2. Water in lube oil.</li> <li>3. Loss of cooling water, lower level indicated in expansion tank or surge tank when engine is stopped.</li> <li>4. When engine is running, F.W. level increases, gas bubbles and vapor escape from F.W. expansion tank vent.</li> <li>5. High F.W. temperature.</li> <li>6. Lower firing and cylinder temperatures.</li> <li>7. Engine cylinder knock.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Crack in cylinder head or liner.</li> <li>2. Leaking or blown out gaskets or seals between combustion chamber and cooling water jacket or exhaust system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Engine not to be started until cause of leak is determined and corrected.</li> <li>2. Check cylinders by jacking over with test cocks open.</li> <li>3. Put pressure test on F.W. cooling system. Conduct visual inspection of unit.</li> <li>4. Replace part or parts affected.</li> <li>5. Start lube oil purifier to remove water from lube oil.</li> </ol>	<p>1. Loss or reduced power output of unit.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-17 DIESEL ENGINE (AOG 1-11)</p> <p>SHIP SERVICE DIESEL GENERATORS #1 AND #2 DISABLED</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Loss of ship's service power, lighting power and propulsion excitation voltage.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Mechanical failure to prime movers.</li> <li>2. Electrical failure to ship service generators.</li> </ol>	<ol style="list-style-type: none"> <li>1. Light off emergency diesel generator.</li> <li>2. Light off #2 or #4 main diesel propulsion generator.</li> <li>3. Set up switches on #2 or #4 propulsion switch board for ship service power.</li> <li>4. Flash field of generator to be used.</li> <li>5. Bring up engine speed and regulate voltage. Put unit on line at main distribution board.</li> <li>6. Restore power to equipment to be used.</li> <li>7. Set up switches on main propulsion generator switch board for two generator operation. One for port motors and one for starboard motors.</li> </ol> <p>NOTE: Generator being used for ship service bus cannot be used for propulsion.</p>	<p>1. Loss of maneuverability of ship, lighting and ship service bus.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>D-18 DIESEL ENGINE</p> <p>LOSS OF SANITARY WATER PRESSURE</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Indication of low S.W. pressure on sanitary pressure gauge.</li> <li>2. Air compressor stops; cooling water temperature high.</li> <li>3. Refrigeration compressor stops. Discharge pressure high. Condensor cooling water temperature high.</li> <li>4. Loss of cooling water to <del>spring</del> bearings and stern tube.</li> <li>5. No flushing water in heads.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Failure of motor driving pump.</li> <li>2. Failure of sanitary pump end.</li> <li>3. Restriction in suction or discharge piping system. Ruptured sanitary piping.</li> <li>4. Flushing water to heads demand more water than capacity of pump. (Flushometer valves stuck open).</li> </ol>	<ol style="list-style-type: none"> <li>1. Put stand by sanitary pump into service or/cut in fire main to sanitary system.</li> <li>2. Check sanitary pump and motor for proper operation. System clear, etc.</li> <li>3. Check piping for rupture in system.</li> <li>4. Check flushometer valves in heads.</li> <li>5. Check cooling water to:             <ol style="list-style-type: none"> <li>(a) Air compressors</li> <li>(b) Refrigeration compressors</li> <li>(c) Spring bearings and stern tube</li> <li>(d) Steam return condenser.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of the use of the air compressors.</li> <li>2. Refrigeration compressor will stop due to the loss of cooling water to the condensers.</li> <li>3. Loss of cooling water to spring bearings and stern tube.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p><b>E-1 ELECTRICAL</b></p> <p><b>ERRATIC OR UNSTABLE VOLTAGE-SHIP'S SERVICE SWITCHBOARD</b></p>	<p><b>SYMPTOMS</b></p> <ol style="list-style-type: none"> <li>1. Fluctuating needle of voltmeter.</li> <li>2. Flickering or fluctuating of lights.</li> <li>3. Hunting of prime mover governor.</li> </ol> <p><b>CAUSES</b></p> <ol style="list-style-type: none"> <li>1. Voltage regulator not functioning properly.</li> <li>2. Prime mover governor not functioning properly.</li> <li>3. Poor commutation.</li> <li>4. Loose connection.</li> <li>5. Excessive dirt and oil accumulation in generator</li> </ol>	<ol style="list-style-type: none"> <li>1. Start up standby generator and shift electrical load to same.</li> <li>2. Check out affected unit:             <ol style="list-style-type: none"> <li>a. Voltage regulator</li> <li>b. Governor</li> <li>c. Commutation and/or excitation generator</li> <li>d. Loose connections, shorts, or grounds in system.</li> <li>e. Clean generator, regulator, and adjust as necessary, refer to manufacturer's instructions.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced or loss of electrical power.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-2 ELECTRICAL</p> <p>FIRE BEHIND SHIP'S SERVICE SWITCHBOARD</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Smell of smoke and burning insulation.</li> <li>2. Smoke and flames issuing from behind switchboard.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Shorting out of electrical circuits.</li> <li>2. Loose connections causing arcing and overheating.</li> <li>3. Overload on circuits.</li> </ol>	<ol style="list-style-type: none"> <li>1. De-energize circuits affected.</li> <li>2. Shift the load to standby circuits if available.</li> <li>3. Release and direct CO<sub>2</sub> at base of flame. 15 lb bottle or semi-portable hose and reel type CO<sub>2</sub>.</li> <li>4. Extreme emergency may require uninterrupted power, in which case leave circuits energized.</li> <li>5. Use an OBA when fire fighting in a small compartment. Electrical fires frequently create toxic fumes.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of electrical power on circuits affected.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-3 ELECTRICAL</p> <p>OVERSPEEDING OF SHIP'S SERVICE GENERATOR</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Fluctuating speed of the ship's service generator.</li> <li>2. Overspeed governor trip, tripping generator prime mover throttle to close position.</li> <li>3. High voltage protecting device on circuit breakers tripping out.</li> <li>4. Indicated on voltmeter and RPM counter on prime mover.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Defective governor and/or governor control linkage.</li> <li>2. Excessive fluctuating load demands of unit in service.</li> </ol>	<ol style="list-style-type: none"> <li>1. De-energize the non-vital circuits if unit is to be subjected to heavy fluctuating loads.</li> <li>2. Put standby unit into service and parallel generators.</li> <li>3. If governor defective or affected unit, trip out same and put standby unit into service.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of electrical power.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-4 ELECTRICAL</p> <p>HOT BEARINGS ON SHIP'S SERVICE GENERATOR</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Bearing temperatures above normal.</li> <li>2. Bull's eye not showing oil flow.</li> <li>3. Lube oil pressure gauge indicated low or loss of lube oil pressure.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Lube oil pump failure.</li> <li>2. Restriction in L.O. system.</li> <li>3. Insufficient cooling water going through L.O. cooler.</li> <li>4. Worn or misalignment of bearings.</li> <li>5. (Ball bearings) Insufficient or over-loading of lubricating requirements.</li> </ol>	<ol style="list-style-type: none"> <li>1. Shift load to standby generator.</li> <li>2. Reduce speed of defective unit flush out L.O. system with clean oil.</li> <li>3. Check out L.O. cooler.</li> <li>4. Check bearing affected for wear and misalignment.</li> <li>5. On greased type bearings, replace bearing and repack with recommended type lubricant.</li> </ol>	<ol style="list-style-type: none"> <li>1. Dearrangement of shifts and bearings.</li> <li>2. Loss of electrical power.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p><b>E-5 ELECTRICAL</b></p> <p><b>SHORT CIRCUIT IN MAIN CIRCUIT BREAKER</b></p>	<p><b>SYMPTOMS</b></p> <ol style="list-style-type: none"> <li>1. A brilliant flash (arc) when short occurs.</li> <li>2. Inflammables on fire at or near the area.</li> <li>3. Odors of smoke and burning insulation.</li> </ol> <p><b>CAUSES</b></p> <ol style="list-style-type: none"> <li>1. Defective or dirty circuit breaker.</li> <li>2. Steam or water leaking on circuit breaker, causing short or ground.</li> <li>3. Breaking down of insulation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Trip out/or secure generator in service.</li> <li>2. Open disconnecting switches ahead of circuit breaker.</li> <li>3. Put standby generator into service.</li> <li>4. Have available CO<sub>2</sub> fire extinguishing equipment.</li> <li>5. Observe all safety precautions when replacing or repairing circuit breaker.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of electrical power.</li> <li>2. Class "A" and "C" fires.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-6 ELECTRICAL</p> <p>LOSS OF POWER TO I.C. SWITCHBOARD</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Neon lamp in blown fuse indicator does not glow.</li> <li>2. Audible sounding of constant-frequency bus-failure alarm.</li> <li>3. Audible sounding of gyrocompass alarm system.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Loss of ship's service power.</li> <li>2. DC-AC converter fails.</li> <li>3. Blown fuses.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power supply from main distribution board.</li> <li>2. Check out fuses.</li> <li>3. Check out DC-AC converter for proper operation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of ship's service power.</li> <li>2. Loss of communication on P.A. system and "E" call circuits.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-7 ELECTRICAL</p> <p>LOSS OF ELECTRIC POWER TO STEERING GEAR</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Sounding of alarm for electrical power failure to steering gear.</li> <li>2. Rudder and rudder angle indicator will not shift with the movement of the helm (wheel).</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Severance of power cables between steering gear room and engine room.</li> <li>2. Heavy shock from collision or explosion.</li> <li>3. Power failure due to overload, blowing fuses or tripping out circuit breaker.</li> </ol>	<ol style="list-style-type: none"> <li>1. Helmsman reports to Bridge Watch Officer.</li> <li>2. Shift to alternate steering motor if power is available.</li> <li>3. Check control panel for electrical power.</li> <li>4. Check electric power to stbd/port steering motor.</li> <li>5. Shift to alternate supply cable.</li> <li>6. Rig casualty power (jury rig-jump).</li> <li>7. Operate hand operated dual hydraulic pump to hydraulic rams if installed.</li> <li>8. Rig chain hoists with suitable attachments for rudder positioning.</li> </ol>	<ol style="list-style-type: none"> <li>1. Derangement of hydraulic telemotor system.</li> <li>2. Derangement of stbd/port steering motor.</li> <li>3. Loss of steerage way.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-8 ELECTRICAL</p> <p>FAILURE OF RUDDER ANGLE INDICATOR SYSTEM</p>	<p><u>SYMPTOMS</u></p> <p>1. Rudder angle indicator does not correspond with mechanical angle indicator at helm.</p> <p><u>CAUSES</u></p> <p>1. Blown fuse indicator neon lamp glows.</p> <p>2. Loss of power at I.C. equipment.</p> <p>3. Open-in circuit.</p>	<p>1. Check power supply to system from I.C. switchboard.</p> <p>2. Check power supply to system from action cut-out switchboard.</p> <p>3. Check action cut-out switches on the action cut-out switchboard.</p> <p>4. Check the mechanical operation of the indicator system.</p> <p>5. Check for open in circuit.</p>	

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p><b>E-9 ELECTRICAL</b></p> <p><b>SELF-EXCITED DC GENERATOR FAILS TO EXCITE</b></p>	<p><b>SYMPTOMS</b></p> <ol style="list-style-type: none"> <li>1. Generator pilot light does not light up when generator is brought up to speed.</li> <li>2. Voltmeter does not register a build-up of voltage.</li> </ol> <p><b>CAUSES</b></p> <ol style="list-style-type: none"> <li>1. Open circuits in wiring.</li> <li>2. Ground in system.</li> <li>3. Loss of residual magnetism in fields of generator.</li> <li>4. Unit will not come up to design speed.</li> </ol>	<p><b>A. Generator Fails to Excite and Build Up Voltage</b></p> <ol style="list-style-type: none"> <li>1. Check for loose connection or an open in the field circuits.</li> <li>2. Check brush contacts in field circuits.</li> <li>3. Check position of brushes.</li> <li>4. Check for high resistance or open circuit in rheostat.</li> <li>5. Check armature for open or short circuit.</li> <li>6. Check for proper connection of series and shunt fields in compound-wound generators.</li> <li>7. Check for residual magnetism in field.</li> <li>8. Check speed of generator.</li> <li>9. Check leads from positive and negative brushes.</li> <li>10. Flash fields of generator with external DC current.</li> </ol> <p><b>B. Generator Builds Up Voltage, But Not to Normal Voltage</b></p> <ol style="list-style-type: none"> <li>1. Check for low speed.</li> <li>2. Check switchboard instruments for correct readings.</li> <li>3. Check for partial shunt field short circuited.</li> <li>4. Check polarity of one or more field poles.</li> <li>5. Check correct setting of brushes.</li> <li>6. Check field circuit for unnecessary resistance.</li> </ol>	<p>1. Loss of available electrical power from unit affected.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-10 ELECTRICAL</p> <p>POOR COMMUTATION ON DC MACHINES</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Sparking at the armature and brush contact points.</li> <li>2. Arcing and sparking completely around the commutator.</li> <li>3. Overheating of machine or unit.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Brushes not seating or spaced properly.</li> <li>2. Unit or machine needs cleaning.</li> <li>3. High mica between commutator bar segments.</li> <li>4. Short and/or open in the armature coils.</li> <li>5. Overload on machine.</li> <li>6. Loose connection(s).</li> </ol>	<ol style="list-style-type: none"> <li>1. Check load on machine.</li> <li>2. Check brushes and commutator: <ul style="list-style-type: none"> <li>a. Brush tension, etc.</li> <li>b. Spacing of brushes.</li> <li>c. High mica.</li> </ul> </li> <li>3. Short or open in armature coils.</li> <li>4. Check for loose connections.</li> <li>5. Clean machine.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of service of machine.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>E-11 ELECTRICAL</p> <p>OVERHEATING OF GENERATORS</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Generator operating above normal temperature.</li> <li>2. Thermo readings high; far above normal.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Restricted ventilation.</li> <li>2. Overloaded.</li> <li>3. Machine not running at design speed.</li> <li>4. Brushes or brush rigging not set properly.</li> <li>5. Short in armature.</li> <li>6. (Water cooled units) Restricted cooling water system.</li> <li>7. Improper air gap.</li> </ol>	<p>A. <u>Generator Overheated.</u></p> <ol style="list-style-type: none"> <li>1. Check air passages or ventilation ducts.</li> <li>2. Check flow of cooling water in water-cooled machines.</li> <li>3. Check temperature of water inlet in water-cooled machines.</li> </ol> <p>B. <u>Field Coils Overheated</u></p> <ol style="list-style-type: none"> <li>1. Check speed of generators.</li> <li>2. Check for high voltage.</li> <li>3. Check brushes for forward and backward lead, DC generators only.</li> <li>4. Check for short circuit in one coil.</li> </ol> <p>C. <u>Stator of AC Generator or the Armature of DC Generator Overheated.</u></p> <ol style="list-style-type: none"> <li>1. Check on overloading.</li> <li>2. Check for partial short circuit of one or more coils.</li> <li>3. Check for short circuits or ground on armature or commutator.</li> <li>4. Check on air gaps or rotor rubbing the stator.</li> </ol> <p>D. <u>Commutator Overheats</u></p> <ol style="list-style-type: none"> <li>1. Check on overloading.</li> <li>2. Check brushes for sparking.</li> <li>3. Check on brush pressure.</li> </ol>	<p>1. Loss of electric power and electric-driven auxiliaries.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
M-1 ENGINE ROOM  JAMMED MAIN ENGINE THROTTLE (AHEAD-ASTERN)	<p><u>SYMPTOMS</u></p> <p>1. Throttle valve wheel frozen, unable to turn.</p> <p><u>CAUSES</u></p> <p>1. Valve jammed in open position. 2. Foreign material between bushing and stem of valve 3. Balance by-pass not open.</p>	<p>1. Use main line stop valve for throttling. 2. Use astern guarding valve for astern throttle control if astern throttle jammed.</p>	<p>1. Reduced or loss of maneuverability.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-2 ENGINE ROOM</p> <p>LOSS OF/OR LOW LUBRICATING OIL PRESSURE</p> <p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Indication on L.O. pump pressure gauge.</li> <li>2. No visual evidence of oil passing bull's eye or overflow from gravity tanks.</li> <li>3. Closing of ahead throttle by action of low L.O. pressure governor.</li> <li>4. Low L.O. pressure alarm rings.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Main L.O. pump failure: <ol style="list-style-type: none"> <li>a. (Electric) oil cold causing overload and controller to drop circuit out.</li> <li>b. Power failure to pump prime mover</li> </ol> </li> <li>2. Restriction in L.O. piping, strainers or pump.</li> <li>3. Low or empty L.O. sump.</li> <li>4. L.O. too hot for pump to maintain required discharge pressure.</li> </ol>		<ol style="list-style-type: none"> <li>1. Stop the affected shaft and simultaneously endeavor to regain L.O. pressure.</li> <li>2. Start up standby L.O. pump. Check L.O. level in sump and shift over strainers. Check L.O. temperature.</li> <li>3. Inspect bearings, strainers for metal flakes, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of maneuverability of ship.</li> <li>2. Damage to bearings, shafting and gears of unit.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-3 ENGINE ROOM</p> <p>LOSS OF/OR LOW LUBRICATING OIL PRESSURE (TURBO-ELECTRIC DRIVE)</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Indicated on L.O. pump pressure gauge.</li> <li>2. No visual evidence of oil passing bull's eye or overflow from gravity tank.</li> <li>3. The closing of throttle by action of low L.O. pressure governor.</li> <li>4. Low L.O. pressure alarm rings.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Main L.O. pump failure/standby L.O. fails to start on loss or low L.O. pressure regulator.</li> <li>2. Low or empty L.O. sump and/or gravity tank.</li> <li>3. Restriction in L.O. lines or sump or pump.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stop unit as soon as possible.</li> <li>2. On twin screw units reduce speed if necessary to prevent overload of the unaffected unit.</li> <li>3. Check out the cause of the casualty and correct, inspect bearings, etc., before putting the unit back into service.</li> <li>4. Refer to: M-2</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of one propulsion unit.</li> <li>2. Reduced maneuverability.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-4 ENGINE ROOM</p> <p>LOSS OF VACUUM</p> <p><u>SYMPOMS</u></p> <ol style="list-style-type: none"> <li>1. Indication on vacuum guage.</li> <li>2. Turbine slowing down.</li> <li>3. Temperature rise in L.P. exhaust. (Top of condenser)</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Loss of gland seal.</li> <li>2. Defect in air ejector.</li> <li>3. Air leaks from: <ol style="list-style-type: none"> <li>a. Make up feed system.</li> <li>b. Piping, etc.</li> <li>c. Loop seal.</li> <li>d. Drain tank.</li> </ol> </li> <li>4. Insufficient cooling water through condensers.</li> </ol>		<ol style="list-style-type: none"> <li>1. Put standby set of air ejectors into service.</li> <li>2. Throttle in on engine until vacuum is increased.</li> <li>3. Check gland seal pressure.</li> <li>4. Check for air leaks: <ol style="list-style-type: none"> <li>a. Make up feed system.</li> <li>b. Piping, etc.</li> <li>c. Loop seal.</li> <li>d. Drain tank.</li> </ol> </li> <li>5. Check cooling water through condensers.</li> <li>6. Check out for defect in air ejector.</li> </ol>	<p>1. Loss or reduced power output of main propulsion unit.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p><b>M-5 ENGINE ROOM</b></p> <p><b>PROPELLER OR SHAFT DAMAGE</b></p>	<p><b>SYMPTOMS</b></p> <ol style="list-style-type: none"> <li>1. Vibration of shaft and abnormal noises carried up to engine and reduction gears.</li> <li>2. Possible heating up of line shaft bearings and stern tube.</li> </ol> <p><b>CAUSES</b></p> <ol style="list-style-type: none"> <li>1. Propeller bent or section broken off.</li> <li>2. Bent tail shaft.</li> <li>3. Mis-alignment of propeller shafting.</li> <li>4. Shaft bearing bed hold down bolts loose.</li> <li>5. Loose, wiped or burned out line shaft bearings.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce engine speed to minimize vibrations.</li> <li>2. Check through the shaft alley to determine causes of the vibrations.</li> <li>3. If casualty is the shafting or bearings in the shaft alley, effect temporary repairs, conditions permitting. If repairs cannot be effected, operate engine at such speeds to minimize vibration. Maintain an alert watch.</li> <li>4.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced or loss of propulsion power.</li> <li>2. Damage to adjacent sections of shafting, bearings, reduction gears and/or engine.</li> </ol>

ENGINEERING CAUSALITY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
M-6 ENGINE ROOM			
HOT BEARINGS			
A. TURBINE BEARINGS	<u>SYMPTOMS (A and B)</u> 1. Abnormal temperature of bearings. 2. Failure of lube oil system.	<u>A and B</u> 1. Reduce engine speed. 2. Check quantity of oil being fed to bearing. 3. Take samples of lube oil and start up purifier on lube oil system. 4. Operate at such speeds to avoid abnormal bearing temperatures. 5. Inspect bearing for wear or mis-alignment when operating conditions permit.	1. Reduced or loss of main propulsion power.
B. REDUCTION GEAR BEARINGS	<u>CAUSES</u> 1. Foreign matter in lube oil and system. 2. Failure of lube oil pump or restriction in system. 3. Excessive wear or mis-alignment of bearings.		
C. LINE SHAFT BEARINGS	<u>SYMPTOMS (C)</u> 1. Abnormal temperature rise of bearings. 2. Smell of hot oil.	<u>C</u> 1. Reduce shaft speed. 2. Check L.O. level, wick feed and/or oil rings for proper operation. 3. Flush out bearings with clean new oil. 4. Fill bearing well or/ sump with the required type oil to the proper level.	1. Reduced or loss of main propulsion power.
	<u>CAUSES</u> 1. Wicks not feeding sufficient lube oil. 2. Oil lubricating rings not rotating (picking up L.O. for lubrication of bearings). 3. Insufficient L.O. in bearing well or/ sump.		14.

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-7 ENGINE ROOM</p> <p>LEAK IN MAIN CONDENSER</p>	<p><u>SYMPOMS</u></p> <ol style="list-style-type: none"> <li>1. High salinity reading on salinity indicator panel for main condensate.</li> <li>2. Boiler chemical water test indicates high salinity build-up in boiler water.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Overheating of condenser.</li> <li>2. Split or cracked condenser tube(s).</li> <li>3. Tubes leaking at tube sheet due to packing failure or in need of re-expanding of tubes.</li> <li>4. Electrolysis or erosion action of the cooling water causing pin holes, etc., in the tubes.</li> </ol>	<ol style="list-style-type: none"> <li>4. If leak is minor and port arrival is within hours:             <ol style="list-style-type: none"> <li>1. Pump sandust through cooling side of condenser to slow down or temporarily stop leak.</li> <li>2. Keep boilers fresh by blowing down as test indicates need.</li> </ol> </li> <li>5. If leak is serious and cannot be controlled with use of sandust:             <ol style="list-style-type: none"> <li>1. Secure main engine.</li> <li>2. Shift all condensate, etc. to auxiliary condenser.</li> <li>3. Cool main condenser and fill F.W. side with distilled water. Remove condenser heads or inspection plates if large, dry out and inspect for leaks. Plug up leaks with proper type plugs.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Serious scaling up of boilers.</li> <li>2. Reduced or loss of main propulsion power during temporary repair period.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-8 ENGINE ROOM</p> <p>MAIN TURBINE VIBRATION</p>	<p><u>SYMPOMS</u></p> <ol style="list-style-type: none"> <li>1. Abnormal vibration of turbine.</li> <li>2. Turbine slows down.</li> <li>3. Low vacuum, low superheat temperature, boilers priming, high turbine exhaust temperature.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Carry over of water with steam from boilers.</li> <li>2. Damaged propeller or shaft.</li> <li>3. Distortion of turbine due to uneven expansion.</li> <li>4. Damaged turbine blading.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce turbine speed.</li> <li>2. If casualty is due to water carry over, lower water level in boilers to safe operating level.</li> <li>3. If casualty is due to distortion of rotor, operate at slow speed until even temperature is distributed throughout the turbine.</li> <li>4. If casualty is due to damaged turbine blading, propeller or shaft, operate unit at such speed to minimize as much vibration as possible.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduced or loss of main propulsion power.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-9 ENGINE ROOM</p> <p>CASUALTY TO THE DEAERATING FEED TANK</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Feed water temperature gauge indicates loss of heat at D.A. tank.</li> <li>2. D.A. tank water level indicator, loss of feed (condensate) water.</li> <li>3. Visual serious leak of feed water (condensate) from D.A. tank.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Loss or insufficient exhaust steam to maintain sufficient heating for condensate in the D.A. tank.</li> <li>2. Rupture in piping tee or D.A. tank itself causing inability to maintain an adequate water level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Bleed live steam into exhaust system to maintain sufficient steam available to keep D.A. temperature up.</li> <li>2. Check exhaust steam relief valve for proper operation.</li> <li>3. Check exhaust steam regulator valve.</li> <li>4. By pass condensate from D.A. tank to a reserve feed tank or feed bottom and take boiler feed pump suction from condensate tank.</li> <li>5. Operate at a reduced steaming demand until repairs are effected.</li> </ol>	<p>1. Reduced steaming capabilities.</p>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
M-10 ENGINE ROOM  FIRE IN PROPULSION GENERATOR	<p><b>SYMPTOMS</b></p> <ol style="list-style-type: none"> <li>1. Smoke and/or arcing noted through inspection ports.</li> <li>2. Generator thermometer indicated excessive high temperature.</li> </ol> <p><b>CAUSES</b></p> <ol style="list-style-type: none"> <li>1. Generator coolers not functioning properly, resulting in overheating of unit.</li> <li>2. Short circuit in generator windings or wiring.</li> <li>3. Excessive accumulation of oil, dirt or moisture on windings and terminals of generator.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stop unit and de-energize generator.</li> <li>2. Secure ventilation and coolers to unit and trip fire extinguishing system installed on the machine.</li> <li>3. Put jacking gear in as soon as possible to prevent warping of the unit.</li> <li>4. Take necessary action to accomplish temporary repairs to the unit.</li> <li>5. Maintain propulsion and steerage with unit not affected.</li> <li>6. Refer to: M-13</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of propulsion generator.</li> <li>2. Fire spreading in engine room.</li> <li>3. Reduced maneuverability.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-11 ENGINE ROOM</p> <p>FIRE IN PROPULSION MOTOR</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Smoke and/or arcing noted through inspection ports.</li> <li>2. Motor thermometer indicates excessive high temperature.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Motor coolers not functioning properly, resulting in overheating of unit.</li> <li>2. Short circuit in motor windings or wiring.</li> <li>3. Excessive accumulation of oil, dirt or moisture in windings and terminals of motor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stop unit and de-energize motor.</li> <li>2. Secure ventilation and cooler to unit and discharge CO<sub>2</sub> fire extinguishing system, if installed, into the machine/ or by removal of covers so provided.</li> <li>3. Maintain propulsion and steerage with unit not affected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of propulsion motor.</li> <li>2. Fire spreading in motor room.</li> <li>3. Reduced maneuverability.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-12 ENGINE ROOM</p> <p>FIRE IN PROPULSION CONTROL CUBICLES AND/OR CABLES</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Smell of smoke and burning insulation.</li> <li>2. Visual smoke and/or arcing in area.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Short circuit or loose connections in wiring or hook-up of control circuits.</li> <li>2. Excessive accumulation of dirt, oil or moisture on and about controller electrical wiring, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stop unit and de-energize control circuits.</li> <li>2. Combat fire with CO<sub>2</sub>.</li> <li>3. Make necessary repairs to controller circuit; operate at reduced load until assured properly and the insulation tests are in accordance with manufacturer's recommendations.</li> <li>4. Maintain propulsion and steerage with unit not affected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Loss of propulsion of unit affected.</li> <li>2. Reduced maneuverability.</li> <li>3. Fire spreading in area.</li> </ol>

ENGINEERING CASUALTY	INDICATED SYMPTOMS AND/OR CAUSES	ACTION TO BE TAKEN	ASSOCIATED CASUALTIES
<p>M-13 ENGINE ROOM</p> <p>LOSS OF FORWARD OR AFT ENGINE ROOM (ONE GENERATOR- TWO MOTOR OPERATION)</p>	<p><u>SYMPTOMS</u></p> <ol style="list-style-type: none"> <li>1. Derangement of turbine or generator of fwd or aft engine room.</li> </ol> <p><u>CAUSES</u></p> <ol style="list-style-type: none"> <li>1. Mechanical failure.</li> <li>2. Electrical failure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use one generator to motor set up.</li> <li>2. Set up motor transfer and disconnect switches as per manufacturer's instructions for one generator, two-motor operation.</li> <li>3. Maintain propulsion and steerage with unit not affected until shift to one generator two-motor operation is put into effect.</li> <li>4. Take action to make repairs if within ship's personnel capabilities.</li> </ol>	<p>1. Reduced power and maneuverability.</p>