Generator Safety

CECOM
Logistics Assistance Representative Training
## Generators

<table>
<thead>
<tr>
<th>Service</th>
<th>Quantity</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army</td>
<td>85,675</td>
<td>83%</td>
</tr>
<tr>
<td>Air Force</td>
<td>10,931</td>
<td>11%</td>
</tr>
<tr>
<td>Marines</td>
<td>5,054</td>
<td>5%</td>
</tr>
<tr>
<td>Navy</td>
<td>1,480</td>
<td>1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>103,140</td>
<td>100%</td>
</tr>
</tbody>
</table>
Generators

History:
1960 - 2000 Makes and Models
1967 - PM MEP Established
   Reduces Makes and Models to 37!
1988 - TQG Development initiated
   Greater Mobility, Reliability & Maintainability
   Enhanced Survivability
   Reduced Infrared & Acoustic signatures
   Lower Costs, Operate on Diesel/JP Fuels
### Generators

#### Army TOE Requirements (BOIP 97)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>QUANTITY</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3 kW</td>
<td>24,137</td>
<td>36%</td>
</tr>
<tr>
<td>5 kW</td>
<td>20,278</td>
<td>30%</td>
</tr>
<tr>
<td>10 kW</td>
<td>11,939</td>
<td>18%</td>
</tr>
<tr>
<td>15 kW</td>
<td>3,847</td>
<td>6%</td>
</tr>
<tr>
<td>30 kW</td>
<td>2,953</td>
<td>4%</td>
</tr>
<tr>
<td>60 kW</td>
<td>3,366</td>
<td>5%</td>
</tr>
<tr>
<td>100-750 kW</td>
<td>800</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>67,526</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Generators

Safety

- FM 20-31
  - Electric Power Generation in the Field

- TB 43-0125
  - C-E Hookup to Generators
Site Selection

- Clearances
- Noise
- Level Ground
- Fire Point
- Environmental Protection
- Auxiliary Fuel
Generators

Operating Procedures

- Inspect Equipment
- Service Equipment
- Install/Maintain Fuel Supply
- Perform Pre-Op Checks & Services
- Connect Distribution Cables
- Establish Fire Point
Generators

Adverse Operating Conditions

- Extreme Cold
- Dusty Sandy Areas
- Rainy and Humid Areas
- Saltwater Areas
- High Altitudes
Generators

Safety Controls

- Low Fuel Level/Oil Pressure
- High Coolant Temperature
- Over Current
- High Engine speed
- Battle Short Switch
- Battery Charge Ammeter
Generators

**PMCS**

- Lubrication
  - Crank Case/Breather, Filter, Lines
- Cooling, Radiator, Water Pump, Belts
- Fuel
  - Pump, Filters, Supply, Tank, Lines
- Electrical
  - Batteries, Starter, Lights/Switches,
  - Regulator, Gages, Meters, Cables
Generators

**Safety Hazards**

- Electrical Safety
- Noise
- Circuit Breakers
- Fueling
- Exhaust
Generators

**Electrical Safety Precautions**

- Bonding and Grounding
- Neutral/Ground Continuity Check
- Power Distribution/Feeder
- Voltage/Phase Matching
- Power Cables
Generators
TQG Problem Areas

WETSTACKING
The buildup of unburned diesel fuel and carbon residues in the engine and exhaust system causing 65% of maintenance problems in generator sets!

PRINCIPLE CAUSE
The UNDERLOADING of the generator. Operating at less than 50% of rated load. Reduce the problem by increasing power consumption above 70% of the rated load.
The major contributors to poor operations and maintenance of TQGs is the lack of sustainment training by using units.
Generators

ACCIDENT HISTORY

- Shorting out battery terminals
- Turbine & compressor wheels disintegrated
- Improper voltage selector setting
- Personnel contact cooling fan blades
- Incorrect fuel can used to fill tank
Generators

**SAFETY MESSAGES**

- No GFCI on 2 kW (CECOM GPM 97-014)

- Leaking Fuel Lines (ATCOM SOUM 96-001)

- Frayed Wires on 5&10 kW TQGs (ATCOM SOUM 95-003)
## Generators

### Military vs Commercial

<table>
<thead>
<tr>
<th>Military</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses Diesel Fuel</td>
<td>Sets &gt; 30 kW are Diesel</td>
</tr>
<tr>
<td>24 V Systems</td>
<td>12 V Systems</td>
</tr>
<tr>
<td>Severe Environments</td>
<td>Do not meet range of operating and storage temperatures</td>
</tr>
<tr>
<td>-25 125 degree F</td>
<td>-65 160 degree F</td>
</tr>
<tr>
<td>NBC protection</td>
<td>None</td>
</tr>
<tr>
<td>Reliable</td>
<td>No dealer on battlefield</td>
</tr>
<tr>
<td>Transportable</td>
<td>Not air liftable,</td>
</tr>
</tbody>
</table>