DEDER GENERAL HOSPITAL

GENERAL SERVICE EQUIPMENT MAINTENANCE PROTOCOL

BY: HSQU

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Deder, Eastern Ethiopia

SMT APPROVAL SHEET

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1. Introduction

Deder General Hospital provides essential healthcare services to the community and operates a complex facility that includes inpatient wards, outpatient departments, specialized units, and support services. The proper functioning of all **infrastructure, utility systems, and hospital equipment** is critical for ensuring uninterrupted patient care, safety, and comfort.

Hospital facilities and equipment are subjected to frequent use, environmental factors, and wear-and-tear. Poorly maintained infrastructure can lead to operational disruptions, compromised patient safety, increased risk of accidents, and inefficient service delivery. To address these challenges, this **General Maintenance Protocol** establishes clear guidelines for maintaining **electrical, water, sanitation, sewerage, ventilation systems, hospital equipment, and building and compound structures**.

Maintenance is a continuous process that includes **preventive, corrective, predictive, and emergency interventions**, ensuring that all systems are functional, safe, and reliable. This protocol provides a structured framework for the **planning, implementation, monitoring, and documentation** of maintenance activities across the hospital.

2. Purpose

The purpose of this protocol is to:

1. **Ensure Safety and Reliability:**
    - Maintain all hospital infrastructure, equipment, and utilities in safe and operational condition.
    - Reduce the risk of accidents, equipment failures, and service interruptions.

2. **Provide Structured Maintenance Guidance:**
    - Standardize procedures for preventive, corrective, predictive, and emergency maintenance.
    - Assign clear responsibilities to maintenance personnel, support staff, and contractors.
3. **Enhance Hospital Efficiency:**
    - Reduce downtime of critical systems and equipment.
    - Optimize resource utilization through timely inspections, repairs, and replacements.
4. **Facilitate Compliance and Accountability:**
    - Ensure adherence to national safety, hygiene, and regulatory standards.
    - Establish clear reporting, monitoring, and documentation practices.
5. **Support Long-Term Asset Management:**
    - Extend the life of hospital infrastructure and equipment.
    - Plan for future replacements, upgrades, and capital maintenance efficiently.

3. Scope

This protocol applies to **all hospital facilities, utility systems, equipment, and structural components** at Deder General Hospital. The scope includes:

1. **Maintenance Coverage:**
    - **Electrical Systems:** Wiring, sockets, switches, panels, lighting, generators, UPS, and emergency backup systems.
    - **Water Supply Systems:** Boreholes, pumps, tanks, pipelines, valves, and taps.
    - **Sanitation & Hygiene Facilities:** Toilets, showers, handwashing stations, wash basins, and related fixtures.

- **Sewerage & Wastewater Systems:** Sewer lines, septic tanks, soak pits, manholes, and drainage channels.
- **Ventilation & Air Circulation Systems:** Windows, vents, ceiling fans, exhaust fans, AC units, and ducting.
- **Hospital Equipment (Non-Biomedical):** Beds, stretchers, trolleys, wheelchairs, sterilizers, oxygen cylinders, and movable hospital furniture.
- **Building and Compound Structures:** Walls, floors, ceilings, roofs, doors, windows, walkways, parking areas, perimeter fencing, and green areas.

2. **Types of Maintenance Included:**
   - **Preventive Maintenance:** Scheduled inspections, cleaning, and servicing to avoid system failures.
   - **Corrective Maintenance:** Immediate repairs for faults or damage.
   - **Predictive Maintenance:** Monitoring system performance to anticipate and prevent failures.
   - **Emergency Maintenance:** Rapid response to restore critical hospital functions.
3. **Personnel Covered:**
   - **Internal Maintenance Staff:** Maintenance Head, Electrician, Plumber, Carpenters & Masons, and Support Staff.
   - **External Contractors:** Specialized service providers engaged for tasks beyond internal capacity, including roofing, major painting, AC servicing, and septic tank desludging.
4. **Operational Boundaries:**
   - Applies to all inpatient, outpatient, administrative, and support service areas.
   - Includes both indoor and outdoor maintenance activities within the hospital compound.
   - Excludes biomedical equipment maintenance (covered under separate protocols).

4. General Principles

- **Safety:** Maintenance activities must only be performed by trained and authorized personnel.
- **Preventive Priority:** Preventive and predictive maintenance are prioritized over corrective maintenance.
- **Documentation:** All maintenance activities must be recorded and reported.
- **Accountability:** Clear roles and responsibilities are defined for all maintenance staff.
- **Emergency Response:** Urgent faults affecting patient care must be addressed immediately.
- **Quality:** All work must comply with hospital safety, hygiene, and regulatory standards.

5. Types of Maintenance

1. **Preventive Maintenance (PM):** Scheduled inspections, cleaning, and servicing to prevent faults.
2. **Corrective Maintenance (CM):** Repairs conducted after a fault or breakdown occurs.
3. **Predictive Maintenance (PdM):** Monitoring system performance to anticipate issues.
4. **Emergency Maintenance (EM):** Immediate interventions to restore critical services.

6. Maintenance Components and Protocols

6.1 Electrical Systems

Components:

- Wiring, sockets, switches, lighting, distribution panels, circuit breakers, generators, UPS, emergency backup systems, and hospital-specific electrical equipment.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
   - Conduct daily inspections of lighting, switches, and sockets for visible damage.
   - Test generators and UPS units weekly to ensure readiness.
   - Verify grounding systems and circuit breakers for functionality.
   - Inspect electrical panels monthly for overheating or corrosion.
2. **Corrective Maintenance:**
   - Repair damaged wiring, faulty sockets, or malfunctioning switches immediately.
   - Replace blown fuses or damaged circuit breakers.
   - Restore power during minor outages caused by internal faults.
3. **Predictive Maintenance:**
   - Monitor voltage fluctuations and load distribution using testing tools.
   - Assess insulation resistance, and identify weak points to prevent future failures.
   - Recommend upgrades or replacements for aging components.

4. **Emergency Maintenance:**
    - Respond immediately to critical failures affecting operating rooms, ICU, or emergency units.
    - Coordinate with hospital management to safely shut down or reroute power.

Responsible Personnel: Electrician under supervision of Maintenance Head.

6.2 Water Supply Systems

Components:

- Boreholes, pumps, overhead tanks, pipelines, valves, taps, and water distribution networks.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
    - Inspect pipelines and pumps weekly for leaks or abnormal noises.
    - Flush overhead tanks monthly to remove sediment and prevent contamination.
    - Test water quality at intake points regularly.
2. **Corrective Maintenance:**
    - Repair leaks, damaged pipelines, or malfunctioning pumps immediately.
    - Replace worn-out valves and taps to ensure uninterrupted water flow.
3. **Predictive Maintenance:**
    - Monitor pump performance, water pressure, and tank levels to forecast potential failures.
    - Recommend upgrades or replacements for worn-out pumps or pipelines.
4. **Emergency Maintenance:**
    - Address sudden water shortages or pipeline bursts to prevent disruption in patient care.
    - Coordinate with contractors for immediate remedial action if required.

Responsible Personnel: Plumber under supervision of Maintenance Head.

6.3 Sanitation & Hygiene Facilities

Components:

- Toilets, wash basins, showers, handwashing stations, drainage points.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
   - Inspect all sanitation facilities weekly to check for leaks, blockages, and water flow.
   - Clean and disinfect toilets, sinks, and showers regularly to maintain hygiene.
   - Ensure proper operation of taps and flush mechanisms.
2. **Corrective Maintenance:**
   - Unblock clogged drains and toilets promptly.
   - Repair leaking taps, flush systems, and broken basins.
   - Replace worn-out plumbing components.
3. **Predictive Maintenance:**
   - Monitor usage trends to identify high-risk areas prone to failure.
   - Recommend system improvements such as pipe replacements or additional fixtures.
4. **Emergency Maintenance:**
   - Respond immediately to sudden overflows, sewage backflow, or facility breakdowns.
   - Coordinate with hospital cleaning teams to ensure minimal disruption.

Responsible Personnel: Plumber + Cleaning Supervisor under Maintenance Head oversight.

6.4 Sewerage & Wastewater Systems

Components:

- Sewer lines, septic tanks, soak pits, manholes, drainage systems.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
    - Inspect sewer lines and manholes monthly for blockages or damage.
    - Clean septic tanks and soak pits quarterly to prevent overflow.
    - Check drainage systems to ensure smooth wastewater flow.
2. **Corrective Maintenance:**
    - Repair damaged sewer pipes or blocked lines immediately.
    - Rebuild or reinforce weakened manholes or drainage channels.
3. **Predictive Maintenance:**
    - Monitor sludge levels and wastewater flow to anticipate potential issues.
    - Recommend system upgrades for aging or inefficient sections.
4. **Emergency Maintenance:**
    - Respond to sewer overflows, blockages, or leaks that pose health risks.
    - Engage contractors if specialized intervention is needed.

Responsible Personnel: Plumber + External Contractor (as needed) under supervision of Maintenance Head.

6.5 Ventilation & Air Circulation Systems

Components:

- Windows, vents, ceiling fans, exhaust fans, AC units, ducting, and air filters.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
2. Clean vents, fans, and AC filters monthly.
    - Ensure all windows and ventilation openings function properly.
    - Inspect ducting and air circulation paths quarterly.
3. **Corrective Maintenance:**
    - Repair broken fans, vents, or AC units as needed.
    - Replace damaged filters or malfunctioning parts.
4. **Predictive Maintenance:**
    - Monitor airflow and indoor air quality to detect potential inefficiencies.
    - Recommend adjustments or upgrades for AC units or ventilation systems.
5. **Emergency Maintenance:**
    - Respond immediately to failures affecting patient care areas, ICU, OR, or wards.
    - Ensure emergency ventilation or temporary air circulation is available.

Responsible Personnel: Electrician + Support Staff under Maintenance Head oversight.

6.6 Hospital Equipment (Non-Biomedical)

Components:

• Movable trolleys, carts, racks, cabinets, office furniture, kitchen equipment (non-patient food storage), ladders, step stools, tool trolleys, and other non-clinical movable hospital equipment.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
   - Inspect movable equipment for structural integrity and mechanical operation.
   - Lubricate wheels, hinges, drawer slides, and other moving parts.
   - Tighten loose screws, bolts, and fasteners.
   - Clean surfaces to remove dust, dirt, or debris.
   - Ensure proper alignment and stability of cabinets, racks, and furniture.
   - Check electrical cords and plugs on non-clinical electrical equipment for damage.
   - Document inspections, cleaning, and minor repairs.
2. **Corrective Maintenance:**
   - Repair broken or malfunctioning equipment promptly.
   - Replace worn-out or damaged parts to maintain functionality.
   - Restore structural stability for furniture, racks, or movable equipment.
3. **Predictive Maintenance:**
   - Monitor condition of equipment to anticipate potential failures.
   - Maintain an inventory of spare parts for prompt replacements.
   - Recommend upgrades or replacement of aging equipment before breakdown.

4. **Emergency Maintenance:**
   - Replace critical equipment immediately in case of sudden failure affecting hospital operations.
   - Coordinate rapid response to ensure continuity of non-clinical services.

Responsible Personnel: Maintenance Head + Compound and Building Maintenance Technicians

6.7.1.Water Boilers (Non-Biomedical)

Components:

• Electric/gas water boiler units, heating elements, water tanks, safety valves, thermostats, pipelines, insulation.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
   - Clean and descale boiler tanks regularly to prevent scaling and mineral buildup.
   - Inspect heating elements for wear, corrosion, or burnout.
   - Check and test safety valves, thermostats, and pressure gauges.
   - Ensure insulation around tanks and pipes is intact.
   - Flush the system periodically to maintain water quality.
2. **Corrective Maintenance:**
   - Repair or replace faulty heating elements, valves, or thermostats.
   - Fix leaks in tanks, pipelines, or joints immediately.
   - Replace damaged insulation materials.

3. **Predictive Maintenance:**
    - Monitor boiler performance through temperature and pressure readings.
    - Use scaling indicators or water hardness levels to predict descaling needs.
    - Plan for replacement of heating elements or tanks based on usage hours and condition.
4. **Emergency Maintenance:**
    - Shut down the boiler immediately in case of overheating, leakage, or electrical failure.
    - Provide emergency repair or replacement to restore water heating supply.
    - Report any major breakdown to Maintenance Head for contractor support if required.

Responsible Personnel:

Compound & Building Maintenance Technicians + Electrician/Plumber (depending on issue).

6.7 Building and Compound Maintenance

Components:

- Walls, floors, ceilings, roofs, doors, windows, walkways, parking areas, green areas, perimeter fencing.

Maintenance Types and Procedures:

1. **Preventive Maintenance:**
    - Inspect walls, floors, ceilings, and roofs quarterly.
    - Conduct landscaping, lawn trimming, and walkway cleaning weekly.
    - Check structural integrity of fences, gates, and compound areas.
2. **Corrective Maintenance:**

- Repair cracks in walls, floors, or ceilings.
- Fix damaged doors, windows, roofs, and fencing immediately.
- Repaint or plaster areas showing wear.

3. **Predictive Maintenance:**
   - Monitor structural trends such as cracks, water damage, or subsidence.
   - Plan renovation, reinforcement, or replacements as needed.
4. **Emergency Maintenance:**
   - Respond to collapse, flooding, storm damage, or other critical structural failures.
   - Coordinate with contractors for urgent building repairs.

Responsible Personnel: Carpenters & Masons + External Contractor (as needed) under Maintenance Head supervision.

7. Roles and Responsibilities

5.1 Maintenance Head

- Oversees all maintenance activities.
- Supervises electricians, plumbers, carpenters/masons, and coordinates with external contractors.
- Develops maintenance schedules, monitors adherence, ensures compliance with safety and regulatory standards.
- Reports quarterly to hospital management.
- Responsible for hospital equipment maintenance and emergency coordination.

5.2 Electrician

- Handles all electrical systems and equipment.
- Performs preventive, corrective, predictive, and emergency maintenance.
- Maintains electrical maintenance logbooks and reports to Maintenance Head.

5.3 Plumber

- Responsible for water supply, sanitation, and sewerage systems.
- Conducts preventive, corrective, predictive, and emergency maintenance.
- Maintains plumbing logbooks and reports to Maintenance Head.

5.4 Carpenters & Masons

- Responsible for building, structural, and minor civil works maintenance.
- Repairs walls, floors, roofs, doors, windows, furniture, walkways, compound areas.
- Assist electricians and plumbers during structural work.
- Conduct preventive inspections, corrective repairs, and emergency interventions.
- Reports activities to Maintenance Head.

5.5 External Contractors

- Provide specialized services such as roof repairs, major painting, AC servicing, and septic tank desludging.
- Perform preventive, corrective, and emergency maintenance as needed.
- Work under the supervision of the Maintenance Head.

7. Documentation and Reporting

- **Daily Logbooks:** Electrician, plumber, carpenters/masons maintain daily activity logs.
- **Incident Reports:** Completed for all corrective and emergency work.
- **Monthly Summary:** Submitted by Maintenance Head to hospital management.
- **Quarterly Reports:** Include preventive, predictive, corrective, and emergency maintenance activities, pending issues, and recommendations.

Support Staff / Greenery Team:

- Responsible for compound cleanliness, landscaping, lawn maintenance, and general upkeep of green areas.
- Assist other maintenance staff as required.
- Report hazards or maintenance needs to Maintenance Head.

8. References

1. Ethiopian Hospital Infrastructure Guidelines (MoH)
2. WHO Hospital Maintenance Standards
3. Manufacturer manuals for hospital systems
4. National Safety and Health Regulations