

K-01: Rebuild Cooling Tower

SAFETY FIRST

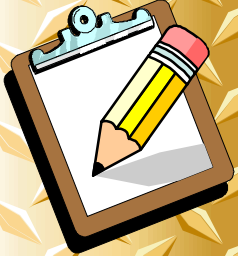
- Follow all Caterpillar facility safety standards when performing this task.
- Verify lockout/tagout, unanticipated fan blade movement can cause personal harm or even death.
- Be aware of rotating shafts.
- The cooling tower ladders and roof are slick. Be aware of tripping hazards.

EQUIPMENT

- protractor
- dial indicator
- Maintenance Mechanic hand tools
- gear puller
- jib hoist (or rigging) and lifting straps

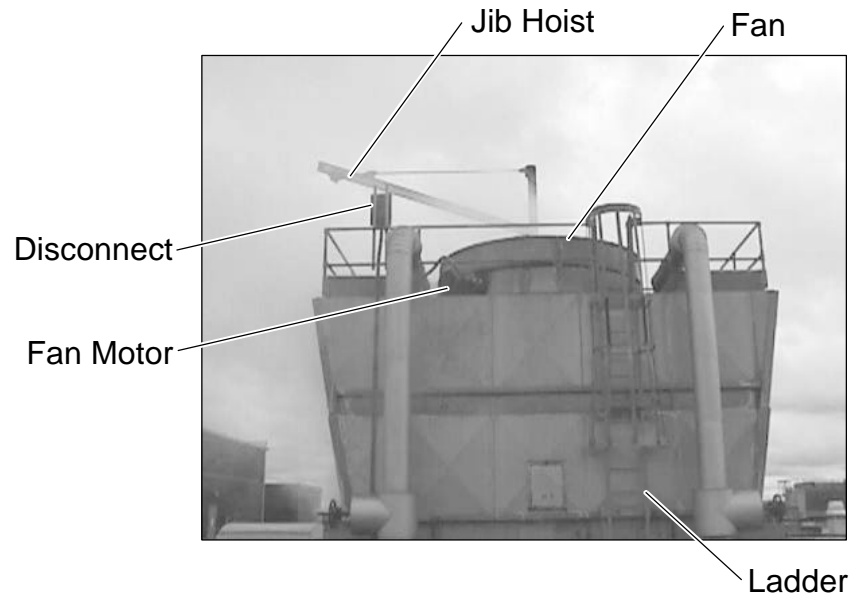
RESOURCES

- manufacturer's manuals
- engineering specifications for the cooling tower



Rebuild Cooling Tower

1. Lockout/tagout the cooling tower.
 - The cooling tower should be equipped with a disconnect near the motor.



Cooling Tower

2. Remove the fan guard.

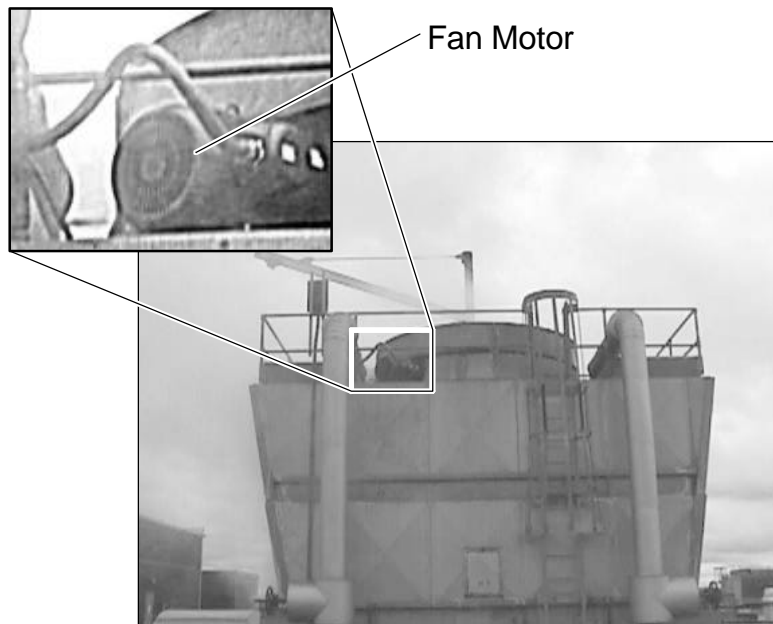


Guard Removal

- The fan guard may be in two pieces. Remove one piece at a time.
- Retain all of the stainless steel bolts.

Note: Due to the infrequency of rebuilding a cooling tower, the motor is usually replaced/repared anytime the cooling tower is rebuilt.

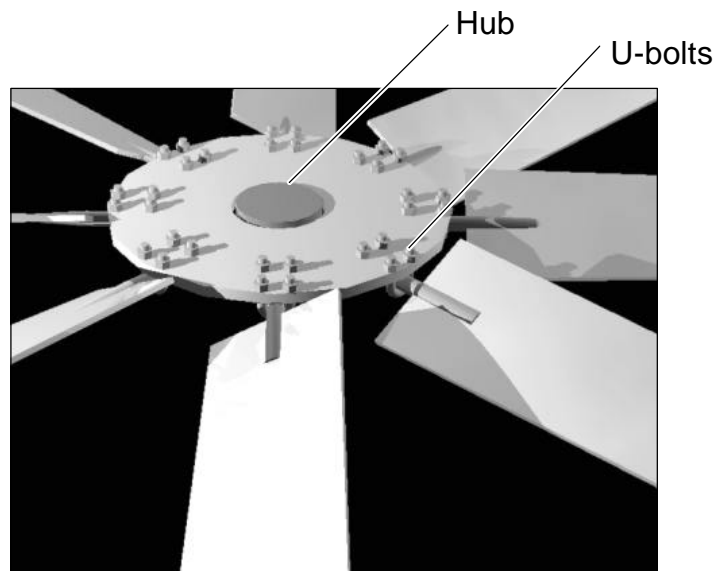
3. Remove the motor, if necessary.



Cooling Tower Fan Motor

- Remove the coupling bolts at both ends of the drive shaft.
 - Remove the motor mount bolts.
 - Attach a lifting strap securely to the motor, and lower the motor to the building roof with the jib hoist or rig, as required.
 - Replace/rebuild the motor, as necessary.
4. Inspect the fan blade U-bolts.
 - Check for missing and loose or damaged U-bolts.
 - Replace the U-bolts, as necessary.
 - Tighten all U-bolts to the specified torque.

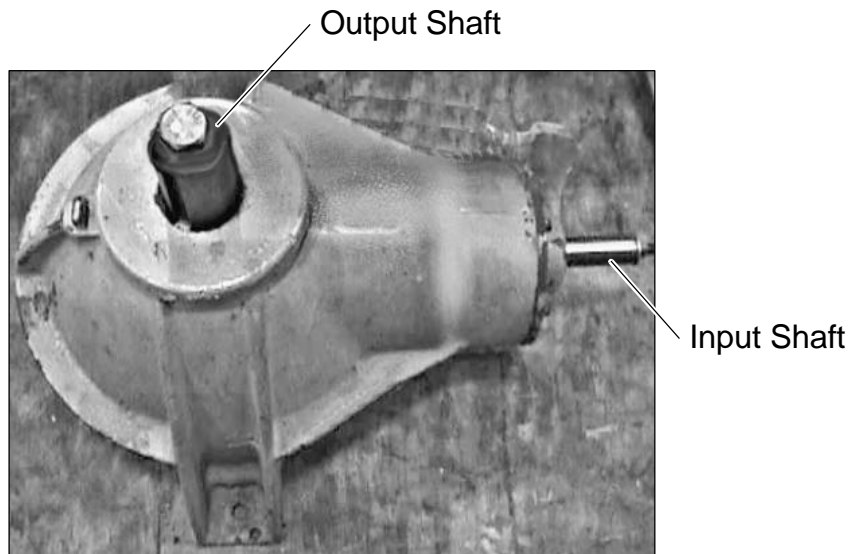
5. Check and adjust the fan blade pitch.
 - Set the protractor on the leveling spot of the fan blade.
 - Check each blade pitch for the specified angle shown on the engineering print or specification sheet.
 - Loosen the U-bolt and rotate the fan blade until it matches the specified angle.
6. Remove the fan blade, if necessary.



Fan Blade Removal

- Remove the hub nut from the tapered driven shaft.
- Attach a gear puller to the shaft to “break” the fan blade loose, if necessary.
- Attach three lifting straps, evenly spaced, to the jib hoist and remove the fan blade.
- Set the fan blade securely to the side.

7. Remove the gear box, if necessary.



Gear Box Removal

- Remove the gear box mounting bolts.
 - Thread an eye bolt into the top of the output (driven) shaft.
 - Tie lifting straps to the gear box and remove it with the jib or rigging.
8. Repair/replace any components as required.
 9. Reinstall the cooling tower components, as required.
 - Replace the gear box, the fan blade, and the motor.
 - Check the fan blade pitch angle with a protractor.
 - The driven shaft alignment must be within tolerance of the manufacturer's specifications at the gear box end and the motor end of the shaft, shim accordingly.
 - Do not reinstall the guard until the vibration crew has balanced the system.
 10. Ask the vibration crew to balance the fan blades and shaft couplings.
 11. Verify cooling tower operation.
 - Check with the Machine Operator to determine if the water temperature has returned to normal operating conditions.