

# C-03

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## MAINTENANCE MECHANIC TRAINING

### TRAINER'S GUIDE

#### Duty C: Fixturing

#### C-03: Rebuild Fixture (BMD Manipulator)

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## **Instructions To The Trainer**

1. The Learner will contact you when ready to practice rebuilding a BMD Manipulator.
2. Be prepared to demonstrate the steps for this task.
3. Ask the Learner to contact the Evaluator when ready for the Skill Check.



## Skill Objective

Given a request to rebuild a BMD Manipulator, rebuild the manipulator.

### Task Standards

1. All 16mmX45, 28 new screws must have Loctite 242 applied to the threads.
2. All 16mmX45 screws must be torqued to 205 Newton Meters (150 ft-lbs).
3. All 12mmX40, 28 new screws must have Loctite 242 applied to the threads.
4. All 12mmX40 screws must be torqued to 100 Newton Meters (74 ft-lbs).
5. The pusher rod must have Cop-Graft applied to the threads and the polished surface.
6. The pusher rod and nut must be a matching set when replacing the pusher rod.
7. Flange sealant must be applied to the cover and flange bearing gaskets.
8. The gear and bearing assembly must be lubricated before the hub and shaft protector assembly is installed.
9. All safe practices must be demonstrated.

## What The Learner Will Need

This section contains the safety information, tools, and resources you will need before rebuilding a BMD Manipulator.

### SAFETY FIRST

DON'T TAKE  
CHANCES

- Follow all Caterpillar facility safety standards when performing this task.
- When cleaning parts, wear heavy industrial gloves and a respirator fitted with a charcoal filter for protection against the hazards associated with the cleaning solvents.
- An explosion hazard exists with cleaning solvents. Smoking is not permitted in the paint or cleaning areas.
- Know the location of the MSDS for the cleaning solutions.
- Solvents must be disposed of according to the HAZMAT regulations.



- hammer and brass punch
- external snap ring pliers
- screw driver (flat blade)
- torque wrench (metric or standard)
- Allen wrenches
- air impact wrench with Allen insert for button allen head screw
- air hose and fitting
- wiping rags and/or paper towels
- Loctite 242
- Maintenance Mechanics hand tools
- electric nut driver

- pry bar
- die grinder with rotary wheel
- Cop-Graft anti-seize compound
- Wil-Bond or other cleaning agent



- Manufacturer's parts list and drawings



## Practice Set-Up

The Learner may perform the following practice to help prepare for the Skill Check. Set up the practice for the Learner. Assist the Learner during the practice, if necessary; answer any questions concerning the task; and be prepared to demonstrate the task to the Learner. Make sure the Learner follows safe work practices while practicing the task.

### Practice

Designate a BMD Manipulator for the rebuilding activity. Ask the Learner to select the required repair kit. Check to ensure the proper kit is selected before beginning disassembly. Ask the Learner to:

- disassemble the manipulator
- clean and inspect the manipulator components
- reassemble the manipulator

Observe as the Learner rebuilds the manipulator to ensure that the manipulator is disassembled, cleaned and inspected, and assembled properly. Check to make sure that the task standards are met.

The Learner is required to follow all the recommended safe practices associated with handling and disposing of cleaning solvents.

### Practice Objective 1

The manipulator must be reassembled using the specified parts. Loctite 242 is applied to the threads and the screws are torqued. The pusher rod must have Cop-Graft applied to the threads and the polished surface. When replacing the pusher rod, the rod and nut must be a matching set. Flange sealant must be applied to the cover and flange bearing gaskets. The gear and bearing assembly must be lubricated before the hub and shaft protection is installed. All cleaning solutions must be disposed of per HAZMAT regulations. All safe practices must be demonstrated.

## Next Step

Allow the Learner to continue practicing and developing skills needed to demonstrate the task. The Learner should ask the Evaluator to schedule a Skill Check when ready to demonstrate the task unaided and meet all the task standards and safe work practices.