**UNITED STATES MARINE CORPS**

ENGINEER EQUIPMENT INSTRUCTION COMPANY

MARINE CORPS DETACHMENT

686 MINNESOTA AVE

FORT LEONARD WOOD, MISSOURI 65473-8963

**LESSON PLAN**

**MULTI-PIECE RIM**

LESSON ID: BEEO-A01(LP)

**BASIC ENGINEER EQUIPMENT OPERATOR COURSE**

**CID A1613F1**

**REVISED 04/27/2012**

Approved By\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_

**(ON SLIDE #1, 2)**

**INTRODUCTION:** **(10 min)**

**1. GAIN ATTENTION.** (Play Tire Safety video)

**(ON SLIDE #3)**

**2. OVERVIEW**. During this period of instruction we will be discussing components, parts, tools and materials required to safely dismount a multi-piece rim. We will also be discussing proper rim maintenance and the safe mounting of the multi-piece rim.

**(ON SLIDE #3)**

**3. LEARNING OBJECTIVES**.

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| **Instructor Note**This is a lesson purpose period of instruction therefore there are no Learning Objectives. |

**(ON SLIDE #4, 5)**

**4. METHOD/MEDIA**. This period of instruction will be taught by the informal lecture method, aided by a detailed outline, computer generated slides; your student outline and TI 11270-OI. I will also demonstrate using applicable training aids.

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| **Instructor Note**Explain Instructional Rating Forms to the students. |

**(ON SLIDE #6)**

**5. EVALUATION.** There is no evaluation for this period of instruction.

**(ON SLIDE #7)**

**6. SAFETY/CEASE TRAINING (CT) BRIEF**. In case of fire make your way out the closest exit and get in formation 200 feet from the building**,** get accountability and wait for further instruction. In case of inclement weather stay seated in the classroom and await further instruction**.**

**(ON SLIDE #8)**

**TRANSITION:** Now that you know what will be taught, how it will be taught and how you will be evaluated, are there any questions on what has been covered up to this point? If not, let’s begin by covering the components and parts of a multi-piece rim.

INSTRUCTOR NOTE:

During the lecture the Instructor will have a tire and split rim with tools as a training aid for component identification and demonstration of correct tool use. This demonstration should take (30 min)

**BODY:** **(3 HRS 40 MIN)**

**(ON SLIDE #9)**

**1. COMPONENTS AND PARTS. (30 min)** Knowing the components and parts of a Multi-Piece rim will provide the operator with a better understanding of the overall characteristics when it comes to the proper maintenance and safety procedures while servicing the rim.

**(ON SLIDE #10)**

 **a. Parts of a wheel and tire assembly**. The multi-piece rim is made up of six components.

**(ON SLIDE #11)**

 (1) Rim. The rim is a circular structure around which a wheel/tire is fitted.

**(ON SLIDE #12)**

 (2) Air Valve. The air valve is a device used for controlling the flow of air. In this case it would be allowing air into or out of the tire.

**(ON SLIDE #13)**

 (3) Tire. The tire is the covering for a wheel, usually made of rubber reinforced with cords of nylon, fiberglass, or other material.

**(ON SLIDE #14)**

 (4) Split Rim. The split rim is the second largest component of the rim. It is used to hold the tire onto the rim with the aid of the snap ring.

**(ON SLIDE #15)**

 (5) O-Ring. The O-Ring is a ring made of rubber and used as a gasket to help prevent the escape of air.

**(ON SLIDE #16)**

 (6) Snap Ring. The snap ring is a form of spring used as a fastener; the ring is elastically deformed, put in place and allowed to snap into a groove or recess. In this case the snap ring is used to keep the split rim on the rim of a multi-piece rim.

**(ON SLIDE #17)**

**TRANSITION**: Thus far, we’ve discussed the components and parts of a multi-piece rim. Are there any questions on what we’ve covered to this point? If not I have a question for you; **QUESTION:** How many components and parts make up a wheel and tire assembly? **ANSWER:** Six, they are the Rim, Air Valve, Tire, Split Rim, O-Ring and Snap Ring. Let’s move on and talk about the tools and materials needed when performing maintenance on a multi-piece rim.

**(ON SLIDE #18)**

**2. TOOLS AND MATERIALS**. **(30 min)** Before repairing any tire assembly you must first refer to the appropriate technical manual for the item of equipment that is being repaired. The tools listed are the most commonly used tools that are needed when performing repair on a multi-piece rim.

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| **Instructor Note**Talk to the students about the types of tools listed below. Explain to them how they are used and what they are used for. Reemphasize the using the right tool for the right job phrase. Also explain to them where these common tools can be located or checked out at their shops in the fleet. |

**(ON SLIDE #19)**

 a. Tire Spoon(s)

**(ON SLIDE #20)**

 b. Tire Iron

**(ON SLIDE #21)**

 c. Sledge Hammer

**(ON SLIDE #22)**

 d. Air Compressor

**(ON SLIDE #23)**

 e. Tire Cage

**(ON SLIDE #24)**

 f. Repair kit

**(ON SLIDE #25)**

**TRANSITION**: We just finished talking about the common tools utilized while performing repairs and maintenance on a multi-piece rim. Are there any questions on what we’ve covered to this point? If not I have a question for you; **QUESTION:** Name the common tools used when performing maintenance on a multi-piece rim? **ANSWER:** Tire Spoon, Tire Iron, Sledge Hammer, Air Compressor, Air Hose, Tire Cage and Repair Kit. Let’s take a break and then we will move on and talk about the demounting, rim maintenance and the mounting of the multi-piece rim.

**(ON SLIDE #26)**

**(BREAK – 10 Min)**

**TRANSITION**: Are there any more questions before we move on?

**(ON SLIDE #27)**

**3. DEMOUNTING, RIM MAINTENANCE AND MOUNTING**. **(2 HRS 10 min)**

**(ON SLIDE #28)**

1. **Demounting.**

**(ON SLIDE #29)**

(1) Step 1. The first step in demounting the tire is to

remove the cap (3) and the valve core (2) from the valve stem (1) and allow the tire to completely deflate.

**(ON SLIDE #30)**

(2) Step 2. Loosen the outer tire bead from the

demountable side ring flange (1) by inserting a curved bead breaker tire iron (3) between tire bead and side ring flange.

**(ON SLIDE #31)**

(3) Step 3. Work progressively around the rim (2),

rotating curved bead breaker tire iron (3) down until outer tire bead is completely free of side ring flange (1).

**(ON SLIDE #32)**

(4) Step 4. Force side ring flange (1) down enough to

clear lock ring (7).

**(ON SLIDE #33)**

(5) Step 5. Insert lock ring tire iron (5) into prying

notch (6) and work lock ring (7) partly out of gutter of rim (2).

**(ON SLIDE #34)**

(6) Step 6. Insert curved flat tire iron (4) between

lock ring (7) and rim (2).

**(ON SLIDE #35)**

(7) Step 7. Work both curved flat tire iron (4) and

lock ring tire iron (5) progressively around rim (2), removing lock ring (7).

**(ON SLIDE #36)**

(8) Step 8. With lock ring removed, force side ring

flange (1) down and remove the O-ring.

**(ON SLIDE #37)**

(9) Step 9. Slide ring flange (1) straight up and off

the rim (2).

**(ON SLIDE #38)**

(10) Step 10. Turn tire and rim (2) over and loosen the

inner tire bead from inner rim flange (8) by inserting a curved bead breaker tire iron (3) between tire bead and rim flange.

**(ON SLIDE #39)**

(11) Step 11. Work progressively around rim (2),

rotating curved bead breaker tire iron (3) down until tire bead is completely free of the inner rim flange.

**(ON SLIDE #40)**

**INTERIM TRANSITION:** So far we have talked about steps in the process of demounting a multi-piece rim. Are there any questions? Everyone take a ten minute break.

**(ON SLIDE #41)**

**(BREAK – 10 Min)**

**INTERIM TRANSITION:** Did anyone think of any questions during the break? If not let’s move on and talk about maintenance of the multi-piece rim.

**(ON SLIDE #42)**

1. **Rim Maintenance.**

**(ON SLIDE #43)**

(1) Inspect the rim, lock ring and flanges for any

damage or abnormal wear.

**(ON SLIDE #44)**

(2) Inspect the rim components for cracks, slits and

tears.

**(ON SLIDE #45)**

(3) Remove any rust, oil and tire and rim lubricant

residue from rim.

**(ON SLIDE #46)**

1. **Mounting.**

**(ON SLIDE #47)**

(1) Step 1. Place rim (2) flat on floor, lubricate beads on tire with tire and rim lubricant and place tire completely on rim.

**(ON SLIDE #48)**

(2) Step 2. Slide side ring flange (1) down onto rim

(2) and under the bead of the tire.

**(ON SLIDE #49)**

(3) Step 3. Force side ring flange (1) down past gutter

of rim (2) and install the O-ring in groove of the rim.

**(ON SLIDE #50)**

(4) Step 4. Holding side ring flange (1) down past the

gutter of the rim (2) place the end of the lock ring (7) without prying notch into gutter.

**(ON SLIDE #51)**

(5) Step 5. Working progressively around the rim (2),

work lock ring (7) over the edge of the rim with lock ring tire iron (5) and step on lock ring, forcing it down into the gutter of the rim.

**(ON SLIDE #52)**

(6) Step 6. Ensure that the O-ring is properly

installed and guide side ring flange (1) up over the O-ring and into lock ring (7).

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| **Instructor Note**Tell the students that they must make sure that the O-ring is not twisted or cut during installation. Also, let them know that an improperly seated side ring flange or lock ring could fly off during inflation. Never attempt to seat the side ring flange or lock ring during or after inflation. Serious injury or death could occur.  |

**(ON SLIDE #53)**

(7) Step 7. Inspect all rim components to ensure that

they are properly seated. Place rim and tire assembly in an inflation safety cage.

**(ON SLIDE #54, 55)**

(8) Step 8. Using a pneumatic tire hose with an in-line

inflator gage, inflate the tire to 40 psi maximum to seat both tire beads. Both tire beads should seat before reaching 40 psi. If tire beads fail to seat, deflate the tire, determine the cause of failure, and take corrective action. If needed, add additional tire and rim lubrication, and repeat this step.

**(ON SLIDE #56)**

(9) Step 9. Visually inspect all rim components to

ensure that are properly seated and allow the tire to deflate.

**(ON SLIDE #57)**

(10) Step 10. Install the valve core (2) into valve

stem (1).

**(ON SLIDE #58)**

(11) Step 11. Inflate the tire to the normal operating

pressure (see appropriate vehicle technical manual for proper tire psi). Visually inspect all rim components to ensure that they are seated.

**(ON SLIDE #59)**

(12) Step 12. Install the valve cap (3) onto the valve

stem (1) finger-tight.

**(ON SLIDE #60)**

(13) Step 13. Remove the rim and tire assembly from the

tire cage.

**(ON SLIDE #61)**

**TRANSITION**: We have just finished talking about the steps in the process of mounting a multi-piece rim. Are there any questions on anything that we have covered? If not I have a question for you; **QUESTION:** When performing rim maintenance what are you checking for when inspecting the rim components? **ANSWER:** You are inspecting the rim components for cracks, slits, and tears.

**(ON SLIDE #62,63)**

**SUMMARY:**  **(10 min)**

During this period of instruction we have covered the components and parts of a multi-piece rim. We also covered the tools and materials needed when dismounting, mounting and performing rim maintenance. The information covered during this period of instruction is vital in the accomplishment of your mission as an engineer equipment operator and should have provided you with a better understanding of what a multi-piece rim is. With the knowledge that you have gained during this period of instruction I am more than confident that you will be able to properly utilize the necessary tools, materials and resources that are available to you, and be able to accomplish your mission as a basic engineer equipment operator. Those students with the instructional rating forms can now fill them out and turn them in to me. The rest of you take a 10 minute break.

**REFERENCES**:

TI 11270-OI Maintenance Procedures For The Multi-Piece Rims On

Applicable Material Handling And Construction Equipment

TM-9-2610-200-14 Operator’s, Unit, Direct Support, and General

Support Maintenance Manual for Care, Maintenance, Repair and Inspection of Pneumatic Tires and Inner Tubes.

MCO 3500.27 Operational Risk Management (ORM)