

UNITED STATES MARINE CORPS
ENGINEER EQUIPMENT INSTRUCTION COMPANY
MARINE CORPS DETACHMENT
1706E EAST 8TH STREET
FORT LEONARD WOOD MISSOURI 65473-8963

LESSON PLAN

LOAD TEST/ANNUAL CONDITION INSPECTIONS

LESSON ID: EEC/EEO-B02

ENGINEER EQUIPMENT WARRANT OFFICER/CHIEF COURSE

A16ACN1/A1613E1

REVISED 9/8/2014

APPROVED BY _____ **DATE** _____

(ON SLIDE #1)

INTRODUCTION

(10 MIN)

1. **GAIN ATTENTION:** Have you ever wondered who is responsible for load testing? What items of tactical engineer equipment require load testing? How often do we load test? Which items only require an Annual Condition Inspection? As a Heavy Equipment Officer, Chief and NCO you have to know this information, because it deals with YOUR gear and your units ability to complete its assigned mission.

2. **OVERVIEW:** Good morning/afternoon, my name is _____. The purpose of this lesson is to familiarize you, the student, with policies and procedures for the inspection, testing, and certification of Marine Corps tactical ground load lifting equipment.

INSTRUCTOR NOTE

Introduce the learning objectives.

(ON SLIDE #2)

3. **LEARNING OBJECTIVES:** Have the students read the learning objectives in their student outline.

INSTRUCTOR NOTE

Have students read learning objectives to themselves.

a. TERMINAL LEARNING OBJECTIVE:

(1) Provided appropriate load lifting equipment with current Annual Condition Inspection (ACI), maintenance resources, and references, supervise/manage load test of engineer equipment, to ensure load testing is conducted, certified, documented and maintained on a scheduled basis. (1310-ADMN-2007/1349-ADMIN-2007)

(ON SLIDE #3)

b. ENABLING LEARNING OBJECTIVES:

(1) With the aid of references, identify load testing requirements per the MCO P11262.2. (1310-ADMIN-2007a/1349-ADMIN-2007a)

(2) With the aid of references, conduct a load test per the MCO P11262.2, and TM 4700-15/1_. (1310-ADMIN-2007b/1349-ADMIN-2007b)

(3) With the aid of references, verify load test administrative requirements per the MCO P11262.2, and TM 4700-15/1_. (1310-ADMIN-2007c/1349-ADMIN-2007c)

(ON SLIDE #4)

4. **METHOD/MEDIA:** This period of instruction will be taught using the lecture method with aid of power point presentation, instructor demonstrations, and practical applications.

INSTRUCTOR NOTE

Explain Instructional Rating Forms and Safety Questionnaire to students.

5. **Evaluation:** You will be evaluated by a written examination at the time indicated on your training schedule.

6. **SAFETY/CEASE TRAINING (CT) BRIEF.** All instructors and students will use caution when walking around the equipment lot during equipment operations. Sun block should be used to avoid sunburn. Issue students bug spray if required. Encourage students to stay hydrated as temperatures can reach 100 degrees plus during the summer months. In the event of a casualty, emergency services (911) will be called and all students will move to the classroom and await further instruction.

TRANSITION: Now that you know what you're going to be taught, how you're going to be taught and how you're going to be evaluated, are there any questions? If not let's take a look at the MCO P11262.2, Inspection, testing, and certification of tactical ground load lifting equipment.

BODY

(14 HRS 30 MINS)

(ON SLIDE #5,6,7)

1. BACKGROUND (5 Min)

a. The Secretary of Defense requires all components, including the Marine Corps, to conform with the Department of Labor's Occupational Safety and Health Administration (OSHA) regulations (with some exceptions predicated by Defense missions). Extracts of pertinent safety instructions set forth in OSHA-29 Code of Federal Regulations (CFR) 1910 have been consolidated in the Marine Corps Order (MCO) P11262.2.

b. For many years most of the Department of Defense (DOD) agencies concerned have been much more stringent than OSHA requires with regard to industrial safety when load lifting equipment is involved. Load testing has been performed, especially in the Marine Corps, when not required by OSHA. This has resulted in considerable unnecessary expense of time, manpower, and material.

INSTRUCTOR NOTE

This refers back to when the Marine Corps did Annual Load tests on equipment (late 80's early 90's)

TRANSITION: Now that we know some of the background behind our order, are there any questions? Let's move on to the responsibilities

(ON SLIDE #8,9,10,11)

2. Responsibilities (5 Min)

a. Commanding Officers (CO) and Officers-in-Charge (OIC) shall ensure that inspections, testing, and certifications are conducted per (MCO) P11262.2 and appropriate TM's. This includes proper working of the items of equipment and annotating the appropriate equipment records (NAVMC 696D).

b. Commanding Generals (CG) shall designate specific 3rd Echelon capable organizations to provide inspection and testing services for units without the organic resources/maintenance authority to conduct those inspections and tests.

c. Commanders of Marine Corps Bases (MCB) and stations shall make the facilities referred to in chapter 3 of MCO P11262.2 available to tenant/geographically proximate Fleet Marine Force organizations.

d. Operators assume direct responsibility for equipment when it is assigned or dispatched to them. This responsibility includes safe operation, proper use, performance of such periodic maintenance as may be prescribed, and collection of operational data as may be required.

TRANSITION: Now that we know the responsibilities lets move into some general information about ACI's and load testing.

(ON SLIDE #12-40)

3. General Information (20 Min)

a. Table 1-1 of MCO P11262.2 lists requirements by items of equipment for inspection, testing, and certification of load lifting equipment.

b. When set forth in TM's as a scheduled maintenance (SM) check, condition inspections will be conducted at the same time as SM using the Condition Inspection Record shown in TM 4700-15/1 Pg 2-25-1 through 2-25-3. When no general inspection is specified as part of SM services or where inspection requirements are not adequately covered, it will be conducted annually as set forth herein.

INSTRUCTOR NOTE

Hand out a copy of the Annual Condition Inspection check-list to the students; also have the students refer to TM 4700-15/1 pg 2-25-1 through 2-25-3 or MCO P11262.2 pg 4-9 through 4-11.

c. Only cranes and aerial personnel devices require load testing. Aerial personnel devices are defined as any mechanically, hydraulically, or electrically operated device used to lift a person in the air. Scheduled periodic load testing is not required. Prior to initial use, however, all, newly manufactured, extensively repaired

or altered cranes/aerial personnel devices shall be load tested.

d. Condition inspection and/or load test is required prior to initial use and all new items being fielded will be inspected/tested as part of the equipment acceptance inspection unless the item of equipment has the required certifications that are current within the past 12 months.

e. Load tests are required for extensively repaired or altered cranes and aerial personnel devices. It is the responsibility of the organization doing the repairs to ensure the load tests are performed prior to returning the equipment to its owner. Therefore, upon receipt of a mobile crane/aerial device, the CO/OIC will determine if a load test has been accomplished by examination of the equipment records. If no certification is present, the CO/OIC may elect to refuse to accept the equipment or accept it and arrange to have it locally load tested.

f. The purpose of the annual condition inspection is to ensure that the overall structural, mechanical, hydraulic, and electrical components of the equipment have been maintained in a safe and serviceable condition and are functioning properly.

g. Certification. The certifying officer is responsible for ensuring the safety and reliability of all load-lifting equipment. The certifying officer shall be designated in writing by the CG/CO. Certifying officers shall either be Marine officers or qualified civilians. The Marines will possess military Occupational Specialties 1349 (Engineer Equipment Officer), 3510 (Motor Transport Maintenance Officer), or 2110 (Ordnance Vehicle Maintenance Officer). The certifying officer shall, in turn, designate the authorized test directors, inspection and test personnel. Certifications shall be based on the condition inspection and availability of load test certification.

(1) All contracts for the purchase of new mobile cranes/aerial personnel devices include a requirement for a manufacturer's load test certification to accompany the vehicle on delivery.

(2) Load testing is only required if the lifting portion of the crane or aerial personnel device has been repaired or altered; e.g., repairs to the truck portion of

a mobile crane will not require load testing of the crane portion. Outriggers will be considered as part of the lifting portion of a crane/aerial personnel device.

(3) It is mandatory that contracts with repair contractors for rebuilt or significantly repaired mobile cranes/aerial personnel devices contain a load test requirement/certification clause. Depots are required to furnish the same.

(4) Certification officers should be qualified at an appropriate Marine Corps school or Labor Department approved civilian run school. Certification of condition inspection and/or load test shall be signed by the test inspector and certifying officer.

h. Certification Frequency. Each item of load lifting equipment shall be certified as condition inspected at least once annually.

i. Waivers. The requirements of MCO P11262.2 are waiver able for any unit under extended combat conditions.

(1) The requirements of MCO P11262.2 may be waived for items of equipment that are placed in administrative storage as delineated in paragraph 3002.11 (Deferred PMCS) of MCO P4790.2. Under no circumstances will a waiver for administrative storage extend beyond a 2-year period. This waiver does not apply to items placed on administrative deadline or low usage items. Local procedures must be addressed in the major command maintenance management standard operating procedure.

(2) During peacetime, CG's of the 4th Division Wing Team (DWT) authorized to waiver the requirements of MCO P11262.2 for a 1-year period. Equipment records will be so annotated. Copies of waivers will be maintained in the applicable equipment record jacket. At no time will an item of the 4th DWT equipment be allowed to go without inspection, testing, or certification for two consecutive years. CG's of the 4th DWT are encouraged to establish Inter-service Support Agreements (ISA) or commercial contracts to comply with these requirements if appropriate organic/Marine Corps personnel are not available or due to geographical location. Inspection, testing, and certification by agencies outside the Marine Corps should

clearly state that they are made per the provisions of MCO P11262.2.

j. Marking. Load lifting equipment shall be stenciled, in a position clearly visible to the operator, with certification data indicating the test status.

EXAMPLE: CAP. 50,000 lbs certified 15 July 1996.

(ON SLIDE #41,42)

TRANSITION: We have just covered the background, responsibilities, and some general information about ACI's and load test. Are there any questions?

OPPORTUNITY FOR QUESTIONS:

1. QUESTIONS FROM THE CLASS

2. QUESTIONS TO THE CLASS:

a. Mandatory that rebuilt cranes contain a?

Load Test requirement clause

b. Waivers for administrative storage will not extend beyond what?

2 year period

(ON SLIDE #43)

(BREAK 10 MIN)

TRANSITION: Now that we know some of the background, responsibilities, and some general information about ACI's and load test, let's move on to what makes up an actual condition inspection.

(ON SLIDE #44-64)

4. Annual Condition Inspection (40 Min)

In addition to those inspections required by load lifting equipment TM's or commercial manuals, the inspections in the following paragraphs (as applicable) will be performed on all load lifting equipment.

a. Check all mechanical controls for proper adjustments and check the entire control mechanism for excessive wear of components and contamination by leaking lubricants or foreign matter.

b. Check hydraulic system seals, hoses, lines, fittings, pumps, and valves for deterioration, leaks, and wear.

c. Check mast and lift carriage assemblies including forks and chains, for cracks, broken welds, distortion, improper fit, and excessive wear.

INSTRUCTOR NOTE

The following standards are from ASME (American Society of Mechanical Engineers) B56.1-1993

(1) Straightness of blade or shank - If deviation from straightness exceeds 0.5% of the length of the blade and/or the height of the shank, the fork shall not be returned to service until it has been repaired.

(2) Fork Angle - Any fork that has a deviation of greater than 3 deg. from the original specification shall not be returned to service until it has been reset and tested.

(3) Difference of Height of Fork Tips - If the difference in the tip heights exceeds 3% of the length of the blade, (2.16". for 72" forks and 1.2" for 40" forks) the set of forks shall not be returned to service until repaired.

(4) Fork blade and shank wear - If the thickness is reduced 10% of the original thickness, the fork shall not be returned to service.

(a) Only the manufacturer of the fork or an expert of equal competence shall decide if a fork may be repaired for continued use, and the repairs shall only be carried out by such parties.

d. Check the brake and steering systems for excessively worn or defective moving parts to include seat switches, parking brakes, and brake interlock switches.

e. Check electrical, gasoline, and diesel systems for signs of malfunction, excessive deterioration, dirt or moisture accumulation, and compliance with applicable safety regulations.

f. Check protective motor control circuit devices, battery cable connectors, battery compartment insulation, thermo protectors, compartment covers, filters, and emergency switches.

(1) Ensure that all electrical cables are appropriately mounted and protected to prevent damage by abrasion, cutting, or catching on stationary objects.

(2) Ensure that batteries are securely fastened in place to prevent spillage of electrolyte onto electrical cables.

(3) Ensure that battery compartments provide ample ventilation and have openings properly guarded to prevent contact of foreign objects with cell terminals.

(4) Equipment must be clean and free of excessive oil and grease accumulation, particularly within the confines of the motors and on electrical contacts.

g. All deficiencies observed shall be corrected and repairs made prior to load testing (if required).

(ON SLIDE #65,66)

TRANSITION: We have just covered the forks inspection. Are there any questions?

OPPORTUNITY FOR QUESTIONS:

1. QUESTIONS FROM THE CLASS:

2. QUESTIONS TO THE CLASS:

a. Fork with angle deviation of _____ from original spec not returned to service until reset and tested?

3 degrees.

b. Inspection performed in addition to those required by TM's?

ACI

(ON SLIDE #67)

(BREAK 10 MIN)

TRANSITION: Now that we have covered the forks inspection, let us move on to the hook inspection.

(ON SLIDE #68-84)

5. Hook Inspection (40 Min)

a. General Inspection. Hooks shall be inspected annually for wear in swivels and pins, other wear, cracks or gouges, and proper operation and condition of safety latches, where installed.

INSTRUCTOR NOTE

Use hook training aids

(1) Cracks and gouges parallel to the contour of the hook shall be removed by surface abrasion and shall result in a smooth surface retaining the profile of the hook.

(2) Where cracks and gouges cannot be removed by surface abrasion, the hook shall be discarded.

(3) Where cracks and gouges are transverse to the contour of the hook, the hook shall be evaluated for retention or disposal. Defects in the unstressed portion of the hook do not affect strength.

(4) No attempt shall be made to correct hook deficiencies by use of heat or welding.

(5) Where normal wear or removal of cracks or gouges results in a reduction in the original sectional dimension of 10% or more, the hook shall be discarded.

(6) If the hook is visually bent or twisted, it shall be discarded. No attempt shall be made to straighten a bent or twisted hook.

b. Hook Throat Spread. Hooks shall be measured for hook throat spread upon receipt. A throat dimension base measurement shall be established by installing two tram points and measuring the distance between these tram points ($\pm 1/64$ "). This base dimension shall be retained in the "remarks" section of the equipment record jacket (NAVMC 696D) for the life of the hook. Hooks showing an increase in the throat opening by more than 15% from the base measurement shall be discarded.

c. Hook Block Inspection and Nondestructive Test. The hook, retaining nut, and bearings shall be thoroughly inspected annually. The hook and retaining nut shall be visually examined for thread wear and corrosion damage. The block bearing plate shall be visually inspected for cracks, wear, or other damage. Bearings shall be inspected for unusual wear and free rotation. All components shall be lubricated as required. The entire hook and retaining nut assembly shall be nondestructively tested for structural defects.

d. The nondestructive test of general-purpose service crane hooks is valid for five certification periods. The effective date of hook inspection and nondestructive test shall be the crane certification date. Nondestructive tests shall be performed during load tests. Five years after crane certification, a hook that has been with said crane that entire time will be subject to a new nondestructive test.

INTERIM TRANSITION: Are there any questions on Hook inspections before we go into the demonstration?

(ON SLIDE #85)

INSTRUCTOR NOTE

Perform the following demonstration.

DEMONSTRATION. (30 MIN) Using the hook training aids, demonstrate the proper way to inspect the hook and measure hook throat spread.

1. Inspection

a) Inspect for crack/gouges parallel and traverse of the contour of the hook.

2. Hook throat spread

a) Locate tram points.

b) Position dial calipers between tram points on hook throat opening. Ensure the dial is facing the students while you explain how it is read.

c) Restate how the measurements are documented on the 696D.

STUDENT ROLE: Observe process and ask questions.

INSTRUCTOR(S) ROLE: Demonstrate how to properly conduct the inspection.

1. **Safety Brief:** Ensure the training aid is in constant contact with the table to prevent it from falling.

2. **Supervision & Guidance:** Students will be encouraged to ask questions and make notes on their application.

3. **Debrief:** Are there any questions or comments concerning the hook?

(ON SLIDE #86,87)

TRANSITION: Are there any questions concerning the hook inspection or the demonstration we just done?

OPPORTUNITY FOR QUESTIONS:

1. **QUESTIONS FROM THE CLASS**

2. **QUESTIONS TO THE CLASS:**

a. What are two types of hook block inspections and what are the intervals?

Hook inspection/NDT, Annually/every 5 years

b. If a hook is visibly bent or twisted what do you do?

Discard it.

(ON SLIDE #88)

(BREAK - 10 Min)

TRANSITION: Now that we have covered the annual condition inspection and hook inspection let us now talk about the inspection of wire rope and hardware.

(ON SLIDE #89-99)

6. Inspection of Wire Rope, Fastenings, and Terminal Hardware (50 Min)

a. General Procedures. Remove the wire rope dressing from those areas exposed to maximum wear, exposure, and abuse. Inspect for crushing, kinks, corrosion, or other damage, broken wires, and proper lubrication. Check the wire rope sockets, swage fittings, eyes, swivels, trunnions, stays, pendants, and securing hardware for wear, cracks, corrosion, and other damage. The drum end fittings need only be disconnected and/or disassembled when visible evidence of deterioration deems it necessary.

b. Wire Rope Rejection Criteria. Remove the damaged portions, or replace all wire rope exceeding the following:

INSTRUCTOR NOTE

Show students examples of wire rope and show parts of the wire rope.

(1) Kinks or Crushed Sections. Severe kinks or crushed rope in straight runs where the core is forced through the outer strands or wires are damaged. (This does not apply to runs around eyes, thimbles, and shackles.)

(2) Flattened Sections. Flattened sections where the diameter across the flat is less than five-sixth ($5/6$) of original diameter. (This does not apply to runs around eyes, thimbles, and shackles.)

(3) Wear. Not to exceed 30 percent the original diameter of outside individual wires.

c. Broken Wires.

(1) Running Ropes. The number of broken or torn wires is six or more randomly distributed broken or torn wires in one lay or three broken wires in one strand in one lay. Replace the end connection if there is one or more broken wires adjacent to the end connection.

(2) Standing, Guy, and Boom Pendant Ropes. More than two broken wires in one lay in sections beyond the end connection or one or more broken wires at an end connection.

(3) Loss in Diameter: Not to exceed 10 percent of the nominal diameter of the wire rope. Use calipers when measuring wire rope, and if reduction from nominal diameter is $3/64$ inch or more, for $3/4$ in. wire rope and $1/32$ in. for $1/2$ in. wire rope. Then wire rope must be replaced. Measurements should be about every six to seven feet apart for the entire length of the wire rope.

(4) Accumulation of Defects. An accumulation of defects that in the judgment of the inspector creates an unsafe condition.

(5) Rated Capacity. The rated capacity of the replacement wire rope for all cranes shall be per the manufacturer's stated requirements.

(ON SLIDE #100,101)

TRANSITION: We have covered the wire rope and hardware inspections are there any question?

OPPORTUNITY FOR QUESTIONS:

1. QUESTIONS FROM THE CLASS

2. QUESTIONS TO THE CLASS:

a. What is the wire rope rejection criterion on wear?

30% of outside individual wires.

b. What is the wire rope rejection criterion on loss of diameter?

Not to exceed 10% of nominal diameter.

(ON SLIDE #102)

(BREAK 10 MIN)

TRANSITION: Now that we have covered the wire rope and hardware inspection are there any question? Now let's continue on with the remaining components.

(ON SLIDE #103-106)

7. Hoist, Winches, and Structural Metal Components (30 MIN)

a. Operation Check. The operator shall perform an operation check as prescribed in the appropriate TM. For equipment where such checklist is not included in the TM the following inspections shall be conducted as a minimum requirement:

(1) Inspect all control mechanisms for maladjustment which could interfere with proper operation.

(2) Inspect all control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter.

(3) Inspect all safety and locking devices for malfunction.

b. Condition Inspection.

During each annual certification, inspect for the following, as applicable:

1. General Information:

- (a) Check for proper marking.
- (b) Check for evidence of mishandling and/or damage.
- (c) Check for excessive wear on brake and clutch system linings, pawls and ratchets.
- (d) Check rope reeving for nonconformance with manufacturer's specifications.
- (e) Inspect sheaves for cracks, wear, and wire rope imprint.

c. Frames. Check for bends, distorted sections, broken welds, excessive corrosion, and loose bolts or rivets.

TRANSITION: Now that we have covered all the checks for the annual condition inspection are there any questions? Now we are going to cover the recording requirements.

(ON SLIDE #107-110)

8. **Recording Requirements** (5 MIN)

a. The form contained in TM 4700-15/1 Pg 2-25-1 shall be used for recording (as applicable) the annual condition inspection of load lifting equipment.

b. Load tests, when required, will be recorded and certified as shown in the form contained in TM 4700-15/1 Pg 2-26-1.

c. Annual condition inspection of load lifting equipment will be filed in the equipment record jacket (NAVMC 696D) and retained until successful completion of the next inspection/test.

d. Load test certification forms will be filed in the equipment record jacket (NAVMC 696D) and retained until successful completion of the next inspection/ test; however, the load test certification which documents the completion of the nondestructive tests shall be retained until completion of the next nondestructive test.

e. Additionally, the date of the nondestructive test will be annotated in the "remarks" section of forms NAVMC 696D and NAVMC 10395.

(ON SLIDE #111,112)

TRANSITION: We have covered the Hoist, Winches, and Structural Metal Components and Recording requirements. Are there any question?

OPPORTUNITY FOR QUESTIONS:

1. QUESTIONS FROM THE CLASS

2. QUESTION TO THE CLASS:

a. How long are ACI's retained?

Until successful completion of the next inspection/test

INTERIM TRANSITION: Are there any more question? Let's move into the demonstration

(ON SLIDE #113)

INSTRUCTOR NOTE

Perform the following demonstration.

DEMONSTRATION (30 MIN) Using the wire rope, hardware, and sheave training aids demonstrate the proper way to inspect, reject, document and record defects.

1. Inspection

a) Inspect wire ropes for kinks, crushes, flattened sections and wear. Ensure you explain to the students, using the training aids, what exactly they should be looking for. Also restate that they will never use marlin spikes.

b) Inspect hook block end connections. Take the students outside and show them an actual horses head for this demonstration.

c) Inspect sheaves (Block and Horses Head). Use the sheave gauge, ensuring that all students can see. Ensure to rotate the sheave at least twice during the inspection.

2. Rejection criteria

a) An accumulation of defects will determine if the wire rope is rejected.

b) Determine if the item meets the rejection criteria.

3. Document and recording defects/discrepancies

a) Properly document the defects/discrepancies on the ACI checklist.

STUDENT ROLE: Observe process and ask questions.

INSTRUCTOR(S) ROLE: Demonstrate how to properly conduct the inspection.

1. **Safety Brief:** Ensure the training aid is in constant contact with the table to prevent it from falling.

2. **Supervision & Guidance:** Students will be encouraged to ask questions and make notes on their application.

3. **Debrief:** Are there any questions or comments concerning the inspection, rejection, documentation or record defects?

(ON SLIDE #114)

(BREAK 10 MIN)

TRANSITION: Now that we have covered how a condition inspection is done are there any more questions? If not let's move on to what resources are required to perform load tests.

(ON SLIDE #115-118)

9. **Facilities Required** (5 MIN)

The following facilities are required for load testing mobile cranes and aerial personnel devices.

a. A sufficiently large, level hardstand.

b. A deadman strong enough to withstand at least 150% of the area's largest mobile crane's capacity.

c. A calibrated Baldwin SR-4 load cell, or its equivalent, with a capacity of measuring at least 150% of the area's largest mobile crane's capacity.

d. Calibrated weights heavy and dense (compact) enough to be used in the load tests described.

(1) MCB, Camp Pendleton, California and MCLB, Barstow, California presently possess well-designed deadman/load lifting measuring devices. Liaison with these installations is encouraged to determine data required to build similar facilities at other Marine Corps installations.

TRANSITION: Now they we have covered what resources are required to perform load tests. Are there and questions? Let's talk about some general information on the test itself.

(ON SLIDE #119-121)

10. Load Test General Information (10 MIN)

a. Prescribed tests are overload tests and extreme caution should be observed at all times. When testing hydraulic boom cranes, an outrigger opposite a load positioned at a swing angle of 45° , 135° , 225° , and 315° (Measured from the front of the vehicle as 0°) may rise off the ground. This is not tipping. At no time during testing should two outriggers of a hydraulic boom crane rise off the ground. If this condition occurs, testing should immediately be terminated by lowering the test load to the ground. A condition inspection per the instructions contained in paragraph 2000, of MCO P11262.2, will be conducted prior to load testing.

b. Personnel shall remain clear of suspended loads and areas where they could be struck in the event of boom failure.

c. The test load should be raised only to a height sufficient to perform the test.

d. Items of Marine Corps equipment shall not be used as load testing weights.

INSTRUCTOR NOTE

Brief students on the "Interim policy and procedures for the inspection, testing, and certification of Marine Corps tactical ground load lifting equipment during continuous combat operations." Dated 15 Apr 2011

e. Safety chains attached to outriggers on the side opposite the lift are recommended to preclude accidental rollover during maximum (overload) testing.

f. Wooden cribbing under the crane's counterweight is recommended to prevent rear rollover in the event a wire rope or hook fails during maximum (overload) testing.

(ON SLIDE #122,123)

TRANSITION: We have just covered facilities required and general information. Are there any questions?

OPPORTUNITY FOR QUESTIONS:

1. QUESTIONS FROM THE CLASS

2. QUESTIONS TO THE CLASS:

a. How strong should a DEADMAN be for load test?

150% of areas largest crane capacity.

b. What item of MC gear can be used for load testing?

NONE

(ON SLIDE #124)

(BREAK 10 MIN)

TRANSITION: Now that we have covered some general testing information, are there any more questions? Now let us get into the actual testing procedures.

(ON SLIDE #125-138)

11. **Cranes Testing** (45 MIN)

a. Extend outriggers and raise the crane carrier off the ground to completely unload tires or wheels. Level the crane as required by the manufacturer's load chart. Rotate the boom 90^0 from the longitudinal axis of the crane carrier and position the boom at the minimum working radius.

b. No-Load Test

(1) Hoist:

(a) Raise and lower the hook through the full working distance of hook travel.

(b) Run the hoist block into the limit switch(es) (where installed) at slow speed.

(c) Run the hoist block beyond the limit switch(es) (where installed) by using the bypass switch.

(2) Boom:

(a) Raise and lower the boom through the full working range.

(b) Raise the boom into the upper limit switch (where installed) Raise the boom past the boom upper limit switch, using the bypass switch.

(c) Test the lower limit switch (where installed) by the same procedure prescribed for testing the upper limit switch.

(d) Extend and retract the telescoping boom sections the full distance of travel.

(e) Check the radius indicator by measuring the radius at the minimum and maximum boom angle.

(f) Other motions, including swing, shall be operated through one cycle (one full revolution of major components).

c. Load Test. The load test consists of two parts: a maximum load test and a stability test. The tests will be performed in the following sequence:

(1) Maximum Test

(a) Position the crane with the boom at maximum prescribed lift angle, hook attached to the load lifting measuring device, with the position of the boom 90^0 to the right or left of the lower carrier frame, outriggers must be at full horizontal extension and vertical jacks lowered to level the turntable bearing. Check level with carpenter's level. Place level in direction of boom and at 90^0 to direction of boom to establish a level turntable. Tires must be free of ground for test, and the wire rope connecting the hook to the boom in a vertical configuration (check wire rope with carpenter's level).

(b) Exert 110% of the crane's rated capacity on the load lifting measuring device and hold for one minute. Slowly decrease load until wire rope is barely slack. Repeat this test once more. The hook will be inspected per the procedures in paragraph 5 of this student outline. This will serve as the nondestructive hook test.

(2) Stability Test

(a) Choose any load from the load chart below the black (bold) line of the rated load 360^0 chart. All weights above the bold line are in the structural strength portion of the load chart, and all weight below the bold line are in the stability portion. The test load must be able to clear outriggers during full 360^0 rotation.

(b) Position of the crane for the lift is to be either right or left side at 90^0 to side of the lower carrier frame.

(c) Outriggers must be at full horizontal extension and vertical jacks lowered to level the turntable

bearing. Check the level of the crane deck or frame with carpenter's level. Place the level in the direction of boom and at 90^0 to the direction of boom to establish a level turntable. Tires must be free of the ground for the test.

(d) Position the hook block in a manner to obtain the appropriate operating test radius for test boom length. Confirm the test radius by the actual measurement of the operating radius from the hook to the center of rotation. Adjustment may be necessary to obtain the specified radius.

(e) Mark the operating radius with a line of sufficient length to ensure its visibility when the load is suspended over it. The line should be on an arc about the axis of rotation for the tested radius.

(f) Position the test load inside the selected operating radius. The "rated load" is equal to the test weight plus hook-block weight (approximately 620 lbs) plus sling weight.

(g) Boom up 2^0 to 4^0 to position the hook block over the load and to compensate for boom deflection. Lift the rated load. Boom down while keeping load close to ground until the rated load and hook block is centered over the selected operating radius and suspends the rated load 2" to 4" above the ground.

(h) Swing the crane through the 360^0 rotation.

(i) Lower load.

(ON SLIDE #139,140)

TRANSITION: We just talked about the testing of the crane itself. Are there any questions?

OPPORTUNITY FOR QUESTIONS:

1. QUESTIONS FROM THE CLASS

2. QUESTIONS TO THE CLASS:

a. How do you confirm proper radius?

By actual measurement.

b. What is the max capacity of a load test?

110%

TRANSITION: We just talked about the testing of the crane itself, let us talk about the man basket.

(ON SLIDE #141,142)

12. **Aerial Personnel Devices** (5 MIN)

a. General Information. The sequence of inspections shall be condition inspection, no-load test, and load test.

b. Pre-operation. The operator shall perform a pre-operation check as prescribed in the appropriate TM's. For equipment where such a checklist is not included in the manual, the following shall be conducted as a minimum requirement:

(1) Position the vehicle on the test site.

(2) Check for proper markings.

(3) Carefully inspect all safety devices, including all specialized features.

c. Condition Inspection. This inspection shall be conducted per the instructions contained in paragraph 2000 of MCO P11262.2.

d. Load Test (Stability and Range of Movement). The load test shall be conducted with the vehicle not fastened to any artificial base and the outriggers in place. All tests shall be conducted using the ground level controls. At no time will personnel be permitted to ride on the platform (basket). The platform shall be loaded with an evenly distributed load equal to twice the rated working load and exercised through the full range of horizontal and vertical positions, to include at least the following:

(1) The upper and lower arms are moved to a horizontal or their most horizontal plane and extended to the maximum reach.

(2) The lower arm is moved to a horizontal or near horizontal position over the side of the vehicle and the upper arm is moved to the most vertical position possible.

(3) With the lower arm at the maximum travel from the towed position and the upper arm both horizontal and 45° to the side of the vehicle, or over the four corners of the vehicle, rotate the turntable both clockwise and counterclockwise with the test load through 360° for a minimum of 15 minutes.

(ON SLIDE #143,144)

TRANSITION: We just talked about Aerial Personnel Devices. Are there any questions?

OPPORTUNITY FOR QUESTIONS

1. QUESTIONS FROM THE CLASS?

2. QUESTIONS TO THE CLASS.

a. How much weight is used to test aerial personnel devices?

Twice the rated working load.

b. While testing a aerial personnel device, the turntable is rotated a minimum of how long?

(ON SLIDE #145)

(BREAK 10 MIN)

(BREAK/END OF TRAINING DAY)

INTERIM TRANSITION: Are there any questions about anything we have covered before moving into the practical application?

(ON SLIDE #146)

INSTRUCTOR NOTE

Introduce the following Practical Application.

PRACTICAL APPLICATION. (8 HOURS) Have the students conduct an Annual Condition Inspection (ACI) and load test on a MAC-50 and LRT-110 crane and an ACI on a TRAM.

PRACTICE: Students will conduct the following;

- a) Use the Annual Condition Inspection checklist to conduct the proper ACI.
- b) Use the required equipment (Dead man, Dynamometer, dial caliper, 100' tape, electronic level, and calibrated weights) to conduct a proper load test.

PROVIDE HELP: Observe the students and answer questions.

1. Safety Brief: Ensure that all students are wearing proper PPE while conducting inspection/testing. Ensure that all students remain clear of all training aids that are suspended or moving. A ground guide will be used during all lifting operations.

2. Supervision & Guidance: Be sure to follow the checklist step by step as covered in the student outline along with the instructor's supervision.

3. Debrief: Are there any questions or comments concerning the conduct of the ACI and load test. To ensure that your equipment is capable to perform the required mission it is paramount that the inspection and testing is completed correctly and when required.

TRANSITION: Are there any questions concerning the practical application or anything else we have covered?

(ON SLIDE #147-148)

OPPORTUNITY FOR QUESTIONS

1. QUESTIONS FROM THE CLASS?

2. QUESTIONS TO THE CLASS.

a. Who is required to sign a finished ACI?

Certifying Officer, Test Director, and Inspector

b. What equipment requires a ACI

All load lifting equipment

(ON SLIDE #149)

SUMMARY:

(10 min)

During this period of instruction we covered, load-lifting requirements, how to conduct inspection, testing, and certification of tactical ground load lifting equipment as well as load testing of equipment. Now that you have a better understanding of load testing and inspection procedures you can now conduct, supervise and manage your testing program.

The Marines that have the IRF, finish filling them out and hand them to the instructor the remainder of the class take a 10 minute break.

(BREAK 10 MIN)