

TRUCK, LIGHTWEIGHT AND TRUCK LIGHT – ALL TYPES – LAND ROVER 110 4X4 AND 6X6

INSPECTION GUIDELINES

EQUIPMENT INSPECTION AND EXAMINATION DATA

This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with EMEI General A 001.

INTRODUCTION

1. The purpose of this instruction is to provide inspection guidelines for Land Rover 110 vehicles and to ensure that the vehicles are classified in a consistent manner. A Land Rover which passes this inspection may be deemed safe for use. This specification however does not infer anything about suitability for designated military roles specific to the vehicle.
2. This instruction provides guidance for inspection and details the criteria necessary to determine roadworthiness. While the guidelines contain some flexibility, if they are interpreted with technical judgment they will assist inspectors to arrive at common conclusions.
3. This instruction is intended to help inspectors develop a procedure for inspections based on current policy. It should only need to be referred to occasionally by experienced inspectors.
4. This instruction is to be used as guidance during the completion of Complete Equipment Inspections, Reclassification Inspections, NFW Inspections, BR Inspections and Special Inspections

Associated Publications

5. Reference may be necessary to the latest issue of the following documents:
 - a. [Defence Road Transport Instructions](#) (DRTI);
 - b. Current version of the Technical Regulation of ADF Materiel Manual – Land (TRAMM-L) (available from DTR-A website: <http://intranet.defence.gov.au/armyweb/Sites/DTRA/docs/tramml.pdf>);
 - c. [Electronic Supply Chain Manual](#) (ESCM);
 - d. Land Rover All Variants:
 - (1) [EMEI Vehicle A 291-1](#) – Tyres And Tubes – Care And Maintenance of B Vehicles;
 - (2) [EMEI Vehicle A 291-5](#) – Tyres And Tubes – General Service B Vehicle Tyre Guide;
 - (3) [EMEI Vehicle A 468-1](#) – Crack Inspection Of Land Rover Wheel Rim;
 - (4) [EMEI Vehicle A 548-1](#) – Vehicle Seat Belts Inspection Data;
 - (5) [EMEI Vehicle D 108](#) – Recovery Equipment – Inspection of Recovery Equipment;
 - (6) [EMEI Vehicle G 008-1](#) – Truck, Light and Lightweight, MC2 – All Types Inspection and Repair of Towing Pintle Assembly;
 - (7) [EMEI Vehicle G 187-9](#) – Truck, Lightweight and Truck, Light - All Types - Land Rover 110 4X4 and 6X6 – Repositioning of the Air Inlet Hose and Rear Axle Breather;
 - (8) [EMEI Vehicle G 188-1](#) – Suspension and Steering Inspection Procedure;
 - (9) [EMEI Vehicle G 189-17](#) – Truck, Lightweight and Truck, Light - All Types - Land Rover 110 4X4 and 6X6 – Chassis Crack Inspection and Repair;
 - (10) [EMEI Workshop H 149-1](#) – Vehicle Jacks – Hydraulic (Bottle) Vehicle Jacks, Inspection and Servicing; and
 - (11) [EMEI Workshop H 149-2](#) – Vehicle Jacks – Mechanical Inspection and Servicing;

- e. Land Rover 4X4 Variants:
- (1) [EMEI Vehicle G 103](#) – Truck, Utility, Lightweight and Truck, Utility, Lightweight, Winch, MC2 – Land Rover 110 4X4 – Light Grade Repair;
 - (2) [EMEI Vehicle G 104-1](#) – Truck, Utility, Lightweight and Truck, Utility, Lightweight, Winch, MC2 – Land Rover 110 4X4 – Medium Grade Repair;
 - (3) [EMEI Vehicle G 104-2](#) – Truck, Utility, Lightweight and Truck, Utility, Lightweight, Winch, MC2 – Land Rover 110 4X4 – Heavy Grade Repair;
 - (4) [EMEI Vehicle G 113](#) – Truck, Utility, Lightweight, FFR and Truck, Utility, Lightweight, FFR, Winch, MC2 – Land Rover 110 4X4 – Light Grade Repair;
 - (5) [EMEI Vehicle G 114](#) – Truck, Utility, Lightweight, FFR and Truck, Utility, Lightweight, FFR, Winch, MC2 – Land Rover 110 4X4 – Medium and Heavy Grade Repair;
 - (6) [EMEI Vehicle G 123](#) – Truck, Panel, Lightweight, Survey, FFR, Winch, MC2 – Land Rover 110 4X4 – Light Grade Repair;
 - (7) [EMEI Vehicle G 124](#) – Truck, Panel, Lightweight, Survey, FFR, Winch, MC2 – Land Rover 110 4X4 – Medium and Heavy Grade Repair;
 - (8) [EMEI Vehicle G 133](#) – Truck, Surveillance, Lightweight, Winch, MC2 – Land Rover 110 4X4 – Light Grade Repair;
 - (9) [EMEI Vehicle G 134](#) – Truck, Surveillance, Lightweight, Winch, MC2 – Land Rover 110 4X4 – Medium and Heavy Grade Repair;
 - (10) [EMEI Vehicle G 143](#) – Truck, Carryall, Lightweight, Senior Commander, Winch, MC2 – Land Rover 110 4X4 – Light Grade Repair;
 - (11) [EMEI Vehicle G 144](#) – Truck, Carryall, Lightweight, Senior Commander, Winch, MC2 – Land Rover 110 4X4 – Medium and Heavy Grade Repair;
 - (12) [EMEI Vehicle G 153](#) – Truck, Carryall, Lightweight, Personnel Carrier, MC2 – Land Rover 110 4X4 – Light Grade Repair;
 - (13) [EMEI Vehicle G 154](#) – Truck, Carryall, Lightweight, Personnel Carrier, MC2 – Land Rover 110 4X4 – Medium and Heavy Grade Repair;
 - (14) EMEI Vehicle G 163 – Truck, Lightweight, Surveillance and Reconnaissance, Winch, MC2-Land Rover 110 4X4 – Light Grade Repair (to be published);
 - (15) EMEI Vehicle G 164 – Truck, Lightweight, Surveillance and Reconnaissance, Winch, MC2-Land Rover 110 4X4 – Medium and Heavy Grade Repair (to be published);
- f. Land Rover 6X6 Variants:
- (1) [EMEI Vehicle G 203](#) – Truck, Cargo, Light and Truck, Light, Winch, MC2 – Land Rover 110 6X6 – Light Grade Repair;
 - (2) [EMEI Vehicle G 204-1](#) – Truck, Cargo, Light and Truck, Light, Winch, MC2 – Land Rover 110 6X6 – Medium Grade Repair;
 - (3) EMEI Vehicle G 204-2 – Truck, Cargo, Light and Truck, Light, Winch, MC2 – Land Rover 110 6X6 – Heavy Grade Repair (to be published);
 - (4) [EMEI Vehicle G 213](#) – Truck, Air Defence, Light, FFR, Winch, MC2 – Land Rover 110 6X6 – Light Grade Repair;
 - (5) EMEI Vehicle G 214 – Truck, Air Defence, Light, FFR, Winch, MC2 – Land Rover 110 6X6 – Medium and Heavy Grade Repair (to be published);
 - (6) [EMEI Vehicle G 223](#) – Truck, Ambulance, Light, Four Litter, FFR, Winch, MC2 – Land Rover 110 6X6 – Light Grade Repair;
 - (7) EMEI Vehicle G 224 – Truck, Ambulance, Light, Four Litter, FFR, Winch, MC2 – Land Rover 110 6X6 – Medium and Heavy Grade Repair (to be published);

- (8) [EMEI Vehicle G 233](#) – Truck, Long Range Patrol, Light, Winch, MC2 – Land Rover 110 6X6 – Light Grade Repair;
- (9) EMEI Vehicle G 234 – Truck, Long Range Patrol, Light, Winch, MC2 – Land Rover 110 6X6 – Medium and Heavy Grade Repair (to be published);
- (10) [EMEI Vehicle G 243](#) – Truck, General Maintenance, Light, Winch, MC2 – Land Rover 110 6X6 – Light Grade Repair;
- (11) EMEI Vehicle G 244 – Truck, General Maintenance, Light, Winch, MC2 – Land Rover 110 6X6 – Medium and Heavy Grade Repair (to be published);
- (12) [EMEI Vehicle G 253](#) – Truck, Electronic Repair and Truck Comsec Repair, Light, Winch, MC2 – Land Rover 110 6X6 – Light Grade Repair;
- (13) EMEI Vehicle G 254 – Truck, Electronic Repair and Truck Comsec Repair, Light, Winch, MC2 – Land Rover 110 6X6 – Medium and Heavy Grade Repair (to be published);
- (14) [EMEI Vehicle G 263](#) – Truck, Cargo, Light, Crew Cab, Winch, MC2 – Land Rover 110 6X6 Parakeet – Light Grade Repair;
- (15) EMEI Vehicle G 264 – Truck, Cargo, Light, Crew Cab, Winch, MC2 – Land Rover 110 6X6 Parakeet – Medium and Heavy Grade Repair (to be published);
- (16) EMEI Vehicle G 273 – Truck, Light, Infantry & Mortar Carriers, FFR, Winch, MC2 & Truck, Light, Assault Pioneer, Winch, MC2, & Truck Light, Direct Fire Weapons, FFR, Winch, MC2 - Land Rover 110 6X6– Light Grade Repair (to be published);
- (17) EMEI Vehicle G 274 – Truck, Light, Infantry & Mortar Carriers, FFR, Winch, MC2 & Truck, Light, Assault Pioneer, Winch, MC2, & Truck Light, Direct Fire Weapons, FFR, Winch, MC2 - Land Rover 110 6X6– Medium and Heavy Grade Repair (to be published); and
- (18) [EMEI Workshop E 544](#) – Occupational Health and Safety Instructions – Safety Inspections and Testing Of Electrical Equipment.

Authorised Tradespersons

6. Actions detailed in this instruction can be performed by technical maintenance organisations authorised to perform Light, Medium or Heavy Grade Repairs. The inspection is to be performed by the following qualified tradespeople appropriate to the task:

- a. ECN-229 Vehicle Mechanic;
- b. ECN-226 Recovery Mechanic;
- c. ECN-418 Technician Electrical;
- d. ECN-146 Fitter Armament; or
- e. Triservice/civilian equivalent.

7. A thorough vehicle inspection can only be achieved if the inspector possesses the necessary knowledge, technical judgement and common sense required for the task.

8. This inspection consists of a static inspection and a road test.

Recording Action

9. The results of the inspection are to be recorded on a GI 041 Technical Inspection Report – Vehicles (TI), Part 2 of the Vehicle GM120 – Record Book for Service Equipment and MIMS Maintenance Module (MMM) in accordance with normal unit procedures, making reference to this EMEI.

GENERAL PROCEDURES

Guiding Principles

10. When using this instruction, the following principles are relevant:

- a. Equipment necessary for wheel changing and self-recovery which is part of the vehicle's Complete Equipment Schedule (CES) must be present and inspected in accordance with relevant referenced documentation in Para 5.d.
- b. Ancillary or miscellaneous equipment that is not part of the vehicle's CES and has no direct effect on the vehicle's safe operation or the control of its emissions does not have to be inspected in accordance with this EMEI.

Identification

11. In order to correctly identify the vehicle and record the correct data the following is to be performed:
 - a. Identification must be obtained from the vehicle itself, not only from the Vehicle's GM 120 – Record Book for Service Equipment.
 - b. All sections of the TI (hardcopy or MMM) must be completed and legible.
 - c. The engine number and chassis number:
 - (1) must not be altered,
 - (2) are to be verified as correct in the GM 120, and
 - (3) are to be recorded on the TI.
 - d. The current odometer reading and hours (for FFR variants) must be recorded on the TI.

Modifications

12. To check that modifications have been carried out in an approved manner, the following requirements are to be verified:
 - a. **Modifications Authorised Under EMEI.** Check for the implementation of authorised modifications under EMEI as follows:
 - (1) All Group 1 modifications must have been completed in accordance with the relevant EMEI. The vehicle is to be classified '**Do Not Use – XX**' if there are outstanding Group 1 modifications.
 - (2) Any Group 2 modifications that have been completed must be in accordance with the relevant EMEI.
 - (3) Any Group 1 or 2 modifications that have not been completed must be recorded on the TI.
 - (4) The modification plate must be correctly defaced to identify the modifications that have been completed. Modification plates are to be defaced by the use of an 8 mm drill bit to remove the surface colour of the modification plate.
 - b. **Modifications Authorised Under the TRAMM.** Modifications that have been properly authorised locally under the TRAMM are to have the details recorded in the Vehicle GM 120. The inspector is to ensure that they have been completed correctly, in accordance with the authorisation, and that they remain safe to use.

STATIC INSPECTION

Engine and Engine Compartment

13. The vehicle is to be classified '**Do Not Use – XX**' if during a visual inspection of the engine and engine compartment any of the following are found:
 - a. oil leaks from the engine that allow oil to drop onto the road surface, exhaust system or brake components;

NOTE

The practical interpretation of this requirement is that the vehicle should be classified '**Do Not Use – XX**' if fresh oil drips become evident on the pavement under the vehicle during the time it takes to complete the inspection.

- b.** seals on covers between the engine and the passenger compartment are missing, distorted, or damaged in a way that allows fumes to enter the passenger compartment;
- c.** an engine mounting is broken or not secured;
- d.** the engine oil level is below the minimum level;
- e.** the radiator and/or hoses are damaged, holed, perished, cracked etc. in any way;
- f.** a check of the radiator coolant reveals:
 - (1)** the level is below the minimum;
 - (2)** there is no label in the engine compartment identifying the coolant used; or
 - (3)** the coolant label is for a coolant type other than those approved for the vehicle;

NOTE

Nalcool Maximum is the approved coolant and has replaced the now obsolete Alfloc 3601. Either coolant is acceptable, provided that a label in the engine compartment identifies the coolant used. For the LRPV variant only, Alfloc Maxitreat 3777 is the approved coolant.

- g.** V-belts are missing, cracked, perished, stretched or loose;
- h.** the bonnet latch and safety catch are missing, damaged, or not adjusted in accordance with EMEI Vehicle G 103 (4X4 variants) and Vehicle G 203 (6X6 variants);
- i.** the bonnet hinge bushes are missing, damaged, or not fitted in accordance with EMEI Vehicle G 103 (4X4 variants) and Vehicle G 203 (6X6 variants);
- j.** the air intake opening is not facing the correct way, in accordance with EMEI Vehicle G 187-9;
- k.** the air intake tube is rubbing on top of the oil filter or any adjacent clutch or brakelines; or
- l.** the heater air intake rubber drain valve is blocked.

Electrical

14. The vehicle is to be classified '**Do Not Use – XX**' if during an inspection of the vehicle's electrical system any of the following is found:

- a.** the electrical wiring or connectors are damaged or hanging loose;
- b.** any batteries (main, FFR and/or auxiliary) are not securely mounted or are leaking;
- c.** any batteries are in poor condition;
- d.** the battery cable clamps are not clean and tight;
- e.** a vehicle's battery isolation switch or battery management system (if fitted) fail to operate correctly; or
- f.** the GMV, ERV or Comsec 6X6 variants fail to comply with the electrical integrity test requirements in accordance with EMEI Workshop E 544.

15. Other aspects of vehicle specific electrical systems may also require a '**Do Not Use – XX**' classification after inspection.

Brakes

16. Inspect the brake booster to ensure the drain hole is at the bottom of the booster as any brake fluid leakage into the booster may damage the diaphragm.

17. The vehicle is to be classified '**Do Not Use - XX**' if during an inspection of the vehicle's braking system any of the following faults is found:

- a.** metal is showing on rubber faced pedals;
- b.** there is no effective anti-slip surface on metal faced brake pedals;

- c. the pedal shaft is bent, damaged or misaligned (outside the scope of the manufacturer's original design);
- d. the pedal, handle, lever, and/or associated components are missing, not secure, not correctly adjusted, bind or are worn and affect efficient operation;
- e. when the engine is running and the brakes are firmly applied, less than 20% of the pedal travel remains;
- f. when the engine is running and steady moderate pressure is applied to the brake pedal for at least 10 seconds, the pedal travels towards the floor or the brake failure indicator light comes on;
- g. there is an indication of air in the hydraulic brake system;
- h. the brake pedal does not have free travel in accordance with the vehicle manufacturer's specifications;
- i. when not in use, the brake pedal does not return to the fully released position;
- j. the brake failure warning light fails to illuminate when starting the engine;
- k. the brake failure warning lamp remains illuminated when the ignition is on and the vehicle is running;
- l. the parking brake ratchet or locking device does not hold the park brake in its applied position;
- m. the parking brake does not fully release when the control is released;
- n. the park brake warning lamp does not operate when the ignition is 'on' and the parking brake is applied;
- o. where any visible brake component is damaged, corroded, broken, seized, excessively worn, leaking, contaminated or is not securely mounted;
- p. any hydraulic hose which is:
 - (1) damaged or severely deteriorated;
 - (2) twisted;
 - (3) not of the type approved for use and marked with the name or trademark of the manufacturer; or
 - (4) of insufficient length to allow for the full range of steering and suspension movement;
- q. any hydraulic brake line showing signs of chaffing, abrasive wear or is not constructed of an approved material as specified in the RPS;
- r. it is evident that the vacuum assistance for the brakes is not operating;
- s. the vacuum pump drive belt (the 12-volt alternator drive belt) is loose, frayed, split, cut or worn;
- t. the level of brake fluid is below the minimum indicated level;
- u. the thickness of disc brake pads is less than 3 mm;
- v. the thickness of drum brake pads is less than 3 mm;
- w. disc rotors are worn or machined to less than 13 mm thick or scoring is greater than 1.5 mm deep;
- x. there are visible cracks on friction surfaces, external cracks or mechanical damage; or
- y. lining material is contaminated with oil, grease or brake fluid.

Transmission and Drive Line

18. The vehicle is to be classified 'Do Not Use – XX' if during a visual inspection of the transmission and drive line any of the following is found:

- a. there are oil leaks from the transmission or drive line that allow oil to drop onto the road surface, exhaust system or brake components;

NOTE

The practical interpretation of this requirement is that the vehicle should be classified 'Do Not Use – XX' if fresh oil drips become evident on the pavement under the vehicle during the time it takes to complete the inspection.

- b. any transmission mounting is broken or not secured;
- c. fasteners on couplings in the drive line are loose or missing;
- d. any transmission drive shaft is bent, damaged, loose, visibly misaligned or excessively worn (propellor shaft slip joints, when greased should have no discernible movement); or
- e. any universal or constant velocity joint has excessive wear, is misaligned, seized, not securely attached or has a damaged or missing boot.

Suspension

19. The vehicle is to be classified '**Do Not Use - XX**' if during a visual inspection of the vehicle's suspension system any of the following is found (this may include limited application of the inspector's weight to the vehicle):

- a. any suspension component is broken, insecure, cracked, cut, damaged, missing or illegally repaired by heating or welding;

NOTE

There are authorised repair procedures for the repair or reclamation of certain suspension components that may involve heating and/or welding (At the time of issue of EMEI Vehicle G 188, these repair procedures are currently being drafted as EMEI).

- b. any rubber bushings that are perished, swollen or show signs of separation;

NOTE

Superficial crazing is acceptable on rubber bushes. This is often present on rubber suspension components that are new.

- c. any shock absorber is dented, leaking, exhibits shaft corrosion, or is not securely mounted;
- d. any nut, bolt or locking device is missing or not secure;
- e. any axle or suspension component, U-bolt, spring hanger, centre bolt etc. associated with the axle installation or operation, is cracked, loose, broken, damaged, or missing;
- f. any springs are cracked, broken, missing, displaced from centre by more than 10% of their width or in contact with wheels, brakes or the chassis; or
- g. any component fails its inspection criteria in accordance with EMEI Vehicle G 188-1.

Steering

20. The vehicle is to be classified '**Do Not Use - XX**' if during an inspection of the vehicle's steering system any of the following is found:

- a. if the steering wheel does not turn the same revolutions between left and right full lock from the straight ahead position;
- b. the steering wheel is loose on the steering column;
- c. the steering wheel grip has deteriorated, affecting the driver's control;
- d. the steering wheel has structural damage;
- e. the steering wheel fitted is not the approved type;
- f. any steering component is missing, cracked, broken, distorted or not securely mounted;
- g. any steering components seen to have been repaired or modified by heating or welding;
- h. any nut, bolt or locking device is missing or insecure;
- i. the steering box is not securely fixed to the vehicle;
- j. there is any movement on the spline between the pitman arm and the steering box or between any thread and tapered joint;

- k. any power steering component is leaking, damaged, or inoperative;
- l. any power steering belts are loose, broken, frayed, missing, or cracked through to the reinforcing plies;
or
- m. any component fails the inspection criteria in accordance with EMEI Vehicle G 188-1.

Body and Chassis

21. The vehicle is to be classified 'Do Not Use - XX' if during an inspection of the vehicle's body any of the following is found:

- a. doors, door locks and latches, and bonnet locks and latches with:
 - (1) any inside or outside door latch, control or hinge that is not secure or functional;
 - (2) any hinges, or slides for doors, tailgates, side gates, hatches or compartment covers that are damaged or worn and are not likely to prevent either the load or passengers from falling off; or
 - (3) a primary and secondary securing device on the bonnet which does not function;
- b. on the windscreen and glazing:
 - (1) the windscreen is missing unless it is an authorised vehicle configuration;
 - (2) the wiped area of the windscreen in front of the driver and on the right-hand side of the vehicle has:
 - (a) damage such as scoring, sandblasting or discolouration caused by delamination that interferes with the driver's view;
 - (b) bulls eyes or star fractures over 16 mm in diameter; or
 - (c) cracks over 150 mm long in a single layer of glass;

NOTE

Bullseye or star fractures UP TO 16 mm in diameter and cracks UP TO 150 mm long in a single layer of glass are allowable, provided that they do not impair the driver's vision to the extent that the vehicle cannot be driven safely.

- (3) cracks in a laminated windscreen that penetrate more than one layer of glass;
 - (4) glazing is not of an approved type of safety glass and does not bear an identification mark indicating the standard (AS 2080) to which the glass has been manufactured;
 - (5) glazing is loose in its frame or cracked to the extent that sharp edges are exposed (e.g. laminated glazing is cracked on the inside);
 - (6) the driver's and passenger's side window is discoloured, distorted, obscured, badly scratched, sandblasted or fractured to the extent that it interferes with the driver's view; or
 - (7) items are present, which obscure the driver's view or the corresponding area on the other side of the windscreen (e.g. posters, stickers or other non-transparent materials);
- c. body panels, chassis and subframes where:

WARNING

The vehicle body work and fittings, both exterior and interior, have sharp edges that could cause injury. This includes those caused by corroded panels or body damage.

- (1) any structural member of the chassis frame, cabin or body is cracked, broken, distorted or corroded to the extent that the component is weakened or a failure of a component is likely to occur, or any structural member is loose (Ref EMEI Vehicle G 189-17 for guidelines on the classification of chassis cracks);

- (2) the cabin, body and any attachment/fitting is not securely mounted to the frame or chassis (e.g. cam net carrier, radio and antenna mounts, and other ancillary equipment designed for integration into the vehicle); or
- (3) any repairs carried out do not retain the original strength of the component/section;

NOTE

Minor rust/corrosion in body panels is not considered dangerous to structural integrity. Pay particular attention to seat belt and seat anchorages. Further guidance on rust and corrosion is provided in Paras 28 to 37.

- d. inspection of rear vision mirrors reveals:
 - (1) rear vision mirrors are not fitted;
 - (2) rear vision mirrors do not provide a clear view to the rear; or
 - (3) rear vision mirrors are not securely mounted and free from damage, blemishes or tarnishing that would reduce the view to the rear of the vehicle;
- e. inspection of the number plates reveals that:
 - (1) a number plate is obscured (e.g. by a fitting or other attachment);
 - (2) a number plate is damaged or faded to the extent that the registration number is not legible;
 - (3) the characters on the number plate are not clearly visible from a distance of 20 metres at any point at an angle of 45 degrees from the surface of the number plate above or to either side of the vehicle; or
 - (4) a number plate is not of the type issued or approved by Defence;
- f. the spare wheel carrier is broken or insecure.

Seats and Restraints

22. The vehicle is to be classified ‘Do Not Use - XX’ if during an inspection of the vehicle seats and restraints any of the following is found:

- a. seats and cushions where:
 - (1) seat cushions, backrests, head restraints and seat frames are not fitted, not secure, are structurally damaged, have sharp or jagged edges or protrusions;
 - (2) a seat slide or other seat control used for adjustment of a seating position is not operational and does not hold any selected position allowed for in the mechanism’s design;
 - (3) the seat structure is not securely fastened to the vehicle body or chassis; or
 - (4) seat mounting points show signs of corrosion, distortion, cracks, fractures or other damage likely to lead to failure;
- b. seat belts where:

NOTE

EMEI Vehicle A 548-1 contains details for the inspection of seatbelts.

Discolouration alone is not cause for rejection.

- (1) any seat belt has not been installed in the original position, or any seat belt is missing (unless the vehicle is the subject of a approved modification);
- (2) seat belt assemblies are not securely attached to the respective anchorage point or show signs of distortion, cracks, fractures or other damage likely to cause failure;
- (3) seat belt anchorage points show signs of distortion, cracks, fractures or other damage likely to cause failure;
- (4) seat belt webbing is not correctly and firmly secured to each end fitting or is damaged, frayed, twisted, split, torn, burnt, altered, modified, tied in a knot or has broken stitching;

NOTE

Twisting of seat belt webbing can occur when a male connector is able to slide around to the inside of the belt. Seat belts should be flat over the upper body and lap with no twisting.

- (5) the buckle and tongue mechanisms are not operational;
- (6) adjustment devices are not operational;
- (7) seat belt retractors or locking mechanisms are not operational; or
- (8) any metal seat belt stalks are missing or have broken wires.

Towing Equipment

23. The vehicle is to be classified as **'Restricted Use – RU'** with the restriction **not to be used for towing** if during an inspection of the towing equipment any of the following is found:

- a. the tow coupling (pintle hook) is cracked, excessively worn, deformed, severely corroded, not operational, or damaged in a way likely to cause failure, when inspected in accordance with EMEI Vehicle G 008-1;
- b. any tow coupling mounting bolts are missing or severely corroded;
- c. the 12-pin NATO trailer socket is loose, damaged or deformed to the extent that a trailer plug will not properly connect to it;
- d. the safety chain attachment points are missing, loose, cracked, excessively worn, deformed, severely corroded or damaged in a way that prevents trailer safety chains from being attached, or is likely to cause failure; or
- e. the safety chain retaining pin assembly is not complete with the pin and clip or is excessively worn.

Exhaust System

24. The vehicle is to be classified **'Do Not Use – XX'** if during a visual inspection of the vehicle's exhaust system any of the following is found:

- a. a component of the exhaust system is not securely mounted or is fouling on any other component;
- b. the exhaust pipe outlet is not in the position originally fitted by the manufacturer; or
- c. there is a leak in the exhaust system, excluding manufacturer's drain holes in the mufflers.

Fuel System

25. The vehicle is to be classified **'Do Not Use – XX'** if during a visual inspection of the vehicle's fuel system any of the following is found:

- a. there is any leak from the fuel system;
- b. a part of the fuel system is insecure or damaged so that there is a risk of a fuel leak;
- c. fuel lines are in contact with moving parts or a heat source, are kinked, cracked or not secure;
- d. the fuel tank is not securely mounted and straps, supports, mounting brackets or fasteners are missing, cracked, broken or loose;
- e. the fuel tank is damaged or corroded so that leaks could result;
- f. the fuel filler cap is missing or not suitable for the type of tank; or
- g. the fuel filler cap seal is damaged or missing.

Emissions

26. The vehicle is to be classified **'Do Not Use – XX'** if during a visual inspection of the vehicle emission control system any of the following is found:

- a. the engine lets out sparks, flames, excessive gases, oil or fuel residue;

- b. the vehicle emits visible emissions for a continuous period of more than 10 seconds;

NOTE

A vehicle should not be rejected for emissions that are visible only because of heat or the condensation of water vapour.

- c. the fuel injection system, engine speed governor or any other part of the engine is adjusted so that it increases smoke; or
- d. the cold starting device is kept in a condition that causes the engine to be supplied with excess fuel when the vehicle is in motion.

Wheels and Rims

27. The vehicle is to be classified 'Do Not Use – XX' if during a visual inspection of the vehicle wheels and rims any of the following is found:

- a. wheels or rims are not of an authorised type and construction;
- b. wheels or rims are not secure or are cracked, corroded, bent, buckled or otherwise damaged;
- c. wheels or rims show signs of repairs by welding;
- d. stud or bolt holes are expanded or elongated;
- e. wheels and wheel nut tapers do not match;
- f. wheels are not fitted with the correct number and type of nuts and studs;
- g. studs/nuts are not securely fitted, are damaged and not engaged for at least the same thread length as provided originally by the vehicle manufacturer;
- h. the tyres or rims foul any component at any point over the range of suspension travel or steering movement: or
- i. if the wheel rims have not been inspected at the designated service interval in accordance with EMEI Vehicle A 468-1.

CHECKING FOR RUST

Classification of Rust

28. The extent of corrosion in a vehicle can range from light surface rust to the total breakdown of parent material.

29. There are many different ways in which corrosion can begin and the degree to which a material or structure is attacked can vary widely. In general, the formation of rust and resultant loss of metal occurs in areas that retain moisture (e.g. an area of build-up of road dirt and mud).

30. In order to simplify identification and classification when performing a vehicle inspection, this instruction classifies the extent of corrosion in three different stages, as follows:

- a. **Stage 1 - Surface Rust.** Surface rust is termed as a light powdery corrosion on the surface of a section of metal and is sometimes the first indication of corrosion that can be visually observed. It should warn the vehicle maintainers to take steps to prevent the rust from spreading. Surface rust can occur on or behind any body panel of a vehicle, particularly if the protective coating is scratched or damaged. Removal of surface rust can be achieved simply by rubbing and when cleaned reveals a smooth clean surface.
- b. **Stage 2 - Advanced Rust.** Advanced rust is surface rust left unattended that has developed into an advanced form of corrosion and can usually be seen as an eruption of oxidised metal, either on bare metal or under paint. This eruption occurs because the rust reaction involves an increase in volume so that pitting or bubbling of the paint is the usual indication of penetration. Removal of advanced rust leaves pit marks which can only be eliminated by removal of the parent metal.
- c. **Stage 3 - Extensive Rust.** Extensive rust is the final stage of the corrosion process and is the formation of a heavy encrustation of oxidised metal that completely replaces the parent metal. The rust

will have formed visible flakes, the removal of which leaves a very rough pitted surface. Pits can extend through the thickness of the material and cause eruption on the other side. This results in a hole or a series of holes in the body panel or structural member of the vehicle when the rust is removed. This category of rust can usually only be rectified by replacement of the affected body panels and parts.

Classification of Vehicle Structures

31. Vehicle structural components are categorised according to their importance to safety. For instance, sub-frames and other basic structural sections are only permitted to have surface rust, as their failure could make a vehicle difficult to control and may cause it to crash. Such failures will also probably reduce the chances of survival in a crash. For the purpose of this instruction structures are classified as follows:

- a. **Primary Structure.** A primary structure is any structure or component which, if it collapsed, would make the vehicle uncontrollable or would considerably reduce occupant safety in a crash. Examples of primary structures are:
 - (1) main structural members such as sub-frames and chassis rails,
 - (2) roll over protection structure,
 - (3) suspension mountings and parts,
 - (4) steering component mounting points,
 - (5) door sills and pillars,
 - (6) door hinges and latch mounting points,
 - (7) seat anchorage points,
 - (8) seat belt anchorage points,
 - (9) all floor panels, and
 - (10) bulkheads.

- b. **Secondary Structure.** A secondary structure is any structure or component which, if it collapsed, would not immediately affect a vehicle's controllability or the protection provided by its built-in safety systems. Normally, surface rust or advanced rust would not be a reason for rejection in these components. Extensive rust however, is usually either hazardous to persons in or near the vehicle because of its sharp edges and because exhaust fumes can get into the vehicle. In such cases, extensive rust must therefore be rejected. Examples of secondary structures are:
 - (1) the mudguards or fenders;
 - (2) the roof;
 - (3) the bonnet, doors and tailgate (areas within 100 mm of mounting and locking points must be free of advanced or extensive rust); and
 - (4) the exhaust system.

Reasons for Rejection

32. Table 1 summarises the acceptability of rusted components in terms of the categories of rust and structures described. The contents of Table 1 are general rules only. In some cases it may be necessary to depart from the table.

Table 1 Acceptability of Rusted Components

Serial	Types of Corrosion	Category of Structure	
		Primary	Secondary
1	Surface rust	Not acceptable (Note 1)	Acceptable
2	Advanced rust	Not acceptable	Acceptable (Note 2)
3	Extensive rust	Not acceptable	Not acceptable

Notes:

1. Areas within 100 mm of hinges and locks (e.g. bonnet, doors and tailgates) and A, B and C pillars are considered primary structures and must be free of all rust.
2. Advanced rust is not acceptable in secondary structures, if it has resulted or is likely to result in hazardous conditions to persons in or near the vehicle (e.g. sharp edges, loose panels, or in the case of exhaust system, gas leaks).

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Rust Inspection Method

- 33.** Visual inspection is usually adequate, as advanced corrosion is almost always associated with an eruption of oxidised metal and pitting and bubbling of paint.
- 34.** This method may not be adequate in all cases. In underbody areas prone to rust, such as steering and suspension mounting points and major structural components that include chassis, floor, structural sills and sub-frames, the presence of rust should be checked by probing with a rod. This method should also be used to check for the presence of rust in other areas where cosmetic damage is not a problem, such as inside wheel arches.
- 35.** In using this technique, care must be taken to ensure that sound panels or paint work are not scratched or damaged in any way. It should be remembered that the purpose of such checks is to find out whether rust is present, not to determine its extent.
- 36.** When checking for advanced rust, particular attention should be paid to seam welds and spot welds. These frequently corrode through from the interior and can result in the eventual detachment of panels. Any panel that is made insecure by such corrosion must be repaired, even if it is an area of the component where rust holes are not an immediate danger.
- 37.** Experience has shown that Land Rover vehicles are particularly prone to rust in the following areas and should be checked:
- a.** in the footwell area, particularly where it joins the firewall and the floor pan;
 - b.** in-between the footwell panel and the underside reinforcement panel; and
 - c.** at the lap joint in the upper panel of the left-hand footwell under the heater box.

SAFETY STATIC CHECK (LIGHTS, TYRES ETC.)

- 38.** The static safety check is always to be completed prior to commencing the road test (para 40).
- 39.** The vehicle is to be classified '**Do Not Use – XX**' if during a visual inspection of the equipment any of the following faults are found:
- a.** the windscreen, glass and mirrors fail the criteria as described in para 21.
 - b.** inspection of the lighting reveals:
 - (1)** compulsory red reflectors on the rear of vehicle are damaged, faded, insecure or missing;

NOTE

Reflectors are incorporated into the tail lamp assemblies.

- (2)** any of the following lights do not operate or have the incorrect colour:
 - (a)** headlight (high/low beam) (white);
 - (b)** front park lamps (white);
 - (c)** tail lights (red);
 - (d)** brake lights (red);
 - (e)** turn indicator lights (amber);
 - (f)** number plate light (white); or
 - (g)** reversing lights (white);
- (3)** any rear light, other than a reversing light, is in a condition or damaged to the extent that white light shows to the rear of the vehicle;
- (4)** any front turn indicator light is in a condition or damaged to the extent that it shows white light;
- (5)** the number plate light is not directing light onto the surface of the rear number plate;
- (6)** the turn signal operation is not indicated by means of a visible and/or audible telltale;
- (7)** any instrument panel light does not operate correctly; or
- (8)** the reverse light operates other than when reverse gear is selected;

- c. inspection of the headlights for operation and condition reveals:
- (1) the reflector surfaces are tarnished or damaged to the extent that headlight performance is impaired;
 - (2) lenses are cracked or broken;
 - (3) a headlight assembly is not secured or out of position;
 - (4) a headlight does not show white light;
 - (5) the headlights are not clearly visible under all normal conditions and of a consistent intensity, or are affected by poor electrical contact;
 - (6) the dipping device to change the headlights from the high beam position to the low beam position is not fitted and operational; or
 - (7) the high beam indicator light is not fitted and operational;
- d. the aim of headlights is checked with a tester or testing screen and the headlight is incorrectly adjusted when either:
- (1) on high beam and measured at an effective distance of 8 m, the projected centre of the beam is to the right of the headlight centre and/or above the headlight centre; or
 - (2) measured at an effective distance of 8 m, any part of the top edge of the high intensity portion of the **low beam pattern** is above **and to the right** of the centreline of the headlight;

NOTE

A wall or improvised screen may be used if a testing screen is not available as detailed in EMEI Vehicle G 103.

The portion of the beam to the left of the centre line of the light may extend above the height of the centre line of the headlight.

The centre line of the headlight passes through the centre of the globe filament, or equivalent.

- e. inspection of the tyres reveals:
- (1) the age of the tyre is beyond the limit in accordance with current instructions;
 - (2) the tyre has less than 1.5 mm tread depth on the surface that normally contacts the road;
 - (3) tyres have cuts, bulges, tread separation, exposed or damaged cords, UV damage, or other evidence of case failure;
 - (4) the tyres are not of an authorised type and construction (Ref EMEI Vehicle A 291-5);
 - (5) all tyres fitted to rims on the same axle are not of the same case construction;
 - (6) tyres fitted to rims on an axle or axle group are not the same size;
 - (7) the tyres have been re-grooved;
 - (8) the tyres have been retreaded;
 - (9) the tyre load and/or speed rating, as marked on the tyre side wall, are less than the rating specified by the manufacturer on the tyre placard; or
 - (10) valve stems are cracked, damaged, perished or loose;
- f. inspection of the windscreen wipers and washers reveals:
- (1) windscreen wipers are not operational at all wiper speeds or do not return to their correct position;
 - (2) wiper blade rubbers and wiper arms are not in good condition and are ineffective i.e. rubbers are split, frayed or perished or wiper arms/blades are missing etc; or
 - (3) the windscreen washer system is not operational or correctly aimed;

- g.** a check of the operation of the horn shows:
 - (1)** the horn is not working; or
 - (2)** the horn is not the correct type;
- h.** a check of the windscreen demister shows:
 - (1)** the demister unit is missing; or
 - (2)** there is no air blown onto the windscreen when the demister is turned on;
- i.** when the speedometer indicator values are not legible;
- j.** an inspection of the fire extinguisher inspection tag shows the extinguisher is out of test date; or
- k.** the vehicle jack fails the inspection in accordance with EMEI Workshop H 149-1.

ROAD TEST

- 40.** Prior to starting the road test, ensure that the safety static check (Para 39) has been completed.
- 41.** Do not commence the road test if a defect has been detected during the static inspection or the safety static check which has resulted in a '**Do Not Use – XX**' classification, until the classification has been cleared.

Engine

- 42.** Check the engine as follows:
 - a.** Check the engine for rough idling, misfiring, bearing noises, piston slap and knock.
 - b.** Check for unusual exhaust smoke.
 - c.** Check that the fuel gauge is operating.
 - d.** Check that the volt-meter gauge is operating.
 - e.** When the engine has warmed up, check the maximum engine temperature is within limits.
 - f.** Check the accelerator pedal movement for smooth operation and that the engine returns to idle when the pedal is released.
 - g.** Ensure that the maximum (governed) engine speed is obtained.

Clutch

- 43.** Check the clutch as follows:
 - a.** Check the clutch pedal free travel.
 - b.** If free travel is less than 6 mm (0.250 in.), adjust the clutch to specifications.
 - c.** Check the clutch release while the vehicle is stationary and the engine is running at low idle.

Speedometer

- 44.** Check that the speedometer is functional.

Steering

- 45.** Check the steering as follows:
 - a.** Check for excessive bind in the steering. This may be caused by inadequate lubrication, excessively worn steering or steering axle components.
 - b.** Check for excessive free play in the steering. This may be caused by excessive steering gear backlash, incorrect toe-in, inadequate lubrication or excessively worn steering or steering axle components.
 - c.** Check for steering wander.
 - d.** Check for shimmy in the steering. This may be caused by unbalanced or out-of-round tyres, wheels or brake drums, or play in the steering system.

- e. Check that the steering self-centres when it is released.
- f. Check that the turn signal switch is self-cancelling.

Service Brakes

46. Check the service brakes as follows:

- a. Check for unusual noise during brake operations. Squeal may be caused by glazed linings or linings worn to the rivets.
- b. Check for brake drag. This may be caused by maladjustment, loose wheel bearings or malfunctioning brake wheel cylinders.
- c. A test to state legislative standards may be performed using an appropriately calibrated decelerometer if available. Otherwise, a stopping distance test, as described below, is to be completed. No other methods of brake test are permitted. The service brake test is to be carried out with the vehicle in an unladen condition, using a suitable area with a hard, level surface which is free from gravel or other loose material and at least 100 m long. Perform the test as follows:
 - (1) Drive the vehicle at 35 km/hr.
 - (2) Put the transmission into neutral.
 - (3) With both hands on the steering wheel bring the vehicle to a stop as rapidly as possible in a safe manner with one sustained and smooth braking action (the brakes should not lock-up) using the service brake.
 - (4) The vehicle is to be classified '**Do Not Use – XX**' if either of the following faults is found:
 - (a) the application of the brakes causes the vehicle to swerve from a straight line path; or
 - (b) the stopping distance is greater than 12.5 m for a Land Rover 4x4 variant or 16.5 m for a Land Rover 6x6 variant.

NOTE

12.5 m and 16.5 m is the maximum legal stopping distances for vehicles of this category when tested in this manner. However, if the stopping distance is greater than 11 m for the 4x4 variant or 15 m for the 6x6 variant, it indicates that the brake system may not be in good working order and that it should be inspected further.

Park Brake

47. Check the parking brake as follows:

- a. The park brake of an unladen vehicle must be able to hold the vehicle stationary on a 12% gradient. The vehicle is to be classified '**Do Not Use - XX**' if the parking brake does not hold the vehicle stationary.
- b. Check the operation of the warning light indicating parking brake application.

Transmission and Transfer Case

48. Check the transmission and transfer case as follows:

- a. Check that gear selection takes place quickly and quietly in both high and low range.
- b. Check the lever operation and note any difficult movement or binding and that the transfer case lever does not disengage.
- c. Check for excessive movement of the lever. This indicates wear, which could cause partial engagement of the gears and eventual damage to the transmission or transfer case.
- d. Check for bearing and gear noises or excessive vibration in all gears.
- e. Check the operation of the differential lock and reverse warning lights.

Engine Shutdown

49. Test the engine shutdown by checking the operation of the engine stop motor.

INSPECTION COMPLETION

50. The full inspection is not considered complete until the vehicle has successfully completed a road test.
51. Vehicles incapable of being road tested due to mechanical reasons are to have the Technical Inspection Report and the Vehicle Log Book clearly annotated with the statement 'VEHICLE NOT ROAD TESTED'.
52. Vehicles undergoing reclassification after the completion of repairs are not to be reclassified until they have had a complete road test (including a static safety check).

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END

Distribution List: **VEH G 16.0 – Code 2** (Maint Level)
(Sponsor: LV SPO, Lt B Vehicles)
(Authority: ECO LVSP073/09)