

TRUCK, UTILITY, LIGHTWEIGHT, FFR, MC 2 - LAND ROVER 110  
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ROLL OVER PROTECTION AND  
FITTING OF HEAD RESTRAINTS

MODIFICATION INSTRUCTION

Issue of this instruction is authorised by CONMEA.

Introduction

1. This instruction details the fitting of a roll over protection system to the Land Rover 110, to enhance the strength of the current roll tube (MPN HYG 1877). It will also provide a stable mounting point for the currently fitted seat belt. The fitting of head restraints is also detailed in this instruction.
2. The fitting of the roll over protection system to vehicles fitted with Raven radios will require the modification as detailed in EMEI VEH G 117-2 to be actioned. This modification will move the Raven radio frames inboard by approximately 25mm.

Note:

1. NSN and Designation used in this instruction were current at the date of issue. If twelve months or more have expired since issue, the NSN should be checked for supersession.

General

3. Estimated Modification Time. 4.30 hours.
4. Priority. Group 1. SAFETY MODIFICATION is to be actioned in accordance with EMEI WKSP A 850 issue 4 Jun 89 and completion reported in accordance with the Equipment Maintenance Programme issued by HQ Log Comd MM Div, however continued use of vehicles is permitted prior to modification being completed.
5. Modification to be applied to. All subject vehicles.
6. Item Affected. Roll tube.
7. Action Required. By RAEME units authorised to carry out unit, field and base repairs. Modification is only to be carried out by the following tradesmen:
  - a. Metalsmith ECN 235-2, and
  - b. Defence employed civilian welders including contract repair and JRA approved warranty repair agent welders with welding certificates three and eight in accordance with AS 1796 - 1783 standard.
  - c. Defence employed civilian welders who have been assessed by an authorised assessing officer to have passed ECN 235-2 welding certificate standard; and
  - d. Contract repair and JRA approved warranty repair agent welders with welding certificates three and eight in accordance with AS 1796 - 1783 standard.

TABLE 1 - STORES REQUIRED (To be demanded through normal supply channels). Issue of initial stores for retrofit will be controlled by HQ Log Comd MM Div (Mech Gp).

Note:

- As there are two types of seat assemblies fitted to the vehicles which require different head restraints, there are two kit numbers, with the only component difference being the head restraints.

Item	MPN/NSN	Designation	Qty per Equip
1.	NSN 2540-66-128-5999 HYG 5650 (ISRI seat) NSN 2540-66-128-6000 HYG 5743 (Stratos)	MODIFICATION KIT ROLL TUBE COMPRISING OF:	1
a.	HYG 5584	REAR BRACE - RIGHT HAND	1
b.	HYG 5585	REAR BRACE - LEFT HAND	1
c.	HYG 5587	SHEAR PLATE (CHANNEL)	1
d.	HYG 5586	CORNER BRACE	2
e.	HYG 5588	CAPPING PLATE LOWER (THREADED)	2
f.	HYG 5589	CAPPING PLATE UPPER	2
g.	HYG 5590	GUSSET	2
h.	WL112251	SCREW	8
i.	WL112001	LOCK WASHER	8
j.	WA112081	FLAT WASHER	8
k.	HYG 5684	WARNING DECAL	1
l.	HYG 5648	HEAD RESTRAINT (Stratos)	2
m.	HYG 5671	HEAD RESTRAINT (ISRI)	2
n.	HYG 4719	PLUG HEAD RESTRAINT (ISRI)	2
o.	HYG 5820	INSTALLATION DRAWING	1
2.	8010-66-052-4627	PRIMER COATING, METAL, ZINC RICH EPOXY	500 ML
3.	8010-66-052-4629	PRIMER COATING, METAL, ZINC RICH EPOXY	4 LT
4.	8010-66-025-5002	ENAMEL, LUSTRELESS, OLIVE DRAB	4 LT
5.	3439-66-016-2219	ELECTRODE, WELDING, MILD STEEL	5 KG

Note:

- For in service replacement of ROPS, NSN 2540-66-128-6009 (kit number HYG 5824) is to be used. This kit will include all original kit items (less head restraints and fitting instruction) plus the original roll tube HYG 5663 as this will no longer be serviced separately.

Detail

8. The completed modification is shown at Fig 6, with the engineering assembly drawing (MEA drawing No 1565) shown at Fig 7 and is to be completed strictly in the sequence as described below:

- a. Remove the four bolts securing the cam net carrier to the front and rear roll tubes.
- b. Remove the cam net carrier.
- c. Remove the canopy from rear of the vehicle and fold forward over cabin roof.
- d. Refit the cam net carrier to assist in location of roll tubes and ensure correct fitting location of the cam net carrier on completion.
- e. Disconnect all battery connections.
- f. Remove the two horizontal canopy rails connected to the front roll tube and intermediate canopy bow.

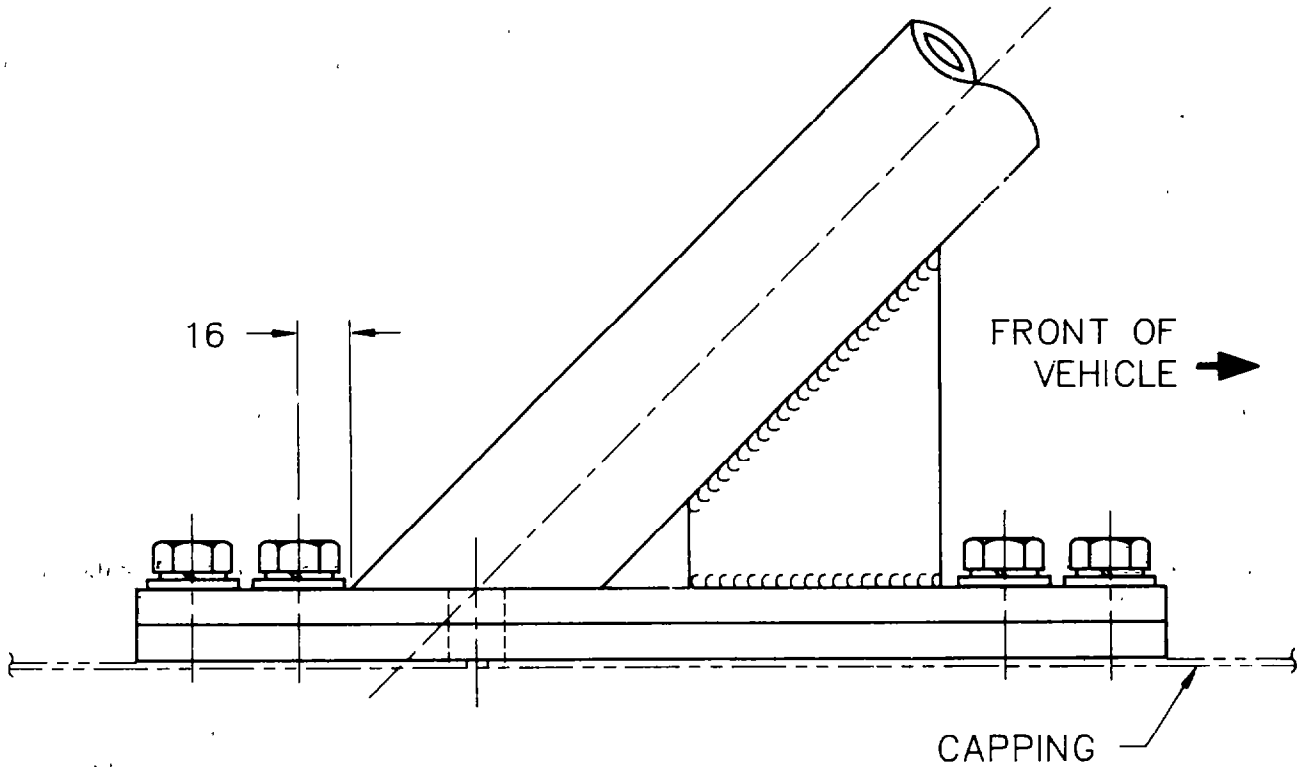
Note:

1. Do not remove metallic plate connecting the front roll tube to the front canopy bow as this will assist in the correct location of the roll tube and front canopy bow.
- g. Remove the eight bolts retaining the seat frames in the cargo area and remove the seat frames from the vehicle.
- h. Remove the seat belts from the front roll tube or lower mounting point as fitted and cover them to prevent damage from weld splatter.
- i. Fold cabin seats forward and cover them with suitable material to avoid damage from weld splatter.

**CAUTION:**

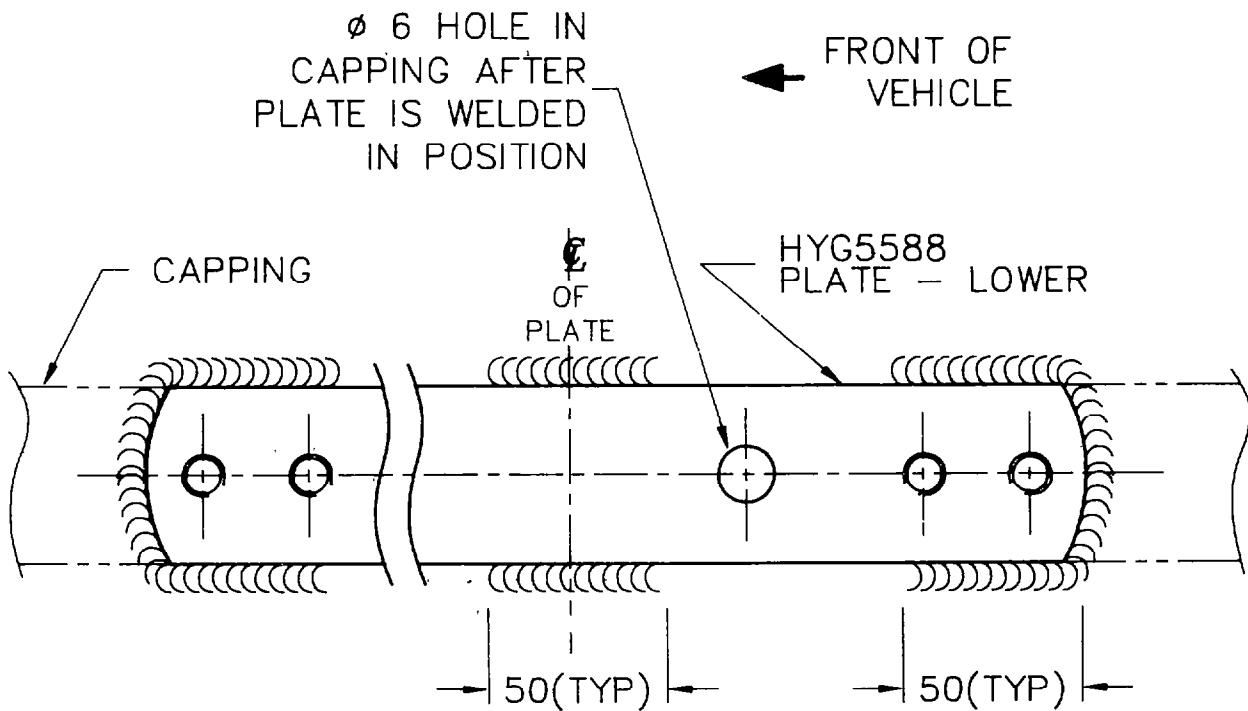
1. When removing the PUP paint, procedures as detailed in EMEI WKSP E 652 must be strictly adhered to, work area is to be well ventilated by use of fan forced air or extraction.

- j. Bolt capping plates (item 1e and 1f from Table 1) together to ensure correct alignment and maximum thread engagement is achieved.
- k. Position capping plates and rear braces (item 1a and 1b from Table 1) to obtain a flush fitting of rear braces to existing roll tube and upper capping plate ensuring a 16 mm clearance from pipe end to bolt centre as shown in Fig 1 is achieved.



DIMENSIONS ARE IN mm  
NEW WORK IN FULL LINE  
EXISTING WORK IN CHAIN LINE

FIG 1 - POSITION OF CAPPING PLATES, REAR BRACE AND GUSSET



DIMENSIONS ARE IN mm  
NEW WORK IN FULL LINE  
EXISTING WORK IN CHAIN LINE

FIG 2 - WELD DIMENSIONS LOWER PLATE TO CAPPING

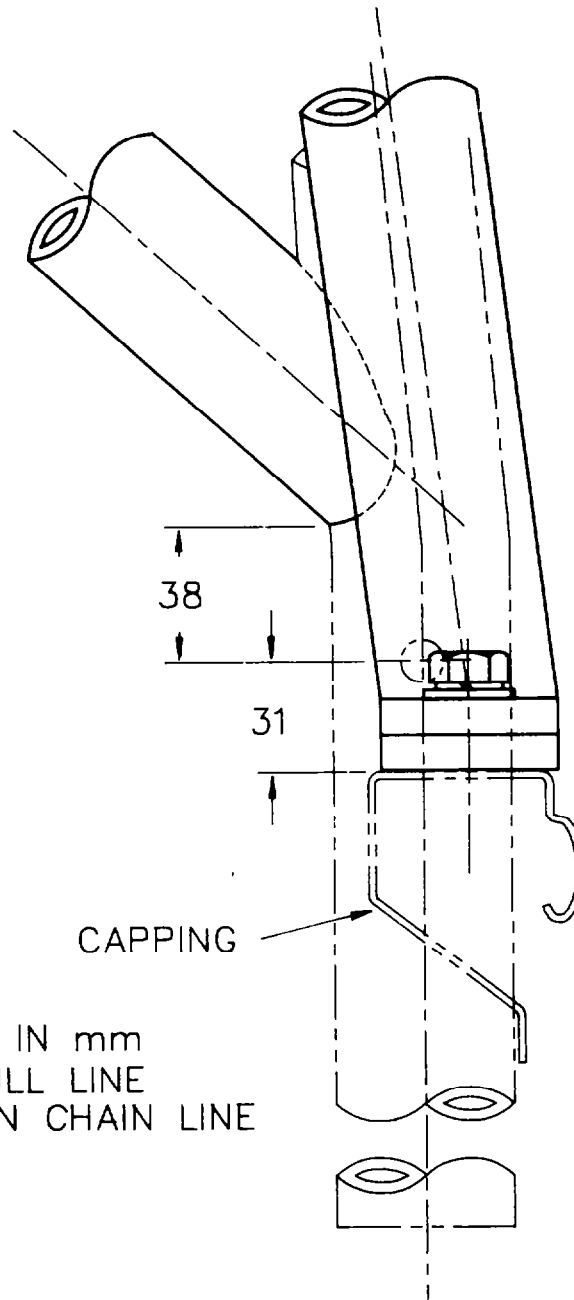
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- l. Mark contact area of lower plates to capping and rear braces to existing roll tube and upper capping plate. Grind areas marked to facilitate welding of lower plate to capping and rear brace to upper plate and existing roll tube.
- m. Position bolted plates and rear brace and tack weld lower plate to capping ensuring plate is in line with Top of Radius bend as shown in Fig 3 and the 16 mm clearance from pipe end to bolt centre as shown in Fig 1 is achieved.
- n. Tack weld rear braces to upper plates and existing roll tube.
- o. Position gusset (item 1g from Table 1) centrally to both rear brace and upper plate, ensuring that the bolts can be accessed with a ring spanner and tack weld into position, as shown in Fig 1.
- p. Position corner braces (item 1d from Table 1) with lower edge 38 mm from existing bolt hole as shown in Fig 3, mark all contact areas and grind area free of galvanising to facilitate welding.
- q. With corner braces held in position, tack weld and check positioning from acceptance of shear plate, (item 1c from Table 1) prior to all round weld of braces at either end.
- r. Mark and weld lower plate to capping as shown in Fig 2.
- s. Fully weld rear brace to upper capping plate and existing roll tube.
- t. Fully weld gusset as shown in Fig 1.
- u. Remove the cam net carrier.
- v. Fully weld corner braces at either end to existing roll tube.

Note:

1. Raising of roll tube assembly is necessary to complete welds and is to be carried out in sequence as detailed in sub paragraph z.
- w. Position and mark contact area of shear plate and grind area free of galvanising to facilitate welding.
- x. With shear plate held in position, tack weld and check that shear plate is horizontal and that all slot welds can be achieved.
- y. Mark and weld areas as shown in Fig 4 (Qty 8-50 mm welds and 12 slot welds).
- z. Remove all roll tube mounting bolts, raise roll tube assembly and complete welds on lower edges of corner braces.

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NEW WORK IN FULL LINE  
EXISTING WORK IN CHAIN LINE

FIG 3 - POSITION OF CROSS BRACE

- aa. Drill a 6 mm hole in each capping rail as detailed in Fig 2.
- ab. Lower roll tube assembly and replace all mounting bolts, capping plate bolts are to be secured with Loctite 277.
- ac. Clean all welds and paint all exposed surfaces with primer, zinc rich epoxy and allow to dry, then apply olive drab (item 4 from Table 1) as a finish coat.

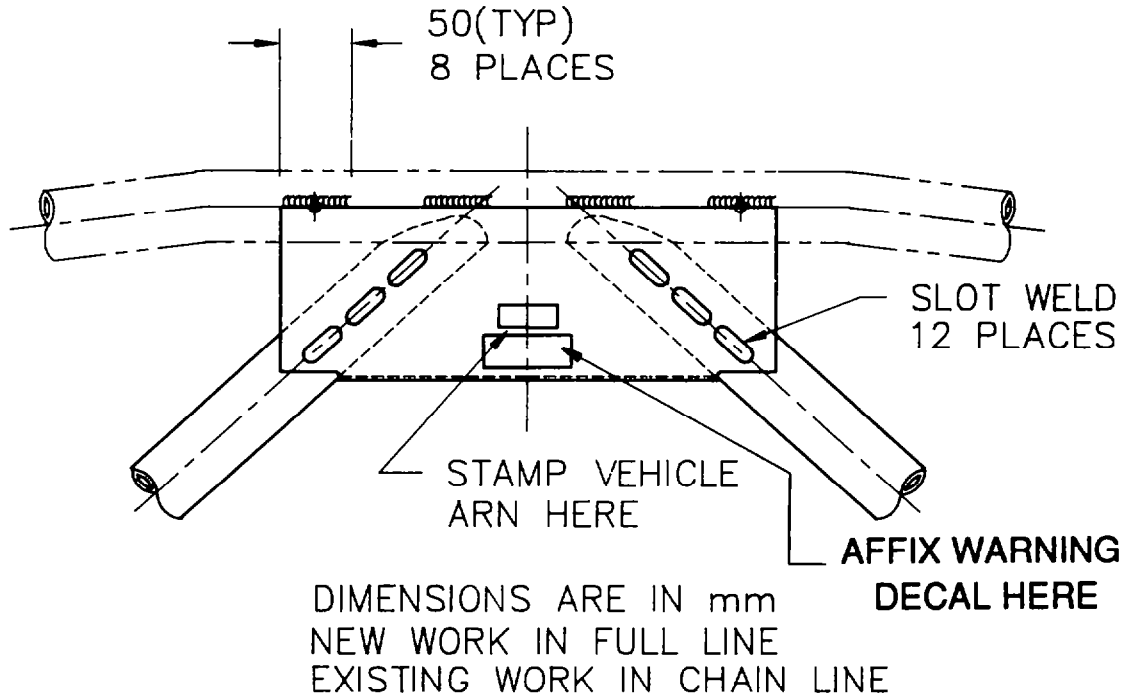


FIG 4 - POSITION AND WELD DIMENSIONS FOR SHEAR PLATE

- ad. Replace seat belts on the upper mounting position of the roll tube.
- ae. Replace cargo seat frames.
- af. Replace the two horizontal canopy rails.
- ag. Replace the canopy and cam net carrier.
- ah. Reconnect the battery.
- ai. Using 1/4 inch metal stamps, clearly mark the vehicle ARN on the rear of the shear plate as detailed in Fig 4.

**CAUTION:**

1. The roll over protection assembly is not to be modified or repaired. i.e. drilling, grinding and welding.

- aj. Fit warning decal (Item 1k from Table 1) as shown in Fig 4.

9. There are two types of head restraints suitable for either the ISRI or Stratos manufactured seats. The ISRI seat is identified by letters 'ISRI' marked on the seat squab back pivot plate as detailed in Fig 5., the Stratos seat does not have a pivot plate or markings.

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10. Head restraints are to be fitted as detailed below:

- a. In both seat types there are two vertical tubes located beneath the vinyl trim in the seat squab back as shown in Fig 5.
- b. Locate the tubes by feeling for them beneath the vinyl and when located carefully cut vinyl with a sharp instrument to expose the apertures as shown in Fig 5.
- c. On ISRI seat only fit ferrules (Item 1n from Table 1) by placing over tubes and forcing downwards until flush with the seat squab.
- d. Fit head restraints into tubes until flush with the seat squab.

Note:

1. Should the head restraints not engage fully in the tubes it may be necessary to use an 8mm ream or drill to remove any restriction in the tubes.

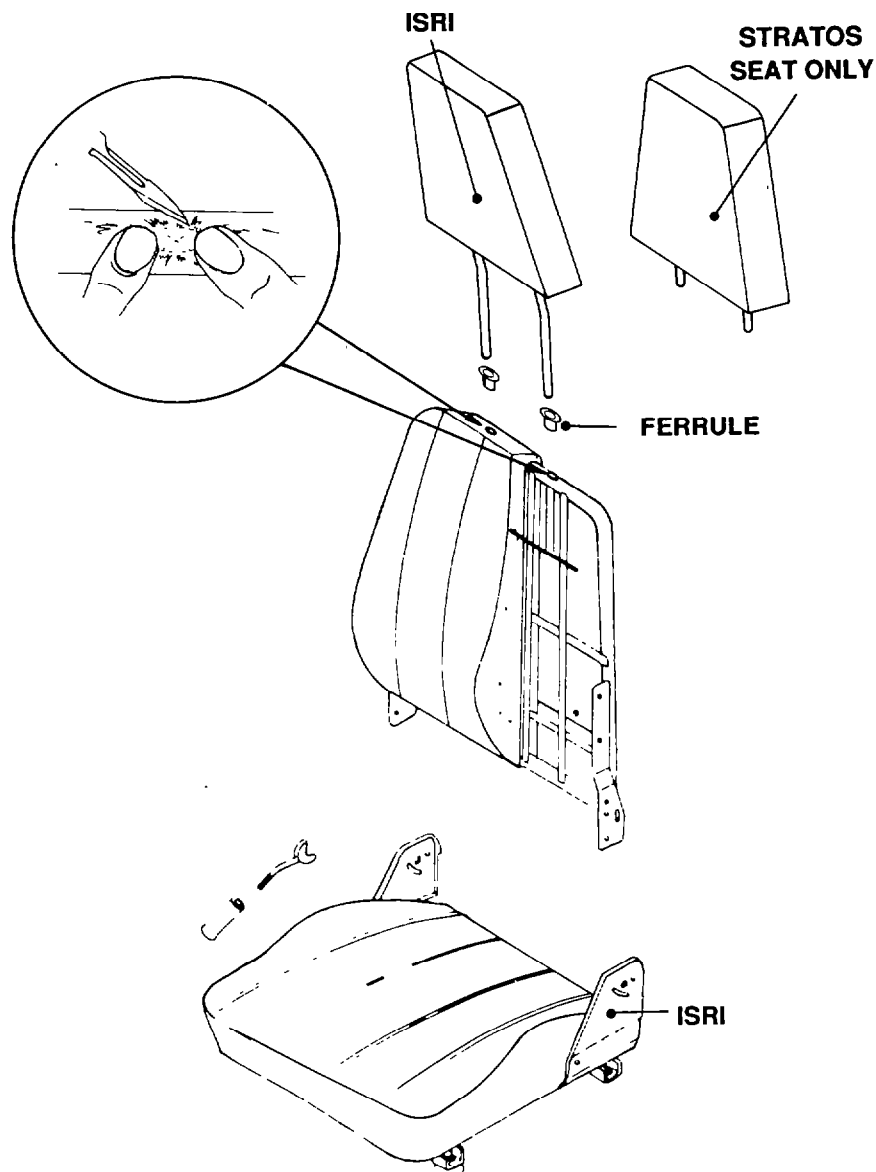


FIG 5 - FITTING OF HEAD RESTRAINTS

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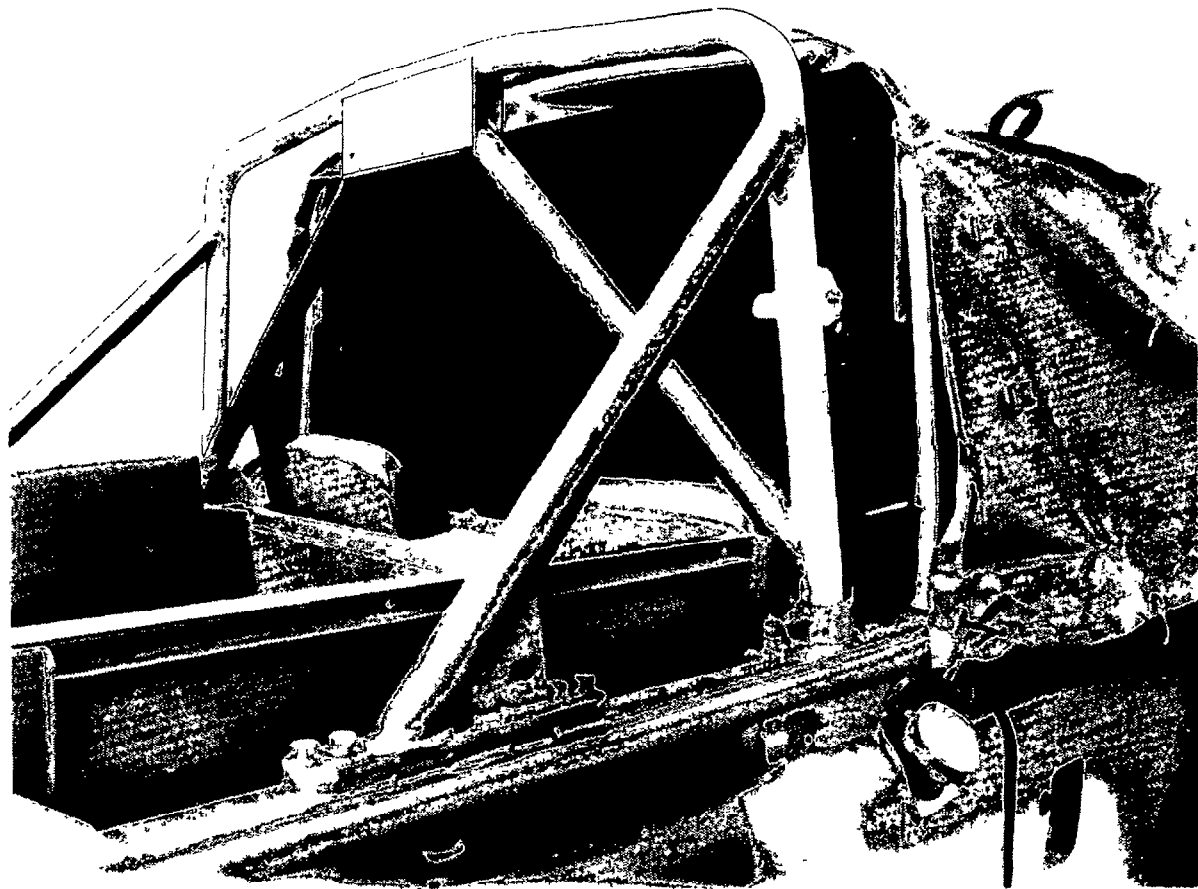


FIG 6 - COMPLETED MODIFICATION  
(LESS HEAD RESTRAINTS)

**WARNING:**

1. The roll over protection assembly is to be replaced should any one or combination of the following occur:
  - a. Vehicle is involved in a roll over accident.
  - b. Where distortion has occurred to the roll over structure, capping rails.
  - c. Weld failure.

11. Modification Record Plate. Deface the numeral 12 on the modification record plate.

12. Documentation. Detail of the modification are to be entered in the TGM 120 Record Book for Service Equipment of all the subject vehicles.

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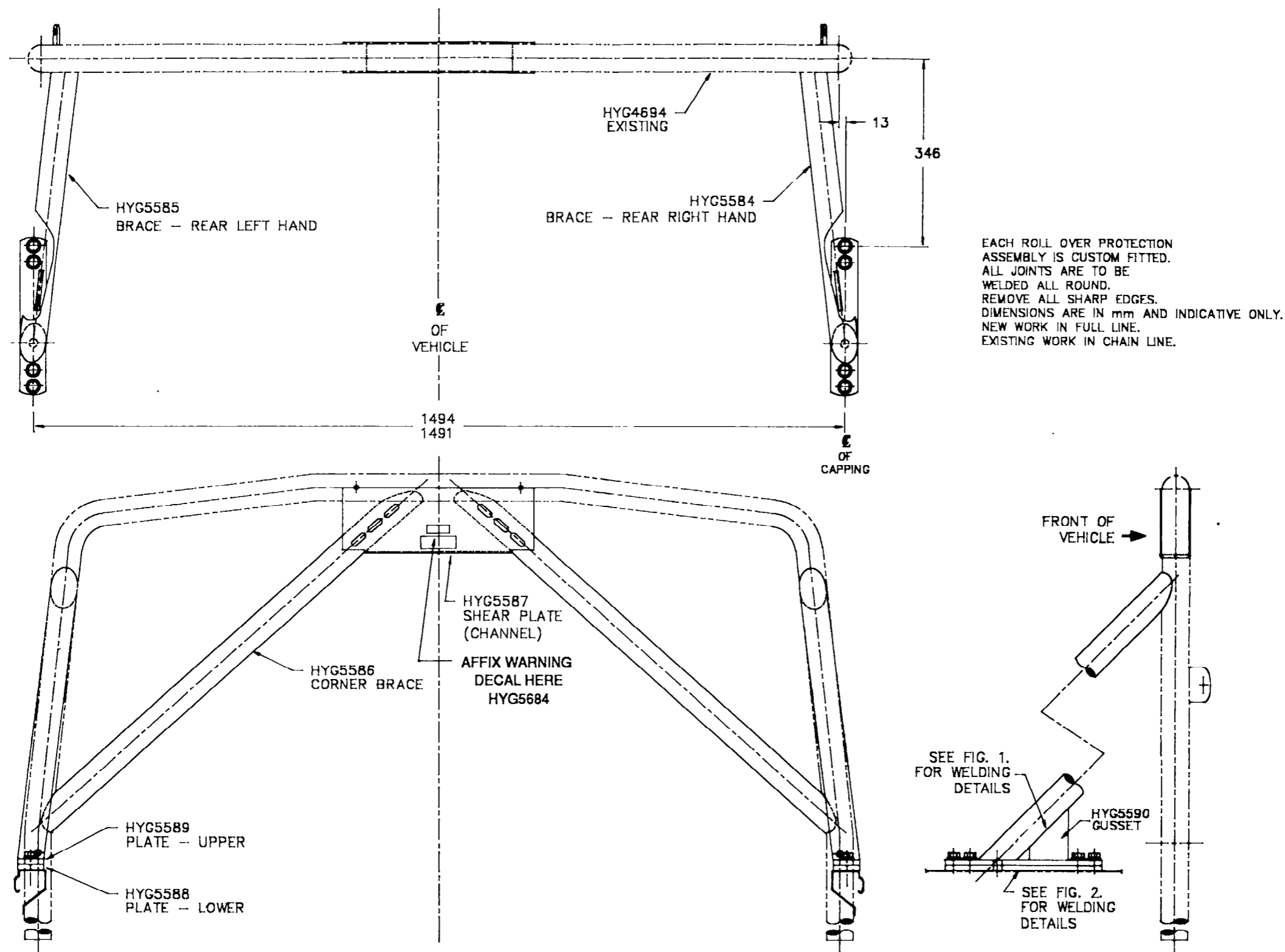


FIG 7 - ASSEMBLY - ROLL OVER TUBE

E N D