

TRUCK, UTILITY, LIGHTWEIGHT, FFR AND FFR WINCH, MC2
- LAND ROVER 110 4X4

REINFORCEMENT OF REAR CANOPY BOW FOR AIR PORTABILITY
OF VEHICLES FITTED WITH INTERIM GUNNERY COMPUTER

MODIFICATION INSTRUCTION

This instruction is authorised for use by command of the Chief of the General Staff. 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 GENERAL A 001.

Introduction

1. This instruction details the reinforcement of the rear canopy bow on those Land Rover 110 4x4 FFR variants fitted with the Interim Gunnery Computer (IGC) to allow the vehicle to be carried as a slung load without damaging the equipment. The modification affects only a small number of vehicles located in Artillery units, as detailed in paragraph 5.

2. The action necessary to return a vehicle back to standard FFR configuration is also detailed in paragraph 17.

General

3. *Associated Publications.* The latest issued of the following references should be read in conjunction with this instruction:

- a. EMEI Workshop A 850 - Modifications, Trial Modifications and Local Modifications to Equipment;
- b. EMEI Workshop A 851 - Modifications to Equipment - Use of Modification Record Plates and Documentary Requirements; and
- c. EMEI Workshop E 652 - Use of Polyurethane Paints and Solvents.

4. *Authority.* Land Rover Australia Drawing Office Instruction DOI-Y-845.

5. *Modification Application.* Land - Rover 110 4x4 FFR and FFR Winch fitted with Interim Gunnery Computer as follows:

- a. 1 Fd Regt - 49128, 49129, 49131, 49132, 49137, 49689.
- b. 4 Fd Regt - 48615, 48616, 48753, 48795.
- c. 5 Fd Regt - 51547.
- d. 8/12 Mdm Regt - 48964, 48971, 48975, 48976.
- e. School of Artillery - 48798, 48799.
- f. 11 Fd Regt - 49386, 49387, 49383, 49384.

6. *Items Affected.* ROPS, rear body, centre and rear canopy bows.

7. *Priority - Group 2.* All applicable equipment detailed in para 5 is to be modified on receipt of stores detailed in Table 1. The modification is to be completed before the vehicle is carried as a slung load when the IGC is fitted (the rear straps will exert pressure on the rear canopy bow).

8. *Action Required.* Actions detailed in this instruction are to be performed by RAEME units or sub units authorised to carry out unit, field or base repairs. Welding is only to be carried out by the following tradesmen:

- a. Metalsmith ECN 235-2.
- b. Defence employed civilian welders including contract repair and Rover warranty agents with welding certificates three and eight in accordance with AS 1996 - 1983 standard.
- c. Defence employed civilian welders who have been assessed by an authorised assessing officer to have passed ECN 235-2 welding certificate standard.

9. *Estimated Manhours to Perform.* For initial planning purposes only, it is estimated that this modification will take 4.0 manhours to perform.

Table 1 - Stores required to Complete the Modification

Item	NSN	Mfr Part No	Designation or Description	Qty per Equip
1	2590-66-128-6445	HYG6440	Kit, Interim Gunnery Computer, Rear Canopy bow Reinforcement comprising items 1 to 16 in Table 3.	1

Table 2 - Stores Required (to be ordered through normal supply channels)

Item	NSN	Designation	UOI	Qty per Equip
1.		Primer Coating, Metal, Zinc Rich Epoxy		
a.	8010-66-052-4627	500 ml can, or	500 ml	1
b.	8010-66-052-4629	4 litre can	4 lt	1
2.	8010-66-025-5002	Enamel, Lustreless, Olive Drab	4 lt	1
3.	3439-66-016-2219	Electrode, Welding, Mild Steel	5 kg	1

Table 3 - Components Contained in Modification Kit (to assist parts identification and not to indented for to complete the modification)

Item	NSN	MPN	Designation	UOI	Qty per Equip
1		HYG6427	Canopy bow rear	ea	1
2.		HYG6438	Brace, H Frame	ea	1
3.		HYG6500	Reinforcement, Front ROPS	ea	2
4.		HYG6459	Bolt	ea	8
5.	5310-99-122-6476	WA110061	Washer, 10 mm dia	ea	12
6.	5310-99-122-5497	NY110041	Nut, Nyloc, 10 mm dia	ea	8
7.	2510-66-128-6350	HYG5889	Plate, Plain	ea	2
8.		HYG5588	Plate, Tapped	ea	2
9.	5305-99-122-4912	SH112251	Screw, 12 mm dia	ea	8
10	5310-99-122-6477	WA112081	Washer, Flat, 12 mm dia	ea	8
11.	5310-66-128-5111	WL112001	Washer, Lock, 12 mm dia	ea	8
12.		HYG6436	Brace, RH	ea	1
13.		HYG6437	Brace, LH	ea	1
14.		HYG6435	Gusset	ea	2
15.		HYG6432	Installation drawing	ea	1
16.		HYG6455	Installation drawing	ea	1

UNCONTROLLED WHEN PRINTED

10. *Items to be Removed.* Rear canopy bow to be removed but may be retained in unit for use as a spare part on standard Land Rover 110 4x4 Cargo and FFR variants.

11. *Stores Required.* The parts kit required to complete the modification is listed in Table 1 and will be force issued and delivered to units detailed in paragraph 5, via Moorebank Log Gp. Table 2 shows welding rods and paints to be used on welded areas and these are to be ordered through normal supply channels if stocks are not held in units. Table 3 shows the parts breakdown of the modification kit (item 1, Table 1) to assist parts identification and the items are not to be ordered to complete the modification.

MODIFICATION DETAIL

12. *Proceed as follows:*

- a. Disconnect the vehicles and FFR batteries.
- b. Remove the cam net carrier and canopy from the vehicles.
- c. Remove the canopy tie rails, rear canopy bow and centre hood bow.
- d. Cover or remove the seat belts and vehicle upholstery to prevent damage from weld splatter.

Fitting of H Frame

13. Proceed as follows with reference to Figure 1 for assembly detail and Table 3 for part descriptions:

- a. Fit the new rear canopy bow (item 1) and mark the centre line of the vehicle on the front ROPS roll bar and rear canopy bow.
- b. Fit the 'H' frame (item 2) between the front ROPS and rear canopy bow so that the frame is symmetrical about the centre line of the vehicle and clamp the frame in position with G clamps.

WARNING

WHEN REMOVING PUP PAINT, PROCEDURES DETAILED IN EMEI WORKSHOP E 652 MUST BE STRICTLY ADHERED TO. THE WORK AREA IS TO BE WELL VENTILATED BY THE USE OF FORCED AIR OR FUME EXTRACTION.

- c. Mark and drill 11.0 mm holes to mount the frame to the bows.

d. Fit the reinforcement plate (item 3) to the front of the ROPS then secure the H frame using mounting bolts, nuts and washers (items 4, 5, 6).

e. Tighten all fasteners.

Fitting of Rear Canopy Bow Support Braces

14. Proceed as follows with reference to Figure 2 for assembly detail and Table 3 for part descriptions:

- a. Using the plain plates (item 7) as a template position the plates on the capping so that the rear plate holes are 362 mm from the rear canopy bow centre. Mark and drill four 16 mm holes in the body capping.
- b. Assemble the threaded capping plates (item 8) to the plain capping plates using bolts and washers (items 9, 10, 11).
- c. Position the capping plates and braces to obtain a flush fitting of the braces (items 12, 13) to the rear canopy bow and upper capping plate and ensuring a 16 mm clearance from pipe end to bolt centre is achieved.
- d. Mark the contact area of the lower capping plates to the capping and the braces to the roll tube and upper capping plate. Grind the marked areas to allow welding of the lower plate to the capping and the rear brace to the capping and rear canopy bow.
- e. Position the capping plates and braces and tack weld the lower capping plate to the capping ensuring that the 16 mm clearance from the pipe end to the bolt centre is maintained.
- f. Tack weld the rear braces to the upper capping plates and rear canopy bow.
- g. Position the gusset (item 14) centrally to both braces and the upper plate, ensuring that the bolts can be accessed with a ring spanner and tack gussets in position.
- h. Mark and weld the lower capping plates.
- i. Fully weld the brace to the upper capping plate and rear canopy bow, then fully weld the gusset.
- j. Clean all welds and paint all exposed surfaces with primer, zinc rich epoxy and allow to dry, then apply olive drab as a finish coat using the paints shown in Table 2.

NOTE

Do not remove the threaded capping plates from the body capping. Order a new threaded capping plate (item 8) which is to be fitted to the vehicle to be reconfigured with IGC.

- c. Replace the centre canopy support bow with a standard canopy support.
- d. Manufacture and weld the reinforcement sleeves shown in Figure 4 to the front ROPS to cover the front reinforcement mounting holes. Ensure that the seat belts and upholstery are protected from weld splatter.
- e. Clean all welds and paint weld affected areas.

NOTE

The welding of sleeves has been approved by the Engineering Development Establishment and will ensure that the structure will achieve identical performance to the standard ROPS. The welding of the sleeves conflicts with the requirement of VEHICLE G 117-1 but is approved in this instance. Welding is to be carried out by tradesmen detailed in paragraph 8.

18. *Recording Action.* On completion of the modification enter the details of the modification in Part 3 of the GM 120, Record Book for Service Equipment, for the subject vehicles. Due to the limited number of vehicles affected by this modification there is no action required to deface the modification plate. Vehicles reconfigured to a standard variant are to have the modification deleted from Part Three of the GM 120.

Rework of Centre Canopy Bow

15. Proceed as follows with reference to Figure 3 for assembly detail:

- a. Rework the centre canopy bow by crushing the pipe under a hydraulic press or similar.
- b. Refit the centre canopy bow over the top of the 'H' frame and secure the bow to the body.
- c. Clean all welds and paint all exposed surfaces with primer, zinc rich epoxy and allow to dry, then apply olive drab as a finish coat using the paints shown in Table 2.

Vehicle Reassembly

16. Proceed as follows:

- a. Uncover or refit seat belts and upholstery.
- b. Refit the canopy tie rails, canopy and cam net carrier.
- c. Reconnect the vehicle and FFR batteries.

VEHICLE RECONFIGURATION TO STANDARD FFR VARIANT

17. In the event of the IGC being transferred to another vehicle parts may be interchanged between vehicles. To reconfigure the vehicle to a standard FFR variant the following actions are required:

- a. Remove the H frame.
- b. Replace the rear canopy bow and brace assembly with a standard rear canopy bow.

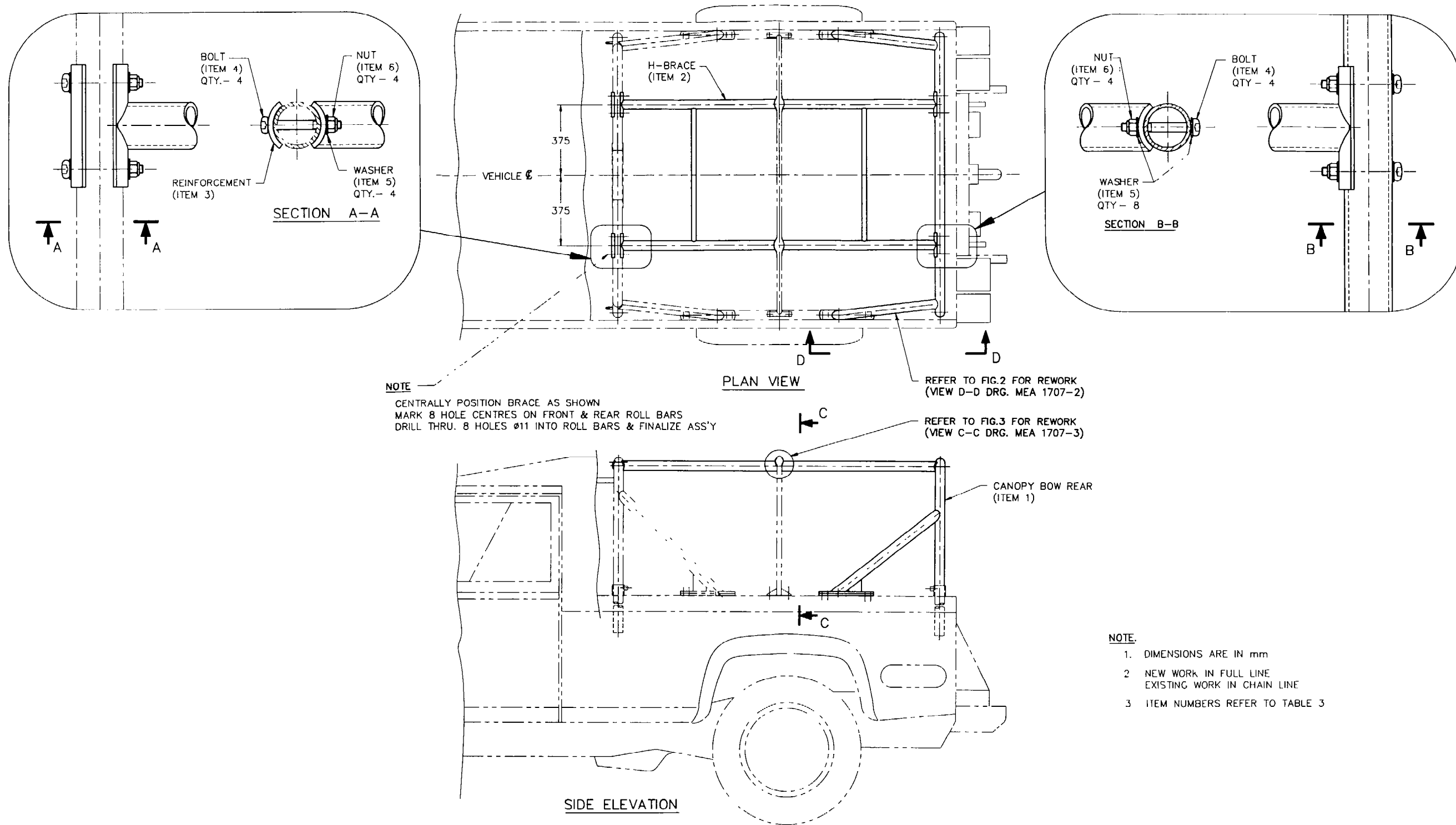


Figure 1 - Fitting of H Frame

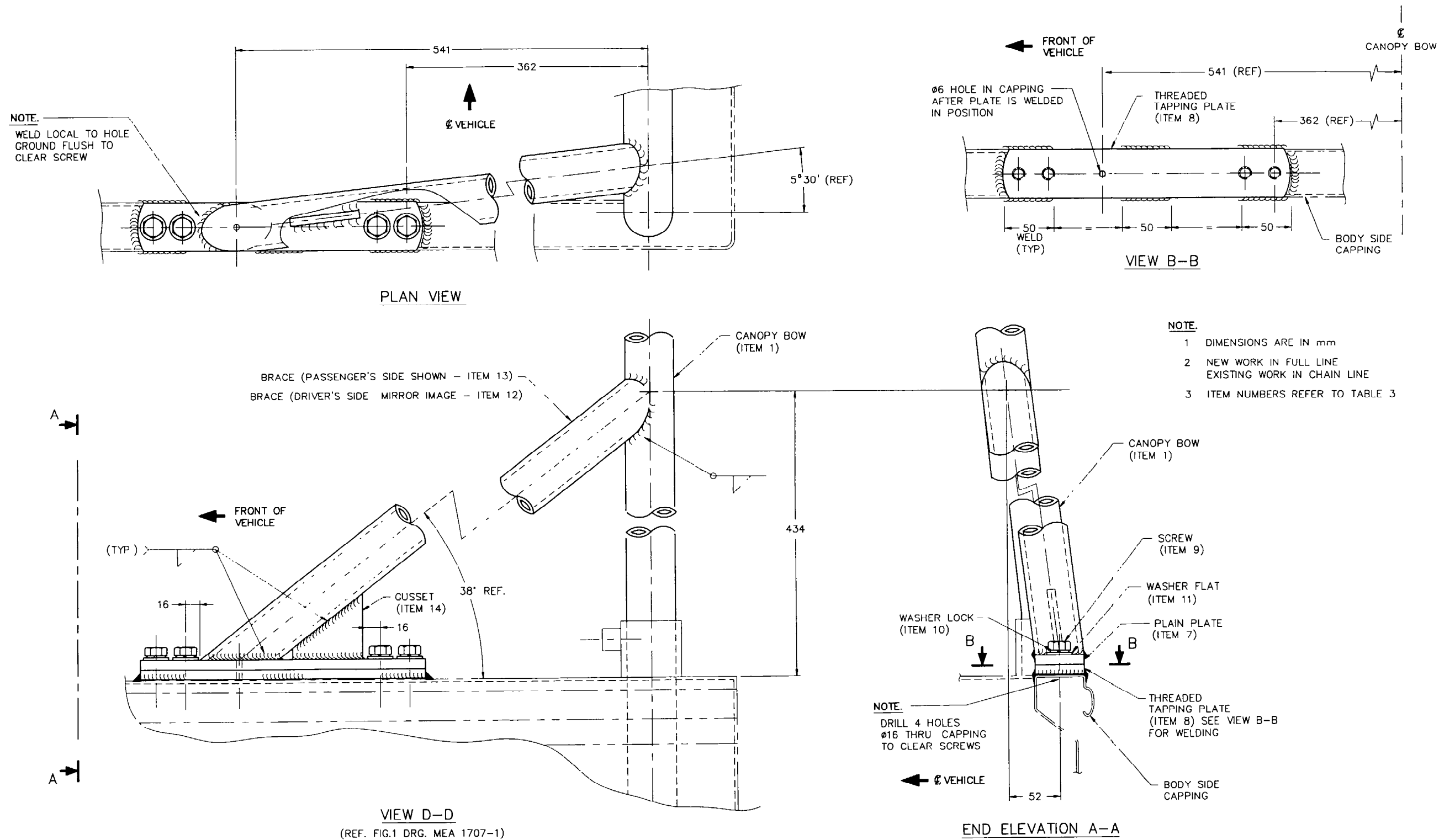


Figure 2 - Rear Canopy Bow Support Braces

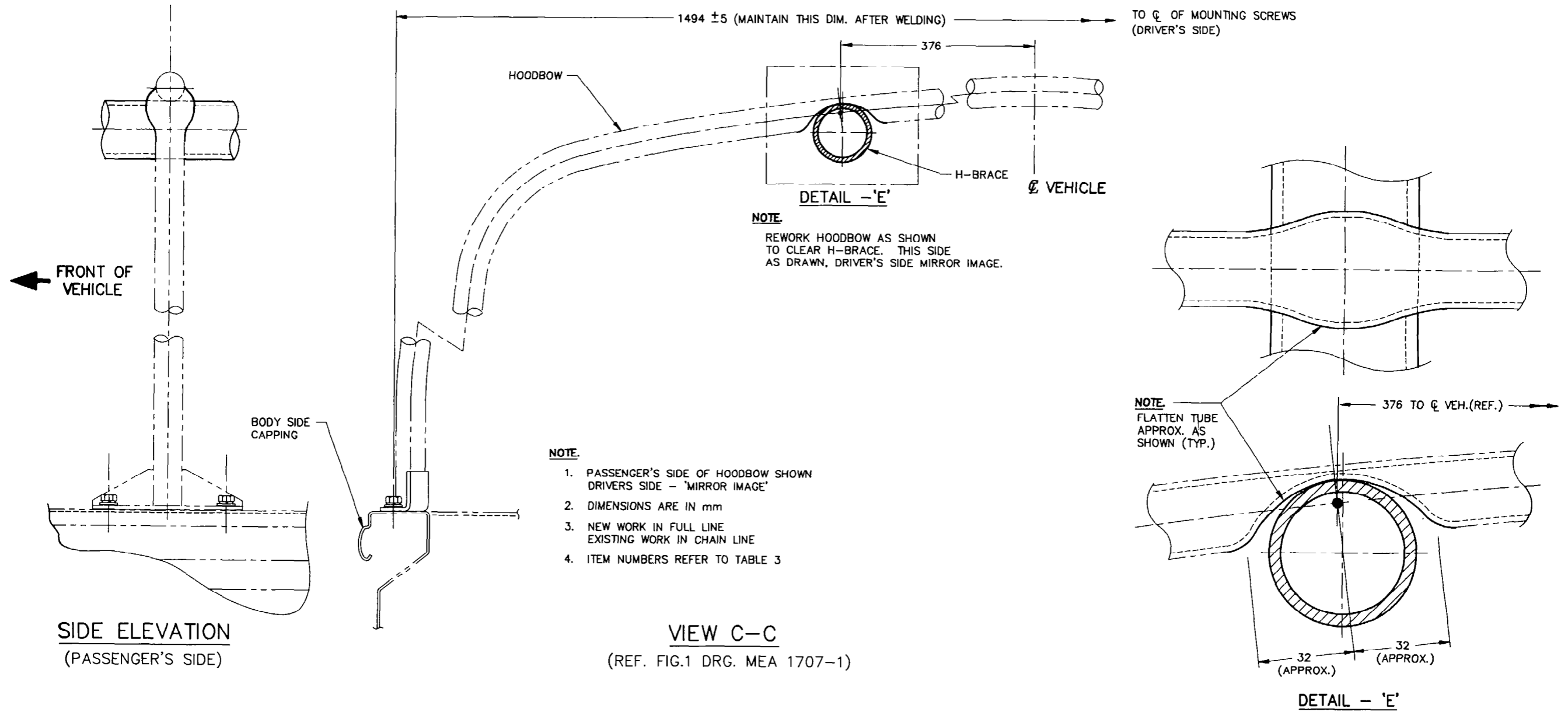
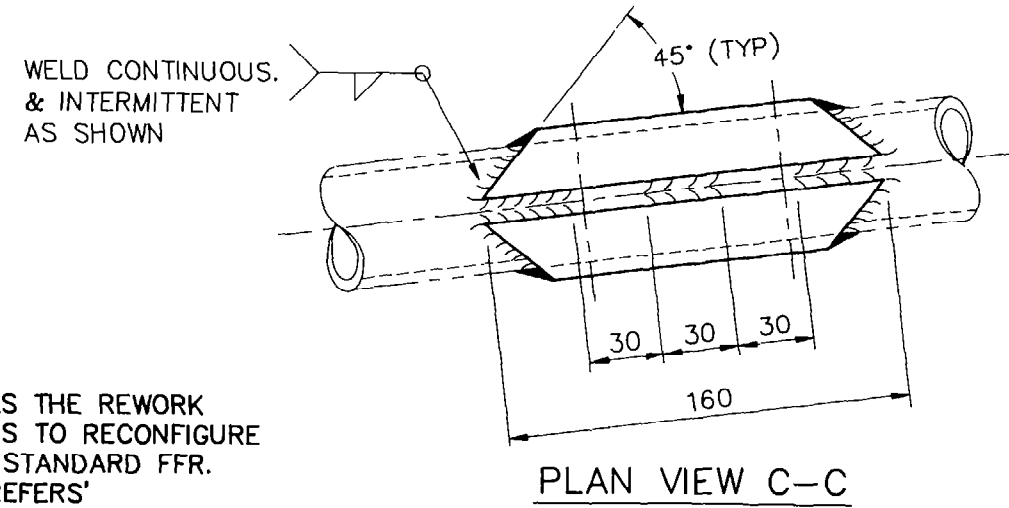
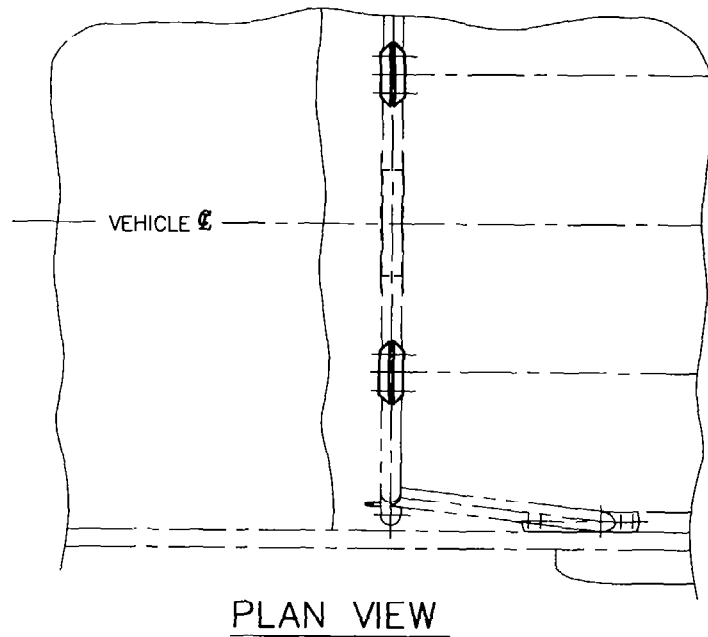
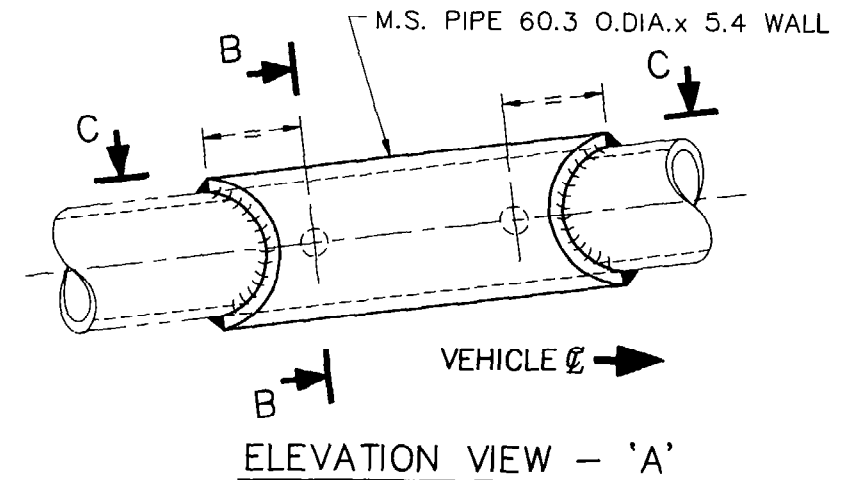
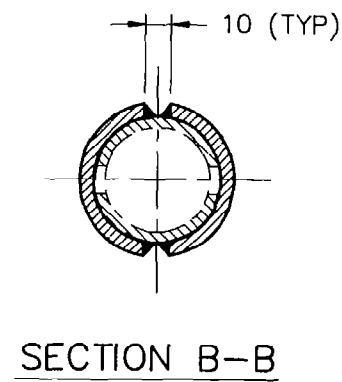
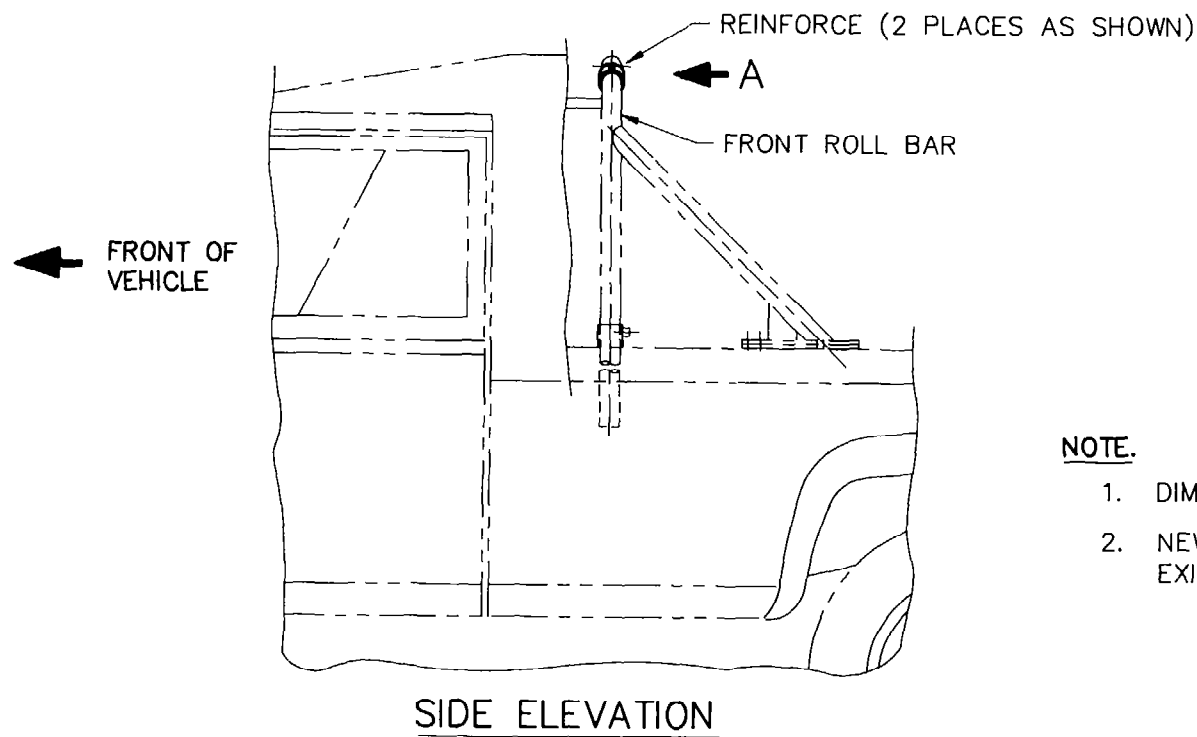


Figure 3 - Rework of Centre Canopy Bow



NOTE.

THIS FIGURE DETAILS THE REWORK
OF THE FRONT ROPS TO RECONFIGURE
THE VEHICLE TO A STANDARD FFR.
- 'PARAGRAPH 17 REFERS'



NOTE.

1. DIMENSIONS ARE IN mm
2. NEW WORK IN FULL LINE
EXISTING WORK IN CHAIN LINE

Figure 4 - Reinforcement Plate