



Ministry  
of Defence



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Via: [REDACTED]  
[REDACTED]

25 October 2019 Our Reference: FOI2019/11459

Dear [REDACTED],

Thank you for your email of 7 October 2019 requesting the following information:

***I have acquired the following Shelters through disposal / second hand channels and would like to make an FOI request for copies of the appropriate -201 Operating Instruction AESP documents to ensure correct use and care.***

- 8340-C-101-201 - Shelter, Passageway 3.6m x 1.8m
- 8340-C-108-201 - Sunshade 3.6m x 3.6m
- 8340-C-111-201 - Shelter, 4 Way Connector
- 8340-C-116-201 - Shelter, Operational Field Catering System (OFCS) 3.6m x 3.6m

I am treating your correspondence as a request for information under the Freedom of Information Act 2000 (FOIA).

A search for the information has now been completed within the Ministry of Defence (MOD), and I can confirm that all the information in scope of your request is held.

The information you have requested can be found attached but some of the information falls entirely within the scope of the absolute exemption provided for at section 40 (Personal Data) of the FOIA and has been redacted.

Section 40(2) has been applied to some of the information in order to protect personal information as governed by the Data Protection Act 2018. Section 40 is an absolute exemption and there is therefore no requirement to consider the public interest in making a decision to withhold the information.

If you have any queries regarding the content of this letter, please contact this office in the first instance.

If you wish to complain about the handling of your request, or the content of this response, you can request an independent internal review by contacting the Information Rights Compliance team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.gov.uk). Please note that any request for an internal review should be made within 40 working days of the date of this response.

If you remain dissatisfied following an internal review, you may raise your complaint directly to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not normally investigate your case until the MOD internal review process has been completed. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website at <https://ico.org.uk/>.

Yours sincerely,

**DES SEC PolSec Land Equipment**



# Ministry of Defence

**SHELTER, PASSAGEWAY  
3.6 M x 1.8 M (12 FT x 6 FT)**

**NSN 8340-99-130-2183**

**OPERATING INFORMATION**

This publication contains information covering the requirements  
of Categories 2 and 6 at information level 1

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By  
**Operational Infrastructure Project Team  
Elm 1c, MOD, Abbey Wood, Bristol BS34 8JH**

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**PREFACE**

Sponsor:	DE&S OI
Project Number:	-
File Ref:	-
Publication Agency:	OI

**INTRODUCTION**

1. Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of the preliminary pages; it should be photocopied and used for forwarding comments on this AESP.

2. AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3. The subject matter of this publication may be affected by Defence Instruction Notices (DINs), Standard Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

**RELATED AND ASSOCIATED PUBLICATIONS****Related Publications**

4. The octad for the subject equipment consists of all the categories shown in Table 1. All references are prefixed with the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index in AESP 0100-A-001-013.

Category/Sub-Category		Information Level				
		1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance	
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
2	0	Operating Information	*	*	*	*
	1	Aide Memoire	201	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	*	*	*	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	*	*	*	*
	2	Repair Instructions	201	*	201	*
	3	Inspection Standards	201	*	*	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	201	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

\* Category/Sub-category not published.

**Table 1: Related Publications**

**Associated Publications**

5. The following publication are associated with this octad. None

**ABBREVIATIONS**

6. The following abbreviations are used in this AESP.

<u>Abbreviation</u>	<u>Nomenclature</u>
AESP	Army Equipment Support Publication
AFG	Army Form General
CES	Complete Equipment Schedule
DIN	Defence Instruction Notices
Fig	Figure
ft	feet (foot)
ft <sup>3</sup>	feet cubed
in.	inch
IPC	Illustrated Parts Catalogue
kg	kilogram
lb	pound
m	metre
m <sup>2</sup>	metres squared
m <sup>3</sup>	metres cubed
mm	millimetres
NATO	North Atlantic Treaty Organisation
NI	Not Illustrated
NIV	Not in Vocabulary
NSCM	NATO Supply Code for Manufacturers
NSN	NATO Stock Number
Para	Paragraph
PPE	Personal Protective Equipment
RLC	Royal Logistics Corp
SOP	Standard Operating Procedures
TSP	Training Support Plan

**WARNINGS AND CAUTIONS****HAZARDOUS SUBSTANCES**

7. Before using any hazardous substances or material, the user must be conversant with the safety precautions and first aid instructions:
- 7.1. On the label of the container it was supplied in.
  - 7.2. On the material Safety Data Sheet.
  - 7.3. In local Safety Orders and Regulations.

**WARNINGS**

- (1) **PERSONNEL INJURY/EQUIPMENT DAMAGE. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF, THE MINIMUM IS ONE PERSON PER LEG.**
- (2) **PERSONNEL INJURY/CRUSH HAZARD. EXERCISE CAUTION WHEN ASSEMBLING POLES AND BRACKETS DUE TO THE RISK OF CRUSH INJURY TO FINGERS.**
- (3) **PERSONNEL INJURY. WHEN POLES ARE CURVED UNDER TENSION THERE IS A HIGH RISK THAT THEY MAY SLIP AND SPRING BACK TO THEIR STRAIGHT RELAXED POSITION. PERSONNEL SHOULD NOT POSITION THEMSELVES DIRECTLY IN FRONT OF THE POLES.**
- (4) **PERSONNEL INJURY/HEAVY WEIGHT. MINIMUM PERSONNEL NUMBERS REQUIRED TO LIFT OR MOVE THE SHELTER SHOULD BE OBSERVED.**
- (5) **PERSONNEL INJURY/BURN HAZARD. WHEN BURNING WEBBING TO PREVENT FRAYING, THE WEBBING WILL BECOME EXTREMELY HOT AND MELT.**
- (6) **PERSONNEL INJURY, WHEN FITTING OR RELEASING THE INSULATION TENSIONERS THERE IS A HIGH RISK THAT UNDER TENSION THEY MAY SLIP AND SPRING BACK AT PERSONNEL.**
- (7) **IT IS ESSENTIAL THAT THE BASE RESTRAINT STRAPS AND THE FRAME RESTRAINT STRAPS ARE FITTED TO THE FRAME BEFORE INSTALLING THE PVC COVERS. THIS ENSURES THAT THE FRAME IS RIDGID AND ENHANCES THE WIND RESISTANCE OF THE SHELTER AS WELL AS MAKING IT EASIER TO FIT THE COVERS.**
- (8) **WHEN REPAIRING PVC COVERS, THE TEXTILE NEEDS TO BE ABRAIDED. PVC DUST IS TOXIC AND SHOULD NOT BE INHALED. WEAR THE APPROPRIATE PPE.**
- (9) **WHEN REPAIRING PVC COVERS, A CONTACT ADHESIVE IS UTILISED. FOLLOW SAFETY DATA SHEET SUPPLIED WITH THE CONTACT ADHESIVE.**

**CAUTIONS**

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** Wet textile should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed.
- (3) **EQUIPMENT DAMAGE.** All insulation panels can be added after the shelter has been erected EXCEPT the roof panel that must be attached to the frame prior to the covers.
- (4) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.
- (5) **EQUIPMENT DAMAGE.** The sunshade when fitted is to be erected prior to the shelter if possible or alternatively moved into position over the tent after assembly with the base restraint straps being added after it is in its final position. The ratchet straps should not be over tightened and never used if damaged.
- (6) **EQUIPMENT DAMAGE.** The shelter is to be erected on firm level ground, which has been cleared of any large stones or rubble.
- (7) **EQUIPMENT DAMAGE.** A power washer may be used at low pressure with warm water. Use judgement and caution regarding water pressure and temperature.
- (8) **EQUIPMENT DAMAGE.** Do not use solvents or detergents to clean the shelter as they will dissolve the protective coating on the fabric.
- (9) **EQUIPMENT DAMAGE.** Rips and tears must be repaired immediately to maintain the insulation integrity.
- (10) **EQUIPMENT DAMAGE.** The PVC covers are different from the cotton canvas covers in that they do not stretch. Fitting the end gables requires the frame to be in the correct position to fit the PVC cover spigots over the frame extensions using the appropriate straps. Do not under any circumstances force the canvas into position or use frame parts to lever the canvas into position.

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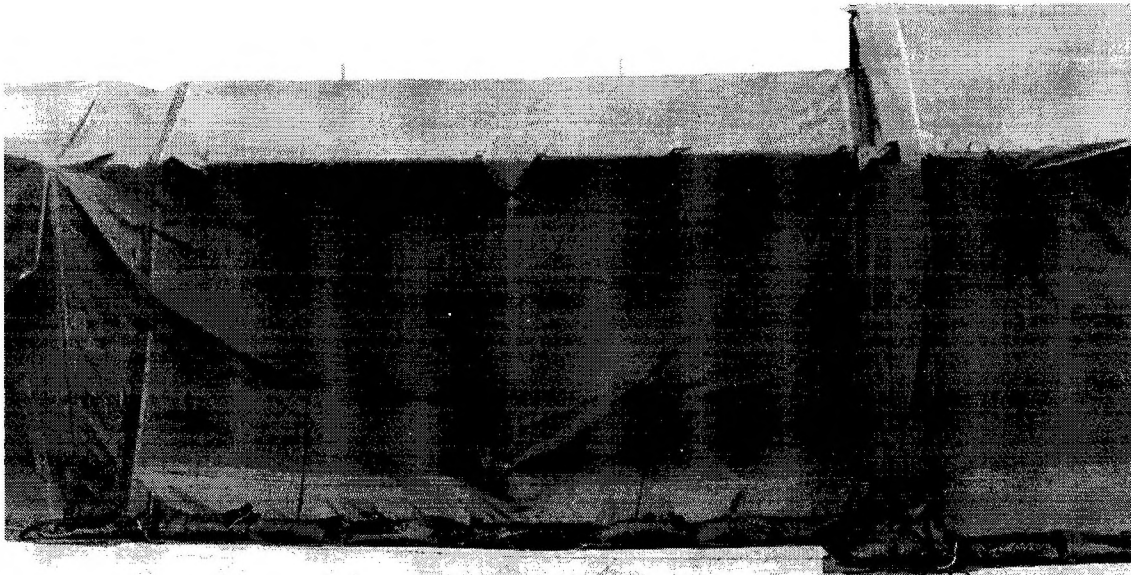
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DESCRIPTION



**Figure 1: Shelter, Passageway 3.6 m x 1.8 m (12 FT x 6 FT) Mk 4  
(connected to 12 x 12 and 4 way connector)**

1. This AESP provides operation and maintenance information for SHELTER, PASSAGEWAY 3.6 m x 1.8 m (12 FT x 6 FT) MK 4

NATO Stock no 8340-99-130-2183

2. The passageway is a framed shelter with gradual sloping side walls. A single canvas comprising one roof and walls section fits over the top of the frame. It is possible to add end sections to make the passageway into a small tent using (J11/8340-99-997-8442) that closes with slide fasteners, toggles and loops can be fitted to the roof and wall canvas with zip fasteners.

3. When installing installation read Chapter 2 in combination with Chapter 1. In summary the roof insulation is applied before the main PVC cover. The wall insulation is installed after the full tent erection.

4. The MK 4 version utilises flame resistant PVC coated polyethylene in place of cotton canvas. All PVC parts are interchangeable with cotton canvas parts by attachment using Dutch lacing. The MK 4 PVC tent also has the option of quick connection using keder rails.

5. The shelter (Fig 1) consists of a metal frame supporting a PVC textile cover. The frame is constructed of light alloy tubular members that are connected by brackets.

6. The frame is built from five different tubular components.

- 6.1. Aluminium members 1.8 m long and 0.9 m long Outside Diameter (32 mm).
- 6.2. 4-way cast light alloy brackets for connecting the members at the eaves and ridge.
- 6.3. T-brackets for connecting the members at ground level to the wall members.

The fabric from which the cover is made is a Polymer of polyethylene coated on both sides with PVC and is 700g/m<sup>2</sup>, this has replaced the woven cotton covered polyester core yarn. The PVC material is waterproof and does not require water resistance treatments through life. For the avoidance of doubt

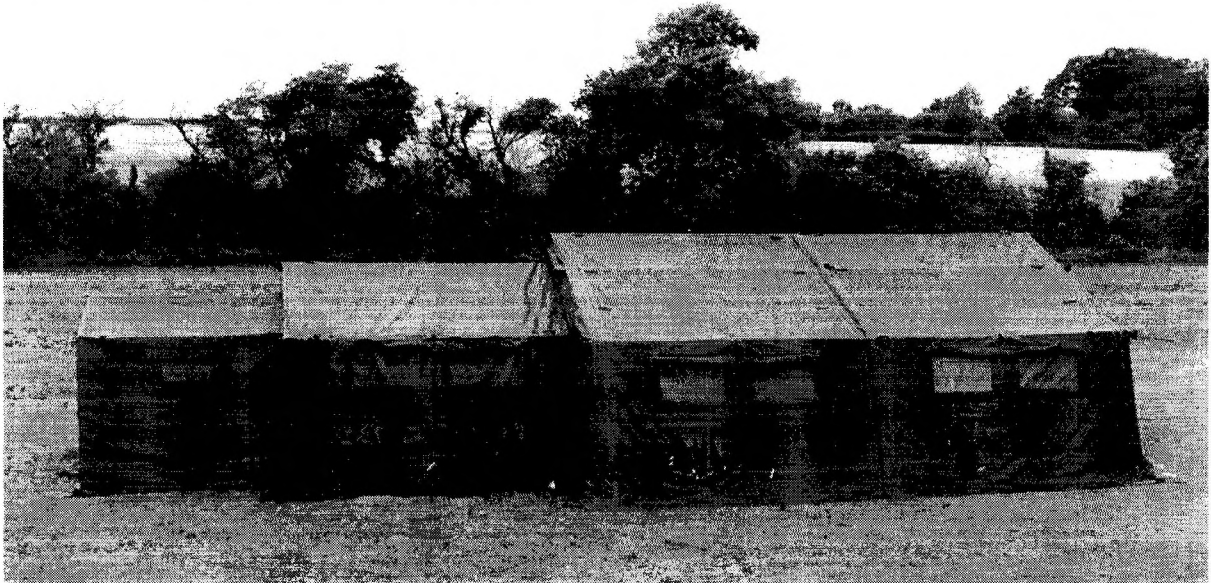
the two materials will be referred to in the AESP as "PVC Covers" and "cotton canvas".

7. The cover is made up of one roof section and one end panel. There are two methods of connecting the panels together. Firstly, the traditional Dutch lacing, this enables the new PVC covers and old cotton canvas panels to be connected together or roof sections to be pre-connected prior to deployment. Secondly there is a fast erect keder rail system when connecting two PVC covers together. The two end sections each have a personnel entrance fitted with slide fasteners, toggles and loops, which can be also rolled up and secured with toggles and loops.

The sod cloth is made from Polymer of polyethylene coated on both sides with PVC and is 900g/m<sup>2</sup> that ensures ample strength and rot resistance.

## DEPLOYMENT

9. It is possible to link many of the GS types of shelters together, and to extend in length by 12 ft increments, the 12 ft x 12 ft and 18 ft x 24 ft shelters to make composite arrangements such as headquarters layouts, cooking/dining rooms, field hospitals and other specific to requirement temporary shelter facilities. It is also possible to link shelters together Fig 2.



**Figure 2: 12 x 12 Connected to 24 x 18 and Passageway**

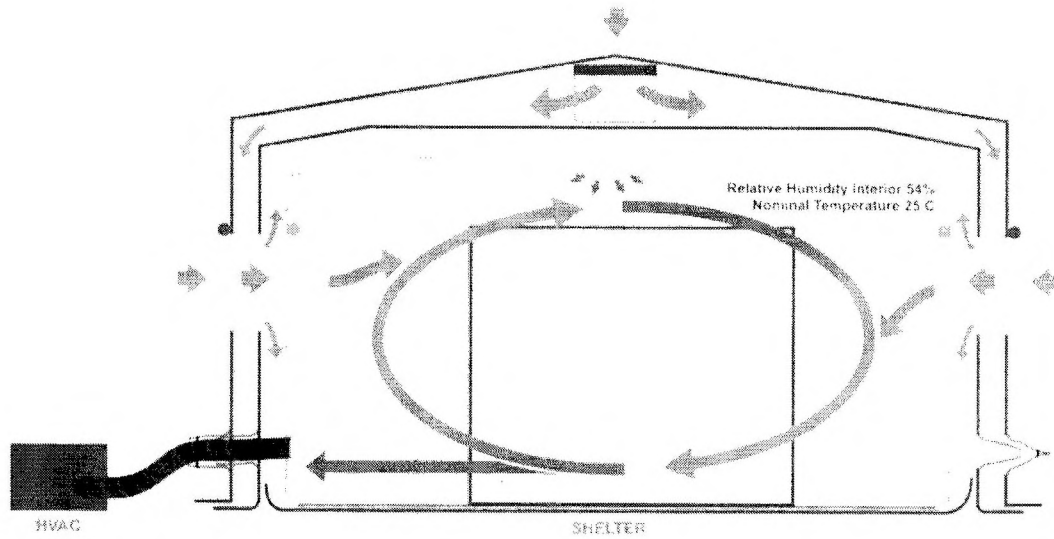
10. The Porch can be connected directly to a number of different shelters including:-
  - 10.1. 18 x 24
  - 10.2. 18 x 24 OFCS
  - 10.3. 12 x 12
  - 10.4. 12 x 12 OFCS
  - 10.5. Porch
  - 10.6. 4 way connector

11. The shelter is manufactured from PVC coated polyethylene which is completely waterproof. It is not breathable and thus whilst there will be a level of air movement when the tent doors are open permanent ventilation ducts are provided at the eaves of the shelter walls. Further to this the HVAC ducts and windows can be used as air vents as required.

With respect to addressing potential condensation issues where the shelters are deployed in high humidity environments (above 50RH which includes most of Europe in the mid-summer) there is a risk of condensation inside the shelters. This is caused by the temperature differential between day time and night time operations and the small differences between dry bulb and wet bulb temperatures in very high humidity areas. There are a number of possible strategies to avoid this effect, which to some degree will depend on the specific air conditions. Ultimately the wet bulb temperature is very close to the dew point temperature so keeping the shelter internal temperature above the wet bulb temperature will negate the formation of condensation. For instance, for an external temperature of 78°C at an RH of 80% gives a wet bulb temperature of 71.37°C and a dew point of 71.34°C. If the internal temperature is maintained above the wet bulb temperature by maintaining a low level of cooling mixed with fresh air or for unoccupied or unconditioned shelters where temperature conditions are not critical ensuring that the internal and external temperatures are normalised by providing natural or forced ventilation.

## Humidity

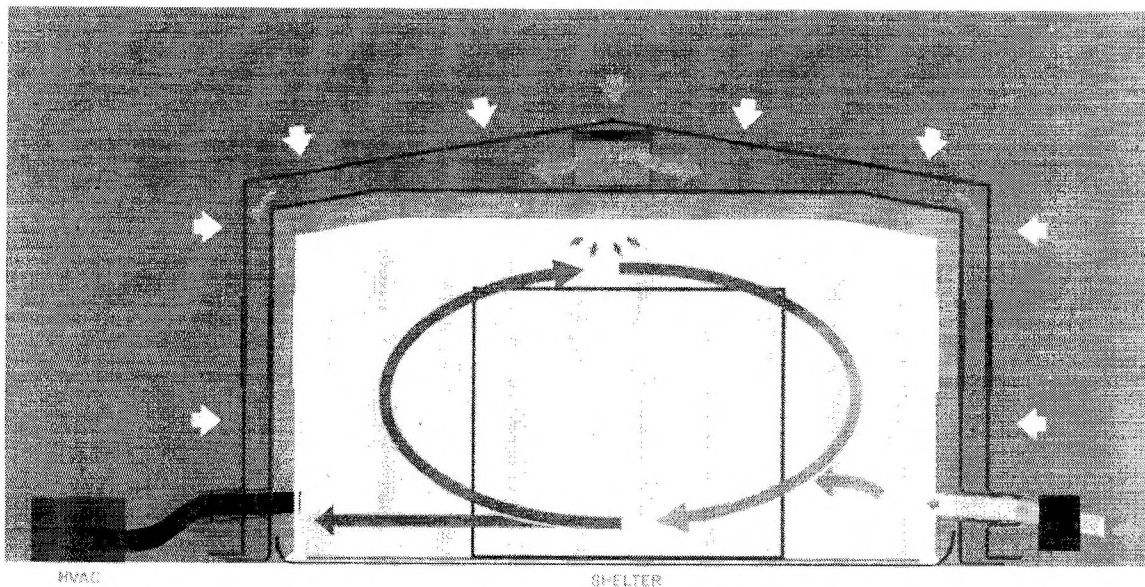
Ambient Relative Humidity 52%  
Ambient Outdoor Temperature 20°C



**Figure 3: Normal Ventilation**

12. Under normal conditions with the HVAC running and the ventilation duct open there should not be any condensation issues, opening windows will aid ventilation.

**NOTE:** On shelters that are not in use opening the window shutters to let in natural light will also reduce the risk on mould growth and mould spores will not grow if exposed to UV light.



**Figure 4: Closed down shelters**

Fig 4 shows a shelter that is closed down and has the highest risk of condensation particularly if it has been occupied during the day and is closed up at night. To reduce this risk there are a number of mitigation strategies that can be employed, listed as follows:-

- Cool with HVAC for 15 minutes to remove condensate from the air then briefly heat to above ambient temperature.
- Open or partially open window vents.
- Open thermal fly vent.
- Open window shutters to let in natural light during the day
- Run the HVAC or provide forced ventilation.
- Fit Shelter insulation

## SITING

13. To site shelters, proceed as follows:

- 13.1. The ground should be as level as possible, avoiding hollows where water would collect during heavy rain. Dry river beds or wadis, must be avoided as heavy rainfall or flash floods, however infrequent, can jeopardise the integrity of the shelter.
- 13.2. The ground should also be firm thus ensuring stability for pins and poles.
- 13.3. The site should be clear from obstacles such as rocks, trees and bushes to avoid the risk of tears in the PVC covers or ground cloth.
- 13.4. Drainage may be achieved by cutting channels around each shelter when the gradient and composition of the ground allows it.
- 13.5. Alternatively, the ground should be broken up between the tent pins and tent walls and a small bank of earth built on the inside of the tent wall.
- 13.6. Attention should be paid to the direction of the prevailing wind so that the tent is erected with its entrance located on the side facing away from the wind. Consideration should also be given towards minimising the area exposed to the wind, as this will gradually loosen the over straps and guy lines.
- 13.7. To prevent the propagation of fire between shelters, wherever possible, a spacing of 6m between shelters or shelter complexes is to be maintained.

## PITCHING

### WARNING

**PERSONNEL INJURY. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF, THE MINIMUM IS ONE PERSON PER SHELTER LEG.**

### CAUTIONS

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** The PVC Covers are manufactures from polyethylene covered PVC, this is a stronger and more waterproof material than the old cotton canvas but it is not flexible and does not stretch. The end gable strap must be installed before the gable cover is fitted to ensure the frame spigots are correctly located.
- (3) **EQUIPMENT DAMAGE.** All insulation panels can be added after the shelter has been erected EXCEPT the roof panel that must be attached to the frame prior to the covers.
- (4) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.

**General**

14. The pitching space should be marked out in accordance with the ground plan provided

**NOTE: Pitching party is to comprise of four personnel and a supervisor.**

**NOTE: The angle of the upright poles is critical if the covers are to fit correctly, base restraint straps are to be fitted to ensure the correct spacing.**

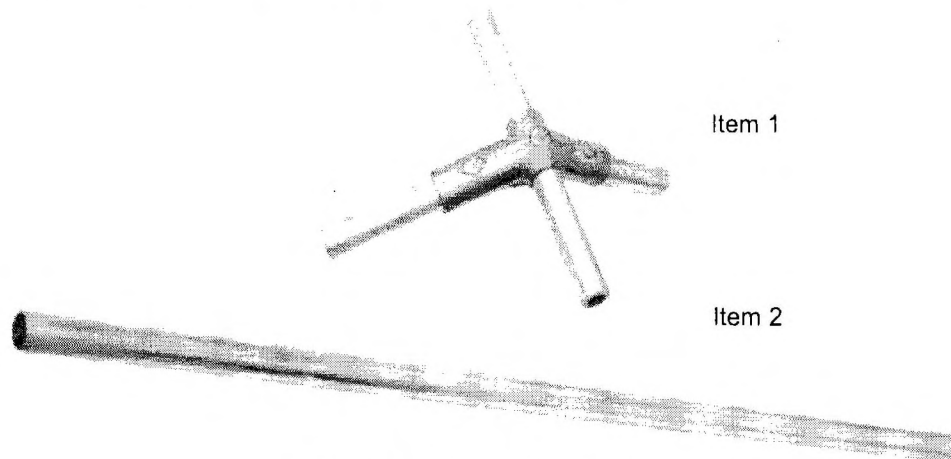
15. The valise or bundle containing the tent cover should be carried as near as possible to the pitching site.

- 15.1. To prepare the cover, proceed as follows:
- 15.2. Open covers and lay out with inside uppermost.
- 15.3. Follow the assembly instructions

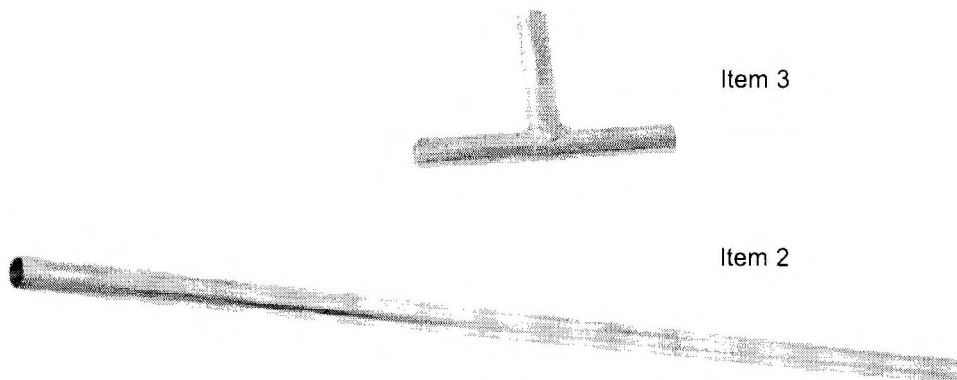
16. With the MK4 shelter system there are options for assembly. The tent can be erected using keder rails or laced together as detailed in Fig 19 to 26. If the tent is being erected using a combination of MK 4 and earlier cotton canvas panels then you can utilise a combination of the two or just dutch lacing.

17. The frame should be laid out as ready to assemble. This includes the following:-

- 17.1. 9 off Ridge and Eaves Brackets (J11/8340-99-132-0008) (Item 1)
- 17.2. 6 off Universal Members 3 FT (J11/8340-99-132-0007) (Item 2)
- 17.3. 16 off Universal Members 6 FT (J11/8340-99-132-0006) (Item 3)
- 17.4. 6 off Base Bracket (J11/8340-99-132-0010) (Item 4)

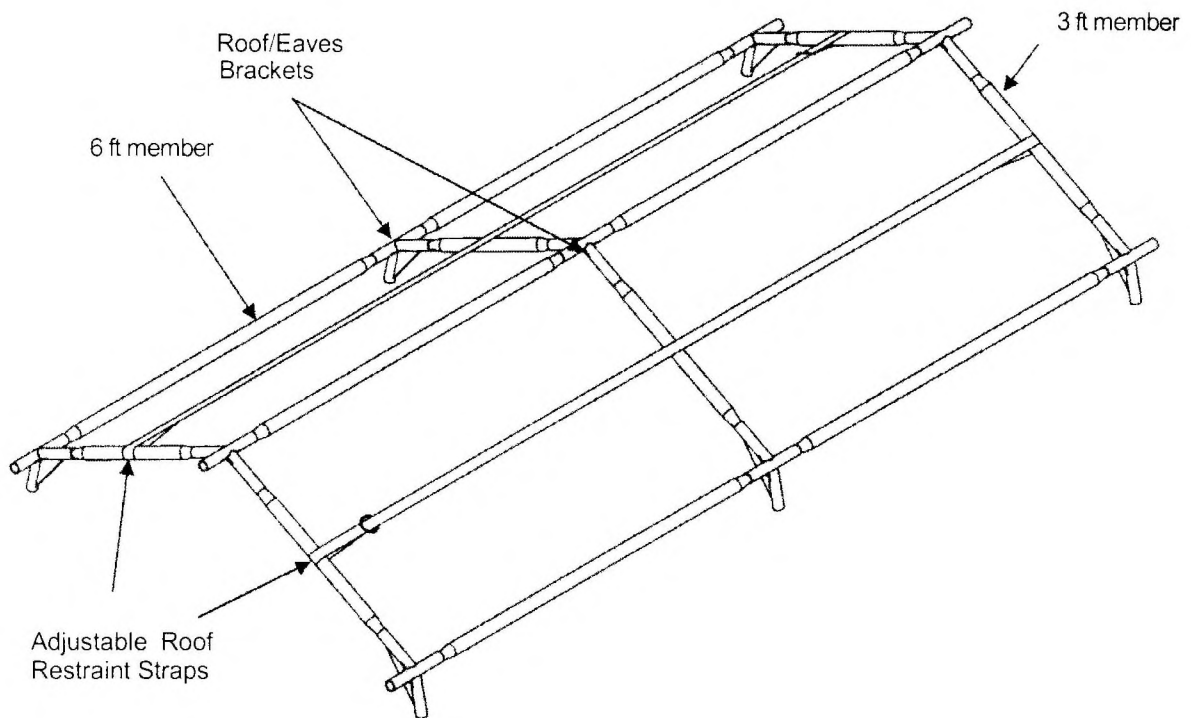


**Figure 5: Roof Components**



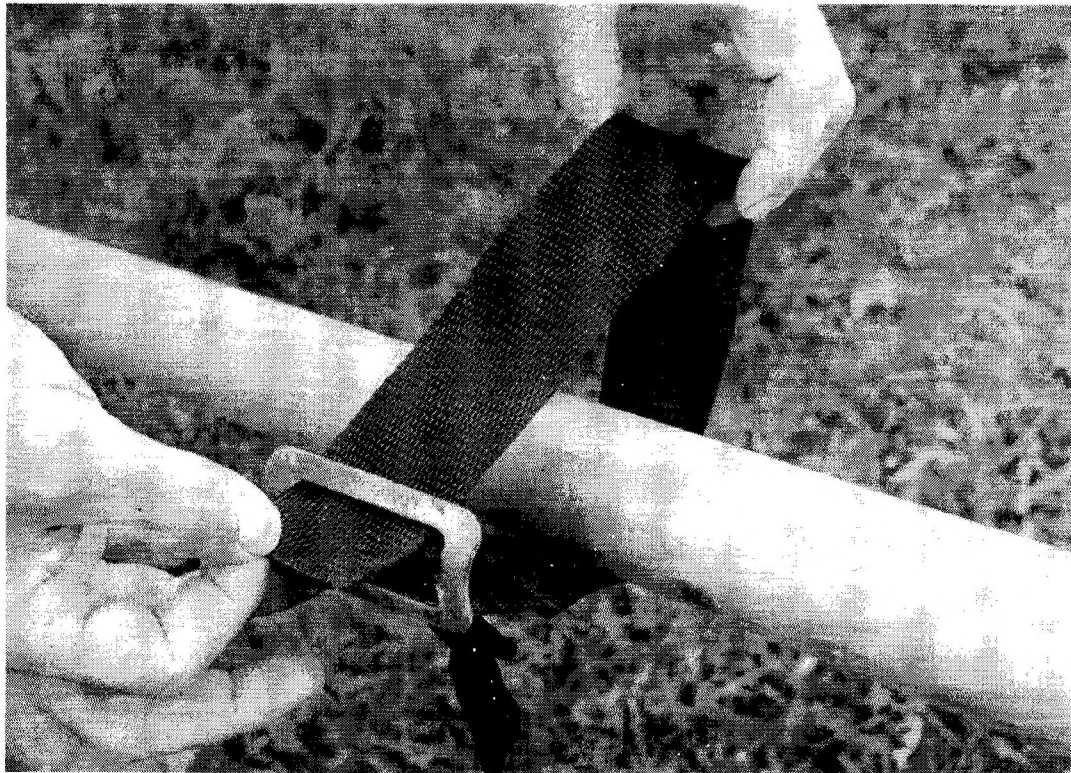
**Figure 6: Wall Components**

18. Commence construction with the roof as detailed in Fig 7.

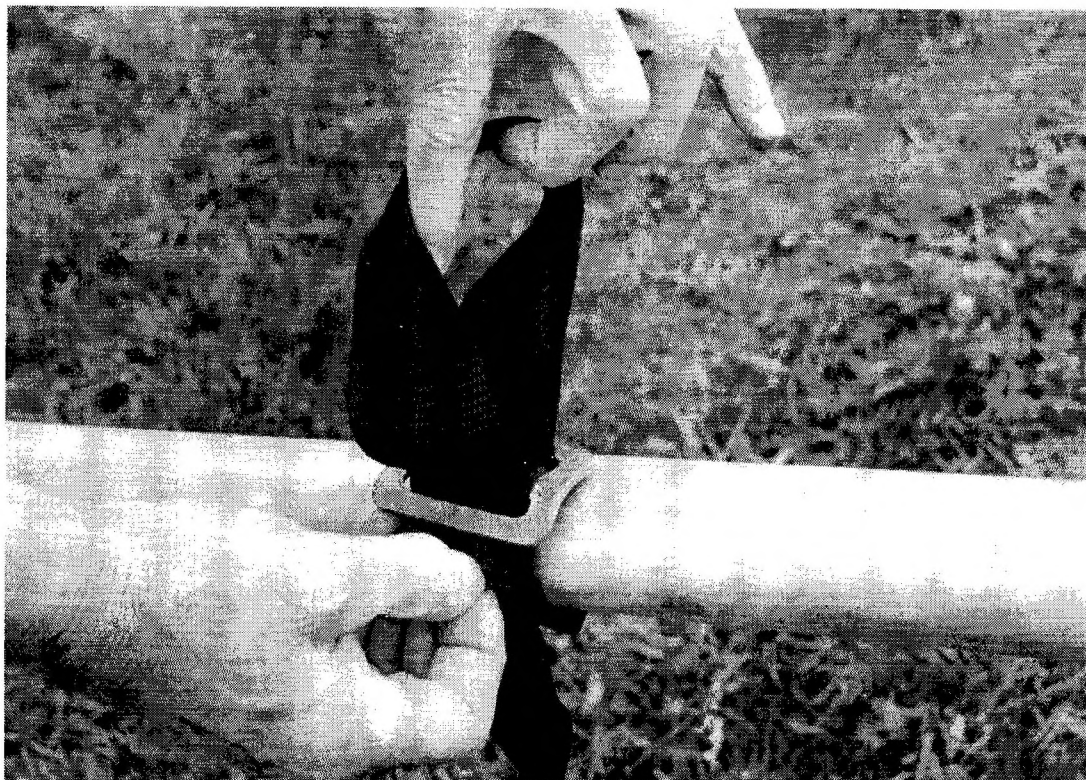


**Figure 7: Frame Layout**

19. Tent poles should be fitted together to produce the roof framework with roof restraint straps attached. The frame should be assembled from one end and the poles inserted in sequence, this minimises stress on the frame Fig 7.
20. Fit strap, adjustable roof restraint (J11/8340-99-614-5444) (qty 2) Fig 8 to 15 and situate the strap as detailed in Fig 7. Ensure the straps are not twisted and the buckles are on the inside of the roof.
21. Fit the buckle end of the strap first passing the webbing through the buckle Fig 8, over and through the other side Fig 8 and back over itself Fig 10. Arrange the buckle to be under the frame so that it does not chafe the PVC covers Fig 15.
22. Tension roof restraint strap at other end of frame as detailed in Fig 11.
23. Secure through rings as detailed in Figs 12, 13 & 14.



**Figure 8: Buckle Connection 1**



**Figure 9: Buckle Connection 2**





Figure 10: Buckle Connection 3

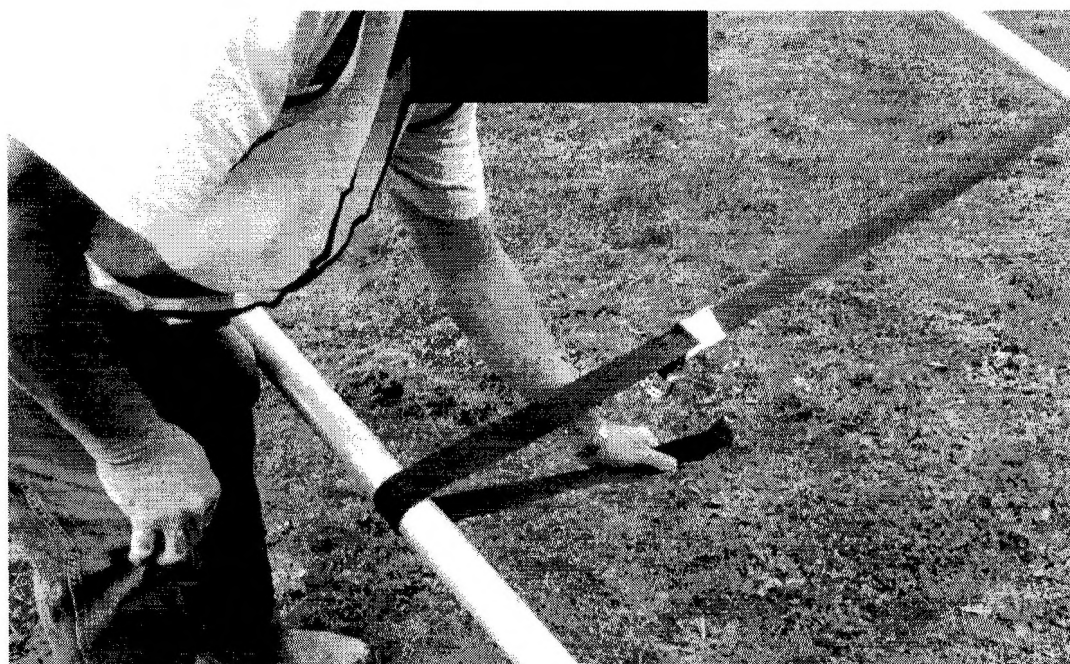


Figure 11: Tensioning Roof Restraint

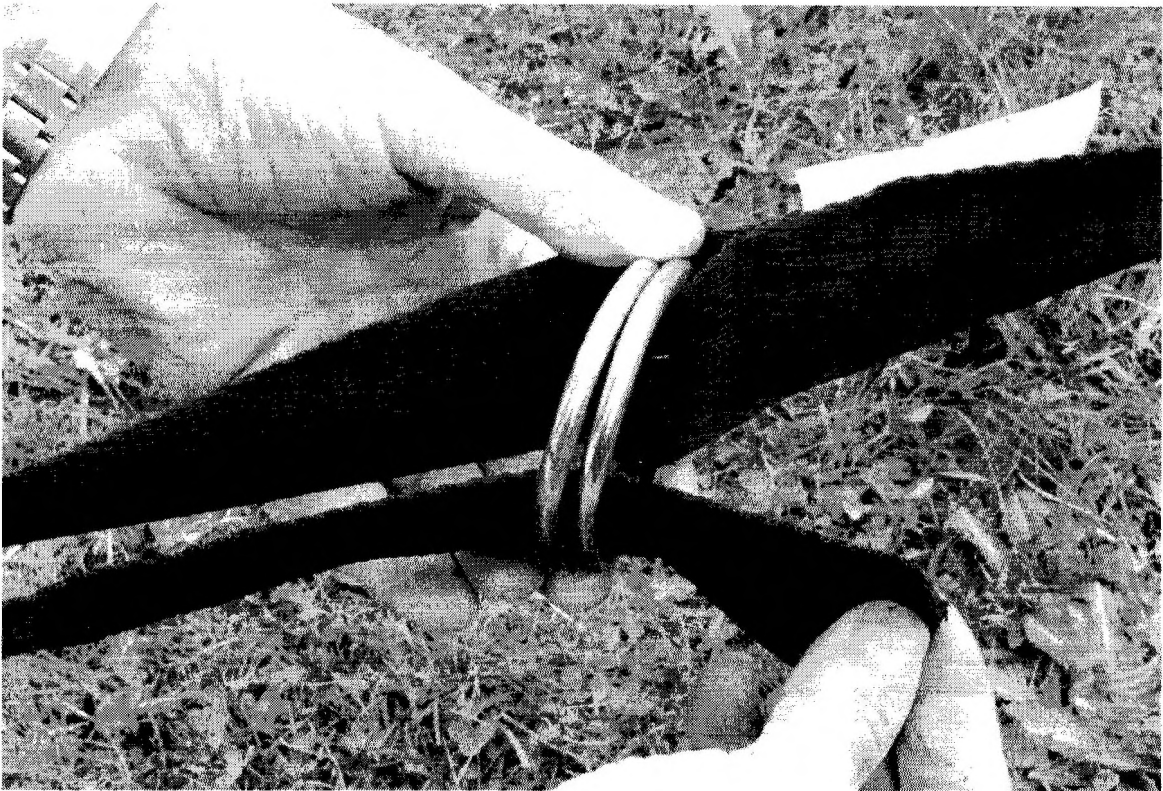


Figure 12: Secure Roof Restraint Strap through rings 1



Figure 13: Secure Roof Restraint Strap through rings 2

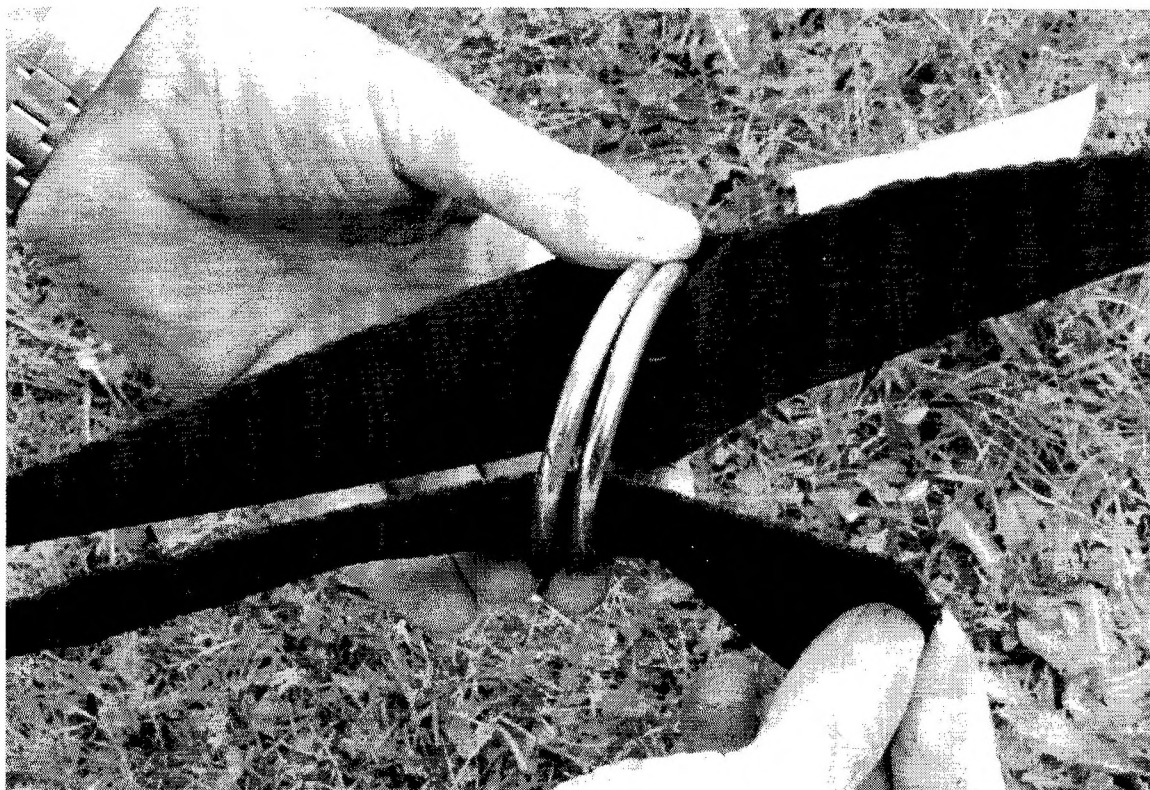


Figure 12: Secure Roof Restraint Strap through rings 1



Figure 13: Secure Roof Restraint Strap through rings 2

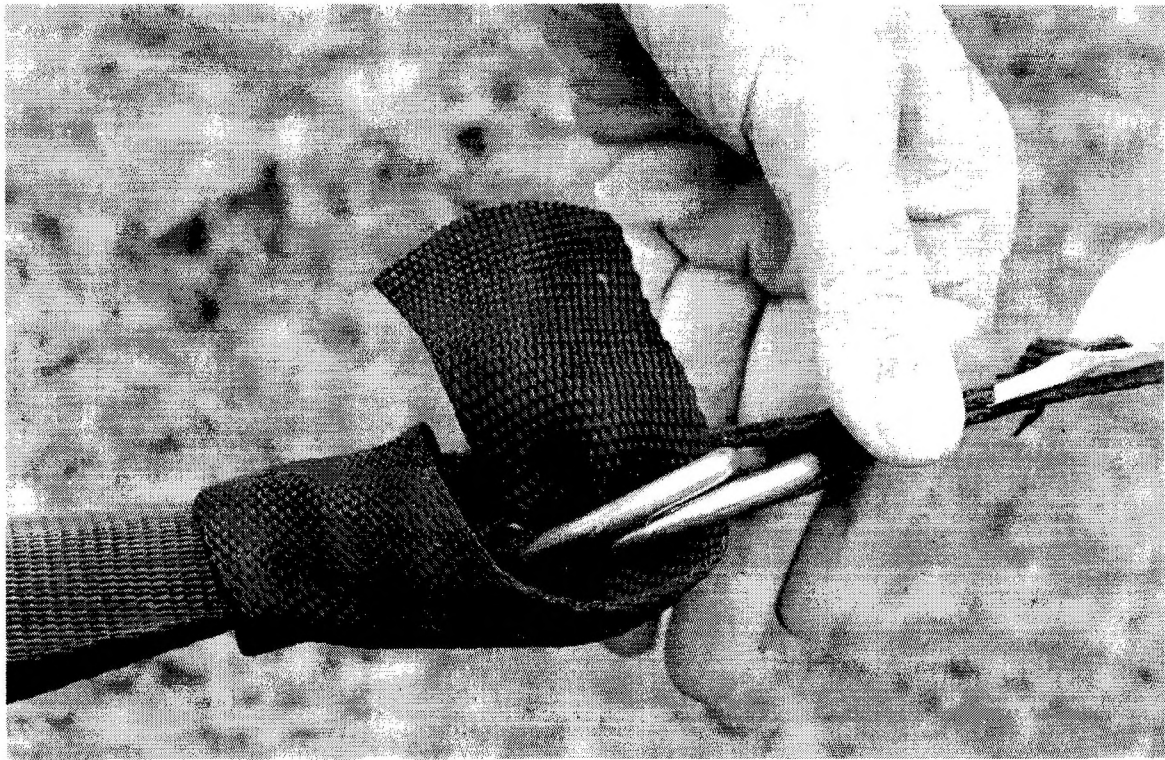


Figure 14: Secure Roof Restraint Strap through rings 3

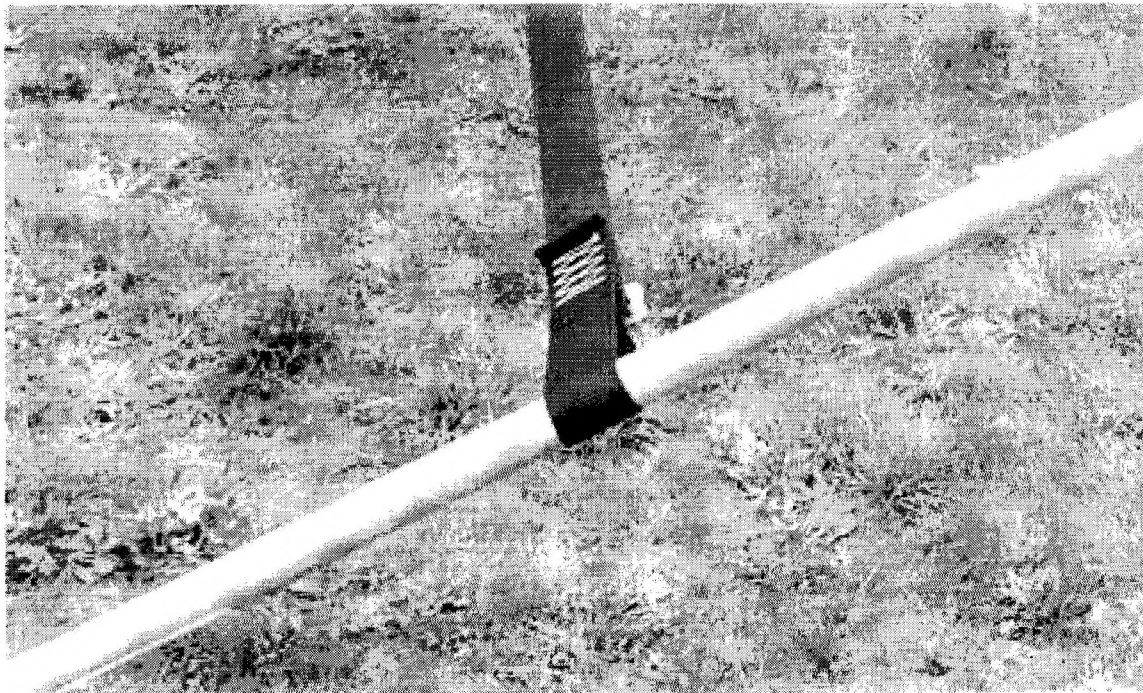


Figure 15: Roof Restraint Straps fitted as frame roof is assembled

**CAUTION**

The PVC Covers are manufactured from polyethylene covered PVC, this is a stronger and more waterproof material than the old cotton canvas but it is not flexible and does not stretch. Care should be taken fitting the end gable covers onto the frame spigots so that they are correctly located.

24. The roof and wall can then be connected to the main shelter either using keder rail or dutch lacing.



Figure 16: Passageway roof and wall connected to end panel

**CAUTION**

Do not attempt to stretch the PVC cover using frame parts as a lever, they should fit without any force. If they do not fit re check the end gable strap is attached correctly.

**CAUTION**

Protective gloves must be worn when inserting the keder rail to avoid potentially nipping fingers while pushing the rail into position.

25. Inserting the keder rail is a two (2) person operation, insert the rail from above (see Fig 17 below) whilst a second person holds the keder beads together, this allows the rail to slide freely. Keder rails are fitted to each end of the roof (J11/8340-99-380-1742) (Qty 1 in each roof section, total 2 in the roof), one after the other and pushed into place so that they are just short of the eave and apex positions Fig 18.

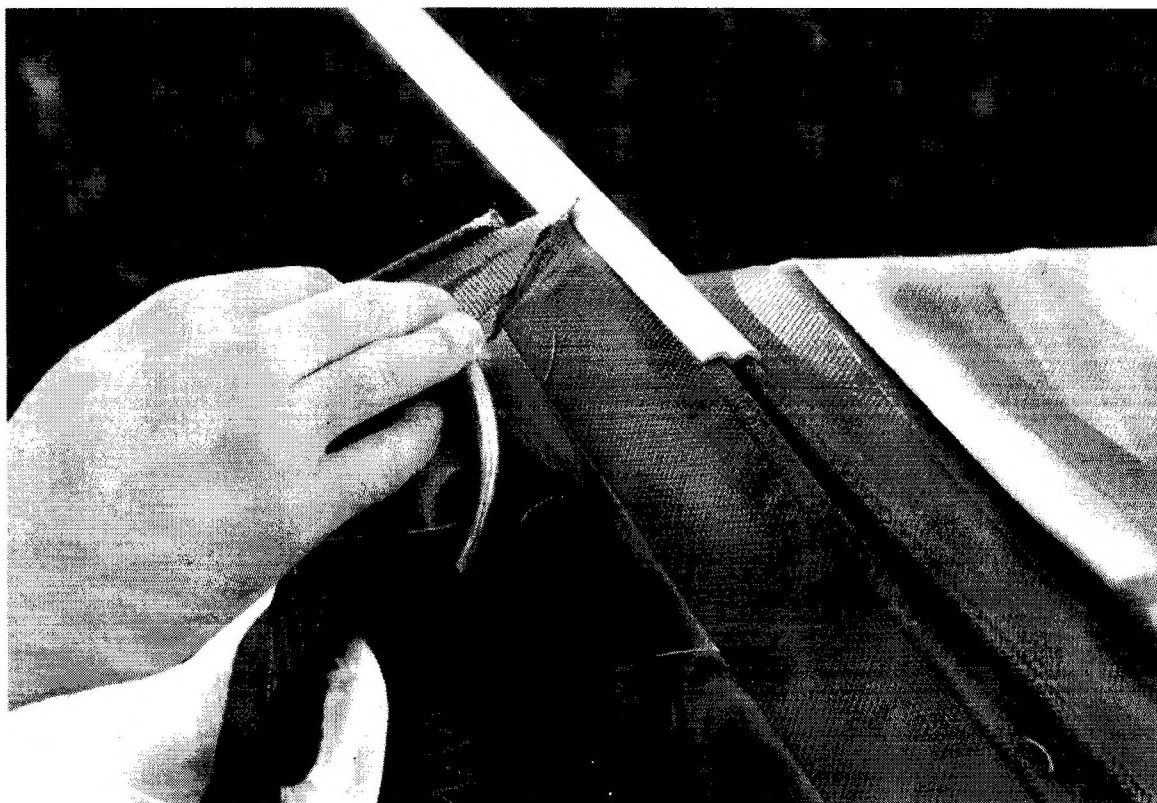


Figure 17: Adjusting flap positions at joints

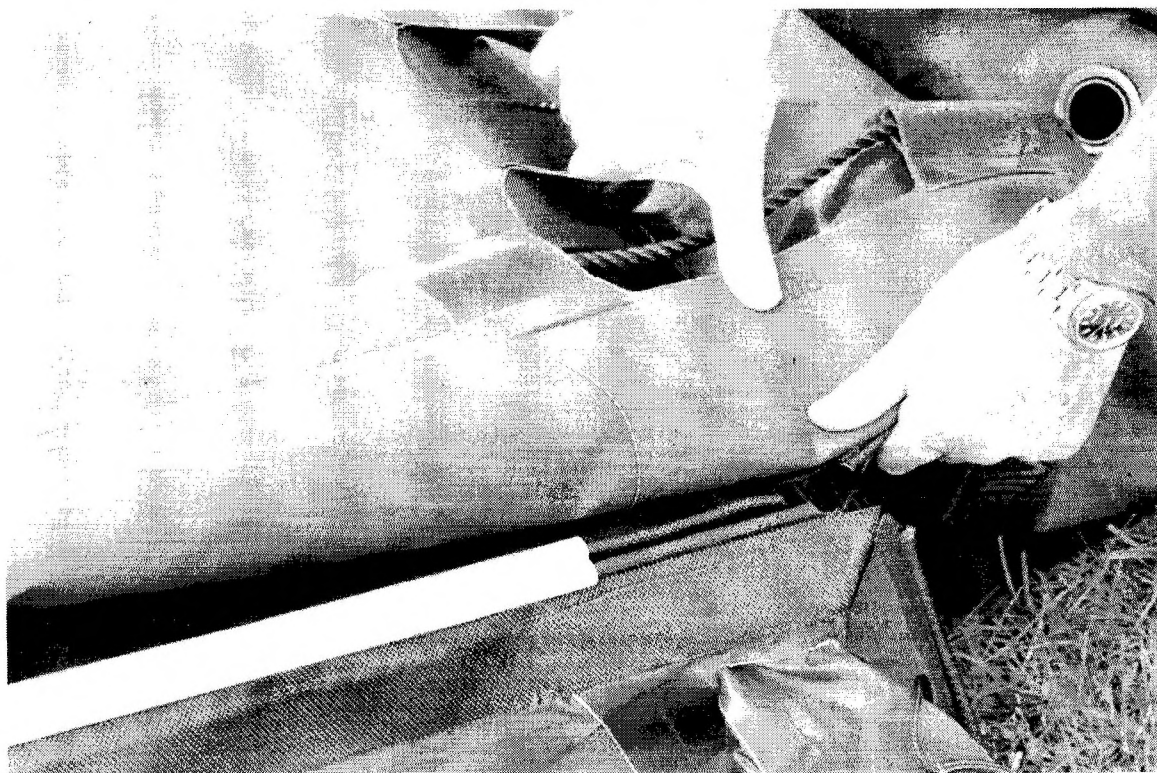
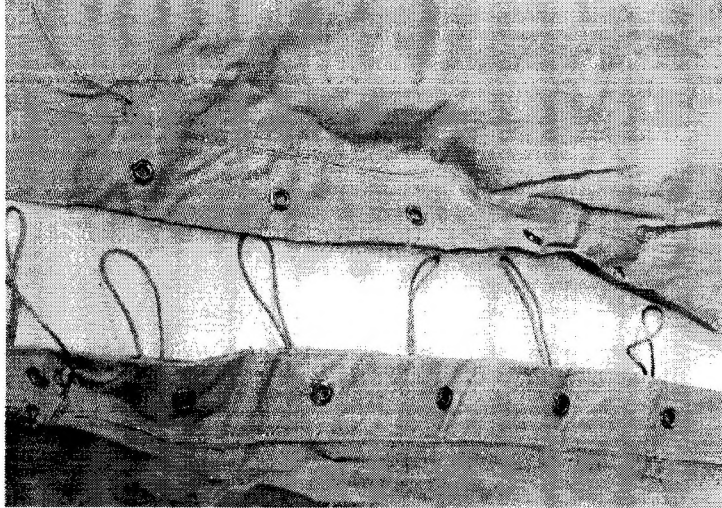


Figure 18: Keder Rail Installation

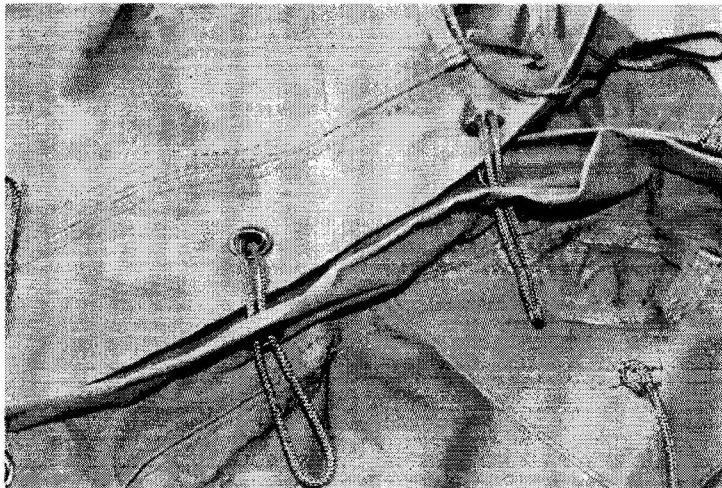
**Dutch Lacing**

26. The PVC covers are designed to be compatible with the existing cotton canvas covers and are fitted with dutch lacing, this enables older cover designs to remain in service.

27. The dutch lacing is installed by aligning the eyelets as detailed in Fig 19. Then passing the loops through the eyelets Fig 20. The top loop is then looped over the next loop down Fig 22. Finally the bottom loop is secured by a toggle or tie Fig 26.



**Figure 19: Lacing cover sections (1)**



**Figure 20: Lacing cover sections (2)**

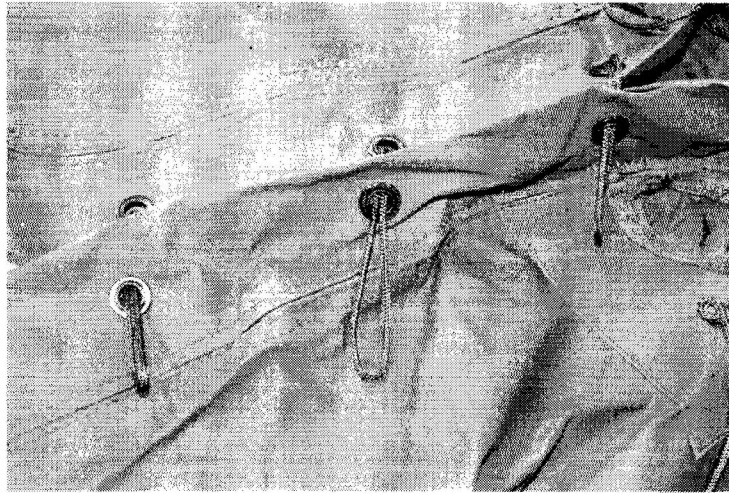


Figure 21: Lacing cover sections (3)

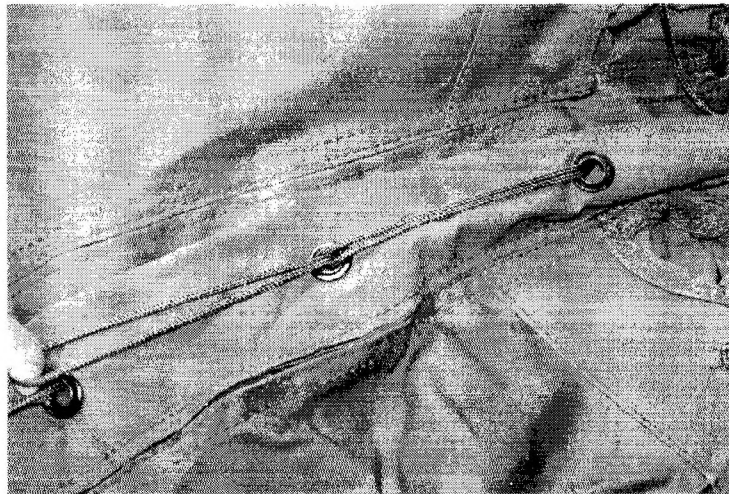


Figure 22: Lacing cover sections (4)

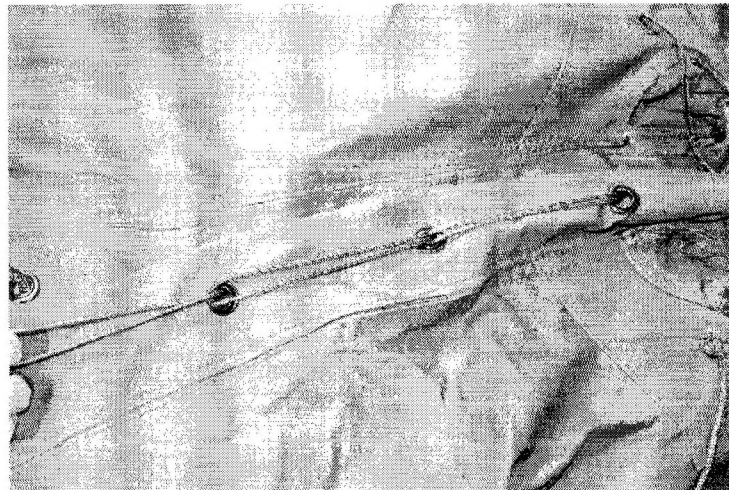


Figure 23: Lacing cover sections (5)



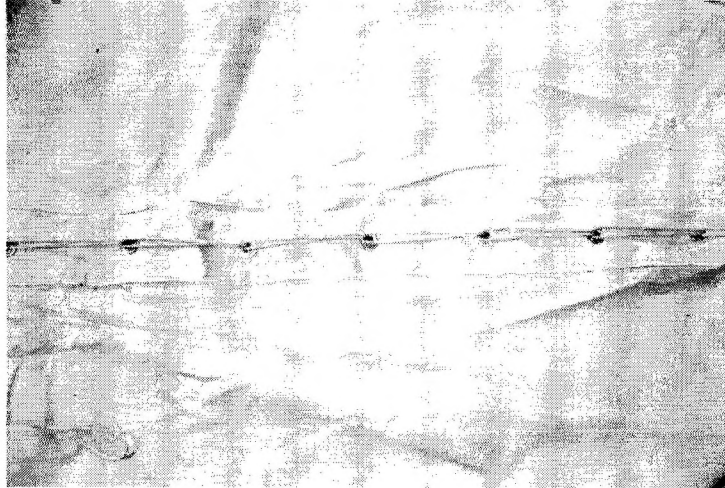


Figure 24: Lacing cover sections (6)

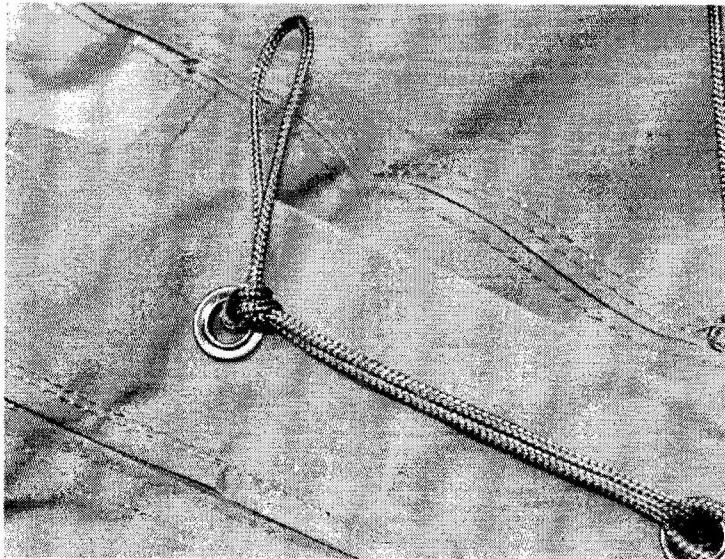


Figure 25: Lacing cover sections (7)

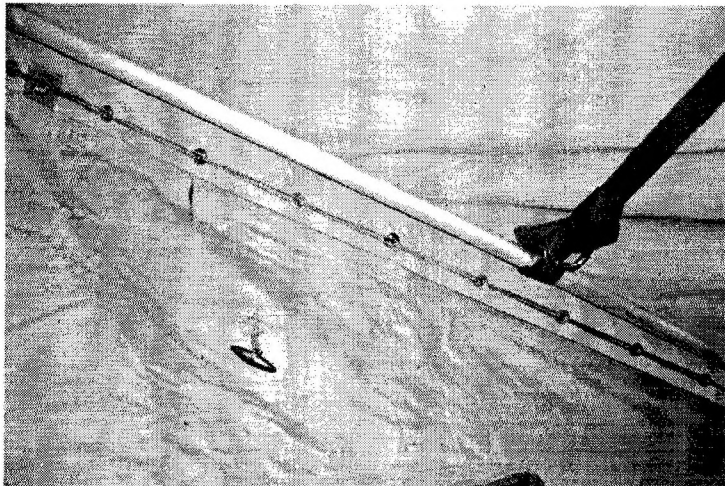
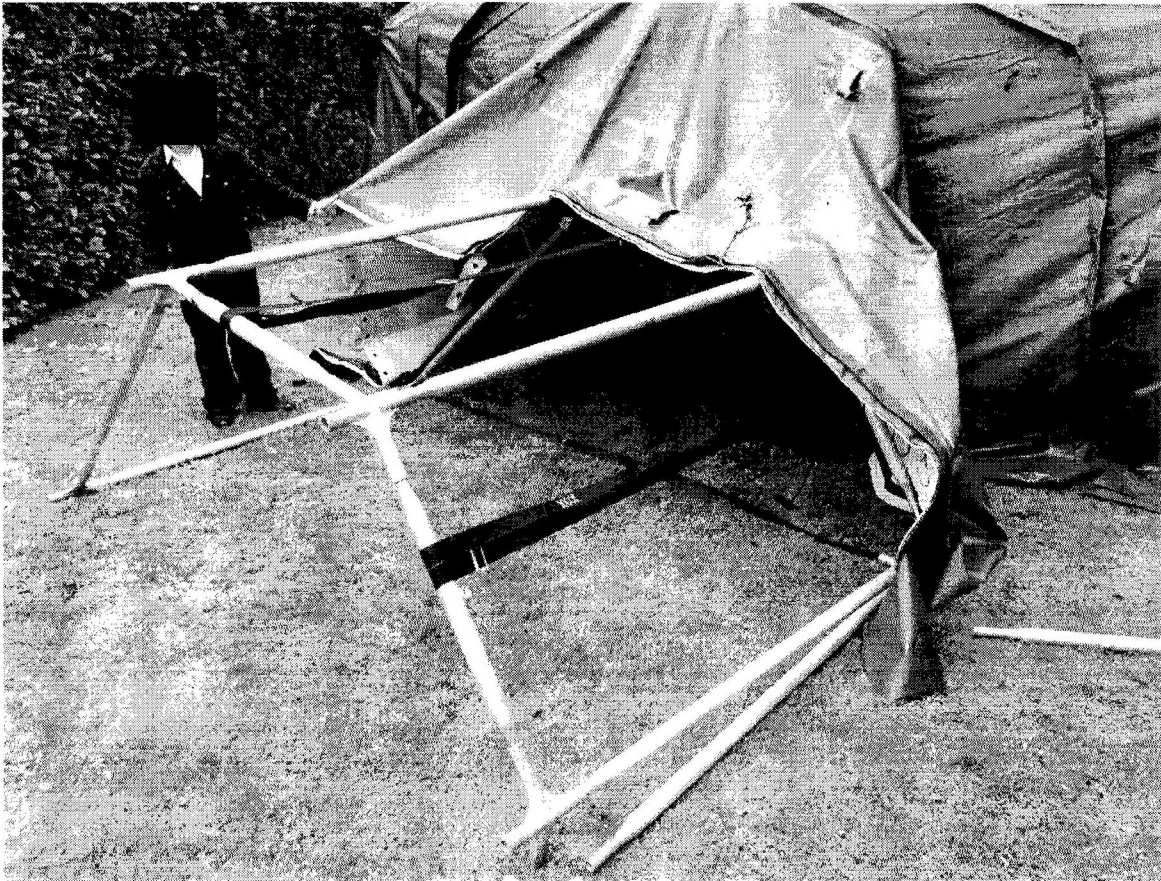


Figure 26: Lacing cover sections (8)



**Figure 27: Fit legs on one side then work the canvas over the frame**

28. Fit the legs on one side then work the canvas over the frame Fig 27.

**NOTE: The shelter legs should be fitted using at least 2 people. The shelter is lifted at each leg position evenly and the legs pushed into place.**

29. Fit the lower bracket to the legs fitting the base restraint straps in two positions Fig 28 to 31. The Base Restrain Strap (J11/8340-99-423-3355) (Qty 2) pre-sets the width of the tent and ensures that the tent frame is in the correct size configuration, this also aids the fitting of the Ground Sheet (J11/8340-99-968-3474) later in the process. Fit the ground poles as shown in Fig 31 and 32.



**Figure 28: Correct attachment of base restraint strap**

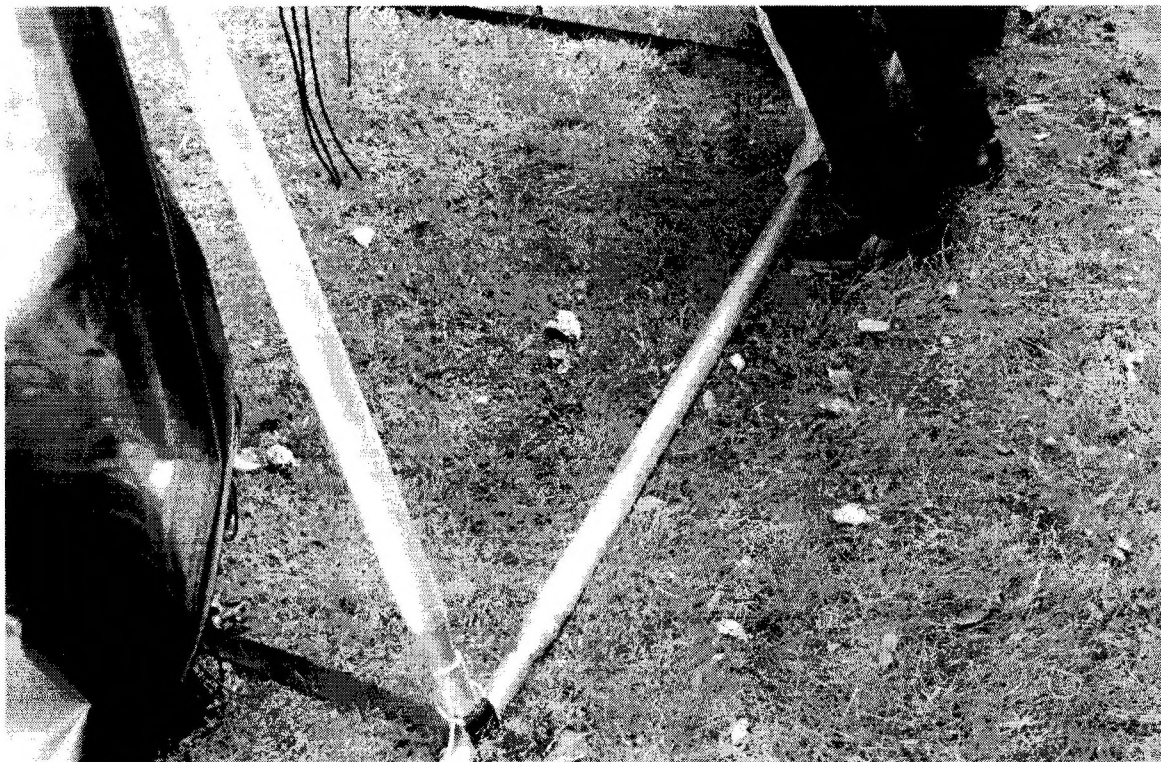


**Figure 29: Fit lower leg bracket and base restraint strap**



**Figure 30: Install Leg Brackets**

30. Install poles Fig 31 and fold down canvas Fig 32.



**Figure 31: Installing ground poles**

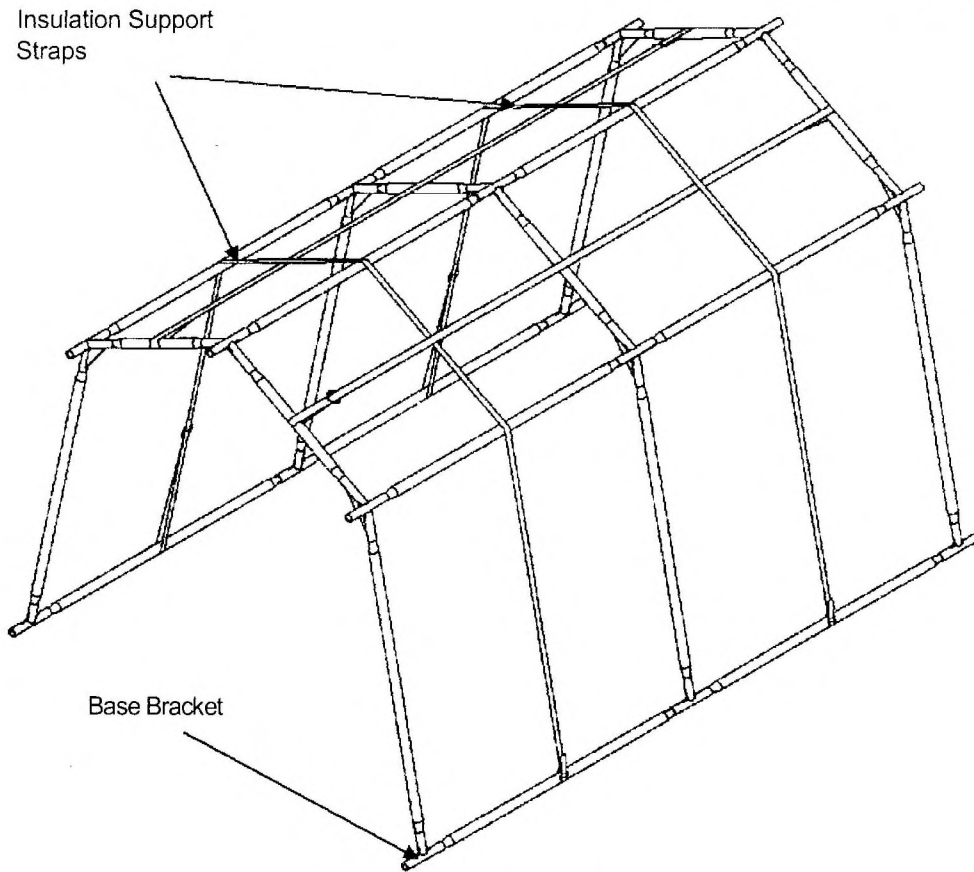


Figure 32: Frame Complete



Figure 33: Installing wall keder using two (2) people (Passageway to tent or end wall)



**Figure 34: End wall fitted (Optional)**

31. Install the end wall gable keder rails (J11/9390-99-477-5695) (Qty 2 each side, total 6) or complete the lacing of the end gables using the same process as detailed for the roof keder.
32. The sod-cloth should be pinned through the external eyelets using tent-pins at an angle of 90 degrees from the horizontal (J11/8340-99-137-3895) Fig 35 and internal cords using (J11/8340-99-132-0028) at an angle of approximately 60 degrees from the horizontal Fig 36.
33. When pegging out the shelter, proceed as follows:
  - 33.1. Pins for shelter lines (J11/8340-99-943-9052) should be driven at an angle of approximately 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground and approximately 300 mm (1ft) from the edge of the sod cloth Fig 37.
  - 33.2. Hooks on tent pins should face in the opposite direction to the pulling force of the line and any cords should be placed around the pin prior to pegging.
  - 33.3. For ease of driving the pins into the ground and to obtain the correct angle, personnel should try to position themselves behind the pin, facing away from the direction of the pulling force of the line when striking.
  - 33.4. Avoid unequal strain and wear on the PVC covers by ensuring that:
    - 33.4.1. Guy lines are not twisted and lie flat across the cover.
    - 33.4.2. Restraint and insulation straps are not twisted and lie flat across the insulation.
    - 33.4.3. Doorways are closed while erection and pegging is carried out.

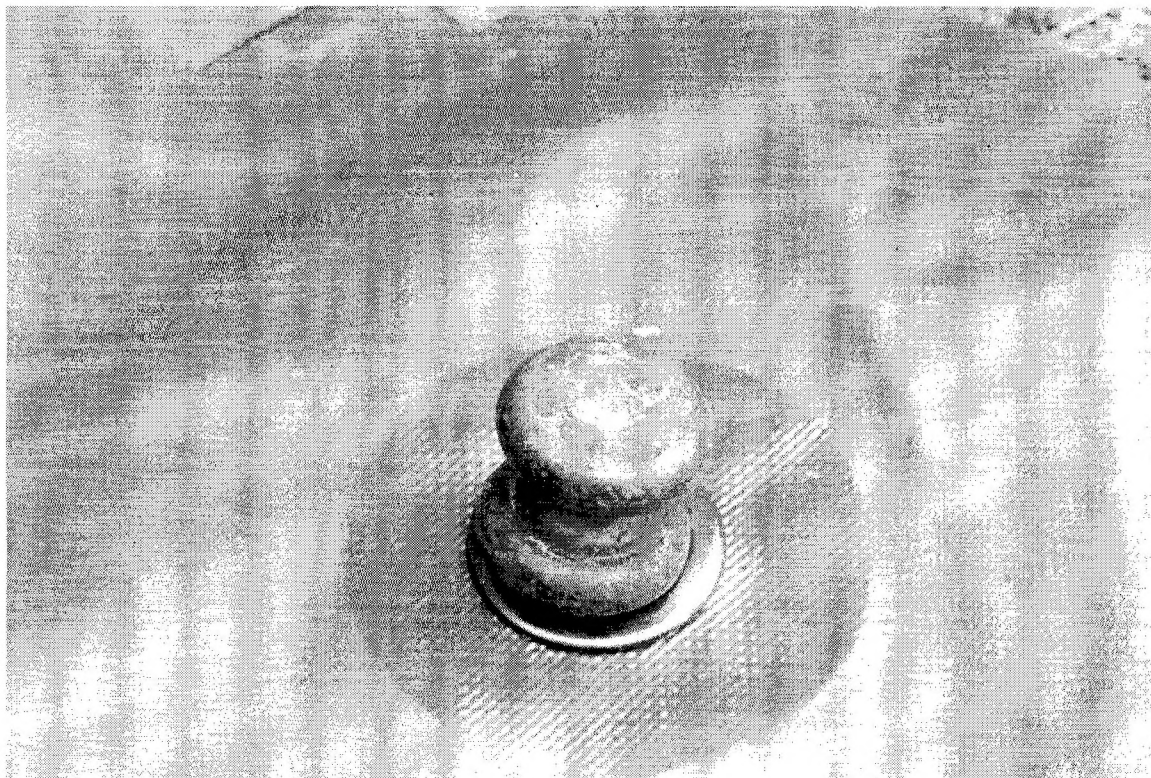


Figure 35: Sod Cloth Pins installed (J11/8340-99-137-3895)

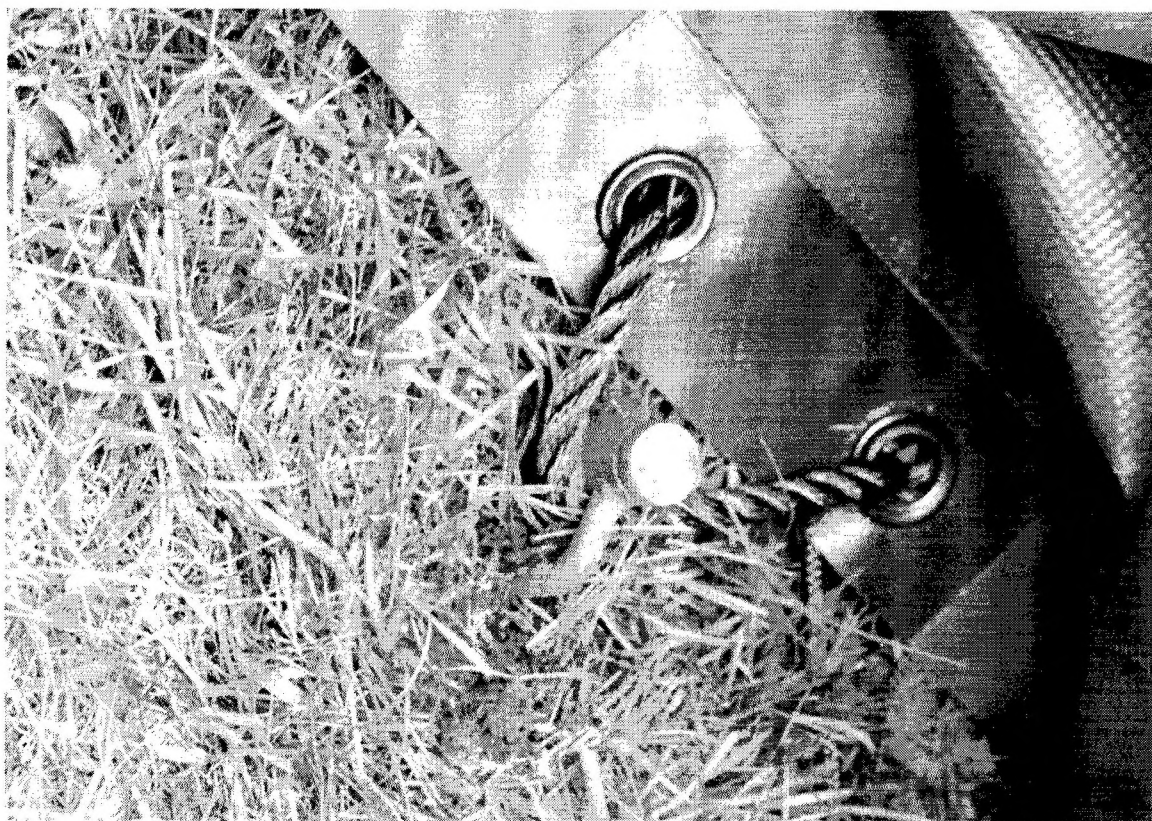
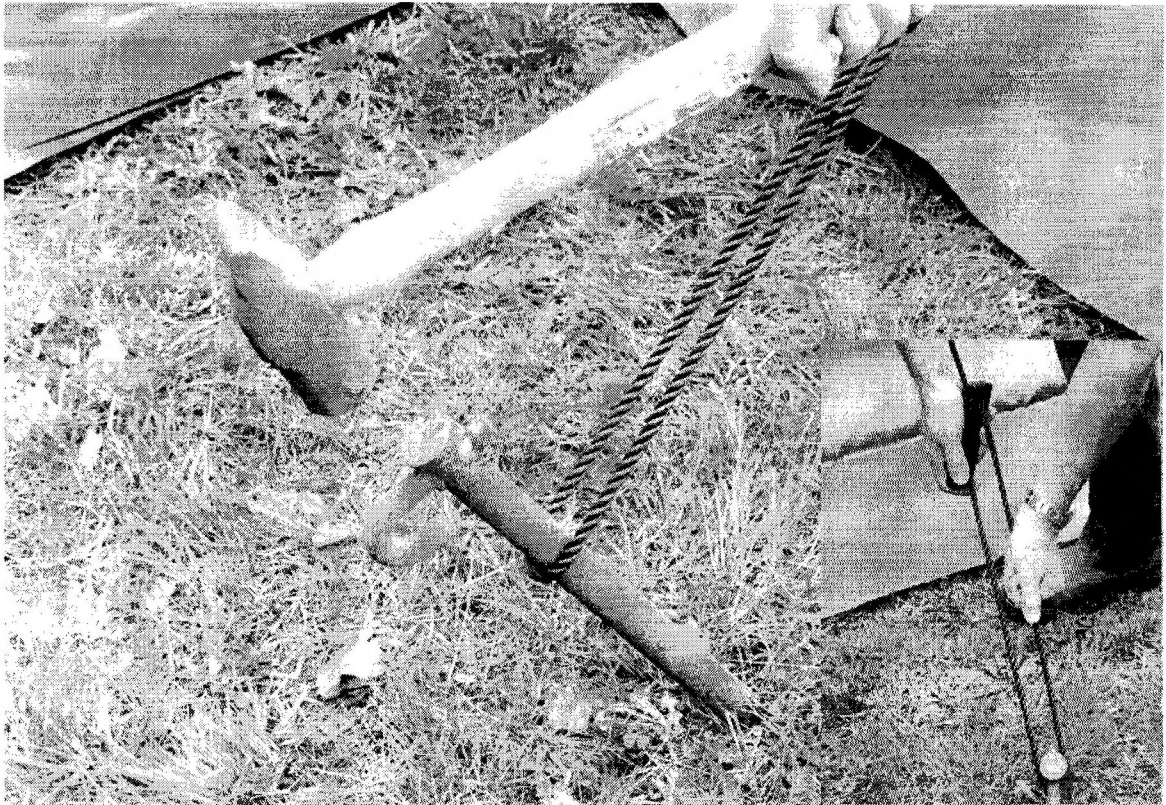


Figure 36: Internal Pins (J11/8340-99-132-0028)



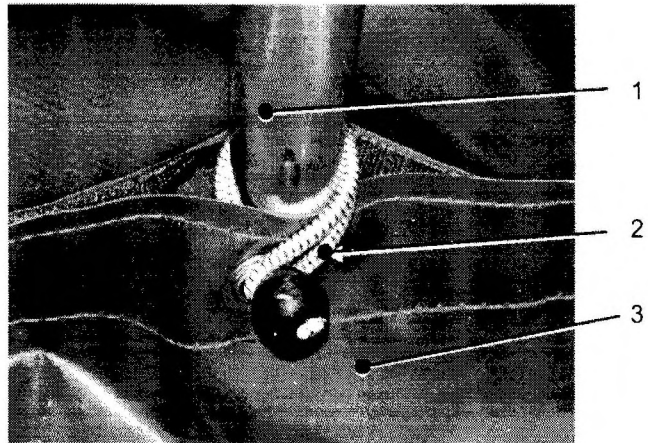
**Figure 37: Installing Guy Rope Pins (J11/8340-99-943-9052)**

34. The Overstrap (J11/8340-99-490-4093) strap should be fitted at both ends and in the centre and installed using (Qty 1) (J11/8340-99-477-1543) Pins pulling the strap directly 180° from the tent and installing the pins so that the Overstrap is taught but not too tight. The Pin should be driven at an angle of approximately 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground.

35. The Ground Sheet (J11/8340-99-968-3474) (Qty 1) is fitted by tightening the cord in the corners of the ground sheet to form a "bath tub". The sheet is then laid on the floor over the base restraint straps, evenly positioned and connected to the Velcro around the walls of the tent.

36. It is then connected to the frame using tensioners Fig 38 (J11/8340-99-865-3035) down inside the shelter and fix this to the framework (if being fitted).





- Item 1: Framework
- Item 2: Tensioner
- Item 3: Groundsheet

**Figure 38: Attachment of groundsheets with tensioners**

### DETAILED OPERATING INSTRUCTIONS

37. The tents are fitted with standard doors and windows and operation is generally self evident given that the deployment of the camp has been undertaken in accordance with the correct procedures. A few areas warrant specific note as detailed below:

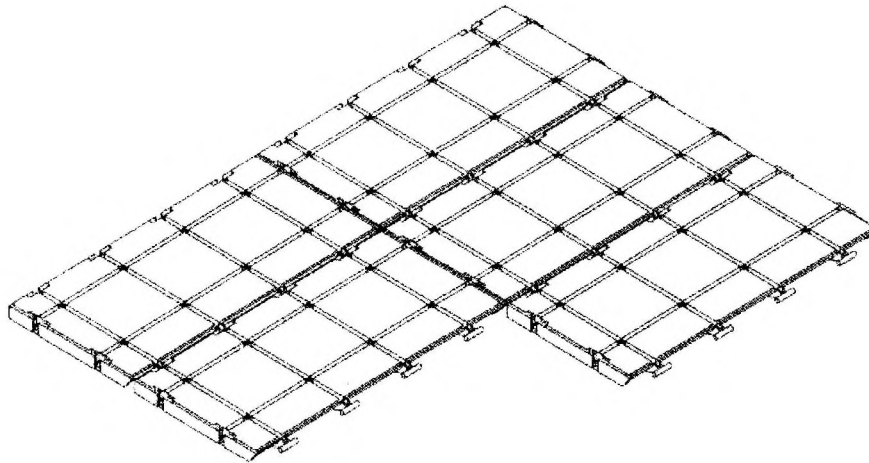
#### Doors and Zips

38. Where zips are utilised such as Doors and fly screens heavy duty zips are utilised. However these still need to be operated with care and must be kept clean.

39. Fly screens are available on most doors, these can be zipped open rolled up.

#### HARD FLOORING IF FITTED (J11/8340-99-958-8986)

40. Place the hard flooring (Fig 39) over the groundsheet (Item 3 from Fig 38) (if used). Do not place hard flooring on hard surfaces. Flooring clips together in sections. Fold flooring back on its self to dismantle.



**Figure 39: Installation of hard flooring**

41. Ensure all straps (internal and external) are taught and unable to move from their desired position on the frame.



**CHAPTER 2**

**OPERATING INFORMATION INSULATION NSN 8340-99-421-2154**

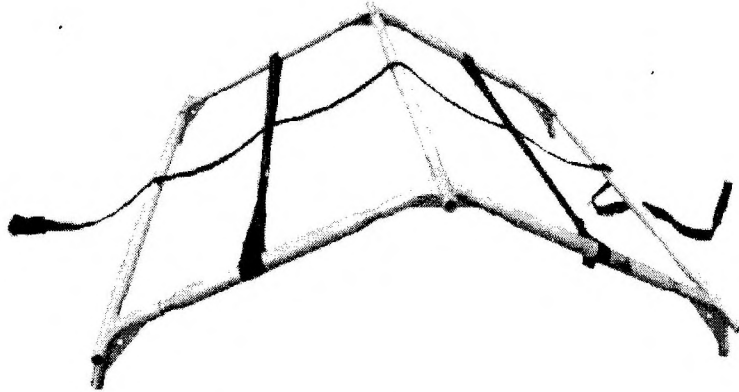
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**INSTALLING INSULATION**

42. The insulation is fitted between the PVC covers and the frame. The roof insulation has to be fitted prior to the main PVC cover in the early part of the shelter construction once the frame roof is erected.

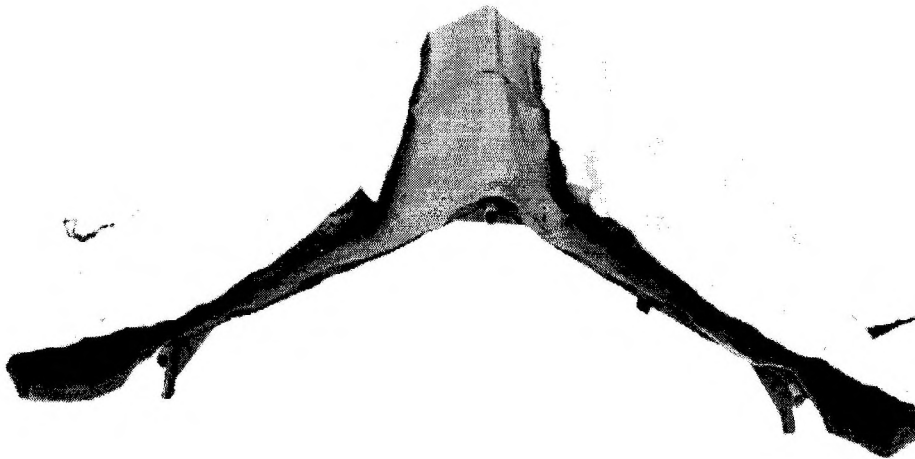
43. Additional insulation support straps must be laid over the roof frame (J11/8340-99-391-3314) (Qty 2) as well as the Roof Restraint Straps (J11/8340-99-614-5444). The roof insulation panel should then be attached to the framework. Attach the top of the insulation end sections to the framework by using tensioners (4020-99-908-8176) (Qty 40).



**Figure 40: Insulation support straps**

44. Lay the roof insulation panel, over the roof with white side facing inwards and loosely attach to the framework by the use of the tensioners, ensuring the ridge of the roof panel is aligned centrally Fig 41.

**NOTE: The insulation panel must be fitted during tent erection - all other panels may be fitted after erection.**

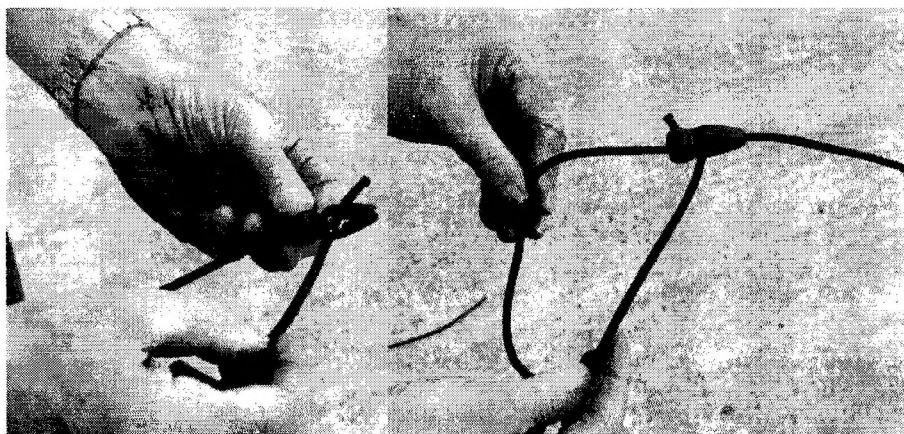


**Figure 41: Roof frame with attached insulation panel**

**WARNING**

**PERSONNEL INJURY. WHEN FITTING OR RELEASING THE INSULATION TENSIONERS THERE IS A HIGH RISK THAT UNDER TENSION THEY MAY SLIP AND SPRING BACK AT PERSONNEL.**

45. The tensioners are fitted by passing the loose end through the centre of the clip, pulling the tail to tension, then still under tension laying the tail into the jaws and end opening of the clip before releasing the tension to secure; the remaining tail should continue round and be reinserted through the centre of the clip to double secure. To release pull the tail to tension' lift the loose cord out of the clip, and release. Tensioner tails should pass through the insulation from the inside and be secured around the tent frame. Fig 42 and Fig 43.

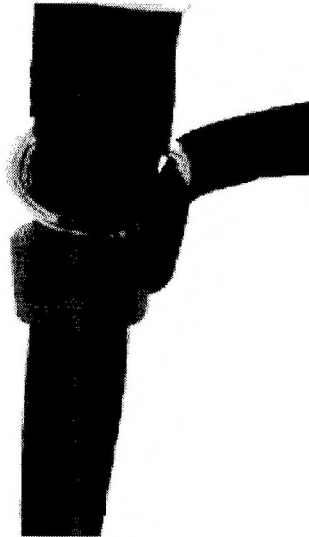


**Figure 42: Tensioner loose and locked**



**Figure 43: Tensioner Fitted**

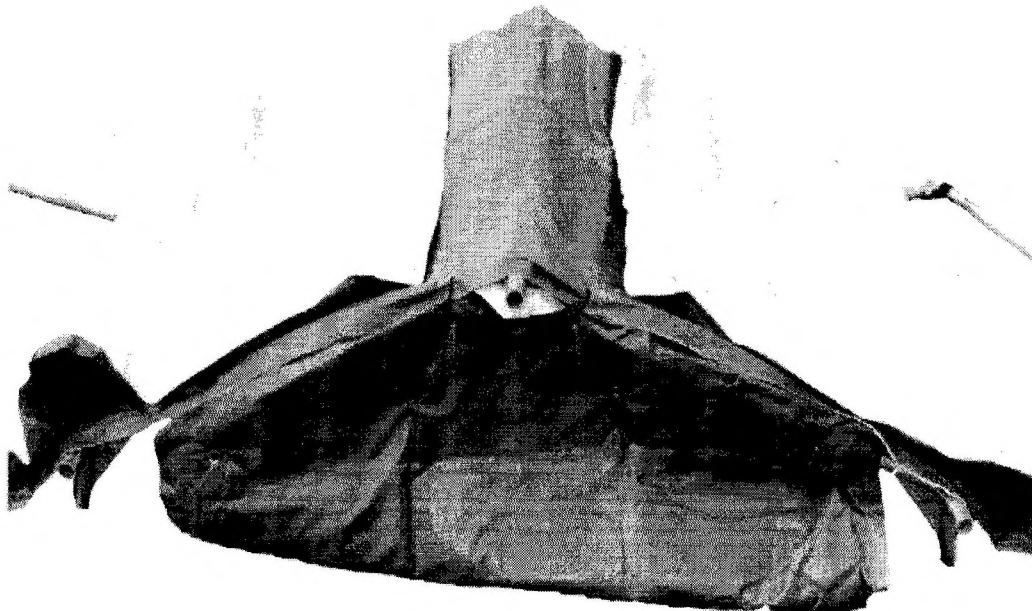
46. Fit and secure the roof insulation support straps ensuring that loose ends are tidied away Fig 46.



**Figure 44: Correct attachment of insulation support strap**

47. Once the tent is fully erected with the roof insulation fitted and the PVC covers fitted the wall insulation can now be fitted.

48. The insulation roof panel must overlap the top of the wall panels on the PVC cover side. Viewed from the outside the side wall panels should overlap the inner panels, Fig 45.



**Figure 45: Overlap insulation using toggles and eyelets**

49. Raise one side of the shelter and attach the outer component. Working from inside, tighten the uppermost tensioners and ensure that all panels overlap correctly. Raise the other side of the shelter and attach the remaining end wall component insulation panels at each end. Viewed from the outside the outer 2 end wall panels must overlap the centre two Fig 46.

50. Attach the insulation panel walls (qty 4 per side) with the tensioners, loosely at first, Working from the inside ensure that all panels are fitted correctly before tightening the tensioners fully Fig 46. The insulation roof panel must overlap the top of the wall panels on the canvas side. Viewed from the outside the end wall panels should overlap the inner 2 panels.

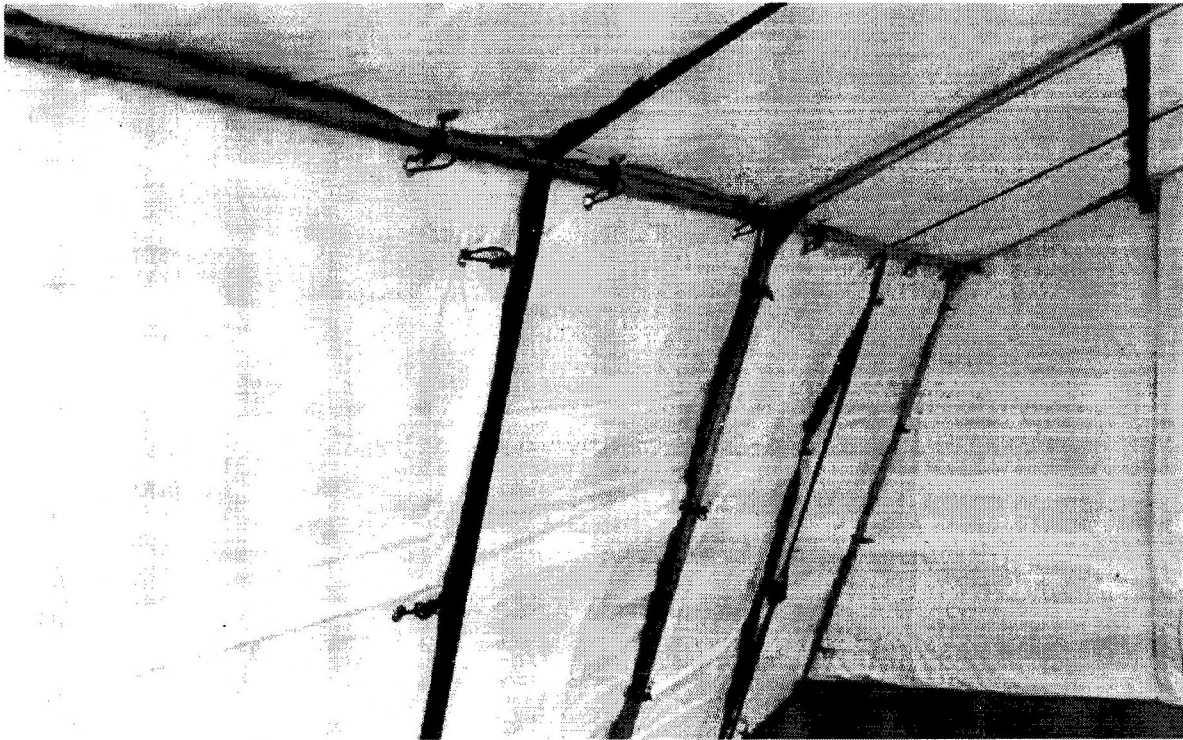


Figure 46: Wall insulation panel (Typical arrangement)

51. If end panels are to be fitted proceed as follows:-

52. The Mk 4 Insulation end panel consists of 4 items per end and are shown in Fig 47, viewed from the inside (J11/8340-99-226-2816).

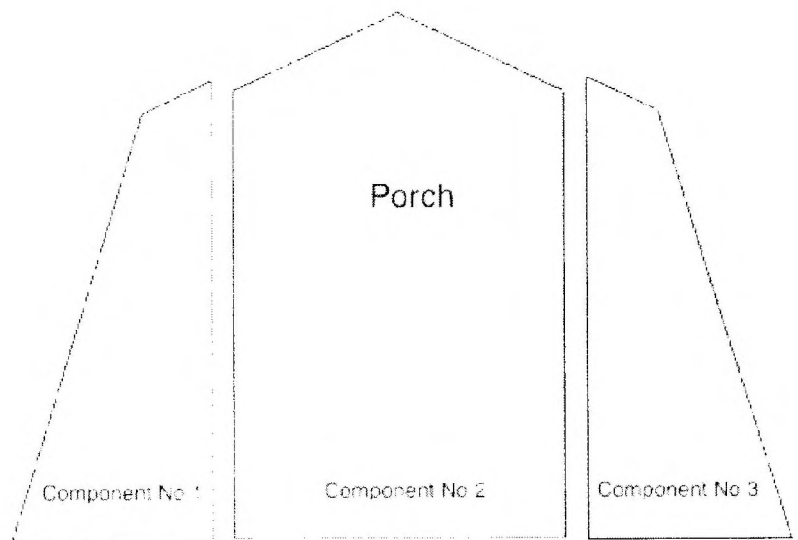


Figure 47: The Mk 4 Insulation end panel (Viewed from inside)



53. Lay the 4 end wall component insulation panels at each end of the shelter. Attach the centre 2 insulation panels with tensioners to the roof panel ensuring the tensioners are fitted around the poles. The centre panels can overlap each other either way.
54. To provide access the centre end wall panels should be rolled up from the inside Fig 48.

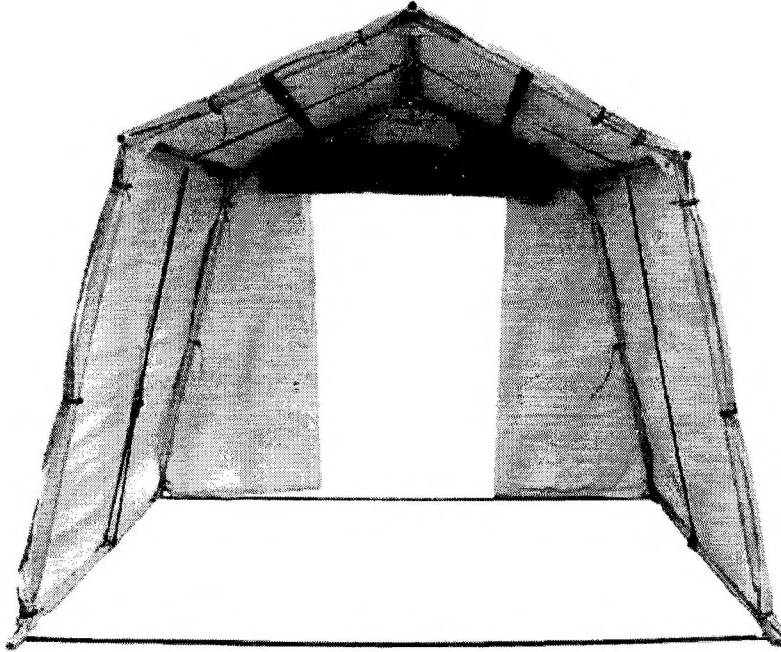


Figure 48: Access (Typical arrangement)

## STRIKING

### CAUTION

**EQUIPMENT DAMAGE.** Wet PVC cover should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed. In cases where the PVC cover has to be packed wet it must be removed from the packing, washed and dried as soon as practically possible.

55. Striking the shelter is the reverse of the pitching procedure, noted the following key points:
- 55.1. Close all doors and windows
  - 55.2. Remove and stow all ground pegs, they are a trip hazard and could damage the covers.
  - 55.3. Remove and stow all loose parts i.e. Ground Sheet, Overstraps, End Guy ropes etc

### FOLDING

56. Folding and packing of PVC cover is to be carried out using the following process:

#### Shelter cover end

57. To fold the shelter end, proceed as follows:
- 57.1. Lay out PVC cover with outer side uppermost and brush off as much dirt and debris as possible.
  - 57.2. Fold in half to centre of door opening.
  - 57.3. Fold the top and side in to form a square and then fold in half.
  - 57.4. Fold twice to make a strip approximately 1 m (3 ft) wide.
  - 57.5. Finally, roll to form the smallest possible bundle.

#### Shelter cover roof and wall

58. To fold shelter panels, proceed as follows:
- 58.1. Lay out PVC cover with outer side uppermost and brush off as much dirt and debris as possible.
  - 58.2. Fold the sides to the centre.
  - 58.3. Fold once more in the same manner.
  - 58.4. Fold the walls to the ridge.
  - 58.5. Finally, roll to form the smallest possible bundle.

### PACKING

**NOTE:** Whenever it becomes necessary to pack PVC cover in a wet condition the packages are to be clearly marked **NOT DRY** to indicate the cover was packed in a wet condition. If the PVC cover is being retained at unit, the officer in charge is to be notified of the condition of the cover so he can arrange for it to be dried at the earliest opportunity. If the PVC cover is to be despatched, the consignee is to be notified by telephone or signal, so the PVC cover can be unpacked and dried as soon as possible after receipt.

59. To pack the shelter, proceed as follows:
- 59.1. Place the folded shelter PVC cover in the Valise with the straps.
  - 59.2. Place the shelter frame components and the tent pins in the bags provided.
  - 59.3. Place the rolled insulation panels in the insulation valise

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**CHAPTER 3**  
**MAINTENANCE INSTRUCTIONS**

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**Introduction**

60. The life of tentage can be enhanced considerably if reasonable care is taken whilst in use or in storage. Such care will also help to minimise costs involved in refurbishment after exercises or operations.

**Common causes of damage to PVC covers**

61. Common causes or damage to covers are as follows:
- 61.1. Burns - due to careless smoking or siting shelters near braziers or incinerators.
  - 61.2. Holes - due to careless pitching, stacking or stowage of articles too close to shelter walls. When shelters are used for storage, stacks should be approximately 60 mm (2 ft) from the walls and should not touch the PVC cover at any point. Gangways are essential in case of fire.
  - 61.3. Tears in the sod-cloth can be caused by walking on it if there are sharp stones or rubble beneath, or if sharp rubble is used to ballast the shelter.
  - 61.4. Damage to the fabric may occur as a result of folding PVC cover when wet, or on ground contaminated by oil etc.
  - 61.5. Similarly, fabric may be damaged when shelters are used as kitchens or medical theatres if blood, grease or other fats come into contact with the PVC cover. PVC cover should be rinsed off as soon as possible should this occur. Work surfaces that would normally have blood, grease or other fats on them should be kept clear of the PVC cover. Grease and fats will also become a fire hazard unless cleaned
  - 61.6. Grease or oil on the hands or clothing of personnel handling or using the tentage will cause damage if in contact with the PVC cover.
  - 61.7. Care must be exercised when loading or unloading tentage into or from vehicles to avoid damage from contact with projections on the vehicle as well as slip, trip and fall.
  - 61.8. In overseas theatres, where native flora and fauna may damage the PVC cover, regular checks should be carried out.

- 61.9. When joining a number of shelters together, care should be taken to avoid abnormal stress being placed on the PVC cover.
- 61.10. Exposure to Ultra Violet (UV) light causes damage to all fabrics. To prolong the life of a shelter in areas of high UV an appropriate sunshade should be used.

### Repairs to PVC Covers

**NOTE: The glue utilised is contact adhesive which is solvent based, only use the glue in a ventilated environment and use the appropriate PPE.**

62. The PVC patch used must cover the fabric by at least 5 cm beyond the limit of the tear to offer an equivalent strength. For damage to the main PVC cover, a single repair to the external face of the main cover is sufficient, unless the tear is particularly large (>20cm). Shape the patch as required if damage occurs on a complex area of the cover or at a joint.

63. Surface Preparation:

- 63.1. Carefully clean the PVC surface around the tear and dry thoroughly prior to applying adhesive. Use fine rasp or sandpaper to lightly roughen the area where patch is to be applied, roughen under surface of patch in the same manner. Ensure repair area is kept dry until adhesive has set.
- 63.2. Support the PVC cover against a flat surface to allow the patch to be securely applied.

64. Gluing :

- 64.1. Apply adhesive in a thin, consistent layer to both the patch and the area where the patch is to be applied to ensure positive bonding of the two elements. Apply adhesive from the middle of the patch outwards. Ensure adhesive is applied to the correct side of the patch so that the visible face matches the PVC cover colour Fig 49.
- 64.2. Affix the PVC cover patch to the external canvas and apply careful pressure to remove any bubbles or air pockets with roller Fig 50.
- 64.3. Leave to set for two hours before moving the cover.

Serial (1)	Item (2)	D of Q:	DMC	NSN (3)
0	Repair Kit	Each	J11	8340-99-362-8303
1	HH-66 Vinyl Cement - Tube 237ml	Tin		
2	Black adhesive tape	Each		
3	Triangular File	Each		
4	Standard Fabric - Green Grey	m2		
5	OFCS Textile Fabric - Green Green	m2		
6	Floor Textile Fabric - Green	m2		
7	Fly Screen Material	m2		
8	Sanding Paper	Each		
9	Cutter 18 mm	Each		
10	Plastic Box	Each		
11	Repair Instruction Sheet	Each		
12	Safety Data Sheets	Each		

**Table 2: PVC Cover Repair Kit**

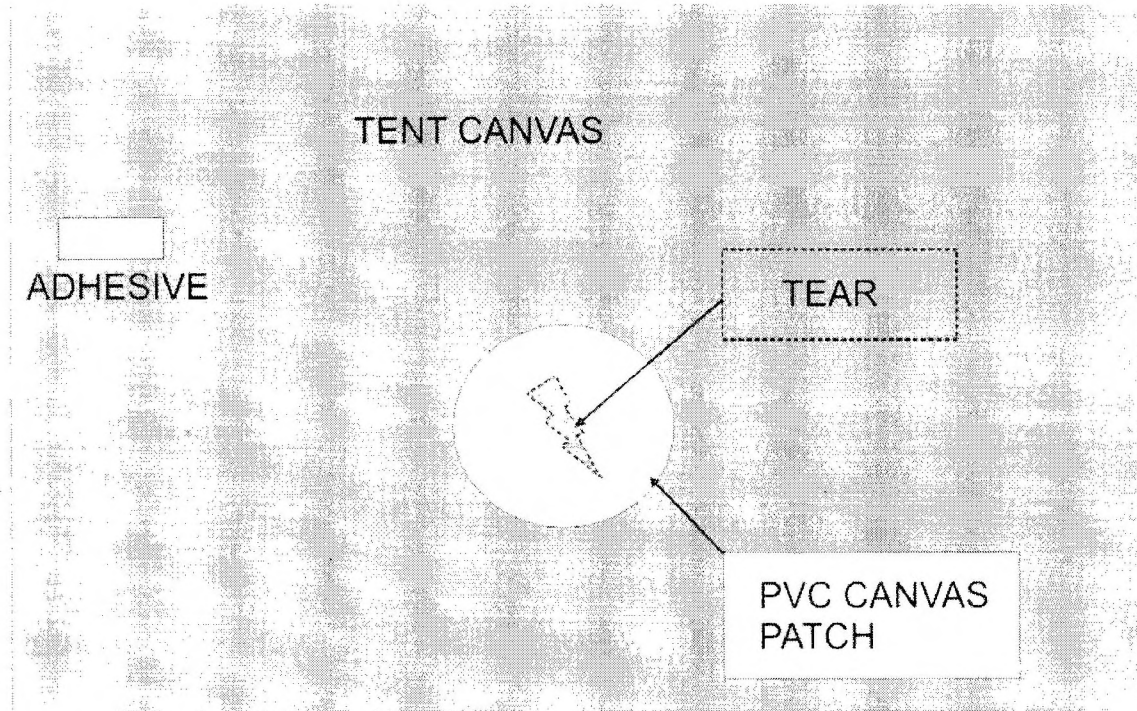


Figure 49: PVC Cover Repair, spreading of glue



Figure 50: Glue application



**Figure 51: Completed Repair**

#### **EFFECTS OF DAMP**

65. PVC cover can be subjected to mould growth, whilst this can generally be cleaned off some forms of mould are hazardous to health.
66. All PVC cover must be thoroughly dry before storing. Stacks should be examined periodically, and any damp or suspect cover removed and examined immediately.
67. Storehouses employed for storing tentage should be inspected regularly for any sources of water ingress.
68. Shelter weather lines and ropes should be dry before storing.

#### **DAMAGE TO POLES AND BRACKETS**

69. Common causes of damage to shelter poles are as follows:
  - 69.1. Distortion of alloy shelter frames through misuse and carelessness, i.e. using the alloy poles as bearers or levers, or permitting components to lie where they can be crushed by vehicle tyres/tracks.
  - 69.2. Excessive use of force when fitting framework together. Care should be taken to ensure the hollow ends of the components are free from dirt or other blockages.
  - 69.3. Employing too few people when pitching and striking tentage will result in loss of control over the twisting and bending of the frame and will eventually result in the components becoming unserviceable.
  - 69.4. Excessive loading to the roof such as snow, sand and other debris. Personnel should never climb on or over any shelters.

**DAMAGE TO INSULATION**

**CAUTIONS**

**EQUIPMENT DAMAGE.** Rips and tears must be repaired immediately to maintain the insulation integrity.

70. The following repair kit is available to effect repairs on the insulation panels.

Serial (1)	Item (2)	D of Q:	DMC	NSN (3)
1	INSULATION PANEL REPAIR KIT	1	J11	8340-99-839-8761
2	FABRIC TAPE	Roll	J11	7510-99-854-9439
3	FABRIC HAGIHARA . POLYETHYLENE UV FR - WHITE	2 SQ M	J11	8305-99-741-6212
4	FABRIC HAGIHARA POLYETHYLENE UV FR - GREEN	2 SQ M	J11	8305-99-929-8077
5	MATERIAL REPAIR PATCH KIT	1	J11	8340-99-153-6635
6	ALUMINIUM TAPE	Roll	J11	5999-99-872-2227
7	ALUMINIUM FOIL	2 SQ M	J11	5640-99-297-9453

**Table 3: Insulation repair kit**

71. To carry out a repair on the insulation fabric outer cover proceed as follows:
- 71.1. Apply the green/white tape to repair slits or tear in fabric cover material where there is sufficient remaining material to bring together for a complete tape covering. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.
  - 71.2. Apply fabric patch material for holes or tears where there is insufficient material to bring together to enable a tape only repair. Cut a patch to cover the hole/tear. Apply tape to all edges of the patch. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.
72. To carry out a repair on the insulation inner material proceed as follows:
- 72.1. Apply the foil tape to repair slits or tear in inner material where there is sufficient remaining material to bring together for a complete tape covering. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.
  - 72.2. Apply foil/bubble patch material for holes or tears where there is insufficient material to bring together to enable a foil tape only repair. Cut a patch to cover the hole/tear. Apply tape to all edges of the patch. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.
73. Repairs that require a patch larger than supplied in the repair kit will require the panel to be replaced.
74. Where damage to the eyelets has occurred, this will require the panel to be replaced.

**Personal Protective Equipment (PPE) JSP 437**

75. Table 4 details some of the NATO Stock Numbers (NSNs) of suitable Personal Protective Equipment (PPE) for personnel when carrying out repairs.



Serial (1)	Item (2)	D of Q:	DMC	NSN (3)	Size (4)
	<b>GLOVES</b>				
1	Chemical & Oil Protective	PR	GL	8415-99-132-1427	Size 7
2	Chemical & Oil Protective	PR	GL	8415-99-132-1428	Size 8
3	Chemical & Oil Protective	PR	GL	8415-99-132-1429	Size 9
4	Chemical & Oil Protective	PR	GL	8415-99-132-1430	Size 10
5	Chemical & Oil Protective	PR	GL	8415-99-978-3706	Size 7
6	Chemical & Oil Protective	PR	GL	8415-99-978-3707	Size 8
7	Chemical & Oil Protective	PR	GL	8415-99-978-3708	Size 9
8	Chemical & Oil Protective	PR	GL	8415-99-978-3709	Size 10
9	Chemical & Oil Protective	PR	GL	8415-99-978-3710	Size 11
10	Rubber		GL	8415-99-130-8250	Size Small
11	Rubber		GL	8415-99-130-8251	Size Medium
12	Rubber		GL	8415-99-130-4729	Size Large
13	Rubber		GL	8415-99-130-8252	Size Extra Large
14	Rubber		GL	8415-99-571-3559	Size 7/7 IA
15	Rubber		GL	8415-99-571-3560	Size 8/8 1/2
16	Rubber		GL	8415-99-571-3561	Size 9/9 1/2
17	Rubber		GL	8415-99-571-3562	Size 10/10 1/2
	<b>GOGGLES, INDUSTRIAL</b>				
18	Goggles	EA	VO47	4240-99-577-3798	
19	Goggles	EA	VO47	8415-99-130-9776	
	<b>COVERALLS</b>				
20	Coverall, disposable		CAS	8415-99-130-8302	Size M
21	Coverall, disposable		CAS	8415-99-130-8303	Size L
22	Coverall, disposable		CAS	8415-99-130-8304	Size XL
23	Coverall, disposable		CAS	8415-99-665-7624	Size XXL
24	Coverall, disposable		CAS	8415-99-665-7625	Size XXXL
25	Coverall, disposable		CAS	8415-99-978-4772	Size M
26	Coverall, disposable		CAS	8415-99-978-4773	Size L
27	Coverall, disposable		CAS	8415-99-978-4774	Size XL
28	Coverall, disposable		CAS	8415-99-978-4775	Size XXL
29	Coverall, disposable		CAS	8415-99-978-4776	Size XXXL
	<b>FACEMASK</b>				
30	Mask, disposable		VO47	4240-99-132-1426	
31	Mask, disposable		VO47	4240-99-257-8006	

Table 4: PPE

## GUIDANCE FOR CONDITIONING ITC/GS TENTAGE SYSTEMS

76. **PVC Cover** – Users must periodically inspect their tentage on the condition based approach for service life outlined below. The new PVC tent provides fire protection, however at any point should users be concerned with the level of fire protection or fire fighting systems being applied to their deployed tent systems they must raise it through the chain of command.

77. **Existing Cotton Canvas Tentage.** Users must periodically inspect their tentage on the condition based approach for service life outlined below. At any point should users be concerned with the level of fire protection or fire fighting systems being applied to their deployed tent systems they must raise it through the chain of command.

78. **Current General Service (GS) Cotton Canvas, including ITC Canvas.** The condition of the canvas is key, when the material becomes thin and worn it begins to lose its fire retardant properties. OI have investigated each of the wearing factors (Age, Environment, Use) and found that alone Age is not a contributing factor. The minimum expected deployed life (in desert conditions) for GS canvas is 4 years of continuous use, however OI have tested 30 year old samples and found them to achieve the required standard. The material characteristics degrade when the wearing factors are combined together, the actual service life of GS canvas will be determined by the environmental conditions experienced in storage and when deployed, as well as the nature of usage and the management/maintenance regime being applied by Users. Service life is therefore expected to vary widely.

79. The GS canvas retains its fire retardant properties as long as the material remains intact:
- 79.1. Users must inspect their GS tentage when erecting and striking the tent as well as every six months whilst in continual use.
  - 79.2. There must be no open tears in the fabric.
  - 79.3. There must be no holes in the fabric.

ARMY EQUIPMENT AND SUPPORT PUBLICATION (AESP) AND ELECTRICAL AND  
MECHANICAL ENGINEERING REGULATIONS (EMER) - FORM 10

*AESP/EMER NUMBER:		*IS THIS SAFETY RELATED?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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**SUNSHADE, 3.6 M x 3.6 M  
(12 FT x 12 FT)**

**NSN J11/8340-99-884-6622**

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## PREFACE

Sponsor: DEC ELS  
Publication Authority: DE&S  
ECI IPT

## INTRODUCTION

1 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of the preliminary pages; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Instruction Notices (DINs), Standard Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

**RELATED AND ASSOCIATED PUBLICATIONS**

**Related publications**

4 The octad for the subject equipment consists of all the categories shown in Table 1. All references are prefixed with the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index in AESP 0100-A-001-013.

**TABLE 1 RELATED PUBLICATIONS**

Category/Sub-Category		Information Level				
		1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance	
1	0	Purpose and Planning Information	101	*	*	*
	1	Equipment Support Policy Directives	*	*	*	*
2	0	Operating Information	201	*	*	*
	1	Aide Memoire		*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	*	*	*	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	*	*	*	*
	2	Repair Instructions	*	*	*	*
	3	Inspection Standards	*	*	*	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	*	*	*	*
7	1	Illustrated Parts Catalogues	*	*	*	*
	2	Commercial Parts Lists	711	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	*	*	*	*
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	741	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

\* Category/Sub-category not published.

**Associated publications**

5 The following publications are associated with this AESP octad.

<u>Reference</u>	<u>Title</u>
NONE	

**ABBREVIATIONS**

6 The following abbreviations are used in this AESP octad.

<u>Abbreviation</u>	<u>Nomenclature</u>
AESP	Army Equipment Support Publication
DIN	Defense Instruction Notices
Fig	Figure
ft	feet (foot)
ft <sup>3</sup>	feet cubed
in.	inch
kg	kilogram
lb	pound
m	metre
m <sup>2</sup>	metres squared
m <sup>3</sup>	metres cubed
mm	millimeters
NATO	North Atlantic Treaty Organisation
NSCM	NATO Supply Code for Manufacturers
NSN	NATO Stock Number
Para	Paragraph
PPE	Personal Protective Equipment
SOP	Standard Operating Procedures

**WARNINGS AND CAUTIONS****HAZARDOUS SUBSTANCES**

7 Before using any hazardous substances or material, the user must be conversant with the safety precautions and first aid instructions:

- 7.1 on the label of the container it was supplied in;
- 7.2 on the material Safety Data Sheet;
- 7.3 in local Safety Orders and Regulations.

**WARNINGS**

- (1) **PERSONNEL INJURY/EQUIPMENT DAMAGE. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF. THE MINIMUM IS ONE PERSON PER WALL MEMBER.**
- (2) **PERSONNEL INJURY/CRUSH HAZARD. EXERCISE CAUTION WHEN ASSEMBLING POLES AND BRACKETS DUE TO THE RISK OF CRUSH INJURY TO FINGERS.**
- (3) **PERSONNEL INJURY. WHEN POLES ARE CURVED UNDER TENSION THERE IS A HIGH RISK THAT THEY MAY SLIP AND SPRING BACK TO THEIR STRAIGHT RELAXED POSITION. PERSONNEL SHOULD NOT POSITION THEMSELVES DIRECTLY IN FRONT OF THE POLES.**
- (4) **PERSONNEL INJURY/HEAVY WEIGHT. A MINIMUM OF FOUR PERSONNEL ARE REQUIRED TO LIFT OR MOVE THE SHELTER.**
- (5) **PERSONNEL INJURY/BURN HAZARD. WHEN BURNING WEBBING TO PREVENT FRAYING, THE WEBBING WILL BECOME EXTREMELY HOT AND MELT.**
- (6) **PERSONNEL INJURY/TOXIC HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING GLOVES, GOGGLES OR FACEMASK AND COVERALLS ARE TO BE WORN WHEN USING MYSTOX.**
- (7) **PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX COMES INTO CONTACT WITH SKIN OR EYES WASH THE AFFECTED AREA IMMEDIATELY WITH WATER AND SEEK MEDICAL ATTENTION. JSP 437 REFERS.**
- (8) **PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX IS SWALLOWED, SEEK IMMEDIATE MEDICAL ATTENTION.**
- (9) **PERSONNEL INJURY/TOXIC HAZARD. ONLY USE MYSTOX IN AUTHORIZED AREAS. DO NOT USE WHERE THERE IS A DANGER OF SPILT MYSTOX ENTERING THE WATER COURSE INCLUDING PONDS, DITCHES OR WATERWAYS.**
- (10) **PERSONNEL INJURY/TOXIC HAZARD. DISPOSAL OF SURPLUS MYSTOX AND EMPTY CONTAINERS IS TO BE ORGANISED BY THE UNIT QUARTERMASTER/SUPPLY OFFICER IN ACCORDANCE WITH UNIT ENVIRONMENT STANDING ORDERS AND/OR LOCAL PUBLIC HEALTH BY-LAWS.**

## CAUTIONS

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** Wet canvas should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed.
- (3) **EQUIPMENT DAMAGE.** All insulation panels can be added after the shelter has been erected EXCEPT the roof panel that must be attached to the frame prior to the canvas. Due to the structure of the insulation it must not be crushed, as this will drastically reduce its effectiveness.
- (4) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.
- (5) **EQUIPMENT DAMAGE.** The sunshade is to be erected prior to the shelter if possible or alternatively moved into position over the tent after assembly with the base restraint straps being added after it is in its final position. The ratchet straps should not be over tightened and never used if damaged.
- (6) **EQUIPMENT DAMAGE.** The shelter is to be erected on ground that has been cleared of any large stones or rubble.
- (7) **EQUIPMENT DAMAGE.** A power washer may be used at low pressure with warm water. Use judgement and caution regarding water pressure and temperature.
- (8) **EQUIPMENT DAMAGE.** Do not use solvents or detergents to clean the shelter as they will dissolve the protective coating on the fabric.





**OPERATING INFORMATION**

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7	Attach the cloth
8	Raise the sunshade
9	Position the sunshade
10	Secure the sunshade
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**DESCRIPTION**

1 The Sunshade, 3.6 m x 3.6 m (12 ft x 12 ft) is a framed shelter with virtually no side walls. The frame is composed of aluminium poles and brackets with a one piece fabric cover fitted over the top. The sunshade is extendable in units of 3.6 m (12 ft) and will cover any shelter up to the size of a 3.6 m x 3.6 m (12 ft x 12 ft) small field HQ.



Fig 1 Sunshade, 3.6 m x 3.6 m (12 ft x 12 ft)

- 2 The sunshade framework is designed to support a mesh shade approximately 300 mm above the canvas of a shelter and cover the entire length of the shelter. The mesh sunscreen helps to reduce the solar loading on the tent/shelter by up to 68%.
- 3 The frame is free standing but must be appropriately strapped, weighted and pinned down to provide strength and stability.
- 4 Each sunshade is extendable by itself. The sunshades are attached to each other by fitting tensioners through the eyelets and around the poles to decrease wind damage.

#### PITCHING

#### WARNING

**PERSONNEL INJURY/EQUIPMENT DAMAGE. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF. THE MINIMUM IS ONE PERSON PER WALL MEMBER.**

#### CAUTION

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** The sunshade is to be erected prior to the shelter if possible or alternatively moved into position over the tent after assembly with the base restraint straps being added after it is in its final position. The ratchet straps should never be overtightened and should never be used if damaged.
- (3) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.

### Deployment

5 The pitching party for the sunshade 3.6 m x 3.6 m (12 ft x 12 ft) will comprise of three personnel and a supervisor.

### Assemble the roof framework

6 Refer to Fig 2 and proceed as follows:

6.1 Lay out the components and assemble the roof frame.

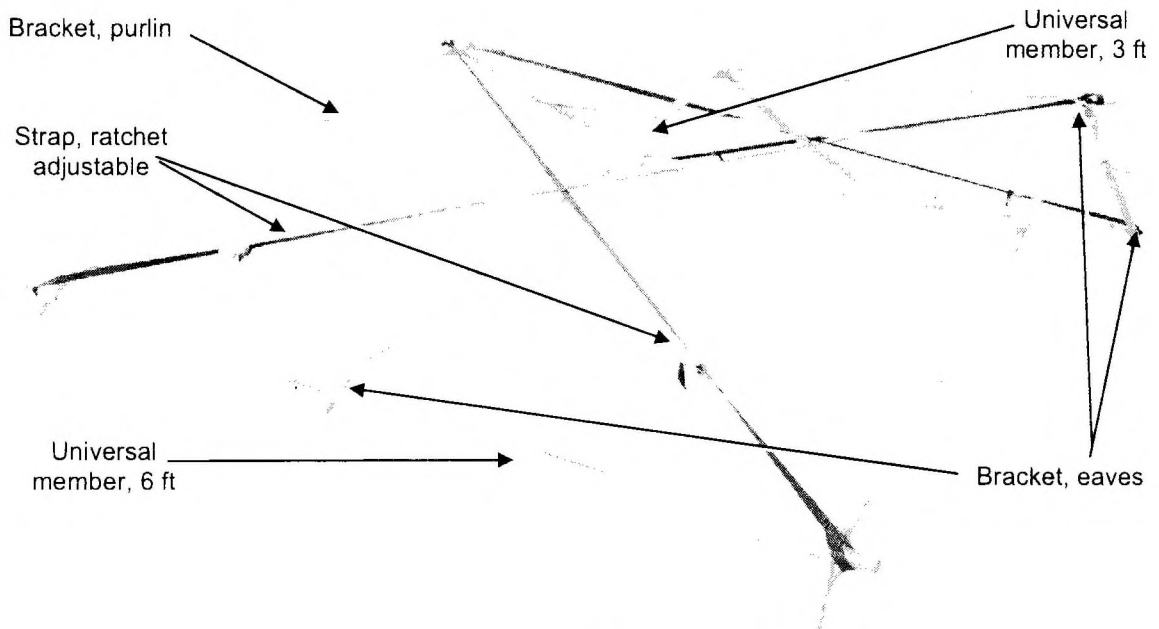


Fig 2 Assembled roof framework

6.2 Fit the straps, ratchet adjustable (qty 4) diagonally between the eaves brackets on the ridge and the eaves bracket on the eaves.

6.3 Ensure that the straps are not twisted and that the ratchets are on the inside of the shade.

### Attach the cloth

7 To attach the cloth to the roof frame, refer to Fig 3 and proceed as follows:

7.1 Lay the cloth over the assembled roof section ensuring that the rubbing strips and the label are on the underside.

7.2 Use the tensioners through the eyelets at either end of the cloth to attach the cloth to the roof frame.

7.3 Tie off the internal tapes to the roof frame assembly.

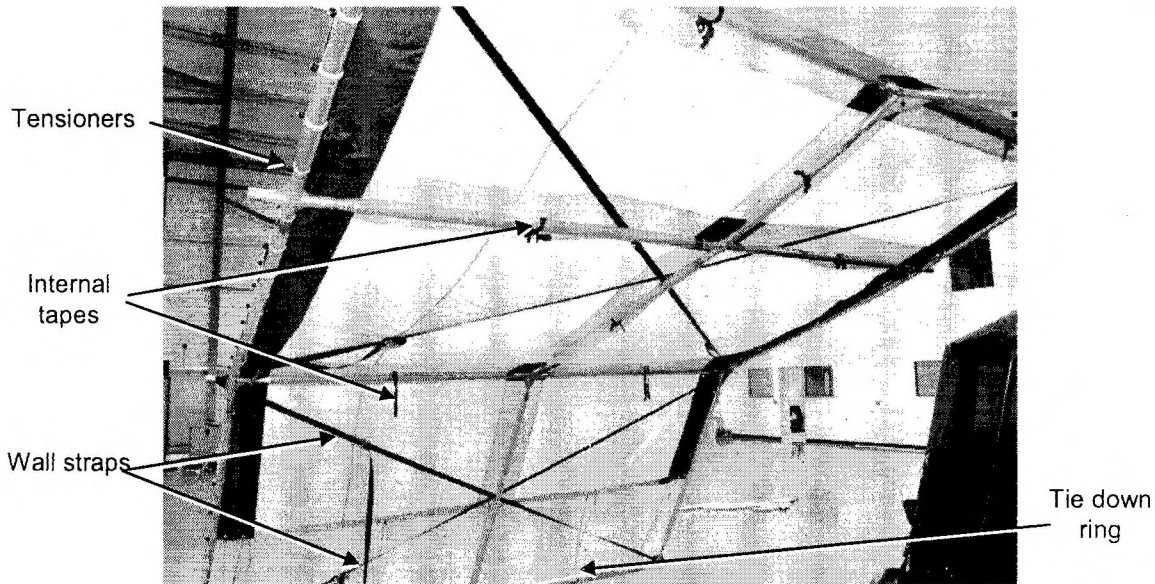


Fig 3 Attaching the cloth to the roof frame assembly

### Raise the sunshade

8 To raise the sunshade, proceed as follows:

#### NOTE

One person is required for each wall member and the lift must be even to avoid distortion and damage to the frame.

- 8.1 Lift one side of the roof to shoulder height and assemble the wall and ground members.
- 8.2 Slide a tie down ring over each of the base members as shown in Fig 3.
- 8.3 Attach and tighten the adjustable wall straps diagonally between opposing corners as shown in Fig 3.
- 8.4 Ensure that the straps are not twisted and that the ratchets are on the inside of the shade.
- 8.5 Repeat the operations detailed in para 8.1 to 8.4 and raise the other side.
- 8.6 Secure the sunshade with the side wall cords as follows:
  - 8.6.1 Pass one end of the cord through the tie down ring on the base member.
  - 8.6.2 Pass the other end of the cord through the eyelet in the cloth above the ring and tie the two ends of the cord together.

### Position the sunshade

9 To position the sunshade, proceed as follows:

- 9.1 Position one personnel on each vertical member.
- 9.2 Lift the framework ensuring that the lift is even to avoid distortion and damage to the frame.
- 9.3 Walk the sunshade into position over the shelter under direction of the supervisor.

**Secure the sunshade**

10 To secure the sunshade, proceed as follows:

10.1 Refer to Fig 4 and fit the base restraint straps.

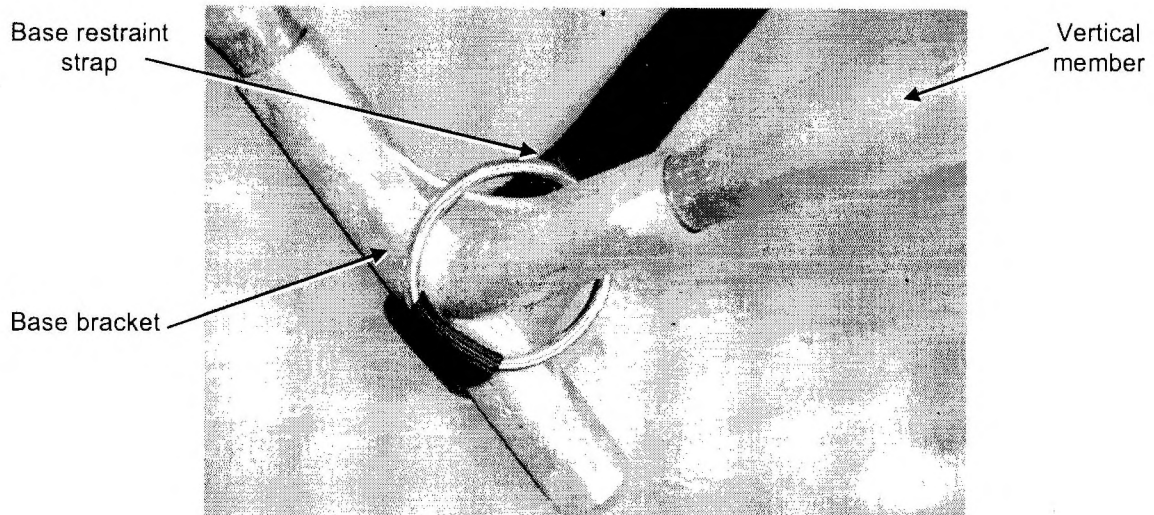


Fig 4 Base restraint strap fixing

10.2 Slacken the wall straps on one side of the framework.

10.3 Lift the vertical members out of the base brackets and place the ring of the base restraint strap over the base brackets.

10.4 Refit the vertical members in the base brackets and re-tighten the wall straps.

10.5 Pass the strap underneath the base bracket and position next to the base bracket on the opposite side of the frame.

10.6 Repeat the operations detailed in para 10.2 to 10.4 and secure the base restraining straps to the opposite side of the framework, taking care to ensure that the straps are not twisted.

10.7 Use the pins to anchor the sunshade to the ground ensuring that the pins are placed alternately on the inside and outside of the framework. The pins are especially designed to hook over the base members.

10.8 Attach the end guy straps to the eaves brackets at each of the framework.

10.9 Anchor the guys to ground outside of the shelter with pins.

10.10 In windy conditions, it may be necessary to apply ballast to the base members. Sandbags (F2/5610-99-200-4386) filled with spoil from the drainage trench is recommended for this purpose.

11 When pegging out the shelter, proceed as follows:

11.1 Pins for shelter lines (8340-99-943-9052) should be driven at an angle of 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground and approximately 300 mm (1ft) from the edge of the sod cloth.

11.2 Hooks on tent pins should face in the opposite direction to the pulling force of the line and any cords should be placed around the pin prior to pegging.

11.3 For ease of driving the pins into the ground and to obtain the correct angle, personnel should try to position themselves behind the pin, facing away from the direction of the pulling force of the line when striking.

11.4 Avoid unequal strain and wear on the canvas by ensuring that:

11.4.1 Weather lines are not twisted and lie flat across the canvas.

11.4.2 Restraint and insulation straps are not twisted and lie flat across the insulation.

11.4.3 Doorways are closed while erection and pegging is carried out.

#### **Fit the ground sheet**

12 If the sunshade is being used as a stand alone shelter it may be necessary to fit the groundsheet. To fit the groundsheet, proceed as follows:

12.1 Ensure that the ground area to be covered is free of debris.

12.2 Spread the groundsheet over the floor area taking care to smooth out any creases.

12.3 Attach the sides of the groundsheet to the base of the frame using tensioners.

12.4 Secure the ends of the groundsheet to the ground using tent pins if necessary.

13 When fitting multiple groundsheets to form a passageway, proceed as follows:

13.1 Fit the groundsheets in accordance with para12.

13.2 Overlap the groundsheets ensuring that the peg rings align.

13.3 Secure the overlapping groundsheets with tent pins.

#### **STRIKING**

##### **WARNING**

**EQUIPMENT DAMAGE. WET CANVAS SHOULD NEVER BE FOLDED OR PACKED UNLESS CIRCUMSTANCES RENDER THIS UNAVOIDABLE. SHELTERS SHOULD THEREFORE BE LEFT TO DRY THOROUGHLY BEFORE THEY ARE STRUCK. IF THE SHELTER IS NOT COMPLETELY DRY THE OFFICER IN CHARGE OF THE CAMPSITE OR RECEIVING UNIT IS TO BE INFORMED.**

14 Striking the shelter is the reverse of the pitching procedure.

#### **FOLDING**

15 To fold the sunshade cloth, proceed as follows:

15.1 Lay the cloth flat on the ground with the outer side uppermost.

15.2 Brush off any debris.

15.3 Fold the two ends in half to meet in the centre.

15.4 Fold the two sides in half to meet in the centre.

15.5 Fold twice to make a strip approximately 1 m (3 ft) wide.

15.6 Roll to form the smallest possible bundle.

## **PACKING**

- 16 To pack the shelter, proceed as follows:
- 16.1 Whenever it becomes necessary to pack canvas in a wet condition the packages are to be clearly marked 'NOT DRY'.
  - 16.2 If the wet canvas is being retained in the campsite, the officer in charge is to be notified of the condition of the canvas so that he can arrange for it to be dried at the earliest opportunity.
  - 16.3 If the wet canvas is to be despatched, the consignee is to be notified by telephone or signal so that the canvas can be unpacked and dried as soon as possible after receipt.
  - 16.4 Place the folded shelter canvas in the Valise with the straps.
  - 16.5 Place the shelter frame components and the tent pins in the bags provided.

## **MAINTENANCE INSTRUCTIONS**

### **Introduction**

17 The life of tentage can be enhanced considerably if reasonable care is taken whilst in use or in storage. Such care will also help to minimise costs involved in refurbishment after exercises or operations.

### **Common causes of damage to canvas**

- 18 Common causes or damage to canvas are as follows:
- 18.1 Burns, due to careless smoking or siting of shelters near braziers or incinerators.
  - 18.2 Holes due to careless pitching, stacking or stowage of articles too close to shelter walls. When shelters are used for storage, stacks should be approximately 60 mm (2 ft) from the walls and should not touch the canvas at any point. Gangways are essential in case of fire.
  - 18.3 Tears in canvas can be caused through over-taut weather lines. In wet weather, lines directly attached to the canvas should be slackened.
  - 18.4 Tears in the sod-cloth can be caused by walking on it if there are sharp stones or rubble beneath, or if sharp rubble is used to ballast the shelter.
  - 18.5 Damage to the fabric may occur as a result of folding canvasses when wet, or on ground contaminated by oil etc.
  - 18.6 Similarly, fabric may be damaged when shelters are used as kitchens or medical theatres if blood, grease or other fats come into contact with the canvas. Canvas should be rinsed off as soon as possible should this occur. Work surfaces that would normally have blood, grease or other fats on them should be kept clear of the canvas. Grease and fats will also become a fire hazard if not cleaned.
  - 18.7 Grease or oil on the hands or clothing of personnel handling or using the tentage will cause damage if in contact with the canvas.
  - 18.8 Care must be exercised when loading or unloading tentage into or from vehicles to avoid damage from contact with projections on the vehicle.
  - 18.9 Vehicles must be examined before loading to check for dirty or contaminated interiors or any oily or dirty items. Unless they can be cleaned prior to loading tentage, such vehicles should not be employed.
  - 18.10 In overseas theatres where native flora and fauna may damage the canvas, regular checks should be carried out.

18.11 When joining a number of shelters together, care should be taken to avoid abnormal stress being placed on the canvas.

18.12 Exposure to Ultra Violet (UV) light causes damage to all fabrics. To prolong the life of a shelter in areas of high UV an appropriate sunshade should be used.

### **EFFECTS OF DAMP**

19 Wet or damp canvas deteriorates rapidly. If stored in this condition it is liable to catch fire due to spontaneous combustion.

20 All canvas must be thoroughly dry before storing. Stacks should be examined periodically and any damp or suspect canvas removed and examined immediately.

21 Storehouses employed for storing tentage should be inspected regularly for any sources of water ingress.

22 Shelter weather lines and ropes should be dry before storing.

### **DAMAGE TO POLES AND BRACKETS**

23 Common causes of damage to shelter poles are as follows:

23.1 Distortion of alloy shelter frames through misuse and carelessness, i.e. using the alloy poles as bearers or levers, or permitting components to lie where they can be crushed by vehicle tyres/tracks.

23.2 Excessive use of force when fitting the framework together. Care should be taken to ensure that the hollow ends of the components are free from dirt or other blockages.

23.3 Employing too few people when pitching and striking tentage will result in loss of control over the twisting and bending of the frame and will eventually result in the components becoming unserviceable.

23.4 Excessive loading to the roof such as snow, sand and other debris. Personnel should never climb on or over any shelters.

### **PROOFING**

### **WARNINGS**

**(1) PERSONNEL INJURY/TOXIC HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING GLOVES, GOGGLES OR FACEMASK AND COVERALLS ARE TO BE WORN WHEN USING MYSTOX. JSP 437 REFERS**

**(2) PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX COMES INTO CONTACT WITH SKIN OR EYES WASH THE AFFECTED AREA IMMEDIATELY WITH WATER AND SEEK MEDICAL ATTENTION.**

**(3) PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX IS SWALLOWED, SEEK IMMEDIATE MEDICAL ATTENTION.**

**(4) PERSONNEL INJURY/TOXIC HAZARD. ONLY USE MYSTOX IN AUTHORIZED AREAS. DO NOT USE WHERE THERE IS A DANGER OF SPILT MYSTOX ENTERING THE WATERCOURSE INCLUDING PONDS, DITCHES OR WATERWAYS.**

**(5) PERSONNEL INJURY/TOXIC HAZARD. DISPOSAL OF SURPLUS MYSTOX AND EMPTY CONTAINERS IS TO BE ORGANISED BY THE UNIT QUARTERMASTER/SUPPLY OFFICER IN ACCORDANCE WITH UNIT ENVIRONMENT STANDING ORDERS AND/OR LOCAL PUBLIC HEALTH BY-LAWS.**



**Introduction**

24 A waterproofing agent Mystox TRP (8030-99-225-1573) is available for the renovation of all canvas tentage. This is a preservative coating that is an olive drab, water solvent emulsion that will restore the Flame resistance, Water resistance and Rot Resistance (FWRR).

**Personal protective equipment (PPE) JSP 437**

25 Table 1 details some of the NATO Stock Numbers (NSNs) of suitable Personal Protective Equipment (PPE) for personnel using Mystox.

26 Units that do not have sufficient quantities of the items to equip a 4-6 person reproofing team should demand items through the normal supply chain. A team should be sufficient to reproof a battalion's entitlement of shelters.

**TABLE 1 PPE**

Serial (1)	Item (2)	D of Q:	DMC	NSN (3)	Size (4)
	<b>GLOVES</b>				
1	Chemical & Oil Protective	PR	GL	8415-99-132-1427	Size 7
2	Chemical & Oil Protective	PR	GL	8415-99-132-1428	Size 8
3	Chemical & Oil Protective	PR	GL	8415-99-132-1429	Size 9
4	Chemical & Oil Protective	PR	GL	8415-99-132-1430	Size 10
5	Chemical & Oil Protective	PR	GL	8415-99-978-3706	Size 7
6	Chemical & Oil Protective	PR	GL	8415-99-978-3707	Size 8
7	Chemical & Oil Protective	PR	GL	8415-99-978-3708	Size 9
8	Chemical & Oil Protective	PR	GL	8415-99-978-3709	Size 10
9	Chemical & Oil Protective	PR	GL	8415-99-978-3710	Size 11
10	Rubber		GL	8415-99-130-8250	Size Small
11	Rubber		GL	8415-99-130-8251	Size Medium
12	Rubber		GL	8415-99-130-4729	Size Large
13	Rubber		GL	8415-99-130-8252	Size Extra Large
14	Rubber		GL	8415-99-571-3559	Size 7/7 IA
15	Rubber		GL	8415-99-571-3560	Size 8/8 1/2
16	Rubber		GL	8415-99-571-3561	Size 9/9 1/2
17	Rubber		GL	8415-99-571-3562	Size 10/10 1/2
	<b>GOGGLES, INDUSTRIAL</b>				
18	Goggles	EA	VO47	4240-99-577-3798	
19	Goggles	EA	VO47	8415-99-130-9776	
	<b>COVERALLS</b>				
20	Coverall, disposable		CAS	8415-99-130-8302	Size M
21	Coverall, disposable		CAS	8415-99-130-8303	Size L
22	Coverall, disposable		CAS	8415-99-130-8304	Size XL

(continued)





TABLE 1 PPE (continued)

Serial (1)	Item (2)	D of O:	DMC	NSN (3)	Size (4)
23	Coverall, disposable		CAS	8415-99-665-7624	Size XXL
24	Coverall, disposable		CAS	8415-99-665-7625	Size XXXL
25	Coverall, disposable		CAS	8415-99-978-4772	Size M
26	Coverall, disposable		CAS	8415-99-978-4773	Size L
27	Coverall, disposable		CAS	8415-99-978-4774	Size XL
28	Coverall, disposable		CAS	8415-99-978-4775	Size XXL
29	Coverall, disposable		CAS	8415-99-978-4776	Size XXXL
	FACE MASK				
30	Mask, disposable		VO47	4240-99-132-1426	
31	Mask, disposable		VO47	4240-99-257-8006	

**Myslox - Instructions for use****WARNINGS**

(1) PERSONNEL INJURY/TOXIC HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING GLOVES, GOGGLES OR FACE MASK AND COVERALLS ARE TO BE WORN WHEN USING MYSTOX. JSP 437 REFERS

(2) PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX COMES INTO CONTACT WITH SKIN OR EYES WASH THE AFFECTED AREA IMMEDIATELY WITH WATER AND SEEK MEDICAL ATTENTION.

(3) PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX IS SWALLOWED, SEEK IMMEDIATE MEDICAL ATTENTION.

(4) PERSONNEL INJURY/TOXIC HAZARD. ONLY USE MYSTOX IN AUTHORIZED AREAS. DO NOT USE WHERE THERE IS A DANGER OF SPILT MYSTOX ENTERING THE WATERCOURSE INCLUDING PONDS, DITCHES OR WATERWAYS.

(5) PERSONNEL INJURY/TOXIC HAZARD. DISPOSAL OF SURPLUS MYSTOX AND EMPTY CONTAINERS IS TO BE ORGANISED BY THE UNIT QUARTERMASTER/SUPPLY OFFICER IN ACCORDANCE WITH UNIT ENVIRONMENT STANDING ORDERS AND/OR LOCAL PUBLIC HEALTH BY-LAWS.

27 To apply Myslox, proceed as follows:

27.1 The emulsion is to be applied with a brush only. Spray painting is strictly forbidden.

27.2 The emulsion should be well stirred and look like ordinary emulsion paint. If it thickens during application it should be thinned by adding a small amount of water.

27.3 Under cold conditions it may be necessary to stir for a longer period than under warm conditions.

27.4 The emulsion should be stored in a temperature that does not fall below 0°C. If after extended storage, it can be applied with a brush without balling or curdling it should perform satisfactorily.

27.5 Only those parts of the tent which leak (i.e. most worn areas and seams) should be treated.

- 27.6 If, in spite of wearing protective clothing any Mystox comes into contact with the skin, the affected area should be washed immediately with water.
- 27.7 Disposal of surplus emulsion and empty containers must be organised by the unit.
- 27.8 Quartermaster/Supply Officer in accordance with the local public health by-laws and advice of local authorities must be sought as regulations may vary from area to area.
- 27.9 Drying time with good drying conditions is between seven and eight hours. To ensure that the emulsion is absolutely dry, whenever possible drying should be extended over 24 hours in a warm dry atmosphere.
- 27.10 Application can be made onto a damp canvas if necessary. In such a case extra care with drying is essential.
- 27.11 Mystox is issued in 25 kg containers therefore it will probably be necessary to decant the liquid into smaller containers. These are to be suitably labelled and treated for disposal in the same way as the original containers.
- 27.12 It is advisable, whenever practicable, to reproof shelters whilst they are erected and to leave them standing during the drying process. This is of course more difficult for the larger shelters that may require their roofs to be reproofed prior to complete erection. Alternatively, a brush on an extended handle can be used, however extra care must be taken to ensure splashes and spillage are kept to a minimum and cleaned as soon as possible.
- 27.13 After use, all protective clothing should be scrubbed in soapy water and then thoroughly rinsed to aid the removal of residual deposits of Mystox.
- 27.14 Hands should be washed thoroughly and nails scrubbed with warm soapy water.
- 27.15 Mystox emulsion paint dries fairly hard, and provided that sufficient drying time is allowed, no problems with sticking (tackiness) should occur.
- 27.16 If cracking or flaking occurs, the applied layer of Mystox is too thick, and any excess should be removed and Mystox re-applied as necessary.



**COMMENT(S) ON AESP\***

To: Camp Systems  
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Defence Equipment and Support  
Yew 1a # 1141  
MOD Abbey Wood Bristol BS34 8JH

From: .....

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Chapter(s)/Instruction	Page(s)/Paragraph(s)	
If you require more space please use the reverse of this form or a separate piece of paper.		
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Thank you for commenting on AESP 8340-C-108-201

Your reference: ..... Date: .....

Action is being taken to:	Tick	Tick
Issue a revised/amended AESP*		Under investigation
Incorporate comment(s) in future amendments		No action required
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# SHELTER, 4-WAY CONNECTOR

## NSN 8340-99-130-2184

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## PREFACE

Sponsor: DE&S OIP  
Publication Authority: DE&S JSC SCM EngTLS-TD-Pol

## INTRODUCTION

1 Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of the preliminary pages; it should be photocopied and used for forwarding comments on this AESP.

2 AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3 The subject matter of this publication may be affected by Defence Instruction Notices (DINs), Standard Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

**RELATED AND ASSOCIATED PUBLICATIONS**

**Related publications**

4 The octad for the subject equipment consists of all the categories shown in Table 1. All references are prefixed with the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index in AESP 0100-A-001-013.

**TABLE 1 RELATED PUBLICATIONS**

Category/Sub-Category			Information Level			
			1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
2	0	Operating Information	201	201	201	201
	1	Aide Memoire	*	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	*	*	*	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	*	*	*	*
	2	Repair Instructions	*	*	*	*
	3	Inspection Standards	*	*	*	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	201	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

\* Category/Sub-category not published.

**Associated publications**

5 The following publications are associated with this AESP octad.

Reference

Title

NONE



## ABBREVIATIONS

6 The following abbreviations are used in this AESP octad.

<u>Abbreviation</u>	<u>Nomenclature</u>
AESP	Army Equipment Support Publication
DIN	Defense Instruction Notices
Fig	Figure
ft	feet (foot)
ft <sup>3</sup>	feet cubed
in.	inch
kg	kilogram
lb	pound
m	metre
m <sup>2</sup>	metres squared
m <sup>3</sup>	metres cubed
mm	millimeters
NATO	North Atlantic Treaty Organisation
NSCM	NATO Supply Code for Manufacturers
NSN	NATO Stock Number
Para	Paragraph
PPE	Personal Protective Equipment
SOP	Standard Operating Procedures

**WARNINGS AND CAUTIONS****HAZARDOUS SUBSTANCES**

7 Before using any hazardous substances or material, the user must be conversant with the safety precautions and first aid instructions:

- 7.1 on the label of the container it was supplied in;
- 7.2 on the material Safety Data Sheet;
- 7.3 in local Safety Orders and Regulations.

**WARNINGS**

- (1) **PERSONNEL INJURY/EQUIPMENT DAMAGE. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF, THE MINIMUM IS ONE PERSON PER WALL MEMBER.**
- (2) **PERSONNEL INJURY/CRUSH HAZARD. EXERCISE CAUTION WHEN ASSEMBLING POLES AND BRACKETS DUE TO THE RISK OF CRUSH INJURY TO FINGERS.**
- (3) **PERSONNEL INJURY. WHEN POLES ARE CURVED UNDER TENSION THERE IS A HIGH RISK THAT THEY MAY SLIP AND SPRING BACK TO THEIR STRAIGHT RELAXED POSITION. PERSONNEL SHOULD NOT POSITION THEMSELVES DIRECTLY IN FRONT OF THE POLES.**
- (4) **PERSONNEL INJURY/HEAVY WEIGHT. A MINIMUM OF FOUR PERSONNEL ARE REQUIRED TO LIFT OR MOVE THE SHELTER.**
- (5) **PERSONNEL INJURY/BURN HAZARD. WHEN BURNING WEBBING TO PREVENT FRAYING, THE WEBBING WILL BECOME EXTREMELY HOT AND MELT.**
- (6) **PERSONNEL INJURY/TOXIC HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING GLOVES, GOGGLES OR FACEMASK AND COVERALLS ARE TO BE WORN WHEN USING MYSTOX.**
- (7) **PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX COMES INTO CONTACT WITH SKIN OR EYES WASH THE AFFECTED AREA IMMEDIATELY WITH WATER AND SEEK MEDICAL ATTENTION. JSP 437 REFERS**
- (8) **PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX IS SWALLOWED, SEEK IMMEDIATE MEDICAL ATTENTION.**
- (9) **PERSONNEL INJURY/TOXIC HAZARD. ONLY USE MYSTOX IN AUTHORIZED AREAS, DO NOT USE WHERE THERE IS A DANGER OF SPILT MYSTOX ENTERING THE WATER COURSE INCLUDING PONDS, DITCHES OR WATERWAYS.**
- (10) **PERSONNEL INJURY/TOXIC HAZARD. DISPOSAL OF SURPLUS MYSTOX AND EMPTY CONTAINERS IS TO BE ORGANISED BY THE UNIT QUARTERMASTER/SUPPLY OFFICER IN ACCORDANCE WITH UNIT ENVIRONMENT STANDING ORDERS AND/OR LOCAL PUBLIC HEALTH BY-LAWS.**
- (11) **PERSONNEL INJURY. WHEN FITTING OR RELEASING THE INSULATION TENSIONERS THERE IS A HIGH RISK THAT UNDER TENSION THEY MAY SLIP AND SPRING BACK AT PERSONNEL.**

## CAUTIONS

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** Wet canvas should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed.
- (3) **EQUIPMENT DAMAGE.** All insulation panels can be added after the shelter has been erected EXCEPT the roof panel that must be attached to the frame prior to the canvas.
- (4) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.
- (5) **EQUIPMENT DAMAGE.** The sunshade is to be erected prior to the shelter if possible or alternatively moved into position over the tent after assembly with the base restraint straps being added after it is in its final position. The ratchet straps should not be over tightened and never used if damaged.
- (6) **EQUIPMENT DAMAGE.** The shelter is to be erected on firm level ground, which has been cleared of any large stones or rubble.
- (7) **EQUIPMENT DAMAGE.** A power washer may be used at low pressure with warm water. Use judgement and caution regarding water pressure and temperature.
- (8) **EQUIPMENT DAMAGE.** Do not use solvents or detergents to clean the shelter as they will dissolve the protective coating on the fabric.



**OPERATING INFORMATION**

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**DESCRIPTION**

1 The shelter (Fig 1), 4-way connector roof section comprises a folding cruciform roof member and eight 0.91 m (36 in.) tubular members which are connected with a 3-way and 4-way angle bracket. This is supported by four 1.81 m (71 1/4 in.) tubular members which use 3-way brackets as feet.

2 The cover is made in one piece, with four entrances which are designed to be laced to the end of the 1.8 m x 1.8 m (6 ft x 6 ft) porch, 3.66 m x 1.8 m (12 ft x 6 ft) passageway. All entrances are capable of being closed when not in use.

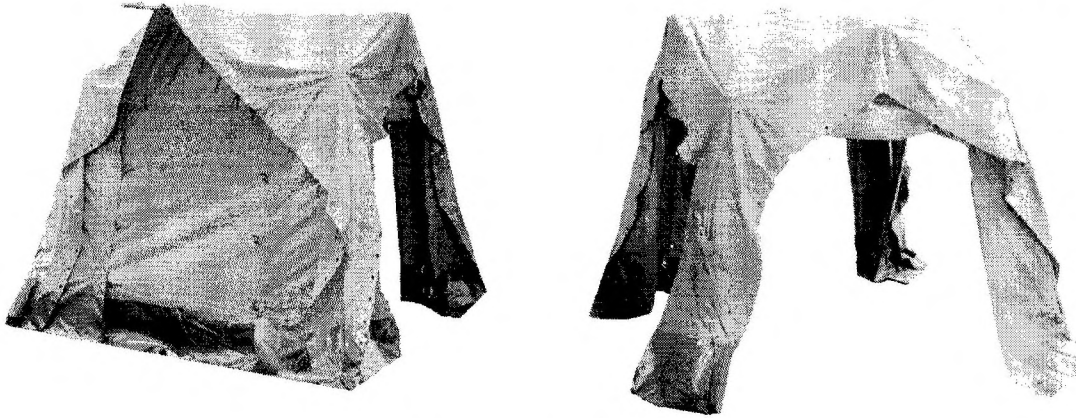


Fig 1 Shelter, 4-way connector

## DEPLOYMENT

3 It has been discovered that the canvas tentage can leak when new. The canvas is a 50:50 polyester/cotton blend and when initially erected is not waterproof due to small holes within the textile as well as the stitching holes around the thread. When the tentage is initially soaked the cotton fibres swell as they absorb the water, which in turn plugs the holes in the canvas. After the canvas naturally dries, the cotton fibres do not shrink back but instead remain permanently enlarged thus the canvas becomes permanently water-resistant.

## SITING

4 To site shelters, proceed as, follows:

4.1 The ground should be as level as possible, avoiding hollows where water would collect during heavy rain. Dry river beds or wadis, must be avoided as heavy rainfall or flash floods, however infrequent, can jeopardise the integrity of the shelter.

4.2 The ground should also be firm thus ensuring stability for pins and poles.

4.3 The site should be clear from obstacles such as rocks, trees and bushes to avoid the risk of tears in the canvas or ground cloth.

4.4 Drainage may be achieved by cutting channels around each shelter when the gradient and composition of the ground allows it.

4.5 Alternatively, the ground should be broken up between the tent pins and tent walls and a small bank of earth built on the inside of the tent wall.

4.6 Attention should be paid to the direction of the prevailing wind so that the tent is erected with its entrance located on the side facing away from the wind. Consideration should also be given towards minimising the area exposed to the wind, as this will gradually loosen the over straps and guy lines.

4.7 To prevent the propagation of fire between shelters, wherever possible, a spacing of 6 m between shelters or shelter complexes is to be maintained.

## PITCHING

### CAUTION

**EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.

**General notes**

- 5 The pitching space should be marked out in accordance with the ground plan.
- 6 The valise or bundle containing the tent canvas should be carried as near as possible to the pitching site.
- 7 To prepare the canvas, proceed as follows:
  - 7.1 Open canvas and lay out with inside uppermost.
  - 7.2 Lace canvas sections together loosely and tie off at eaves as shown in Figs 2 to 9.

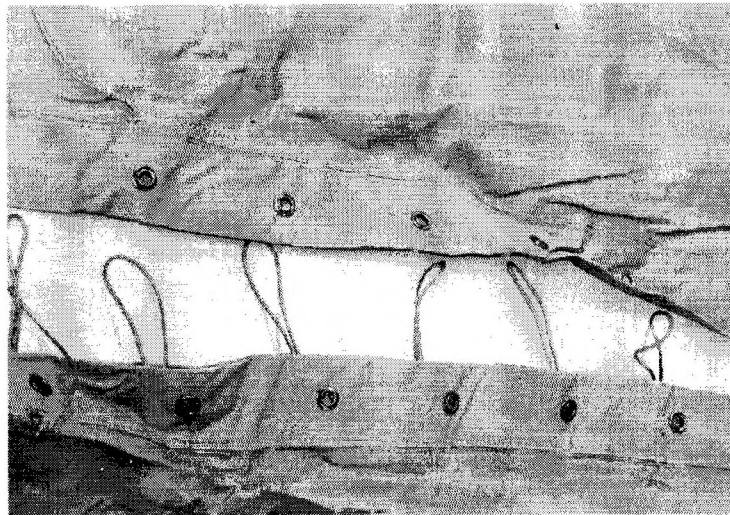


Fig 2 Lacing canvas sections (1)

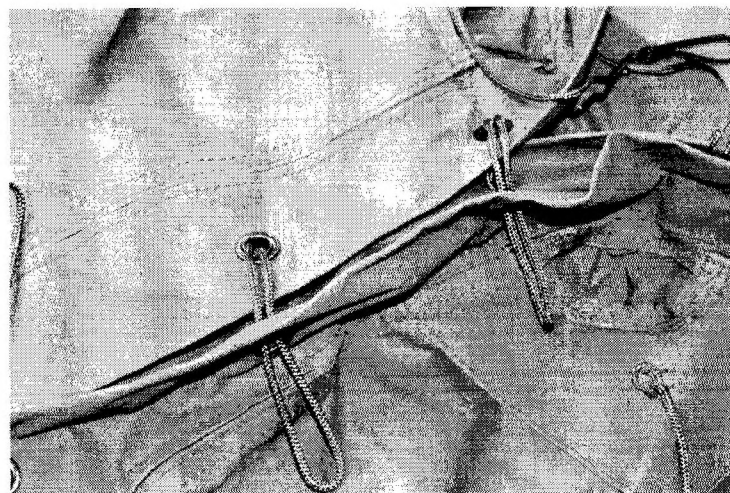


Fig 3 Lacing canvas sections (2)

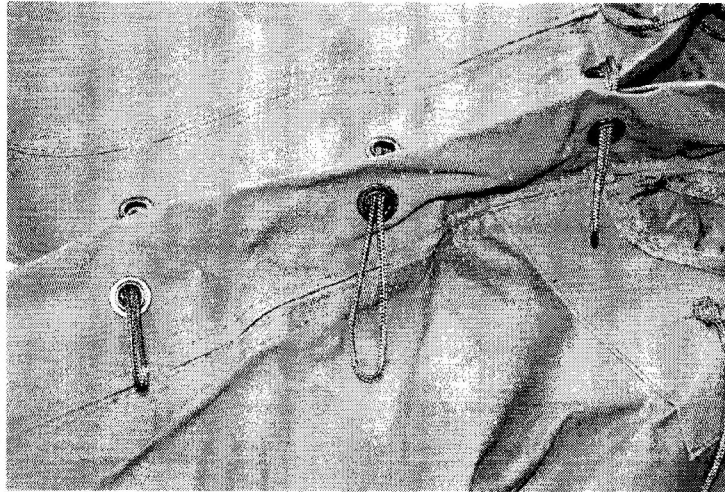


Fig 4 Lacing canvas sections (3)

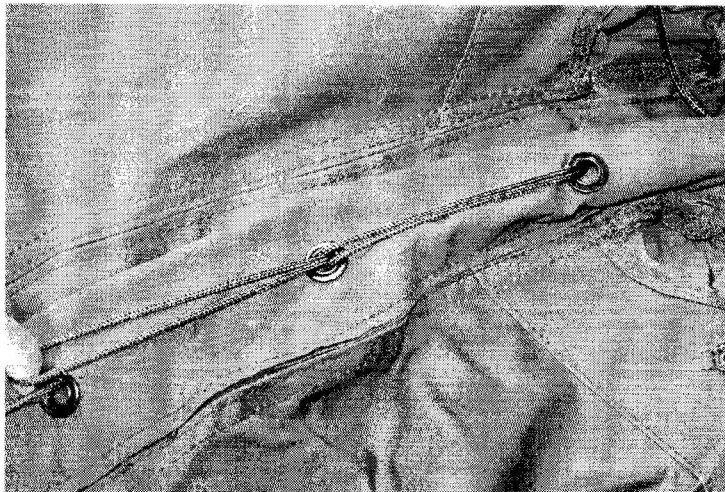


Fig 5 Lacing canvas sections (4)

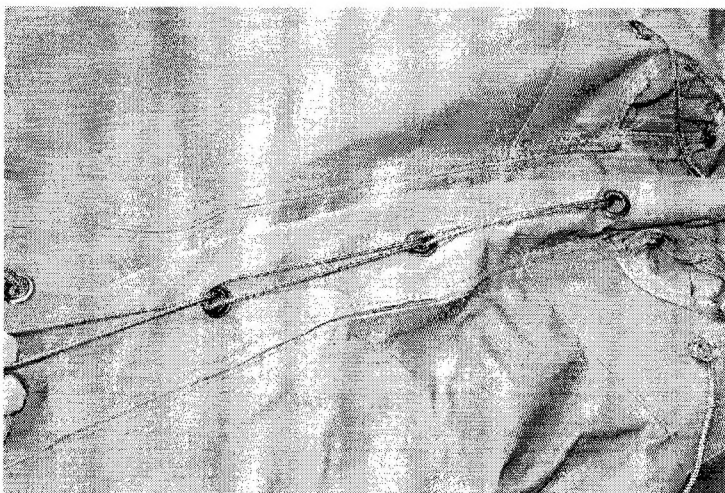


Fig 6 Lacing canvas sections (5)



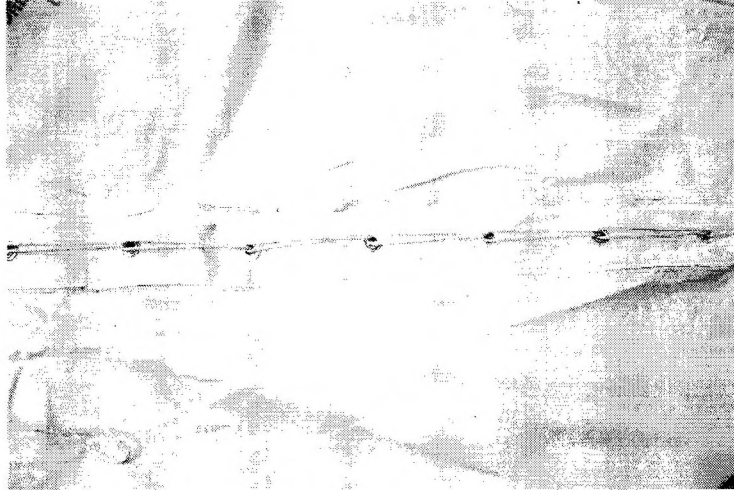


Fig 7 Lacing canvas sections (6)

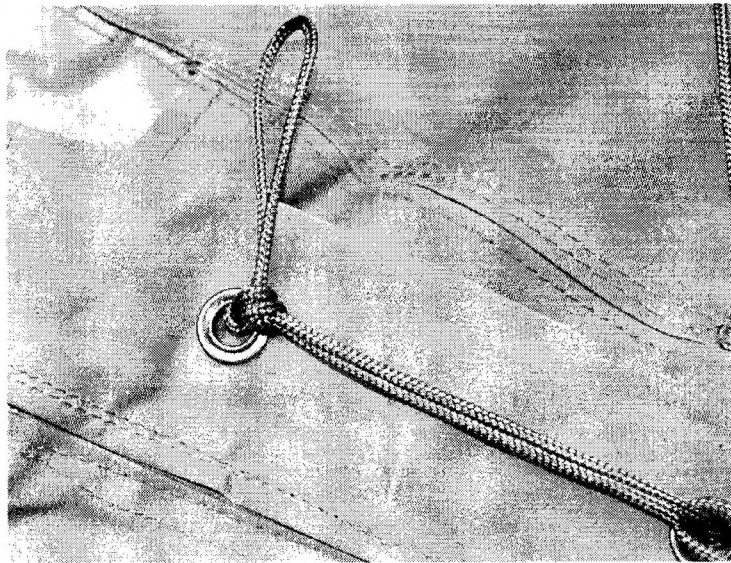


Fig 8 Lacing canvas sections (7)

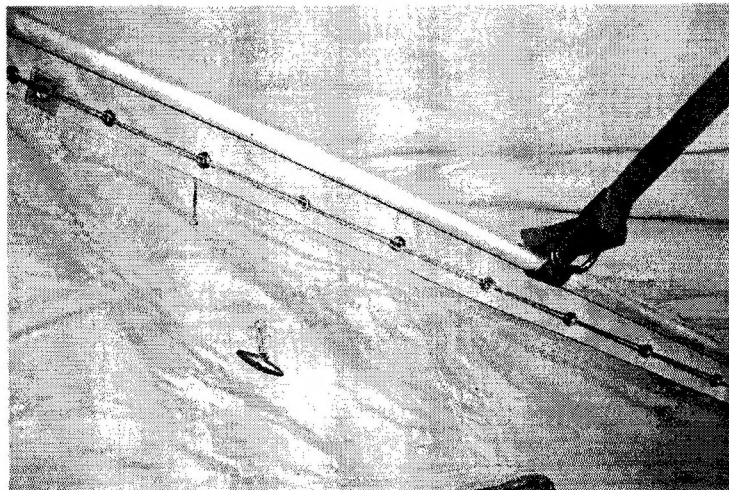


Fig 9 Lacing canvas sections (8)

8 Tent poles should be fitted together to produce the roof framework with roof restraint straps attached. The roof insulation panel (if provided) should then be attached to the framework. Attach the top of the insulation end sections (if provided) to the framework by using tensioners. Then the canvas should be placed over the roof framework. The overstrap and end guys (if provided) should be placed over to the shelter. The sides should be lifted one at a time and the wall and base members inserted. The remaining lacing on the walls of the canvas should be completed and the end insulation sections (if provided) should be completely attached to the framework. Base restraint straps (if provided) should be attached to the base brackets. Insert insulation side panels (if provided) and attach between the framework and canvas by using tensioners.

9 The sod-cloth should be pinned through the external eyelets using tent-pins at an angle of 90 degrees from the horizontal (J11/8340-99-137-3895) and internal cords using (J11/8340-99-132-0028) at an angle of 60 degrees from the horizontal.

10 When pegging out the shelter, proceed as follows:

10.1 Pins for shelter lines (8340-99-943-9052) should be driven at an angle of 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground and approximately 300 mm (1ft) from the edge of the sod cloth.

10.2 Hooks on tent pins should face in the opposite direction to the pulling force of the line and any cords should be placed around the pin prior to pegging.

10.3 For ease of driving the pins into the ground and to obtain the correct angle, personnel should try to position themselves behind the pin, facing away from the direction of the pulling force of the line when striking.

10.4 Avoid unequal strain and wear on the canvas by ensuring that:

10.4.1 Weather lines are not twisted and lie flat across the canvas.

10.4.2 Restraint and insulation straps are not twisted and lie flat across the insulation.

10.4.3 Doorways are closed while erection and pegging is carried out.

11 The shelter sod-cloth can be ballasted to restrict the bellowing effect of the wind. Sandbags (F2/5610-99-200-4386) filled with spoil from the drainage trench is recommended for this purpose.

#### **Pitch the shelter, 4-way connector**

12 To pitch the shelter, proceed as follows:

12.1 The pitching party is to be comprised of four personnel and a supervisor.

12.2 Lay out the components and assemble the roof members. There are two different lengths of universal member and a roof member and two different types of brackets: 4-way angled brackets for the ridge and eaves, 3-way Y-piece brackets for the corners and 3-way T-piece brackets for the wall members. Figs 10 and 11.

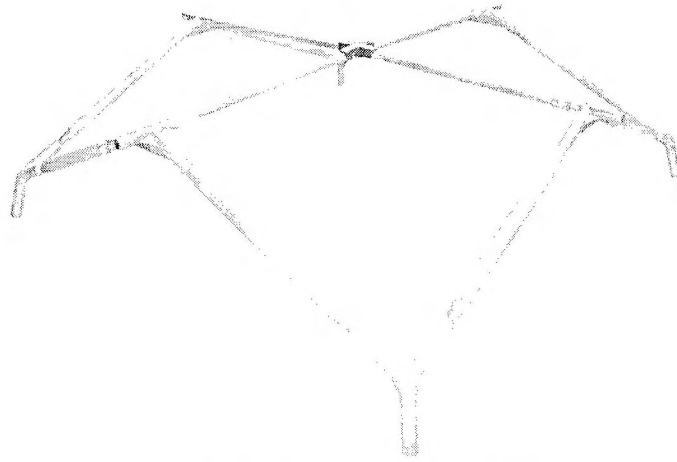


Fig 10 Roof Framework Assembled

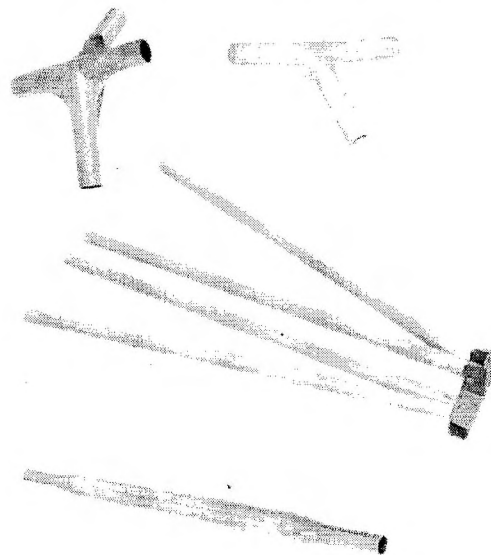


Fig 11 Framework Components

12.1 Lay the roof insulation panel, over the roof with white side facing inwards Fig 12. Loosely attach to the framework by the use of the tensioners, ensuring the ridge of the roof panel is aligned centrally.

NOTE

The roof insulation panel must be fitted before erection - all other panels may be fitted after erection.

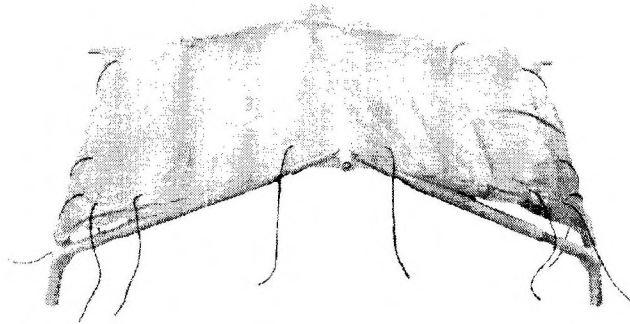


Fig 12 Roof frame with insulation panel unsecured (typical arrangement)

**WARNING**

**PERSONNEL INJURY. WHEN FITTING OR RELEASING THE INSULATION TENSIONERS THERE IS A HIGH RISK THAT UNDER TENSION THEY MAY SLIP AND SPRING BACK AT PERSONNEL.**

12.1 The tensioners are fitted by passing the loose end through the centre of the clip, pulling the tail to tension, then still under tension laying the tail into the jaws and end opening of the clip before releasing the tension to secure; the remaining tail should continue round and be reinserted through the centre of the clip to double secure. To release pull the tail to tension' lift the loose cord out of the clip, and release. Tensioner tails should pass through the insulation from the inside and be secured around the tent frame. Fig 13 and Fig 14

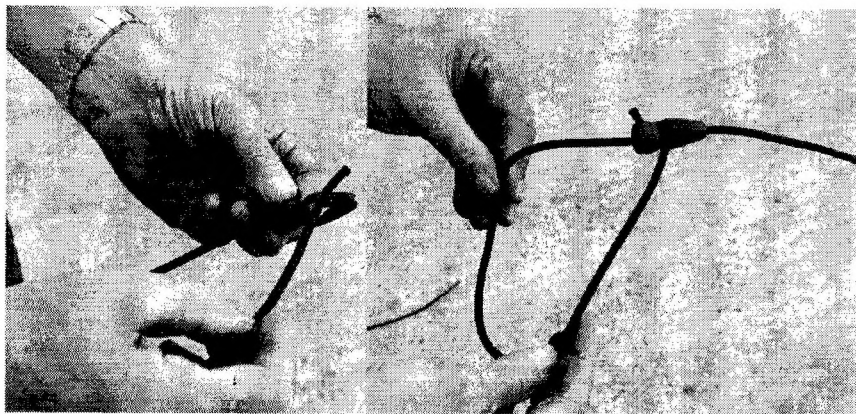


Fig 13 Tensioner loose and locked

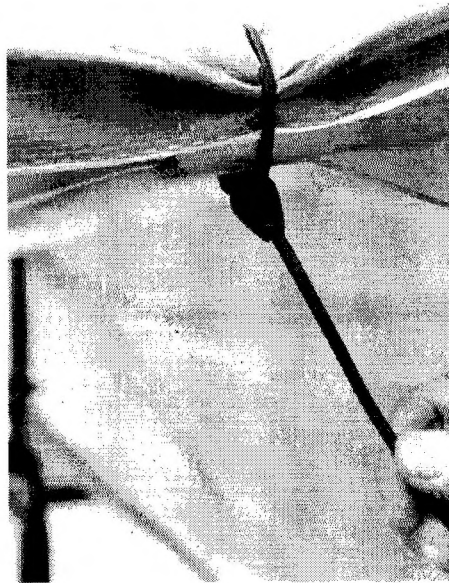


Fig 14 Tensioner

12.2 The Mk 3 end panel consists of 3 items per end and are shown in Fig 15, viewed from the inside.

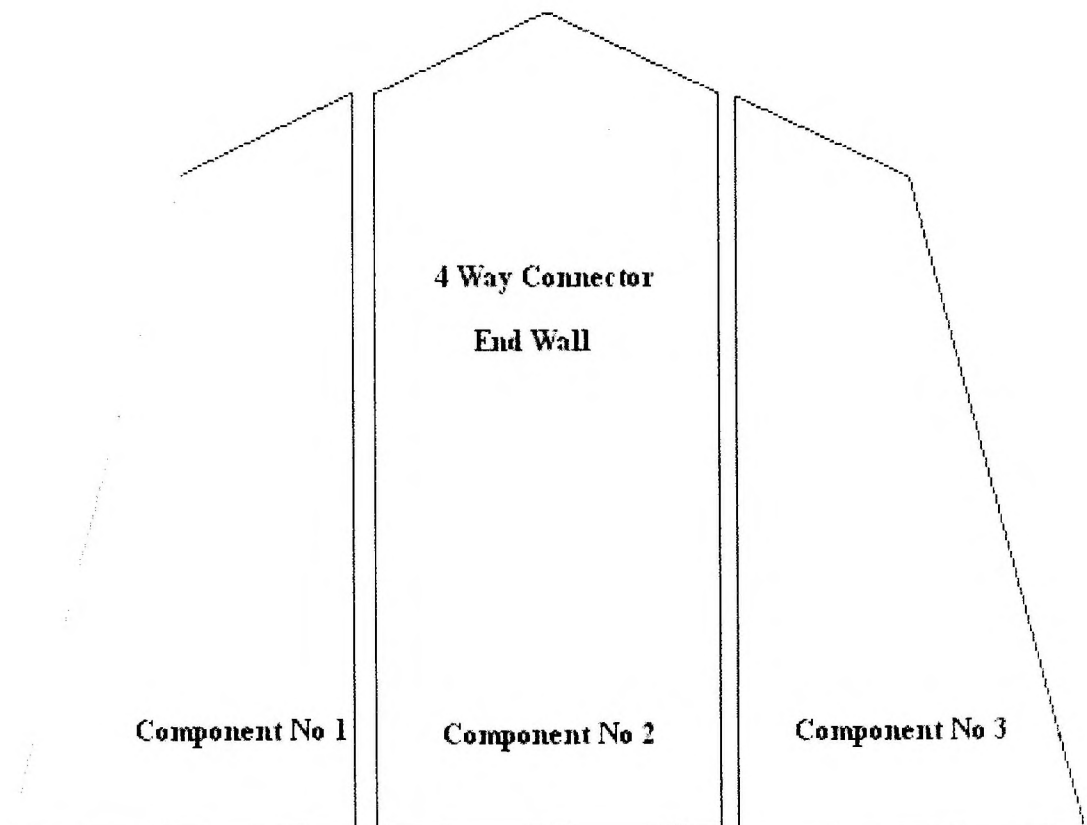


Fig 15 The Mk 3 end panel (Typical arrangement)

12.3 Lay the 3 end wall component insulation panels at each end of the shelter. Attach the centre insulation panel with tensioners to the roof panel ensuring the tensioners are fitted around the poles.

12.4 Raise the shelter and attach the outer components. Working from inside, tighten the uppermost tensioners and ensure that all panels overlap correctly. Viewed from the outside the outer 2 end wall panels must overlap the centre panel.

### Fitting Canvas

12.5 Unzip and roll up all door panels, and fit the canvas onto the assembled roof framework. Fig 16.

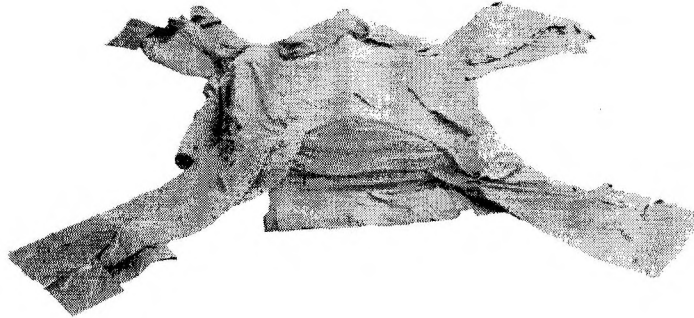


Fig 16 Place Canvas Over Roof Frame

12.6 Raise the roof assembly by fitting the four wall members with the adaptors attached. Fig 17.

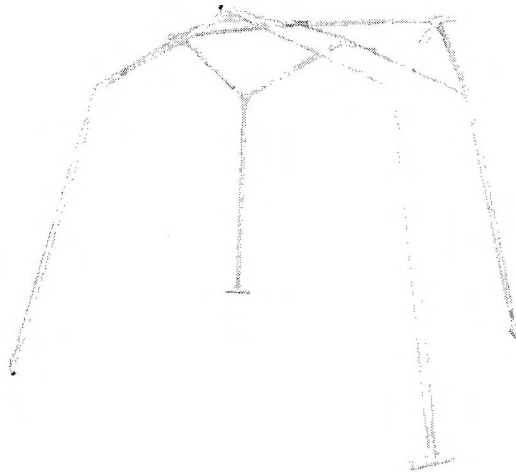
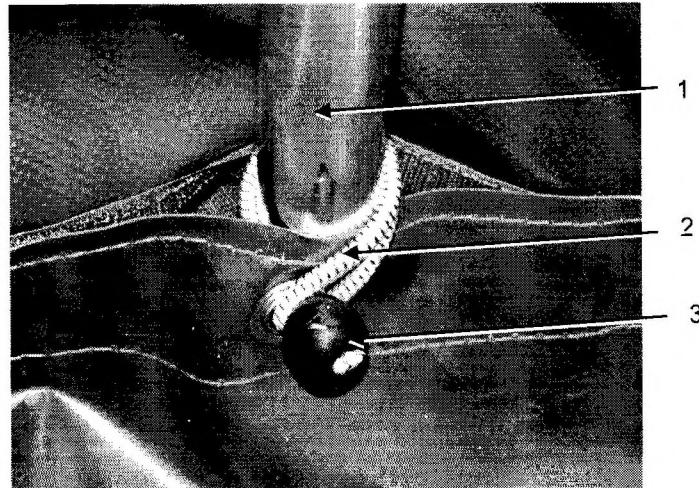


Fig 17 Raise the roof assembly by fitting the four wall members (Canvas not shown for clarity)

12.7 Position the 4-way connector up against the shelter to be attached.

12.8 Insert pins through the eyelets in the sod cloth and anchor to the ground. Ensure the pins are positioned on the outside of the framework.

12.9 Lay the groundsheet down inside the connector and attach to the framework (Fig 15).



- 1 Framework
- 2 Tensioner
- 3 Groundsheet

Fig 18 Attachment of groundsheet with tensioners

## STRIKING

### CAUTION

**EQUIPMENT DAMAGE.** Wet canvas should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed.

- 13 Striking the shelter is the reverse of the pitching procedure.

## FOLDING

- 14 To fold shelter panels, proceed as follows:
  - 14.1 Lay the shelter canvas flat on the ground.
  - 14.2 Fold the ends onto the roof and walls.
  - 14.3 Fold the walls to the ridge in three equal folds.
  - 14.4 Roll to form the smallest possible bundle.

## PACKING

- 15 To pack the shelter, proceed as follows:
  - 15.1 Whenever it becomes necessary to pack canvas in a wet condition the packages are to be clearly marked NOT DRY to indicate the canvas was packed in a wet condition. If the canvas is being retained in the campsite, the officer in charge is to be notified of the condition of the canvas so he can arrange for it to be dried at the earliest opportunity. If the canvas is to be despatched, the consignee is to be notified by telephone or signal so the canvas can be unpacked and dried as soon as possible after receipt.
  - 15.2 Place the folded shelter canvas in the Valise with the straps.
  - 15.3 Place the shelter frame components and the tent pins in the bags provided.

## MAINTENANCE INSTRUCTIONS

### Introduction

16 The life of tentage can be enhanced considerably if reasonable care is taken whilst in use or in storage. Such care will also help to minimise costs involved in refurbishment after exercises or operations.

### Common causes of damage to canvas

17 Common causes or damage to canvas are as follows:

17.1 Burns - due to careless smoking or siting shelters near braziers or incinerators.

17.2 Holes - due to careless pitching, stacking or stowage of articles too close to shelter walls. When shelters are used for storage, stacks should be approximately 60 mm (2 ft) from the walls and should not touch the canvas at any point. Gangways are essential in case of fire.

17.3 Tears in canvas can be caused through over-taut weather lines. In wet weather lines directly attached to the canvas should be slackened.

17.4 Tears in the sod-cloth can be caused by walking on it if there is sharp stones or rubble beneath, or if sharp rubble is used to ballast the shelter.

17.5 Damage to the fabric may occur as a result of folding canvas when wet, or on ground contaminated by oil etc.

17.6 Similarly, fabric may be damaged when shelters are used as kitchens or medical theatres if blood, grease or other fats come into contact with the canvas. Canvas should be rinsed off as soon as possible should this occur. Work surfaces that would normally have blood, grease or other fats on them should be kept clear of the canvas. Grease and fats will also become a fire hazard unless cleaned.

17.7 Grease or oil on the hands or clothing of personnel handling or using the tentage will cause damage if in contact with the canvas.

17.8 Care must be exercised when loading or unloading tentage into or from vehicles to avoid damage from contact with projections on the vehicle.

17.9 Vehicles must be examined before loading to check for dirty or contaminated interiors or any oily or dirty items. Unless they can be cleaned prior to loading tentage, such vehicles should not be employed.

17.10 In overseas theatres, where native flora and fauna may damage the canvas, regular checks should be carried out.

17.11 When joining a number of shelters together, care should be taken to avoid abnormal stress being placed on the canvas.

17.12 Exposure to Ultra Violet (UV) light causes damage to all fabrics. To prolong the life of a shelter in areas of high UV an appropriate sunshade should be used.

### EFFECTS OF DAMP

18 Wet or damp canvas deteriorates rapidly. If stored in this condition it is liable to catch fire due to spontaneous combustion.

19 All canvas must be thoroughly dry before storing. Stacks should be examined periodically and any damp or suspect canvas removed and examined immediately.



20 Storehouses employed for storing tentage should be inspected regularly for any sources of water ingress.

21 Shelter weather lines and ropes should be dry before storing.

**DAMAGE TO POLES AND BRACKETS**

22 Common causes of damage to shelter poles are as follows:

22.1 Distortion of alloy shelter frames through misuse and carelessness, i.e. using the alloy poles as bearers or levers, or permitting components to lie where they can be crushed by vehicle tyres/tracks.

22.2 Excessive use of force when fitting framework together. Care should be taken to ensure the hollow ends of the components are free from dirt or other blockages.

22.3 Employing too few people when pitching and striking tentage will result in loss of control over the twisting and bending of the frame and will eventually result in the components becoming unserviceable.

22.4 Excessive loading to the roof such as snow, sand and other debris. Personnel should never climb on or over any shelters.

**DAMAGE TO INSULATION**

23 The following repair kit is available to effect repairs on the insulation panels

**TABLE 1 INSULATION REPAIR KIT**

Serial (1)	Item (2)	D of Q:	DMC	NSN (3)
1	INSULATION PANEL REPAIR KIT	1	J11	8340-99-839-8761
2	FABRIC TAPE	Roll	J11	7510-99-854-9439
3	FABRIC HAGIHARA . POLYETHYLENE UV FR WHITE	2 SQ	J11	8305-99-741-6212
4	FABRIC HAGIHARA POLYETHYLENE UV FR - GREEN	2 SQ M	J11	8305-99-929-8077
5	MATERIAL REPAIR PATCH KIT	1	J11	8340-99-153-6635
6	ALUMINIUM TAPE	Roll	J11	5999-99-872-2227
7	ALUMINIUM FOIL	2 SQ M	J11	5640-99-297-9453

24 To carry out a repair on the insulation fabric outer cover proceed as follows:

24.1 Apply the green/white tape to repair slits or tear in fabric cover material where there is sufficient remaining material to bring together for a complete tape covering. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.

24.2 Apply fabric patch material for holes or tears where there is insufficient material to bring together to enable a tape only repair. Cut a patch to cover the hole/tear. Apply tape to all edges of the patch. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.

25 To carry out a repair on the insulation inner material proceed as follows:

25.1 Apply the foil tape to repair slits or tear in inner material where there is sufficient remaining material to bring together for a complete tape covering. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.

25.2 Apply foil/bubble patch material for holes or tears where there is insufficient material to bring together to enable a foil tape only repair. Cut a patch to cover the hole/tear. Apply tape to all edges of the patch. Using a suitable support behind the panel light pressure should be applied to the tape to ensure a tight seal.

26 Repairs that require a patch larger than supplied in the repair kit will require the panel to be replaced.

27 Where damage to the eyelets has occurred this will require the panel to be replaced.

## **PROOFING**

## **WARNINGS**

**(1) PERSONNEL INJURY/TOXIC HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING GLOVES, GOGGLES OR FACEMASK AND COVERALLS ARE TO BE WORN WHEN USING MYSTOX. JSP 437 REFERS**

**(2) PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX COMES INTO CONTACT WITH SKIN OR EYES WASH THE AFFECTED AREA IMMEDIATELY WITH WATER AND SEEK MEDICAL ATTENTION.**

**(3) PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX IS SWALLOWED, SEEK IMMEDIATE MEDICAL ATTENTION.**

**(4) PERSONNEL INJURY/TOXIC HAZARD. ONLY USE MYSTOX IN AUTHORIZED AREAS, DO NOT USE WHERE THERE IS A DANGER OF SPILT MYSTOX ENTERING THE WATER COURSE INCLUDING PONDS, DITCHES OR WATERWAYS.**

**(5) PERSONNEL INJURY/TOXIC HAZARD. DISPOSAL OF SURPLUS MYSTOX AND EMPTY CONTAINERS IS TO BE ORGANISED BY THE UNIT QUARTERMASTER/SUPPLY OFFICER IN ACCORDANCE WITH UNIT ENVIRONMENT STANDING ORDERS AND/OR LOCAL PUBLIC HEALTH BY-LAWS.**

## **Introduction**

28 A waterproofing agent Mystox TRP (8030-99-225-1573) is available for the renovation of all canvas tentage. This is a preservative coating that is an olive drab, water solvent emulsion that will restore the Flame resistance, Water resistance and Rot Resistance (FWRR).

## **Personal protective equipment (PPE) JSP 437**

29

Table 2 details some of the NATO Stock Numbers (NSNs) of suitable Personal Protective Equipment (PPE) for personnel using Mystox.

30 Units that do not have sufficient quantities of the items to equip a 4-6 person reproofing team should demand items through the normal supply chain. A team should be sufficient to reproof a battalion's entitlement of shelters.

TABLE 2 PPE

Serial (1)	Item (2)	D of Q: (3)	DMC (4)	NSN (5)	Size (6)
	GLOVES				
1	Chemical & Oil Protective	PR	GL	8415-99-132-1427	Size 7
2	Chemical & Oil Protective	PR	GL	8415-99-132-1428	Size 8
3	Chemical & Oil Protective	PR	GL	8415-99-132-1429	Size 9
4	Chemical & Oil Protective	PR	GL	8415-99-132-1430	Size 10
5	Chemical & Oil Protective	PR	GL	8415-99-978-3706	Size 7
6	Chemical & Oil Protective	PR	GL	8415-99-978-3707	Size 8
7	Chemical & Oil Protective	PR	GL	8415-99-978-3708	Size 9
8	Chemical & Oil Protective	PR	GL	8415-99-978-3709	Size 10
9	Chemical & Oil Protective	PR	GL	8415-99-978-3710	Size 11
10	Rubber		GL	8415-99-130-8250	Size Small
11	Rubber		GL	8415-99-130-8251	Size Medium
12	Rubber		GL	8415-99-130-4729	Size Large
13	Rubber		GL	8415-99-130-8252	Size Extra Large
14	Rubber		GL	8415-99-571-3559	Size 7/7 IA
15	Rubber		GL	8415-99-571-3560	Size 8/8 1/2
16	Rubber		GL	8415-99-571-3561	Size 9/9 1/2
17	Rubber		GL	8415-99-571-3562	Size 10/10 1/2
	GOGGLES, INDUSTRIAL				
18	Goggles	EA	VO47	4240-99-577-3798	
19	Goggles	EA	VO47	8415-99-130-9776	
	COVERALLS				
20	Coverall, disposable		CAS	8415-99-130-8302	Size M
21	Coverall, disposable		CAS	8415-99-130-8303	Size L
22	Coverall, disposable		CAS	8415-99-130-8304	Size XL
23	Coverall, disposable		CAS	8415-99-665-7624	Size XXL
24	Coverall, disposable		CAS	8415-99-665-7625	Size XXXL
25	Coverall, disposable		CAS	8415-99-978-4772	Size M
26	Coverall, disposable		CAS	8415-99-978-4773	Size L
27	Coverall, disposable		CAS	8415-99-978-4774	Size XL
28	Coverall, disposable		CAS	8415-99-978-4775	Size XXL
29	Coverall, disposable		CAS	8415-99-978-4776	Size XXXL
	FACEMASK				
30	Mask, disposable		VO47	4240-99-132-1426	
31	Mask, disposable		VO47	4240-99-257-8006	

**Mystox - instructions for use**

**WARNINGS**

- (1) **PERSONNEL INJURY/TOXIC HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) INCLUDING GLOVES, GOGGLES OR FACEMASK AND COVERALLS ARE TO BE WORN WHEN USING MYSTOX. JSP 437 REFERS.**
- (2) **PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX COMES INTO CONTACT WITH SKIN OR EYES WASH THE AFFECTED AREA IMMEDIATELY WITH WATER AND SEEK MEDICAL ATTENTION.**
- (3) **PERSONNEL INJURY/TOXIC HAZARD. IF MYSTOX IS SWALLOWED, SEEK IMMEDIATE MEDICAL ATTENTION.**
- (4) **PERSONNEL INJURY/TOXIC HAZARD. ONLY USE MYSTOX IN AUTHORIZED AREAS, DO NOT USE WHERE THERE IS A DANGER OF SPLIT MYSTOX ENTERING THE WATER COURSE INCLUDING PONDS, DITCHES OR WATERWAYS.**
- (5) **PERSONNEL INJURY/TOXIC HAZARD. DISPOSAL OF SURPLUS MYSTOX AND EMPTY CONTAINERS IS TO BE ORGANISED BY THE UNIT QUARTERMASTER/SUPPLY OFFICER IN ACCORDANCE WITH UNIT ENVIRONMENT STANDING ORDERS AND/OR LOCAL PUBLIC HEALTH BY-LAWS.**

31 To apply Mystox, proceed as follows:

- 31.1 The emulsion is to be applied with a brush only - spray painting is strictly forbidden.
- 31.2 The emulsion should be well stirred and look like ordinary emulsion paint. If it thickens during application it should be thinned by adding a small amount of water.
- 31.3 Under cold conditions it may be necessary to stir for a longer period than under warm conditions.
- 31.4 The emulsion should be stored in a temperature that does not fall below 0°C. If after extended storage, it can be applied with a brush without balling or curdling it should perform satisfactorily.
- 31.5 Only those parts of the tent which leak (i.e. most worn areas and seams) should be treated.
- 31.6 If, in spite of wearing protective clothing, any Mystox comes into contact with the skin the affected area should be washed immediately with water.
- 31.7 Disposal of surplus emulsion and empty containers must be organised by the unit.
- 31.8 Quartermaster/Supply Officer in accordance with the local public health by-laws and advice of local authorities must be sought as regulations may vary from area to area.
- 31.9 Drying time, with good drying conditions, is between seven and eight hours. However, to ensure the emulsion is absolutely dry, whenever possible drying should be extended over 24 hours in a warm dry atmosphere.
- 31.10 Application can be made onto a damp canvas if necessary. In such a case, extra care with drying is essential.
- 31.11 Mystox is issued in 25 kg containers therefore it will probably be necessary to decant the liquid into smaller containers, these are to be suitably labelled and treated for disposal the same as the original containers.

31.12 It is advisable, whenever practicable, to reproof shelters whilst they are erected and to leave them standing during the drying process. This is of course more difficult for the larger shelters that may require their roofs to be reproofed prior to complete erection. Alternatively, a brush on an extended handle can be used, however extra care must be taken to ensure splashes and spillage are kept to a minimum and cleaned as soon as possible.

31.13 After use, all protective clothing should be scrubbed in soapy water and then thoroughly rinsed to aid the removal of residual deposits of Mystox.

31.14 Hands should be washed thoroughly and nails scrubbed with warm soapy water.

31.15 Mystox emulsion paint dries fairly hard, and provided that sufficient drying time is allowed, no problems with sticking (tackiness) should occur.

31.16 If cracking or flaking occurs, the applied layer of Mystoc is too thick, and any excess should be removed and Mystoc re-applied as necessary.

### OIP GUIDANCE FOR CONDITIONING ITC/GS TENTAGE SYSTEMS

32 **Current Tentage.** Users must periodically inspect their tentage forthwith in order to apply the new OIP direction on condition based approach for service life outlined below. At any point should users be concerned with the level of fire protection or fire fighting systems being applied to their deployed tent systems they must raise it through the chain of command.

33 **Current General Service (GS) Canvas, including ITC Canvas.** The condition of the canvas is key, when the material becomes thin and worn it begins to lose its fire retardant properties. OIP have investigated each of the wearing factors (Age, Environment, Use) and found that alone Age is not a contributing factor. The minimum expected deployed life (in desert conditions) for ITC/GS canvas is 4 years of continuous use, however ECI have tested 30 year old samples and found them to achieve the required standard. The material characteristics degrade when the wearing factors are combined together, the actual service life of ITC/GS canvas will be determined by the environmental conditions experienced in storage and when deployed, as well as the nature of usage and the management/maintenance regime being applied by Users. Service life is therefore expected to vary widely.

34 The ITC/GS canvas retains its fire retardant properties as long as the material remains intact:

34.1 Users must inspect their GS tentage when erecting and striking the tent as well as every six months whilst in continual use.

34.2 There must be no open tears in the fabric.

34.3 There must be no holes in the fabric.

34.4 If the canvas leaks, then Users should apply the Mystox (J11/8030-99-225-1573) recoating agent in order to improve the waterproof properties, as well as the resistance to rot.

35 **Current General Service (GS) in service Insulation.** The condition of the insulation is critical. The ITC/GS current in service insulation must be in A1 condition. The minimum deployed life for ITC/GS insulation is 18 months of continuous use. This assessment is limited by the availability of test samples (none older than 18 months) however the actual service life of ITC/GS insulation will be determined by the environmental conditions experienced in storage and when deployed, as well as the nature of usage and the management/maintenance regime being applied by Users. Service life is therefore expected to vary.

35.1 Users must inspect their GS insulation when erecting and striking the tent as well as every six months whilst in continual use.

35.2 There must be no damage to the inner foil layer.

35.3 It is essential that there are no holes in the insulation. Cables must be passed under or around the insulation and not through.

35.4 There must be no damage to the joints or seams of the insulation.

35.5 The insulation must be attached to the tent frame by all points specified within the relevant AESP respective Category 201.

35.6 There must be no personal items hung directly from the insulation or canvas.

35.7 The outer 'polyethylene' layer is a protective layer and some minor damage may be acceptable. Materials included within the repair kit (NSN: 8340-99-839-8761) are to be used in accordance with manufacturer's instructions.











# Ministry of Defence

## SHELTER, OPERATIONAL FIELD CATERING SYSTEM (OFCS) 3.6 M X 3.6 M (12 FT X 12 FT) MK4

**NSN 8340-99-147-7464**

### OPERATING INFORMATION

This publication contains information covering the requirements  
of Categories 2 and 6 at information level 1

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By  
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**PREFACE**

Sponsor:	DE&S OI
Project Number:	-
File Ref:	-
Publication Agency:	OI

**INTRODUCTION**

1. Service users should forward any comments on this publication through the channels prescribed in AESP 0100-P-011-013. An AESP Form 10 is provided at the end of the preliminary pages; it should be photocopied and used for forwarding comments on this AESP.

2. AESPs are issued under Defence Council authority and where AESPs specify action to be taken, the AESP will of itself be sufficient authority for such action and also for the demanding of the necessary stores, subject to the provisions of Para 3 below.

3. The subject matter of this publication may be affected by Defence Instruction Notices (DINs), Standard Operating Procedures (SOPs) or by local regulations. When any such Instruction, Order or Regulation contradicts any portion of this publication it is to be taken as the overriding authority.

**RELATED AND ASSOCIATED PUBLICATIONS****Related publications**

4. The octad for the subject equipment consists of all the categories shown in Table 1. All references are prefixed with the first eight digits of this publication. The availability of the publications can be checked by reference to the relevant Group Index in AESP 0100-A-001-013.

Category/Sub-Category		Information Level				
		1 User/Operator	2 Unit Maintenance	3 Field Maintenance	4 Base Maintenance	
1	0	Purpose and Planning Information	101	101	101	101
	1	Equipment Support Policy Directives	*	*	*	*
2	0	Operating Information	*	*	*	*
	1	Aide Memoire	201	*	*	*
	2	Training Aids	*	*	*	*
3		Technical Description	*	*	*	*
4	1	Installation Instructions	*	*	*	*
	2	Preparation for Special Environments	*	*	*	*
5	1	Failure Diagnosis	*	*	*	*
	2	Repair Instructions	201	*	201	*
	3	Inspection Standards	201	*	*	*
	4	Calibration Procedures	*	*	*	*
6		Maintenance Schedules	201	*	*	*
7	1	Illustrated Parts Catalogues	711	711	711	711
	2	Commercial Parts Lists	*	*	*	*
	3	Complete Equipment Schedule, Production	*	*	*	*
	4	Complete Equipment Schedule, Service Edition (Simple Equipment)	741	741	741	741
	5	Complete Equipment Schedule, Service Edition (Complex Equipment)	*	*	*	*
8	1	Modification Instructions	*	*	*	*
	2	General Instructions, Special Technical Instructions and Servicing Instructions	*	*	*	*
	3	Service Engineered Modification Instructions (RAF only)	*	*	*	*

\* Category/Sub-category not published.

**Table 1: Related Publications**

**Associated publications**

5. The following publication should be referred to when installing and cooperating the Operational Field Catering System:

AESP: AESP 7310-B-105

**ABBREVIATIONS**

6. The following abbreviations are used in this AESP.

<u>Abbreviation</u>	<u>Nomenclature</u>
AESP	Army Equipment Support Publication
AFG	Army Form General
CES	Complete Equipment Schedule
DIN	Defence Instruction Notices
Fig	Figure
ft	feet (foot)
ft <sup>3</sup>	feet cubed
in.	inch
IPC	Illustrated Parts Catalogue
kg	kilogram
lb	pound
m	metre
m <sup>2</sup>	metres squared
m <sup>3</sup>	metres cubed
mm	millimetres
NATO	North Atlantic Treaty Organisation
NI	Not Illustrated
NIV	Not in Vocabulary
NSCM	NATO Supply Code for Manufacturers
NSN	NATO Stock Number
Para	Paragraph
PPE	Personal Protective Equipment
RLC	Royal Logistics Corp
SOP	Standard Operating Procedures
TSP	Training Support Plan

**WARNINGS AND CAUTIONS****HAZARDOUS SUBSTANCES**

7. Before using any hazardous substances or material, the user must be conversant with the safety precautions and first aid instructions:

- 7.1. On the label of the container it was supplied in.
- 7.2. On the material Safety Data Sheet.
- 7.3. In local Safety Orders and Regulations.

**WARNINGS**

- (1) **PERSONNEL INJURY/EQUIPMENT DAMAGE. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF, THE MINIMUM IS ONE PERSON PER LEG.**
- (2) **PERSONNEL INJURY/CRUSH HAZARD. EXERCISE CAUTION WHEN ASSEMBLING POLES AND BRACKETS DUE TO THE RISK OF CRUSH INJURY TO FINGERS.**
- (3) **PERSONNEL INJURY. WHEN POLES ARE CURVED UNDER TENSION THERE IS A HIGH RISK THAT THEY MAY SLIP AND SPRING BACK TO THEIR STRAIGHT RELAXED POSITION. PERSONNEL SHOULD NOT POSITION THEMSELVES DIRECTLY IN FRONT OF THE POLES.**
- (4) **PERSONNEL INJURY/HEAVY WEIGHT. MINIMUM PERSONNEL NUMBERS REQUIRED TO LIFT OR MOVE THE SHELTER SHOULD BE OBSERVED.**
- (5) **PERSONNEL INJURY/BURN HAZARD. WHEN BURNING WEBBING TO PREVENT FRAYING, THE WEBBING WILL BECOME EXTREMELY HOT AND MELT.**
- (6) **PERSONNEL INJURY, WHEN FITTING OR RELEASING THE INSULATION TENSIONERS THERE IS A HIGH RISK THAT UNDER TENSION THEY MAY SLIP AND SPRING BACK AT PERSONNEL.**
- (7) **IT IS ESSENTIAL THAT THE BASE RESTRAINT STRAPS AND THE FRAME RESTRAINT STRAPS ARE FITTED TO THE FRAME BEFORE INSTALLING THE PVC COVERS. THIS ENSURES THAT THE FRAME IS RIDGID AND ENHANCES THE WIND RESISTANCE OF THE SHELTER AS WELL AS MAKING IT EASIER TO FIT THE COVERS.**
- (8) **WHEN REPAIRING PVC COVERS, THE TEXTILE NEEDS TO BE ABRAIDED. PVC DUST IS TOXIC AND SHOULD NOT BE INHALED. WEAR THE APPROPRIATE PPE.**
- (9) **WHEN REPAIRING PVC COVERS, A CONTACT ADHESIVE IS UTILISED. FOLLOW SAFETY DATA SHEET SUPPLIED WITH THE CONTACT ADHESIVE.**

## CAUTIONS

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** Wet textile should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed.
- (3) **EQUIPMENT DAMAGE.** All insulation panels can be added after the shelter has been erected EXCEPT the roof panel that must be attached to the frame prior to the covers.
- (4) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.
- (5) **EQUIPMENT DAMAGE.** The sunshade when fitted is to be erected prior to the shelter if possible or alternatively moved into position over the tent after assembly with the base restraint straps being added after it is in its final position. The ratchet straps should not be over tightened and never used if damaged.
- (6) **EQUIPMENT DAMAGE.** The shelter is to be erected on firm level ground, which has been cleared of any large stones or rubble.
- (7) **EQUIPMENT DAMAGE.** A power washer may be used at low pressure with warm water. Use judgement and caution regarding water pressure and temperature.
- (8) **EQUIPMENT DAMAGE.** Do not use solvents or detergents to clean the shelter as they will dissolve the protective coating on the fabric.
- (9) **EQUIPMENT DAMAGE.** Rips and tears must be repaired immediately to maintain the insulation integrity.
- (10) **EQUIPMENT DAMAGE.** The PVC covers are different from the cotton canvas covers in that they do not stretch. Fitting the end gables requires the frame to be in the correct position to fit the PVC cover spigots over the frame extensions using the appropriate straps. Do not under any circumstances force the canvas into position or use frame parts to lever the canvas into position.

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## DESCRIPTION



**Figure 1: Shelter, general purpose 3.6 m x 3.6 m (12 ft x 12 ft) Mk 4**

1. This AESP provides operation and maintenance information for SHELTER, OPERATIONAL FIELD CATERING SYSTEM (OFCS) 3.6 m X 3.6 m (12 FT X 12 FT) MK 4

NATO Stock no 8340-99-147-7464

2. When installing installation read Chapter 2 in combination with Chapter 1. In summary the roof insulation is applied before the main PVC cover. The wall insulation is installed after the full tent erection.

3. The MK 4 version utilises flame resistant PVC coated polyethylene in place of cotton canvas. All PVC parts are interchangeable with cotton canvas parts by attachment using Dutch lacing. The MK 4 PVC tent also has the option of quick connection using keder rails.

4. The shelter (Fig 1) consists of a metal frame supporting a PVC textile cover. The frame is constructed of light alloy tubular members that are connected by brackets.

5. The frame is built from five different tubular components.

5.1. Aluminium members 1.8 m long Outside Diameter (32 mm).

5.2. 4-way cast light alloy brackets for connecting the members at the eaves and ridge.

5.3. T-brackets for connecting the members at ground level to the wall members.

The fabric from which the cover is made is a Polymer of polyethylene coated on both sides with PVC and is 700g/m<sup>2</sup>, this has replaced the woven cotton covered polyester core yarn. The PVC material is waterproof and does not require water resistance treatments through life. For the avoidance of doubt the two materials will be referred to in the AESP as "PVC Covers" and "cotton canvas".

6. The cover is made up of one roof section and two end panels. There are two methods of connecting the panels together. Firstly, the traditional Dutch lacing, this enables the new PVC covers and old cotton canvas panels to be connected together or roof sections to be pre-connected prior to

deployment. Secondly there is a fast erect keder rail system when connecting two PVC covers together. The two end sections each have a personnel entrance fitted with slide fasteners, toggles and loops, which can be also rolled up and secured with toggles and loops.

7. Two windows are incorporated into each sidewall section. The apertures are fitted with mosquito netting, uncoloured plastic sheeting and a PVC textile flap. The plastic sheeting and/or the PVC textile flap can be fastened in either the open or closed positions, whereas the mosquito netting is stitched closed at all times.

8. The sidewall has a snood incorporated into it to allow electric cables and environmental control ducts to enter the interior. This snood can then be secured around the cable/hose or closed off to ensure a closed environment within the shelter.

The sod cloth is made from Polymer of polyethylene coated on both sides with PVC and is 900g/m<sup>2</sup> that ensures ample strength and rot resistance.

9. The shelter is designed to be extendable in length by multiples of 3.6 m (12 ft) by using additional frame roof and wall components. The shelter can be attached to a porch, 12 ft passageway, or 4-way connector by means of the alternative dual attachment end section.

## DEPLOYMENT

11. It is possible to link many of the GS types of shelters together, and to extend in length by 12 ft increments, the 12 ft x 12 ft and 18 ft x 24 ft shelters to make composite arrangements such as headquarters layouts, cooking/dining rooms, field hospitals and other specific to requirement temporary shelter facilities. It is also possible to link shelters together Fig 2.



**Figure 2: 12 x 12 Connected to 24 x 18 and Passageway**

12. The PVC canvas panels are designed to allow the tent to be configured in various lengths and with attachments as detailed above. The tent has Roof and Wall panels (J11/NSN 8340-99-872-2429) and two (2) types of end panel:

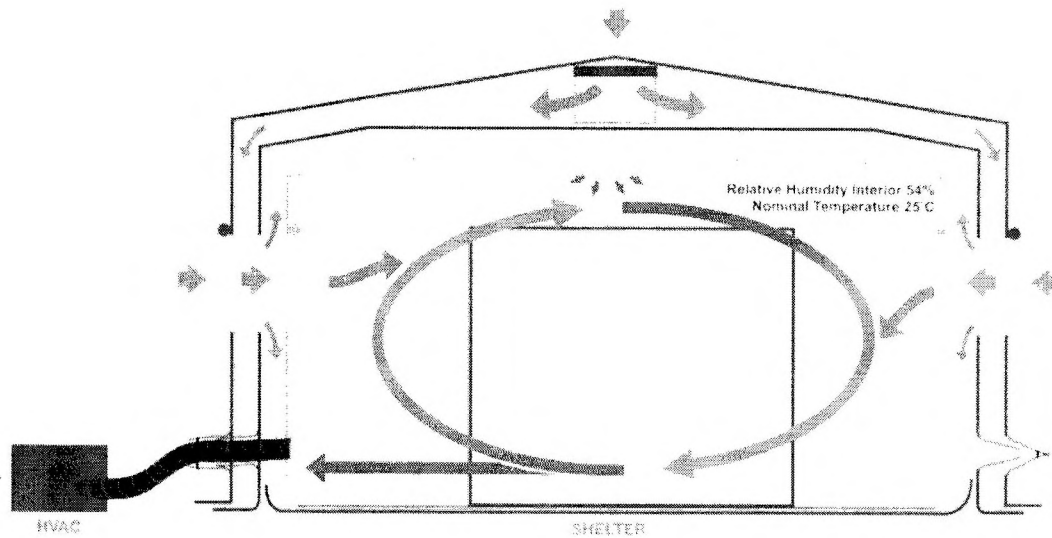
- 12.1. End Section Mk 4 (J11/NSN 8340-99-282-9697) is profiled end with a doorway
- 12.2. End Section Mk4, Passage End (J11/NSN 8340-99-844-1160) is a dual end including attachments for the porch or passageway.

13. The shelter is manufactured from PVC coated polyethylene which is completely waterproof. It is not breathable and thus whilst there will be a level of air movement when the tent doors are open permanent ventilation ducts are provided at the eaves of the shelter walls. Further to this the HVAC ducts and windows can be used as air vents as required.

With respect to addressing potential condensation issues where the shelters are deployed in high humidity environments (above 50RH which includes most of Europe in the mid-summer) there is a risk of condensation inside the shelters. This is caused by the temperature differential between day time and night time operations and the small differences between dry bulb and wet bulb temperatures in very high humidity areas. There are a number of possible strategies to avoid this effect, which to some degree will depend on the specific air conditions. Ultimately the wet bulb temperature is very close to the dew point temperature so keeping the shelter internal temperature above the wet bulb temperature will negate the formation of condensation. For instance, for an external temperature of 78°C at an RH of 80% gives a wet bulb temperature of 71.37°C and a dew point of 71.34°C. If the internal temperature is maintained above the wet bulb temperature by maintaining a low level of cooling mixed with fresh air or for unoccupied or unconditioned shelters where temperature conditions are not critical ensuring that the internal and external temperatures are normalised by providing natural or forced ventilation.

## Humidity

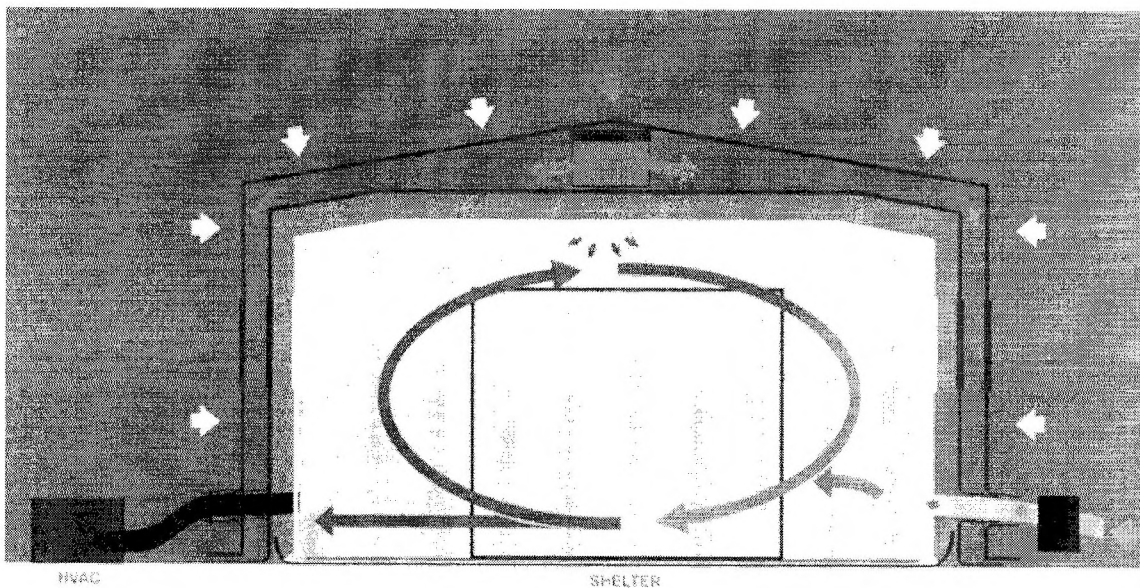
Ambient Relative Humidity 52%  
Ambient Outdoor Temperature 20°C



**Figure 3: Normal Ventilation**

14. Under normal conditions with the HVAC running and the ventilation duct open there should not be any condensation issues, opening windows will aid ventilation.

**NOTE:** On shelters that are not in use opening the window shutters to let in natural light will also reduce the risk on mould growth and mould spores will not grow if exposed to UV light.



**Figure 4: Closed down shelters**

Fig 4 shows a shelter that is closed down and has the highest risk of condensation particularly if it has been occupied during the day and is closed up at night. To reduce this risk there are a number of mitigation strategies that can be employed, listed as follows:-

- Cool with HVAC for 15 minutes to remove condensate from the air then briefly heat to above ambient temperature.
- Open or partially open window vents.
- Open thermal fly vent.
- Open window shutters to let in natural light during the day
- Run the HVAC or provide forced ventilation.
- Fit Shelter insulation

## SITING

15. To site shelters, proceed as follows:

- 15.1. The ground should be as level as possible, avoiding hollows where water would collect during heavy rain. Dry river beds or wadis, must be avoided as heavy rainfall or flash floods, however infrequent, can jeopardise the integrity of the shelter.
- 15.2. The ground should also be firm thus ensuring stability for pins and poles.
- 15.3. The site should be clear from obstacles such as rocks, trees and bushes to avoid the risk of tears in the PVC covers or ground cloth.
- 15.4. Drainage may be achieved by cutting channels around each shelter when the gradient and composition of the ground allows it.
- 15.5. Alternatively, the ground should be broken up between the tent pins and tent walls and a small bank of earth built on the inside of the tent wall.
- 15.6. Attention should be paid to the direction of the prevailing wind so that the tent is erected with its entrance located on the side facing away from the wind. Consideration should also be given towards minimising the area exposed to the wind, as this will gradually loosen the over straps and guy lines.
- 15.7. To prevent the propagation of fire between shelters, wherever possible, a spacing of 6m between shelters or shelter complexes is to be maintained.

## PITCHING

### WARNING

**PERSONNEL INJURY. SUFFICIENT PERSONNEL ARE REQUIRED WHEN LIFTING THE ASSEMBLED ROOF, THE MINIMUM IS ONE PERSON PER SHELTER LEG.**

### CAUTIONS

- (1) **EQUIPMENT DAMAGE.** The shelter is to be pitched on firm level ground and it is essential that adequate anchorage or ballast be placed on the coated fabric sod cloths at the bottom of the wall and ends of the shelter. The listed tent pins or spoil from drainage trenches is suitable for this purpose and may be used in sandbags or other flexible containers, if available. Guy lines are also provided to give additional stability under high wind conditions.
- (2) **EQUIPMENT DAMAGE.** The PVC Covers are manufactures from polyethylene covered PVC, this is a stronger and more waterproof material than the old cotton canvas but it is not flexible and does not stretch. The end gable strap must be installed before the gable cover is fitted to ensure the frame spigots are correctly located.
- (3) **EQUIPMENT DAMAGE.** All insulation panels can be added after the shelter has been erected EXCEPT the roof panel that must be attached to the frame prior to the covers.
- (4) **EQUIPMENT DAMAGE.** When lifting the roof, the supervisor must ensure that the lift is even along the length of the frame, thus avoiding distortion of the brackets and poles.

**General**

16. The pitching space should be marked out in accordance with the ground plan provided

**NOTE: Pitching party is to comprise of four personnel and a supervisor.**

**NOTE: The angle of the upright poles is critical if the covers are to fit correctly, base restraint straps are to be fitted to ensure the correct spacing.**

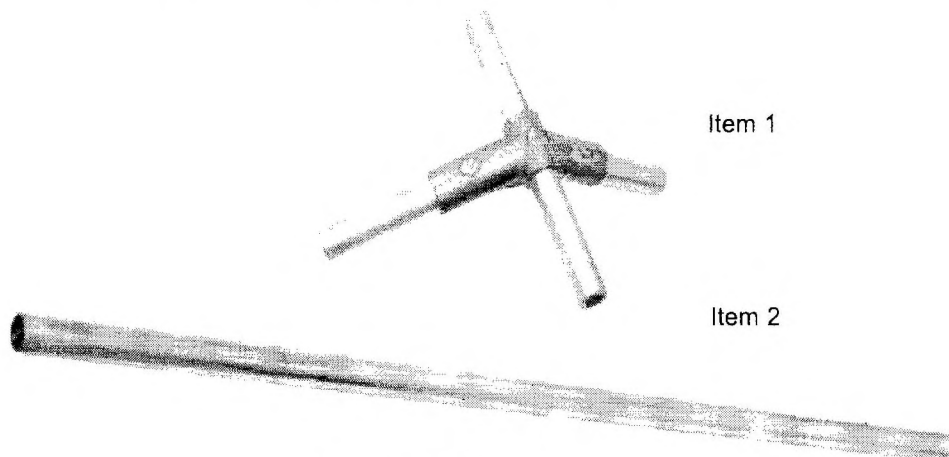
17. The valise or bundle containing the tent cover should be carried as near as possible to the pitching site.

- 17.1. To prepare the cover, proceed as follows:
- 17.2. Open covers and lay out with inside uppermost.
- 17.3. Follow the assembly instructions

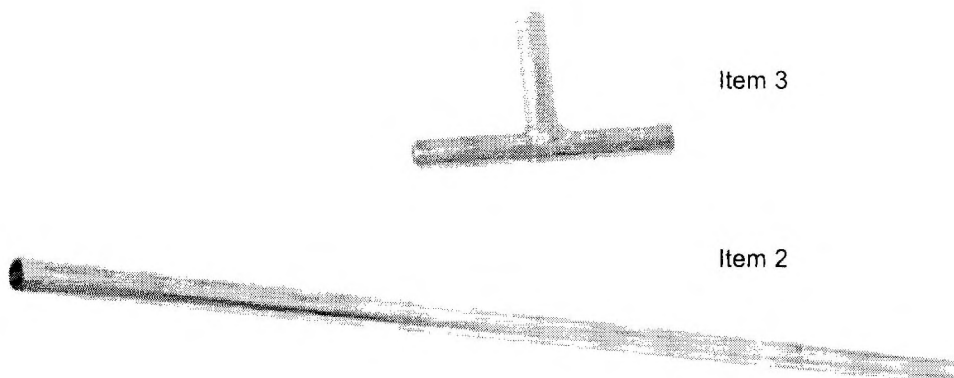
18. With the MK4 shelter system there are options for assembly. The tent can be erected using keder rails or laced together as detailed in Fig 27 to 34. If the tent is being erected using a combination of MK 4 and earlier cotton canvas panels then you can utilise a combination of the two or just dutch lacing.

19. The frame should be laid out as ready to assemble. This includes the following:-

- 19.1. 9 off Ridge and Eaves Brackets (J11/8340-99-120-6726) (Item 1)
- 19.2. 22 off Universal Members (J11/8340-99-120-6725) (Item 2)
- 19.3. 6 off Base, Bracket (J11/8340-99-120-6727) (Item 3)

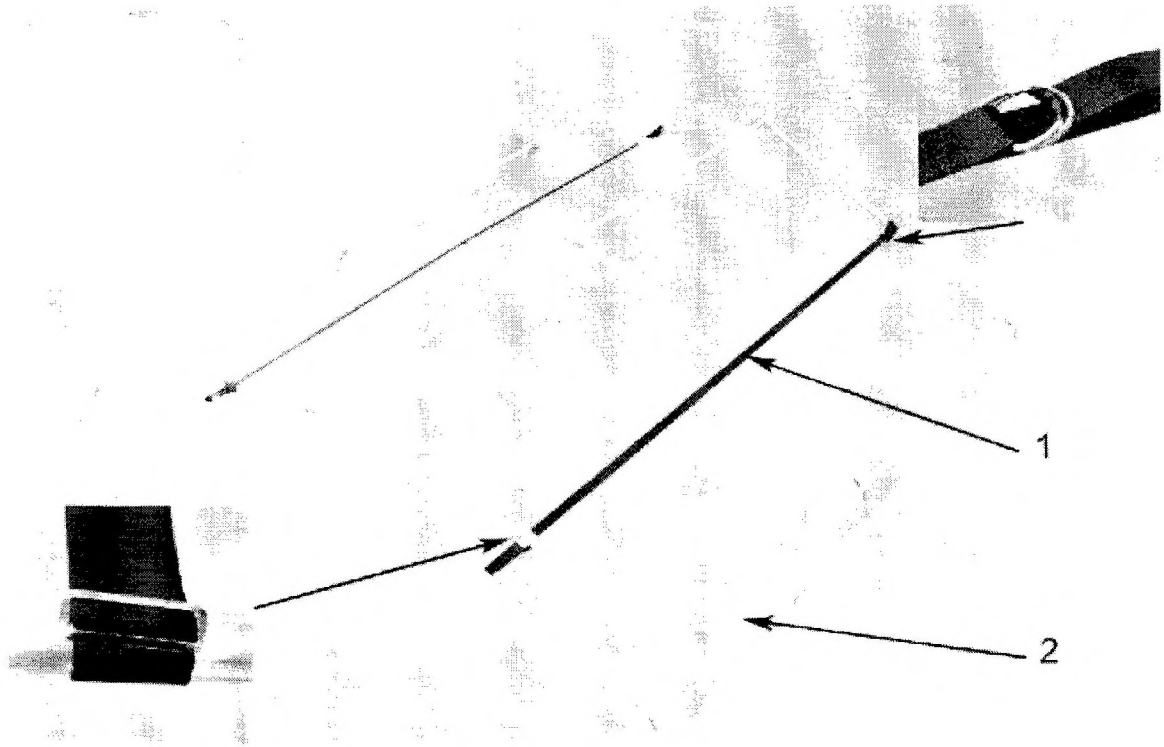


**Figure 5: Roof Components**



**Figure 6: Wall Components**

20. Commence construction with the roof as detailed in Fig 7.



**Figure 7: Frame Layout**

21. Tent poles should be fitted together to produce the roof framework with roof restraint straps attached. The frame should be assembled from one end and the poles inserted in sequence, this minimises stress on the frame.
22. Fit strap, adjustable roof restraint (J11/8340-99-988-3214) (qty 2) Fig 8 to 15 and situate the strap as detailed in Fig 15. Ensure the straps are not twisted and the buckles are on the inside of the roof.
23. Fit the buckle end of the strap first passing the webbing through the buckle Fig 8, over and through the other side Fig 9 and back over itself Fig 10. Arrange the buckle to be under the frame so that it does not chafe the PVC covers Fig 15.
24. Tension roof restraint strap at other end of frame as detailed in Fig 11.
25. Secure through rings as detailed in Figs 12, 13 & 14.

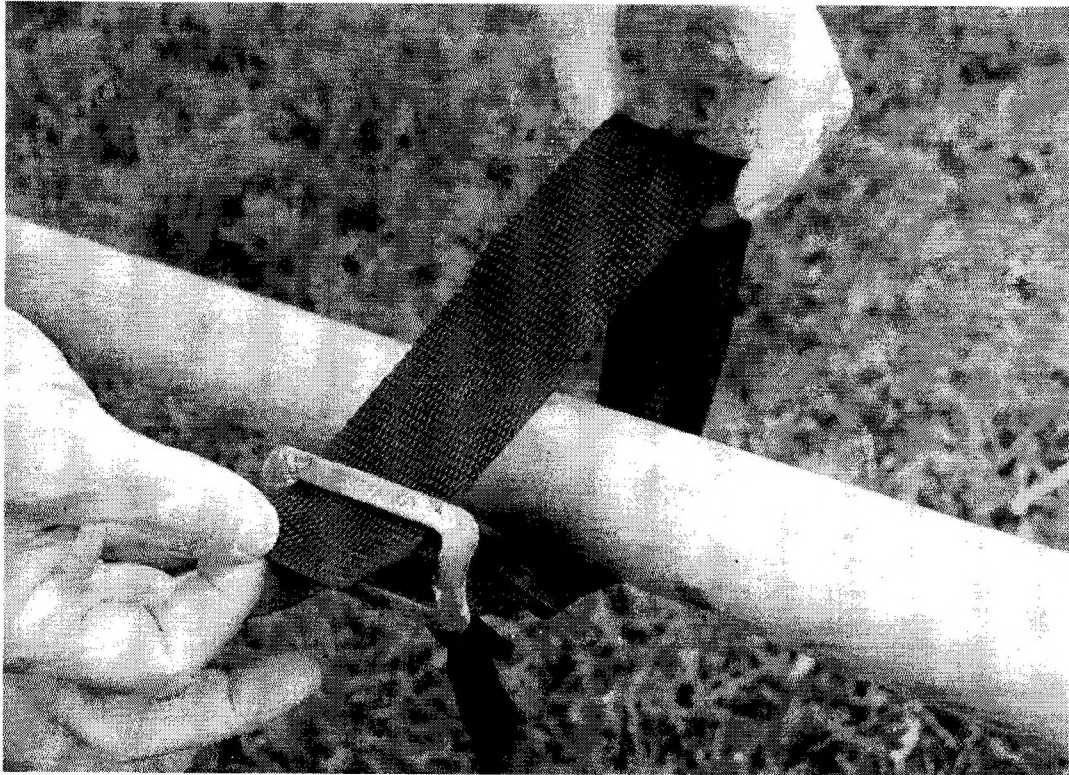


Figure 8: Buckle Connection 1

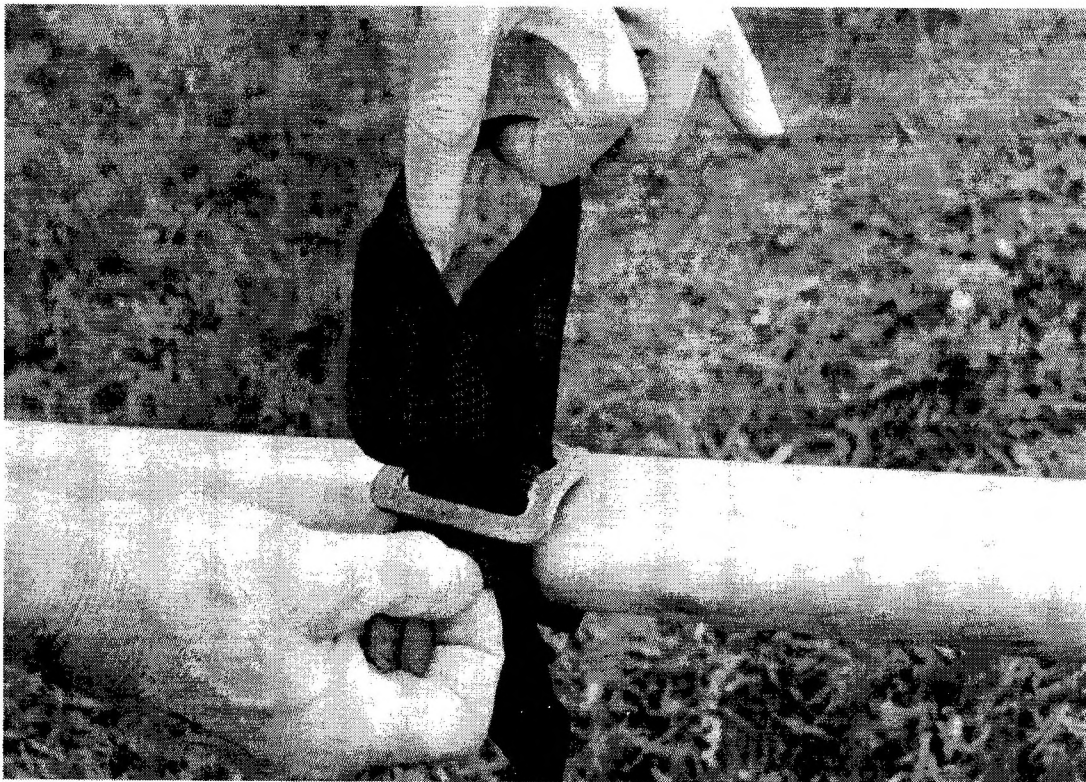


Figure 9: Buckle Connection 2





Figure 10: Buckle Connection 3

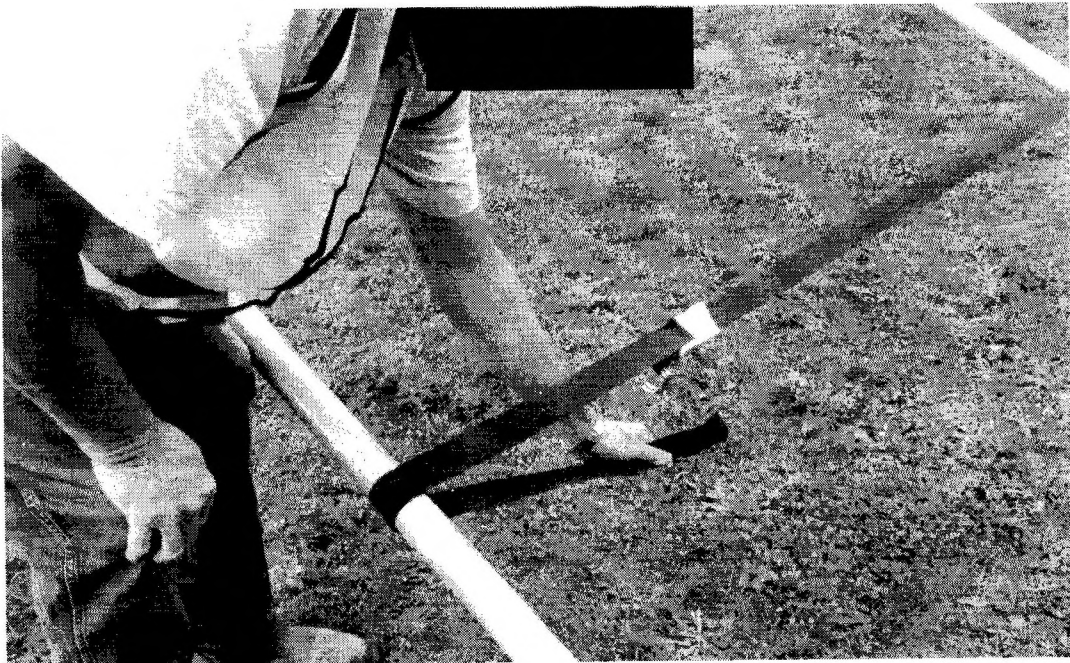


Figure 11: Tensioning Roof Restraint

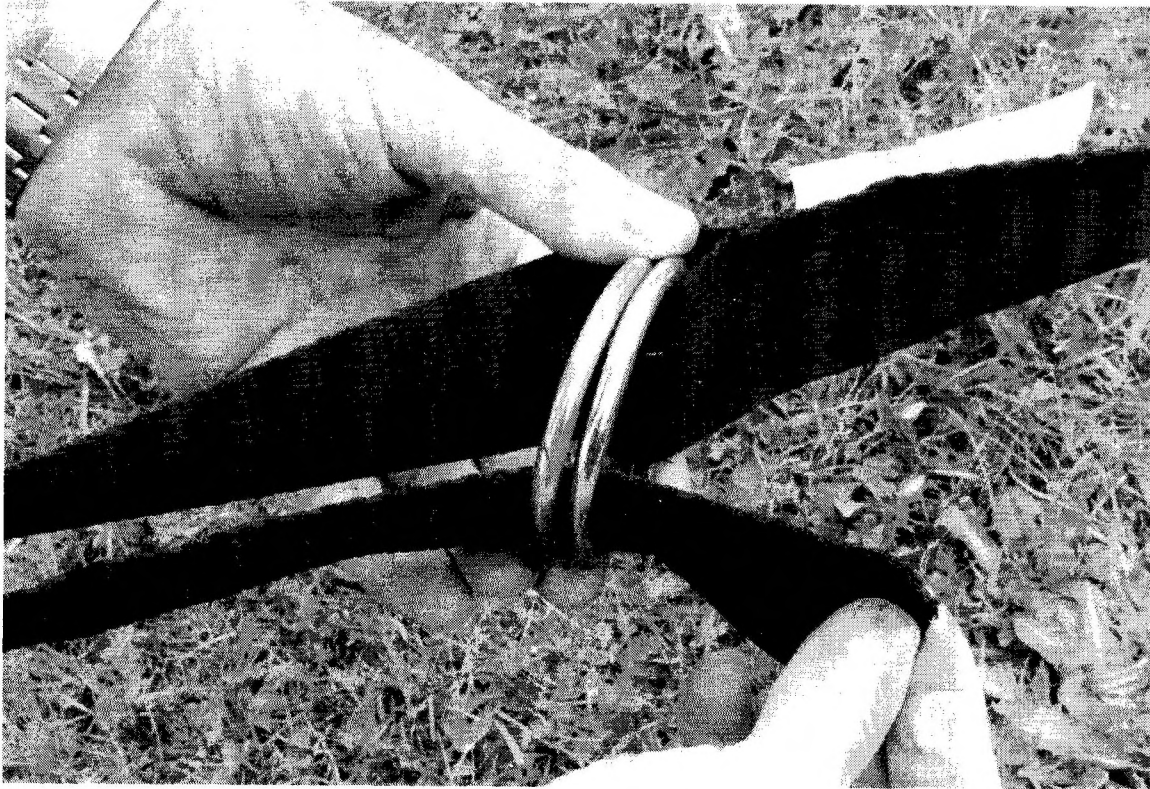


Figure 12: Secure Roof Restraint Strap through rings 1



Figure 13: Secure Roof Restraint Strap through rings 2

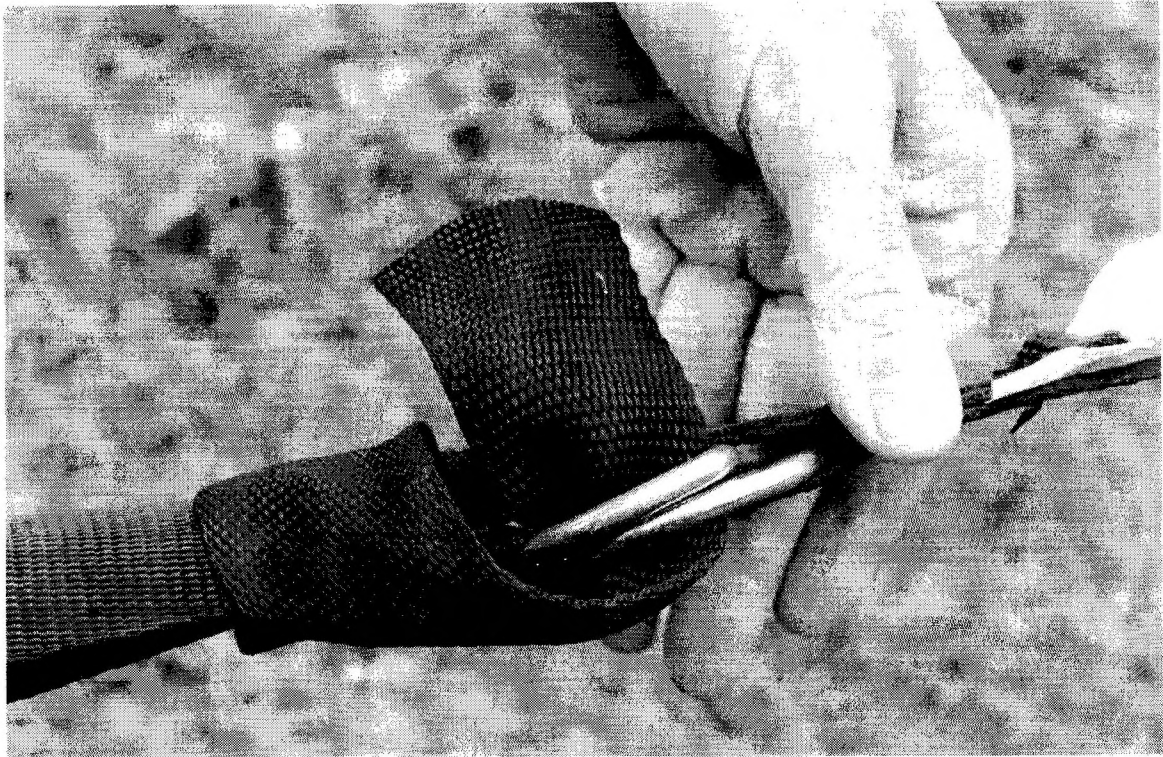


Figure 14: Secure Roof Restraint Strap through rings 3

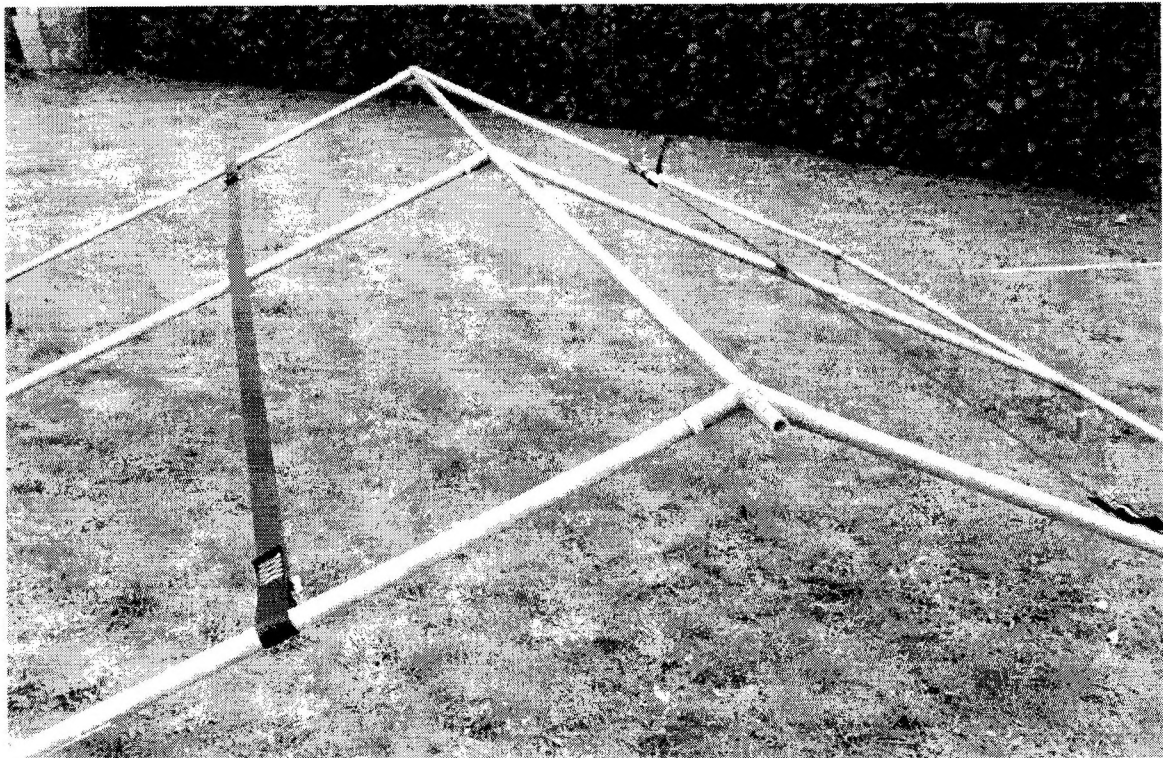


Figure 15: Roof Restraint Straps fitted as frame roof is assembled

**CAUTION**

The PVC Covers are manufactured from polyethylene covered PVC, this is a stronger and more waterproof material than the old cotton canvas but it is not flexible and does not stretch. Care should be taken fitting the end gable covers onto the frame spigots so that they are correctly located.

26. The end gable cover is then laid out and fitted to the roof section of the frame Fig 16, this should be completed at both ends before moving onto the roof and wall.



**Figure 16: Installation of end gable strap with insets of hook connection**

27. The gable PVC cover should then be fitted over the frame spigots as detailed in Fig 17 & 18.

**CAUTION**

**Do not attempt to stretch the PVC cover using frame parts as a lever, they should fit without any force. If they do not fit re check the end gable strap is attached correctly.**

28. Once the gable is fitted over all 3 spigots at each end the spigot covers should be sealed with the Velcro seal and ties off using a double knot Fig 19 inset.

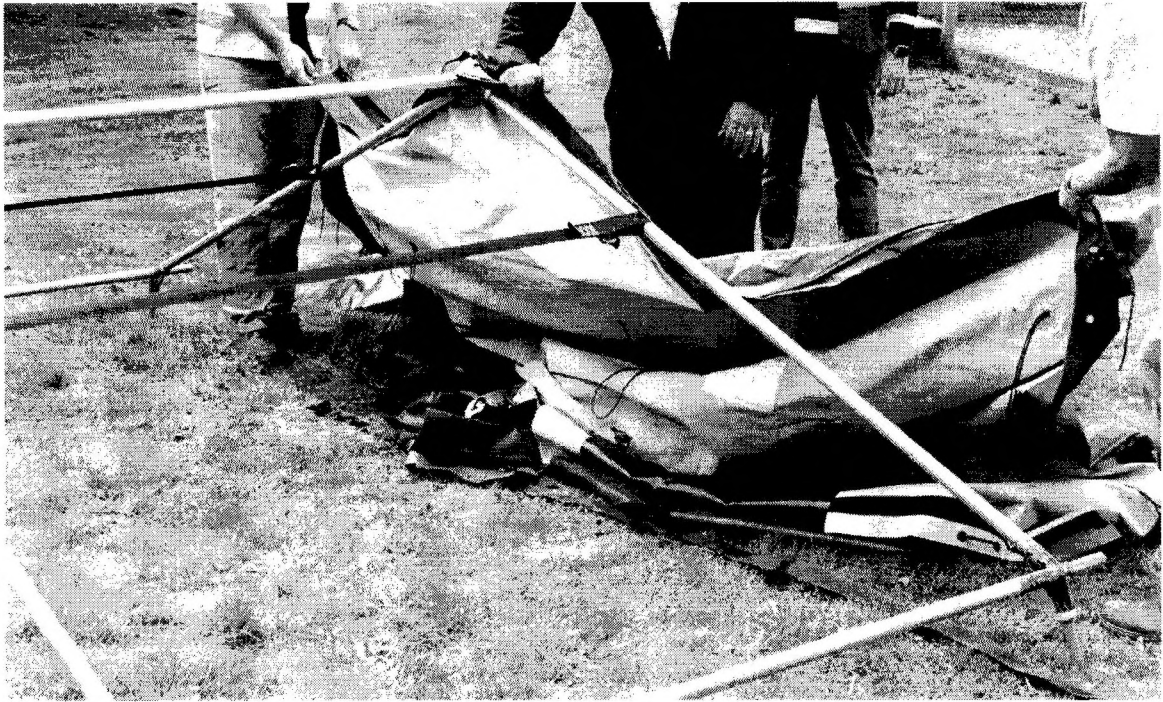


Figure 17: PVC Cover fitting over frame spigots

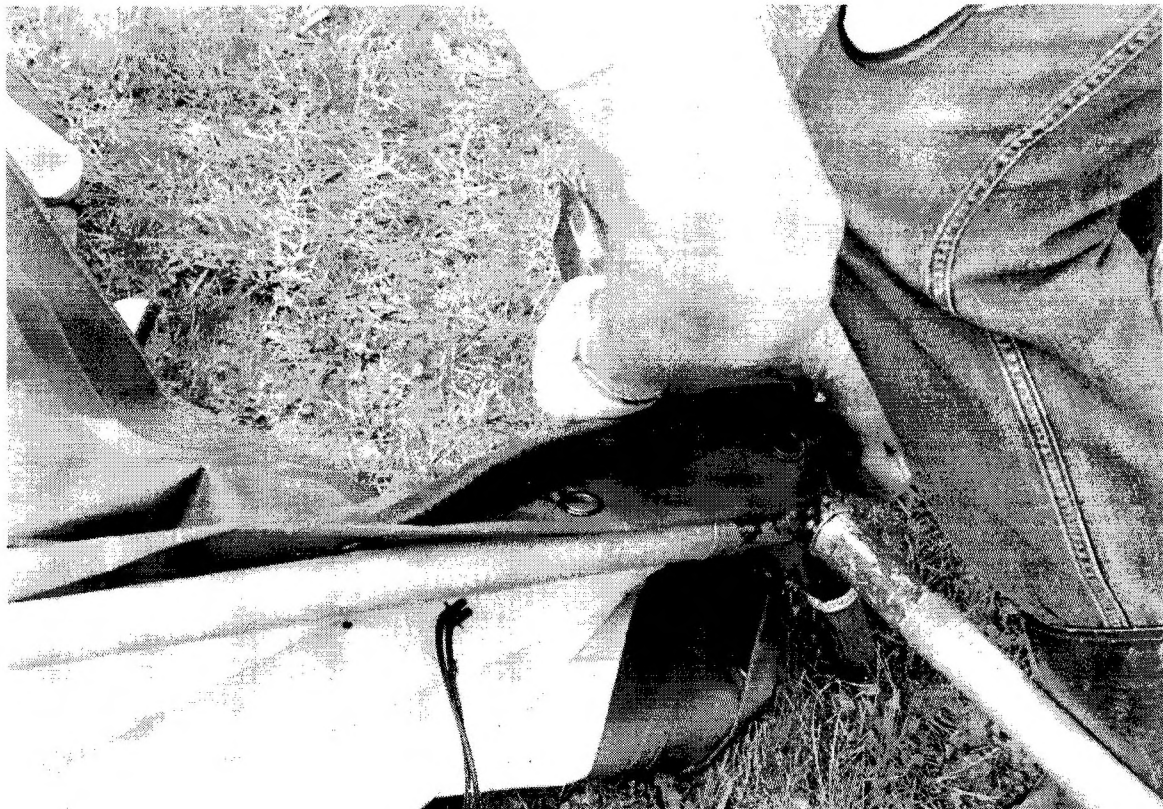
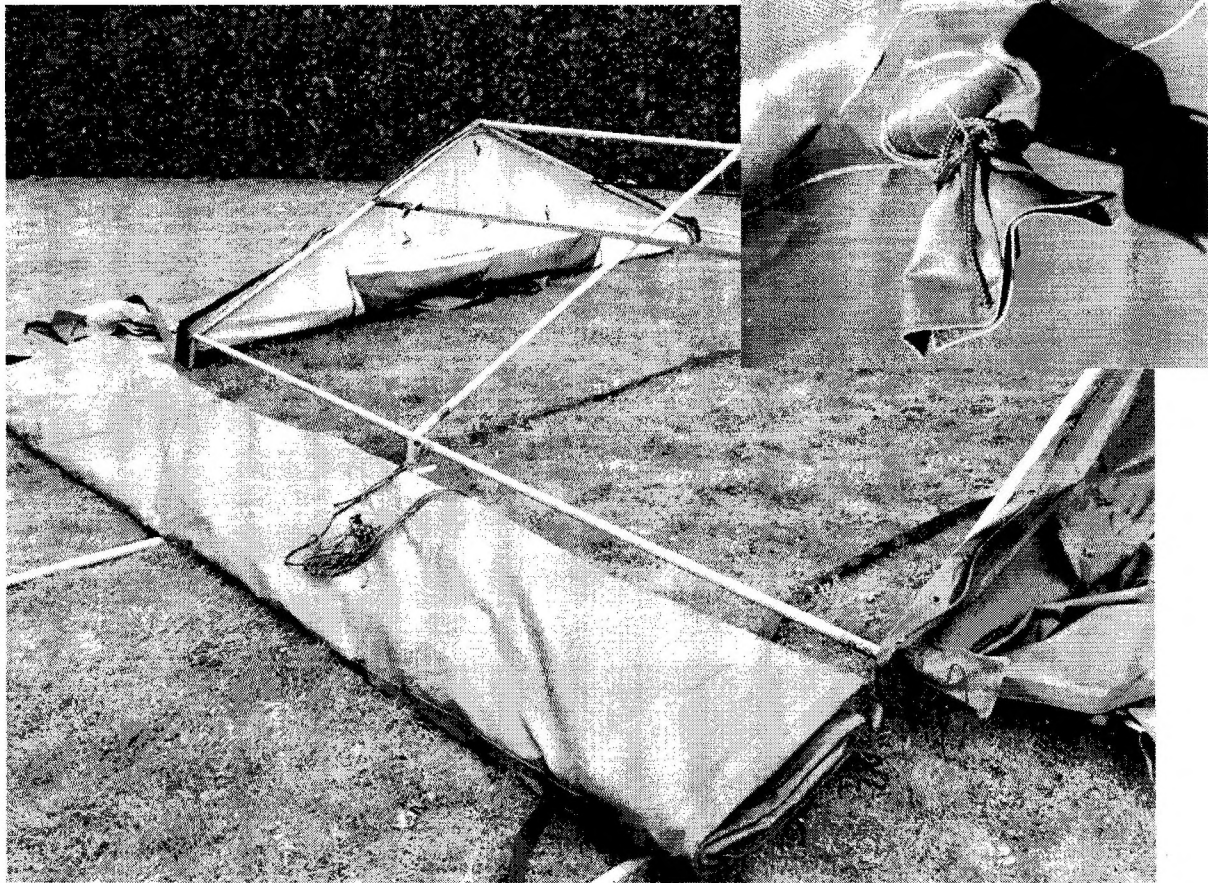


Figure 18: Fit covers over frame spigots



**Figure 19: End gable covers in place**

29. The roof and wall section is then positioned ready to position over the roof frame as shown in Fig 19, and attached to the gables as follows:

**CAUTION**

**Protective gloves must be worn when inserting the keder rail to avoid potentially nipping fingers while pushing the rail into position.**

30. The roof and wall cover should be placed over the roof framework. It is easier to fold the cover to position for connection with the end wall, this eases access to the keder rail or the dutch lacing as shown in Fig 20.

31. At the joints between the end wall and the roof and wall covers there are a number of flaps. This is due to the combination of the keder rail and dutch lacing combination. The flaps should be interlinked as detailed in Fig 22 and closed together as inset to aid the joining of the keder rail. Note on the right hand side of the roof looking on the end of the tent the eyelets will be directly under the keder, on the left hand side there will be a plane flap Fig 23.

32. Inserting the keder rail is a two (2) person operation, insert the rail from above (see Fig 24 below) whilst a second person holds the keder beads together, this allows the rail to slide freely. Keder rails are fitted to each side of the roof (J11/8340-99-477-5695) (Qty 4 in each roof section, total 8 in the roof), one after the other and pushed into place so that they are just short of the eave and apex positions Fig 25.

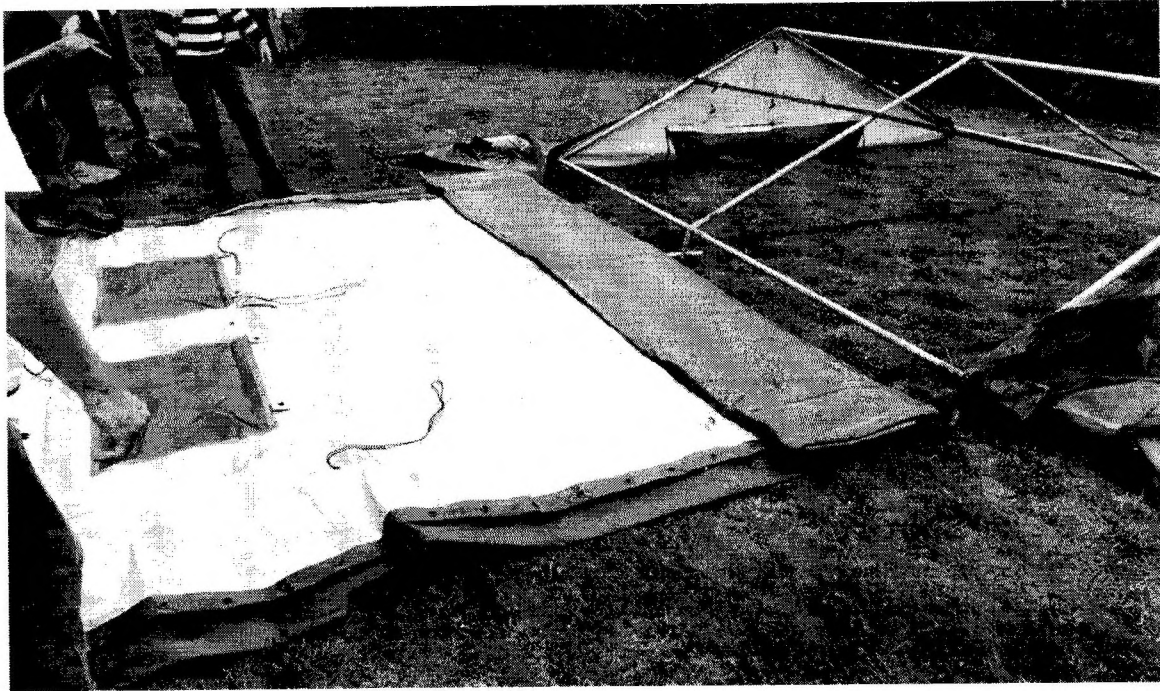


Figure 20: Roof and wall panel laid out ready for fitting on the roof

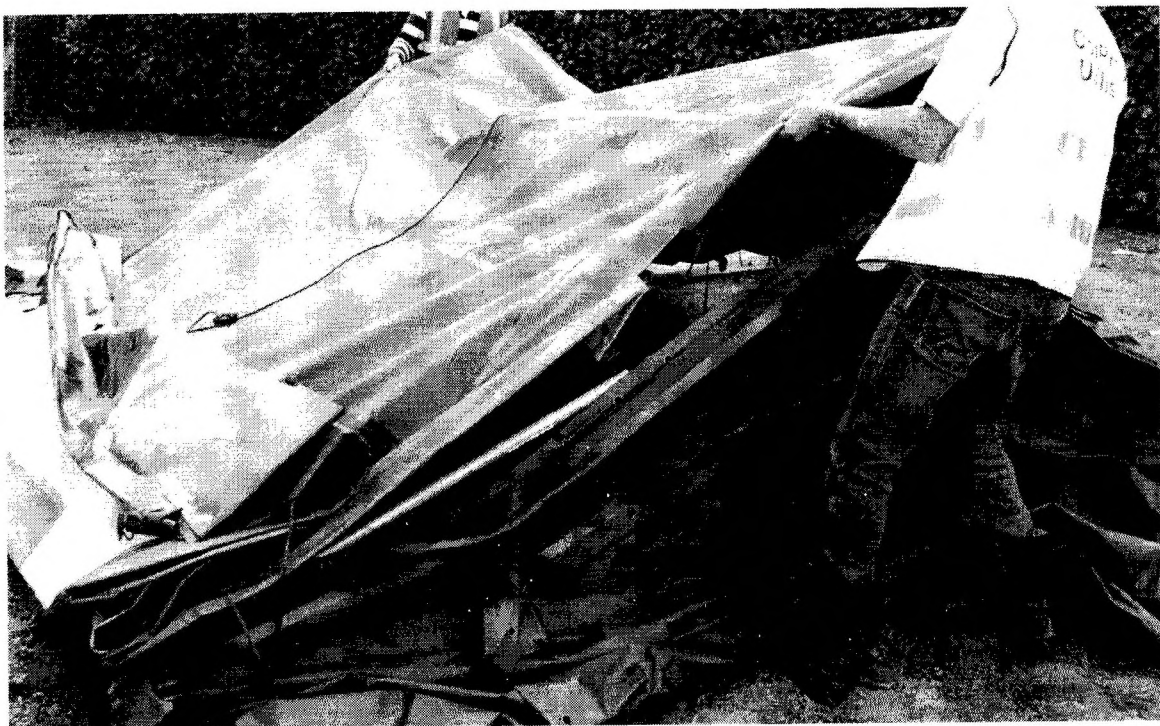


Figure 21: Pull PVC cover into place

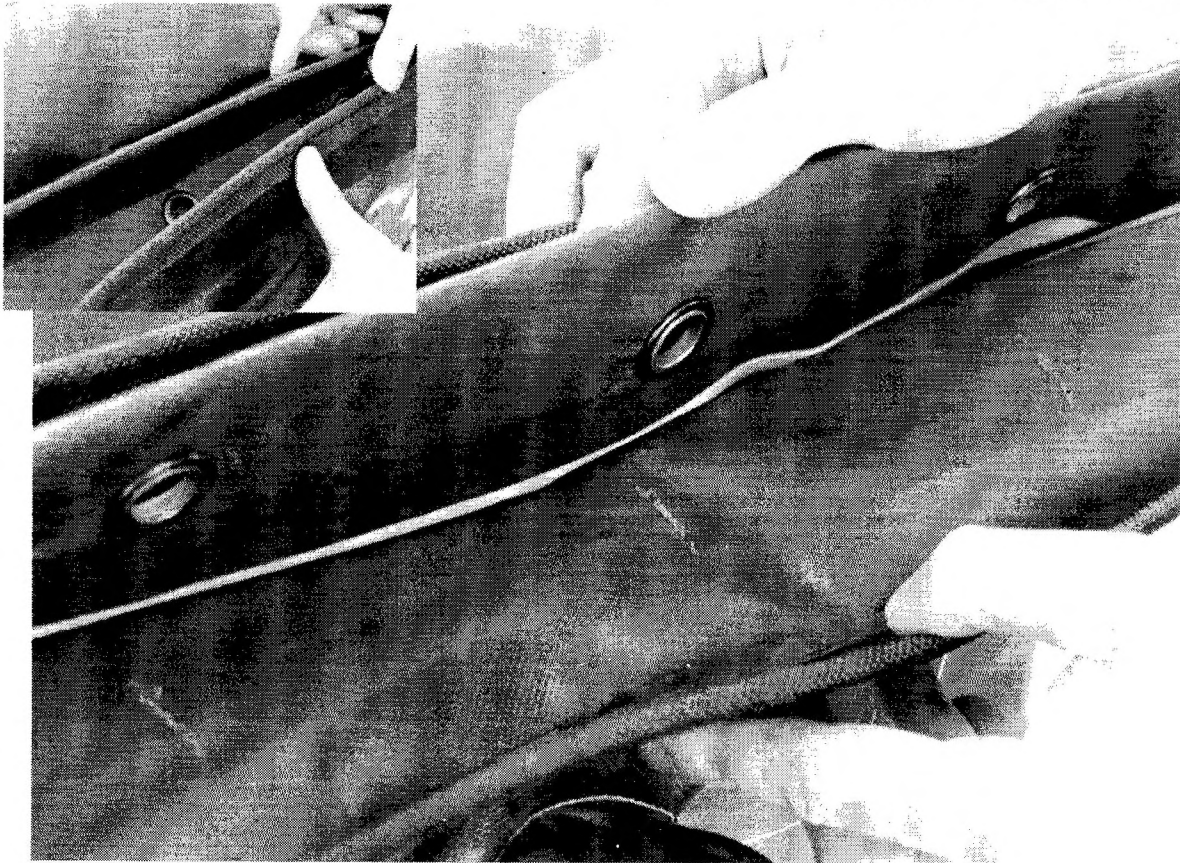


Figure 22: Adjusting flap positions at joints Right Hand Side

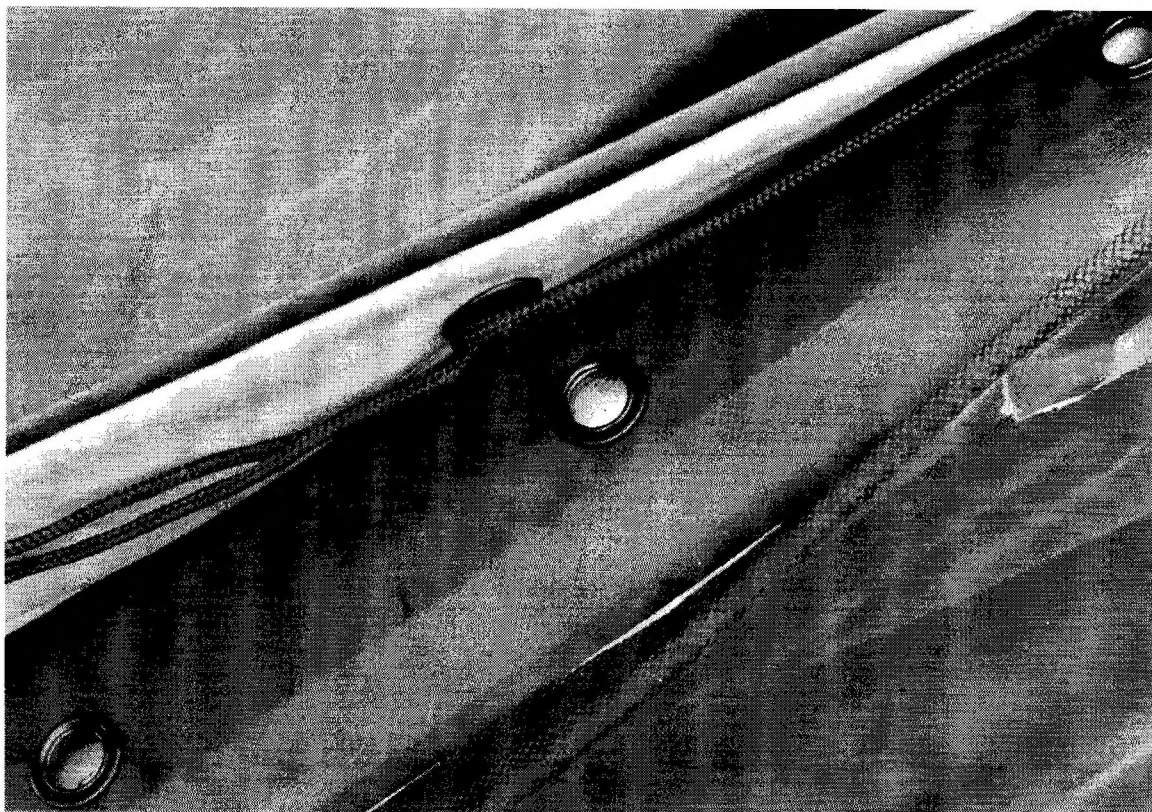


Figure 23: Adjusting flap positions at joints Left Hand Side



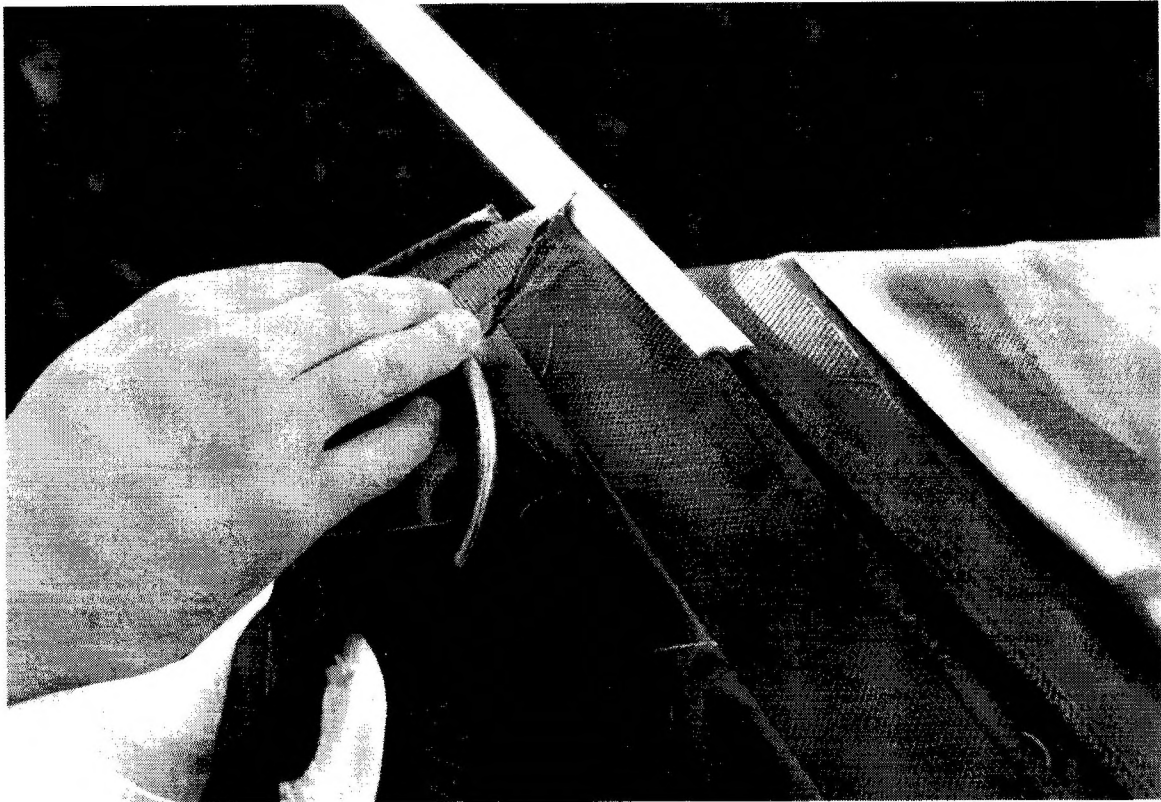


Figure 24: Adjusting flap positions at joints

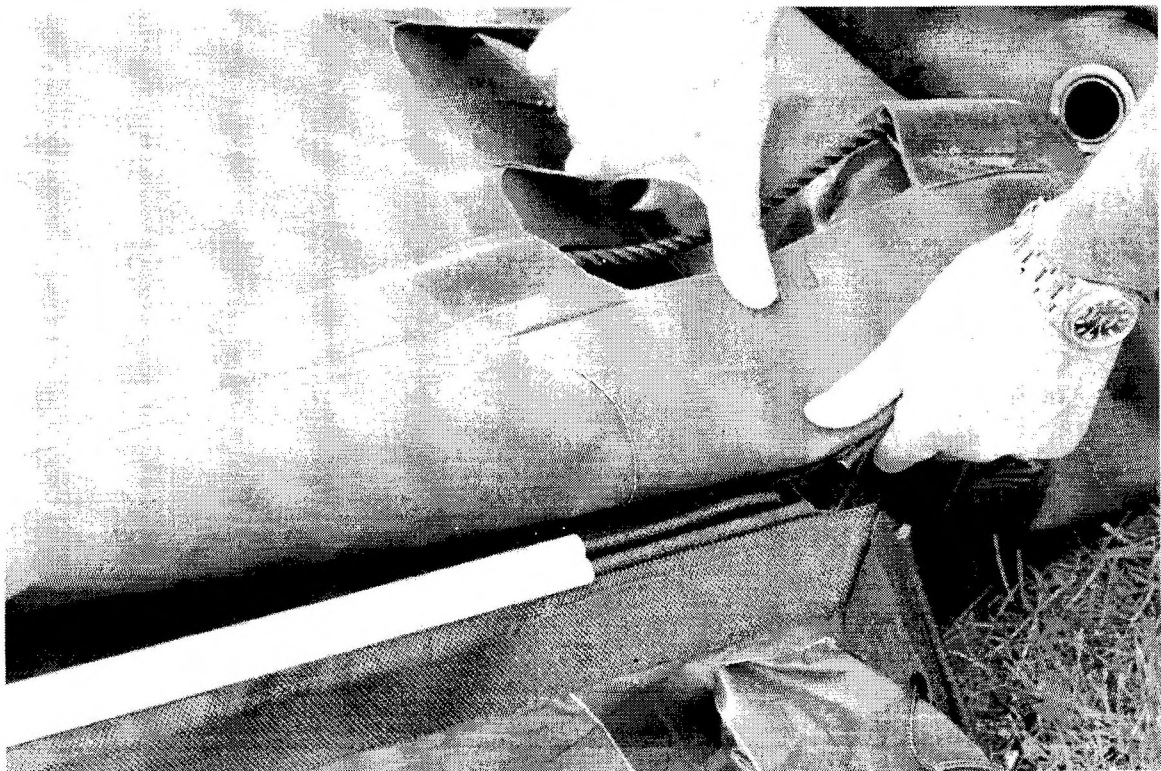
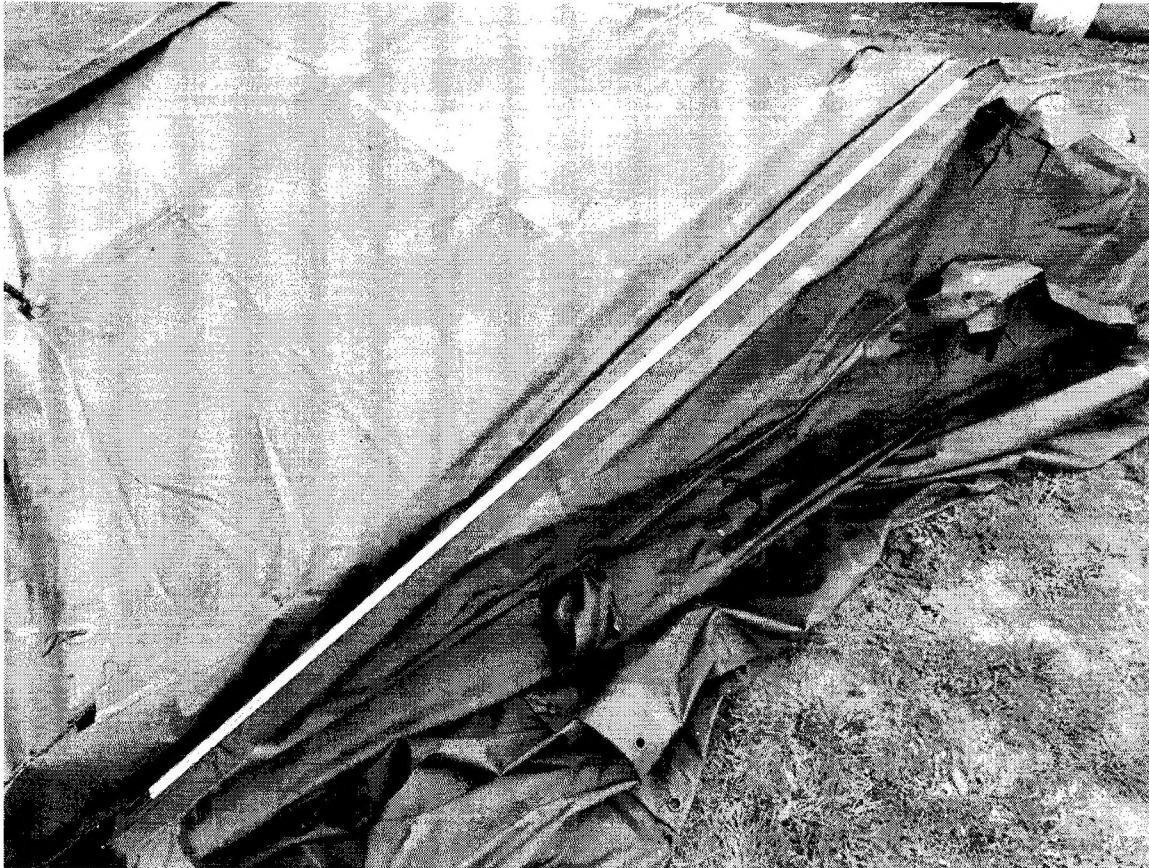


Figure 25: Keder Rail Installation



**Figure 26: Install Keder, joining the roof**

33. Carry out the same procedure for connecting the roof and wall sections at both ends of the tent, inserting the keder rails in the same way.

#### **Dutch Lacing**

34. The PVC covers are designed to be compatible with the existing cotton canvas covers and are fitted with dutch lacing, this enables older cover designs to remain in service.

35. The dutch lacing is installed by aligning the eyelets as detailed in Fig 27. Then passing the loops through the eyelets Fig 28. The top loop is then looped over the next loop down Fig 30. Finally the bottom loop is secured by a toggle or tie Fig 34.

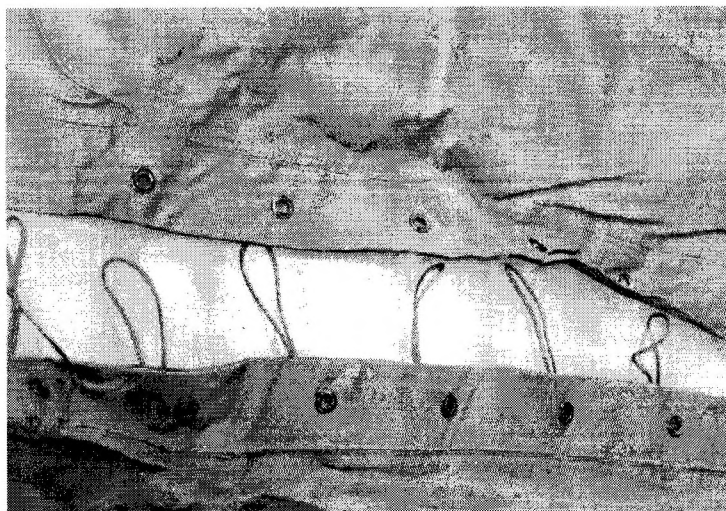


Figure 27: Lacing cover sections (1)

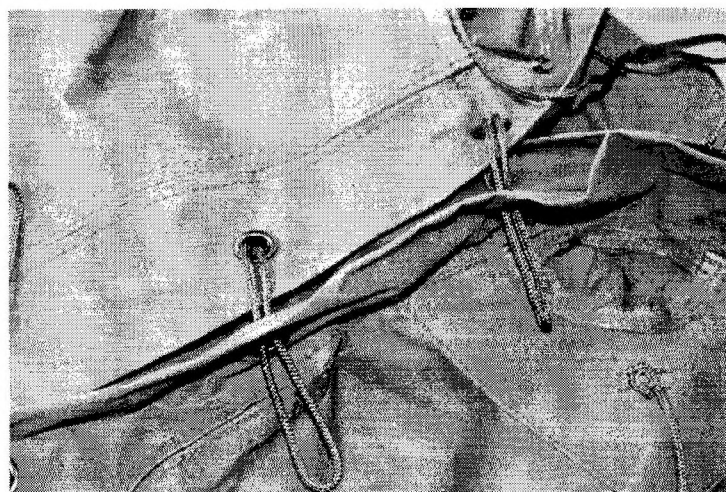


Figure 28: Lacing cover sections (2)

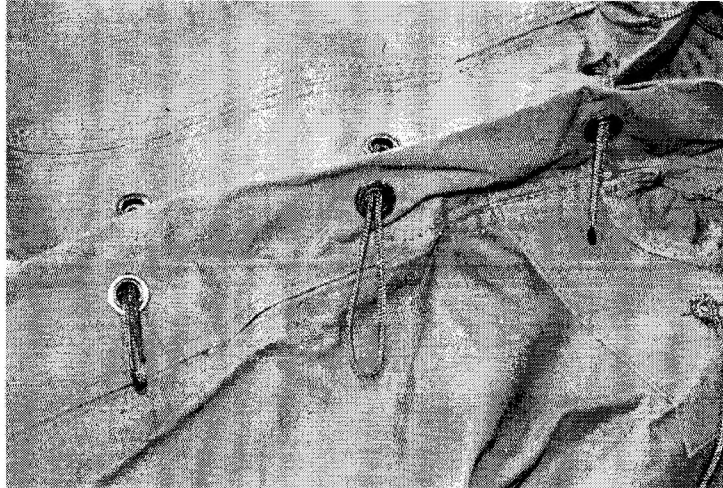


Figure 29: Lacing cover sections (3)

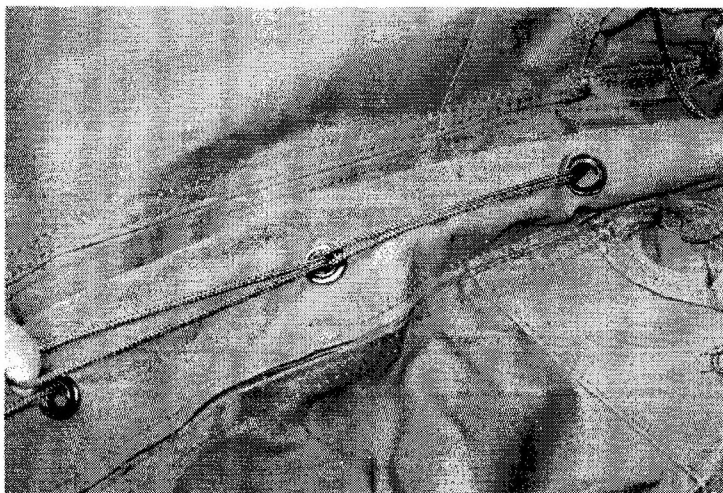


Figure 30: Lacing cover sections (4)

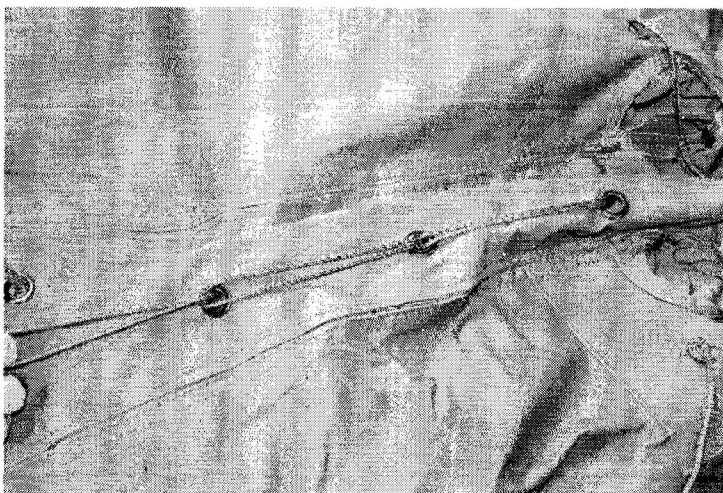


Figure 31: Lacing cover sections (5)

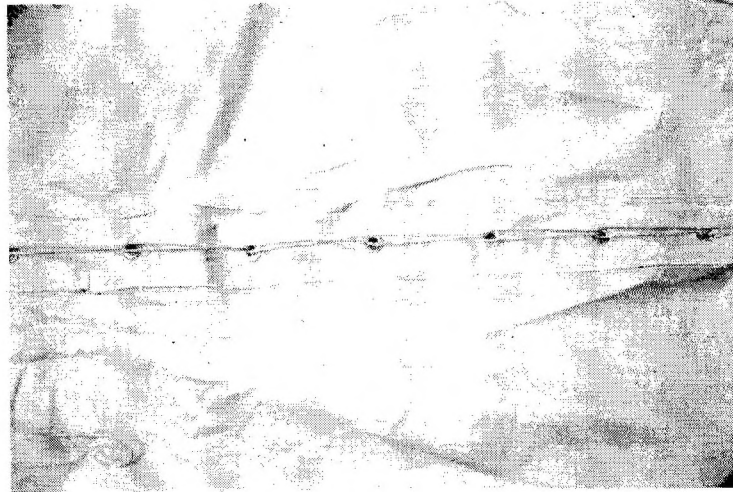


Figure 32: Lacing cover sections (6)

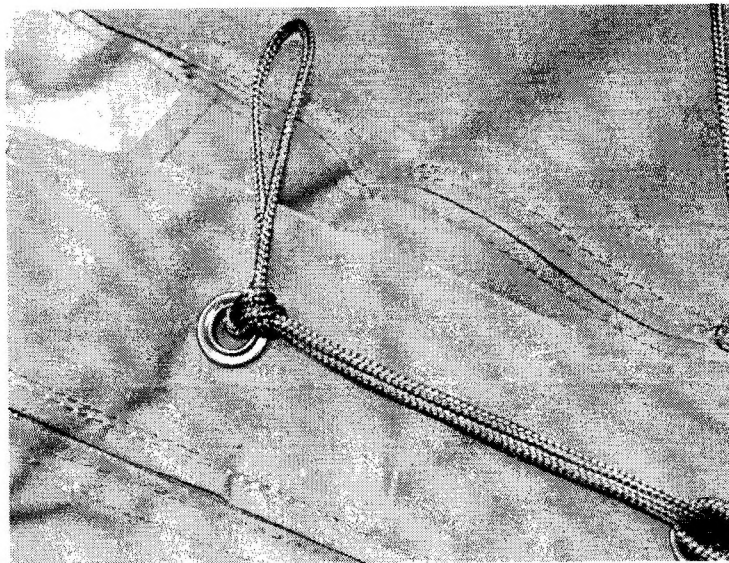


Figure 33: Lacing cover sections (7)

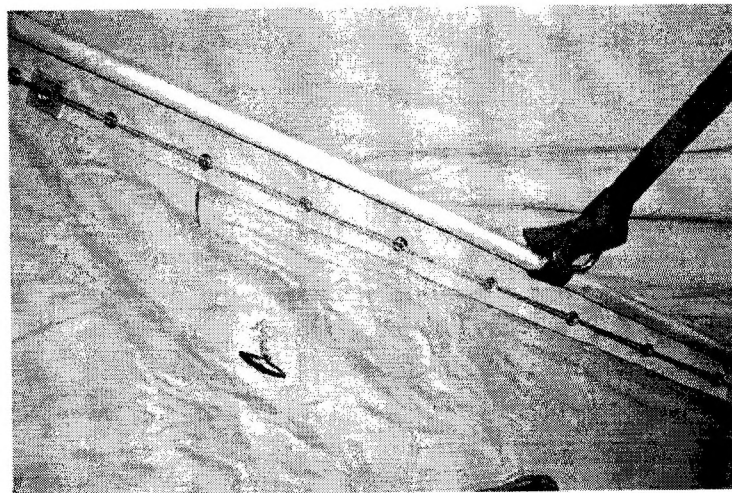
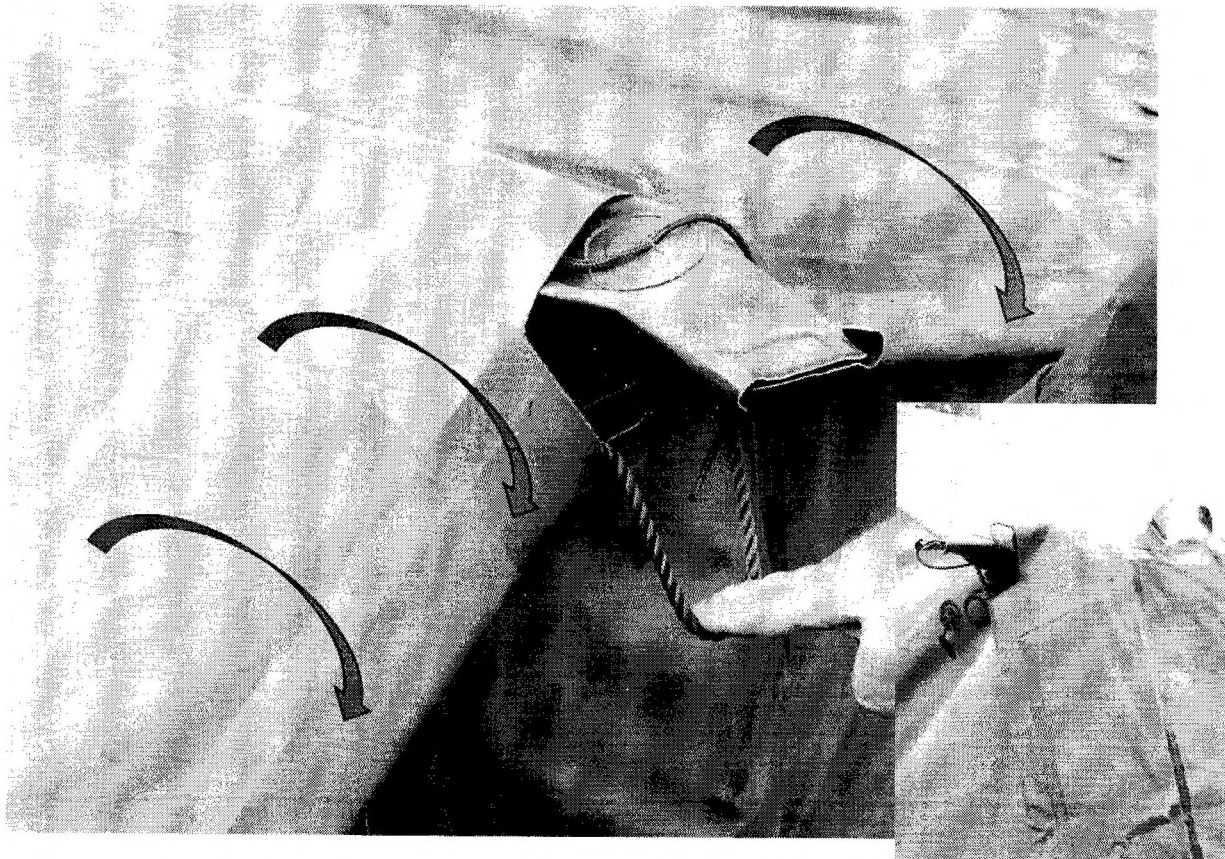


Figure 34: Lacing cover sections (8)

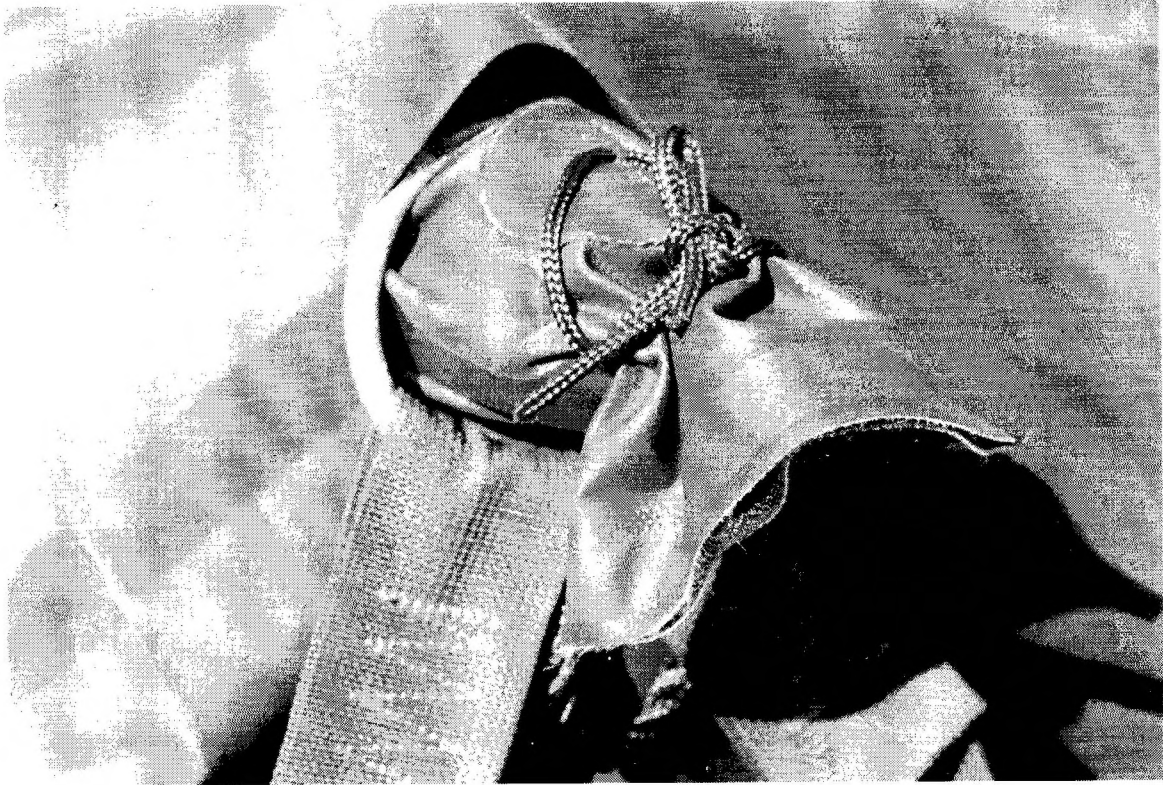
36. Once the roof and gables are joined together the weather covers should be folded over Fig 35 at all of the tent joints as it is very difficult to reach these flaps once the tent is erected.



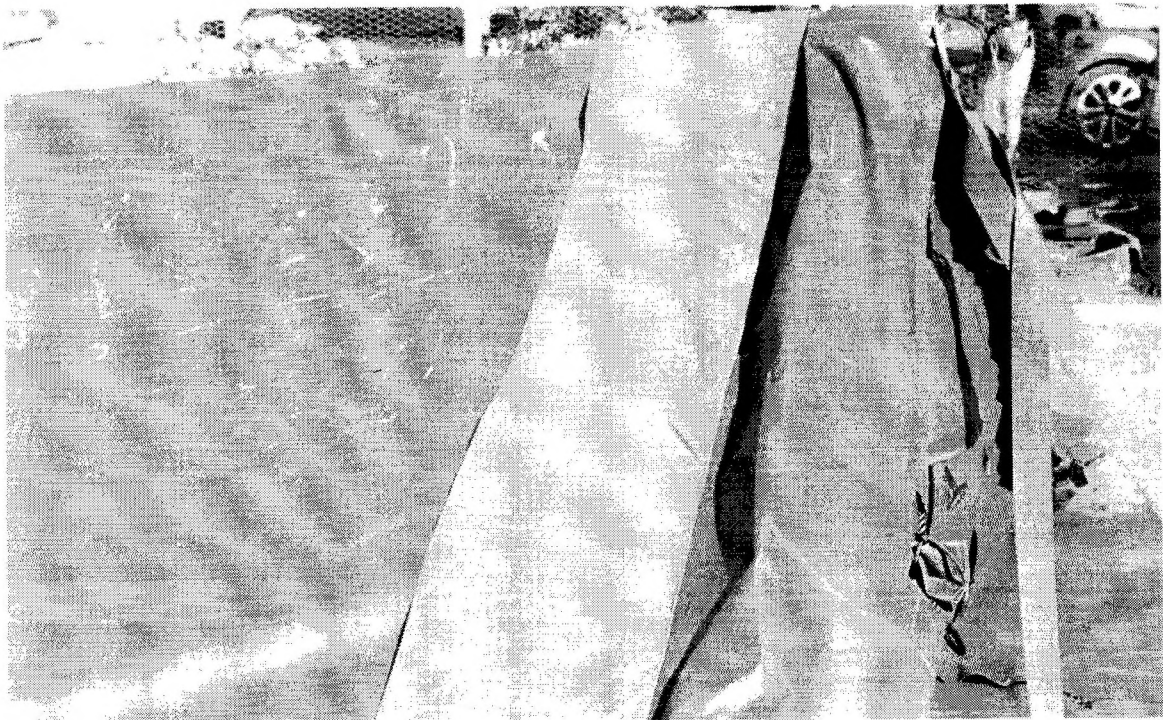
**Figure 35: Ensure Water Cover is pulled into position before fitting shelter legs**

**NOTE: This is relevant for keder or lacing, once the shelter legs are fitted it is difficult to reach the shelter roof**

37. The Overstrap (J11/8340-99-477-1544) (Qty 2) and End Guy Strap (J11/8340-99-270-7535) (Qty 2) should be placed over the shelter Fig 36 and 37. The Overstrap should be fitted at both ends. The End Guy is fitted at both ends. Details for final installation of these items are given at Paragraph 46, 47 and 48.



**Figure 36: Locating the End Guy Strap on the Apex spigot**



**Figure 37: Fit the over strap at each end of the tent**

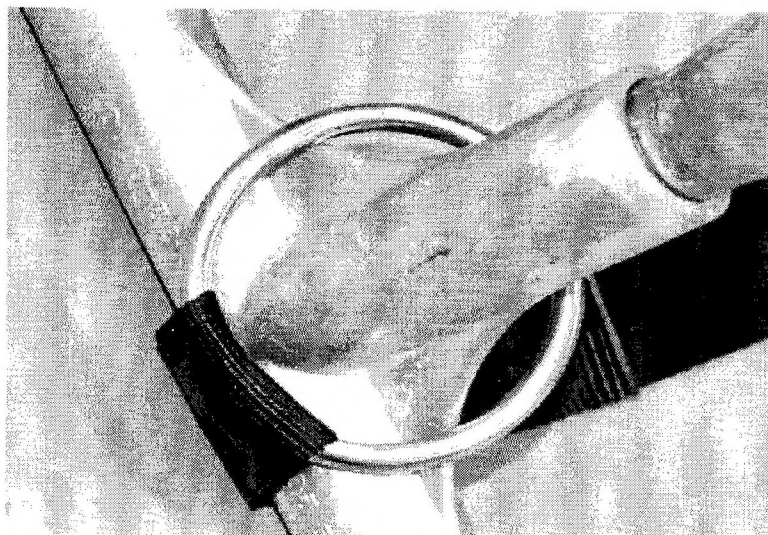
38. The canvas should be folded over to gain access to the frame to lift Fig 38. The sides should be lifted one at a time and the legs inserted. The operation should utilise one person for each leg as shown in Fig 38.



**Figure 38: Shelter legs fitted on one side**

**NOTE:** The shelter legs should be fitted using at least 3 people. The shelter is lifted at each leg position evenly and the legs pushed into place.

39. Fit the lower bracket to the legs fitting the base restraint straps in three positions Fig 40. The Base Restrain Strap (J11/8340-99-892-4503) (Qty 3) pre-sets the width of the tent and ensures that the tent frame is in the correct size configuration, this also aids the fitting of the Ground Sheet (J11/8340-99-488-6065) later in the process. Fit the ground poles as shown in Fig 42 and 45.



**Figure 39: Correct attachment of base restraint strap**





**Figure 40: Fit lower leg bracket and base restraint strap**

40. Install the legs on the other side of the tent using the same process as for the first side Fig 38.



**Figure 41: Install the legs on the other side of the tent**

41. To aid fitting the base restraint straps it is necessary to tug on the straps using the lower leg bracket as shown in Fig 42 and install leg brackets Fig 43.

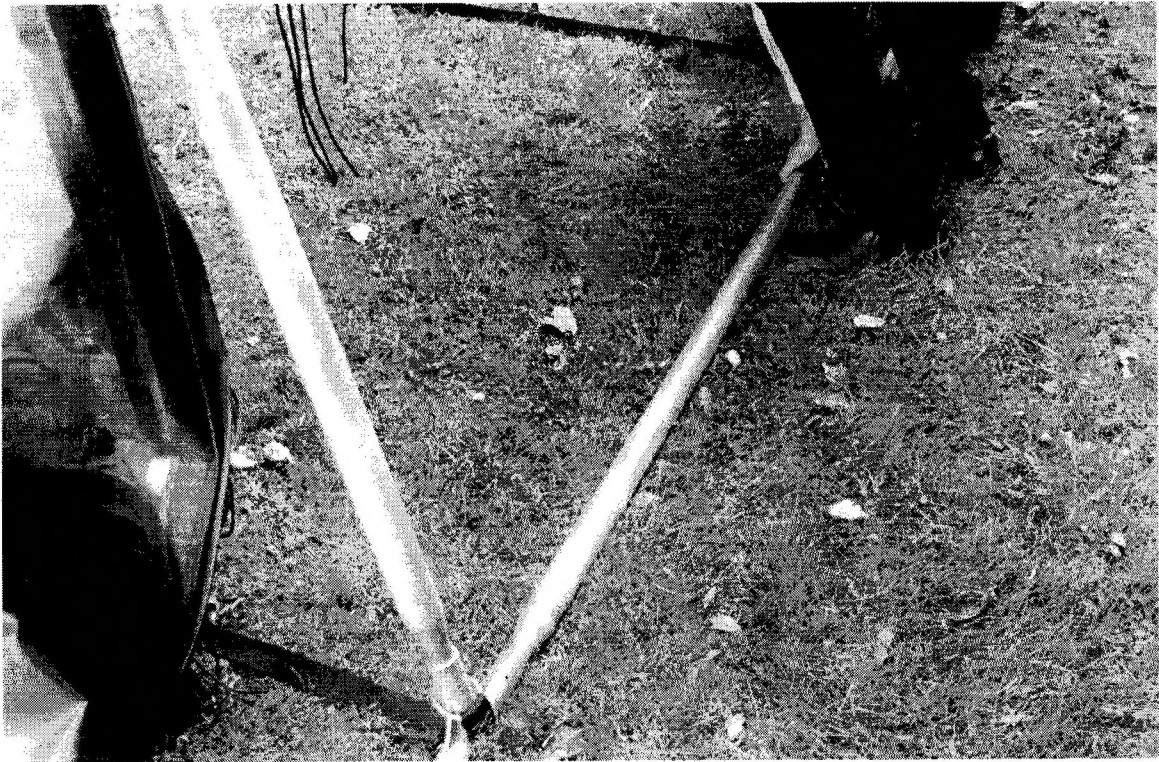


**Figure 42: Tug on the base restraint strap to adjust the gap between the legs**



**Figure 43: Install Leg Brackets**

42. Install poles Fig 44 and fold down canvas Fig 45.



**Figure 44: Installing ground poles**



Figure 45: Tent ready for connecting side walls



Figure 46: Installing wall keder using two (2) people

43. Install the side wall and gable keder rails (J11/8340-99-477-5695) (Qty 2 each side, total 8) or complete the lacing of the end gables using the same process as detailed for the roof keder, and ensure the tent is light and waterproof by ensuring the flaps are folded over and no light can be seen from inside the tent Fig 35.

44. The sod-cloth should be pinned through the external eyelets using tent-pins at an angle of 90 degrees from the horizontal (J11/8340-99-137-3895) Fig 47 and internal cords using (J11/8340-99-132-0028) at an angle of approximately 60 degrees from the horizontal Fig 48.

45. When pegging out the shelter, proceed as follows:

- 45.1. Pins for shelter lines (J11/8340-99-943-9052) should be driven at an angle of approximately 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground and approximately 300 mm (1ft) from the edge of the sod cloth Fig 49.
- 45.2. Hooks on tent pins should face in the opposite direction to the pulling force of the line and any cords should be placed around the pin prior to pegging.
- 45.3. For ease of driving the pins into the ground and to obtain the correct angle, personnel should try to position themselves behind the pin, facing away from the direction of the pulling force of the line when striking.
- 45.4. Avoid unequal strain and wear on the PVC covers by ensuring that:
  - 45.4.1. Guy lines are not twisted and lie flat across the cover.
  - 45.4.2. Restraint and insulation straps are not twisted and lie flat across the insulation.
  - 45.4.3. Doorways are closed while erection and pegging is carried out.

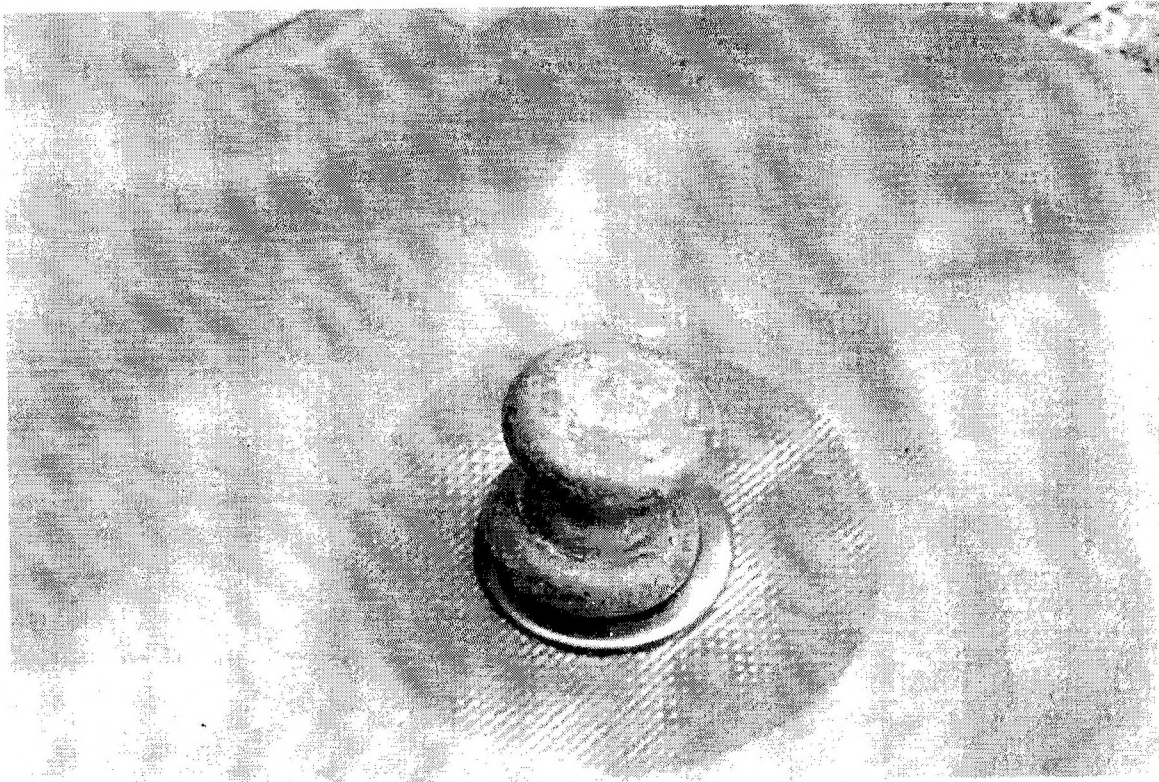


Figure 47: Sod Cloth Pins installed (J11/8340-99-137-3895)



Figure 48: Internal Pins (J11/8340-99-132-0028)

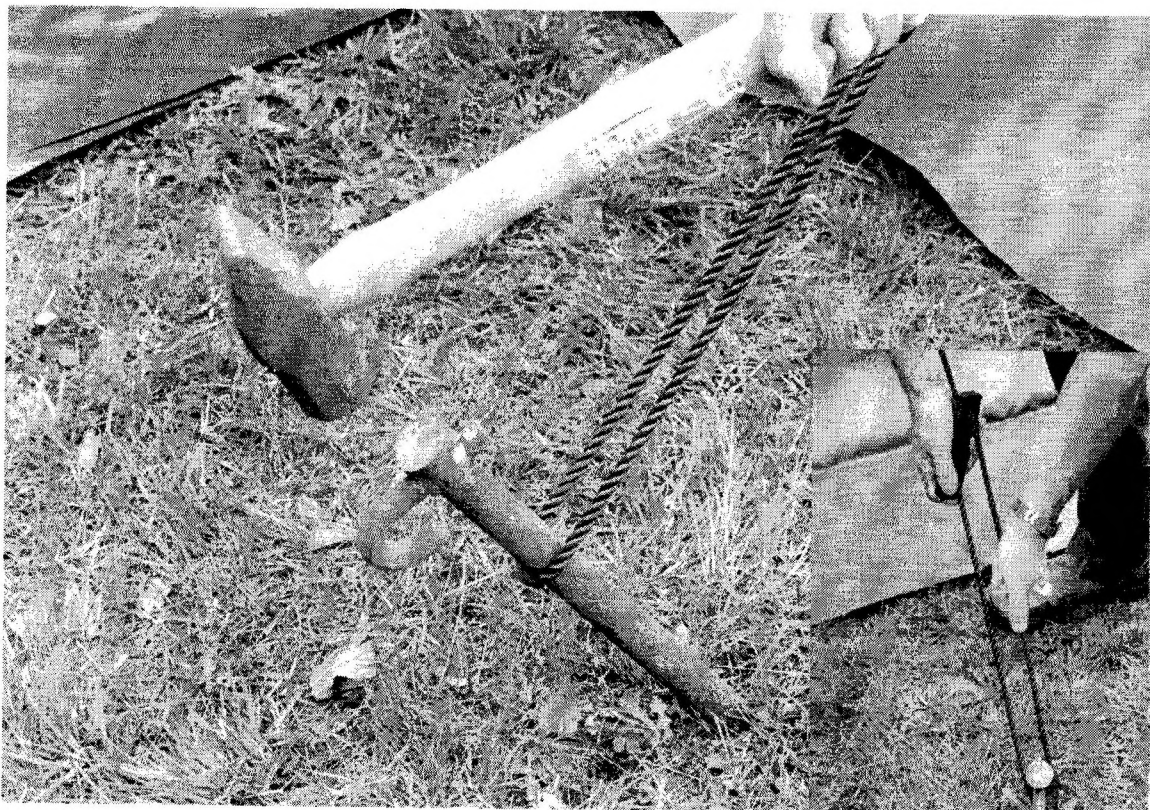


Figure 49: Installing Guy Rope, Weather Flap or Overstrap Pins (J11/8340-99-943-9052)

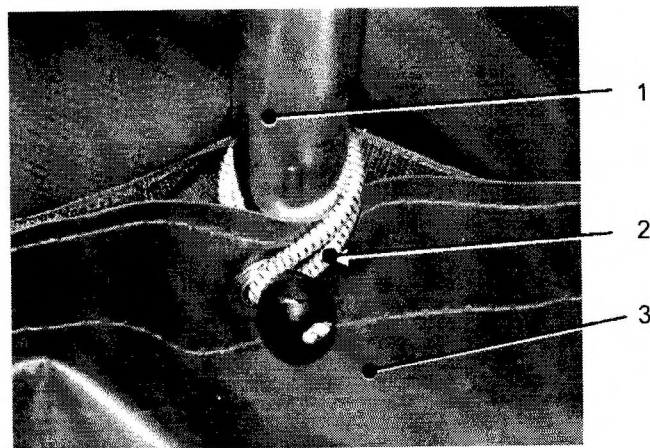
46. The Overstrap (J11/8340-99-477-1544) (Qty 2) and End Guy Strap (J11/8340-99-270-7535) (Qty 2) Fig 36 and 37 should now be pegged down.

47. The Overstrap should be fitted at both ends and in the centre and installed using (Qty 4) (J11/8340-99-943-9052) Pins pulling the strap directly 180° from the tent and installing the pins so that the Overstrap is tight. The Pin should be driven at an angle of approximately 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground.

48. The End Guy Rope pulls back over the roof and is pegged to the ground with the straps approximately 45° to the end wall, this will be approximately in line with the centre of the tent. The strap should be fitted at both ends and in the centre and installed using (Qty 2) (J11/8340-99-943-9052) Pins pulling the strap directly 180° from the tent and installing the pins so that the Overstrap is taught but not too tight. The Pin should be driven at an angle of approximately 60 degrees from the horizontal approximately four fifths into the ground whereby the bottom of the hook or head of the pin is level with the ground.

49. The Ground Sheet (J11/8340-99-488-6065) (Qty 1) is fitted by tightening the cord in the corners of the ground sheet to form a "bath tub". The sheet is then laid on the floor over the base restraint straps, evenly positioned and connected to the Velcro around the walls of the tent Fig 51.

50. It is then connected to the frame using tensioners Fig 50 (J11/8340-99-865-3035) down inside the shelter and fix this to the framework (if being fitted).



Item 1: Framework  
Item 2: Tensioner  
Item 3: Groundsheet

**Figure 50: Attachment of groundsheets with tensioners**

**Figure 51: Tent with Groundsheet Installed**

**DETAILED OPERATING INSTRUCTIONS**

51. The tents are fitted with standard doors and windows and operation is generally self evident given that the deployment of the camp has been undertaken in accordance with the correct procedures. A few areas warrant specific note as detailed below:

52. There are two (2) types of end wall available, the End Section Mk4 (Profiled End) (J11/8340-99-282-9697) (standard) Fig 52 and the End Section Mk4, Passage End (J11/8340-99-844-1160) Fig 53. The latter enables connection to the 12 x 12, porch and passageway tents.



**Figure 52: End Section Mk4 (J11/8340-99-282-9697)**





**Figure 53: End Section Mk4, Passage End (J11/8340-99-844-1160) alternative to (J11/8340-99-282-9697)**

#### **Doors and Zips**

53. Where zips are utilised such as Doors and fly screens heavy duty zips are utilised. However these still need to be operated with care and must be kept clean.

54. Fly screens are available on most doors, these can be zipped open rolled up.

#### **Windows**

55. Operation of the windows is simple, however to minimise the visual signature the canvas should be rolled up so that only the green side is visible and tied back in position using the toggles Fig 54 and Fig 55.

#### **Vents**

56. Operation of the vents is simple, see Fig 56.

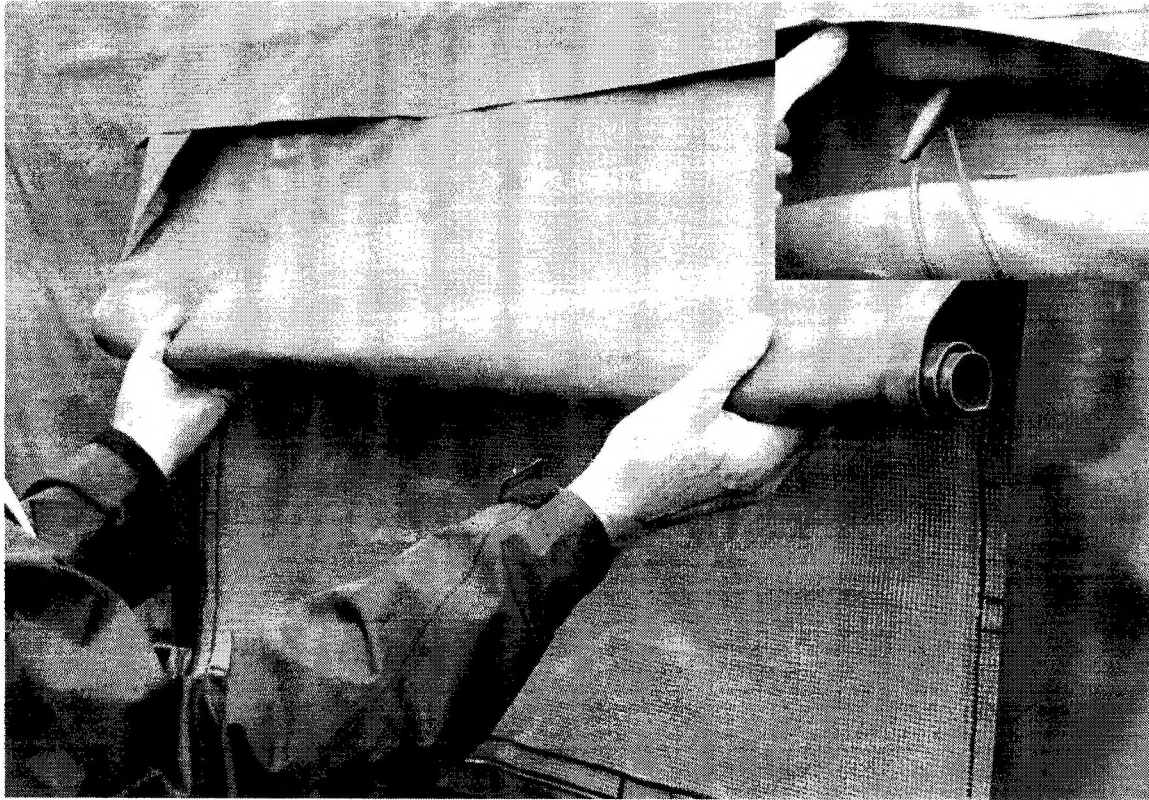


Figure 54: Window adjustment

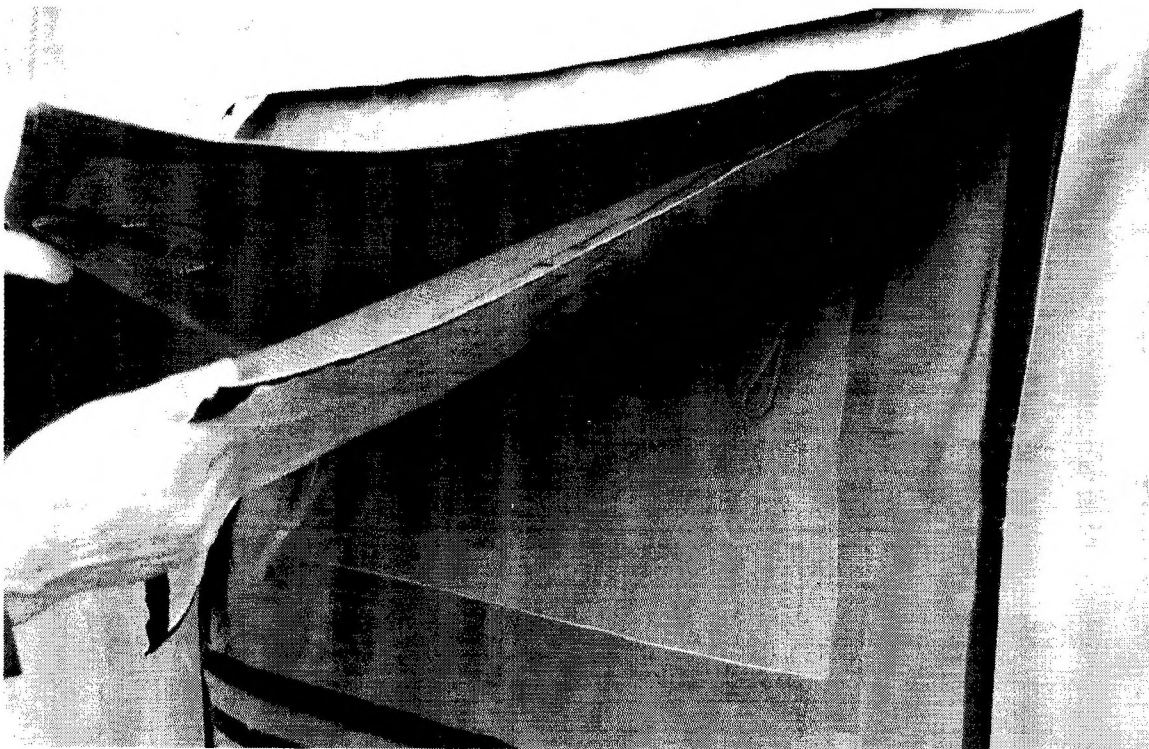


Figure 55: Window adjustment for ventilation

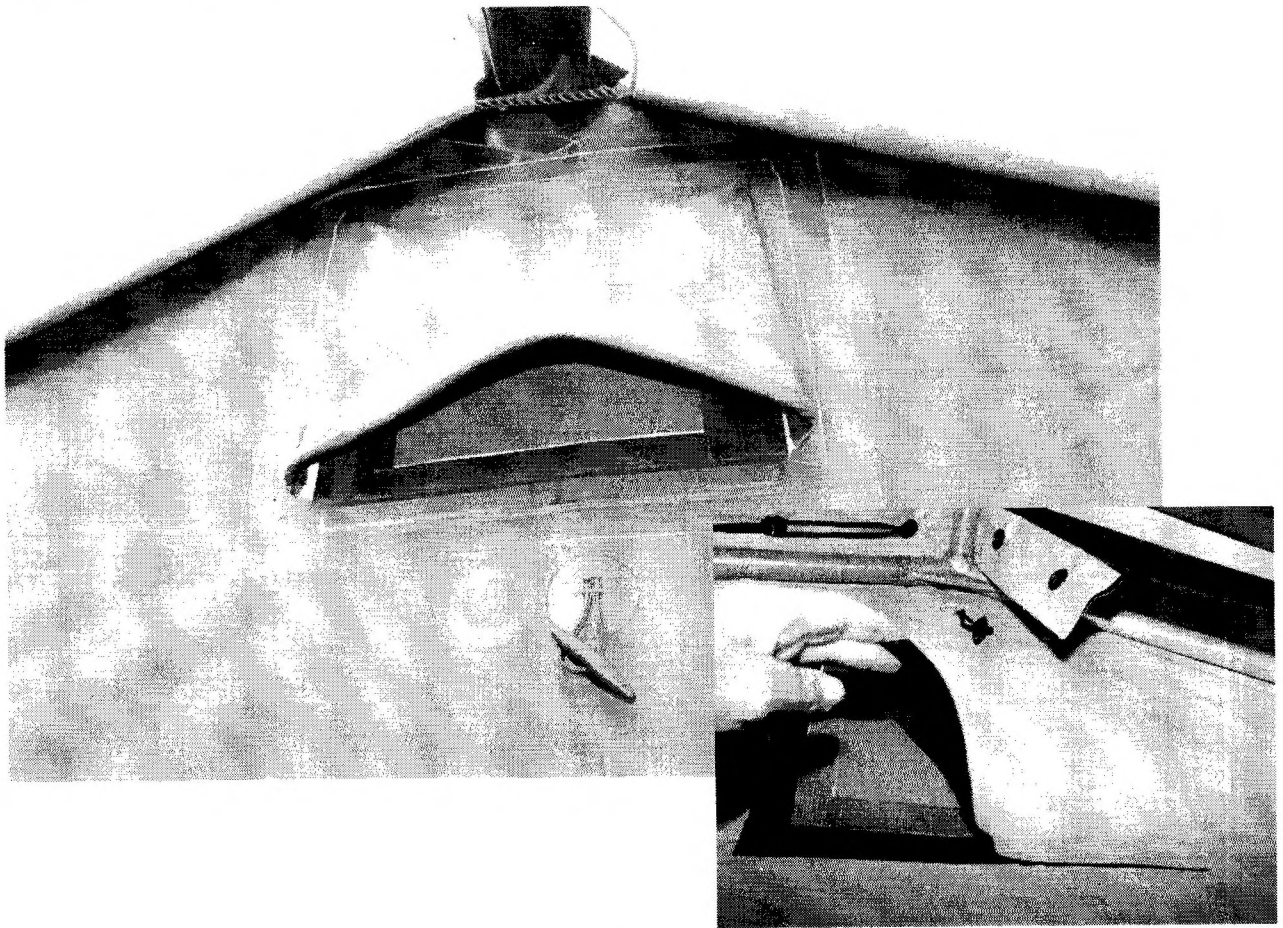


Figure 56: Gable Vents

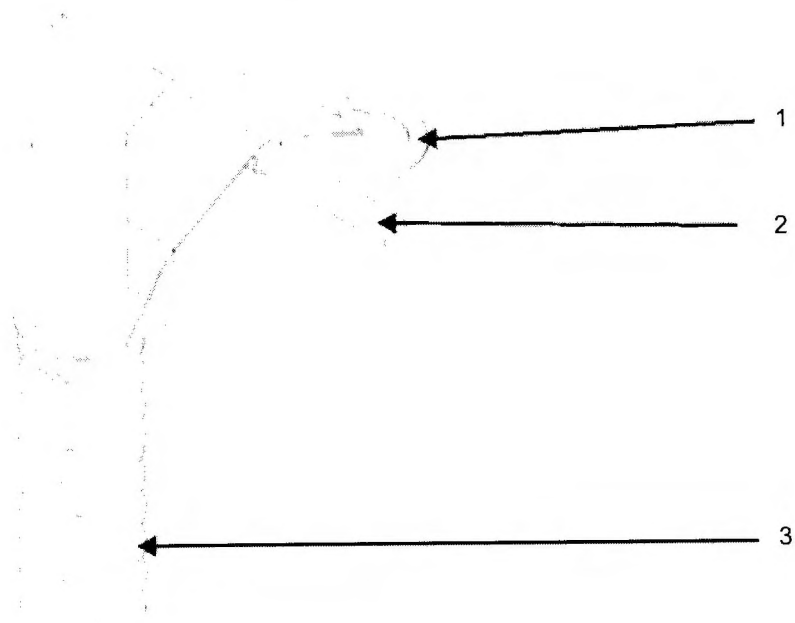
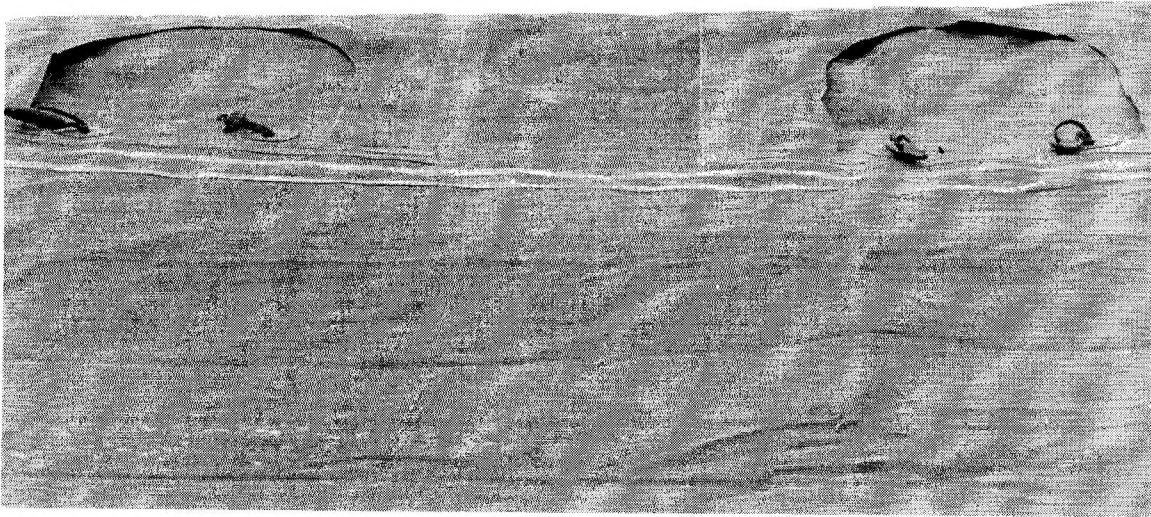


Figure 57: OFCS Installation

- 1 Chimney Bracket (Part of OFCS)
- 2 Ridge Pole
- 3 Chimney (Part of OFCS – Shown for illustration purposes only)



**Figure 58: OFCS Roof and Wall exhaust ports**

**HARD FLOORING IF FITTED (J11/8340-99-958-8986)**

57. Place the hard flooring (Fig 59) over the groundsheet (Item 3 from Fig 50) (if used). Do not place hard flooring on hard surfaces. Flooring clips together in sections. Fold flooring back on its self to dismantle.

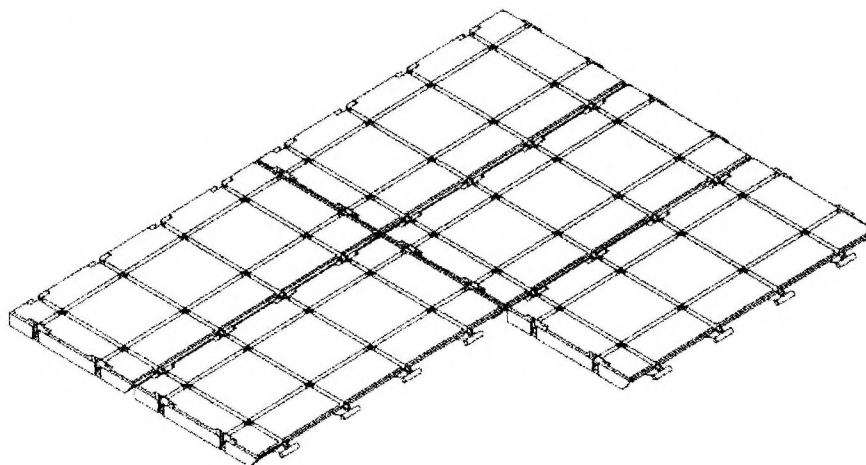


Figure 59: Installation of hard flooring

58. Ensure all straps (internal and external) are taught and unable to move from their desired position on the frame.

#### STRIKING

#### CAUTION

**EQUIPMENT DAMAGE.** Wet PVC cover should never be folded or packed unless circumstances render this unavoidable. Shelters should therefore be left to dry thoroughly before they are struck. If the shelter is not completely dry the officer in charge of the campsite or receiving unit is to be informed. In cases where the PVC cover has to be packed wet it must be removed from the packing, washed and dried as soon as practically possible.

59. Striking the shelter is the reverse of the pitching procedure, noted the following key points:

59.1. Close all doors and windows

59.2. Remove and stow all ground pegs, they are a trip hazard and could damage the covers.

59.3. Remove and stow all loose parts i.e. Ground Sheet, Overstraps, End Guy ropes etc

60. The Bag, Tent Frame Poles (J11/8340-99-488-6307) stows Qty 22 Universal Member, (Poles) (J11/8340-99-120-6725). Bag, Tent Frame Brackets (J11/8340-99-499-9176) stows Qty 9 Ridge and Eaves, Bracket (J11/8340-99-120-6726) and Qty 6, Base, Bracket (J11/8340-99-120-6727).

#### FOLDING

61. Folding and packing of PVC cover is to be carried out using the following process:

##### Shelter cover end

62. To fold the shelter end, proceed as follows:

62.1. Lay out PVC cover with outer side uppermost and brush off as much dirt and debris as possible.

62.2. Fold in half to centre of door opening.

62.3. Fold the top and side in to form a square and then fold in half.

62.4. Fold twice to make a strip approximately 1 m (3 ft) wide.

62.5. Finally, roll to form the smallest possible bundle.

##### Shelter cover roof and wall

63. To fold shelter panels, proceed as follows:

63.1. Lay out PVC cover with outer side uppermost and brush off as much dirt and debris as possible.

63.2. Fold the sides to the centre.

- 63.3. Fold once more in the same manner.
- 63.4. Fold the walls to the ridge.
- 63.5. Finally, roll to form the smallest possible bundle.

## PACKING

**NOTE: Whenever it becomes necessary to pack PVC cover in a wet condition the packages are to be clearly marked NOT DRY to indicate the cover was packed in a wet condition. If the PVC cover is being retained at unit, the officer in charge is to be notified of the condition of the cover so he can arrange for it to be dried at the earliest opportunity. If the PVC cover is to be despatched, the consignee is to be notified by telephone or signal, so the PVC cover can be unpacked and dried as soon as possible after receipt.**

64. To pack the shelter, proceed as follows:
  - 64.1. Place the folded shelter PVC cover in the Valise with the straps.
  - 64.2. Place the shelter frame components and the tent pins in the bags provided.
  - 64.3. Place the rolled insulation panels in the insulation valise

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**CHAPTER 2**  
**MAINTENANCE INSTRUCTIONS**

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**Introduction**

65. The life of tentage can be enhanced considerably if reasonable care is taken whilst in use or in storage. Such care will also help to minimise costs involved in refurbishment after exercises or operations.

**Common causes of damage to PVC covers**

66. Common causes or damage to covers are as follows:
- 66.1. Burns - due to careless smoking or siting shelters near braziers or incinerators.
  - 66.2. Holes - due to careless pitching, stacking or stowage of articles too close to shelter walls. When shelters are used for storage, stacks should be approximately 60 mm (2 ft) from the walls and should not touch the PVC cover at any point. Gangways are essential in case of fire.
  - 66.3. Tears in the sod-cloth can be caused by walking on it if there are sharp stones or rubble beneath, or if sharp rubble is used to ballast the shelter.
  - 66.4. Damage to the fabric may occur as a result of folding PVC cover when wet, or on ground contaminated by oil etc.
  - 66.5. Similarly, fabric may be damaged when shelters are used as kitchens or medical theatres if blood, grease or other fats come into contact with the PVC cover. PVC cover should be rinsed off as soon as possible should this occur. Work surfaces that would normally have blood, grease or other fats on them should be kept clear of the PVC cover. Grease and fats will also become a fire hazard unless cleaned
  - 66.6. Grease or oil on the hands or clothing of personnel handling or using the tentage will cause damage if in contact with the PVC cover.
  - 66.7. Care must be exercised when loading or unloading tentage into or from vehicles to avoid damage from contact with projections on the vehicle as well as slip, trip and fall.
  - 66.8. In overseas theatres, where native flora and fauna may damage the PVC cover, regular checks should be carried out.
  - 66.9. When joining a number of shelters together, care should be taken to avoid abnormal stress being placed on the PVC cover.
  - 66.10. Exposure to Ultra Violet (UV) light causes damage to all fabrics. To prolong the life of a

shelter in areas of high UV an appropriate sunshade should be used.

### Repairs to PVC Covers

**NOTE: The glue utilised is contact adhesive which is solvent based, only use the glue in a ventilated environment and use the appropriate PPE.**

67. The PVC patch used must cover the fabric by at least 5 cm beyond the limit of the tear to offer an equivalent strength. For damage to the main PVC cover, a single repair to the external face of the main cover is sufficient, unless the tear is particularly large (>20cm). Shape the patch as required if damage occurs on a complex area of the cover or at a joint.

68. Surface Preparation:

68.1. Carefully clean the PVC surface around the tear and dry thoroughly prior to applying adhesive. Use fine rasp or sandpaper to lightly roughen the area where patch is to be applied, roughen under surface of patch in the same manner. Ensure repair area is kept dry until adhesive has set.

68.2. Support the PVC cover against a flat surface to allow the patch to be securely applied.

69. Gluing :

69.1. Apply adhesive in a thin, consistent layer to both the patch and the area where the patch is to be applied to ensure positive bonding of the two elements. Apply adhesive from the middle of the patch outwards. Ensure adhesive is applied to the correct side of the patch so that the visible face matches the PVC cover colour Fig 60.

69.2. Affix the PVC cover patch to the external canvas and apply careful pressure to remove any bubbles or air pockets with roller Fig 61.

69.3. Leave to set for two hours before moving the cover.

Serial (1)	Item (2)	D of Q:	DMC	NSN (3)
0	Repair Kit	Each	J11	8340-99-362-8303
1	HH-66 Vinyl Cement - Tube 237ml	Tin		
2	Black adhesive tape	Each		
3	Triangular File	Each		
4	Standard Fabric - Green Grey	m2		
5	OFCS Textile Fabric - Green Green	m2		
6	Floor Textile Fabric - Green	m2		
7	Fly Screen Material	m2		
8	Sanding Paper	Each		
9	Cutter 18 mm	Each		
10	Plastic Box	Each		
11	Repair Instruction Sheet	Each		
12	Safety Data Sheets	Each		

**Table 2: PVC Cover Repair Kit**

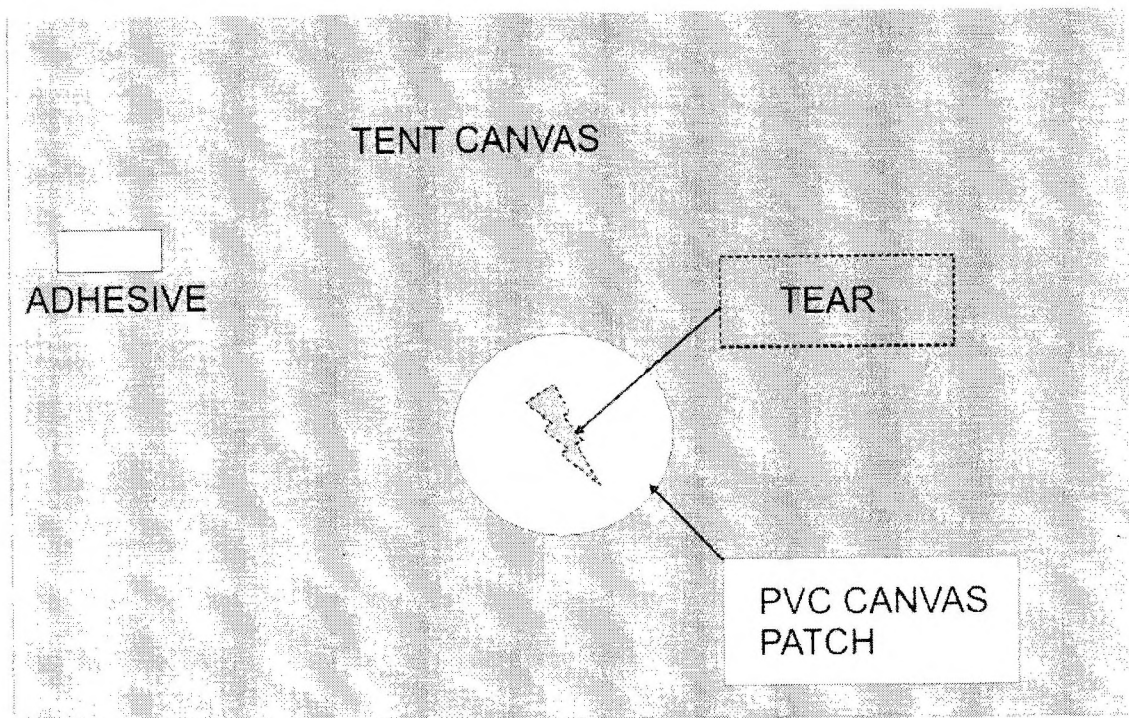


Figure 60: PVC Cover Repair, spreading of glue

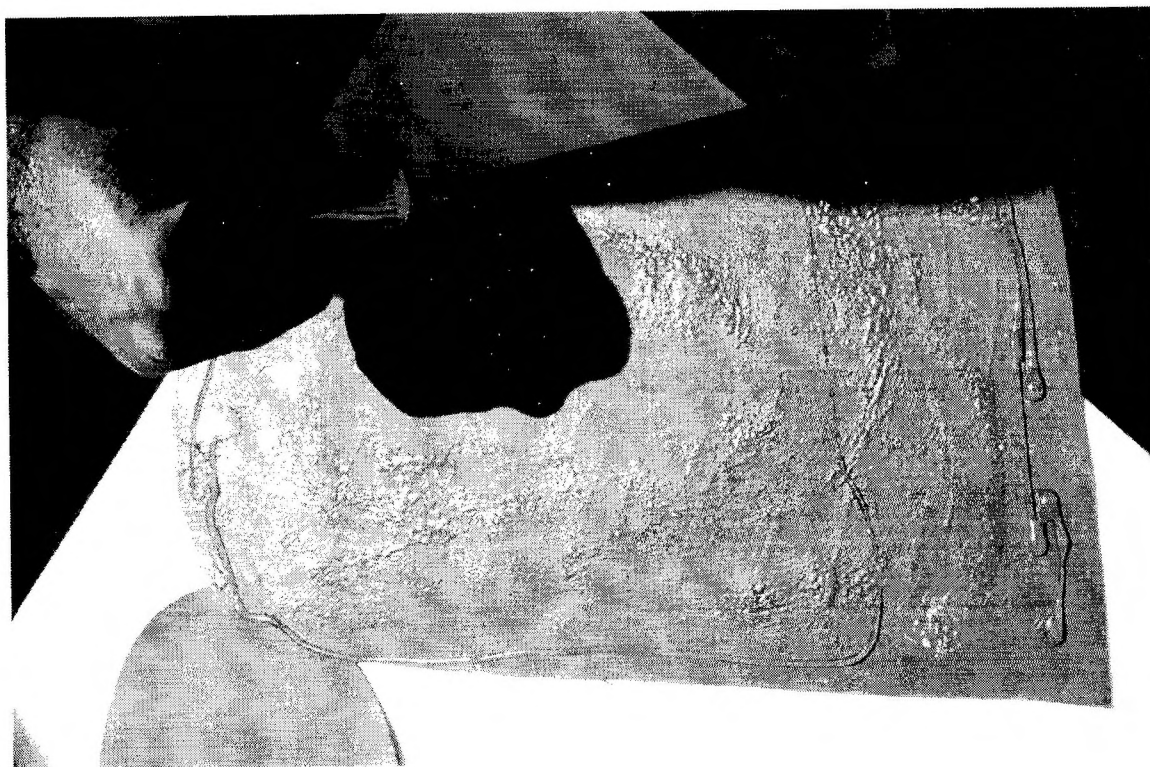
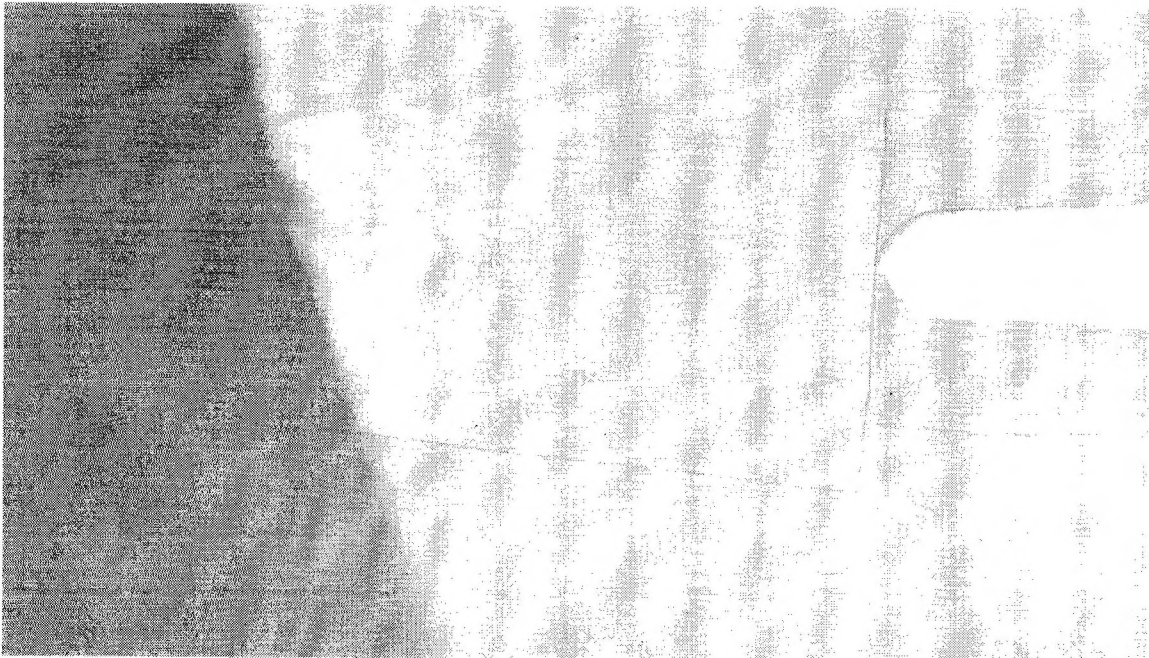


Figure 61: Glue application



**Figure 62: Completed Repair**

#### **EFFECTS OF DAMP**

70. PVC cover can be subjected to mould growth, whilst this can generally be cleaned off some forms of mould are hazardous to health.
71. All PVC cover must be thoroughly dry before storing. Stacks should be examined periodically, and any damp or suspect cover removed and examined immediately.
72. Storehouses employed for storing tentage should be inspected regularly for any sources of water ingress.
73. Shelter weather lines and ropes should be dry before storing.

#### **DAMAGE TO POLES AND BRACKETS**

74. Common causes of damage to shelter poles are as follows:
  - 74.1. Distortion of alloy shelter frames through misuse and carelessness, i.e. using the alloy poles as bearers or levers, or permitting components to lie where they can be crushed by vehicle tyres/tracks.
  - 74.2. Excessive use of force when fitting framework together. Care should be taken to ensure the hollow ends of the components are free from dirt or other blockages.
  - 74.3. Employing too few people when pitching and striking tentage will result in loss of control over the twisting and bending of the frame and will eventually result in the components becoming unserviceable.
  - 74.4. Excessive loading to the roof such as snow, sand and other debris. Personnel should never climb on or over any shelters.

#### **Personal Protective Equipment (PPE) JSP 437**

75. Table 4 details some of the NATO Stock Numbers (NSNs) of suitable Personal Protective Equipment (PPE) for personnel when carrying out repairs.

Serial (1)	Item (2)	D of Q:	DMC	NSN (3)	Size (4)
	GLOVES				
1	Chemical & Oil Protective	PR	GL	8415-99-132-1427	Size 7
2	Chemical & Oil Protective	PR	GL	8415-99-132-1428	Size 8
3	Chemical & Oil Protective	PR	GL	8415-99-132-1429	Size 9
4	Chemical & Oil Protective	PR	GL	8415-99-132-1430	Size 10
5	Chemical & Oil Protective	PR	GL	8415-99-978-3706	Size 7
6	Chemical & Oil Protective	PR	GL	8415-99-978-3707	Size 8
7	Chemical & Oil Protective	PR	GL	8415-99-978-3708	Size 9
8	Chemical & Oil Protective	PR	GL	8415-99-978-3709	Size 10
9	Chemical & Oil Protective	PR	GL	8415-99-978-3710	Size 11
10	Rubber		GL	8415-99-130-8250	Size Small
11	Rubber		GL	8415-99-130-8251	Size Medium
12	Rubber		GL	8415-99-130-4729	Size Large
13	Rubber		GL	8415-99-130-8252	Size Extra Large
14	Rubber		GL	8415-99-571-3559	Size 7/7 IA
15	Rubber		GL	8415-99-571-3560	Size 8/8 1/2
16	Rubber		GL	8415-99-571-3561	Size 9/9 1/2
17	Rubber		GL	8415-99-571-3562	Size 10/10 1/2
	GOGGLES, INDUSTRIAL				
18	Goggles	EA	VO47	4240-99-577-3798	
19	Goggles	EA	VO47	8415-99-130-9776	
	COVERALLS				
20	Coverall, disposable		CAS	8415-99-130-8302	Size M
21	Coverall, disposable		CAS	8415-99-130-8303	Size L
22	Coverall, disposable		CAS	8415-99-130-8304	Size XL
23	Coverall, disposable		CAS	8415-99-665-7624	Size XXL
24	Coverall, disposable		CAS	8415-99-665-7625	Size XXXL
25	Coverall, disposable		CAS	8415-99-978-4772	Size M
26	Coverall, disposable		CAS	8415-99-978-4773	Size L
27	Coverall, disposable		CAS	8415-99-978-4774	Size XL
28	Coverall, disposable		CAS	8415-99-978-4775	Size XXL
29	Coverall, disposable		CAS	8415-99-978-4776	Size XXXL
	FACEMASK				
30	Mask, disposable		VO47	4240-99-132-1426	
31	Mask, disposable		VO47	4240-99-257-8006	

Table 3: PPE

**GUIDANCE FOR CONDITIONING ITC/GS TENTAGE SYSTEMS**

76. **PVC Cover** – Users must periodically inspect their tentage on the condition based approach for service life outlined below. The new PVC tent provides fire protection, however at any point should users be concerned with the level of fire protection or fire fighting systems being applied to their deployed tent systems they must raise it through the chain of command.

77. **Existing Cotton Canvas Tentage.** Users must periodically inspect their tentage on the condition based approach for service life outlined below. At any point should users be concerned with the level of fire protection or fire fighting systems being applied to their deployed tent systems they must raise it through the chain of command.

78. **Current General Service (GS) Cotton Canvas, including ITC Canvas.** The condition of the canvas is key, when the material becomes thin and worn it begins to lose its fire retardant properties. OI have investigated each of the wearing factors (Age, Environment, Use) and found that alone Age is not a contributing factor. The minimum expected deployed life (in desert conditions) for GS canvas is 4 years of continuous use, however OI have tested 30 year old samples and found them to achieve the required standard. The material characteristics degrade when the wearing factors are combined together, the actual service life of GS canvas will be determined by the environmental conditions experienced in storage and when deployed, as well as the nature of usage and the management/maintenance regime being applied by Users. Service life is therefore expected to vary widely.

79. The GS canvas retains its fire retardant properties as long as the material remains intact:
- 79.1. Users must inspect their GS tentage when erecting and striking the tent as well as every six months whilst in continual use.
  - 79.2. There must be no open tears in the fabric.
  - 79.3. There must be no holes in the fabric.

ARMY EQUIPMENT AND SUPPORT PUBLICATION (AESP) AND ELECTRICAL AND  
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Email: [REDACTED]	Post to	Form 10 Cell FRACAS BFPO 794	
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<b>ORIGINATORS DETAILS</b>			
*Address	*Name		
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	*Phone		
	*Senders Reference		
	*Date Raised		
*E-Mail	Eqpt Asset Code (if applicable)		
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*Full Title of AESP/EMER (Not the AESP/EMER Number)			
*Edition	*Amendment	*Chapter	*Page
*Comments: If additional information is to be supplied, please e-mail with the Form 10 as separate attachments.			
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<b>PROJECT TEAM / SME RESPONSE TO COMMENTS:</b>			
Project Team (PT) / SME		*Sponsors Name	
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Incorporate comment(s) in future amendments:			No action required:
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AESP Form 10 (Issue 6 2 dated July 13)

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Form 10 Guidance

Form 10 can be found within the AESP or, as a template, from the JAMES Portal (Hot Topic – Forms) & TDOL (FORM10).

**Originator responsibility** is to enter the following details marked \*:

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- Is this **Safety Related?** – select Yes or No as appropriate.
- Originator Details:
  - Full address Inc Post Code or BFPO NO.
  - Originator email address
  - Senders Reference – that must be unique.
- AESP Details shall enter the following details:
  - The Full Title of AESP/EMER should not include the AESP/EMER Number
  - Enter details in all other mandatory fields marked \*.
  - Additional information relating to the Comments (AESP copies, additional text details or photographs) should be attached to the Email at the same time.
- Originator makes up the Form 10 & Sends to Form 10 cell via
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  - Email to [REDACTED]
  - **Any AESP that holds a Security marking higher than 'Restricted' should be securely circulated.**

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- Date Received
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The Sponsor will:

- Enter their name, email address & phone contact details.
- Enter Date Received
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- Acknowledge receipt of Form 10, within 5 working days, by email to Form 10 Cell.
- Assess the contents of comments and details received.
- Mark the relevant Action box and fill out the Remarks field.
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