

MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

AR-003-671

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COPY No. 3 of 24  
AMTDU 89/5227/AIR (21)  
DATED 26JUL83

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DEC 28 1983  
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**REPORT**

**TITLE:** AMTDU TECHNICAL INVESTIGATION NO 5227 -AIR PORTABILITY OF TRUCK FIRE  
FIGHTING RURAL 5 TON (MERCEDES)BY HERCULES AIRCRAFT

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JULY 1983

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16 Abstract <b>The requirement to assess the air portability of the test item grew out of the concept of the Operational Deployment Force (ODF), and the need for a large number of current, in-service vehicles to be trialed for air movement. This report presents the assessment of the air portability status of the test item for carriage by C130 aircraft, and a loading and lashing diagram for the air transportation of the test item. (U)</b>			

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RICHMOND NSW 2755

IN REPLY QUOTE AMTDU 89/5227/Air

26 July 1983

Headquarters Operational Command (AMNT2)  
Headquarters Support Command (AEENG4)

AMTDU TECHNICAL INVESTIGATION NO 5227  
AIR PORTABILITY OF TRUCK FIRE FIGHTING RURAL 5 TON  
(MERCEDES) BY HERCULES AIRCRAFT

- References: A. HQSC 2625/84/107 Pt 1 (5) dated 26 April 1982  
 B. HQOC HIG/HJG TN817/TOPSENG dated 29 April 1982

Find enclosed Technical Investigation No 5227, Loading and Lashing Diagram to AAP 7211.013-9-3 as requested by Reference A.

(W.R. MATTES)  
Squadron Leader  
for Officer Commanding

- Enclosures: 1. Report on AMTDU Technical Investigation No 5227  
 2. Loading and Lashing Diagram No 111 to AAP 7211.013-9-2

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INDEX

TO

AMTDU TECHNICAL INVESTIGATION NO 5227  
AIR PORTABILITY OF TRUCK FIRE FIGHTING RURAL 5 TON  
(MERCEDES) BY HERCULES AIRCRAFT

<u>Paragraph</u>		<u>Page</u>
1 - 2	INTRODUCTION	1
3	AIM	1
4	BACKGROUND	1
5 - 6	TEST ITEM	1 - 2
7 - 9	STATIC TRIALS	2
10	CONCLUSIONS	2
11	RECOMMENDATIONS	3

Annex: A. Loading and Lashing Summary

Enclosure: 1. Loading and Lashing Diagram to AAP 7211.013-9-2

REPORT ON AMTDU TECHNICAL INVESTIGATION NO 5227  
AIR PORTABILITY OF TRUCK FIRE FIGHTING RURAL 5 TON  
(MERCEDES) BY HERCULES AIRCRAFT

- References:
- A. DEFARM LOG 009146 of 26 Mar 82
  - B. HQSC 2625/84/107 Pt 1 (5) dated 26 Apr 82
  - C. HQOC HIG/HIG TN 817/TOPSENG dated 29 Apr 82
  - D. AAP 7211.013-9-2 Loading and Lashing Diagram Hercules Aircraft

INTRODUCTION

- 1. Reference B requested Headquarters Operational Command (HQOC) to task Air Movements Training and Development Unit (AMTDU) with requirement of Technical Investigation (TI) 5227.
- 2. Reference C tasked AMTDU with subject TI.

AIM

- 3. The aim of this report is to present:
  - a. an assessment of the air portability status of the test item for carriage by C130 aircraft, and
  - b. a loading and lashing diagram for inclusion in Reference C.

BACKGROUND

- 4. The requirement to assess the air portability of the test item grew out of the concept of the ODF and the need for a large number of current, in service, vehicles to be trialed for air movement.

TEST ITEM

- 5. The test item issued to AMTDU was obtained from the School of Military Engineering (SME) and C130 loading trials were completed using this vehicle. Test item was documented as a Truck Fire Fighting Rural 5 ton, DSN 4310-66-100-8941, Liability Code 39020/4 shown in Figure 1.



Figure 1 The Test Item

6. The test item dimensions and weight are as follows:

Length	7.26 m	(23' 10 ")
Width	2.41 m	( 7' 11 ")
Height	2.80 m	( 9' 2½")
Height (reduced)	2.65 m	( 8' 8½")
Front Axle	5 090 kg	(11 198 lb)
Rear Axle	5 220 kg	(11 484 lb)
Total Weight	10 310 kg	(22 682 lb)

#### STATIC TRIALS

7. Prior to trial loading in C130 the test item was disassembled as detailed in the loading and lashing diagram at Enclosure 1.
8. Loading and lashing diagrams are at Enclosure 1.
9. Restraint and aircraft centre of gravity calculations are attached at Annexes A and B.

#### CONCLUSIONS

10. AMTDU concluded that the test item described is suitable for internal carriage by C130 aircraft.

RECOMMENDATION

11. AMTDU recommends that the enclosed loading and lashing diagram be incorporated in Reference E.



(K. HALES)  
Warrant Officer  
Project Officer



(P.W. KEANE)  
Major  
Officer Commanding Army Component



(W.R. MATTES)  
Squadron Leader  
Commanding Officer

11 July 1983

Annex: A. Loading and Lashing Summary

Enclosure: 1. Loading and Lashing Diagram No 111  
to AAP 7211.013-9-2

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AIR MOVEMENTS TRAINING AND DEVELOPMENT UNIT

LOADING AND LASHING SUMMARY

C130      LOAD NO: 111  
(AIRCRAFT)

ITEM NAME: TRUCK FIRE RURAL 5 TON

ATTACHED SHEETS

- 1 LOAD DETAILS
- 2 EQUIPMENT DATA SHEET
- 3 LIMITS CALCULATIONS
- 4 LOAD RESTRAINT SUMMARY
- 5 RESTRAINT CALCULATIONS
- 6 TIEDOWN INSTRUCTIONS

AMDU

EDSCING

Loading and Lashing Summary

Approved by AEING4

Prepared by: K. HALES  
(PRINTED NAME)

\_\_\_\_\_  
(PRINTED NAME)

*K. Hales*      26JUL83  
(SIGNATURE)      DATE

\_\_\_\_\_  
(SIGNATURE)      DATE

Checked by: \_\_\_\_\_  
(PRINTED NAME)

\_\_\_\_\_  
(SIGNATURE)      DATE





LIMITS CALCULATIONS

C130 LOAD NO: 111  
(AIRCRAFT)

LOAD ITEM NO: 1

LOAD ITEM NAME: TRUCK FIRE RURAL 5 TON

AIRPORTABLE WEIGHT: 22 682 LBS

AXLE WEIGHTS: \_\_\_\_\_ LBS

TYRE PRESSURE:

DOLLY: \_\_\_\_\_ LBS

\_\_\_\_\_ PSI

FRONT: 11 198 LBS

55 PSI

INTER: \_\_\_\_\_ LBS

\_\_\_\_\_ PSI

REAR: 11 484 LBS

55 PSI

STORAGE CALCULATIONS:

N/A

RIGID LOAD LIMITS:

WITHIN LIMITS

RAMP LIMITATIONS:

NIL

CG CALCULATIONS:

GENERAL COMMENTS:

LOAD RESTRAINT SUMMARY

C130      LOAD NO: 111  
(AIRCRAFT)

LOAD ITEM NO: 1

ITEM NAME: TRUCK FIRE RURAL 5 TON

1. AIRPORTABLE WEIGHT: 22 682 LBS

2. RESTRAINT REQUIRED                      RESTRAINT APPLIED \*

FORWARD (4.0G)      90 024 LBS      102 416 LBS

AFT (1.5G)              33 759 LBS      46 398 LBS

LATERAL (1.5G)      \_\_\_\_\_ LBS      \_\_\_\_\_ LBS

PORT                      33 759 LBS      57 887 LBS

STARBOARD              33 759 LBS      57 887 LBS

VERTICAL (2.0G)      45 012 LBS      63 620 LBS

\*Restraint applied based upon calculations attached at Sheet 5.

NOTE: This lashing pattern provides restraint for an item of maximum weight 25 604 lbs.

RESTRAINT CALCULATIONS

C130 LOAD NO: 111

(AIRCRAFT)

LOAD ITEM NO: 1

ITEM NAME: TRUCK FIRE RURAL 5 TON

Tie Down No	Rated Cap	Tie Down Length	Fwd Restraint	Aft Restraint	Lateral Restraints		Vertical Restraint
					Port	Stbd	
4B		L= 98 ins	X= ins lbs	X= 67 ins 6837 lbs	Y= ins lbs	Y= 62 ins 6326 lbs	Z= 30 ins 3061 lbs
4F		L= 98 ins	X= ins lbs	X= 67 ins 6837 lbs	Y= 62 ins 6326 lbs	Y= ins lbs	Z= 30 ins 3061 lbs
9C		L= 60 ins	X= 26 ins 4333 lbs	X= ins lbs	Y= ins lbs	Y= 45 ins 7500 lbs	Z= 32 ins 5333 lbs
9E		L= 60 ins	X= 26 ins 4333 lbs	X= ins lbs	Y= 45 ins 7500 lbs	Y= ins lbs	Z= 32 ins 5333 lbs
12A		L= 89 ins	X= ins lbs	X= 73 ins 8202 lbs	Y= ins lbs	Y= 42 ins 4719 lbs	Z= 27 ins 3033 lbs
12G		L= 89 ins	X= ins lbs	X= 73 ins 8202 lbs	Y= 42 ins 4719 lbs	Y= ins lbs	Z= 27 ins 3033 lbs
13B		L= 98 ins	X= 83 ins 8469 lbs	X= ins lbs	Y= ins lbs	Y= 54 ins 5510 lbs	Z= 23 ins 2346 lbs
13F		L= 98 ins	X= 83 ins 8469 lbs	X= ins lbs	Y= 54 ins 5510 lbs	Y= ins lbs	Z= 23 ins 2346 lbs
14A		L= 87 ins	X= ins lbs	X= 71 ins 8160 lbs	Y= ins lbs	Y= 43 ins 4942 lbs	Z= 24 ins 2758 lbs
14G		L= 87 ins	X= ins lbs	X= 71 ins 8160 lbs	Y= 43 ins 4942 lbs	Y= ins lbs	Z= 24 ins 2758 lbs
15B		L= 113 ins	X= 90 ins 7964 lbs	X= ins lbs	Y= ins lbs	Y= 64 ins 5663 lbs	Z= 33 ins 2920 lbs
15F		L= 113 ins	X= 90 ins 7964 lbs	X= ins lbs	Y= 64 ins 5663 lbs	Y= ins lbs	Z= 33 ins 2920 lbs
21G		L= 90 ins	X= 76 ins 8444 lbs	X= ins lbs	Y= ins lbs	Y= 45 ins 5000 lbs	Z= 22 ins 2444 lbs
21E		L= 90 ins	X= 76 ins 8444 lbs	X= ins lbs	Y= 45 ins 5000 lbs	Y= ins lbs	Z= 22 ins 2444 lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
TOTAL RESTRAINT			58 420 lbs	46 398 lbs	39 660 lbs	39 660 lbs	43 790 lbs

NOTE: This lashing pattern provides restraint for an item of maximum weight

25 694 lbs

RESTRAINT CALCULATIONS

C130 LOAD NO: 111  
(AIRCRAFT)

LOAD ITEM NO: 1

ITEM NAME: TRUCK FIRE RURAL 5 TON

Tie Down No	Rated Cap	Tie Down Length	Fwd Restraint	Aft Restraint	Lateral Restraints		Vertical Restraint
					Port	Stbd	
22B		L= 90 Ins	X= 62 ins 6888 lbs	X= ins lbs	Y= ins lbs	Y= 62 ins 6888 lbs	Z= 30 ins 3333 lbs
22F		L= 90 ins	X= 62 ins 6888 lbs	X= ins lbs	Y= 62 ins 6888 lbs	Y= ins lbs	Z= 30 ins 3330 lbs
23B		L=104 ins	X= 75 ins 7211 lbs	X= ins lbs	Y= ins lbs	Y= 62 ins 5961 lbs	Z= 37 ins 3557 lbs
23F		L=119 ins	X= 75 ins 7211 lbs	X= ins lbs	Y= 62 ins 5961 lbs	Y= ins lbs	Z= 37 ins 3557 lbs
24A		L=119 ins	X= 94 ins 7899 lbs	X= ins lbs	Y= ins lbs	Y= 64 ins 5378 lbs	Z= 36 ins 3025 lbs
24G		L=119 ins	X= 94 ins 7899 lbs	X= ins lbs	Y= 64 ins 5378 lbs	Y= ins lbs	Z= 36 ins 3025 lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
		L= ins	X= ins lbs	X= ins lbs	Y= ins lbs	Y= ins lbs	Z= ins lbs
TOTAL RESTRAINT			102 416 lbs	46 398 lbs	57 887 lbs	57 887 lbs	63 620 lbs

NOTE: This lashing pattern provides restraint for an item of maximum weight  
25 604 lbs

SHEET 6

Pg of  
AMDU L/L SUMMARY  
OCT 78

TIEDOWN INSTRUCTIONS

C130 LOAD NO: 111  
(AIRCRAFT)

Load Item No	Tie Down Fittings	Lashings			Vehicle/Equipment Attachment Point
		No of Chains	No of Devices	Capacity	
1	4B	1	1	10 000	Around left rear spring hanger.
	4F	1	1	10 000	Around right rear spring hanger.
	9E	1	1	10 000	Around right rear spring hanger.
	9C	1	1	10 000	Around left rear spring hanger.
	12A	1	1	10 000	Around right front spring hanger.
	12G	1	1	10 000	Around left front spring hanger.
	13B	1	1	10 000	Around left rear axle.
	13F	1	1	10 000	Around right rear axle.
	14A	1	1	10 000	Around right front axle.
	14G	1	1	10 000	Around left front axle.
	15B	1	1	10 000	Around left rear spring hanger.
	15F	1	1	10 000	Around right rear spring hanger.
	21C	1	1	10 000	Around left front axle.
	21E	1	1	10 000	Around right front axle.
	22B	1	1	10 000	Around left front spring hanger.
	22F	1	1	10 000	Around right front spring hanger.
	23B	1	1	10 000	Around left bull bar bumper plate.
	23F	1	1	10 000	Around right bull bar bumper plate.
	24A	1	1	10 000	Around bumper bar - right side of centre tow bar.
	24G	1	1	10 000	Around bumper bar - right side of centre tow bar.



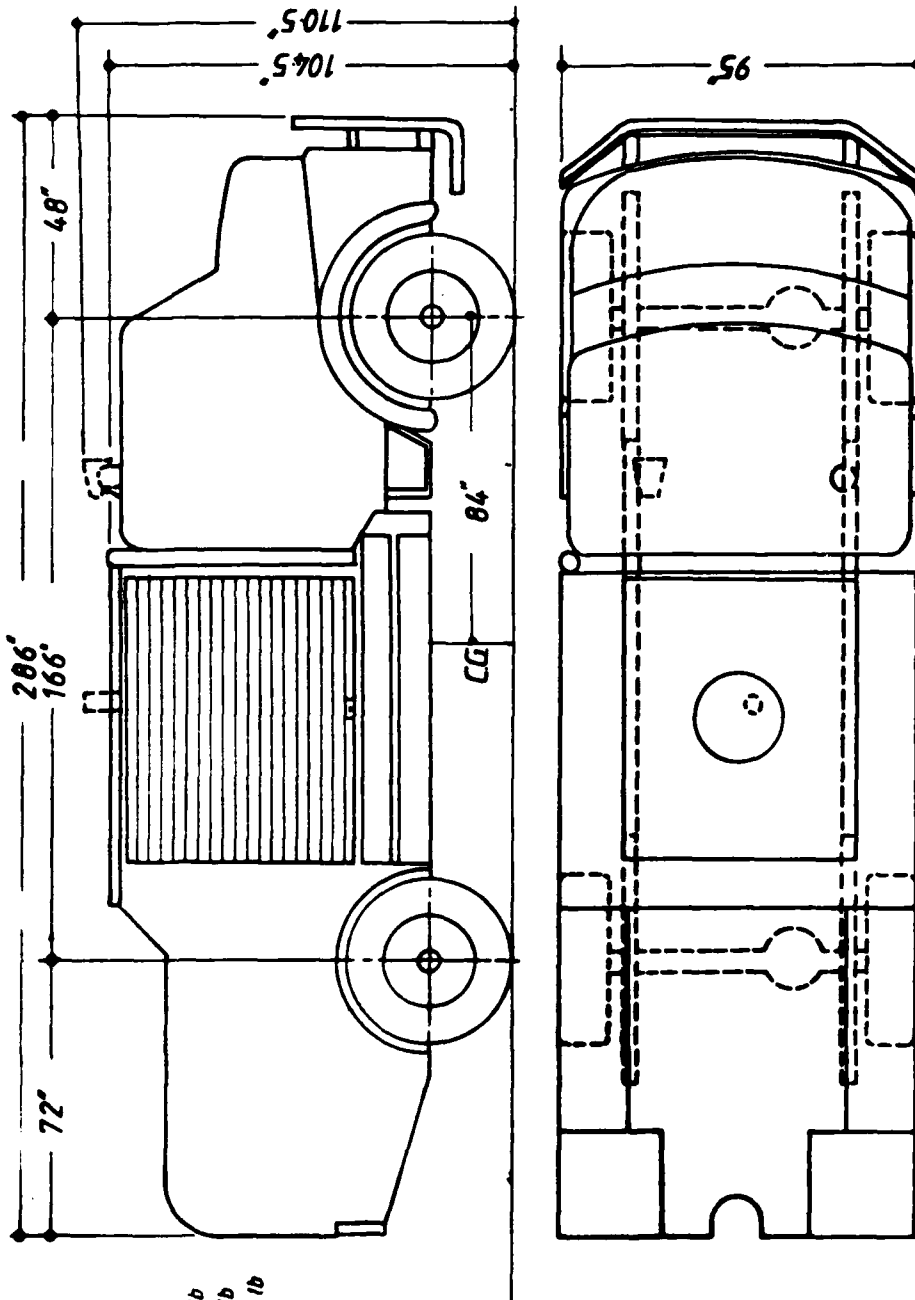






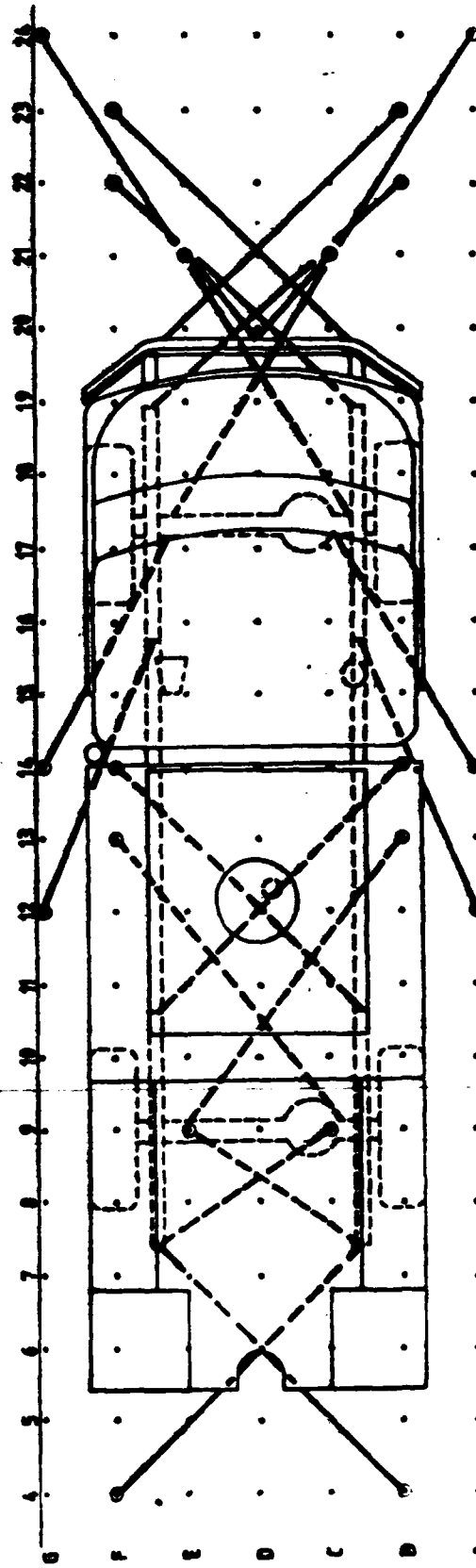
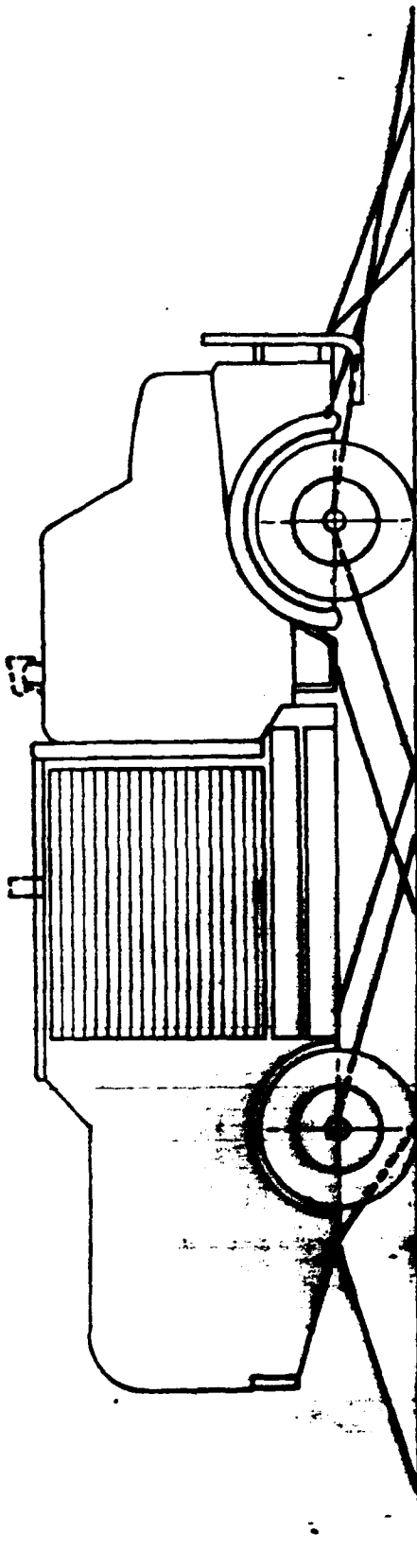
AAP 7211.013-S-2  
TRUCK FIRE RURAL STON  
LIABILITY CODE 39020/4

LOAD N° 111  
PAGE 1 OF 5



WEIGHTS  
FRONT AXLE 11198 lb  
REAR AXLE 11484 lb  
TOTAL WEIGHT 22682 lb

TYRE PRESSURE 55 PSI



TIE DOWN LEGEND  $\odot$  10,000 LB

## LOADING INSTRUCTIONS

### Introduction

1. This load is suitable for carriage in flat floor aircraft or aircraft fitted with -4A dual rail system.

### Aircraft Preparation

2. The aircraft is to be fitted with -4A BP cargo handling system with intermediate rollers removed.
3. Position the ramp for loading in accordance with procedures in AAP 7211.013-9-1.
4. Install the auxiliary truck loading ramps or a ramp jack as required.

### Vehicle Preparation

5. Before loading, the vehicle is to be prepared for air transportation by qualified personnel as follows:
  - a. Secure 4 x auxiliary hoses on right side open compartment.
  - b. Secure 2 x rear hose wheel handles to adjacent body bar.
  - c. Secure 2 x rear hose nozzles to adjacent reflector guards.
  - d. Secure chain saw wooden box on right rear crew seat.

- e. Secure 6 x plastic portable fire fighting knapsack sprayers located in front crew cab around metal holding bars to floor attaching point.
- f. Purge pumping system.
- g. Remove 1 x flashing red light, 1 x PA system speaker, and 1 x tank overflow pipe from top of vehicle and store in driver's compartment.
- h. Remove 2 x flood lights and secure to adjacent guard rail.
- i. Remove first section of exhaust pipe and secure to guard rail.
- j. Secure together 2 x driver assisting aid antennas.
- k. Secure 2 x side view mirrors to front doors.
- l. Raise and secure rear set-up ladder to adjacent 'U' hooks on rear floor of crew cab.
- m. Ensure that the vehicle, and its equipment if necessary, are prepared and certified for air transportation in accordance with AAP 7002.007-1 and AAP 3631.001-B2.

### Loading Aircraft

6. Reverse the truck into the aircraft and position rear axle over F5 417.

LOADING INSTRUCTIONS (CONT'D)

7. Apply the handbrake, engage transmission in the lowest forward gear, and stop engine.
8. Secure the vehicle as shown in the diagram.

Unloading

9. Reverse the loading procedures.

## LOAD DETAILS

Veh etc No	Description	Faces	Reference Point	CG	WT	Moment (1000)
1	Truck fire fighting Rural 5 ton	Aft	Rear axle over FS 357		22 682	

## TIE DOWN INSTRUCTIONS

Veh etc No	Tie Down Fittings	Lashings		Capacity	Vehicle/Equipment Attachment Point
		No of Chains	No of Devices		
1	4B	1	1	10 000	Around left rear spring hanger.
	4F	1	1	10 000	Around right rear spring hanger.
	9E	1	1	10 000	Around right rear spring hanger.
	9C	1	1	10 000	Around left rear spring hanger.
	12A	1	1	10 000	Around right front spring hanger.
	12C	1	1	10 000	Around left front spring hanger.
	13R	1	1	10 000	Around left rear axle.
	13F	1	1	10 000	Around right rear axle.

## TIE DOWN INSTRUCTIONS CONT'D

Veh etc No	Tie Down Fittings	Lashings		Capacity	Vehicle/Equipment Attachment Point
		No of Chains	No of Devices		
1	14A	1	1	10 000	Around right front axle.
	14G	1	1	10 000	Around left front axle.
	15B	1	1	10 000	Around left rear spring hanger.
	15F	1	1	10 000	Around right rear spring hanger.
	21C	1	1	10 000	Around left front axle.
	21E	1	1	10 000	Around right front axle.
	22B	1	1	10 000	Around left front spring hanger.
	22F	1	1	10 000	Around right front spring hanger.
	23B	1	1	10 000	Around left bull bar bumper plate.
	23F	1	1	10 000	Around right bull bar bumper plate.
	24A	1	1	10 000	Around bumper bar - right side of centre tow bar.
	24G	1	1	10 000	Around bumper bar - right side of centre tow bar.

## SUMMARY OF TIE DOWN DEVICES

20 x 10 000 lb Chains and Devices

## LOADING INSTRUCTIONS

### Introduction

1. This load is suitable for carriage in flat floor aircraft or aircraft fitted with -4A dual rail system.

### Aircraft Preparation

2. The aircraft is to be fitted with -4A RP cargo handling system with intermediate rollers removed.
  3. Position the ramp for loading in accordance with procedures in AAP 7211.013-9-1.
  4. Install the auxiliary truck loading ramps or a ramp jack as required.
- a. Secure 4 x auxiliary hoses on right side open compartment.
  - b. Secure 2 x rear hose wheel handles to adjacent body bar.
  - c. Secure 2 x rear hose nozzles to adjacent reflector guards.
  - d. Secure chain saw wooden box on right rear crew seat.
- a. Secure 6 x plastic portable fire fighting knapsack sprayers located in front crew cab around metal holding bars to floor attaching point.
  - f. Purge pumping system.
  - g. Remove 1 x flashing red light, 1 x PA system speaker, and 1 x tank overflow pipe from top of vehicle and store in driver's compartment.
  - h. Remove 2 x flood lights and secure to adjacent guard rail.
  - i. Remove first section of exhaust pipe and secure to guard rail.
  - j. Secure together 2 x driver assisting aid antennas.
  - k. Secure 2 x side view mirrors to front doors.
  - l. Raise and secure rear set-up ladder to adjacent 'U' hooks on rear floor of crew cab.

### Vehicle Preparation

5. Before loading, the vehicle is to be prepared for air transportation by qualified personnel as follows:

### Loading Aircraft

6. Reverse the truck into the aircraft and position rear axle over FS 367.
7. Apply the handbrake, engage transmission in the lowest forward gear, and stop engine.

LOADING INSTRUCTIONS (CONT'D)

8. Secure the vehicle as shown in the diagram.

Unloading

9. Reverse the loading procedures.

END

DATE  
FILMED

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