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Final Report
OCTOBER 1989

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ROAD TEST OF TWO-HIGH PALLETIZED
LOAD ON HEAVY EXPANDED MOBILITY
TACTICAL TRUCK (HEMTT)
SECURED WITH WEB STRAP
TIEDOWN ASSEMBLIES

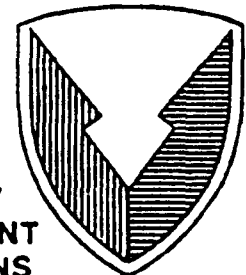
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EVALUATION DIVISION
SAVANNA, ILLINOIS 61074-9639

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<p>The U.S. Army Defense Ammunition Center and School (USADACS), Evaluation Division (SMCAC-DEV), was tasked by the Storage and Outloading Division (SMCAC-DEO) to test a weigh-out pallet load configuration on the Heavy Expanded Mobility Tactical Truck (HEMTT). In order to reach the weigh-out level, pallets had to be stacked two high. To accomplish this under field conditions, web straps were utilized to secure the pallet load onto the HEMTT bed. The test load of 12 pallets of 105mm Howitzer ammunition was subjected to the USADACS Road Transportability Test. This test consisted of two passes over a hazard course, road trip, panic stops, two more passes over the hazard course, and one pass over the washboard course. The proposed tiedown procedure passed this series of tests.</p> <p><i>* Strapped down systems * Transportability</i></p>			
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REPORT NO. EVT 37-89

ROAD TEST OF TWO-HIGH PALLETIZED LOAD ON
 HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)
 SECURED WITH WEB STRAP TIEDOWN ASSEMBLIES

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PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center and School (USADACS), Evaluation Division (SMCAC-DEV), was tasked by the Storage and Outloading Division (SMCAC-DEO) to test a weigh-out pallet load configuration on the HEMTT. In order to reach the weigh-out level, pallets had to be stacked two high. To accomplish this under field conditions, web straps were utilized to secure the pallet loads to the HEMTT bed. The test load of 12 pallets of 105mm Howitzer ammunition was subjected to the USADACS Road Transportability Test. This test consisted of two passes over a hazard course, road trip, panic stops, two more passes over the hazard course and one pass over the washboard course.

B. AUTHORITY. This test was conducted in accordance with mission responsibilities delegated by the U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL 61299-6000. Reference is made to Change 4, 4 October 1974, to AR740-1, 23 April 1971, Storage and Supply Operations; AMCCOMR 10-17, 13 January 1986, Mission and Major Functions of U.S. Army Defense Ammunition Center and School.

C. OBJECTIVE. The objective of these tests was to determine if the tiedown procedures developed for the two-high pallet load transported on a HEMTT is suitable for an on/off road transportation environment.

D. CONCLUSIONS. The tiedown procedure depicted in part 5 of this report satisfied the tests without damage to the unit loads or HEMTT.

E. APPROVED. The tested procedures are approved for use in an on/off road environment.

PART 2

ATTENDEES

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PART 3

TEST PROCEDURES

A. HAZARD COURSE. The specimen being tested will be subjected to the road hazard course. Using a suitable truck/tractor or tactical vehicle, the vehicle/specimen of test method No. 1 shall be towed/driven over a hazard course two times at a speed of approximately 5 mph. The speed may be increased or decreased, as appropriate, to produce the most violent load response.

B. ROAD TRIP. Using a suitable truck/tractor and trailer, or tactical vehicle, the tactical vehicle/specimen load shall be driven/towed for a total distance of at least 30 miles over a combination of roads surfaced with gravel, concrete, and asphalt. Test route shall include curves, corners, railroad crossings, cattle guards, stops, and starts. The test vehicle shall travel at the maximum speed suitable for the particular road being traversed, except as limited by legal restrictions. This step provides for the tactical vehicle/specimen load to be subjected to three full airbrake stops while traveling in the forward direction and one in the reverse direction while traveling down a 7 percent grade. The first three stops are at 5, 10, and 15 mph, while the stop in the reverse direction is of approximately 5 mph.

C. WASHBOARD COURSE. Using a suitable truck/tractor, and/or tactical vehicle, the specimen shall be towed/driven over the washboard course at a speed which produces the most violent response in the particular test load (as indicated by the resonant frequency of the suspension system beneath the load).

PART 4

ROAD TEST DATA

TEST NO. 1

DATE: 27 September 1989

TEST SPECIMEN: Twelve pallets of 105mm, two-high, two-wide and three-long on a HEMTT secured with web strap.

PASS 1-A OVER FIRST SERIES OF TIES: 0.10 MIN 5.68 MPH

PASS 1-B OVER SECOND SERIES OF TIES: 0.10 MIN 5.68 MPH

REMARKS: Longitudinal positioning straps were added before the test.

No damage to load or strapping.

PASS 2-A OVER FIRST SERIES OF TIES: 0.10 MIN 5.68 MPH

PASS 2-B OVER SECOND SERIES OF TIES: 0.10 MIN 5.68 MPH

REMARKS: No damage to pallet load or straps. Slight lateral pallet shift approx 1/2 inch.

30-MILE ROAD TEST: No change in load.

PANIC STOP TEST: Forward pallets slid forward approx 1/2 inch. About 3/4-inch lateral shift of upper pallets.

PASS 3-A OVER FIRST SERIES OF TIES: 0.10 MIN 5.68 MPH

PASS 3-B OVER SECOND SERIES OF TIES: 0.10 MIN 5.68 MPH

REMARKS: No change.

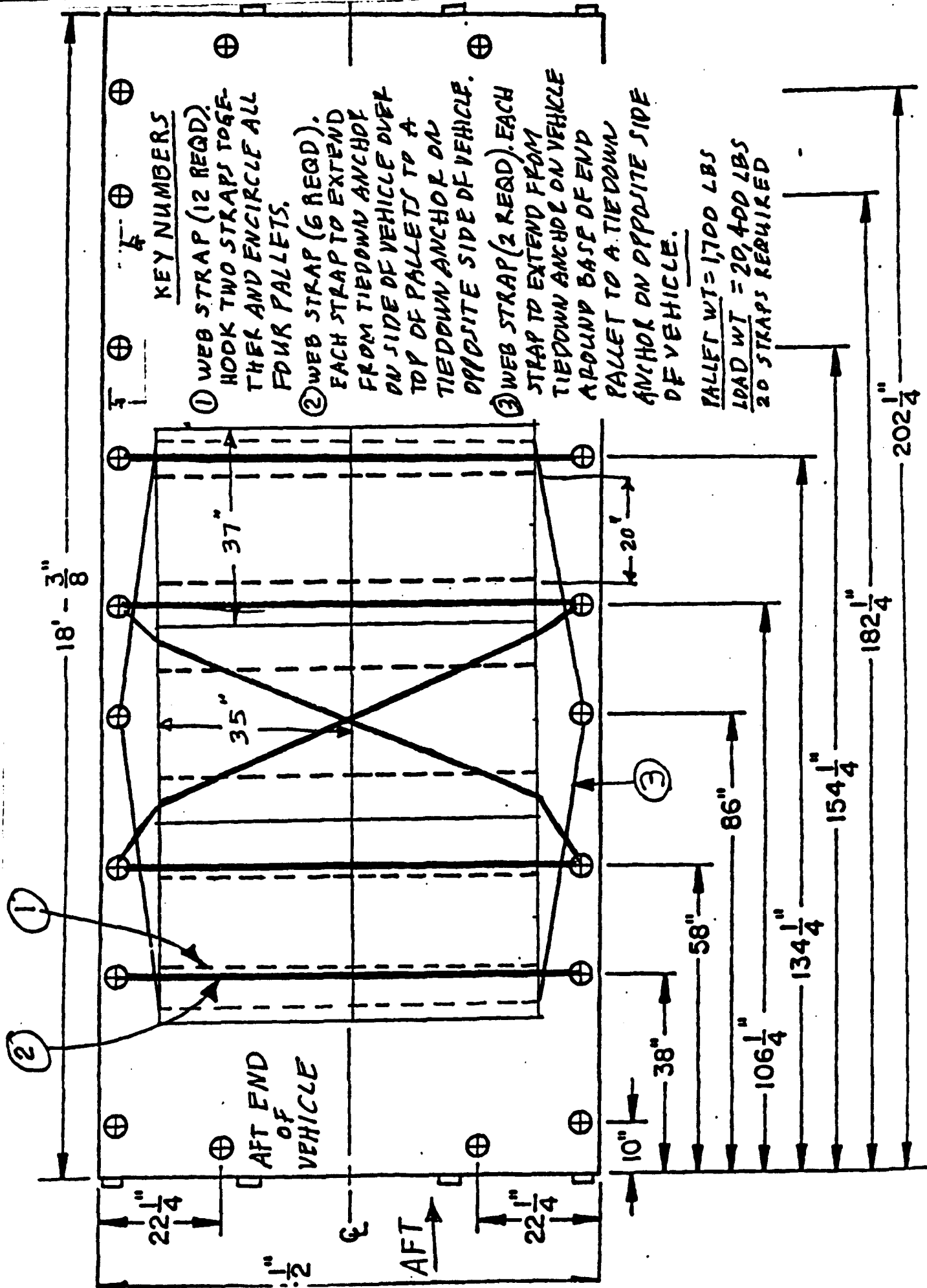
PASS 4-A OVER FIRST SERIES OF TIES: 0.10 MIN 5.68 MPH

PASS 4-B OVER SECOND SERIES OF TIES: 0.10 MIN 5.68 MPH

REMARKS: No damage or breakage to the unit loads or tiedown procedure.

WASHBOARD COURSE: No physical damage. Forward and aft pallets shifted away from the center pallet approx 1.5 inches.

PART 5
TIEDOWN PROCEDURE



KEY NUMBERS

- ① WEB STRAP (12 REQD). HOOK TWO STRAPS TOGETHER AND ENCIRCLE ALL FOUR PALLETS.
- ② WEB STRAP (6 REQD). EACH STRAP TO EXTEND FROM TIEDOWN ANCHOR ON SIDE OF VEHICLE OVER TOP OF PALLETS TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF VEHICLE.
- ③ WEB STRAP (2 REQD). EACH STRAP TO EXTEND FROM TIEDOWN ANCHOR ON VEHICLE AROUND BASE OF END PALLET TO A TIEDOWN ANCHOR ON OPPOSITE SIDE OF VEHICLE.

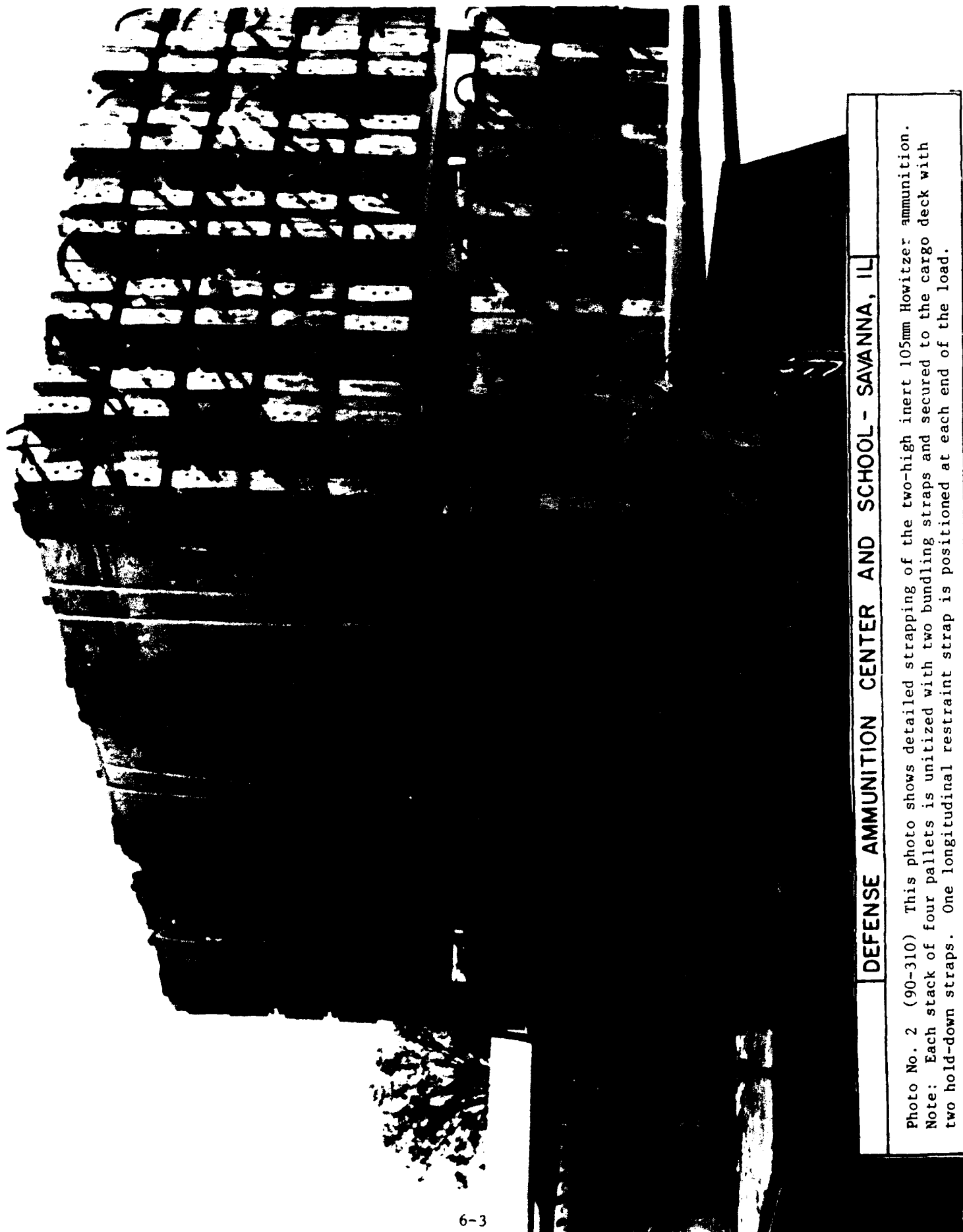
PALLET WT = 1700 LBS
LOAD WT = 20,400 LBS
20 STRAPS REQUIRED

PART 6
PHOTOGRAPHS



6-2

DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL
Photo No. 1 (90-316) This photo shows the HEMTT with a two-high load of inert 105mm Howitzer ammunition secured with web straps.



DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL

Photo No. 2 (90-310) This photo shows detailed strapping of the two-high inert 105mm Howitzer ammunition.
Note: Each stack of four pallets is unitized with two bundling straps and secured to the cargo deck with two hold-down straps. One longitudinal restraint strap is positioned at each end of the load.