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NWHL REPORT 6012

**TEST AND EVALUATION  
OF  
MK 470 CONTAINER  
FOR SPARROW III MISSILE  
WITH MODIFIED WINGS AND FINS**



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**NAVAL WEAPONS HANDLING LABORATORY  
NAVAL AMMUNITION DEPOT EARLE  
Colts Neck, N.J. 07722**

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WITH MODIFIED WINGS AND FINS**

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Technical Director

**NAVAL WEAPONS HANDLING LABORATORY  
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## I. INTRODUCTION

A Mk 470 Mod 0 Container of latest manufacture, produced by SPACO on Contract No. N00197-69-C-0609, was used to test the stowage capabilities of a complete set of modified wings and fins. One set consisted of four fins and four wings. The container with the stowed wings and fins was subjected to the applicable tests of Naval Ordnance Requirements OR-11. For the purpose of these tests, two modified wings and four modified fins were employed in conjunction with two original wings to maintain a full complement of missile components.

## II. DESCRIPTION

The overall configuration of the new modified fin was approximately the same as that of the old fin. A side-by-side comparison is shown in Figures 1 and 2. The NATO SPARROW III utilizes the modified wing and fin when it is stowed in an all-up condition. This modification reduces the size of the missile launcher cell envelope by 75% since the modified wing can be folded. The fin is modified by removal of its outboard tip.

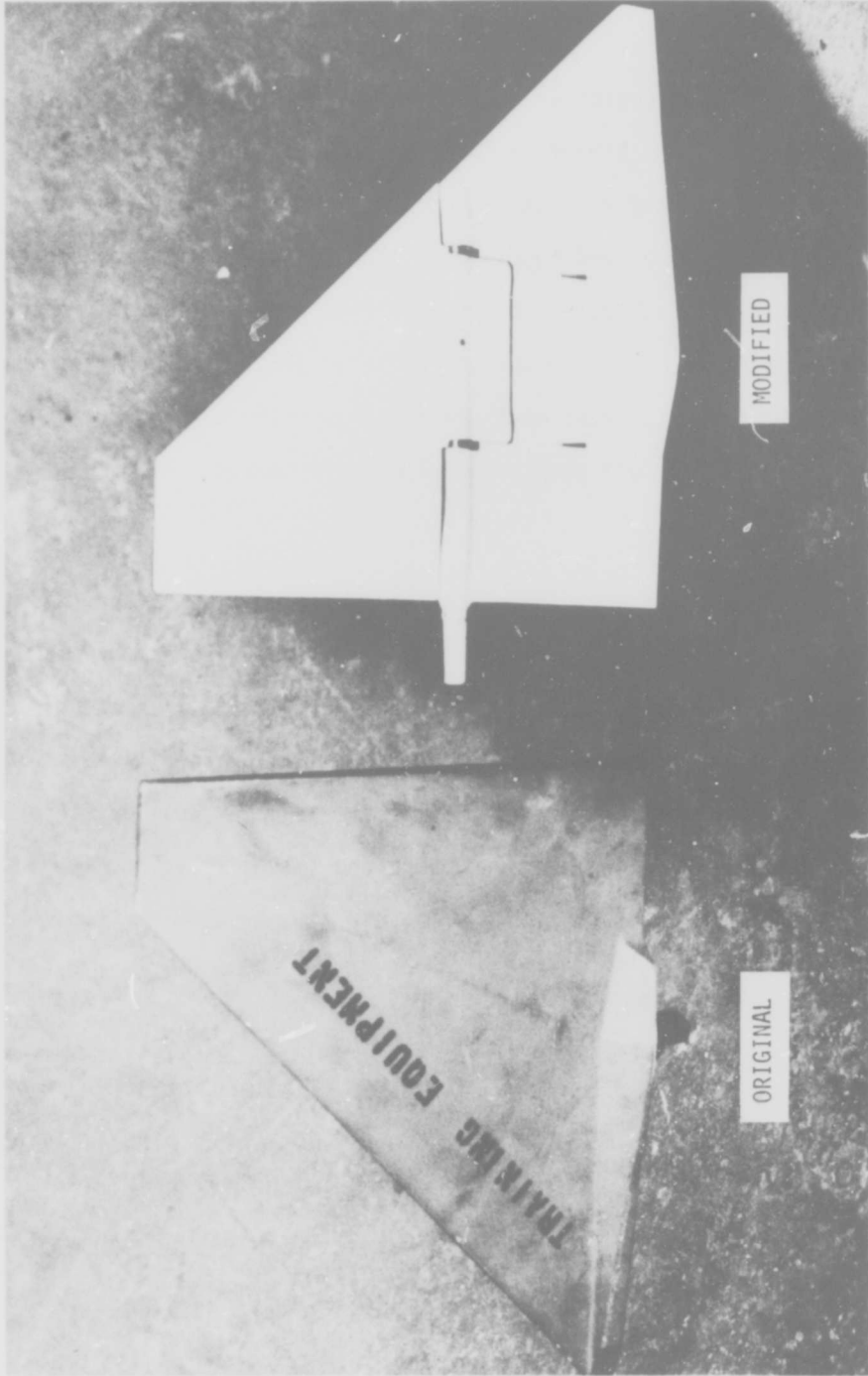


Fig. 1 --Comparison of Original and Modified Wing.

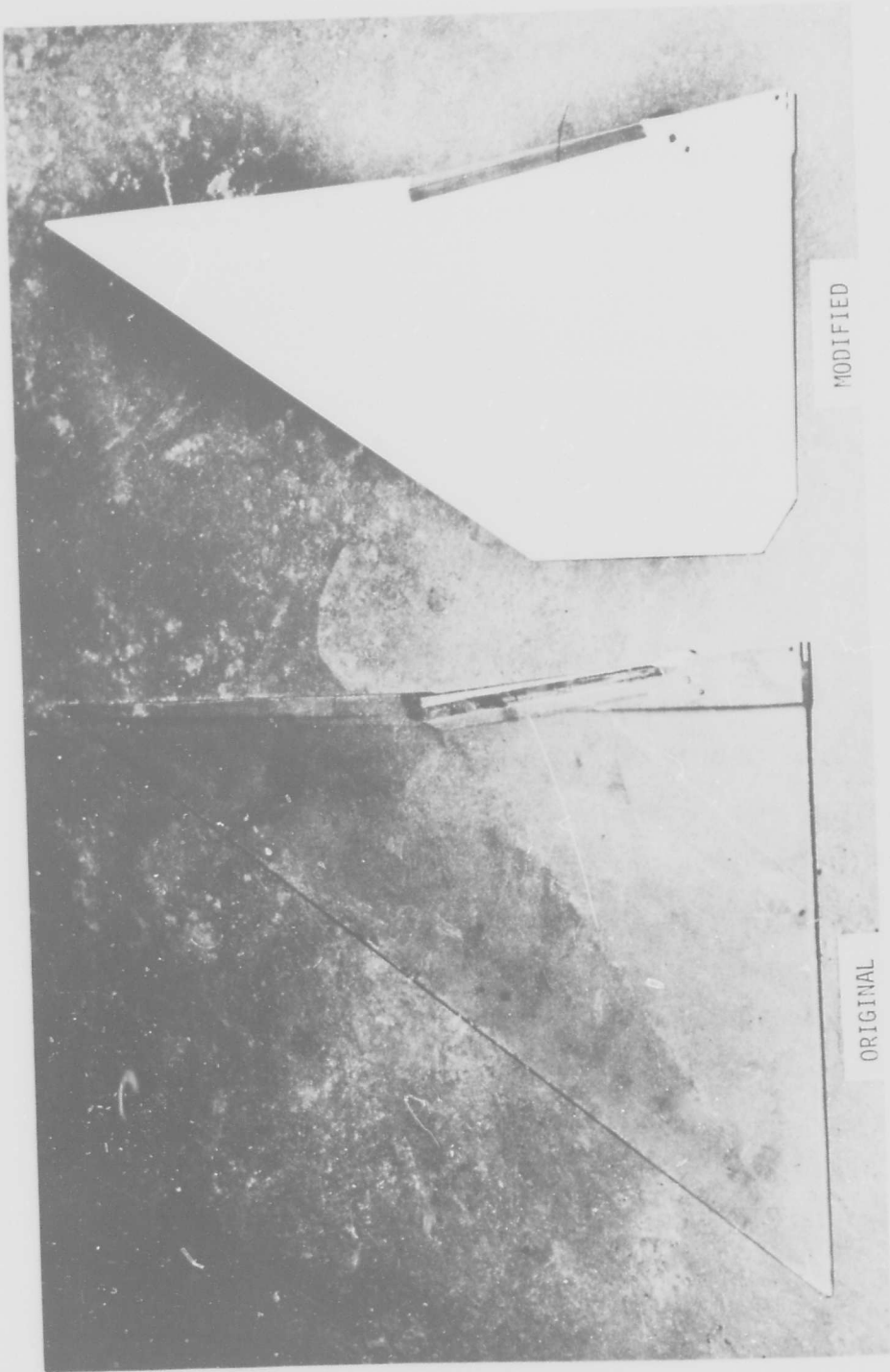


Fig. 2 --Comparison of Original and Modified Fin.

Following inspection of fit of the modified wings and fins in a Mk 470 Mod 0 Container for the SPARROW III Missile, the container with the stowed wings, fins and inert SPARROW III Shape, was subjected to the rough handling tests specified by Naval Ordnance Requirements OR-11.

### III. TEST PROCEDURES AND RESULTS

Fit and Inspection - Three depressed pockets are incorporated in the base of the Mk 470 Container for stowage of the removed wings and fins. At one end of the container is a compartment for four fins each. Adjacent to this and at the opposite end of the container are two more compartments, each designed to accept two wings. Each compartment is fitted with a cushion of foamed urethane rubber, molded to shape, to contain each fin or wing. A strongback-type retainer is utilized to hold the wings and fins in their respective compartments (Figures 3, 4 and 5).

The standard wings and fins were removed from the container and replaced by the modified wings and fins without difficulty. Two modified wings can be stowed in each of two compartments. The fit was satisfactory and the retainer put in place (Figures 6 and 7). One complete set of four modified fins was easily stowed in the end compartment designed for a standard set of fins (Figures 8 and 9). The retainer fit satisfactorily and was capable of being well secured.

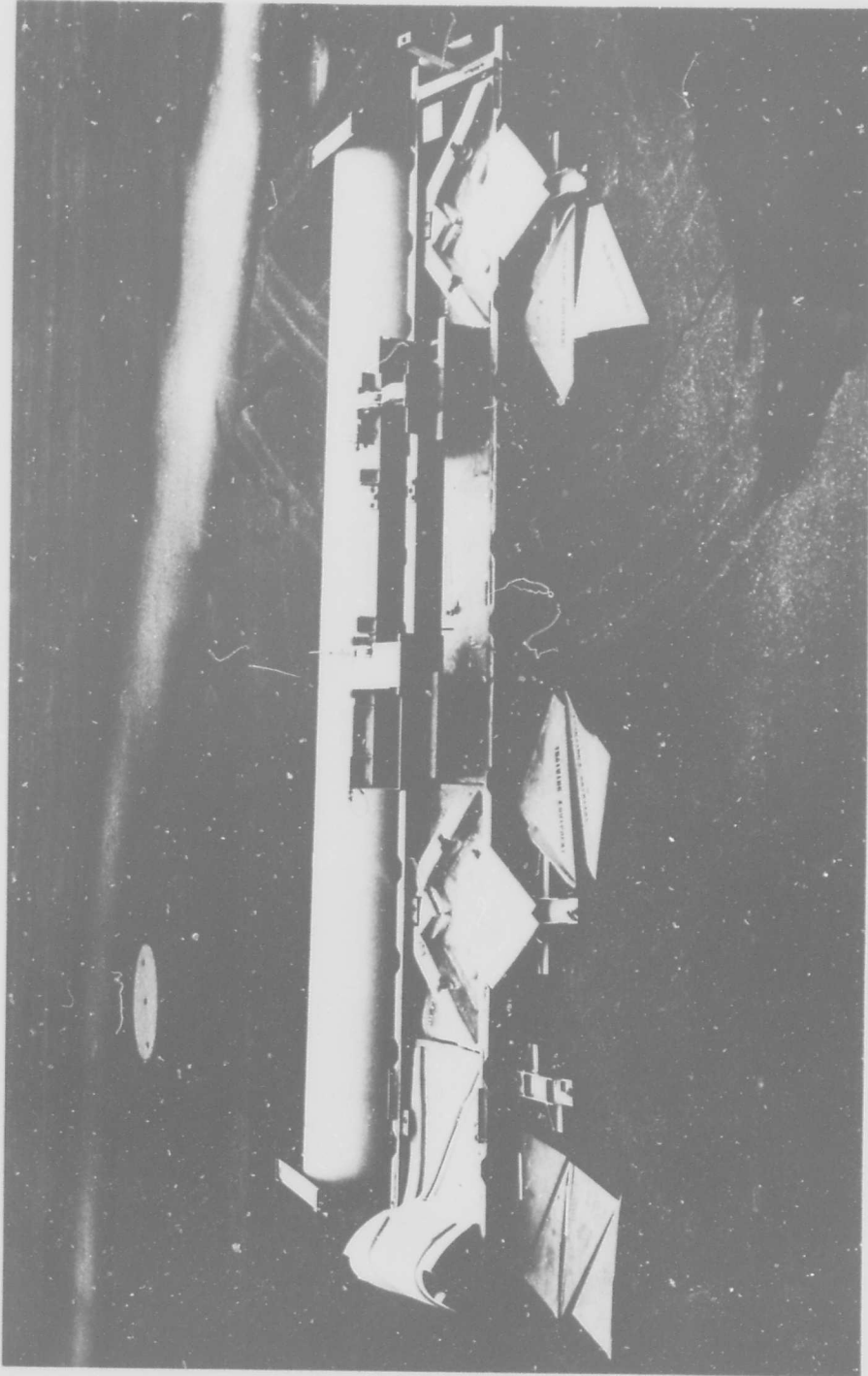


Fig. 3---Wings and Fins Arranged for Installation into Container Storage Compartments.

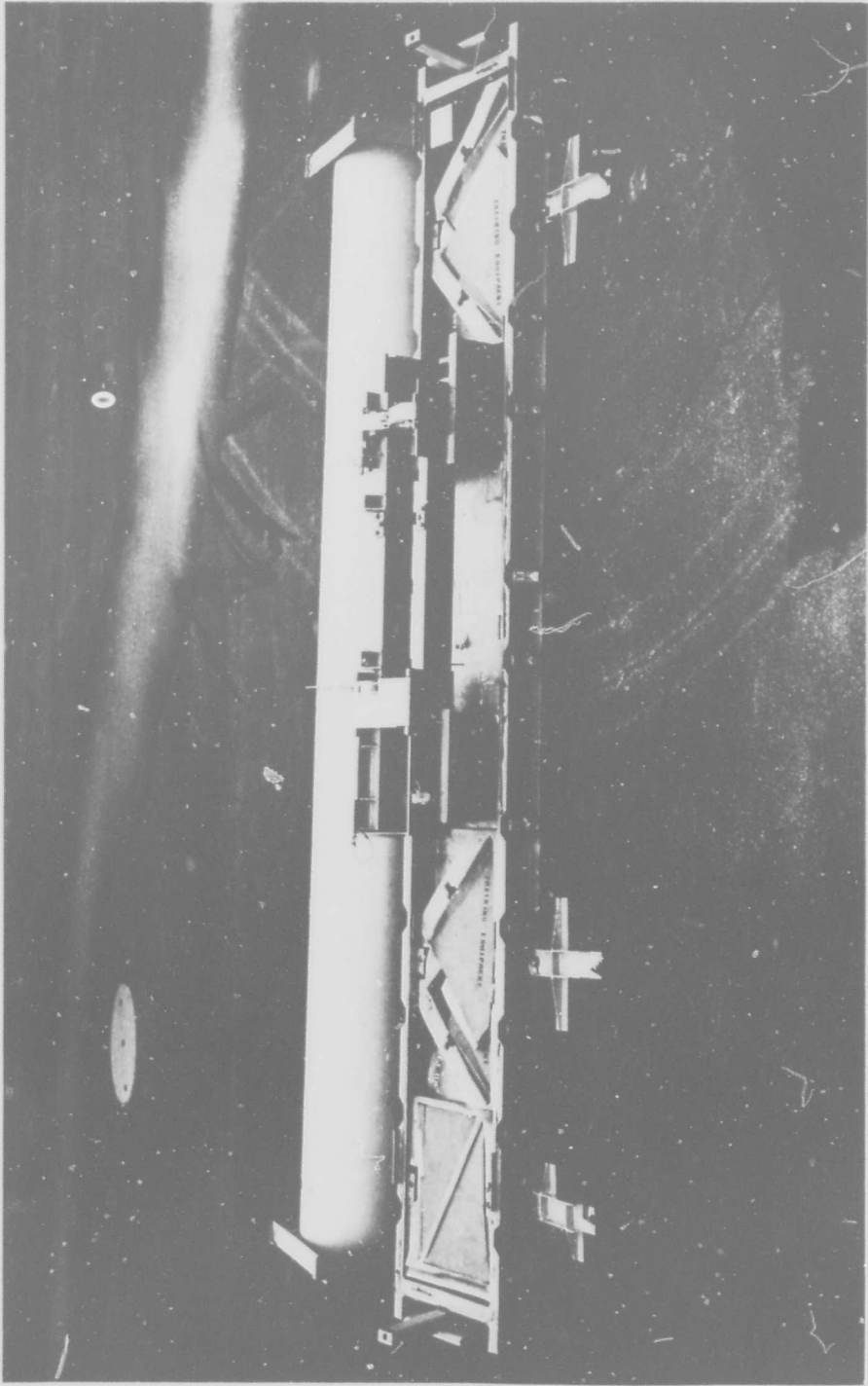


Fig. 4 ---Wings and Fins Stowed into Compartments.

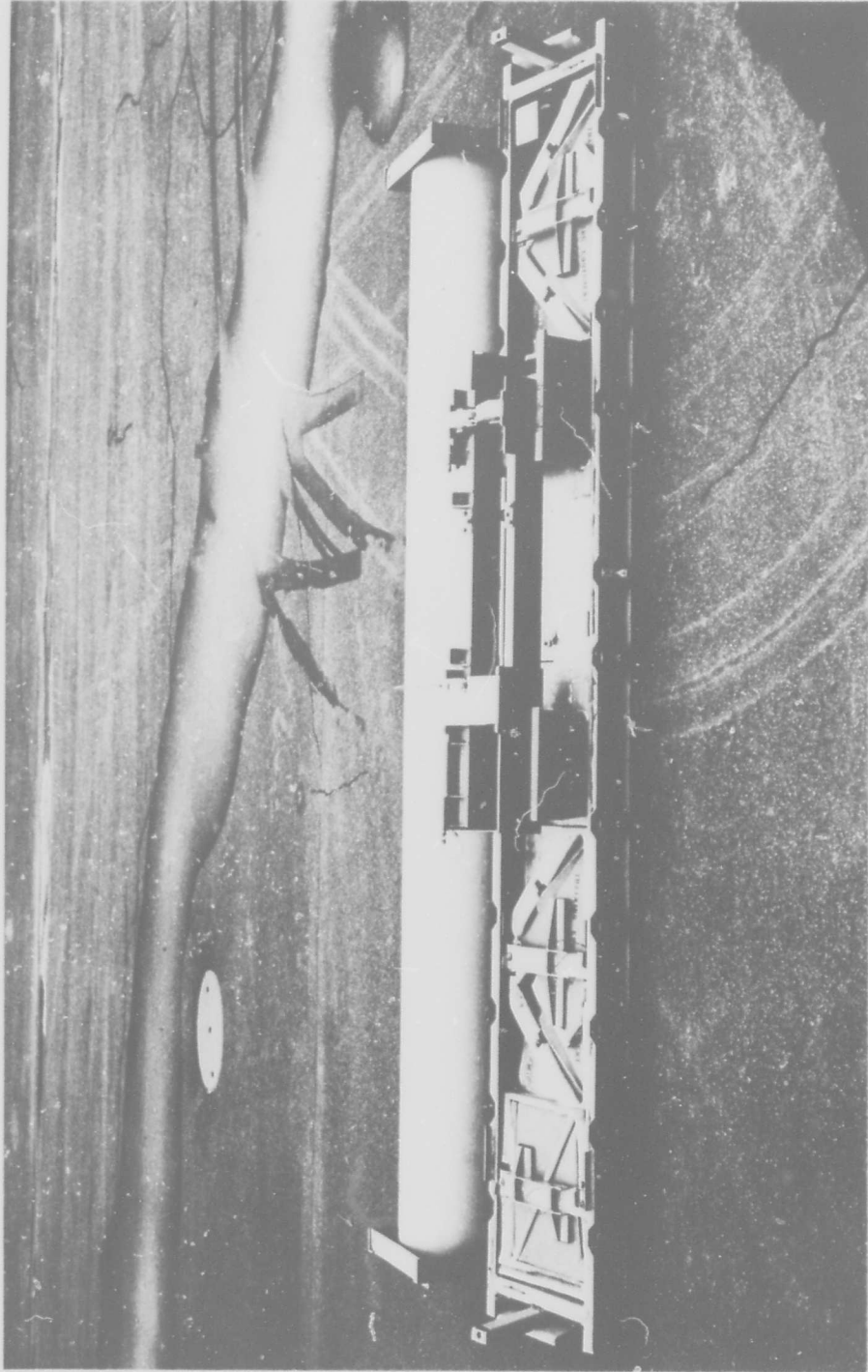


Fig. 5 ---Wings and Fins Stowed and Secured.

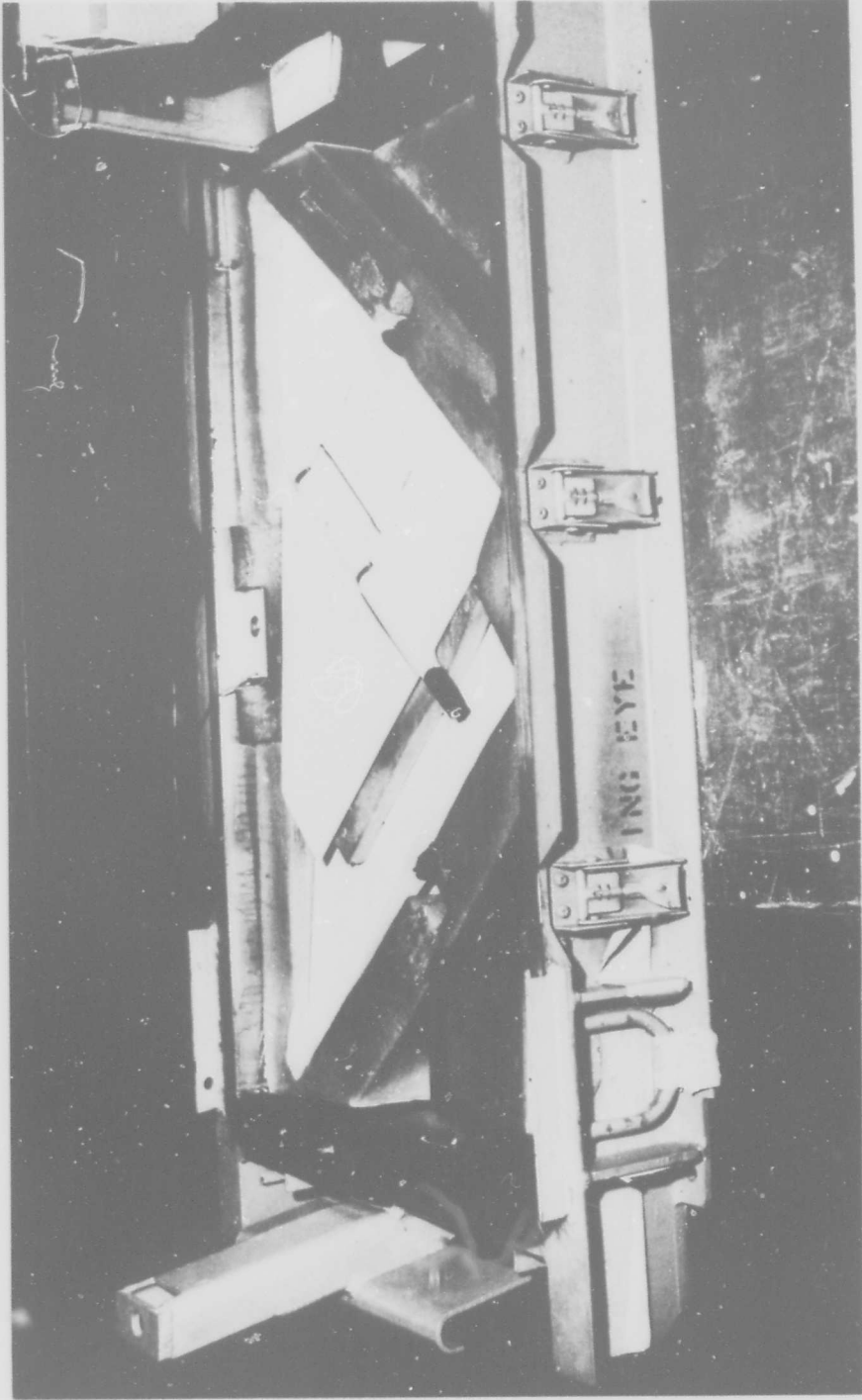


Fig. 6---Two Modified Wings--Fit Check.

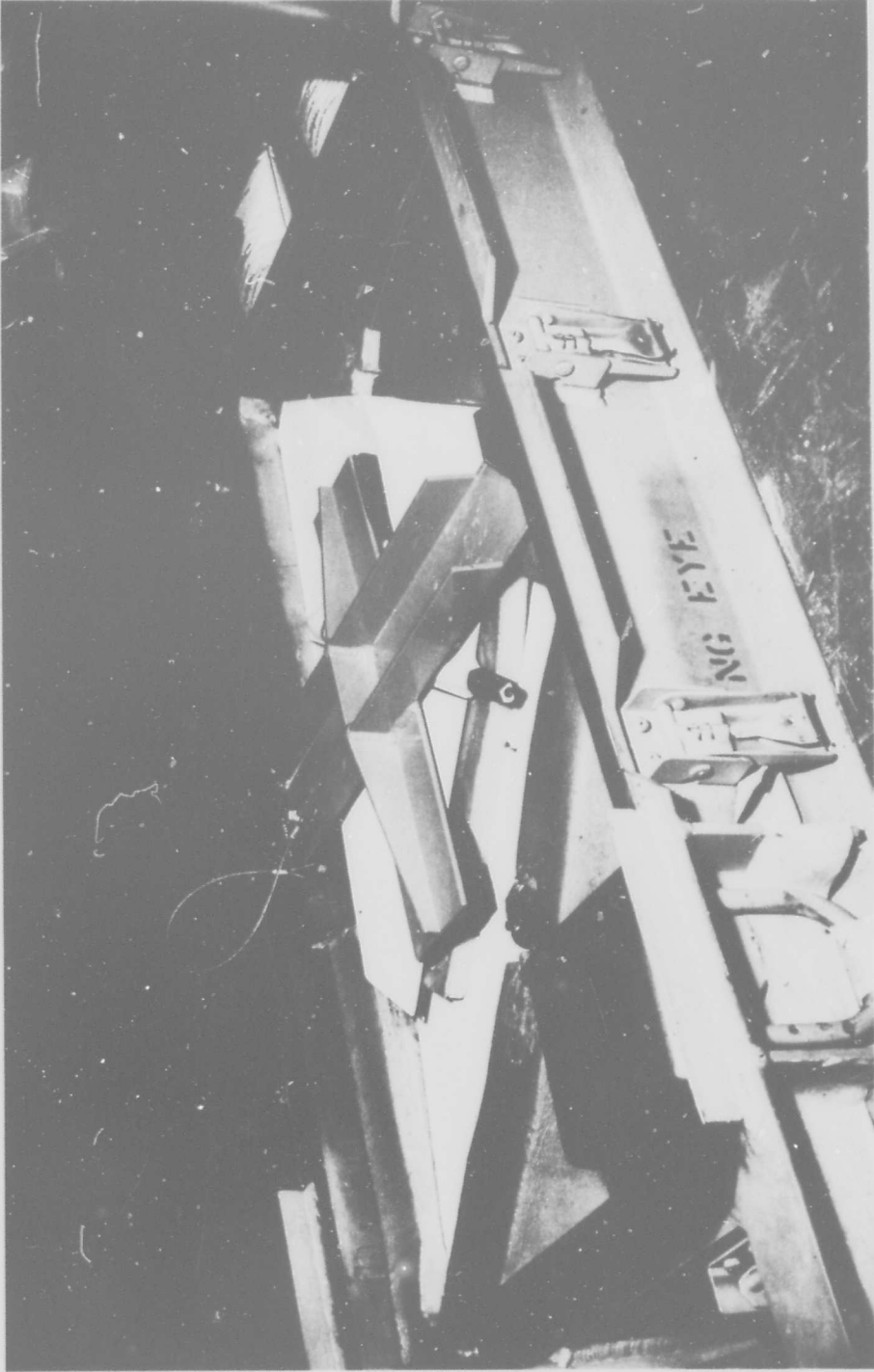


Fig. 7---Two Modified Wings with Retainer Secured.

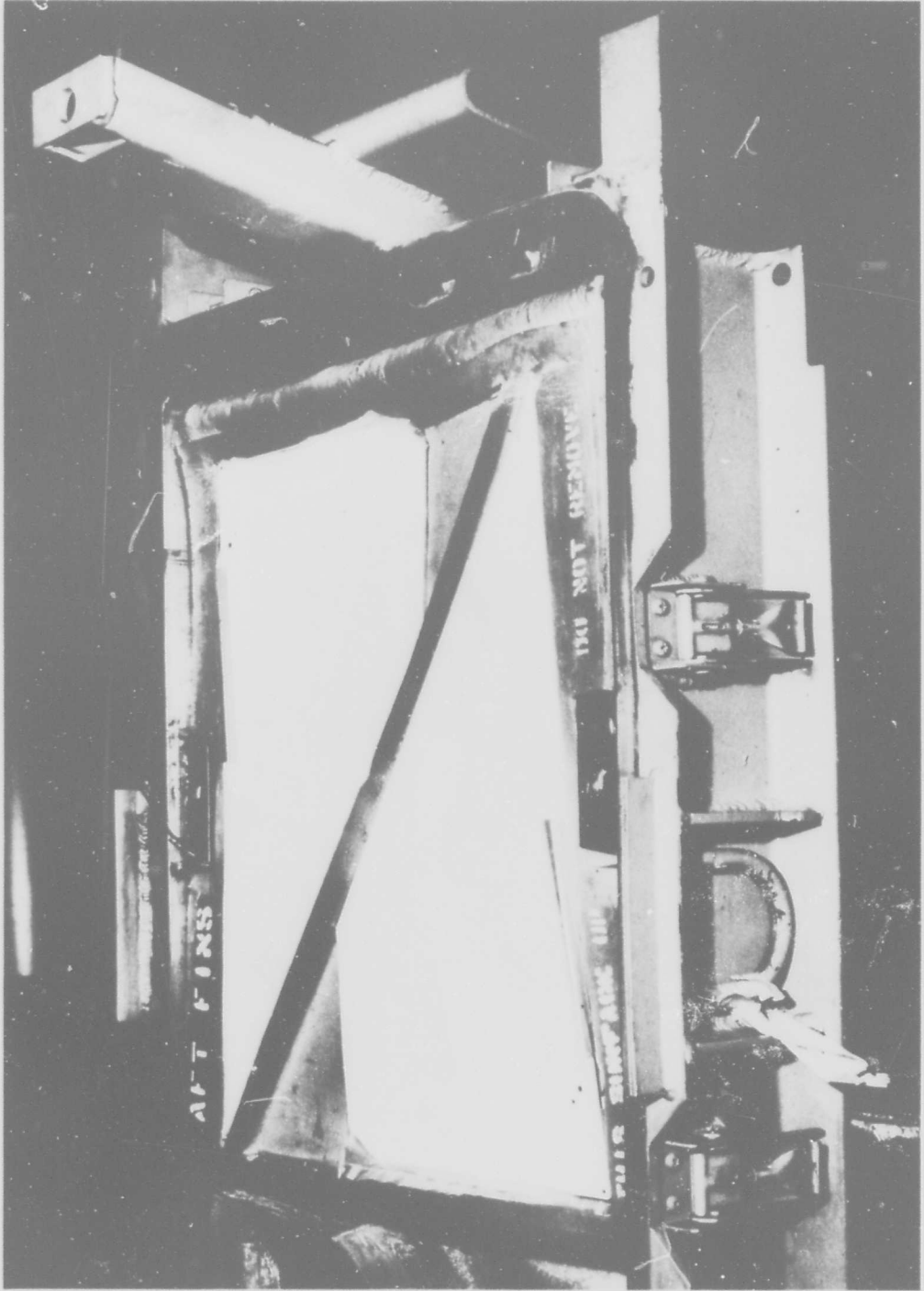


Fig. 8---Four Modified Fins--Fit Check

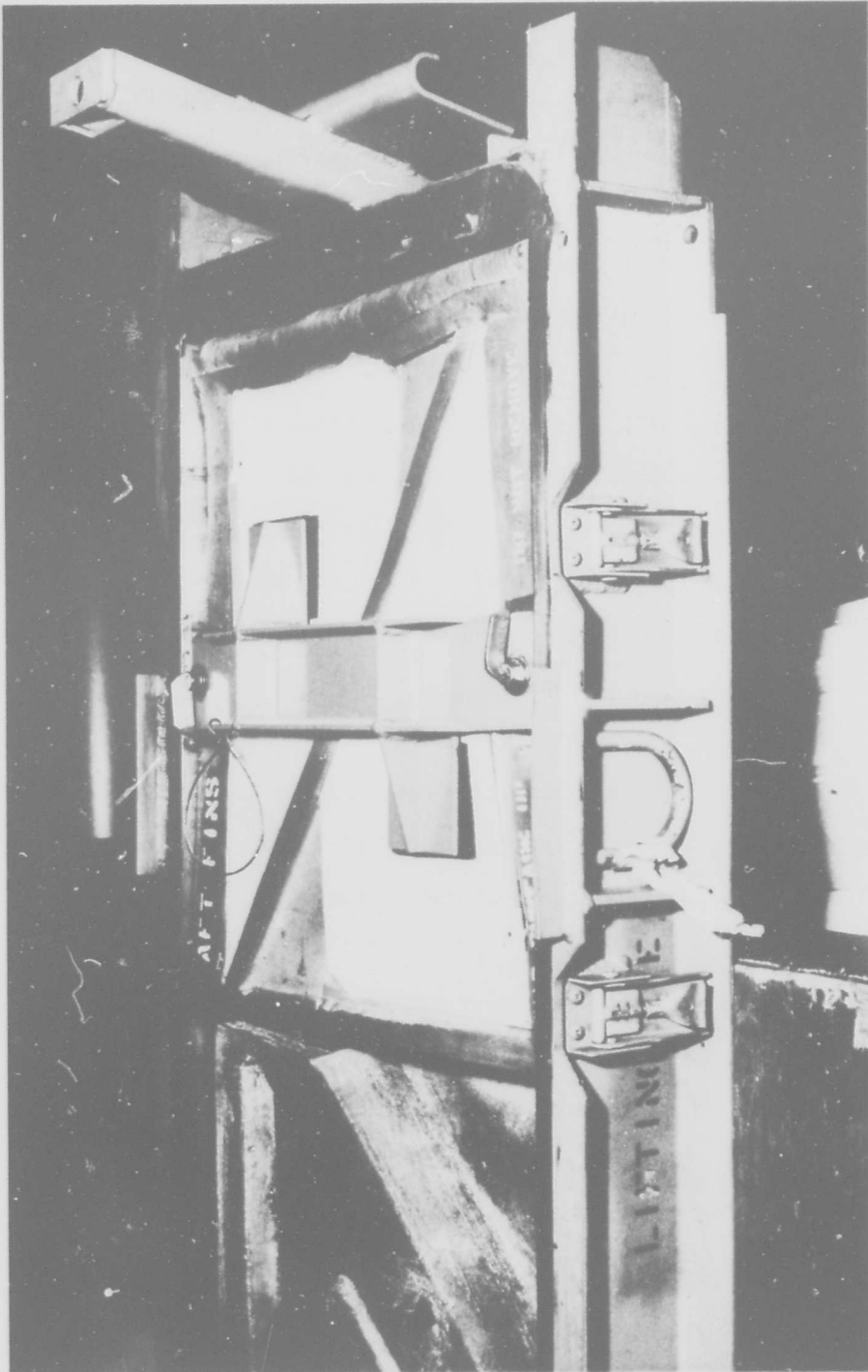


Fig. 9---Four Modified Fins with Retainer Secured.

Low Order Repetitive Shock - The container was subjected to repetitive shock for two hours at one-inch vertical double amplitude with all points of the loaded container leaving the table 1/16-inch at some instant during each cycle.

RESULTS - The frequency at this point was 3.8 Hz. There was no damage to or loosening of the cushion, fins or wings.

Rotational Drop Test - The loaded container was supported at one end by a six-inch block at one corner and a twelve-inch block at the adjacent corner. The corner diagonally opposite the twelve-inch block was raised to a height of eighteen-inches and subjected to free fall and impact on an unyielding concrete surface. All four corners were impacted in this manner.

RESULTS - During this test there was minor racking of the container, but the fins and wings remained tightly secured in their respective places of stowage. There was no damage to any of these items.

Wall Impact Test - The test container was impacted on two ends by means of the pendulum method against a solid steel wall at 10-feet per second. The load was lifted by means of a four-legged sling.

RESULTS - A post-test examination revealed no damage to the cushioning or to the fins or wings. The retainers remained securely in place.

#### IV. CONCLUSION

The NATO SPARROW III Missile, with modified wings and fins, may be successfully packaged and shipped in the Mk 470 Mod 0 Container.

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1. Rough handling tests of MK 470 MOD 0 Container.

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2. Satisfactory stowage capabilities for modified wings and fins of NATO SPARROW III Missile

By Ralph J. Mercurio  
W. Howard Trowbridge

June 1971

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