

DEPARTMENT OF THE NAVY

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COMNAVAIRLANTINST 13800.3F/
COMNAVAIRPACINST 13800.9D
NAVAIRLANT N81A
NAVAIRPAC N73

MAY 18 1999

COMNAVAIRLANT INSTRUCTION 13800.3F/COMNAVAIRPAC INSTRUCTION 13800.9D

Subj: AIRCRAFT LAUNCH AND RECOVERY OPERATIONS MANUAL

1. Purpose. To establish procedures and safety precautions and promulgate detailed guidance for training and for the conduct of shipboard launch and recovery operations. Due to extensive revision, paragraph markings have been omitted. This directive should be read in its entirety.
2. Cancellation. COMNAVAIRLANTINST 13800.3E and COMNAVAIRPACINST 13800.9C
3. Discussion. The carrier launching and recovery field has grown rapidly in complexity and consequently the directives associated with this field have increasingly grown in number. This instruction consolidates the large amount of information located in the various launching and recovery publications including standard operating procedures for fixed wing aircraft, personnel training and qualification criteria, required emergency drills, and operational reports. When used in conjunction with current Aircraft Launching/Recovery Bulletins, NAVAIR operating instructions, and the CV NATOPS Manual, this instruction, written in the form of a manual, provides most of the information necessary to safely and expeditiously launch and recover aircraft. If appropriate guidance has been omitted from this manual then any directive, which either partially or completely covers the circumstances, shall govern.
4. Action. Commanding officers of carriers are directed to:
 - a. Incorporate the procedures and policies contained in this manual.

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COMNAVAIRPACINST 13800.9D

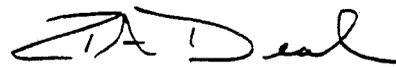
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b. Submit recommended additions in writing to Commander Naval Air Force, U.S. Atlantic Fleet, Attn: Code N81A, or to Commander Naval Air Force, U.S. Pacific Fleet (Code N73). Urgent recommendations should be submitted by message. An information copy of the recommended change should be provided the TYCOM not addressed. See page i of the foreword for specific addresses.

c. Report in writing any conflict between this manual and other existing directives to COMNAVAIRLANT and COMNAVAIRPAC.



R. J. O'HANLON
Chief of Staff



R. A. DEAL
Chief of Staff

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FOREWORD

SCOPE

This manual is issued by the authority of the Commander Naval Air Force, U.S. Atlantic Fleet, and Commander Naval Air Force, U.S. Pacific Fleet. It provides the best available operating instructions for most circumstances; however, no manual is a substitute for sound judgment. Operational necessity may require modification of the procedures contained herein. It will then be incumbent upon the personnel concerned to use good judgment and common sense to determine a proper course of action. It is the responsibility of all Catapult and Arresting Gear Officers to have a complete knowledge of its contents.

This manual is intended as an operational manual. No attempt has been made to include maintenance/material, administrative or other information, other than that directly concerned with operations.

In order to provide one manual that covers all situations, some ships will find information that is not applicable to their particular installation, i.e., ships with ICCS, etc. In these cases, such information shall, obviously, be disregarded.

UPDATING THE MANUAL

To ensure that the manual contains the latest procedures and information, a review conference will be held periodically as necessary.

YOUR RESPONSIBILITY

This manual will be kept current through an active manual change program. If errors and omissions are found or improvements or additions are desired, submit a change recommendation at once.

CHANGE RECOMMENDATIONS

Recommended changes to this manual may be submitted by anyone. Change recommendations of an URGENT nature (safety of flight, etc.) should be submitted directly to COMNAVAIRLANT, information COMNAVAIRPAC, by priority message. Submit routine change recommendations to the model manager on OPNAV Form 3710/6. Address routine changes to:

Commander Naval Air Force
U.S. Atlantic Fleet (Code N81A)
Norfolk, VA 23511-5315

Copy to: Commander Naval Air Force
U.S. Pacific Fleet (Code N73)
Naval Air Station, North Island
San Diego, CA 92135-5100

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INTERIM CHANGE SUMMARY

The interim change summary in each manual is provided for the purpose of maintaining a complete record of all interim changes issued to the manual. Each time the manual is changed or revised, the interim change summary will be updated to indicate disposition and/or incorporation of previously issued interim changes. When a regular change is received, the interim change summary should be checked to ascertain that all outstanding interim changes have been either incorporated or canceled; those not incorporated should be re-entered and noted as applicable.

WARNING, CAUTIONS AND NOTES

The following definitions apply to "WARNINGS," "CAUTIONS" and "NOTES" found throughout the manual:

WARNING

An operating procedure, practice, or condition, etc., which may result in injury or death, if not carefully observed or followed.

CAUTION

An operating procedure, practice, or condition, etc., if not strictly observed, may damage equipment.

NOTE

An operating procedure, practice, or condition, etc., that is essential to emphasize.

WORDING

The concept of word usage and intended meaning which has been adhered to in preparing this Manual is as follows:

"Shall" has been used only when application of a procedure is mandatory.

"Should" has been used only when application of a procedure is recommended.

"May" and "need not" have been used only when application of a procedure is optional.

"Will" has been used only to indicate futurity, never to indicate any degree of requirement for application of a procedure.

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DEFINITIONS

The following definitions shall apply through this manual:

Catapult Officer. Qualified officers assigned to V-2 Division responsible for conducting the launch. (V-2 Division Officer shall be synonymous with the catapult and arresting gear officer.)

Arresting Gear Officer. Qualified officers assigned to V-2 Division responsible for conducting the recovery.

Catapult Safety Observer (ICCS). The direct representative of the Launching Officer, and is responsible for ensuring proper launching procedures and safety precautions.

Topside Safety Petty Officer (TSPO). Ensures proper installation of holdbacks, repeatable release assemblies and the mandatory seating of aircraft launch bar within the shuttle spreader. (For bridle aircraft), ensures proper engagement of bridle to spreader and aircraft tow fittings. He shall be the last man to exit from underneath the aircraft.

Holdback Man. Properly installs holdbacks and repeatable release assemblies. (For bridle aircraft), properly installs tension rings/bars, holdback assemblies and verifies correct positioning.

Hookup Man. (Bridle) Properly engages bridles to aircraft hookup points.

Primary Flight Arresting Gear Controller. The member of the recovery crew stationed in Primary Fly who shall ensure all stations are properly manned prior to recovery operation. He informs the Arresting Gear Engine Operators of the required weight setting for the recovery and monitors the proper setting on the synchro repeaters/dixon meters. He checks and reports proper gear and lens settings to the Air Officer during recovery operations. He is also referred to as the Primary Fly Controller or the Primary Fly Arresting Gear Console Operator.

Fresnel Lens Console Operator. The member of the recovery crew stationed in Pri Fly who shall make the proper lens settings and monitor the lens system for proper operation during the recovery.

Recovery Director. The assigned member of the flight deck crew responsible for taxiing aircraft clear of the landing area during recovery operations. He is also referred to as the "gear puller."

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(4) Ensure that all launch and recovery procedures are standard and in accordance with this manual and in compliance with all safety precautions, and directives.

102. ASSISTANT CATAPULT AND ARRESTING GEAR OFFICERS (BRANCH OFFICERS)

a. The V-2 Division is normally divided into four operational branches with an Assistant Catapult and Arresting Gear Officer serving as branch head.

These are the Bow Catapult Officer, Waist Catapult Officer, Arresting Gear Officer and Visual Landing Aids Officer.

b. The V-2 Division Branch Officers are responsible to the Catapult and Arresting Gear Officer for the maintenance and readiness of the equipment under their cognizance. In addition, they are responsible for the training of their unit's crew. They shall ensure that a complete and comprehensive training program is carried out and that all personnel responsible for operating any portion of the unit's equipment are completely familiar with their assigned tasks. Furthermore, they shall ensure that only PQS qualified and designated personnel are assigned to man launch and recovery stations.

c. In addition they shall ensure:

(1) That the pre- and post-operational checkouts are properly conducted in accordance with the Planned Maintenance System (PMS), and Aircraft Launch and Recovery Maintenance Program (ALREMP).

(2) That all safety precautions are posted and personnel are familiar with and comply with these precautions.

(3) That all personnel are familiar with fire fighting and damage control procedures.

(4) That a current file of Aircraft Launch and recovery Bulletins are maintained and updated for use at all applicable stations.

(5) That all personnel are familiar with the appropriate portions of this manual and NAVAIR operating manuals.

(6) That a record is maintained of all launch and recovery information and that reports and records are prepared in accordance with Section V for submission by the Catapult and Arresting Gear Officer.

103. AIRCRAFT LAUNCH AND RECOVERY EQUIPMENT MAINTENANCE OFFICER

a. The ALRE Maintenance Officer, under the direction of the Catapult and Arresting Gear Officer, is responsible for the proper maintenance and upkeep of assigned equipment.

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- b. In addition he shall (in accordance with OPNAVINST 4790.15 series):
- (1) Plan, schedule and control all phases of maintenance.
 - (2) Administer the Division's Planned Maintenance System.
 - (a) Maintain current CSMP.
 - (b) Plan and schedule for overhaul, repair and alteration actions via the Consolidated Ship's Maintenance Plan (CSMP).
 - (c) Ensure that an adequate stocking level is maintained, by both V-2 and the Supply Department, for all material, equipment and spares necessary to support launch and recovery operations.
 - (3) Administer a Quality Assurance Program.
 - (a) Compile and maintain a list of critical areas of each maintenance action to be inspected.
 - (b) Ensure an up-to-date list of Quality Assurance inspectors is available for maintenance personnel. Maintenance actions requiring a QA inspector shall not be inspected one who has participated in the maintenance action.
 - (4) Operate the ALRE technical library in support of activities being performed within the division and ensure all changes and revisions are entered in each publication and are complied with.
 - (5) Review Equipment Maintenance Logs at least twice monthly.
 - (6) Maintain liaison with other departments on board ship to obtain adequate maintenance and material support.
 - (7) That an up-to-date history is kept of all work done and repairs accomplished on the machinery under their cognizance. The Consolidated Ship's Maintenance Plan (CSMP) is the recommended means of maintaining an up-to-date history of all work done and repairs accomplished. To augment CSMP, Machinery History Logs shall be maintained on each catapult, arresting gear engine, Fresnel Lens (FLOLS) and Integrated Launch and Recovery Television System (ILARTS). These logs will enhance command awareness of local maintenance trends, assist in the investigation of discrepancies, and will be available for periodic review by NAVAIRWARCEN representatives in determining fleet-wide trends.
 - (8) Maintaining an effective tool control program.

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104. LAUNCHING OFFICER

a. The Launching Officer is directly responsible to the Air Officer via the ACHO for the safe and efficient operation of the launch equipment, and for the performance of the crew during launch operations. He has the ultimate responsibility for safety in the launching of all aircraft from the catapults. He shall be thoroughly familiar with the applicable Aircraft Launching Bulletins, Deck Gear, Accessories Bulletins, and the CV NATOPS Manual. In addition, he shall be thoroughly familiar with this manual and shall ensure that all launch procedures are conducted in accordance with this manual and applicable NAVAIR operating instructions. The Launching Officer shall ensure strict compliance with all operational safety precautions.

b. The Launching Officer/Catapult Officer shall be a commissioned officer, properly trained and fully qualified to perform this function.

c. Detailed duties and responsibilities are set forth in appropriate sections of this manual.

105. CATAPULT CREW. During launch operations, the Catapult Crew is responsible to the Launching Officer for the safe and efficient actions required of their stations. They shall be thoroughly familiar and comply with the applicable operating procedures and safety precautions contained in this manual and NAVAIR operating instructions.

106. RECOVERY OFFICER

a. The Recovery Officer is responsible to the Air Officer via the ACHO for the safe and efficient operation of the recovery equipment and crew during recovery operations. He shall be thoroughly familiar with the installed recovery equipment, the applicable Aircraft Recovery Bulletins and the CV NATOPS Manual. In addition, he shall be thoroughly familiar with the applicable portions of this manual and shall maintain a complete file of the current Aircraft Recovery Bulletins, CV NATOPS, and NAVAIR operating instructions. The Arresting Gear Officer shall ensure strict compliance with all operational safety precautions.

b. The Recovery Officer/Arresting Gear Officer shall be a commissioned officer, properly trained and fully qualified to perform this function.

c. Detailed duties and responsibilities are set forth in appropriate sections of this manual.

107. ARRESTING GEAR CREW. During recovery operations, the Arresting Gear Crew is responsible to the Recovery Officer for the safe and efficient actions required of their stations. They shall be thoroughly familiar with, and comply with, the applicable operating procedures and safety precautions contained in this manual and NAVAIR operating instructions.

108. VISUAL LANDING AIDS CREW. During air operations, the Visual Landing Aids Crew is responsible directly to the Air Officer for the safe and efficient operation of the VLA equipment.

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109. TRAINING AND QUALIFICATION

a. The following training and qualification criteria are mandatory for all Catapult and Arresting Gear Officers and Assistant Catapult and Arresting Gear Officers.

b. Officers reporting for duty will normally have completed Part I (Formal Schooling). If this training has not been accomplished, ships shall make arrangements for officers to attend the courses prior to qualification. Completion of all outlined criteria is the minimum required for qualification to perform duties as Launching and Recovery Officer. Completion of Parts I and II is considered the minimum requirement for qualification to perform duties as Launch and/or Recovery Officer.

110. CATAPULT AND ARRESTING GEAR OFFICER TRAINING AND QUALIFICATIONS CRITERIA

a. Part I - Formal Schooling

(1) Aircraft Launch and Recovery Equipment Officer Course, Class C-2G-2010

(a) Location: Naval Air Technical Training Center Detachment
Naval Air Station
Lakehurst, NJ 08733

(b) Length of Course: Two weeks

(2) Air Department Officer Indoctrination (ADOI)

(a) Location: COMNAVAIRLANT (Code N81A)/COMNAVAIRPAC (Code N7)
and

OIC NAMTRAGRUDET Norfolk/North Island
Naval Air Station
Norfolk, VA 23511/San Diego, CA 92135

(b) Length of Course: One week (includes fire fighting, 3M, ADOI, and TYCOM briefings)

b. Part II - Complete Personnel Qualification Standards (PQS) for applicable Watchstations for Aircraft Launch and Recovery Officer (NAVEDTRA 43443).

Certification. Having completed Part I and II and demonstrated the required high level of skill and competence, the officer may be certified by the Commanding Officer, as recommended by the air officer and V-2 division officer, to perform the duties of Recovery, No-Load, and Launching Officer. Qualification shall be recognized for each, by a letter of certification similar to that issued to underway officers of the deck.

NOTE

At no time shall Launching Officers/Catapult Officers under instruction, launch aircraft from catapults with personnel training on Monitor/Deckedge.

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111. CATAPULT ARRESTING GEAR AND VLA CREWS

a. All watchstations shall be manned by fully PQS qualified personnel only. Watchstations manned by personnel under training shall also be manned by fully PQS qualified crewmembers. If the duties include voice communication, both personnel shall be so equipped.

b. Catapult, Arresting Gear, and Visual Landing Aids personnel training requirements, leading to qualifications/designations, shall be established by the individual carriers. However, minimum requirements shall be those found in the following:

- (1) NAVEDTRA 43426-5 Steam Catapults
- (2) NAVEDTRA 43426-6 MK-7 Arresting Gear
- (3) NAVEDTRA 43426-25 Catapult/AG Electrician
- (4) NAVEDTRA 43225-6 Fresnel Lens
- (5) NAVEDTRA 43225-7 ILARTS
- (6) NAVEDTRA 43443 Aircraft Launch and Recovery Officer
- (7) NAVEDTRA 43426-0 Flight Deck Familiarization
- (8) NAVEDTRA 43426-2 CV/CVN Tower Operations

c. Catapult and Arresting Gear Crewmember Training. Designated V-2 Division personnel shall receive additional (in-depth) training to include a minimum of two personnel to receive formal training/certification in basic arc welding.

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SECTION II

PRE-DEPLOYMENT

Table of Contents

General (V-2) II-1
Squadron (Brief) II-2

200. GENERAL. Prior to getting underway, whether it be for an extended cruise or an operating period just off shore, certain preparations are required to ensure success. The following areas shall be reviewed in advance of each and every deployment.

201. PERSONNEL QUALIFICATIONS. Ensure that all personnel are properly qualified and that a comprehensive training program is provided and ongoing. This program should be planned to not only train and qualify current operators, but also to provide cross training and reserve operators.

202. SAFETY BRIEF. The V-2 Officer shall be responsible for ensuring that all personnel within the division receive thorough topside and below decks safety briefs prior to each deployment, and again after any one week long in-port period.

203. AIRCRAFT TO BE EMBARKED

a. Ensure that a NATOPS Manual and Pocket Checklist for each type aircraft is available and that pertinent portions are reviewed by all Catapult and Arresting Gear Officers.

b. Determine and make accommodations for any aircraft service changes applicable to deploying aircraft that could effect launch and recovery parameters.

c. From each deploying squadron, obtain and review pertinent portions of squadron doctrine, SOP, air wing TACNOTES and air operations manual that refer to aircraft launch or recovery techniques or procedures.

204. LAUNCH/RECOVERY BULLETINS

a. Review all bulletins to ensure all current bulletins are on hand and that all outdated material has been discarded.

b. Ensure that all Catapult and Arresting Gear Officers review all applicable bulletins.

c. Ensure that all operator information, taken from bulletins, is current and up-to-date.

205. SPARE PARTS AND ACCESSORIES. Review the planned operating schedule and usage records to ensure that adequate parts and accessories are on board to support the launch and recovery equipment for the deploying aircraft.

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206. SQUADRON BRIEF. The Ship's Operations Department is required to provide a Carrier Control Approach (CCA) brief to each deploying unit prior to departure. It is recommended that the required Air Department brief, including launch and recovery procedures, be given in conjunction with this brief. The following sections are a recommended outline for a launch and recovery brief. Details are covered elsewhere in this manual.

1. INTRODUCTION

a. Air Department

- (1) Organization
- (2) V-2 Division areas of responsibility
- (3) Catapult spotter's dual responsibility to the V-1 Division and catapult officers during operations

b. Name and J-DIAL of all V-2 officers and chief petty officers

2. CATAPULTS

a. Installation

- (1) Type
- (2) Description
- (3) Basic operation
- (4) Capabilities and limitations

b. Preparation for launch:

- (1) Procedures for establishing gross weights
- (2) Procedures for determining CSV setting
- (3) Review flap, trim tab settings, and stabilator positions for applicable aircraft.

c. Pilot procedures (launching) - Review paragraph 4., "Special Instructions to the Pilot," in all applicable Zero Dash Aircraft Launching Bulletins.

(1) Taxiing to catapult:

- (a) Concentrate on following the director closely, especially at night.
- (b) Reaction time is most important for a good shot.
- (c) Do not allow spotter to bring you up too fast; if in doubt, STOP.

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(d) Approaching catapult, the Weight Checker shows gross weight:

1 Review signals (day and night)

a Gross weight correct

b Raise gross weight

c Lower gross weight

2 Maximum changes allowable and procedures to verify changes if in excess of maximum.

(2) Approach to, spotting on, and launch from catapult - review following applicable signals (day and night):

(a) Come ahead

(b) Slow

(c) Stop

(d) Turn (fine correction)

(e) Nose wheel steering

1 Engage

2 Disengage

(f) Tiller bar (if required)

1 Insert

2 Remove

(g) Launch bar down

(h) Nose strut extension or lowering

(i) Main mount extension - (C-2) (after launch bar is lowered)

(j) Ease into holdback

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(k) Pushback

1 Reasons - anytime aircraft is in holdback and:

- a Engages tension bar too hard
- b Off spot
- c Holdback man misses hook-up
- d Aircraft down
- e Catapult down

2 Procedures - follow director's signals, normally:

- a Pushback
- b Stop
- c Reverse thrust - (C-2), (E-2)

(l) Catapult in first ready/cat ready - Deck Edge Operator to Launch Officer/ICCS Officer to Catapult Safety Observer

(m) Hook-up

(n) Tension

- 1 BRAKES OFF
- 2 Power in accordance with aircraft NATOPS and Launch Bulletin
- 3 Raise aircraft launch bar (for applicable aircraft)

Bulletin

(o) Director pass aircraft to Launch Officer/Catapult Safety

Observer

(p) Power in accordance with aircraft NATOPS and Launch Bulletin

- 1 Check aircraft
- 2 Observe location of squadron maintenance and ordnance

checkers

(q) Two finger turn up to 100 percent (One finger for E-2/C-2)

(r) Burner (Open palm of hand held above head)
* CRT (Combat Rate of Thrust) if required

(s) Salute. Ensure sufficient time is allowed after saluting for the pilot to place his hand on the control stick.

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(t) Launch - If the deck is pitching, the launch cycle is timed and the fire signal given so that the deck will be level, pitching up, or at the top of the pitch cycle at the completion of the catapult power stroke.

(3) Clearing turns

(a) Only during day VFR launches

- 1 To the right off bow catapults
- 2 To the left off waist catapults

(4) Emergency Procedures - Review applicable signals (day and night)

(a) Suspend

1 What

2 Why

a Catapult/hook-up malfunction

b Improper launch bar paint scheme

c Pilot/aircraft malfunction

____(1) Day - pilot shake head negatively "NO"

____(2) Night - do not turn on lights, or if lights are on turn off.

____(3) Transmit, "Suspend, Suspend Catapult # ____."
Primary will attempt to suspend the catapult. (If your lights have already been turned on, it may be too late to suspend the launch.)

3 Be prepared to be launched.

WARNING

The difference between the SUSPEND signal and the EMERGENCY STOP signal must be fully understood by the air wing pilots. The SUSPEND signal is arms crossed overhead with HANDS OPEN. The EMERGENCY STOP signal is arms crossed overhead with FISTS CLENCHED. At night, a single RED wand held vertically overhead indicates the SUSPEND signal; RED and GREEN wands crossed overhead indicates the EMERGENCY STOP signal. This difference shall be explained in order that the pilots fully understand that the Catapult Officer/Catapult Safety Observer must be able to indicate "ON" or "OFF" brakes (i.e., OFF brakes during a SUSPEND; ON brakes for a premature launch, T-bar breakage, holdback malfunction, etc.).

4 Catapult Officer or Catapult Safety Observer will give the suspend signal followed by the shuttle aft signal.

5 When shuttle moves aft, the bridle will fall free/launch bar will raise or a signal will be given to raise the launch bar; the shuttle will then be moved FWD to clear the launch bar.

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6 Throttle back only on signal from Catapult Officer or Catapult Safety Observer. (day and night signal)

7 Catapult Officer/Catapult Safety Observer will turn control of the aircraft back to the director after catapult shuttle is free of the aircraft.

(b) Hangfire.

1 What

2 Why

3 Pilot procedures remain the same as those for "suspend."

(c) Removing aircraft from catapult

1 Buffer signals

2 Pushback

(5) Catapult Endspped

(a) Minimum endspped (10-15 knots excess)

(b) Pilot advised when excess

1 Less than 10 knots

2 More than 20 knots

(c) Endspped determination

1 Chronograph/DESI

2 Wind over the deck

3. FRESNEL LENS. A complete lens brief is given by LSO; however, points to cover:

a. Ship Installation

(1) Stabilization

(a) Line

(b) Inertial

b. Hook to ramp clearance

c. Hook touchdown point

d. Report difficulties/lens problem to V-2

4. ARRESTING GEAR

a. Installation

- (1) Type
- (2) Description
- (3) Basic operation
- (4) Capabilities and limitations
- (5) Off center engagements
- (6) Deck pendants
 - (a) Target wire
 - (b) Pendant locations

b. Pilot procedures (arresting)

- (1) Upon arrestment
 - (a) Power on (except for reciprocating engine aircraft)
 - (b) Speed brakes in
 - (c) Power off - as soon as arrestment assured
 - (d) ACCEPT ROLLBACK (turbo prop use reverse thrust)
 - (e) look for gear puller
 - (f) Hook "up" signal
 - (g) Flaps up, and fold wings
- (2) If hung up in gear - pull back
 - (a) Follow director's signals. If in doubt, STOP. Do not act on own initiative, request clarification (UHF).
 - 1 Hook "down" (mandatory for pull back)
 - 2 Off brakes
 - 3 Pull back (turbo props use reverse thrust)
 - 4 Hook "up"
 - (b) Do not ride brakes during pull back or hook will remain engaged.

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- (3) Clearing arresting gear
 - (a) Follow director's signals
 - (b) Clear gear expeditiously but SAFELY
 - (c) "No brakes" signal - hook DOWN - Notify primary; turn on navigation lights at night.

5. BARRICADE

- a. Description
 - (1) Endless reeve - line up most important - on center with no deviation.
 - (2) Stanchions
 - (a) Height
 - (b) Location
 - (c) Webbing assembly
- b. Maximum weight, engaging speed, and recommended approach speed as indicated in Aircraft Recovery Bulletin 12 series.
- c. Pilot procedures
 - (1) Jettison ordnance and dispose of external stores or as NATOPS prescribes
 - (2) Execute normal pass
 - (3) Anticipate losing "ball" in close momentarily due to port stanchion (you will be committed by this time)
 - (4) When arrested (no bolters here)
 - (a) Secure power
 - (b) Exit aircraft

6. INTEGRATED LAUNCH AND RECOVERY TELEVISION SYSTEM - ILARTS

- a. Camera installation and coverage
 - (1) Centerline
 - (2) Island
 - (3) Catapult surveillance camera

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b. Utilization

(1) Playback

(a) Starts 10 minutes after recovery

(b) Played twice if time permits

(2) If you missed the playback of your approach or desire additional ILARTS playbacks, arrangements with the V-2 Division Officer can be made.

(a) Do not handicap the operator in his performance of his duties by calling ILARTS room.

(b) Coordinate with the V-2 Division Officer for playback after flight operations for the day have been secured.

7. SUMMATION

a. All bulletins on file in V-2 office

b. Come visit us - free tours of spaces and machinery upon request

c. From time to time, bulletins that are applicable to individual type aircraft are issued. These will be made subject of memorandums to squadrons and CAG LSO as appropriate.

d. In general, examination of the catapult and arresting gear logs is not permitted. Any time you would like information concerning any catapult launch or arrestment, coordinate with the Catapult and Arresting Gear Officer.

8. QUESTION AND ANSWER PERIOD

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SECTION III

LAUNCHING FIXED WING AIRCRAFT

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SECTION III

CHAPTER 1

AIRCRAFT LAUNCHING BULLETINS

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300. GENERAL. Section III of this manual contains information pertaining to the launching of fixed wing aircraft. This section is to be used in conjunction with Aircraft Launching Bulletins, NAVAIR and COMNAVAIRLANT/COMNAVAIRPAC directives.

310. DISCUSSION. This manual has been prepared for use in conjunction with Aircraft Launching Bulletins. The bulletins include special instructions to the flight deck crew, the pilot and the Catapult Officer. It is imperative that all Catapult Officers and pilots be completely familiar with all applicable bulletins. Aircraft Launching Bulletins are issued by the Naval Air Warfare Center to provide launching data for catapult and aircraft, required aircraft launching accessories, list of effective bulletins, etc.

312. BULLETIN IDENTIFICATION NUMBER

a. Aircraft Launching Bulletins are assigned identification code numbers that indicate equipment applicability and subject matter. The number preceding the dash indicates the catapult type or catapult type and ship if the catapult on one ship differs in performance from a catapult of the same type on another ship. For example, the 31 Series Bulletins pertain to the C13-2 catapults on USS ABRAHAM LINCOLN (CVN 72). 24 Series pertain to the C13-1 catapults on USS DWIGHT D. EISENHOWER (CVN 69).

b. When the number zero precedes the dash, the bulletin is applicable to all steam catapults. The numbers following the dash identify the subject matter as follows:

(1) 0-10 Aircraft Launching Bulletin. This bulletin outlines the basic content of the various bulletins, how they were prepared and specific instructions in their use.

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(2) 0-11 Aircraft Launching Bulletin. This bulletin is issued quarterly and is a list of bulletins in effect, superseded or canceled. Interim bulletin revisions that are promulgated by message or speedletter are also listed in this bulletin. The 0-11 bulletin should be carefully reviewed in order to maintain a complete up-to-date file of all applicable aircraft launching/recovery bulletins. As changes and revisions are received, applicable information shall be promptly disseminated.

(3) 0-12 Aircraft Launching Bulletin. This bulletin is a list of aircraft launching accessories required for all aircraft. Information also includes National Stock Number (NSN), Part Number (P/N), usage limitations, color codes and the effective Catapult Deck Gear and Accessories Service Bulletin for each aircraft type. Changes that arise prior to revision of the 0-12 Bulletin will be indicated in the 0-11 Bulletin.

(4) 0-15 Aircraft Launching Bulletin. This bulletin provides crosswind limitations for both catapult and deck launches for each aircraft. Additional crosswind information includes trim settings, excess endspeed requirements and a discussion of off-center spotting.

(5) 0-37 and Subsequent Zero Dash Aircraft Launching Bulletins. These bulletins contain special instructions for launching specific aircraft, which include special instructions to the Launching Officer, flight deck crew and pilot, launch precautions, corrections for minimum wind-over-the-deck, trim settings, off-center spotting limitations and other safety precautions. The number following the dash indicates the specific aircraft type. For example, the 0-3 series bulletins pertain to the TA-4F/J aircraft; the 0-65 series bulletins pertain to F-14 aircraft, etc.

(6) 5-21, 6-21, etc., and Subsequent Aircraft Launching Bulletins. These bulletins contain wind-over-the-deck data for launching specific aircraft from specific catapults on board specific aircraft carriers. Remember, the number preceding the dash indicates the specific carrier(s). The number following the dash indicates the specific aircraft type. For example, the 24-68 Bulletin applies to the F-14A plus series aircraft launched from the C-13-1 catapult on board USS DWIGHT D. EISENHOWER (CVN 69); the 31-67 Bulletin applies to the F/A-18 aircraft launched from the C-13-2 catapults on board USS ABRAHAM LINCOLN. From these examples the 68 indicates F-14A plus and 67 indicated F/A-18 aircraft.

313. BULLETIN REVISION IDENTIFICATION. Revisions of aircraft launching bulletins are identified by a revision letter following the bulletin number and by a new date corresponding to the date of the revision. The first revision of a bulletin is identified by the letter A; subsequent revisions follow in alphabetical order (i.e., 24-67A of 28 February 1986, 24-67B of 31 August 1986, etc.). The portion of the text affected by the current revision is indicated with a vertical black line in the outer margins of the page. Revision identification is the same for all bulletins except the 0-11 Bulletin. The first issue of each year is identified with the basic number 0-11-93 and each subsequent quarterly revision has a suffix number added to the basic number (i.e., 0-11-93-1 of 23 December 1992, 0-11-93-2 of 23 March 1993, etc.).

314. WAR EMERGENCY BULLETINS. Aircraft launching bulletins that have a Q prefix in their numbers are designed as War Emergency Bulletins. Such bulletins authorize launching aircraft at higher gross weights or Capacity Selector Valve (CSV) settings than are currently permitted by the NATOPS Flight Manual and by the Aircraft Launching Bulletins. Routine carrier launches, launches under simulated war emergency conditions, and training launches shall be made under the authorization and restrictions set forth in the NATOPS Flight Manual and by the Aircraft Launching Bulletins.

WARNING

Use of War Emergency Bulletins may cause the aircraft catapulting strength design limit to be exceeded by as much as 15 percent. An aircraft logbook entry is required as specified in the applicable Bulletin.

315. COMPLIANCE WITH PROVISIONS

a. Aircraft launching data are prepared to set forth uniform instructions for launching within the performance capability of the aircraft and the catapults. The minimum take-off airspeed for launching, as listed in the Aircraft Launching Bulletins is determined by the Aircraft Test Directorate (Carrier suitability branch) of the Naval Air Warfare Center while conducting the carrier suitability portion of the Board of Inspection and Survey (BIS) trials. This minimum take-off airspeed may be limited by; aerodynamic stall; thrust available for acceleration after launch; loss of aileron, elevator or rudder control; time required to rotate to a flying attitude after launch; control effectiveness and pitching rates in an accelerated stall; overly stringent pilot techniques required; or stick forces or movement beyond limits in event of an aircraft systems failure. This data, which establishes the minimum conditions which must exist prior to the launch and upon which the launching bulletins are based, enable the Operational Commanders to know the ultimate capability of the launching equipment. Thus, a measure of the safety involved in launches made above minimum conditions can be effected. To ensure additional safety, operations should be conducted above the minimum conditions. Ten to 15 knots in excess of minimum take-off airspeed is optimum for bow launched aircraft. Fifteen knots is recommended for waist aircraft. Stored energy nose strut aircraft (F-14) require 15 knots when launched off catapult four. Launch charts shall be prepared and aircraft may be launched within this range without any special clearance. However, should operational requirements exist that require launching under 10 knots excess, the Commanding Officer shall authorize each launch and the pilot should be advised of the anticipated excess.

b. The Aircraft Launching Bulletins contain the governing instructions for launching specified aircraft from specified catapults. An Aircraft Launching Bulletin does not authorize aircraft launching, but sets forth the conditions under which the aircraft can be launched when authorization has been received. Authority to launch and restrictions for launching the aircraft are contained in the applicable NATOPS Flight Manuals. Compliance with the provisions of both the Aircraft Launching Bulletins and the NATOPS Flight Manuals is mandatory for safety of operations. An activity must consult both documents prior to commencing aircraft launches.

SECTION III

CHAPTER 2

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320. LAUNCH CHARTS

321. GENERAL. The information presented in the minimum required Wind Over Deck charts in the current launch bulletins is easy to use. This data shall not be converted to "quickie" or "pocket" launch charts.

322. PARAMETERS. The following parameters should be considered in the preparation of launch charts:

a. Wind Over the Deck

(1) The wind over the deck range should include the normal operating winds, plus low winds for those aircraft that would conceivably be launched under these conditions.

(2) Winds shall be indicated in 2 knot increments.

b. Weight Range. The weight range should cover the minimum through the maximum weights for carrier operations including carrier qualification weights.

c. Temperature Range

(1) It is recommended that launch charts be prepared for 59 and 80 degrees for most aircraft. Some aircraft with complicated temperature corrections should have launch charts for each 5 degrees increment or less, especially in the high temperature range; for those carriers operating in extremely hot climates it may be necessary to prepare launch charts for temperatures in excess of 90 degrees.

WARNING

For each launch, WOD should be corrected for ambient air temperature and catapult cylinder elongation to achieve the minimum take-off air speed, as listed in aircraft launching bulletins.

(2) Since the temperature corrections below 59 degrees are lineal and not mandatory, launch charts below that temperature should not be required.

COMNAVAIRLANTINST 13800.3F/
COMNAVAIRPACINST 13800.9D

d. Excess Endspeed

(1) Ten to 15 knots is the minimum endspeed excess range. The actual programmed excess, within this range, shall be determined by the Commanding Officer after consideration of all factors involved (i.e., aircraft strength, stability, pilot experience level, operating conditions, etc.).

WARNING

Aircraft launchings at high excess endspeeds impose limitations as critical as those imposed by launches made at or near minimum conditions.

(2) Whenever possible, aircraft excess endspeeds shall fall within the 10-15 knot limitations. Excesses within these limitations are not only considered optimum, but will provide a consistency to the Air Wing pilots and result in improved Air Wing proficiency and safety.

SECTION III

CHAPTER 3

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330. GENERAL

a. Every Catapult Officer must know, or have readily available, a considerable amount of information pertaining to each type of aircraft to be launched. Much of this information is taken directly from the Aircraft Launching Bulletin Zero Dash Series (e.g., required trim/flap settings, maximum off-center spotting distances, maximum permissible excess airspeeds and other special instructions). In addition, every Launching Officer must be intimately familiar with the peculiarities and idiosyncrasies of each aircraft type.

b. Either an experienced Catapult Officer/Catapult Safety Observer, or qualified squadron personnel shall give a pre-launching familiarization inspection of each aircraft. Items to be covered should include: position of wing locks, flap and trim positions and indications, access doors which are most commonly used, ejection seat pins and location of arming indicators, and other such pertinent information.

c. This chapter, in conjunction with the aircraft launching bulletins and NATOPS, should give all necessary information pertaining to the aircraft to be launched. Refer to the Aircraft Launching Bulletin No. 0-15 for crosswind limits, and use the specific aircraft Zero Dash Bulletins for spotting limits, trim, nose wheel cock limits, and other information.

331. A-4

a. Pre-Launch

(1) There are several model, external store, and engine combinations. Make certain the proper launch bulletin and launch charts are used.

(2) The flaps should be "up" any time the aircraft is taxied crosswind. Ensure the flaps are up before allowing a "down status" aircraft to be taxied off the catapult.

(3) Flap settings may vary with weight and temperature. Pilots should be briefed on what to expect in accordance with the locally prepared launch charts.

(4) Positioning the flap switch does not automatically attain flap position. The pilot has an up-down-off type of control. Flap positions, other than full up or full down, must be discussed and decided upon with squadron checkers.

NOTE

Throwaway bridle launches shall be IAW Deck Gear and Accessories Service Change 275.

b. Launch

(1) The nose wheel has a tendency to turn/cock off-center when full power or tension is applied. If this occurs beyond aircraft launching bulletin limits, the aircraft should be re-spotted. Tension shall not be taken with the tiller-bar man in place.

(2) Ensure the nose strut compresses prior to taking bridle arrester tension to preclude premature bridle separation. The Launch Officer shall down the aircraft if the nose strut does not compress.

(3) Check canopy stripe for alignment indicating locked canopy.

(4) The take-off trim setting can be confirmed by noting the trim markings on the tail and fuselage. These markings are even more evident if applied with reflective tape.

(5) Recheck the flap position after the application of full power. Due to the location of the flap switch, it can be inadvertently actuated to the up position.

(6) The aircraft must complete a fuel control transfer (auto/manual) check at 80percent on the catapult prior to tensioning. Catapult spotter shall give one finger turn up signal prior to tensioning. When the pilot is satisfied with fuel control transfer, he shall signal the spotter with a pronounced nod of his head at which time the aircraft may be tensioned.

(7) Some series of A-4's tend to blow tires during the launch, Keep alert for this possibility.

(8) Pilot technique is critical during launches at high aircraft weights and temperatures. If the pilot does not rotate off the catapult, the plane will settle excessively.

332. EA-6

a. Pre-Launch

(1) Nose wheel steering is limited. A tag lock disengages the steering when the nose wheel is turned past 56 degrees from the center position. Sharp turns must be avoided. To prevent damage to the nose gear, the launch bar must not be in the locked "up" position after the trail bar is attached to the aircraft.

(2) The aircraft is very difficult to push back due to the high engine RPM at idle. Care should be taken not to overrun the nose tow ramp.

(3) The location of the intakes in relation to the nose strut makes this aircraft one of the most dangerous in the fleet. If it becomes necessary to take the plane off the catapult, the Launching Officer/Catapult Safety Observer must take positive control of the buffer aft, and the pushback evolution.

(4) The launch bar has a tendency to come up prior to tensioning (See: C-2/E-2 prelaunch).

CAUTION

Ensure the launch bar is clear of the shuttle before allowing the buffer aft sequence to commence. However, it must not be locked in the up position. Buffering with the launch bar locked may damage the nose gear mechanism.

(5) There are several model, external stores, engine, and trim combinations. Make certain the proper launch bulletin and launch charts are used.

(6) Wing flaps and slats cannot be extended unless the wings are spread. EA-6B aircraft are susceptible to wing damage when wings are folded. When spotted aft of the JBDs with aircraft on the catapult turning up, the EA-6B wings must be spread.

b. Launch

(1) The catapult grip locks the nose strut. Pilots should be briefed to ensure the use of the catapult grip for the entire catapult stroke. Catapult grip is visible to the Launching Officer when the aircraft is on the starboard catapult.

(2) The pilot is seated in the port side of the cockpit. The Launching Officer must vary his position accordingly to ensure all his signals may be seen by the pilot.

(3) Avoid standing in a position where the wing tip passes overhead. Aircraft is equipped with wing-tip speed brakes, which may be inadvertently actuated on stroke.

333. T-45 Refer to F/A-18 paragraph 337 for pre-launch and launch procedures.

334. C-2/E-2

a. Pre-Launch

(1) The launch bar has a tendency to come up once the aircraft is in the holdback and prior to tension. Maintaining slight thrust keeps tension on the system preventing the launch bar from coming up and the requirement for hands or feet to be in the area during tensioning is eliminated. The launch bar must not be in the locked up position after the holdback has been attached to the aircraft.

(2) Ensure the launch bar is up prior to backing aircraft on the catapult.

(3) Never back aircraft with the trail bar in place. The trail bar may catch in the holdback cleat or bind in the ramp causing damage to the aircraft and the launching accessories. Never buffer the aircraft with the launch bar in the locked up position.

(4) On the C-2 aircraft, ensure main gear struts are extended prior to taking tension.

WARNING

The pilot of C-2 aircraft must receive the anticipated end airspeed and flap setting from the Catapult Officer.

(5) The E-2/C-2 pilot, upon receipt of the tension-up signal, will place the power levers at FLT IDLE and apply 2,500 to 3,500 IHP. The Catapult Officer/Catapult Safety Observer then receives the aircraft from the director and ensures that the Topside Safety Petty Officer is clear of the aircraft and has given the GO signal. The Catapult Officer then gives the turn-up signal to the aircraft, at which time, the pilot places the power levers at MAXIMUM POWER.

WARNING

T-56 engine flameout can result from ingestion of jet exhaust. It is, therefore, imperative that C-2/E-2 aircraft are not launched from waist catapults to be conducted when jet aircraft with engines operating are positioned on the No. 2 catapult or along the foul deck line forward of the waist catapults.

b. Launch. Ensure the areas around the prop arcs are clear of any objects, which may be drawn into the prop arc during engine turn-up or during catapult stroke.

335. T-2

Pre-Launch. Ensure the tip tanks are either full or empty. Half-full tip tanks cause a pitch down movement off the catapult. Check the sight gauge on the tip tanks to determine the fuel level.

336. F-14

a. Pre-Launch

(1) Flaps/slats cannot be lowered to the take-off position until the wing is swept fully forward and locked. Flaps should not be extended more than 5 minutes due to possible outboard spoiler module malfunction.

(2) The F-14 is kneeled in the "wye" area. The hook-up crew should allow a few seconds before lowering the launch bar to allow the pilot to check the launch bar malfunction lights in the cockpit.

(3) The aircraft shall be armed after kneeling and when properly configured for flight.

(4) The holdback unit must be kept clear of the aircraft fuselage until the fully kneeled position is reached.

b. Launch

(1) After any suspend and shuttle aft, the pilot must be instructed to raise and hold the launch bar up to allow the shuttle to be maneuvered forward.

(2) The wing is long and low; all personnel should remain outside the span.

(3) When removing the F-14 from the catapult for any reason, the aircraft should remain kneeled until the launch bar is well clear of the deck ramp assembly.

CAUTION

Unkneeling the aircraft while still in the deck ramp assembly can cause severe damage both to the nose mount as well as the catapult equipment.

(4) Restrictions apply to the launching of the F-14 on catapults with the MK6 JBD. Launching Officers must ensure that key Air Department personnel are aware of and comply with these restrictions.

(5) Topside Safety Petty Officer, prior to exiting aircraft shall ensure the launch bar is properly seated in the throat of catapult shuttle spreader.

WARNING

Mispositioning of aircraft launch bar may result in the launch bar separating from shuttle spreader during the launch.

337. F/A-18

a. Pre-Launch

(1) The launch bar is controlled from the cockpit. Always have the nose wheel aligned, fore and aft with the aircraft, before giving the launch bar down signal. Normally a four-second delay follows completion of control wipe out before the pilot gives his final salute.

(2) The launch bar control must be in the up position prior to launching. There is no external indication when the launch bar control has been selected to the up position.

(3) The Aircraft Director shall pass control to the Launching Officer/Catapult Safety Observer after the Topside Petty Officer has cleared the aircraft and the raise launch bar signal has been given to the pilot.

338. S-3

a. Pre-Launch

(1) The launch bar, which is controlled from the cockpit, will not always drop to the deck when lowered. This is caused by a slight misalignment of the nose wheel causing the launch bar to strike the top of the two guide forks. It is possible to damage the aircraft if the launch bar is allowed to drop outside the guide forks. Always have the nose wheel aligned, fore and aft with the aircraft, before giving the launch bar down signal. Do not allow the aircraft to taxi with the launch bar outside the guide forks.

(2) The launch bar control must be in the up position prior to launching. There is no external indication when the launch bar control has been selected to the up position.

(3) The Aircraft Director shall pass control to the Launching Officer/Catapult Safety Observer after the Topside Petty Officer has cleared the aircraft and the raise launch bar signal has been given to the pilot.

After turn-up, catapult crewmen shall exit forward toward the nose gear prior to moving away from the aircraft.

SECTION III

CHAPTER 4

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340. PREPARATION FOR LAUNCH

341. PRE-OPERATIONAL INSPECTION

a. Qualified catapult officers shall ensure that the catapults and associated launch equipment pre-operational inspections and no-loads are conducted and completed in accordance with current NAVAIR operational manual and PMS requirements.

b. At the time, the Catapult and Arresting Gear Officer or his designated representative shall inform the Aircraft Handling Officer and the Air Officer that subject inspections are completed in accordance with ORNAVINST 4790.15 and give the current status of all equipment under his cognizance.

342. NO-LOADS

a. No-loads shall be fired in accordance with current PMS MRC:

(1) In conjunction with daily pre-operational inspections.

(2) After repairs have been completed on the catapult control system.

(3) Upon completion of repairs following a hangfire, two no-loads shall be fired.

(4) As required by NAVAIR pubs following maintenance of hydraulic system repair and steam operated pressure switches.

b. A qualified no-load launching officer shall be on deck or in the ICCS and shall be responsible for enforcing safety precautions during no-loads firing.

WARNING

As in all phases of catapult operations, the catapult must not be fired unless every precautionary step has been taken to ensure a maximum margin of safety. Catapults shall not be fired between any of the landing gear of any single aircraft, under drop tanks or ordnance. Extreme care shall be taken if no-loads are fired in the vicinity of any aircraft (including helicopters on the waist).

c. If the catapult track is clear of aircraft and its entire length clearly visible, the following procedures shall apply:

- (1) A qualified no-load launching officer may fire no-loads.
- (2) All members of the crew not actually engaged in firing the catapult shall man the track to prevent injury to unsuspecting personnel. A safety line shall be used to prevent personnel from entering danger area.
- (3) The words, "Stand clear of number _____ catapult on the bow/waist while firing no-loads" shall be passed over the SMC prior to each shot. A no-load shall not be fired until such warning has been given over the SMC.
- (4) The man actually giving the "fire" signals calls out, "Watch the track" prior to each shot. This word will be repeated down the line for the complete length of the catapult with the acknowledgement of a thumbs-up given by the individual standing at the forward end of the track.

WARNING

The spreader shall be removed while firing no-loads in port or at anchorage.

- (5) No one shall be permitted to approach the catapult or step across the track while the shuttle is in "battery" position.
- (6) Ensure the area forward of the catapult is clear prior to firing all no-loads.
- (7) All personnel not in V-2 Division will be removed from the area of the catapult track and catwalks. Plane captains and squadron maintenance personnel shall be cleared away from and off of aircraft spotted in the vicinity of the catapult.
- (8) No aircraft shall be moved in the area of the catapult being tested.
- (9) Personnel shall be stationed in the catwalk, near access ladders and light lockers, to prevent unsuspecting personnel from coming into the firing area.
- (10) If the flight deck noise level is such that the human voice is inadequate to maintain positive safe control, a sound megaphone or other means of communication must be used.

343. DETERMINATION OF GROSS WEIGHTS. It is essential that the Catapult Officer know the correct gross weight of every aircraft being launched. In order to minimize any chance of error, the gross weight shall be computed by squadron line personnel/pilot, and shall be checked by the Catapult Officer against information available on the status board in Flight Deck Control.

a. Weight Chits

(1) No later than 45 minutes prior to a launch, each squadron shall furnish the Catapult Officer with a weight chit listing the computed weight of each aircraft scheduled.

(2) Weight chits shall be locally prepared and shall contain the following information:

- (a) Squadron
- (b) Date
- (c) Launch event number or time of scheduled launch
- (d) Aircraft side number
- (e) Basic weight
- (f) Fuel weight
- (g) Ordnance/external store weight
- (h) Gross weight
- (i) Signature of person filling out chit
- (j) Flap setting for E-2/C-2
- (k) CRT/MRT for F-14/F-18
- (l) Asymmetric loading over 950 lbs for S-3 aircraft
- (m) FCF aircraft

(3) Figure 3-2 below is a sample of an acceptable weight chit.

DATE _____ SQUADRON _____ EVENT # _____ TIME _____

SIDE NO

BASIC WT

FUEL

ORD/EXT

GROSS WT

OTHER

Signature _____

b. Basic Weight

(1) The basic weight shall be the weight of a mission ready aircraft with crew minus the weight of fuel on board and ordnance/external stores.

(2) The Air Wing Maintenance Officer shall be responsible for maintaining the basic weight of each aircraft on a status board in Flight Deck Control. Each change to the basic weight must be reflected on the status board so that correct and current information is available to the Catapult Officer.

(3) The Catapult Officer shall compare the basic weight on the weight chit to that on the status board. Any difference between the two shall be resolved prior to launching the aircraft.

c. Fuel Weight

(1) The Aviation Fuels Officer (V-4) shall maintain a current fuel status board in Flight Deck Control. The status board will display the side number of all aircraft on board and the fuel status of each.

(2) The Catapult Officer shall compare the fuel weight on the weight chit to that on the status board. Any difference between the two shall be resolved prior to launching the aircraft.

d. Ordnance/External Stores

(1) Ordnance/external stores weight shall include all ordnance, external tanks, buddy stores and all other items not included in basic weight.

(2) The Catapult Officer shall compare the ordnance/external stores weight on the weight chit to that on ordnance status board maintained by the Air Wing Ordnance Officer, or ordnance chits submitted by squadron ordnance personnel. Any differences shall be resolved prior to launching the aircraft.

344. PRE-LAUNCH PROCEDURES

a. The following procedures shall be adhered to; however, the timeframes provided are recommendations only and may be modified to suit individual carriers and situations.

b. Preparations for the launch should commence "approx. 45 minutes" prior to the scheduled launch time. At this time, the following actions shall take place:

(1) Squadron representatives shall deliver completed weight chits to Flight Deck Control.

(2) Catapult Officer(s) shall report to Flight Deck Control and:

(a) Ascertain side numbers of all aircraft on launch.

(b) Verify the aircraft weight chits by comparing listed weights with status boards, and by checking addition.

(c) Make a list of gross weights to be used by the Weight Board Operator.

(d) Obtain from meteorology the current ambient temperature.

(e) Determine the maximum and minimum Wind Over Deck (WOD) requirements and crosswind limits and inform the Air Officer of same.

(f) Attend the flight deck brief to obtain the anticipated launch sequence and any other situational requirements.

c. Thirty minutes prior to the launch, the launch crews shall man their stations, conduct a voice communication system check, and perform any other pre-launch actions that may be required of their stations. In particular:

(1) Catapult Safety Observer/Topside Safety Petty Officer shall:

(a) Ensure slot seals are removed and properly stowed.

(b) Ensure all slot buttons are removed and accounted for.

(c) Inspect the catapult and deck for FOD, and/or loose gear.

(d) Inspect and ensure that there is an adequate supply of deck gear and accessories.

(2) Catapult Console Operator/Central Charging Panel Operator shall verify the steam plant lineup and inform the Centerdeck Operator/ICCS Monitor for relay to the Catapult Officer.

(3) Centerdeck Operator/ICCS Monitor shall ensure availability of proper launch charts and equipment including an extra set of Catapult Officer wands at night.

d. Upon completion of the flight deck brief in Flight Deck Control, the Catapult Officer shall:

(1) Inspect the catapults

(2) Give Weight Board Operator the side numbers and gross weights of all aircraft to be launched and inform Centerdeck Operator as to what temperature launch charts shall be used. JBD Operator for ICCS shall, in turn, relay this information to the Catapult Console/ICCS Operators/Central Charging Panel Operator so that they will know which launch charts to use.

(3) Brief the topside crew on the anticipated number and sequence of aircraft to be launched, and on special procedures or circumstances that are anticipated.

(4) Ensure all stations are manned.

345. CATAPULT INSPECTIONS. Each Launch Officer/Catapult Observer shall ensure that each of the following items is performed on the catapults. Precise sequence and method of accomplishment is left to the individual. Catapult inspections should be completed not later than 5 minutes prior to the launch.

10/18/82

a. Bow Catapults.

(1) Inspect jet blast deflector panels for signs of leaks and distortion.

CAUTION

Jet engine exhausts directed at the jet blast deflectors without cooling water running through the panels can result in thermal expansion inducing warping and cracking that results in leaks. The cooling water should be running through the water-cooled jet blast deflector panels prior to launch.

(2) Ensure holdback units are in good condition in accordance with PMS cards, and that sufficient numbers of accessories are present for launch requirements.

(3) Inspect the holdback cleat for FOD, proper position of holdback unit, and proper installation of filler bar.

(4) Inspect nose gear launch equipment for security and leaks.

(5) Ensure all deck accessories are properly stowed, and that a sufficient number are present for launch requirements.

WARNING

Prop tip vortices created by the E-2/C-2 and other prop aircraft can draw objects up into the prop arc. Ensure a clear area of at least 10 feet is maintained around prop arcs.

(6) The Launching Officer/Catapult Safety Observer shall walk the catapult looking for loose items, bolts, and FOD in the catapult slot and surrounding areas of the flight deck.

WARNING

During night operations, the track shall be walked after the area is clear of all aircraft, including helicopters and squadron personnel.

(7) Ensure all whip and/or fan antennas are down and locked.

(8) Check spreader pin, side plates, set screw (turtleback pin, spring and setscrew) for security.

(9) Check catapult elongation (when launching/recovery operations permit).

(10) Check safety nets for FOD and personnel.

(11) Check centerdeck equipment, launch charts, and verify anemometer readings with Primary Flight Control.

(12) Ensure AESS hatches are closed and secured.

b. Waist Catapults

(1) The inspection procedure for the waist catapults is essentially the same as that for the bow catapults. There are some important differences and inherent dangers that pertain to the waist catapults.

(a) Walking the waist catapult tracks can become very hazardous because aircraft, abeam the island and/or on the tracks themselves, are starting and their heat and jet blast present a potential personnel injury hazard.

(b) The area around the waist catapults is more susceptible to FOD. This FOD quickly becomes a missile hazard during the launch; therefore, it is extremely important to be continuously on the lookout for FOD or FOD producing situations.

(c) All slot buttons must be accounted for prior to movement of shuttle. A minimum of 12 is required on all ships except CV-67, which requires a minimum of 18.

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SECTION III

CHAPTER 5

LAUNCH PROCEDURES (SEQUENCE OF EVENT FOR NORMAL OPERATIONS)

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350. COMMENCING LAUNCH CYCLE

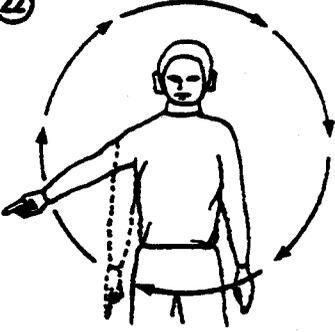
a. The Air Officer shall direct the Catapult Officers, Flight Deck Officer and other flight deck personnel to commence preparations for the launch when aircraft starts are called away.

b. At this time, tiedown chains and chocks shall be removed, Aircraft are taxied to the catapults and shuttles retracted upon signal from the Catapult Officer.

WARNING

Aircraft tiedown rings shall be checked to be in the proper flush/retracted position.

RETRACT SHUTTLE

SIGNAL	FROM	TO	EXECUTION
<p>22</p>  <p>RETRACT SHUTTLE</p>	Catapult Officer	Deckedge Operator	<p>Day: Finger pointing towards the bow at waist level. Sweep arm in a complete large circular motion. Stopping the sweeping motion with the finger pointed aft at waist level.</p> <p>Night: Same except use RED wand.</p> <p>Remarks: Deckedge Operator retract shuttle.</p>

WARNING

Shuttles shall not remain in battery for more than 5 minutes. Condensation in launch cylinders may cause a slow shot. If shuttle is in battery for more than 5 minutes, it shall be advanced and retracted again prior to launching aircraft.

351. CONFIRMING AIRCRAFT GROSS WEIGHT. As each aircraft approaches the catapult, the Weight Board Operator shall show the pilot/NFO the computed gross weight of the aircraft. The pilot/NFO shall verify and confirm the gross weight by giving a thumbs up signal (day) or a circular motion with a flashlight (night). A thumbs down or negative signal will not be used to indicate disagreement with the weight. If the pilot/NFO does not agree with the gross weight, he will signal as follows:

a. Day

(1) To raise gross weight, hold hand flat with palm up and move in a vertical direction, emphasizing the upward motion.

(2) To lower gross weight, hold hand flat with palm down and move in a horizontal direction.

b. Night

(1) To raise gross weight, move flashlight in a vertical direction, emphasizing the upward motion.

(2) To lower gross weight, move flashlight in a horizontal direction.

NOTE

The weight board will be changed in 500 or 1000 pound increments in accordance with applicable launch bulletins.

(3) When more than two corrective steps are required on the weight board or any difficulty is experienced in confirming the gross weight, the aircraft will not be launched until positive determination can be made by the Air Officer and confirmed by the pilot and Catapult Officer.

(4) Once the weight of the aircraft is confirmed by the pilot/NFO, the Weight Board Operator shall show the weight board to the Catapult Officer, Centerdeck Operator, and Deckedge Operator (JBD Operator for ICCS). The Centerdeck Operator, Deckedge Operator or JBD Operator shall in turn relay this weight to the Console Operator/CCP Operator and Recorder. The Console Operator/CCP Operator shall use this weight in confirming the Catapult Officer's desired CSV setting using applicable launch charts.

(5) The Weight Board Operator shall display the weight board to the Catapult Officer until he receives a positive acknowledgement that the weight has been noted.

NOTE

One (1) weight board is required per catapult. Once the aircraft weight is confirmed, the weight board operator shall not change the weight displayed until the aircraft is off the catapult.

352. DETERMINING CSV SETTING

a. After retracting the shuttle and while the aircraft is being spotted on the catapult, the Catapult Officer shall determine the proper CSV setting. Factors to be considered:

- (1) Wind over the deck
- (2) Proper launch chart for aircraft, configuration and temperature
- (3) Cylinder-elongation correction (as per ALB)

b. Use of preheat/trough heat is recommended to maintain proper catapult cylinder elongation in accordance with applicable ALB. Once the CSV setting has been determined, the Catapult Officer shall ensure that the setting is entered in the CSV command selector and that the setting matches the Console/CCP Operator's position readout.

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WARNING
Conventional

The Console Operator, upon receiving type aircraft, weight, and wind over deck, shall independently verify desired command CSV setting prior to depressing the CSV setting pushbutton. Under no circumstance shall the position indicator match the command readout until absolutely verified that desired command setting is correct for type aircraft. If there is any doubt, the Console Operator shall not depress the CSV pushbutton, instead shall SUSPEND, until resolution of the CSV disagreement is corrected.

WARNING
(ICCS) Deckedge Mode

When the Catapult Officer observes the aircraft type, weight, and side number, he determines the capacity selector valve setting desired and dials it in at the Catapult Centerdeck Operator's station. All pertinent information shall be passed to the CCP Operator for confirmation. The CCP Operator shall check the applicable Launching Bulletin. If the setting desired by the Catapult Officer is correct, the CCP Operator shall press the CSV setting pushbutton.

c. The Commanding Officer shall make the decision to launch aircraft if the following situation exists:

- (1) Catapult CSV operating in the defeat interlock mode.
- (2) When the catapult will be fired from the below decks emergency panel.
- (3) When aircraft will be launched with less than 10 knots excess. The pilot shall also be notified of the intended excess.
- (4) When Jet Blast Deflectors cannot be raised.

d. (Non-ICCS) The Console Operator, using his launch charts and launch information relayed via voice communication system, shall verify the CSV setting over the voice communication system prior to pushing CSV setting pushbutton. The Console Operator shall verify the position and mechanical CSV reading match prior to selecting First Ready. (ICCS Deckedge Mode) The CCP Operator, using his launch charts and launch information relayed via voice communication system, shall verify the desired CSV setting over the phones and then verify the matching of the position and mechanical CSV readings."

NOTE

The Deckedge Operator shall not give the Cat Ready signal until the CSV match is verified by the CCP Operator.

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e. Once the CSV setting has been verified, the Console/CCP Operator shall ensure steam pressure is maintained until the catapult is fired. If, for any reason, he is unable to maintain proper steam pressure prior to firing the catapult, he shall suspend at once.

f. The Console/CCP Operator shall monitor the water level (wet receivers), hydraulic pressure, and receiver pressure. He shall suspend if they are out of operating limits.

353. ORDNANCE ARMING. When an aircraft carrying ordnance requires arming, the aircraft will be taxied into the arming area. Nose tow aircraft shall be stopped prior to positioning the launch bar over the shuttle; bridle aircraft will be positioned tight in the holdback, without bridle attached, and properly configured for flight. The director shall ensure that all personnel are clear and then direct the aircrew's attention to the Ordnance Safety Petty Officer for arming.

WARNING

Aircraft shall not have bridle attached, or aircraft launch bar over the shuttle until the aircraft is armed and properly configured for flight.

WARNING

If the launch is suspended after forward firing weapons have been armed, ensure that those weapons are dearmed prior to a pushback/breakdown of the aircraft, or when the area in front of the aircraft cannot remain clear until the launch.

354. LAUNCHING AIRCRAFT (CONVENTIONAL/ICCS DECKEDGE MODE)

a. Taxiing/Spotting Aircraft on Catapults

(1) When positioning an aircraft on the catapult, the Director must be acutely aware of the activities of the catapult crew, and must control the aircraft's speed and movement in such a way that personnel safety will not be jeopardized. Pilots must guard against the tendency to use excessive power, which invariably results in roughness and poor control and makes accurate catapult spotting difficult. As the aircraft approaches the catapult, the Director shall signal the pilot to lower flaps. Jet Blast Deflectors shall be raised as appropriate when the tail of the aircraft is clear of the arc of JBDS.

CAUTION

Often aircraft on catapult number four block the view of the number three JBD Operator. All JBD Operators/Safety Observers shall ensure aircraft clearance is sufficient prior to raising or lowering a JBD. Catapult three requires a JBD Safety Observer at all times. Bow catapults utilizing JBD deckedge control boxes require one JBD Safety Observer per catapult. JBD Safety Observers shall be positioned on the furthest side of JBD away from JBD Operator.

WARNING

If a JBD cannot be raised, the Commanding Officer must authorize the catapult's use.

WARNING

Personnel shall not work or transit immediately behind a JBD with aircraft at launch power on the catapult.

(2) As the aircraft is positioned on the catapult, the squadron Plane Checkers shall inspect the aircraft to ensure it is properly configured and ready for flight.

WARNING

Aircraft shall not be taxied across the shuttle or reach a position where the launch bar can engage the spreader until the aircraft is ready for flight in all respects. This includes gross weight confirmed, wings spread and locked, flaps set, ordnance armed, green beacon, and the catapult is in first ready/cat ready.

(3) The Director shall stop the aircraft at the lead-in track wye area. He shall then signal the pilot to Disengage Steering (fig. 5-1) by touching the end of his nose with his forefinger and then sweeping his arm downward in the direction of intended aircraft movement. The Holdback man shall install the trail bar and check the tension bar/release unit for the proper seating position (not cocked). F-14 aircraft shall be kneeled.

② **TILLER BAR REMOVED
OR DISENGAGE NOSE-
WHEEL STEERING**



Director

Pilot

**Day: Touch end of nose with forefinger.
Then, sweep arm downward in direction
of aircraft movement.**

**Night: Touch end of nose with wand. Then,
sweep wand downward in direction of
aircraft movement**

(fig. 5-1 Disengage Steering)

(4) The Director shall then give the Lower Launch Bar signal (fig. 5-2) to the pilot upon direction of the TSPO.

LOWER LAUNCH BAR/
TOW LINK



Director

Deck crew,
Pilot

Day: Rest right elbow in left palm at waist level. Bring right hand down to horizontal position.

Night: Same except with wands.

(fig. 5-2 Lower Launch Bar Signal)

WARNING

Trail bars and/or launch bars should not be installed/lowered before the aircraft reaches the lead-in wye area. Excessive keel wear or burring may occur as the bars pass over the holdback clear/nonskid, or the bars may hang up in the track. If an imbalance of the bar occurs, equipment damage or personnel injury may result.

(5) As the aircraft is taxied forward, the TSPO shall ensure the launch bar is properly positioned and that the buffer slider is in its full aft position.

CAUTION

Aircraft taxi speed shall not exceed 4 mph while approaching the buffer.

WARNING

To avoid possibility of premature tension bar failure, do not actuate "BUFFER FWD" or "BUFFER AFT" pushbuttons during the aircraft buffer stroke.

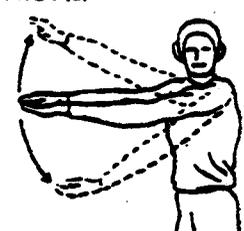
(6) The Director shall direct the pilot to taxi slowly over the shuttle spreader.

(7) For bridle aircraft, the Director shall momentarily stop the aircraft, and the Holdback man shall attach the holdback unit and check the tension ring/bar for proper seating after the holdback assembly is taut.

WARNING

An incorrectly installed tension ring/bar may cause premature disengagement during tensioning or when full thrust of the aircraft is applied.

(8) If aircraft strut(s) must be extended, Director shall signal the pilot (fig. 5-3).

<p>(1) EXTEND or LOWER STRUT(S)</p> 	Director	Pilot	<p>Day: Extend arms to one side, palms together and horizontal. Then, open arms.</p> <p>Night: Same except hold wands horizontally.</p> <p>Note - For lowering strut, reverse the procedure for extending strut.</p>
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(fig. 5-3 Extend Strut)

b. Tensioning Aircraft

Two minutes prior to the launch, the Catapult Officer shall signal to the pilots, directors and catapult crews, "TWO MINUTES" by pointing to his wrist and extending two fingers. Deckedge Operators shall pass the word to their respective crews via voice communication system. From that time until the end of the launch, strict voice communication system discipline shall be maintained.

(2) Upon receiving the two-minute warning, the Console Operator/CCP shall check all operating indications. When satisfied all conditions are normal and, if applicable, select FIRST/CAT READY and pass the word "FIRST READY"/"CAT READY".

(3) The Deckedge Operator, upon observing the FIRST READY/CAT READY light and hearing the word passed shall give the FIRST READY/CAT READY signal to all topside personnel (fig. 5-4).



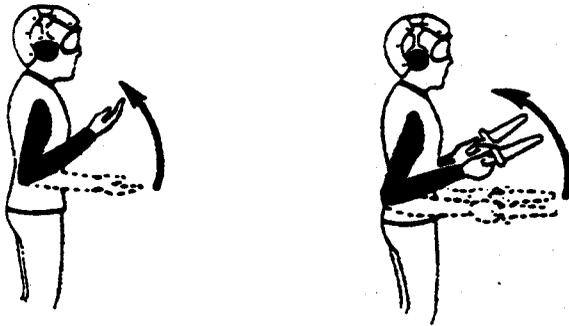
Hold one hand high overhead with forefinger extended.

(fig. 5-4 First Ready/Cat Ready)

(4) The Catapult Officer signals the TSPO to tension/hook up the aircraft (fig. 5-5). For bridle aircraft, the TSPO directs his hook-up crew to place the bridle on aircraft launching hooks.

WARNING

When launching from the waist catapults, the go no-go chart shall be consulted prior to tensioning each aircraft. Catapult officers will not attempt to memorize criteria. Aircraft on waist catapults will not be put in tension as long as no-go situation exists.



Day: Extend forearms forward at waist level with palms facing up; make slight lifting motion with forearms.

Night: Hold both wrists close to waist and extending forward horizontally; rotate wrists from horizontal to vertical position.

(fig. 5-5 Tension/Hook-up by Catapult Officer)

(5) Prior to taking tension, the TSPO shall ensure:

- (a) Properly configured for flight.
- (b) The catapult is in FIRST READY/CAT READY.
- (c) The JBDS are raised and personnel are properly positioned.
- (d) That only the topside crew is under the aircraft.
- (e) The areas forward and aft of the catapult are clear.
- (f) The hook-up men have positioned the bridle properly, and all slack is removed from the holdback unit (if applicable).

NOTE

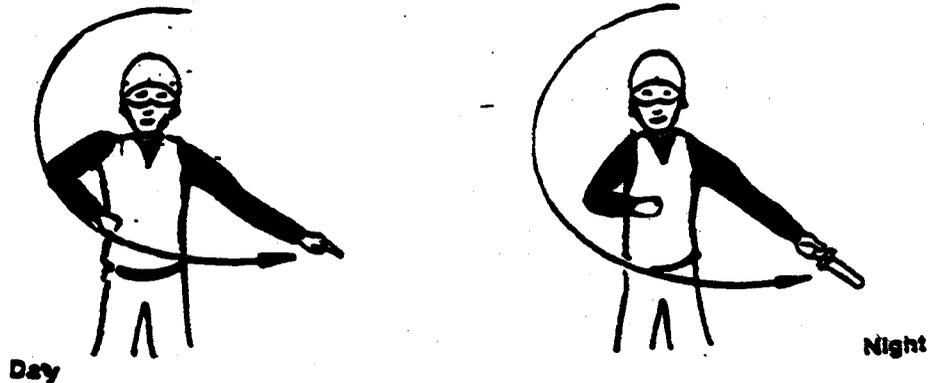
For Case III launches, the Catapult Officer must maintain absolute control of the launch sequence; therefore, aircraft shall NOT be hooked up and tensioned except upon signal from the Catapult Officer.

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WARNING

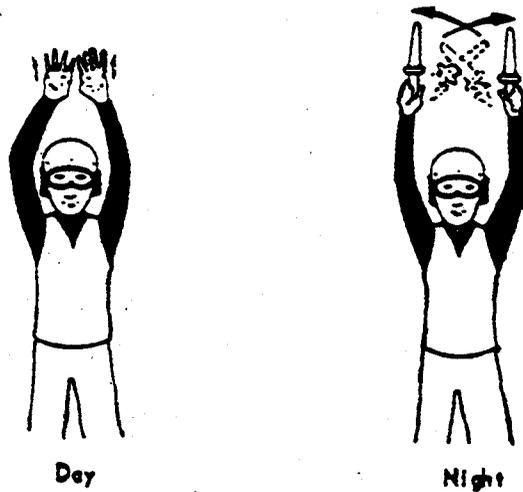
Aircraft tiedown rings shall not be used as a handle while placing aircraft in tension.

(6) Once all requirements are met, the TSPO shall signal to the Director to TAKE TENSION (fig. 5-6).



(fig. 5-6 Take Tension by TSPO)

(7) The Director, upon observing the TAKE TENSION signal from the TSPO, signals the pilot to RELEASE BRAKES (fig. 5-7).



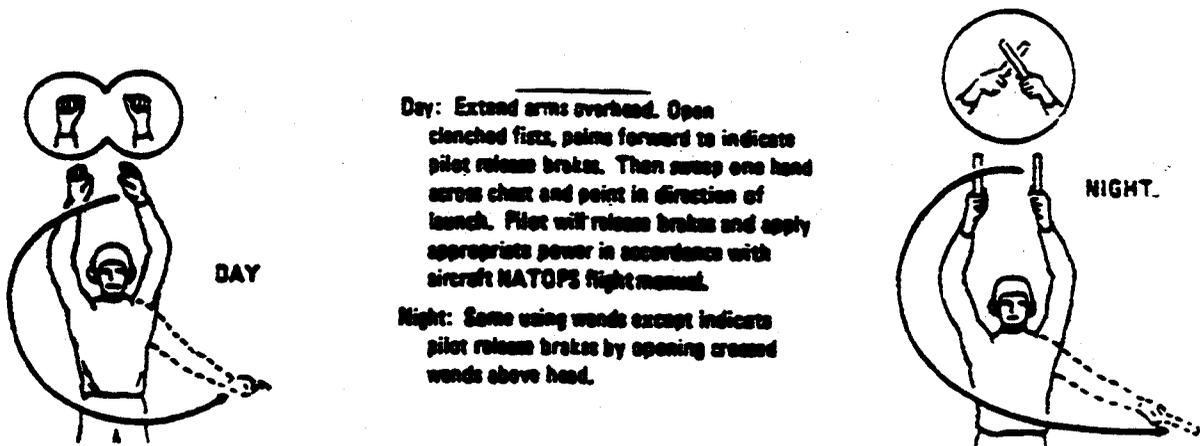
(fig. 5-7 Release Brakes)

(8) The Director will check forward and aft of the shot line, signal the pilot and Deckedge Operator to take tension (fig. 5-8), and if required the raise launch bar signal (fig. 5-27). He shall hold the tension signal until passing control to the Catapult Officer. The Deckedge Operator shall depress "bridle tension" on the Director's tension signal.

WARNING

Giving a raise launch bar signal prior to the shuttle fully engaging the aircraft launch bar could cause a launch bar misposition and possible loss of pilot and aircraft during the catapult stroke.

(9) The Director shall not give the raise launch bar signal until after the Topside Petty Officer has exited the aircraft.



(fig. 5-8 Tension by Director)

(10) Pilots shall apply power as prescribed in the applicable NATOPS manual. Pilots shall keep their feet off the brakes.

WARNING

During tensioning, jet aircraft will be operating at 80 to 100 percent. Intakes and exhausts must be avoided.

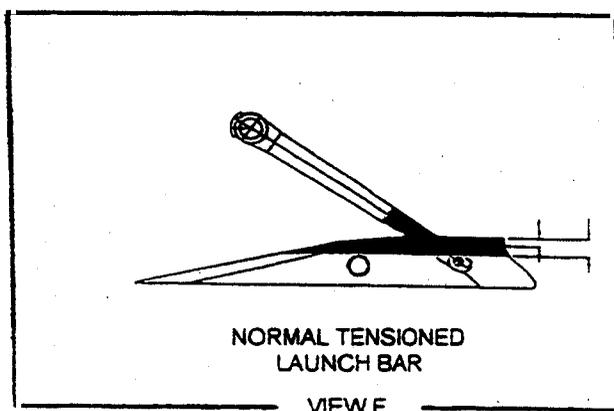
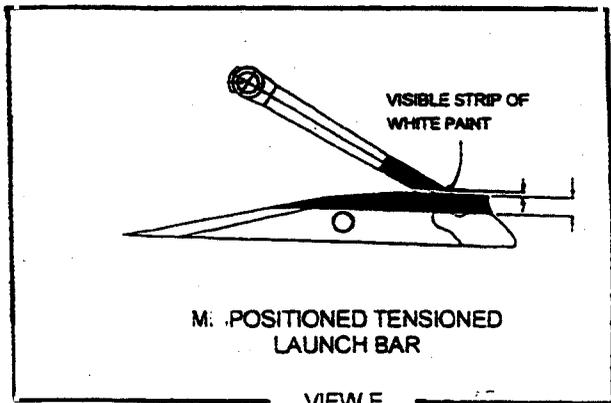
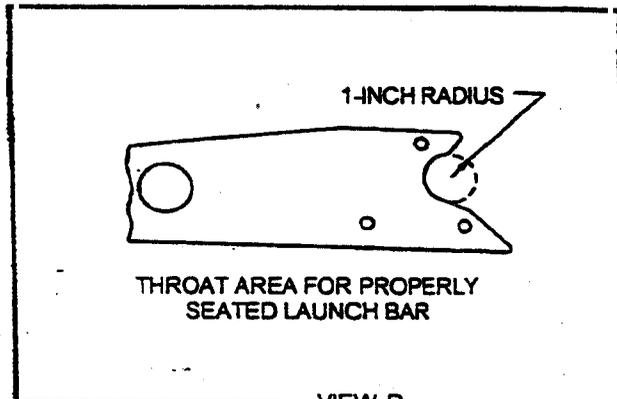
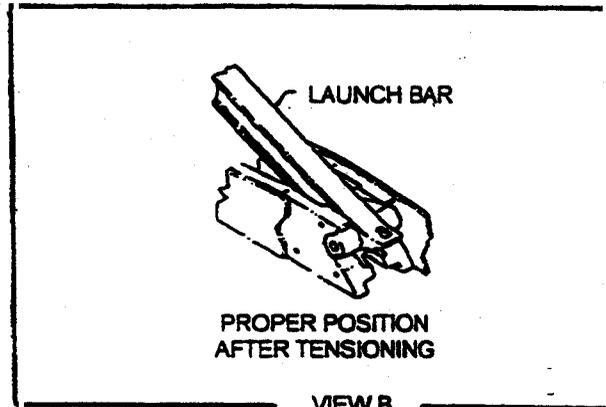
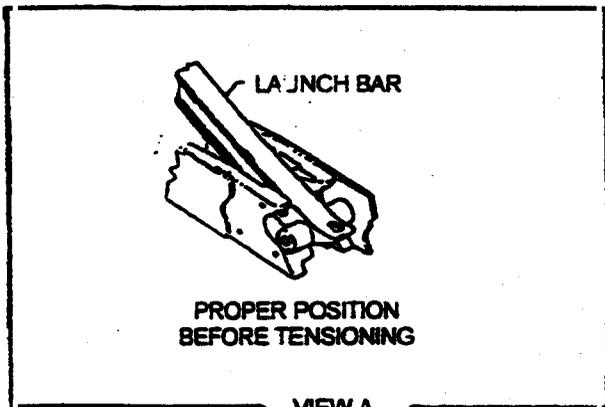
(11) As the Deckedge Operator presses BRIDLE TENSION he shall verbally relay the message to the Console/CCP Operator via voice communication system, saying the words "Taking Tension;" these shall be the last words passed until after the aircraft is launched.

(12) Immediately after taking tension, the Deckedge Operator shall return the FIRST READY/CAT READY signal.

(13) After tension is taken, the TSPO shall inspect the launch bar seating in the spreader, and inspect the seating of the tension bar/repeatable release element prior to exiting from under the aircraft, and giving the Catapult Officer a thumb up.

WARNING

It is mandatory that it be positively determined that the aircraft launch bar is properly seated in the nose gear launch shuttle spreader as shown after tension is taken (fig. 5-9). Mispositioning of the aircraft launch bar can result in the launch bar separating from the shuttle spreader during launch. F-14 and F-18 aircraft shall not be launched with improper or missing launch bar paint schemes.



(fig. 5-9 Proper Positioning After Tensioning)

(14) For bridle aircraft, when tension is applied, the Holdback man shall make one last check of the tension bar ensuring it is properly seated and there are no cracks evident. If all is proper, he shall give a thumb up to the TSPO as he exits from under the aircraft. If not, he shall give the suspend signal.

(15) For bridle aircraft, during and after the tension stroke, the TSPO shall ensure the proper seating of the bridle. In accordance with applicable service bulletins and once tension is completed, he shall again check for proper seating.

(16) After completion of tensioning and before exiting from under the aircraft, the TSPO shall conduct a final inspection of the hook-up to include bridle properly tensioned and all other personnel are clear of the aircraft.

WARNING

Aircraft jet engines will be at full power and a conscious effort to avoid jet intake danger areas must be made while exiting from under the aircraft.

(17) If all is satisfactory, the TSPO shall exit from under the aircraft giving a thumbs up signal (day) or holding a steady white stubby wand (night) vertical, the signal will be held until the aircraft is launched. If anything is wrong, he shall exit from under aircraft immediately and give the suspend signal.

c. Launch

(1) As the ship approaches the launch course, the Air Officer shall monitor the wind velocity. Upon receiving permission from the bridge to launch aircraft, he shall make a final check to ensure the relative wind is within the envelope prescribed in the applicable launching bulletin. This shall be accomplished before changing the rotating beacon(s) from red/amber to green, thereby clearing the Catapult Officer to begin launching.

(2) The Centerdeck Operator shall closely monitor the anemometer, ensuring it is within operating limits as established by the Catapult Officer. If all indications are within limits, he shall signal by holding a thumb up (day) or steady white stubby wand (night) vertical. If not, he shall give the suspend signal.

(3) Prior to taking control of the aircraft, the Catapult Officer shall:

- (a) Observe a green rotating beacon
- (b) Check the wind and crosswind conditions
- (c) Verify CSV setting
- (d) Check off-center distance and aircraft alignment
- (e) Check nose wheel cock
- (f) Observe deck pitch

(g) Ensure JBDs are raised and all personnel are clear of aircraft, jet exhaust or prop wash

(h) Wing and tail locks

(i) Appropriate flap, slat and trim settings

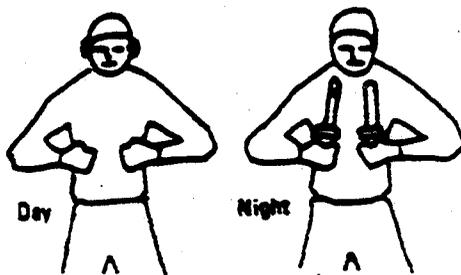
(j) Canopies closed and locked

(k) Gear, ejection seat, and ordnance safety pins removed

(l) Access panels secured

(m) Observe thumbs up (day) or steady vertical white stubby wand (night) from TSPO

(4) When all these conditions have been met and the Catapult Officer considers the aircraft and catapult ready for launch, he shall accept control of the aircraft from the Director (fig. 5-10).



Day: Hold both hands with fists clenched in front at waist height.

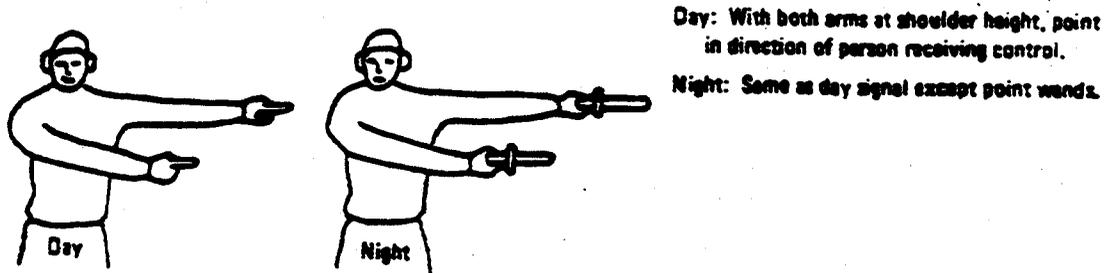
Night: Hold wands vertically in front of body. Turn wands on.

(fig. 5-10 Accepting Control)

(5) The Director, upon seeing the Catapult Officer accepting control, shall pass control (fig. 5-11).

WARNING

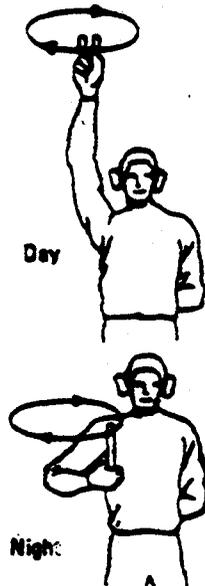
The Director shall not pass control of the aircraft until all personnel are clear of the aircraft.



Day: With both arms at shoulder height, point in direction of person receiving control.
Night: Same as day signal except point wands.

(fig. 5-11 Passing Control)

(6) Once the Catapult Officer has control of the aircraft, he shall give the FINAL TURNUP signal (fig. 5-12).



Day: Extend arm overhead, index and middle finger pointing up. Hesitate then rotate hand rapidly in a horizontal circle.

Night: Rotate GREEN wand in a horizontal circle at chest level. Hold RED wand behind back.

Remarks: The pilot will apply or maintain full power, check instruments, get set and:

1. Day - turn head slightly toward launching officer, execute a hand salute, and position head against headrest.
2. Night - turn on only his running lights (STEADY), and keep them on until clear of ship.

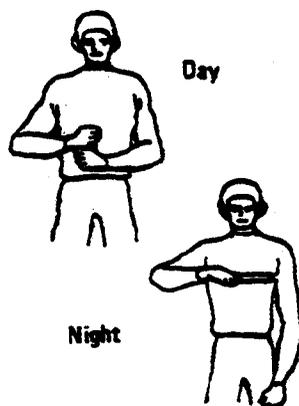
(fig. 5-12 Final Turnup)

(7) The pilot, upon seeing the FINAL TURNUP signal, will apply take-off power.

WARNING

In the event of a suspend, the Catapult Officer shall not signal the pilot to throttle back until he has positively determined that the launching bridle is no longer attached to the aircraft or the catapult shuttle is forward of the launch bar. If the bridle cannot be removed or the launch bar cannot be raised without sending personnel under the turned-up aircraft, an emergency condition exists. The Catapult Officer shall positively determine that the catapult is in a SAFE condition, then give pilot the THROTTLE BACK signal to permit safe removal of the aircraft.

(16) THROTTLE BACK



Launching officer/
Catapult safety
observer
(ICCS)

Pilot

Day: Hold one fist at waist level, thumb extended up. Grasp thumb with other hand and rock as if adjusting throttle.
Night: Hold RED wand horizontally across chest. Raise and lower horizontal wand. GREEN wand is off.

(fig. 5-13 Throttle Back)

(8) The Deckedge Operator, upon observing the FINAL TURNUP signal, immediately presses the STANDBY/MIL PWR pushbutton. As soon as the STANDBY/MIL PWR light comes on at the deckedge control panel, he holds two fingers overhead (fig. 5-14).



Extend arm overhead, forefinger and
middle finger pointing up

(fig. 5-14 Deckedge Standby/Mil Pwr)

NOTE

When catapults are being operated as interlocked pairs, the first catapult to reach STANDBY/MIL PWR must be fired or suspended before the other catapult can attain STANDBY/MIL PWR.

(9) For non-ICCS ships, the Console Operator, observing the STANDBY light on, immediately checks all gauges, lights, and shall verify the position of the CSV by comparing the position readout on the console with the mechanical counter on the CSV. If everything is satisfactory, he places the catapult in FINAL READY.

WARNING

Silence must be maintained on voice communication system from the time the taking tension is passed until the launch has been completed, or if a suspend or hangfire occurs, in order that signals between stations are not misinterpreted.

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COMNAVAIRPACINST 13800.9D

(10) For non-ICCS ships, when the catapult is in FINAL READY and the Deckedge Operator observed the FINAL READY (red) light, he signals the catapult is in FINAL READY by holding both hands above his head (fig. 5-15). This action also prevents him from inadvertently depressing the FIRE pushbutton.



Hold arms overhead with hands open.

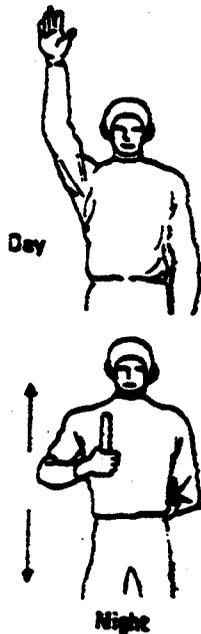
(fig. 5-15 Final Ready)

WARNING

The Deckedge Operator shall not lower his hands for any reason other than to depress the FIRE or SUSPEND pushbutton.

(11) For non-ICCS ships, if the launch is to be made at Combat Rated Thrust (CRT), the Catapult Officer, upon observing that the catapult is in FINAL READY, shall give the CRT/AFTERBURNER signal (fig. 5-16).

10 AFTERBURNER



Launching officer

Pilot

Day: Give "final turnup" signal (no. 9).

Wait 2 or 3 seconds while pilot turns up to military rated thrust and checks instruments. Then, hold open hand toward pilot, fingers extended vertically.

Night: Same except hold GREEN wand vertically and move up and down.

Remarks: Pilot select afterburner, check instruments, and:

1. Day - Salute when ready for launch.
2. Night - turn on only his running lights (STEADY), and keep them on until clear of the ship.

(fig. 5-16 CRT/Afterburner)

(12) For ICCS ships using Deckedge Mode, when the CCP Operator observes the military power light on, he shall check all gauges and lights.

WARNING

Silence shall be maintained on the voice communication system from the time bridle tension pushbutton is pressed until launch is completed or a suspend/hangfire occurs.

(13) For ICCS ships using Deckedge Mode, if CRT is required, the Catapult Officer gives the CRT signal (fig. 5-16) and the Deckedge Operator shall press the combat power pushbutton.

(14) For ICCS ships using Deckedge Mode, after the Catapult Officer salutes the pilot, the Deckedge Operator shall depress the FINAL READY pushbutton. After observing the final ready light, the Deckedge Operator shall give the final ready signal (fig. 5-15).

WARNING

The Deckedge Operator shall not lower his hands for any reason other than to depress the FIRE or SUSPEND pushbuttons.

(15) The squadron Plane Checkers shall position themselves so they may observe the lighting of the afterburners and normal nozzle action. They shall withhold giving the thumbs up (day) or steady vertical blue stubby wand (night) signal until all conditions are normal. Should an afterburner fail to ignite, the Plane Checker will give the SUSPEND signal.

(16) With the aircraft at take-off power, the pilot will make his final checks. If everything is satisfactory, he will position his head against the seat headrest and will indicate he is ready by turning his head slightly toward the Catapult Officer and by executing a right or left hand salute. If, for any reason, the pilot desires to abort the launch, he shall so indicate by transmitting "SUSPEND, SUSPEND CATAPULT NO. _____," and by shaking his head negatively (day) and not turning on the navigation lights (night), in which case the Catapult Officer shall SUSPEND.

WARNING

Once the aircraft is tensioned on the catapult and turned up to take-off power, the pilot shall not adjust his visor nor make any other movement which might be mistaken for a salute until he is ready to be launched.

WARNING

The Air Officer shall not rely on changing rotating beacons from GREEN to RED to suspend the launch, but shall activate the SUSPEND pushbutton.

(17) Upon receiving the pilot's salute (day) or navigation lights on (night), but before giving the signal to FIRE, the Catapult Officer shall return the salute (day) or extend a green wand overhead (night) and:

- (a) Check for a green rotating beacon
- (b) Make a final scan of the aircraft
- (c) Check the position of the flight controls
- (d) Ensure the aircraft sounds normal at take-off power
- (e) Ensure the catapult is still in final ready
- (f) Check the Centerdeck Operator for a thumb up (day) or steady white stubby wand (night) held vertically, indicating wind is within limits.
- (g) Check squadron Plane Checkers for a thumb up (day) or steady blue stubby wand (night) held vertically.
- (h) Check TSPO for a thumb up (day) or steady white stubby wand (night) held vertically.
- (i) If the deck is pitching, the launch must be timed and the fire signal given so that the deck will be level, pitching up, or at the top of the pitch cycle at the completion of the catapult power stroke.

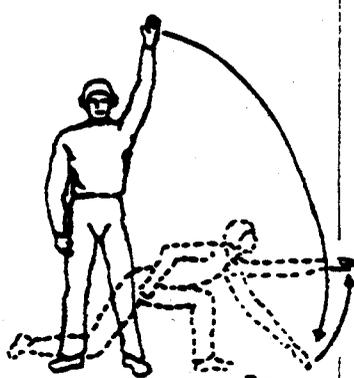
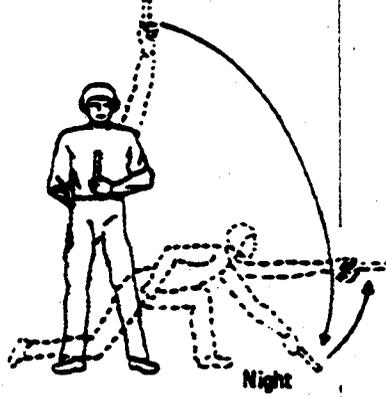
(j) Check for airborne aircraft traffic (waveoff, bolter, etc.) to preclude the possibility of collision between the airborne and the launching aircraft.

(k) Bow/Angle Observer for GO signal.

WARNING

Timing will vary with the cycle of the deck, and type of aircraft. Deckedge Operators and pilots must be briefed not to change procedures in an attempt to time the shot themselves.

(18) When the Catapult Officer determines the catapult, aircraft and pilot are ready in every respect, he shall give the signal to FIRE the catapult (fig. 5-17) by sweeping his raised hand down in the direction of the launch, touching the deck and returning it to the horizontal position in the direction of launch.

(11) FIRE/LAUNCH	Launching officer	Catapult crew, Pilot	
 <p style="text-align: center;">Day</p>			<p>Day: Extend arm overhead. Ensure that pilot's head is against headrest and deck is clear forward. Sweep up-raised hand downward in the direction of launch, touching the deck and returning hand to the horizontal in the direction of launch.</p> <p>Night: Raise GREEN wand vertically overhead. Wait 2 or 3 seconds for pilot to position head against headrest. Ensure that deck is clear forward. Sweep wand in a wide arc, ending by pointing in the direction of launch, touching the deck and returning wand to the horizontal in the direction of launch.</p>
 <p style="text-align: center;">Night</p>			<div style="border: 2px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">WARNING</div> <p>The launching officer shall remain in the crouched position with his hand/wand held horizontally in the direction of launch until the aircraft has passed his position or a suspend/hangfire situation is indicated.</p> <p>Note - Also used for free deck launches.</p>

(fig. 5-17 Fire Signal)

WARNING

The Catapult Officer and all topside personnel shall remain in the crouched position until the signaled aircraft has passed their position or until the Catapult Officer has executed a SUSPEND/HANGFIRE and the catapult is safe.

(19) The Deckedge Operator, upon observing the Catapult Officer touch the deck, shall check the deck, aircraft, and catwalk (fore and aft) noting the Safety's (bow/angle) signal, thumbs up (day) or green wand/light (night), then lower his hand and depress the FIRE pushbutton.

WARNING

The Deckedge Operator must not anticipate the FIRE signal as the Catapult Officer or topside personnel may initiate a SUSPEND at any time prior to the Deckedge Operator depressing the FIRE pushbutton.

(20) If any deficiency in aircraft hook-up is noted by the Deckedge Operator or if the deck and catwalk forward areas are not clear, he shall not FIRE but SUSPEND and notify the Catapult Officer of the deficiency. Anytime the Deckedge Operator suspends, he shall signal SUSPEND (fig. 5-18) to the Catapult Officer.



Day: Cross arms high overhead indicating the launch is off.

Night: Hold RED wand high overhead



(fig. 5-18 Suspend from Deckedge)

WARNING

The Catapult Officer, after touching the deck, shall monitor the pilot for any signs of a suspend. At night, he shall monitor the navigation lights ensuring they remain on.

WARNING

It is extremely important that all personnel stationed in the catwalk remain as low as possible and attempt to hug the inboard catwalk bulkhead when the catapult is fired. This position will offer the most protection from the jet blast and potential objects that may fall off the aircraft.

d. Launch Complete

(1) After ensuring the launch is complete, the Console/CCP Operator shall prepare for the next launch and the Deckedge Operator, after ensuring the track is clear, shall retract the shuttle.

(2) Subsequent aircraft will be spotted, hooked up and tensioned as rapidly and safely as possible.

355. LAUNCHING AIRCRAFT (ICCS)

a. Taxiing/Spotting Aircraft on Catapults

(1) When positioning an aircraft on the catapult, the Director must be acutely aware of the activities of the catapult crew, and must control the aircraft's speed and movement in such a way that personnel safety will not be jeopardized. Pilots must guard against the tendency to use excessive power, which invariably results in roughness and poor control and makes accurate catapult spotting difficult. As the aircraft approaches the catapult, the Director shall signal the pilot to lower flaps. Jet Blast Deflectors shall be raised as appropriate when the tail of the aircraft is clear.

CAUTION

Often aircraft on catapult number four block the view of the number three JBD Operator. All JBD Safety Observers/Operators shall ensure aircraft clearance is sufficient prior to raising or lowering a JBD.

WARNING

If a JBD cannot be raised, the Commanding Officer must authorize the catapult's use.

WARNING

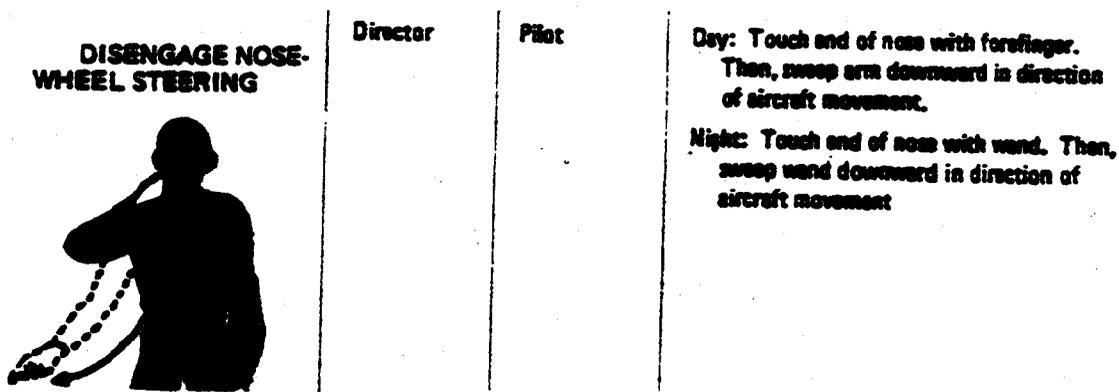
Personnel shall not work or transit immediately behind a JBD with aircraft at launch power on the catapult.

(2) As the aircraft is positioned on the catapult, the squadron Plane Checkers shall inspect the aircraft to ensure it is properly configured and ready for flight.

WARNING

Under normal operating conditions, aircraft shall not be taxied to a position where the launch bar can engage the spreader until the aircraft is ready for flight in all respects. This includes gross weight confirmed, wings spread and locked, flaps set, ordnance armed, green beacon and Cat Ready.

(3) The Director shall stop the aircraft at the lead-in track wye area. He shall then signal the pilot to Disengage Steering (fig. 5-19) by touching the end of his nose with his forefinger and then sweeping his arm downward in the direction of intended aircraft movement. The Holdback man shall install the trail bar and check the tension bar/release unit for the proper seating position (not cocked). F-14 aircraft shall be kneeled.



(fig. 5-19 Disengage Steering)

(4) The Director shall then give the Lower Launch Bar signal (fig. 5-20) to the pilot upon direction of the TSPO.



Day: Rest right elbow in left palm at waist level. Bring right hand down to horizontal position.

Night: Same except with wands.

(fig. 5-20 Lower Launch Bar Signal)

WARNING

Trail bars and/or release units should not be installed/lowered before the aircraft reaches the lead-in wye area. Excessive keel wear or burring may occur as the bars pass over the holdback cleat (zipper), or the bars may hang up in the track. If an imbalance of the bar occurs, equipment damage or personnel injury may result.

(5) As the aircraft is taxied forward, the TSPO shall ensure the launch bar is properly positioned and that the buffer slider is in its full aft position.

CAUTION

Aircraft taxi speed shall not exceed 4 mph while approaching the buffer.

WARNING

To avoid possibility of premature tension bar failure, do not actuate "BUFFER FWD" or "BUFFER AFT" pushbuttons during the aircraft buffer stroke.

(6) The Director shall direct the pilot to taxi slowly over the shuttle spreader.

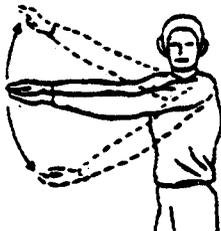
(7) For bridle aircraft, the Director shall momentarily stop the aircraft, and the Holdback man shall attach the holdback unit and check the tension ring/bar for proper seating after the holdback assembly is taut.

WARNING

An incorrectly installed tension ring/bar may cause premature disengagement during tensioning or when full thrust of the aircraft is applied.

(8) If aircraft strut(s) must be extended, Director shall signal the pilot (fig. 5-21).

1) EXTEND or LOWER STRUT(S)



Director

Pilot

Day: Extend arms to one side, palms together and horizontal. Then, open arms.

Night: Same except hold wands horizontally.

Note - For lowering strut, reverse the procedure for extending strut.

(fig. 5-21 Extend Strut)

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b. Tensioning Aircraft

WARNING
(ICCS)

When the Catapult Officer observes the aircraft type, weight, and side number, he determines the capacity selector valve setting desired. He shall relay this information to the CCP Operator for confirmation, who shall check the applicable Launching Bulletin. If the setting desired by the Catapult Officer is correct, the CCP Operator shall press the CSV setting pushbutton. If a mismatch occurs with the command setting and any remote readout, the Catapult Officer/CCP Operator shall suspend and down the catapult until the malfunction is corrected.

WARNING

Operation of the catapult in the defeat interlock mode shall only be accomplished with the Commanding Officer's permission. If the defeat interlock mode is used, instructions delineated in the applicable catapult operations manual (NAVAIR 51-15) shall be followed.

(2) If the Monitor observes a red malfunction or status light, or the catapult area fouled, he shall press the suspend pushbutton and notify the Catapult Officer.

(3) The CCP Operator shall continually check his panels and ensure that all lights and readouts indicate a "go" condition. If a "no-go" condition exists, he shall press the suspend pushbutton and notify the Monitor.

(4) When all conditions are satisfactory prior to tensioning aircraft, the green CAT RDY light at the Catapult Officer's Console and white lights at the CCP and Monitor's station will be illuminated. If the CAT RDY lights are not illuminated, the cause must be investigated and corrected.

WARNING

If the CAT RDY condition is lost even momentarily, the Catapult Officer, Monitor, or CCP Operator shall suspend the catapult and determine the cause. When the condition causing the loss of CAT RDY has been corrected, the suspend shall be removed. At no time shall the Catapult Officer place the catapult in tension without first ensuring a CAT RDY condition exists.

(5) Prior to signaling the Catapult Safety Observer to initiate the hook-up, the Catapult Officer shall ensure:

(a) The CSV is set in accordance with the appropriate launching bulletin

(b) The area forward of the catapult is clear

(c) Wind over the deck and crosswinds are within limits and in accordance with applicable launch bulletins

(d) Green rotating beacon

- (e) In CAT RDY
- (f) Aircraft configured for flight
- (g) The "catapults interlocked" light is illuminated unless intentionally operating in the "catapults not interlocked" mode
- (h) Go/no go charts are reviewed
- (i) When all conditions are satisfactory, the Catapult Officer shall signal the Catapult Safety Observer to hook up the aircraft.

NOTE

For Case III launches, the Catapult Officer shall maintain absolute control of the launch sequence and aircraft shall not be hooked up and tensioned except upon the Catapult Officer's signal.

(6) After receiving the hook-up signal from the Catapult Officer, and prior to signaling the TSPO to initiate hook-up, the Catapult Safety Observer shall ensure:

- (a) Area forward of the catapult and safe shot lines are clear
- (b) JBDs are raised and aircraft immediately aft of the JBD are configured to sustain turbulence from launching aircraft
- (c) Aircraft is properly configured for flight
- (d) Aircraft is properly armed (if applicable)
- (e) Green rotating beacon
- (f) The TSPO is giving thumbs up (day) or steady white stubby wand (night) indicating ready for hook-up

(7) When all conditions are satisfactory, the Catapult Safety Observer shall give the hook-up signal to the TSPO (fig. 5-22).



Day: Extend forearms forward at waist level with palms facing up; make slight lifting motion with forearms.

Night: Hold both wands close to waist and extending forward horizontally; rotate wands from horizontal to vertical position.

(fig. 5-22 Hook-up)

(8) When the TSPO receives the hook-up signal from the Catapult Safety Observer, he shall ensure the following prior to signaling tension:

(a) The holdback is attached and all slack removed from the holdback unit. In case of nose gear launch aircraft, ensure the holdback is properly seated in the buffer hooks, and the aircraft has fully engaged the nose gear launch unit.

(b) The bridle hook-up men have correctly positioned the bridle to ensure proper engagement between the shuttle spreader and the aircraft tow fittings after tension has been applied.

(c) Check bridle fittings ensuring all parts are properly hooked up to prevent damage (fig. 5-23).

④ ATTACH BRIDLE/
PENDANT



Day



Night

Launching
officer

Director and
Catapult crew

Day: Extend arms forward at waist level;
make slight lifting motion with forearm.

Night: Hold both wands close to waist,
extending forward horizontally; rotate wands
from horizontal to vertical position.

(fig. 5-23 Bridle Hook-up)

WARNING

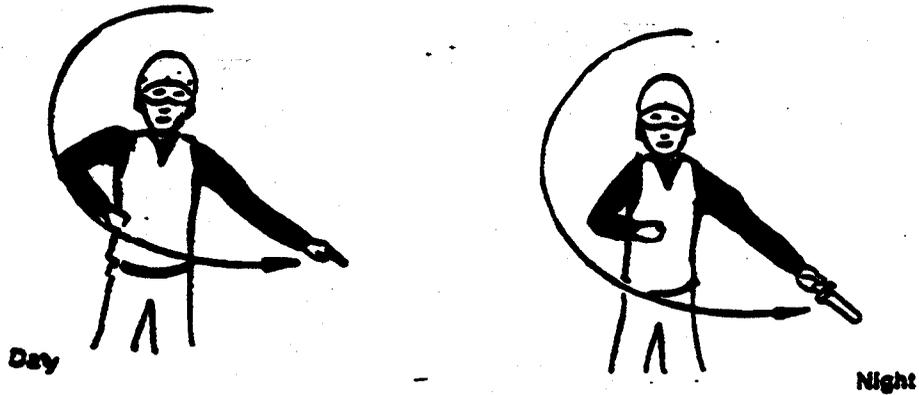
Improper attachment of a bridle can cause premature separation or failure of these components, and result in a mishap.

- (d) JBDs are raised and personnel properly positioned
- (e) Catapult area forward is clear
- (f) Squadron Plane Checkers are clear from under the aircraft
- (g) Catapult deckedge red suspend light not illuminated

WARNING

Aircraft tiedown rings shall not be used as a handle while placing an aircraft in tension.

(9) The TSPO shall then give the tension signal to the Catapult Safety Observer and Director (fig. 5-24).

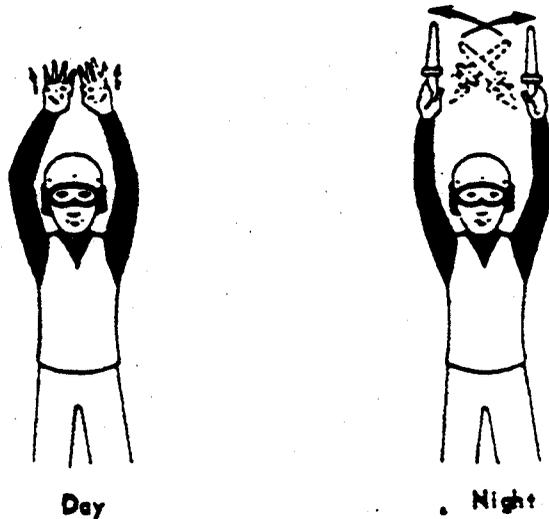


(fig. 5-24 Tension Signal TSPO)

(10) After receiving the tension signal from the TSPO, the Director shall:

(a) Check forward ensuring all personnel and aircraft are clear of the catapult "safe shot line."

(b) Signal the pilot to release brakes (fig. 5-25) followed by the tension signal (fig. 5-26).

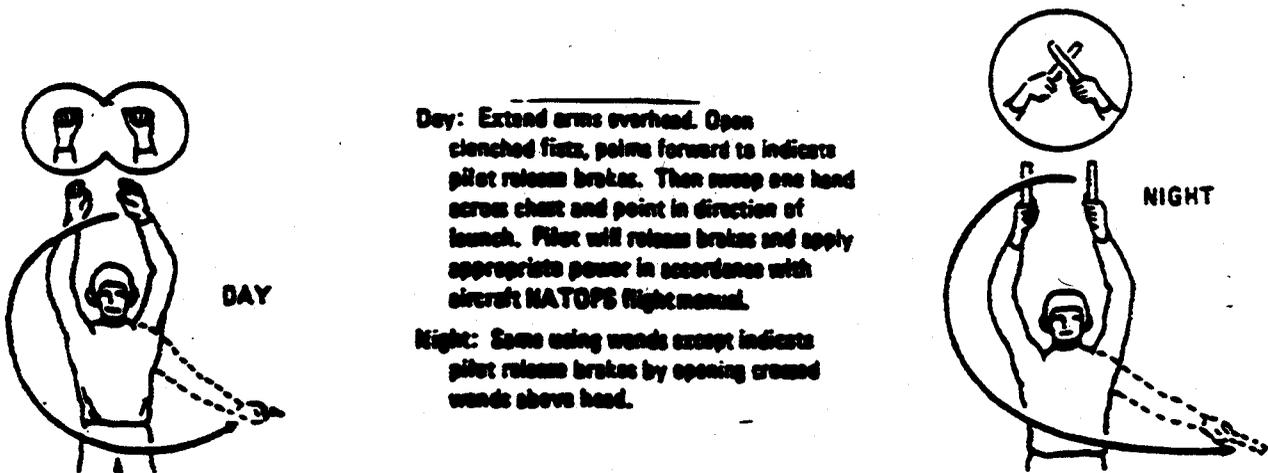


(fig. 5-25 Release Brakes)

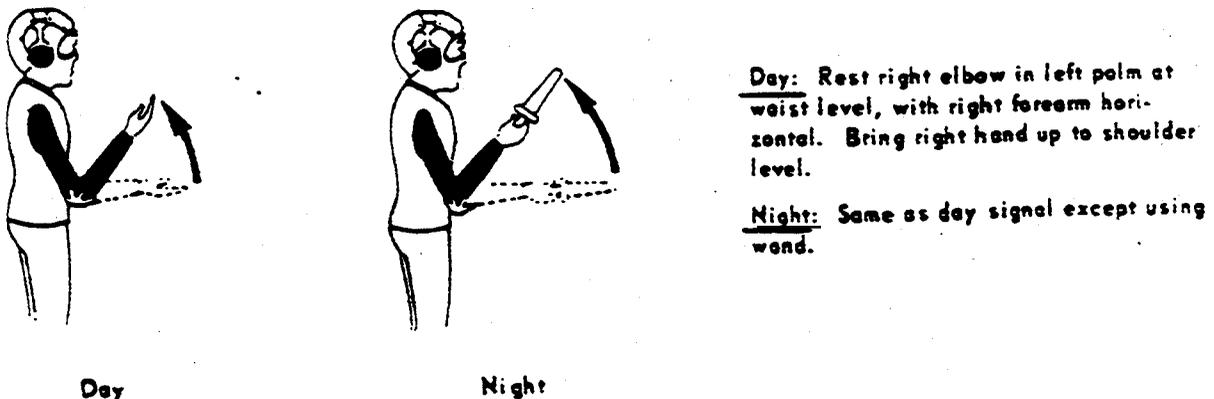
WARNING

Giving a raise launch bar signal prior to the shuttle fully engaging the aircraft launch bar could cause a launch bar misposition and possible loss of pilot and aircraft during the catapult stroke.

(c) Signal the pilot to raise launch bar (fig. 5-27) if applicable. The raise launch bar signal shall not be given until after the Topside Petty Officer has exited the aircraft.



(fig. 5-26 Tension Signal by Director)



(fig. 5-27 Raise Launch Bar)

(d) Pass the aircraft to the Catapult Safety Observer who in turn directs the pilot's attention to the ICCS deck signal lights.

(11) After receiving the tension signal from the Director, the Catapult Officer shall depress the tension pushbutton, paying particular attention to proper engagement of the shuttle and launch bar, or the shuttle and bridle as the shuttle strokes forward. After tension is taken, the TSPO will perform the following:

(a) For bridle aircraft:

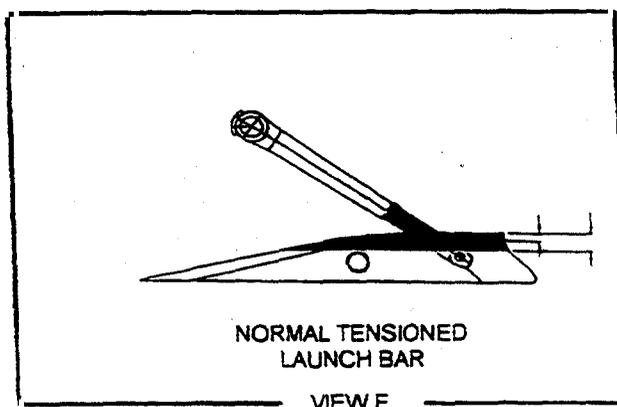
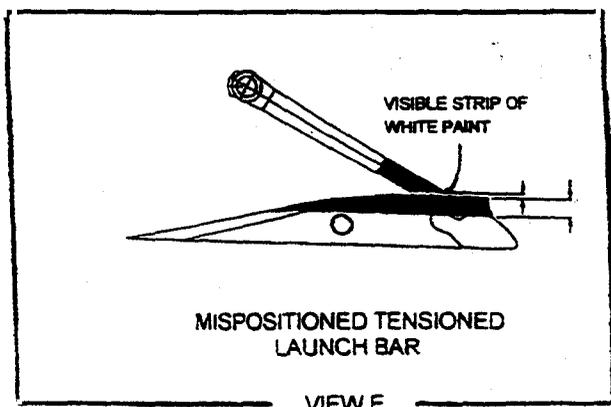
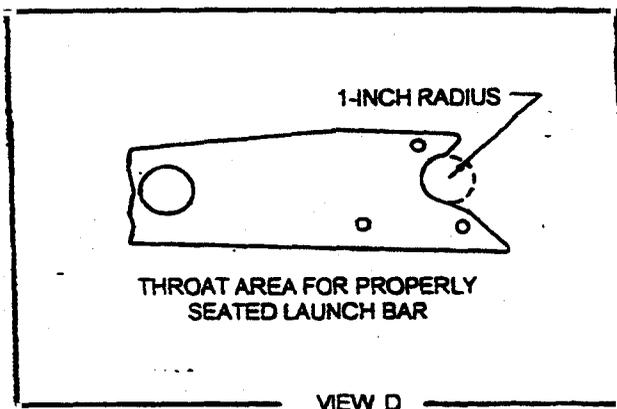
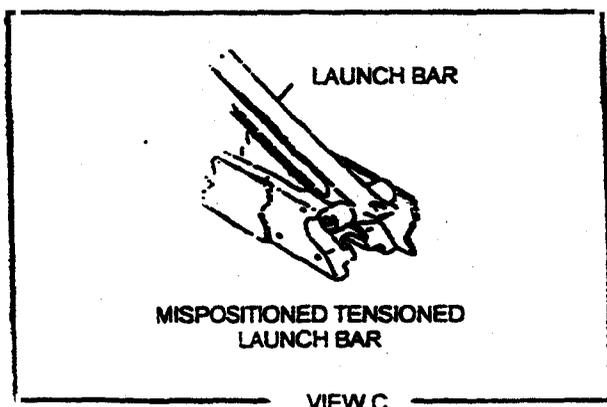
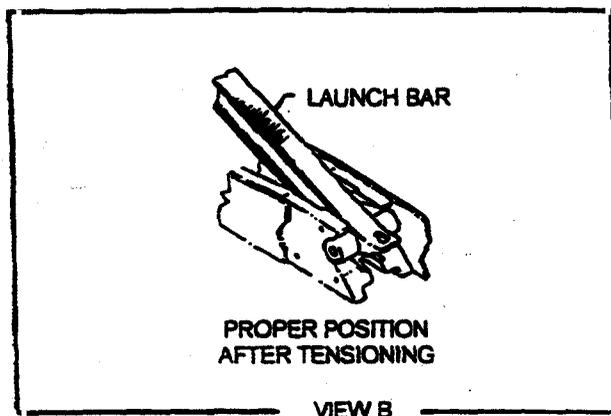
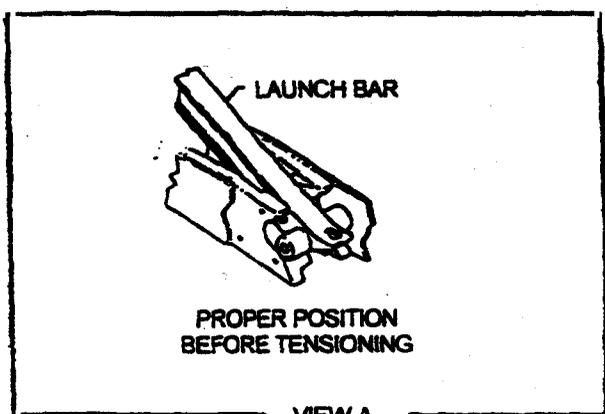
1 Ensure bridle hook-up men have correctly positioned bridle and ensure proper engagement between the shuttle spreader and aircraft tow fittings after tension is applied.

(b) For nose tow aircraft:

1 After tension is taken, the TSPO shall inspect the seating of the launch bar in the spreader (fig. 5-28), and inspect the seating of the tension bar/repeatable release element prior to exiting from under the aircraft. Give the Catapult Safety Observer a thumb up (day) or steady white stubby wand (night) held vertically if all conditions are satisfactory.

WARNING

It is mandatory that it be positively determined that the aircraft launch bar is properly seated in the nose gear launch shuttle spreader as shown in (fig. 5-28) after tension is taken. Mispositioning of the aircraft launch bar can result in the launch bar separating from the shuttle spreader during the launch. F-14 and F-18 aircraft shall not be launched with improper or missing launch bar paint schemes.



(fig. 5-28 Proper Positioning After Tensioning)

(12) Before tensioning, the CCP Operator shall verify the position of the CSV by comparing the digital readout on the CCP with the mechanical counter on the CSV. After ensuring both readouts match, he shall repeat the CSV settings to the Monitor over the voice communication system. The Monitor will advise the Catapult Officer of the CSV setting.

(13) The CCP Operator shall verify the Catapult Officer's CSV setting by referring to the appropriate launch chart, and the wind indicator. If the CCP Operator disagrees with the CSV setting selected by the Catapult Officer, he shall suspend.

WARNING

Independent computations of CSV settings by CCP Operators cross check CSV settings by Catapult Officers; therefore, it is essential that CCP Operators be fully trained on launch bulletin usage and CSV computation.

(14) After observing the TSPO exiting from under the aircraft, giving a thumbs up (day) or steady white stubby wand (night) signal, the Catapult Officer shall depress the military power pushbutton and if applicable, the combat power pushbutton.

(15) The pilot shall apply full take-off power and if applicable, afterburner when the deck signal lights are illuminated; green for military power and amber for afterburner.

(16) The squadron Plane Checkers shall position themselves so they may observe the lighting of the afterburners and normal nozzle action. They shall withhold giving the thumbs up (day) or steady blue stubby wand (night) signal until all conditions are normal. Should an afterburner fail to ignite, the Plane Checker will give the SUSPEND signal.

(17) With the aircraft at take-off power, the pilot will make his final checks. If everything is satisfactory, he will position his head against the seat headrest and will indicate he is ready by turning his head slightly toward the Catapult Safety Observer and by executing a right or left hand salute. If, for any reason, the pilot desires to abort the launch, he shall so indicate by transmitting "SUSPEND, SUSPEND CATAPULT NO. _____," and by shaking his head negatively (day) and not turning on the navigation lights (night), in which case the Catapult Officer shall SUSPEND.

WARNING

Once the aircraft is tensioned on the catapult and turned up to take-off power, the pilot shall not adjust his visor nor make any other movement which might be mistaken for a salute until he is ready to be launched.

WARNING

The Air Officer shall not rely on changing rotating beacons from GREEN to RED to suspend the launch, but shall activate the SUSPEND pushbutton.

WARNING

If there is any doubt in the mind of the Catapult Safety Observer, TSPO, Director, Plane Checker, or any topside crewman as to satisfactory hookup, aircraft configuration, or proper catapult condition, they shall give the suspend signal; crossed arms overhead (day) or horizontal wand movement (night). Below deck personnel shall depress their suspend button and/or state "suspend" over the voice communication system.

(18) The Catapult Safety Observer, after observing the pilot's salute (day) or navigation lights (night), shall return the salute (day) and shall:

(a) Immediately assume a crouched position and ensure all personnel in the immediate catapult area are in a crouched position

(b) Ensure the aircraft is properly configured for flight, paying particular attention to flap/slat setting, open panels, safety pins, wing locks, and stabilator position.

(c) Check for a green rotating beacon

(d) Check for a clear deck forward

(e) Ensure the catapult deckedge red suspend light is not illuminated

(f) Ensure the aircraft sounds normal at take-off power

(g) Check squadron Plane Checkers for thumbs up (day) or steady blue stubby wand (night) held vertically

(h) Check TSPO for a thumb up (day) or steady white stubby wand (night) held vertically

(i) Ensure Bow/Angle Safety Observers are displaying thumbs up (day) or green wand/light (night)

(j) Check for airborne aircraft traffic (waveoff, bolter, etc.) to preclude the possibility of collision between the airborne and the launching aircraft

(19) If all conditions are satisfactory, the Catapult Safety Observer shall go down on one knee and give a thumb up (day) or vertical green wand (night) to the Catapult Officer.

(20) The Catapult Officer, upon observing the pilot's salute (day) or navigation lights illuminated (night) and the Catapult Safety Observer in a crouched position, shall depress the final ready pushbutton and begin a final scan.

WARNING

ICCS (All modes of operation)

If at any time after launch bar is in the spreader there is a need to make a CSV setting change, the catapult shall be suspended and launch bar raised. The verification process must be completed again. Any time there is a disagreement between any stations on the correct CSV setting, the catapult must be suspended until resolution of the disagreement.

(21) The CCP Operator, after observing the final ready light illuminate, will conduct a final scan of the CCP, paying particular attention to ensure the launch valve clock timers have reset to zero. If there is an indication of any malfunction, he shall immediately suspend the catapult.

(22) The Monitor, after observing the final ready illuminate, will conduct a final scan of his control console, checking for malfunction lights or red status lights, and shall announce to the Catapult Officer the "steam pressure" and "clear forward." If there is any indication of a malfunction, he shall immediately suspend the catapult.

(23) If all conditions are "go," the Catapult Officer will complete his final scan and shall include the following:

- (a) Clear area forward and observe Bow/Angle Safety Observers thumbs up (day) or green wand/light (night)
- (b) Monitor's console for malfunction indications
- (c) Green rotating beacon/green "go" light on Catapult Officer's console
- (d) Green steam pressure "go" light on Catapult Officer's console
- (e) Wind and crosswind components
- (f) CSV command selectors matching with position readout
- (g) Observe Catapult Safety Observer, TSPO and squadron Plane Checkers giving thumbs up or appropriate night signal
- (h) Observe aircraft properly configured for flight
- (i) Observe pilot is properly positioned for launch
- (j) Check deck pitch

(24) If all conditions are satisfactory, the Catapult Officer shall depress the fire pushbutton.

Launch Complete

(1) After ensuring the launch is complete, the Catapult Console Operator/CCP shall take such actions as are necessary to initiate next launch. The Monitor Operator shall retract the shuttle after ensuring the track is clear.

(2) Subsequent aircraft will be spotted, hooked up and tensioned as rapidly and safely as possible.

356. NIGHT/CASE III OPERATIONS

a. Night/Case III procedures are essentially the same as those for normal day operations with one exception; a minimum departure (launch) interval of 30 seconds shall be utilized between aircraft.

b. The Catapult Officer must have sufficient view of the other set of catapults so that they may control the launch interval or the Air Officer may maintain complete control. In any case, the Air Officer shall monitor the launch to ensure that the bow and waist catapults do not launch simultaneously, and provide coordinating assistance should any unusual circumstances arise such as aircraft or catapult becoming inoperative.

c. The types of wands to be used during launching operations are as follows:

Catapult Officer/Catapult Safety Observer	1 red and 1 green standard
Topside Petty Officer	1 white stubby
Director	2 amber standard
Plane Checker	1 blue stubby
* Centerdeck Operator	1 white stubby
Deckedge Operator	1 red standard
Ordnance Safety	2 red standard (banded)
JBD Safety	1 white stubby
Bow/Angle Safety Observer	1 red and 1 green standard

* Note: Centerdeck Operator shall maintain an extra set of Catapult Officer's wands.

Standard denotes full length cones and stubby denotes a modified cone providing 3 inches of cone. Any suitable battery and switch housing is authorized if the cone is brightly lighted. Banded denotes two 3/4 inch bands spaced equidistant from the cone.

357. POST-LAUNCH PROCEDURES

357.1 PILOT DEBRIEF

a. It is extremely important to maintain a flow of information between the pilots and the Catapult Officers. When pilots make procedural errors, they should be aware of their errors so a complete understanding of flight deck procedures is maintained. Catapult Officers must keep in mind that each pilot is an individual and each has his own level of proficiency. At times, the Catapult Officer must become an instructor of flight deck procedures. Everyone connected with the launch should know what everyone else is doing and the reason why. The pre-deployment brief and post-launch debriefs are necessary to ensure the pilots do know what is going on around them and to correct any misunderstanding they might have about procedures and the functions of flight deck personnel.

b. Some of the common errors that should be covered in debriefs are:

(1) Reducing power on a SUSPEN) signal rather than waiting for a THROTTLE BACK signal from the Catapult Officer/Catapult Safety Observer.

(2) Not recognizing other than normal night signals; in particular, THROTTLE BACK signal at night.

(3) Raising a hand to his head to adjust visor, set clock, or make actions that might be misinterpreted as a salute while in tension and at full power.

(4) Not understanding the weight board procedures, using improper signals when trying to lower or raise weight, and/or not having a flashlight at night to give the proper signals (this goes for RIOs, BNs and other crewmen as well).

(5) Not knowing the weight of the aircraft prior to arriving at the catapult.

(6) Not completing his take-off list (Checklists, under normal circumstances, shall be completed prior to crossing the shuttle.)

(7) Saluting before the Catapult Officer/Catapult Safety Observer has control of the aircraft (although not unsafe, does lead to confusion between pilot and Catapult Officer).

(8) Rough or rapid taxi procedures.

357.2 CATAPULT CREW DEBRIEF

a. While not always necessary or required after every launch, post-launch debriefs by the Catapult Officer should be held with the catapult crews periodically, and shall be whenever a situation during a launch needs clarification. These debriefs may pertain to either the topside crew, the below deck crew, or the entire catapult crew.

b. The best possible results may be realized when there is a continuing flow of information and ideas between the Catapult Officer, supervisory personnel, and the catapult crew. Debriefs which correct errors and compliment the crew on outstanding performance can do wonders for crew morale and enhance the smoothness and efficiency of subsequent launches.

357.3 SHOT LOG REVIEW. After each day's operations, the ALRE Maintenance Officer shall review the shot log. The catapult will rarely fail without giving fair warning. By reviewing the shot log daily, the ALRE Maintenance Officer may be able to detect a possible malfunction before it occurs. Items to be checked and compared include:

- a. Launch valve timer readings
- b. Endspeeds above and below predicted (excess)
- c. Steam temperatures and pressures (before and after shot)

NOTE

Upon completion of each cycle launch, the Catapult Officer shall review shot logs.

357.4 CARRIER QUALIFICATIONS. During CARQUAL operations, the pilot shall transmit aircraft side number, fuel weight and gross weight during a two-way radio check. The same transmission is required not only for the initial launch but also after hot refueling and after a pilot switch. The Air Officer shall ensure that the aircraft side number and gross weight are passed to the Catapult Officer.

WARNING

Launching Officer must closely scan recovering aircraft to avoid simultaneously launching and recovering aircraft.

WARNING

During CARQUAL operations, a close monitoring of aircraft gross weights is mandatory by the Air Officer, the Catapult Officer, pilots, and squadron representatives.

357.5 CROSSWIND LAUNCH. Crosswind launches shall be conducted in accordance with Aircraft Launching Bulletin No. 0-15 series.

357.6 WAIST CATAPULT LAUNCH RESTRICTIONS

a. Waist Catapult Launch Restrictions. Waist catapult launches shall be conducted in accordance with Aircraft Launching Bulletin No. 0-16 series. Copies of GO/NO GO charts shall be provided at the following stations:

- (1) Centerdecks
- (2) Bow/waist catapult deckedges
- (3) Primary Flight Control
- (4) Flight Deck Control
- (5) Bow/Angle Safety Observer

The following stations shall have copies for ICCS operations:

- (6) Bow/waist ICCS Launching Officers
- (7) Bow/waist ICCS Monitor
- (8) Primary Flight Control
- (9) Flight Deck Control
- (10) Bow/Angle Safety Observer
- (11) Centerdecks (for use during deckedge mode)

b. Operating Procedures

(1) It is essential that all personnel concerned have a general knowledge of these restrictions and have GO/NO GO charts readily available for reference during launch operations.

(2) Prior to each launch series, the Catapult Officer/Catapult Safety Observer shall sight down the catapult launch/shot lines to ensure no personnel or equipment obstructs shot lines. Waist Catapult Bow Safety will not give thumbs up or green light without ensuring compliance with applicable go/no-go charts.

(3) Launch bar shall not be in throat of shuttle any time deck is fouled.

(4) During night operations, the Bow Catapult Officer must inform the Waist Catapult Officer of a foul deck situation.

(5) The Air Officer shall monitor and, if necessary, SUSPEND the applicable catapult(s) whenever a foul deck situation arises during launch operations.

357.7 DECK LAUNCHING

a. If a deck launch is preceded by a catapult launch, it is the responsibility of the Catapult Launching Officer to ensure that all personnel and equipment are clear, and that no loose gear is adrift on the deck area to be used (axial/angle). He shall then give the Deck Launching Officer the "CLEAR DECK" signal. The Air Officer shall announce of the 5MC "Stand clear of the angle/bow while deck launching aircraft." The Air Officer shall not turn the rotating beacon from red to green until the warning is given. When a deck launch is not preceded by a catapult launch, it is the responsibility of the Deck Launching Officer to ensure all the aforementioned is accomplished prior to launch.

b. Before clearing the Launching Officer to commence launching aircraft, the Air Officer shall verify the previously determined deck run required. The Director, when positioning the aircraft for launch, shall ensure that the nose wheel is aligned, wings are spread and locked, and flaps are set as required before passing control to the Launching Officer. The aircraft shall be aligned as accurately as possible with the launch lineup line (landing area centerline when launching down the angle deck). The Director will then taxi the aircraft into position, and the squadron's aircraft inspector shall check the aircraft for loose or missing panels/doors, leaks, and other visible discrepancies. If he is satisfied and the aircraft is ready for launch, he shall so signify by giving the Launching Officer the "THUMBS UP" signal.

c. The Launching Officer shall ensure the area behind the aircraft is clear of personnel, equipment, and loose gear. He shall check for a green rotating beacon and a clear deck forward before signaling for the pilot to add power for takeoff.

d. When signaled to do so, the pilot shall smoothly but expeditiously add power and complete final cockpit checks. He shall, in the case of a single piloted aircraft, indicate his readiness for launch by an exaggerated nod of the head in the daytime or by turning navigation lights on steady at night. In dual-piloted aircraft, readiness to launch will be signaled by a salute from the pilot, relayed by the copilot if the Launching Officer is on the starboard side of the aircraft. As power is being applied for launch, the Launching Officer will check the aircraft's configuration and inspect it for leaks or other visible discrepancies. After receiving a "THUMBS UP" from the aircraft inspector and a salute from the pilot(s), the Launching Officer will again check for a clear deck forward. He shall ensure that the deck and catwalks are clear of personnel before giving the pilot the signal to launch. After receiving the launch signal, the pilot will release his brakes and execute a takeoff in accordance with the applicable aircraft NATOPS flight manual.

357.8 OPERATIONAL SAFETY WARNINGS

a. General

(1) The launching of today's high performance aircraft is a complex and demanding operation involving various inherent dangers. Personnel engaged in the operation of the launch equipment must be thoroughly trained and qualified for the launch operation. The procedures and safety precautions contained in this manual must be complied with. Disregard for these procedures, cautions, or safety warnings may create hazards more dangerous than those previously mentioned.

(2) Safety is an all hands concern; as such, all hands shall be thoroughly familiar with this manual and applicable instructions, procedures, and safety precautions. Further, all hands shall also insist on strict adherence to established safety precautions by all others not having direct access to this manual.

(3) The following general rule shall apply:

PERSONNEL HAVING REASON TO SUSPECT THE SAFE OPERATIONAL/MATERIAL READINESS CONDITION OF THE LAUNCH EQUIPMENT, DECK GEAR ACCESSORIES, THE AIRCRAFT, OR THE AIRCRAFT HOOK-UP SHALL IMMEDIATELY CAUSE THE LAUNCH TO BE SUSPENDED BY EITHER SUSPENDING THE CATAPULT THEMSELVES, OR BY INFORMING THE CATAPULT OFFICER OR OTHER PERSONNEL CAPABLE OF SUSPENDING THE CATAPULT.

(4) Prior to operational actuation of launch and recovery equipment, an inspection of equipment shall be made to locate any possible misplaced tools, rags, machine parts, etc. that would interfere with proper functioning of equipment.

b. Flight Deck In addition to the inherent safety precautions applied during operational procedures, the following special precautions shall be observed:

(1) During launch operations, no personnel other than those required by applicable operating instructions shall be on the flight deck, catwalks, sponsons, or in the launch area without the expressed permission of the Air Officer. It shall be the responsibility of the Catapult Officers, Flight Deck Officer, and Flight Deck Supervisors to ensure compliance.

(2) All personnel that are required to be on the deck in the launch area and who do not have a specifically assigned station shall remain in a safe area.

(3) Any person who observes any unusual condition during the launch, such as objects falling from or striking the aircraft, shall immediately inform the Catapult Officer.

(4) Personnel required to be in the catwalks shall duck below flight deck level during actual aircraft launch.

(5) No one shall enter the launch area to effect repairs, or for any other reason, until positive clearance has been obtained from the Catapult Officer.

(6) The Catapult Officer shall ensure that all pre-operational inspections have been completed before launching.

(7) During night operations, the pre-launch check of catapult components or aircraft launching intervals shall not be speeded up. Sufficient time shall be taken to double check each step to prevent possible accidents due to faulty hook-ups, misinterpreted signals, and other causes.

(8) The shuttle or grab shall not be moved along the track until the Catapult Officer is present at his station, and the track slot and surrounding areas have been inspected and found to be clear.

(9) The pistons shall not be retracted when steam is in the receiver, unless the water brakes are operating properly.

(10) Do not hold shuttle in battery position longer than 5 minutes. If operations are delayed, advance and retract the pistons just prior to launching.

(11) The Weight-Confirmation Unit Operator must be in a position so that the numerals on his unit will be legible for observation by all concerned.

(12) Before setting the aircraft weight on the Weight-Confirmation Unit, the Operator shall make certain that he has the correct weight for the applicable aircraft side number, since the sequence of the aircraft coming on the line may be different from the sequence given to him prior to operations.

(13) When attaching the aircraft to the shuttle, utmost care shall be taken to ensure that the bridle is properly connected to the aircraft and the shuttle.

(14) During positioning of nose-gear launch aircraft, the speed of the aircraft shall at no time exceed 4 knots while approaching the buffer. Approach speed when the buffer is inoperative must be dead slow.

(15) Ensure that the launch bar on nose-gear launch aircraft is properly positioned so that it will engage the shuttle spreader cutout when tension is applied. It is mandatory to positively determine that the launch bar is properly positioned in the spreader throat.

(16) The Topside Safety Petty Officer shall ensure that the correct bridle is properly installed and tensioned.

(17) The pilot shall not taxi hard against the holdback unit, to ensure against release of the aircraft before the proper time.

(18) After tension is taken on an aircraft having a launch bar selector switch, the pilot shall not place the launch bar selector switch in the OFF, ABORT, or RETRACTED position until he receives the RAISE LAUNCH BAR signal from the Director. The Director shall not give the raise launch bar signal until after the TSPO has exited the aircraft.

(19) When the catapult is in use, no one shall go in front of the shuttle or forward of an aircraft or dead-load which is ready to be launched. No one except authorized operating personnel shall be permitted in catwalks or on the flight deck forward of the catapult battery position.

(20) When launching operation is suspended for any period of time, bridle tension shall be released and the bridle removed from the aircraft. With the nose-gear launch aircraft, launch bar should be lifted clear of the shuttle and the shuttle moved forward of the launch bar.

(21) If a pilot observes the flashing red SUSPEND deck light, he shall remain ready for the launch and not throttle back until directed to do so.

(22) After the aircraft is turned up for launching, the signal to THROTTLE BACK shall not be given to the pilot until it has been positively determined that the catapult has been suspended, the launching bridle is no longer attached to the aircraft, or the nose-gear launch bar has been raised and the shuttle is forward of the launch bar, except in an emergency condition. An emergency condition exists when it is necessary for crewmen to approach the aircraft to remove the bridle, raise the launch bar, or attach a line to tow the shuttle or aircraft aft. When this occurs during a SUSPEND, the Catapult Officer/Catapult Safety Observer shall ensure that the catapult is in a SUSPEND condition before giving the THROTTLE BACK signal. When this occurs during a HANGFIRE, the Catapult Officer/Catapult Safety Observer shall ensure that the catapult is suspended and the launching-valve cutout valve is in the EMERGENCY position, then give the THROTTLE BACK signal.

(23) Personnel should not go under the aircraft until the aircraft is throttled back.

(24) The requirement to manually detach the bridle or lift the launch bar following a SUSPEND or HANGFIRE is an especially dangerous operation. Crewmen performing this task must remain extremely alert at all times so that they can jump clear if the shuttle or aircraft should suddenly lurch forward. If raising the launch bar by hand, extreme caution is required to avoid hand injuries.

(25) During emergency situations when moving or towing the shuttle or aircraft, crewmen shall stand clear.

(26) Under no circumstances shall retraction be initiated with any gear or personnel in the path of the shuttle.

(27) The catapult crew shall remain clear of the aircraft during arming operations.

(28) The Director shall ensure the jet blast deflector is raised prior to giving TENSION AIRCRAFT signal.

c. Integrated Catapult Control Station, Deckedge Control Panel, and Central Charging Panel Safety Warnings

(1) Tensioning pressure (internal and external) shall be accurately adjusted and maintained at all times. Pressures in excess of those specified can cause premature holdback release. Low pressure may cause uneven or erratic launching or disengagement of the bridle or launch bar from the shuttle during launching.

(2) The launching cylinders shall be lubricated by manually operating the lubricating oil system before the first launching of the day and after the last launching prior to securing.

(3) Do not advance the pistons unless all conditions for advance are correct and one water-brake pump is running. When operating from the central charging panel, permission shall be obtained from the retraction engine and flight deck station.

(4) Steam shall not be admitted into the launching engine cylinders except during normal launching sequence when the pistons are in the battery position.

(5) Prior to pressing the FIRE pushbutton or RETRACT pushbutton, ensure that the deck is clear.

(6) In the event of a CATAPULT SUSPEND signal from the flight deck, the operator at the station controlling catapult operations shall immediately actuate the CATAPULT SUSPEND pushbutton.

(7) The Central Charging Panel Operator shall not rotate the launching valve cutout valve from the EMERGENCY position until directed to do so.

(8) The shuttle shall never be maneuvered aft during a HANGFIRE situation until the launching valve cutout valve has been rotated to the EMERGENCY position.

(9) Operating personnel shall be careful not to press the FIRE or LAUNCH COMPLETE pushbutton accidentally during launching operations.

(10) During normal operations, never press the LAUNCH COMPLETE pushbutton following a SUSPEND. Except for no-load launches and in cases where it is known positively that a launch is complete, the LAUNCH COMPLETE pushbutton shall be pressed only with the permission of the Catapult Officer.

(11) Do not hold the NGL BUFFER AFT pushbutton in the depressed position at any time other than when pulling an aircraft aft with the launch bar engaged in the nose-gear launch spreader. When towing only an aircraft or when repositioning the buffer hook, only press the NGL BUFFER AFT pushbutton momentarily.

(12) Defeat Interlock Mode. This mode of operation necessitates extreme caution to ensure the capacity selector valve is properly positioned prior to FINAL READY. If operational necessity dictates, the Commanding Officer may authorize the use of the DEFEAT INTERLOCK MODE.

d. Water-Brakes Safety Warnings

(1) If a malfunction is observed in the water-brake area, the CATAPULT SUSPEND switch on the water-brake panel shall immediately be pressed to suspend catapult operation. If it is necessary to maneuver aft when the catapult has been suspended from the water brake, the operator of the controlling station shall press his CATAPULT SUSPEND pushbutton and advise the Water-Brake Operator to lift his SUSPEND prior to pressing the MAN. GRAB AFT pushbutton.

(2) If the water-brake cylinder elbow pressure drops below the minimum value, the Catapult Officer shall be notified immediately. The malfunctioning water-brake pump shall be secured and the standby pump started. If the standby pump does not raise the water pressure to the minimum specified value, the catapult shall be secured and corrective action taken.

(3) No one shall enter the water-brake tank until all steam valves are secured in the launching system and the steam receivers are blown down and properly tagged out.

(4) The water brake tank shall be cleaned prior to arrival in port. The lubricating oil shall not be permitted to reach overflow drains nor skimmed while a vessel is in port. The proper water level can be maintained by using bottom drains.

e. General Safety Warnings

(1) During launching operations, the voice communication system shall be used only for essential communications, to ensure that signals between operators are not misunderstood.

(2) Blowers or ventilation ducts shall not be pointed directly on the launching valve assembly or steam supply area (steam receiver and steam supply lines).

(3) Pressures shall be held at predetermined settings.

(4) The catapult shall not be operated with any known broken safety wires, loose or cracked components, major hydraulic leakage, or defective communications or electrical control equipment.

(5) A HANGFIRE can leave the launch valve control valve in the stroked or nonstroked position. If a HANGFIRE occurs, no one shall pass forward of the aircraft until all danger of a delayed launching has passed.

(6) Do not launch aircraft at less than the required nominal cylinder elongation unless corrections to wind over deck requirements have been made in accordance with applicable Aircraft Launching Bulletins.

(7) All aircraft launchings shall be in accordance with all requirements specified in applicable Aircraft Launching Bulletins.

(8) All pumps, limit switches, and safety valves shall be inspected. Failure of safety devices can result in dangerous overpressure if the pump continues to operate causing ruptured hydraulic or pneumatic lines and danger to personnel.

(9) During any type of launching, live steam escapes from the track and brake areas. As this steam can cause scalding of exposed areas of the body, personnel in the area shall avoid contact with it. When the catapult is in operating status, exposed metallic parts, such as track covers, launching and exhaust valves, and steam supply piping, may be hot enough to burn exposed areas of the body on contact. Therefore, operating personnel with duties in these areas shall be equipped with required protective clothing.

(10) Ear protectors shall be worn in all areas of high noise level.

(11) Never use a jacking bar to start a motor-driven pump when the circuit to pump is energized.

(12) If STEAM-CUTOFF pressure switches are not functioning properly, down the catapult and replace before continuing catapult operations. No troubleshooting or maintenance shall be performed on these switches while catapult operations are in progress.

(13) Personnel who work in areas where there is a danger of contact with "live" steam or hot metallic surfaces shall wear appropriate protective clothing to prevent burns.

(14) All loose gear and tools shall be kept clear of all equipment.

(15) Operational/maintenance equipment pressures shall be maintained at predetermined settings.

(16) All catapult, arresting gear, and VLA spaces are RESTRICTED areas; unauthorized personnel shall not be allowed in these spaces at any time. RESTRICTED signs shall be posted.

f. Fire Prevention in Catapult Spaces

(1) High-pressure fluids, high temperatures, and nearness to flight deck combustibles greatly increase the possibility of fire in the steam catapult system. Combustible and flammable liquids or materials shall be kept away from the heated catapult parts to reduce the possibility of fire and explosion. Adequate ventilation shall be provided below deck to prevent the buildup of explosive gases. After every fire and before resumption of flight operations, a thorough inspection of the affected portion of the catapult and associated equipment shall be made. In addition, the entire crew shall be made aware of the hazards to safe flight operations and of other potential dangers should there be a recurrence of the same type of fire in the future. To minimize the causes of fire and the extent of fire damage, particular attention shall be continually given to the following precautions:

(2) Training of all personnel in the proper fire fighting procedures.

(3) Procurement, proper stowage, and ready availability of effective fire fighting equipment.

(4) Periodic checkout of automatic and semi-automatic fog, foam, and steam smothering systems to ensure proper operation.

NOTE

At each catapult steam smothering valve location, valve enclosure boxes shall be painted with 1" black and white alternating stripes. Deck and wheel stop coaming shall be in accordance with VLA General Service Bulletin No. 8.

(5) All spaces kept in a clean condition, especially the trough. Clean up any spillage immediately.

(6) Installation of track slot seals whenever possible. (Track slot seals shall not be used on the waist catapults during recovery operations, but shall be installed immediately thereafter.)

(7) Repair of lagging breaks in excessively high temperature areas.

(8) Assurance that sentries posted during non-operating hours have been thoroughly indoctrinated in the proper procedure for reporting and containing a fire until competent assistance arrives.

SECTION III

CHAPTER 6

EMERGENCY ACTIONS AND PROCEDURES

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360. GENERAL. Safety is paramount when conducting emergency procedures. Proper procedures mixed with common sense will enable catapult crews to handle any emergency. This manual does not discuss all emergencies nor are they in-depth. The reader should refer to appropriate NAVAIR Operation Manuals for a thorough discussion of emergency procedures. Drill scenarios are outlined in FXP-4 publications and COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 3500.20B, and should be practiced at a minimum of weekly.

361. ABORTING THE LAUNCH

a. At any time, up to and including FINAL READY, firing of the catapult can be prevented and the launch aborted. The Deckedge Operator, Console/CCP Operator, Monitor, Pri-Fly, Water Brake Operator and Catapult Officer (ICCS) all have SUSPEND switches, which when activated, break the interlock complete circuit and prevent the launch.

b. Any person, other than those having access to a SUSPEND switch, who detects a cause for aborting the launch shall signal the Catapult Officer/Catapult Safety Observer and/or the Deckedge Operator/Monitor by crossing his arms high overhead (day) or waving a wand back and forth horizontally (night) to indicate a SUSPEND situation exists.

c. The Deckedge/Monitor Operator does not have to receive the SUSPEND signal from the Catapult Officer/Catapult Safety Observer in order to actuate his SUSPEND switch. He shall do so immediately upon observing a SUSPEND signal from anyone on deck, or if he detects any condition that would be reason to abort the launch.

d. The pilot can abort the launch at any time prior to being tensioned by refusing to taxi onto the catapult, and/or using hand signals to indicate his desire not to go. At night, he shall notify Pri-Fly who shall relay his problems to the Catapult Officer/Director.

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e. Once the aircraft is tensioned, the pilot shall indicate his desire to abort by shaking his head negatively (day) and by not turning on his lights (night), and by transmitting the words "SUSPEND, SUSPEND, CATAPULT NO. . . ." The Catapult Officer, after taking control of the aircraft and upon observing the aircraft turning up to full power, will wait a reasonable length of time and then initiate a SUSPEND if Pri-Fly has not already done so.

f. Any time a SUSPEND is initiated, it must be carried out to completion. This includes untensioning of the aircraft, reduction of aircraft power back to idle, and moving the shuttle forward of the launch bar; it does not necessarily include removal of the aircraft from the catapult.

WARNING

In the event of a SUSPEND, the Catapult Officer/Catapult Safety Observer shall not signal the pilot to throttle back until he has positively determined that the catapult is safe/suspended and the shuttle is forward of the launch bar. If the launch bar cannot be raised without sending personnel under the aircraft, the Catapult Officer will ensure the catapult is safe/suspended, then give pilot the THROTTLE BACK signal. With direct control of the aircraft, the Catapult Officer will then send personnel to lift the launch bar and signal SHUTTLE FORWARD with caution.

362. SUSPEND (CONVENTIONAL/DECKEDGE MODE)

a. Signals and Procedures

(1) Anytime prior to the FIRE pushbutton being depressed, the catapult may be stopped and the launch aborted, by initiating a catapult SUSPEND. The Catapult Officer, upon observing a SUSPEND condition or being notified of a catapult SUSPEND situation, shall give the SUSPEND signal (fig. 6-1).

Any flight deck crewman who detects any reason for aborting the launch may SUSPEND the catapult launch by immediately giving the SUSPEND signal (fig. 6-1).

(2) Anytime a SUSPEND is initiated, it shall be carried out to completion. This includes untensioning of the aircraft, moving the shuttle forward of the launch bar, and reduction of aircraft power to idle.



Day: Cross arms high overhead indicating the launch is off.

Night: Hold RED wand high overhead indicating the launch is off. GREEN wand is turned off.

Remarks: After this signal, pilot must remain ready for launch and not throttle back until after the "UNTENSION" and "THROTTLE BACK" signals are given by the launching officer/catapult safety observer (ICCS).

Note - Any flight deck or catapult personnel may signal a "SUSPEND" to the launching officers. The DAY signal is the same as launching officer's. The NIGHT signal is a horizontal movement of a wand or light.



(fig. 6-1 Suspend Signal)

(3) The Deckedge Operator, upon observing any SUSPEND signal, shall immediately actuate the SUSPEND switch followed by giving the SUSPEND signal (fig. 6-1).

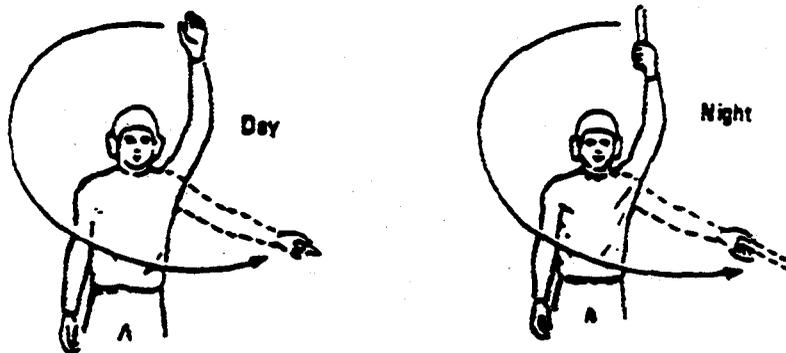
NOTE

In the event another station suspends the catapult, the Deckedge Operator shall give the SUSPEND signal to notify the Catapult Officer of the SUSPEND condition.

WARNING

When the SUSPEND signal is given, the pilot must remain ready to be launched, and he must not retard his throttle until so directed by the Catapult Officer. At no time after full power turnup shall the signal to retard throttle be given to the pilot until the catapult is SAFE.

(4) The Catapult Officer, after noting the return of his SUSPEND signal, shall signal the Deckedge Operator to UNTENSION (SHUTTLE AFT) the aircraft (fig. 6-2).



(fig. 6-2 Shuttle Aft/Untension)

(5) The Deckedge Operator shall immediately depress shuttle/maneuver aft causing tension to be relaxed and the shuttle to move aft, and the bridle to fall from aircraft tow fittings (If applicable).

(6) If the Water Brake Operator initiated the SUSPEND, the Console/CCP Operator shall actuate his suspend switch and then direct the Water Brake Operator to remove his SUSPEND prior to the Deckedge/Monitor Operator depressing the maneuver aft pushbutton. In case of electrical failure, the Deckedge Operator shall direct the Rotary/Retraction Engine Operator to depress the manual override on the maneuvering valve.

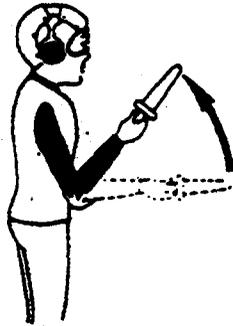
(7) As the shuttle moves aft, the launch bar will normally raise automatically as it disengages the throat of the shuttle. With the launch bar in the raised position, the Catapult Officer shall give the SHUTTLE FORWARD signal to the Deckedge Operator (fig. 6-4).

NOTE

For F-14 aircraft, the Catapult Officer will signal the pilot to raise launch bar after signaling SHUTTLE AFT.



Day



Night

Day: Rest right elbow in left palm at waist level, with right forearm horizontal. Bring right hand up to shoulder level.

Night: Same as day signal except using wand.

(fig. 6-3 Raise Launch Bar)



Day



Night

Day: Sweep one hand (pointed aft) in the forward direction.

Night: Sweep RED wand (pointed aft) in the forward direction. GREEN wand is off.

(fig. 6-4 Shuttle Forward)

WARNING

Under normal conditions, the catapult crew shall not approach the aircraft until the bridle is free and the pilot has returned to idle power.

WARNING

If the bridle fails to disengage from the aircraft, the Catapult Officer shall positively determine that the catapult is in a safe/suspended condition before giving the **THROTTLE BACK** signal. After which, he will direct crewmen to disengage the bridle by shaking it free.

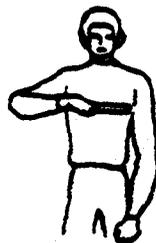
(8) Once the shuttle is forward of the launch bar, the Catapult Officer shall give the **THROTTLE BACK** signal (fig. 6-5) to the pilot.

NOTE

If failure of the bridle tensioner prevents normal movement of the shuttle past the raised launch bar, the Catapult Officer shall throttle back the aircraft, and instruct applicable watchstations to position their **SUSPEND** switches off, and instruct the Deckedge Operator to **MANEUVER FORWARD**. After the shuttle is maneuvered forward, the **SUSPEND** switches shall be reactivated, if applicable.



Day



Night

Day: Hold one fist at waist level, thumb extended up. Grasp thumb with other hand and rock as if adjusting throttle.

Night: Hold **RED** wand horizontally across chest. Raise and lower horizontal wand. **GREEN** wand is off.

(fig. 6-5 Throttle Back)

WARNING

Catapult crewmen shall not approach the aircraft until the shuttle is forward of the launch bar, and the pilot has retarded his throttle to idle, except when an emergency condition exists.

WARNING

In the event of a **SUSPEND**, the Catapult Officer shall not signal the pilot to throttle back until he has positively determined that the catapult is suspended and the shuttle is forward of the launch bar. If the launch bar cannot be raised without sending personnel under the aircraft, the Catapult Officer will ensure the catapult is suspended and then give the **THROTTLE BACK** signal. With direct control of the aircraft, the Catapult Officer will then send personnel to lift the launch bar and signal **SHUTTLE FORWARD** with caution.

(9) When the catapult is secure, the cause of the **SUSPEND** must be determined prior to resuming catapult operation.

(10) With the aircraft at idle power, control will be passed to the Director to either resume the launch, or to remove the aircraft from the catapult.

b. Procedures Under Emergency Conditions

NOTE

Emergency conditions are construed to apply to aircraft that do not have the capability to, or are unable to, raise the launch bar automatically.

(1) If the shuttle is moved aft and the launch bar does not automatically raise, the Catapult Officer, after ensuring the catapult is properly suspended, shall signal the pilot to THROTTLE BACK. When the aircraft is at idle power, the launch bar shall be raised manually by the TSPO and held until the shuttle is moved forward of the launch bar.

WARNING

The TSPO, holding the launch bar in the raised position, must keep his hands clear of the shuttle as it is maneuvered forward.

(2) For nose tow aircraft, if the grab latch fails or any malfunction preventing the shuttle to SHUTTLE/MANEUVER AFT, the Catapult Officer, after ensuring the catapult is safe/suspended, may:

- (a) Throttle back the aircraft
- (b) Off-brakes
- (c) Buffer aft for 4 to 10 inches
- (d) Taxi aircraft forward
- (e) Raise launch bar
- (f) Shuttle forward

CAUTION

Do not allow the MK-2 NGL unit to buffer too far aft causing buffer hook retraction with the trail bar still attached.

c. Removing Aircraft from Catapults

CAUTION

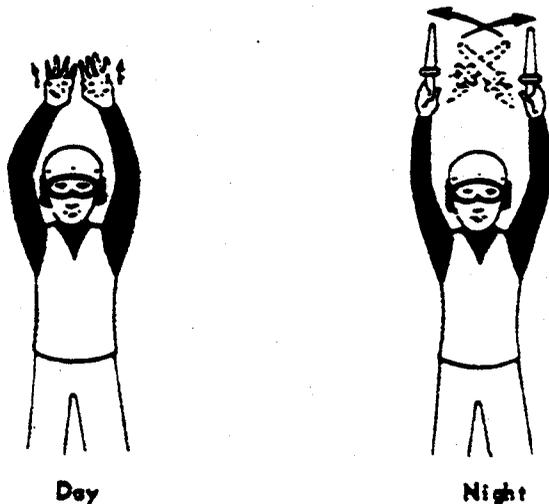
Prior to buffering aft, ensure the aircraft is dearmed and the JBD is lowered.

CAUTION

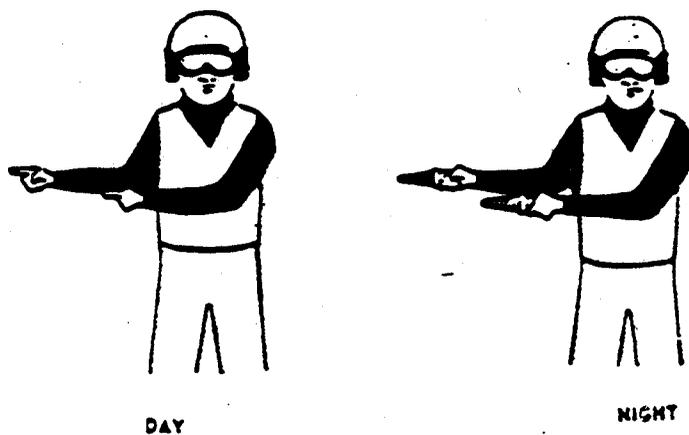
Pilots of E-2/C-2 aircraft must be briefed not to attempt to move aft by reversing engine thrust as damage to the trail bar or aircraft may result. Backing is permitted by reversing engine thrust only after removal of the trail bar. If BUFFER AFT is inoperative, using extreme caution, the aircraft may be taxied in reverse only as far as required to relieve tension on the trail bar.

(1) Once the shuttle is forward, the control is passed to the Director.

(2) In order to remove the aircraft from the buffer unit when buffering aft, the Director, upon signal from the Catapult Officer, shall signal OFF BRAKES (fig. 6-6). The Catapult Officer shall then signal the Deckedge Operator to BUFFER AFT (fig. 6-7).

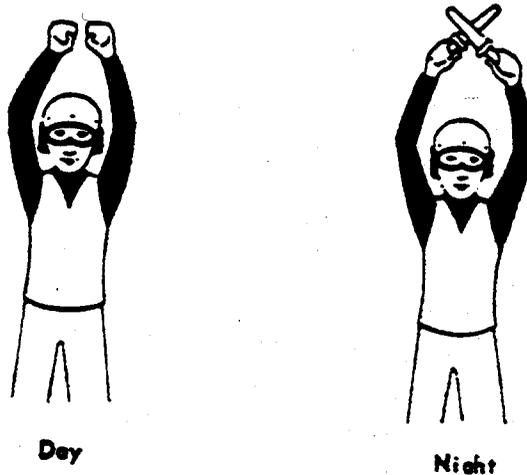


(fig. 6-6 Off Brakes)



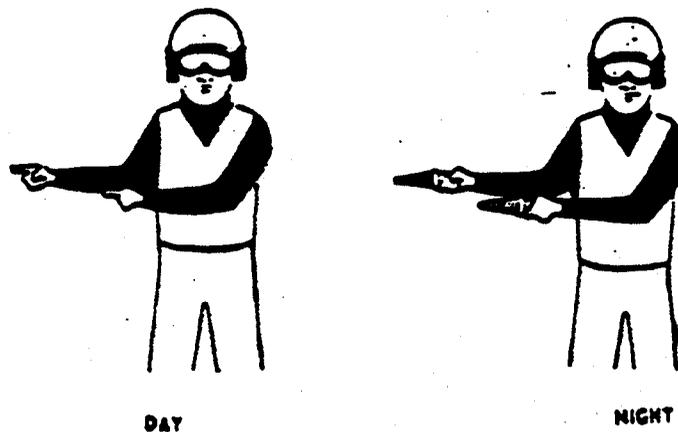
(fig. 6-7 Buffer Aft)

(3) After the aircraft moves approximately 4 to 10 inches, the Catapult Officer signals the pilot via the Director to HOLD BRAKES (fig. 6-8).



(fig. 6-8 Hold Brakes)

(4) The Catapult Officer shall then give the BUFFER FWD signal (fig. 6-9) to the Deckedge Operator who presses the BUFFER FWD pushbutton to allow slack in the trail bar/release element. The catapult crew may then disconnect the trail bar/release element. After the trail bar/release element is removed, the Catapult Officer signals the Deckedge Operator to BUFFER AFT to lower the buffer hooks. When the catapult crew is clear, the Catapult Officer passes control back to the Director and then the aircraft may then be taxied forward and clear of the catapult.



(fig. 6-9 Buffer Forward)

COMNAVAIRLANTINST 13800.3F/
COMNAVAIRPACINST 13800.9D

(5) The hand signal sequence required to complete removing an aircraft is as follows:

BRIDLE AIRCRAFT (T-2, A-4, etc.)

Suspend
Shuttle Aft/Untension
Hold Brakes
Throttle Back
(a) Pass Control (push back if required)

NOSETOW (T-45, S-3, F-14, F/A-18)

Suspend
Shuttle Aft/Untension
(b) Raise Launch Bar
Shuttle Forward
Throttle Back
Off Brakes
Buffer Aft
Hold Brakes
Buffer Forward
Buffer Aft
(a) Pass Control

NOSETOW (EA-6B, E-2, C-2)

Suspend
Shuttle Aft/Untension
Throttle Back
(c) Raise Launch Bar
Shuttle Forward
Off Brakes
(d) Buffer Aft
Hold Brakes
Buffer Forward
Buffer Aft
(a) Pass Control

(a) The Director will taxi the aircraft off the catapult after the trail bar/release element is removed. The Director will signal for unknéeing the F-14 aircraft after it is clear of the NGL track guide.

(b) If the launch bar does not raise automatically, then the catapult must be properly suspended and the throttle retarded so the TSPO can raise and hold the launch bar up until the shuttle is maneuvered forward of the launch bar. The launch bar will be lowered for the buffer sequence.

(c) Warning: When raising launch bar by hand, exercise extreme care to avoid hand injuries.

(d) Buffering aft of E-2/C-2/EA-6B aircraft with the launch bar in the locked-up position will damage the aircraft nose gear assembly.

363. SUSPEND (ICCS)

a. Signals and Procedures

(1) Anytime prior to the FIRE pushbutton being depressed, the launch may be aborted by initiating a catapult SUSPEND. The Catapult Officer, upon observing a SUSPEND condition or being notified of a catapult SUSPEND situation, shall initiate the SUSPEND procedure by immediately depressing the catapult SUSPEND pushbutton. Any flight deck crewman who detects any reason for aborting the launch may SUSPEND the catapult launch by immediately giving the SUSPEND signal (fig. 6-10).



Day: Cross arms high overhead indicating the launch is off.

Night: Hold RED wand high overhead indicating the launch is off. GREEN wand is turned off.

Remarks: After this signal, pilot must remain ready for launch and not throttle back until after the "UNTENSION" and "THROTTLE BACK" signals are given by the launching officer/catapult safety observer (ICCS).

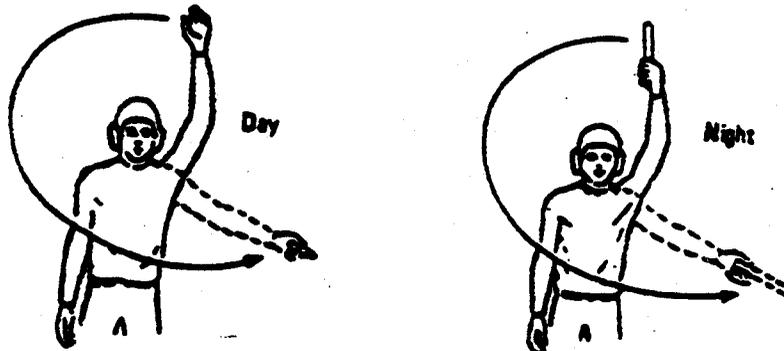
Note - Any flight deck or catapult personnel may signal a "SUSPEND" to the launching officers. The DAY signal is the same as launching officer's. The NIGHT signal is a horizontal movement of a wand or light.



(fig. 6-10 Suspend)

(2) Anytime a SUSPEND is initiated, it shall be carried out to completion. This includes untensioning of the aircraft, reduction of aircraft power to idle, and moving the shuttle forward of the launch bar.

(3) The Catapult Safety Observer shall, upon observing a SUSPEND signal, or the flashing red deckedge SUSPEND light, give the SUSPEND signal immediately followed by the SHUTTLE AFT/UNTENSION signal (fig. 6-11).



(fig. 6-11 Shuttle Aft/Untension)

(4) Upon observing the SHUTTLE AFT/UNTENSION signal, the Catapult Officer shall depress the MANEUVER AFT pushbutton.

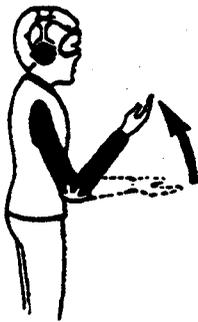
(5) If the Water Brake Operator initiated the SUSPEND, the Catapult Officer shall actuate his suspend switch and then direct the Water Brake Operator to remove his SUSPEND prior to depressing the MANEUVER AFT pushbutton. In case of electrical failure, the Catapult Officer shall direct the CCP/Retraction Engine Operator to depress the manual override on the maneuvering valve.

(6) For nose tow aircraft, the Catapult Safety Observer, after observing the shuttle move aft, shall give the RAISE LAUNCH BAR signal (fig. 6-3) to the pilots of all aircraft capable of raising launch bars.

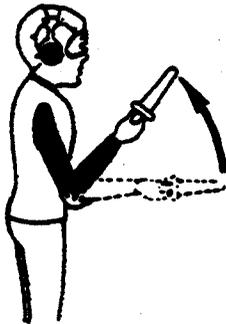
NOTE

For F-14 aircraft, the Catapult Safety Observer will signal the pilot to raise launch bar after signaling SHUTTLE AFT.

(7) When the aircraft launch bar is clear of the shuttle, the Catapult Safety Observer shall give the SHUTTLE FORWARD signal (fig. 6-12) to the Catapult Officer.



Day



Night

Day: Rest right elbow in left palm at waist level, with right forearm horizontal. Bring right hand up to shoulder level.

Night: Same as day signal except using wand.

(fig. 6-3 Raise Launch Bar)



Day



Night:

Day: Sweep one hand (pointed aft) in the forward direction.

Night: Sweep RED wand (pointed aft) in the forward direction. GREEN wand is off.

(fig. 6-12 Shuttle Forward)

(8) The Catapult Officer, upon observing the SHUTTLE FORWARD signal, shall depress the BRIDLE TENSION pushbutton.

WARNING

Under normal conditions, the catapult crew shall not approach the aircraft until the bridle is free and the pilot has returned to idle power.

WARNING

If the bridle fails to disengage from the aircraft, the Catapult Safety Observer shall positively determine that the catapult is in a safe condition before giving the THROTTLE BACK signal. After which, he will direct crewmen to disengage the bridle by shaking it free.

(10) Once the shuttle is forward of the launch bar or the bridle falls free of the aircraft, the Catapult Safety Observer shall step in front of the aircraft and give the THROTTLE BACK signal (fig. 6-13) to the pilot.

NOTE

If failure of the bridle tensioner prevents normal movement of the shuttle past the raised launch bar, the Catapult Officer shall direct the Catapult Safety Observer to THROTTLE BACK the aircraft, and instruct applicable watchstations to position their SUSPEND switches off, and press MANEUVER FORWARD. After the shuttle is maneuvered forward, the SUSPEND switches shall be reactivated.



Day



Night

Day: Hold one fist at waist level, thumb extended up. Grasp thumb with other hand and rock as if adjusting throttle.

Night: Hold RED wand horizontally across chest. Raise and lower horizontal wand. GREEN wand is off.

(fig. 6-13 Throttle Back)

WARNING

Catapult crewmen shall not approach the aircraft until the shuttle is forward of the launch bar, and the pilot has retarded his throttle to idle.

WARNING

In the event of a SUSPEND, the Catapult Safety Observer shall not signal the pilot to THROTTLE BACK until he has positively determined that the catapult is suspended and the shuttle is forward of the launch bar. If the launch bar cannot be raised without sending personnel under the aircraft, the Catapult Safety Observer will ensure the catapult is suspended then give the THROTTLE BACK signal. With direct control of the aircraft, the Catapult Safety Observer will then send the TSPO to lift the launch bar and signal SHUTTLE FORWARD with caution.

(11) When the catapult is secure, the cause of the SUSPEND must be determined prior to resuming catapult operation.

(12) With the aircraft at idle power, control will be passed to the Director to either resume the launch, or to remove the aircraft from the catapult.

b. Procedures Under Emergency Conditions

NOTE

Emergency conditions are construed to apply to aircraft that do not have the capability to, or are unable to, raise the launch bar automatically.

(1) If the shuttle is moved aft and the launch bar does not automatically raise, the Catapult Safety Observer, after ensuring the catapult is properly suspended, shall signal the pilot to THROTTLE BACK. When the aircraft is at idle power, the launch bar shall be raised manually by the TSPO and held until the shuttle is moved forward of the launch bar.

WARNING

The TSPO, holding the launch bar in the raised position, must keep his hands clear of the shuttle as it is maneuvered forward.

(2) For nose tow aircraft, if the grab latch fails or any malfunction prevents the shuttle from MANEUVERING AFT, the Catapult Officer and Catapult Safety Observer, after ensuring the catapult is safe/suspended, may:

- (a) Throttle back the aircraft
- (b) Off-brakes
- (c) Buffer aft for 4 to 10 inches
- (d) Taxi aircraft forward
- (e) Raise launch bar
- (f) Shuttle forward

CAUTION

Do not allow the MK-2 NLG unit to buffer too far aft causing buffer hook retraction with the trail bar still attached.

c. Removing Aircraft from Catapults

CAUTION

Prior to buffering aft, ensure the aircraft is dearmed and the JBD is lowered.

CAUTION

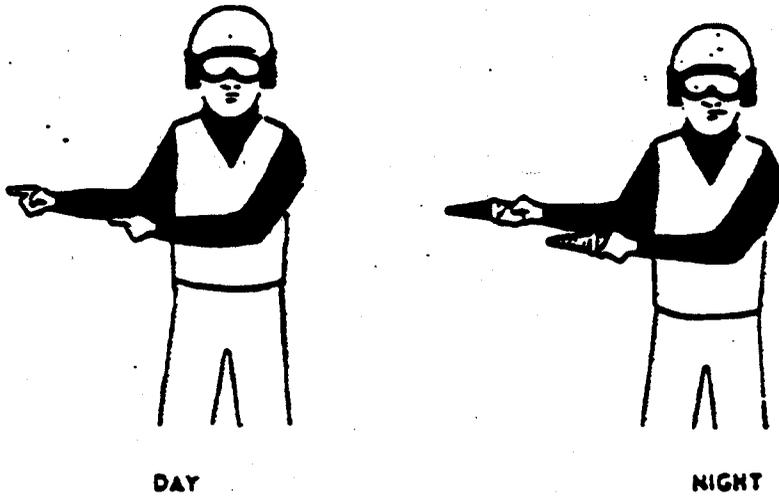
Pilots of E-2/C-2 aircraft must be briefed not to attempt to move aft by reversing engine thrust as damage to the trail bar or aircraft may result. Backing is permitted by reversing engine thrust only after removal of the trail bar. If BUFFER AFT is inoperative, using extreme caution, the aircraft may be taxied in reverse only as far as required to relieve tension on trail bar.

(1) Once the shuttle is forward, the control is passed to the Director.

(2) In order to remove the aircraft from the buffer unit when buffering aft, the Director, upon signal from the Catapult Safety Observer, shall signal OFF BRAKES (fig. 6-14). The Catapult Safety Observer shall then signal the Monitor to BUFFER AFT (fig. 6-15).

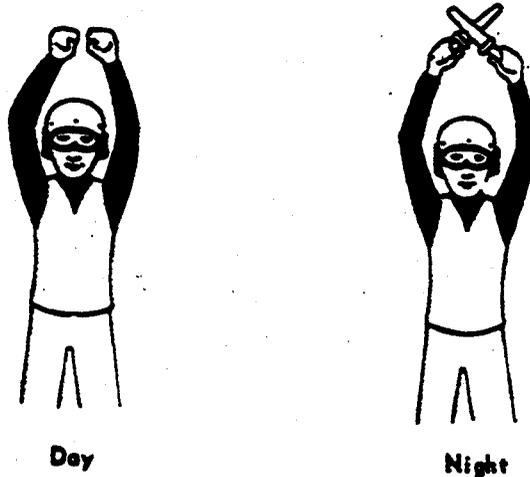


(fig. 6-14 Off Brakes)



(fig. 6-15 Buffer Aft)

(3) After the aircraft moves approximately 4 to 10 inches, the Catapult Safety Observer signals the pilot via the Director to HOLD BRAKES (fig. 6-16).



(fig. 6-16 Hold Brakes)

(4) The Catapult Safety Observer shall then give the BUFFER FWD signal (fig. 6-9) to the Monitor who presses the BUFFER FWD pushbutton to allow slack in the trail bar/release element. The catapult crew may then disconnect the trail bar. After the trail bar is removed, the Catapult Safety Observer signals the Monitor to BUFFER AFT to lower the buffer hooks. When the catapult crew is clear, the aircraft may then be taxied forward and clear of the catapult.

(5) The hand signal sequence required to remove an aircraft is as follows:

BRIDLE AIRCRAFT (T-2, A-4, etc.)

- Suspend
- Shuttle Aft/Untension
- Hold Brakes
- Throttle Back
- (a) Pass Control (push back if required)

NOSETOW (T-45, S-3, F-14, F/A-18)

- Suspend
- Shuttle Aft/Untension
- (b) Raise Launch Bar
- Shuttle Forward
- Throttle Back
- Off Brakes
- Buffer Aft
- Hold Brakes
- Buffer Forward
- Buffer Aft
- (a) Pass Control

NOSETOW (EA-6B, E-2, C-2)

- Suspend
- Shuttle Aft/Untension
- Throttle Back
- (c) Raise Launch Bar
- Shuttle Forward
- Off Brakes
- (d) Buffer Aft
- Hold Brakes
- Buffer Forward
- Buffer Aft
- (a) Pass Control

(a) The Director will taxi the aircraft off the catapult after the trail bar/release element is removed. The Director will signal for unknocking the F-14 aircraft after it is clear of the track guide.

(b) If the launch bar does not raise automatically, then the catapult must be properly suspended and the throttle retarded so the TSPO can raise and hold the launch bar up until the shuttle is maneuvered forward of the launch bar. The launch bar will be lowered for the buffer sequence.

WARNING

When raising launch bar by hand, exercise extreme care to avoid hand injuries.

(c) Buffering aft of E-2/C-2/EA-6B aircraft with the launch bar in the locked-up position will damage the nose gear assembly.

364. HANGFIRE (CONVENTIONAL/DECKEDGE MODE)

a. In the event that the catapult does not fire within 10 seconds after the FIRE pushbutton is pressed, a hangfire exists.

b. The Catapult Officer shall:

- (1) Signal SUSPEND (fig. 6-17) to the Deckedge Operator.



Day

Day: Cross arms high overhead indicating the launch is off.

Night: Hold RED wand high overhead indicating the launch is off. GREEN wand is turned off.

Remarks: After this signal, pilot must remain ready for launch and not throttle back until after the "UNTENSION" and "THROTTLE BACK" signals are given by the launching officer/catapult safety observer (ICCS).

Note - Any flight deck or catapult personnel may signal a "SUSPEND" to the launching officers. The DAY signal is the same as launching officer's. The NIGHT signal is a horizontal movement of a wand or light.



Night

(fig. 6-17 Suspend)

(2) Signal HANGFIRE (fig. 6-18) to the Deckedge Operator.



Day

Day: Give "SUSPEND" signal. Then point index finger of one hand at palm of other hand.

Night: Give "SUSPEND" signal. Then hold RED wand overhead in a horizontal position. GREEN wand remains off.



Night

(fig. 6-18 Hang fire)

c. The Deckedge Operator, upon observing these signals, shall immediately:

(1) SUSPEND the catapult

(2) Inform the Console/CCP Operator that a hangfire exists by saying over the voice communication system only, "ROTATE THE EMERGENCY CUTOUT VALVE, ROTATE THE EMERGENCY CUTOUT VALVE."

d. The Console/CCP Operator for the C13 catapult shall perform the following:

WARNING

The Console/CCP Operator shall activate his SUSPEND switch at the control console to ensure the catapult has been suspended prior to initiating the following procedure.

(1) Remove the cotter pin, unscrew the stop screw, and rotate the handle of the launching valve cutout valve to the EMERGENCY position.

(2) Extension the aircraft using the following procedures:

(a) If electrical power is ON, depress the MANEUVER AFT pushbutton on the control console for 15 seconds.

(b) If electrical power is OFF, inform the Retraction/Rotary Engine Operator of the power failure. The Retraction/Rotary Engine Operator shall depress the MANUAL OVERRIDE pushbutton for 15 seconds on the maneuver aft valve to maneuver the shuttle aft.

(c) Once the Console/CCP Operator has reported procedures complete and the catapult is safe, the Deckedge Operator shall return the HANGFIRE signal (fig. 6-18) to the Catapult Officer.

(3) Once the Deckedge Operator returns the HANGFIRE signal, the Catapult Officer will proceed with normal SUSPEND procedures.

e. Once the shuttle is forward of the aircraft launch bar, the Catapult Officer shall set in the CSV no-load setting to prevent catapult damage should inadvertent firing occur.

f. The Console/CCP Operator shall not rotate the emergency cutout valve from the EMERGENCY position until specifically directed to do so by the ALRE Maintenance Officer.

g. After any hangfire, the catapult shall be placed in a down status until the specific cause of the hangfire is identified and corrective action taken.

h. After the discrepancy causing the hangfire is discovered and corrected, two no-loads shall be fired before the catapult resumes operations.

365. HANGFIRE (ICCS)

a. If the catapult does not fire within 10 seconds after the FIRE pushbutton has been pressed, a hangfire exists.

b. The Catapult Officer shall:

(1) Press the SUSPEND pushbutton

(2) Pass to the CCP Operator over voice communication system, "ROTATE EMERGENCY CUTOUT VALVE, ROTATE EMERGENCY CUTOUT VALVE."

(3) Communicate the hangfire condition to the Catapult Safety Observer via the voice communication system and giving the HANGFIRE signal (fig. 6-18).

c. The CCP Operator shall:

WARNING

The CCP Operator shall depress his SUSPEND pushbutton at the charging panel to ensure the catapult is suspended.

(1) Remove the cotter pin, unscrew the stop screw, and rotate the handle of the launching valve cutout valve to the EMERGENCY position.

(2) Depress the MANEUVER AFT pushbutton for 15 seconds.

(3) If there is an electrical failure, he shall direct the Rotary Engine Operator to depress the MANUAL OVERRIDE pushbutton on the maneuvering valve at the rotary engine for 15 seconds.

(4) Report procedures complete and the catapult is safe to the Catapult Officer via the Monitor over voice communication system.

d. Once the catapult is safe, the Catapult Officer shall transmit over the voice communication system to the Catapult Safety Observer "CATAPULT NO. _____ SAFE" and shall give a thumbs up signal (day) and red wand held vertically (night) giving permission to continue with normal SUSPEND procedures.

WARNING

The Catapult Safety Observer shall, prior to giving the THROTTLE BACK signal and continuing normal SUSPEND procedures, positively ensure he receives the proper signals and/or communications that the catapult is safe.

e. Once the shuttle is forward of the aircraft launch bar, the Catapult Officer shall set in the CSV no-load setting to prevent catapult damage should inadvertent firing occur.

f. The CCP Operator shall not rotate the emergency cutout valve from the EMERGENCY position until specifically directed to do so by the ALRE Maintenance Officer.

g. After any hangfire, the catapult shall be placed in a down status until the specific cause of the hangfire is identified and corrective action taken.

h. After the discrepancy causing the hangfire is discovered and corrected, two no-loads shall be fired before the catapult resumes operations.

HANGFIRE DRILL

HANGFIRE ON CATAPULT EXERCISE

1. Purpose. To train and evaluate personnel in the proper procedures to be used when the catapult does not fire within 10 seconds of initiating this action.
2. Requirement. This exercise shall not be conducted using aircraft, and is to be accomplished during no-load firing only.
3. Procedures
 - a. OCE (Officer Conducting the Exercise)
 - (1) With permission and assistance of the ALRE Maintenance Officer, initiate a hangfire situation by creating an acceptable mechanical, electrical, or hydraulic malfunction that will prevent the catapult from firing.
 - (2) A less realistic but acceptable method is to notify the Catapult Officer that a hangfire exists prior to reaching the firing sequence during daily no-loads.
 - b. Catapult Officer. Upon notification from the OCE, or failure of the catapult to fire 10 seconds after the order has been given, initiate authorized hangfire procedures.
 - c. Catapult Crew. Once the hangfire exercise has been initiated by the Catapult Officer, the crew will place the catapult in a safe condition following proper hangfire procedures.

NOTE

Simulated drills, in some situations, do not fully examine the operator's knowledge and ability to execute proper emergency procedures. Therefore, each operator should be questioned on all aspects of his functions in this particular emergency.

4. Evaluation. Refer to COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 3500.20 for evaluation sheet.

366. EMERGENCY LOWERING JET BLAST DEFLECTOR (JBD)

a. In the event aircraft are airborne and a JBD is fouling the landing area, emergency lowering procedures must be carried out expeditiously. Material must be available at all times; personnel must be thoroughly trained to recognize the type of failure and be able to take corrective action.

b. Emergency lowering of a JBD will require a minimum of eight crewmen as follows:

- (1) TSPO (overall in-charge)
- (2) Topside JBD Phone Talker
- (3) Below Decks Phone Talker/Valve Operator (depending on location this may require an additional crewman)
- (4) Two crewmen to install emergency lower push bar
- (5) Two safety observers (station at the port and starboard sides of the JBD panels)
- (6) Tractor driver

CAUTION

Ensure voice communication is established between the Topside Phone Talker and the Below Decks Phone Talker/Valve Operator prior to the emergency lowering of the JBD.

c. Procedures for ELECTRICAL FAILURE are:

- (1) Turn electrical power switch OFF
- (2) Attempt manual operation of the Solenoid Operated Pilot (SOP) valve by inserting a 3/16" diameter rod into the hole of solenoid "B" or by depressing the pushbutton on the solenoid until the panel is completely lowered.
- (3) In the event electrical failure procedures do not lower the panel, follow procedures outlined for a complete hydraulic failure.

d. Procedures for a complete HYDRAULIC FAILURE are:

- (1) Position personnel at required stations
- (2) Secure hydraulic pressure
- (3) Open bypass valve
- (4) Commence pushing struts over-center

WARNING

Once the emergency lower push bar is installed, all hands shall stand back at a safe distance from JBD and around tractor. As JBD begins to lower, the emergency lower push bar will be dragged out of JBD pit by tractor utilizing reverse gear.

WARNING

The TSPO shall brief the Tractor Driver on all commands and signals prior to commencing the emergency procedure. The Tractor Driver shall not anticipate commands from the TSPO (i.e., applying force, braking, or backing out).

(5) Once the strut is over-center, the JBD panel will fall under its own weight until it is flush with the deck.

WARNING

The Topside Phone Talker must stay alert at all times in case of an unsafe condition for suspending, at which time he shall direct the Below Decks Phone Talker/Valve Operator to secure the bypass valve.

EMERGENCY LOWERING JBD DRILL

JET BLAST DEFLECTOR EMERGENCY EXERCISE

1. Purpose. To train and evaluate catapult personnel in the emergency lowering of the jet blast deflectors.
2. Requirements
 - a. Raise all jet blast deflector panels on a catapult that will affect the landing area.
 - b. Simulate complete hydraulic and/or electrical failure of raised panels.
3. Procedures
 - a. OCE (Officer Conducting the Exercise). Inform the Air Officer that the jet blast deflector panels have suffered a hydraulic/electrical failure and that landings are expected momentarily.
 - b. Catapult Crew. Line up hydraulic system for manual operation and manually lower the jet blast deflector panels.
4. Evaluation. Refer to COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 3500.20 for evaluation sheet.

SECTION IV
RECOVERING FIXED WING AIRCRAFT

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400. Section IV of this manual covers the recovery of fixed wing aircraft. Included are procedures for normal, emergency operation, associated drills, and safety precautions.

SECTION IV

CHAPTER 1

RECOVERY PROCEDURES
(Sequence of Events for Normal Operations)

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410. RECOVERY PROCEDURES SEQUENCE OF EVENTS FOR NORMAL OPERATIONS

411. PREPARATIONS FOR RECOVERY

(1) The Arresting Gear Officer shall be on deck for all recoveries. On deck is construed to mean a position in the starboard catwalk or on the flight deck, from which the entire landing area may be viewed. The Arresting Gear Officer shall:

- (a) Inspect the landing area for loose gear.
- (b) Ensure that all after deck-edge antennas are positioned as required.
- (c) Check the condition of crossdeck pendants, barrel fittings, wire supports, and ensure retractable sheaves (if applicable) are in the raised position.
- (d) Ensure that all aircraft and mobile equipment parked on the flight deck are inside the safe-parking line.
- (e) Ensure that hook runners and the deck-edge operator are on station.
- (f) Ensure that the ready barricade, including deck ramps, is in a ready status, with a clear route to the area and, if applicable, a tractor with driver is standing by.
- (g) Ensure that waist catapult slot buttons are installed in accordance with current bulletins.
- (h) Notify PriFly when the deck is ready.

(2) Thirty minutes prior to each scheduled recovery, or immediately upon the word being passed to prepare to recover aircraft, all stations shall be manned expeditiously, and the following preparatory actions taken:

(a) The Primary Flight Arresting Gear Controller in Primary Fly shall:

1. Ensure that all Arresting Gear Engine/Sheave Dampener Operators, the Deckedge Control Operator, Arresting Gear Talker, LSO Spotter/Talker, and ILARTS/Lens Operators have manned their stations and are monitoring the appropriate voice communication system.

2. Report to the Air Officer when all stations are manned, reporting the existing arresting gear engine and lens settings.

(3) The Lens, ILARTS and SPN 44 Operators shall ensure that their respective equipment is turned on and operating. The lens operator shall turn on the lens ONLY when directed by the Air Officer.

WARNING

Except for the purpose of conducting tests, the lens shall not be turned on until the LSO has manned the platform. The wave-off lights shall be continuously activated any time the lens is turned on and the LSO platform is not manned and ready.

(4) The Waist Catapult Officer/Catapult Safety Observer shall ensure:

(a) Launching accessories are clear of the landing area.

(b) Number 3/4 catapult shuttle(s) (as applicable) are aft with the grab latch disengaged, and the appropriate shuttle spreader cover installed.

(c) The centerdeck console hatch (and any other hatches in the waist catapult area) are closed and dogged.

(d) Jet blast deflectors are lowered completely and hydraulics secured.

(e) Catapult track slot seals are removed and catapult slot buttons installed. A minimum of 12 buttons is required on all ships except for CV-67, which requires a minimum of 18.

WARNING

Ensure catapult shuttle is retracted prior to installing track slot buttons.

(f) Waist catapult safety light rigged in the down position if appropriate.

(g) For ships so equipped, Deckedge ICCS is fully lowered.

(h) In the event the recovery immediately follows a launch, the Waist Catapult Officer or Catapult Safety Observer shall signal the Arresting Gear Officer with a raised arm extended overhead (day) or with a green wand (night) signifying the above actions have been completed. If the recovery is not preceded by a launch, the Arresting Gear Officer shall ensure that the above actions have been completed.

(5) The LSO Spotter/Talker

(a) Prepare the platform for the recovery as previously directed by the senior wing LSO.

(b) Establish voice communications with all recovery stations.

(c) Turn on deck status lights and check both primary and secondary light operation.

(d) Ensure that the following distress equipment is available:

1 Battery powered floating marker (1)

2 Life preserver ring (1)

3 Very pistol with adequate supply of shells

4 Search and Rescue Sonobuoy

(e) Ensure that emergency deck status signal devices are on hand (red and green flags or paddles for day, a set of red and green wands for night operations)

(6) The Deck Edge Control Operator shall:

(a) Establish voice communications with all recovery stations.

(b) Energize the sheave damper indicator lights, and ensure that all battery position lights operate and indicate battery.

(c) Raise retractable sheaves, ensuring that indicator lights function properly and that all sheaves indicate up (if applicable).

(d) Ensure that a set of red and green flags or paddles (day)/ wands (night) are on hand for use by the Arresting Gear Officer.

(e) Report to the Arresting Gear Officer when all stations are manned and ready.

(f) Ensure required recovery bulletins are available for emergency use.

NOTE

In the event of deck launches, the Deckedge Control Operator shall be on station and retractable sheaves shall be up.

(7) The Arresting Gear Topside Petty Officer shall assist the Arresting Gear Officer with his pre-recovery inspections as directed. Prior to each recovery cycle he shall:

(a) Ensure that all topside personnel are on station with their necessary tools and equipment.

(b) Ensure that all necessary tools are available. These should include, but are not limited to:

- 1 Tools necessary to remove/replace deck pendants
- 2 Tools necessary to remove/install wire supports
- 3 Tractor hook (for pulling out purchase cable)
- 4 Barricade air guns and associated parts/tools (spare hoses, fittings, etc.)
- 5 Manual tool for barricade winches

(c) Ensure that adequate spare equipment is on deck including:

- 1 Deck pendants
- 2 Wire support parts
- 3 Clevis pins and nuts
- 4 Pickle Switch (AGO Deck Status Lights)

(d) Ensure that the Arresting Gear Officer's deck status light "pickle" switch is connected and functioning.

(e) Ensure the barricade hatch is open, and a tractor is in position to pull out the barricade.

(f) Ensure retractable deck sheaves are raised to required height.

(8) The Sheave Damper Operator shall:

(a) Inspect all sheave damper installations in accordance with current maintenance requirement cards from PMS system.

(b) Ensure all cages are in place and properly secured.

(c) Report to the Arresting Gear Talker via voice communication system when all sheave dampers have been inspected, and equipment is ready to recover aircraft.

(9) The Arresting Gear Engine Operators shall:

- (a) Establish voice communications with all recovery stations.
- (b) Ensure all unauthorized personnel are clear of engine spaces.
- (c) Inspect engine in accordance with current maintenance requirement cards.
- (d) Report to the Deckedge Operator when above checks have been completed and their engines are ready to recover aircraft.

(10) The Flight Deck Officer shall:

(a) Ensure that the mobile crane, forklift and tractor are warmed up and that drivers are standing by. Also ensure that operationally ready mobile fire fighting equipment is manned, and that such equipment has clear access to the landing area.

(b) Ensure that the crash crew is on station.

(c) Ensure that directors and plane handlers in sufficient number are standing by.

(d) Ensure that the following equipment for all applicable aircraft is on hand:

1 Landing gear locks/pins (NAVAIR 00-80R-14-Aircraft Fire Fighting-Rescue Manual)

2 Tiller bars (if applicable)

3 Tow bars

4 Lifting slings

5 Crash dollies

(e) Provide mobile equipment, as practical, to be utilized as protective barriers by the Arresting Gear Officer and Arresting Gear Talker, if applicable, and for those essential personnel positioned along the safe parking line.

(11) The LSO shall:

- (a) Prepare for recovery in accordance with LSO NATOPS Manual
- (b) Report to the Air Officer when "Manned and Ready"

(12) The Air Officer Recovery Checklist

(a) Check off procedures, etc.

- 1 Determine Case recovery and time (confirm first ramp time with CATTC and bridge) _____
- 2 Obtain expected Base Recovery Course (BRC), altimeter setting, and weather _____
- 3 Radio Check: Recovery Channels, frequencies, and tactical calls _____
- 4 15 minute notice (SMC) "Man all Recovery Stations" _____
- 5 Red rotating beacon "on" aft _____
- 6 Aircraft recovery status: Numbers, type, fuel, hung or unexpended ordnance, and other pertinent info on status board for accuracy _____
- 7 Pri-Fly Arresting Gear controller reports all recovery stations manned:
 - Arresting Gear
 - ILARTS/Lens
 - SPN44 (Case I/II)
 - LSO Spotter/Talker_____
- 8 Recovery Officer (AGO) reports deck is "manned and ready:" _____

Recovery area is clear of personnel, loose gear, aircraft, and mobile equipment.

Deck hatches, deckedge antennas, JBDS and waist catapult ICCS lowered.

Catapult shuttles positioned, covers in place.

Wire supports, retractable sheaves raised and CDPs in battery.

Barricade hatch open

Tractor positioned at the Barricade Hatch

Deck status light raised and operational.
- 9 LSO reports "manned and ready" _____
- 10 Clearance from bridge to land aircraft _____

- 11 Lens and deck lighting "ON" for recovery (notify LSO "paddles/tower, lens on, you have control") _____
- 12 Check wind (Crosswind/speed) _____
- 13 Green rotating beacon "ON" aft _____
- 14 (5MC) "land aircraft" _____

412. Approach. Prior to the LSO receiving a "clear deck" from the Arresting Gear Officer, the following sequence of events shall be strictly adhered to for the first and all subsequent landings:

a. The Air Officer shall determine aircraft type to be recovered. He shall verbally acknowledge aircraft weight and lens setting calls as reported to him (e.g.; "Roger, gear ... lens set ... five four zero ... TOMCAT".)

b. The Primary Flight Arresting Gear Controller, upon ascertaining the type of aircraft to be recovered (from Air Officer), shall inform the engine operators of the setting required for the next aircraft using only the first three digits and aircraft type; (e.g.; "Set all engines five four zero, TOMCAT"). If the weight setting is to remain the same for the next aircraft, the phraseology shall be, "Check setting five four zero, TOMCAT". He shall then monitor the engine weight setting synchro repeaters/dixson meters and cross check settings using the arresting gear voice communication system. He shall monitor the correct lens setting set by the Fresnel Lens Console Operator. When all engine operators have reported the correct weight setting and the synchro repeaters/dixson meters indicate this setting, and the correct lens angle has been set, he shall report verbally to the Air Officer the number of engines set, the setting, lens status, and aircraft type. (e.g.; "All four gear ... lens ... set five four zero, TOMCAT").

NOTE

Aircraft recovery techniques using the single weight setting method have proven to be within acceptable operating limits. Control valve performance characteristics are essentially the same for all installations. It is recommended that the single weight setting technique be used. Recommended single weight settings may be found in appropriate Aircraft Recovery Bulletins. Weight setting error should not exceed +/- 500 pounds.

NOTE

Lens settings are not repeated/reported during MOVLAS operations.

c. The Arresting Gear Engine Operators shall report settings in sequence, engine numbers one through four (followed by barricade if applicable). If an engine is out of service, the report for that engine will be omitted in the reporting sequence. The report shall be "Engine one set five four zero, TOMCAT ... Engine two set five four zero, TOMCAT, etc." Engine Operators shall repeat calls ("Groove, Ramp") from the Deckedge Operator to alert personnel in their spaces of an impending arrestment.

d. The Deckedge Control Operator shall:

- (1) Monitor the sheave damper indicator lights.
- (2) Monitor the retractable sheave indicator lights.
- (3) Ensure the landing area is clear (within his field of view).
- (4) Ensure all deck pendants are fully retracted and are taut.
- (5) Ensure all engines are in battery (received over voice communication system from engine operators).
- (6) Monitor engine weight settings. It is imperative that the Arresting Gear Officer know the exact weight setting of the arresting gear engines so he can ensure the engines are set for the type aircraft to land. After all engines have reported the correct weight setting, the Arresting Gear Officer shall receive verbal confirmation, "All engines set five four zero, TOMCAT" from the Deckedge Operator.
- (7) Keep the engine operators informed on the status of the recovery by reporting the following aircraft positions: GROOVE/RAMP. He shall call "Groove" on the voice communication system as the aircraft approaches short final, and call "ramp" as it reaches the fantail.

e. The Sheave Damper Operators shall repeat calls ("groove, ramp") from the Deckedge Operator to alert personnel in their spaces of an impending arrestment

CAUTION

When the word "GROOVE" is passed over the voice communication system, all non-essential communications shall cease until after the aircraft touches down. Anyone not ready to land aircraft at that time shall immediately respond with "FOUL DECK."

f. The Fresnel Lens Console Operator shall make appropriate lens setting and continuously monitor the lens system during recoveries and report any malfunction immediately to the Air Officer.

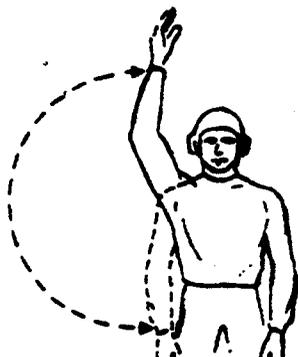
NOTE

If the ship is equipped with the FLOLS/Arresting Gear Cross Check Lighting System, the Pri Fly Controller shall energize the appropriate aircraft indicator button when the lens and arresting gear are set properly, thus lighting the Air Officer's indicator light. The light shall be turned OFF following each arrested landing, bolter, touch and go, or wave-off.

g. The Arresting Gear Officer, upon receiving clearance to "land aircraft" from the Air Officer and upon observing the aft GREEN rotating beacon, shall ensure the following conditions exist prior to providing a "clear deck" signal to the LSO:

- (1) A "clear deck forward" signal has been received from the Flight Deck Officer or his designated representative. The signal is given by sweeping one arm from vertically overhead to the horizontal position and returning overhead (Day), or by using the same signal with an AMBER wand (night). This signal shall be acknowledged from the Recovery Officer by repeating the signal using his arm (day) and RED wand (night).

① CLEAR DECK



Flight deck
officer/
Director

Arresting gear
officer

Day: Sweep arm from overhead position to
side position and return.

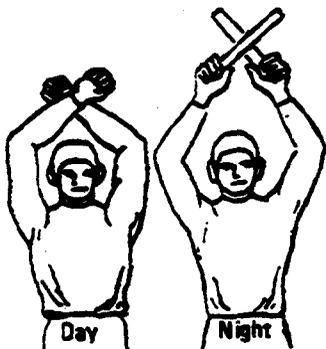
Night: Same as day except with AMBER wand.

Clear Deck Signal

NOTE

The "foul deck" signal from the Flight Deck Officer or his designated representative to the Arresting Gear Officer is indicated by arms crossed overhead with fists clenched (day), or crossed AMBER wands held overhead (night).

② FOUL DECK



Flight deck
officer/
Director

Arresting gear
officer

Day: Cross arms overhead, fists clenched.

Night: Crossed AMBER wands held overhead.

Foul Deck

(2) All deck pendants appear fully retracted and taut.

(3) Observe the Deckedge Control Operator's signal indicating that all conditions for recovery have been completed.

(4) Ensure the Deckedge Operator indicates engines are set.

(5) Retractable sheaves are raised and wire supports are in place.

(6) The catwalks, flight deck, and other hazardous areas are clear of unauthorized personnel.

(7) Visually and positively identify aircraft to be recovered.

WARNING

The utmost attention to every detail is required during night or reduced visibility flight operations. Presently, certain aircraft have similar features that hinder the rapid, positive identification of approaching aircraft. Consequently, the entire recovery team must be alert to preclude a mismatch between landing aircraft and the arresting gear settings. The final assurance to prevent this mismatch shall rest with the Arresting Gear Officer.

NOTE

While the final check for compatibility of the landing aircraft and the arresting engine settings are made by the Arresting Gear Officer, cross checks by other personnel are critical. The Pri-Fly Controller, Console Operator, Lens Console Operator, LSO Spotter/Talker, Deckedge Control Operator, and Topside Petty Officer should also be trained in aircraft recognition under all conditions. This becomes even more imperative during night or reduced visibility operations and when EMCON conditions are in effect. All visual and aural characteristics (aircraft lighting, flight characteristics, engine sounds, etc.) must be utilized in making the final determination. If a positive determination cannot be made, a low pass by the ship shall be requested to positively identify the aircraft.

WARNING

The Arresting Gear Officer shall NOT, under any circumstances, provide a "clear deck" until the aircraft has been positively identified visually or via the Air Officer.

(1) When satisfied that all the above requirements have been met, the Arresting Gear Officer shall change the deck status light from RED to GREEN, remaining alert for any malfunctions of the equipment or violations of the safe parking line. The deck will be declared "foul" by switching the deck status light to RED after each arrested landing, bolter, touch and go, or wave-off, and it will remain so until completion of the above procedures.

h. The LSO Spotter and Talker.— When visual confirmation of aircraft type and configuration (gear, flaps and hook down) has been made, he shall notify the LSO; (e.g.; "TOMCAT, all down.") He shall also notify the LSO of type aircraft, arresting engines set, weight setting, and clear or foul deck, whichever is appropriate, depending on the light indication in the deck status light box. (e.g.; "Gear set, five four zero, TOMCAT, CLEAR DECK.") If the red light is on, the "FOUL DECK" call is repeated continuously until the green light comes on. One "CLEAR DECK" call is then made and the spotter/talker shall monitor the light status until the aircraft has passed the ramp for any change in deck status.

i. The Integrated Launch and Recovery Television System Operator shall ensure coverage of each aircraft approach and arrestment. Additionally, any abnormal situation (crash, fire, aircraft in catwalk, etc.) shall be duly recorded. To attain coverage for detailed tape analysis, the following camera sequence shall be utilized:

(1) Island camera for initial approach

(2) Centerline camera for final approach, touchdown and until nose wheel blocks the view or reaches the centerline camera in use.

(3) Island camera for roll out, ensuring that aircraft side number and the pendant engaged is shown.

NOTE

ILARTS tapes shall normally be retained at least 48 hours before erasing/over recording. In the event there is any deviation from a normal arrested landing, ILARTS tapes shall be retained in accordance with Report of Deviation from Normal Arrested Landing found in Section V. In the event of an aircraft mishap of sufficient severity as defined in OPNAVINST 3750.6, the ILARTS tape shall immediately be made available to the senior member of the Aircraft Mishap Board for the duration of the investigation. During recording of mishaps and aircraft emergencies, camera signals to the ship's entertainment system must be secured. This will prevent unauthorized copying of the TV signal, but still allow ILARTS monitors to be available during the mishap.

413. LANDING

a. During night recovery operations, only those signal wands prescribed below shall be used by recovery personnel:

Arresting Gear Officer	1 RED and 1 GREEN standard
Arresting Gear Deckedge	1 GREEN stubby and 1 RED standard
Arresting Gear Hook Runner	1 RED stubby
Gear Puller	2 AMBER standard
LSO Talker	1 RED and 1 GREEN standard

b. During the landing, roll out, and clearing of the arresting gear the following sequence of events shall take place:

(1) The Arresting Gear Officer shall change the deck status light from GREEN to RED as the aircraft touches down.

WARNING

All personnel shall seek as much protection possible as the aircraft approaches and lands. Personnel in the catwalks and at the deckedge control station shall duck behind cable shields or below flight deck level. Hook Runners, directors, crash crew, and other personnel in the roll-out area shall utilize tractors or any other mobile equipment that might be available for protection.

NOTE

After the aircraft completes its arrestment and roll out, it shall be permitted to roll back a few feet to permit the pendant to fall free of the hook.

(2) The Hook Runner shall enter the landing area, as necessary, to ensure that the hook and aircraft are clear of the pendant prior to the aircraft being taxied forward and/or the pendant being retracted.

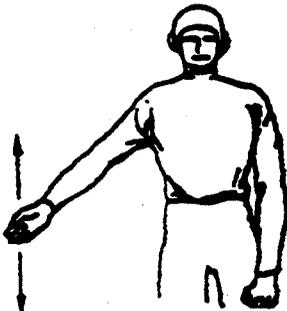
(3) The Gear Puller (Director) shall position himself so as to be clearly visible to the pilot.

WARNING

The Hook Runner and Gear Puller shall not enter the landing area until the aircraft has come to a complete stop.

(4) The Hook Runner shall give the "WIRE CLEAR" signal to the Gear Puller by making a vertical motion with his arm (day) or RED standard wand pointed at the Gear Puller (night) when the aircraft and/or hook is clear of the pendant.

⑦ WIRE CLEAR



Hook runner

Director

Day: Make a vertical motion with arm pointed at the taxi director.

Night: Same, holding RED stubby wand.

WIRE CLEAR

(a) The Gear Puller will then give the pilot the signal to raise the hook, followed by the signal to hold brakes. After the aircraft has stopped and is clear of the cable, the Gear Puller will give the pilot the "off brakes" signal, and taxi the aircraft clear of the landing area.

(b) In the event the pendant does not disengage from the hook, the following actions shall be taken:

1 The Hook Runner shall give the "HOOK DOWN" signal to the Gear Puller which the Gear Puller shall relay to the pilot. "Release brakes" signal to the pilot shall then follow.

⑥ LOWER HOOK



Day



Night

Director

Pilot

Day: Position left hand horizontally in front of body, palm up. Move right hand downward, bringing extended thumb into left palm.

Night: Position left wand horizontally in front of body. Position right wand vertically to form an inverted "T."

LOWER HOOK

2 As soon as the hook is observed down, the Hook Runner shall give the "PULL BACK" signal to the Gear Puller. The Gear Puller shall relay this signal to the pilot and Deckedge Operator.

③ PULL BACK



Hook runner

Director

Day: Make fore-to-aft sweeping motion with arms extended downward, palms aft.

Night: Same motion except with RED stubby wand.

Director

Pilot
Deck-edge
operator

Day: Make fore-to-aft sweeping motion with arms extended downward, palms forward.

Night: Same motion except with two AMBER wands.

PULL BACK

CAUTION

Retraction during the tailhook "up" cycle may cause extensive damage to the aircraft tailhook mechanism. Ensure tailhooks are in the full down position.

3 The Deckedge Control Operator shall carefully retract the gear momentarily, causing the aircraft to slowly roll back creating the necessary slack for hook disengagement. The Hook Runner will signal "HOOK-UP" to the Gear Puller who will relay the signal to the pilot followed by the signal to "HOLD BRAKES." After the aircraft has stopped its roll back, the Gear Puller will signal "OFF BRAKES," and then taxi aircraft clear of the landing area.

5 RAISE HOOK



Director

Pilot

Day: Position left hand horizontally in front of body, palm down. Move right hand upward, bringing extended thumb into left palm.

Night: Position left hand horizontally in front of body. Position right hand vertically to form a "T".

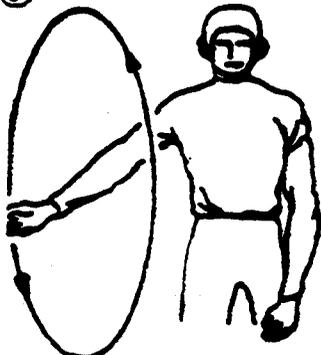
HOOK-UP

CAUTION

Attempting to use the arresting engine wire retract cycle to tow a recovered aircraft aft can cause cable slack or ram slap resulting in damage to arresting gear components. Additionally, the tail hook mechanism may be damaged if it is towed underneath any cross deck pendant.

(5) The Hook Runner shall signal the Deckedge Control Operator to "RETRACT" when the aircraft and/or hook are clear of the pendant.

8 WIRE RETRACT



Hook runner

Deck-edge operator

Day: Make large circular motion with arm extended to one side.

Night: Same, holding RED stubby wand.

WIRE RETRACT

NOTE

The Hook Runner shall ensure his signal to retract has been received by the Deckedge Operator prior to leaving the landing area.

(6) The Deckedge Control Operator, upon receiving the "RETRACT" signal and ensuring there are no obstructions in the cable bite retract.

WARNING

The Deckedge Control Operator must NOT retract until he has received a positive signal to do so. He must also be alert to immediately stop cable retraction if someone comes into the bite of the cable or the cable falls into the catapult track slots.

CAUTION

The speed of retraction is governed by the distance the retract control lever is pulled away from the deckedge bulkhead. Always start retraction slowly increase speed, then ease lever toward bulkhead to slow retraction near the end of the cycle. If retraction is stopped at any time before completion, slack may build up in the system. Therefore, resume retraction very slowly to rid cable system of all slack. When slack is eliminated and cable system is tensioned, resume normal retraction.

(7) The Arresting Gear Officer, Topside Petty Officer and Deckedge Control Operator shall observe the deck for FOD and broken wire supports during retraction.

(8) The Arresting Gear Engine Operator of the engine having engagement shall:

(a) Relay to Primary Fly, the information necessary for completing the recovery log.

(b) Report "Battery" when the engine is fully retracted and anchor dampers are extended.

(c) Ensure temperature, pressure, fluid level, and engine battery positions are within normal operating limits.

(9) The Sheave Damper Operators shall inspect the sheave dampers having engagement in accordance with pre-recovery procedures.

(10) The Primary Flight Arresting Gear Controller shall watch the aircraft touchdown point and assist in reporting off-center hits and engaging speeds to the Arresting Gear Officer via voice communication system when an engagement exceeds the limits listed in current recovery directives.

414. POST RECOVERY

a. It is extremely important to maintain a flow of information between the pilots and the Arresting Gear Officers. When pilots make procedural errors, they should be made aware of their errors so a complete understanding of flight deck procedures is maintained. Arresting Gear Officers must keep in mind that each pilot is an individual, and each has his own level of proficiency. At times the Arresting Gear Officer must become an instructor on flight deck procedures. Everyone connected with the recovery should know what everyone else is doing, and the reason why. Periodic de-briefs are necessary to ensure pilots know what is going on around them, and to resolve any misunderstanding they might have about procedures and functions of flight deck personnel.

b. Some of the common errors that should be covered in debriefs are:

(1) Not recognizing night signals.

(2) Not taxiing clear of the landing area in a safe but timely manner.

(3) Not understanding procedures when a CDP is hung-up in the aircraft hook/landing gear.

(4) Not remaining at full power until the aircraft comes to a full stop.

415. ARRESTING GEAR CREW DEBRIEF

a. While not always necessary or required after every Recovery, post recovery debriefs by the Arresting Gear Officer shall be held with the Arresting Gear Crew whenever a situation occurred during a recovery cycle that needed clarification. These debriefs may pertain to the topside crew, the below-deck crew, or the entire arresting gear crew.

b. The best possible results may be realized when there is a continuous flow of information and ideas between the Arresting Gear Officer, supervisory personnel, and the Arresting Gear crew. Debriefs reviewing potential errors or compliments on the crews outstanding performance can do wonders for crew morale and enhance the smoothness and efficiency of the next event.

SECTION IV

CHAPTER 2

EMERGENCY ACTIONS, PROCEDURES, AND ASSOCIATED DRILLS

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420. EMERGENCY ACTIONS, PROCEDURES, AND ASSOCIATED DRILLS

421. GENERAL

a. Due to the necessarily rapid tempo of recovery operations, all hands must be ready to react immediately to any emergency situation in order to minimize foul deck time.

b. Adequately trained personnel shall be readily available to assist the arresting gear topside crew in any emergency action.

c. To ensure proficiency and equipment readiness, drills shall be held as often as possible. At the very least, prior to getting underway, weekly at sea or as operations dictates. All drills shall be initiated by the Air Officer who shall take into consideration the Aircraft Handling Officer's, Catapult and Arresting Gear Officer's, and LSO's recommendations and drill compatibility with ongoing air operations (i.e., deck pendant change drill at end of a recovery when pendant needs to be changed due to maximum engagements; MOVLAS drill to conform with LSO's requirement for MOVLAS recoveries).

d. Drill grades are outlined in FXP-4 publications.

422. REMOVAL OF ENGINE FROM SERVICE DURING RECOVERY OPERATIONS

a. Taking an engine "off the line" (removing deck pendant), or taking the time necessary to correct a malfunction, is ultimately the Air Officer's decision. However, the Arresting Gear Officer must be prepared to provide rapid and knowledgeable decisions and make recommendations as to the course of action to be taken. The Arresting Gear Officer shall exercise judgment in recommending removal of arresting engines from service and the changing of cross deck pendants. All arresting gear personnel shall immediately report any malfunction or condition requiring the "downing" of equipment to the Arresting Gear Officer who will advise the Air Officer of the required action.

b. Due to the remote location of the Arresting Gear Officer, it is imperative that engine room personnel and Sheave Damper operators provide immediate and accurate information concerning below deck emergencies to the AGO via the Deckedge Operator.

WARNING

In the event of an emergency, all unaffected stations shall maintain voice communication system silence.

c. The following conditions and malfunctions will necessitate the removal of an engine from operation if timely corrections or explanations cannot be made:

WARNING

If any doubt exists as to the readiness of the arresting gear engine or associated equipment, the engine shall remain "off the line" until careful and unhurried analysis and corrective action is made without sacrificing any margin of safety.

(1) Engine

limits. (a) Pressures, temperature or fluid level not within operating

(b) Unexplained smoking of sheave assemblies.

(c) Crosshead to crosshead stop clearance less than 1 inch.

1/2 inch. (d) Crosshead to crosshead stop clearance changes more than

(e) Fluid indicator not indicating battery.

(f) Excessive and/or unexplained ram overtravel. The following are factors that might contribute to ram overtravel and should be closely monitored:

NOTE

Refer to applicable NAVAIR manuals for further amplification.

- 1 Excessive aircraft gross weight
- 2 Excessive aircraft engaging speed
- 3 Large increase of aircraft thrust applied just prior to and/or during the arrested runout
- 4 Improper torque of CRO valve
- 5 Improper CRO valve setting

CAUTION

Careful monitoring of 1 and 2 above, with attention to accuracy of speed indicator readiness and actual aircraft weights, is imperative. Errors in these areas can be significant factors in arresting gear overtravel. Also, engagement with afterburners operating will almost always produce ram overtravel. As an additional precaution, control valve cam torque should be kept as close as possible to the maximum limit.

- (g) Unpredicted, extremely short runout
- (h) Anchor damper not in battery
- (i) Constant runout valve weight setting malfunction

(2) Sheave Dampers

- (a) Pressures and fluid levels not within operating limits.
- (b) Fluid leaks in damper cylinder, accumulator or associated piping.
- (c) Purchase cable not routed correctly.
- (d) Crosshead not in battery.
- (e) Excessive and/or unexplained smoking of crosshead or fairlead sheaves.

(3) Topside

- (a) Deck pendant or purchase cable does not meet specifications as outlined in applicable NAVAIR manuals or PMS cards.

NOTE

The Topside Petty Officer shall make inspections as necessary in accordance with applicable NAVAIR manuals or PMS cards.

- (b) Excessive or unexplained smoking of sheaves.
- (c) Inability to raise retractable deck sheave to full up position.

WARNING

Even though complete failure of the purchase cable may be prevented as a result of the modification of pan and flight deck cut-out, any arrestment completed with the retractable sheave DOWN will damage the purchase cable enough to require cable replacement. It is imperative that "No Arrestment Ever" be made with the retractable sheave in the DOWN position.

(d) Purchase cable deck pendant inspection or replacement criteria. Proper preplanning should eliminate this requirement during recovery operations.

(e) Inability to retract. In the case of a broken retract cable, retraction can be effected from the retract valve in the engine room.

(4) Sequence of Events for Removal of an Engine from Service During Operations. For any condition or malfunction requiring the removal of an arresting gear engine from service, the following procedures shall be used:

(a) The Arresting Gear Officer will be notified immediately by voice communication system and/or hand signal, e.g., "Foul deck, Number (engine number) is down." All stations except the sending stations will remain silent. The hand signal for a foul deck shall be arms crossed overhead with fists clenched.

(b) Upon receiving a "foul deck", the Arresting Gear Officer shall:

1 Notify the LSO via the deck status light that the deck is fouled

2 Evaluate the existing conditions and notify the Air Officer of the appropriate action and estimated time of repair.

NOTE

The Primary Flight Arresting Gear Controller shall relay to the Air Officer the initial report and/or any amplifying information as it is passed to the Arresting Gear Officer over the voice communication system.

(c) The Air Officer shall "close" the deck for recovery until the malfunction has been corrected or the engine has been removed from service, and the normal operations reestablished.

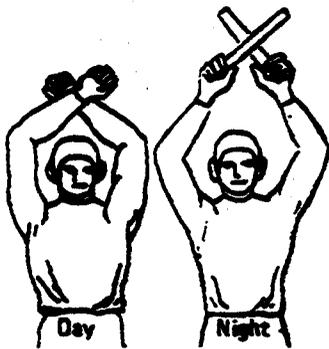
(d) The Arresting Gear Officer, if necessary, shall direct that the deck pendant be removed and the deck cleared after which he shall continue normal operations.

WARNING

No one shall enter the landing area until positive clearance has been obtained from the Arresting Gear Officer.

During the removal of a deck pendant or when a situation exists that requires personnel in the landing area, all personnel should work facing aft and be continually alert and ready to clear the landing area. The Topside Petty Officer or other cognizant person shall stand forward of personnel in the landing area, facing aft, giving the proper foul deck signal and observing aircraft in the pattern. Should an aircraft approach and fail to wave off, it shall be his responsibility to notify those personnel in time to clear the deck. All personnel must be aware of the shortest route away from the landing area for that situation, and not always use the routine path to the Arresting Gear Deck Edge station.

2) FOUL DECK



Flight deck
officer/
Director

Arresting gear
officer

Day: Cross arms overhead, fists clenched.

Night: Crossed AMBER wands held overhead.

FOUL DECK SIGNAL

Deckedge Control Operator shall stand well clear of the retract lever while personnel are removing the deck pendant.

The retract cable shall be disconnected at the retract valve if the deck pendant is to be removed for a prolonged period.

NOTE

In cases requiring a "functional test," the engine will not be returned to service during recovery operations unless a complete preoperational inspection has been completed.

423. RETURNING OF ENGINE TO SERVICE DURING RECOVERY OPERATIONS. To return an engine to service, the following procedures shall be used:

- a. The ALRE Maintenance Officer shall determine that the condition or malfunction causing removal of the engine from service has been corrected.
- b. The ALRE Maintenance Officer shall advise the Air Officer that the engine is ready to be returned to service.
- c. If the deck is open, the Air Officer shall close the deck for recovery.

d. After the deck pendant has been replaced, and after ensuring that all conditions are met for a normal recovery, the Arresting Gear Officer shall:

- (1) Notify the Air Officer.
- (2) Institute the normal operations sequence.
- (3) Notify the LSO by changing the deck status light to GREEN after the Air Officer opens the deck for recovery.

WARNING

After the decision has been made to put an engine back in service and before a clear deck signal is initiated, the Arresting Gear Officer will ensure that the weight setting for that engine is correct for the approaching aircraft.

424. CHANGING CROSS DECK PENDANT (CDP) (Ref: NAVAIR Operations Manual)

a. Emergency Procedures. There are some situations that may require changing the CDP during recovery. The following procedures are:

- (1) Air Officer announces via 5MC, "Foul deck, change number ____ wire."
- (2) AGO shall notify LSO that the deck is fouled via a red deck status light.
- (3) Once the CDP has sufficient slack, the topside crew will change the CDP.

WARNING

The Topside Petty Officer or other cognizant personnel shall stand forward of the topside crew, facing aft and giving the FOUL DECK signal while observing aircraft in the pattern. Should an aircraft approach and fail to wave off, it shall be his responsibility to notify the topside crew in time to clear the deck.

WARNING

The Deckedge Operator shall stand well clear of the retract lever while topside crew is changing the deck pendant.

- (4) After the CDP has been changed, the Deckedge Operator will retract the wire only upon the Topside Petty Officer's signal.
- (5) The topside crew will check for FOD prior to resuming recovery operations.

b. Drill. It is recommended that completely changing the CDP be practiced as opposed to swapping ends.

CROSS-DECK PENDANT CHANGE EXERCISE

1. Purpose. To train arresting gear personnel to re-rig cross-deck pendants.
2. Requirement. Half of these exercises are to be conducted during darkness.
3. Procedures
 - a. When directed, re-rig cross-deck pendant.
 - b. One-minute standby will be given prior to commencing re-rigging of the cross-deck pendant.
 - c. Timing stops when the pendant is ready in all respects for aircraft engagement.
4. Evaluation. Refer to COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 3500.20 for evaluation sheet.

425. DECK STATUS LIGHT FAILURE

a. Emergency Procedure

(1) In the event of a failure of the deck status light system, the Recovery Team shall immediately shift to the emergency back-up system. The LSO Talker shall break out emergency deck status signal devices. These shall consist of RED and GREEN paddles or flags for day and a set of RED and GREEN wands at night.

NOTE

Signaling devices shall be of sufficient size or intensity and be so displayed so as to be clearly visible to the Arresting Gear Officer, LSO and Primary Fly.

(2) The Recovery Officer shall signal "CLEAR DECK": by raising a GREEN flag vertically overhead during the day/at night holding a GREEN wand overhead. LSO Talker shall display the same signal until the Arresting Gear Officer changes the signal.

(3) The "FOUL DECK" signal shall be given by raising a RED flag vertically overhead during the day and a RED wand held overhead at night. The LSO Talker shall display the same signal until the Arresting Gear Officer changes the signal.

(4) The LSO Talker shall continually be alert for changes of the Arresting Gear Officer's signals and shall NOT display a "CLEAR DECK" until he has received a positive "CLEAR DECK" signal from the Arresting Gear Officer.

(5) The LSO Talker shall continuously display the "CLEAR DECK" signal as displayed by the Arresting Gear Officer.

(6) In the absence of any signal from the Arresting Gear Officer, the LSO Talker shall immediately foul the deck.

b. Drills

DECK STATUS LIGHT FAILURE EXERCISE

1. Purpose. To train and evaluate Air Department personnel in flight operations with a deck status light failure.
2. Requirement. Half of these exercises are to be conducted during darkness.
3. Procedures
 - a. OCE (Officer Conducting Exercise). With the Air Officer's concurrence, the OCE shall initiate this exercise by securing the flight deck status light power switch at the LSO platform just prior to or during a recovery.
 - b. Arresting Gear Officer. Upon loss of the deck status light, immediately shift to emergency signal devices.
 - c. LSO Spotter/Talker. LSO Spotter/Talker immediately shifts to emergency signal devices and repeats all signals from the Arresting Gear Officer until power is restored.
4. Evaluation. Refer to COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 3500.20 for evaluation sheet.

426. VOICE COMMUNICATION SYSTEM FAILURE

- a. Provisions shall be made to ensure the continuation of necessary communications in the event of a voice communication system failure. Individual carriers shall devise their own system and procedures compatible with their installations.
- b. Any emergency procedure is necessarily going to cause significant delays in meeting all requirements for a clear deck. To preclude or minimize foul deck waveoffs, the Air Officer shall cause the landing interval to be extended accordingly and shall make every effort to recover aircraft by type, in sequence.

427. CONSTANT RUNOUT CONTROL VALVE WEIGHT SETTING MALFUNCTIONS. In the event of any malfunction of the constant runout control valve weight setting unit, the engine shall normally be taken out of service. If, in the opinion of the Air Officer, removal of the engine from service is not feasible, weight settings shall be made manually. In the event settings must be made manually, the Air Officer shall make every effort to recover aircraft by type, in sequence, to minimize weight setting delays.

NOTE

If Deckedge Synchro Repeater is out of limits, an additional qualified Engine Operator shall also verify proper weight setting at engine.

428. RIGGING THE BARRICADE

a. Emergency Procedures

(1) General

(a) Rigging of the barricade is an all hands evolution under supervision of the Arresting Gear Officer. Experienced arresting gear personnel shall be assigned specific key duties. Other topside personnel, such as catapult, flight deck and squadron personnel, shall be trained to assist as necessary. These personnel should be assigned specific duties, e.g., "blue shirts" break out and rig deck ramps, "yellow shirts" supervise installation and ensure security of deck ramps, etc.

(b) Since barricade arrestments are emergency situations, barricade rigging operations must be correct, efficient and timely.

NOTE

The barricade shall be rigged in accordance with detailed instructions outlined in current NAVAIR operations/maintenance/overhaul manual.

b. Procedures. In the event the decision is made to rig the barricade, the following procedures shall take place:

(1) The Air Officer shall announce on the SMC, "Stand by to rig the barricade." and provide as much information as available to the AGO over the flight deck communications system or other voice communication system. Any safety information (i.e., one aircraft to go, remain clear of the foul line) shall be passed at this time.

(2) Crash and Salvage shall position mobile crash equipment forward and Bow Catapults shall raise JBDS as applicable.

WARNING

To keep personnel clear of the landing area and minimize the possibility of injuries, the Air Officer shall normally pass the above word after the last normal recovery aircraft has landed. If this is not feasible, he shall pass the word as late in the recovery as possible, and inform personnel to proceed with caution.

(3) All available personnel shall assemble at assigned pre-rig stations, breaking out the barricade, deck ramps, air guns and other necessary tools and equipment. Care shall be taken not to foul the deck during this period.

(4) The Air Officer will announce the type aircraft, the weight, and its landing configuration.

(5) The Arresting Gear Officer, with the use of the appropriate Bulletins, shall report to the Air Officer with information concerning the removal of deck pendants, barricade and engine settings, required wind over deck, recommended approach speed, lens setting and configuration. Requirements shall be cross checked and verified by the Air Officer before the deck is open.

(6) When the last normal recovery has been completed and the engaged pendant retracted, the Air Officer shall pass the word to remove cross deck pendants as necessary. After cross deck pendants are clear the word will be passed, "Rig the barricade."

CAUTION

C-2/E-2 double barricade webbing shall be marked for easy identification and shall be used for C-2/E-2 aircraft only.

(7) Install and lock deck ramps in proper position. Deck ramps should be numbered in sequence corresponding to positions on the flight deck, numbering from port to starboard.

(8) Disengage both barricade stanchion latches.

(9) As soon as the webbing is spread and the upper tensioning pendants are connected, tension will be taken by the use of the barricade air guns. If air pressure is lost, tension may be taken by hand with a ratchet wrench or a special NAWC tool.

NOTE

To aid in obtaining the proper height of the barricade, a mark should be made on the upper load strap tensioning pendants which, when lined up with the sheave on the stanchion, indicates a proper tension for proper height.

(10) After proper tensioning is assured on both load straps, the lower load straps shall be tucked under the deck ramps.

(11) When personnel are clear of both the stanchions and from within the webbing assembly, the Officer or Petty Officer in Charge of the barricade rig shall signal for the stanchions to be raised.

NOTE

Failure to install ramps may permit the wind over the deck to raise the lower load straps off the deck and interfere with proper engagement. Also, lack of ramps may result in damage to the lower load straps if the engaging aircraft has damaged landing gear.

When U-shackle and links have been connected to the clevis end socket assemblies of the purchase cable, the Officer or Petty Officer in Charge of the barricade rig shall signal retract after ensuring:

(a) Parallel pendant is clear of load straps and aft of deck ramps.

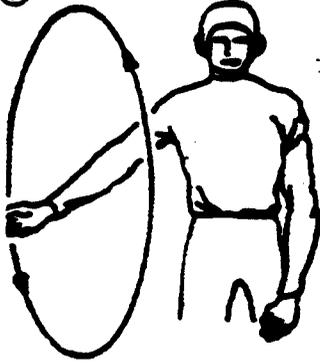
(b) Extension loops, ring type couplings, and U-shackle and link are positioned on proper side of webbing.

(c) All personnel are clear

NOTE

The Deckedge Control Operator shall retract slowly to prevent the parallel pendant from fouling on deck ramps.

③ WIRE RETRACT



Hook runner

Deck-edge
operator

Day: Make large circular motion with arm
extended to one side.

Night: Same, holding RED stubby wand.

RETRACT SIGNAL

c. Post Rig Inspection. The Arresting Gear Officer shall inspect the barricade rig for the following:

(1) Check hookup of all four tension pendant release assemblies to ensure proper seating of hooks.

(2) Ensure deck winches are properly locked to deck (if applicable)

(3) Check purchase cable and parallel pendant for alignment to sheave throat. Ensure clevis pin installation, anchor nuts tight, and set screw for proper installation and security.

(4) Ensure deck ramps are secure and locked and lower load strap is forward of and tucked under the ramp.

(5) Ensure barricade is raised to a sufficient height. The minimum height shall be 20 feet at mid-span for jet barricade and 21 feet mid-span for E-2/C-2 barricade.

d. Post Rig Procedures. The Arresting Gear Officer shall inform the Air Officer that the rig is ready and present a GREEN status light when:

(1) The barricade is properly rigged.

(2) Deck pendants are removed as required for aircraft type and configuration.

(3) Ensure the proper weight setting is made on the barricade engine. Weight settings shall be made in accordance with applicable recovery bulletins.

(4) Ensure proper weight setting is made on all pendant engines as time may prohibit removal of pendants as planned.

(5) Retractable sheaves of all engines in service are raised.
(If applicable)

(6) Ensure all loose tools, personnel, and any detached deck pendants are clear of the landing area.

e. Post Engagement Procedures

(1) To prepare the deck for further recoveries after a barricade engagement, the purchase cable must be disconnected from the barricade and retracted. If necessary, the webbing must be cut away from the aircraft and the deck inspected thoroughly for FOD.

(2) After engagement by an aircraft, used webbing, pendants and associated hardware installed between purchase cable terminals must be discarded.

2. Drills

a. General. Time is important; however, emphasis shall be placed on the proper rigging of the barricade ensuring that all component parts are ready for the engagement.

MOD-D-19-SF RIGGING BARRICADE (CV/CVN)

1. Purpose. Train flight deck personnel in rigging barricades.

2. Requirements. One half of these exercises are to be conducted during night periods.

3. Procedures. One minute "STANDBY" will be given prior to commencing the rigging of the barricade. Timing starts when the signal is given to "RIG THE BARRICADE." Timing stops when barricade is ready in all respects for an aircraft engagement and procedures 3(a) through 3(1) have been completed.

4. Evaluation. Refer to COMNAVAIRPAC/COMNAVAIRLANT INSTRUCTION 3500.20 and FXP-4 publication for evaluation sheets.

429. RIGGING THE MOVLAS

a. Emergency Procedures

(1) General. The rigging of the MOVLAS shall be performed by qualified VLA personnel and assisted, as necessary, by the V-2 personnel under the supervision of a qualified Arresting Gear Officer.

b. Procedures

(1) When the decision is made to rig the MOVLAS, the Air Officer shall pass the word over the 5MC, "RIG THE MOVLAS, Station _____."

NOTE

MOVLAS stations shall be designated as follows:

Station 1 - source light box only on lens platform

Station 2 - portable frame port side

Station 3 - portable frame starboard side

The necessary components shall be broken out and rigged as per ship's installation.

NOTE

The MOVLAS portable components shall be stored within the ship's structure on starboard side to preclude damage from aircraft crash or fire on the flight deck or in the catwalks.

(2) The perforated covers in the center panel shall be locked open for day, and closed for night operations.

(3) When the MOVLAS is installed and the cannon plugs are connected to the appropriate power source, the LSO shall check for proper operation.

(4) When the LSO is satisfied with the operation, he shall so indicate to the Arresting Gear Officer by giving a "thumbs up", and the Arresting Gear Officer shall initiate normal recovery procedures.

c. Drill

(1) General. Time is important; however, emphasis shall be placed on personnel safety and proper installation of the system.

MOB-S-23-SF - MANUAL OPERATED VISUAL LANDING AIDS SYSTEM (MOVLAS)

1. Purpose. Train Air Department personnel in rigging the MOVLAS.
2. Requirements. One exercise to be conducted at each MOVLAS location.
3. Procedures. One minute standby will be given prior to commencing the rigging of the MOVLAS. Timing stops when the MOVLAS is ready in all respects
4. Evaluation. Refer to FXP-4 publication for evaluation sheet.

430. FLOLS Control Drill

a. General. Train Air Department personnel in transferring control of FLOLS control from A710 (Pri-Fly) remote control panel to A720 (FLOLS Room) remote control panel.

b. Drill

MOB-S-24-SF - FRESNEL LENS OPTICAL LANDING SYSTEMS (FLOLS) DRILLS

1. Purpose. Train Air Department personnel in transferring control of FLOLS control from A710 (Pri-Fly) remote control panel to A720 (FLOLS Room) remote control panel.
2. Requirements. One day recovery and one night recovery.
3. Procedures. Designate the exercise to start after the first aircraft of the recovery has been trapped.
4. Evaluation. Refer to FXP-4 publication for evaluation sheet.

SECTION IV

CHAPTER 3

OPERATIONAL SAFETY PRECAUTIONS

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440. OPERATIONAL SAFETY PRECAUTIONS

441. GENERAL

a. The recovery of today's modern aircraft, with their high gross weights and airspeeds, is a complex and demanding operation involving various inherent dangers. Personnel engaged in the operation of the recovery equipment must be thoroughly trained and initiated in the recovery process. The procedures and safety precautions contained in this manual must be complied with. Disregard for these procedures and the fundamentals of caution and safety will create hazards far in excess of the previously mentioned inherent dangers.

b. Safety is an all hands concern; as such, all hands shall be thoroughly familiar with this manual, its procedures and safety precautions. Further, all hands shall also insist on strict adherence to established safety practices by personnel not having access to this manual.

c. The following general rule shall apply in regard to recovery equipment:

WARNING

ANY ARRESTING GEAR PERSONNEL HAVING REASON TO SUSPECT THE READINESS OR SOUND OPERATING CONDITION OF ANY ARRESTING GEAR ENGINE, DECK PENDANT, PURCHASE CABLE OR ASSOCIATED EQUIPMENT SHALL IMMEDIATELY CAUSE THE DECK TO BE FOULED BY INFORMING THE ARRESTING GEAR OFFICER OR THE RECOVERY EQUIPMENT CONTROLLER IN PRIMARY FLY.

442. TOPSIDE

a. The most important step in reducing flight deck injuries is the elimination of unnecessary personnel from the flight deck during recovery operations. This is difficult to accomplish because there are many well motivated but non-essential personnel who sincerely believe their presence is justified on the flight deck. The first step in any injury prevention program must be the elimination of those non-essential personnel and unauthorized personnel from the recovery area. Therefore, while aircraft are being recovered, no personnel, other than those required by this manual, shall be on the flight deck, in catwalks or sponsons along the landing area without the expressed permission of the Air Officer. The landing area is defined as that portion of the ship, from the fantail to the forward end of the angled deck. This area includes the safe parking area near the island. It shall be the responsibility of the Arresting Gear Officer and the Flight Deck Officer to ensure safety compliance within the Fly 3 and Fly 2 areas respectively.

b. In addition to the basic safety precautions used during operational procedures, the following special safety precautions shall be observed:

(1) All topside personnel shall be in the proper flight deck uniform.

(2) Personnel shall not stand in or otherwise block entrances to the island structure, or exits leading from the catwalks.

(3) Avoid crowding of personnel or material in the catwalk areas near the deck edge control station.

(4) During recovery operations, with the exception of the LSO and his assistants, no personnel shall be permitted in the port catwalk without authorization from the Air Officer.

(5) Personnel shall not turn their backs on aircraft landing or taxiing out of gear; they shall stay alert and in a position which allows quick and agile movement.

(6) Personnel required to be in the catwalks shall duck below the flight deck or behind cable shields during the aircraft's touch down and roll-out.

(7) Personnel in the roll-out area shall position themselves behind tractors or other mobile equipment as feasible.

(8) Hook Runners, Recovery Director, Gear Puller, and other personnel in the rollout area shall not enter the landing area until the aircraft has completely stopped.

(9) No one shall enter the landing area to effect equipment repairs, or for any other reason, until the deck is "fouled" and until positive clearance has been obtained from the Arresting Gear Officer.

WARNING

If the arresting gear crew is required to enter the landing area during aircraft recovery, a safety man shall be stationed forward of the crew, facing aft, to ensure crew safety and observe approaching aircraft.

(10) Deckedge Operator shall stand well clear of the retract lever while personnel are on deck and all purchase cables are not fully retracted.

(11) Purchase cables shall never be fed back through the flight deck sheave by hand. Purchase cables must be retracted by the arresting engine.

c. To minimize the possibility of an aircraft landing on a fouled deck, the following procedures are mandatory:

(1) The lens, and at night the landing area lights, shall never be turned on without the expressed permission of the Air Officer.

(2) Except for the purpose of conducting tests, neither the lens nor the landing area lights will be turned on until the LSO has manned the platform.

(3) The wave-off lights shall be continuously activated any time the lens or landing area lights is turned on and the LSO is not on the platform.

(4) Practice CCA approaches, using visual landing aids, shall be permitted only when the LSO is on the platform. He shall wave off each aircraft at 1/2 mile or greater.

(5) To avoid unnecessary delay in recovering the first aircraft, the lens and/or landing area lights may be turned on a short time before the ship is completely ready to commence recoveries but wave-off lights shall be continuously activated until an LSO is on station. The LSO shall wave off approaching aircraft at a distance of 1/2 mile or greater if he has not received the "clear deck" signal.

(6) During instrument recoveries, Primary Fly will keep CATCC advised as to the status of the deck and provide the estimated time the deck will be clear. CATCC will keep Primary Fly advised as to the position of the nearest aircraft.

(7) Combat and CATCC must keep Primary Fly informed of any aircraft known or suspected to have radio failure.

(8) Primary Fly will notify the Arresting Gear Officer and Flight Deck Officer of any aircraft with problems that will affect recovery (lights, electrical problems, fuel, hydraulic, control, flaps, etc.).

443. BELOW DECKS

a. The primary safety factor in the operations of the arresting gear engine is constant attention to inspection and operation. Engine operators must stay constantly alert during recovery operations.

b. In addition to the inherent safety precautions used during operational procedures, the following special safety precautions shall be observed:

(1) All below deck personnel should be in complete uniform, including long sleeve shirt.

(2) All unauthorized personnel shall remain clear of all arresting gear engine rooms. Engine rooms shall NOT be utilized as passageways by any personnel during recovery operations.

(3) All personnel shall keep hands and bodies clear of the engine when operating or when engagement is imminent. Safety guards, shields, cages, etc. must be in place. Engine and sheave damage operators shall make "groove" and "ramp" calls loud and clear at all times.

(4) In the event all equipment is not ready to land aircraft when "groove" is passed over voice communication system, respond with "FOUL DECK."

SECTION V

OPERATIONAL REPORTS AND LOGS

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500. OPERATIONAL REPORTS AND LOGS

501. FLIGHT DECK OPERATIONS REPORT (Part I Launching and Part II Landing)

a. This report shall be submitted quarterly by the Commanding Officer in paper format, via the main ALRE ASRL system, no later than the 15th day of each month following the end of each quarter to Naval Air Warfare Center (Aircraft Division), Code 4.8.10.4, Lakehurst, NJ 08733-5090.

502. CATAPULT LAUNCHING LOG

a. The Catapult Captain shall ensure that a Steam Catapult Log is maintained for his catapult. Careful maintenance of the Catapult Log will provide a uniform system for recording invaluable launch data.

b. A clock shall be installed in a location where it will be plainly visible from the Console Recorder's station during all launches.

c. Neatly completed logbooks shall be retained in chronological order for a period of at least 1 year. Logbooks more than 1 year old may be discarded.

d. Special Instructions

(1) An entry shall be made for every catapult shot, including no-load and dead-load launches.

(2) The number recorded in the "Shot No." column shall be an accurate running total of catapult shots, including no-loads and dead-loads.

e. Submission. Launching data shall be transferred to the Automated Shot and Recovery Log Program (ASRL) daily. Ships shall submit ASRL disks no later than the 5th day of each month to Naval Air Warfare Center (Aircraft Division) Code 4.8.10.4, Lakehurst, NJ 08733-5090.

503. CHRONOGRAPH/DESI TAPES

a. Chronograph/DESI tapes shall be maintained for each catapult shot, including no-loads and dead-loads.

b. Tapes shall be retained in chronological order for a period of at least 1 year, after which they may be discarded.

c. Special Instructions. Each tape shall be annotated with the following information:

- (1) Date
- (2) Shot number
- (3) Type of aircraft, no-load or dead-load
- (4) Weight of aircraft or dead-load
- (5) Endspeed

d. Submission. Tapes shall be retained on board and submitted only upon request.

504. PRI-FLY RECOVERY LOG. Recovery data shall be transferred to the Automated Shot and Recovery Log Program daily. ASRL collects all data formerly submitted on Pri-Fly Recovery Log NAVAIR form 13800/4.

a. Special Instructions

(1) With the exception of the "Remarks" column, an entry shall be made for every recovery, excluding emergency barricade engagements.

(2) The number recorded in the "Recovery No." column shall be an accurate running total of arrestments.

(3) It is imperative that all information be recorded accurately at time of each engagement.

(4) Particular care shall be exercised on the accuracy of entries for "Distance-Off-Center" and "Landing Type" columns. Refer to footnotes 1 and 2 on log sheet for information concerning the nature and requirements for these columns.

(5) Any unusual aspect of a recovery shall be noted accordingly in the "Remarks" column.

(6) Entries made in "Engine Weight Setting" and "Ram Travel" columns shall be obtained from the engine operator.

b. Submission. Submit ASRL disks no later than the 5th day of each month to Naval Air Warfare Center (Aircraft Division) Code 4.8.10.4, Lakehurst, NJ 08733-5090.

505. WIRE ROPE HISTORY. Wire rope history shall be transferred to the Automated Shot and Recovery Log Program daily. ASRL collects data formerly submitted on NAVAR form 13800/5.

a. Special Instructions

(1) A separate chart shall be kept for each arresting gear serving a deck pendant.

() When making each entry in this chart, include the last recovery number of the applicable arresting gear unit. The vital and necessary information can be obtained from the "Recovery No." and "Pendant No." columns of the Recovery Log at the Primary Fly station.

(3) Columns requiring a specific type of entry are so noted by the six numbered footnotes.

(4) An entry shall be made in the Wire Rope History Chart each time one or more of the following occurs:

(a) After each regularly required inspection of the purchase cable.

(b) After every replacement of a purchase cable, as required.

(c) After every replacement of a deck pendant, as required.

(d) After removal of torque in cable system, as required.

(e) After cropping of a purchase cable due to stretch, recession of wire in terminals, defective terminals, etc.

b. Submission. Submit ASRL disks no later than the 5th day of each month to Naval Air Warfare Center (Aircraft Division) Code 4.8.10.4, Lakehurst, NJ 08733-5090.

506. REPORT OF DEVIATION FROM NORMAL ARRESTED LANDING OR CATAPULT LAUNCH

a. In view of the highly technical aspects of launch and recovery equipment, timely and accurate information shall be submitted in regards to the circumstances surrounding any mishap resulting from defective material or errors in established operating procedures. Speed in reporting is essential for the purpose of expeditiously determining the cause and corrective action necessary to prevent a similar occurrence aboard other carriers.

b. The V-2 Division Officer shall submit (in accordance with COMNAVAIRLANTINST 3750.30/COMNAVAIRPACINST 13800.6) a report covering: any barricade engagement; any catapult launch or arrested landing which deviates from the limits outlined in the appropriate catapult launching bulletin or recovery bulletin; any launch or recovery which results in an aircraft incident or personnel injury.

507. LAUNCH AND RECOVERY EQUIPMENT MAINTENANCE LOGS

a. The Catapult/Arresting Gear and ILARTS/Lens Petty Officers shall establish and maintain a maintenance log for each catapult/arresting gear engine and ILARTS/Lens system assigned. Each log shall be presented to the Aircraft Launch and recovery Equipment Maintenance Officer twice monthly for review in accordance with ALREMP.

b. Special Instructions. Each log shall contain, but not be limited to, the following information:

(1) Date and launch/landing number for maintenance actions performed.

(2) All non-scheduled maintenance actions, including PMS related maintenance.

(3) All measurements (used to predict trends and avoid possible casualties).

(4) Parts replaced, including part number, contract number, and reason for replacement. Logs will be retained on board for a period of at least 2 years.