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FLIGHT DECK ARRESTING GEAR
AND BARRICADE CONFIGURATION
CRITERIA FOR MARK 7 MQS 3
ARRESTING ENGINE
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ENGINEERING DEPARTMENT (SI)

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FLIGHT DECK ARRESTING GEAR AND BARRICADE CONFIGURATION CRITERIA FOR MARK 7 MOD 3 ARRESTING ENGINE

PREPARED BY

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ABSTRACT

This report presents information regarding flight deck arresting gear & barricade configuration criteria for the Mk. 7 Mod. 3 arresting engines and is provided for use in the preparation of installation plans for new aircraft carriers or on present carriers planning utilization of Mk. 7 Mod. 3 arresting gear.
I INTRODUCTION

The purpose of this report is to provide information for use in the preparation of Mark 7 Mod 3 arresting gear installation plans for new carriers or existing carriers which are to be reconfigured to utilize new gear.
II SUMMARY

The installation criteria for the arresting engine and associated equipment, i.e., deck pendant, barricade, flight deck and arresting gear control station were determined based upon past operational experiences and reflect the optimum design configuration features for future recovery systems.
III CONCLUSION

Criteria contained herein has been compiled and developed based on past experience in order to obtain the best operational features in future recovery system reconstruction and new carrier design. Deviations from criteria established within this report should initially be approved by the Naval Air Engineering Center. In addition, Preliminary guidance arrangements and all pertinent recovery system drawings should be forwarded to the Naval Air Engineering Center for review and approval.
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VI REPORT TEXT

A. GENERAL CRITERIA:

1. Estimated weight and space requirements for the arresting engines and associated equipment are shown on Figures 1 through 5. Arresting engines should be placed athwartship so that lengths of port and starboard purchase cable from the deck sheave to the engine movable crosshead are as nearly equal as possible. In addition, Figure 6 shows an example of the desired positioning of the engines; the crosshead shall be on the starboard side of the ship when the engine is reeved, as shown in Figure 1.

2. Pendant engine deck runout is 349 feet to airplane tailhook. Barricade engine deck runout is 409 feet 6 inches to airplane nosewheel, which includes barricade slack takeup.

3. The drive system uses 28 inch pitch diameter sheaves throughout, as shown in Figure 7 with the exception of the 24 inch anchor damper turn-around sheave, as noted.

4. The choice number of sheaves (minimum) in the drive system for one engine is 10; 5 per each side of the engine extending to the flight deck. Description of these sheaves directly from one side of engine to the flight deck, is as follows:
   a. On deck fairlead sheave
   b. Bottom stationary sheave of sheave damper assembly
   c. Crosshead sheave of sheave damper assembly
   d. Thru-Deck sheave
   e. Flight-Deck sheave

5. The minimum allowable cable wrap in the arresting gear fairlead system which includes the sheave dampers, is 15 degrees. There is one exception: the "Y" type sheave damper installation may use a minimum of 10 degrees of cable wrap around the bottom stationary sheave with the sheave damper in battery position.
6. Use "Y" type sheave dampers wherever possible, in preference to the "X" type. This arrangement is shown in Figure 2.

7. Direct access is required to sheave damper compartments from each arresting engine compartment to enable arresting gear personnel to move quickly from one compartment to another should emergency repairs be necessary during air operations. Access openings should be at least 24 inches by 36 inches with a 24 inch sill to permit passage of 28 inch pitch diameter sheaves which have an outside diameter of 29-1/8 inches. Access openings of 18 inches by 24 inches will not permit passage of the sheave and are not suitable.

8. Where two sheave dampers are housed in one compartment, a minimum clearance of 4 feet is required between components for inspection, lubrication and maintenance.

9. The Arresting Gear Shop and the Arresting Gear Storeroom should be centrally located as close as possible to the arresting engine compartments. The inclusion of two separate pouring compartments, approximately 12 feet x 16 feet is required. These should be on each side of the vessel, centrally located between and adjacent to all engine spaces. These compartments are to be used solely for pouring arresting gear cable terminals.

10. The arresting engine fluid drain and fill system should be centrally located as close as possible to the arresting engine compartments, as shown in Figure 8.

11. The sheave damper fluid drain and fill system should be centrally located among the sheave damper installations, as shown in Figure 9.

12. Provide longitudinal tracks for use with an overhead trolley in all arresting engine compartments. Tracks should be located over the center of each engine and over the engine compartment opening in the gallery deck. The tracks must extend the full length of the engine compartment. The overhead trolley must be capable of lifting 5 tons and must have a built-in automatic brake.
13. Retractable deck sheaves are to be installed in accordance with Figure 10. However, this installation should be restricted to pendant and barricade deck sheave locations where above deck obstructions interfere with airplane movement and cannot be tolerated. If no interference problem exists, the fixed horizontal deck sheave should be used. If a retractable deck sheave installation is desired, the following is necessary in order to maintain a minimum fleet angle between the retractable deck sheave and the through deck sheave. When the installation of the through deck sheave is not 90 degrees to the deck pendant line, the following principles apply:

a. If the location of the through deck sheave must be positioned inboard, or less than 90 degrees to the deck pendant line, it is required that the distance between the retractable sheave and through deck sheave be made greater than the normal requirement as shown in Figure 10.

b. If the location of the through deck sheave must be positioned outboard, or greater than 90 degrees to the deck pendant line, it is required that the distance between the retractable sheave and through deck sheave be made less than the normal requirement as shown in Figure 10.

14. Since the time required to rig a barricade is critical, it is recommended that the barricade webbing stowage compartment be located as close to the barricade stanchion as possible. The preferred location for this compartment is outboard of the starboard barricade stanchion. The compartment should be positioned so that the hatch rollers are perpendicular to the line of pull on the barricade webbing when it is being pulled onto the deck. If the barricade hatch is in the deck, the hatch cover must be "quick" opening, to reduce barricade rigging time to a minimum.

15. The material specification for the auxiliary air flask, which is to be furnished by the installing activity, should be QQ-S-682, FS 302, Finish 1, Grade B. (This material should justifiably be of a better grade than that used for the air flask on the arresting engine since the auxiliary flask is used at 3000 PSI as opposed to 400 to 800 PSI in the engine air flask.)
16. Terminal impact pads will be required for all deck pendant installations in accordance with Figure 11.

17. A sound powered phone (6 j g) jack box, tied into the arresting gear telephone circuit, should be provided at the following locations:

a. Each arresting engine control panel
b. Each sheave damper charging panel
c. Each terminal pouring room
d. Each arresting gear work shop
e. Barricade hydraulic control station
f. Arresting Gear deck edge control station
g. LSO platform
h. Pri-Fly
i. Arresting Gear Flight Deck Officer

18. The face of all fluid gages, for sheave dampers, barricade power package, engine stowage tank and sheave damper stowage tank, should be suitably illuminated. Gage lights can be mounted on the back for the shine-thru type and for the metal encased gage, a light should be mounted to shine on, or reflect light onto the face of the gage. Also, battle lanterns should be installed in all engine compartments directed at the engine dial and engine control panel. In addition, installation of battle lanterns should be made in all sheave damper spaces - one directed at the sliding sheave and one at the sheave damper control panel.

19. Individual air stations must be provided in each of the various systems requiring an air supply (wire supports and controls, automatic lubrication system and anchor damper battery positioner) to ensure that these systems are furnished an adequate air supply. In addition, an air pressure gage must also be included near each station to render operating personnel assurance of adequate pressure in each system.
B. DECK PENDANT CRITERIA:

1. The deck pendant sheave span for use with a Mark 7 Mod 3 arresting engine may be between 120 and 130 feet. A 120 foot span is recommended. A span up to 130 feet provides no advantage but may be used, if required.

2. Deck sheave spans for each pendant should be as close to being equal as possible. If this is not achieved, the difference in length between deck pendants will provide severe logistic problems with possible installation errors. Variations must be avoided if at all possible.

3. All deck pendants must be in the "wrap-on" sheave arrangement, as shown in Figure 7.

4. All deck sheave span centers should be on the angled deck centerline if at all possible. If off-center positioning cannot be avoided, the centerline of the deck sheave span should not be more than two feet from either side of the angled deck centerline.

5. Deck pendant spacing for a deck sheave span between 120 feet and 130 feet should be as follows:

   Note: These figures are based on an airplane touchdown point between wires 2 and 3.

   a. No. 3 pendant should be 254 feet (+0 feet -4 feet) forward of the aft ramp.

   b. No. 2 pendant should be 40 feet (+4 feet -0 feet) aft of No. 3 pendant.

   c. No. 1 pendant should be 40 feet (+4 feet -0 feet) aft of No. 2 pendant.

   d. No. 4 pendant should be 40 feet (+4 feet -0 feet) forward of No. 3 pendant.

   Note: The distances given provide a proper landing area aft of the first wire based on the latest lens setting and hook to ramp clearance.
C. BARRICADE CRITERIA:

1. Figure 4 provides the required information for the installation of the barricade stanchion hydraulic control.

2. The barricade stanchion span should be 130 feet (± 5 feet). The sheave span should be 120 feet (+ 5 feet - 2 feet). Both the stanchion and the deck sheave should be on the same centerline. (It should be noted that if a minimum stanchion span is used "125 feet" and a maximum sheave span "125 feet" is used, they will overlap; they must then be separated and still stay within the spans listed above).

3. The off-center distance for the stanchion (and sheave) spans should not exceed two feet either to port or starboard of the landing area centerline.

4. The barricade should preferably be located 235 to 245 feet forward of the aft ramp; in no case should a barricade be placed less than 210 feet from the aft ramp. This is to assure that all of the aircraft's wheels are on the deck prior to engagement into the barricade webbing.

5. A "wrap-on" cable sheave arrangement is required for the barricade installation, as shown on Figure 12.

6. The barricade winch air motor, which is used to tension the barricade webbing system, must operate from a 90 psi minimum air supply (150 psi maximum) in order to provide proper tensioning of the webbing.

D. FLIGHT DECK CRITERIA:

1. The utilization of two basic landing area criteria are to be employed to evaluate the arresting gear arrangement. A typical arrangement is shown on Figure 13. All airplane wheels are to be safely on the deck, at full gear runout, to accommodate the following airplane landing patterns:

   a. Landings parallel to the angled deck centerline, twenty feet off-center to the port for all pendants and the barricade.
b. Landings on-center, angled to the port. This angle, the yaw angle, is presently set at a minimum of 7 degrees for all pendants and the barricade. This will accommodate airplanes landing at an angle to the landing area.

2. The requirement for airplane turn-around is 110 feet when measured from the airplane hook point on the angled deck centerline from the end of full runout of the No. 4 deck pendant.

3. The installation of wire supports is shown in Figure 14. Locations for wire supports are to be in accordance with data as shown in Figure 15.

E. ARRESTING GEAR CONTROL STATION:

1. To provide an unobstructed view of the landing area the optimum location for the "deck edge controls" are inside the carrier island just below Pri-Fly level. The island location also ensures personnel maximum protection from the environment, including noise. The second best location for the "deck edge controls" is on the starboard side of the vessel, away from the carrier island to permit an unobstructed view of incoming aircraft and all pendants and the barricade from battery position to full runout.

NOTE: Port side deck edge controls are hazardous with regard to "wave-off" airplanes, or during a possible cable failure.
ENGINE CYLINDER (REF)

LOAD DIAGRAM
ALL LOADS IN POUNDS
(SEE NOTE 5)

REVIEW NO. A B C D

66756585 16200 16200 14000 14000
5600 5600

FRAME NO.

REVIEWING DIAGRAM (SEE N.
18:1 RATIO: SINGLE PENDANT A
CABLE ANCHOR DAMPER
18:1 RATIO: ENGLISH REEIVING,
SINGLE PENDANT
SCALE: NONE

STOP AND BACK UP TO THIS POSITION
WITH REPLACEMENT SLIPPERS

LEAD END

LEAD 36
LEAD 18

VIEW E-E

REELING DIAGRAM (SEE N.
18:1 RATIO: SINGLE PENDANT A
CABLE ANCHOR DAMPER
18:1 RATIO: ENGLISH REEIVING,
SINGLE PENDANT
SCALE: NONE

16:1 RATIO: SINGLE PENDANT
SCALE: NONE

FIXED SHEAVE

ENGINE (SYM ABOUT X EXCEPT AS SHOWN)

ANGLES FOR CONTROL VALVE ASSEMBLY
SEE NOTE 3

DEC 3

6000
ANCHOR DIA.

LEAD 36

LEAD 18
NOTES:

1. DATA SHOWN ON THIS ARRESTING ENGINE IS CONVENIENT. ENGINE MOUNTED OPPOSITE PANEL MAY BE ADJUSTED TO location, MODIFYING THE CHOICE OF ENGINE DETERMINED BY THE ENGINEER AN APPROVAL OF THE ENGINEERING FACILITY ON ENGINES WHICH CYLINDER SADDLE IS THOROUGHLY CLEAN.

2. THE DECK SUPPORT LOADS AND MOMENTS OF ALTERNATIVE LOADS ARE BREAKING STRENGTH DYNAMIC CONDITION AND/OR ON OPPOSITE PANEL MAY BE ASSISTIZED.

3. AFTER INSTALLATION HYDROSTATICALLY REPORT RECEIVED.

4. THE INSTALLING ENGINEER COGNIZANCE THE PRESENT INSTALLATION.

5. A 3000 PSI ACCUMULATOR (A) 440 VOLT, 60 CYCLE, 60 OUT OF CAPACITY OF (C) A 10 VOLT, 60 OPERATION OF CAPACITY MUST BE NOW (A) ALL NECESSARY DRAWING, POWERS, AND HYDRAULIC ACCUMULATORS (B) AUXILIARY PISTON ARRESTING E (C) SUPPLIED TIME, OR HYDRAULIC SUPPLIED BY SHIP WATER PRESSURE 200 PSI.

6. GENERAL DATA:
   (A) CABLE:
      1 3/8 DIA 6X19 CABLE 17.25 LENGTH OF (F) AGAINST 80 FT 831 FEET.
   (B) WEIGHT OF 3000 PSI SUPPLEMENTARY SHEAVE END, 57 ARRESTING ASSEMBLY (WITH TERMINAL SWAGED ON DECK PENDANT/していない) BOLTING REQUIREMENT INSTRUCTION B10

7. DECK BOLT PATTERN SCALE: 1/8" = 1" - 1/4"

8. NOTE: BOLT PATTERN IS FOR GENERAL INFORMATION ONLY; ACTUAL BOLT LOCATION SHOULD BE TEMPERATURE FROM ENGINE BASE.

9. 601000 (REF)

10. FOR ENDLESS REEVING LEADS 18 AND 19 TO PENDANT

11. SEE NOTE 2.

12. CROSSHEAD

13. 60203 (REF)

14. SHEAVE DAMPER INSTALLATION.

15. TERMINAL SWAGED ON DECK PENDANT.

16. 400791 (REF)

17. 404815 (REF)

18. 02-61946
NOTES:

1. DATA SHOWN ON THIS DRAWING IS FOR THE INSTALLATION OF A MK7 MOD2 ARRESTING ENGINE ON ALL TYPES OF VESSELS. WHEN NECESSARY, OR MORE CONVENIENT, ENGINE ASSEMBLY WITH CONTROL VALVE INSTALLATION MOUNTED OPPOSITE HAND FROM THAT SHOWN SHALL BE INSTALLED. CONTROL PANEL MAY BE ASSEMBLED IN POSITION SHOWN OR ANY OTHER CONVENIENT LOCATION AS NECESSARY.

2. THE CHOICE OF LEAD CABLES, SHOWN IN REEVING DIAGRAM, TO BE DETERMINED BY THE INSTALLING AGENCY, DEPENDING ON THE FUNCTION OF THE ENGINE AND LOCAL INSTALLATION CONDITIONS, SUBJECT TO THE APPROVAL OF THE ENGINEERING DEPARTMENT OF THE NAVAL AIRCRAFT ENGINEERING FACILITY.

3. ON ENGINES WHICH ARE TO BE USED FOR ENDLESS REEVING, THE CYLINDER SADDLES MUST BE MODIFIED AS SHOWN ON DRAWING 57-50874.

4. THE DECK SUPPORTING THE ENGINE MUST BE REINFORCED TO CARRY ALL LOADS AND MOMENTS SHOWN IN LOAD DIAGRAM AND IN OTHER VIEWS. THESE LOADS ARE BASED ON 100% EFFECTIVENESS OF THE MAXIMUM BREAKING STRENGTH OF THE CABLE UNDER THE MOST SEVERE EMERGENCY DYNAMIC CONDITIONS. ALL LOADS CAN OCCUR IN OPPOSITE DIRECTIONS AND/OR ON OPPOSITE SIDES FROM THE ONES SHOWN, FOR DECK BOLT PATTERN, SEE PLAN VIEW SHOWN ON THIS DRAWING.

5. AFTER INSTALLATION OF ARRESTING ENGINE AND REEVING CABLE, TEST HYDROSTATICALLY IN ACCORDANCE WITH SHIPBOARD TEST PROCEDURES REPORT NAEL-ENG-7085.

6. THE INSTALLING AGENCY SHALL FURNISH AND INSTALL UNDER ITS OWN COGNIZANCE THE FOLLOWING ITEMS:
   (a) A 3000 PSI AIR SUPPLY LINE WITH A STRAINER FOR CHARGING THE ACCUMULATOR AND AUXILIARY AIR FLASKS.
   (b) A 440 VOLT, 60 CYCLE, 3 PHASE POWER SUPPLY LINE FOR THE OPERATION OF THE CONTROL UNIT MOTOR WITH A MAXIMUM RATED CAPACITY OF ONE (1) HORSEPOWER.
   (c) A 110 VOLT, 60 CYCLE, SINGLE PHASE POWER SUPPLY LINE FOR THE OPERATION OF THE WEIGHT SELECTION REMOTE INDICATOR, VOLTAGE MUST BE NON-FLUCTUATING.
   (d) ALL NECESSARY 7/8 DIA BOLTS (MATERIAL MIL-S-2758 OR MIL-S-3000 LENGTHS TO SUIT) TO FASTEN THE ENGINE TO THE DECK.
   (e) ALL NECESSARY LIGHTS TO GIVE A MINIMUM INTENSITY OF 30 FOOT CANDLES POWER IN THE VICINITY OF THE CONTROL PANEL, AND THE ACCUMULATOR PISTON POSITION INDICATOR.

7. AUXILIARY FLASKS FOR 25 CUBIC FT OF AIR AT 3000 PSI IN EACH ARRESTING ENGINE COMPARTMENT.

8. SEA WATER OR FRESH WATER FOR ENGINE LIQUID COOLER TO BE SUPPLIED BY SHIP SERVICE. WATER DELIVERY TO BE 100 GPM. MINIMUM WATER PRESSURE 100 PSI. MAXIMUM WATER PRESSURE NOT TO EXCEED 200 PSI.

9. GENERAL DATA:
   (c) CABLE:
   1-3/4 DIA (6X25) FILLER WIRE LANG LAY. BREAKING STRENGTH OF CABLE (17),000 POUND MINIMUM.
   (d) LENGTH OF CABLES REEVED WITHIN STRUCTURE WITH CROSSHEAD AGAINST STOP: ON OUTER SHEAVES-942 FEET, ON INNER SHEAVES-83 FEET.
   (e) WEIGHT OF ENGINE EXCLUSIVE OF LIQUID AND CABLES-82,813 LB.

10. SUPPLEMENTARY ARRESTING ENGINE DRAWINGS: 610541 BASE-FIXED SHEAVE END, 57-61210 BASE CROSSHEAD END, 50-61837 ENGINE-ARRESTING ASSEMBLY (WITH COOLER), 50-61938 ENGINE-ARRESTING ASSEMBLY (WITHOUT COOLER).

11. BOLT, RING, REQUIREMENTS WILL BE IN ACCORDANCE WITH BUSHIPS INSTRUCTION 910.54.

--END--
SEE DETAIL E
EDGE G.

SINDA BOLTS TO ANCHOR ACCUMULATORS TO SUPPORT BRACKET-BERICO BOLT MATERIAL STEEL L.T.E. 80000 MIN (SEE NOTE 6)

FOR MOUNTING TO DAMPER SEE DETAIL G. ZONE A.18

ZERO MARK ON LEVEL GAGE MOUNT LOCATION SHOWN

MINIMAL CLEARANCE REQUIRED TO SERVICE DAMPER AND SHAFT POSTION

-2 ASSEMBLY MOVING VOLUME REDEMPTION (SEE NOTE 13)
SCALE 112 X 93
17. ADD OR REMOVE SHIMS 320646-1 AS NECESSARY TO MAINTAIN
ALIGNMENT OF SHEAVE, TRACK RAILS, (REF 320632-1650528-9-1)
18. MATERIAL IS NOMINAL SIZE WITHOUT MANUFACTURING ALLOWANCE.
FOR NAEL (B) USE ONLY.
19. MATERIAL FOR PARTS -344 SHALL BE IN ACCORDANCE WITH
G2-5.741 OR B.
20. MATERIAL FOR PART-5 SHALL BE IN ACCORDANCE WITH WH-9-104-CLS92H.
22. ALL PIPE RUNS SHALL BE SUPPORTED EVERY 6FT (APPROX.) TO
REDUCE PIPING VIBRATION.
23. INSTALLING ACTIVITY SHALL FURNHIS THE FOLLOWING:
(a) JACK BOXES FOR PHONE CONNECTIONS SHALL BE INSTALLED
IN SHEAVE DAMPER AREA.
(b) INSTALL GAUGE LIGHTS FOR ACCUMULATOR, FLUID LEVEL GAUGES.
(c) INSTALL SUITABLE LIGHT AT CONTROL PANEL 31423-1.
(d) FLUID STORAGE SYSTEM SHALL BE DESIGNED IN ACCORDANCE
WITH NAEL (B), DWG 901168.
24. NUMBER OF SCALE FREE COUPLING $410421-15$ WELDING RING (312032-93) PROVIDED FOR 2 ASSEMBLY INCLUDES AN
ADDITIONAL 100% FOR INSTALLATION SPARES.
25. BUFFER PIPING ARRANGEMENT MUST BE INSTALLED OPPOS
BULKHEAD AS SHOWN. IT MAY BE REQUIRED TO DISASSEMBLE
THE EXISTING BUFFER PIPING ON THE SHEAVE DAMPER
ASSEMBLY TO CONFORM TO ARRANGEMENT SHOWN.

FLOW DIAGRAM
SCALE: 1:200
NOTES:

1. THIS DRAWING SHOWS A TYPICAL SHIPBOARD INSTALLATION FOR THE MK I MHD C DAMPERS SHELLS, P.I. NO. (19597-1). ALL DETAIL
   COMPONENTS ARE ALIKE FOR PORT AND STARRBOARD DAMPERS.
   FOR ASSEMBLY OPPOSITE TO THAT SHOWN, VENT VALVES AND
   DRUM PLUGS SHALL BE ROTATED 180° SO THAT VENT VALVES
   ARE ON TOP AND DRUM PLUGS ARE ON BOTTOM. FLOW CONTROL
   VALVES SHOULD BE ROTATED IF NECESSARY SO THAT VENT VALVES
   ARE ON TOP.

2. WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH MIL-R-2726
   CLASS IV MACHINERY, P-1 OR P-3 PIPING, FOR P-1 PIPING WELDING
   RING A/B/28-9X SHALL BE MACHINED OUT.

3. CYLINDERS, PIPES, AND ACCUMULATORS SHALL BE THOROUGHLY
   CLEANED AS NECESSARY BEFORE AND AFTER ASSEMBLY TO
   INSURE REMOVAL OF ALL METALLIC WASTE AND FOREIGN
   MATTER PRIOR TO FILLING WITH FLUID, IN ACCORDANCE WITH
   ARRESTING GEAR SERVICE BULLETIN 1956.

4. ALL BOLTS, NUTS, SUPPORT BRACKETS, TUBING, ETC. MARKED
   THUS 5 MILL BE SUPPLIED BY THE INSTALLING ACTIVITY.

5. ALL COMPONENTS ARE TO BE PROPERLY ALIGNED TO INSURE SMOOTH,
   FUNCTIONING WITHOUT BENDING OR CHATTERING.

6. CYLINDER ASSEMBLY TRACK MAY BE INSTALLED ON A SLOPING
   ANGLE (UP TO 10°) WITH BUMPING END OF CYLINDER ON THE LOW
   END OF THE SLOPE. LOCATION OF ACCUMULATOR MAY BE VARIED,
   BUT IN ALL INSTALLATIONS IT MUST BE IN A VERTICAL
   POSITION. ANY VARIATION OF THE INSTALLATIONS AS SHOWN MUST
   BE APPROVED BY THE NAEL(S) ENGINEERING DEPARTMENT.

7. PAINT ALL EXPOSED HOA-WORKING NON-PAVING SURFACES
   IN ACCORDANCE WITH MPR 1201-15.

8. FOUNDATION STRUCTURE FOR CYLINDER ASSEMBLY 6139371 MUST
   WITHSTAND LOAD SHOWN IN PLAN VIEW.

9. BOTH 6139371-2 ASSEMBLIES SHALL WITHSTAND IN LEAKAGE OR
   PERMANENT DEFORMATION THE FOLLOWING HYDRAULIC TEST:
   (COMPONENT REQUIRED FOR TEST SHALL BE PROMPTED BY MANUFACTURER)
   WITH PURCHASE CABLE REEVED AND CROSSHEAD ASSY 612457-1
   TO INSTALLATION POSITION. ALL DAMPERS ACCUMULATORS
   WITH FLUID CONDUCT STANDARD TEST PROVEN TO PROOF
   ARRESTING GEAR DRIVE SYSTEM, CAUTION PRESSURE IN
   DAMPER ACCUMULATOR 60000-1 MUST NOT EXCEED 5000 PSI.
   DURING TEST, FILL BUFFER WITH OIL 9762-1 6 TO OR LIQUID SIGHT
   TO LEVEL GUARD ENCLOSURE SHALL BE DESIGNED AND SUPPLIED BY
   THE INSTALLING ACTIVITY IN ACCORDANCE WITH NAEL(S) Dwg. 6139371.

10. FOR ACTUAL INSTALLATIONS ON DIFFERENT VESSELS SEE APPLICABLE
    BUREAUX SHIP DRAWING.

11. ANGULAR DAMPER SHEAVE INSTALLATION MAY BE NECESSARY
    WHEN "Y" SHEAVE ARRANGEMENT IS USED ON VESSELS
    OUTFITTED WITH RETRACTABLE DECK SHEAVES.

12. "X" AND "Y" ARRANGEMENTS CAN BE USED INTERCHANGEABLE.

13. TO BLOCK DAMPER SHEAVE ASSEMBLY IN A FIXED POSITION
    INSTALL MATERIAL AS SHOWN IN DETAIL "B" TO BLOCK DAMPER
    CROSSHEAD IN THE FULLY RETRACTED POSITION. CHARGE AND FILL
    DAMPER ACCUMULATOR TO NORMAL OPERATING PRESSURE &
    LEVEL.

14. BOTH DIMENSIONS AND DESIGNATIONS SHALL BE INTERPRETED
    IN ACCORDANCE WITH HANDBOOK NO. 26 AND MIL-STD-5, RESPECTIVELY

15. BEFORE FLUID IS INTRODUCED INTO SYSTEM, CROSSHEAD ASSY
    612457-1 ATTACHED TO CYLINDERS ASSEMBLY SHALL SHOW WEIGHT
    BINDING OR CHATTERING UNDER A FORCE OF APPROX. 200 LB.
A TYPICAL SHIPBOARD INSTALLATION FOR THE
PR SHEAVES, PART NO. 613937-1. ALL DETAIL
LIKE FOR PORT AND STARBOARD DAMPERS.

PROPOSE TO THAT SHOWN, VENT VALVES AND
ALL BE ROTATED 180° SO THAT VENT VALVES
SHALL BE IN ACCORDANCE WITH MIL STD 173.

SUPPORT BRACKETS, TUBING, ETC. MARKED
SHOWN IN DETAIL "B." TO BLOCK DAMPER
FULLY EXTENDED POSITION; CHARGE AND FILL
TO NORMAL OPERATING PRESSURE (6)

1. SHEAVE INSTALLATION MAY BE NECESSARY
AVE. ARRANGEMENT IS USED ON VESSELS
RETRACTABLE DECK SHEAVES.

2. SHEAVE ASSEMBLY IS FIXED POSITION
AS SHOWN IN DETAIL "B" TO BLOCK DAMPER
FULLY EXTENDED POSITION; CHARGE AND FILL
TO CYLINDER ASSY. 16336-1, SHALL MOVE WITH
UNDER A FORCE OF APPROX 200 LB.

3. SHEAVE INSTALLATION MAY BE NECESSARY
AVE. ARRANGEMENT IS USED ON VESSELS
RETRACTABLE DECK SHEAVES.

4. SHEAVE ASSEMBLY IS FIXED POSITION
AS SHOWN IN DETAIL "B" TO BLOCK DAMPER
FULLY EXTENDED POSITION; CHARGE AND FILL
TO CYLINDER ASSY. 16336-1, SHALL MOVE WITH
UNDER A FORCE OF APPROX 200 LB.

5. SHEAVE INSTALLATION MAY BE NECESSARY
AVE. ARRANGEMENT IS USED ON VESSELS
RETRACTABLE DECK SHEAVES.

6. SHEAVE ASSEMBLY IS FIXED POSITION
AS SHOWN IN DETAIL "B" TO BLOCK DAMPER
FULLY EXTENDED POSITION; CHARGE AND FILL
TO CYLINDER ASSY. 16336-1, SHALL MOVE WITH
UNDER A FORCE OF APPROX 200 LB.

7. SHEAVE INSTALLATION MAY BE NECESSARY
AVE. ARRANGEMENT IS USED ON VESSELS
RETRACTABLE DECK SHEAVES.

8. SHEAVE ASSEMBLY IS FIXED POSITION
AS SHOWN IN DETAIL "B" TO BLOCK DAMPER
FULLY EXTENDED POSITION; CHARGE AND FILL
TO CYLINDER ASSY. 16336-1, SHALL MOVE WITH
UNDER A FORCE OF APPROX 200 LB.
A single fairlead sheave may be used in place of two sheaves provided that the single sheave is attached to the anchor damper in such a manner that the long pitch diameter of the single sheave is not less than the anchor damper stroke (tangent to pitch diameter of the single sheave). The dimension must be held.

**Dimensions:**
- Longitudinal
- Anchor damper tangential to pitch diameter of single sheave

**Materials:**
- 316 stainless steel

**Notes:**
- See drawing for installation activity details.
NOTES

1. **Unbundling** or spacing in cable to be located within 6' of sheaves before retracting and after retracting.
2. Control cables are to be enclosed in steel pipe guards, with suitable pipe supports as required.
3. Quantity of sheaves & method of mounting to be determined by installing activity.
4. 4 sheave cables, raise all, fairlead supports, with line-up brackets for sheave assemblies.注意，shop and installing brackets for deck edge control. 5. 1-4/40, 1, required fasteners and all parts marked with * are to be supplied by installing activity.
5. Metal pipe to be installed in socket 97-95 at installation. See. mouting instructions. See M.I.B. bulletin 97.
6. TOP TO BE INSTALLED AT 90° VERTICAL POSITION.
7. Refer to record. 1-4-1, 178-1, reference page 3.

**USING Bracket**

**SPLICE P. CA13101, BE ENCASED IN STEEL PIPE GUARD, WITH PIPE GUARD SUPPORTS AS REQUIRED.**

**CONTACT INSTALLATION**

**NAVAL AIR ENGINEERING FACILITY**

**CONTROL INSTALLATION**

**MANUAL**

**CONSTANT**

**INCREASED CAPACITY**

**504200**

**MOD 1, MOD 2 & MOD 3**
PLAN VIEW

ARRESTING ENGINES AND DRIVE SYSTEM

ARRANGEMENT

SHEAVE DAMPERS NOT SHOWN

SEE SCHEMATIC DIAGRAM OF

A G DRIVE SYSTEM

ALL ENGINES SHALL BE
LOCATED AS SHOWN
REFERENCE PLANS:

1. ARRESTING ENGINE - INSTALLATION DATA - MK 7 MOD 3 ... 02-61540
2. ARRESTING GEAR - DRIVE SYSTEM - INSTALLATION ........... 612792
3. SHEAVE DAMPER - TYPICAL INSTALLATION .................. 615937
4. ANCHOR DAMPER - TYPICAL INSTALLATION .................. 613068
5. MK 7 MOD 3 ARRESTING GEAR - FLIGHT DECK STUDY ......... 616110

SCHEMATIC DIAGRAM
ARRESTING GEAR DRIVE SYSTEM
SEE NOTE 3A
NOTES:
1. THIS DRAWING SHOWS THE OPTIMUM MARK 7 MOD 3 ARRESTING ENGINE AND DRIVE SYSTEM ARRANGEMENT AS PLANNED FOR FUTURE AIRCRAFT CARRIERS.
2. AN ARRESTING ENGINE COMPARTMENT SHALL BE A MINIMUM OF FOUR (4) FRAMES (10 FT O) FOR THE SUITABLE INSTALLATION OF ONE (1) ENGINE.
3. THIS DRAWING DEPICTS A PROPOSED ARRANGEMENT OF DESIRED ARRESTING ENGINE LOCATIONS. THE PREMISE FOR LOCATION WAS BASED ON THE FOLLOWING.
   A. TO PROVIDE AN OPTIMUM DRIVE SYSTEM ARRANGEMENT WITH UTILIZATION OF A MINIMUM OF TEN (10) SHEAVES FOR EACH INDIVIDUAL SYSTEM.
   B. AS A PRECAUTIONARY MEASURE, CONSIDERING THE SAFETY OF FLIGHT DECK PERSONNEL. PREVIOUS OCCURRENCES OF CABLE BREAKAGE HAVE INDICATED BREAKAGE AT THE 25 INCH P.D. ENGINE SHEAVES WITH CONSEQUENT CABLE WHIPLASH RESULTING ON THE FLIGHT DECK AT THE OPPOSITE SIDE OF THE ARRESTING ENGINE'S 25 INCH P.D. SHEAVES. CABLE BREAKAGE FROM THE 25 INCH P.D. SHEAVES (SHEAVES NO. 3G) WILL RESULT IN CABLE WHIPLASH TO THE PORT SIDE OF THE FLIGHT DECK, AWAY FROM THE CARRIER ISLAND, IN AN AREA UNLIKELY TO CAUSE INJURY TO PERSONNEL.
PLAN VIEW
BARRICADE Position
TYPICAL

CROSSHEAD
END

FIXED SHEAVE END

FLIGHT DECK

FRONT ELEVATION

CABLE "RUNNING" (SEE NOTE 7)

SEE DETAIL D
NOTES

1. THIS DRAWING SHOWS A TYPICAL INSTALLATION OF THE PENDANT AND BARREAU DRIVE SYSTEM FOR THE MARK 7 MOD 1, MARK 7 MOD 2 AND MARK 7 MOD 3 ARRESTING GEAR ASSEMBLY. ADDITIONAL INFORMATION SEE REFERENCE DRAWINGS LISTED BELOW.

2. ARRANGEMENT, SELECTION, QUALITY AND TYPE OF ALL ITEMS SHALL BE INSTALLED UNDER THE COUPLING OF THE INSTALLING ACTIVITY TO SUIT LOCAL CONDITIONS AND NAVAL (NAV) REQUIREMENTS.

3. SAFETY WIRING TO BE IN ACCORDANCE WITH MS 33540.

4. SHEAVE ASSEMBLIES INSTALLED IN LOCATIONS INACCESSIBLE FOR LUBRICATION SHALL BE EQUIPPED WITH 3/4" OIL GROOVED PIPE AND RECOIL CHUTE/RECOIL ASSEMBLY.

5. ARRANGE ALL DECK EDGE SHEAVE INSTALLATIONS SO THAT DECK HOLE IS LOCATED IN LOWEST POSITION SO THAT DRAWING OR SHEAVE ASSEMBLY MAY BE PULLED OVERBOARD.

6. ALL DECK EDGE SHEAVE ASSEMBLIES ACID WET OF SHEAVE DAMPER INSTALLATION MUST BE PULLED OVERBOARD.

7. CABLE TRUCKS ON 2¼ DIAMETER PIPE WITH SUPPORTS WORE REQUIRED, SHALL BE INSTALL BETWEEN ALL FAIRLEAD SHEAVES MATERIAL SHALL BE PULLED OVERBOARD BY INSTALLING ACTIVITY.

8. SHEAVE ASSEMBLIES SHALL BE MOUNTED WITH A 1 INCH DIAMETER HIGH TENSILE STEEL BOLTS HAVING A MINIMUM STRENGTH OF 30,000 LBS.

9. STANDARD DRAWING IS 1504, EXCEPT AS NOTED ABOVE.

10. THE DESIGN OF ALL STRUCTURES SUPPORTING THE PARTS SHOWN ON THIS INSTALLATION MUST BE ON THE 75,000 POUNDS NORMAL BREAKING STRENGTH OF 1¼ DIAMETER, 3/8 INCH STEEL SPEC MIL-W-17610, TYPE 1.

11. MOUNT BARREAU AND SHEAVE ASSEMBLIES TO FLAT KNIFE SYSTEM CABLE LEAD AND SHEAVE ARRANGEMENT ALSO SHEAVE ASSEMBLIES TO SHEAVE DECKS. SHEAVE AND FAIRLEAD SHEAVES MOUNTING BOLTS OF FAIRLEAD ASSEMBLY ARE CONSTRUCTED BY THE SHEAVE HOUSING BOLTS.

12. ON DECK EDGE SHEAVE ASSEMBLIES 6/250X-50 ONLY MOUNTED TYPE RINDBLEEDER G-1470351 MAY BE INSTALLED AS AN ALTERNATE TO 6/250X-50 WITH MINOR MODIFICATION OF 6/470-38 ONLY TO BASE FAIRLEAD SHEAVE HOUSING WITH PIN LIFTER MOUNTED.

13. SEE AUXILIARY SHEAVE INSTALLATION TO BE IN ACCORDANCE WITH MS 335-206.

14. TO FACILITATE ARRESTING LINE MAINTENANCE CABLE TRUCKING INSTALLED IN ACCORDANCE WITH MS 335-206. SEE DRAWING NS 335-206 FOR INSTALLATION.

15. ALL PAYOFF SURFACES SHALL HAVE AN APPLICATION OF ONE (1) L.O.T. OF ZINC PRIMER PRIOR TO APPLICATION OF CHROMATE, SEE DRAWING FOR INSTALLATION.

16. TO FACILITATE ARRESTING LINE MAINTENANCE CABLE TRUCKING INSTALLATION MUST BE PULLED OVERBOARD.

17. FOR PAYOFF AND TERMINAL PAYOFF INSTRUCTIONS OF PURCHASE CABLE SEE NAVY SR-5-3641 (NAVY MOD 6 AG), NAVY SR-5-3641 (NAVY MOD 2 AG).

18. ALL PAYOFF SURFACES SHALL HAVE AN APPLICATION OF ONE (1) L.O.T. OF ZINC PRIMER PRIOR TO APPLICATION OF CHROMATE, SE DRAWING FOR INSTALLATION.

19. TO FACILITATE ARRESTING LINE MAINTENANCE CABLE TRUCKING INSTALLATION MUST BE PULLED OVERBOARD.

20. ALL SHEAVE INSTALLATION MUST BE PULLED OVERBOARD.

21. ALL SHEAVE INSTALLATION MUST BE PULLED OVERBOARD.

22. CABLE LEADS #1 AND #19 ONLY MUST HAVE ELONGATED TRUNKING AT MID-VALUE TO PERMIT LATERAL TRAVEL OF PURCHASE CABLE AS CROSSHEAD MOVES FROM BATTERY POSITION TO FULL IN POSITION.

23. ALL SHIPS INSTALLING 2½ INCH SHEAVE ASSEMBLIES IN ACCORDANCE WITH MARK 7 ARRESTING GEAR SERVICE CHANGE MUST NOT REPLACE EXISTING 2¼ INCH DIAMETER SHEAVES BETWEEN ARRESTING ENGINE AND ANCHOR DAMPER ASSEMBLIES.
PORTABLE FUNNEL FOR FILLING AT FLIGHT DECK LOCATION

NOTES:
1. PIPES, FITTINGS AND VALVES TO BE THOROUGHLY CLEANED AND FREE FROM SCALE PRIOR TO INSTALLATION.
2. ALL PIPES TO BE SECURED IN SUCH A MANNER AS TO REDUCE VIBRATION TO A MINIMUM.
3. MOISTURE SEPARATOR SHALL BE SIMILAR OR EQUIVALENT TO MOISTURE SEPARATOR FS29C4730-277-850.

LEGEND:
- GLOBE VALVE
- CHECK VALVE
- RELIEF VALVE
- 4 WAY, 2 POSITION PLUG COCK
- FILTER

PLAN VIEW - GALLERY DECK
SHOWING ARRESTING ENGINE INSTALLATION
DRAIN AND FILL ARRANGEMENT
(SEE NOTE G)
**NOTES:**

1. **This drawing shows a typical piping arrangement which provides a fluid fill system from the flight deck and the transfer drain and fill system for arresting engine fluid.**

2. **To drain or transfer the fluid from the engine to the reservoir as shown for a typical operation, the following steps are to be taken:**
   
   - **Check fluid level in reservoir.**
   - **With engine fully retracted, blow down engine accumulator pressure to 150 PSI and block retracting valve in open position.**
   - **Open reservoir vent and assure that valve E is closed.**
   - **Open valves F and G, then open 4-way, 2 position plug cock to draining position.**
   - **Open valve H, fluid will now flow thru filter to reservoir.**
   - **After desired level of fluid is drained into reservoir from engine, close valves G and H.**

3. **To fill or return fluid to the arresting engine, the following steps are to be taken:**
   
   - **Close reservoir vent and assure that valve F is closed.**
   - **Charge engine accumulator to 150 PSI and block open retracting valve. Open valve H.**
   - **Open 4-way, 2 position plug cock to filling position.**
   - **Open valve G at the engine.**
   - **Open low pressure air supply valve E at reservoir and fill engine to desired level.**
   - **Vent air from system, close vent valves when fluid appears at vents.**
   - **Close transfer valve G when system is completely vented of air.**
   - **Remove block from retracting valve allowing valve to close.**

4. **A schematic diagram with general operating instructions shall be provided in each arresting engine compartment.**

5. **The manhole cover is provided to enable inspection of interior of reservoir flanged end of tank is provided for access and to facilitate cleaning.**

6. **Air strainer shall be similar or equivalent to strainer shown on navships DWG NO. 5312 5462-2706, ship's parts control center part NO. M-354-5053 except that the filter element be capable of removing minimum size particles 5.4 microns.**

7. **All low pressure, high rise piping, valves, reservoir etc. shall withstand a maximum hydrostatic test of 200 PSI.**

8. **The fluid storage system should be initially located as close as possible to arresting engine structures.**

9. **The installing activity shall provide an air pressure gauge with a range of 0 to 200 PSI at an appropriate location close to the storage tank where operating personnel can ascertain proper operating pressures.**

10. **Air lines shall be marked "ALP (air low pressure) and with directional flow arrows indicating to be placed near valve on pressure side where possible. Paint shall be black in accordance with MIL-P-5449.**

11. **Construction and material of tank to be as follows:**

   - **Corrosion resisting steel plate per QQ-S-664, CLASS 347.**
   - **Corrosion resisting clad steel plate per QQ-S-664, CLASS 347.**
   - **All clad plate with electrode ML-E-2220/20A, TYPE ML-347-B or nickel.**
   - **Corrosion resisting clad steel plate per QQ-S-664, CLASS 347.**
   - **Held clad side with electrode ML-E-2220/20A, TYPE ML-347-B or nickel.**
   - **Held clad side (outside) with electrode ML-E-2220/20A, TYPE ML-7018.**
   - **Except for high pressure items called out, all air supply piping and fittings to be corrosion resistant (copper vs steel or brass).**
   - **Provide a watertight cover on the flight deck for the funnel opening when not in use. The portable funnel can be stored in the arresting gear store room.**

12. **The installing activity under the cognizance of navships shall furnish all equipment or material. For this installation, this drawing does not designate all possible pipe, elbows, straps or hangers that may be required.**
LEGEND:

- BLEED VALVE
- A WAY, 2 POSITION PLUG COCK
- FILTER
- RELIEF VALVE
- CHECK VALVE
- GLOBE VALVE

PLAN VIEW - GALLERY DECK
SHOWING CHEM DRAIN, DAMPER INSTALLATION, ORAG: FILL ARRANGEMENT
SEE NOTE B.
1. CONSTRUCTION OF TANK: TO BE AS FOLLOWS:
   a. TANK, CORROSION-RESISTANT STEEL, PLATE 42 1/2, 0.219" THICK, WELDED WITH ELECTRODE MIL-E-22000/24, TYPE MIL-34720, OR EQUIVALENT.
   b. TANK, CORROSION-RESISTANT CLAD STEEL PLATE 6 1/2, 0.051" CLAD ON INSIDE ONLY, WELDED CLAD JIG WITH ELECTRODE MIL-E-22000/24, TYPE MIL-34720, OR EQUIVALENT.

2. ALL MATERIALS TO BE USED IN TANKS AND THEIR INSTALLATION SHALL BE CAPABLE OF WITHSTANDING HYDRAULIC TEST PRESSURE OF 300 PSIG.

3. TANK PLATE, END OF TANK PROVIDED FOR ACCESS AND CLEANING.

4. INSPECTION OF TANK COVER IS PROVIDED FOR INSPECTION OF INTERIOR OF TANK.

5. AIR LINES SHALL BE MARKED WITH AIR LOW PRESSURE AND THE AIRLINES IDENTIFICATION ON A RECOGNIZABLE BASIS TO BE PLACED NEAR THE AIR VALVE IN PRESSURE WHERE POSSIBLE.

FIGURE 2
NOTES


2. TRUSS CLIP RE-PLATE METAL TRUSS, 2 1/2 PIPE SIZE CABLE TRUCK LINE IS PIPE SIZE "DRAIN LINE," LINERS, SUPPORTING STRUCTURES AND BOLTS TO BE FURNISHED UNDER THE COGNIZANCE OF THE INSTALLING ACTIVITY.

3. THE DESIGN OF SUPPORTING STRUCTURES W/S NOT BE BASED ON THE 175,000 POUNDS NOMINAL BREAKING STRENGTH OF 1 3/8 INCH 1/16 WIRE ROPE SPEC MIL-W-5650, WRAPPED 180° AROUND SHEAVE.

4. PAIREAD ASSEMBLY 5907-11/11 MUST BE LOCKED ON RETRACTABLE SHEAVE HOUSING SO THAT CENTERLINE CONCEDES TO 2° ANGLE BETWEEN SHEAVE AND PAIREAD SHEAVE HHEN RETRACTABLE SHEAVE IS IN RAISED (OPERATING) POSITION. SHEAVE CORNERS WHERE NECESSARY, WILL PAIREAD ASSEMBLY 5907-11/11 = MOUNTING BOLTS OF PAIREAD ASSEMBLIES ARE OBLITRATED BY THE SHEAVE HOUSING BOLTS 2 9/16 DIAMETER COUNTERBORED IN PAIREAD ASSEMBLY 5907-11/11 "W/BE MADE LARGER TO ADMIT 2 1/2" PIPE SIZE CABLE TRUCK TO SWIVEL BETWEEN EXTREME LIMITS SHOWN.

5. FOR INSTALLING AND REMOVAL OF RETRACTABLE SHEAVE ASSEMBLIES 017464-1 AND 017469-1 SEE NAEL DRAWING NUMBER 40786-1.

6. BOLT TORQUE REQUIREMENTS ARE TO BE IN ACCORDANCE WITH B.SHEAVE INSTALLATION SHO.5.

7. THREAD DIMENSIONS AND DESIGNATIONS SHALL BE INTERPRETED IN ACCORDANCE WITH NAEL SHEAVE 5907-11/11 AND MIL-STD-9, RESPECTIVELY.

8. PUSH IN ACCORDANCE WITH MPR 1201-2 FOR +1/11 AND -2 L/R.

9. SHEAVE RETRACTABLE WITH SHEAVE ASSEMBLY 5907-11/11.

10. DRAWN PA, CL# 1.

11. DRAWN DIA. PA, CL# 1.

12. BOLT IN.

13. LOCKWASHER.

14. AB320-7 LOCKWASHER.

15. 1/4-20 X 3/4 BOLT.

16. 5/16-18 X 1" BOLT.

17. 5/16-18 X 1 1/2 BOLT.

18. 3/8-24 X 1 1/4 BOLT.

19. 7/16-20 X 1" BOLT.

20. 7/16-20 X 1 1/4 BOLT.

21. 7/16-20 X 1 3/4 BOLT.

22. 7/16-20 X 1 1/2 BOLT.

23. 9/16-18 X 1" BOLT.

24. 9/16-18 X 1 1/2 BOLT.

25. 9/16-18 X 1 3/4 BOLT.

26. 5/16-18 X 1 1/2 BOLT.

27. 5/16-18 X 1 3/4 BOLT.

28. 5/16-18 X 1 1/2 BOLT.

29. 5/16-18 X 1 3/4 BOLT.

30. 5/16-18 X 1 1/2 BOLT.

31. 5/16-18 X 1 3/4 BOLT.

32. 3/8-24 X 1 1/2 BOLT.

33. 5/16-18 X 1 1/2 BOLT.

34. 5/16-18 X 1 3/4 BOLT.

35. 3/8-24 X 1 1/4 BOLT.

36. 5/16-18 X 1 1/4 BOLT.

37. 3/8-24 X 1 1/4 BOLT.

38. 5/16-18 X 1 1/4 BOLT.

39. 3/8-24 X 1 1/4 BOLT.

40. 5/16-18 X 1 1/4 BOLT.

41. 3/8-24 X 1 1/4 BOLT.

42. 5/16-18 X 1 1/4 BOLT.

43. 3/8-24 X 1 1/4 BOLT.

44. 5/16-18 X 1 1/4 BOLT.

45. 3/8-24 X 1 1/4 BOLT.

46. 5/16-18 X 1 1/4 BOLT.

47. 3/8-24 X 1 1/4 BOLT.

48. 5/16-18 X 1 1/4 BOLT.

49. 3/8-24 X 1 1/4 BOLT.

50. 5/16-18 X 1 1/4 BOLT.

51. 3/8-24 X 1 1/4 BOLT.

52. 5/16-18 X 1 1/4 BOLT.

53. 3/8-24 X 1 1/4 BOLT.

54. 5/16-18 X 1 1/4 BOLT.

55. 3/8-24 X 1 1/4 BOLT.

56. 5/16-18 X 1 1/4 BOLT.

57. 3/8-24 X 1 1/4 BOLT.

58. 5/16-18 X 1 1/4 BOLT.

59. 3/8-24 X 1 1/4 BOLT.

60. 5/16-18 X 1 1/4 BOLT.

61. 3/8-24 X 1 1/4 BOLT.

62. 5/16-18 X 1 1/4 BOLT.

63. 3/8-24 X 1 1/4 BOLT.

64. 5/16-18 X 1 1/4 BOLT.

65. 3/8-24 X 1 1/4 BOLT.

66. 5/16-18 X 1 1/4 BOLT.

67. 3/8-24 X 1 1/4 BOLT.

68. 5/16-18 X 1 1/4 BOLT.

69. 3/8-24 X 1 1/4 BOLT.

70. 5/16-18 X 1 1/4 BOLT.

71. 3/8-24 X 1 1/4 BOLT.

72. 5/16-18 X 1 1/4 BOLT.

73. 3/8-24 X 1 1/4 BOLT.

74. 5/16-18 X 1 1/4 BOLT.

75. 3/8-24 X 1 1/4 BOLT.

76. 5/16-18 X 1 1/4 BOLT.

77. 3/8-24 X 1 1/4 BOLT.

78. 5/16-18 X 1 1/4 BOLT.

79. 3/8-24 X 1 1/4 BOLT.

80. 5/16-18 X 1 1/4 BOLT.

81. 3/8-24 X 1 1/4 BOLT.

82. 5/16-18 X 1 1/4 BOLT.

83. 3/8-24 X 1 1/4 BOLT.

84. 5/16-18 X 1 1/4 BOLT.

85. 3/8-24 X 1 1/4 BOLT.

86. 5/16-18 X 1 1/4 BOLT.

87. 3/8-24 X 1 1/4 BOLT.

88. 5/16-18 X 1 1/4 BOLT.

89. 3/8-24 X 1 1/4 BOLT.

90. 5/16-18 X 1 1/4 BOLT.

91. 3/8-24 X 1 1/4 BOLT.

92. 5/16-18 X 1 1/4 BOLT.

93. 3/8-24 X 1 1/4 BOLT.

94. 5/16-18 X 1 1/4 BOLT.

95. 3/8-24 X 1 1/4 BOLT.
NOTES:

1. EACH IMPACT PAD GROUP SHALL CONSIST OF NINE (9) INDIVIDUAL POLYURETHANE IMPACT PAD ASSEMBLIES, 408320-1.
2. THE PAD GROUP SHALL BE INSTALLED IN A MANNER WHICH WILL FACILITATE READY REPLACEMENT OF INDIVIDUAL PADS.
3. A RAMP SHALL BE PROVIDED AROUND EACH PAD GROUP TO FACILITATE MOVEMENT OF AIRCRAFT. THE RAMP SHALL BE FAIRED IN WITH A FLIGHT DECK COMPOUND.
4. PROVIDE SUITABLE SLOTS IN RAMP TO PERMIT DRAINAGE OF IMPACT PADS TO BE INSTALLED AT DECK PENDANT POSITIONS.
5. FOR VESSELS IN SERVICE, THE LOCATING DIMENSIONS SHOWN FOR GENERAL GUIDANCE AND MAY BE MODIFIED TO MATCH CABLE TERMINAL MARKINGS IN DECK IF NECESSARY. THE IMPACT AREA OF ACTUAL CABLE TERMINAL MARKS IN DECK BE USED FOR LOCATING THE INTERSECTING CENTERLINES OF THE IMPACT PAD ARRANGEMENT.

PORT SHOWN STBD OPPOSITE
Up shall consist of nine (9) individual impact pads assemblies, 408320-1, to be installed in a manner which will facilitate placement of individual pads worked around each pad group to facilitate the ramp shall be faired in with non-skid und. slots in ramp to permit drainage. Talled at deck pendant positions only, these locating dimensions shown are nice and may be modified to match actual berings in deck if necessary. The metal cable terminal marks in deck shall act the intersecting centerlines of range.

List of Materials

<table>
<thead>
<tr>
<th>Reference</th>
<th>Material</th>
<th>Specification</th>
<th>Unit</th>
</tr>
</thead>
</table>

3.12.4.2 Installation Data

Mark 7 Mod 3 Arresting Gear Terminal Impact Pad Metal Deck

Title: INSTALLATION DATA

Approved Date: 1964

Drawing No.: 419045

Scale: None

Sheet: 1
Aircraft tail hook location at full runout from pendant.

Deck edge

Wheel path

See detail A

40° 5°

To barricade

360°

To corresponding pendant (Typ.)

Aircraft tail hook location at full runout from pendant.

Aircraft tail hook location at full runout from pendant.

Aircraft tail hook location at full runout from pendant.

Aircraft tail hook location at full runout from pendant.

Detail A:

Wheel pattern

See note.*3

Hook point (Ref.)

Mainwheel (Typ.)

Nosewheel (Typ.)

235° (Ref.)

51°4 (Ref.)

51°4 (Ref.)
AIRCRAFT NOSE WHEEL AT FULL RUNOUT FROM THE BARRICADE

90° (MIN.) REQUIRED FOR AIRCRAFT TURN AROUND

AIRCRAFT TAIL NOSE LOCATION AT FULL RUNOUT FROM PENDANT PA
NOTES:
1. THIS DRAWING SHOWS THE RESULTS OF THE ARRESTING GEAR ARRANGEMENT EVALUATION FOR FUTURE AIRCRAFT CARRIERS. THIS STUDY WAS MADE USING TWO BASIC AIRCRAFT LANDING CRITERIA:
   A. SHOWING LANDINGS APPLIED PARALLEL TO THE ANGLED DECK CENTERLINE, TWENTY FEET OFF-CENTER TO THE PORT
   B. SHOWING LANDING APPLIED ON-CENTER-ANGLED TO THE PORT. THE YAW ANGLE WHICH SAFELY ACCOMMODATES ARRESTMENTS FOR ALL PENDANTS, AND THE BARRICADE, IS THE ANGLE OR 7° AS SHOWN.
2. PENDANT AND BARRICADE ENGINE ARE MARK 7 MOD 9 PENDANT ENGINE RAM TRAVEL IS 183 INCHES (LONG STROKE CAM). THE BARRICADE ENGINE RAM TRAVEL IS 150 INCHES (SHORT STROKE CAM)
3. THE E-2A AIRCRAFT WHEEL PATTERN SHOWN IN DETAIL 'A' DEPENDS THE CRITICAL LIMITS OF AIRCRAFT PLACEMENT AT THE COMPLETION OF RUNOUT. THE E-2A IS THE MOST CRITICAL EXPECTED FOR PRESENT OR NEAR FUTURE CARRIER SUITABILITY.
NOTES
1. The drawing shows a typical installation of高压电和低压电 with point to point and double contact in millimeters. It is intended to demonstrate correct wire splicing and grounding arrangements to be used in factory and field installations.

2. Arrangement, quantity, and type of all items shall be installed under final design of the manufacturer to suit local conditions.

3. Name plates showing wire size, neutral and wire type, and stop for wiring test shall be marked, but blank name plates designating number of wire controlled by each lever shall be furnished by the manufacturer.

4. Name plates shall be provided by the manufacturer. They shall show the following information:

   - Wire size
   - Wire type
   - Stop for wiring test
   - Blank name plates

5. For new installations, new wire shall be supplied as shown in the drawing. Existing wire shall not be reused.

6. What is intended to prevent interconnection between wires and control lines from various manufacturers, these wires are shown to be installed separately.

7. Provide spacers as indicated between air cylinders and mounting plate. Air cylinder and mounting plate to match location and size of tubes, and to match tubes holes in mounting plate. Mount air cylinder on plate centerline.

8. The manufacturer shall provide air pressure regulator in accordance with the air station and installation. Air pressure shall be provided by the manufacturer.

9. Critical items shall be marked with 'CRITICAL.'

10. All dimensions are shown to the nearest 0.01 inch, unless otherwise specified.

11. This drawing is to be used in conjunction with Manufacturer's Technical Data Sheet 104 and 105.

REFERENCE PLANS
1. Wire support - Assy. (Steel)
2. Wire support - Assy. (Wood)
3. Control - Deck edge - Assy.
5. Wire support - Assy. (Steel)
6. Wire support - Assy. (Wood)

CLASSIFICATION OF CHARACTERISTICS
CRITICAL: 100
MAJOR: 10
MINOR: 0

LOT 20012
NOTES
1. THIS SHEET SHOWS A TYPICAL INSTALLATION OF MECHANICAL GEAR WIRE MOUNT
AND DOOR CONTROL ASY. FOR EACH WIRE MOUNT
WEIGHT WILL VARY DEPENDING UPON AIRCRAFT FACTORY SPECIFICATIONS
2. ARRANGEMENT SHOWN AND TYPE OF ALL ITEMS SHOWN WILL BE INSTALLED UNDER
CONCERN OF THE INSTALLING ACTIVITY TO suit LOCAL CONDITIONS.
3. SAME PLATES SHOWN ARE UP, NEUTRAL AND WIRE DOWN, AND STOPS FOR
A TYPICAL INSTALLATION OF LEVER. THEY MOUNT PLATES DESIGNATING NUMBER
OF ENERGIZED WIRE CONTROLLED BY EACH LEVER WILL BE PLACED BY THE
INSTALLING ACTIVITY.
4. WIRE SNAPS SHALL BE INSTALLED IN THE INSTALLING ACTIVITY WITH SUITABLE
VALUE AND SUITABLE TECHNIQUE TO PREVENT FOREIGN WIRE OR ELASTIC
MATERIAL FROM ENTERING THE WIRE SYSTEM.
5. FOR NEW INSTALLATION, WIRE SPACERS TO BE INSTALLED A DEE-4 IN. FOR OLD
INSTALLATION WIRE SPACERS TO BE INSTALLED A DEE-1 IN.
6. MULTIPLE PLATE IS INTENDED TO REPRESENT INTERCHANGABLE INSTALLATION, IF A SHADOW FILL:
FROM VARIOUS MANUFACTURERS WHERE A PLATE FALLS WITHIN THE 7 IN. TOLERANCE
HARD SPACER MAY BE USED IN PLACE OF THE TOLERANCE WIRE SPACER TO COMPLETE THE INSTALLATION
7. BRAND Size AS REQUIRED BETWEEN AIR CYLINDER AND MOUNTING PLATE. Drill
THROUGH SPACER AND "WIRE MOUNTING PLATE TO MATCH LOCATION AND SIZE OF
MOUNTING HOLES IN AIR CYLINDER. MOUNT AIR CYLINDER ON PLATE WITHOUT
INSTALLING ACTIVITY. SMALL SUPPLY SPACERS.
8. THE 200 PSI AIR SUPPLY PORTS, IF INSTALLING A WIRE, MUST EACH BE LOCATED
AS FAR AS POSSIBLE TO PROVIDE A FUEL GAGE, AIR LINE WITH AN AIR STATION INSTALLED TO
PROVIDE THE AIR REQUIREMENTS.
9. THE 200 PSI AIR SUPPLY PORTS, IF INSTALLING A WIRE, MUST EACH BE LOCATED
AS FAR AS POSSIBLE TO PROVIDE A FUEL GAGE, AIR LINE WITH AN AIR STATION INSTALLED TO
PROVIDE THE AIR REQUIREMENTS.
10. THE DECKING IS TO BE STORED IN CONJUNCTION WITH MANUAL 9 ATTACHING GEAR
SERVICE CHANGES NO 124, AND M 115.

REFERENCE PLANS
1. WIRE SUPPORT ASS'Y - STEEL DECK TYPE...
2. WIRE SUPPORT ASS'Y - WOOD DECK TYPE...
3. CONTROL 5 DECK EDGE ASS'Y...
4. AIR CYLINDER ASS'Y...
5. WIRE SUPPORT ASS'Y - STEEL DECK TYPE...
6. WIRE SUPPORT ASS'Y - WOOD DECK TYPE...
WIRE SUPPORT & CONTROL TEE UNTS. SIMILAR TO AS OUT2

LANDING AREA

P1

P2

P3

P4

SEE NOTE 1

SEE NOTE 2

SEE NOTE 3

SEE NOTE 4
NOTES

1. PROVIDE 25" X 30" BOX AND MATCHING WATERMARKS.
2. PROVIDE MARINE SEAL FOR USE AT A HULL GUN. (CHECK PAINT)
3. DO NOT PRODUCE UNLESS APPROVED.

THE N WIRE AND ARRANGEMENT IN HEADING POSITIONS AND WIDE SUPPORTS TO BE UNDER THE COGNIZANCE OF NAVY AIR AND SUBJECT TO APPROVAL OF NAVAL.
| Flight Deck Arresting Gear | NAEC-EN-7593  
<table>
<thead>
<tr>
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<tbody>
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</tr>
<tr>
<td>Criteria For Mark 7 Mod 3</td>
<td>9126 - 2293</td>
</tr>
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<td>Arrester Engine</td>
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This report presents information regarding flight deck arresting gear & barricade configuration criteria for the Mk. 7 Mod. 3 arresting engines and is provided for use in the preparation of installation plans for new aircraft carriers or on present carriers planning utilization of Mk. 7 Mod. 3 arresting gear.

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