

APPENDIX I

GLOSSARY

ABE—Aviation Boatswain's Mate (Launching and Recovery Equipment).

ABRASION—Wearing away of a surface by friction, either by motion while in contact with another part or by mechanical cleaning or resurfacing with abrasive cloth or compound.

ac—Alternating current.

ACHO—Aircraft Handling Officer.

ACNO—Assistant Chief of Naval Operations.

ACTIVATE—To put into action mechanically.

ACTUATE—To put into action electrically.

ADP—Automated Data Processing.

AEL—Allowance Equipage List.

AIMD—Aircraft Intermediate Maintenance Department.

ALINEMENT—Parts in correct related positions as specified on manufacturing drawings.

ALRE—Aircraft Launch and Recovery Equipment.

ALREMP—Aircraft Launch and Recovery Equipment Maintenance Program.

AMBIENT TEMPERATURE—The surrounding temperature.

APL—Allowance Parts List.

ASG—Afloat Shopping Guide.

ATMOSPHERIC PRESSURE—The normal pressure of the air at sea level (14.7 psi).

AWM—Awaiting Maintenance.

AWP—Awaiting Parts.

AWR—Automated Work Request.

BACK OUT—To remove a screw or other threaded part from its fully torqued or set position.

BINDING—The stopping or the slowing down of motion between two surfaces because of foreign matter, poor alinement of ports, unequal expansion, or unequal wear between surfaces.

BRAZE—To join two metals by intense heat and the application of a hard solder containing brass.

BRINELLING—A displacement or flow of metal rather than a loss of metal due to wear.

BULB SIDE—The side of the launching-engine cylinders that mates directly with the cylinder covers and is opposite the sealing-strip side.

BUR—A sharp projection of metal from an edge, usually the result of drilling, boring, counter-sinking, and so forth, but may also be caused by excessive wear of one or both surfaces adjacent to the burred edge.

CAFSU—Carrier and field service unit.

CALIBRATION—To check, fix, or correct the graduation of a measuring instrument.

CALIPERS—An instrument composed of two curved hinged legs, used for measuring internal and external dimensions.

CASREP—Casualty Report.

CAUTION—An emphatic notice requiring correct operating or maintenance procedures to prevent damage to equipment.

CDI—Collateral Duty Inspector.

CDP—Cross Deck Pendant.

CDQAI—Collateral Duty Quality Assurance Inspector.

CHAMFER—To bevel to a sharp external edge.

CHARGE—To pressurize a hydraulic or pneumatic system with fluid or air.

CHATTER—Vibration caused by uneven motion of a machine, possibly resulting in damage to parts.

CIRCUMFERENCE—A line around a closed figure of area.

CNO—Chief of Naval Operations.

COGNIZANT—Pertaining to the responsible upper authority who can make a final decision on a specific matter.

COH—Complex Overhaul.

COMCARGRU—Commander Carrier Group.

COME-ALONG—Ratchet hoist.

COMFAIRMED—Commander Fleet Air, Mediterranean.

COMFAIRWESTPAC—Commander Fleet Air, Western Pacific.

COMNAVAIRLANT—Commander Naval Air Force, U.S. Atlantic Fleet.

COMNAVAIRPAC—Commander Naval Air Force, U.S. Pacific Fleet.

COMNAVAIRSYSCOM—Commander Naval Air Systems Command.

COMNAVSEASYSYSCOM—Commander Naval Sea Systems Command.

COMNAVSURFLANT—Commander Naval Surface Force, U.S. Atlantic Fleet.

COMNAVSURFPAC—Commander Naval Surface Force, U.S. Pacific Fleet.

COMPONENT—A part of an assembly or sub-assembly.

CONCENTRICITY—Having a common axis or center. Usually refers to the closeness of tolerances between the common center of two or more circles (bore and outside diameter, bore and bolt circle diameters, and so forth).

CONDENSATE—The liquid that forms when a gas or vapor, such as steam, is cooled.

CONTINUITY—The completeness of an electrical circuit.

CORROSION—Deterioration of a metal surface, usually caused by moist, salty air.

COSAL—Coordinated Shipboard Allowance List.

CROV—Constant Run Out Valve.

CSMP—Current Ship's Maintenance Project.

CSV—Capacity Selector Valve.

CV—Multi-purpose aircraft carrier.

CVN—Nuclear-powered multi-purpose aircraft carrier.

DLA—Defense Logistics Agency.

D-LEVEL—Depot level.

DEAD LOAD—A wheeled vehicle used instead of an aircraft during catapult testing.

DEENERGIZE—To remove from operation electrically.

DEFORMATION—A change in the shape or dimensions of a body, due to overstressing or repeated usage.

DEPRESSURIZE—To remove air or hydraulic fluid from a system.

DIAMETER—The width or thickness of a part.

DIAMETRICAL CLEARANCE—The difference between the inside diameter (ID) of one part and the outside diameter (OD) of another part when both parts have the same axis.

DOD—Department of Defense.

DON—Department of the Navy.

DSCC—Defense Supply Center Columbus.

DSCP—Defense Supply Center Philadelphia.

DYNAMOMETER—A device used to measure force.

EI—Engineering Investigation.

EIC—Equipment Identification Code.

ELONGATION—An increase in the length of a material due to heating, stretching, hammering, and so forth.

EM—Electrician's Mate.

ENERGIZE—To put into operation electrically.

EROSION—Pitting or eating away of metal due to the action of steam, chemicals, water, or atmosphere.

ERRATIC—Operating in an unusual manner that may result in possible breakdown or failure.

FATIGUE—A major breakdown of the surface metal over a large area, resulting in the surface metal's becoming loose and detached from the base material.

FBR—Feedback Report.

FED LOG—Federal Logistic.

FLOLS—Fresnel Lens Optical Landing System.

FMSO—Fleet Material Support Office.

FOD—Foreign Object Damage.

FREEZING—Stopping of motion between two contacting surfaces because of lack of lubrication.

GALLING—Tearing away of a metal surface by friction.

HERTZ—Cycles per second.

HMR—Hazardous Material Report.

HONE—To grind with an abrasive stone to remove surface imperfections.

HUD—Heads-Up Display.

HYDRAULIC—That which is operated or moved by the use of pressurized fluid.

HYDROSTATIC TEST—A test to determine whether a part can withstand certain hydraulic pressures without deforming or leaking.

I-LEVEL—Intermediate level.

IC—Interior Communications.

ICCS—Integrated Catapult Control Station.

ICP—Inventory Control Point.

IEM—Inactive Equipment Maintenance.

ILARTS—Integrated Launch and Recovery Television Surveillance System.

IMA—Intermediate Maintenance Activity.

INSURV—Inspection and survey.

IPB—Illustrated Parts Breakdown.

IRAC—Interim Rapid Action Change.

JBD—Jet Blast Deflector.

JCN—Job Control Number.

JSN—Job Sequence Number.

LAGGING—The material used to insulate steam pipes or boilers to prevent the loss of heat by radiation.

LANG LAY—The lay in the strands and the lay in the rope are in the same direction.

LAY—That length of rope in which one strand makes one complete revolution about the core.

LOEP—List of Effective Pages.

MC—Maintenance Control.

MAF—Maintenance Action Form.

MAGNETIC PARTICLE INSPECTION—A nondestructive method of inspecting areas on or near the surface of iron or steel. The part is magnetized and then sprinkled with iron powder to locate discontinuities, such as hairline cracks.

MALFUNCTION—Any failure of a system or component that prevents normal operation of the catapult.

MCRL—Master Cross Reference List.

MDS—Maintenance Data System.

MEGGER—An instrument used for checking the insulation of electrical cables.

MEGOHM—A unit of electrical resistance equal to a million ohms.

METCAL—Meteorology and Calibration (program).

MICROINCH—A unit of measurement equal to a millionth of an inch.

MIOCROMETER—A device used for measuring minute distances.

MILSTRIP—Military Standard Requisition and Issue Procedures.

MIP—Maintenance Index Page.

MISALINEMENT—The condition of not being along a fixed straight line; cocked to one side with respect to other parts.

MOVLAS—Manually Operated Visual Landing Aid System.

MR—Maintenance Requirement.

MRC—Maintenance Requirement Card.

MRIL—Master Repairable Item List.

MS—Maintenance Support.

NATTC—Naval Air Technical Training Center.

NATO—North Atlantic Treaty Organization.

NAVAIRWARCEN—Naval Air Warfare Center.

NAVSHIPYD—Naval Shipyard.

NAVSUP—Naval Supply System Command.

NDI—Non-destructive inspection.

NECKING-DOWN—A reduction in diameter, as in a bolt or stud, caused by wear from vibration of another part.

NGL—Nose Gear Launch.

NPC—Naval Personnel Command.

NSN—National Stock Number.

NTP—Navy Training Plan.

O-LEVEL—Organizational Level.

OHM—A measurement of electrical resistance.

OJT—On-the-job training.

OPNAV—Office of the Chief of Naval Operations.

OPTAR—Operations (or Operating) Target (funding).

OSI—Operating space item.

PARALLEL—Being arranged so that two or more lines, such as centerlines or lines along outside edges, can all be at right angles to one common line.

PEB—Pre-Expended Bin.

PEEN—To change the shape of a metal part by striking with a hammer.

pH NUMBER—A number used to measure the acidity or alkalinity of a solution; pH values run from 0 through 14. A value of 7 indicates neutrality; numbers less than 7 indicate acidity, and numbers greater than 7 indicate alkalinity.

PICKLE—To clean castings or forgings in a hot weak-sulfuric-acid bath.

PITTING—Small deep cavities with sharp edges. May be caused in metal surfaces by high impacts or by oxidation.

PME—Precision Measuring Equipment.

PMS—Planned Maintenance System.

PNEUMATIC—That which is operated or moved by the use of pressurized air.

POWER PACKAGE—Provides and maintains the hydraulic pressure to raise and lower the barricade stanchions.

PQS—Personnel Qualification Standards.

PRESSURIZE—To compress air or hydraulic fluid to a pressure greater than normal.

QA—Quality Assurance.

QAI—Quality Assurance Inspector.

QDR—Quality Deficiency Report.

RAC—Rapid Action Change.

REEVE—To pass a cable or rope through a sheave, hole, ring, or similar object.

REMOVAL TORQUE—The minimum torque required to remove an installed screw, measured with no axial load in the screw and while the screw is in motion.

SATURATED STEAM—Steam that contains moisture.

SAYBOLT SECONDS UNIVERSAL—A unit of measurement of fluid viscosity as determined by a Saybolt viscometer. (The higher the SSU number, the more viscous the fluid.)

SCORING—Deep grooves in a surface caused by rubbing when fine, hard particles are forced between moving surfaces (as in a bearing and journal), or when a moving part is not supplied with lubricant.

SE—Support Equipment.

SECDEF—Secretary of Defense.

SECNAV—Secretary of the Navy.

SECURE—Tighten joints or fasteners.

SEIZING—A wrapping, consisting of several turns of light line or wire, placed around the cut end of a wire rope to prevent the strands of the rope from unraveling.

SEIZING—The stopping of motion between two contacting surfaces because of lack of lubrication.

SFOMS—Ship's Force Overhaul Management System.

SFWP—Ship's Force Work Package.

SHEAR—A break in a part caused by an external pressure.

SHIPALT—Ship Alteration.

SI—Ship Installation.

SIMA—Shore Intermediate Maintenance Activity.

SLEP—Service Life Extension Program.

SM&R—Source, Maintenance, and Recovery Code.

SNAP—Shipboard Non-tactical ADP Program.

SPALLING OR FLAKING—A breakdown of the surface metal over a small area, resulting in the surface metal's becoming loose and detached from the base material.

SRA—Selected Restricted Availability.

STAKE—To spread the head of a fastener, while in place, with a center punch or similar tool to prevent rotation of the fastener.

STELLITE—A very hard metal composition used for facings.

STRAIN—That force within a part that is caused by an external pressure.

STRIP SIDE—The side of the launching-engine cylinders on which the sealing strip is located.

SUPERHEATED STEAM—Steam that is hotter than the boiling point of water and contains no moisture.

SWAGE—To make a binding between a fitting and wire rope by hammering the fitting until its diameter over the wire rope is reduced so that the fitting holds the wire rope tightly.

SWLIN—Ship's Work Line Item Number.

TAV—Technical Availability.

TCP—Tool Control Program.

TD—Technical Directive.

TFBR—Technical Feedback Report.

THERMAL—Relating to or caused by heat.

3-M—Maintenance and Material Management.

TMDER—Technical Manual Deficiency/Evaluation Report.

TOLERANCE—The amount of variation permitted in the size of a part.

TORQUE—A force applied to a part, using a twisting or rotating motion.

TPDR—Technical Publication Deficiency Report.

TPL—Technical Publications Library.

TYCOM—Type Commander.

UIC—Unit Identification Code.

VENT—To remove air or other gas or vapor from a system.

VIDS—Visual Information Display System.

V-RING PACKING—Chevron Packing.

VISCOSITY—Measure of resistance of a fluid to flow. (Thick liquids, such as syrup or glue, would have a higher viscosity than water.)

VLA—Visual Landing Aid.

VOLATILE—Passing off readily in the form of a vapor.

VR—Voyage Repair.

VRT—Voyage Repair Team.

W/C—Work Center.

WARNING—An emphatic notice requiring correct operating or maintenance procedures and the ensuring of safe conditions to prevent injury or loss of life.

WARPING—Bending or twisting out of shape.

WDC—Work Definition Conference.

WET STEAM—Steam mixed with free water particles.

APPENDIX II

REFERENCES USED TO DEVELOP THIS NONRESIDENT TRAINING COURSE

NOTE: Although the following references were current when this NONRESIDENT TRAINING COURSE was published, their continued currency cannot be assured. Therefore, you need to be sure that you are studying the latest revision.

Chapter 1

Blueprint Reading and Sketching, NAVEDTRA 12144, Naval Education and Training Professional development and Technology Center, Pensacola, Fla., 1994.

Use and Care of Hand Tools and Measuring Tools, NAVEDTRA 12085, Naval Education and Training Professional development and Technology Center, Pensacola, Fla., 1994.

Aircraft Launch and Recovery Equipment (ALRE) Tool Control Manual, NAEC-51-OR732.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Steam Catapults, NAVAIR 51-15ABB-4.1.

Chapter 2

Use and Care of Hand Tools and Measuring Tools, NAVEDTRA 12085, Naval Education and Training Professional development and Technology Center, Pensacola, Fla., 1994.

Aircraft Launch and Recovery Equipment (ALRE) Tool Control Manual, NAEC-51-OR732.

Chapter 3

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Aircraft Recovery Equipment, NAVAIR 51-5BBA-2.1.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Aircraft Recovery Equipment, NAVAIR 51-5BBA-2.2.

Chapter 4

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Steam Catapults, NAVAIR 51-15ABB-4.1.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Steam Catapults, NAVAIR 51-15ABB-4.2.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Steam Catapults, NAVAIR 51-15ABB-4.3.

Organizational and Intermediate Operation, Service, and Maintenance Instructions with Illustrated Parts Breakdown, Digital Endspeed Indicator System (DESI), NAVAIR 51-15ABE-2.

Chapter 5

Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, Jet Blast deflector, Mk7 Mod 0, Mk7 Mod 1, Mk7 Mod 2, NAVAIR 51-70-13.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Steam Catapults, NAVAIR 51-15ABB-4.3.

Operation, Service, Maintenance and Overhaul Instructions with Illustrated Parts Breakdown, Nose Gear Launch Equipment Mark 2 Mod 0 (Flush Deck Type), NAVAIR 51-25-19.

Chapter 6

Aircraft Launch and Recovery Equipment (ALRE) Tool Control Manual, NAEC-51-OR732.

The Aircraft Launch and Recovery Equipment Maintenance Program (ALREMP), OPNAVINST 4790.15 (Series).

Chapter 7

Ships Maintenance Material Management Manual (3-M), OPNAVINST 4790.4 (Series).

Naval Supply Procedures, Afloat Supply, Volume I, NAVSUP Publication 485.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Steam Catapults, NAVAIR 51-15ABB-4.1.

Operational and Organizational/Intermediate Maintenance Manual with Illustrated Parts Breakdown, For All Shipboard Aircraft Recovery Equipment, NAVAIR 51-5BBA-2.1.

APPENDIX III

ANSWERS TO REVIEW QUESTIONS

ANSWERS TO QUESTIONS FOR LESSON 1

- A1. The Tool Control Program is based on the concept of a family of specialized toolboxes and pouches configured for instant inventory before and after each maintenance action. The content and configuration of each container is tailored to the task, work center, and equipment maintained.
- A2. Good tool work habits include:
1. Keep each tool in its proper stowage place
 2. Keep tools in good condition
 3. Keep your tool allowance complete
 4. Use each tool only for the job it was designed to do
- A3. Striking tools include:
1. Ball peen hammer
 2. Cross peen hammer
 3. Riveting hammer
 4. Claw hammer
 5. Mallets and sledges
- A4. Machinists' hammers are used on metal and machinery. Soft-faced hammers are used when there is a danger of damaging the surface of the work, such as when pounding on a machined surface. Mallets are used to drive wooden-handled chisels, gouges, and wooden pins. Short-handled sledges are used to drive driftpins, large nails, and to strike cold chisels and small hand-held rock drills. Long-handled sledges are used break rock and concrete, to drive spikes or stakes, and to strike rock drills and chisels. Claw hammers are used for carpentry work.
- A5. Striking tools should be kept clean and free of oil. The heads should be dressed to remove any battered edges. A light film of oil should be kept on mallets to maintain a little moisture in the head. Hammer handles should be kept tight.
- A6. Do not use a hammer handle for bumping parts in assembly, and never use it as a pry bar. Do not strike a hardened steel surface with a steel hammer.
- A7. The different types of wrenches are open end, box, combination, socket, ratchet, torque and, adjustable, such as the union nut, pipe, and strap wrenches. There are also spanner and setscrew wrenches.
- A8. Wrenches are used to turn nuts, bolts, pipes, and setscrews.
- A9. The safety precautions that apply to wrenches are:
1. Always use a wrench that fits the nut properly
 2. Keep wrenches clean and free from oil
 3. Do not increase the leverage of a wrench by slipping a pipe over the handle
 4. Determine which way a nut should be turned before trying to loosen it

A10. The different types of metal-cutting tools are:

1. Snips and shears
2. Hacksaws
3. Chisels
4. Files
5. Twist drills
6. Punches
7. Taps and dies

A11. Hawks-bill snips are used for cutting circles

A12. Hacksaws are used to cut metal that is too heavy for snips or boltcutters.

A13. Taps and dies are used to cut threads in metal, plastics, or hard rubber.

A14. The different types of punches are:

1. Center punch
2. Prick punch
3. Drift or starting punch
4. Pin punch
5. Aligning punch
6. Hollow shank gasket punch

A15. The center punch is used to mark the center of a hole to be drilled.

A16. A prick punch is used to mark the intersection of two layout lines.

A17. The different types of taps are:

1. Taper
2. Plug
3. Bottoming
4. Pipe

A18. Taper taps are used for starting a tapping operation or for tapping through holes.

A19. The different types of dies are:

1. Rethreading dies
2. Round split adjustable dies
3. Two piece collet dies
4. Two piece rectangular pipe dies

A20. Two-piece rectangular pipe dies are used for cutting internal American Standard Pipe threads.

A21. Screw and tap extractors are used to remove screws and taps without damaging the material being worked on.

A22. Pipe cutters are used to cut pipe made of steel, brass, copper, wrought iron, or lead.

A23. Tube cutters are used to cut tubing made of iron, steel, brass, copper, or aluminum.

A24. Flaring tools are used to make flares in the ends of tubing.

A25. The different types of screwdrivers are the standard, clutch tip, Phillips, Reed and Prince, offset, and ratcheting.

A26. Safety precautions that apply to screwdrivers include:

1. Never use a screwdriver to check electrical circuits.
2. Never try to turn a screw driver with a pair of pliers.
3. Do not hold work in your hand while using a screwdriver.

A27. The different types of pliers are:

1. Slip-joint
2. Wrench
3. Water-pump
4. Groove-joint
5. Diagonal
6. Side-cutting
7. Duckbill pliers
8. Needle-nose
9. Wire-twister

A28. Wrench pliers are used for clamping and holding onto objects regardless of their shape.

A29. Side-cutting pliers are used for holding, bending, and cutting thin materials or small gauge wire.

A30. A small three-corner file is used to sharpen the serrations on the jaws of pliers.

A31. Mechanical fingers are used to retrieve small articles that have fallen into places that cannot be reached by hand.

A32. A standard Navy vaporproof two-cell flashlight belongs in every toolbox.

A33. Inspection mirrors are used to view areas that cannot be seen by a direct line of sight.

A34. Several principles that apply to the care of handtools are:

1. Clean tools after each use.
2. Never hammer with a wrench.
3. Never leave tools scattered about.
4. Apply a light film of oil after cleaning to prevent rust.
5. Inventory tools after each use to prevent loss.

A35. Personal safety equipment includes safety shoes, goggles, Gloves, and safety belts and straps.

A36. Common power tools include drills, Disk sanders, portable grinders, and electric impact wrenches.

A37. Although electric drills are designed for drilling holes, by adding accessories they can be adapted for sanding, sawing, buffing, polishing, screw driving, wire brushing, and paint mixing.

A38. Safety precautions that apply to power tools:

1. Ensure electrical tools are inspected and approved for shipboard use.
2. Wear safety goggles when using portable electric tools.
3. Rubber gloves must be worn when using portable electric tools under hazardous conditions.

- A39. Safety precautions that apply to extension cords:
1. Only use three-wire extension cords with three prong plugs.
 2. Plug the tool into the extension cord before the extension cord is plugged in.
 3. Replace damaged cords.
- A40. Portable pneumatic power tools include pneumatic chipping hammers, rotary and needle impact scalers, and portable pneumatic impact wrenches.
- A41. Rotary and needle impact scalers are used for removing rust, scale, and old paint from metallic and masonry surfaces.
- A42. Safety precautions that apply to pneumatic tools include:
1. Wear the appropriate protective devices.
 2. Only authorized and trained personnel should use pneumatic tools.
 3. Pneumatic tools should be laid down in such a way that no harm will be done if the switch is accidentally turn on.
 4. Never point the air hose at another person.
- A43. The title block is located in the lower right corner on all blueprints and drawings prepared to military standards.

ANSWERS TO QUESTIONS FOR LESSON 2

- A1. The different types of measuring tools are:
1. Rules and tapes
 2. Calipers
 3. Micrometer calipers
- A2. Steel or wooden straightedge rules are used for short measurements. Tape measures are used for longer measurements, up to 300 feet. Calipers are used in conjunction with a scale to determine the thickness or diameter of a surface, or the difference between surfaces.
- A3. Handle rules and tapes carefully, and keep metal rules lightly oiled. Keep calipers clean and lightly oiled.
- A4. The different types of micrometers are:
1. Outside micrometers, including screw thread micrometers
 2. Inside micrometers
 3. Depth micrometers
- A5. Outside micrometers are used to measure outside dimensions, such as the diameter of round stock or the thickness of flat stock. Screw thread micrometers are used to determine the pitch diameter of screws. Inside micrometers are used to measure the inside diameter of a pipe or hole. Depth micrometers are used to measure the depth of a hole or recess.
- A6. Keep micrometers clean and lightly oiled. Always keep micrometers in a case or box.
- A7. All measuring tools will be marked in some manner to comply with the standard inventory instructions found in OPNAVINST 4790.15.

ANSWERS TO QUESTIONS FOR LESSON 3

- A1. The constant runout control valve is considered the heart of the arresting engine.
- A2. The retract valve permits the return of hydraulic fluid from the accumulator to the main engine cylinder.
- A3. The capacity of the fluid stowage tank is 700 gallons.
- A4. The pitch diameter of the sheaves on the outboard shaft of the crosshead is 33 inches.
- A5. The drive system transfer energy from an arresting aircraft to the arresting engine.
- A6. The sheave damper reduces peak cable tension.
- A7. The differences between the pendant engine and the barricade engine are:
 - 1. No fluid coolers are installed.
 - 2. Barricade engines are endless reeved.
 - 3. No anchor dampers are installed.
 - 4. A short stroke control valve cam is used.
- A8. Multiple release straps connects the upper and lower loads straps to the barricade stanchions.
- A9. The counterbalancing springs are compressed when the stanchions are lowered.
- A10. The deck latch secures the barricade stanchions to the deck.
- A11. The power package accumulator operating pressure is 1500 psi.
- A12. Off, Automatic, and Run are the three position of the motor controller switch.
- A13. One inch is the minimum allowable clearance between the crosshead and the crosshead stop.
- A14. The age of all packing are based on the cure date.
- A15. The shelf life of V-ring packing is three years.
- A16. The open side of the packing face the pressure.
- A17. Hookrunner should approach the aircraft from the front and side.
- A18. Air in the main engine cylinder or the CRO valve not properly seated.
- A19. The barricade stanchions safety brace must be installed.
- A20. When the weight selector is set to light for the incoming aircraft two-blocking can occur.
- A21. Fast retraction is an indication of excessive accumulator pressure.

ANSWERS TO QUESTIONS FOR LESSON 4

- A1. The launching engine cylinders are heated by a pair of trough heaters located below each row of launching engine cylinders.
- A2. The trough steam smothering is actuated pneumatically by a valve located at deckedge or manually by a bypass located near the pneumatically operated steam supply valve.

- A3. The launch valve steam valve admits and shuts off the flow of steam to the launching engine cylinders during operation.
- A4. The launch valve stroke timer electrical system measures launch valve performance.
- A5. To prevent the exhaust valve from opening while the launch valve is open.
- A6. The shuttle assembly by means of a launch bar attached to the aircraft nose gear and connected to the catapult NGL spreader?
- A7. The lubrication system provides a means of lubricating the launching engine cylinders?
- A8. The retract permissive and maneuver aft circuit.
- A9. Capacity of 90 gallons.
- A10. The retraction engine and drive system is used to return the launching engine pistons and shuttle assembly to the battery position after each launch.
- A11. Control is divided between the ICCS and the CCP.
- A12. The deck edge signal box indicates the readiness of the catapult.
- A13. No loads are conducted during the accomplishment of preoperational MRCs and may also be required during post maintenance check out.
- A14. After 10 seconds.

ANSWERS TO QUESTIONS FOR LESSON 5

- A1. The operating gear assembly provides the means of physically raising and lowering the JBD panels.
- A2. The Mk 7 Mod 0 JBD consists of 14 tube assemblies.
- A3. The swivel joint permits rotational movement of the piping during raising and lowering of the JBDS.
- A4. The maximum temperature of the cooling water is 210°F.
- A5. The four-way control valve (stack valve) controls the hydraulic fluid to and from the hydraulic cylinders.
- A6. The stack valve is a four-way, solenoid controlled pilot operated valve.
- A7. The difference between the deckedge and the auxiliary panels is none, because they are identical.
- A8. The double indicator light indicates low cooling water pressure and high cooling water temperature.
- A9. The "all" raise switch permits raising and lowering of all JBD panels simultaneously.
- A10. The panel support is used to lock the JBD panels in the raised position for maintenance or emergencies.
- A11. The personnel required for an JBD emergency lowering are:
 1. Topside safety Petty Officer (overall in charge)
 2. Topside JBD phone talker
 3. Below decks phone talker/valve operator
 4. Two personnel to install emergency lowering device

5. Two safety observers (station at the port and starboard sides of the JBD panels)
6. Tractor driver

A12. The NGL guide tracks are:

1. Approach track
2. Buffer cylinder track
3. Aft slide-access track
4. Forward slide-access track
5. Forward track

A13. The slide is mechanically connected to the buffer cylinder piston rods by three links.

A14. The reset assembly resets the buffer hook.

A15. Inserts installed in the forward slide-access track ensures the launch bar makes contact with the buffer hook actuator roller.

A16. The orifice tube is located in the two outer cylinders.

A17. Fluid from the buffer accumulator assembly fills the void created as the piston rods move forward.

A18. The buffer fwd and buffer fwd pushbuttons are installed in the monitor control console, deckedge, and the central charging panel.

ANSWERS TO QUESTIONS FOR LESSON 6

A1. The three levels of maintenance are:

1. Organizational
2. Intermediate
3. Depot

A2. The concept of each level of maintenance is:

1. O-level: done by catapult and arresting gear personnel
2. I-level: done by designated maintenance activities in support of fleets units
3. Depot-level: maintenance that require the skills and facilities beyond O- and I- level maintenance

A3. The general types of maintenance are upkeep and overhaul.

A4. Maintenance control is the nerve center of the division maintenance effort.

A5. The distinct organizations within V-2 division are:

1. Operational
2. Maintenance group
3. Maintenance organization

A6. The columns that are required on the VIDS board are:

1. Work center designation
2. Inwork
3. AWM (awaiting maintenance)
4. AWP (awaiting parts)

A7. The ALRE MAF card is used to track all outstanding maintenance actions.

- A8. Color codes are used to annotate the priority section of the ALRE MAF card.
- A9. The ALRE MAF is divided into seven areas.
- A10. Copy 1 of the ALRE MAF is retained by QA.
- A11. The primary role of maintenance support is to assist operating work centers by providing technical expertise in performing maintenance and repairs on critical equipment.
- A12. The maintenance summary sheets must be retained for 2 years.
- A13. Benefits of the tool control program are:
1. Reduced initial outfitting and tool replacement costs
 2. Reduced tool pilferage
 3. Reduced man-hours required to complete each maintenance task
 4. Assurance that the proper tools are available to perform specific maintenance tasks
- A14. False: CDIs are assigned to their respective work centers.
- A15. The work center supervisor is responsible for ensuring that the proper level of QA inspection is assigned to a maintenance action.
- A16. QAIs and CDQAIs are designated in writing by the commanding officer.
- A17. The categories of QA audits are:
1. Work center
 2. Special
 3. Annual TYCOM

ANSWERS TO QUESTIONS FOR LESSON 7

- A1. Inactive Equipment Maintenance is maintenance performed when specific equipment will remain inactive for 30 days or longer and is not scheduled for repair, maintenance, or overhaul by either ship's force or an external repair activity.
- A2. The workcenter PMS manual contains only the planned maintenance requirements applicable to a particular workcenter.
- A3. The maintenance requirement card provides detailed procedure used to perform maintenance.
- A4. The cycle schedule displays the planned maintenance requirements to be performed during the period between major overhauls of the ship; that is, from the first quarter after overhaul to the next first quarter after a ship's overhaul.
- A5. All superseded cycle schedules are retained for 12 months.
- A6. The quarterly schedule is updated weekly.
- A7. The Maintenance Data System is used to record information considered necessary for workload planning and coordination and to provide a data base for evaluating and improving equipment installed in the fleet.
- A8. Under MDS, The job control number (JCN) consists of a five-character unit identification code (UIC), a four-character workcenter code, and a four-character serial number called the job sequence number (JSN).

- A9. The OPNAV 4790/2K is used to report all deferred maintenance actions and the completion of maintenance actions that do not result in configuration changes.
- A10. The maintenance planning and estimating form (OPNAV 4790/2P) is used along with the OPNAV 4790/2K form for deferring maintenance to be done by an intermediate maintenance activity (IMA).
- A11. The national stock number is made up of 13 digits.
- A12. The Federal Supply Classification number occupies the first part of the national stock number.
- A13. The cognizant (COG) symbol identifies the stores account and cognizant inventory manager of an item.
- A14. The Afloat Shopping Guide (ASG) is designed to assist the fleet personnel in identifying the NSNs for items that are frequently requested by ships.
- A15. The casualty report (CASREP) system contains four types of reports: Initial, Update, Correct, and Cancel.
- A16. The workcenter maintenance logs are retained for a minimum of two years.

INDEX

A

Accumulator and air flasks, 4-32
Accumulator system, 3-12
Adjustable wrenches, 1-25
 pipe, 1-26
 strap, 1-26
Aircraft launch and recovery equipment (ALRE)
Arresting engine, 3-4
 constant runout (CRO) control valve assembly,
 3-4
 control valve weight selector, 3-6
 electrical system, 3-8
 engine structure, 3-4
 the CRO drive system, 3-4
Arresting gear logs and reports, 7-43
 automated shot and recovery logs program, 7-45
 maintenance log, 7-43
 wire rope history report, 7-45
Automatic lubrication system, 3-19
Auxiliary air flasks, 3-16

B

Blueprints and drawings, 1-4
 lines, 1-5
 revision block, 1-4
 title block, 1-4
Bridle tensioning system, 4-29
Butterfly exhaust valve, 4-10
 pressure-breaking orifice elbow, 4-10

C

Cable anchor damper, 3-21
 battery positioner, 3-24
 cushioning piston, 3-23
Cable terminal proof-loading machine, 3-57
Calipers, 2-4
 combination firm-joint caliper, 2-6
 hermaphrodite, 2-5
 inside transfer firm-joint, 2-5
 outside calipers, 2-5
 spring-joint, 2-5
 transfer calipers, 2-5
Casualty reporting, 7-40
Catapult control systems, 4-44
Catapult trough covers, 4-23
Cognizant Symbol, 7-31
Configuration change, 7-27
Crosshead and fixed sheave installation, 3-18
Cycle schedule, 7-13
Cylinder and ram assemblies, 3-17

D

Deck gear, 3-28
 deck pendants, 3-31
 fairlead system sheaves, 3-28
 impact pads, 3-32
 retractable sheave, 3-28
 wire supports, 3-33
Dies, 1-34
 rethreading, 1-34
 square pipe, 1-34
 two piece collet, 1-35

E

Emergency recovery equipment, 3-34
 barricade power package, 3-42
 barricade stanchion winches, 3-39
 barricade webbing assembly, 3-35
 counterbalancing spring, 3-40
 deck ramp installation, 3-37
 deck winches, 3-39
 pendant and anchor installation, 3-39
 stanchion hydraulic cylinder, 3-39
 tensioning pendants, 3-39
Extractors, 1-42
 screw, 1-42
 tap, 1-42

F

Federal Catalog System, 7-30
Feedback report, 7-11
Flaring tools, 1-43
Fluid replenishment system, 3-13
Fluid stowage system, 3-14
 fluid cooler, 3-14

H

Hydraulic system, 4-31
Hydraulic-lock-valve panels, 4-12

I

Inspection mirror, 1-47

J

Jet blast deflectors, 5-1
 comparison, 5-2

L

- Launching engine system, 4-3
 - cylinder covers, 4-15
 - cylinder expansion and elongation indicators, 4-25
 - cylinder sealing strips, 4-16
 - launching cylinders, 4-15
 - sealing strip anchor and guide, 4-17
 - sealing strip tensioner, 4-17
 - shuttle, 4-18
 - steam piston assembly, 4-18
 - water-brake cylinders, 4-19
 - water-brake pressure-sensing switches, 4-21
 - water-brake pumps, 4-20
- List of Effective Pages, 7-2
 - force revision, 7-2
 - maintenance index page, 7-3
- Lubrication system, 4-27

M

- Maintenance log, 7-42
- Maintenance requirement description, 7-8
- Main hydraulic pumps, 4-33
 - rotary retraction engine, 4-35
- Maintain JBD equipment, 5-13
 - cleaning, 5-14
 - hoses, seals, and o-rings, 5-14
 - standard safety precautions, 5-14
- Maintenance procedures, 3-45
- Maintenance types, levels, and responsibilities, 6-1
 - depot maintenance, 6-2
 - intermediate maintenance, 6-1
 - organizational maintenance, 6-2
- Material control codes, 7-33
- Measuring tools, 2-1
 - rules and tapes, 2-1
- Mechanical fingers, 1-46
- Metal-cutting tools, 1-9
 - files, 1-13
 - hacksaws, 1-11
 - snips and shears, 1-9
- Microfilm/aperture cards, 1-8
- MK 2 nose-gear-launch system, 5-15
 - actuator reset assembly, 5-17
 - buffer accumulator, 5-18
 - buffer cylinder, 5-18
 - guide track, 5-15
 - shock absorber assembly, 5-20
- MK 7 MOD 0 jet blast deflector, 5-2
 - control system, 5-9
 - emergency procedures, 5-12
 - water-cooled panel assembly, 5-4

P

- Part number, 7-35
- Personal safety equipment, 1-2
 - belts and straps, 1-2
 - goggles, 1-2
 - safety shoes, 1-2

- Pipe cutter, 1-43
- Pliers, 1-18
 - duckbill, 1-29
 - needle-nose, 1-30
 - side-cutting, 1-29
 - slipjoint, 1-28
 - wire-twister, 1-30
 - wrench, 1-18
- PMS maintenance requirement status boards, 6-9
- Pneumatic tools, 1-40
 - clipping hammer, 1-40
 - impact wrench, 1-41
- Power tools, 1-37
 - disk sander, 1-38
 - drills, 1-37
 - impact scalers, 1-40
 - portable grinders, 1-38
- Punches, 1-32
 - aligning, 1-33
 - drift, 1-33
 - hollow shank gasket punch, 1-34
 - prick, 1-33
- Purchase cable, 3-27
- Push-button station, 3-9
 - control valve weight selector indicator circuit, 3-9
 - deckedge control, 3-9

Q

- Quality assurance, 6-13
 - audits, 6-16
 - inspector qualifications, 6-15
- Quarterly schedule, 7-16

R

- Recovery log, 7-43
- Repairables, 7-36
- Replacing packings, 3-63
 - general precautions, 3-64
 - gland installation, 3-59
 - installing new packings, 3-59
- Replacing purchase cable, 3-46
 - inspecting the terminal, 3-55
 - preparing and pouring zinc, 3-53
 - testing the terminal, 3-56
- Retracting valve, 3-10
 - plunger, 3-11
 - retracting lever, 3-11
 - valve body, 3-10
 - valve seat, 3-11
 - valve stem, 3-11
- Retraction system, 4-35
 - drum assembly, 4-36
 - screw and traverse carriage, 4-36

S

- Schematic diagrams, 1-8
 - electrical systems, 1-8
 - piping systems, 1-8

- Screwdrivers, 1-44
 - offset, 1-46
 - reed and prince, 1-45
 - standard, 1-44
- Setscrew wrenches, 1-26
 - allen, 1-26
 - bristol, 1-26
- Sheave damper, 3-24
- Socket handles, 1-23
 - sliding t-bar, 1-23
 - speedhandle, 1-23
- Spanner wrenches, 1-26
 - hook spanner, 1-26
 - pin spanner, 1-26
- Steam catapults, 4-1
 - description, 4-1
 - launching valve assemblies, 4-4
- Steam cutoff pressure-switch installation, 4-22
- Steam system, 4-1
 - capacity selector valve, 4-9
 - launching valve assembly, 4-4
 - launching-valve control valve, 4-9
- Striking tools, 1-30
 - ball-peen hammer, 1-31
 - machinists' hammers, 1-31

T

- Taps, 1-34
 - bottoming, 1-34

- plug, 1-34
- Tool Control Program, 1-1,6-13
 - care of hand tools, 1-2
- Toolbox flashlight, 1-47
- Torque wrenches, 1-23
 - deflecting beam, 1-24
 - dial indicating, 1-24
 - micrometer setting, 1-24
- Transfer switches, 4-49
 - integrated catapult control system (ICCS), 4-44

V

- V-2 maintenance organization structure and responsibility, 6-2
 - ALRE maintenance support, 6-12
 - maintenance control, 6-3
 - quality assurance branch, 6-13
- Visual information display system (VIDS), 6-4
 - maintenance action form (MAF) Cards, 6-7

W

- Walkback, 3-60
- Weekly schedule, 7-19
- Wrenches, 1-18
 - box, 1-21
 - combination, 1-21
 - open-end, 1-19
 - socket, 1-22

