# C-9B/DC-9 (SPECIFIC) Enlisted Aviation Warfare Specialist (EAWS) Tutorial

**Welcome to the C-9B/DC-9 Specific PQS questions and answers. This study guide was designed to aid instructors and students alike. All of the questions were answered from instructions and directives found in NAVEDTRA 43902-14, Personnel Qualification Standard (PQS), Enlisted Aviation Warfare Specialist (EAWS), Unit Specific for Fixed-Wing Logistics (VR), (C-9B/DC-9).**

**Click on the section of the C-9B/DC-9 Specific PQS that you would like to review. Good luck and study hard!**


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# C-9B/DC-9 Specific PQS


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# 101: SAFETY FUNDAMENTALS

**101.1 Discuss the basic requirements for each of the following Navy Occupational Safety and Health (NAVOSH)Programs:**

**a. Respiratory Protection** - Many repairs performed at naval facilities generate air contaminants which can be dangerous if inhaled. Local exhaust ventilation is the best means for protecting personnel from exposure, however this may not always be feasible. In such situations, appropriate respiratory protection shall be used to ensure personnel protection shall be used to ensure personnel protection. A respiratory protection program shall be established and maintained as per OPNAVINST 5100.23D. A program manager shall be appointed in writing by the Commanding Officer or Officer in Charge. The manager is responsible for implementing program requirements. Persons requiring respiratory protection shall have it provided to them by the Navy. Persons requiring respiratory protection shall have it provided to them by the Navy. Persons who must enter an area where the use of respiratory protection is required shall be provided and use appropriate equipment. Personnel shall be fit tested and medically qualified to wear the respirator being issued.

**b. Hearing Conservation** - Noise exposure has been recognized as an occupational hazard related to certain tasks. Exposure to either blast noise (gunfire, rocket fire, etc.) or from continuous sounds such as aircraft engines can deteriorate the auditory fitness of Navy personnel. Personnel must be able to hear well enough for adequate communication. The goal of the Hearing Conservation Program is to prevent occupational hearing loss. The program shall identify potentially hazardous noise levels. The use of personnel hearing protection devices are used as a protective measure. Periodic hearing testing shall be conducted. Education on hazardous noise is required.

**c. Sight Conservation** - Navy policy requires that Navy personnel exposed to eye hazardous areas or operations are provided adequate eye protection at government expense. Some hazardous areas include welding, sand blasting, milling and drilling areas. Any persons entering a posted eye hazard area shall be required to wear eye protective equipment. Eyewash stations are located where water is not readily available.

**d. Personal Protective Equipment**- PPE is employed to reduce or eliminate personal exposure to hazards. Activities shall provide necessary protective equipment where there is a reasonable probability that the use of the equipment will prevent or reduce the severity of injury or illness. PPE is simply a last line of defense and any equipment breakdown failure or misuse immediately exposes the worker to the hazard. All personnel will be familiar with the use of PPE.

**101.2 Define the following terms as they apply to Naval Air Training and Operating Procedures Standardization (NATOPS) and Maintenance Instruction Manuals (MIM's):**

a. **"Shall"** - means a procedure that is mandatory.

b. **"Should"** - means procedure is recommended.

c. **"May"** - means procedure is optional.

d. **"Will"** - indicates futurity and never indicates any degree of requirement for application of a procedure.

**101.3 Discuss the following as they apply to hangar deck safety:**

**a. Portable fire extinguisher** - classified according to the type of fire they are designed to extinguish. They shall be located on normal paths of travel so as to be readily accessible and immediately available in the event of fire.

**b. Fire Lanes** - lanes suitable for firefighting equipment shall be clearly marked and kept clear.

**c. Smoking/Open flame** - smoking or open flames shall not be permitted within 50 feet of parked aircraft, hangars, bays, etc.

**d. Aircraft ground** - aircraft shall be electrically grounded during all maintenance evolutions. Tie down chains do not provide adequate ground path and shall not be used to ground aircraft.

**104.4 Discuss "HERO" (Hazards of Electromagnetic Radiation to Ordnance)conditions, and the safety precautions associated with handling "CAD's" (Cartridge Actuated Devices):**

HERO is concerned with the accidental actuation of electroexplosive devices (EED's) or otherwise activating electrically initiated ordnance do to radio frequency electromagnetic fields. Equipment which produce useful internal signals, or generate, transmit, receive, store, process or utilize information in the broadest sense shall not be used during explosives loading operations. This may include communications, radar, sonar, countermeasures, navigation, computers, test equipment, etc. CAD's should be treated as explosives.

**104.5 Discuss the following safety precautions for lifting an aircraft:**

**a. Wing and fuselage**

The entire aircraft may be lifted at the wing and aft fuselage jack points. Aircraft are generally lifted for performing landing gear tests, removing and installing nose and main gears, and leveling the aircraft. Do not unlatch or latch the forward upper cargo door with the airplane on jacks. Jack on a level surface for support of each jack. The jacking site should be protected from the wind, preferably in a hangar. A tail support should be installed as a precaution as the aircraft center of gravity moves aft when jacked.

**b. Nose and main**

Do not jack fuselage station 218.0(forward fuselage jack point) in conjunction with fuselage station 995.0 (aft fuselage jack point). Severe structural damage will occur if the wing jacks are released while the jacks are raised at both fuselage jack points.

**c. Emergency procedures:**

**101.6 Discuss the safety precautions for handling Skydrol (hydraulic fluid).**

a. Before performing any operation on the hydraulic system, personnel should read and thoroughly understand the following precautions to be observed when working with skydrol. Long exposure to Skydrol can cause skin dehydration and chapping.

b. Wash hands thoroughly with soap and water before starting work.

c. Apply barrier cream to hands, wrists, and forearms. Rub cream under the fingernails and into creases in the skin.

d. Wear goggles when pressure testing components or systems, and at any time there is possibility of Skydrol splashing into the eyes.

e. If Skydrol splashes into the eyes, treat eyes immediately by irrigating thoroughly with clear cold water, and report the incident.

f. Wash hands, wrists, and forearms with soap and hot water whenever they have been in contact with Skydrol.

g. If clothing becomes soaked with Skydrol, remove it as soon as possible, thoroughly wash the skin, and put on clean clothing.

**101.7 Discuss the safety precautions associated with Liquid Oxygen (LOX).**

a. Do not service LOX converters in an unsheltered area during inclement weather (rain, snow, etc.). Moisture can easily enter the vent port of the fill buildup vent valve and supply manifold. Moisture will freeze immediately on contact with LOX rendering pressure closing and relief valve or both inoperative. This situation, if undetected, will lead to critical over pressurization and explosion of the LOX converter. LOX converters shall be drained in a well ventilated, clean area with limited access and protection from inclement weather so designated by the type commander. A drip/drain pan with sides at least 6 inches high and free from dirt, grease, oil, fuel, hydraulic fluid, and other hydrocarbons, shall be used when draining LOX converters. Two qualified persons shall be present when draining the LOX converters, one of which will be designated safety observer. A maximum of two LOX converters can be drained at one time.

b. Do not operate LOX equipment unless qualified or are working under the supervision of qualified personnel.

c. Use only MIL-O-27210 Type II LOX.

d. Wear goggles or a face shield.

e. Do not handle with bare hands any tubing or fittings through which LOX is flowing. Wear clean, dry gloves when handling parts of equipment cooled by LOX.

f. Wear a rubber coated, cotton duck, impermeable apron when working with LOX. The apron shall be tied or secured in a fashion that would make it easy to remove in an emergency.

g. Wear cuff less coveralls. The coverall shall be worn over the gloves and the top of the shoes, so that in the event of LOX spillage, the LOX will roll off the clothing and not become trapped in the gloves or boots.

h. Approved type LOX boots shall be worn.

i. In the event of accidental contact with LOX, quickly thaw the exposed area, preferably by immersion or by bathing the area with large amounts of water. After the rapid thaw, wrap the exposed area loosely with clean dry dressing and report to a doctor immediately.

j. Do not permit smoking, open flames, or sparks in the LOX handling area.

k. Do not carry matches in LOX handling areas.

l. Ensure all LOX equipment left outdoors is sheltered from the elements.

m. Keep work area and equipment free of oil, grease or any other combustible material.

n. Keep tools and clothing free of oil and grease.

o. Avoid spilling LOX on the floor or deck areas. In case of accidental spillage, ventilate the area.

p. Always call LOX by its proper name, not to confuse it with compressed air. Never use oxygen in place of compressed air for any reason.

q. Handle converters, storage tanks and transfer hoses with care to avoid damage to the insulating space.

r. Prior to filling the converter, check safety wire and relief valve and pressure closing valve for security.

**101.8 Discuss the safety precautions associated with gaseous oxygen.**

a. Gaseous oxygen is extremely hazardous when used in the presence of readily combustible materials. Do not permit oil, grease, gasoline, kerosene, aviation fuel or any other readily combustible material to come in contact with oxygen.

b. Only oxygen conforming to MIL-27210, Type I shall be used in aircraft gaseous oxygen systems.

c. Exercise care that compressed oxygen does not become contaminated in anyway with hydrogen, hydrocarbon gases, or oil base liquids as a serious explosion can occur.

d. Oil or grease must never be allowed to come into contact with or be used in the presence of open cylinders, valves, regulators, gages or fittings. Fire or explosion can result.

e. Never lubricate oxygen valves, regulators, gages or fittings with oil or any substance except an approved oxygen compatible lubricant such as Type III Krytox or Type III Tribolube 16.

f. Hands should be clean and free from oil. Do not wear greasy gloves or clothes.

g. A spark is not necessary to cause a fire or explosion. The chemical reaction of having fuel gases and oils combine with oxygen is sufficient to develop spontaneous combustion, and could cause a fire or explosion.

h. Never permit oxygen cylinders to come in contact with electrical welding circuits or apparatus.

i. Never use oxygen from a cylinder without reducing the pressure through a pressure reducing regulator.

j. Never mix other gases or compressed air in an oxygen cylinder.

k. Never test for pipe line leaks or blow-out pipe lines with oxygen unless the lines are specifically made for that.

**101.9 Discuss the safety precautions that must be observed during fueling operations.**

a. Do not operate radio, radar, or any other electrical or electronics equipment on the aircraft except as specified.

b. Ground the fuel supply unit and aircraft.

c. Make certain the fueling source contains the proper fuel grade as specified by the engine manufacturer.

d. No smoking around the aircraft while fueling.

e. Check that the main gear inboard doors are closed before fueling.

**101.10 Discuss the safety precautions observed for an open fuel cell.**

a. Have area approval and identify the area as an open fuel cell area. The area must be approved by the Maintenance Officer, Fire Marshall and Safety Officer. An additional 50 foot requirement may apply if exhaust purge is used. Warning signs will read "DANGER, OPEN FUEL TANKS, UNAUTHORIZED PERSONNEL KEEP OUT."

b. All portable electrical equipment and connections shall meet the requirements of the National Electrical Code for Class I, Division I, Group D Hazardous Locations. All areas shall have 2 approved, fully-charged fire extinguishers. Additional extinguishers shall be provided as required by the station Fire Marshal.

c. Adjacent aircraft shall not be allowed to operate under their own power within 100 feet of the repair area.

**101.11 Discuss Operational Risk Management (ORM).**

Operational Risk Management is a systematic, decision making process used to identify and manage hazards that endanger naval resources. ORM is a tool used to make informed decisions by providing the best baseline of knowledge and experience available. Its purpose is to increase operational readiness by anticipating hazards and increasing the potential for success to gain the competitive advantage in combat. ORM is not just related to naval aviation; it applies across the warfighting spectrum.

ORM employs 5 steps:

1. Identify hazards

2. Assess hazards

3. Make risk decisions

4. Implement controls

5. Supervise

# 102: AIRCRAFT CHARACTERISTICS/CAPABILITIES FUNDAMENTALS

**102.1 Describe the general characteristics of the C-9B/DC-9 aircraft.**

Ans: Manufactured by McDonnell Douglas Corporation and is designed for the transport of personnel and cargo. The maximum takeoff gross weight is 110,000 pounds and design maximum landing gross weight is 99,000 pounds. The aircraft is 119.3 feet long and 93.3 feet wide. The tail height is 27.5 feet.

**102.2 Discuss the duties of the following aircrew positions:**

Ans: Note: All of the following aircrew positions shall be designated in writing by the commanding officer or other competent authority.

a. **Transport Aircraft Commander (TAC)**

Ans: He/she shall be in command of the aircraft and is responsible for the safety and orderly conduct of the flight. The aircraft commander shall also be the mission commander.

b. **Transport second pilot (T2P)**

Ans: A T2P is a pilot who is still in training. His/her flights will be conducted from the pilot's seat. He/she needs a minimum of 250 flight hours in order to upgrade to TAC.

c. **Transport third pilot (T3P)**

Ans: A T3P is a pilot who has never flown in a C-9B/DC-9 aircraft. He will sit in the copilot seat for all of his/her flights. Once he/she completes all the requirements for T3P, he/she will fly a minimum of 100 flight hours before being considered for upgrade to T2P.

d. **Crew Chief (CC)**

Ans: The crewchief will supervise the enlisted crew in the performance of their duties. He/she is responsible to the aircraft commander for aircraft preflight, servicing, and normal en route line maintenance.

e. **Loadmaster (LM)**

Ans: The loadmaster will normally be the senior flight attendant on the flight. He/she is responsible to the aircraft commander for the supervision of aircraft loading of all cargo and baggage. The loadmaster will ensure the weight and balance data is prepared for the aircraft commander's signature prior to takeoff.

f. **Flight Attendants (FA)**

Ans: The flight attendants are responsible for all the activities in the cabin as directed by the aircraft commander. The safety and comfort of the passengers are the prime concerns of the flight attendant. The flight attendant will determine that all miscellaneous and emergency equipment required in the cabin is properly installed or stowed before flight.

**102.3: State the primary and secondary emergency exits:**

Ans: In a ditching situation, the primary exits are the overwing exits. The secondary exits are the pilot and copilot clear view windows, forward entrance door, service door and clear view windows. In a ground egress the forward entrance, service doors, and aft entrance are primary exits. The overwing, pilot and copilot clear view windows are secondary exits.

**102.4: Describe the following C-9B/DC-9 Aircraft Seat and Equipment Configuration Outlines (SECO):**

a. **SECO "A"**

Ans: Three pallets with Very Important Person (VIP) seats and 47 coach seats.

b. **SECO "C"**

Ans: Two HCU-6/E pallets plus 65 coach seats.

c. **SECO "D"**

Ans: Ninety coach seats

d. **SECO "G"**

Ans: Three HCU-6/E pallets plus 45 coach seats

e. **SECO "H"**

Ans: Special mission seven HCU-6/E pallets plus 7 coach seats.

**102.5: Discuss the history of the C-9B/DC-9.**

Ans: In 1970 the Naval Air Reserve undertook the concept to integrate manpower and equipment to augment its active duty counterparts in a time of war. The Navy's version of the McDonnell Douglas DC-9 was engineered with a cargo door to accommodate passengers and cargo. In addition, the airframe incorporated extended fuel tank capabilities to satisfy its worldwide commitment. The VR community joined with the Joint Operational Support Airlift Command for scheduling. VR squadrons are in a constant state of readiness, regularly deploying to the Mediterranean and Western Pacific. This readiness proved vital during Desert Storm. All VR commands are manned by Selected Reserve and active duty personnel.

Establishment dates for various VR squadrons is as follows:

VR-52 24 Jun 1972
VR-55 01 Apr 1976
VR-56 01 Jul 1976
VR-57 01 Nov 1977
VR-58 01 Nov 1977
VR-48 01 Oct 1980
VR-46 01 Mar 1981
VR-59 01 Oct 1982
VR-61 01 Oct 1982
VR-62 01 Jul 1985
VR-54 01 Jun 1991
VR-53 01 Oct 1992
VR-1 01 May 1997
VR-51 01 Jun 1997

# 103: AVIONICS/ELECTRICAL FUNDAMENTALS

**103.1 Define the following acronyms:**

**a. RADAR**

Radio Detection and Ranging. Used in aircraft to detect objects, and indicate their range and relative position.

**b. IFF**

Identification Friend or Foe. Allows a friendly aircraft to identify itself automatically, when interrogated, before approaching near enough to threaten the security of other naval units.

**c. ADF**

Automatic Direction Finding. Two identical ADF systems are installed on the aircraft. Each system receives signals from radio range stations, commercial AM stations, and low-frequency nondirectional navigation aid stations. Each system provides automatic direction-finding capability.

**d. TACAN**

Tactical Air Navigation. Uses a bearing determining system to determine aircraft position and distance from a TACAN station up to 300 nautical miles to a selected facility or TACAN beacon. Primary navigation aid used by carrier-based aircraft.

**e. TCAS**

Traffic Collision Avoidance System. Tells the exact position or location of other aircraft traffic.

**f. FMS**

Flight Management System. Tells your position, fuel burn, rate of fuel consumption, guides the automatic pilot, gives time to way point, fuel required and airspeed. Similar to the INS system but better due to better accuracy. INS is a backup for the FMS system.

**g. GPS**

Global Positioning System. Works in conjunction with a minimum of three global satellites to provide exact location in longitude, latitude and attitude. Accurate within 3 to 6 meters.

**h. INS**

Inertial Navigation System. A navigation system that provides aviation and guidance data without reference to ground-based navigation aids. The INS provides steering guidance, capture, tracking, and leg transfer signals to the autopilot. It also provides steering commands to the flight directors and true heading, desired track and track deviation to the horizontal situation indicators.

**I. VOR**

Very High Frequency Omni directional Range Station. A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in an azimuth, oriented from magnetic north. Voice transmissions may be made by the pilot and air traffic control facility.

**j. ILS**

Instrument Landing System. A precision approach system that provides alignment and descent guidance to the pilot.

**k. GPWS**

Ground Proximity Warning System. Provides the pilot with a visual and aural warning of potentially hazardous flight paths relative to the terrain.

**103.2 Discuss the importance of the Aircraft Static Dissipation system.**

Static discharges are installed at the extremities of the airplane to dissipate static electricity with a minimum amount of radio interference. Static dischargers are located where discharge is likely to occur. These include the wing tips, elevator, horizontal stabilizer, vertical stabilizer and tailcone.

**103.3 State the purpose of the C-9B/DC-9 Electrical Power Supply system as stated in the NATOPS Flight Manual.**

The aircraft's engine-driven generators are the main electric power source. The APU generator is used for electric power for engine starting, air-conditioning, and other electric needs while on the ground, and as a backup power source in flight. For dc power requirements, four transformer rectifiers convert 115-Volt alternating current (Vac) power to 28-Volt direct current (Vdc) power for lighting, control circuits, and other dc components. Two nickel cadmium, 14-volt batteries provide emergency ac and dc power to essential flight instruments and necessary lights and radios in the event of a total loss of ac power. The batteries are also used for power to start the Auxiliary Power Unit (APU) and run the refueling system via the emergency inverter when normal ac power is not available.

**103.4 Define thermal runaway as it pertains to aircraft batteries.**

Thermal runaway is a condition in which the current for a fully charged nickel-cadmium battery rises out of all proportion to the impressed voltage. It is caused by heat from oxygen recombination and an inherent property of most rechargeable batteries that causes their voltage to drop as they get hot. The battery can become dangerously hot, gas excessively, and spew electrolyte. During overcharge, the oxygen gas generated in the cells can pass through or around the separator and recombine on the negative plates. The oxygen recombination generates heat, causing the battery temperature to rise and the battery voltage to drop, so that it draws a higher charge current. If allowed to continue, the cadmium plate may ignite and burn.

**103.5 Discuss the procedures for detecting and handling thermal runaway.**

Check for the following conditions: If flames are present, use a CO2 fire extinguisher. If no flames are present, but smoke, fumes, or electrolyte is coming from the battery or vent tubes, spray the battery with low-velocity water fog. Never spray CO2 from a portable fire extinguisher into a battery compartment for cooling or to displace explosive gases. The static electricity generated by the discharge of the extinguisher could explode the gases trapped in the battery compartment.

**103.6 Discuss the precautions concerning the use of radar.**

a. Do not operate radar during refueling operations or in the vicinity of trucks or containers holding flammable or explosive liquids.

b. Do not operate radar when ground personnel are within 21 feet of the radar antenna. The transmission of radio frequency energy could result in serious injury.

c. Do not operate the radar while the aircraft is in the hangar or with the antenna directed towards nearby large metal objects.

**103.7 State the location of the Electronic Equipment compartment (E & E compartment).**

Access to the E & E compartment is located aft of the nose wheel landing gear assembly on the underside of the fuselage. Aft of the pilot's seat in the cockpit is an access panel to the compartment on the floor.

**103.8 Briefly discuss the Fire Detection system:**

The fire detection system detects overheating or a fire condition in either engine nacelle or in the APU compartment and alerts the crew by aural and/or visual indications. It is a dual system with 2 separate fire-sensing element loops and control units for each fire detector area.

# 104: C-9B/DC-9 OPERATIONS FUNDAMENTALS

**104.1 Describe the following scheduling authorities:**

**a. Joint Operational Support Aircraft Center (JOSAC)**

JOSAC was established as the continental United States operational scheduling authority or activity.

**b. Naval Air Logistics Office (NALO)**

NALO acts as the principle scheduling authority or activity for all Navy Reserve C-130 airlifts and all overseas flights originating or terminating in the continental United States.

**104.2 Describe the basic purpose of the following flights related to operational proficiency:**

**a. Instrument training**

General instrument or all weather instrument training flights when instrument training is the principle objective of the flight.

**b. NATOPS Refresher Training (NRT)**

A training flight to test the proficiency of the pilot when traveling to various locations.

**c. Functional Check Flight (FCF)**

Checkflights are required under the following conditions (after the necessary ground check and prior to release of the aircraft for operational use):

1. At completion of aircraft rework and Phase D of an inspection cycle.

2. After reinstallation of an engine.

3. After reinstallation of fuel system components.

4. When fixed flight surfaces have been installed or movable flight control surfaces replaced, removed for major repairs, or rigged. When the primary control cables, rods, or tubes have been replaced or rigged; or when the control system components have been adjusted and where improper adjustment or installation could adversely affect the flight characteristics or result in loss of aircraft control.

5. Anytime the aircraft does not fly for a period of 30 days or more, regardless of the reason.

**d. NATOPS Instrument evaluation**

An evaluation flight to check the general instrument or all weather instrument operations when performed on an actual flight.

**e. Line Flight**

Logistics transport flights include transportation of military or civilian personnel (other than at points of contact with enemy or in training exercises) as incident to change in location of duty or civil employment or to the transfer of entire units as well as transport of cargo or mail (including guard mail with or without couriers) for other than troop support purposes. Administrative transport flights can include transportation of military or civilian personnel for inspection, conference, instruction, or other official business involving no permanent change of station and for other authorized purposes. Troop support flights include the transportation of troops and other personnel (including battle casualties) to or from points of contact with the enemy as well as rescue of personnel or transport of liaison personnel to or from engaged units. Transport of cargo for equivalent circumstances also is authorized.

**104.3 Describe the basic purpose of the following flights related to aircrew operational proficiency:**

**a. Aircrew training**

Aircrew candidates have 18 months to complete Naval Aircrewman or positional qualification or they shall be removed from flight status or placed in an aircrew billet in which the previous qualification was attained. Training is divided into 3 Phases and all 3 vary according to aircrew position. Basically, Phase I training involves the review and completion of selected lesson guides. Phase II training may involve a school, such as Weight and Balance school for Loadmasters or Flight Safety Instruction (FSI) for Crew Chiefs. It also includes all training flights, positional JQR's and recommendations for qualification. Phase III is the qualification process. It requires an evaluation flight, testing, and oral questioning. Phase IV is the recurrent training required after qualification.

**b. NATOPS evaluation flight**

Evaluation flights are performed annually, or upon initial qualification or upgrade. The evaluator identifies him or herself to the pilot and shall observe the duties of the crewmember. The crewman being evaluated may be asked to answer questions that are applicable to the position. If the TAC is found to be incompetent or otherwise incapacitated, to the extent that safe for flight is jeopardized, he is authorized to take command. He shall advise the TAC and crew of his decision and assume full responsibility of the flight. If any other NATOPS evaluator or instructor observes a crewmember to be deficient, the Instructor will advise the TAC. At the TAC's discretion the instructor will assume the duties of the delinquent crewmember until the deficiency has been corrected or a qualified replacement is obtained. A complete report will be submitted to the CO and CFLSW.

**104.4 Discuss the procedures for determining an Equipment Operational Capability (EOC) code on a VIDS/MAF.**

EOC codes are used on a VIDS/MAF to determine the mission capability of an item noted on the MAF. The EOC code determines whether the item changes the aircraft's ability to carry out its mission. These determine whether the aircraft is Full Mission Capable (FMC), Partial Mission Capable (PMC), or Non-Mission Capable (NMC). For example: if the windshield wipers are malfunctioning on an aircraft, the gripe is recorded on a VIDS/MAF for repair. The Maintenance Control worker will determine whether the wipers effect the mission capability or not. They will then assign the appropriate EOC code to the MAF until the gripe is repaired or replaced. In this case the wipers impact the aircraft's ability to fly in inclement weather. The aircraft is PMC. It cannot fly any missions in weather impacted areas.

**104.5 Describe the purpose of a Communications Security Equipment (COMSEC) functional check.**

The COMSEC functional check is a physical inspection and functional test of a COMSEC system which does not require a graduate of either a limited or unlimited maintenance course of instruction of the specific systems. It consists of a full and complete on-the-air use of the IFF (Identification Friend or Foe) system either aircraft-to-aircraft or aircraft-to-ground station, using proper communication procedures and applicable publications. COMSEC functional checks shall be performed prior to detachments. Successful accomplishment of functional checks shall be recorded in the miscellaneous history section of the aircraft logbook.

**104.6 Describe the function and procedures of the On Site Storeroom (OSS).**

The OSS Contractor personnel, (currently Raytheon), are responsible for managing and operating the Government's On-Site Storeroom/property system for the C-9B/DC-9 aircraft. The OSS's are located with the operating sites. The contractor maintains an inventory at each site. The OSS contractor issues parts and material, assembles kits for organizational level installation only, receives items for repairs, overhauls, etc., and provides replenishment services. The contractor maintains adequate inventory records of storeroom transactions to document receipt and issuance of materials.

These records are monitored for usage trends which may indicate incorrect maintenance procedures, design defects, and/or relaxed vendor quality control. The government furnishes aviation fuel, lubricating oil, hydraulic fluid, soft consumables such as cleaning agents, solvents, lubricants, sealants, etc. They also provide a secure, enclosed storeroom stocked with spare parts, consumable materials, personnel safety equipment, tool equipment, and publications.

**104.7 Define how Maintenance Control coordinates with the OSS contractor.**

The cognizant Maintenance Officer provides a list to the contractor of personnel authorized to assign requisition priorities. OSS contractors provide 7 day a week services, except on observed holidays. They are on an "on-call" basis for Partial Mission Capable Supply (PMCS) and Non-Mission Capable Supply (NMCS) parts. All parts removed from the aircraft during the course of maintenance are turned into the OSS for exchange of a serviceable like item. A copy of the VIDS/MAF is used to requisition parts and material or request services from the OSS.

**104.8 Discuss the overseas support provided by the OSS contractor.**

Whenever there is a requirement for parts/material when away from the base, the Aircraft Commander notifies his home base, who will coordinate with the OSS for the loan or shipment of the necessary items. Movement of parts or material to support aircraft away from home base is accomplished by the fastest means available including Government and/or commercial transportation unless otherwise directed by higher authority.

**104.9 Describe the purpose of the following contractor assisted functions.**

**a. Standard depot level maintenance (SDLM)**

SDLM provides for a comprehensive inspection of selected aircraft structures, flight systems and materials; critical defect correction; preventive maintenance, modification, and specified technical directive incorporation to ensure reliability and operational availability of the aircraft for the established operating service period as defined in the OPNAVINST 3110.11 series. C-9B/DC-9 aircraft are currently on a 60 month SDLM cycle. SDLM is sometimes referred to as "overhaul" maintenance.

**b. Mid-term inspection (MTI)**

C-9B/DC-9 aircraft are currently on a 30 month MTI interval. At MTI special rework items are corrected or inspected as noted on the MTI Special Work Request (OPNAV Form 4790/65). These shall include all depot level Technical Directives not incorporated. Special work items are listed in order of priority.

**c. Drop-in maintenance (DIM)**

Contractor support for maintenance beyond the capability of the organizational level. DIM is normally depot level maintenance such as modernization, modification, conversion, in-service repairs, or other major maintenance actions and is performed at the depot facility.

**d. Field team assistance**

Airframe or Engine Depot Contractor support for maintenance beyond the organizational level capability. This assistance is performed at the aircraft location. Example: Fuel leaks determined to be beyond the capability of the squadron maintenance department.

**104.10 Define the responsibilities of the following aircraft divisions:**

**a. Power Plants (Work Center 110)**

Performs O-level maintenance on Power Plants or engines and engine related components. In the C9B/DC9 community they also perform repairs and maintenance to the Auxiliary Power Unit.

**b. Airframes (Work Center 120)**

Perform O-level maintenance on the structural components of the aircraft. They are also responsible for the Hydraulic Contamination Control Program, Tire and Wheel Maintenance Safety Program, Corrosion Prevention and Control Program and other programs as required.

**c. Aviation Life Support System (ALSS) (Work Center 130)**

Perform O-level maintenance on aircraft survival equipment and environmental systems, and clothing needed to allow aircrew members to perform their duties. They are responsible for the Aviator's Breathing Oxygen Program and the Ordnance Certification Program.

**d. Avionics division (Work Center 210/220)**

Perform O-level maintenance on the electrical and electronic devices on the aircraft. They are responsible for Electrostatic Discharge Safety program.

**e. Line division (Work Center 310)**

They are responsible for maintaining and inspecting aeronautical equipment. They serve as Plane Captains, trouble-shooters, and Support Equipment coordinators. They are responsible for the Fuel Surveillance program, Foreign Object Damage (FOD) program, Corrosion Prevention and Control program, Support Equipment Operator Training and Licensing and Plane Captain training.

**104.11 Discuss the following as they apply to mission readiness:**

**a. Crew rest**

Crew rest commences when the crew departs the aircraft following post flight duties and terminates at show time. Crew rest is normally 12 hours at home base. Minimum crew rest on return over night (RON) flights is 12 hours. On missions extending beyond the 13 or 14 hour crew duty limits, minimum crew rest shall be extended for the same length of time that the mission was extended. Example: A 14 hour 45 minute crew duty day requires a minimum 12 hour 45 minute crew rest period. On detachments, all transoceanic flights crossing more than 3 time zones and remaining in theater and remaining in theater for additional tasking shall RON for a minimum of 18 hours on deck.

**b. Crew duty**

Crew duty commences at show time and terminates at block in on the final leg of the day.

In theater operations:

Show time: 0700-1400 : 14 hours crew duty Extendable to 15 hours by the Tactical Aircraft Commander (TAC) Extendable to 16 hours by the CO, XO, or OIC (inconus) Extendable to 16 hours by the Detachment OIC overseas or outconus.

Show time: 1401-0659: 13 hours crew duty Extendable to 14 hours by the Tactical Aircraft Commander (TAC)

Transoceanic missions to or from different theaters of operation, not including Bermuda or the Caribbean:

Show time: 0700 - 1400: 16 hours crew duty not extendable.

Show time: 1401 - 0659: 13 hours crew duty, extendable to 14 hours by the TAC.

TAC's must consider the impact of extending crew duty on consecutive days. Because of the cumulative effect of consecutive crew duty extensions, crew duty can only be extended by the TAC or parent command for 3 consecutive days. On the 4th or subsequent days crew duty can only be extended by Commander, Fleet Logistics Support Squadron (CFLSW) Operations.

All crew duty extensions shall be reported to the wing Operations or the wing Duty Officer within 72 hours via the most expeditious and convenient means (phone, fax, memo, E-mail).

**c. Crew currency**

Crew currency requirements for all aircrewmen are satisfied when the crewman completes flights totaling, at a minimum, 6 flight hours, in a given month, in position.

# 105: EMERGENCY EQUIPMENT FUNDAMENTALS

**105.1 State the location of the following emergency equipment:**

a. **Smoke goggles**

Forward galley area

b. **Escape ropes**

Pilot/copilot clear view windows and in the top of each overwing exit.

c. **Evacuation slides**

Passenger entrance, service entrance and tailcone exit

d. **Hand held fire extinguishers**

Cockpit, mid-cabin port overhead panel, port aft bulkhead.

e. **Life rafts**

Forward galley and port and starboard mid-cabin overhead panels.

f. **First Aid Kits**

Starboard forward overhead panel and port aft overhead panel.

g. **Megaphones**

Port forward and aft overhead panel.

h. **Passenger Oxygen masks**

Overhead panels located over every passenger seat

i. **Emergency Locator Transmitter**

Port mid-cabin overhead panel.

j. **Crash Axe**

Attached to the back of the pilot's seat.

k. **Flashlights**

Forward entrance bulkhead, starboard cockpit bulkhead, port aft bulkhead.

l. **Survival Radios**

One in each one-man life raft (starboard forward galley) and one attached to the compartment which contains each 25-man life raft.

m. **High and low pressure oxygen bottles**

One or two low pressure(2 on C-9B aircraft), behind the copilot's seat. Used for firefighting. Two high pressure walk around bottles in the starboard forward overhead panel. Used for crew mobility. One full-faced oxygen bottle located starboard aft overhead panel used for firefighting and crew mobility.

**105.2 State the 2 methods of deploying the tailcone:**

From inside the aircraft, fold the crewmember seat upward, pull aft entrance door handle and turn to OPEN position, and open door. Jettison the tailcone by pulling the EMERGENCY EXIT handle. From outside the aircraft, jettison the tailcone by pushing the access door in and pulling the emergency exit handle out.

**105.3 State the primary fire extinguisher used on the flight line during fueling operations.**

The Halon 1211 fire extinguisher is a 150-pound wheeled unit.

# 106: TRAINING AND READINESS FUNDAMENTALS

**106.1 Explain the following terms associated with Squadron Training:**

a. **Reserve Job Qualification Requirement (RJQR)**

Designed to define and standardize training for on-the-job awarded Navy enlisted classifications (NEC's). The intent of the RJQR is to reflect day-to-day maintenance requirements in the various weapons platforms. RJQR usage will ensure that personnel are able to safely and competently perform maintenance on equipment assigned to their organization and that required training is standard with like type/model/series aircraft.

b. **Reserve Standard Training Administration and Readiness Support (RSTARS)** To provide management information system support to the training functions performed by the Naval Reserve. The major function is to automate and standardize the manner in which training requirements are identified, displayed, compiled and reported for Reserve activities under Commander, Naval Reserve Force (COMNAVRESFOR) and to support the scheduling and documentation of weekend training evolutions.

c. **On-the-Job Training (OJT)**

A local training tool which identifies all the practical training requirements of a unit for a given billet, work center, division or department. Known as "hands-on" training.

d. **Aircrew Coordination Training (ACT)**

Designed to improve mission effectiveness by enhancing crew coordination through increased awareness of seven associated behavioral skills which include: decision making, assertiveness, mission analysis, communication, leadership, adaptability/flexibility and situational awareness. Practicing ACT principles will improve mission effectiveness and reduce the number of mishaps that result from poor crew coordination.

**106.2 Define the following acronyms:**

a. **ADT** - Active Duty Training

b. **AFTP** - Additional Flight Training Period

c. **PBFT** - Planning Board For Training

d. **ATD** - Aviation Training Division

e. **GMT** - General Military Training

f. **PAR** - Professional Advancement Requirements

g. **MTS** - Master Training Specialist

h. **RBTR** - Reserve Billet Training Requirement

**106.3 Explain the purpose of the squadron Planning Board For Training (PBFT):**

PBFT will be held monthly. The purpose is to collect and consolidate training requirements from local commands, departments, divisions and tenant activities and assign instructors and facilities to meet individual activity needs.

# 107: AIRFRAME/ENGINE/FUEL FUNDAMENTALS

**107.1 Discuss the corrosion prone areas of the C-9B/DC-9 aircraft.**

A. On the middle fuselage these areas include:

- seams on the exterior skin and around fasteners. - around window frames - around antenna mounting areas - light covers - overwing emergency exits

B. In the Main landing gear and wheel wells these areas include:

- around cables, pulleys, etc. - around doors and spray deflectors. - around wheels and wheel assemblies. - around all hydraulics and hydraulic components.

C. On the wings these areas include:

- on seams and around fasteners. - on the slats - around the leading edge structure. - around all access doors and panels. - around the wing tips and lights - around the fuel filler cover - around the rear spar - around all control cables and hydraulic lines - around the doors and hinges - near the flaps, spoilers, ailerons, trim tabs - around all static discharge wicks

D. Aircraft Interior

- main cargo door actuator and locks - storage areas - flooring, tracks and floor attachment fittings - overwing exits and frames - around all doors - around the toilets - around all crew seats adjustment mechanisms - rudder pedal adjustment mechanism - around all windows and adjacent areas

**107.2 Discuss the purpose of the Aircraft Automatic Flight Control System (AFCS).**

Better known as the "autopilot," it controls the aircraft in vertical speed, attitude, and heading to reduce workloads on the flightcrew and to provide improved flight comfort and stability. It takes over to control the aircraft in pitch, yaw and roll maneuvering axes. When engaged in a climbing or descending turn, the autopilot will roll the aircraft to a wings-level attitude and hold the vertical speed existing at the time of engagement. Since the autopilot receives VHF navigation, tacan and inertial navigation signals through the pilot flight director navigation selector, VOR/ILS, TAC or INS, as applicable, must be selected on the pilot flight director navigation selector input to the autopilot.

**107.3 State the type and model of the C-9B/DC-9 engine.**

The aircraft is powered by two-axial flow, bypass, turbofan, Pratt and Whitney JT8D-9A engines flat rated at 14,500 pounds of thrust.

**107.4 Discuss the purpose of the constant speed drive.**

The constant speed drive (CSD) transmission is a hydromechanical transmission located on the aft side of the engine accessory drive section, at the bottom center line of the engine. It is used to drive an ac generator at a constant speed of 6000 rotations per minute regardless of the engine speed.

**107.5 Discuss the types of aircraft fueling methods.**

Fueling can be accomplished by pressure or gravity method, with or without power, utilizing conventional ground support equipment. Pressure fueling is accomplished through a fueling adapter located under the right wing. Gravity fueling is accomplished through an overwing fill adapters located on both wings.

**107.6 Define and discuss the term "EPR."**

EPR stands for Engine Pressure Ratio. The EPR indicators receive sensing signals from the respective engine air inlet pressure probe and the turbine discharge pressure probes, and indicate the engine pressure ratio. This is a measure of the thrust being developed by the engine.

**107.7 State the four classifications of fuel leaks.**

**Class "A"** is a slow seep of about 0 to 1/4 inch of leaking fuel.

**Class "B"** is a seep of greater than 1/4 to 3/4 of an inch of leaking fuel.

**Class "C"** is a heavy seep of 3/4 to 6 inches, without dripping for JP-4 or 8 inches and/or 4 drops per minute for JP-5 or JP-8.

**Class "D"** is a running leak. Fuel is greater than 6 inches for JP-4 or 8 inches for JP-5/8; Runs from the surface for both fuels.

**107.8 Define the maximum acceptable hydraulic fluid contamination levels for Navy aircraft and related support equipment.**

Navy standard class five for aircraft and equipment standard class three for support equipment as defined in the Aviation Hydraulics Manual, NA 01-1A-17, or cleaner contamination level shall be maintained.

**107.9 Discuss the safety considerations to be observed when approaching an aircraft with hot brakes.**

Park the aircraft in an isolated location and allow the assembly to cool in ambient air. Do not use agents to accelerate the cooling as it exposes personnel to danger. If necessary use spray water fog to the brake side of the wheel. Approach the wheels fore and aft, due to the possibility of the rim exploding.

**107.10 Discuss the procedure and responsibilities of the Emergency Reclamation Team.**

The team will minimize further damage the aircraft parts and components due to crash, exposure to firefighting chemicals, and salt water. Procedures include: Ensuring the aircraft is safe for maintenance. Removing components from affected areas. Open, loosen, or remove covers, access panels, etc. Allow accumulated salt water to drain off whenever possible. Remove gross amounts of contaminants by flushing with fresh water and draining. Remove components and process them in accordance with the Command Priority List and NAVAIR 01-1A-509.

**107.11 Discuss the warnings involved with pressurizing/depressurizing the hydraulic system.**

The left and right hydraulic systems are pressurized independently. Doorkeepers must be installed when personnel are working in the wheel wells. Keep the wing flap area clear of personnel and equipment whenever the hydraulic system is depressurized with the flaps in the up position. The flaps could drop rapidly to the full down position. Before pressurizing or using the hydraulic system, make certain that thrust reversers, flaps, spoilers, elevators, rudder, forward upper cargo door, leading edge slats, rudder pedals, and control columns are clear of obstructions and personnel. The landing gear control lever is in the down position and that the landing gear lockpins have been installed.

# 108: ENVIRONMENTAL FUNDAMENTALS

**108.1 Discuss the purpose of the following:**

**a. Aircraft Cabin pressurization**

Flying at altitudes up to 37,000 feet, places humans in surroundings in which he cannot survive without artificial aids. At altitudes above 10,000 feet breathing becomes very rapid and above 25,000 feet unconsciousness occurs, quickly followed by death. The higher the altitude the less the amount of oxygen per unit of volume of air, therefore oxygen intake is reduced. Pressurizing the air keeps the oxygen level at a breathable level for passengers and crew. Pressurized air for the cabin is derived from the engine compressors. The air is processed by the pneumatic and air-conditioning systems before entering the cabin. The automatic cabin pressure control system will maintain pressure within set parameters to a maximum of approximately 7.46 pounds per square inch differential pressure.

**b. Air Conditioning**

There are different temperatures at various altitudes and also aerodynamic heating, engine heat, solar heat, and heat from electrical units. Air conditioning is needed to maintain reasonable temperatures for human comfort and aircraft operation. The aircraft has 2 air-conditioning systems designed for use on the ground or in-flight. The right system operates from the right engine bleed air and supplies pressurized conditioned air to the cabin. The left system operates from the left engine bleed air and supplies conditioned air to the flight compartment. Either system can supply the requirements of both components.

**108.2 Discuss the De-Ice system for inclement weather procedures.**

Ice on the airframe decreases lift and increases weight, drag, and stalling speed. In addition, the accumulation of ice on exterior movable surfaces affects the control of the aircraft. The possibility always exists that engine icing may result in loss of power. The total effect of aircraft icing is loss of aerodynamic efficiency; loss of engine power, loss of proper operation of control surfaces, brakes, and landing gear. Loss of aircrew's outside view; false flight instrument indications and possible loss of radio communication. Should any coating of frost be present on the lower wing surface, the captain must be advised. Immediately following a snowfall, the aircraft should be cleared of all snow to prevent melting snow from freezing to the surface and interior areas of the aircraft to which water may flow. Heated deicing solutions may be used effectively to remove snow and ice from aircraft surfaces. Loosened ice should be removed from surfaces immediately. There are several warnings and cautions associated with de-icing. Some of these are:

1. Ingestion of deicing solutions into operating engines used as environmental control air sources can cause smoke and vapors to enter the cabin area.

2. When de-icing avoid excessive fluid flow. Use special care to prevent flushing of resultant slush into control areas forward of the control surfaces.

3. Dilution of deicing solutions with melted snow water could result in a weak mixture which may refreeze. This can create an icing condition more difficult to remove.

4. If it is suspected that snow, slush or ice is present in seal or control areas forward of control surfaces, this must be cleared prior to powering up the hydraulic systems. Failure to do this could result in serious damage to the control surfaces.

5. Never spray deicing fluid or water on or into the pitot tubes, static ports or heater cabin intakes, or against the trailing edge of the wings or control surfaces.

6. Accumulations of deicing fluids and solutions should be removed before from engines or APU before starting. These solutions can cause internal damage to the engines and APU hot sections.

7. When heated water is used for snow and ice removal, deicing fluid should be applied to the surface immediately following to prevent refreezing.

8. Avoid temperatures in excess of 200 degrees F when heating aircraft surfaces and or compartments when using heated air. High temperatures on cold windows can crack windows.

# 109: LINE OPERATIONS FUNDAMENTALS

**109.1 Explain the procedures used to wash an aircraft.**

Open all circuit breakers associated with battery power prior to application of any flammable solvent. Wipe up all excess oil and grease. Close doors and emergency openings. Check drain holes and cover vents, openings and ports. Do not use a direct spray of water or cleaning compound on brakes or wheel/wheel hubs. Wear rubber gloves, goggles, and water-resistant boots during cleaning operations. Clean the aircraft bottom to top and inboard to outboard to avoid streaking caused by the cleaning solution.

**109.2 State the number of personnel required to tow an aircraft.**

Six persons; 2 wing walkers, tail walker, brake rider, tow tractor driver and director. The brake rider will be seated in the cockpit and is there to apply brakes to the aircraft if necessary.

**109.3 Discuss the requirements to be met before the issuance of a support equipment license.**

The member must first attend the appropriate Support Equipment operator training. After receipt of the completion certificate, the individual must complete on-the-job (OJT) and complete a written exam. After completion of the above requisites, the member is issued a SE license. The license is good for three years. Licenses for self-propelled SE are good for three years or upon expiration of the individual's drivers license, whichever comes first.

**109.4 Discuss the procedure for grounding an aircraft.**

Attach ground wires or cables to an unpainted surface on the aircraft and to a certified ground eyelet or a common static earth, which will bleed off static electricity.

**109.5 Describe the conditions that would require the aircraft to be moored.**

Generally all C-9B/DC-9 aircraft will be moored anytime winds exceed 90 knots.

**109.6 State the responsibilities of a Plane Captain.**

1. Complete all training syllabus requirements.

2. Be familiar with and demonstrate practical knowledge of the particular type aircraft and its systems.

3. Perform daily and turnaround inspections in conjunction with assisting others in performing O-level maintenance.

4. Assist pilots in flight preparation and be capable of advising them of the material condition of the aircraft.

5. Be responsible for the cleanliness and prevention of corrosion on the aircraft by pursuing an effective and continual preventive maintenance program.

6. Perform work required and assist on phase, special, and conditional inspections within the rating specialty and as required by Maintenance Requirements Cards.

7. Be thoroughly familiar with and demonstrate knowledge of the aircraft cockpit, controls, systems, starting, and ground turnup procedures.

8. Be thoroughly familiar with fueling and defueling procedures.

9. Be familiar with servicing procedures, taking oil samples, servicing and performing maintenance on engine/gearbox systems and the documentation of oil consumption.

**109.7 Discuss who initiates a Support Equipment Misuse/Abuse report and how it is routed.**

Reporting Support Equipment (SE) misuse/abuse is an all hands' responsibility. Anyone witnessing SE misuse or abuse is expected to prepare and forward a SE Misuse/Abuse Report (OPNAV 4790/108) to the activity with Individual Material Reporting List (IMRL) reporting responsibilities for the SE item. Handwritten forms are acceptable. QA will assign a control number and prepare an official typewritten report for the Maintenance Officer's signature. The report is forwarded to the CO of the command which held custody of the item.

**109.8 Discuss the procedures used for the issue and receipt of Support Equipment.**

All personnel shall have in their possession a valid USN Aviation Support Equipment Operator's License (OPNAV 4790/102) for specific equipment being checked out. A joint preoperational inspection shall be performed, using the applicable MRC's prior to issue. The inspection shall be done by the issuing and receiving personnel. The SE Preoperational Record (OPNAV 4790/64) shall be signed by the user. For receipt: persons shall have in their possession a valid OPNAV 4790/102 for the specific equipment being returned, along with the SE Preoperational Record. A joint inspection is performed using applicable MRC's.

# 201: AIRFRAME SYSTEMS

**201.1.1 Fuselage**

The following is a list of items found on the fuselage of the C-9B/DC-9 aircraft:

**a. Radome**

**What is its function?**

Provides a visual display of weather precipitation up to a 180-mile range so that its associated hazards can be avoided. It also provides for ground mapping and terrain avoidance.

**Where is it located?**

It consists of an antenna in the nose, a receiver-transmitter in the forward accessory compartment, a control panel and an indicator in the cockpit.

**What are the safety precautions?**

Never operate or test the radar system with maintenance workers present. The radio frequency energy can cause a heating of the body tissues and possible cataracts.

**b. Flight compartment**

**What is its function?**

Consists of all the flight instruments and visual aids needed for flight.

**Where is it located?**

In the cockpit.

**c. Main cabin**

**What is its function?**

It is the main area in the aircraft where passengers are seated and cargo is loaded and shipped. It extends to 60.7 feet, is 115 inches wide and 80 inches high.

**Where is it located?**

The main cabin area runs from station 234 to station 963.

**d. Jettisonable Tailcone**

**What is its function?**

The tailcone, when jettisoned, provides an emergency exit accessible from the main cabin through the aft entrance door and with the aft stairway ceiling in the down position to form a walkway.

**Where is it located?**

The tailcone is attached to the aft end of the fuselage and is jettisonable.

**201.1.2 Wings**

**What is its function?**

**a. Left wing**

The port wing; primary lift surface on the aircraft.

**b. Right wing**

The starboard wing; primary lift surface on the aircraft.

**201.1.3 Tail:**

**a. Horizontal stabilizers**

**What is its function?**

Provides stability of the aircraft about its lateral axis. This is longitudinal stability. The horizontal stabilizer serves as a base to which the elevators are attached. The elevators control pitch or the movement of the nose of the aircraft in an up and down motion.

**Where is it located?**

On the tail of the aircraft. It serves as a base for the elevator.

**b. Vertical stabilizer**

**What is its function?**

Maintains the stability of the aircraft about its vertical axis. This is known as directional stability.

**Where is it located?**

Located on the tail the vertical stabilizer usually serves as the base to which the rudder is attached.

**201.1.4 Flight controls/surfaces:**

**a. Flaps**

**What is its function?**

Gives the aircraft extra lift. Their purpose is to reduce the landing speed, thereby shortening the length of the landing roll out. Flaps, when extended, increase the camber of the wing, thereby increasing the lifting effect of the wing.

**Where is it located?**

On the aft trailing edge of the wings.

**What are the modes of operation or control?**

The wing flaps are a double-slotted type that move aft and down. The flaps are actuated by two hydraulic cylinders. The flaps are normally operated by both hydraulic systems. The flaps are controlled by a flap control handle which can set the flaps from UP to 50 degrees extended.

**What are the safety precautions?**

Always clear the area of maintenance workers or personnel before extending or retracting the flaps. Personnel can become trapped in the moving surfaces.

**b. Ailerons/trim tabs**

**What is its function?**

They control the rolling or banking motion of the aircraft. Trim tabs control roll or bank in small increments.

**Where are they located?**

They are attached to the trailing edge of the wings.

**What are the modes of operation or control?**

The ailerons are protected against ground gust forces by viscous dampers and hydraulic cylinders. A takeoff warning horn is provided should the flight surfaces be in the incorrect position for takeoff. Control wheels are connected by cable connected to control tabs on the ailerons, and the aerodynamic force on these tabs moves the ailerons. Each aileron contains a conventional trim tab connected by cables to a trim knob on the pedestal.

**e. Elevators/Trim tabs**

**What is its function?**

Elevators control the climb or descent (pitching motion) of the aircraft through geared trim/control tabs.

**Where are they located?**

They are attached to the horizontal stabilizer on the tail.

**What are the modes of operation or control?**

The elevator control system is an aerodynamic boost system that operates a single control tab on each elevator and is driven by an independent two-way cable system from the corresponding control column in the cockpit. The system will nosedown assist if the elevator control tab is displaced approximately 10 degrees, but normally= the maximum elevator nosedown tab used is 8 degrees.

**e. Slats**

**What is its function?**

Slats are used to improve lift at low speeds. They allow the aircraft to be controlled at airspeeds below the normal landing speed.

**Where are they located?**

They are attached to the leading edge of the wing.

**What are the modes of operation or control?**

When the slat is retracted, it forms the leading edge of the wing. When the slat is open or extended forward, a slot is created between the slat and the wing leading edge. Thus, high energy air is introduced into the boundary layer over the top of the wing. Each slat is actuated by two hydraulic cylinders. The cylinders are powered by the left and right hydraulic systems. Normally, the slats operate by pressure from both hydraulic systems, but will continue to operate at a reduced rate with pressure from a single system. The slat control handle is found in the cockpit.

**d. What are the safety precautions?**

The slats should never be extended or retracted without first calling for hydraulics and checking to be sure that the area is clear. Personnel can be trapped between the moving surfaces.

**201.1.5 Landing gear**

**a. Strut**

**What is its function?**

Struts absorb the shock that otherwise would be sustained by the airframe.

**Where is it located?**

The strut is part of the wheel assembly. The wheels are mounted on the strut assembly.

**b. Brakes**

**What is its function?**

Used to slow and stop the aircraft. Also, used to prevent the aircraft from rolling while parked.

**Where are they located?**

Each main gear wheel is equipped with a disc-type power brake actuated by two separate sets of cylinders, each powered by a separate hydraulic system or its own accumulator.

**c. Wheels**

**Where are they located?**

The aircraft has dual (two) wheels attached to each shock strut assembly.

**d. Landing gear doors**

**What is its function?**

These are doors which close flush with the fuselage after the landing gear is extended.

**Where is it located?**

Landing gear doors are hinged to the fuselage around the main landing gear and the nose landing gear.

**What are the safety precautions?**

When working in the main landing gear area, be sure to use the Belly Bypass handle. The handle, located on the lower center fuselage forward of the main landing gear doors, places the main landing gear and gear doors hydraulic system in the bypass condition when the OPEN position is selected. Warning: If the main gear door release handle is returned to the closed position, with right hydraulic system pressurized, the doors will automatically close.

**201.1.6 Hydraulics**

**a. Pumps**

**What is its function?**

They are used to supply hydraulic fluid to a system.

**Where are they located?**

Left and right engine pumps installed on each engine. An alternate hydraulic motor/pump provides a mechanical connection between the right and left system to drive a pump that will provide pressure in the opposite system. This is located in the right wheel well. And an electrically driven auxiliary pump, located in the right wheelwell, to provide normal operation of the right system if needed.

**What are the modes of operation or control?**

The aircraft has two completely independent hydraulic systems. There are no provisions for routing hydraulic fluid from one system to the other. Each system has a hydraulic reservoir, required filters, valves, accumulator, and an engine-driven hydraulic pump. Fluid supply to the engine-driven pumps can be stopped by pulling the fire shutoff handles, thereby mechanically closing the hydraulic fire shutoff valves.

**b. Reservoirs**

**What is its function?**

It is a storage area for 3 gallons of hydraulic fluid. A site glass is located on the reservoir to check for excessive air accumulation.

**Where is it located?**

In the left and right wheelwell. There is one reservoir for each system.

**c. Accumulators**

**What is its function?**

Used to provide means for checking initial charging pressure. They provide uniform pressure for lateral control spoiler operation.

**Where is it located?**

Two accumulators are located in each wheelwell.

**d. Actuators**

**What is its function?**

Actuators are the mechanical means by which the cargo door, stairs, nose wheel steering, flaps, slats, and landing gear all function.

**e. Fluids**

**What is its function?**

Keeps the system working by working as the main pressure inductive liquid. Conducts pressure into work.

**Where is it located?**

Located throughout the system and primarily in the accumulators.

**What are the safety precautions?**

Do not get into the skin or eyes.

**201.1.7 Aircraft doors**

**a. Forward stairs and components**

**What is its function?**

The forward stairs provide exit capability from the aircraft.

**Where is it located?**

Port side of the aircraft under the forward entrance door.

**What are the safety precautions?**

Do not open the door for normal deplaning until the slide girt bar is properly stowed. There is a lockable mechanical detent latch provided to lock the stairway in the extend position when electrical power is removed from the stair circuit. The stairway has handrails which must be extended when the stairs are extended when the stairs are to be used. This will keep personnel from falling off the stairs.

**b. Aft stairway and components.**

**What is its purpose?**

Used for exiting the aircraft from the aft.

**Where is it located?**

The stairs are part of the aft tailcone which is lowered and extended for entering or exiting the aircraft.

**What are the safety precautions?**

Prior to actuating the AUX hydraulic pump for aft stairway door operation, visually check the exterior of the aircraft to ensure all personnel are clear. Do not free fall the stairway after it has been manually stowed because of possible damage to the stairway.

**c. Service door**

**What is its function?**

Designed to be used when additional servicing is required on the aircraft and as not to interfere with passenger loading.

**Where is it located?**

It is the starboard forward entrance door. It is smaller than the port entrance door.

**d. Main cargo door**

**What is its function?**

It used for loading palletized or loose cargo into the main cabin area.

**Where is it located?**

Located on the left side of the fuselage aft of the forward passenger door.

**What are the modes of operation or control?**

To open the cargo door from inside the aircraft, there is a door control handle located near the forward entrance door, under a floor panel door. The door can also be manually opened from the outside by placing the lockpin control handle to the UNLOCK position and inserting a bar into the external manual latch release.

**What are the safety precautions?**

Do not taxi the aircraft with the main cargo door opened or unlatched. If wind velocities from 40 to 65 knots are anticipated, the main cargo door may be opened to the 84-degree position only if the aircraft is parked so that the wind direction is against the right side of the aircraft; otherwise, do not open the door.

**What are the probable indications if the door fails?**

If the cargo door fails to close the MAIN CARGO DOOR annunciator light will come on in the cockpit. Also, the lockpins may not be engaged in the latches. On the outside of the cargo door there are three visual indicators which should all be in the LOCKED position. If one or all of the three indicators read UNLOCKED the door is not properly secured.

**e. Lower baggage hold doors**

**What is its function?**

It is a door which seals up the lower cargo compartments for flight.

**Where is it located?**

On the lower starboard side of the aircraft. There are two baggage hold doors. One forward of the wing and one aft.

**What are the modes of operation or control?**

Both doors have a round shaped access handle. The handle must be pushed in on the right side which will protrude the left side of the handle. Grab and twist the handle down and counterclockwise to unlatch the door. Push up on the door until it cannot be raised any further. Return the handle to its original position. This will latch the door to the baggage compartment=s ceiling.

**What are the probable indications if this component fails?**

A light will come on in the cockpit annunciator panel indicating that the door is not properly closed. Outside the aircraft, the access handle will not be flush with the door if the door is not closed.

**201.1.8 Cabin Pressurization system:**

**a. Air Turbine pacs**

**What is its function?**

Provides air conditioning and pressurization for the aircraft.

**Where is it located?**

There are two air pacs. Both are in the tail compartment, port and starboard sides.

**b. Outflow valve**

**What is its function?**

These valves enable the aircraft to maintain a certain aircraft pressurization rate.

**Where is it located?**

The cabin air outflow nozzle is located in the aft pressure bulkhead, and is part of the cabin air outflow valve. The cabin air outflow butterfly valve is located on the aft port side of the aircraft fuselage and both act together to keep cabin pressurization within prescribed limits.

**C. Dual pressure relief valve**

**What is its function?**

Protect the aircraft from excess cabin ambient pressure differential. The relief valves are set to limit cabin pressure to approximately 8.06 pounds per square inch differential.

**Where is it located?**

This consists of the cabin air outflow nozzle and the cabin air outflow butterfly valve and are located on the aft port side of the fuselage.

**201.1.10 Fire Extinguishing Units**

**a. Engine**

**What is its function?**

Used to extinguish an engine fire. They contain an extinguishing agent known as bromotrifluoromethane.

**Where is it located?**

Located in the aft tail compartment. There are two bottles. Both are located on the port side and both have three extinguishing lines: one for each engine, and one for the APU.

**What are the safety precautions?**

The agent is not designed to be recharged while installed on the aircraft. Do not allow extinguishing agents to come in contact with the skin, eyes or mouth. The extinguishing agent is a respiratory hazard. Do not inhale.

**b. Auxiliary Power Unit (APU)**

**What is its function?**

Used to extinguish an APU fire. They contain an extinguishing agent known as bromotrifluoromethane.

**Where is it located?**

Located in the aft accessory compartment near the APU.

**What are the safety precautions?**

Do not allow extinguishing agents to come in contact with the skin, eyes or mouth. The aft fire warning horn for an APU fire is very loud. Exposure to the horn for a period of time without hearing protection can may affect your hearing ability.

**201.1.11 Discuss the types of oxygen systems:**

**a. Liquid oxygen**

**What is its function?**

Used to supply breathable oxygen when needed to the passengers, cabin crew, and cockpit.

**Where is it located?**

Located in the nose section of the aircraft. Breathable oxygen is located through oxygen masks distributed throughout the cockpit and cabin.

**What are the safety precautions?**

Detailed safety precautions are discussed in section 101: Safety Fundamentals, of the C-9B/DC-9 specific JQR.

**b. Gaseous oxygen**

**What is its function?**

To provide breathable oxygen for the cockpit crewmembers, passengers and crew when needed.

**Where is it located?**

In two large portable cylinders located behind the copilot's seat.

**What are the safety precautions?**

The portable oxygen cylinders are compressed gases and are considered a hazardous material. Do not handle oxygen cylinders unless certified to do so.

**c. Walkaround bottles**

**What is its function?**

To provide oxygen to cabin crewmembers in the event of fire, decompression, or for emergency first aid oxygen.

**Where is it located?**

There are two high pressure bottles located forward of the 25 man rafts in the overhead panel used for crew mobility in the event of cabin decompression. One high pressure oxygen bottle with a full-face oxygen mask is located on the starboard side, aft of the 25 man life rafts, in the overhead panel. Its primary use is for firefighting. And two high pressure bottles located in the aft coat closet, on the starboard side, forward of the aft lavatory. The bottles are mounted to the bulkhead there and are used for crew mobility and first aid. On C-9B model aircraft, a low pressure bottle is located aft of the copilot's seat. It is used for firefighting.

**201.1.12 Discuss the following:**

**a. Lavatories**

**What is its function?**

They provide sanitary facilities for passenger and crew which include razor outlets, sinks, and toilets.

**Where are they located?**

There are two lavatories. One located forward, port side, just aft of the entrance way. The second is located aft, starboard side, just forward of the aft entrance way door.

**What are the safety precautions?**

In an emergency, first aid oxygen is available in the lavatory area. In an emergency, the lavatory door may be unlocked from the outside by inserting a screwdriver or sharp object into a slot on the OCCUPIED sign on the door latch and sliding the sign to the VACANT position. Smoke detectors are installed in each lavatory and smoking is strictly prohibited.

**b. Potable water**

**What is its function?**

Used for drinking water and for clean, washing water dispensed by sink faucets located in each lavatory. May be used to charge the toilet flushing system.

**Where is it located?**

The potable water charging station is located forward of the starboard forward baggage compartment.

**c. Galley**

**What is its function?**

Contains items used for passenger and crew comfort needs including an oven, coffee maker, electrical control panel, refrigerator, freezer, and miscellaneous galley equipment.

**Where is it located?**

There are two galley areas. One located forward, next to the forward service door, just aft of the cockpit area. The second is located aft in the cabin just forward of the aft entrance door, port side.

**201.1.13 Discuss the purpose of the aircraft Anti-ice/De-ice system.**

Ice present on flight surfaces can effect normal flight control by decreasing lift, increasing weight drag, and inducing stalling speeds. It can result in uncontrollable aircraft functions and increased fuel consumption. The aircraft ice protection system employ hot air and electrical resistance heating for anti-icing and defogging. Rain removal is accomplished by means of chemical repellant and mechanical wipers.

# 202: ENGINE SYSTEMS

**202.1.1 Thrust Reverser**

**a. What is its function?**

The thrust reversers direct engine exhaust gases forward, above and below the engine nacelle to reverse forward motion.

**b. Where is it located?**

Each engine is equipped with a thrust reverser that consists of two doors or deflectors, that form the aft nacelle fairing when the doors are in the stowed position.

**c. What are the safety precautions?**

The reverser control valve has a manual override control arm that may be manually operated from the exterior of the aircraft through an access door to deactivate the thrust reverser doors in the stowed or open position for safe ground maintenance or inspection. To operate the manual override, the control valve arm is rotated to the dump position and a safety pin, provided in stowage clips, is inserted through the control valve arm. This action ports thrust reverser actuator and accumulator pressure to return, and aircraft hydraulic system pressure is blocked. The access door to the reverser control valve cannot be closed until the override control arm is placed in a safe flight position.

**202.2 Auxiliary Power Unit (APU)**

**a. What is its function?**

The APU is a gas turbine engine that supplies pneumatic power and drives an APU mounted generator to supply electrical power. When the aircraft is on the ground, the APU supplies pneumatic and electric power for starting the main engines, for fuselage air conditioning, and for operating the complete electrical system. When the aircraft is in flight, the APU is operable to supply an alternative source of electrical power. The APU is not designed to supply pneumatic power in flight.

**b. Where is it located?**

The APU is mounted transversely in a fixed, fire proof, sound-attenuated, enclosed compartment on the lower centerline of the fuselage aft of the rear pressure bulkhead.

**c. What are the safety precautions?**

Remove all covers and inspect the area for foreign objects and foreign object damage (FOD).

**202.3 Fuel System:**

**Fuel cells/tanks**

**a. What is its function?**

The fuel supply system is designed to provide uninterrupted fuel flow under all conditions and attitudes encountered in normal service. The system permits fuel servicing from a single point on the bottom of the right wing by one man, without ground support equipment other than a fuel servicing unit. The system may also be serviced by gravity feed at fill points on the top outboard end of each wing.

**b. Where is it located?**

There are 3 integral wing tanks, a forward fuselage tank, and an aft fuselage tank.

**c. What are the safety precautions?**

When fueling the aircraft, ensure it is grounded and there is a fire bottle watch posted.

**Vents**

**a. What is its function?**

Allows fuel vapors to escape from the fuel tank/cell during fueling. Allows air to return to the tank as fuel is consumed.

**b. Where is it located?**

Located on the bottom of each wing tip.

**c. What are the safety precautions?**

Stay away from fuel vents when fueling. Fuel vapors are a respiratory hazard. Be certain that vents are unobstructed.

**Fuel Boost Pumps**

**a. What is its function?**

To provide adequate fuel flow to both engines at takeoff power.

**b. Where is it located?**

There are two installed in each tank.

**c. What are the safety precautions?**

There are thermal switches installed within each pump that are not self-resetting.

**Control Panels**

**a. What is its function?**

The control panel contains switches that are necessary for turning the boost pumps on and off.

**b. Where is it located?**

Overhead panel in the cockpit.

**202.3.1 What is the C-9B/DC-9 total fuel capacity in pounds?**

The combined total fuel capacity is 5,920 U.S. gallons or 38,770 pounds based on a fuel density of 6.539 pounds per gallon.

# 203 AVIONICS/ELECTRICAL SYSTEMS

**203.1.1 Discuss the purpose of the following communication equipment:**

**a. Public Address System**

The public address system enables the pilots and the flightcrew to address the passengers through speakers located in the cabin of the aircraft. Each has a handset that looks like a telephone.

**b. Ultra High Frequency (UHF)**

Radio frequencies between 225.00 and 399.95 megahertz used in various UHF radios.

**c. Very High Frequency (VHF)**

Radio frequencies between 116.000 and 149.975 megahertz used in various VHF radios.

**d. High Frequency (HF)**

Radio frequencies between 2 and 29.50 megahertz used in the HF radio.

**203.2 State the purpose of the following navigation equipment:**

**a. Inertial Navigation Systems (INS)**

Provides navigation and guidance data without reference to ground-based navigation aids. Provides steering guidance, tracking, capture of the signal, and leg transfer signals to the autopilot. It also provides steering commands to the flight directors and true heading, desired track, and track deviation.

**b. Tactical Air Navigation (TACAN)**

Provides bearing and range up to 300 nautical miles to a selected TACAN facility or to the surface or airborne tacan beacon.

**c. Global Positioning System (GPS)**

Global Positioning System. Works in conjunction with a minimum of three global satellites to provide exact location in longitude, latitude and attitude. Accurate within 3 to 6 meters.

**d. Automatic Direction Finding (ADF)**

There are 2 identical ADF systems installed in the aircraft and they receive signals from radio range stations, commercial AM stations, and low-frequency nondirectional navigation aid stations in the 190- to 1750-kilohertz frequency range.

**e. Traffic Collision Avoidance System (TCAS)**

Traffic Collision Avoidance System. Tells the exact position or location of other aircraft traffic.

**203.3 State the purpose of the following tactical mission equipment:**

**a. Voice Recorder**

The voice recorder records and preserves all sounds and voice conversations audible on the flight deck and communications heard on either the pilot, copilot, or crewchief headsets. The recorder will record and preserve the last 30 minutes of sounds and communications.

**b. Flight Recorder**

The flight data recorder is an airborne recorder that provides a record of pressure altitude, indicated airspeed, heading, vertical acceleration with respect to time, and time correlation of communication with Air Traffic Control. The tape provides 300 hours of recording for each side of the tape. The recorder and tape are fireproof, waterproof, and able to withstand unusual shock and vibration.

**203.4 State the function of the following equipment:**

**a. Aircraft Battery**

The aircraft has 2 series-connected nickel cadmium 14-volt batteries that provide emergency alternating current (ac) and direct current (dc) power to essential flight instruments and necessary lights and radios in the event of a total loss of ac power. The batteries are also used for power to start the APU and run the refueling system via the emergency inverter when normal ac power is not available.

**b. Main alternating current (ac) generator**

The voltage output of each generator is controlled by a static adjustable-type voltage regulator set to maintain 115-volts ac output.

**203.1.5 State the purpose of the Electrical Priority System.**

The ac power distribution system is divided into two separate systems operating independently of each other, but with crosstie capabilities. The right and left ac generators supply power, through the right and left generator relays, directly to the respective generator buses for distribution. Power from the APU or an external power supply may be routed to either or both generator buses when the respective engine driven generator is not operating. In the event that either generator shuts down for a fault on that generator bus, the ac crosstie relay will lock open, isolating that bus from the rest of the system. There is a priority control of ac power to the right and left generator buses. The engine driven generators have the highest priority. The APU generator has the next priority, and the external power has the lowest.

**203.1.6 State the purpose of the following aircraft lighting systems:**

**a. Strobe lights**

Strobe lights are installed on each wingtip. They are used to designate the end of each wingtip.

**b. Position lights**

The forward position lights consist of a red light on the left (port) wingtip and a green light on the right (starboard) wingtip. They indicate the respective wingtips to other aircraft and ground proximity operations.

**c. Nacelle lights**

The engine nacelle lights are installed on each side of the fuselage and are provided to visually check the engine nacelles and wing leading edges for icing conditions.

**d. Wing landing lights**

One retractable wing landing light is installed on the lower surface of each wingtip. They are used to aid in illuminating the landing surface or runway.

**e. Nose taxi lights**

Two, sealed-beam, fixed position lights are installed on the nose gear assembly. They are used to aid in illuminating the landing surface or runway.

**f. Anti-collision lights**

The anti-collision lights are installed on the upper and lower fuselage surfaces. They illuminate the aircraft at night and they are illuminated whenever the engines are running.

**g. Ground flood lights**

A fixed position ground floodlight is installed on each side of the fuselage to provide area lighting for ground servicing and to aid side visibility while taxiing.

**h. Downlock lights**

These lights are located in the cockpit to indicate if the landing gear is in the down and locked position.

**i. Interior/emergency evacuation lights**

The emergency evacuation lighting system consists of numerous lights and lighted exit signs located throughout the main cabin, flight compartment, and aft stairway compartment. The lights are powered by 8 rechargeable battery packs that supply power for approximately 15 minutes. The lights are controlled by the emergency lights switch located on the overhead switch panel or the emergency lights switch located on the aft flight attendant panel.

**203.5.1 Discuss the precautions used when handling cracked emergency exit signs containing tritium gas.**

Escaping radioactive tritium gas may present a health hazard. If gas is inhaled, seek immediate medical advice.

# 204: WARFARE MISSION AREA

**204.1.1 State and explain the squadron mission statement.**

To provide fleet logistical support to all branches
of the military.

To provide training to the Selected Reservists.

**204.1.2 State the command's operational chain of command.**

- Commanding Officer
- Executive Officer
- Department Head
- Division Officer
- Division Chief
- Leading Petty Officer
- Immediate Supervisor
- Nonrated Personnel

**204.1.3 Discuss the role of the C-9B/DC-9 mission.**

The C-9B/DC-9 was designed to provide worldwide transportation
of personnel and cargo, as deemed necessary by the United States Military.

**204.1.4 Discuss the following Primary Warfare Mission areas:**

**a. Command Control Communications**

- Provide for their own unit's command and control functions.
- Provides all personnel services, programs and facilities to safeguard classified information.
- To carry out emergency destruction of classified matter.
- To employ Identification Friend or Foe (IFF)
- To provide communication for own unit
- To maintain tactical voice communications
- To process message traffic.

**b. Fleet Support Operations**

- Provides First Aid assistance.
- To train personnel in First Aid.
- To provide fleet training.
- To provide cargo handling training.

**c. Logistics**

- To provide airlift of personnel, cargo and mail.

**d. Mobility**

- To support and provide aircraft for all weather operations.
- To prevent and control damage.
- Maintain security against unfriendly acts.
- To fly on a short-notice if necessary.
- Perform seamanship, airmanship and navy related tasks.
- To maintain mount-on capabilities.
- To provide rapid airlift and detachment persons.
- To maintain the health and well-being of the crew.
- To monitor hazardous material.
- To maintain reserve unit mobilization readiness.
- To conduct operations ashore or to operate in cold or desert environments.
- To conduct peacetime exercises.

**204.1.5 Discuss the Secondary Warfare Mission area:**

- To provide administration and supply support of your own unit.
- To provide supplies, clerical, messing, maintenance and security for the unit.
- To provide upkeep and maintenance of own unit.
- To provide emergency and disaster assistance.
- To provide evacuation of noncombatant personnel.
- To provide transportation of evacuees.