Delta-C&S

AIR LINES

A REVIEW OF THE DC-7

Time is Money!

ON TIME OPERATION
is a result of:

Job Knowledge

Equipment Handling

Personal Interest

The Finest

The Fastest

The Newest

Aircraft flown

KNOW YOUR DC-7

Delta-C&S AIR LINES

The arrival of the DC–7 is another example of the never ending progressive policy of the Delta–C&S management. Our Company continues to offer the finest service to the passengers and provide employees with the newest and best aircraft for operations over Company routes.

With the DC–7, Delta–C&S takes the back seat to no one. Each employee, whether a member of the crew or of the ground team, can be especially proud of his Company, realizing there is no finer aircraft flying anywhere for any airline.

CONTENTS

Operating functions described herein are maintained in the Standard Practice system. The Standard Practices, as contained in Company manuals, are not just confined to individual departments, but are coordinated between departments involved as a factor in accomplishing the various procedures, so as to reduce duplication and confliction of procedures. Standard Practices are written in a particular manner to fulfill this coordination. They are written as a method of explaining procedures in sequence to accomplish a particular work assignment, that is, to show the correct order of events necessary to accomplish that particular work. The versatility of the Standard Practice is further displayed by the adaptability of the written procedure for use as training material without changing either form or context.

Many people will be interested in studying the DC-7 in more detail than is given in the text of this review. In order to give each person the necessary operating data for his particular job, manuals were written covering every phase of operation. Available in the library are copies of the DC-7 Maintenance Manuals, Volumes I and II; DC-7 Wiring Book and Equipment List; DC-7 Pilots Handbook; Ground Service Data Book; Stewardess Manual, which includes procedures for the DC-7; Station Procedures Manual, which contains Standard Practices of DC-7 Station operations. The library is located in the Training Department Room 221, General Offices, Atlanta, Georgia. Any text available in the library may be checked out for a two week period and renewed if desired. If you are unable to come to the library, send a memo addressed to Library, P & T, ATL. Your request will be promptly handled and your requested text shipped to you via company mail.

As a supplement to the Technical Training manuals, and training text, this guide is offered for study by those persons not directly concerned with the maintenance or flight operations of the new DC-7. Through study of this guide you will be able to obtain a comprehensive picture of the operating functions relating to sales features, passenger comfort, ramp servicing, cargo and baggage handling, and cabin service equipment.

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BACKGROUND ON THE "7"

The performance and reliability of an airplane is the result of the experience and ability of its builder. The word Douglas has been taken from the corporate name to become a standard in the industry for excellence of aircraft. "Douglas Standard" is a measure of quality. The following test briefly reviews the history of the Douglas Company, builder of the DC–7.

A history of the Douglas Aircraft company is a history of aviation's growth and expansion during the last three decades. Here, in chronological order, are the highlights of this company's 30 years of development.

The Douglas Aircraft Company was founded by Donald W. Douglas in 1920, with working capital of $600. (The total assets of the company, as of November 30, 1950, were more than $100 million.)

The first Douglas airplane was built in that first year, 1920. It was the Cloudster, first airplane in history to lift successfully its own weight in payload and thus establish the basis for the future economics of air transport.

In 1922 the first Douglas military airplane was built. It was constructed for the U. S. Navy and was the world's first torpedo plane.

For the U. S. Army, Douglas designed and built observation planes, designated O–2's. The O–2H model brought the company its first million-dollar order.

In 1924, Douglas again made aviation history, when Army Air Force pilots flew three Douglas biplanes 28,945 miles, the first airplanes to fly around the world. (Today, Douglas transports fly 20 times around the world every day.)

In 1927, the year Charles A. Lindbergh flew the Atlantic, the first airplane especially designed for air mail–by Douglas–was placed in service by Western Air Express. This was the famous M–2.

In 1929, with sales rising to $2.5 million, Douglas moved to the present location of the Santa Monica Division at Clover Field.

Thoroughly established as a manufacturer of military aircraft, in the early 1930's Douglas turned to the development of commercial air carriers of which the prototype DC–1 (Douglas Commercial – 1) was the first of a line to become familiar to the entire world.

It was a Douglas DC–2 which finished second in the 1934 London–Melbourne, Australia, race, competing against supposedly much faster racing planes.

The Douglas DC–3, probably "the world's most honored airplane," was introduced in 1935 and entered airline service in 1936. Known to the U. S. Air Force as the C–47, to the Navy as the R4D, and to the Royal Air Force and other of our allies as the Dakota, the DC–3 became the "work horse of the war." Commercially, it has been flown in every country in the world where airplanes can land and take off. The company constructed a total of 10,691. No transport airplane in history was ever built in such numbers, none served so many owners and individuals so faithfully or well. Today, more than 6,000 remain in world-wide operation.

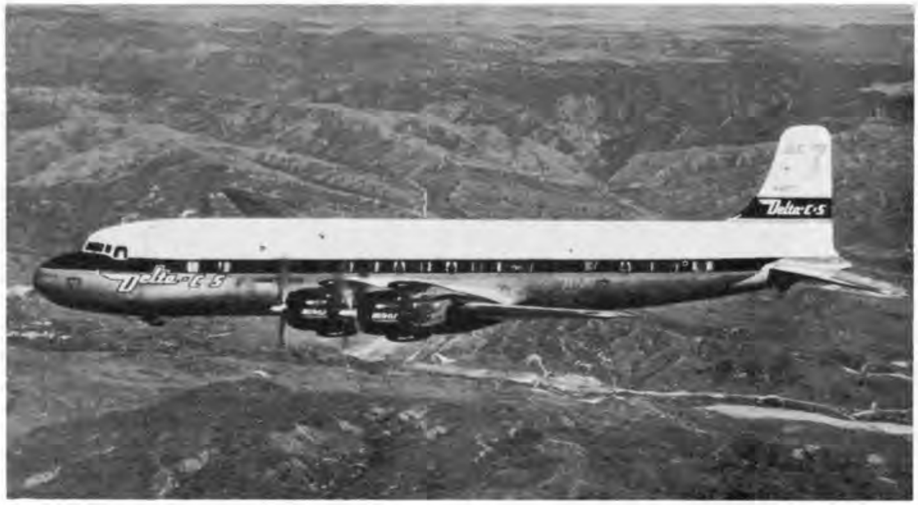
Before and during the war years, Douglas was a large-scale manufacturer of combat aircraft as well as transports. From Douglas assembly lines came the A–20 Havoc and B–26 Invader, rugged medium bombers; carrier attack planes were the SBD Dauntless and the famed AD Skyraider series. The DC–4 and its military counterpart, the C–54 Skymaster, succeeded and supplemented the DC–3 as a prime mover of cargo and personnel, inaugurating the era of trans-ocean flying now accepted as routine.

Douglas plants are currently producing the jet-driven F3D Skyknights; the turbo-prop A2D Skyshark. New, more powerful piston engines are mounted in the new DC–6 series, in the tremendous C–124. The Tulsa Division is preparing to produce the swift, jet-powered B–47.

With the introduction of the DC–7 to the air transportation industry, the Douglas Company moved another step forward. This latest Douglas airplane offers to the airline the economy, speed and dependability modern commercial aviation demands. The DC–7 flying today will supply the service and luxurious refinements expected from air transports of tomorrow.

MEET THE MAJESTIC SEVEN

A DESCRIPTION OF THE AIRPLANE



The Douglas DC-7 is a long-range, low-wing monoplane powered by four Curtiss-Wright R-3350 turbo-compound engines. The DC-7 continues the clean aerodynamic design of the DC-6 series and is in fact quite similar in appearance and dimensions.

The DC-7 has a fuselage length of 108 feet 11 inches, wing span 117 feet 6 inches, and stands 28 feet 7 inches high at the tip of the vertical stabilizer. It is thus 8 feet 4 inches longer than the DC-6, with other exterior dimensions remaining the same.

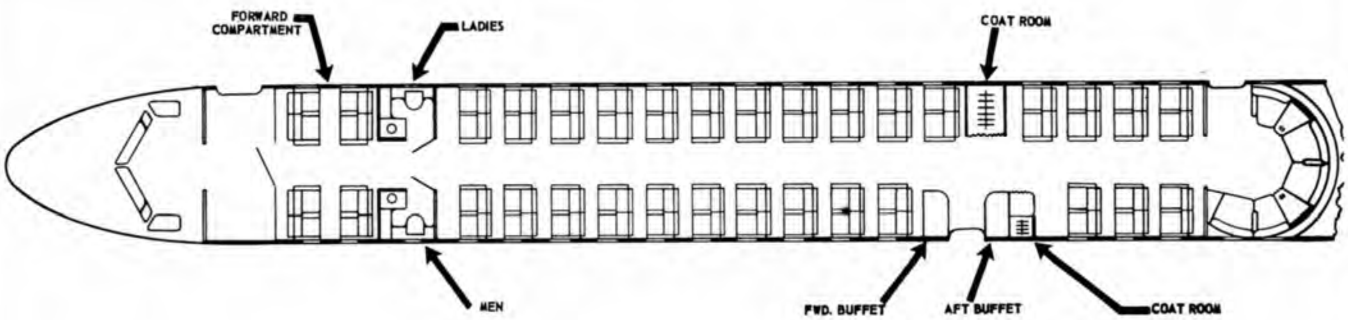
The passenger cabin will accommodate 69 passengers, plus two cabin attendants. A forward compartment seating eight is separated from the main passenger cabin by twin toilet compartments. The lounge in the rear as featured in the DC-6 is retained, seating five rather than six. An additional auxiliary exit has been installed on the forward right hand side of the lounge. The buffet area and coat room are similar to those of the DC-6 series. The main cabin door is moved aft 40 inches, due to increased fuselage length, and it is expected that the new door location will result in a material reduction in damage to wing fillet and flap trailing edge caused by loading ramps.

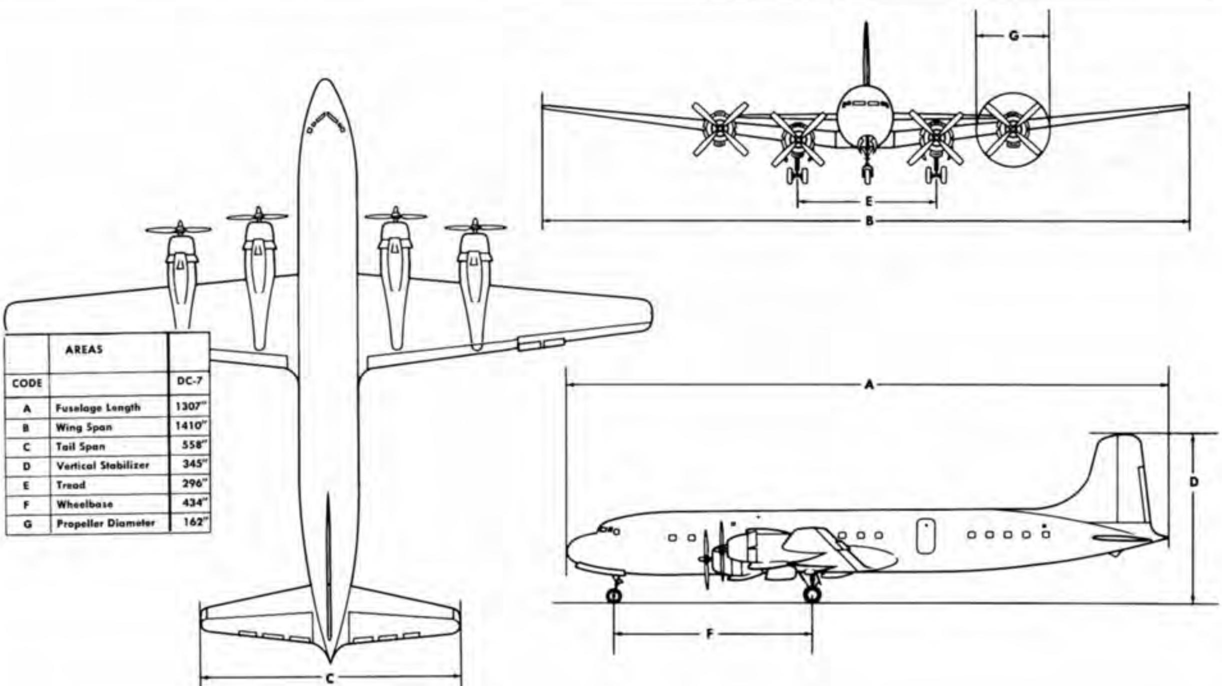
The DC-7 retains the same wing, fuselage and tail design as used on the DC-6 and DC-6B. The all-metal fuselage has the familiar contours of the constant cross section at the center. Two loading doors located along the lower right hand side of the fuselage permit access to two cargo compartments located forward and aft in the belly of the fuselage. The wing, including ailerons and flaps, is of all metal construction. The horizontal and vertical stabilizers are all metal, with all metal elevators and a rudder of metal frame, fabric covered construction.

The landing gear is retractable tricycle type, incorporating five wheels, two on each main gear, and a steerable single nose wheel. Retraction and extension of the gear, steering, and operation of the brakes are accomplished hydraulically.

The R-3350 radial, air-cooled engines are equipped with Hamilton Standard four bladed propellers, square-tipped, 13½ feet in diameter.

The flight compartment consists of crew accomodations for captain and first officer, with folding seats provided for a third crew member and for an observer.

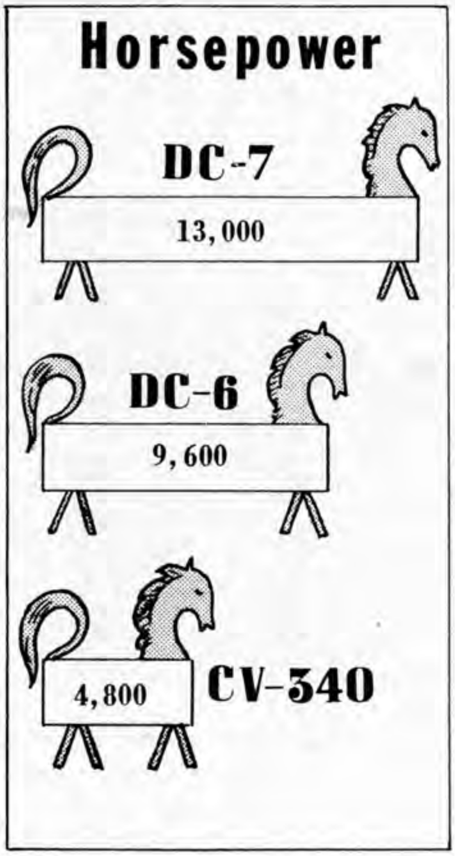




	AREAS	
CODE		DC-7
A	Fuselage Length	1307"
B	Wing Span	1410"
C	Tail Span	558"
D	Vertical Stabilizer	345"
E	Tread	296"
F	Wheelbase	434"
G	Propeller Diameter	162"

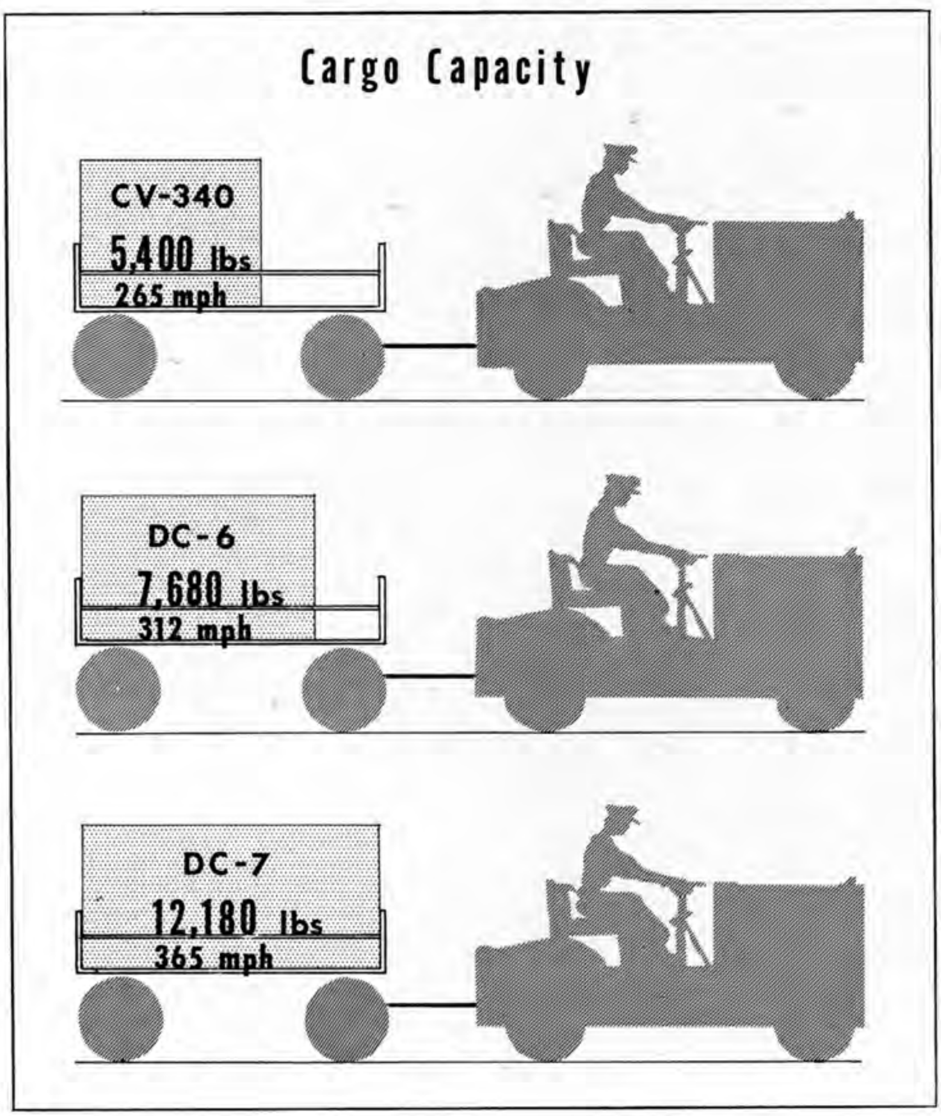
Greater Speed

The 13,000 horsepower delivered by the Wright compound engines and the aerodynamically clean design make the DC-7 the fastest piston-powered commercial airplane available today. By designing around these new engines the DC-7 was assured of a speed considerably faster than that of competitive aircraft using the same engines. Until commercial jet transports come of age in this country, it is not likely that any commercial airliner will match the more than 400 mph top speed and the 365 mph average cruising speed of the DC-7. This speed is based on normal cruise power at 23,500 feet, at a gross weight of 100,000 pounds.



Greater Range

Assuming the maximum gross weight allowable for take-off (116,622 pounds) and a capacity fuel load (4512 gallons), the DC-7 has a range of over 3,000 miles at 20,000 feet. Such a flight could accomodate 69 passengers and over 7,000 pounds of cargo. On routine domestic flights approximating two hours with five hours of fuel aboard, the DC-7 can accomodate 69 passengers and over 4,000 pounds of cargo, and still operate well within the prescribed gross weight limits.



Greater Load

The maximum take-off weight of 116,622 pounds is based on a field length of 5,400 feet and the standard conditions of sea level at an airport without obstructions, zero wind. The maximum landing weight of 95,000 pounds is based on a field length of 5510 feet and standard conditions. These figures apply to the first group of four airplanes. The second group of six airplanes will have the same take-off weight, with landing weight increased to 97,000 pounds.

Climb Performance

At maximum take-off weight the normal rate of climb of the DC-7 is 750 feet per minute, although the airplane is capable of climbing at over 1200 feet per minute at maximum take-off weight. The airplane can take-off and climb at more than 600 feet per minute with three engines operating.

You Get There FIRST *On The* DC-7

Chicago **Miami**

COMPARATIVE PERFORMANCE DATA

SPEED

ALTITUDE	DC-6 (1100 BHP/ENG.) (85,000 lbs.)	L-649 (1100 BHP/ENG.) (95,000 lbs.)	DC-7 (1800 BHP/ENG.) (100,000 lbs.)
25,000 ft.	----	----	365
20,000 ft.	292	272	355
15,000 ft.	284	266	340
10,000 ft.	272	256	323

All performance data relative.
For operations, consult pertinent manuals.

SCHEDULES

FROM	TO	DC-7	DC-6	L-649 L-749	L-1049	L-1049-C*
CHI	STL	1:04	1:09	1:12		
	MSY	2:47	3:06	3:25		
	CVG	1:04	1:10	1:10		
	ATL	2:01	2:20	2:20		
	MIA	3:40	4:15	4:15	4:10	4:00
STL	HOU	2:18	2:30	2:46		
CVG	ATL	1:25	1:38	1:38		
	MIA	3:03	3:25	3:25		
ATL	MIA	2:03	2:15	2:15		

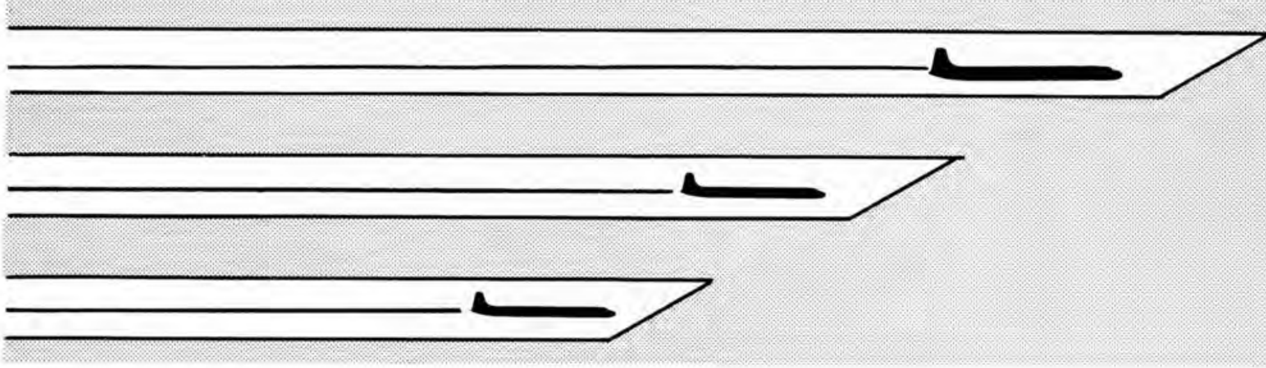
* Operating with Wright compound engines.

OPERATING DATA

	DC-6	L-649	DC-7
Number of passengers	56	57	69
Operating weight - lbs.	56,643	65,050	69,575
Maximum landing weight - lbs.	78,000	89,500	95,000
Maximum Take-off weight - lbs.	89,900	98,000	116,622
Fuel capacity - gals.	3,322	4,690	4,512
Fuel consumption - gals/hr	400	410	530

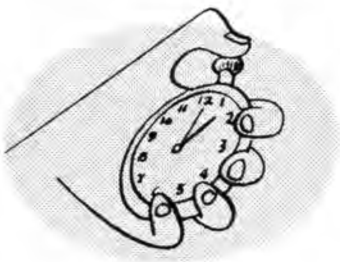
What makes the DC–7 a better airplane? Many features which are described in the text of this review, but increased pay load at a faster speed is the main difference. The original DC–6 airplanes had an initial cost of $700,000.00 each; the new DC–7 airplanes cost $1,750,000 each. So you might say that the premium cost difference for the DC–7 is mainly for speed and load. Aside from weather and ATC delays, block to block speeds depend upon proper pilot techniques. By using safe but improper techniques the speed of the DC–7 can be reduced by as much as 20 knots. The difference of 20 knots can mean the difference in performance of the DC–7 over the Super Connie and the DC–6. In effect, at this reduced speed you have made a DC–6 out of the DC–7.

Slow boarding of passengers, as well as slow catering, can nullify the premium operation of the DC–7. Since the passenger is expecting the speed shown on the published schedules he cannot appreciate the DC–7 if the difference in speed is consumed in ground handling time. Our speed in passenger handling, our speed in ground handling, our knowledge of proper techniques of operation make possible the utilization of this premium speed which the DC–7 has to offer.



Sales Features

DC-7 SPEED



Six miles a minute! The speed of the DC-7 puts it in a class by itself. The DC-7 offers passengers schedules never before possible, in unexcelled luxury and comfort. Quoted in the performance data are typical DC-7 schedules, with similar schedules for other equipment. In each case the direction of flight is south bound, and the figure quoted is block to block time.

NEW - TITANIUM

For the first time in any commercial aircraft, other than in token quantities, the DC-7 makes use of the high-strength high-temperature metal, titanium. Approximately 90% of the nacelle skins aft of the firewalls, as well as the firewall itself, are of this material. Not only does this metal improve the strength vs. temperature characteristics of the engine nacelles, but a weight saving of more than 200 pounds results. This weight saving is equivalent to one passenger for the entire life of the airplane.

PRESSURIZATION

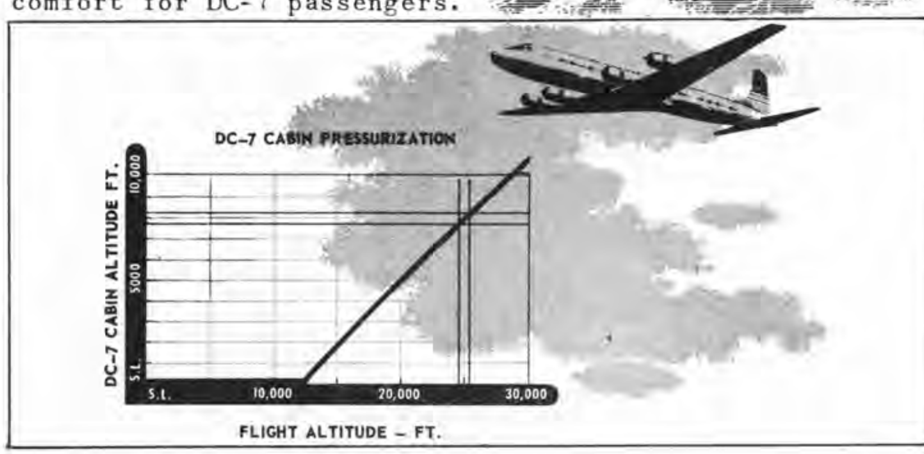
DC-7 passengers will continue to enjoy the comforts and convenience of pressurization, just as in the DC-6 series. Cabin pressure will approximate sea level up to 12,500 feet, an equivalent of 5000 feet when flying at 20,000 feet, and an 8000 foot cabin can be maintained when flying at 25,000 feet.

AIR CONDITIONING

A major change in system designs in the DC-7 is the installation of an airborne freon refrigeration system. The new vapor-cycle unit, capable of five tons of refrigeration, provides, in effect, a built-in airconditioning truck. The freon system operates much like a household refrigerator, and can be operated from ground power. It thus precludes the use of a ground air conditioner during summer operations, either when preparing the airplane for flight duty or during intermediate schedule stops. The freon system is in addition to the air-cycle airconditioning system, operating off cabin superchargers, as in the DC-6. The freon system promises a new era in all-weather comfort for DC-7 passengers.

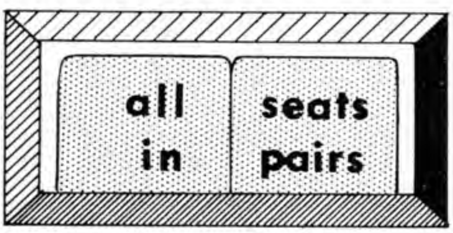
SPEED BRAKE

An important factor in the block speed of the DC-7 is the new speed brake. The main landing gear and related components have been strengthened to permit extension at airspeeds up to 300 mph indicated. The drag of the clean airplane is almost doubled by extending the main gear, thus allowing a fast and steeper descent without sacrificing block speed or passenger comfort. Without the speed brake the pilot would have the choice of starting the descent from cruise altitude several hundred miles from destination or making a steep but slow descent at the maximum speed permissible with gear and/or flaps extended. The speed brake is also effective in lessening the discomfort of turbulence encountered enroute.



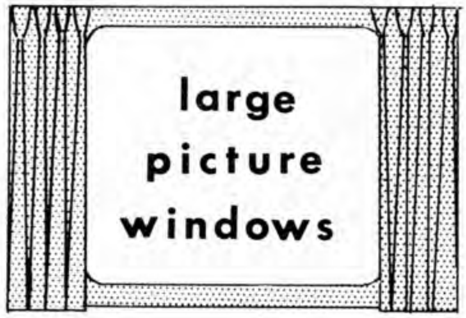
SOUND PROOFING

A new peak in eliminating cabin noise has been reached in the DC-7. In addition to improved sound insulation between wall panels and outside skin, built-in cabin wall rigidity helps to muffle noise. This is accomplished by doubling the number of fuselage frames from the leading edge of the wing forward for 185 inches. The cabin windows in the critical noise areas of the DC-7 are anacoustic in design, that is, a third glass pane, mounted in rubber, is installed inside the two conventional panes. In effect, a window of this type reduces noise to the level that would be transmitted by a solid wall construction.



INTERIOR

The varied configuration of the passenger cabin offers an arrangement to suit almost any passenger preference: an eight passenger forward stateroom for families or parties traveling together, a 56 passenger main cabin, and a five passenger lounge with a "sky club" atmosphere. The interior design of the passenger cabin features a variety of striking colors. The seats are a rich forest green with mottled gray leatherette arm rests. The gray-green ceiling and beige overhead rack are set off by gold curtains at the large passenger windows. The lounge is gray-green with bright coral upholstery. Dark maroon carpeting completes the picture - a handsome but restful interior, pleasing to the eye and the taste. The luxuriously appointed toilet compartments are finished in gray-green, with a buff lacquer for the fixtures.



SEATS

The seats themselves are spacious and comfortable, measuring approximately 18 inches between the arm rests and 18 inches from front to back. The foam-rubber contour seats recline from 9° to 38°. The aisle width between seats is ample, measuring over 21 inches, tapering to approximately 15½ inches in the rear. Each passenger has at his finger tips controls for individual reading lights, fresh air outlets, stewardess call. Twin outlets at each double seat provide an oxygen supply for each passenger in the main and forward compartments, with four outlets in the lounge.

BUFFET

The compact, efficient buffet makes the serving of in-flight meals an easy task. Passengers may enjoy full course dinners, hot from the oven, in dining room comfort while flying four miles high at six miles a minute. When not in use the buffet is hidden from sight by panels.

LAVATORY

The toilet compartments provide all the comforts of home -- a gleaming wash basin complete with warm water and linens, a large mirror illuminated by indirect lighting. Other conveniences include ash tray, cold air outlets, assist handle.

DC-7 TECHNICAL FEATURES

The Engine

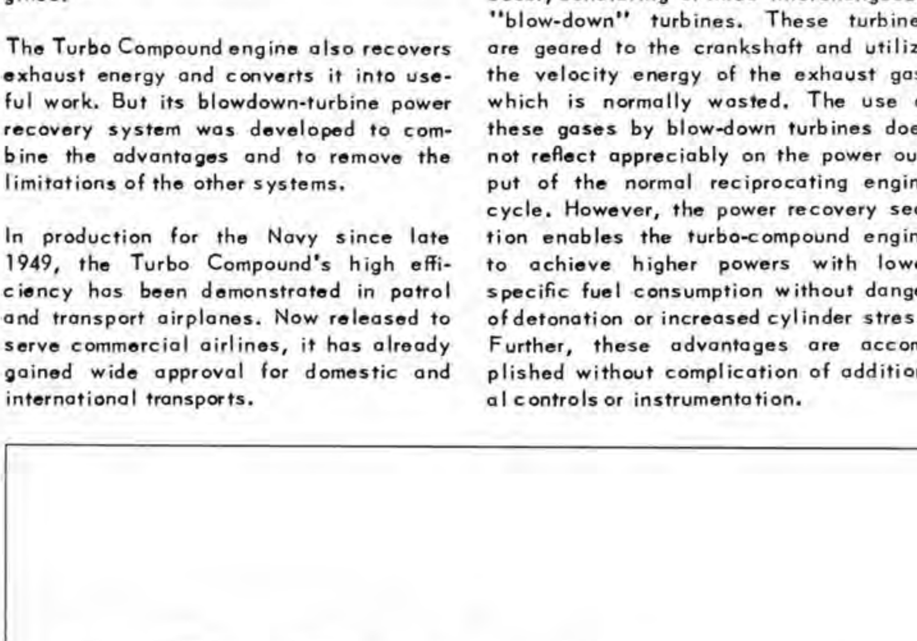
In searching for ways to improve the efficiency of reciprocating engines, a number of methods have been employed to recover exhaust energy and convert it into useful work. Jet stacks, turbosuperchargers, and jet augmentation have been used with good results. Each, however, has limited application to aircraft engines.

The Turbo Compound engine also recovers exhaust energy and converts it into useful work. But its blowdown-turbine power recovery system was developed to combine the advantages and to remove the limitations of the other systems.

In production for the Navy since late 1949, the Turbo Compound's high efficiency has been demonstrated in patrol and transport airplanes. Now released to serve commercial airlines, it has already gained wide approval for domestic and international transports.

The power by which the DC–7 airplane is able to achieve its more than 400 miles per hour top speed and 365 miles per hour cruising speed is supplied by four Wright R–3350 turbo-compound engines. In an engine sense, compounding is the combining of two or more power producing units in a single power plant. In the case of the turbo-compound, the basic 18–cylinder engine power section has been supplemented with a second power producer, consisting of three interchangeable "blow-down" turbines. These turbines are geared to the crankshaft and utilize the velocity energy of the exhaust gas, which is normally wasted. The use of these gases by blow-down turbines does not reflect appreciably on the power output of the normal reciprocating engine cycle. However, the power recovery section enables the turbo-compound engine to achieve higher powers with lower specific fuel consumption without danger of detonation or increased cylinder stress. Further, these advantages are accomplished without complication of additional controls or instrumentation.

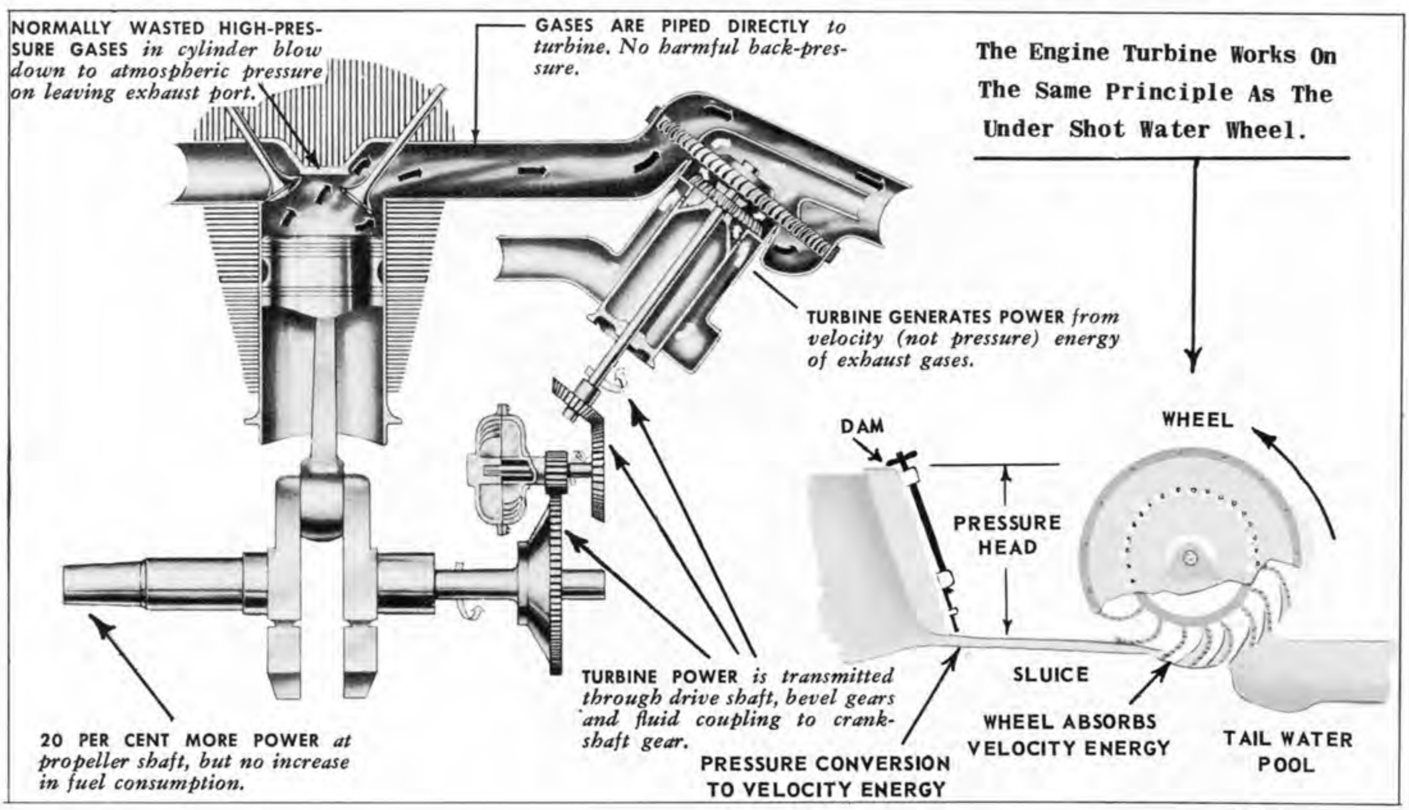
The Wright R–3350–972TC18DA2 engine is an 18-cylinder air-cooled, compound, radial, reciprocating power plant. The engine is equipped with a single-stage, two-speed supercharger (mechanically controlled); a cylinder fuel injection system; a low-tension ignition system; and incorporates the three blow-down turbines for exhaust gas power recovery. The engine has a take-off horsepower rating of 3250 (dry).



Probably the most remarkable feature of the Wright R–3350 engine is the blow-down turbine power recovery section. The three blow-down turbines are mounted 120 degrees apart on the supercharger front housing. Each of the turbines is supplied exhaust gases from six cylinders (three front and three rear). Pipes from one front and one rear cylinder are siamesed and enter the turbine nozzle through one opening. Therefore, only three exhaust jets attach to the turbine housing. The exhaust gases cause the turbine wheel to revolve at great speed. A hollow shaft, splined to the turbine wheel, passes through a support clamped to an adapter on the supercharger front housing. A coupling, splined at each end, connects the turbine shaft to the bevel drive gear in the supercharger front housing. The drive gear meshes with a larger bevel gear connected by a drive shaft to a fluid coupling impeller. The fluid coupling rear half (runner) is connected by a spline shaft to a pinion which meshes with the crankshaft drive gear coupled to the engine crankshaft.

To prevent the high temperatures of the exhaust gases from damaging the turbine blade attachment to the hub, cooling air (taken from forward of the engine through a duct between the cylinders) is conducted around the hub of the turbine assembly. A tube and duct assembly delivers the air between the nozzle support and the cooling air shield. An impeller forces the cool air through the assembly and discharges it, together with the exhaust gases, from the flight hood.

The temperatures of the exhaust gases will vary, depending upon the fuel mixtures employed to meet power requirements. Under certain conditions of power, rpm, and mixture, high exhaust gas temperatures can result in visible flames being discharged from the exhaust stacks. The condition is more prevalent with the richer mixtures necessitated by take-off power, and climb power requirements. With the richer mixtures, more particles of unburned fuel escape the cylinder with resultant "burning-off" in the exhaust process. Such exhaust conditions are not peculiar to the turbo-compound engine alone. They exist, in varying degree, in all gasoline-burning engines, including those installed on automobiles. On aircraft equipped with turbo-compound engines, however, the visible results are more obvious. This is due primarily to the fact that the turbine arrangement requires that one outlet on the left hand engines and two outlets on the right hand engines be located in view of the main passenger cabin on the inboard side of the nacelle. At the same time, the turbine cooling system requires the introduction of fresh air, which is forced through the turbine assembly by an impeller and discharged with the exhaust gases from the exhaust outlet. Thus, a ready source of oxygen is supplied by the fresh air which oxydizes any unburned fuel particles in the hot exhaust and causes subsequent "burning-off" in the exhaust outlet. It should be noted that the engine components, as well as the surrounding aircraft structure involved, are designed to withstand temperatures much higher than those experienced.



Each of the four DC–7 power plants and propeller feathering systems is supplied lubricating oil by an independent oil system. The nacelle oil tanks, one attached to the upper section of each engine mount (forward of the firewall), have a capacity of 40 gallons of usable oil exclusive of the 12 gallon expansion space provided. An oil sump retains three gallons of oil for the propeller feathering system. The propeller feathering oil supply line bypasses an emergency oil shutoff valve mounted at the outlet of the tank. Oil from the propeller feathering system is routed from the oil tank, through the feathering pump, to the propeller hub assembly. When inoperative, the feathering pump acts as a shutoff valve.

The oil tank is equipped with a cylindrical hopper, which aids in rapid engine warm-up, and the de-aereation of returning oil. Return oil from the engine enters the oil tank through a curved tube which extends partially around the inside of the hopper. The oil flows from the tube at an angle which starts a swirling motion and this, in turn, tends to separate the oil from the air, thus reducing foaming action within the tank. As the oil flows down through the hopper, it passes over a vane, composed of two crossed metal strips, which reduces the induced agitation. Consumed oil is replaced by oil which flows in through the space between the bottom of the hopper and the sump.

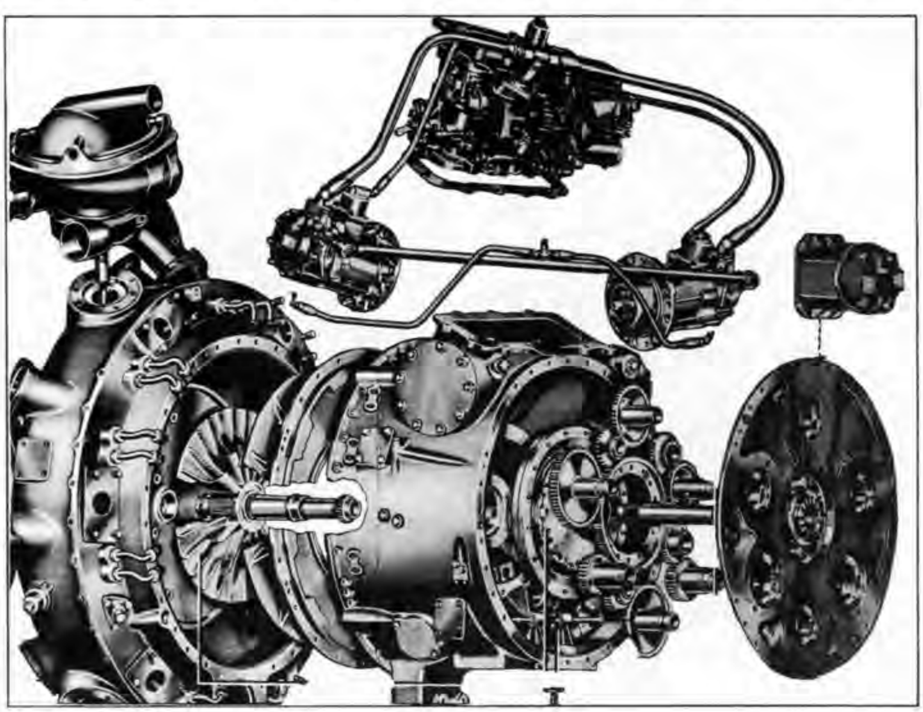
The oil tank filler cap is accessible through an access door located on the right side (aft) of the master control (carburetor) airscoop fairing. The filler cap is chained to the access door to prevent its loss. A pan assembly is located around the filler neck to permit any overflow or spillage of oil to drain overboard.

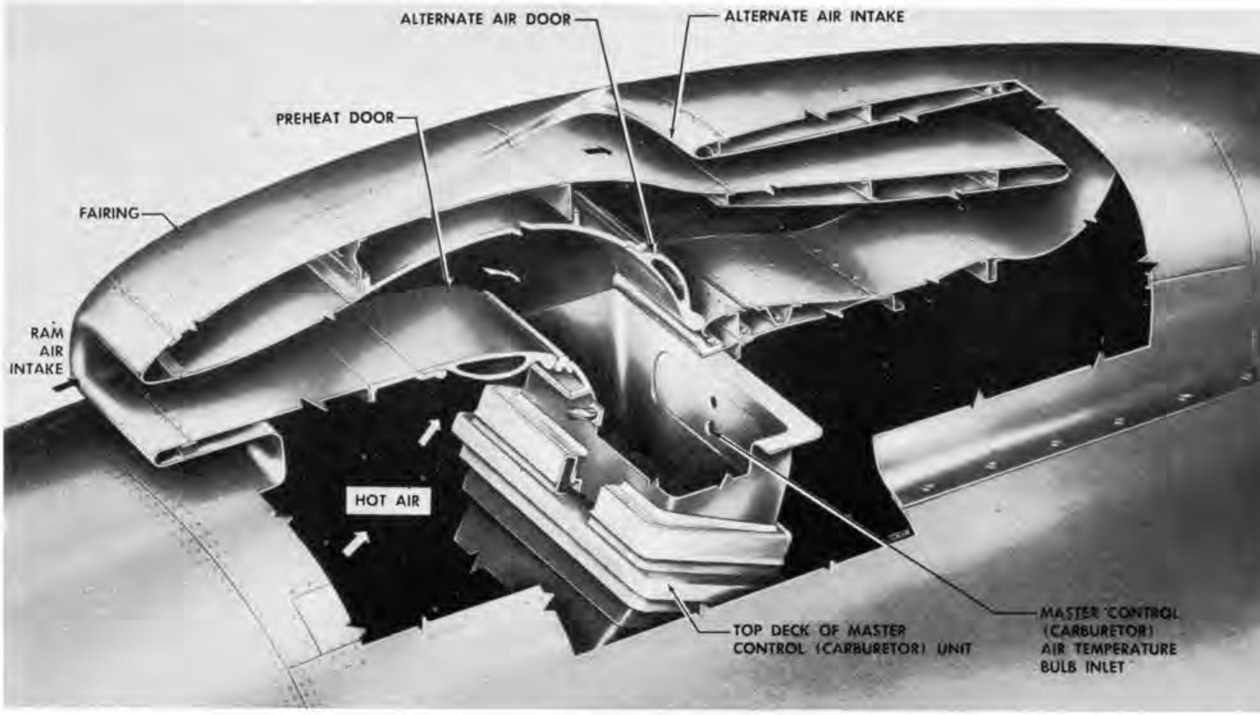
There are four cowl flaps (two on each side of each engine assembly) to aid in controlling engine operating temperatures. The cowl flaps are shock-mounted to the cowl flaps support ring with rubber bushings in the hinge fittings. The support ring, in turn, is mounted to the engine at the rocker boxes by nine shock mounts.

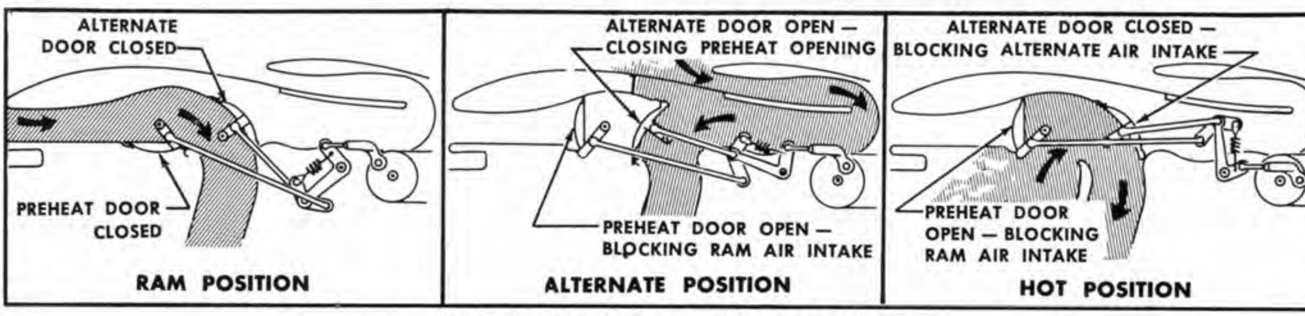
The cowl flaps are operated by a reversing-type electric motor mounted on the top of the oil cooler fairing and are controllable through a range of minus 2 degrees to plus 20 degrees of flap travel.

Flexible shafts, extending from each side of the electric motor, connect to two "T" drive assemblies (one mounted on each side of the engine rear case). Each of the "T" drive assemblies is connected to two jack screws (one for each flap) by flexible drive shafts. The jack screws are shock-mounted on the aft side of the inner ring, extend through cutouts in the inner ring, and connect to brackets on the under side of each cowl flap. The cowl flaps for each engine may be controlled by two means; a four-position toggle switch (one for each engine) located on the aft overhead panel, and a remote positioning CONTROL POTENTIOMETER (one for each engine) located on the auxiliary electrical panel. The toggle switches have four positions; OFF, OPEN, CLOSED, and POSITIONING. The potentiometer knobs are graduated through a range of minus 2 degrees to plus 20 degrees to agree with the limits of cowl flap travel. The potentiometers are used to position the cowl flaps to a desired setting when the toggle switches are moved to POSITIONING, and provide an accurate and sensitive control over the cowl flap positions.

The fuel injection system, as installed in the Wright R–3350 engine, consists of a master control (carburetor) unit (Bendix-Stromberg type – PR-58-S-2), two fuel injection pumps (Bendix D9H1), and eighteen individual cylinder discharge nozzles. The operation of the Bendix-Stromberg master control unit is similar to the Stromberg PR series injection carburetors. The important difference is that metered fuel from the master control unit is piped directly to the two fuel injection pumps instead of to the usual single discharge nozzle or discharge bar in the induction system. The fuel injection pumps, acting as distributors, divide the total quantity of fuel received from the master control unit into equal parts. The fuel is then delivered to the engine cylinders through stainless steel tubes and discharged, at high pressure, through nozzles in the cylinder heads. The path of the fuel to each of the cylinders is primarily inside the engine. The tubes are external, however, from the front of the supercharger front housing to the cylinder head nozzles, and from the front of the supercharger rear housing to the rear of the supercharger front housing. The right fuel injection pump supplies fuel to the even-numbered (front) cylinders; the left pump, to the odd-numbered (rear) cylinders. A synchronizer bar interconnects the two fuel injection pumps.







Air Induction System — Cutaway View

The airscoop, as installed on the DC–7, provides for the taking of air from any of three different sources: the normal ram (cold) airscoop; the alternate (cold) airscoop; or the engine section, as preheated air. Any combination of alternate air (cold) and preheated air is also available. The air induction system is activated by a three-position control in the flight compartment. The control positions are RAM (full down), ALTERNATE (mid-position), and HOT (full up). A ratchet arrangement is provided between the ALTERNATE and HOT positions for any combination of hot and alternate air desired to maintain optimum preheat temperatures.

Two doors are incorporated in the airscoop. The preheat door is located in the forward part of the airscoop, with the alternate door behind it. With the control in the RAM position, the alternate and preheat doors are closed and form a part of the primary air duct. This allows ram air to flow directly to the master control unit. Moving the control to ALTERNATE fully opens both the alternate and preheat doors. The preheat door, in opening, swings into the ram air duct closing it off. The alternate door likewise moves into the ram air duct, but, due to its location aft of the preheat opening, prevents preheated air from entering the duct. Consequently, cold air from the alternate airscoop flows to the master control (carburetor) unit. When the control is moved to HOT, the alternate door moves back to the closed position, but the preheat door remains open. This continues to restrict the flow of ram air and allows preheated air to enter the main duct, flow past the alternate door (now faired into the duct wall), and hence to the master control unit. As previously explained, the ratchet arrangement provided between the ALTERNATE and HOT positions allows positioning of the alternate door at intermediate positions to supply any combination of preheated and alternate air desired.

UNDER ICING CONDITIONS

THE NEW DC–7

AIR INDUCTION SYSTEM

OFFERS GREATER SAFETY

AND ENGINE PERFORMANCE.

THE PROPELLER

The DC–7 is equipped with 4–bladed Hamilton Standard full-feathering, reversible-pitch, constant-speed propellers, Type 34E60. The propeller control system provides for governor control by electrical means, while blade positioning is accomplished by hydraulic pressure. The electrical control system is designed to make possible independent control of each propeller, as well as synchronization and control of all propellers simultaneously. In addition to the propeller, the basic equipment includes a double-acting constant speed governor, electric de-icing and control assembly, a de-icing timer, RPM control box assembly, RPM control relay box, and various switches, indicator lights, etc. A synchronizer and its associated parts are also installed. This installation provides automatic synchronization, as well as manual synchronizer override. The propeller blades are equipped with electric heating elements along the leading edges for ice removal.

The blade pitch angles are measured at blade Sta. 42. Constant speed range is from 28° to approximately 59°. Low pitch stop is 29½° (plus ½ minus ½), full feather is 94° (plus ½ minus ½), and full reverse is –14° (plus or minus ½).

The propeller hydraulic system employs engine oil, boosted in pressure by a pump in the governor unit for normal governing operation. Feathering, unfeathering, reversing and unreversing are controlled through the governor with the oil pressure and flow required for these operations increased by an electrically-driven feathering pump.

A propeller-feathering system provides a means of transferring engine oil from the engine section oil tank to the propeller governor.

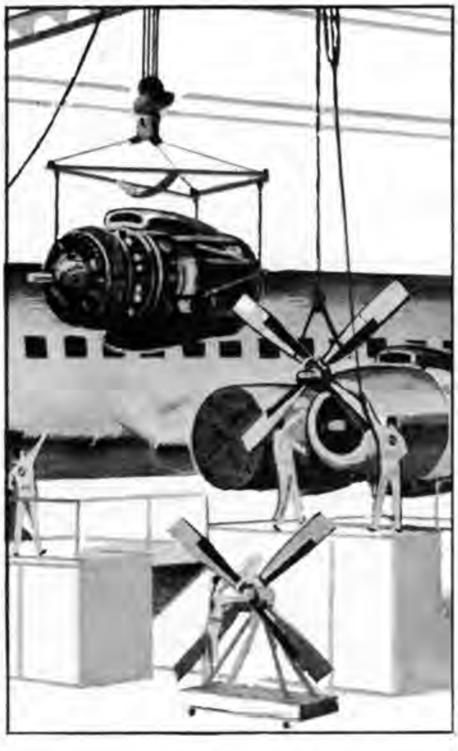
An automatic propeller feathering system is installed to provide automatic feathering of a single propeller during take-off, in the event of loss of power from an engine.

The feathering pump is a gear type pump driven by a two horsepower DC electric motor assembled with it as a single unit. The assembly is located forward of the firewall in the engine nacelle, strapped to the right hand longitudinal channel below the engine oil supply tank. The feathering pump takes oil from the bottom of the engine oil supply tank. A stand pipe above the normal engine oil outlet in the oil tank maintains three gallons of reserve oil for feathering. Control of the pump and its motor is completely automatic. The motor is energized by electrical circuits used in the feathering and reversing cycles.

Propeller blade adjustment is accomplished by this fluid pressure being exerted on either the front or back surface of a piston inside the propeller dome which, by its fore and aft movement, causes the blades to change angle through a cam and gear arrangement. A bevel gear at the root of each blade is in constant mesh with a power gear driven by a moveable helically-slotted fixed-position cam through a roller assembly. As the roller assembly travels back and forth in the cam slots, the power (or rotating) gear cam is forced to rotate back and forth also, thus driving the blade gears and changing the angle of the blades. The roller assembly is moved by the abovementioned piston, which moves forward to decrease blade pitch, and aft to increase blade pitch. Normally, the piston is limited in travel at the low-pitch setting by stop levers. However, when the propeller-reversing feature is used, the low-pitch stops are released, allowing the piston to move forward to the reverse-pitch stop. The low-pitch stop levers reseat themselves when the propeller has completed the un-reversing cycle.

The basic electrical system consists of a step-motor connected to a rack and pinion gear in the governor, a commutator and a motor in the synchronizer unit and toggle switches installed on the control pedestal. The synchronizer unit controls the pitch of all propellers simultaneously through the movement of a master control lever located to the left of the toggle switches.

All propeller controls are located on the top face of the control pedestal, with the exception of the circuit breakers, the tachometer isolation switches, the feathering switches and the auto-feathering controls.



THE FUEL SYSTEM

The fuel system provides fuel for the engines and engine oil dilution, priming, and combustion heaters, from integral- and collapsible-type tanks. In general, the fuel system consists of four independent fuel systems, one for each engine, but also includes provisions for cross-feed.

In addition to the tanks, components of the fuel system include engine-driven fuel pumps, electrically-driven booster pumps, valves, strainers, instruments, controls, sumps, vents, and piping. Fuel system controls in the cockpit operate the selector valves, cross-feed valves, dump valves, and chutes. A mechanically-controlled emergency shutoff valve and a strainer are installed in each engine main supply pipe on the aft side of the firewall, between the tank selector valve and the engine-driven pump. In addition, a fuel tank drain and shutoff valve is provided for each of the eight tanks. A check valve with a thermal expansion bleed is installed in each main supply pipe between the strainer and the tank sump. A cross-feed thermal expansion relief valve is installed at the left cross-feed valve fitting, which connects the pipe between the cross-feed valves to the No. 2 engine main supply pipe. This valve relieves thermal expansion in the cross-feed system. A flowmeter, with its transmitter located between the engine-driven fuel pump and the master control (carburetor), registers the consumption of fuel in pounds per hour.

Fuel dumping facilities are provided for the emergency jettisoning of fuel in flight in order to decrease airplane gross weight. Each main and alternate tank is fitted with a dump valve. A standpipe is installed in each main tank so that when fuel is dumped in level flight, sufficient fuel will remain in the four main tanks for approximately 45 minutes of flight at 75 per cent of rated (METO) power. As much fuel as possible is dumped from the alternate tanks. Fuel is dumped overboard from an extended chute in the bottom at the rear of each nacelle. Dump valves and chutes open and extend in coordinated sequence operation by means of four cable-rigged control levers located beneath the floor plate aft of the control pedestal.

NEVER COMPROMISE

WITH

SAFETY STANDARDS

THE OXYGEN SYSTEM

A high-pressure diluter-demand type oxygen system for the crew, and a high-pressure continuous-flow type oxygen system for the passengers, are installed in the airplane. The oxygen supply to each system is separate; the supply cylinders are not interconnected. A portable high-pressure oxygen cylinder is also provided.

Oxygen is supplied to the crew from a 38.4 cubic foot high-pressure oxygen cylinder, located on the right side of the fuselage at station 69. A diluter-demand type regulator is installed at each of the three crew stations. A flow-indicator is located on the panel at each regulator, and a pressure gage is installed on the oxygen instrument panel, to the right of the First Officer's seat.

Oxygen is supplied to the passengers from a 38.4 cubic foot high-pressure oxygen cylinder, located on the left side of the fuselage at station 672. A flow-indicator, pressure gage, and continuous-flow type regulator is provided for the passengers' oxygen supply system, located at the supply cylinder at station 672.

A portable high-pressure oxygen cylinder, with a capacity of 11 cubic feet, is installed on the cockpit floor behind the Captain's seat.

A single oxygen outlet is installed at each crew member's station and double oxygen outlets are provided near each passenger seat and at the buffet. Oxygen is available at the outlets, when masks have been plugged in, and after the shut-off valves at the cylinders have been opened to start the flow of oxygen to the outlets.

HYDRAULICS

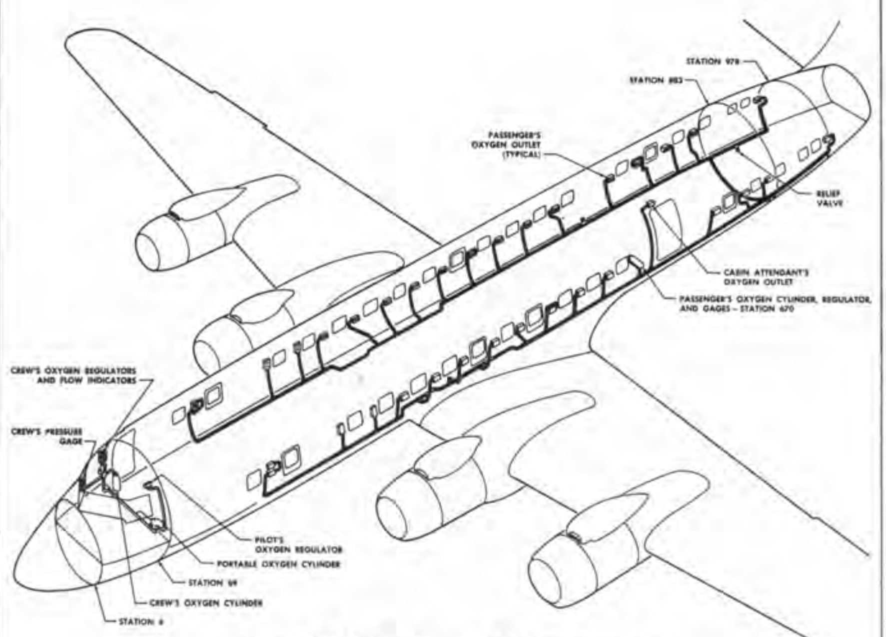
The constant-pressure type hydraulic system, with a system pressure of 2650 to 3100 PSI, extends and retracts the nose and main landing gears, operates the nose wheel steering system, actuates the windshield wipers, and operates the brakes and wing flaps. The hydraulic system may be considered as consisting of four individual but integrated systems:

(1) The pressure supply system (engine driven pumps) and the pressure regulating system.

(2) The pressure accumulator system, installed between the pressure supply and the hydraulically actuated units.

(3) The hydraulically actuated units themselves.

(4) The auxiliary system; an entirely separate hydraulic system which is supplied with pressure by an electrically actuated auxiliary hydraulic pump.



OXYGEN SYSTEM

LANDING GEAR

The landing gear is composed of three major units: two fully retractable main gear units with dual wheels, and a fully retractable nose gear with a single steerable wheel.

The main and nose gears are extended and retracted by hydraulic actuating struts, which are controlled by the landing gear control lever on the control pedestal.

In the event of hydraulic failure, the gear can be lowered by gravity by placing the landing gear control lever in the DOWN position to unlatch the uplatches and permit the gear to extend by its own weight.

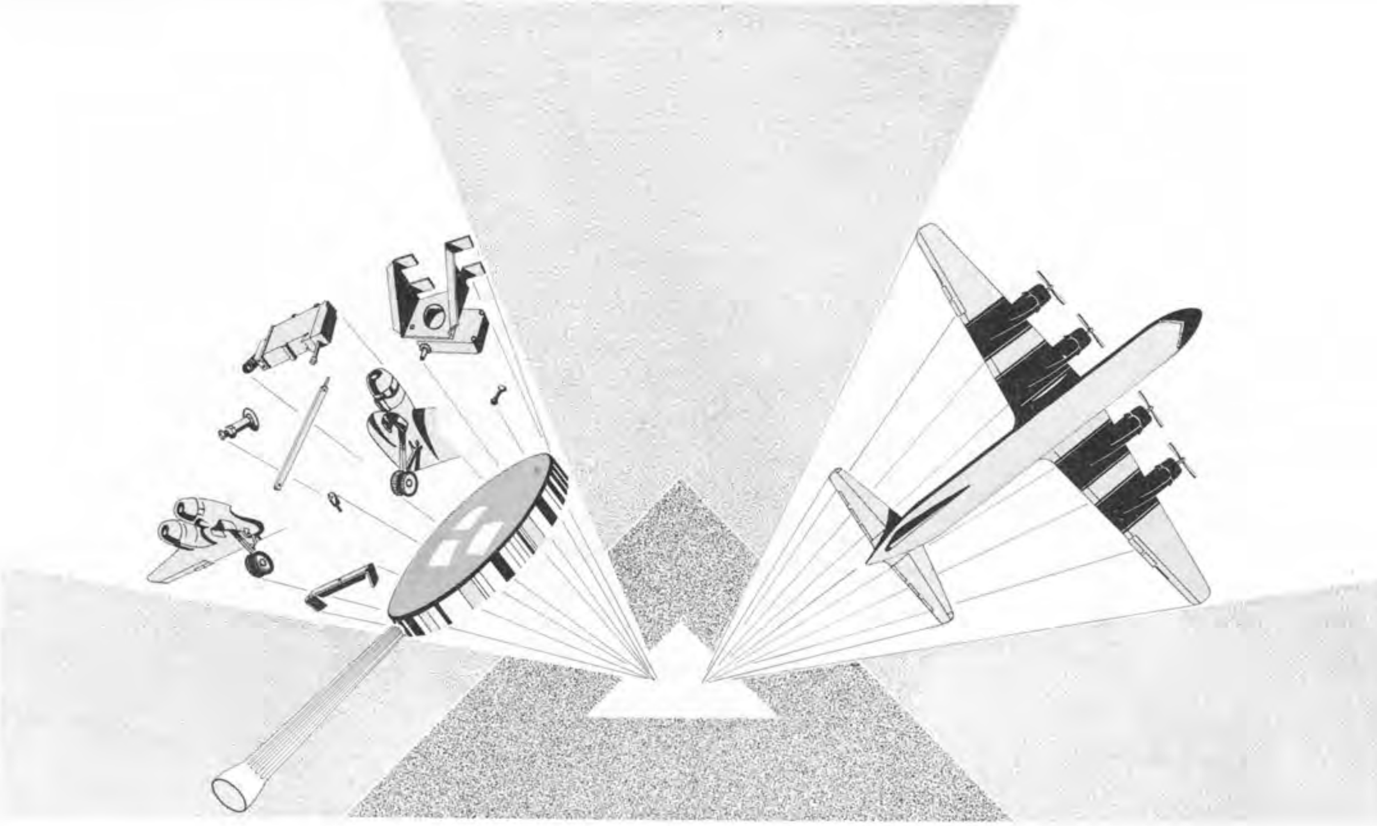
In the event of failure of the uplatch operating cables, the gear may be lowered by operating the uplatch shear cylinders which will shear a bolt in the uplatch for each gear.

Each main gear unit is equipped with dual wheels and tires. The nose gear is equipped with a single wheel and tire. A hydraulically operated brake is installed in each main gear wheel. An emergency air brake system is available for use in case the hydraulic system fails.

A faired, nonretracting tail skid, supported by a shock strut, protects the fuselage tail section from possible damage in the event of a tail-down landing.

The wheel well doors on each inboard nacelle and nose are closed automatically when the landing gear is retracted,

The main landing gear and related components such as struts, links, attachments, landing gear doors, etc., have been strengthened to permit extension at 300 miles per hour (below 15,000 feet altitude) or at main landing gear placarded speed above 15,000 feet (285 TIAS at 25,000 feet). A handle on the control pedestal is used for extending the main landing gear as a speed brake. A separate and conventional landing gear system is used to lower all wheels simultaneously, or to lower the nose wheel after the main gear has been dropped into position as an air brake. Cockpit warning lights operate in the conventional manner and are not affected by dropping the main gear for braking effect.



THE BALANCE OF QUALITY & REPUTATATION

An airplane such as the DC–7 must go through a never ending inspection during its production. Inspection begins when the materials reach the factory, where receiving inspection is based upon rigid standards of quality control. Airplanes begin in little pieces. In the fabrication department where these parts are made, each is inspected thoroughly before being assembled. As the parts are assembled and become components, they are again reviewed for conformance to the high standards of quality. The components are joined into main sections of the aircraft where the operating systems are installed, and quality of production is again checked for workmanship and functional operation. Upon final assembly, the airplane is moved to Flight Test. The airplane, such as our DC–7, is put through its final inspection and test. This progression of quality control puts each piece, component and section up for review many times before the airplane is actually flown. All these inspection efforts result in the delivery of an airplane of excellent quality and efficient performance.

Upon delivery to the airline, the maintenance of this quality and performance becomes the responsibility of the airline people. We now uphold this high standard of quality. The airplane now represents to the public the product we have to sell. The reputation of the airline, and the airplane, rests upon our personal interest. This effort and our interest is a never ending responsibility, for we desire to offer the finest aircraft in airline service.

ELECTRICAL

The electrical system consists of a 24- to 28-volt, direct-current, single-wire installation. The structure of the airplane forms the negative or ground return for the majority of the circuits.

Primary DC power is delivered to the electrical system from 4 engine-driven generators normally rated at an output of 400 amperes each at 28 volts. Auxiliary power for the 24- to 28-volt DC system is supplied by two 12-volt, 88-ampere-hour batteries connected in series. An external power receptacle is installed to permit the use of ground power.

Power output from the four generators is delivered to a main distribution line, or main bus, located in the main junction box installed in the flight compartment ceiling, aft of the flight compartment door. A secondary bus, used as the distribution bus for all but the emergency circuits, is connected to the main bus through a current limiter. All other systems which are connected to either bus use current limiters, circuit breakers, and fuses for protection. In most cases, the circuit protectors, such as fuses, current limiters, and circuit breakers, are located in the main junction box or on the main circuit breaker panel. The generator bus system is so designed that if a short occurs on one or more generator supply lines, the faulty generator system will be automatically disconnected from the main distribution bus.

Alternating current is supplied by two rotary inverters located in the soundproof compartment. Either inverter is capable of supplying the entire alternating-current load, but both may be connected to the system to divide the load and supply 115-volt, 400-cycle alternating current for the AC equipment. In addition, single-phase, 26-volt, 400-cycle alternating current, is furnished to the engine instruments through step-down autotransformers which lower the output voltage of the inverter.

Emergency alternating current is obtained from two alternate sources. An emergency inverter obtains its DC power from the battery bus, controlled by the emergency AC power transfer switch and the emergency AC power selector switch. Its 115-volt, 3-phase 400-cycle output is used to power certain flight instruments on the Captain's and First Officer's instrument panels in case the 2 main inverters fail, or the 28-volt DC master bus is disabled. In addition to the emergency inverter, 2 engine-driven alternators are provided to supply 3-phase, 115-volt, 400-cycle alternating current to the above flight instruments. These AC outputs are likewise controlled by the emergency AC power selector switch, and are available in the event of a complete failure of all of the inverters, or of the airplane's entire DC system.

ELECTRICAL POWER AVAILABLE AT 28 VOLTS

DC-3 *	450 AMPS
CV-340	800 AMPS
DC-6	1400 AMPS
DC-7	1800 AMPS

* 12 Volt System

In addition to the rotary inverters and alternators, a single vibrator type razor inverter is installed in the inverter compartment to supply 110-volt, 60-cycle, AC power for the electric razor outlets.

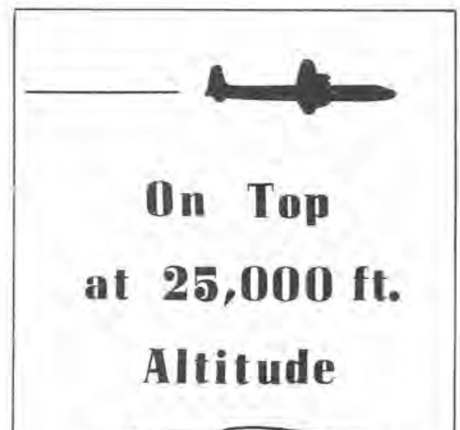
AIR CONDITIONING

The passenger and crew compartments for the DC-7 are maintained at comfortable pressures and temperatures, both in flight and on the ground, by an air conditioning system. The pressure and temperature of the air can be controlled in flight, and it is also possible to establish a preflight setting of the system that will be maintained automatically. A compartment pressure approximating sea level atmosphere can be maintained to a flight altitude of about 12,300 feet, and a compartment pressure equivalent to that of the atmosphere at 8000 feet can be maintained at a flight altitude of approximately 25,000 feet.

Air for the conditioning and pressurization of the cabin area, from the bulkhead forward of the cockpit to the bulkhead aft of the aft lounge, is obtained from scoops in the leading edge of each wing between the inboard and outboard nacelles. From the scoops, the air passes through engine-driven superchargers, located in each outboard nacelle, where the air pressure is raised as necessary for use by the air conditioning and pressurization equipment. From the superchargers, the air is ducted through the wing to the air conditioning accessories compartment, which is located below the floor just aft of the rear spar and ahead of the rear baggage compartment. In the air conditioning accessories compartment, the air can be sent through with no change in temperature, or it can be heated by a gasoline-fired internal combustion heater, or cooled by an air-cycle refrigeration unit. Routing of the air is controlled by a mixing valve which receives its signal from the cabin temperature control circuit. Air from the air conditioning accessories compartment may be further cooled by a Freon refrigeration system located in the forward end of the aft baggage compartment, after which it is distributed throughout the occupied sreas. Control of the air temperature is automatic.

The exhaust air leaves the cabin through various venturi used to ventilate compartments such as toilets and radio racks. In addition, an outlet is provided on the right side of the air conditioning accessories compartment. The opening of this outlet can be varied and is controlled automatically by the cabin pressure control instruments. By closing the opening, pressure is increased, and vice versa. Pressure and vacuum relief valves are also provided, below the floor on the bulkhead aft of the aft lounge. Switches are provided to override both the automatic temperature and pressure controls. Should the electrical system be inoperative, the cabin pressure can be manually controlled.

When on the ground with no superchargers running, a separate source of air is available through a check valve, located in the side of the fuselage in the bay forward of the main entrance door. A blower draws air in through this check valve and discharges it to the cabin distribution system. With the Freon refrigeration system, this blower can act as a recirculation blower by having its inlet switched from the check valve to an internal opening. Recirculation is used during Freon refrigeration. Also, the blower will recirculate air if one supercharger becomes inoperative in flight.



The cabin heater, operation of which is automatic, is of the gasoline internal-combustion type, and is located forward of the access door to the air conditioning accessories compartment. It consists of a heat exchanger over which ventilating air is passed before being routed to a port of the cabin temperature control mixing valve. A separate portion of air is ducted to the flight compartment and windshield anti-icing system.

Cooling of the air is obtained by an air cycle system, supplemented by a Freon system.

The air cycle cooling system consists of the following components, located in the air conditioning accessories compartment: an air-to-air heat exchanger (aftercooler); an air expansion turbine; and an axial-flow cooling air fan, driven by the turbine. Ventilation air from the superchargers is compressed to a pressure of approximately eight psi, with a resultant temperature increase. This hot, compressed air is led to the inside of the after cooler tubes, about which cooling outside air flows from a coolant airscoop located beneath the fuselage. Since the aftercooler is not 100 per cent efficient, the pressurized air leaving the cooler is slightly above the outside air temperature. With its pressure still approximately eight psi, the air is next expanded through the turbine to approximately cabin pressure, causing a temperature drop. The air is then ducted to the cold air port (A) of the cabin air temperature mixing valve.

The Freon system operates much like a conventional household refrigerator and is made up of a compressor, condensor and evaporator. The compressor and evaporator are in the forward part of the DC-7 aft belly cargo compartment, while the condenser is in the right wing fillet fairing.

Freon refrigeration is accomplished by the evaporation of low pressure Freon liquid in the evaporator, which is a tube and fin heat exchanger with Freon inside the tubes and cabin inlet air outside. The compressor removes the gas being generated by the evaporating liquid and discharges it as high pressure, high temperature gas to the condenser, another tube and fin heat exchanger. The condenser is located outside the refrigerated area where a fan blows air across the tubes to cool the high temperature gas, thus causing it to condense to a high pressure liquid. Air used to accomplish this condensation is then discharged overboard, carrying the heat with it.

WHEN THE SUN BEATS DOWN ON A DC-7 YOU'RE COOL AND COMFORTABLE:-

IN THE AIR

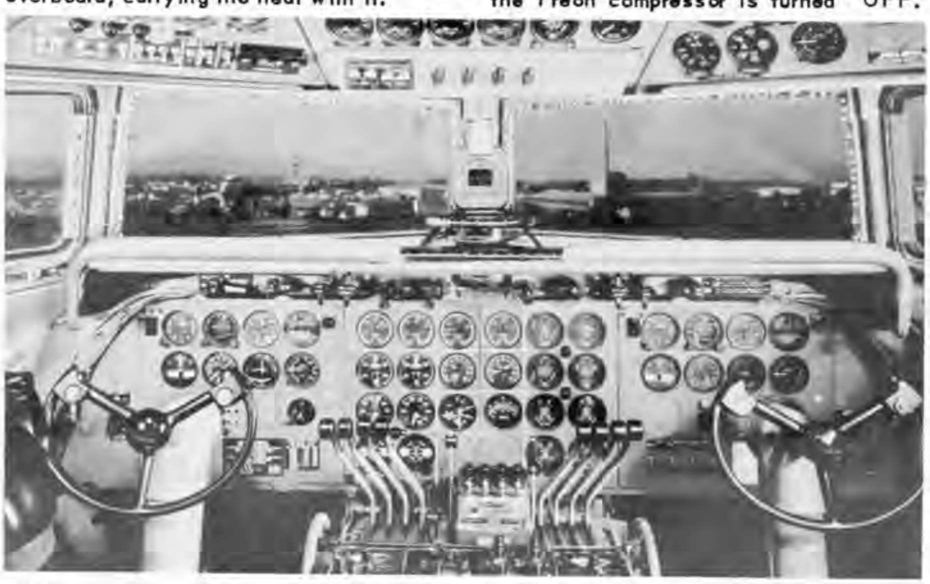
ON THE RAMP

TAXIING

WAITING FOR TAKE-OFF

The liquid Freon then leaves the condenser to be stored in the receiver. From the receiver, the high pressure liquid is piped to the expansion valve where the pressure is again dropped to that required in the evaporator. The expansion valve meters the correct amount of Freon to the evaporator so that complete evaporation of the liquid occurs just before the entry of the gas into the compressor.

The requirements of the refrigeration system are determined by either the automatic or the manual temperature control system. Sequencing is handled by the main cabin mixing valve actuator. The first refrigeration applied will be the cooling obtained by opening the aftercooler coolant air flap thus allowing ram air to pass over the aftercooler. If this is insufficient, the Freon compressor is started, applying additional refrigeration. Should this still be inadequate, the turbine is started. In reducing the amount of refrigeration, the turbine flow is first gradually reduced. If, after complete closing of the turbine supply, too much cooling is still available, the coolant flap on the aftercooler is closed until, upon complete closure, the Freon compressor is turned "OFF."



CONTROLS

The DC-7 is equipped with statically and dynamically balanced surface controls, (all metal except the rudder), and Douglas double-slotted, hydraulically operated flaps. This type flap is provided with an air flow deflector between the wing and the flap and provide additional lift, enabling the airplane to take off and land at lower speeds.

The employment of an aerodynamically assisted rudder "flying tab" affords reduced flight control loads without hydraulically or electrical "boost" systems.

The movable flight control surfaces are operated from the flight compartment through conventional two-way closed cable systems with the exception of the wing flaps, which although cable-controlled, are operated hydraulically. Spring control tab control surfaces are provided on both ailerons, on both elevators, and on the rudder; trim tab control surfaces are provided on the left aileron only, on both elevators, and on the rudder. A single tab on the rudder acts as both a trim tab and spring control tab. Spring control tabs are operated by the main flight controls, providing aerodynamic boost for the control surfaces and thus reducing operating loads.

COCKPIT

The cockpit contains seats for the Captain and First Officer that are adjustable vertically and horizontally. A folding seat, adjustable forward and aft, is provided for the Second Officer and is located on the inboard edge of the right bulkhead at station 69. A folding, non-adjustable seat is provided for a fourth crew member and is mounted on the floor with quick-detachable fittings. It is stowed on the radio rack aft of the Second Officer's seat.

The seat backs, cushions, and armrests are upholstered. Each seat is equipped with a safety belt.

The control pedestal located in the center of the cockpit is enclosed by removable cover plates, and supports the shaft assemblies for the power plant controls, the fuel tank selector controls, and some of the flight controls. It also contains the actuating units for the hydraulic system controls and the landing controls.

All surface controls in the cockpit are dual controls except those for the rudder and aileron tabs, wing flaps and control-surface locks.

All electrical controls (switches etc.) are described under electrical system.

DC-7 EMERGENCY INFORMATION

There are four hand operated portable fire extinguishers located as follows:

1. At the storage cabinet behind the last row of seats on the right hand side.

2. On the bulkhead forward of the forward buffet.

3. On the bulkhead forward of left lavatory.

4. On the face of the bulkhead immediately aft of the co-pilot.

There are six fixed fire extinguisher bottles located in the nose wheel well, three on each side, i.e., one bank of three bottles in the right nose wheel well tunnel and one bank of three bottles in the left nose wheel well tunnel. The fire extinguishing agent used in this system is CO_2. The arrangement of this system affords fire protection to the engines, cargo compartments, air conditioning compartment, fuselage accessory compartment, and the wing leading edge heaters. The cabin and tail surface heaters have separate CO_2 bottles located at the heaters.

There are two colored discs installed on the mounting brackets of each forward bottle in the nose wheel well. The red disc will be blown out if the system pressure exceeds a pre-determined setting; this affords an outlet for the system pressure in the event there is a discharge from the bottles when a selector valve is not opened. The yellow disc installed in the system when blown will indicate which bank or bottles were discharged when the system is operated normal.

Instructions for the servicing and inspection of the fire extinguishers and their systems are detailed in the maintenance manual.

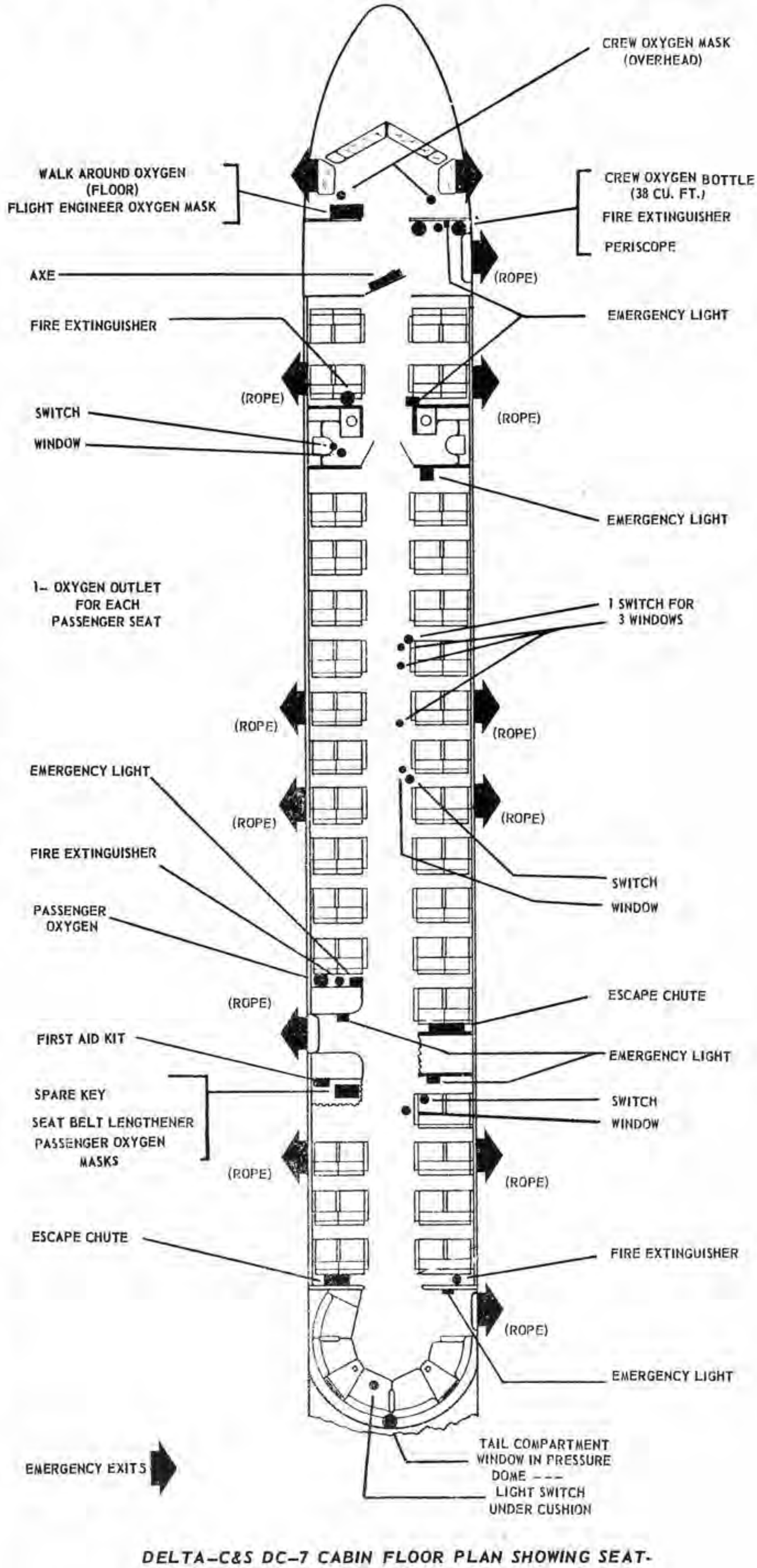
OPERATION OF FIRE EXTINGUISHERS:

To operate the portable pyrene fire extinguishers follow instructions on the bottle. In general, however, the conventional method is as follows:

1. Unlock by rotating handle counter-clockwise.

2. Pump fluid from the bottle by activating the handle with pumping motions.

3. Direct fluid at the base of the flames.



DELTA-C&S DC-7 CABIN FLOOR PLAN SHOWING SEATING ARRANGEMENT, LOCATION OF CABIN AND EMERGENCY EQUIPMENT, AS WELL AS EMERGENCY EXITS.

The operation of the fixed fire extinguisher system is outlined in detail in the pertinent aircraft operations manual. The general procedures are as follows:

1. Select the area to which CO_2 is to be directed as indicated by the fire detection system.

2. Discharge either the right or left bank of CO_2 fire bottles.

3. If fire is not controlled, reselect the area and discharge the remaining CO_2 fire bottles.

CAUTION

Before using CO_2 the crew should put on oxygen masks to reduce the possibility of asphyxiation, from the resulting fumes.

The heater air circulation control switch on the temperature control panel should be turned off before CO_2 is released into any of the lower compartments to reduce the possibility of circulation of harmful fumes.

FIRST AID KIT:

The first aid kit is located outboard of the stewardess seat in the aft coat compartment.

CRASH AXE:

The crash axe is located in the sheath on the cockpit side of the stateroom forward door.

ESCAPE CHUTES:

Two escape chutes are provided for emergency evacuation of passengers. One chute is located at the bulkhead forward of the right coat compartment. This chute is intended for the passengers loading door. The other chute is located in the storage cabinet behind the last row of seats on the left hand side of the aft cabin. This chute is intended for the emergency escape door on the right side of the lounge.

LOWER COMPARTMENT VIEWERS:

The DC-7 has facilities which allow the lower compartments to be viewed during in-flight operations allowing inspection of these compartments. These facilities include viewer windows, lower compartment lights, and a viewer.

Viewer Window and Light Switch Locations:

1. Window located at the right side of the aisle adjacent to aisle seat No. 27.

The switch for use with this window is located in a recess under the forward inboard corner of aisle seat No. 27.

2. Window located at right side of aisle adjacent to the aft corner of aisle seat No. 11.

The switch for use with this window is located in a recess between the aft corner of aisle seat No. 11 and the forward corner of aisle seat No. 15.

3. Window located at the right side of the aisle adjacent to the aft corner of aisle seat No. 9.

4. Window located at the right side of the aisle adjacent to aft corner of aisle seat No. 7.

5. Window located at right side of aisle adjacent to forward corner of aisle seat No. 7.

The switch for use with these three viewer windows is located in a recess adjacent to the forward corner of aisle seat No. 7.

6. Window located in the floor of the left lavatory just forward of the toilet.

The switch for use with this viewer is located in a recess inboard of the window.

There is a light installed in the tail cone for viewing this compartment. The switch for the light is located to the right and below the cushions of the center lounge seat. The viewer window is located behind the removable upholstered handle at the center of the pressure dome.

The viewer windows in the floor are covered by hinged doors. If necessary to use the windows, the carpet must first be pulled up and the door opened. Viewing the compartments below the floor is made possible by the use of a periscope inserted in the viewer windows.

PERISCOPE:

The periscope is located at the bulkhead forward of the crew entrance door. When viewing of a lower compartment is necessary, this periscope is installed in the viewer window, the light switch is turned on, and the entire compartment can be seen.

EMERGENCY EXITS:

Emergency exit windows are located on each side of the main passenger cabin at seats No. F-3, F-4, 9, 10, 14, 15, 28, and 29.

Emergency exit door is installed at the right side of the lounge.

The main cabin entrance door, crew entrance door, and the two sliding cockpit windows are also used as emergency exits.

The Emergency Exit Windows Are Opened By:

1. Tearing away the plastic cover.

2. Pull the latch lever as per the instructions written on it. The window opens outward and latches in the open position.

The emergency exit door located in the lounge has an identical unlatch mechanism as the emergency windows. However, the door is hinged at the bottom and opens inward after being released. After opening it should be lifted up and off of the hinges.

The entrance doors are unlatched by rotating the locking handle toward the unlatch position, the doors open outward.

The sliding cockpit windows may be opened by turning the latch handle to the unlatch position and sliding the window aft.

CAUTION

No attempt should be made to open any emergency exit when the airplane is pressurized.

ESCAPE ROPES:

There are eleven escape ropes, one at each exit except for the sliding cockpit windows. The ropes are stowed in tubes which follow the upper contour of the fuselage built into the structure out of sight. The end protrudes from the upper surface of the exit and is secured in place with a leather strap and snap fastner. The ropes are intended to aid in evacuation of the aircraft when the exits are a considerable distance above the surface.

EMERGENCY LIGHTS:

The lights designated as emergency lights are self contained units, battery operated, and are not detachable from their mountings.

1. On the bulkhead forward of the crew entrance door.

2. On the bulkhead overhead to the right forward side of the stateroom entrance door.

3. On the bulkhead forward right side of the forward cabin.

4. On the bulkhead left side forward of the forward buffet.

5. On the forward buffet.

6. On the bulkhead forward right side of aft cabin.

7. On the bulkhead forward right side of the lounge.

The emergency lights are so located to provide adequate light for the passenger aisles and emergency exits in the event of emergency conditions.

Avoid Emergencies — Keep Up-To-Date !

LAVATORY DOORS:

The lavatory doors are one piece full opening type hinged at the aft side opening toward the cabin area. When in use the door locks indicate on the outside of the door OCCUPIED. If it is necessary to enter the lavatory when occupied, pushing the slide containing the word *Occupied* toward the hinge of the door will unlock the latch.

SPARE KEY:

The spare key is located in the compartment above the rear coat rack. This spare key fits the cockpit door.

SEAT BELT LENGTHENER:

Seat belt lengtheners are located in the compartment above the rear coat rack.

SMOKE EVACUATION:

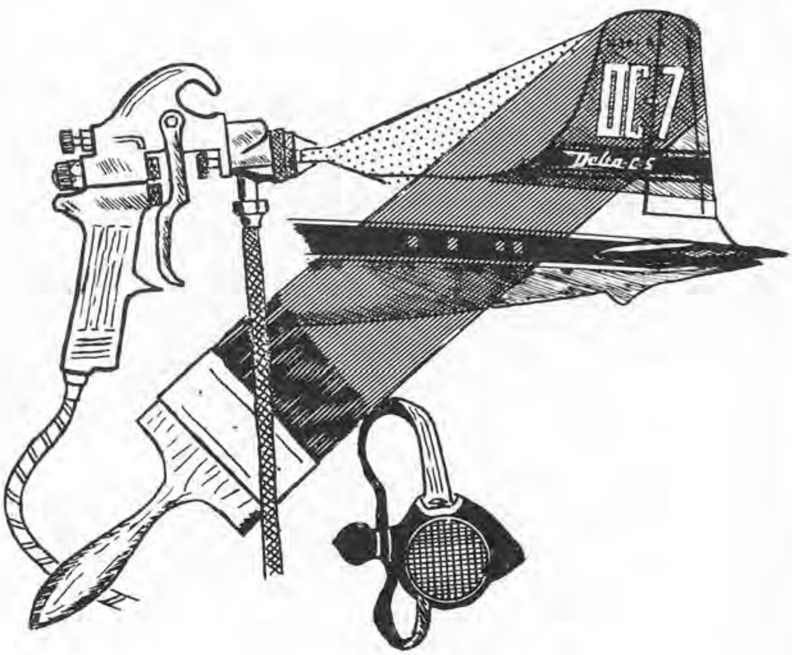
In the event of fire in flight causing heavy smoke concentration in the cockpit or cabin, the DC-7 has provision for smoke evacuation. For the proper detailed Smoke Evacuation Procedures consult the approved operations manual. In general, Smoke Evacuation is accomplished as follows:

1. Heavy smoke concentrations may be reduced in the cockpit by opening the hinged window in the flight compartment external door after depressurizing. **Do not exceed 260 KNOTS IAS with window open (to avoid excessive negative pressures in the fuselage).**

Heavy smoke concentration in the main cabin area may be reduced by opening either emergency exit over the wing only after depressurizing and below 260 KNOTS IAS. **Do not exceed 260 KNOTS IAS with either exit open (to avoid excessive negative pressures in the fuselage).**

WARNING

Caution and judgement must be used when opening an emergency exit as this will produce an increased airflow through the ventilating system with the possible result of increasing the fire hazard.



CLEANLINESS Is Essential In Keeping The DC-7 Finish LIKE NEW

THE STEWARDESS LOOKS AT THE DC-7

This section of the DC-7 guide is written for the benefit of Stewardesses. The following pages describe and illustrate the facilities, equipment and conveniences which the Stewardess will manage to provide superior passenger service in keeping with the unsurpassed speed and safety offered by the DC-7.

A thorough study of this section and the relative parts of the others will enable the Stewardess to discuss with passengers the advantages of the DC-7 over other airliners and assist her in explaining the operational innovations.

PASSENGER SEATS

Designed especially for the Delta-C&S DC-7, the Hardeman manufactured seats combine comfort, beauty and efficiency in the manner of a home type easy chair with built in reclining adjustment. The finger tip control for operation of the reclining seat back is located on the forward portion of each outer arm rest. The inner arm rest is detachable at the intersection of the seats so that it can be lowered to form a divan type seat.

A handsome polished chrome ash tray inset at arm's length is provided on each outer arm rest. When not in use the ash trays may be closed off with a roll top cover.

The deep seat pockets on the back of each passenger seat are divided to permit separation of literature and supplies stored in the pockets.

Tray tables for meal service will be used on DC-7 flights. The tray table holders are inserted in the armrests alongside the seat adjustment control.

THE STEWARDESS REPRESENTS TO THE PASSENGER THE INTERESTS AND EFFORTS OF ALL DELTA-C&S PEOPLE.

CABIN LIGHTING

The passenger cabins are illuminated by indirect lighting softly reflected from a ceiling trough containing a large number of small incandescent lamps. In the main cabin and in the aft cabin, the overhead indirect lighting may be dimmed to approximately 20% of normal brightness.

At night, when the main cabin lights are off, aisle lights will supply sufficient light for safe passage through the cabin.

All the above mentioned lights are controlled by the Stewardess from the control panel located in the buffet area just aft of the main passenger door. An alternate switch for control of night lights is located on the left bulkhead at the forward end of the main cabin.

Each coatroom is equipped with individual lighting, operated by conveniently located switches in the immediate area.

In addition to general illumination in the lavatories, the mirrors are illuminated by fluorescent lights located above and below each mirror. All lighting in the lavatory compartment is controlled by switches located near the lavatory entrance door.

Two individual reading lights are installed at each double seat. These lights are arranged to prevent annoyance of other passengers due to glare. Individual light switches are readily accessible to the occupant of each seat.

The passenger entrance area is equipped with spot lights to illuminate the floor area at the passenger entrance door and to provide the Stewardess with ample light for checking boarding passes and reading passenger manifests.

Lighting at the buffet can be adjusted to suit the needs of the Stewardess without annoyance to passengers sitting adjacent to the buffet area since the lights are shielded to prevent direct glare on the seating area.

A lounge-type dome light is installed in the lounge. This light is controlled by a separate switch, permitting illumination of the lounge separately from the main cabin lighting.

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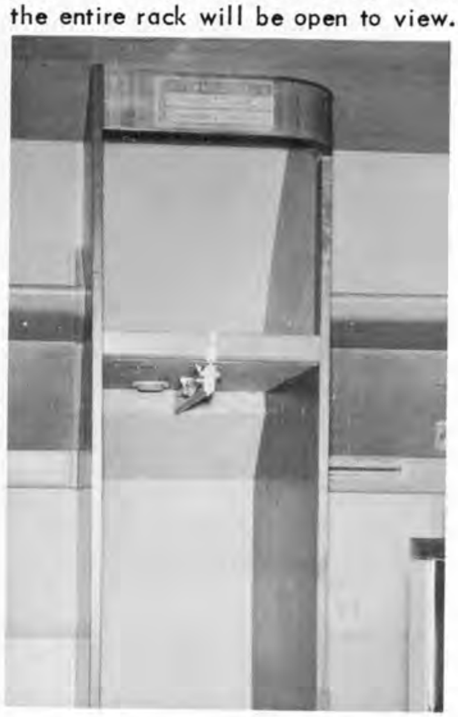
COATROOMS

Two coatrooms are supplied on the DC–7; both are conveniently located near the passenger entrance area. The coatroom on the right hand side is directly opposite the passenger door. The left hand coatroom is immediately behind the aft buffet.

A ceiling light is provided in each coatroom with the light switch placed overhead at the left corner of the entrance. Space over the coatrooms is used as shelved storage compartments.

The ingenious rollout rack installed in each coatroom permits full use of the coatroom area for storage of coats. There is no need to set apart space in the coatroom for the Stewardess to enter since the coatroom literally rolls into the aisle when the rack is pulled out. Thus a Stewardess can hang up the coats rapidly on departure and on arrival at passenger's destination, she can select the proper coat quickly and easily since the entire rack will be open to view.

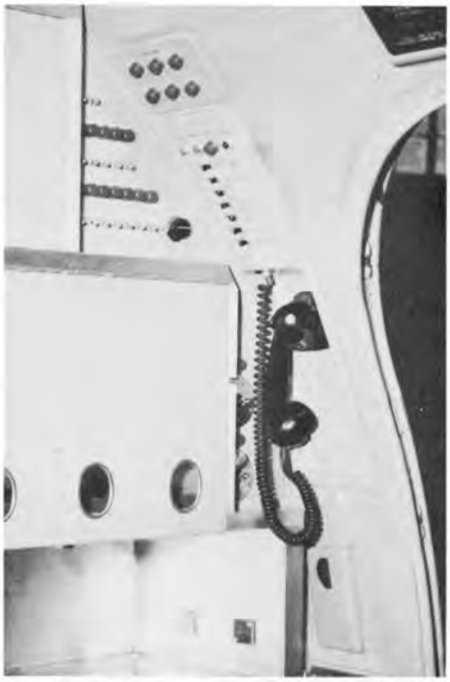


SWITCH PANEL

On the DC–7, the Stewardess switch panel is conveniently located on the outboard side of the aft buffet just aft of the main passenger door. Switches controlling buffet equipment are positioned on a forward facing panel. The lower row of switches on this panel are for the hot food ovens (casserole carriers), with the exception of the toggle switch nearest the wall which controls the buffet light. The rheostat control for the buffet light is located adjacent to the toggle switch that controls the buffet light. The middle row of toggle switches on the forward facing panel control the five beverage containers. A light is mounted above each of the switches that control the hot food ovens and beverage containers. When heat is switched on, the corresponding light glows so that the Stewardess can tell at a glance which of the units is in operation. At the top of the forward facing panel are two toggle switches used to control the supply of electricity to the hot cups. Rheostat controls for the hot cups are located at the end of the row of beverage containers. These controls are graduated and marked for heating of coffee, soup, water and baby bottles.

The Stewardess switch panel located on the bulkhead consists of two panels. The annunciator panel shows the origination of the Stewardess call signal as coming from a passenger in the stateroom, left hand lavatory, right hand lavatory, forward cabin, aft cabin, or lounge. Controls for the PA system are positioned at the top of the handset panel. These controls consist of the cockpit call button, the "ANNOUNCE" button, the pilot call light and the pilot call reset switch. In descending order, the following light switches are located on the handset panel: stateroom dome light, main cabin dome light, entrance area spot light, entrance area dome light, lounge light and aisle lights.

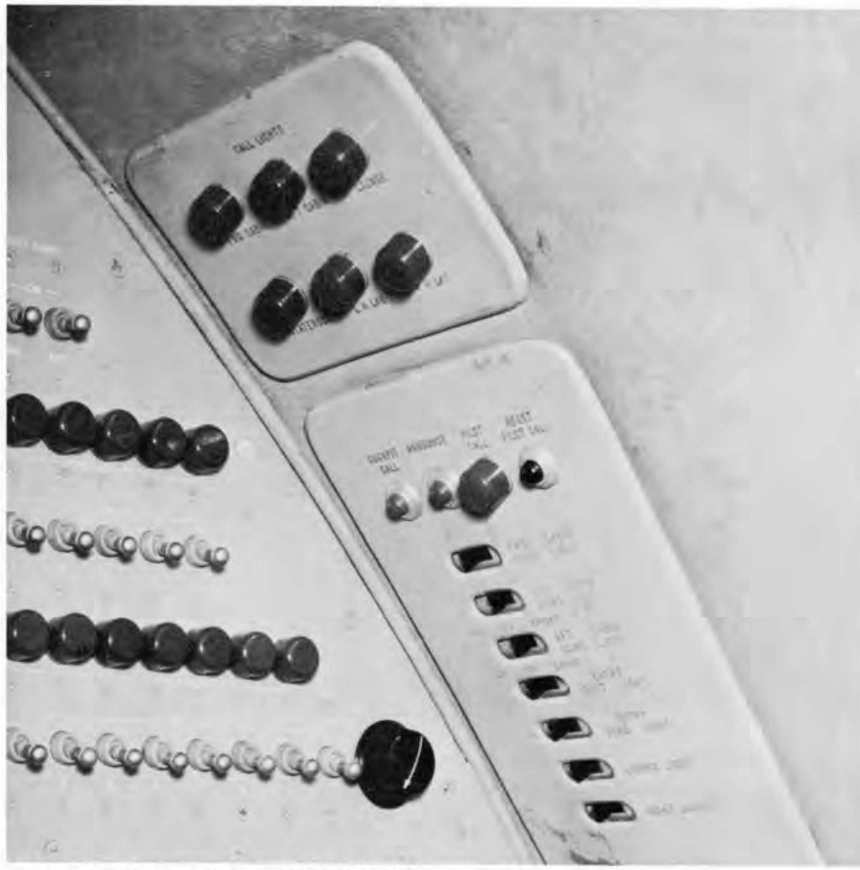
All switches and lights are labeled and identified for the convenience of the Stewardess.



A push-button type switch, including an integral light, is located adjacent to each double passenger seat within easy reach of both passengers. These switches actuate a chime on the Stewardess switch panel, as well as a call light indicating whether the call originates in the forward or aft cabin, lounge, stateroom, left hand or right hand lavatory. Exact location of a call from the cabin is determined by the individual lights at each double seat station. When the individual call lights are turned off, the Stewardess call light will be off.

A call switch located in the cockpit actuates a chime on the Stewardess switch panel, as well as a call light identified as "Pilot Call." This light is turned off by means of a reset switch on the Stewardess switch panel.

Seven call lights are mounted on each of the two annunciator panels which are located, one in the aft header of the forward main passenger cabin and one in the forward header of the aft passenger cabin. These lights will be actuated by the call switches in the passenger areas and in the Pilot's compartment so that the Stewardess will know the source of the call, i.e., Pilot's compartment, right hand lavatory, left hand lavatory, stateroom, forward cabin, aft cabin or lounge. When the annunciator is lighted, a single stroke chime will sound to attract the Stewardess' attention.



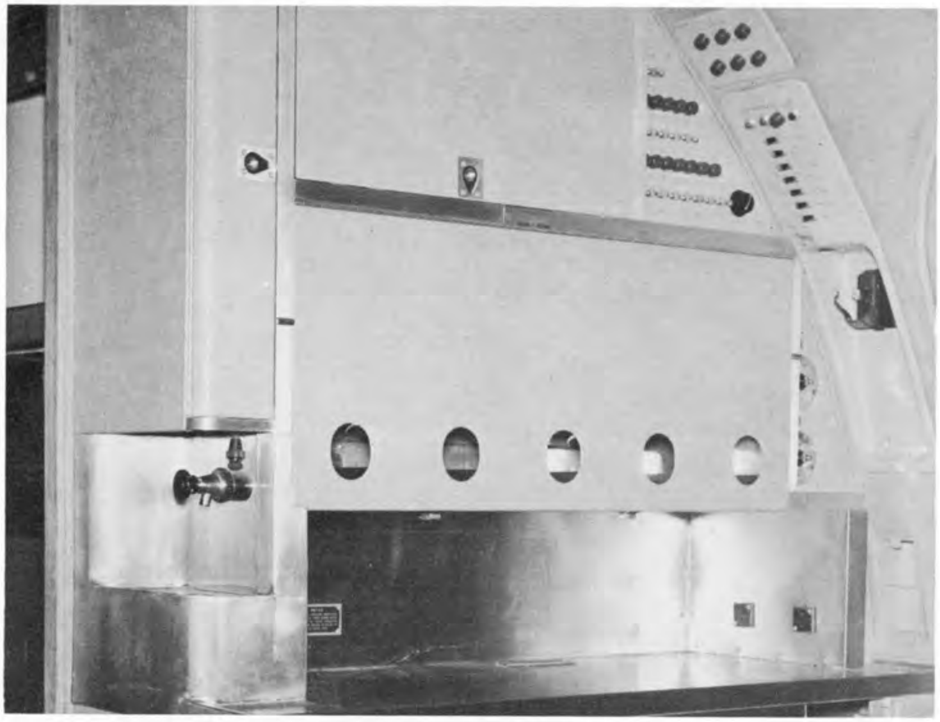
PUBLIC ADDRESS

The DC–7 public address system provides facilities for cabin announcements and communication between the buffet area and the cockpit. The handset for Stewardess use is mounted on the bulkhead just aft of the main passenger door. Control switches are located on the Stewardess switch panel above the handset installation.

For communication with the cockpit, the Stewardess presses the cockpit call button which sounds a one bell chime in the cockpit area. She then uses the phone in a normal manner, depressing the handset button while speaking.

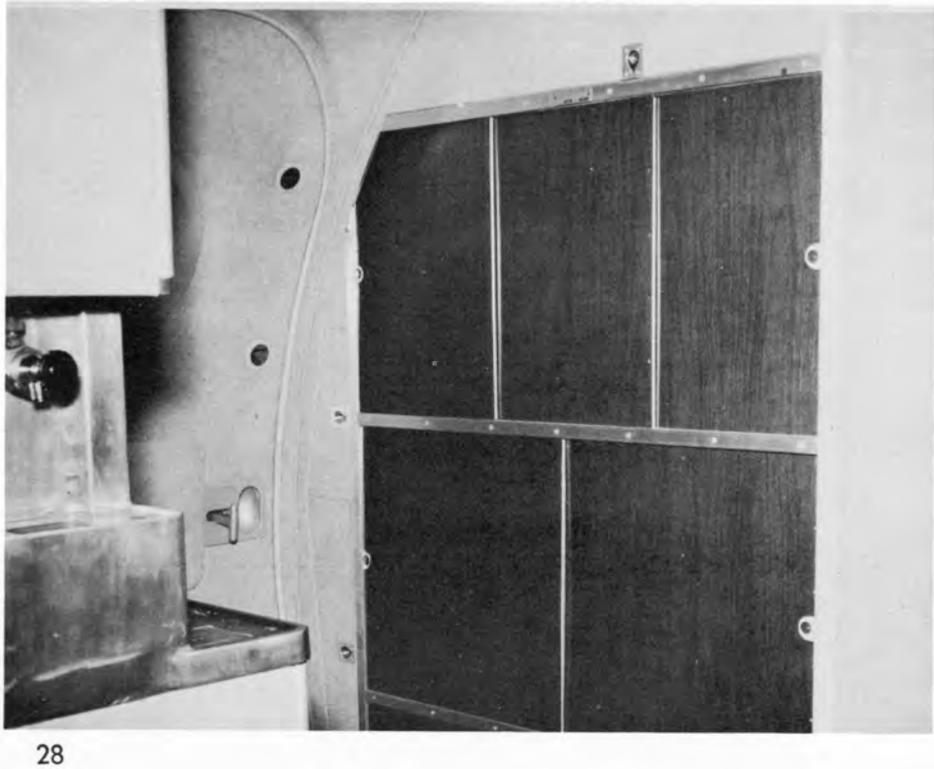
Seven speakers are installed to permit passenger announcements to be heard in all parts of the cabin. One speaker is located in the stateroom, three in the forward cabin and three in the aft cabin. The Stewardess will make passenger announcements with the handset, depressing the "ANNOUNCE" switch on the control panel for the duration of the announcement.

Thus it is impossible to inadvertently broadcast remarks intended for interphone conversation, since the public address system is activated only when the "ANNOUNCE" switch is held in the depressed position.



THE BUFFET

The DC–7 buffet area is strikingly compact with equipment and facilities arranged in two units which are located on either side of the passenger entrance area. The forward buffet contains the cold food cases while the aft buffet consists of work table area, beverage containers, hot food ovens, water fountain and the Stewardess switch panel. In addition, storage compartments are incorporated in each buffet.



To provide meal service for 69 passengers, the buffet area includes the following:

- 9 Cold Food Cases (8 trays each case)
- 6 Hot Food Ovens (12 casseroles each oven)
- 1 Ice Chest (Stored in oven rack)
- 5 Beverage Containers
- 1 Hot Cup
- 40" width work table area with drawer storage located beneath.
- Stewardess switch panel with necessary controls for operation of heating elements.
- Water fountain and paper cup storage.
- Storage space for supplies and equipment.
- Soiled linen storage and waste disposal container.

When meal service is completed, the buffet equipment is neatly hidden from view by means of sliding panel doors. Even the beverage containers are covered. Boarding and deplaning passengers see only the gleaming stainless steel work surface, the handsome door paneling and the trim leather covering of the remainder of the buffet area.

LAVATORY

Two lavatories are installed opposite each other at the forward end of the main cabin. Each lavatory has a single panel door which is hinged at the aft side and opens into the main aisle. Each door is equipped with a slot which permits sliding the latching mechanism to the open position for emergency entry to the compartments.

Each lavatory is equipped with a stainless steel washbasin, glass mirror, waste container, a toilet and storage space for the clean and soiled linen. Dispensers are provided for soap, tissues and miscellaneous supplies. There is an ash tray in each lavatory and a cold air outlet is mounted on the bulkhead adjacent to the window. Assist handles, motion sickness containers and flush coathooks are also included in the lavatory facilities.

The men's lavatory is further equipped with a razor blade disposal container and electric shaver outlet which is placarded to indicate 110 volt AC power.

A 26–gallon capacity water tank, equipped with an electrical immersion type heater, is installed in the ceiling between the lavatories. This tank supplies both lavatories. Waste water from each washbasin drains overboard. Each toilet has a waste tank with a 10 gallon capacity. External panels permit filling and draining of the water supply tank and servicing of the toilets from outside the airplane.

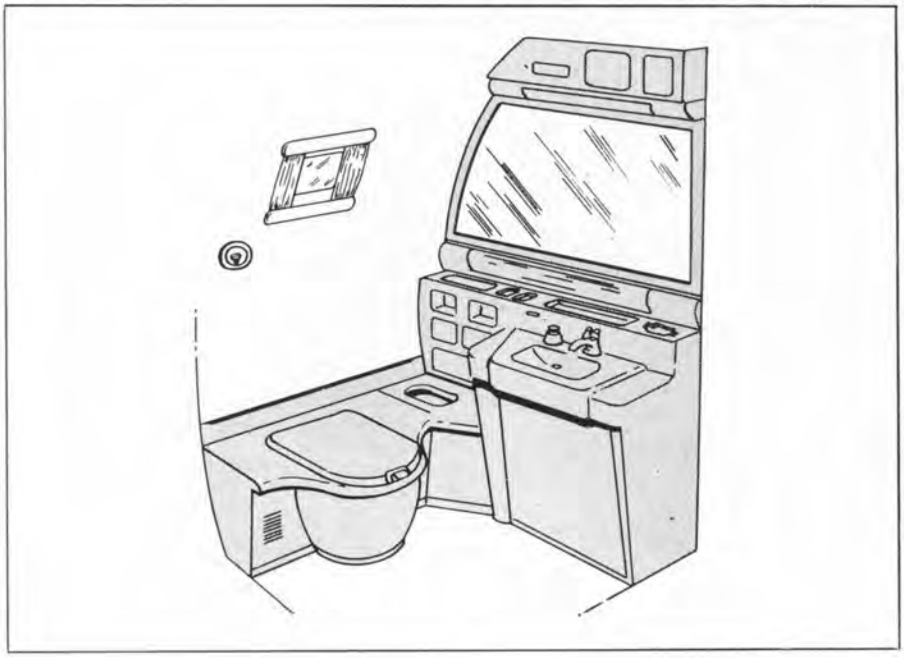
OXYGEN SYSTEM

A high pressure, diluter-demand type oxygen system is installed for the passengers on the DC–7. The oxygen supply to each system is separate, as the cylinders are not interconnected.

Oxygen is supplied to the pilots from a 38–cubic foot high-pressure oxygen cylinder. At 20,000 feet, the crew has sufficient oxygen for 2 hours and 24 minutes.

Oxygen is supplied to the passengers from a 38 cubic foot high-pressure oxygen cylinder installed on the left side of the cabin just ahead of the forward buffet. Double oxygen outlets are installed adjacent to each passenger double seat, and at the buffet.

Shut-off valves on the crew's and passengers' cylinders must be opened to start the flow to the respective outlets, where oxygen will be available when the masks have been plugged in. There are 7 disposable oxygen masks for passengers stowed in a carrier in compartment above aft coat room. A portable oxygen cylinder is installed in the flight compartment on the floor behind the Captain's seat. A full face demand type mask for use with the portable oxygen bottle is attached.



***STEWARDESS SEAT – FORWARD CABIN** located in companionway between main cabin and stateroom.*

***STEWARDESS SEAT – AFT CABIN** located in left coatroom. Seat folds against bulkhead when not in use.*

***ALTERNATE SWITCH – CABIN AISLE NIGHT LIGHTS** located on bulkhead at forward end of main cabin, Night lights may also be controlled from Stewardess switch panel.*

***COCKPIT – CABIN DOOR LOCK** – opened with cockpit key. (Same key used on CV–340, DC–6 and DC–7.) A spare key is stored in the compartment over the left coatroom.*

AIR CONDITIONING

The air conditioning control panel regulated by the Stewardess is located directly over the main passenger entrance door. This panel consists of a temperature control knob for automatic operation of the system, manual control switches to be used when the automatic control is inoperative, a dial showing position of the air conditioning system mixing valve and a toggle switch for shutting off heater air in event of emergency.

Normally the desired cabin temperature can be secured and maintained by positioning the temperature control knob, (the range is from 65° to 85°). By a check of the cabin temperature mixing valve gauge, the Stewardess can determine if the system is operating correctly as the mixing valve must be positioned in port "C" to deliver heated air and in port "A" to circulate cooled air.

If the automatic system fails, the Stewardess can resort to manual temperature control by raising the hinged door at the left of the panel and manipulating the "HOT" or "COLD" switch to obtain the correct cabin temperature.

The "Heater Air Shut Off" switch will be used by the Stewardess at the direction of the Captain. The purpose of this switch is to shut off the circulation of air into the cabin from the system when it is necessary to release CO_2 in the cargo compartments due to fire or suspected fire in these areas.

Air supplied by the ventilation system is automatically controlled. The system is capable of delivering fresh air at the rate of 112 pounds per minute through the expansion turbine at sea level conditions. The air distribution system is installed in such a way that direct air movement over passengers is held to a minimum. Air delivered to the cabin is free from fumes and odors produced by the airplane equipment or lower compartment cargo in flight. All compartments within the pressurized fuselage are free of carbon monoxide or engine exhaust fumes within allowable limits under all flight conditions.

THE FREON SYSTEM, EXPLAINED ON PAGE 19, WORKS UPON DEMAND OF THE TEMPERATURE CONTROL SETTING.

Cold air supplied from the expansion turbine is ducted to the individual cold air supply ducts. Two cold air outlets are provided for each passenger double seat and four outlets are installed in the lounge. These outlets are so arranged that the amount and direction of flow may be adjusted by the seat occupant but cannot be directed on the passenger ahead or behind. A similar source of cold air is provided for each lavatory and the buffet area. The cold air outlets are designed so that they will not permit noticeable air leakage when closed; and when open, they are quiet in operation when delivering cold air.

Air is taken from openings in the leading edge of the wing between the nacelles through ducts to the supercharger blowers. A delivery duct carries the air from each supercharger through check valves into the fuselage, where it is directed through the air aftercooler, cooling turbine, or through the heater as the automatic cabin temperature controls dictate. From the temperature conditioning apparatus, air is directed under the floor and lengthwise of the cabin through a distribution duct from which it is branched into flat ducts made as part of the floor and behind the wall lining to provide panel heating (or cooling) for the passenger cabin. Air entrance to the cabin is through longitudinally aligned slots in the cabin lining below the hat racks to direct the air upward. Air motion within the cabin is then predominantly downward. Ventilating air is discharged from the cabin through the sidewalls at floor level and through the lower compartments to the pressure control valve outlet.

GROUND OPERATIONS

TAXIING

1. At ground speeds from "0" to 10 MPH the acceleration factor is such that a minimum of braking action is necessary to maintain the DC-7 at a safe speed.

2. At the speed of 10 MPH and above braking action is required in amounts and frequencies which will cause serious overheating of the brake discs.

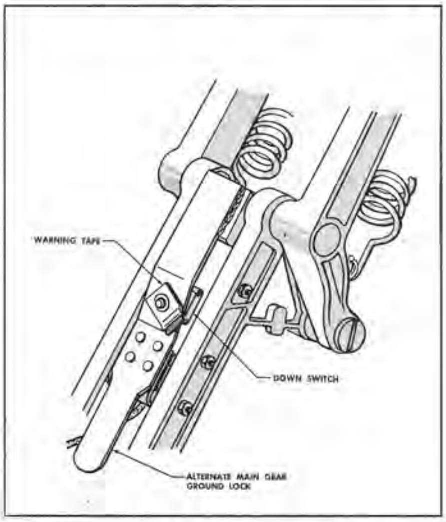
3. Turns - Taxiing turns should be made with the airplane slowed to very near "0"MPH in order to reduce the possibility of side loads damaging the nose gear and the nose wheel strut attaching structure.

4. With the nose torque links connected, wing tip clearance will clear the entire aircraft in a turn.

PARKING

1. Wheel chocks should be placed forward and aft of the main gear when the airplane is parked.

1. Due to the amount of heat generated when the DC-7 brakes are used, it is impractical to allow the airplane to remain on the ramp with the brakes parked after taxiing. It is reccommended that chocks be installed fore and aft of the main landing gear wheels immediately after parking.



LG LOCK PINS

1. Insert a ground lock pin in the hole provided in the nose gear down-latch linkage knee-joint.

2. Insert a safety pin in the end of the ground lock pin.

3. Make certain that the warning tape is clearly visible.

INSTALLATION OF MAIN GEAR SAFETY GROUND LOCKS

1. Insert a safety ground lock at the drag linkage knee-joint on each main gear.

2. Make certain that the warning tape is clearly visible.

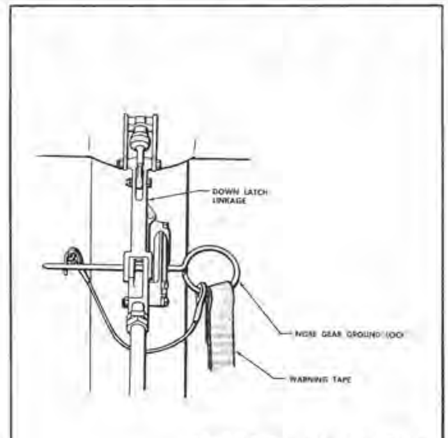


Figure 4-3. Ground Lock Installation

TOWING

1. Use approved tow bar.

2. Disconnect nose steering torque.

3. Maintain airplane Hydraulic system pressure.

4. Qualified person in cockpit for brake operation.

5. In turns shorter than is possible with torque links connected, tail clearance will clear the entire airplane.

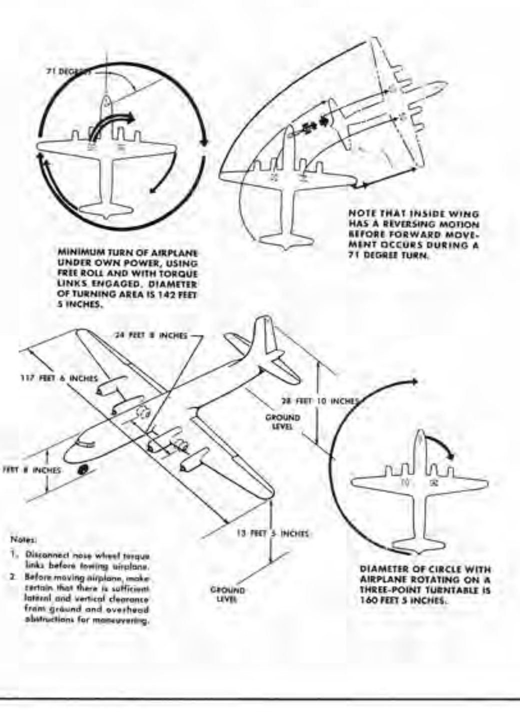
MOORING

During normal weather conditions, it is not necessary to tie down the airplane when other precautions, such as setting parking brakes and chocking wheels, and locking the control surfaces, have been taken. If a high wind is expected, tie down the airplane to a prepared mooring base as follows:

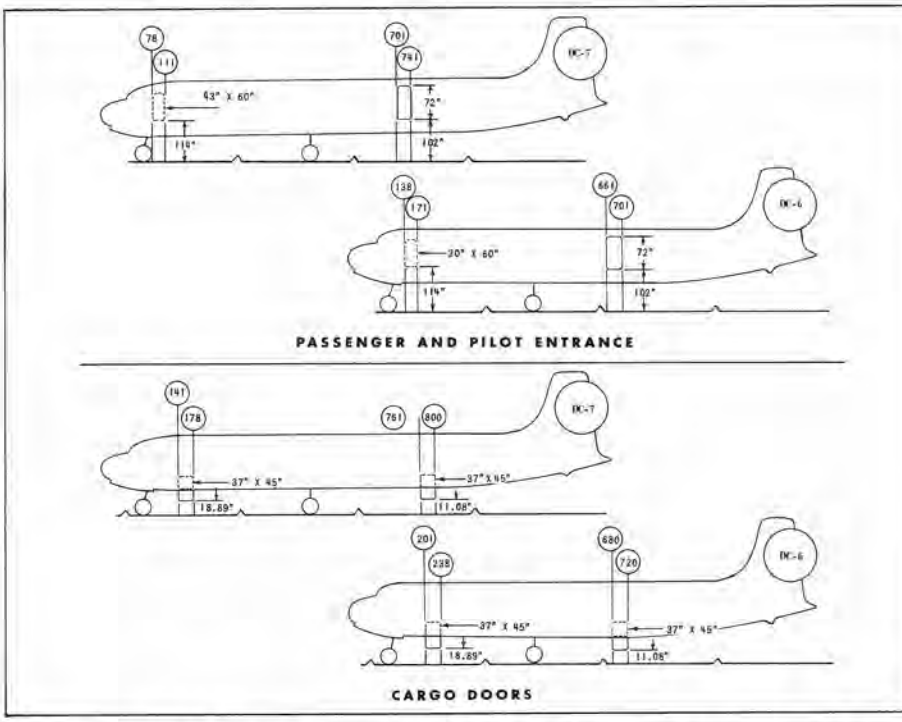
1. After making certain that wheel chocks are snugged up against both nose and main gears, forward and aft, attach a tie-down cable to the wing mooring point at sta. 415.0 in each wing near spar. The angle between the tie down cable and the vertical should not exceed 25 degrees aft, 5 degrees forward, 10 degrees outboard, or 0 degrees inboard.

2. Attach a tie-down cable to the tail skid through the 1 ½ inch diameter hole in the tail skid. Do not exceed an angle of 21 degrees forward or 23 degrees aft from the vertical.

3. Attach a tie-down cable to the nose wheel around the nose wheel axle.



4. All tie-down cables should be not less than 5/8 inch diameter, except the tail skid cable, which should not be less than 3/4 inch in diameter. Cables should be tightened so that they have no appreciable slack.



Cargo

Two cargo compartments are provided in the lower portion of the fuselage for all general cargo and luggage.

1. Lower forward cargo compartment:

   This compartment has a door size of 37 x 45 inches, is hinged at the bottom, swinging out and down when opened.

   Compartment capacity, 5,690 pounds.

   This compartment is divided into two bins. Bin 1 forward of the door has a capacity of 2,000 pounds. Bin 2 aft of the door has a capacity of 3,690 pounds.

   The floor loading is 75 pounds per square foot maximum. The approximate measurement of the entire compartment is 72 inches wide, 252 inches long, 30 inches deep.

2. Lower aft cargo compartment:

   This compartment has a door size of 37 x 45 inches, is hinged at the bottom, swinging out and down when opened.

   Compartment capacity, 6490 pounds.

   The approximate size is 72″ wide, 354″ long, 30″ deep.

This compartment is divided into two bins. Bin 3 forward of the door has capacity of 3,380 pounds. Bin 4 aft of the door has a capacity of 3,110 pounds.

The floor loading is 75 pounds per square foot maximum.

NOTE: The aft end of Bin 4 is referred to as the lower cargo compartment extension. This area is limited to 30 pounds per square foot floor loading, which will be indicated by wall markings.

Each of the cargo compartment doors is equipped with hold open latch and when opened each door is equipped with a step platform to facilitate cargo loading.

The total capacity of the cargo compartments is 12,180 pounds. The total volume of compartments is 590 cubic feet. For cargo loading to maintain proper balance on the DC-7 airplane, consult the Tabular Loading Chart showing the maximum and minimum load for the aft cargo compartment.

Ground Power

With the addition of new electrical systems and the increased electrical load requirements for improved conventional systems, the demands on the ground power unit for the DC-7 make it necessary to use a 1000 amphere generator to supply all circuits.

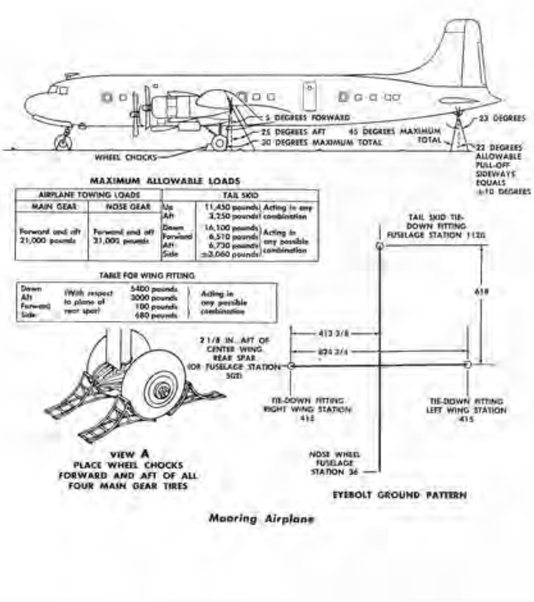
If only a 500 amphere power unit is available it is necessary to turn off certain electrical systems as specified by the placard on the instrument panel, the main system being inoperative is the Freon system.

The ground power receptacle is located under an access door aft of the nose wheel well, the receptacle having five prongs to accommodate the 1000 amp plug, however, the three prong plug of the 500 amp unit may be used.

Ground Air Conditioning Unit

The connection for the ground air conditioning unit is located on the bottom aft right side of the fuselage.

When the Freon system is in operation on the ground and the ground air conditioning unit is connected, a re-circulating blower operating in conjunction with the Freon system is automatically turned off.



Mooring Airplane

FUELING

1. The airplane must be electrically grounded during all refueling operations. Make certain that the grounding plug is inserted in the grounding jack provided near each filler neck, before servicing any fuel tank, or that the fuel hose is otherwise grounded to the airplane structure. Use fuel grade 115/145. The fuel tank filler necks are located in recessed panels at the outboard end of each tank, center wing stations 104, 250, and 385, and outer wing station 625. Filler inlets will admit fuel at the maximum rate of 200 gallons per minute.

2. In determining fuel quantity per tank, it is important to remember that as a result of tank dimensions and wing dihedral combined, the fuel level is such that it is not possible to obtain stick measurements below certain quantities. For outer wing tank measurements, use the inboard integral cap-dipstick at approximately wing station 519 for measurements from 100 gallons to 480 gallons; for measurements above 480 gallons in the outer wing and all measurements in the center wing tanks, use the dipstick stowed in the nose wheel well.

CAUTION

Do not remove the inboard integral cap dip-stick if the outer wing tank contains more than 500 gallons.

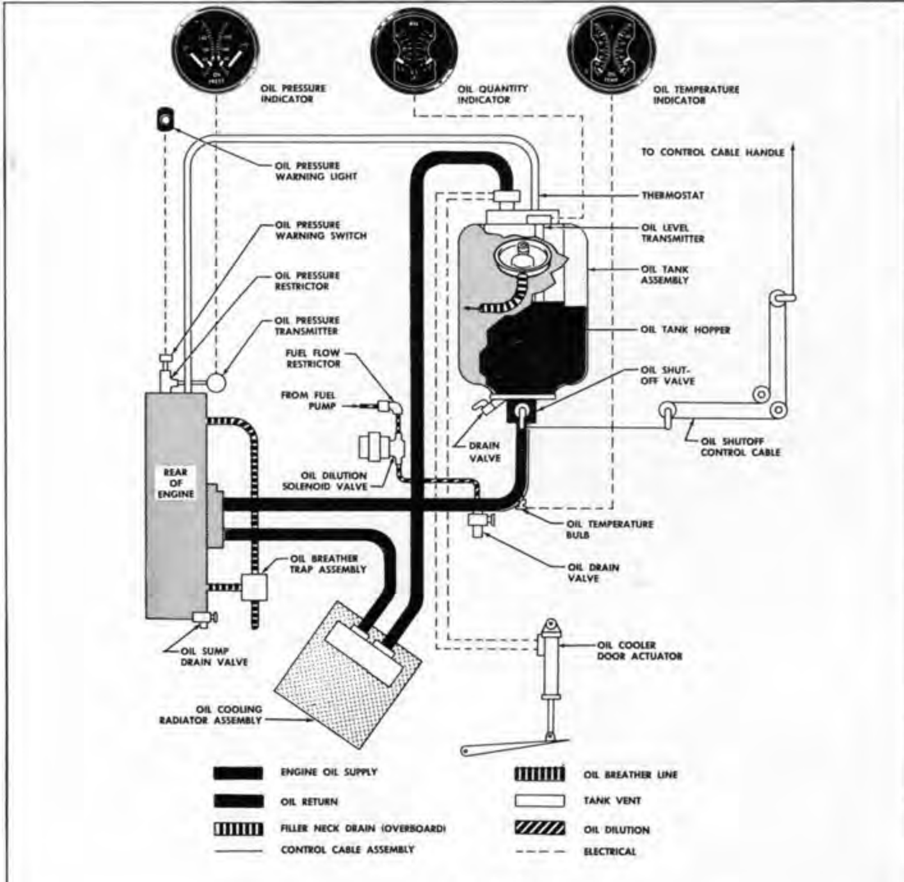
3. Fill tanks in accordance with fuel loading chart. Replace the filler caps and close the access doors.

NOTE (1). A channel on the inside of the access door prevents the door from closing if the filler cap is not in the locked position.

NOTE (2) There is a pin in each fuel tank filler neck which is installed at right angles to the neck structure over which the slot in the inner race of the fuel tank cap must fit before the cap can be rotated to the locked position.

CAUTION

THE PROBABILITY OF AFTER-FIRING OF A HOT ENGINE IS GREATLY ENHANCED BY THE FUEL INJECTION SYSTEM INCORPORATED ON THE DC-7. LINE-SERVICE OPERATIONS SHOULD BE ACCOMPLISHED IN SUCH A MANNER WHICH WILL ELIMINATE THE NECESSITY OF RE-POSITIONING THESE PROPELLERS.



Oil System Schematic

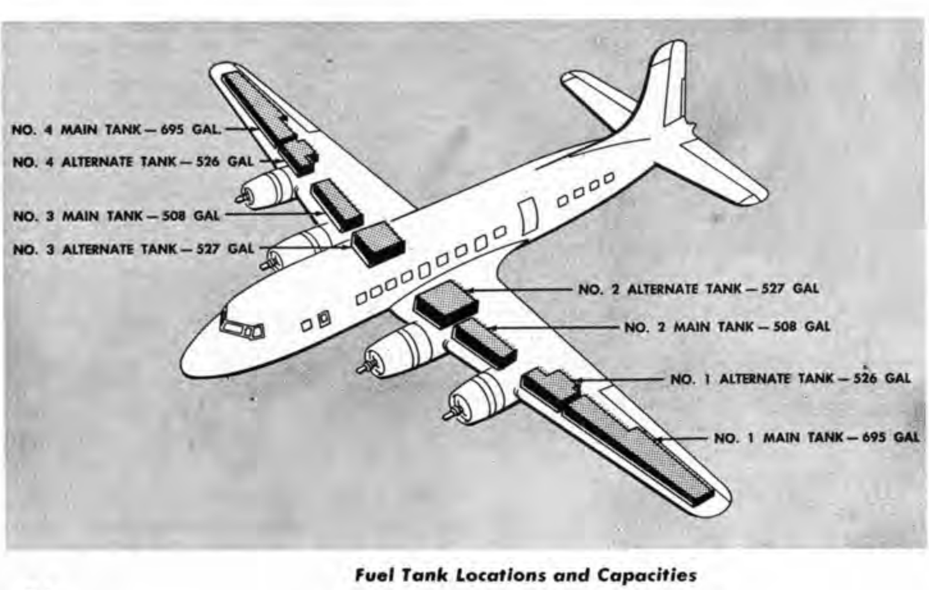
OIL SYSTEM

1. Fill oil tanks located in each nacelle, with oil, grade 1100 or 1120 for winter and summer operation. Each tank holds 40 gallons, but is restricted to 35 gallons maximum.

2. Secure filler caps and close the access doors after filling the tanks.

3. The oil tank filler neck has a pin installed at a right angle to it, which must fit into the slot in the inner race of the oil tank cap before the cap can be rotated to the locked position.

4. If the tank cap is not properly locked the nacell door over the cap will not close.



Fuel Tank Locations and Capacities

DC-7 speed
+
efficient ground handling =
the Fastest Service ever!

LAVATORY

The toilets are serviced from the exterior of the airplane at station 285 on each side of the fuselage by means of a service panel.

PERFORM THE SERVICING OPERATIONS AS FOLLOWS:

1. Raise the cover of the service panel

2. Remove the large cap.

3. Connect the four inch hose from the field equipment.

4. Unlock and pull the toilet valve handle on the right side of the panel.

5. When draining is complete, leave the drain hose attached and connect one inch hose from the field service equipment to the flushing fitting.

6. Flush the toilet thoroughly and allow all water to drain out.

7. Close the toilet valve and pump two gallons of water into the toilet bowl.

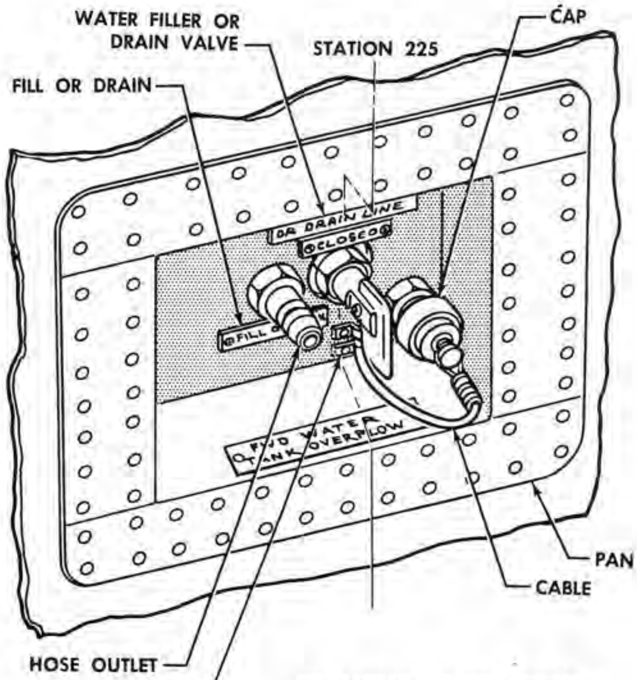
8. Open the toilet valve and allow water to drain out to complete flushing operation.

9. After all water has drained out close the drain valve and disconnect the four inch drain hose.

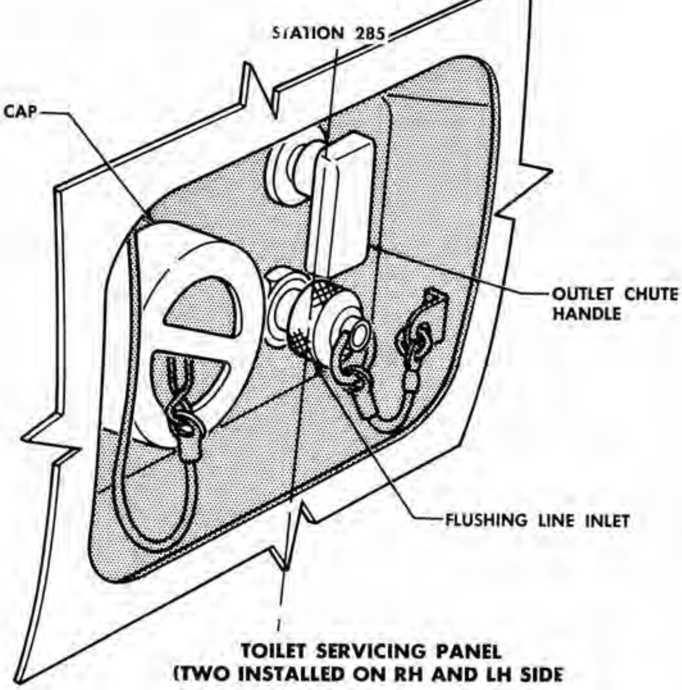
10. Attach the chemical hose from the field service equipment to the one inch connection and charge the toilet with two gallons of disinfectant.

11. Install cap on flushing line inlet.

12. Close the service panel cover plates.



WASHING WATER FILLER



TOILET SERVICING PANEL (TWO INSTALLED ON RH AND LH SIDE

The water supply tank, for the lavatories wash basins is filled and drained through a small drain panel located on the outside of the fuselage, adjacent to the lavatory area at station 225 on the lower left side of the fuselage.

FILLING WASHING WATER TANK:

1. Open the access door to the water tank and fill and drain panel.

2. Attach the hose from the field servicing equipment.

3. Remove the cap from the overflow line.

4. Turn the drain-fill valve to the open position.

5. Fill the tank until water runs from the overflow line.

6. Return the valve to the closed position.

7. Allow all the water to drain from the overflow line.

8. Replace cap on overflow line.

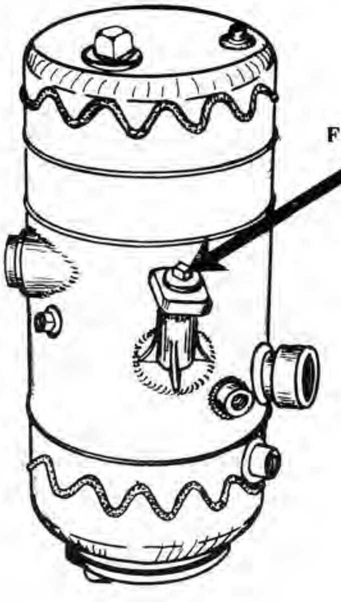
9. Remove field service equipment.

10. Close the panel access door.

Hydraulic Service

The hydraulic reservoir located in the hydraulic accessories compartment has a capacity of 5.4 U.S. gallons.

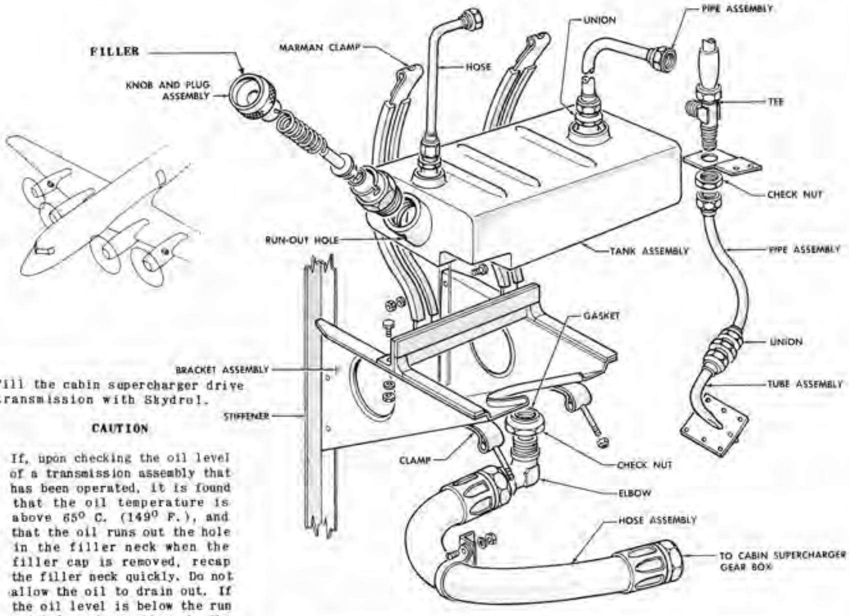
A sight gage on the face of the reservoir indicates the fluid level. The reservoir fluid level can also be read from the flight compartment by means of a remote - indicating Liquidometer indicator, controlled by a remote - indicating Liquidometer transmitter in the reservoir. The quantity indicator is calibrated as follows: "Re-fill", "Normal Flight", and full, "Zero Pressure". In re-filling the reservoir, fill to zero pressure with engines not running; then fill to normal flight (corresponding to upper arrow on the reservoir sight gage) with engine running, 3000 P.S.I. pressure in the system, landing gear extended, brakes set, and flaps up.



CAUTION

Before removing the filler-cap, back off the cap two turns to relieve reservoir air pressure. Hold the filler neck with a wrench while unscrewing the cap.

Efficient Operation depends on Proper Service



Fill the cabin supercharger drive transmission with Skydrol.

CAUTION

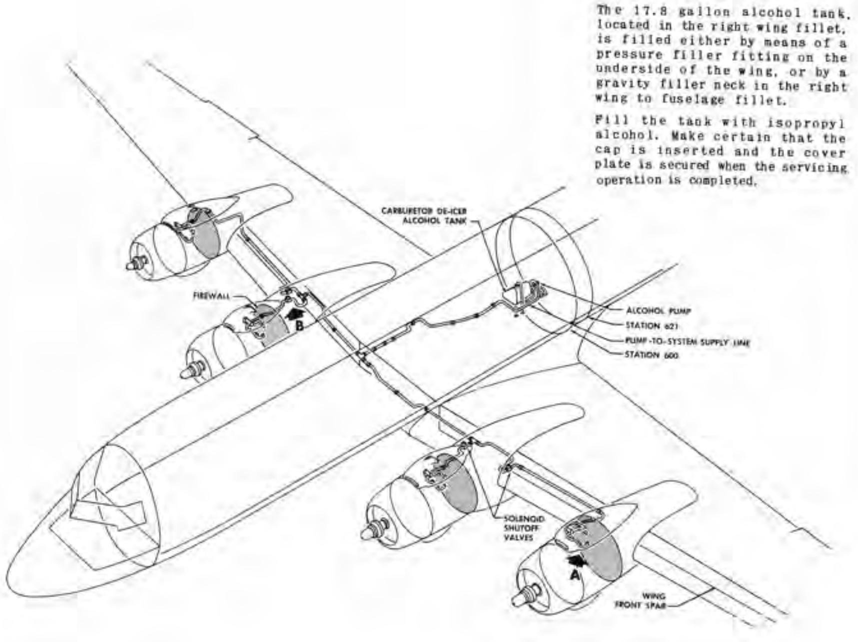
If, upon checking the oil level of a transmission assembly that has been operated, it is found that the oil temperature is above 65° C. (149° F.), and that the oil runs out the hole in the filler neck when the filler cap is removed, recap the filler neck quickly. Do not allow the oil to drain out. If the oil level is below the run out hole, at any time, in the filler neck, add sufficient oil to bring the level to the run out hole.

Filling Cabin Supercharger

Fitting Accessory Anti-Icing Alcohol Tank

The 17.8 gallon alcohol tank, located in the right wing fillet, is filled either by means of a pressure filler fitting on the underside of the wing, or by a gravity filler neck in the right wing to fuselage fillet.

Fill the tank with isopropyl alcohol. Make certain that the cap is inserted and the cover plate is secured when the servicing operation is completed.



Two pressure accumulators, connected in parallel, are installed in the fuselage accessories compartment.

ADJUSTMENT OF MAIN ACCUMULATOR PRESSURE

1. Relieve main hydraulic system pressure to 0 P.S.I.

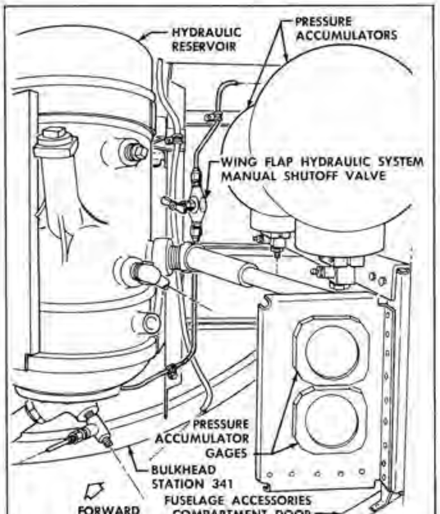
   (a) In all cases where specific instructions are not given, wing flaps should be operated to reduce pressure. Make sure that flaps are clear of all obstruction.

2. Remove the cap from the air valve in the bottom of the accumulator.

3. Operate the brakes to maintain zero pressure on the flight compartment gauge while inflating the accumulator.

4. Connect the air filling chuck from the booster pump or air cylinder to valve stem threads.

5. Loosen the 5/8-inch hex swivel nut to a maximum of 3/4 of a complete turn, turning counterclockwise.

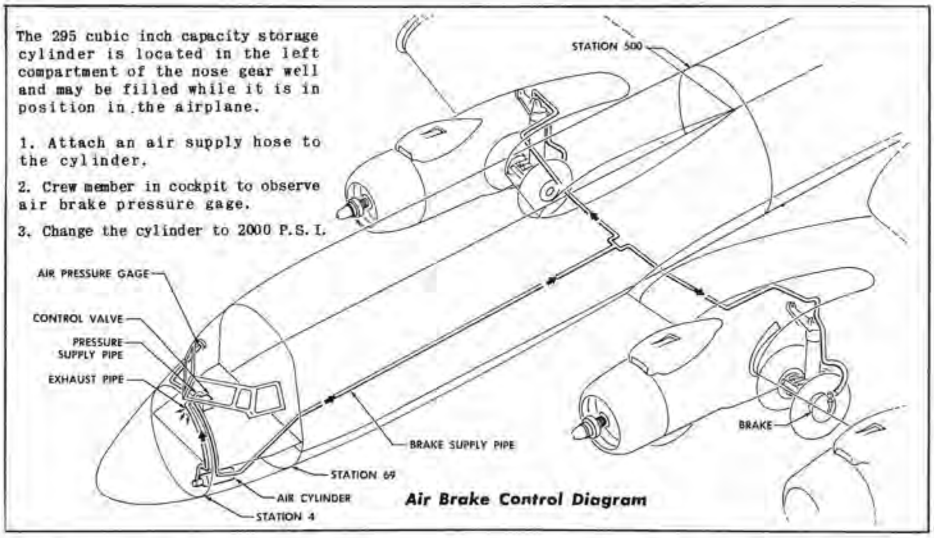


CAUTION

Excessive loosening will result in the stem assembly dropping into the unit to which the valve is attached.

6. Add air until the initial accumulator pressure is 1000 P.S.I. (Plus 200 Minus 0).

7. Tighten the 5/8-inch hex swivel nut to between 50 and 70 inch-pounds of torque.



Air Brake Control Diagram

8. Remove the air filling chuck from the valve and replace the valve cap, tightening it to extreme finger tightness.

The nose wheel steering pressure accumulator is a small spherical tank installed on the forward left side of the bulkhead in the left nose wheel well tunnel, accessible through an exterior door.

CHECKING AIR PRESSURE OF THE NOSE WHEEL STEERING PRESSURE ACCUMULATOR:

1. Open bleeder valve on the nose wheel steering control valve.

2. Read air pressure from the gauge attached to the air side of the accumulator.

3. Close and safety the bleeder valve.

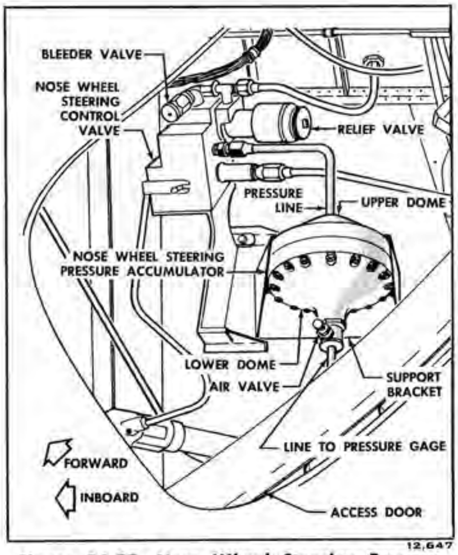


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Figure 24-27. Nose Wheel Steering Pressure Accumulator Installation

ADJUSTING THE NOSE WHEEL STEERING ACCUMULATOR AIR PRESSURE:

1. Relieve hydraulic pressure in the accumulator by opening the bleeder valve on the steering control valve.

2. Remove the cap from the air valve in the bottom of the accumulator.

3. Connect the air filling chuck from the booster pump or air cylinder to valve stem.

4. Loosen the 5/8-inch hex swivel nut to a maximum of 3/4 of a complete turn, turning counterclockwise.

CAUTION

Excessive loosening will result in the stem dropping into the unit to which the valve is attached.

5. Add air until the initial accumulator pressure is 50 P.S.I.

6. Tighten the 5/8-inch hex swivel nut to between 50 and 70 inch-pounds of torque.

7. Remove the air filling chuck from the valve and replace the valve cap, tightening it to extreme finger tightness.

Shock Struts Service

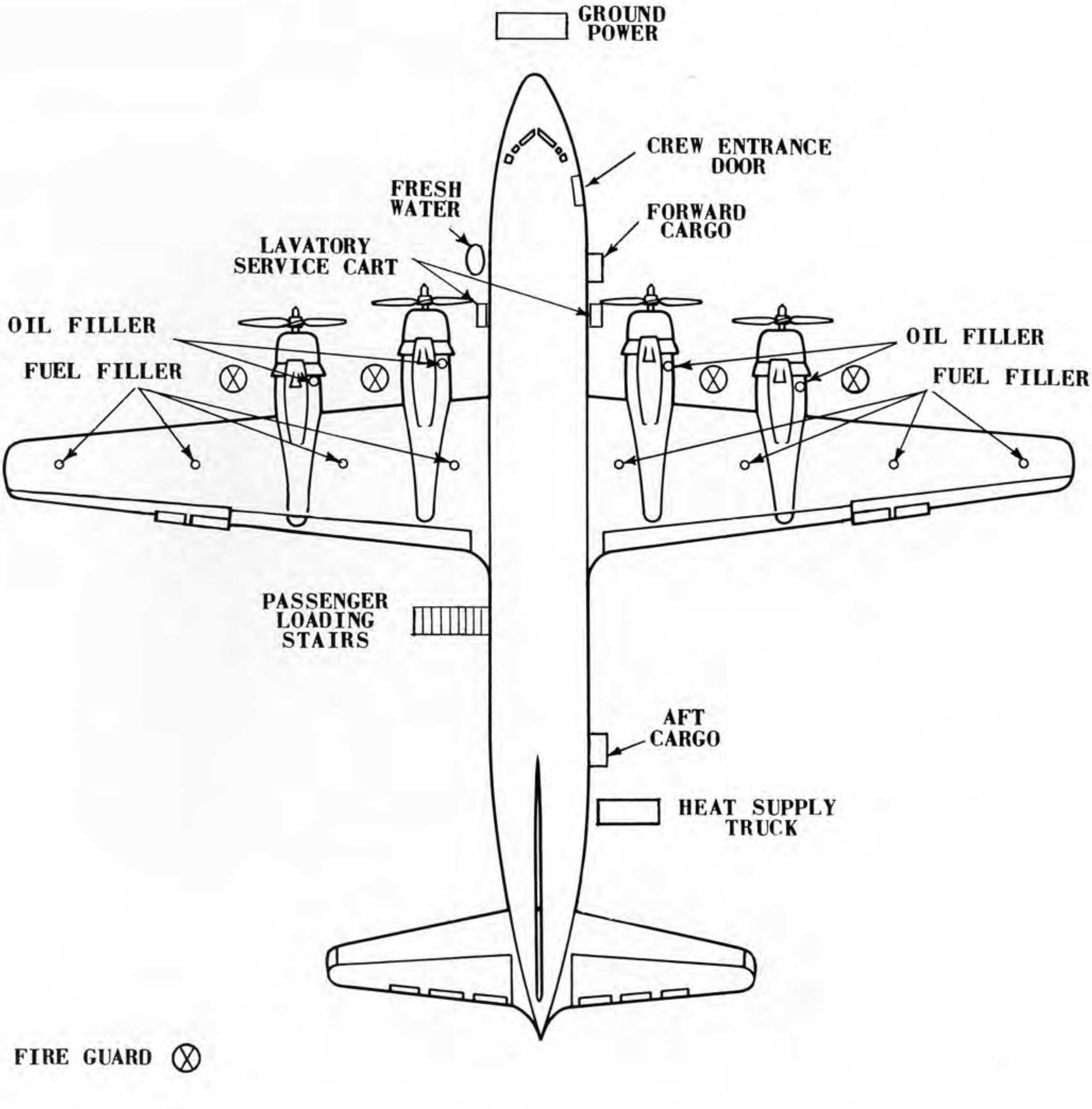
1. Shock struts should be inflated in accordance with the load temperature chart on or near the strut.

2. Inflation is done in the same manner as with accumulator high pressure valves.

3. Inflate the shock strut with compressed nitrogen or helium only.

(Do not use Oxygen, Hydrogen, Actylene, etc., or serious damage will result).

Ramp Equipment Placement



THE PRESENT 4 ENGINE GROUND HANDLING EQUIPMENT AVAILABLE AT STATIONS WILL BE USED FOR SERVICING THE DC-7 EXCEPT THE GROUND POWER MUST BE A 1000 AMP OUTPUT. FREON SYSTEM MUST BE OFF IF ONLY 500 AMP UNIT IS AVAILABLE.

CUSTOM BUILT

the

DC-7

A combination of experienced engineering, careful planning, ingenious tooling and painstaking production control enables the Santa Monica Division of Douglas Aircraft company to produce "custom-built" aircraft on a semi-mass production basis.

No less than four aircraft models, with some 40 major variations, are produced consecutively on a single production line and at a rate which exceeds that of any other airplane of comparable size and configuration complexity.

Major variations of configuration involve the construction and installation of floors, fuel tanks, interiors, power plants, electrical systems, radios and scores of miscellaneous installations.

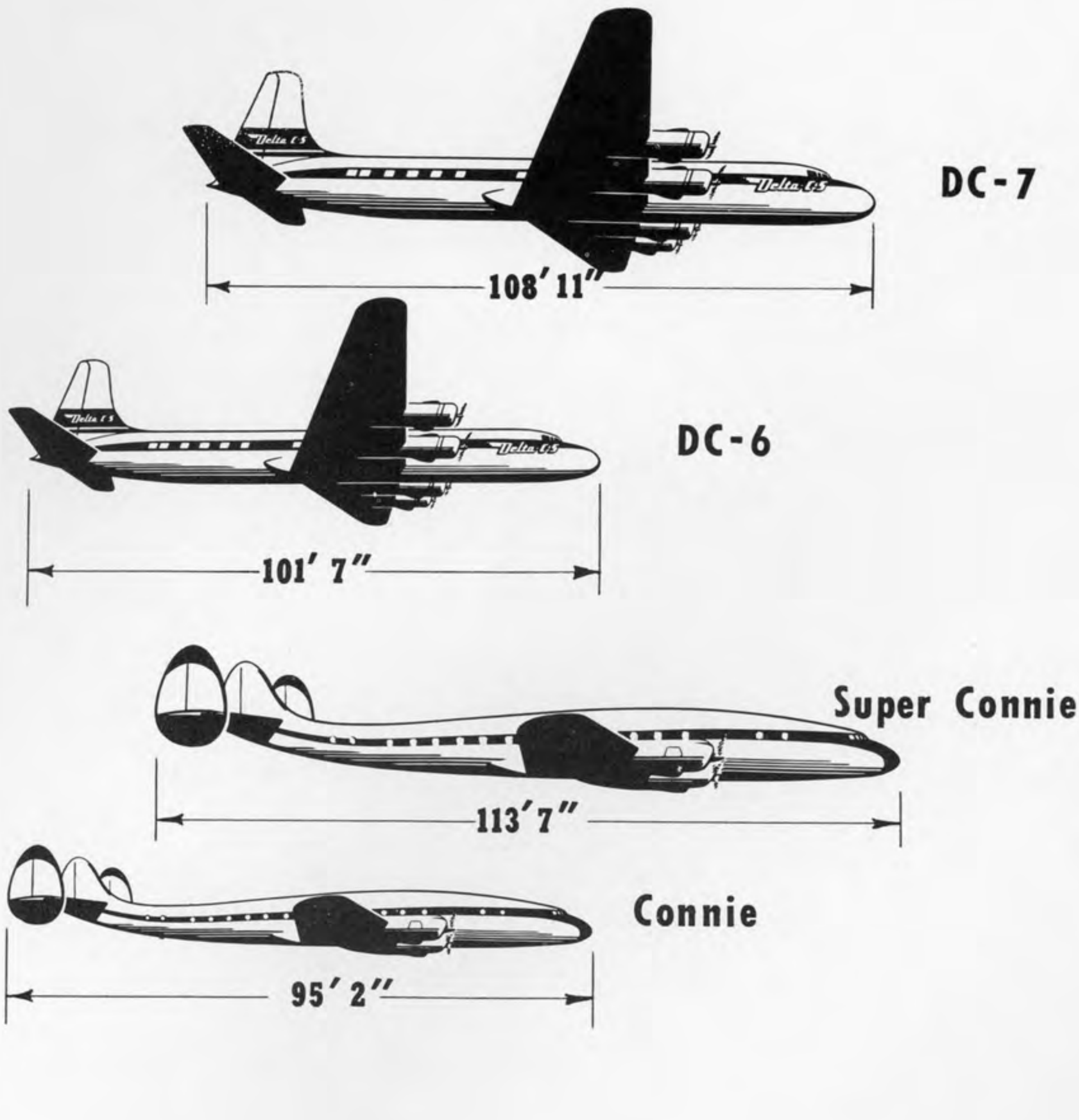
The nose sections, except for internal fittings. They are seen lined up to go on DC-6's, 6A's, 6B's, or DC-7's.

Here the line will take a 90 dc3ree turn to pick up wing sections.

A major step in the assembly is the mating of the wing section and fuselage. From here, the planes roll forward on their own gear.

The first DC-7 coming along the line. It is eight feet longer and 32,000 pounds heavier than the "6" series.

THE CONSTANT WIDTH AND HEIGHT, FULL LENGTH OF THE DC-7 CABIN ADDS TO THE LUXURY OF THE INTERIOR AND TO THE COMFORT OF THE PASSENGER.

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