

DATE: June 18, 1959

FROM: O. B. Marble, G-5-18

SUBJECT: "DC-8 PILOT REPORT" REPRINT, AVIATION WEEK

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Enclosed is a reprint of a recent AVIATION WEEK article entitled, "DC-8 Demonstrates Over-All Flyability."

About 150 of these reprints have been mailed to officials of DC-8 customer and prospect airlines. Another 300 copies are available for general use or other distribution.



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Aviation Week

Including Space Technology

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**First Details Of
X-15 Powerplant**

**Pilot Report on
Douglas DC-8**

Sikorsky HSS-2 Turbine Helicopter





HIGH DEGREE of pitch stability was one of the Douglas DC-8 transport's flight characteristics reported by Aviation Week pilot.

Aviation Week Pilot Report:

DC-8 Demonstrates Over-All Flyability

By Richard Sweeney

Long Beach, Calif.—First impressions of the flight handling of the Douglas DC-8 indicated to AVIATION WEEK's pilot an over-all flyability greater than that usually expected of large swept-wing jet transports.

Although strictly normal flying was done and no edges of the flight envelope were investigated, the DC-8 showed potential for becoming a standard for a "pilot's airplane" among jet transports.

Favorable characteristics it displayed included:

- **Very high degree** of pitch stability for a long airplane.
- **Damping out** roll due to yaw (dutch roll) in acceptably few oscillations, with hands off the controls.

Sampling of the aircraft's stability, control responses and pressures was accomplished during a 30-min. period including cruise at 31,000 ft., letdown,

ILS-type approach to Long Beach airport, plus follow-through on landing with Douglas pilot Arnold G. Heimerdinger.

Flown by AVIATION WEEK pilot without autopilot or other automatic flight control or stability augmentation device, the DC-8 showed a very high degree of pitch stability at cruise altitude even with people traversing the full length of the fuselage.

Trim Characteristics

Turns by AVIATION WEEK pilot at cruise altitude and during letdown, with gear down and up, indicate the aircraft has excellent trim characteristics. Speed was held constant at Mach 0.785 at altitude, while constant 290 kt. indicated air speed (IAS) was held during descent, and in this regime, control pressures and response rates were very good. In level turns and in letdown, turn rate was held to one needlewidth.

The DC-8 handled extremely well

throughout approach, with minimum trim change at gear extension. Stability was excellent during the low portion of approach, and response rates to control inputs for corrections also were extremely good.

Approach speed varied from 160 kt. IAS initially to 140 kt. on close final with landing flap extended, while landing flare speed was 129 kt. IAS. The aircraft settles nicely onto the runway after rotation using the standard technique of rotate, then hold what you have.

Landing was at maximum landing weight of 189,000 lb. for the DC-8, or slightly heavier.

During the letdown, Heimerdinger accomplished one demonstration, the dutch roll dampout. Descent rate was 1,500 fpm., a heavy left roll was induced, then rudder pressure applied to augment the roll. Only the shaft of the yoke was held to maintain desired descent rate, and airspeed. The airplane

Douglas DC-8 Specifications*

Data Applicable to All Models

Wing area.....	2,758 sq. ft.
Wing span.....	139 ft. 9 in.
Over-all length.....	150 ft. 6 in.
Over-all height.....	42 ft. 4 in.
Wing sweepback at 25% chord.....	30 deg.
Landing gear type (swivel caster).....	Dual tandem
Turning radius (for wingtip clearance).....	91 ft. 1 in.
Lower cargo compartments (2).....	
Total volume—both compartments.....	1,390 cu. ft.

Engines		Domestic First Class	Domestic First Class	Intercontinental (Mixed First Class-Tourist)		
		JT3C-6 (J57)	JT4A-3 (J75)	JT4A-3 (J75)	Conway (J75)	Conway (RCO-12)
Design gross weight.....	lb.	265,000	265,000	287,500	287,500	310,000
Design landing weight.....	lb.	189,000	189,000	194,000	194,000	199,500
Fuel capacity.....	lb.	114,400	114,400	140,500	140,500	151,500
Fuel capacity.....	gal.	17,600	17,600	21,615	21,615	23,307
Capacity payload (space limited).....	lb.	33,040	33,040	35,680	35,680	35,680
Number of passengers.....		116	116	132	132	132
Cargo.....	lb.	13,900	13,900	13,900	13,900	13,900
Range.....	stat. mi.	3,900	4,100	4,500	4,680	5,200
Level flight speed, max. cruise thrust at 30,000 ft., at 220,000 lb.....	mph.					
	T.A.S.†	561	589	589	591	588

*All range and performance data pertains to specific payload and weights indicated. Range includes allowance for start, taxi, takeoff, climb and descent, plus reserve fuel for 300 stat. mi. and one-hour holding.

†True air speed.

returned to its original descent track in 6½ cycles.

This airplane, No. 4 DC-8, has installed on the copilot's instrument panel the Bulova altimeter, recently flown by this pilot in Beech E18S (AW Feb. 16, p. 37). Instrument's performance in the jet transport was very good, with response rate, readability and lack of ambiguity helping to make level flight at altitude, as well as the approach, easier than with a three-pointer or drum-pointer altimeter.

Test Flight

Short flying session was accomplished during the first flight of the DC-8 with press representatives aboard, conducted at Douglas Long Beach facility. Flight was a routine part of the DC-8 test program, and the mission primarily was to obtain data on air conditioning and pressurization function during normal flight profile of takeoff, climb to cruise altitude, cruise, letdown and landing.

Aircraft has a partial airline-type interior, with one section compartmented off with instrumentation installed. This particular plane is being used in work such as icing, for which a special paint job was installed on wing leading edges, engine cowls and other surfaces, plus pressurization and other systems functional testing. The partial passenger

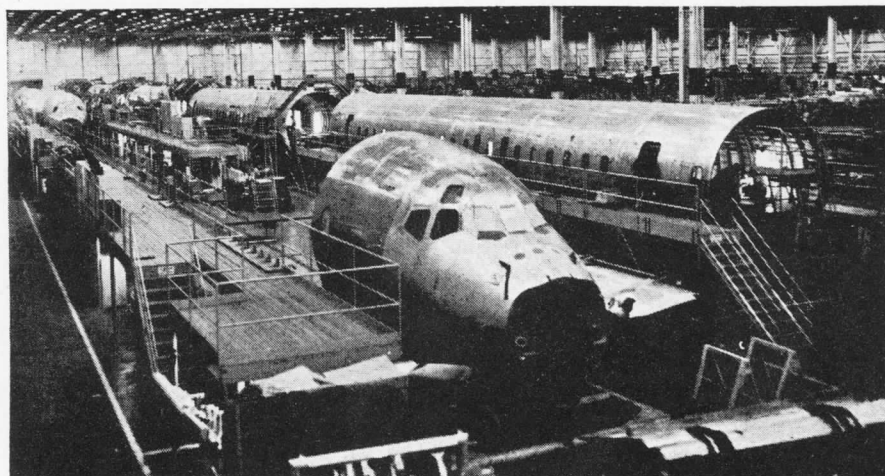
seating installation is intended for interior acoustical tests.

Takeoff gross weight approximated 210,000 lb., and water injection was used in the Pratt & Whitney Aircraft JT3C-6 turbojet engines which develop 13,200 lb. thrust for wet takeoff. Flight spanned approximately 1 hr. 10 min., with AVIATION WEEK pilot sitting in for last half hour.

Crew included Heimerdinger, who is flight operations manager for Douglas Santa Monica Division, as pilot in com-

mand; Bert A. Foulds, Douglas chief pilot, as copilot, and Don L. Mullin, Douglas engineering test pilot, as systems operator. Foulds yielded his seat to AVIATION WEEK pilot during last part of the flight.

Roll for takeoff, which Foulds accomplished, took approximately 23 sec., with a distance close to 5,100 ft. to lift-off. Unstick speed, V_2 was 140 kt., with rotation speed, V_r , about 7 kt. below this. Climbout was at 280 kt. IAS, value currently used by Douglas.



DOUGLAS DC-8s, shown being produced at the manufacturer's Long Beach, Calif., plant, are equipped with daisy petal sound suppressors and eventually will have thrust reversers.