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16. Abstract About 0355 e.d.t. on September 20, 1975, Airlift International, Inc. Flight 101, a McDonnell-Douglas DC-8-63F, struck components of the runway 22L instrument landing system, the runway 4R automatic landing system flasher, and the runway 4R field monitor while taking off from runway 22L at the John F. Kennedy International Airport at Jamaica, New York. The accident occurred during hours of darkness and reduced visibility. The takeoff was made on an 8,400-foot runway using calculations for a takeoff on a 11,352-foot runway. The four occupants aboard were not injured. The aircraft was damaged slightly and several ground components were destroyed. The National Transportation Safety Board determines that the probable cause of this accident was the captain's decision to use a runway that was too short for the aircraft's takeoff performance capability under existing load and weather conditions. As a result, the aircraft struck obstacles beyond the departure end of the runway before it began to climb. The flightcrew had failed to use available data which would have informed them that the runway was not long enough for the takeoff.			
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TABLE OF CONTENTS

	Page
Synopsis	1
1. Investigation.	1
1.1 History of the Flight	1
1.2 Injuries to Persons.	3
1.3 Damage to Aircraft	3
1.4 Other Damage	4
1.5 Crew Information.	4
1.6 Aircraft Information	4
1.7 Meteorological Information	5
1.8 Aids to Navigation	5
1.9 Communications	5
1.10 Aerodrome and Ground Facilities.	5
1.11 Flight Recorders.	5
1.11.1 Flight Data Recorder	5
1.11.2 Cockpit Voice Recorder.	6
1.12 Wreckage	6
1.13 Medical and Pathological Information	6
1.14 Fire.	6
1.15 Survival Aspects.	6
1.16 Tests and Research	6
1.17 Other Information	6
1.17.1 Airlift International Takeoff Data Computation and Procedures.	6
1.17.2 Performance Data.	7
2. Analysis and Conclusions	7
2.1 Analysis	7
2.2 Conclusions	8
(a) Findings.	8
(b) Probable Cause.	9
 Appendices	
Appendix A - Investigation and Hearing	11
Appendix B - Crew Information	12
Appendix C - Aircraft Information	13
Appendix D Jeppesen Taxiway and Parking Facilities Chart.	14
Appendix E - Takeoff Limitations Chart, Runway 22L, Runway Analysis Manual.	15

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

Adopted: March 24, 1976

AIRLIFT INTERNATIONAL, INC.
McDONNELL-DOUGLAS DC-8-63F, N6161A
JOHN F. KENNEDY INTERNATIONAL AIRPORT
JAMAICA, NEW YORK
SEPTEMBER 20, 1975

SYNOPSIS

About 0355 e.d.t. on September 20, 1975, Airlift International, Inc., Flight 101, a McDonnell-Douglas DC-8-63F, struck components of the runway 22L instrument landing system, the runway 4R automatic landing system flasher, and the runway 4R field monitor while taking off from runway 22L at the John F. Kennedy International Airport at Jamaica, New York. The accident occurred during the hours of darkness and reduced visibility. The takeoff was made on an 8,400-foot runway using calculations for a takeoff on a 11,352-foot runway.

The four occupants aboard were not injured. The aircraft was damaged slightly and several navigation aid ground components were destroyed.

The National Transportation Safety Board determines that the probable cause of this accident was the captain's decision to use a runway that was too short for the aircraft's takeoff performance capability under existing load and weather conditions. As a result, the aircraft struck obstacles beyond the departure end of the runway before it began to climb. The flightcrew had failed to use available data which would have informed them that the runway was not long enough for the takeoff.

1. INVESTIGATION

1.1 History of the Flight

On September 20, 1975, Airlift International, Inc., Flight 101, a McDonnell-Douglas DC-8-63F, N6161A, was being operated as a scheduled cargo flight from the John F. Kennedy International Airport (JFK) to the San Francisco International Airport (SFO).

Before departing, the captain checked the flight plan and weather and accepted the weight and balance calculations that had been

computed by the station agent for a takeoff **on** runway 22R. The aircraft's gross weight had been computed to be 347,819 lbs. at 24.5 percent MAC. Runway 22R is 11,352 feet long.

The ground controller issued the following taxi clearance:

"Taxi left **on** runway 13L, Kennedy weather indefinite ceiling zero, sky obscured, visibility 1/8 mile and fog. Runway 22R visibility is less than 1/4 mile; runway 22L is available for departure with a visual range of 1,400 feet and a rollout of 1,400 feet."

Since the visibility **on** runway 22R was below takeoff minimums, the captain accepted clearance for runway 22L which had more than the runway visual range (RVR) required for takeoff.

At 0345, 1/ the flight left the gate with three crewmembers and a nonrevenue rider in the jumpseat. It was cleared to the San Francisco International Airport in accordance with a stored instrument flight rules (IFR) flight plan. The assigned en route flight level was 310 (31,000 feet). 2/

The pilot of another aircraft, which was also taxiing out, and communicating with the ground controller **on** the same frequency as Airlift Flight 101 reported that his aircraft was too heavy to take off from runway 22L. The ground controller suggested that he use runway 13R, and the pilot accepted. Runway 13R is 14,572 feet **long** and had an RVR of 1,600 feet; runway 13R was also available to Flight 101.

The captain stated that while he was occupied in taxiing the aircraft toward runway 22L in low-visibility conditions, he requested that the first officer "check" and see if the runway was adequate for takeoff. The first officer then looked at the Jeppesen taxiway and parking facilities chart (see Appendix D) and advised the captain that runway 22L was acceptable. This chart does not contain runway limitations data. However, the applicable chart in the Runway Analysis Manual (see Appendix E), which is carried in the aircraft and which was available to the flightcrew, stated that the maximum allowable takeoff weight **on** runway 22L for the DC-8-63F airplane with JT3D-7 engines and configured with flaps of 23°, when computed at 68°F and 0 wind, was 314,800 lbs. The crewmembers did not refer to the Runway Analysis Manual.

1/ All times herein are eastern daylight, based **on** the 24-hour clock.
2/ All altitudes herein are mean sea level unless otherwise noted.

Flight 101 changed from the ground control frequency to tower control frequency and was cleared for takeoff on runway 22L. The first officer made the takeoff from a standing start, using the same V speed values that had been computed for runway 22R (V1 146 kn.; VR 153 kn.; and V2 164 kn.). The precise takeoff starting point on the runway could not be determined.

The aircraft lifted off near the end of the runway and the landing gear struck several fixed structures associated with the navigational aids beyond the runway which were less than 5 feet above the runway elevation.

The captain and first officer did not recall anything that the aircraft struck, but the flight engineer recalled that he felt and heard some "thumps" after liftoff.

After the aircraft had reached an altitude of 5,000 feet, the flight engineer reported to the captain that the aircraft was not pressurizing. The crew reported their difficulties to the New York Air Route Traffic Control Center when the aircraft reached 16,000 feet.

The flight changed its destination to Atlanta, Georgia, and was cleared by New York ARTCC to maintain 16,000 feet. Later on, company personnel advised the flight to divert to Miami. The flight arrived before daylight and held to the west. After it became light, the flight made a low approach and flew by the Miami Tower with landing gear extended. Tower controllers told the flightcrew that one inboard landing gear tire was flat on each of the main gears. The flight proceeded to a fuel dump area where all excess fuel was dumped to lower the landing weight.

The approach and landing at Miami International Airport (MIA) to runway 9R was routine, except that additional tires blew out during the landing.

1.2 Injuries to Persons

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Other</u>
Fatal	0	0	0
Nonfatal	0	0	0
None	3	1	

1.3 Damage to Aircraft

Main landing gear tires Nos. 1, 2, 3, 4, 5, and 6 were either damaged or destroyed. A 4-inch by 6-inch skin depression and puncture was located at the lower inboard right wing, 2 feet outboard of the fuselage station and bordering the landing gear cutout X. Orange marks

and a skin depression were found on the lower right fuselage skin, between station 1220 and 1292. The fuselage skin adjacent to the aft rear baggage compartment door at fuselage station 1385 was torn. A 4-inch by 6-inch gouge was located in the aft rear baggage compartment door's exterior skin, near stations 1420 to 1424. The cabin pressure outflow butterfly valve hinge was damaged at station 1640. The circumferential fairing around the butterfly valve door, near stations 1630 to 1645, was torn. The lower edge of the butterfly valve was scored and dented. The fuselage tail skid fairing and associated metal were crushed and torn near station 1766. The right-hand fuselage skin near station 1805 was punctured and contained a 3-inch by 4-inch tear. The right horizontal stabilizer's leading edge (station 76.500) had a skin depression and a 4-inch by 4-inch puncture. The lower skin on the right horizontal stabilizer, near the spar and station **XFS** 145.500 had a 3-inch by 5-inch skin puncture.

1.4 Other Damage

At **JFK**, the red approach lights for runway 4R, located 250 feet from the end of the runway and 1 foot above the elevation of the runway, were destroyed. The instrument landing system (ILS) monitor locations 1 and 2, located 325 feet from the end of the runway and 2.75 feet above the elevation of the runway, were destroyed. A section of the railing on the landing light pier, located between 625 and 750 feet from the end of the runway and 4.5 feet above the elevation of runway 4R, was destroyed. The instrument landing system's localizer antenna system, located 500 feet from the end of the runway and 4.5 feet above the elevation of the runway, was destroyed. An approach light and stanchion, located 650 feet beyond the end of the runway and 4.5 feet above the elevation of the runway, were destroyed. An approach light and stanchion, located 850 feet beyond the end of the runway and 4.5 feet above the elevation of the runway, were destroyed.

1.5 Crew Information

The three crewmembers were properly certificated for the flight. (See Appendix B.)

1.6 Aircraft Information

The aircraft was certificated, equipped, and maintained in accordance with Federal Aviation Administration (**FAA**) requirements. (See Appendix C.) The center of gravity was within the prescribed limits. The aircraft's gross weight was less than the maximum allowable limit.

1.7 Meteorological Information

The JFK 0351 surface weather observation was, in part, as follows:

Record special observation, ceiling -- indefinite zero, sky obscured, visibility -- 1/8 mile, fog, temperature -- 68°F, dew point -- 63°F, wind -- 140° at 3 kn, altimeter setting -- 30.00 in., 10-minute extreme values of RVR for runway 4 right were 1,600 feet lowest value and 1,800 feet highest value.

The air traffic control specialist reported the visibility as 1/16 mile at the actual departure time of Flight 101.

The official surface weather observations taken during the 2 hours before takeoff showed that prevailing visibilities at JFK fluctuated between 1/8 and 3/16 of a mile.

1.8 Aids to Navigation

Not applicable.

1.9 Communications

No communications difficulties were reported.

1.10 Aerodrome and Ground Facilities

JFK is at an elevation of 12 feet. Runway 22R is 11,352 feet long and has RVR measuring equipment installed. Runway 22L is 8,400 feet long and is not equipped with RVR measuring equipment. Runway 13R is 14,572 feet long and is equipped with RVR measuring equipment.

1.11 Flight Recorders

1.11.1 Flight Data Recorder

The aircraft was equipped with a Fairchild Model 15600-501, Flight Data Recorder (FDR) serial No. 5148. There was no evidence of recorder malfunctions. The foil medium was undamaged and all parameter traces had been recorded clearly.

The recorded data were plotted for a 2-minute period beginning with the takeoff roll. Although the airspeed trace showed many aberrations during the takeoff, the data were faired and examined to determine airplane acceleration and distance. The examination showed that the airplane reached 164 kn within 47 seconds, at which time a slight decrease

in altitude, indicative of liftoff; was recorded. The corresponding distance calculated from the rate of change in airspeed was approximately 7,500 feet.

One second later, 48 seconds after the start of the takeoff roll, excursions in vertical acceleration were recorded. Peak amplitude varied between +2 and 0 g for the next 5 seconds. Thereafter, all traces appeared normal for a departure climb.

1.11.2 Cockpit Voice Recorder

The cockpit voice recorder (CVR) is designed so that the recording tape operates in a continuous loop, erasing recordings every 30 minutes as new ones are added. Since the flight was airborne for several hours after the accident, any conversations recorded during the takeoff were erased.

1.12 Wreckage

Not applicable.

1.13 Medical and Pathological Information

There was **no** evidence of preexisting physical problems which could have affected the crewmembers' judgments or performances.

1.14 Fire

Not applicable.

1.15 Survival Aspects

This was a survivable accident.

1.16 Tests and Research

None

1.17 Other Information

1.17.1 Airlift International Takeoff Data Computations and Procedures

Airlift International, Inc., employed the procedure of having the company agent prepare the weight and balance sheet, compute the takeoff "V" speeds, and compute other flight data for the crewmembers before the flight. The flight computations prepared for this flight were computed for a departure on runway **22R**.

The procedures also required the pilot to consult the Runway Analysis Manual if any of the precomputed takeoff conditions changed, including a change in the takeoff runway.

1.17.2 Performance Data

According to calculations furnished by the McDonnell-Douglas Corporation, the aircraft's performance from a standing takeoff, using normal takeoff procedures, was as follows:

	<u>Knots</u>	<u>Feet</u>
V ₁	138	5,250
V _R	154	6,595
V _{LOF}	164	7,540
V ₃₅	168	8,832

The above V_{LOF} represents the speed and distance obtained by the airplane at liftoff from the runway. The V₃₅ represents the speed and distance obtained at 35 feet above the runway's elevation with all engines operating.

2. ANALYSIS AND CONCLUSIONS

2.1 Analysis

The aircraft was certificated, equipped, and maintained in accordance with **FAA** requirements and approved procedures.

Based on the investigation, the flightcrew's statements, and the performance analysis, the Safety Board concludes that the aircraft's powerplants, airframe, electrical and pitot/static instruments, flight controls, and hydraulic and electrical systems were not factors in this accident. The flightcrew was route and airport qualified.

Because the captain was occupied with taxiing in restricted visibility conditions, the responsibility for determining whether runway 22L was adequate for takeoff was assigned to the first officer. Instead of checking the appropriate data contained in the Runway Analysis Manual, the first officer looked at a taxiway and parking facilities chart which did not contain sufficient information from which to make this determination.

The Safety Board believes that the captain and the first officer were remiss in their duties since they did not determine that the aircraft could be operated safely from a different runway than that for which takeoff data had been calculated. The captain should have instructed one of the flightcrew to review specifically the Runway Analysis Manual to determine if the gross weight of the aircraft restricted a takeoff on runway 22L.

Since another DC-8 on the same ground control frequency requested a takeoff on a longer runway because his takeoff weight required the additional length, the flightcrew of Flight **101** should have been even more alert to the need to consult the manual. The manual would have indicated that the takeoff weight of the accident aircraft was 33,019 lbs. over the maximum weight allowed for takeoff on runway 22L.

A runway of adequate length with the required takeoff RVR was available to Flight **101** -- runway 13R. The runway was 14,572 feet long and had a reported RVR of 1,600 feet. Runway 13R would have been a logical choice for the weight of the aircraft.

Theoretical performance data showed that the airplane should have become airborne at an airspeed of **164** kn after a takeoff roll of 7,540 feet. The airspeed and altitude values recorded by the flight data recorder correspond to expected performance values and indicate that the airplane accelerated as expected. This evidence shows that the airplane became airborne within the confines of the runway; however, the distance from the threshold at which the takeoff thrust was established and the distance from the departure end at which the airplane actually lifted off could not be determined.

The Safety Board believes that the airplane lifted off near the end of the runway and that it was being rotated to the climb attitude when it struck the navigation aid structures beyond the runway's end.

Although the aircraft did become airborne, the insufficient runway length did not allow the margin of safety that is provided in the normal takeoff criteria as required by 14 CFR 121.189, which relates to takeoff requirements.

This accident demonstrates the need for flightcrews to be aware of the factors which can adversely affect the safe operation of their flight and to be familiar with, and use, all information that is available to them for this purpose.

2.2 Conclusions

(a) Findings

1. The crewmembers were certificated and qualified for the intended flight.
2. The aircraft was certificated, equipped, and maintained in accordance with FAA requirements and procedures.

3. The aircraft's weight, center of gravity, and load distribution were within established limits.
4. The weight calculations were made for a takeoff on runway 22R; however, visibility on runway 22R precluded its use for takeoff.
5. The RVR on runway 22L was greater than required for takeoff and the captain elected to use the shorter runway.
6. The captain did not request that any of the crewmembers consult the Runway Analysis Manual; the manual would have indicated that Flight 101 was 33,019 lbs overweight for a takeoff on the 8,400-foot runway.
7. A runway of sufficient length and with adequate visibility was also available for takeoff.
8. The takeoff was made on a runway that was too short for the performance capability of the aircraft. Consequently, the aircraft lifted off near the runway's end and there was not sufficient time or distance in which to rotate the aircraft and establish a climb.
9. The aircraft struck objects 1 foot above the elevation of the runway and 250 feet beyond the end of the runway. It also struck objects 4.5 feet above the runway elevation and 850 feet beyond the end of the runway.
10. The aircraft could not be pressurized properly because it was damaged during takeoff.

(b) Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the captain's decision to use a runway that was too short for the aircraft's takeoff performance capability under existing load and weather conditions. As a result, the aircraft struck obstacles beyond the departure end of the runway before it began to climb. The flightcrew had failed to use available data which would have informed them that the runway was not long enough for the takeoff.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ WEBSTER B. TODD, JR.
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

March 24, 1976

INVESTIGATION AND HEARING

1. Investigation

The Board was notified of the accident at 0600 **on** September 20, 1975, by Airlift International, Inc., Miami, Florida. An investigator was dispatched from the Safety **Board's** Miami Field Office. The Federal Aviation Administration and Airlift International, Inc., participated in the investigation. The on-scene portion of the investigation was completed **on** September **22**, 1975.

2. Hearing

A hearing was not held.

CREW INFORMATION

Captain Patrick J. Cavella

Captain Cavella, 56, holds Airline Transport Pilot Certificate No. 92378-41 with type ratings in C-46, DC-4, DC-6, DC-7, DC-8, B-707, B-720 and B-727. At the time of the accident, he had accumulated about 25,784 flight-hours, 2,535 hours of which had been in the McDonnell-Douglas DC-8. His last proficiency check in the DC-8 was completed satisfactorily on April 28, 1975. He possessed a current First-class Medical Certificate, dated June 9, 1975, with no limitations.

First Officer Sidney C. Sims, Jr.

First Officer Sims, 54, holds Airline Transport Pilot Certificate No. 132030 with type ratings in Douglas DC-4, DC-6, DC-7, Lockheed Constellation, C-46, and Canadair CL-44. At the time of the accident, he had accumulated about 24,000 flight-hours, 2,000 hours of which had been in the McDonnell-Douglas DC-8. His last proficiency check in the DC-8 was completed satisfactorily on January 29, 1975. He possessed a current First-class Medical Certificate, dated October 20, 1974, with a waiver stating that holder shall possess correcting glasses for near vision.

Flight Engineer Madison O. Rogers

Flight Engineer Rogers, 51, holds Flight Engineer Certificate No. 460122872, turbojet. He also holds an Airline Transport Pilot Certificate No. 218838 and Mechanic Certificate No. 1162605, with type ratings in C-46, DC-6, DC-7, DC-8, A&W 650, L-382 and B-25. At the time of the accident, he had accumulated about 16,724 flight-hours, 1,053 hours of which had been in the McDonnell-Douglas DC-8 as flight engineer and 1,947 hours in the DC-8 as pilot. His last proficiency check in the DC-8 was completed satisfactorily on December 11, 1974. He possessed a current First-class Medical Certificate, dated June 22, 1975, with a waiver stating that holder shall wear glasses for distant vision.

AIRCRAFT INFORMATION

Make and Model	McDonnell-Douglas DC-8-63F
Registration	N6161A
Serial No.	45969
Date of Manufacturer	September 25, 1968
Total Flight-Hours	27,391:23
Engines	Pratt and Whitney JT3D-7

ENGINES

No.	S/N	Total Time	Time Since Overhaul
1	671440	17,468:35	<u>1/</u>
2	671172	16,259:39	
3	671253	16,152:22	
4	671026	22,709:20	

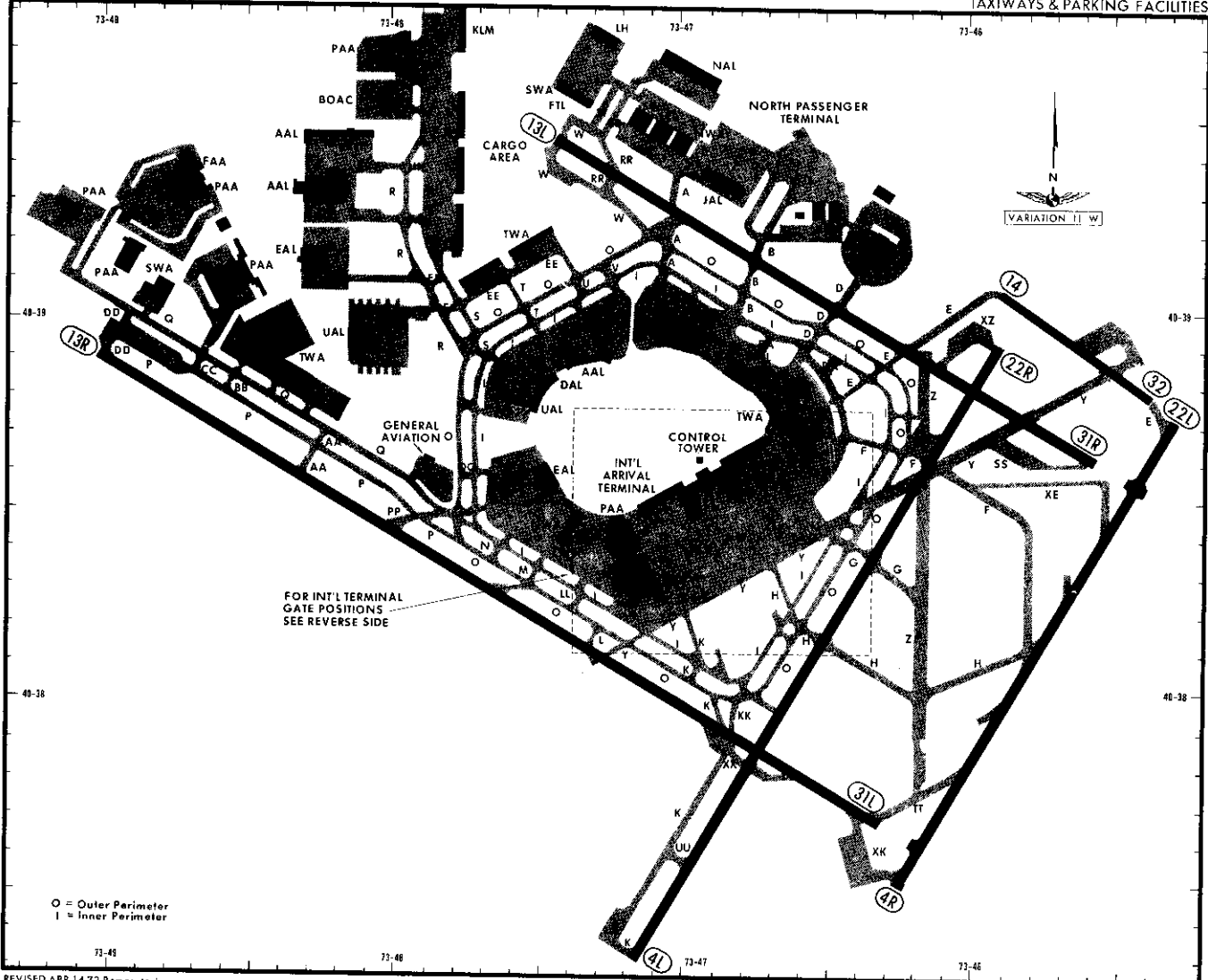
1/ The engines were maintained by United Air Lines under their logical information based on reliability analysis (LIBRA) program.

APPENDIX D

Jeppesen

20-3A

NEW YORK (KENNEDY)
TAXIWAYS & PARKING FACILITIES



REVISED APR 14-72 Ramps, taxiways.

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APPENDIX E

DC-8-63F JT3D-7 23° FLAPS



JFK 22L		LENGTH 8400. RUNWAY LIMITED					ELEV 12. GRAO 0.0	NEW YORK, N.Y. JFK INT'L.	
G/W	V1	V2	VR INCREMENT TEMP-F				TEMP DEG F	ZERO WINO	STRUCT /CLIMB LIMIT
			20	50	60	110			
355	141	165	11	11	9	e	-10	3405	3550
350	139	164	11	11	10	8	0	3369	3550
340	137	162	12	12	10	9	10	3334	3550
330	134	160	12	12	11	9	20	3300	3550
320	131	158	13	13	12	10	30	3267	355P
310	128	155	13	13	12	10	32	3261	3550
300	127	153	14	14	17	11	34	3254	3550
290	125	151	14	14	13	12	36	3248	3550
280	123	148	14	14	13	12	38	3241	3550
270	121	146	15	15	14	13	40	3235	3550
260	118	144	16	16	15	14	42	3228	3550
250	115	141	16	16	15	14	44	3222	355C
74	111	139	15	15	16	15	46	3215	3550
23	108	136	12	12	16	15	48	3209	3550
VMCG 113 113 113 102							50	3203	3550
GROSS WEIGHT CORRECTIONS							52	3198	3550
BARO PRESS- FDR EACH .1 IN HG							54	3193	3550
BELOW 29.70 USE 1 DEG							56	3188	3550
HOTTER TEMP.							58	3183	355C
WIND-ADJUST ZERO WIND COLUMN							60	3172	355C
nnn 620 LBS/KT H.W.							62	3166	355C
SUB 2470 LBS/KT T.W.							64	3160	3550
DO NOT EXCEED STRUCT/CLIMB WT							66	3154	3550
							68	3148	3550
							70	3142	3550
							72	3137	3550
							74	3131	3550
							76	3125	3550
							78	3119	3550
							80	3114	3550
							82	3105	3550
							84	3096	3550
							86	3081	3550
							88	3065	3527
							90	3048	3496
							92	3030	3463
							94	3012	3430
							96	2994	3398
							98	2975	3365
							100	2957	3333
							110	2856	3162
							120	2745	2982
							122	2721	2945

ASI MAX WT- SUB 12000 LBS FROM R W LIMIT WT.

REV. 9 9 OCT 31 1968