FINAL REPORT

OF

DC – 10

HL 7328

26/07/1989

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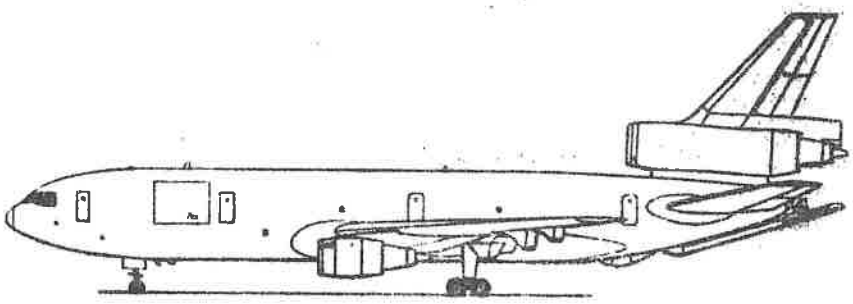
DC-10



HL 7328

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C O N T E N T S

AIRCRAFT ACCIDENT FINAL REPORT

KOREAN AIR MCDONNELL DOUGLAS DC-10-30 KOREAN REGISTRATION HL-7328 CRASHED NEARBY TRIPOLI INTERNATIONAL AIRPORT SOUTH -EAST OF RUNWAY 27 ON JULY 27TH 1989.

SYNOPSIS

KAL 803 Flight from Jeddah (Saudi Arabia) to Tripoli (Libya) aircraft contacted Tripoli Area Control Centre (ACC). Received all available Weather Information, and flight has been continued untill the aircraft crashed nearby Tripoli International Airport.

Copies of this Report will be distributed according to ICAO Annex 13.

The Investigation Team has been formed according to ICAO Annex 13 and Libyan Civil Aviation Law No. 2 of 1965.

This Report is released by the Civil Aviation and Meteorological Authority on December 30th, 1989.

1. FACTUAL INFORMATION

1.1. History of Flight

On 26 July 1989 Korean Air Flight 803, McDonnell Douglas DC10-30 of Korean Registry was regularily scheduled International Passenger Flight from Seoul to Tripoli with two intermediate stops at Bangkok and Jeddah.

Before leaving Jeddah the Flight Crew received Tripoli Airport ILS Notam No. A055 and Weather Forecaste which was as follows:-

> Date: 26 July 1989, HLLT 18 18, Wind: 030/12KT, CAVOK, gradually at time: 20002200 Wind: variable 05KT probably 20%, at time: 0000-0600 Visibility: 6000 meters 10BR (mist) gradually at time: 0700-0900 Wind: 030/12KT CAVOK.

There were 100400 pounds of fuel onboard, the take off weight was 413446 pounds.

DJerba was the alternate airport. The flight from Seoul to Tripoli was normal and no incident has been reported.

KAL 803 took off on early morning (UTC 01:42) on 27-07-1989 with 181 passengers and 18 crew members onboard.

Flight entered Tripoli FIR at 0337 UTC and established contact with Tripoli ACC at time 0436 reported Garda position maintaining FL 310 E.T.A. MIS 48 and Tripoli E.T.A. 0510 and requested Tripoli Actual Weather.

Tripoli ACC passed the following information to KAL 803: Wind Calm, Visibility 3KM in fog, Temperature 24, Dewpoint 22, QNH 1013, Active R/W 09. Then the R/W changed to R/W 27 clearance given to PE , identified 67 miles East of Mike India Sierra F.L. 310 and vectored for NDB Approach R/W 27.

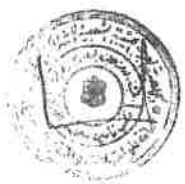
The ACC also gave the latest visibility of one kilometer due to fog. The F/O requested the ACC to confirm, which he did. The F/O also repeated one kilometer. The Captain asked about the wind, and was answered by the F/O as calm. He went on questioning why they did not give Runway 27, apparently not hearing the previous two calls from the ACC in which R/W 27 was specified. The F/O telling him that it has already been changed from 09 to 27.

In the meantime the F/E contacted L.A.A. Flight Watch giving the fuel remaining as 36000, E.T.A. 0510 and asked about the gate number.

At about 0443, there was a discussion about a Libyan Pilot being onboard wanting to come into the cockpit, and since this is contrary to Company Regulations the Captain decided to invite in a KAL Mechanic who was onboard the flight so that there will be no seat available for the Libyan pilot. By this time the F/E contacted L.A.A. Flight Watch again and asked for the weather which he gave as follows:-

> At Time 0430 Wind Calm, Visibility 800 meters, 45 Fog, Temperature 22/21, QNH 1013.

The F/E then told the other crew about the information he just received, changing the visibility as 8 kilometers.



At this time (0447) the Mechanic came in, and his entrance spurred a lengthy conversation on a variety of subjects. For the next 14 minutes only intermittently interrupted by crew to attend to matters related to the flight.

At 0449 the F/O asked the Captain if they should request a lower altitude, and contacted the ACC which gave them clearance the A/C acknowledged and confirmed leaving FL 310.

Three minutes later the ACC advised the aircraft of the Met. Warning Number Two, valid 2704 00 until 270630 fog observed and forecasted over the HLLT over Tripoli Airfield reducing visibility to 800 meters or less.

The Captain and F/O both commented that it was marginal. The ACC continued to advise the actual visibility as "and visibility now fifty meters, five zero meters, only". Again a member of the crew said "Marginal" and the F/O told the ACC "Roger continuing Approach".

The Captain asked about the fuel, the F/E answering that just earlier it was 30000, and the F/O asked the Captain about his decision, to which the Captain replied "if visible we are to land" and some members of the cockpit remarked that fog is very dense. The Captain assigned the task of looking outside carefully to the F/E and the F/O to watch well inside the aircraft. One minute later at 0454 "16 minutes before the crash" the F/E called "descent check list". The last item of the check called by the F/E was "landing briefing" to which the Captain answered "yes" and went on to remind both the F/O and F/E about what he told them earlier to look ahead if runway insight and at 200 ft. Three times saying "there will never be any going below the 200 ft". The aircraft was cleared at 0458 to FL 70 and almost immediately after cleared to 4000. One minute later it was told to contact the approach on 124.0. The Approach identified the flight gave it its position as 37 miles South-East of Tripoli VOR, instructing to turn left heading 290, descend and maintain 4000, QNH 1013. Then the F/E called "Approach Check List", and when he called Radio Altimeter, the F/O said 200. A member of the cockpit commented, "it is foggy". The Captain acknowledged that he has been here many times but this condition was the first time. The F/E saying it is a shallow layer and the F/O said 400.

At 0502 the flight was given its position by the Approach Control as 21M South-East of TPI VOR, and cleared to continue descent to 2000 QNH 1013. One minute later there was an altitude horn and a stabilizer trim noise, following 38 seconds later by second altitude horn, the Approach Control gave the aircraft position as 10 miles from touchdown. This raised a question from the Captain "if they do that by radar". The F/O confirmed and F/E added "it is replaced by the latest type". The F/O lowered the landing gear, and then confirmed the four greens. By this time the aircraft was 7 miles and instructed by the Approach Control to turn left heading 270. At 050658 the Approach Control advised the aircraft as 5 miles from touchdown. The F/O acknowledged and told the Captain to maintain 2000. The Captain remarked they have not set ILS, in the meantime the Controller called clear for approach.

The Captain noted that ILS is not working and asked how he is to try the approach? And if it is possible to do a visual approach? Remarking "if it is right"? The F/O confirmed and said "let us push" the Captain went on again about the ILS not being displayed and how the Approach Control said clear for approach in such conditions and if they said ILS is inoperative? The F/O contacted Approach Control and requested to confirm NDB Approach, the Controller confirmed giving the aircraft position as two miles from touchdown, and requested to report R/W insight. The Captain remarked "insight possible!". The F/E called landing check complete. By this time it was 050838.

At 050851 F/O called 300, it is impossible followed by GPWS Warning at 050852. A few seconds later there was a shout and the crash occurred at 323940N 0131030E point of 280 ft above MSL at (0509) UTC.

1.2. Injuries to Persons

Injuries	Crew	Passengers	Others	Total
Fatal	4	70	6*	80
Serious	10	93	6*	109
Minor/None	4	18	8*	30
TOTAL:	18	181	20*	219

* Including the two houses and cars occupants.

1.3. Damage to Aircraft

The aircraft is completely destroyed by impact and post crash fire.

1.4. Other Damages

The aircraft impacted with two houses resulted in destroying the two houses, 3 low tension powerlines, 4 cars, number of trees, two fence walls and one street electricity post.

1.5. Personnel Information

1.5.1. Pilot-in-Command:

Name : Kim, Ho June
Age : 54 years (born on Oct. 5th, 1935)
Lic. Type: Airline Transport Pilot Certificate
Certificate No: 49
Date of issue : 10 June, 1968
Validity of Certificate: 30-11-1989.
Medical Class & Date: Class I, May 2nd. 1989
Radio Lic. No: 755099
Issued by: Ministry of Communication
Date of issue: 04-07-1975.

Ratings : Aeroplanes

DC-3	dated	08-10-1966
DC-4	"	28-10-1968
YS-11	"	19-09-1972
F-27	"	17-03-1975
B707-720	"	31-03-1976
DC-10	"	14-05-1979

Instructor Ratings:

Aeroplanes dated 30-12-1966

Checks: Last simulator check has been carried out on 11-06-1989 at Tokyo (Japan).

Flying Experience:

Total time: 20,533 hours
DC-10 time: 7,255 hours
Last 6 months DC10 time: 390 hours

1.5.2. First Officer

Name : Choi, Jae Hong

Age : 57 years (Born on May 7th, 1932)

Lic. Type: Airline Transport Pilot Certificate

Certificate No: 487

Date of issue : 23-10-1980

Validity of Certificate: 31-07-1989

Medical Class & Date: Class I, 20-01-1989

Ratings: Aeroplane
Multi-engine land, DC-10 dated 14-03-1980

Checks : Last simulator check carried out in Tokyo, Japan on 04-06-1989.

Flying hours:

Total time: 11,597 hours

DC-10 time: 7,058 hours

Last 6 months DC10 time: 435 hours.

1.5.3. Flight Engineer

Name : Myon, Kyu Hwan

Age : 53 years (born on 10-10-1936)

Lic. Type: Flight Engineer Certificate

Certificate No: 184

Date of issue : 27-07-1979.

Validity of Certificate: 31-08-1989

Medical Class & Date: Class I, 27-02-1989.

Ratings: Aeroplane
B-707 dated 04-07-1983
DC-10 dated 01-08-1988

Checks: Last simulator check has been carried out in Japan (Tokyo) on 29-04-1989.

Flying Experience:

Total time: 15,126 hours (including Air Navigator time)

DC-10 time: 943 hours

Last 6 months DC10 time: 445 hours.

1.5.4. Other Crew Members:-

There were 15 crew members other than the cockpit crew as follows:-

13 persons cabin crew
1 ground mechanic
1 security officer

1.6. Aircraft Information

The aircraft McDonnell Douglas DC-10-30 owned by the McDonnell Douglas Corporation and registered in the Republic of Korea Civil Registry under the Registration Number HL-7328 as per the Certificate of Registration Number 77-01 dated 25-01-1977 and aircraft Serial No. is 47887.

The aircraft was manufactured on 12-09-1973 and delivered to Korean Air on 25-02-1977.

The aircraft was operated by Air Siam before it has been leased to and operated by Korean Air.

The aircraft 7328 has a Korean Certificate of Airworthiness Number 8882 issued on 28-09-1988 and valid upto 27-09-1989. The aircraft was certified for Transport Category.

The aircraft is maintained by Korean Air Maintenance Bases in Korea following A, C, D1, D2, D3, D4 and ISI Scheduled Maintenance in the following intervals:-

Check A is due every 300 hours
Check C is due every 900 hours
Check D1 is due every 4000 hours
Check D2 is due every 8000 hours
Check D3 is due every 12000 hours
Check D4 is due every 16000 hours
Check ISI is due every 18000 hours.

The technical history of this aircraft before it has been delivered to Korean Air is not available. However, there were no significant problems since it has been leased to and operated by Korean Air.

The aircraft has flown 49025 hours upto 26-07-1989 and made 11361 cycles upto that date.

The last aircraft periodic checks were as follows:-

Last A Check carried out on 10-07-1989 at 48814 F.H.
Last C Check carried out on 16-04-1989 at 47887 F.H.
Last D Check carried out on 23-04-1988 at 45088 F.H.

The aircraft has not been subjected to any previous accident or serious incident or any major repair but it has been subjected to lightning strikes one of them was on 30-10-1986 during climb at 5000 ft on the right hand side of the fuselage, the corrective actions have been taken and aircraft check was normal. Another lightning strike was on 13-05-1989, the aircraft was subjected to the lightning strike 3-times at 5000 ft during descent, aircraft was inspected and every thing was normal.

The last compass swing for the standby compass was carried out on 19-02-1981. The aircraft was powered by 3-general Electric CF6-50C engines as follows:-

Engine No. 1: S/No. 455-388 installed on 05-01-1989, has a total time of 26464 hours since new and 2054 hours since last shop visit which was the 8th visit dated on 12-10-1988.

Engine No. 2: S/No. 455-267 installed on 29-09-1988, has a total time of 30780 hours since new and 2842 hours since last shop visit which was the 7th visit dated on 01-09-1988.

Engine No. 3: S/No. 455-440 installed on 18-12-1987, has a total time of 32928 hours since new and 4847 hours since last shop visit which was the 7th visit dated on 10-10-1987.

These engines are using JET A-1 fuel and Esso 2380 as lubrication oil.

The aircraft last Weighing Report is dated on 22-06-1989 and the following results were obtained:-

The Basic Aircraft Empty Weight is 255 296.1 lbs , the C.G. Position is 25.1% MAC , the aircraft standard operating weight is 267625 lbs and CG at 17.38 % MAC.

The aircraft differs from other Korean Air DC10's, some of these differences are :-

a) It has duel ANS-70 while the others not.
b) It has no INS.
c) It has single ISDU.
d) Its ILS Panel is installed on the pedestal.
e) Its ADF is displayed on HSI.
f) Fuel quantity gauges are in kgs.
g) Many differences are also in the Check List.

The aircraft has a station licence issued on 04-03-1977 for the aircraft Radio Equipment from M.O.C.

1.7. Meteorological Information

1.7.1. General Situation

An extension of high pressure over North Coast of Libya with a very slack gradient, low level inversion below 960mb, calm wind and high humidity.

The above mentioned criteria gave rise to :-

1. Formation of low stratus clouds with a base height of 600 to 1000 ft.
2. Formation of mist reducing the visibility to 3000 M during the period from 0030 till 0330 UTC.
3. Radiation fog formed at 0400 UTC reducing the horizontal visibility to 0800M deteriorated to 50M at times obscuring the sky.

The following Met. Reports have been issued :-

a) At 0043 UTC airfield warning concerning the stratus clouds formation which tend to reduce both vertical and slant visibility within the layer between ground and a height of 2500 ft.

b) At 0400 UTC airfield warning for fog formation was issued to cover the period 270400-0630 UTC.

c) Routine and special Met. Reports and observations according to W.M.O. and ICAO Regulations.

Copies of Met. Reports are attached herewith.

1.7.2. Weather information available to the crew :-

Temperature 22, Dewpoint 21, QNH 1013, also Local Met. Warning No. 2 valid 270400 until 270630, fog observed and forecasted over HLLT airfield reducing visibility to 800 meters or less. Special Warning Report stated the visibility (at 0451) was 50 meters only.

This was the last Weather Information given to the KAL 803 crew.

1.8. Navigational Aids

a) Facilities Serving Runway 27

PE Locator: Freq. 390 KHZ, Position 4.05NM from threshold on centreline, range 25NM, operating normally.

ILS : Freq. 109.5 MHZ out of service (Notam A055 issued on 27/04/1989).

TPI/VOR : Freq. 114.5MHZ Terminal VOR Position Coordinates 323945N 0130920E
260 meters South of Runway 27 centreline and 400 meters West of Runway 36 centreline. Range 150NM operating normally. (No let down Chart is published).

G. Locator: 365KHZ Position 0.57NM from threshold on centreline range 25NM operating normally.

b) Visual Ground Aids

Aerodrome Beacon: On Control Tower, flashing green/white.
Wind Direction Indicators; threshold, runway 27 lighted signal lamp.

c) Lightning Aids for Runway 27

Approach Lights: White calvert Cat. II LIL Red.
VASIS : 2-Bar Glide Slope 2.5°.
Runway Lights: LIM white elevated edge, last 600 meters yellow.
: Centreline.
Touchdown Zone Runway 27
Threshold with Wing Bars.

1.9. Communications

Ground and aircraft communications were reliable upto the crash.

1.10. Airport Information

Reference Point: Lat. 324010N
Long.0130924E
Elevation: 263 ft.
Magnetic Variation: 1°W (1975)
Medical Facilities: 2 ambulances, first aid only. Full facilities and hospitals in Tripoli.
Oil Grades: Aeroshell 100, 120, W100, W120, and Esso 120.
Fire Protection: 24 hours
Required: Category 8
Available: Category 8
Trained Personnel: 112
Fuel Grades: AVO GAS / JET A-1, Methanol 45.
Physical Characteristics:
Runway 27:
- Slope (Max. -0,4%)
- True Bearing: 269
- Length 3600 meters
- Width 45 meters
- LCN 100

1.11. Flight Recorders

The aircraft has been equipped with a Sundstrand Digital Flight Data Recorder Model 9804100 DXUS, S/No. 152300, which has been installed on the aircraft on Sept. 25, 1987 after an overhaul of the unit, the last check carried out on the unit was 2000 hours check on March 17, 1989. The box DFDR has been found in the first day few hours only after the crash with an impact in the rear zone and the front of the DFDR was missing. The DFDR has been taken to (Centre D'ESSAIS ENVOL) in France and opened on 16-08-1989. The tape found broken in two places with piece of the tape remained in the head area. Some parameters were not recorded but the information got was fair.

The aircraft was equipped also with a Sundstrand Cockpit Voice Recorder P/No. 1036004 S/No. 3015 which has been installed on the aircraft on 25-07-1989 and found few hours after the crash.

The equipment has been subjected to a hard shock resulted in destroying all the electronic system, the tape was cut once between the erase and recording head just after recording the crash noise. Transcript was made and Korean Language has been translated into English and a full transcript in English is attached with this Report.

1.12. Wreckage and Impact Information

The accident occurred in farm land with two houses, citrus grove, and some olive trees.

The aircraft struck a house at an elevation of 280 ft above mean-sea level, 415M South and 800M East of R/W 27 threshold.

The first impact was made by the left hand main landing gear with the Northern corner of the first house, at a point 4M above the ground level, 50cm below the roof level, tearing part of the flat inforced concrete roof and causing heavy damage to the house. The wheels broke off from the strut and remained in the house. The strut detached from the aircraft and lay on the roof. The flap scrapped off a part of the 75cm high parapetle.

The centre landing gear clipped off an olive tree about 3½m high before impacting the annex of the first house, and the second house, few meters down wind from the first impact. Low tension power line running across was out and an electric pole broken.

Engine No. 1, and the left handside trailing edge flap impacted the second house at a height of 2.5M. The centre landing gear, a large part of the flap, mean accessory gear box and transfer gear box, all were found in the rubble of the house. The part of the house subject to impact was completely destroyed.

Engine No. 1, separated from the aircraft and came to rest at 158M down wind from the first impact point. The fan and four stages of the low pressure compressor broke off from the main engine and was found close by parts of the cowling were also nearby. Minor debris related mainly tothe power plant made a trail from the position of engine impact with the second house, upto the area where the engine and fan compressor unit where located.

From a point of 160M from the first impact and upto a point of 217 meters, 3 columns of trees, 15 to 18m wide, left of the centre of the track were broken at ground level upto a distance of 217m from the first impact, where the second part of the flap was found.

The first and second columns of trees right of the centre of the track were broken at the ground level from a point of 75m from the first impact point upto the end of the farm, some parts and debris from the power plant made a trail. The items include the upper and lower tail cone, engine oil tank, CSD and alternator, APU intake and pylon, pneumatic fan reverser motor, and the oil scavange pump.

At the end of the farm the aircraft struck three sides of stone wall fence of another dwelling 242m from the first impact. The two sides of the fence normal to the down wind direction are 20m apart on the R.H.S. of the aircraft and the side parallel to the down wind about 2m left of the centreline of the aircraft. The wall was destroyed, and the right hand engine was located inside the fence, near the second wall, after destroying an other low tension power line and an electrical pole.

The aircraft crossed the high-way breaking a lamp post, striking four cars destroying two of them, and damaging the other two. The aircraft came to a full stop on the other side of the road in a semicucular area of 30m radius, 350m from the point of first impact striking another powerline and a number of trees belong to another farm.

The main wreckage shows the aircraft has disintegrated. The centre part of the fuselage turned over about 50°, and the foreward fuselage with the cockpit upside down and heading South-East. The left wing was broken into two pieces and separated from the centre box, but was not damaged by fire. The right wing separated from center-box and was completely destroyed by fire. The fuselage was also destroyed by fire except for about 10m of the foreward part including the cockpit. The empanage and engine number two were in one piece and only part of the lower cowling was damaged by the fire. The tail was pointing to the North-West. The right hand main and nose landing gears were found with the main wreckage. The right hand wheels separated from the strut. The nose landing gear was a complete unit but detached from the aircraft.

Engine No. 1 was lying with the top "12 O'Clock" position on the ground. Fan blades, disc and 2-4 stages of the low pressure compressor, the foreward and aft fan case separated from the main engine. All blades bent or broken. The foreward mount bolt sheared, the left hand forward lug of the rear mount was broken and missing. Right hand lugs are intact with bolt in place. Cowlings, reversers, and tailpipe all separated. Lube and scavange pump not located. Guidance of heavy rub marks on the spool of the H.P.C. sand dirt and small pebbles in the L.P.T. Turbine blades from 10 O'Clock position to 1-30 position broken and bent. No evidence of fire or uncontained failure.

Engine No.3: The fan forward casing missing probably burried with the rubble of the stone was found near the engine. The fan aft casing and frame separated to the fan frame and compressor front case, 1 locating pin still in place. 24 blades were broken above platform. 7 blades bent in the direction of rotation, and 7 more in the opposite direction. A large stone was impedded between two fan blades. The aft rotor attached to the LPT shaft. No damage to the HPC casing.

The aft mount complete including top beam, and part of pylon attached. No signs of fire or uncontained failures. Examination of the chip detectors from the scavange pump showed no traces of metal.

Engine No. 2 was not damaged and rotates freely in a light wind.

The aircraft track after impact was in a straight-line heading West parallel to the runway direction upto the main wreckage area. The total width of the track within 15 meters, on either side. And only some high trees located on a column 25 meters to the right were clipped by the right wing at height of 3 to 4m. The aircraft was effectively level at impact, and after passing the two houses, was effectively airborne with no evidence of impacting the ground until after it hit the wall fence and crossing the highway.

1.13. Medical and Pathological Information

The flight crew were upto the psycho-physical requirements of the medical centre approved by the KCAB to make such flight. Captain and First Officer sustained serious injuries from impact and some fire burns, some cabin crew and passengers suffered deaths while the others suffered serious injuries, but only few of aircraft occupants had minor injuries.

1.14. Fire Fighting & Rescue

As poor visibility at Tripoli Airport a Local Alert has been given to Fire Fighting Team according as per local instructions and Fire Brigade statement. Fire Fighting Crew was informed by ATC that an aircraft type DC10 Korean Airline Flight No. 803 might been crashed due to the smoke seen and reported by another aircraft South-East of the R/W 27.

The fire and rescue people arrived at 0515 UTC and the fire was extinguished at 0610 UTC all injured cases were taken to the hospitals. All victims were taken to the hospitals. It was a ground fire after the aircraft collided with double wall stone fence.

Equipment used and Vehicles:

1. 14 vehicles capacity 10,000 lt. foam liquid and 1000 kg of powder.
2. Four vehicles equipped (12) strechers each.
3. Four vehicles capacity 3600 lt. of water + other liquid.
4. Two helicopters were used for rescue purposes.
5. Two cars fully equipped specially for rescue.
6. No. of persons included by fire fighting & rescue team were about 120.
7. Ambulance cars - more than 100 fully equipped within (4) hours all the effected people were avacuated.
8. Most of the deaths happened by shock and fire after impact.
9. Most of dead pax were occupying the centre and rear of the aircraft, few of them were at the front.
10. Paxs. evacuated by Fire Fighting and Search and Rescue people and taken immediately to the hospitals. Two hospitals were alerted since the crash happened. Salah Uddin and Central Hospital.
11. People in the houses were evacuated by the Rescue Team using buldozers for removing the concrete of the roofs and columns to rescue the victims. Some of them were dead, one woman died in the hospital and others were saved and had no injury.
12. Most of the fire fighting, search and rescue team reached within a reasonable time and their performance was satisfactory.

1.15. Survival Aspects

Fire broke out at about 50m before the aircraft came to a complete stop. The aircraft fuselage disintegrated into three main sections. The openings thus formed were used by some of the survivors and the rescue team for evacuating the occupents. The survivors were about 63% of the A/C occupants. 90% of fatalities were caused by fire, most of them were in the centre cabin. There were no fatality in the forward section due to fire. The remaining 10% of the fatalities were caused by shock distributed evenly at the foreward and aft cabin but none of them were in the centre cabin.

2. ANALYSIS

The flight crew were properly certificated in accordance with regulations of the Republic of Korea.

The airplane was properly certificated, equipped and maintained in accordance with regulations and approved procedures of the state of registry.

All three engines functioned normally and airplane gross weight and centre of gravity were within the specified limits.

All communications between Tripoli ACC/APP and the aircraft were loud and clear.

Tripoli ATC Controllers were properly qualified and certificated to do the jobs according to Libyan Regulations and I.C.A.O. Standards.

Weather information was given to the aircraft by the Tripoli ACC Controller several times and the final visibility of 50 meters was given at 04:51 UTC.

In Tripoli Airport, PE (NDB) was operating normally and was the only type of instrument approach available at that day.

Though the crew were informed during the first two contacts with the ACC of the NDB Approach and runway in use, and though the crew were listening on the speaker, the Captain was unaware of the change of the runway from 09 to 27, untill he was informed by the First Officer during the discussion that followed the ACC transmission. However, there was no discussion of the type of approach or confirmation of the NDB Approach. This seemed to pass their attention and the crew were thus not sure untill they were two miles from the touchdown and finding the ILS not working, and in state of confusion asked the Approach Control to confirm NDB Approach, which he did.

The crew said during the interview after the accident that they were aware that it was an NDB Approach. However, it is most probable that this awareness did not come about until they had the confirmation at the end of the approach. They also said that they know that the ILS was not operating, however, the ILS Localizer and VOR are separate in this aircraft, they tuned the ILS, since on some occasions in the past, according to their statement, they find the equipment operating contrary to the Notam.

The NDB was selected according to the crew information and the aircraft wreckage. However, there was no evidence that they tried to follow it. The crew said subsequently they were not concerned with the NDB and that they did not identify it. The VOR was selected and most probably was used as the navigation aid after they passed the seven miles from touchdown on the 270 radial which explained the crash line South of R/W 27.

The crew also seemed to be unaware of the type of the radar service. When they were ten miles from touchdown, the Captain asked if they "the ATC" give the position by radar which the F/O confirmed and the F/E added that it had been replaced by the latest type. It is probable that they had been under impression that it was a precision approach radar.

The crew showed concern about the visibility from the beginning of their contact with ACC. When they were given the visibility of one kilometer the F/O requested confirmation and informed the Captain who asked about the wind and he was told it is calm. Few minutes later the F/E contacted Libyan Arab Airlines Flight Watch, to ask about the weather and was given the 0430 actual in which the visibility was 800 meters, however he misinterpreted it as 8 kilometers. Later the ACC gave the Met. Warning No. 2 which gave the visibility as 800 meters or less, and both pilots commented it was marginal.

ACC gave the actual visibility of fifty meters. The F/O said " Roger continuous approach". There was no further reference to it and the F/O did not read back or ask for confirmation as he often did. The Captain when asked in the interview about this visibility of 50M, he said that he did not know about it otherwise he would have gone to alternate airport.

The F/O asked the Captain about his decision and the Captain's reply was that they will land if visible. After about 8 minutes, there was some discussion of the dense fog, and the Captain said that he had been many times here but never experienced so dense fog. The F/E commenting it is shallow and the F/O saying it covered 400. However, there was no discussion of the action to be taken.

It is probable that the information of the visibility of 50 meters at that time, coming immediately after the Met. Warning, it passed unnoticed by the crew who were still pondering on the Met. Warning information which they considered as marginal. Regarding that the (800 meters) visibility is not marginal for this aircraft and type of approach available according to Jeppesen Minima and Company Operations Manual but (800m) visibility is marginal if ILS is operating.

When the aircraft was cleared for approach at 4½ miles from touchdown, the Approach Control did not give the weather information and active R/W to KAL 803 because it is well known that the aircraft received all this information and there is no change in it. But after in the Captain's interview, he said that he has all information including the type of approach. But from the cockpit voice recorder we could not find any briefing about the type of approach at all, and no discussion about the visibility of 50 meters. All these facts lead to the poor crew understanding and the overconfidency of the Captain.

When tuned the ILS, and found it not working. They seemed unprepared and unsure of the action to be taken. Then, they requested the Controller to confirm that it is an NDB Approach. With the aircraft in the landing configuration the crew instead of following the proper NDB procedure as per the chart, they started descending, the F/E under instruction to look outside as well as his normal duty of calling the altitude from the radio altimeter (from interview) he called the 800 ft (no evidence of this in the C.V.R.) but missed all the other standard calls of 1000, 500, 400, 300, 200 as instructed by the Captain. Though during the interview after, he said he called the 300 but he missed the 1000, and the 500 because he was looking outside, and also the rate of descent was so fast after passing 2 miles from touchdown he could not keep up with it. Since the callout were in Korean language, the Korean Representative confirmed that only the First Officer called (300 it is impossible).

It is the opinion of the Committee that the Captain considering himself familiar with the airport he did not review the airport data and specifically the NDB Procedure. Having been vectored after the 7 miles from touchdown to heading 270 he continued that on the VOR radial even after passing the NDB which brought him slightly South of the runway, and following First Officer's suggestion, started descent in the anticipation of making visual contact before the 200 ft altitude or go around. The earlier discussion of the shallow layer and the 400 may well gave the impression that lower down they could make visual contact. The crew however, were preoccupied with looking outside, and the rate of descent was high such that the 200 feet call was missed. The GPWS warning came on 6.7 seconds before the crash. The pilot pulled up but it was

not sufficient to avoid the accident. Only one second before the crash, there was a shout indicating at least one member of the crew saw the houses which were the most prominent.

Spectrographic analysis of the last 10 seconds before the crash showed that the 300 ft call was made at about 7.7 seconds prior to impact. This is consistent with the DFDR reading of just over 300 ft AGL at that time.

The rate of descent calculated from the DFDR data during this period was about 2200 ft/min. However, both pilots when asked during the interview about their rate of descent said it was about (700-800 ft/min.) and the Captain considered the aircraft impact so quickly after the start of descent, was perhaps due to an incorrect barometric setting by one of his crew. The Committee considered this point. During the descent check list there was no evidence that a cross check between the Captain and F/O instruments was made though after the crash the Captain's altimeter was found set at 1006 mb; the F/O's at 1017 mb and the stand-by at 1020 mb. This variation is most probably due to impact and/or crew existing the wreckage and/or altimeter wrong setting.

The DFDR recording of barometric altitude, taken from CADC 2, evidences that the aircraft was at about 2070 feet QNH at (7 miles) from the touchdown reference point. This is consistent with the 2000 ft. he was supposed to maintain while crossing the NDB and also the evidence of the voice recorder. The altitude at the crash site (of 315 ft.) was consistent with the site actual altitude of 280 feet AMSL.

The altimeter setting however is not relevant to this accident. The 300 feet call was made from the radio altimeter.

In Approach Briefing, Captain who was flying the aircraft asked the F/O to watch the instruments and F/E to make call out and watch out for any ground reference. F/O failed to remark the high rate of descent and did not notice the deviation from final approach track comparing it with PE Locator, the F/E failed to make call out and/or to watch ground references. He said that the rate of descent was very high "DFDR confirmed that" and he could not follow to call out. Both F/E and F/O did not inform the Captain.

The last flight performed by the crew before this ill-fated flight was on the night of 22-23 July from Bahrain to Riyadh as an extra crew and from Riyadh to Bahrain as an operating crew. The crew arrived at Bahrain early morning (2 or 3 O'Clock) and rested in Bahrain the following night. Next day (24/07) in the afternoon they arrived Jeddah, as passengers and rested in Jeddah for the next two days. During these 3 days (in Bahrain and Jeddah) they followed a normal pattern of early retirement to their rooms and slept, equally they getting up early in the morning and follow their recreational activities. This sequence went on until the last day before this flight. On that day however, the crew returned to their hotel after lunch to sleep. The First Officer according to his statement, slept around 3 hours, and after waking up he tried to pass the time by reading until pick up time. The Captain decided to take a souna for about an hour and a half and then took half a pill of sleeping tablet. In accordance with his statement, such a dose would be effective for a 4 hours sleep, as he was informed by the Pharmacist, who supplied it. It is to be noted that it was not obtained from an approved civil aviation medical examiner. It is estimated that he slept from 5.00 P.M. upto the pick up time. This would give him about 7 hours of sleep.

Though the crew in terms of total time they had more than sufficient rest period after the last flight. It is evident that the crew body system has become adapted to the local time zone, and they were unable to get the normal sleep, while the Captain was obliged to take sleeping tablets which may have had some effects well after the time it is expected to wear off. It is probable then that this situation for the crew has affected their alertness and mental concentration.

According to the manufacturer, the GPWS was installed on this aircraft prior to the development of any FAA and/or ICAO guidelines, and therefore does not meet the FAA Circular AC No. 25-6 or TSO-C92b. It has only two modes of operation. Mode (1) descent rate, warning is activated only if parametric descent rate exceeds 4000 ft/min. at radio altitude of less than 2400 ft., and therefore this mode was not activated in this case since the conditions did not exist. The second mode (Mode 2) closure rate, was activated at 6.7 seconds before the crash, at which time the aircraft was at approximately 270 ft radio altitude.

From the theoretical performance of the unit, this would give a warning if the closure rate is 1750 ft/min or more. The GPWS stopped after 1.7 seconds even though the aircraft remained within the warning envelope upto the time of the crash.

DFDR data of elevator angle, vertical acceleration and pitch attitude indicate that a pull up action was taken by the pilot about 6 seconds before the crash giving initially an elevator setting of 5° degrees. However, this elevator setting was maintained for only about 3 seconds, and was reduced by about one degree during the next 2 seconds, then it was increased to 5° degrees once more only to be reduced immediately to about 2° degrees, and finally there was a heavy pull giving 10° degrees elevator at the instant of the crash.

On questioning the crew, they were not sure of the events during the last few seconds of the flight, and they did not remember the GPWS warning. Therefore, it is not possible to explain with certainty the action of the pilot during this time. It would appear however, that he did react to the GPWS, but as the warning stopped after 1.7 seconds, he considered the situation as being corrected, it would seem to explain the elevator setting on two occasions during last 6 seconds to about 5° angle, and then bring it shortly afterwards to one or two degrees.

According to the manufacturer analysis, under the prevailing conditions at that time, with 5 degrees elevator and no power, the aircraft could recover with 160 ft loss of height and with 8° and 10° elevators the height loss would be 110 ft and 100 ft respectively. With one second allowance for recognition of the situation and taking action, this would mean that 4 seconds after the initiation of the action being sufficient to avert the impact. The power setting does not have any appreciable effect during the first (7) seconds of the pull up.

The operator performed simulator tests on DC 10 simulator in Japan. The Committee was not present during these tests. However, the information supplied to the Committee gave two cases, both with a rate of descent of 2400-2500 ft/min and a pull up at 300 ft but one case with advancing of the throttle, and the other case in the idle position. The height loss was 110 ft and 235 ft respectively. Another simulator test, for the aircraft attitude, with 3° nosedown, a rate of descent of 2000 ft/min was obtained.

This would indicate that, recovery in this situation with throttles in the flight idle position is not possible. Since the activation of the GPWS was at about 270 ft and this has to be reduced by the height loss during pilot response time to recognize the situation and take the corrective action.

The DC10 crew simulator training was conducted in Japan. The Committee did not have the opportunity to examine this simulator. However, the Japan Air Fleet of DC10-40 is of a later date of manufacture (1975 and later), and presumably would have the latest GPWS, with more modes, and verbal warnings, giving for example the "pull up, terrain, etc" and presumably also the simulator has the same type of GPWS. The crew during their training, if the GPWS was at all activated, would be more familiar with this type rather than the one installed on the subject aircraft, which they said was never activated.

The Company Operations Manual states that on activation of GPWS System Warning, go around should be initiated promptly in situation where immediate visual reference to terrain is not available. When the Committee asked some of the Operator's crews (not involved in this accident) there were two responses. Some said they will confirm the danger situation first then initiate go around. Others said they will initiate go around regardless. It seems in practice it was not stressed on all crews to comply with the instructions of the Operations Manual in this respect.

A rate of descent calculation for the last 1000 ft height above terrain was calculated from the DFDR barometric altitude and plotted versus the radio altimeter height. Though there were some data points scattered, it is clear that the rate of descent was between 1900 ft/min - 2000 ft/min down to a radio altitude of 500-450 ft., after which the rate of descent increased to approximately 2200 ft/min. Comparison of this plot with the theoretical performance requirements of TSO-C92b indicates that conditions for the activation of a warning existed when the aircraft was at about 750 ft AGL.

The Committee wants to remark that if the aircraft had been equipped with GPWS Unit complying with the FAR Requirements, a warning would have been initiated, and maintained for as long as the aircraft was within the warning envelop at about 20-19 seconds before the time of the crash. The crew would certainly have been more positively alerted to the dangerous situation.

3. CONCLUSIONS

3.1. Findings

1) Tripoli ILS was out of service and the crew have the Notam concerned and the NDB Approach is the only type of instrument approach available on that day.

2) The Captain decided to descend to 200 ft which is ILS Minima without any proper briefing on weather and type of approach.

3) The Captain tried to tune ILS in the Final Approach Phase.

4) The crew was advised for NDB Approach by ACC and PE (NDB) was functioning normally.

5) The weather at 0446 UTC for the 0430 report remained unchanged upto the crash time and it was below the NDB, Company and Jeppesen Minima, (Company Visibility Minima for NDB Approach is 1600 meters).

6) ACC/APP. Controllers are working in the same room and a direct communication can be made specially when traffic is light.

7) The Captain did not ask for alternate airport weather.

8) The Captain has a hyper-tension and treated with an FAA and KCAB approved medicine.

9) No PE (NDB) identification has been made by the crew.

10) The crew were not using head sets, they were listening to the loudspeakers and the Co-pilot was not passing all the information to his Captain and did not get his APP. Chart out.

11) The F/O did not try to take over from the pilot.

12) The F/O has no radio licence and his english was not good.

13) The F/E was an x-navigator and he has been transferred to a Flight Engineer.

14) The Pilot and Co-pilot failed to cross check their instruments during last approach phase especially the vertical speed indicator.

15) The Captain was flying and instructed the F/E to look outside in addition to his normal duty (Alt. Callout) and instructed the F/O to watch the instruments.

16) None of the crew draws the attention of the Captain that he is 100 ft above the minima or at minima.

17) Tripoli VOR is not along the R/W 27 centreline, it is South of the Runway and no VOR let down chart is published.

18) First impact was with left landing gear at slightly nose down attitude (2^{o} nose down).

19) The aircraft fuselage was clear from the ground until the aircraft crossed the road, after that the aircraft was completely destroyed on ground and caught fire when the aircraft collided with the double wall fence.

20) Emergency doors were not used and no proof on the cabin crew contribution to save lives after crash.

21) The auto-throttle system was off position and auto-pilot was disengaged at final stage.

22) The aircraft was in landing configuration, landing gear down and 35^{o} flaps at the time of impact.

23) DFDR and CVR information was reasonable although some DFDR parameters were not recorded.

24) This aircraft was equipped with a GPWS Part No. 965-0182-002 which did not comply with the FAA Advisory Circular No. 25-6, and no service has been carried out on this unit since installed on the aircraft dated 25 November 1974.

3.2. Probable Causes

1) Crew fatigue due to lack of proper sleep affecting their mental concentration on the operation of the aircraft and their performance led to :-

   a) Captain failed to make proper weather and NDB Approach Briefing.

   b) The flight crew continued the approach in bad visibility below company and Jeppesen minima for NDB Approach and failed to follow the prescribed procedures.

   c) The flight crew failed to grasp the actual visibility information given by the ACC as 50 meters.

   d) F/O and F/E failed to follow the Captain's instructions.

2) The available GPWS failed to maintain the warning while the aircraft still in dangerous situation in colliding with terrain.

3) Flight crew simulator training was conducted on an aircraft simulator differently equipped from the crashed aeroplane especially in the GPWS.

4. SAFETY RECOMMENDATIONS

1) Company operations manual should be strictly followed specifically in crew briefing, minimas and procedures.

2) All turbine powered aeroplanes should be equipped with a developed GPWS with more modes of operation.

3) Simulator training should reflect the actual aircraft performance and equipment.

4) Crew should use head sets.

5) Crew should not take any medicine other than that approved by an Approved Medical Examiner.

6) Crew member who is doing radio operations must be qualified and certificated for this job.

7) At least two of the flight crew members must be of grade (A).

8) Duty time and rest period in the Company Operations Manual should include the crossed time zones since the Caompany flies long routes covering wide time zones.

5. APPENDICES

NO.	SUBJECT
1.	Symbols and Abbreviations
2.	I L S Notam
3.	Weather Forecast
4.	Weather Reports
5.	A T C Tape Transcript
6.	C V R Transcript
7.	Selected Photos for Aircraft Wreckage
8.	Navigation Charts
9.	Weight and Balance
10.	Crew Licences
11.	A/C Certificate of Registration and Airworthiness Certificate.
12.	Passenger Manifest and Victims Distribution.
13.	Other Wreckage Information.
14.	HL7328 Differences from other KAL DC-10's.

APPENDIX NO. (1)

SYMBOLS AND ABBREVIATIONS

ACC	Area Control Centre
APP	Approach Control
A/C	Aircraft
ANS	Area Navigation System
ADF	Automatic Direction Finder
APU	Auxiliary Power Unit
AMSL	Above Mean Sea Level
AGL	Above Ground Level
ATC	Air Traffic Controller
C.G.	Centre of Gravity
CSD	Constant Speed Drive
CAPT.	Captain
ETA	Estimated Time of Arrival
FL	Flight Level
F/O	First Officer
F/E	Flight Engineer
F/W	Flight Watch
HSI	Horizontal Situation Indicator
HPC	High Pressure Compressor
ILS	Instrument Landing System
INS	Inertia Navigation System
ICAO	International Civil Aviation Organization
ISDU	Inertial Sensing Display Unit
KCAB	Korean Civil Aviation Bureau
KAL	Korean Airlines
LAA	Libyan Arab Airlines
LCN	Load Classification Number

LPT	Low Pressure Trubine
LIL	Light Intensity Low
LIH	Light Intensity High
mb	Milli-bar
MIS	Misrata
MAC	Mean Aerodynamic Cord
NM	Nautical Miles
NDB	Non-Directional Beacon
QNH	Altimeter Sub-Scale Setting to obtain Elevation when on Ground.
R/W	Runway
UTC	Universal Time Coordinated
VOR	Very High Frequency Omni Directional Radio Range
VASIS	Visual Approach Slope Indicator System
W.M.O	World Meteorological Organization

APPENDIX NO. (2)

I L S NOTAM

NNNN

ZCZC LDA019
GG HLLTYAYA HLLLZQZX HLLTZTZX HLLTYDYX HLLQYXYX HLLTLNKW HLLTZPZX
271232 HLLLYNYN
A054 NOTAMN
A-HLLT
B-WIE
C-TPI/VOR 114.5MHZ U/S STOP
A055 NOTAMN
A-HLLT
B-WIE
C-UFN
E-HLLT ILS OUT OF SERVICE STOP

NNNN

++ RCV MSG 07.26 20:08 +++++++

ZCZC 054 261959JUL89
QD JEDLLKE
.SELRMKE 261937 OSL221261937
//MSG 209 PART 1

HLLT
DTTJ
27 JUL 1989
---------- HLLT/TIP ----------
COMPANY ADV- LCL TIME GMT PLUS 2(01APR-30SEP).
.
A077/89 A)HLLL B)WIE C)PERM
. E)ATS RUT SEGMNT RE-ESTBLSHD AND AMENDED AS FLWS
. .AWY SEGMNT(A411) PORTN E OF BENINA VOR/DME REOPEND
. TO SERVE AIR TRAFFIC BTN BENINA VOR/DME AND THE A.R
. OF EGYPT BDRY AS FLWS
. BENINA VOR/DME FREQ 117.4MHZ COORD(32075N2012.2E)
. TO LABRAQ NDB FREQ 392KHZ COORD(32472N2158.0E)
. BRG064/244 DIST 96NM MEA FL50 TO CRP RASLO
. COORD(3206.0N2459.0E) BRG 107/287 DIST 165NM
. MEA FL90
.
A053/89 A)HLLL FIR B)WIE C)PERM
ALL ACFT INTENDING TO OPERATE WITHIN TIP ADIZ MUST CONTACT
TRIPOLI ACC/FIC FREQ(11300 OR 5658) OR KUFRA VHF 121.9 OR
121.5 MHZ AT LEAST 15MINS PRIOR TO ENTER THE ADIZ
REPORTING /CALLSIGN. LATEST POSITION. FLT LVL ND ESTIMATE
OF ADIZ BOUNDARY.
.
A038/89 WIE UFN MIS VOR O/S

A007/89 A)HLLL B)WIE C)UFN
. E)ACC MAIN FREQ 128.4MHZ U/S
A107/88 A)HLLL B)WIE C)UFN
. E)TRG VOR FREQ 117.0MHZ DISCOMMSSND.
A055/89 A)HLLT B)WIE C)UFN
E)HLLT ILS OUT OF SERVICE
.....
HLLT APO OPS FROM 0600L TO 2359L DAILY
.....

---------- DTTJ/DJE ----------

APPENDIX NO (3)

WEATHER FORECAST

```
QU SELOPKE BAHODKE
.BAHODKE 270923G
TAF*HLLT ***** ILS 27 200-800   LOCATOR 09 620-1600
TAF*DTTJ ***** ILS 09 412-1200  VOR DME 27 480-3000
.     26 JUL 89
HLLT 1818 03012 CAVOK G 2022 VRB05 PROB20 T 0006 6000
.    10BR G 0709 03012 CAVOK
DTTJ 1818 03012 CAVOK G 1922 04008 7000 2CUSC030
.    PROB10 1CB030 G 0007 VRB04 5000 3SC030 G 0918
.    05016 9999 2CUSC026 3AC100 PROB10 T 1618 1CB030
OSI JED/TIP WEATHER FOLDER NEUN JED KKU E JI SI HA YED
. CREW E GE JEON DAL DGEN GEOS GWA DONG IL HAN GEOS EUL
. HWAG BO TO ROG JC CHI HAESS EUB NI DA
KKW
;
270934 JUL89 AOP 103

                    ////////////////////////////
                    / NON-GRAPHIC INFORMATION /
                    ////////////////////////////

270538
HLLT 0606 09010KT CAVOK TEMPO 1218 03010/20KT GRADU 2022 VRB06KT
 PROB20 TEMPO 0006 6000 10BR

270800
HLLT 0252 00000KT 3000 10BR SST006

LDI DOES NOT MAINTAIN NOTAMS FOR HLLT

270525
DTTJ 0606 VRB06KT 5000 2SC030 GRADU 0819 10014KT 9999 2CU026 PROB10
 TEMPO 1618 1CB030 GRADU 2206 VRB04KT 5000 3CI200

270900
DTTJ 0300 08002KT 5000 2SC030 24/21 1013
DTTJ 0100 08002KT 5000 3SC030 24/20 1014

LDI DOES NOT MAINTAIN NOTAMS FOR DTTJ

END 0004 WEATHER BRIEFINGS        000 GRAPHIC        004 NON-GRAPHIC
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END OF LOCKHEED DATAPLAN REQUEST NO. 5468

;
270959 JUL89 AOP 109
@NNNN
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APPENDIX NO (4)

WEATHER REPORTS

ZCZC LYB010
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270037 HLLTYMYX
SPMP31 HLLT 270040
HLLT 00000KT 3000 10BR 5ST006=

NNNNZCZC LYB011
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLTLNYX HLLSYMYX HLLTKWLN
270043 HLLTYMYX
WS03 HLLT LOC MET WARNING NR.01 VALID 270045 TO 0600
LOW CLOUD 4 TO 6 OKTAS STRATUS BASE 800FT TO 1000FT WILL EFFECT
HLLT AIR FIELD REDUCE VIS.TO 2000M OR LESS AT TIMES=

NNNN

NNNN

.ZCLYB 013
FF HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270055 HLLTYMYX
SAMP31 HLLT 270100
HLLT 00000KT 3000 10BR 5ST006-23/21 1013=

ZCZC LYA025
DD HLLBZQYX HLLTZQYX HLLTYMYX HLLTYGYX HLLTZPZX LMMMYMYX LMMMYTYX
270207 .HLLBYYMYX
WS 72 HLLB LOC MET WRN NO 1
VALID 27 0200 TO 0500 LOW CLOUD
2 TO 4 OKTAS ST BASE 800 FT TO 1500 FT
REDUCE VIS TO 1500 M OR LESS

NNNNNZCZC LYA026
FF HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270253 HLLTYMYX
SAMP31 HLLT 270300
HLLT 00000KT 3000 10BR 4ST008 22/20 1013=

ZCZC LYB025
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270355 HLLTYMYX
SPMP31 HLLT 270400
HLLT 00000KT 0800 40FG 4ST008 22/21 1013=

NNNN

ZCZC LYB026
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270405 HLLTYMYX
SPMP31 HLLT 270405
HLLT 00000KT 0050 45FG 1013=

NNNNZCZC LYB027
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLSYMYX HLLLZQZX HLLTLNYX HLLTKWLN
270403 HLLTYMYX
WS03
HLLT LOC MET WARNING NR.02 VALID 270400 TO 270630
FOG OBS AND FCST OVER HLLT AIRFIELD RED VIS.TO 0800 OR LESS=

ZCZC LYB035
FF HLLTZTZX HLLBYMYX HLLBZRZX HLLSYMYX HLLTLNYX HLLLZQZX HLLTKWLN
270425 HLLTYMYX
SAMP31 HLLT 270430
HLLT 00000KT 0050 45FG 1013=

NNNNZCZC LYB036
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270441 HLLTYMYX
SPMP31 HLLT 270440
HLLT 00000KT 0800 42FG 4ST008 1013=

NNNNZCZC LYB037
DD HLLTZTZX HLLBYMYX HLLBZRZX HLLLZQZX HLLSYMYX HLLTLNYX HLLTKWLN
270455 HLLTYMYX
SPMP31 HLLT 270500
HLLT 00000KT 2000 10BR 7ST010 22/21 1013=

APPENDIX NO. (5)

A T C TAPE TRANSCRIPT

803 ATC CONVERSATION

TIME	VOICE	STATEMENT
043653	A/C	- Tripoli Control Korean Air 803 Good Morning.
043705	ACC	- Korean Air 803 Good Morning Go-ahead.
043707	A/C	- Roger Korean Air 803 Garda 34 Maintain 310 estimated Mistrata 48 Tripoli 10-0510 request Tripoli Weather please.
043729	ACC	- Korean Air 803 How do you read Tripoli?
043735	A/C	- Estimate Tripoli 0510.
043741	ACC	- Copy Tripoli weather : Wind calm visibility 3 KM in fog; temperature is 24 D/point 22 QNH 1013 active runway 09 after Misrata fly heading 270.
043803	A/C	- Roger Korean Air 803 1013 R/W 09 after Misrata Heading 270 confirm.
043811	ACC	- Affirmative after Misrata fly heading 280 fly heading 280 active runway 27 PE PE the clearance limit.
043825	A/C	- Ah. Misrata heading 280 confirm?
043834	ACC	- Heading 280 after Misrata to PE the clearance limit active runway 27.
043837	A/C	- Roger runway 27.
043919	ACC	- Korean 803 Squawk A4011 A4011.
043925	A/C	- Roger 4011.
044033	ACC	- Korean 803 now identified position is 67 miles East of Mike India Seirra Level 310 vectoring for NDB approach runway 27.
044045	A/C	- Roger Korean Air 803 vectoring R/W 27.
044054	ACC	- Visibility now 1 Kilometer due to fog.
044107	A/C	- Confirm visibility one kilometer.
044110	ACC	- One kilometer due to fog.
044112	A/C	- Roger 1 kilometer due to fog.
044912	A/C	- Tripoli Korean Air 803 heading 280 request descent.
044920	ACC	- Korean Air 803 Roger descent and maintain flight level 120.
044924	A/C	- Roger descend and maintain 120 now leaving 310.
045120	ACC	- Korean Air 803 Tripoli.

TIME	VOICE	STATEMENT
045124	A/C	- 803 go ahead.
045126	ACC	- Roger we just have local met. warning from the Met. Office. Are you ready to copy?
045134	A/C	- Go ahead.
045137	ACC	- Local Met. Warning No. 2 valid 270400 until 270630 fog observed and forecast over the HLLT over the TPI airfield Reduce visibility to 800 meters 800 meters or less.
045202	A/C	- Korean Air 803 Roger.
045206	ACC	- And visibility and the visibility now fifty meters five zero meters now only.
045214	A/C	- Roger we are continuous approach.
045218	ACC	- Roger.
045554	ACC	- Korean Air 803 descent to flight level 70.
045600	A/C	- 803 say again please.
045604	ACC	- Descent to altitude four thousand feet QNH 1013 QNH 1013.
045610	A/C	- Roger descent to four thousand QNH 1013.
045901	ACC	- Korean Air 803 contact approach radar 1240.
045903	A/C	- Roger 1240.
045911	A/C	- Tripoli approach Korean Air 803 good morning, descent to four thousand maintain heading 280.
045920	APP	- Korean Air 803 good morning identified 37 miles South East of Tango Papa India VOR. Trun right heading 290 descent and maintain four thousand feet QNH 1013.
045935	A/C	- 803 Roger heading 290 descent to four thousand 1013.
050242	APP	- Korean Air 803 position 21 miles south-east of TPI VOR continue descent to two thousand feet 1013.
050253	A/C	- 803 Roger, continue descent to two thousand QNH 1013.
050300	APP	- Roger.
050540	APP	- Korean Air 803 one zero mile from touch down.
050545	A/C	- 803
050635	APP	- Korean Air 803 position seven miles from touch down turn left heading 270.
050644	A/C	- 803 left heading 270.

TIME	VOICE	STATEMENT
050658	APP	- 6 miles from touch down.
050705	A/C	- Korean Air 803 say again.
050712	APP	- Korean Air 803 Five miles from five miles from touchdown.
050717	A/C	- Korean Air 803 five miles touchdown.
050722	A/C	- Now maintain two thousand.
050726	APP	- Roger clear for approach clear for approach.
050729	A/C	- Roger clear for approach.
050823	A/C	- Approach Korean Air 803 confirm NDB approach.
050829	APP	- Affirmative Sir Affirmative Sir two miles from touchdown now.
050833	A/C	- Roger.
050838	APP	- Report runway in sight Korean Air 803.
050841	A/C	- Roger.
050943	APP	- Korean Air 803 confirm overshooting.
050945	APP	- Korean Air 803 Tripoli.
050956	APP	- Korean Air 803 Tripoli.

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APPENDIX NO. (6)

C V R TRANSCRIPT

KAL 803 CVR CHANNEL 1, 2, 3 & 4

TRANSCRIPT

TIME	VOICE	STATEMENT
043825	A/C	After Misrata heading 280 confirm.
043834	ATC	Heading 280 after Misrata to Papa Echo the clearance limit active runway 27.
043837	A/C	Roger runway 27.
043839	F/O	He said to proceed on heading 280 from Misrata.
043919	ATC	Korean 803 squawk A4011, A-4011.
043925	A/C	Roger 4011.
044033	ATC	Korean 803 identified now position is 67 miles east of Mike India Seirra level 310 vectoring for NDB approach runway 27.
044045	A/C	Roger Korean Air 803 vectoring runway 27.
044054	ATC	Visibility now one kilometer due to fog.
044107	A/C	Confirm visibility one kilometer.
044110	ATC	One kilometer due to fog.
044112	A/C	Roger one kilometer due to fog.
044115	F/E	He said one kilo.
044119	Capt.	How is it about the wind.
044122	F/O	Wind? Wind is calm.
044125	Capt.	Then why do not they give us 27?
044127	F/O	It is 27.
044129	F/O	It is runway 27.
044131	Capt.	It is said 09, is not it?
044136	F/O	Later and later (may be he changed)?
044138	Capt.	Ah He said so.
044211	Capt.	Is the heading the same yet?
044215	Capt.	Just before when it was 09, when it was 09, did he say so.
044219	F/O	Ah. He said so.
044220	F/E	Tripoli flight watch Korean 803.

TIME	VOICE	S T A T E M E N T
044221	F/W	Korean 803 Tripoli Flight Watch good morning go ahead.
044224	F/E	Korean 803 good morning ETA 0510 remaining 36 decimal zero normal parking bay.
044226	F/E	10 remaining 360 normal parking bay.
044227	F/O	That is right because it was 09, heading 270 was given.
044228	Capt.	That is right.
044237	F/W	OK. Korean Air 803 estimated 0510 and contact the tower for the gate your parking.
044238	F/E	10 remain 37.0 out.
044249	F/E	Roger Roger understood.
044252	F/W	Roger.
044259	Capt.	It was said that a Libyan crew is on board and he wants to come in for a short time during the approach.
044320	F/E	Yes.
044321	F/O	By the regulations coming is not permitted.
044322	Capt.	Do not let him coming in.
044325	Capt.	Let say to him we have one more crew here so we cannot let him come in.
044333	Capt.	A ground mechanic engineer is here that there is no seat available and call the mechanic engineer to come in after calling him to come in and what if he does not come in. Seat, what if he understands that we say only no seats are available.
044350	Capt.	What is he? Why does he want to come in?
044351	F/O	What does he like to see?
044516	F/E	Tripoli Flight Watch Korean Air 803.
044521	F/W	Korean 803 confirm you are calling Tripoli operation.
044523	F/E	Korean Air 803 request weather metro please.
044533	F/W	Stand by please.
044545	F/W	Korean Air 803 ready to copy Tripoli fresh weather.
044548	F/E	Roger go ahead.
044600	F/W	At time 0430 wind calm and visibility 900 meters 45 fog T 22/21 QNH 1013.

TIME	VOICE	S T A T E M E N T
044607	F/E	1013 Thank you very much.
044609	F/W	Roger.
044617	F/E	Roger 1013 QNH.
044620	F/W	Affirmative.
044623	F/E	Wind calm, 8 kilometer and temperature is 22 degrees - 1013.
044644		Cabin - Cockpit.
044645		Flight Deck: go ahead (sound of opening the door).
044655		Hi. Shim
044709	Capt.	You have come from Bangkok have not you?
044710	Mech.	Yes.
044712	Capt.	From Bangkok.
044714	Mehh.	Yes.
044716	Capt.	It is nice to stay there, is not it.
044720	Mech.	It is hard to sleep well.
044818	Capt.	It seem there was no rain at Seoul.
044823	Mech.	It had poured on the day I left.
044825	Capt.	Uh.
044828	Capt.	Then the rainy season might have come.
044829	Mech.	Rainy season.
044852		When we were leaving it seemed to pour out.
044854		Ah. At that part, may be.
044856		The day when we left.
044900	F/O	May I ask lower altitude here.
044903	Capt.	Yes request lower altitude please.
044912	A/C	Tripoli Korean Air 803 heading 280 request descent.
044920	ATC	Korean Air 803 Roger descend and maintain FL 120.
044924	A/C	Roger descend and maintain 120 now leaving 310.
044936	Capt.	I do not care, let them do as they wish I have no one to demonstrate in my house.
044948	Capt.	Uh, even the feathers are moving too.

TIME	VOICE	STATEMENT
044956	Capt.	For a joke.
044959	F/E	Catholic.
045011	Capt.	Where do you say he goes.
045108	Unknown	USA from the USA to Pyong Yang.
045024	Capt.	He has USA resident card.
045028	F/O	What complains can he have.
045037	F/O	It was said that the party of peace democracy did so?
045043	F/O	In that party .... A member of the parliament .... status ..
045047	F/E	With US resident card what complainscan he have (about our country)?
045052	Unknown	Ah Yes there.
045054	Unknown	What had he thought when he went to USA?
045103	Capt.	Our airplane .... is it all right?
045105	Unknown	Yes, Yes.
045120	ATC	Korean Air 803 Tripoli.
045124	A/C	803 go ahead.
045126	ATC	Roger we just have local met. warning from the Met. Office are you ready to copy?
045134	A/C	Go ahead.
045137	ATC	Local Met. Warning No. 2 valid 270400 until 270630 fog observed and forecast over the HLLT over the TPI airfield reduced visibility to 800 meters 800 meters or less.
045202	A/C	Ah, Korean Air 803 Roger.
045204	Capt.	It is marginal.
045205	F/O	It is marginal.
045206	ATC	And visibility and the visibility now fifty meters five zero meters now only.
045214	A/C	Roger we are continuous approach.
045218	ATC	Roger.
045223	Capt.	If below .... and how much fuel do we have?
045224	F/E	Just before, the fuel quantity was 30,000.

TIME	VOICE	S T A T E M E N T
045227	Capt.	We received that before, do we have that?
045229	Unknown	Yes.
045232	F/O	Are you going to decide here?
045250	Capt.	If visible we are to land.
045252	Unknown	Fog is very dense.
045256	Capt.	Hyun (F/E) you look outside carefully.
045257	Capt.	Choi (F/O) you watch well all the inside.
045322	Unknown	It is said there was an article in Hankook Il Bo (Daily News Paper) in Hankook ILBO.
045327	Capt.	What :?
045340	Capt.	Asiana Airlines did?
045354	Unknown	What was it ? As they have got a blow about 737 it could be a counter blow this time.
045413	F/E	Descend check.
045414	F/O	Go ahead.
045415	F/E	Seat belt.
045416	F/O	ON.
045417	F/E	Landing data landing data.
045418	F/O	Check
045419	F/E	Altimeter set.
045420	F/O	Yes.
045422	F/E	Landing briefing.
045423	Capt.	Yes.
045424	Capt.	Do you remember what I have talked already? Call out continuously look ahead if runway is in sight, and at 200 feet not in sight go around.
045433	F/O	Yes, go around.
045434	Capt.	Shout it out.
045439	Capt.	There will never be any going down lower than 200' at 200'.

TIME	VOICE	S T A T E M E N T
045457	Capt.	200 feet, 200 feet.
045548	Unknown	Depreciation
045549	"	Then take it out.
045554	ATC	Korean Air 803 descend to flight level 70.
045556	A/C	803 say again please.
045604	ATC	descend to altitude 4000' QNH 1013 QNH 1013.
045610	A/C	Roger descend to 4000' QNH 1013.
045616	Unknown	Means buy it.
045619	Unknown	The price of the aeroplanes has gone up.
045621	Capt.	It means that has gone up.
045625	F/E	Getting fortune by various ways.
045627	Capt.	How?
045630	Unknown	Uh, Mr. Choi is getting fortune by various ways.
045635	Unknown	How much has he got, till now?
045639	Unknown	Well.
045643	Capt.	There is some reason why he likes to buy aeroplanes more,
045648	Unknown	Had I been the vice president of technical part ..... the worldwide trend, ... for years ....
045654	Capt.	More contracts may be made on MDMX 4 airplanes are on options, and .....
045801	Unknown	It is said there would be bonus at the end of this month.
045804	Unknown	Yes, they will give us that.
045807	Unknown	Was it agreed with the company?
045808	Unknown	They went to the company.
045810	Unknown	(It looks like it was agreed there.)
045828	Unknown	It could meet the vacations expenditure.
045830	Unknown	On the first day ... on the last day ....
045835	Unknown	Expenditure for summer vacation.
045837	Unknown	It is vacation expenditure.

TIME	VOICE	S T A T E M E N T
045838	Unknown	Vacation expenditure.
045839	Unknown	Then, it will be given on the 31st.
045841	Unknown	When we return, we will get it.
045845	Unknown	Then, on the 1st day, we will get it well.
045855	Unknown	May be for other people 100%.
045901	ATC	Korean Air 803 contact approach radar 124.0.
045903	A/C	Roger 124.0.
045911	A/C	Tripoli approach Korean Air 803 good morning descend to 4000 maintain heading 280.
045920	ATC	Korean Air 803 good morning identified 37 miles South East of Tango Papa India VOR turn right heading 290 descend and maintain 4000 feet QNH 1013.
045935	A/C	Korean Air 803 Roger heading 290 descend to 4000, 1013.
045944	ATC	Roger
045947	F/E	Approach check.
045948	F/O	Hi.
045949	F/E	Runway turn off light.
045950	F/O	ON.
045951	F/E	Altimeter radio flight instrument.
045952	F/O	ON.
045953	F/E	Radio altitude.
045954	F/O	200 feet.
045955	F/E	TRC
045956	F/O	ON
045957	F/E	Shoulder harmness
045958	F/O	ON
045959	F/E	Marker beacon
050000	F/O	ON
050003	F/E	Complete check
050017	Unknown	It is said it is foggy.

TIME	VOICE	S T A T E M E N T
050027	F/E	On the bottom, a shallow layer covered it.
050032	Capt.	I have been here a lot of times, but this condition is the first time.
050035	F/E	Because there is no wind.
050038	F/O	It covered at 400.
050040	F/E	It is foggy, and 22 degrees with the dewpoint of 21 degrees.
050043	Capt.	Humidity is high .
050045	Unknown	Airplane .... was it sent, that?
050046	Unknown	Yes.
050050	Unknown	Ah.
050100	Unknown	To go to Asiana
050102	Unknown	Here
050103	Unknown	Ah.
050107	Unknown	At that time, it was going with HL humber.
050112	Unknown	Again.
050114	Unknown	Ah.
050122	Unknown	It is critical, and painting was requested strongly.
050127	Unknown	Ah.
050242	ATC	Korean Air 803 position now 21 miles south east of Tango Papa India VOR continue descend to two thousand feet QNH 1013.
050253	A/C	Korean Air 803 continue descend 2000 feet 1013.
050300	ATC	Roger.
050304	?	Sound (Select clock sound, horizontal stabilier trim sound, altitude horn).
050538	?	Sound (altitude advisory sound)
050540	ATC	Korean 803 one zero miles from touch down.
050545	A/C	803
050549	Capt.	He gave us position does he do with the radar?
050550	F/O	Yes.
050554	F/E	It is said the radar has been replaced with the latest model.

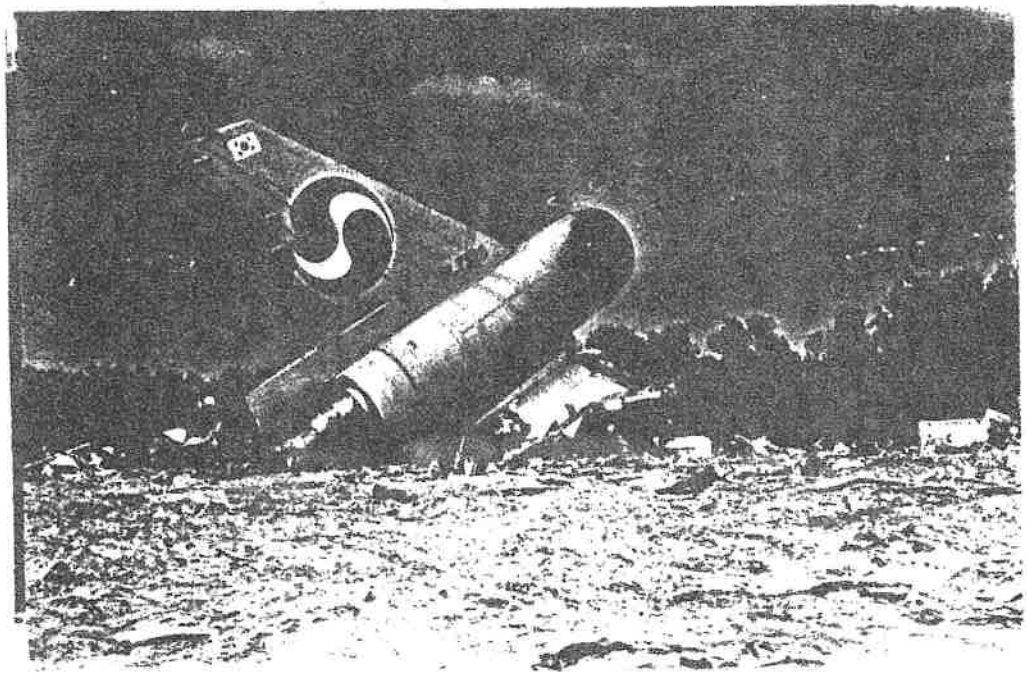
TIME	VOICE	S T A T E M E N T
050610	Capt.	Gear down.
050630	F/O	Four green
050635	ATC	Korean 803 position seven miles from touchdown turn left heading 270.
050644	A/C	803 left heading 270.
050658	ATC	6 miles from touch down.
050700	F/O	Uh.
050702	Capt.	Request say again.
050705	A/C	Korean Air 803 say again.
050712	ATC	Korean Air 803 5 miles from 5 miles from touchdown.
050717	A/C	OK. Korean Air 803 5 miles touch down.
050720	Capt.	We have not set ILS, yet have'nt we?
050722	A/C	Now maintain 2000'.
050726	ATC	Roger cleared for approach, cleared for approach.
050729	ATC	Roger cleared for approach.
050733	Capt.	Oh. ILS does not work.
050741	Capt.	And I wonder if visual approach is possible.
050743	Capt.	Is this correct?
050744	F/O	Yes.
050749	Capt.	But why ILS does not appear.
050755	F/O	Let us push.
050757	Capt.	Thirty five.
050759	F/O	Thirty five.
050806	Capt.	Then how did he say clear for approach if does not work, what should we do?
050815	Capt.	Did you say to them that ILS is not working.
050820	?	Aircraft sound.
050823	A/C	Uh. approach Korean Air 803 confirm NDB approach.
050829	ATC	Affirmative Sir affirmative Sir two miles from touchdown now.

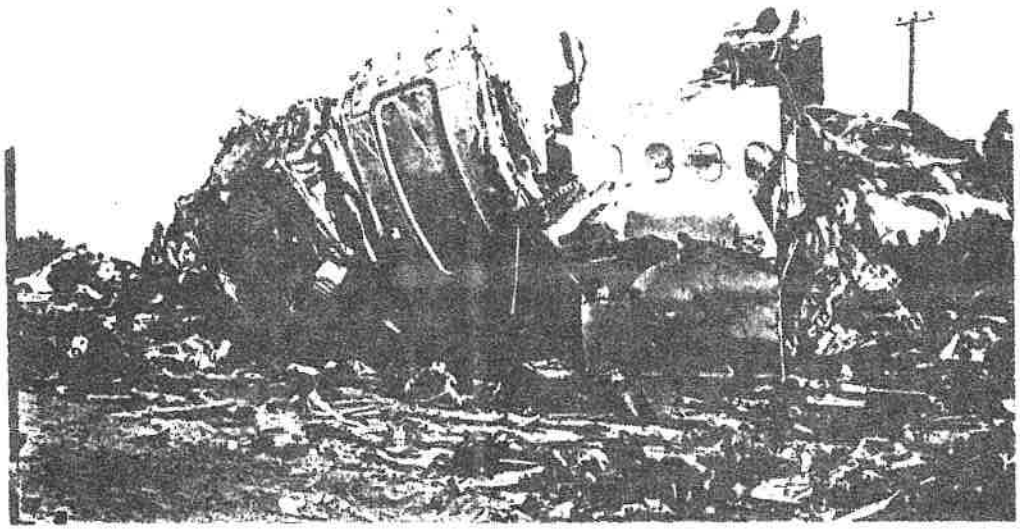
TIME	VOICE	S T A T E M E N T
050833	A/C	Roger.
050838	ATC	Report runway in sight, Korean Air 803.
050841	A/C	Roger.
050842	Capt.	Insight is possible.
050845	F/E	Landing check completed.
050851	F/O	Ah. We are at 300 feet, we cannot make it.
050852	F/O	We cannot make it.
050852	?	Be, Bee (warning sound)
050853	F/O	Ah.
050855	?	Aircraft crashing sound.

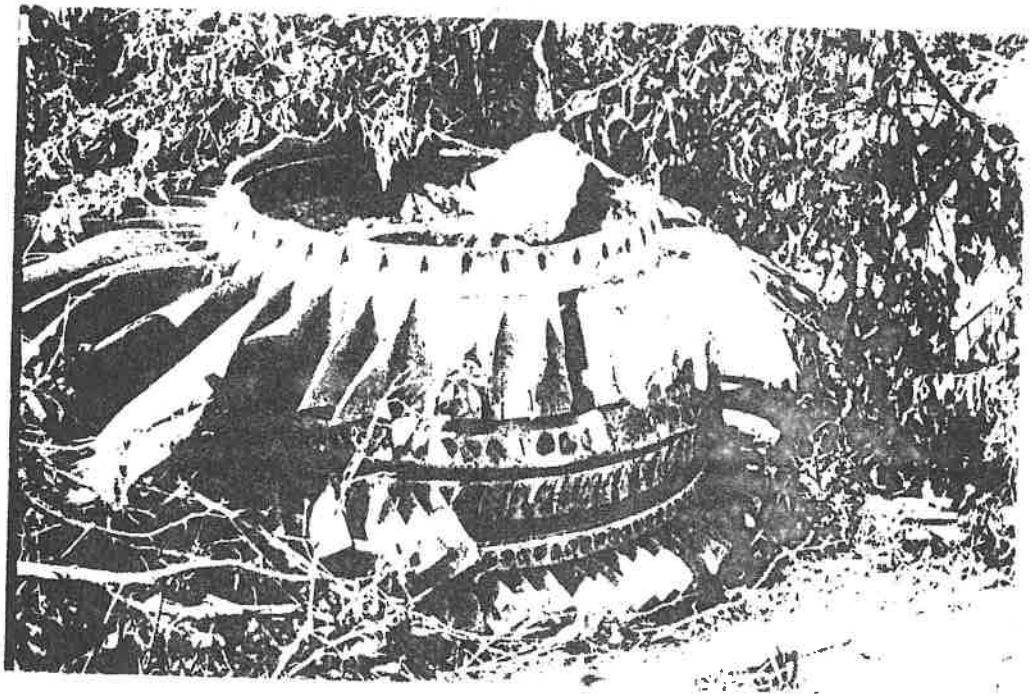
++++++++++++++

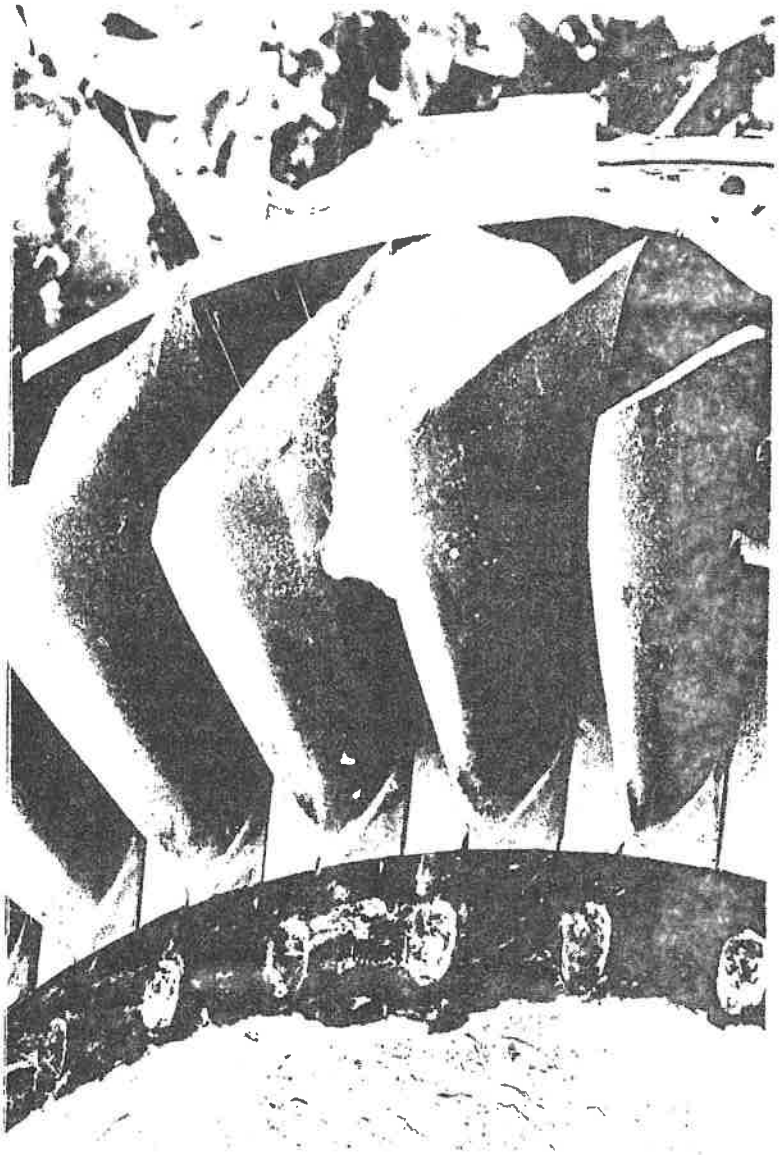
APPENDIX NO. (7)

SELECTED PHOTOS FOR A/C WRECKAGE





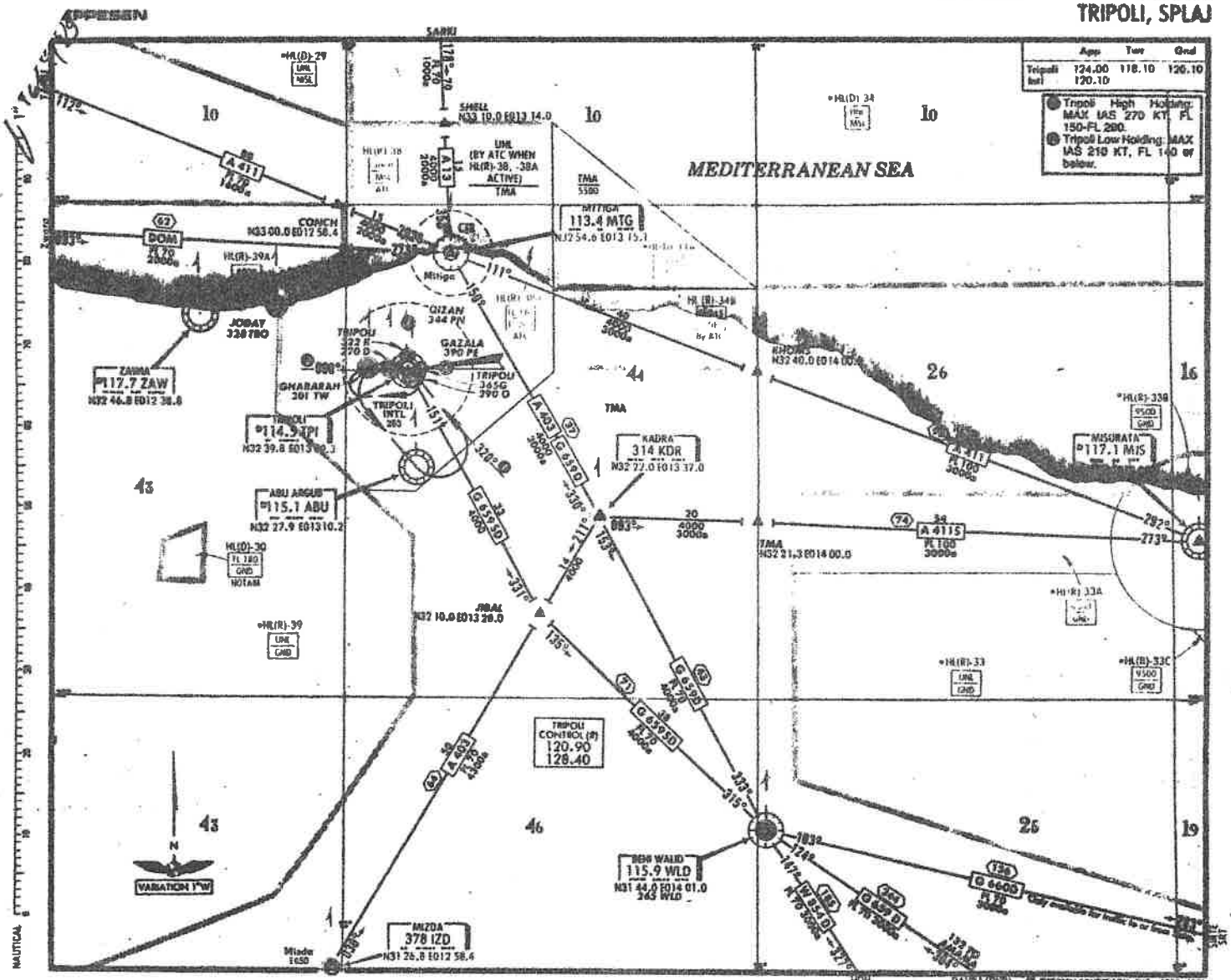




APPENDIX NO. (8)

NAVIGATION CHARTS

TRIPOLI, SPLAJ

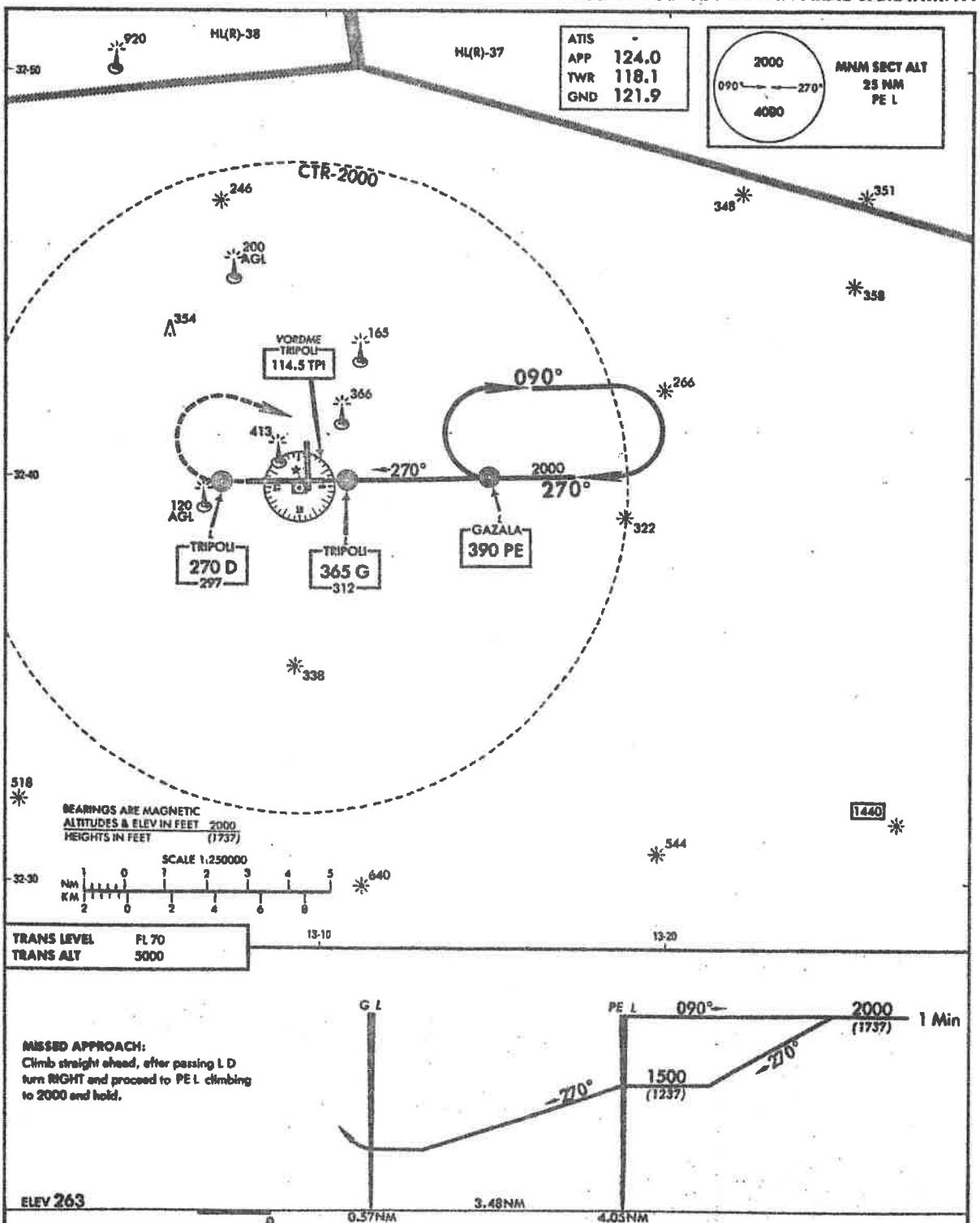


CHANGES: Tripoli Locator G frequency amended; HL (R)-34B area established.

INSTRUMENT APPROACH CHART - ICAO

AP. ELEV 263
VAR. 01°W

TRIPOLI/INTERNATIONAL
L RWY 27
SOCIALIST PEOPLE'S LIBYAN ARAB JAMAHIRIYA



TRANS LEVEL	FL 70
TRANS ALT	5000

MISSED APPROACH:
Climb straight ahead, after passing L D turn RIGHT and proceed to PE L climbing to 2000 and hold.

OCL		TIME TO THR 27 FROM PE L IN MIN AND SEC. DIST 4.05 NM				
		90 KT	120 KT	150 KT	180 KT	210 KT
L 613 (350)						
CIRCLING 1113 (850)		2:42	2:01	1:37	1:21	1:09

CHANGES: Nick edition.

JEPPESEN 5 DEC 86 (11-1)

TRIPOLI, SPLAJ
TRIPOLI INTL
ILS Rwy 27
LOCATOR Rwy 27
LOC 109.5 IWT

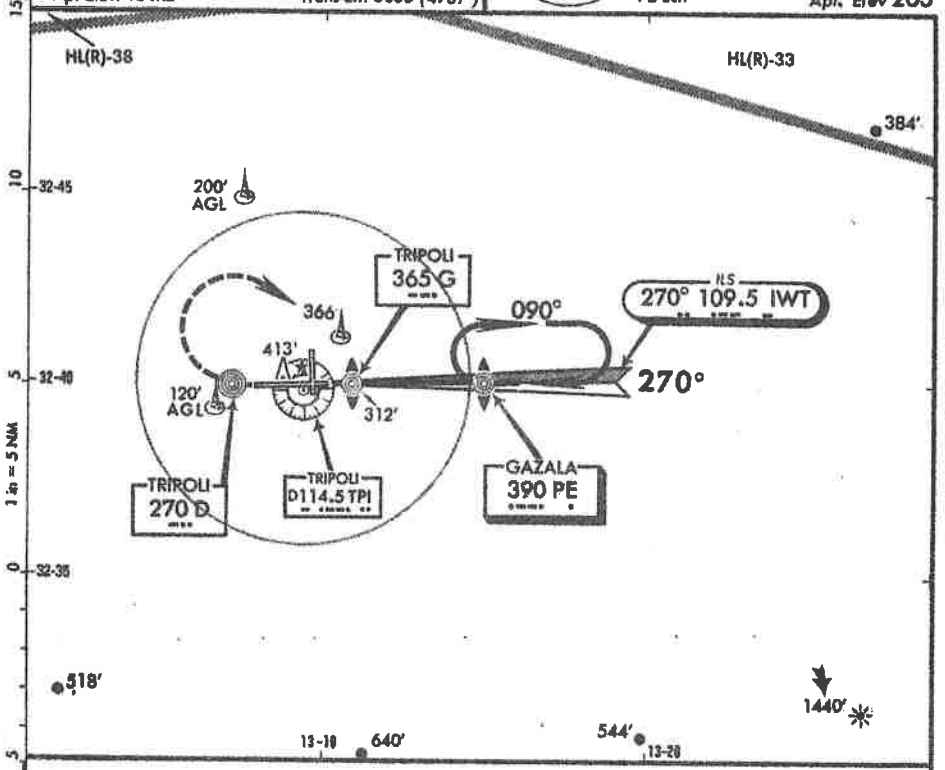
Apt. Elev 263'

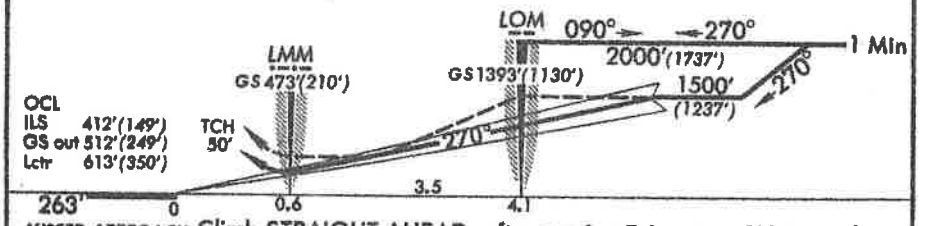
TRIPOLI Approach 124.0
TRIPOLI Tower 118.1
Ground 120.1

Alt Set: MB
Apt Elev: 10 MB

Trans level: FL 70
Trans alt: 5000' (4737')

MSA
2000'
090°–270°
4000'
PE Lctr





MISSED APPROACH: Climb STRAIGHT AHEAD, after passing D Lctr turn RIGHT and proceed to PE Lctr climbing to 2000' (1737') and hold.

	STRAIGHT-IN LANDING RWY 27 ILS		LOC (GS out)		LOCATOR		CIRCLE-TO-LAND
	DH 463' (200')		DH 513' (250')	MDA 520' (257')		MDA 620' (357')	
	FULL ITDZ or CLout	ALS out	MM out	MM out	ALS out		ALS out	MDA
A	800m	1200m	800m	800m	1600m	1200m	1600m	A 1120' (857') 1600 m
B								B 1120' (857') 2000 m
C								C 1120' (857') 4000 m
D			1200m		1600m		2000m	D 1120' (857') 4400 m

Gnd speed-Kts		70	90	100	120	140	160
GS	2.50°	315	405	450	539	629	719
MAP at LMM							

CHANGES: Communications.

APPENDIX NO (9)

WEIGHT & BALANCE

DC-10-30 WEIGHT AND BALANCE MANIFEST

FLIGHT NO.	DATE	FROM	TO	AIRCRAFT NO.
KE- 803	27JUL89	JED	TIP	HL 7328

NO.	ITEM			WEIGHT (LB)	I.U.	CORRECTION WEIGHT
1	STD OPERATING WEIGHT					
2	ADDITIONAL ITEM					
3	OPERATING WEIGHT (1 + 2)			267700	159.0	
4	FWD HOLD 1	MAXIMUM 26,000 LB	NOT AVAIL FOR 7328			
5	FWD HOLD 2	21,000 LB		6070		
6	CTR HOLD 3	21,000LB		10956		
7	CTR HOLD 4	14,000LB		660		
8	AFT (BULK) HOLD 5	7,500 LB				
9	PSGR – ZONE A	PSGR NO	(25)	4000	PSGR NO.	
10	PSGR – ZONE B	PSGR NO	(70)	11200	PSGR NO.	
11	PSGR – ZONE C	PSGR NO	(86)	13760	PSGR NO.	
12	TTL PAYLOAD		(4+5 THRU 11)	46545		
13	ZERO FUEL WEIGHT		(3+12)	314346	TOTAL	
14	MAIN TANK (1 + 3)					
	MAIN TANK (2)					
	CENTER TANK					
15	TOTAL FUEL			100400		
16	TAXI WEIGHT		(13+15)	414746		
17	START/TAXI FUEL			1300		
18	TAKEOFF WEIGHT		(16–17)	413446		
19	EST BURN-OFF FUEL			61100		
20	EST LANDING WEIGHT		(18–19)	352346		

AGTOW = 464100 LB

ACL = 97300 LB

BALANCE CONDITIONS

T.O. = 20.2 % MAC

Z.F. = 14.4 % MAC

L.W. = 18.3 % MAC

T.O.B 181

REMARKS: 181-00-00

F OS. 4176 18%

SIGNATURE DISP OR AGENT:

SIGNATURE CAPTAIN:

KAL-CT-0804

APPENDIX NO. (10)

CREW LICENCES

번호 [illegible]

항공법 제22조의 규정에 의하여

이 항공종사자 기능증명서를 교부 합니다

서기 1968 년 6 월 10 일

대 한 민 국

교 통 부 장 관

기능자격: 정기운송용조종사

발 급 청: 대한민국 교통부

TYPE OF CERTIFICATE

Airline Transport Pi[illegible]

AUTHORITY ISSUED

Ministry of Transportation
Republic of Korea

This Certificate is issued Pursuant to The Provision of Article 22 of Civil Aviation Law

Date of Issue 10 JUNE 1968

KHANG SU RYONG

Minister
Ministry of Transportation
Republic of Korea

[illegible]호

자 격 ATR 49

제 1종항공기승무원신체검사증명서

성 명 김 호 준

생년월일 1935년 10월 5 일

본 적 대한민국

현주소 관악구 봉천동 196-250

유효기간 '89 년 5 월 2 일부터
'89 년 10월 31일까지

항공법 제28조의 규정에 의거 신체검사 기준 제 1 종에 적합한 자임을 증명함.

1989 년 5 월 [illegible]

서울지방항공[illegible]장

No.

TYPES OF LICENCES

CLASS AIRMAN MEDICAL CERTIFICATE

NAME

DATE OF BIRTH

NATIONALITY

ADDRESS

EFFECTIVE:

EXPIRES:

THIS CERTIFICATE IS ISSUED PURSUANT TO THE PROVISION OF ARTICLE 28 OF CIVIL AVIATION LAW IN RELATION TO CLASS AIRMAN MEDICAL STANDARDS.

DATE OF ISSUE

DIRECTOR OF SEOUL REGIONAL AVIATION BUREAU

再交付 번호

기능자격: 운송용조종사

발 급 청: 대 한 민 국 교 통 부

TYPE OF CERTIFICATE
Airline Transport Pilot

AUTHORITY ISSUED
Ministry of Transportation
Republic of Korea

항공법 제22조의 규정에 의하여

이 항공종사자 기능증명서를 교부 합니다

서기 1980 년 10 월 23 일

대 한 민 국
교 통 부 장관의

This Certificate is issued Pursuant to The Provision of Article 22 of Civil Aviation Law

Date of Issue 23 OCT 1980

Minister
Ministry of Transportation
Republic of Korea

제1680호
자 ATR 487
제 1종항공기승무원신체검사증명서
성 명 최 재 용
생년월일 1932 년 5 월 7 일
본 적 한 국
현 주 소 인천 북구 부평 70-5
유효기간 '89년 1월 20일부터
'89년 7월 31일까지

항공법 제28조의 규정에 의거 신체검사 기준 제 1 종에 적합한 자임을 증명함.

1989 년 1 월 20일

서울지방항공관리국장

No.
TYPES OF LICENCES
CLASS AIRMAN MEDICAL CERTIFICATE
NAME
DATE OF BIRTH
NATIONALITY
ADDRESS
EFFECTIVE:
EXPIRES:

THIS CERTIFICATE IS ISSUED PURSUANT TO THE PROVISION OF ARTICLE 26 OF CIVIL AVIATION LAW IN RELATION TO CLASS AIRMAN MEDICAL STANDARDS.

DATE OF ISSUE

DIRECTOR OF SEOUL REGIONAL AVIATION BUREAU

번호 184

기능자격: 항 공 기 관 사

발 급 청: 대 한 민 국 교 통 부

TYPE OF CERTIFICATE: Flight Engineer

AUTHORITY ISSUED: Ministry of Transportation
Republic of Korea

항공법 제22조의 규정에 의하여

이 항공종사자 기능증명서를 교부 합니다.

서기 1979 년 7월 27일

대 한 민 국
교 통 부

This Certificate is Issued Pursuant to The Provision of Article 22 of Civil Aviation Law.

Date of Issue July 27, 1979

Minister
Ministry of Transportation
Republic of Korea

제 17397호
자 격 F/E 184
제 1 종항공기승무원신체검사증명서
성 명 연 규 환
생년월일 1936년 10월 10일
본 적 한국
현 주 소 송파구 송파동 119 한양 12-107
유효기간 '89 년 2 월 27 일부터
'89 년 8 월 31 일까지
항공법 제28조의 규정에 의거 신체검사 기준 제 1 종에 적합한 자임을 증명함.

1989년 2 월

서울지방항공관리국장

No.
TYPES OF LICENCES
CLASS AIRMAN MEDICAL CERTIFICATE
NAME
DATE OF BIRTH
NATIONALITY
ADDRESS
EFFECTIVE:
EXPIRES:

THIS CERTIFICATE IS ISSUED PURSUANT TO THE PROVISION OF ARTICLE 28 OF CIVIL AVIATION LAW IN RELATION TO CLASS AIRMAN MEDICAL STANDARDS.

DATE OF ISSUE

DIRECTOR OF SEOUL REGIONAL AVIATION BUREAU

APPENDIX NO. (11)

A/C CERTIFICATE OF REGISTRATION AND AIRWORTHINESS CERTIFICATE

등록증번호
Registration No. 77-01

대 한 민 국

교 통 부
Ministry of Transportation
Republic of Korea

등 록 증 명 서
Certificate of Registration

1. 국적및등록기호 Nationality And Registration Marks	2 항공기제조자및형식 Manufacturer And Type of Aircraft	3. 항공기일련번호 Aircraft Serial Number
HL7328	McDonnell Douglas Co. DC-10-30	47887

4. 항공기소유자 Name of Owner	임 차 자 : 주식회사 대한항공사장 조중훈 소 유 자 : McDonnell Douglas Corp.
5. 항공기소유자주소 Address of Owner	임 차 자 : 서울특별시 중구 남대문로 2가 118번지 소 유 자 : Long Beach, California, U.S.A.

6. 상기 항공기는 국제민간항공조약(1944년 12월 7일) 및 대한민국 민간항공법 제 3 조에 의거하여 대한민국 교통부 항공기 등록법에 정식으로 등록하였음을 이에 증명함
It is hereby certified that the above described aircraft has been duly entered on the register of Ministry of Transportation of the Republic of Korea inAccordance with The Convention on International Civil Aviation dated 7 December 1944 And with Civil Aeronautics Act of the Republic of Korea

발행년월일
Date of Issue 1977. 1. 25.

교 통 부 장 관
Minister of Transportation

8004-1-8A-1 1971. 11 승인 215㎜×190㎜ (백상지)

대 한 민 국
교 통 부
Ministry of Transportation
Republic of Korea

감항번호 제서8882호
ROKAW. No.

감 항 증 명 서
Certificate of Airworthiness

1. 국적 및 등록번호 Nationality And Registration Marks	2. 항공기제조자 및 형식 Manufacturer And Type of Aircraft	3. 항공기일련번호 Aircraft Serial Number
HL7328	MCDONNELL DOUGLAS DC10-30	47887

4. 종 별 T
Categories

5. 본 증명서는 국제민간 항공조약(1944 12. 7.)및 대한민국 항공법(1961. 3. 7)에 의거하여 이를 교부하며 상기 항공기는 전기 국제조약 및 항공법 그리고 이에 준한 제 항공규정을 준수하여 정비하고 운항할때 한하여 감항성이 있음을 증명함
This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 Dec. 1944 and Civil Aviation law of the Republic of Korea in respect of the above mentioned aircraft which is considered to be airworthy when maintained and operated in accordance with the foregoing and the pertinent operating Limitations

발행년월일
Date of Issue 88. 9. 28.

서 울 지 방 항 공 관 리 국 장
Seoul Regional Civil Aviation Bureau

6. 기 한
Duration 부 터 From 88. 9. 28.
까 지 To 89. 9. 27.

검 사 관
Designated Airworthinese Inspector
M.H.AHN/H.S.CHUNG/C.K.CHUNG/Y.K.PARK

8003~2~7A 1969. 11. 20 승인

190×134㎜(백상지260g/㎡)

APPENDIX NO. (12)

PASSENGERS MANIFEST & VICTIMS DISTRIBUTION

PASSENGER MANIFEST

KOREAN AIR
HL-7328 KE803 26JUL
FROM SEOUL KOREA TO TRIPOLI LIBYA

TIPOLI

C/I	SURNAME INITIAL	SEC	S/N	C/I	SURNAME INITIAL	SEC	S/N
	AHN/DONGGABMR	001	KO-22F		BAE/YUNAMISS	232	KO-19J
	BAIK/MYUNGSUNMR	002	KO-22G		BANG/INYOUNGMR	003	KO-10H
	CHO/EUNSOOMR	004	KO-22J		CHO/JUNGSIKMR	234	KO-17K
	CHOI/HEEYULMR	005	KO-22K		CHOI/HYUNKUKMR	006	KO-21A
	CHOI/INSIKMR	007	KO-23B		CHOI/JUNGOKMR	008	KO-23C
	CHOI/JUNGHEEMR	072	KO-35D		CHO/SUNGHWANMR	073	KO-35E
	AN/HEEKWONMR	074	KO-35F		CHOI/JUNGHWAMR	075	KO-35H
	CHOI/SOONHEUNGM#	076	KO-35J		CHANG/YONGGUNMR	077	KO-35K
	CHOI/KYUBONGMR	078	KO-10A		AN/JINBONG	142	KO-13K
	BENISA/SALLAHMR	235	XX-12G		BENISA/SIFYANM##	236	XX-14E
	EOM/HAEYEOLMR	079	KO-34B		HAN/JUNGHOONMR	009	KO-10J
	HAN/KWANGPILMR	010	KO-12J		HAN/SANGIKMR	011	KO-23F
	HWANG/JEEONMR	185	KO-12B		JANG/YOUNGNAMMR	012	KO-23G
	JOO/JOOOOMR	166	KO-14K		JUN/KYUNGCHANMR	013	KO-04H
	JUN/SANGKOOMR	014	KO-23J		JUN/SUNRYONGMR	015	KO-23K
	JUNG/ISEOSMR	017	KO-24B		JUNG/JAEHOMR	070	KO-04A
	JUNG/KYUNGRAEMR	071	KO-04B		JUNG/MOONHYUNMR	018	KO-24C
F	JUNG/YOUNGHAMR	140	KO-01A		KHADEGA/ELJAMAL#	238	XX-18E
	KIM/CHANGJAMR	144	KO-05B		KIM/CHUNGSOOMR	168	KO-14J
	KIM/DAEHEUNGMR	019	KO-24D		KIM/DUKHWANMR	020	KO-09C
M	KIM/EUNGTAEMSTR	205	KO-11K		KIM/HAEKYOOMR	021	KO-24F
	KIM/HAERYONGMR	022	KO-24G		KIM/HYOJOONMR	203	KO-14G
M	KIM/HYUNJUNGMIS#	206	KO-11J		KIM/JAEDUKMR	024	KO-24J
	KIM/JAESIKMR	025	KO-24K		KIM/JONGCHULMR	220	KO-12F
	KIM/JONGHWAMR	162	KO-17G		KIM/JONGWONMR	161	KO-20A
	KIM/JUNGAEMRS	137	KO-14A		KIM/MOONDUKMR	026	KO-25A
	KIM/SEUNGKIMR	027	KO-25B		KIM/SEUNGTAIKMR	028	KO-09B
	KIM/TAEYULMR	029	KO-25D		KIM/WANGKEUNMR	030	KO-25E
	KIM/YONGHWANMR	031	KO-25F		KIM/YONGKYUNMR	032	KO-25G
	KIM/YONGSOOMR	033	KO-25H		KIM/YOUNGSOOMR	034	KO-25J
	KOH/DUKBOMR	035	KO-25K		KOH/MINSOOMR	036	KO-26A
	KOO/HEUNGJUNMR	037	KO-26B		KOO/MYUNGJINMR	038	KO-09A
	KWAK/SUNGSOOMR	210	KO-37A		KWON/KIDEUKMR	039	KO-04J
	LEE/CHOONGNAMMR	221	KO-12E		LEE/CHUNSOOMR	040	KO-26E
	LEE/EUNJINMS	138	KO-14B		LEE/HANSOOMR	041	KO-26F
	LEE/HEEJAEMR	042	KO-26G		LEE/JAEJONGMR	043	KO-26H
	LEE/JONGBOKMR	230	KO-10F		LEE/JUNHOCHO	139	KO-14C
	LEE/KYOOSIKMR	045	KO-26K		LEE/NAMHOONMR	141	KO-05A
	LEE/SANGJUNMR	046	KO-27A		LEE/SANGMOONMR	047	KO-05F
	LEE/SANGYANGMR	048	KO-27C		LEE/TAEHOONMR	049	KO-05G
	LEE/WANGJOOMR	050	KO-05D		LEE/WONKILMR	244	KO-18J
	LEE/YONGSOOMR	051	KO-27F	F	KIM/YOONKYOOMR	217	KO-02E
	LEE/BONGYOOMR	097	KO-32B		KIM/KAPSUNGMR	098	KO-04C
	HWANG/YUNGHAMR	099	KO-15B		KIM/SUWONMR	100	KO-32E
	LEE/BYUNGROMR	101	KO-32F		KIM/JUNGHWANMR	102	KO-12A
	KWON/TAEMANMR	103	KO-15A		LIM/KISIKMR	105	KO-31A
	JUNG/DUKJOMR	106	KO-18D		LEE/TAERYONGMR	107	KO-04D
	JANG/KEUMSUPMR	108	KO-31D		JOO/SOONAMMR	109	KO-31E
	JANG/HAKYOONMR	110	KO-31F		KIM/KYUNGTAEMR	111	KO-31G
	LEE/JONGGYUMR	112	KO-31H		LEE/SEUNGSOOMR	113	KO-31J
	KIM/YEONGSIKMR	114	KO-31K		KANG/JOOWONMR	115	KO-30A
	KIM/JONGCHEONMR	116	KO-30B		KOO/BONILMR	117	KO-30C
	KIM/HYUNGILMR	118	KO-30D		KIM/GIHYUKMR	119	KO-30E
	JANG/GYAESEOKMR	120	KO-30F		JOO/HYUNJOONMR	121	KO-30G
	JUNG/HONGJINMR	122	KO-30H		JUNG/HAEWOONGMR	123	KO-30J
	JU/WONTAEMR	124	KO-30K		JUNG/MYUNGHOONM#	164	KO-20K
F	KIM/SEONGSIKMR	176	KO-01H		KIM/YOUNGJONGMR	187	KO-10E
	JEON/YOUNGSIKMR	188	KO-15F		KWON/TAEWONMR	189	KO-10D
	KIM/HOONKYOOMR	190	KO-15H		KIM/HANILMR	191	KO-15J
F	HAMAMACHI/YOSHI#	227	JP-02H		KWON/HYUKHEEMR	186	KO-15D

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TIP (2)

PASSENGER MANIFEST

KOREAN AIR
HL-7328 KE803 26JUL
FROM SEOUL KOREA TO TRIPOLI LIBYA

C/I	SURNAME INITIAL	SEC	S/N	C/I	SURNAME INITIAL	SEC	S/N
	JIN/YOUNGKWON	163	KO-16B		KANG/KYUSIK	146	KO-16A
	JANG/HANJOON	147	KO-16C		LEE/YONGIL	148	KO-16D
	LEE/JAN[illegible]	152	KO-16F		KIM/KILSUN	153	KO-16G
	LEE/CHUNGYUN	156	KO-16H		LIM/TAEBONG	157	KO-16J
	LEE/CHUNGIL	158	KO-16K		KIM/KEUMSOO	159	KO-17A
	KANG/MYUNGSIK	160	KO-17B		LEE/MANWOOMR	231	KO-10G
	KIM/JONGWONMR	215	KO-14D		LEE/HAEJONG	229	KO-28K
	KIM/JONGHWA	245	KO-20C		[illegible]A/SEOBUKNR	052	KO-27G
	MAHMOD/ISSAMR	239	XX-11F		[illegible]ILOD/RASHEDMOH#	174	XX-[illegible]K
	MOON/CHULMR	053	KO-27H		NABHIA/ISSAMRS	240	XX-[illegible]G
	OH/KYUNGHAGMR	054	KO-27J		PARK/CHULHYUNGM#	055	KO-[illegible]C
	PARK/CHULWOOMR	056	KO-28A		PARK/JUNGSEOMR	057	KO-[illegible]A
	PARK/KOOHWANMR	058	KO-04K		PARK/KWONSEOBMR	059	KO-[illegible]B
	PARK/SANGILMR	060	KO-06B		PARK/YOONSIKMR	216	JO-[illegible]
	PARK/YOUNGWOOMR	218	KO-18H		PARK/YUNGKIMR	219	KO-[illegible]E
	MIN/HONGKIMR	167	KO-04G		CH/DONGPILMR	125	KO-[illegible]A
	OH/NON-JIKMR	127	KO-34A		PARK/YEONGWOONG#	129	KO-29E
F	MATSUDA/FUJIOMR	228	JP-02J		[illegible]UN/SUKBONG	150	KO-17C
	SANIA/ISSAMS	241	XX-16F		SEO/PILSUKMR	061	KO-28F
	SEUNG/KUN[illegible]OMR	222	KO-04F		SHIM/INBOMR	062	KO-28G
	SHIN/SUK[illegible]AMMR	063	KO-28H		SONG/JINYUNGMR	204	KO-14F
	SHIN/HWA[illegible]OOMR	130	KO-04E		SONG/TAEAMMR	132	KO-29H
	SEO/SUNGHO	154	KO-17F		SUN/JUNGHO	173	KO-15C
	TAE/YUNKYUNGMRS	233	KO-19H		LI/SAMRANGMR	145	KO-05C
	YANG/JUNGROGMR	065	KO-22A		YANG/SOOCHANMR	066	KO-22B
	YOO/KEUNSUNMR	067	KO-22C		YOO/KINAMMR	068	KO-22D
	YOON/JUNGSOOMR	211	KO-37B		YOON/KYUNGHEAMR#	207	KO-11H
	YOON/WONHYUNMR	069	KO-12H		YOON/HANKYOMR	134	KO-35B
	YANG/KYUNGTAEMR	135	KO-35C		YOO/BYUNGCHUL	151	KO-17D
	YANG/JUNGSOO	155	KO-17E		YUN/JIHEUM	165	KO-24A
	TAKADA/HIROMIMS	237	XX-15E				

31

30

F 005 -005/000/000
Y 176 -174/002/000
TTL 181 -179/002/000
GRAND TTL

F 00[illegible] -00[illegible]/000/000
Y 21[illegible] -21[illegible]/002/000
TTL 219 -217/002/000

BAG 329/627P

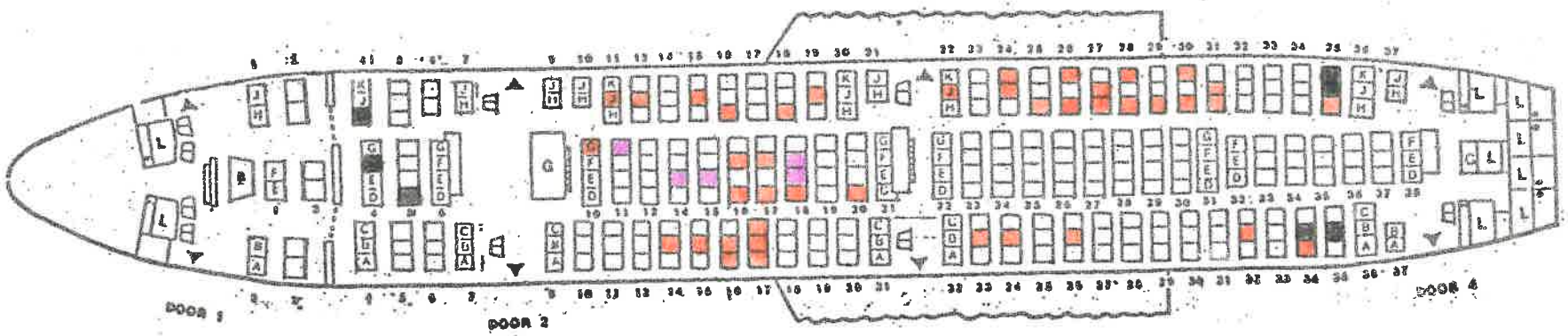
HL 7328 التـــوزيـــع الـــداخـــلى للطائـــــرة

HL7328 CABIN INTERIOR ARRANGEMENT

KOREAN VICTIMS BY FIRE ضحايا كوريـــون بسبب الحريـــق

KOREAN VICTIMS BY SHOCK ضحايا كوريـــون بسبب الصدمـــة

OTHER VICTIMS BY FIRE ضحايا آخرون بسبب الحريـــق



APPENDIX NO. (13)

OTHER WRECKAGE INFORMATION

CAPTAIN'S PANEL:

VHF NAV FREQ. SELECT	114.50
PANEL COURSE SELECT	270
VOR RMI # 1 READING	290
VOR RMI # 2 READING	230
CLOCK	0508
ELAPSED TIME	3.36
#1 A D I	NO INFORMATION
#1 A S I NEEDLE	145 KTS
#1 A S I BUG	148 KTS
#1 V S I	2500 FT/M DOWN
BAR. ALT. SET	1006 mB
TAT.	27°
N1 LIMIT	178.7
RADIO ALT. DECISION HEIGHT SET	202
HSI HEADING	266
VHF COM. N.1 FREQ.	121.5
CONTROL PANEL	120.9
VHF COMM. NO. 3	124.00
CONTROL PANEL	121.00
ADF ANTENNA	NORMAL
VHF COMM. NO. 2 FREQ.	131.40
WEATHER RADAR SELECT NO. 1	128.95
ILS FREQ.	109.2
MAGNETIC HEAD SET	291
ISU SYST.	1
TRIM	OFF
DISPLAY	POSITION
STD-BY BAROMETRIC ALT. SET	1030

ISU MODE NAV		
ISU 3 3 NAV		
FD	ON	
ENGINE NO.	N1	53
ENGINE NO. 2	N1	54
ENGINE NO. 3	N1	55
E.G.T.		NO INFORMATION
F F (CENTRE PANEL)		NO INFORMATION
N 2		NO INFORMATION
STD-BY HORIZON		NO INFORMATION
PIT CONTROL PANEL RADIO ALT. SET		2200
RATE DOWN		1000
FIRST OFFICER'S PANEL VHF NAV PANEL FREQ. SELECT		114.45
FLT. GUIDANCE DIRECT. CONTROL PANEL	HEADING	272
	BANK	25
AUTO THROTTLE		OFF
AIRSPEED BUG F/O		148 KTS
A S I		164 KTS
A S I STD-BY		NO INFORMATION
RMI NO. 1		270
NO. 2		270
ALT. BAROMETRIC SET.		1017 mB
STD-BY ALT. BAR. SET		1020 mB
BRAKE PRESSURE		ZERO
I S U	NAV	
FLAPS		NO INFORMATION
H S I :	HEADING	270
	ADF	83

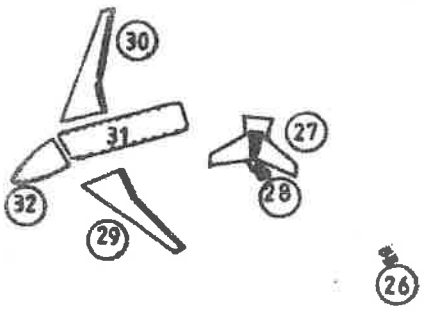
RADIO ALT. SET		210
V S I		2500 FT/M
STD-BY AIR SPEED		NO INFORMATION
VOR RMI N 1		230
N 2		240
HEADING		270
TRIM AIRSPEED		110 KTS
SPOILERS		DOWN
ADF SELECTOR	FREQ.	390 (PE)
	HEADING	270
	A D F	ON
	TONE	ON
COMPASS SLAVED		

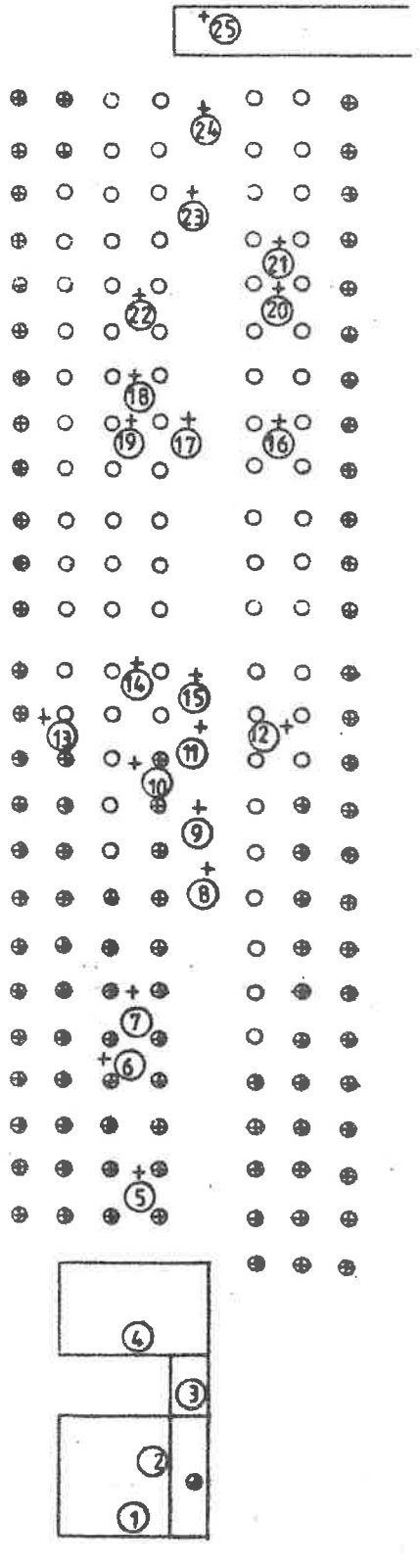
F/E PANEL

FF INDICATORS	a)	510 KG	NOT KNOWN WHICH ENGINE
	b)	630 KG	
	c)	260 KG	
FUEL TRANSFER			OFF
BOOST PUMPS			ON ALL
X-FEED			OFF
HF 1 FREQ.			10.200 SELECTOR OFF
HF 2 FREQ.			13336
HYDRAULIC PRESSURE			NO INFORMATION
HYD. EMERG. PUMP		2-3	ARMED
HYD. EMERG. PUMP		1-3	OFF
APU HOURS			13 84
FUEL QTY. INDICATORS			KGS
	T1 & 3		1000 KG
	AUX. T.		11xx 0 KG
	TANK 2		15750 KG
	TANK 1 & 3		16300
	GROSS WEIGHT		142500

FUEL USED IND.	SYSTEM 1.	9930
	2.	10110
	3.	10100
PRESSURIZATION:	DIFF.	ZERO
	ALT.	ZERO
	BAR. SET.	1010
TRANSPONDER		4011
VHF COMM. N. 3		124.00
CONTROL PANEL FREQ.		121.00

OTHER: STABILIZER POSITION INDICATOR GREEN. SCREW JACK 51 THREADS (45 cm).





1– First Impact & Left Landing Gear Wheel
2– Left L/G Strut on Roof.
3– Impact of Centre Gear and Centre L/G.
4– Impact of Left Hand Trailing Edge Flap
and No 1 engine transfer gear box.
part of the flap,
main gear box
engine control.
5– Part of flap
6– Outboard left aileron
7– Engine cowling (inlet lip)
8– Lower part of tail cone.
9– Upper " " " ".
10– Left engine pylon
11– Control Quadrant.
12– Engine oil tank.
13– Fan & low pressure compressor
14– Part of left aileron
15– Engine Nr 1
16– CSD + Alternator (RHS)
17– Engine driven Hyd. pump.
18– Engine " " ".
19– Turbine compressor
20– APU intake and pylon
21– A P U
22– Large part of left trailing edge Flap
23– Pneumatic Fan reverser motor
24– Oil scavange pump
25– No 3 Engine
26– Right main landing gear (two wheels)
27– Tail unit (Horizontal, vertical stabilizer and Engine No 2)
28– Right hand main landing gear (two wheels)
29– Left wing
30– Right wing
31– A C Fuselage
32– Cockpit

APPENDIX NO. (14)

HL 7328 DIFFERENCES FROM OTHER KAL DC-10's

*HL 7315 / 16 / 17 & HL 7328 A/C DIFFERENCE

NO	SYSTEM	HL7315/16/17 A/C	HL7328 A/C	REMARKS
1	ANS	NONE	YES	DUAL ANS-70
2	INS	YES	NONE	TRIPLE LTN72R
3	ISDU	NONE	YES	SINGLE
4	HSI SW	- RAD - INS	- NAV - ILS - VOR	IN CASE OF HL7328 A/C , ILS PANEL IS INSTALLED ON PEDESTAL PANEL
5	ADF IND	YES	NONE	IN CASE OF HL7328 A/C , ADF IS DISPLAYED ON HSI
6	SEAT CONFIGURATION	F Y TTL 12 / 260 - 272	F Y TTL 12 / 302 - 314	
7	FUEL Q'TY DIMENSION	LBS	KG	
8	LOGO L'T	YES	NONE	
9	DME SW	NONE	YES	