KUWAIT AIRWAYS

FLIGHT SAFETY

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FLIGHT SAFETY & QUALITY ASSURANCE

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Introduction

We hope you enjoyed reading the March issue. The newsletter team is now led by Capt.Shawki Al-Ablani, who is the new Deputy Operations Director, Flight Safety and Quality Assurance. We would like to thank Capt.A/Malek Al Hattab for the genesis of this newsletter and the first five issues.

We continue with our articles on serious incident/accident of aircraft types that are with KAC. In this issue, we bring out the fire incidents on Boeing 777s. We thank Capt. Yacoub Al-Najjar, Manager, Ground Training for his article on "Instrument arrival and approach procedures" which is included in this issue.

We look forward to your feedback, suggestions and of course contribution to this newsletter in the form of articles, anecdotes, pictures, etc. which can be sent to the address given below.

B777 Fire Incidents

FIRE IN CARGO BAY

On September 28, 2003, Emirates Airlines flight EK404, a Boeing 777-300, was cruising at 33,000ft on its regular flight from Dubai, United Arab Emirates to Singapore when the flight crew received a fire warning in the aft/bulk cargo compartment. There were 380 passengers, 16 cabin crew and 2 flight crew on board. At that time, the aircraft was about 170 nautical miles away from Chennai. The flight crew followed the instructions in the quick-reference handbook checklist and discharged fire extinguishing agent into the aft and bulk cargo compartments. The flight crew decided to divert to Chennai after the first illumination of the fire warning. The warning illuminated twice after the crew discharged the extinguishing agent. The plane made an overweight landing at Chennai and taxied to a remote parking stand where the passengers were rapidly disembarked. No injuries to the passengers or crew were reported. To determine the source of the cargo fire warning, the airplane's aft and bulk cargo hold doors were opened under airport fire services observation, and the containers and baggage were removed. A small piece of luggage was found smoldering in the bulk cargo compartment where it had been in direct contact with a ceiling light fixture, which contained a halogen light bulb.

Emirates Airlines conducted the investigation and concluded in its final report that the intense heat from the halogen bulb caused the ignition of the bag, which was the source of the subsequent cargo fire warning during the flight.

As a result of this event, Boeing issued Fleet Team Digest 777-FTD-33-03003 informing 777 operators that it was evaluating the replacement of the halogen light bulbs with lower temperature incandescent lamps. This digest also includes a section, titled "Operator Actions," which notes that Emirates Airlines has implemented a temporary procedure to prohibit loading material within 2 inches of the cargo compartment ceiling to prevent the combustion of materials due to the heat from halogen light bulbs. Boeing subsequently issued a Service Bulletin (SB) directing B777 operators to replace the halogen lamps in the cargo compartment light fixtures with lower temperature incandescent lamp light lamps. This did not need any alteration to the light fixtures.

FIRE IN THE COCKPIT

1. An United Airlines Boeing 777 en route from Frankfurt to Washington made a mayday call over the Hebridean island of Tiree about 150 km west of Scotland. There was fire in the cockpit. The flight crew had to make an emergency landing at Glasgow which was the nearest airport. The British Airport authority who are the operators of airport put the emergency procedures in place and the aircraft landed safely. The fire was brought under control by the time the aircraft landed.
2. An Alitalia Boeing 777 on a Rome to New York flight while flying over the Atlantic appeared to shudder and the innermost layer of the windshield had cracked and there was a small fire in the cockpit. The crew put out the fire with an extinguisher in three seconds and brought the plane to 10,000 ft. An emergency was declared and the

In this issue

NEWS LETTER TEAM

Capt. Shawki Al-Ablani
Dr.M.S.Rajamurthy

Contact:
Flight Safety & Quality Assurance office, Operations dept. P.O.Box.394,
Safat 13004 Kuwait

Phone: +965- 4725475
Fax: +965- 4749823
E mail:
kwioe@kuwaitairways.com

Flight safety/ aircraft accident links

www.kac-opssafety.com
www.ntsb.gov
www.bea-fr.org/anglaise/index.htm
www.bst.gc.ca/en/index.asp
www.bfu-web.de
www.aaib.gov.uk/home/index.cfm
www.atsb.gov.au/

aircraft headed to Shannon, Ireland where it made a safe emergency landing. Boeing traced the problem to faulty wiring in a window heater. The cause is an electrical short due to loosened windshield heater wires. Windshields on B777 had cracked twice earlier.

Boeing has sent a directive to airlines instructing them how to tighten the wire connections. Boeing also is developing circuit breakers that will prevent sparking and the window from overheating. B777 windshields, made of three layers of glass, acrylic and epoxy, can get brittle in the cold, thin air at cruising altitude seven miles up. They're warmed by a heater to stay elastic.

3. A British Airways flight 239 from London to Boston, a B777 shortly after landing at Logan International Airport informed the Logan control tower of a cockpit indication of fire in the avionics compartment on the underside of the plane. Fire fighters were pressed into service. While none of the 219 passengers and 14 crew members were injured, five firefighters were injured battling the fire. The cause of the fire was not known.

FIRE DURING LANDING

On March1, 2005 morning a Pakistan International Airline's flight TK789, Boeing 777 landed at Manchester enroute from Karachi to Toronto, Canada. While the aircraft was taxiing , following an uneventful landing, flames were seen around the left main landing gear. As the airport Rescue and Fire Fighting Service (RFFS) attempted to extinguish the flames, copious quantities of what the RFFS commander assessed as smoke were produced and, fearing that the fire was getting out of control, he advised the aircraft commander to evacuate the aircraft. Of the total 332 passengers and 12 crew members, 31 sustained minor injuries and had to be hospitalized. Several fire service personnel were also injured. The investigation determined that the cause of the fire, established as being in the no.10 main landing gear wheel, most likely resulted from the maintenance practice used when cleaning the wheel heat shields. It was likely that these had been immersed in a flammable solvent, which allowed the ceramic fibre insulation material contained within to become contaminated. The fire occurred on the second landing after the wheel had been fitted to the aircraft, when the brake pad temperature was likely to have been higher than the previous landing. There was slight damage to the fuselage skin, heat damage to the no.10 tyre and hydraulic hose on the left main landing gear.

There were six incidents of same type on the PIA Boeing 777 i.e. fire broke out in the brake assemblies after landing. This was the fourth to occur at Manchester. One incident occurred at Lahore, Pakistan, and other at Toronto, Canada. The investigation by the UK AAIB had discovered the use of a inappropriate grease in the wheel subassembly. The Pakistani CAA report citied two main reasons for the fires. The more serious of these two was the use of an inappropriate solvent while servicing brake assemblies and using it in an inappropriate manner. The other was the use of grease of different specifications.

In-flight fire and smoke

In-flight fire and smoke is a serious safety issue as is exemplified by the Swissair 111 crash off Nova Scotia in 1998. A study by IATA reveals that about 1000 in-flight smoke events occur annually—mostly in cruise. A review of the period 1987-2004 shows that the four leading causal categories of fatalities in commercial jet air transport are loss of control, controlled flight into terrain, specific component failure (non-power plant) and **in-flight fire.** It is alarming to know that in US alone, there is an average of one diversion a day due to cockpit or cabin smoke. With more electronics getting into the cockpit, the electrically generated heat and fire is a matter to be addressed critically.

Modern aircraft have Fire Detection and Suppression System (FDSS) in the engines and the Auxiliary Power Unit (APU). Exception to this are the modern Long-haul aircraft and aircraft operating under ETOPS which have active freight bay FDSS. However, in case of cockpit & cabin, FDSS consists of peoples' nose & eyes, and a few hand held fire extinguishers available to the crew who have a basic training on their use. The point of smoke emergence in the fuselage does not directly lead to the source of smoke and fire and in case of electrical short circuits, the CBs may not trip, making the detection of the fire source and it's isolation difficult.

The cardinal rule in case of in-flight fire is to land as soon as possible. The finite time taken to loose altitude and reach the nearest runway may be too long a period for survival of the crew and passengers. If not the fire, the smoke itself could choke and incapacitate the crew which could lead to a fatal crash. In-flight or on-board fire is a matter to be addressed by the industry on priority. For the present, crew should use the dictum - Land first and then trouble shoot.

Birdstrike Threat Awareness

Adopted from Airbus flight operations briefing notes on Birdstrike Threat Awareness

Birdstrike events are not very uncommon and pilots may expect to encounter two to five birdstrikes during their career. Between 1990 and 2000, FAA reported over 33,000 birdstrikes to civil aircraft. The risk of birdstrikes depends on the regions of the world. Birdstrike statistics over a period of 1980-96 indicate that around 40% of the birdstrikes occurred in Europe. The corresponding number for North America and Asia is 32% and 19% respectively. Based on the statistics from pilot and maintenance reports, the locations and percentage of bird impacts are as shown in the figure in this section. The majority of the birdstrikes occur at very low altitudes, below 500 ft AGL. Nearly two thirds of this occurs below 50 ft AGL.

OPERATIONAL EFFECTS OF BIRDSTRIKE

Airbus In-Service occurrence analysis shows that

- One out of five Birdstrike causes damage to the aircraft.
- Two birdstrikes out of three cause either a delay of an hour and a half for aircraft and engine check, or a longer delay for engine change or structure repair.
- Following a Birdstrike during takeoff or climb, one aircraft out of three does not fly to destination (RTO, IFTB or diversion).
- Birdstrike on the radome can significantly increase fuel consumption as there will an increase in drag.

ENGINE BIRDSTRIKES

GENERAL : Events linked to the engines reveal that:

- Approximately 50% of engine birdstrikes damage the engine(s).
- When an engine strike occurs and damages the engine, usually the fan blades are damaged with significant vibrations, and EGT increases.
- Approximately 20% of engine birdstrikes at takeoff and climb cause an In-Flight Turn Back (IFTB).
- Approximately 25% of engine birdstrikes at takeoff result in the flight crew rejecting the takeoff.
- Only 2% of engine birdstrikes require the flight crew to shut down the engine.

The damage is usually proportional to the bird size and the engine thrust setting. Even a small bird weighing about 80 gm can cause engine damage at high thrust.

BIRDSTRIKE COURSE OF ACTIONS

Suspected Birdstrike: A suspected Birdstrike should be considered, if the flight crew sees birds flying very close by, but there is no confirmation (no sound of bird strike, no change in engine sound, no parameter fluctuation)

Confirmed Birdstrike: A confirmed Birdstrike should be considered, if the flight crew sees birds flying very close by, and hears a bang, or observes a temporary/permanent change in engine parameters, hears changes in engine sounds, or observes significant changes to flight instruments e.g. unreliable airspeed.

There are three potential situations with a confirmed Birdstrike

The airspeed is below 100 Kt

A rejected takeoff at low speed has no serious consequences and shall be envisaged for any suspected or confirmed Birdstrike. The aircraft will return to the ramp for an integrity check. The consequence will be a flight delay, but events analysis have shown that the next takeoff is then performed with a fully operational aircraft, avoiding a possible flight disruption.

The airspeed is above 100 Kt and below V1

A rejected takeoff at high speed is a more serious matter. Action must be taken quickly to ensure a complete stop before the end of the runway. If the Birdstrike is only suspected, the takeoff should be continued.

If the Birdstrike is confirmed, but engine bird ingestion is only suspected, the Captain must evaluate other factors:

- How many engines are affected? (Any decision may differ for a 2 or a 4 engine aircraft.)
- Statistically, a continued takeoff followed by an IFTB is a preferred option.

If the Birdstrike is confirmed and engine bird ingestion probable, aborting the takeoff can be a good decision. This allows the engines to be inspected. In any case, takeoff must be interrupted, if a thrust loss is detected before V_1.

The airspeed is V1 or above

The takeoff must be continued, unless the Captain judges that the aircraft will not fly safely after liftoff (e.g. in the case of uncontained engine failure or total thrust loss on more than one engine).

PREVENTIVE STRATEGIES

The presence of birds at an airport should lead to possible actions being mentioned in takeoff and approach briefings. The following points could be memorized, to help prepare the briefing.

At Takeoff

- Airports are responsible for bird control and must provide adequate bird scaring when necessary. This is also called the "Bird Control Program". Therefore, do not take off if birds are fouling the runway. Advise the tower and expect an airport action.
- Switch on the aircraft lights up to 10000 feet at takeoff, and below 10000 feet at landing. It is assumed that lights provide an additional warning to the birds, and help them to localize the aircraft.
- Flight crews must react immediately when a Birdstrike occurs at takeoff, because there is no time left for analysis. Flight crews should be mentally prepared well before takeoff.

At Landing

- On short final, do not go around, if birds are encountered, but fly through the bird flock and land. Try to maintain a low thrust setting.
- The use of reverse thrust on landing after a Birdstrike should be avoided. It may increase engine damage, especially when engine vibration or high EGT are indicated.

Instrument Arrival and Approach Procedures

Contributed by Capt.Yacoub Al-Najjar, Manager– Ground training

Background:

Because of the series of recent airline accidents, it is essential that the Flight Deck Crew review fundamental principles pertaining to Instrument Approach and Arrival procedures throughout the world. An instrument approach procedure assures full vertical and lateral obstacle clearance, when flown in its entirety, from the published airways structure to the MDA(H) or DH(A). ATC has no authority to modify or delete any segment of an instrument approach procedure or arrival route.

In some cases, ATC can approve direct, No-Radar Routing to terminal navigation facilities or arrival route waypoint. But the pilots should accept this routing only with utmost caution especially in mountainous areas. Upon being cleared to an altitude lower than relevant MSAs(or lower than the highest MEAs of airways in the area), even the smallest doubt should be resolved in favour of remaining on published arrival routing.

Recommendations:

1. When there is any confusion about ATC initiated descents off published routing, or there is a problem programming LNAV-type systems, you should not commence descent until all doubts are resolved and the intended route is centered and being tracked. Consider a climb to safe altitude until the confusion is resolved.
2. It may be appropriate for you to query ATC about radar vectors and direct routing with wording such as "Are you providing my terrain clearance with this assigned altitude and (Heading/routing)?"
3. Maintain a constant awareness of the minimum safe altitude(MSA) for your present position and intended track.

Summary:

ATC cannot provide shortcuts to full instrument approach procedures except when providing an appropriate radar vector. Once cleared for approach, it is your responsibility to complete the Instrument Approach Procedure flying it exactly as published. Be alert for ATC initiated changes or shortcuts to the procedure which might jeopardize your separation from terrain.

NTSB urges inspection of A300 Rudders for disbonding

On March 24, 2006, US NTSB urged FAA to order immediate inspection of the composite rudder surfaces of certain A300 series aircraft in order to potentially prevent a catastrophic failure of rudder.

It may be recollected that in the January 2006 issue of Flight Safety we had reported on the in-flight loss of rudder on an Air Transat A310-300 on March 6, 2005. TSB of Canada is still investigating this accident. The recommendations address a safety issue identified during the investigation by Airbus of a rudder from a FedEx A300-600. While the rudder was damaged during "routine maintenance" and sent to Airbus for assessing the extent of harm, the investigators found in addition to the damage caused during maintenance, " a substantial area of disbonding between the inner skin of the composite rudder surface and the honeycomb core, which is located between two composite skins. " This apparently was caused by the hydraulic fluid contamination and tests have revealed that this could spread during the flight.

During the first week of March 2006, Airbus issued AOTs (All Operator Telexes) notifying operators of the results of the investigation and providing guidance for inspecting the rudders. NTSB has said that any disbonding that occurs in the presence of hydraulic fluid contamination should be repaired or the rudder should be replaced as soon as possible well before the 2,500 flights specified in the AOTs.

Aviation humour

257: Do you have Uniform
Tower: 257, Negative, only Jeans and sweat shirt
257: Do you have X ray?
Tower: 257, Negative, my doctor wants a CAT Scan!

257: Do you have Whiskey?
Tower: 257, Negative, not in the last 8 hours, Am I not on assigned heading?

Web watch

www.airborne.org an informal discussion forum for the flyers and others—many useful discussions on flight safety

The Confidential Aviation Hazard Reporting System (CAHRS) provides a means of reporting hazards and risks in the aviation system before there is loss of life, injury or damage. It is open to anyone who wishes to submit a hazard report or safety deficiencies confidentially and non-punitively. Reports help to identify deficiencies and provide safety enhancement in areas of aviation. CAHRS forms can be collected at different location of KAC (i.e. Flight Dispatch) Premises. Completed forms can be dropped in FS&QA allocated box at Flight Dispatch or e-mailed to kwioe@kuwaitairways.com or faxed to 00965-4749823 or mail to Flight Safety and Quality Assurance office, Operations Department, P.O. Box 394, Safat 13004, Kuwait Airways –Kuwait.