No. 3

Kalinga Airlines, DC-3, VT-AUQ, accident near Mohanbari Aerodrome on 17 October 1965. Report No. 1/37/65-AS, dated 20 November 1965, released by the Director General of Civil Aviation, India

1. - Investigation

1.1 History of the flight

DC-3 aircraft VT-AUQ, owned and operated by Kalinga Airlines, while engaged in a non-scheduled flight, undertaken for air dropping supplies, crashed on 17 October 1965 at 0728 hours GMT, approximately 23 miles north of Mohanbari Aerodrome, (272854 N 950114 E) in N.E.F.A. All the eight members of the crew (pilot, co-pilot, radio operator and five members of ejection crew) were killed. The aircraft was destroyed by impact and subsequent fire.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	8		
Non-fatal			
None			

1.3 Damage to aircraft

Destroyed by impact and subsequent fire.

1.4 Other damage

None.

1.5 Crew information

Pilot - Late Shri V.N.P. Namboodri, aged 39, held a valid ALTP Licence No. 38 (valid till 11 April 1966) endorsed for DC-3 type of aircraft. He had a total flying experience of 12 800 hours, out of which 12 600 hours was on DC-3 type of aircraft including about 8 800 hours on supply dropping operations.

Co-pilot - Late Shri V.S. Arab, aged 33, held a valid SCPL No. 84 (valid till 11 January 1966) endorsed for DC-3 type of aircraft. He had a total flying experience of 3 200 hours. Out of this, he had flying experience amounting to 2 800 hours on DC-3 aircraft which included about 2 500 hours of experience on supply dropping operations.

Radio Operator - Late Shri K.N. Trilokikar, aged 43, had a total flying experience of 15 800 hours as a radio operator.

Ejection Crew - The following five persons had gained experience in Kalinga Airlines to undertake the job they were assigned:

1. Shri Uttim Rai
2. Shri Raghubir Singh
3. Shri Hira Mazi
4. Shri Mafijur Rehman
5. Shri Bhutan-eh-Kalita

1.6 Aircraft information

DC-3 aircraft VT-AUQ, Serial No. 19431, held a current Certificate of Airworthiness (No. 496) which was valid till 16 July 1966.

No adverse report regarding the operational behaviour of this aircraft was recorded since its last major overhaul. The weight of the aircraft and the centre of gravity were well within the prescribed limits.

1.7 Meteorological information

The available evidence shows that the weather at the time of the accident was fair. It was not a factor to the accident.

1.8 Aids to navigation

NDB available at Mohanbari.

1.9 Communications

Normal VHF communications were established with Mohanbari tower.

1.10 Aerodrome and ground facilities

Not applicable.

1.11 Flight recorders

None fitted.

1.12 Wreckage

The crash occurred in a thickly wooded, uninhabited hilly terrain, about 3 300 ft AMSL and having difficult access.

The major portion of the wreckage and the bodies of all the eight occupants were lying in a 500 ft deep gorge and on the hilly slope having an incline of 55° to 60°. The bodies were examined at the site by the Assistant Surgeon-in-charge, Civil Hospital, Passighat, and were later cremated there. In each case it was declared that the death was due to "burn injury and badly cut off due to impact of aircraft with ground".

The following main components were located at the site:

1. Centre section with an undercarriage attached.
2. Tail section of the fuselage (portion aft of the main cabin door).
3. Major portion of the port mainplane.
4. One of the propellers.
5. A partially burnt engine.

It appeared that the major portion of the fuselage was reduced to bits on impact. The clearing made in the jungle growth and the damage suffered by the trees at the site suggest that the aircraft descended to ground almost vertically. There were indications of fire having occurred after impact, but it was not on a large scale.

The following main components were not traceable at the site:

1. Starboard mainplane.
2. Port and starboard tail plane along with the elevators.
3. One engine along with its propeller.

At the foot of the hills is a railway line, approximately 4 miles from the crash site, from where four eyewitnesses observed the aircraft just before it crashed. According to these witnesses the aircraft was in a level attitude just before it lost two 'pankhs' (horizontal surfaces), almost simultaneously, and soon thereafter the aircraft dived to the ground.

1.13 Fire

There were indications of fire having occurred after impact, but it was not on a large scale.

1.14 Survival aspects

The accident was not survivable.

1.15 Tests and research

None.

1.16 Other pertinent information

On going through the transcript of the recorded conversation between the pilot of aircraft VT-AUQ, on one hand, and the pilot of another aircraft VT-AZU and Mohanbari Aerodrome on the other hand, it is evident that the vibrations and severe pitching (up-and-down movements) of the aircraft started since the time a bag was lodged on the tail plane. Consequently, the pilot experienced difficulty in controlling the aircraft. It is clear from the pilot's description "just like a para" (parachute) that a sleeping bag had ballooned. A sleeping bag is made out of quilted material. The material is about 6 ft in length and half of this length is stitched into a bag with an open mouth. The bag got lodged over the tail plane in such a fashion that it got ballooned and caused violent disruption of the air flow over the tail plane, including the elevator, and consequent vibrations.

The efforts to dislodge the bag were of no avail and the aircraft flew almost 28 minutes with the pilot experiencing continuous difficulty in controlling it. About 18 minutes after the bag was lodged on the tail plane, the pilot reported that the aircraft "was going slightly out of control". Eventually (28 minutes after the bag was lodged on the tail plane) complete control was lost, soon after the descent to Mohanbari had commenced, and the aircraft dived to the ground. The complete loss of control may have been caused by failure of the tail plane or by a further displacement of the bag lodged on the tail, resulting in excessive aerodynamic loads which could not be overcome by the pilot. There can be little doubt that excessive speed was built up during the ensuing dive and structural failure of other components followed.

When the supplies are ejected through a door in the side of the fuselage, a possibility exists for the ejected load to strike against, and even to lodge itself, on the tail plane. In fact, Kalinga Airlines have experienced such occurrences. To overcome this problem the operations manual of Kalinga Airlines lays down a procedure which requires the aircraft to be in a tail-up attitude at the time of ejecting a freight. In spite of this procedure, there were occasions in the past when low density bags got lodged on the leading edge of the tail plane after their ejection. Kalinga Airlines, on their own, devised means to dislodge such bags from the tail plane in flight. This is achieved by a long bamboo pole having a fork (with blunt prongs) at its end. The pole is manoeuvred manually through the door of the aircraft for dislodging the bags. However, in some cases this arrangement did not work, due to a bamboo pole being unsteady in a high speed air flow (and possibly the blunt prongs slipping over the bags), and the aircraft had to effect landings to get rid of the bags stuck on their tail plane.

The experience of Kalinga Airlines is that low density loads are most likely to get blown against the tail plane after their ejection. The weight of the ejected gunny bag, containing sleeping bags, was about 32 kg and its size was 46" x 32" x 20".

However, this combination of the weight and size was an unconventional one even for Kalinga Airlines. The usual bags containing cereals etc., carried by the aircraft of Kalinga Airlines, are about 40 kg in weight and comparatively less in volume. Kalinga Airlines have now decided to take precautions in regard to carriage of 'unconventional' packages and will not accept, henceforth, packages of unusual size or weight unless examined and specifically cleared for air dropping by the Operations Manager himself.

Besides, there did not exist in Kalinga Airlines any system of strict inspection of freight, meant for air dropping, to detect poor and insecure packing, before loading the freight in the aircraft. It is almost certain that the packing of the sleeping bags in a gunny bag was poor and insecure and the packing gave way after the bag hit the tail plane. Kalinga Airlines now propose to introduce a 100% inspection by their own staff of the freight meant for air dropping.

Further the constituents (independently packed bags) of a single load, pushed out of the aircraft at one time, were not being tied together by Kalinga Airlines before they were ejected. This introduced the possibility of a constituent of a load striking against the tail plane. Kalinga Airlines would now be requiring the tying together of the constituents of a load before ejection.

With regard to the arrangement for dislodging the bags stuck on the tail plane, it is considered that the existing bamboo pole should be replaced by a stronger metal pole with sharp claws at one end. The metal pole would be steadier when projected in the air flow and sharper claws will be able to catch even on a smooth surface like quilted

material. Kalinga Airlines are actively developing this proposal. They are also proposing to modify the fuselage structure slightly to have an opening in L.H. side of the fuselage, aft of the main cabin door, for providing an additional access through which a second metal pole will be projected out for dislodging the bags stuck on the tail plane. The details are being worked out by Kalinga Airlines, in this regard for submission to the D.G.C.A. for approval.

The Dakota aircraft is by no means an ideal aircraft for air dropping supplies. However, the steps now taken by Kalinga, and those proposed to be taken, will positively increase the operational safety of the aircraft during food dropping sorties and will prevent the recurrence of the disaster that occurred.

2. - Analysis and Conclusions

2.1 Analysis

On 17 October 1965 the aircraft completed 3 supply dropping sorties in the morning (a total flight time of 4.35 hours) without any incident. To operate the fourth sortie of the day, the aircraft took off from Mohanbari Aerodrome at 0606 hours for dropping supplies over Dropping Zone (DZ) and returning back to Mohanbari without landing anywhere. The flying time for the round flight was expected to be 1:30 hours against the aircraft endurance of 3 hours.

At the time of take-off from Mohanbari, the all-up weight and the corresponding CG position of the aircraft were within permissible limits. The freight consisted of packed food-stuff and gunny-wrapped winter clothing (woollen shirts, vests etc.) and also gunny-wrapped quilted sleeping bags. A part of this freight was to be dropped with the help of parachutes and the rest of the load was "free-fall-freight".

The aircraft reached over the DZ at about 0645 hours and commenced dropping operations. It made 3 to 4 successful "runs" over the DZ and discharged once a para-load (load tied to a parachute) containing woollen shirts etc., and twice or thrice "free-fall-freight" consisting of gunny-wrapped quilted sleeping bags, which were pushed out of the aircraft through the main door in the side of the fuselage. Each "free-fall-freight" consisted of 3 to 4 gunny bags (each bag containing 6 to 7 sleeping bags). During the last "run" when the "free-fall-freight" consisting of quilted sleeping bags, was being discharged, one of the gunny bags struck the tail plane of the aircraft, opened up and resulted in a sleeping bag coming adrift and getting lodged over the port tail plane so as to lie partly over the tail plane and partly beneath it.

At 0700 hours, the aircraft originated a WT (wireless telegraphy) message intimating Mohanbari Aerodrome "bag stuck returning Mohanbari with load". At 0709 hours, the aircraft established RT (Radio Telephony) contact with Mohanbari, communicated its position as 50 miles from Mohanbari and notified: "we are in emergency; one bag stuck half-way on the elevator and under tail plane; severe vibrations; heading at the moment for Along" (airfield). The aircraft was at 7 500 ft at that time. Then, from time to time, the pilot radioed that the aircraft was experiencing severe vibrations and pitching movements. At 0718 hours, the aircraft passed over Along airfield, but the pilot did not choose to land there due to limited length of the runway available there, and mentioned for the first time that the aircraft was getting out of control. At 0722 hours, the pilot reported that he was 30 miles away from Mohanbari and that the bag was not coming off. At 0723 hours, the pilot asked Mohanbari Aerodrome to confirm that the full length of the runway would be available to him at the time of landing (surface of half the length of the runway at

Mohanbari was being carpeted at the time) and the same was confirmed. At 0724 hours, when the aircraft was over 20 miles away from Mohanbari, the pilot started descending gradually from a height of 7 500 ft which the aircraft had maintained earlier. At 0728 hours the pilot radioed the last message "This is May-day, May-day, May-day (Distress call-equivalent to "SOS" on WT), UQ (aircraft call sign) May-day, lost control".

The aircraft crashed in a thickly wooded hilly terrain, caught fire and was destroyed. All aboard were killed.

2.2 Conclusions

(a) Findings

The aircraft was airworthy.

The operating crew members held valid licences and were experienced.

The ejection crew were experienced in the work assigned to them.

The weather was fair and not a factor to the accident.

The aircraft was detailed to air drop a load of quilted sleeping bags wrapped in gunny bags.

(b) Cause or
Probable cause(s)

The aircraft crashed as a result of complete loss of control experienced by the pilot after a sleeping bag, ejected as part of an air drop consignment, got lodged and ballooned over the port tail plane.

No. 4

Deutsche Lufthansa A.G., Convair 440, D-ACAT, accident at Bremen, Federal Republic of Germany, on 28 January 1966. Accident report released by the Federal Office of Civil Aeronautics, Federal Republic of Germany

1. - Investigation

1.1 History of the flight

The aircraft was operating a scheduled service of Deutsche Lufthansa on the route Frankfurt-Bremen-Hamburg under flight No. LH 005. Scheduled time of departure in Frankfurt: 1625 hours GMT, scheduled time of arrival at Bremen: 1745 hours GMT. Actually, the aircraft took off at 1641 hours GMT.

The last phase of the flight can be roughly reconstructed from the tape recordings, the evidence given by the witnesses and the position of the wreckage as follows:

17.41 GMT	Descending from flight level 60 and clearance for ILS approach to runway 27 at Bremen.
17.44 GMT	Passing of radio beacon Bremen outbound.
17.48 GMT	Passing of radio beacon Bremen inbound on final approach.
17.49.37 GMT approximately	The aircraft was seen for the first time by witnesses about 1 000 m before the threshold of runway 27 near the middle marker; later it was observed by the control tower with its landing gear extended and the landing lights turned on.
17.50.15 GMT approximately	About 1 200 m after the threshold of runway 27, close to the intersection of runways 27/09 and 32/14, the aircraft went round again at an altitude of about 30 ft above ground with a compass course of about 270°.
17.50.40 GMT approximately	With a pitch of about 30° to 60° and the left wing forward the aircraft crashed on the ground in the opposite direction to runway 27, about 385 m west of the end of runway 27 and about 380 m south of the runway centre line.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	4	42	
Non-fatal			
None			