VISCOUNT DEPRESSURISATION

British European Airways Report

Viscount G-Amod London/Milan—28th April, 1954.

When three miles north of Dijon at 23,500 feet there was a muffled explosion and the cabin pressure, which had been 5½ lb. per sq. inch, immediately fell to zero. The Captain at once started a descent at 1,500 ft. per minute to 12,000 ft, the crew using oxygen, and diverted to Geneva.

On examination after landing there the forward freight hold door was found to be partially open, retained by the forward and rear bolts. Further investigation disclosed that one of the castings, which supports the plunger mechanism inside the door, had fractured and that this had allowed the rear bolt which operates the warning light microswitch to come fully home, although the other bolts had not done so. A modification was put in hand at once, and until that could be embodied instructions were issued for the individual plungers locking Nos. 2 and 3 freight hold doors to be inspected through the inspection apertures on each pre-departure check.

When the crew returned to this country they were medically examined by the B.E.A. Regional Medical Officer, who made the following report:—

Anoxic Effects (Operating Crew).

The aircraft was being operated with three Captains. One of these quite definitely stated that he felt the early symptoms of anoxia, described as 'a tingling of his face' and apprehension that he should 'pass out'. The second member of the crew stated that for a very short period he felt some light-headedness.

It is of interest that the crew member definitely affected was not sitting down but moving about the cockpit setting up the oxygen equipment for the other crew members. He was also the only crew member dressed in tropical uniform and volunteered the fact that he was extremely cold during the descent.

I would suggest that in this case all the operating crew must have been on the verge of anoxic symptoms, and the influencing factor of the production of these symptoms in one member was the increased oxygen requirement through movement and cold.

It may well be that under conditions of higher operating altitude and greater physical effort, such as that which may arise in an endeavour to close a forward door or open clear-vision panel, would produce dangerous anoxia. I would, therefore, suggest that the drill carried out in this case of "Trim fuel - Throttle back - Commence descent - Fit oxygen", may not be satisfactory at higher altitudes, and that this should be altered to Fit oxygen as a first priority.

Anoxic Effects (Cabin Crew).

Immediately following the decompression the steward walked back through the cabin reassuring the passengers. He states that he was 'extremely breathless by the time he was half-way along the cabin, and was completely out of breath and almost incapable of speech by the time he had reached the rear passengers.

It is suggested that emergency oxygen sets be provided for the cabin staff, and that in the design of these consideration should be given to the fact that the staff may be required to carry on a conversation while using this equipment. A straight forward face mask is therefore not considered satisfactory.

Anoxia Symptoms (Passengers).

The cabin staff state that the majority of the passengers appeared unaffected. They were instructed to stop smoking and sit as still as possible, but one passenger showed rigidity with an arched back and hands clenching the seat arms, staring vacantly in front and complaining of severe pains at the back of her neck. This passenger was fitted with the radio officer's oxygen equipment and rapidly recovered, inspite of the fact that due to unfamiliarity the stewardess did not turn this equipment on. I would suggest that this may have been purely hysterical manifestation or possibly aero-embolism.

Effect on Crew Members' Ears.

All crew members noticed a sudden ventilation of the ears on decompression, but stated that they had no difficulty in maintaining ventilation throughout the descent. From the figures given to me by Air Safety Branch, this descent would involve a pressure change at the rate of approximately 0.48 lb/sq. in./min. between 20,000 and 15,000 ft which is almost double the average rate of change of pressure of 0.23 lb/sq.in./min. obtaining during a 500 ft/min. descent from 5,000 ft to sea level.

Effect on Passengers' Ears.

The cabin staff stated that no great discomfort was suffered by any passenger during the descent. It is of interest that one passenger, following the flight, stated that a headache which she had had for the previous three days was cured during this incident, and I would suggest that the 'explosive decompression' of a frontal sinus cleared some obstruction of this sinus, and it may be that a similar 'explosive decompression' of the ears influenced the fact that they subsequently ventilated easily. Such a sweep of air out through the eustachian tubes at the time of the cabin failure should clear any catarrhal obstruction likely to prevent easy flow of the air up the eustachian tubes during the subsequent rapid descent. It is also possible that at certain high rates of descent ventilation of the ear requires frequent opening of the eustachian tube, and that this is easier to obtain than the relatively infrequent opening required during a descent at 500 ft per minute.

I feel that these experiences suggest that consideration of the passengers' ears should not be regarded as the limiting factor in the rate of descent following explosive decompression.

Other Effects of Decompression.

As one would expect, following the decompression the aircraft cabin 'fogged'. The Captain concerned was aware of the likelihood of this happening, and the only suggestion I can make is that it should be ensured that all crews, operating and cabin, be warned of this effect, as not unnaturally their first impression is that of a fire.

Immediately following the decompression the coffee flask and hot water urn began to boil, presumably because of the lower boiling point at the reduced pressure, and I would suggest that consideration be given to the design of such equipment so that there can be no danger of scalding from steam.

Oxygen Equipment.

The operating crew brought forward the fact that the present oxygen stowage does not permit its rapid use. The oxygen cylinder has to be withdrawn from its stowage to permit the fitting of the mask, and in one case at least, this cylinder was not returned to its normal stowage but was left loose in the cabin. There are obvious dangers in having equipment like this unsecured during turbulent descent.

I would suggest that this equipment be stowed with the feed tube already attached to the cylinder, with the cylinder positioned so that the on/off tap is readily accessible, and that the oxygen masks, enclosed in a rapidly 'tear open' bag, be stowed in a more convenient position.

(With the kind permission of British European Airways, Air Safety Branch).