

SRINAGAR TO LEH

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The carriage of individuals suffering from certain types of illness and disabilities in unpressurized aircraft is hazardous to health and life. Among heart conditions it is inadvisable to accept individuals with Coronary occlusion or Angina Pectoris if attack has occurred within 60 days. Even after the lapse of this time, such patients have to be given special consideration. Whilst there is little apparent hazard when cardiac patients are transported at altitudes below 5,000 feet without oxygen, at higher altitudes the mild degree of hypoxia plays a leading role in the causation of adverse effects. Above 5,000 feet and upto a "reasonable" altitude additional oxygen is an essential requirement. (1), (2).

It might appear that the pressure cabin would solve all the problems of mild decompression, but in this particular instance certain peculiarities existed in the flight from Srinagar to Leh which required some consideration in view of the absence of detailed knowledge of the heart condition.

Operational Considerations.

The flight from SRINAGAR (5450 feet) to LEH (10,200 feet) necessitates crossing the ZOJILA at approximately 13,000 feet and gaining altitude thereafter to 15,000 feet prior to descent into the INDUS valey. Flight time is approximately 90 minutes. In poor weather flights may have to be performed at higher altitudes.

The aircraft made available for this proposed flight was Dakota HJ. 234 fitted with a pressure cabin. The pressurization was designed and effected by H. A. I. HJ. 234 is a Mark III Dakota without de-icing equipment, superchargers or oxygen equipment for crew, or passengers located outside the pressure cabin. The ceiling of the aircraft was about 16,000 feet and it was problematical whether having reached LEH it could take off again from the airfield.

Technical Considerations.

The pressurization of HJ. 234 was designed to provide a differential pressure of 3.8 p.s.i. i.e. sea level barometric pressure at 8,000 feet. Above 8,000 feet the cabin altitude would increase above sea level.

During changes of altitude, the master control system located in the cabin provided for a cabin rate of ascent or descent not exceeding 300 ft/min. In point of fact the aircraft was not required to fly higher than 8,000 feet except in an emergency when 12,000 feet ambient with a cabin pressure corresponding to 3,000 feet would be attained.

The cabin is provided with a lock to allow an observer access into and out of the cabin. Rates of ascent and descent in the lock are high, 8,000 ft/min. or more. In addition to the discharge valve which is set to operate the 3.8 p. s. i. differential, the cabin is equipped with a safety valve. (3). A low pressure diluter demand oxygen system is installed inside the cabin.

Medical Considerations.

An essential assumption in the absence of knowledge of the medical condition was that the individual to be airlifted was capable of "standing up" to the anoxic conditions prevalent at Leh, and that on arrival there he would be able to lead an ambulatory existence without decompensation or adverse effects. The individual would have been resident at SRINAGAR for some days previous to flight and would have been at least partially acclimatized to an altitude of 5,500 feet. The problem therefore resolved itself to fly him in the pressurized cabin gradually and evenly from an altitude of 5,450 feet to one of 10,200 feet. By this means it would be ensured that at no stage would sudden changes of oxygen percentage of inspired air be involved and there would be an opportunity for gradual adaptation with increasing altitude. Thus the *cabin flight path* should be direct from SRINAGAR to LEH and not along alternative paths such as those via A and B (vide Figure 1).

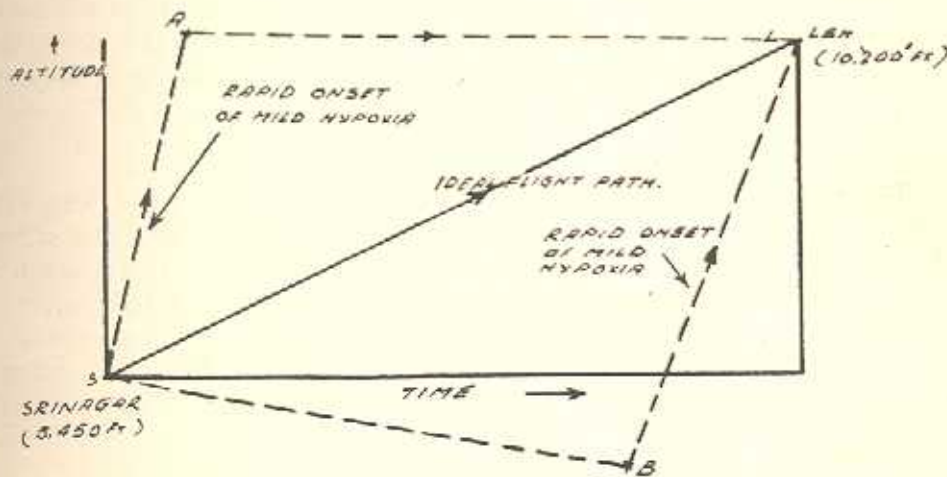


FIGURE 1

As the individual had to manage on his own physiological resources at LEH for efficiency of his cardiovascular and respiratory systems, it was considered essential in the absence of detailed knowledge of his medical condition that the "ascent of the cabin" should be gradual along SRINAGAR-LEH during flight and that at no time should the cabin altitude exceed the altitude of LEH i.e. 10,200 feet.

In view of what has been said, it will readily be seen that the use of oxygen in the cabin is contra-indicated as it would have the effect of reducing the effective cabin altitude and simulating a cabin flight path of the nature of S - B - L of Figure 1.

In addition, consideration had to be given to the occurrences of emergencies such as loss of cabin pressure or, of course, "heart attacks" and the subsidiary factors of motion sickness, emotion affecting pulse rate and blood pressure and intestinal gas expansion causing cardiac embarrassment, had to be borne in mind.

Trials.

With the oxygen equipment available it was found that the second method was impractical because the Mk.XIC regulator of the British high pressure system only provides oxygen flows at levels below 25,000 feet, above 25,000 and for emergencies, whilst the older models of regulators are not capable of the fine adjustment required. The portable oxygen outfits provided in S.S.Qrs. are only adjustable at intervals of 20% oxygen and finally the American diluter demand regulators (available in the pressure cabin of HJ. 234) is designed to maintain constant 5,000 feet or sea level conditions and cannot be adjusted to provide the hypoxic conditions of line S-L.

A number of flight trials were conducted in order to determine whether the pressure differential could be adjusted in flight and line SL reproduced in the cabin. It was found possible to do this by manual adjustment of the safety valve in the cabin and arrangements were accordingly made to carry an operator in the cabin who would operate the safety valve and control equipment as to provide for a cabin rate of ascent of about 53 ft min. from Srinagar to Leh.

The aircraft then proceeded to Srinagar to continue operational trials, whilst from the medical stand point we were satisfied that if the aircraft could get to Leh & back with safety, the least harmful flight plan for the cabin could be provided for the journey and return for this "heart" case.

In point of fact it was found that it might prove extremely difficult for HJ. 234 to take off again from Leh owing to technical considerations and on these grounds the project was eventually abandoned.

Summary.

A description is given in some detail of some of the medical, technical and operational considerations of a project to convey a heart case to Leh by air from Srinagar.

The project indicates:-

1. The necessity of close association between the medical, flying and technical operation of flights in such cases.
2. The project was eventually abandoned due to technical considerations of take-off ability of the aircraft in rarefield atmosphere. Similarly it should be noted also that there are human limitations and situations arise in flying with which the human organism is unable to cope.
3. Individuals suffering from some disease or disability should be encouraged in their own interest to submit to medical examination by I.A.F. medical authorities so that an accurate assessment of the hazards involved can be more fully appreciated.

References.

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