

Cradled in Safety

A Study of Medical Transport Missions in an EC 135



Achieving a maximum of customer satisfaction is one of Eurocopter's prime objectives. This not only means keeping an ear open for the concerns of the operators and continually improving the quality of the products as a consequence. It also calls for a commitment to basic research in all relevant disciplines. Alongside the optimization of performance, passenger safety and comfort are a special focus of attention.

The "test-flight" EC 135 taking off on one of the 20 or so circuits lasting 12 minutes, simulating a rescue/transfer flight under normal conditions. Blood samples were taken every 3 minutes during the flight, in order to obtain a realistic picture of the subjective stress felt by the passengers.

Comfort during air rescue missions means transporting an injured person as quickly as possible without further injury from the site of the accident to the nearest hospital. Above a certain distance, helicopters are far superior to the traditional ambulance when speed is all-important. The time needed to maneuver a patient onto and out of the helicopter was revolutionized by the introduction of rear-bay loading in the BO 105, then later in the BK 117 and today in the EC 135. Low noise and vibration levels are important factors in the transport of patients, keeping additional stress to a minimum. The ARIS incorporated in the EC 135 is of great value in this respect. Superior noise suppression allows communication with the patient during the flight.

However, the actual level of stress experienced by patients during helicopter transport, and during road transport by ambulance, has not been investigated thoroughly to date. Consequently, Eurocopter has decided to finance a study to look into the stresses that patients have to contend with when being transported by helicopter.

Dr Kai Witzel, from the Herz-Jesu hospital in Fulda, has devoted much time to the question of what he refers to as “the previously much ignored factor of stress encountered by patients during transport.” In Witzel’s opinion, doctors called to the site of an accident ought to give greater consideration to helicopters as a means of transport, in preference to cars or other forms of road/rail transport. He has been carrying out investigations on the stress factor in patient transport in an attempt to prove his theory. To take a concrete example: while an ambulance is called to the site of an accident, the doctor on emergency call is brought in by helicopter from a hospital in the vicinity, in order to save time. After making the initial diagnosis, the doctor has a choice of using the helicopter or the ambulance to transport the patient to the nearest hospital. “Many doctors in this situation choose the ambulance, perhaps because they were themselves somewhat wary of having to fly in a helicopter. This is a mistake, in my opinion, especially since the time factor is clearly in favor of the helicopter, over distances of 15-20 kilometers and upwards“, says Witzel.

The doctor’s first investigation into casualty-transport stress confirmed his theory that such stress increased during high-speed road journeys. Patients with heart problems in particular often face greater risk when travelling at high speed in an ambulance, subjected to constant braking and acceleration, the loud siren, flashing blue light, and vibrations at high speed. Such factors



could have a detrimental effect on a patient who is already suffering, also through the subjective impression that “I must be really in a bad way if they have to go all out like this to get me to the hospital”.

Witzel’s alternative solution is to place more emphasis on the smoothness and comfort of the transport procedure, bearing in mind that the time factor is not all-imperative. As he says, “Throughout the journey, the patient is being cared for to the best extent possible, both in terms of the medical equipment available and in terms of personnel. A rushed approach could do more harm than good, but many doctors are less confident about emergency medical treatment, and want to transfer their patients as quickly as possible”, claims Witzel, drawing on his many years of experience in emergency medical services.

The comfort factor in helicopter transport has been constantly improved by efforts to dampen noise and vibration, to the extent that it has meanwhile become an equal alternative to road transport. It may even be the better choice. Witzel’s aim is to provide hard facts. On September 9 1998, he performed an experiment to investigate the subjective stress factors experienced during a helicopter flight, using some 20 volunteers recruited through family

Dr Kai Witzel (second from left) helping a volunteer to board the helicopter. As in real air-rescue missions, the rear-bay doors save vital time. They also simultaneously reduce the (physical) exertions undergone by the patient and by the medical team, who no longer have to tip or hoist the stretcher through side doors.

and friends. The experiment took place at the Siegerland airfield, centrally located between the Länder of North-Rhine-Westphalia, Hesse and Rhineland-Pfalz. This is where the German automobile club ADAC has its air rescue training center, and it is currently home base for their brand-new EC 135, undergoing practical trials. The event was funded by Eurocopter. Witzel himself also hopes to gain professional recognition through his investigations: "If you want to make a serious impression on professors, it helps to be able to refer to new findings that have been published."

Witzel's investigations were supported by a team of a dozen colleagues and assistants. They included Dr Christoph Raschka, from the University of Frankfurt, at the Institute for Sport Medicine, and Carsten Bismarck from the Fulda clinic. Ensuring the investigation proceeded smoothly, they were joined by a laboratory technician, a nurse, a first-aid specialist, numerous helpers, plus pilots Eric Ouzenga and Peter Reinisch of the ADAC. A total of eight blood samples were taken from each patient, before, during and after the twelve-minute circuit in the helicopter. The samples were centrifuged and freeze-dried on the same day, and later analyzed in detail at the Fulda clinic.

Dr Kai Witzel taking a blood sample. The most significant stress factors for patients in a helicopter are the confined space and the noise. Witzel and his colleagues estimate that the EC 135 offers "the ideal situation" in terms of medical treatment on board, both for the patients and for the doctor in charge.

Cortisone levels, in particular, provide reliable statistics on the degree of subjective stress.

The EC 135, too, demonstrated its reliability under stressful conditions over some 20 take-offs and landings. Eric Ouzenga's estimation of the latest EC 135 in the ADAC fleet was that it is "the best machine I've ever flown. The advances in series-produced quality are definitely tangible." The subsequent analysis of the samples confirmed Witzel's assumption that helicopters have not yet been accorded the status they deserve as a means of transport for medical patients. "The more we make use of helicopters, the more they will be perceived as a perfectly normal form of transport, and this in turn will help to reduce one of the greatest stress factors to which patients are subjected, namely their fear of having to travel for the first time in a helicopter".

Eurocopter's explicit support for this action is further proof that the world's largest manufacturer of helicopters gives equal priority to the needs of direct and indirect customers in the (ongoing) development of its products and services.■

