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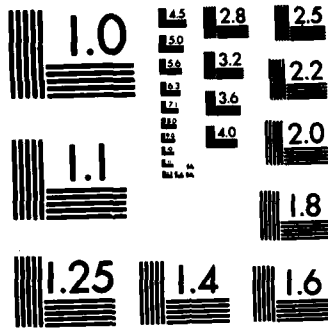
IN-FLIGHT ESCAPE EXPERIENCES OF SOUTHEAST ASIA PRISONER 1/1
OF WAR RETURNEES(U) AIR FORCE INSPECTION AND SAFETY
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**IN-FLIGHT ESCAPE EXPERIENCES OF
SOUTHEAST ASIA PRISONER OF WAR RETURNEES**

by

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**CLEARED
For Open Publication**

3 Sep 1974

**Directorate for Security Review (OASD-PA)
DEPARTMENT OF DEFENSE**

**DTIC
ELECTE
APR 21 1983**

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Twelfth Annual SAFE Conference and Trade Exhibit

**8-12 Sep 1974
Sahara Hotel
Las Vegas, Nevada**

Sponsored by

SURVIVAL AND FLIGHT EQUIPMENT ASSOCIATION

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During the Tenth Annual Symposium of the Survival and Flight Equipment (SAFE) Association, 2-5 Oct 1972, a special papers session addressed combat escape, evasion, and recovery of United States Air Force (USAF) personnel in Southeast Asia (SEA). Specific subjects included escape and evasion problems, use of survival equipment, rescue and recovery of downed crewmen, and the role of life support training and training equipment.

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These papers were based on 648 USAF crew members who were successfully recovered following combat mishaps. They provided the all-important data base to cognizant Department of Defense (DOD) agencies and involved industry concerning the performance of life support equipment/systems in a combat environment. In spite of this extremely valuable and heretofore unavailable data source, there existed a serious information gap--that of the returned prisoner of war (POW). What were the conditions that resulted in his capture while his fellow crew member was able to evade and subsequently be recovered? Were the conditions of shutdown different so as to preclude his ability to evade? Did injuries received during his experience compromise his capability to evade and be picked up? Was his survival equipment adequate for the situation? Was he properly trained? These are but a

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few of the questions that have been raised over the years concerning our POWs. There have been many discussions and some rather serious allegations concerning the availability, use, and function of life support equipment; however, there has been no documentation to either corroborate or refute publicized problem areas.

A program recently initiated by the Air Force Inspection and Safety Center in conjunction with HQ USAF and a group of POW returnees attending the Air War College, and headed by Col Joe Kittinger, has resulted in an extremely valuable life support data bank on 218 returned POWs. At the time this paper was being prepared, 209 of the 218 questionnaires completed by returnees had been received in the Center. Of these 209 personnel, 200 ejected/extracted, seven bailed out, and two were involved in crash landings.

This paper will address the phase between shutdown and parachute landing of the 207 ejections/extractions/bailouts. The next paper will discuss injuries incurred; following this, the period between parachute landing and capture will be covered; and the final paper will give the view of the POW, as well as reflecting on the three previous papers as one who has been there.

The specific method of shutdown will not be discussed, as it is not considered pertinent to this paper.

What is important is that the emergency was usually catastrophic in nature, which necessitated immediate action and sometimes extraordinary efforts to abandon the aircraft. The conditions of ejection were indeed different from those observed in noncombat operations. As with previous analyses of combat escape experience, delaying the decision to eject is not a factor to be reckoned with. Almost one-half of the returnees stated they were out of the aircraft in less than 30 seconds. Obviously, there was precious little time to assess the situation or try and reach a more desirable bailout area. Delaying the decision to eject has been and continues to be a most critical factor in the outcome of ejection in the noncombat environment.

There were 13 different aircraft involved in in-flight egress by the 207 crewmen, with two aircraft types accounting for 75 percent of the total. The personnel involved included 77 (37 percent) with major injuries, 85 (41 percent) with minor injuries, and 42 (20 percent) crewmen were uninjured. In two cases the degree of injury, if any, was not reported. It should be noted that these are injuries incurred during the escape and evasion phases and do not include those received during or subsequent to capture. The 37 percent major injury rate is significantly higher than observed in noncombat, which averages between 15 and 25 percent. When the conditions of the combat in-flight

escapes are considered, however, it is quite remarkable that the major injury rate was not much higher. The major injury rate among Navy POW returnees was reported to have been 52 percent.

The first indication of flight conditions at time of egress was the attitude of the aircraft. Less than 20 percent of the returnees reported the aircraft to be in a favorable attitude for egress; that is, straight and level or slightly nose-up. More than half were encountering such extreme conditions as rolling, tumbling, spinning, and oscillating. In almost 10 percent of the cases the aircraft was actually in the process of disintegration when the escape sequence was initiated.

Altitude of egress showed some rather interesting findings. Fourteen percent of the returnees reported that escape was initiated at altitudes above 20,000 feet. This is comparable to what has been observed in noncombat experience, but significantly higher than the 3 percent reported by the ejectees in combat mishaps who were subsequently recovered. This increased proportion of high altitude escapes by the returnees is no doubt due to the introduction of the B-52 late in the conflict. Actually, the proportion of escapes at various increments of altitude by the returnees closely approximated that of noncombat

operational experience. For example, 8 percent of the returnees initiated escape below 500 feet as compared to 13 percent among the noncombat escapees. Total escapes below 10,000 feet were 66 percent and 60 percent respectively, and between 10,000 feet and 20,000 feet the proportions were 20 percent and 23 percent respectively. Only 4 percent of the recovered survivors of combat mishaps initiated escape below 500 feet, 79 percent were below 10,000 feet, and 18 percent between 10,000 and 20,000 feet.

The relatively small number of escapes at low altitude by both the returnees and recovered survivors is indicative of absence of the decision factor in the combat environment.

The most startling finding of this review is the very high incidence of extremely high speed ejections. Of those cases in which speed at time of ejection was known or reported, almost one-half (44 percent) occurred at speeds above 450 knots indicated. There were 18 between 450-499 knots indicated airspeed (KIAS) with four major injuries, one of which was attributed to windblast/flailing; 44 were initiated at between 500 and 599 KIAS. There were 20 major injuries in this group, with seven being related to windblast/flailing; finally, there were nine ejections in

excess of 600 KIAS. Four of six major injuries in these cases were due to the effects of windblast. Thus, of 71 total ejections at speeds above 450 knots indicated, 30 (42 percent) crewmen received major injuries, and only 12 (17 percent) were directly attributable to high Q-forces. Noncombat experience has consistently shown a very limited exposure in the higher speed ranges. For example, in a recent 3-year study of 325 noncombat ejections, only seven or 2 percent were initiated at speeds of 450 knots indicated, with one related injury. The combat experience quite dramatically illustrates the effectiveness of open ejection seats at the higher speed regimes. Most of the high-speed ejections involved aircraft ejection seats that utilized lower extremity restraints. System initiation was either by means of the sidearm controls or the seat-mounted D-ring. The fact that the latter was adopted by the USAF as the primary method of ejection in the F-4 may have a bearing on the overall low incidence of upper extremity flail injuries. This experience resulted in several valuable findings concerning extremity restraints. Unstable low density seats must provide some means of restraining the lower extremities at speeds such as encountered in combat environments. Lower extremity restraints had been removed from the ejection seat of one weapon system used early in the conflict because operational experience showed that

they were not necessary, and the crew members were not using them. Shortly after its introduction into the conflict there was a high incidence of serious lower limb injuries among the ejectees. The restraint system was subsequently reinstalled. In another aircraft, the lower extremity restraints, which were already an integral part of the ejection seat, had to be modified to provide better protection against the effects of ejection at extreme speeds.

The problems reported by the returnees during and immediately subsequent to egressing the aircraft provide a real insight into the conditions of escape.

It was not unusual for one individual to encounter multiple egress problems. In all, 448 egress problems were reported by the 207 escapees. The vast majority occurred immediately prior to and during the egress episode. The magnitude of egress problems in combat becomes quite evident when compared to a recent study of 325 noncombat ejections in which difficulties were encountered in 75 instances. As would be expected, the major problems involved the effects of G-forces, windblast, and buffeting. These categories accounted for 66, 68, and 44 cases respectively, or 40 percent of the total. The frequency of these factors is indicative of the conditions of ejection precipitated by combat mishaps. G-forces, windblast, and buffeting

result in subsequent difficulties in locating and actuating ejection controls, assuming a proper ejection posture, and flailing of extremities. These conditions not only cause delays in clearing the aircraft, but are frequently identified as contributing to serious injury during the ejection episode.

The next largest single problem reported was that of fire and smoke in the cockpit or crew compartment area, which was reported in 46 (10 percent) instances. It is understandable why this is a frequently reported problem relative to a combat-damaged aircraft, while it is almost nonexistent in noncombat operations. The attendant confusion and delays in effecting escape due to this cause are obvious. The age-old problem of difficulty in locating and actuating ejection controls was reported by 41 (9 percent) of the USAF returnees. This is also a frequently reported problem in noncombat. No doubt some are the result of other factors, such as confusion, fire/smoke, etc, but many others are directly related to the lack of standardization of ejection controls.

Flailing of extremities occurred in 38 (8 percent) cases. In view of the numbers of ejections reported at very high speeds, it is quite remarkable that this is not much higher. It is even more remarkable that only 12 serious injuries were due to this cause.

In 32 (7 percent) cases, confusion/disorientation/panic/darkness occasioned by the severity of the emergency were reported as detriments to escape. In 22 (5 percent) cases, injuries incurred hampered the escape effort; 21 (5 percent) crewmen were hampered or struck by equipment; 15 (3 percent) struck cockpit structures; seven (2 percent) reported seat/man/parachute involvement; and five (1 percent) experienced seat separation problems.

There were 43 additional egress problems categorized as "other," which were distributed among 13 different causes. These included such things as spinning and tumbling prior to and subsequent to seat separation, anthropometric problems, striking external aircraft structures, survival kit deployment problems, one crewman had failed to remove the ejection seat ground safety pins, and there were 11 system component failures. The latter included the seat-man separator - 1 case; canopy/hatch failure - 4 cases; seat sequencer for fore and aft seats - 1 case; and one crew member's seat failed to fire. He was subsequently able to effect a manual bailout.

The number of reported system failures is quite high; however, combat damage must be considered a strong probability when an aircraft is downed by hostile fire.

Following parachute descent, which was not always uneventful as it was not unusual to take a few rounds from enemy forces in the area, landing was made in varied environs. As would be expected for this area, the largest proportion of parachute landings was in wooded areas, which accounted for over 30 percent of the total. The remainder were distributed among nine additional categories.

In summary, the information provided by the returned POWs has filled a vital life support information gap. The USAF now has a complete data bank concerning the use of life support equipment/systems in the combat environment. The experiences of the returnees have shown that existing Air Force aircraft escape systems have performed exceptionally well under the most adverse conditions. They have also provided the all-important data base that will ultimately enable us to provide the Air Force crew member with the best possible life support equipment systems to sustain him in any environment.

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