ASPECTS REGARDING LIFE SAVING MILITARY PILOTS

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Abstract: *Military pilots life saving is a large and very important domain. Though being genuinely natural for human beings to save the lives of their fellows, life saving also has a economical ground. The resources that are being invested in training a pilot are quite extensive, consequently all effort should be made to secure this investment. This article will tackle only an aspect of saving the life of military pilots: the preparation for rescue.*

Keywords*: pilots' life saving, preparation, rescue*

1. INTRODUCTION

The military pilot rescue preparation is a special preparation, as it is a unique category in the training and instruction of a pilot. This preparation does not need any grades, marks or degrees of importance, as it is genuinely imperative.

The ejection or leaving the plane by parachuting, as it is in the limits of fligh safety, is imposed most of the time as the unique alternative of rescuing the pilot, in his attemps to solve a critical fligh situation, when his life is obviously threatened. The pilot's attitude towards this plane leaving procedure and also the concrete way of action are determinant conditions to life saving when it is no longer possible to continue the airplane flight.

The general cases of emergency during the flight, when an airplane must be ejected through forced parachuting, are:

– Fire on board and the impossibility to execute its timely extinction
– Shut down of the propulsion system and the impossibility of timely starting it, or the safe execution of the forced landing;
– Critical damage of the aircraft;
– Abnormal functioning of on-board installation that endangers the life or the body integrity of the crew;
– Dangerous meteorological phenomena that influence the flight, the aircraft functioning or the possibility for the pilot to maintain its position in space;
– Loss of space orientation or control of the aircraft during the execution of maneuvers and impossibility to restore them in due time;
– Serious damage of the pilot's health;
– Other situations that are specified in the aircraft flight manual [1].

In the general rescue actions, catapulting takes the lead. Alongside the adequatelogistic support, consisting of high performing equipment, knowing their features, operating mode and restrictions is imperatively imposed and is organically linked with the instruction and enhancement of a natural confidence in their effectiveness.

2. TYPES OF RESCUE PREPARATION

The types of rescue preparation for flight personnel are:

– parachute training;
– search-rescue exercise for catapulted or forced parachuted flight personnel;
– survival courses;
– training courses for new types of aircraft;
– conventions with flight personnel on knowing and using designated means of rescue;
– practical training sessions of flight personnel.

In addition to the preparation of the flight personnel, it is also importantto focus on the training of the personnel with attributions in this field: the parachuting and means of rescue instructors and the specialized technical personnel.

The purpose of the parachuting training with the flight personnel is to build the necessary skills to leave the aircraft, to understand the infuence of the air nets on the body during the stabilized descent, parachute opening, open parachute decent, observing different landmarks and safely landing the parachute.

I should remind here that the Romanian Air Force flight personnel use a Romanianbuilt parachute to execute the jumps, BG-7M. The parachute opening system is a combined one, permitting both automated and commanded opening. Consequently, the parachute has several types of functioning: automated, stabilized, commanded through simple command, commanded through double command [2].

In the following paragraphs I will present the similarities between the training parachuting with BG-7M and the catapulting process, implicitly the importance of this means of rescue preparation.

The psychological strain on which the flight personnel is subjected to when leaving the aircraft and the parachute opening moment, when the training leaps are performed, is quite similar to those that occur during the catapultion. By performing the leaps, the psychological or mental resilience increases.The mental resilience is the property of psychological processes and products to maintain for a long time the functional parameters in the conditions of disturbing factors. In a broad sense, psychological resilience represents the limit to which the individual's psyche has the capacity to respond functionally and adaptively to the prolonged demands it is subjected to [3].

Among the physical factors that influence both processes, we mention noise, vibrations, cold, heath, smoke, claustration, light, darkness.

Another similarity between the two processes, parachuting and catapulting, would be the influence of the air nets. The stabilized fall with the BG-7M training parachute, at a speed of 33-35 m/s, is quite similar to a pilot'sstabilized fall with he catapult seat, until the seat is detuned and the main parachute opens.

The opening of the training parachute is an important moment and resembles to solving some special situations during the operation of the catapult seat. During catapulting, some components may work improperly and the catapulting process may be blocked. In these cases, in order to disengage the catapult seat and open the main parachute, the pilot must be able to operate the parachute command.

The descent with an open parachute and the observation of different landmarks is an important moment in the catapulting procedure. During the parachute descent, the flight personnel observe the ground landmarks, choose the approximate landing position and execute piloting maneuvers to avoid landing obstacles.

These aspects are really important, on one hand, to generate a secure landing, and on the other hand, for the pilot's future actions after landing. From the air, the pilot observes landmarks that he will use: residence areas or human settlements, flowing waters, lakes, roads, etc.

Parachute landing is also important because the paratrooper contacts the ground at speeds that vary with the speed of wind and the position of the parachute. The landing, either by training parachute, or by rescue parachute, is performed similarly: place the parachute with the face against the wind, feet are close, make contact with the ground on both legs.

To better observe the similarities between the rescue parachutes used by the Romanian Air Forces:

– PS-29 – rescue parachute that equips or equipped some aircrafts that are no longer used: IAK-52, C-130, C-27J, An-2, An-24, An-26, An-30, L-29 [4];

– PSMR - rescue parachute that equips MiG-21 [5], see figure 1;

FIG. 1 Rescue parachute PSMR

– PSC-10 - rescue parachute that equips IAR-99 Standard and Soim [6];

– PL-70 - rescue parachute that equipped L-39 [7], see figure 2;

FIG. 2 Rescue parachute PL-70

– and training parachute BG-7M, i will further present their main features in the Table 1:

Table 1. Main features of rescue parachutes

Main features	Parachute type				
	BG-7M	PS-29	PSMR	PSC-10	PL-70
Cannopy surface (square meters)	94	57	54	56	50
Shape	semi-spherical	semi-spherical	semi-spherical	aero conical	triangle
Nr. of suspante lines	36	28	28	20	24
Type of material	kapron	kapron	kapron	nylon	canvas
Nr. Slots	3	3	-	2 net pannels	-
Landing speed(m/s)	4,5	6	6	6,5	6,5

After a safe landing, the pilot will perform an objective evaluation of the real situation he is in, and depending on which he will take some future actions. The analysis of the situation will be made taking into account:

– health state;
– if the pilot is alone or part of a crew;
– day time;
– nature of landing territory (relief, vegetation, etc) and meteorological conditions;
– coordinates of landing position and identification of landmarks;
– distance from communication routes, residence areas, water flows, etc.;
– material means and level of training to move into hard to reach land and survival;
– distance to air base;
– visibility conditions for search and rescue;
– other factors that may influence the pilot's actions.

Following the analysis, the pilot may choose one of the alternatives:

– to wait at the accident scene until the arrival of the rescue crew;

– to leave the accident scene and head towards the nearest residence area or other route of communication;

– in case of a crew, the injured pilot that cannot be transported remains at the accident scene and the other will leave to look for help and assistance;

– any other action that derives from the created situation.

These actions that need to be performed by flight personnel, are also included in other types of training: search and rescue exercises of ejactioned or forced parachuted flight personnel and survival courses.

During search and rescue exercises, both survivor's/ survivors' and search and rescue crew preparation are carried out: pilots, onboard mechanic, paramedic, search and rescue and evacuation operators. The search and rescue crew will do their best to recover the pilot, that will have to work efficiently and timely with it.

Search and rescue exercises can be carried out in conjunction with other survival courses or exercises.

Survival courses tackle two aspects of survival: survival in friendly terrain and survival in enemy terrain. The survival in enemy terrain is actually the ABC. During this training, the survivor's main skills are acquired: how to build the shelter, how to obtain water, food, how to make the fire, how to move, how to choose the extraction point, how to signal his position in order to be found and recovered by the search and rescue crew.

Survival in enemy terrain is based on the acquired skills and knowledge, but also on some other, more specific aspects. We discuss here about S.E.R.E concept (Survive / Eviction, Evasion / Rezistance / Extraction).

We need to give special attention to the survival on water/sea, a special training that is designed for flight personnel that fly over large water spans. This training resumes the knowledge of the aircraft on board rescue equipment used by the flight personnel as well as how to use it. Also, increased attention needs to be given to the particularities of survival in water environment, as well as the extraction procedures used by the search and rescue crew.

The other three types of preparation, training courses for new types of aircraft,conventions with flight personnel on knowing and using designated means of rescue, practical training sessions of flight personnel are carried out at a predetermined interval and mainly represent small stages in completing the types of preparation or training mentioned above.

3. CONCLUSIONS

This article emphasizes a certain aspect related to military pilots' rescue, namely the rescue preparation. In Romanian Air Force this rescue preparation is performed responsibly, professionally, by responsible personnel, even if in certain periods, due to material shortages, it could not be performed at the required standards.

The execution of training parachuting, with Air Force Academy flight students of and with flight personnel operating aircraft onboard rescue parachutes, participating to survival courses on water/sea and S.E.R.E.(Survive / Eviction, Evasion / Rezistance / Extraction) and to annual search-rescue and survival exercises, has the final purpose to acquire the necessary skills to properly use the military aircraft onboard rescue equipment, increasing the confidence in this equipment to properly and correctly use them when urgently needed. This preparation and training may certainly be improved, as the main objective is flight personnel life saving.

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