

**TCHERTOK Vladimir B.,**

Chief of department environmental control systems crashworthiness, fire protection,  
AVIATION CERTIFICATION CENTR GosNII GA.

Perfection of the requirements to the crashworthiness of aircrafts in conditions  
of changing of the ICAO concept about air search and rescue

**Survival of passengers after emergency landing  
outside of air station depends from:**

- **Character and features of transportations**
- **Geographical features of district**
- **Emergency landing causes**
- **Weather and climatic conditions in emergency landing places**
- **Special situations at a place of damage**

# Features of transportations

- **Aircraft's capacity**

Commercial transportations on long paths are carrying out by large capacity aircraft's. The modern and perspective liners have capacity 400-500 occupants and more.

- **Passengers**

There are no requirements to passenger's conditions of health and age, and among their number can be elderly people, children (including babies), patients, and handicapped persons.

- **Recommended evacuation procedures**

The emergency procedures and various instruction for the passengers recommended before evacuation from a board:

- to remove footwear on high heel;
- to remove clothes from a synthetic materials;
- to not take person things and luggage with itself.

## **Geographical features of district, where flights are carrying out**

The long flights can be carried out above neighbored place, such as:

- **Polar areas**
- **Neighbored places of plain earth (including taiga, tundra)**
- **Sands**
- **Massifs**
- **Large extended water (oceans, seas)**

## **Emergency landing causes**

The aviation authorities of all countries give the large attention to maintenance of aircrafts reliability. However, there are some most probably causes of aircrafts emergency landings outside of airports:

- **Engines failures**
- **Control loss**
- **Weather conditions**
- **Non localized fire on a board**
- **Assassinations consequents**

## **Weather and climatic conditions in emergency landing places**

After emergency landing, aircraft can appear on place with extremely difficult conditions described:

- **Atmospheric temperature (from  $-50$  to  $+50$  °C);**
- **Hard windflaw;**
- **Precipitation (snow, rain, hail etc.)**
- **Dark (including polar night)**

## **Situations, possible on emergency landing place**

The situation can be aggravated by various circumstances:

- **Weather conditions can do impossible using of usual search and rescue means**
- **Significant remoteness from locality and search and rescue bases**
- **Aircraft fuselage can placed in not standard position, when extremely difficult to the passengers to release their safety belts**
- **Fuselage and passengers seats deformation can jam the occupants on their places**
- **Fire, as rule, becomes the reason of death up to 80% of survived after emergency landing occupants, or complete destruct fuselage design**
- **Destruction of fuselage design**
- **Stress and injury of occupants**
- **Miss of clothes, footwear, headgear etc. by left an aircraft occupants**

## **The purpose and tasks of maintenance of a survival passengers after emergency landing**

It is essential to raise probability of a survival passengers after emergency landing in neighbored place can following measures:

- **Reduction of required time for detection emergency aircraft and duly delivery of enough rescue means to crash place**
- **Maintenance probability of occupants evacuation all alone after emergency landing**
- **Maintenance of a survival passengers in extremely difficult conditions after emergency evacuation**

## **Paths and ways of problem solving of maintenance surviving and rescue of the passengers.**

- **Measures permitting to reduce time of definition of position emergency aircraft.**
  - automatic actuating emergency ELT;
  - use of the data from navigational devices (GPS etc.) in the digital message transmitted emergency ELT of system COSPAS-SARSAT;
  - application dependent supervision systems (DSS) in a complex with a system COSPAS-SARSAT.
- **Special accent on saving large plains in the general concept of search and rescue.**
- **Ways of maintenance of occupants evacuation after emergency landing.**
  - use by the passengers smoke protection equipment (hoods), for increase of time of an evacuation;
  - use of the special tool for releasing the passengers binding by belts;
  - use of the special tool for clearing the passengers, fixed by the deformed seats and configuration items of a passenger cabin designed on emergency g-load 9g.
- **Condition maintenance of the occupants surviving after evacuation.**
  - availability of protection means and ways from the factors of external environment;
  - availability of rendering means for the first medical aid damaged;
  - availability of enough products of a feed (meal, power) and means of survival and etc.



## **Normative maintenance of solving the problem of surviving and rescue of occupants**

- **it is necessary to consider the problem on actuation in the ICAO standards (Appendix 10) of the requirement about mandatory actuation of the information about the crash co-ordinates (from navigational systems GPS etc.) in a structure of the digital message transmitted ELT - 406 to systems COSPAS-SARSAT.**
- **the ICAO policy should stipulates a capability of gradual use of dependent supervision systems (DSS) in a complex with a system COSPAS-SARSAT.**
- **it is necessary to study a problem on mandatory maintenance of the smoke protection equipment.**
- **to study the requirements in Appendices 6 and 8 ICAO and national AR about mandatory aircrafts equipment by special adaptations for cutting of the belts and development of the requirements to such adaptations with allowance for eliminations of a capability of unauthorized use.**
- **to study the requirements in Appendices 6 and 8 and Air rules about mandatory equipment maintained aircrafts by special adaptations for clearing the occupants, fixed by passenger seats or configuration items of passenger cabins designed for emergency g-load less 16g.**
- **to study the requirements in Appendices 6 and 8 to the contents of an onboard emergency reserve with the recommendations of structure and quantity of components depending on large capacity aircraft, character of transportations and runtime environments of flights.**