

CRIMINALISTICS TACTICS IN CASE OF CATASTROPHIC PLANE DISASTER

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Abstract

This article is showing the criminalistics tactics in case of catastrophic plane disaster. It was analysed the crime scene investigation and the criminalistic methods of research of the victims in case of a plane disaster. The catastrophic plane disaster can be seen as a crash of an air plane after a collision between two planes, a collision with other obstacles, or other types of disaster if it generates the consequences of death or injured people, or plane and goods destruction and it is a crime referred to in the Air Transport Code. Catastrophic disaster is a tragic event, of great proportions, with no advance notice, with disastrous consequences. The catastrophic disaster is a generic notion. In practice there are two major catastrophic groups: natural catastrophes and disasters. Natural catastrophes are natural phenomena that occur according to physical laws and arise as a result of a brutal, but passive imbalance between the factors underlying these physical laws, predictable as manifestations, unpredictable as a moment of occurrence, observing as tragic events of great proportions and disastrous consequences on social - economic level. The disasters represent the catastrophe group in whose's production is incriminated the direct or indirect action, voluntary or involuntary of human being. Concluding, we can say that through catastrophe we understand all-natural phenomena, unexpected damage or accidents that hit a city, a country or a group of people linked by labour relations or during a trip and whose combat requires a large supply of people and means.

Keywords: *criminalistic tactics, Crime scene investigation, catastrophic plane disaster, photo orientation and sketch, flight crew*

1. Introduction

The activity carried out in the sector of air transportation is particularly important to the economy of Romania, and for this reason it is subject to proper regulation.

The regulatory documents in force define the airspace, determine the activities in connection with the airspace, indicate the bodies that are responsible for regulating and controlling air travels, and set rules for flight discipline and safety. They also stipulate the serious acts which threaten the security of air travels and which are labelled as offences.

The first category of incriminatory acts refers to the conduct of the staff in charge with the aircraft, such as when a crew member or any person participating in piloting the aircraft is intoxicated with alcohol and goes on board of a civil aircraft which is to take off.

The second category of incriminatory acts refers to actions or inactions committed during air navigation and which are such as to prevent the normal operation and travel of an aircraft, precisely:

- Destroying or damaging the air navigation installations or perturbing their operation or the air navigation services, if any of these acts is such as to threaten the security of an aircraft during the flight.
- Communicating information while being aware that it is false, if this act threatens the security of an aircraft during the flight.
- Interfering with the duties of the crew responsible for piloting an aircraft, if this threatens its security.
- Taking control of the aircraft unrightfully, directly or indirectly.

- Committing an act of violence against a person on board of an aircraft in the air, if that act is such as to threaten the security of an aircraft.

- Destroying an aircraft in the course of its service or damaging it, which is such as to make it unfit for flight or to threaten its security during the flight.¹

For the acts listed above, the law stipulates two aggravating forms in relation to the goal pursued (hijacking) and the consequences (killing one or more people, damage or loss of the flying machine).

As viewed by the legislator, an air disaster is the crash or the turnover of an aircraft after the clash of two such means of transportation, the impact of an aircraft against other obstacles, or the occurrence of such other act, if there are very serious consequences like the death of people or body injuries, the destruction of or damage to that means of transportation, of installations or goods. An air disaster may be viewed as a very serious consequence of one of the offences stipulated by the Air Code or the criminal law, in connection with the aircraft, and the people or the goods carried by it.

In case of air disasters, the on-scene investigation is mandatory. According to the rules and regulations in force, the Department for Civil Aviation organises and conducts the inquiry of flight accidents involving civil aircrafts in the Romanian airspace.

Without substituting the criminal prosecution bodies in their rights, the bodies responsible for inquiring flight accidents have a contribution, through their specific means, to determining the facts, and one may conclude that within the investigation of air disasters, the inquiry has a double purpose:

- to determine the technical causes which led to the disaster through a technical inquiry;

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¹ Revistă de informare, documentare și opinii – Criminalistica, no.5, 6/2000.

- to determine any possible criminal responsibilities associated with the disaster through a judicial inquiry.

In consideration of the aforesaid, the on-scene investigation appears as the common start point for both inquiries, being indispensable for determining the causes, the consequences and any possible responsibilities in connection with the disaster. Specialists in the field of aviation, representatives of the Ministry of Internal Affairs, coroners and prosecutors contribute to the objectives of the on-scene investigation. If the aircraft belongs to another state, representatives of the company involved or the aeronautic authority of the state of registration of the aircraft usually participate in the investigation of the scene. Of course, the investigation team will be determined taking into consideration the provisions of the treaties in the field of aeronautics between the Romanian state and the states of registration of the aircrafts involved, as well as other clauses and obligations accepted by the signatory states².

In case of air disasters, the on-scene investigation pursues the following objectives:

- to discover, examine, retain and pick up traces and other types of physical evidence;
- to identify the victims, witnesses and other people in connection with the disaster, and to determine its consequences;
- for the specialists taking part in the investigation, to make technical-scientific findings and conduct expertises, in order to clarify the multiple aspects required by the investigation of causes;
- to determine the causes which led to the conditions and circumstances that brought forward the disaster.

With regard to the scene to be investigated in case of air disasters, we may say that it includes:

- the field where the debris is scattered, the bodies of passengers and crew members, the wreckage, the surrounding areas, as well as the regional direction and control centre, in case that the disaster occurred during a flight;
- the field where the debris is scattered, the bodies of passengers and crew members, the wreckage, the surrounding areas, as well as the regional direction and control centre, in case that the disaster occurred during the take-off and landing.

2. Distinctive features of the on-scene investigation in air disasters

2.1. Preparatory activities for the actual investigation

Until the actual investigation, there are some specific measures which need to be taken, some of them at the police station, others at the scene, if such

measures have not been taken by the first responders at the scene. Some of these measures are:

- a) Obtaining as much information as possible with regard to the disaster that occurred.

Such events are announced in most cases by the airport staff or the air traffic control and direction staff, after losing the radio contact with the aircraft, whether or not they received a prior DANGER message (which means that the aircraft is in a critical situation and needs help) or an EMERGENCY message (the aircraft is in a situation forcing it to land).

The relevant information in this phase is concerned with the nature of the danger, the location of the aircraft, its cargo, the possible crash site, the atmospheric and ground conditions which will be taken into consideration when organising the actions for the search and rescue of victims. Depending on the information that has been gathered, the involvement of other forces will be requested according to the search and rescue plan for aircrafts in difficulty, a plan made jointly by all the bodies which are able to provide help as necessary. The forces and means needed for the search and rescue of victims are also determined in this phase. It is possible to determine urgent measures to be taken by the people nearby in order to save the victims and limit the damaging effects³.

- b) Procuring, making operational and checking the necessary means for going to the disaster site, in order to provide medical help and carry out the necessary activities at the scene.

Unlike other situations, in case of an air disaster, the range of means used in the investigation is complex, and besides the forensic ones and those connected with medical help, airplanes or helicopters are necessary to fly over the area of interest, welding devices to cut the parts which will be subject to technical expertise, bags for carrying the bodies, vehicles necessary for transportation and so on.

- c) Appointing the investigation team and moving to the scene.

The participants in an on-scene investigation in case of air disasters are specialists of Civil Aviation, representatives of the prosecution, staff of the Ministry of the Administration and the Interior, coroners, medical staff, fire fighters, and members of mountain rescue teams.

If the aircraft belongs to another state, representatives of the company involved and the aeronautic authority of the state of registration of the aircraft may participate in the investigation at the scene if they so request.

- d) Providing first aid to save the lives of air disaster victims is part of the category of priority measures, which are applied even at the risk of destroying traces.

This measure involves asking the medical staff to support the team, and the victims shall be transported to the nearest medical facility.

²Association of Romanian Criminalists – *Investigarea criminalistică a locului faptei*, Bucharest 2004, p.117.

³Palcu Pavel – *Considerații privind soluționarea împrejurărilor controversate de la fața locului*, 2004 Arad, p. 53.

e) Securing the scene.

This measure is extremely important, and its purpose is mainly to protect the objects and preserve the traces, to remove the people who are not involved in the on-scene investigation, so as to avoid changes which could influence the judicial goal.

f) The assignment of the tasks to be completed by the participants in the investigation of the scene, determining how they will keep in touch, all these correlated with the large area of the site to be investigated, the complexity of the tasks to be performed and so on.

2.2. Conduct of the on-scene investigation

2.2.1. Activities specific to the static phase

The static phase of an on-scene investigation in case of air disasters starts with some preliminary activities, insofar as they have not been already carried out.

Depending on the particularities of the site to be investigated and of the event, the following main activities will be carried out:

a) Identifying witnesses and obtaining the first information about the disaster.

In an on-scene investigation, the people who may provide information about the disaster that occurred shall be identified. Of course, it is important to identify them, but if the identification is not followed by getting the first information from these people, the result is not the expected one⁴.

The statements of the people concerned shall be recorded on tape or videotape, an important role in solving the case being played by the statements given by the surviving passengers or members of the crew.

The hearing of these people tries to clarify some issues related to the time when the event occurred, the weather conditions, the cloud ceiling, the visibility, the direction of movement of the aircraft, the noises it made, the objects which detached from it, the obstacles encountered, the manoeuvres performed and so on.

It is important to underline once again the need to record the statements of survivors, because their health, in most cases, is precarious, and otherwise valuable information for solving the case may be lost.

b) The overall orientation – this is particularly important for determining the area of the ground to be investigated. While going over the crash site, depending on the peculiarity of the ground, it may be parcelled based on the location of the traces of the disaster and it is possible to decide the order in which the parcelled particularities will be investigated.

During the overall orientation, photographs will be taken for orientation and sketching, which will catch the consequences of the disaster, the condition and the position of the main traces and physical evidence.

The orientation photographs may be taken from a helicopter or from far away, while the sketching ones are executed based on the panoramic technique, they providing a more accurate image of the scene, the consequences and the location of different traces on the ground.

Photographing and video recording may also be used to retain the activities carried out by the investigation team, for locating and extinguishing fires or for saving victims⁵.

c) The topographic survey of the landscape characteristics of the ground, as well as the position of the main objects, with the corresponding distances, for drawing the sketch of the scene.

d) Examining the traces which risk being changed or disappear, then retaining them as appropriate.

After searching for, discovering, retaining and picking up the traces and physical evidence at the scene and after interpreting them, with help from the specialists involved, it is possible to issue versions about how the air disaster occurred.

Based on the investigation of past air disasters, the following causes have been found:

- Technical causes – defects related to design, construction, or defects which appeared as a result of using the aircraft.

- Navigation errors or errors related to the piloting of the aircraft. Wrong coordinates and data are sent to the aircraft by the air traffic direction and control centres or the members of the crew execute commands erroneously.

- Fires or explosions on board, which may be generated by accident or produced on purpose.

The on-scene investigation shall consider all the traces and the physical evidence, it shall be carried out independently of the version that has been developed, and evidence will be gathered both to support and to deny such version⁶.

2.2.2. Activities specific to the dynamic phase

In the dynamic phase, the crash site will be examined thoroughly and the traces and the physical evidence will be analysed based on appropriate techniques, with the specialists participating and helping in their description and interpretation. The investigation of the disaster scene shall be carried out based on an order imposed by the specificity of the investigated surface area. The investigation is usually conducted at the place of impact, continuing with the area on which the debris and passengers and crew's bodies are scattered, and then extending it on the route between the place of impact and the airport, to the airport or the control centre. We should note that the investigation of the air traffic direction and control centre may take place simultaneously with the investigation at the crash site.

⁴ Idem, p. 58.

⁵ Pavel Palcu, *ibidem*, p.63.

⁶ Pavel Palcu, *ibid.*, p.68.

The categories of traces which arise and may be identified during the on-scene investigation are specific to the cause of the disaster, and they are mainly:

I. Traces specific to disasters which occurred because of technical malfunctions

All the parts of the aircraft shall be examined in order to discover traces which confirm the existence or inexistence of technical malfunctions which caused or could have influenced the occurrence of the disaster.

a) Traces created on the outside of the aircraft

They usually consist in dismantling, tearing, bending, and their interpretation may provide information about the phenomenon which caused them, the place where they started and their succession, the place of impact of the aircraft, the functioning of the engine at the time of the impact. The examination of the airscrew is particularly important for the interpretation of traces and the determination of the causes of the accident, when the aircraft is equipped with a piston or a turboprop engine, as well as the examination of the traces it creates.

If we know some particular data about the airscrew, precisely the number of blades, the engine speed, the engine-airscrew transmission ratio at the place of the disaster, it is possible to determine the speed of the aircraft and, in relation to it, other issues relevant to the inquiry may be determined and clarified.

The examination of the airscrew is required even if no traces created by it were identified on the ground, its examination and interpretation providing data about the angle at which the impact occurred, the travelling speed, the functioning or non-functioning of the engine; all these related to the deformation of the airscrew.

b) Traces created in the cell (fuselage) of the aircraft

The cell is that part of an aircraft without the engine and board equipment. Traces may form on the span, the fuselage or the empennage. In order to determine and interpret them in the course of the investigation, tears and deformations will be examined and a conclusion is drawn on whether they could have been produced or not at the time of the impact between the aircraft and the obstacle.

The examination of the cell should take into consideration any possible deviations related to adjustment and balance, whether or not the cover shows any previous deformation or deterioration, traces of ice, missing or loose rivets, and cracks. The exhaust area will be examined for traces of corrosion and deposition of combustion products.

The interpretation of these traces may consider, besides the configuration of the impact area, how the cargo was distributed in the aircraft in order to comply with the requirements related to balance, aircraft weight and other requirements.

c) Traces created by piston engines

To discover such traces, the condition of oil filters is checked to see if they retained any metal particles which confirm the breakage of parts before the impact,

as well as the condition of the intake and exhaust manifold, for tightness, the colour of cinder and smoke black spots. The check will also include the condition of spark plugs and ignition installations, the cooling installation, other aggregates of the engine so as to determine, based on tests with special devices, the working regime of the engine corresponding to the position of the control levers.

Attention will be paid to the presence of fire traces, the condition of the change mechanism of the airscrew blades, as well as the use of fuel and lubricant for that type of engine, and samples of them may be taken for analysis⁷.

Based on this examination and the subsequent findings, it is possible to determine whether or not the operational regime provided by instructions has been complied with.

d) Traces created by reaction engines (turboprop or turbojet)

The following will be checked to determine such traces:

- the condition and the position of the low-pressure filter of the feeding installation (whether they are obstructed or not);
- the condition of the tubes and hoses of the feeding and greasing installation;
- the condition of the engine aggregates, the boxes of the driving gears, to determine any possible tears, cracks, indentations, etc.

The condition of the following will also be examined:

- the transmission bearings;
- the insulating layer of the reactive tube with regard to traces which could be left by broken parts of the engine and which were expelled by gases;
- the turbine, especially the paddles, burning traces or other aspects relevant to the investigation.

e) Traces created at the aircraft commands

When examining such traces attention shall be paid to:

- the incorrect position of levers, rods, cables, pulleys and hydraulic amplifiers;
- the position of counterweights, compensators, and aerodynamic ailerons and brakes;
- the condition of steering, profunder, joysticks, rudder bars;
- abnormal margins, the correct angle of lock, the attachment and safety of all command articulations.

All these shall be examined in comparison and in relation to the position and the indications of the flight instruments which control their functioning. For rigid commands, the check will include the cleaning and greasing condition, the wear in articulations, the rollers, rods, deformations, cracks, exaggerated tightening of bearing axes, the existence of foreign objects on the command routes.

f) Traces created in the cockpit

⁷ Crimnalistica – revistă de informare, documentare și opinii, no. 4, December 2002.

To identify such traces, a thorough examination will be conducted with regard to the position of the board instruments used in the navigation and those which control the functioning of power plants, the position of levers and other controllers of the engine, the undercarriage and flaps. Of course, attention will also be paid to other instruments and devices, special installations, equipment (radio-location, radio-navigation, fire protection etc.).

g) Traces created on the takeoff and landing devices

For discovering them, the following shall be checked:

- the position of the rods of the hydraulic installation and the securing locks which makes it possible to determine whether the undercarriage was out at the time of the contact between the aircraft and the ground;
- the tearing direction of the components of the undercarriage;
- the presence of fuel traces on tyres, their pressure, air loss, mechanical deterioration, thrusting, non-tightness⁸.

II. Traces specific to accidents caused by direction errors or pilot errors

In the Romanian air space, the flight of civil aircrafts transporting passengers and goods is executed only within airport zones, terminal control regions and air ways. Throughout its itinerary, the aircraft is provided with radio-electric protection. During the execution of a flight, the aircraft must be at all times under the direction and control of the air traffic bodies. During the flight, the commander of the aircraft has the obligation to follow the directives of the bodies responsible for the protection of air traffic, is responsible for their application, and must ensure the permanent phonic contact with the direction and control centres. The commander of the aircraft has the obligation to provide information to the direction and control bodies about the evolution of the flight in the form of position reports, which refer to the indicative, position, time, altitude or level, information on weather conditions.

The main traces which may be created and may be used in finding the causes of air disasters and determining any liability are the sound traces of voice and conversation, recorded on tape at the direction body and in the aircraft.

To determine the causes of an air disaster, it is necessary:

- at the direction body with which the aircraft kept contact, to pick up the magnetic tapes on which the conversations with the crew were recorded, checking first the integrity of their seals;
- in the aircraft, to look for and pick up the flight recorder (the "black box"), which is constructed to resist the consequences of a crash. This device records on tape or film the flight parameters, and the

operational parameters of various equipment and aggregates. For some aircrafts, the flight recorder is doubled by a "voice recorder", which records all the sounds in the cockpit. Even if the plane sinks, the recorder may be recovered from water, because it is provided with an ultrasound emitter.

Besides the traces of voice and conversation, in case that the disasters are consequences of pilot or aircraft direction errors, it is also necessary to search for and discover other traces which may indicate the wrong manoeuvres executed by the crew or the erroneous direction by the direction and control body. For this purpose, it is necessary to look for the map indicating the route covered by the aircraft and due attention should be paid to the examination of the component parts of the aircraft⁹.

III. Traces specific to disasters which occurred as a result of fire or explosions

a) Traces produced by fire

For this purpose, the on-scene investigation will consider:

- Traces indicating the possibility of ignition or self-ignition of fuel, which requires the examination of fuel tanks, fixing joints, whether there are any cracks in the fuel ducts and tanks, whether the fuel came into contact with the hot parts of the engine.

Samples of the fuel used by the aircraft shall be taken to determine the ignition and self-ignition point based on an expertise.

- Traces confirming a short-circuit on the electric wiring, at the electric conductors, the characteristic parts of the short-circuit. To determine any possible traces, the examination will include the electric starters, generators, accumulator batteries, conductors, cables, distributing boxes and the terminal panels of the electric equipment. One should not overlook the radio-location equipment, the maintenance, especially any changes to the installation, the chassis ground of the equipment, the voltage of the power source, fuses and protection devices, the insulation of conductors etc.

- The existence of fire points and traces which confirm the spread of fire, determining and retaining the degree of burns on the inside and outside of the aircraft, determining the intensity of the fire and how it propagated.

In this respect, the special fire protection equipment is very important, and it will be examined with regard to its technical condition, the seal of emergency command levers of fixed installations and the triggers of the mobile ones, the condition of the fire alarm devices, the condition of fire extinguishers and so on.

b) Traces resulting from an explosion and for this attention should be paid to:

- How the debris from the aircraft or its content is disposed; this is important for determining whether there was an explosion, if it occurred in the air or on

⁸ Criministica – revistă de informare, documentare și opinii, no. 4, 6, December 2002.

⁹ Mircea I. - Criministica, Ed. Fundației Chemarea, Iași 2002, p. 136.

ground.

If the explosion occurred in the air, the debris is scattered on a large area, directly proportional to the height of the flight and the weight of the spread pieces. The falling apart of the aircraft and the scattering of the debris on a large area may result not only from an explosion, but also from a possible depressurisation determined by various causes, possibly connected to malfunctions or projectiles from fire arms.

In case that the parts of the aircraft are scattered on a large area, and the engines are shallowly sunk, the impact with the ground was under a small fall angle and at high speed, the crash not being the result of an explosion.

The focus of the explosion may be determined only after all the parts of the aircraft have been extinguished, which will be used to rebuild it. Based on the interpretation of traces, it is possible to conclude whether the disaster was the result of an explosion¹⁰.

2.2.3. Other specific activities of the on-scene investigation

Besides the activities presented above, in order to solve all the tasks, in the course of the on-scene investigation, the members of the team will carry out other activities too in order to determine the causes of the disaster, its consequences in terms of victim identification, the search for and picking up of the aircraft documents, the recovery of goods¹¹.

1. The identification of victims

The main task of the on-site investigation, the identification of victims, is much facilitated compared to railway accidents or other accidents, due to the list passengers which contains the passengers' main identification data.

The navigation staff (the staff commanding the aircraft, pilots, air navigators, engineers and navigation mechanics, radio-navigation operators), the technical and ancillary staff (flight attendants), all being members of the crew, may be identified based on the place where they are found, their clothing, identity and work documents. If their bodies were not carbonised, the identification may be provisory on the spot, based on the objects which remained on the body (components of the headphones of the radio emission device etc.), and the certain identification shall be made based on the forensic examination, an important role in this activity being that of the medical record drawn by the team providing medical assistance, especially the odontologic report.

The forensic examination of the command staff shall search for traces on the body attesting the exercise of violence, and biological samples shall be taken for determining the level of alcohol.

The passengers shall be identified using mainly the data provided by the list of passengers, as well as the identity documents found with them.

The practice of air disaster investigation revealed that men are more easily identified and certainly on the spot compared to women, because of the identity documents which they keep with them. Women may be identified on the spot, without full certainty, because most of times they keep their identity documents in bags, which more often are not found on the body.

The identification activity continues and is completed in forensic laboratories, where specific activities may be conducted for the examination of the bodies in order to determine the sex, age, height, and particular signs, and the bodies will be fingerprinted, photographed or video recorded, and after dressing, both the bodies and the clothing or other personal belongings may be presented for recognition¹².

It is important to emphasise that the bodies should be photographed in compliance with the rules of criminalistics, and photographs shall be taken both at the scene and after dressing, as illustrated in the examples below.

2. The search for and picking up of documents and objects

During the on-scene investigation, the investigation team will look for and pick up the identity documents or other documents found with the passengers, as well as the obligatory documents on board which may lead to determine the causes of the disaster.

The obligatory documents on board, or part of them, depending on the nature of the flight, may be:

- The navigability certificate (provisional flight authorisation), based on which any civil aircraft is acknowledged as being able to fly, a document issued or validated for a determined period of time. The certificate also indicates the minimum numerical composition of positions for the aircraft (the crew).
- The registration certificate issued based on the registration in the single register of civil aircrafts, which also indicates the identification mark.
- The flight book of the aircraft where the commander records everything that happens during the mission and what is relevant for the execution of the mission, of the flight in general; these records may serve as official evidence for justifying acts or actions.
- The radio logbook – in case of aircrafts which have a radio-navigation device in the composition of the crew.
- The mission order – which indicates the nominal composition of the crew for each mission, the commander on board etc.
- A copy of the flight plan.
- The necessary navigation and meteorological documentation – documents on the passengers and the cargo, the excerpt of the agreement concluded with the beneficiary for utility flights and so on.
- Documents which the navigation staff are obliged

¹⁰ Suciu, C. - Criminalistica, Ed. Didactică și Pedagogică, Bucharest, 1972, p.263.

¹¹ Mircea I. - Criminalistica, Lumina Lex, Bucharest, 2001, p. 176.

¹² Colecția de reviste - Criminalistica – Revistă de informare, documentare și opinii, 1999 - 2005, no.3/2004.

to keep with them during the execution of flight missions, the brevet with the licence up-to-date, the radio-telegraphic certificate, the passengers' documents.

If the navigation staff or the passengers carried any armament, it is necessary to find and examine it in order to look for traces which could attest any recent firing.

3. Search for and recovery of goods

In the course of the on-scene investigation of air disasters, measures will be taken to recover the goods, among which there are:

- The recovery of the aircraft in so far as this activity is possible, or of parts of it, this task being executed by representatives of civil aviation. If the destruction is massive, or the disaster site is difficult to access or does not allow the transportation of the wreckage, a destruction or abandonment report shall be drawn up.

- The recovery of goods or passengers' belongings. After picking up these goods, inventory documents shall be drawn up, and proofs of handing them over to members of the family. Increased attention should be paid to the possessions of passengers, and measures for their security should be taken. The same measures are required with regard to the goods transported by air.

2.2.4. Retention of the results of the on-scene investigation

I. Retention of the results of the on-scene investigation

The results of the on-scene investigation are retained through description, as well as with the help of technical means. The main means for retaining the results of the on-scene investigation is the report¹³.

a) The on-scene investigation report shall include all the findings, the dimensions and the spatial relations of the investigated area, the characteristics of all the traces and physical evidence, with peculiarities given by:

- the recording of the geographic coordinates, the altitude, the landscape characteristics of the site of the disaster;

- the recording of information as accurate as possible about the time of the announcement, finding the aircraft, the meteorological conditions at the time of the investigation;

- the nature of the flight, and its purpose (public passenger air transport or cargo air transport, utilitarian-sanitary, agricultural-forestry), training or practice, technical for check, sports, special. Moreover, if the flight takes place at sight or based on instruments, its regularity (regular, occasional, special, additional, charter) etc.

- the recording of the impact place as accurately as possible, the area on which the parts of ensembles and sub-ensembles are scattered, the position and the condition of different debris from the aircraft, the way

covered by it;

- the identification of the aircraft, which is based on the flag, the records referring to nationality and the group of letters representing the identification mark, which are written on the body of the aircraft, as well as on a plate made of a fireproof material fixed in the proximity of the main entrance of the aircraft;

- the recording of the documents found, of the magnetic tapes picked up by the direction bodies, the data on the number of passengers, the nature of the cargo;

- the condition and the position of the flight instruments and of different mechanisms and equipment for direction and control, other installations (including those from the airport, if appropriate);

- the number of victims, their identification data, their clothing, the objects found and picked up, other consequences of the disaster.

b) The retention with the help of technical means is intended to reflect as accurately as possible the image of the site, to complement the description given in the report and is done by photographing, video recording, videotaping and sketching.

1. The photograph and the forensic film as a means of retention shall be executed in compliance with the known general rules and with some particularities. So, the orientation of the disaster site shall be done from a plane or a helicopter, so as to cover as much as possible the area containing the debris from the aircraft, the goods and the passengers.

The next to be retained is the impact place of the aircraft with the ground or with the mountain versant, the object hit in the fall, continuing with the retention of the main parts of the aircraft, of the engines at the places where they were found, without moving them, taking photographs and filming, the sketch, which may include aspects regarding the cockpit, the instrument board and the position of control levers, at the place and in the condition in which they were found, then the details of the board instruments, the bending of airscrews, the portions torn up, the deformation of the wings, the fuselage, cables and other traces.

2. The recording on magnetic tape or video tape has the advantage of rendering the statements of victims, witnesses or other people soon enough after the disaster. If they are not recorded, considering the serious condition of the victims, the investigation may lack many essential elements for solving the cause objectively¹⁴.

With reference to video records, they have the advantage of retaining both the image and sound, as well as of catching activities in progress, in their evolution, from the incipient phase to the final one, or phenomena which evolve rapidly (a fire on board). The examination of these records after the investigation at

¹³ Palcu Pavel – Considerații tactice privind pregătirea, etapele și mijloacele tehnice de fixare a cercetării la fața locului, Arad, 2004, p. 49.

¹⁴ Palcu Pavel – Considerații tactice privind pregătirea, etapele și mijloacele tehnice de fixare a cercetării la fața locului, Arad, 2004, p. 56.

the scene may lead to valuable elements for clarifying the causes of the disaster.

3. The sketch of the site where the disaster occurred should render the essential elements of the investigated area, and it shall be completed simultaneously with the report, the photographs, the videotaping and the video recording. It is possible to draw it based on several techniques. A first technique for executing the sketch is the representation in horizontal projection. This makes it possible to make the orientation sketch containing the site where the debris from the aircraft is found, as well as other landmarks, the bodies of victims. This sketch reflects different position relations between various traces and the physical evidence existing at the crash site.

Another technique used preponderantly to illustrate the succession of the phases of the disaster, starting with the point of impact, when fragments of the aircraft are spread on sloped land (mountain versant), is the sketch in vertical projection¹⁵.

3. Forensic methods for victim identification

3.1. The dactyloscopic identification

The digital impression obtained from bodies of unknown identity based on the methodology previously presented is compared with the fingertip's records existing in the criminal record or, as appropriate, with the papillary traces picked up from the homes of missing persons.

We consider that it is not necessary to insist on this category of expertise, the value of this identification being widely recognised, and its application being within the reach of any criminalist.

3.2. The collation of identification forms

The identification forms, which are an "anthropologic catalogue", are usually drawn up in three copies, one of them being sent to the General Inspectorate of the Romanian Police – National Institute of Criminalistics. This way, all the identification forms are concentrated at central level and are compared to see whether the data in the form of an unidentified body match the identification data in the forms of missing persons.

Because the form of a missing person is based on the statements sometimes subjective or incomplete of the person reporting the disappearance, and sometimes the condition of the body does not allow a correct evaluation of particulars, special attention should be paid when making the comparisons. When resemblances between two forms are found, an identification method that is certain is used, the results

of these comparisons serving as a rough guide in principle.

Comparisons are made between general data referring to age, sex, the day the person went missing and the day when the body was found, the blood type and the Rh, then the matching of particulars, clothing and objects found with them. If possible, the photographs of the missing person are compared with those of the body, and when the data is available, the odontologic forms are compared¹⁶.

3.3. The portrait photograph expertise

When we have a recent photo of a missing person, we may use the expertise of the portrait photograph for identification.

The photograph of the missing person and the photograph of the unidentified body are enlarged at the same scale.

A separate and a comparative examination of the two photographs determine:

- a) the anatomical particulars: sex, age, race, the shape of the head and face, the shape, size, location and colour of the component elements of the face;
- b) the singular particulars: scars, spots, warts, moles, tattoos, wrinkles, as well as the particularities of some component elements of the face, which individualize the person through their nature, form, colour, size and location.

In order to clarify the objective of the expertise it is possible to use one or more methods of the portrait photograph expertise:

- collation-based comparison;
- determining the linear continuity;
- the face grid;
- angle measurements;
- the projection of common points.

If we have a photograph in profile of the missing person, identification may be made based on morphological aspects of the ear.

The ear, due to its cartilaginous nature, keeps its morphological characteristics for a longer period and is less influenced by the putrefaction process. With its multiple anatomic parts and their variation, the ear provides a possibility for identification.¹⁷

The body is photographed in profile, approximately at the same angle at which the photograph of the missing person was taken. The photographs of the ears are enlarged at the same scale, and then the comparisons for identification are made, observing the general principles of forensic expertise.

3.4. The over projection

This method is used when it is necessary to identify a body in advanced putrefaction or when only

¹⁵ Palcu Pavel – Considerații tactice privind pregătirea, etapele și mijloacele tehnice de fixare a cercetării la fața locului, Arad, 2004, p. 67.

¹⁶ Colecția de reviste - Criminalistica – Revistă de informare, documentare și opinii, 1999 - 2005, no.3/2004.

¹⁷ Collective work – Tratat practic de criminalistica – vol. I, ed. 1976, p. 170-178.

the skeleton has been discovered. The over projection was used for the first time in England, in 1935.

The identification of a person based on this method is possible after taking into consideration:

a) general identification elements related to:

- race;
- typology;
- sex;
- anthropometrics, and

b) individual identification elements:

- metric;
- morphologic;
- functional;
- aesthetic.

To be able to apply the method, the general and individual elements found on bodies and those referring to the missing person must be corresponding.

Basically, the method consists in examining the overlap of the elements of a photograph of the skull that has been discovered and is to be identified.

The photograph of the missing person may be procured from the population registry office or from the personal photographs of the missing person.

A negative of the photograph of the missing person is taken with the dimension 9/12 or 12/18 cm. The negative is introduced in a photographic chamber with a mat glass, the mat glass is overlapped and a pencil is used to draw, very carefully, the characteristic features in vertical plane – the transversal line connecting the zygoma and the corners of the eye pit.

The skull is fixed on a special stand which allows its movement in all planes and after determining a position as close as possible to that of the head of the missing person, a negative with the same dimensions is taken.

Finally, the two negatives – of the person and of the skull – are projected on the same photographic paper, obtaining the photograph of the skull overlapped with the photograph of the victim. The overlapping may be total or partial.

The identity conclusion is based on the perfect overlapping of all the characteristics consisting in characteristic lines and anatomic graphic points.

Although simple, the method involves special precision, as well as some challenges related to the execution of the overlapped photograph.

For the application of this method, special devices have been made for taking the photograph of the skull. At the National Institute of Criminalistics there is such a device conceived in Romania.

This method has been considerably enhanced with the introduction of computing technology and the video technique which allow the electronic combination of the image of the unknown skull with the photograph of the missing person.

3.5. Odontology

Dentition keeps its characteristics for a long time, and it may be successfully used in the identification of bodies. The importance of the method lies also in the inclusion of the dental form among the identification forms.

The dental form is a drawing which represents the position of the 32 teeth of an adult person, as well as the legend which indicates the names of the teeth and the conventional signs used to indicate dentition changes.

When a body is discovered, the coroner helps to complete the odontogram.

In case of missing persons, this problem will be clarified with the help of people reporting the disappearance and by interviewing the relatives and the acquaintances of the missing person. Also, one should check if the missing person had any dental work done at the dental centre in the neighbourhood, where we could also find sketches or dental radiographs and the number of the dental plate, if any. The dentist who fixed the dental plate may help to identify the body by recognising that plate.

By comparing the odontogram of the body with that of the missing person, elements of coincidence may be found, which allow us to use other identification methods, if the odontogram of the missing person is incomplete or uncertain, because the interviewed people indicate only probable data about the condition of the missing person's dentition. If the records in the dental centre are found, this method is certain and sufficient to identify the body.

For people whose profession involves a higher level of risk – for example, sailors, navigation staff, etc. – several identification methods have been suggested in case of an accident. Such a suggestion was to insert, in case of a dental work, a rod in the tooth subject to the intervention, which could be found through a radiologic check. An aluminium plate containing the identification data of the person marked in miniature shall also be introduced in that tooth. The proposed method confers a high degree of certainty to the identification and is also easy to apply.¹⁸

4. Conclusions

Until the actual investigation, there are some specific measures which need to be taken, some of them at the police station, others at the scene, if such measures have not been taken by the first responders at the scene.

The static phase of an on-scene investigation in case of air disasters starts with some preliminary activities, insofar as they have not been already carried out.

In the dynamic phase, the crash site will be examined thoroughly and the traces and the physical evidence will be analysed based on appropriate

¹⁸ P.L. Samis – Un nouveau procédé d'identification par les dents – in *Revue internationale de police criminelle*.

techniques, with the specialists participating and helping in their description and interpretation. The investigation of the disaster scene shall be carried out based on an order imposed by the specificity of the investigated surface area.

In the Romanian air space, the flight of civil aircrafts transporting passengers and goods is executed only within airport zones, terminal control regions and air ways. Throughout its itinerary, the aircraft is provided with radio-electric protection. During the execution of a flight, the aircraft must be at all times under the direction and control of the air traffic bodies.

In the course of the on-scene investigation, the members of the team will carry out other activities too in order to determine the causes of the disaster, its consequences in terms of victim identification, the search for and picking up of the aircraft documents, the recovery of goods

During the on-scene investigation, the investigation team will look for and pick up the identity documents or other documents found with the passengers, as well as the obligatory documents on board which may lead to determine the causes of the disaster.

The results of the on-scene investigation are retained through description, as well as with the help of technical means. The main means for retaining the results of the on-scene investigation is the report.

The digital impression obtained from bodies of unknown identity based on the methodology previously presented is compared with the fingertip's records existing in the criminal record or, as appropriate, with the papillary traces picked up from the homes of missing persons.

References

- Gh. Asanache, Elemente de medicina biocriminalistica, Bucharest, 1978.
- Association of Romanian Criminalists, Investigarea criminalistică a locului faptei, Bucharest, 2004.
- Association of Romanian Criminalists, Realități și perspective în criminalistică, Bucharest 2003.
- N. Mărgărit, C.R. Pavel, Criminalistică, Curs universitar de metodologia investigării infracțiunilor, Moroșan, Bucharest, 2017.
- M. Gheorghita, Tratat de Metodica Criminalistica, Ed. Universitatea de Stat din R. Moldova, Chisinau, 2015, CEP USM.
- Association of Romanian Criminalists – Rolul și contribuția probelor criminalistice și medico-legale în stabilirea adevărului, Luceafărul, Bucharest, 2005.
- V. Belis, Medicina legala, Teora, 1992.
- V. Beliș et al., Medicina legală, Teora, Bucharest, 1992.
- V. Beliș et al., Tratat de medicină legală, vol. I – II, Editura Medicală, Bucharest, 1995.
- Ciopraga, I. Iacobuță, Criminalistica, Chemarea, Iași, 1997.
- G. Mateut, Procedura penală, vol. I and II, Editura Fundatiei “Chemarea”, Iași, 1995.
- N. Mărgărit, C.R. Pavel, Criminalistică, Tratat de tactică, Moroșan, Bucharest, 2017.
- F. Meixner, Dicționar pentru criminaliști, Hamburg, 1964.
- Mircea, Criminalistica, Lumina Lex, Bucharest, 2001.
- Mircea, Valoarea criminalistică a unor urme de la locul faptei, Vasile Goldiș, Arad, 1996.
- Palcu Pavel, Considerații privind soluționarea împrejurărilor controversate de la fața locului, 2004 Arad.
- Palcu Pavel, Considerații tactice privind pregătirea, etapele și mijloacele tehnice de fixare a cercetării la fața locului, Arad, 2004.
- E. Stancu, Tratat de criminalistică, 2nd edition, reviewed, Bucharest, Universul Juridic, 2002.
- C. Suciu, Criminalistica, Editura Didactică și Pedagogică, Bucharest, 1972.
- L. Suciu, Criminalistica, Editura Didactică și Pedagogică, Bucharest 1982.
- The Cosereni air disaster, File of the Ilfov Prosecution Office – 1977.
- Moraru, Medicina legala, Editura Medicala, Bucharest, 1967.
- C. Simion, Medicine legale judiciare, Librairie Maloine, Paris, 1955.
- Gh. Scripcaru, M. Terbancea, Medicina legala - Manual pentru facultatile de drept, Editura Didactică și Pedagogică, Bucharest 1970.
- V. Dongoroz et al., Explicații teoretice ale Codului Penal Român, Vol. IV, Bucharest, 1972.
- N. Margărit, Criminalistica - Note de Curs, Little Star, Bucharest, 2013.
- N. Margărit, N. Vaduva, Tratat de Tactica Criminalistica, Mustang, Bucharest, 2015.