

## ***LESSONS LEARNT FROM RECENT FLOODS IN EUROPE AND NOT ONLY***

The purpose of this scientific note is to present some first remarks of what going wrong with the measures usually taken in the cases of homicidal floods and the shortcomings that are identified, in the recent floods in Europe, something that unfortunately happened many times in the past all over the world. At the same time, it is our purpose to make some very brief suggestions on how we might avoid similar shortcomings and mistakes in the future, in order to diminish as much as possible, the loss of human lives.

These remarks apply to all cases of floods in urban areas, especially to those cases of cities that are crossed by notable rivers and concern mainly houses and accommodation located in riparian areas, of those cities.

Such areas, that are particularly sensitive to flood action exist in numerous European cities and towns during last week's floods but exist all over Europe as well as it is very usual from the antiquity until nowadays the towns and cities establishment, around a river's bed or a torrent's bed.

In general terms the disastrous flooding action in urban areas is dominating by the following phases:

- A. The awareness phase
- B. The warning phase
- C. The evacuation phase
- D. The safe sheltering phase

The main remarks that were observed in each one phase during the recent floods, as well as, the corresponding suggestions in order to improve things and to save human losses, are quoted below as follows (by the same order with the phases).

### **Remark (A):**

With regard to phase **A**, it was found that the instructions and information that the residents had, despite their adequacy and their analytical presentation, in most cases are not consolidated by the citizens. This is true especially regarding important actions that need to be taken or things that need

to be avoided (e.g. ascend to higher parts of the building or roof, avoiding in any case to use as shelter the basement etc.).

**Suggestion:**

Have small and easy to use brochures in printed form (pocket edition), so that they are always in an accessible position of the house (e.g. dining area). These leaflets should explicitly instruct citizens on what to do and what to avoid, as well as offer instructions on what a survival kit contains for the first hours after a flood.

**Remark (B):**

As for phase **B**, it is known that today there are excellent forecasting systems and tools, which help the Civil Protection Authorities to inform the citizens in time, something that happened in the case of the specific floods. Of course, there were cases when due to a power outage the warning sirens did not work, as well as the television sets and mobile phones, thus making it impossible to warn the residents in time, despite the knowledge of the authorities about the impending danger.

**Suggestion:**

In these cases, individual warning beepers may be provided in each house near the riverbed, which receive power and operate through an autonomous circuit, so that the residents are notified regardless of the power supply. Moreover, a small hydropower unit could be used for alert purposes. This unit could be installed in the neighbor river or torrent. Sensors detecting water level would be attached to the unit. When critical conditions were identified, an alert system such as sirens or lights would go off, warning residents of the danger.

Regarding phase **C**, two very important problems appeared:

**Remark (C1):**

The first is the problem of locating the elderly and the disabled in their homes, who most of the time do not respond or cannot respond to the calls of rescuers.

**Suggestion:**

We suggest a detailed catalogue (as long as they wish to register themselves of course) of all elderly and/or disabled tenants. The recording should be done with exact details, in terms of street, number, floor, and apartment. This list must be strictly confidential and only available to Civil Protection Authorities (due to ethic issues).

**Remark (C2):**

The second problem of phase **C**—perhaps one of the most important issues—is the delay in the decision or the complete refusal of the tenants to leave their residence, which can lead them most of the times to certain death.

**Suggestion:**

Civil Protection Authorities should organize seminars with the support of psychologists, in order to persuade the tenants of the houses who refuse to leave their place to do so immediately and without delay. These seminars, which the local councils should help host, can and must be constantly promoted in the public places, such as schools, municipal halls etc. Augmented reality techniques featured in the videos of these supportive seminars will help the residents better perceive what is going to happen if they do not leave their home in time. This process can be enhanced by door-to-door information to residents, along with reminders of planned and necessary actions during a flood, especially for vulnerable groups.

**Remark (D):**

Regarding phase D, there were problems of disorientation of the people who left their homes. Some did not know where to go, while others could not see in the dark. Given the fact that panic exacerbates disorientation, we can understand the magnitude of the problem.

**Suggestion:**

Establishment of gathering points within the towns and cities based on the altitude of the area, in which the sheltering inhabitants will be protected from the flood waters. In addition, under the responsibility of the Municipality, Local Councils, etc., images of city streets as shown on Google Street can be used. With the help of Augmented Reality techniques, short films could be created, where the above mentioned images of city streets will be presented, incorporating special markings (directional arrows) which could be added to the pictures. Thus, the residents who will be leaving their homes can reach the predetermined gathering point easily having in their mind the directional arrows. These signs, in case the Municipal Authorities wish so, can be placed on the streets in a tangible way, something that will facilitate the purpose.

We also propose the placement of generators in facilities of the Municipality for the operation of street lighting and signage arrows, in case of a power outage (similar to the exit lights found in an aircraft).

**Remark of an Unresolved problem:**

There is a problem that cannot be solved by any scientific or non-scientific methodology because it concerns the human factor. The problem is for all those involved in Civil Protection issues to convince the panicked person to react at a given time when their life is threatened, calmly understanding what to do and what not to do, and, above all, to obey to rescuers or officials when asked to leave their home and property.

**Suggestion:**

Given the ongoing research process of the ASSIST laboratory and the UNESCO Con-E-Ect Chair of the International University of Greece in collaboration with the HADRI Institute of the University of Sydney

(Humanitarian Engineering Institute), it is possible to develop this research (first applied in Australia) in European countries as well, where the building conditions and the geomorphology are different. Through interviews and analysis of the psychosynthesis and mentality of the populations of potentially affected areas, specific and different each time methodologies of approaching and directing the victims to those actions that will help save their lives, can develop and emerge.

All the above presented remarks and suggestions are a result of an over thirty years field and laboratory experience in the anti - flood protection area, of the people who staff both the laboratory ASSIST and UNESCO Chair Con-E-Ect (Entities belong to International Hellenic University).

We would like to announce you that we are willing to help in any form and to contribute in the mitigation of the homicidal action of floods, which are the most disastrous phenomena in the world.

Thessaloniki, Greece, 21/7/2021

The UNESCO Chair Con – E – Ect team



The ASSIST Laboratory team

