STUDY REGARDING DELINEATION OF FLOOD HAZARD ZONES IN THE HYDROGRAPHIC BASIN OF THE SOMEŞ RIVER, BORDER AREA

STOICA F.[1], ROŞU I., SOFRONIE C., DULĂU R., SÂRB M.

ABSTRACT. Study regarding delineation of flood hazard zones in the hydrographical basin of the Someş River, border area. The hydrological studies will provide the characteristic parameters for the floods occurred for the calculus discharges with overflow probabilities of 0,1%; 1%, 5%, 10%. The hydrologic and hydraulic models will be made by using the hydro-meteorological data base and the topographical measurements on site; them calibration will be done according to the records of the historical floods. The studies on the hydrologic and hydraulic models will be necessary for the establishment of the carrying capacity of the riverbeds, for the delimitation of the flood plains and for the detection of the transit discharges at the hydro-technical installations, but also for the establishment of the parameters needed for the structural measures' projects. These will be based on the 1D and 2D unstable hydro-dynamic models. Therefore, the users would be able to assess the proposed measures and the impact over the river's system; of course with the potential combination of the 1D and 2D.
The main objectives followed by the project are:

- identification of the river basins or river sub-basins with flood risks;
- regionalization of the flood hazard;
- presentation of the main flash floods occurred during the last 30 years, which induced floods;
- assessment of the consequences of eventual flood over the population, properties and environment;
- the establishment of the protection degree, accepted for the human settlements, for the economic and social objectives, for the farm areas, etc.;

Keywords: cross border cooperation, flood hazard zones.

1. THE ROMANIA-HUNGARY CROSS BORDER RELATION ON HYDROMETEOROLOGICAL PROBLEMS

The bilateral relation in water management field between Romania and Hungary is conducted based on *the Agreement between the Government of the Republic of Hungary and the Government of Romania on cooperation in the field of protection and sustainable use of trans-boundary waters*, signed at Budapest, 15 September 2003 and ratified by GD no. 577/2004.

Within this Commission, there are the following Subcommissions:

- Subcommission of water management and hydrometeorology;

[1] Apele Române National Administration, Hydrology and Hydrogeology Office, Cluj-Napoca, Romania
e-mail: florin.stoica@dac.rowater.ro

- Subcommission of flood protection;
- Subcommision of water quality;
- Ad-Hoc Subcommission

The Romanian-Hungary Agreement currently in force is elaborated and signed by the Governments of the two neighbouring countries and relates to cooperation for the protection and sustainable use of border waters.

It is stipulated that each Party to conduct a regular exchange of meteorological and hydrological data (current data, real and probable, as well as warnings and forecasts regarding dangerous meteorological and hydrological phenomena).

The objective of data exchange between countries is the detailed and prompt information on meteorological and hydrological phenomena either ongoing or likely to take place on the territories of the two countries, in order to effectively serve the national economies and prevent or limit damage.

At basin level the data exchange is running between Somes-Tisa River Basin Water Administration Cluj and Upper Tisa Water Management Division Nyiregyhaza (corresponding institution of the two countries).

Also, for periods of floods, hydrological warnings will be mutually transmitted on all water levels registred between the hours of transmission, and the maximum level rate of water with mentioning the date and the quantity of precipitation from the range. However, experts from Somes-Tisa River Basin Water Administration Cluj transmit to the Hungarian counterparts the hydrological forecasts elaborated for a number 6 hydrometric stations.

Every autumn there is a bilateral meeting of experts on hydrological forecasts in the two countries, where they discuss issues specific to the activity. The meeting is organized by counterpart water management and scientific research institutions (INHGA Bucharest and VITUKI Budapest), water basin administrations also being invited.

There is an annual exchange of hydrological data between pair stations (level records, flow sheets, rating curve or table, synoptic table of water discharge), and then there is the activity of concording/matching the water flows in the border area (monthly average, monthly maximum, monthly minimum) on the rivers Tur, Someş and Crasna (table 1).

Table 1. The corresponding hydrometric stations included in the annual data exchange

No	River	Hydrometric station - RO	Hydrometric station - HU
1	Tur	Turulung	Garbolc
2	Someş	Satu Mare	Csenger
3	Crasna	Domăneşti	Agerdomajor

Each year the team of Romanian and Hungarian hydrologists run the common campaigns of flow measurements. Measurements take place in the

sections of pair hydrometric stations on the three transboundary water courses, annually taking place two campaigns (one in each country). The calculation of flow measurements is done by using country-specific methodologies, achieving a steady intercalibration.

At hydrological stations' level there is the regulation to run every month simultaneous flow measurements at pair stations (the same day in a month there is a flow measurement).

2. HYDRAULIC MODELLING

Border area floods have the potential to cause fatalities, displacement of people and damage to the environment, to severely compromise economic development and to undermine the economic activities of the Community.

In developing policies referring to water and land uses Member States and the Community should consider the potential impacts that such policies might have on flood risks and the management of flood risks.

The main objectives followed by the project are:

- identification of the river basins or river sub-basins with flood risks;
- regionalization of the flood hazard;
- presentation of the main flash floods occurred during the last 30 years, which induced floods;
- description of the flood vulnerability inside the flood risk areas;
- use of the charting equipment for the making of the flood risk assessment;
- causes of the floods, with the description of the anthropic factors contributing to the urging of the flood phenomenon;
- assessment of the influences / modifications over the hazard regionalization of the flash floods and assessment of the vulnerability;
- estimation of the tendencies regarding the future floods occurrence
- assessment of the consequences of eventual flood over the population, properties and environment;
- the establishment of the protection degree, accepted for the human settlements, for the economic and social objectives, for the farm areas, etc.;
- preliminary assessment of the flood risk (for discharges higher than the calculus discharge);
- presentation of the necessary measures and actions for the reduction of the flood risk, the financial assessment for that and the identification of the necessary projects;
- cost analysis for the potential structural and non-structural measures, in an alternative manner, by using the 2D flood map analysis;
- analysis of the flood risk, for the evacuations and for the contingency plan (number of evacuated people, size of the forces assigned for the evacuation activities, logistics and technique available for the authorities);

Topographical studies will encompass situation plans, cross-section

profiles, longitudinal profiles, topographical studies, altimetry control points and the digital model of the terrain (DTM) with an altitudinal accuracy of 15 cm in the priority areas and 20 cm in the rest of the river basin.

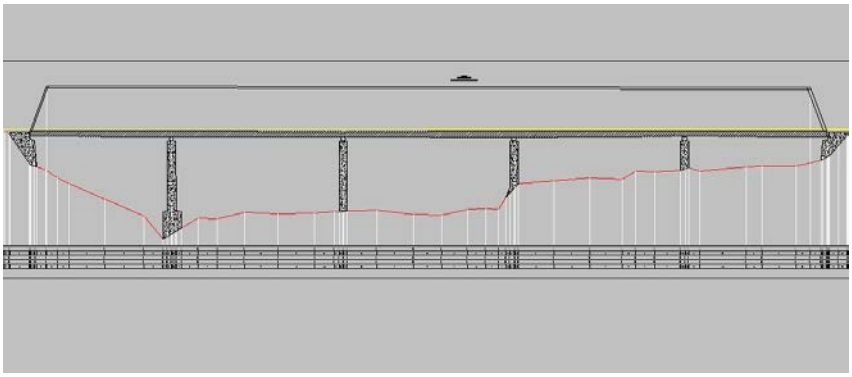

Fig. 1. Cross section example – bridge in Satu-Mare city

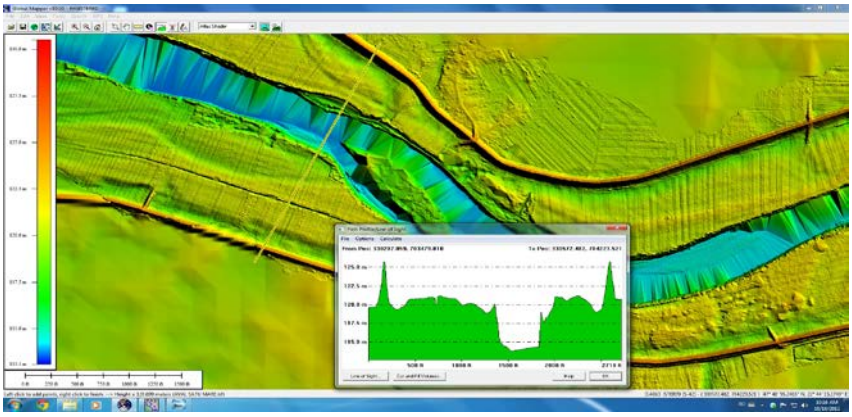

Fig. 2. The Digital Terrain Model – Someş River in the border area

The DTM will be integrated with the plans and the DTM vector maps or similar items, at the existing scale for the urban (inhabited) areas. We will use the most detailed available scale, and for the river basin we will use the informational plans made according with the 1:50.000 and 1:25.000 maps, where these maps are available. DTM will be presented on paper (on a convenient scale) and on digital format (Fig. 2).

The hydrological studies will provide the characteristic parameters for the floods occurred for the calculus discharges with overflow probabilities of 0,1%; 1%, 5%, 10%. The hydrologic and hydraulic models will be made by using the hydro-meteorological data base and the topographical measurements on site; them calibration will be done according to the records of the historical floods.

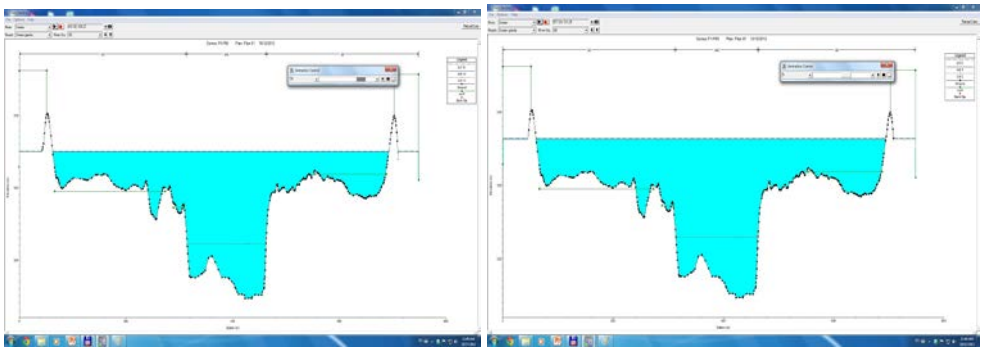

Fig. 3. Hydraulic modelling (cross section example) – Someş River (Romania)

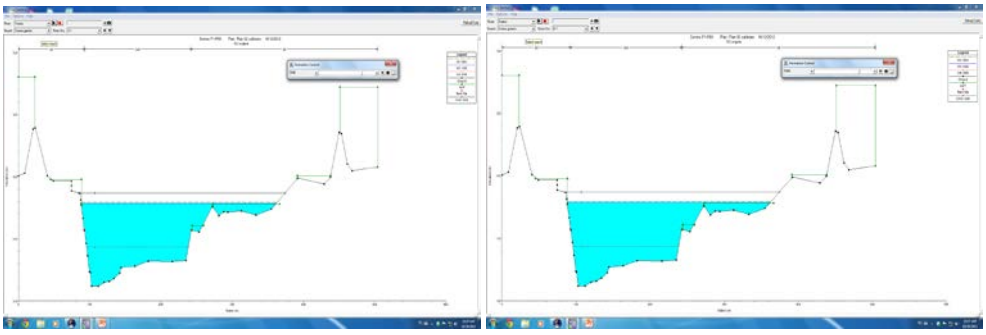

Fig. 4. Hydraulic modelling (cross section example) - Someş River (Hungary)

The studies on the hydrologic and hydraulic models will be necessary for the establishment of the carrying capacity of the riverbeds, for the delimitation of the flood plains and for the detection of the transit discharges at the hydro-technical installations, but also for the establishment of the parameters needed for the structural measures' projects. These will be based on the 1D and 2D unstable hydro-dynamic models (Fig. 1). Therefore, the users would be able to assess the proposed measures and the impact over the river's system; of course with the potential combination of the 1D and 2D.

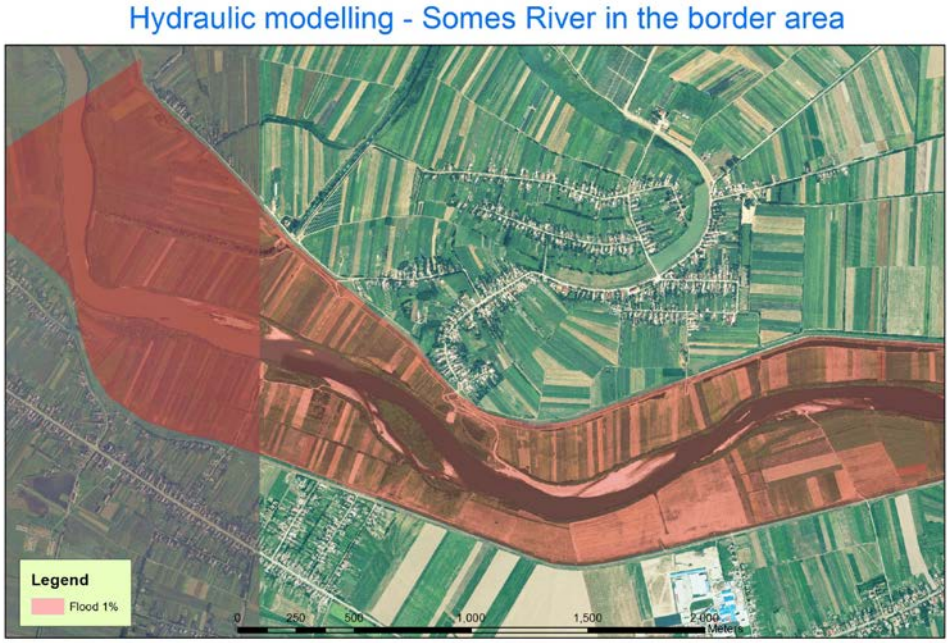

Fig. 5. Flood hazard map (example)

3. CONCLUSIONS

In developing policies referring to water and land uses Member States and the Community should consider the potential impacts that such policies might have on flood risks and the management of flood risks.

Throughout the Community different types of floods occur, such as river floods, flash floods, urban floods and floods from the sea in coastal areas. The damage caused by flood events may also vary across the countries and regions of the Community.

REFERENCES

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