

Tracking the Behavior of the Torrential Works on the Valleys of the Upper Basin of the Someșul Mic River

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Abstract. The torrential hydrographic network poses peculiar problems in terms of action planning. Flash floods are formed with intake leak on the slopes of the basin takes violent forms of expression along the river network, particularly in the areas of training and floating transportation. Prevent these destructive processes on the river cannot be reached except through hydrotechnical works, especially when it comes to preventing and combating the process of warping the accumulation lakes, as is the case of the Someș Valley. For the hydrotechnical works is necessary a continuous and systematic follow-up because these, due to land and torrential special conditions in which are located, are themselves subjected to destructive processes.

Keywords: torrential works, flash floods, river network.

INTRODUCTION

Works on the hydrographic network are subjected to destructive processes, slower or faster processes of degradation (destruction of concrete, of stone masonry etc.), having as a final result the damage of these works (Clinciu and Lazăr, 1997; Dîrja *et al.*, 2002; Dîrja, 2007).

Knowing the behavior of these works, either under continuous aggression and poor environmental factors (physical and chemical phenomena that occur due to infiltration of water through pores and cracks, expansion due to frozen and thawed repeatedly etc.), as well during torrential floods of high aggression, offer the opportunity to improve the technical development of the hydrographic network of torrents (Băloiu, 1980; Gașpar and Clinciu, 2006).

Tracking the behavior in time of construction used in the torrential hydrographic network planning is a systematic collection and recovery of data from observations and measurements of phenomena that conditions the exploitation or the construction quality parameters.

RESULTS AND DISCUSSION

To treat this subject we have considered four torrential valleys from the upper hydrographic basin of the Someș Mic river (Căprița, Păltinița, Negruța and Valea Caselor), valleys which were equipped with hydrotechnical works to correct the torrents since 1964.

On the 4 valleys taken into study are present a total of 92 hydrotechnical works for torrent correction (Fig. 1).

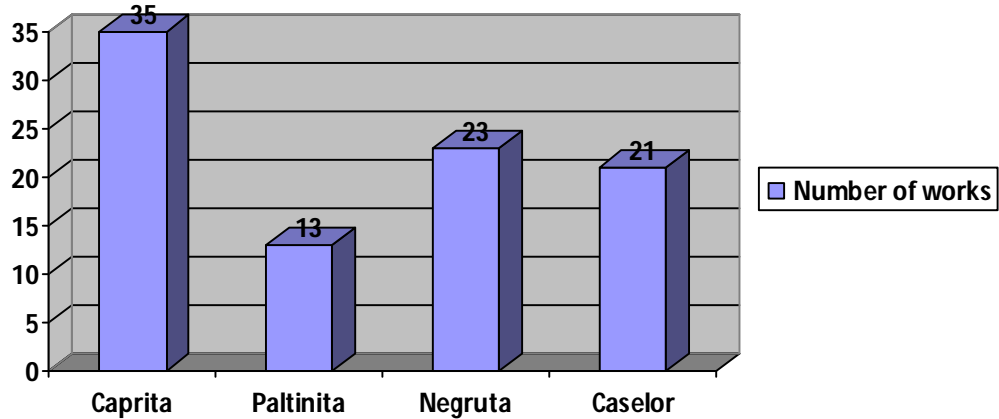


Fig. 1. The number of hydrotechnical works on each valley taken into study

The damages appeared to the hydrotechnical construction affect the safety and durability of the works (cracks, breaks, training, deformation, degradation by erosion, infiltration) as well as the works functionality (blocking the spillway, uncontrolled installation of vegetation, unfulfilment of the siltation or fillings, washing the siltation, unfulfilment of a part of work).

Dams were secured by the annexes to protect downstream tailbay consisting of foundation, walls and guard terminal spur. Exceptions are the flexible works made of dry masonry in wire gauze from the Caselor Valley and the dams executed from reinforced concrete prefabricated elements on the Căprița Valley. The most common damages appeared at the torrent correct hydrotechnical works on the torrential valleys taken into study are: degradation by erosion, undermining of the slab, undermining of the body work and blocking the spillway (Tab.1)

Tab. 1

Number of damaged works

Damages	Name of the valley			
	Căprița	Păltinița	Negruța	Caselor
Degradation by erosion	31	8	20	5
Undermining of the slab	17	4	11	3
Undermining of the body work	22	6	9	-
Sufosions	21	2	5	-
Blocking the spillway	13	5	9	3
Breaks	6	4	5	15
Training	3	-	3	11
Deformation	-	1	-	6
Disintegration	15	6	13	1
Infiltrations	1	4	2	-
Clogging slab	2	3	8	9
Uncontrolled installation of vegetation	2	1	6	3
Washing the tailbay	12	1	-	6
Unfulfilment of the tailbay	13	1	1	8
Failure fillings	2	2	2	-
Failure of a part of the work	2	-	3	1
Cracks	-	1	4	-

Breaks were detected in the discharged area of the works: at sleepers and thresholds on the Căprița and Păltinița valleys; at gabions on the Caselor valley.

In the first case, the damage consists of breaking the body of the discharged area from concrete, caused by the boulders shock.

In the second case, breaking the wire mesh gabions, followed by training of filling materials was produced by the body deformation of the discharge zone during floods of high aggression.

Degradation by erosion in dams was located in the barbicanes of the slab, the spillway practically operating without water slide. Thus water flow speed is increased and flows through the barbicanes section. Speed is dependent on current water depth of the upstream. There is every chance that the development of degradation by erosion associated with active tailbay wash, the works to be decommissioned.

CONCLUSIONS

Torrential hydrographic works in the upper basin of Someș Mic were subjected to slow-acting but long lasting destructive factors, as well as the action of torrential flash floods.

The damage occurred particularly in the downstream tailbay of the works because some have not been provided with energy sinks teeth which led to further interventions related to the work of downstream tailbay.

The breaks from the discharged area of the works occurred because of some execution deficiencies by adopting undersized constructive elements.

Degradation by erosion occurred due to the use of improper building materials and lack of resistant hydraulic stone for building the barbicanes which are subjected to erosion.

The degree of damage is relatively high due to: slow but continuous action of destructive factors; almost total lack of maintenance and repair; use of aggregates from the river bed, without prior washing; deficiencies manifested in the design and execution of the works; use of concrete with a lower mark than proposed; insufficient dosage of cement for the preparation of concrete; unfulfillment, when appropriate, the work from the next stage etc.

Although there are many negative aspects, can still say that the system works in the upper basin of the Somes Mic were well designed and that the goals originally proposed in the development projects were in the highest degree attained.

The neglect of maintenance actions negatively influence the behavior in time of the hydrotechnical works executed, emphasizing the damage at each torrential flash flood.

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