VÉDELEM TUDOMÁNY
KATASZTRÓFAVÉDELMI ONLINE TUDOMÁNYOS FOLYÓIRAT

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SZOKOLYA KÖZSÉG VILLÁMÁRVIZEI

Absztrakt

Napjaink változékony időjárása során a gyorslefolyású patakokon kialakuló villámárvizek, a legnagyobb károsító hatást általában a hegyvidéki településeken okozzák. A jelentős szintkülönbségnek köszönhető rövid csapadékvíz összegyülekezési idő a védekezési lehetőségeket csökkenti. Az intenzív áradás mederfalakat, építményeket, közlekedési utakat és közműveket tesz tönkre, ezzel jelentős gazdasági károkat előidézve. A megelőzés egyik fontos eleme az időtálló védmű kialakítás, amely biztosítja a környezetbe illeszkedő tartós védelmét a településnek.

Kulcsszavak: villámárvíz, vízkár, helyreállítás

FLASH FLOODS IN THE SETTLEMENT OF SZOKOLYA

Abstract

The most serious destruction caused by frequent and intensive downpours and quick floods wreak havoc on the northern area of the county, especially in highland settlements. Water in these cases damages not only buildings, roads and public utilities, but also water protection facilities. It is often dubious if the technical reconstruction of these will offer a long-lasting solution.

Keywords: flash flood, water damage, reconstruction

1. INTRODUCTION

Out of the natural threats, surface water and groundwater fluxes cause the most significant harmful events in the highlands and the hilly areas of Hungary. Settlements have been flooded by high waters on River Danube and Tisza in the past 3-4 years. Furthermore, damage done by local flash floods have also become frequent in our settlements. Damage in these areas has primarily been inflicted in the form of mechanical destruction, burdening settlement councils immensely. During protection work we often come across drainage systems and roads which have been fully recovered. However, as a result of a subsequent event, these facilities are often damaged again. Thus, reconstruction often proves to be of short duration. The rebuilding carried out from government subsidy and that of the local council often fails to provide a long-lasting protection. Dealing with flash floods and the affected areas is, unfortunately, not a priority of the experts, since the effects of such natural powers are rapid; prevention, however, would be costly. Nonetheless, insurance claims following natural disasters in Hungary prove that a significant part of the prevention tasks and the reconstruction work done by local councils are entailed by such harmful events. Drainage problems both in the inland and in the periphery ensue recurrent damage done to territories endangered by surface movement. Flood wave on these streams normally recede within a short period of time, generally within 1,5-3 hours.

2. HARMFUL EVENTS IN THE SETTLEMENT OF SZOKOLYA AND STREAM TÖRÖK

There is a considerable number of fast flowing streams in the northern part of the country which are dominated by flash floods. Protection of these territories can mostly be carried out via prevention. Emergency operation is mostly restricted to saving life and property; flow regulation on the scene is of little or no consequence. Nonetheless, reconstruction works are costly and time-consuming.

The area layout plan of Stream Török; the delineation subcatchments within the river basin district (source: the planning permission of the "Riverbed regulation of Stream Török" issued by the Vizimű Bt. Reference number: VM-06/01)

Stream Török in the settlement of Szokolya is situated in the northern part of Mid-Hungary, between Kismaros and Királyrét. It is the right-hand side branch of Stream Morgó that belongs to the left-bank water catchment area of River Danube. This fast flowing stream threatens the settlements of Szokolya, Kismaros and Verőce partially with flooding, which are located on the southern region of Börzsöny Hill. [1] The valley floor, which is of varied width along both sides of the riverbed, has been heavily urbanised in the past few decades. The newly-built estates are mostly bungalows and weekend houses, although many are often used for permanent habitation. To channel the flash flood on the stream, there remained only the winding mean water level riverbed, occasionally densely covered by lush flora. As a result of the reduced area of the flood plain, water levels have risen a great deal since 1999. The flooding on the stream wreaked considerable havoc on the settlement of Szokolya numerous times: twice in year 2010, and subsequently in 2014 and 2016.

Riverbank destruction (photo taken by Berkes Róbertné)

The destruction reached not only private estates, but also bridges for transportation, public utilities, the riverbank itself and its water protection facilities. In order to reconstruct the original conditions, the local council of Szokolya submitted a so-called 'vis maior' competition to deal with the damage done in 2010. From the support won in the competition, the reconstruction of the riverbank was carried out alongside the river in a few stages, in the stretch of 3188 metres altogether, restoring the canal embankment with scattered rocks and gravel.

An intensive downpour on 17 May 2014, caused massive flooding on the stream. The flowing water destroyed much of the streambed and the steam bank, posing serious threat to flood retention facilities, roads and public utilities. The flow defected the stone cladding that had

been built prior to the flooding, threatening to undermine it, and the embankment, thereby putting nearby estates at major risk. To utilise government subsidy, the local council submitted a competition. Under the auspices of the 'vis maior' process, the authorities inspected the scene on 26 May 2014. During the inspection, 13 scenes of destruction were designated which were to undergo reconstruction and preventive measures. Most of the destruction had already been recovered in 2010, however, the scenes were affected anew in 2014.

Further damage (photo taken by the author)

3. THE EXPERIENCE OF THE RECONSTRUCTION

Recurrent damages incurred by flash floods have proved that scattering rocks and gravel in these scenes is not enough. Furthermore, the natural stone tile flooring is placed—quite unconventionally—into concrete foundation, the inappropriate closure of which very frequently results in their suffusion. The undermined rocks and gravel appeared as deposited rockslides, which had to be removed prior to reconstruction works. As a result of previous consultations, the local council and the constructor resorted to employing a semi-natural solution, placing more durable gabion mattresses and retaining walls, which would also meet aesthetic requirements.

Gabions are steel wire cages filled up by stones on the premises, facilitating stability for the embankment through their weight, whereas gabion RENO mattresses are of shorter height, and are primarily constructed to provide a solid riverbed for the water course. Gabion structures are fast and economical to build in all circumstances, and are especially suitable for stabilising the embankment in hilly regions and areas of low soil quality. Gabion bulkheads are flexible; soil movements, however, do not influence the load bearing capacity of already functioning retaining wall structures. Vegetation will settle on gabion bulkheads within 1-2 years, nonetheless, selected plant species may be grown on them, too. [3]

Reconstruction, photo taken by Berkes Róbertné

A different reconstruction method, being employed gradually since 2010, guaranteed that the flash floods of February and March 2016 did not damage those riverbed phases which had been rebuilt after the events in 2014, and proved to be functioning properly. The flexible gabion structure, soon blending with nature, safeguarded the stability of the embankment and further protection against water destruction. Good samples are worth copying: many more Hungarian settlements which are under threat of flash floods (Tahitótfalu, Kismaros, Solymár) have used this method, or are considering the alternative solution of gabion cages.

Kismaros, Stream Nacsagromi, photo taken by Berkes Róbertné

4. CONCLUSION

Local water damage inflicted by precipitation and that of melt water is an everyday phenomenon in highland areas. It is a recurrent problem, since many times circular trenches in the edge of settlements are ploughed over, others are destroyed due to disregard in territorial planning. Furthermore, the low number of proper inland water drainage systems, the lack of their maintenance, poor implementation and the gradual narrowing-down of steam embankments all pose a major threat. The inadequate water drainage on roads without a hard shoulder, a proper road surface or gravel roads cause immediate damage and threatens primarily transportation safety. It has been a tendency for years that the technical back-up operations carried out during fire service interventions exceed the number of fire service

operations. Warding off extreme weather conditions account for the majority of technical back-up operations. [4] Poor-condition public roads, divided by deep ditches and run-off of surface water, significantly increase the time of interveners' arrival at the scene of event and encumbers carrying out waste dumping services and public transportation. However, reconstruction of local water damage carried out via an adequate technology will assist in the realisation of local flood protection and that of safety of life and property. Thus, in case of flooding, the number of units and equipment dispatched to the scene to control the event may be decreased in the long run, while the necessary financial support from the government is expected to be lower, too.

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