

Endangerment of Innertkirchen due to a dam breakwave

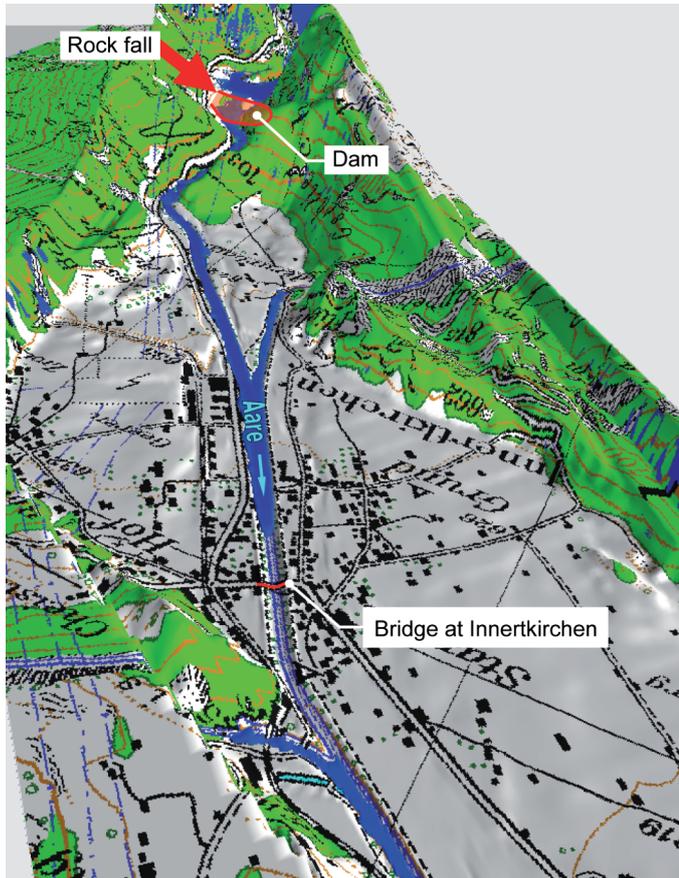


Fig. 1: Overview over the endangered area. The figure depicts the digital terrain model (overlaid with a map) which was used for the simulation. The peak of the wave reaches the bridge in the center of Innertkirchen about 15 Minutes after the overtopping of the dam

Upstream of Innertkirchen, deposits of a potential rock fall were expected to impound the Aare River. A lake would be formed and the question aroused whether the overtopping and the subsequent erosion of the dam would cause a flood wave that could affect the village of Innertkirchen.

The situation is shown in Fig. 1. The shape and the height of the rock fall dam was estimated by geologists, based on an incident which occurred in 1996 with a similar fall path and almost the same rock material. The maximum height of the dam was expected to be 20m.

Concerning the failure mechanism of the dam, inner erosion can be excluded because of its large base and the well graded slide material. Thus, it was assumed that the dam would break due to overtopping and the subsequent erosion of a breach.

The peak discharge of the dambreak wave depends on the inflow into the lake occurring during the opening of the breach and some material properties (grain size, critical side slopes etc.), which determine the erosion process of the breach.

Most of the material eroded at the breach is deposited along the first 400m downstream of the dam. Nevertheless, a part of the material propagates along the watercourse and is deposited at preferential locations (e.g. confluences). Although the depositions only occurred locally, the consequences were remarkable. The capacity of the channel and thus the safety against flooding was reduced by 15%.

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