



A man-induced landslide in Lower Austria: natural conditions versus man-made causes

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In many cases, composition and characteristics of hillslope sediments are of particular importance related to landslide research in low mountain areas. The interaction of geologic, geomorphologic, and hydrologic factors determines the susceptibility for mass movements, which is affected by human impact as well. The present study aims to investigate factors that control mass movements and natural and anthropogenic impacts.

On March 8th 2009, a landslide of 30.000 to 50.000 m³ occurred that destroyed a large part of a sports ground in the village of Hintersdorf, municipality of St. Andrä-Wördern (Lower Austria). As a result of extensive water supply ground liquefaction was initiated and the slide mass moved in form of a mud flow about 200 m down slope. As a consequence a small forest area and a fishpond were destroyed and an adjacent road was damaged.

Closely to the event, first studies started and showed that the Hintersdorf landslide was triggered by extensive water saturation combined with hydrostatic pressure inside the slide mass. Heavy and long-lasting rainfalls and the start of snowmelt caused strong seepage and soil water saturation. Furthermore, insufficient ground drainage and overflow of a small retention pond intensified the unfavourable impact on soil-mechanical stability.

Further studies included archive data analyse, field survey, as well as laboratory analyse and showed that high landslide susceptibility at the Hintersdorf landslide site was caused by a bundle of factors that control the process: The sports ground was built nearby the head of a trough valley that collects interflow and surface run-off from the surrounding slopes. The Flysch bedrock is covered extensively by clayey slope deposits. Furthermore, in the area of the valley head a waste deposit was operated up to the 1980's that resulted in a thick waste filling there. The Hintersdorf sports ground was constructed in 1984 on top of the waste body.

Preliminary results show that hillslope sediments and soils in the landslide area are almost impermeable due to their high amount of clay. On the one hand, they are able to seal the floor and to prevent the penetration of polluted water. On the other hand they provide a slide plane for mass movements. In contrast, the comparably low consolidated waste body forms a water reservoir. Due to technical operation, for example the deposition and mechanical compaction of soil material in context with the construction of the Hintersdorf sports ground, the waste body was partly sealed. To outline the result it can be stated that the unfavourable meteorological conditions during the first days of March 2009 caused an increased water pressure in the waste body, which triggered the landslide with damages to forest and infrastructure in Hintersdorf.

References

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