DRIFT WOOD GUIDANCE STRUCTURE AT THE WEIR "MATTENSCHWELLE" IN BERNE, SWITZERLAND

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Between 22. and 23. of August 2005 extreme precipitation led to serious inundations in far parts of Switzerland. Strongly affected was also the city of Berne, where the rapidly rising discharges of the Aare-River led to problems at an old weir called "Mattenschwelle". The main reason for these problems were large quantities of drift wood that jammed the sluices and gates of the weir (see Fig. 1). As a consequence, the Aare-River was forced to flow through the quarter "Matte", which caused large damages and resulted in hazardous situations for the inhabitants. For the future these processes need to be avoided.

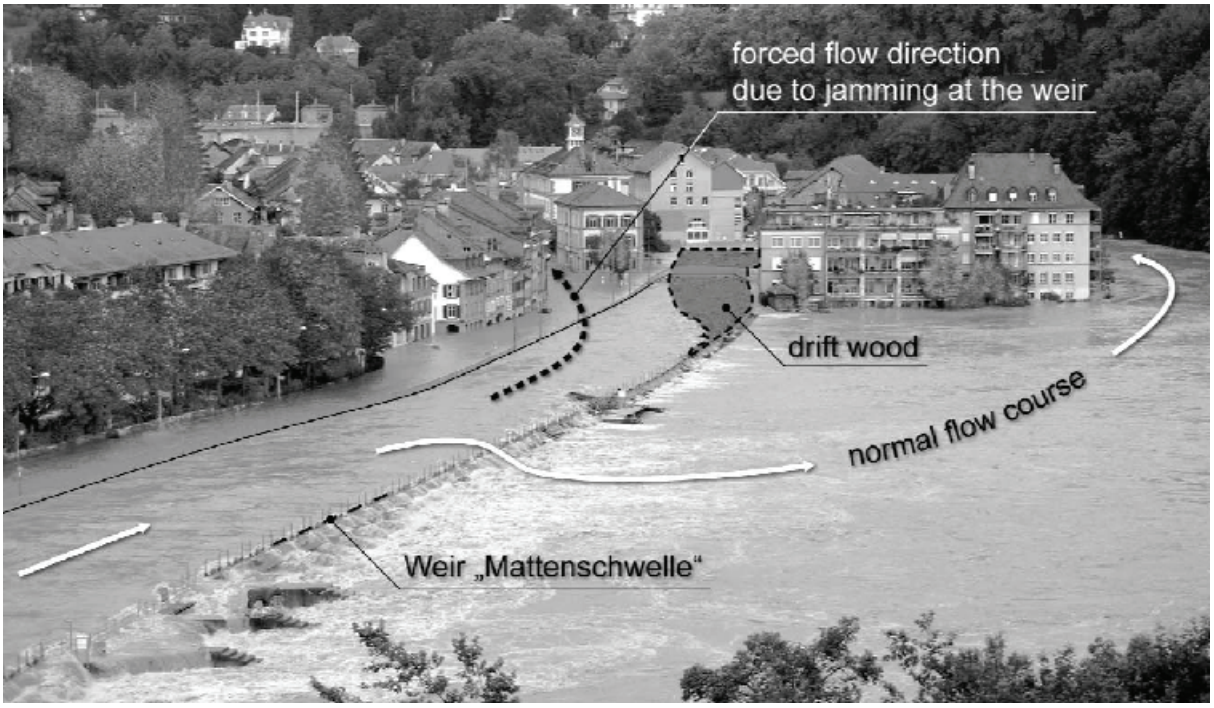

Fig. 1: The weir "Mattenschwelle" in Berne during the flood in August 2005 with large drift wood quantities (flowdirection on the picture bottom-up)

The course of the Aare-River upstream of the weir is characterized by a pronounced right hand bend. The observations during the flood event 2005 showed that the drift wood was transported at the outer side of the bend. For this reason, it is planned to construct a drift wood guidance structure that deflects the drift wood away from the weir towards the left bank, where it can be removed before causing problems. The drift wood guidance structure is designed as skimming wall to prevent that the drift wood is sucked under the structure and transported towards the weir.

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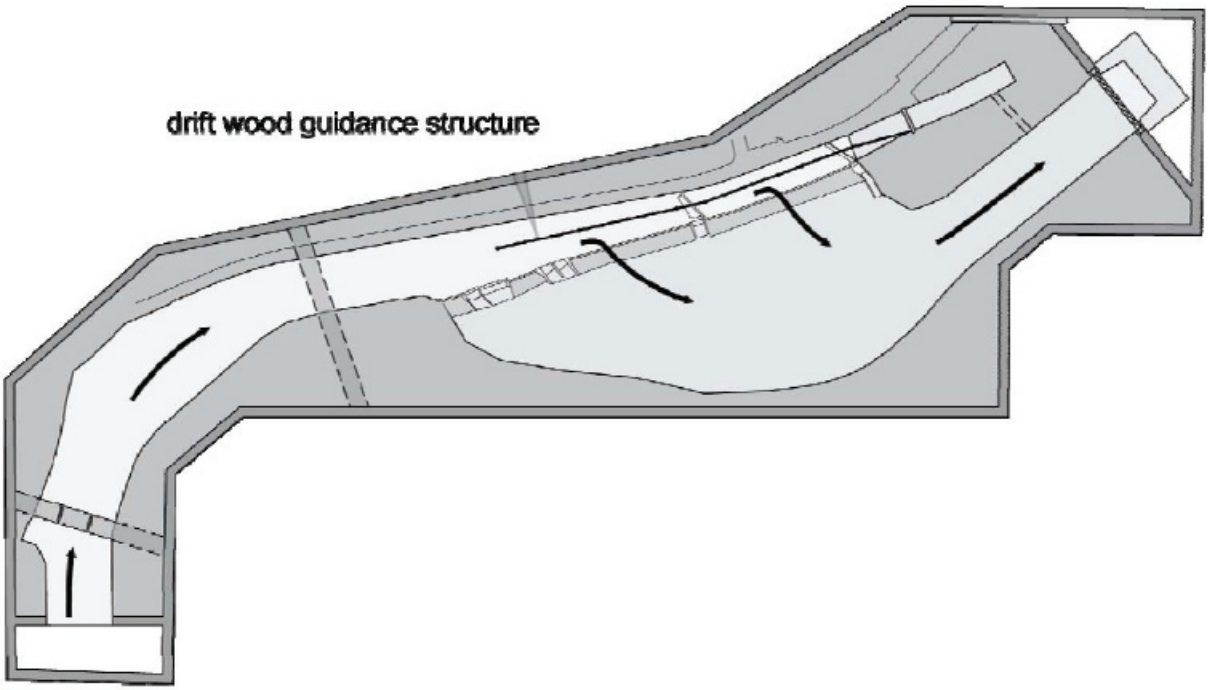

Fig. 2: Plan view of the hydraulic model

Because of the fact, that little practical experience is available for such a structure, a hydraulic model with a scale of 1:50 has been constructed (see Fig. 2). The goal of the physical model investigation is to check the functionality of the structure and to optimize constructive details, as e.g. the immersion depth of the skimming wall.

On the basis of the results of the model tests, criteria for the design of drift wood guidance structures will be derived.

Keywords: drift wood, hydraulic model, flood events