

Development of an integral system for dam and landslide monitoring based on distributed fibre optic technology

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SYNOPSIS. A large benefit of distributed fibre optic sensing technology is the opportunity to receive information on temperature (Distributed Fibre Optic Temperature sensing – DFOT) and strain (Distributed Fibre Optic Temperature and Strain sensing – DFOST) along tens of kilometres of a rather simple fibre optic cable in a spatial resolution of roughly one metre.

As part of the development of an integral monitoring setup for dams and landslides, tests carried out on the slope of “Aggenalm Landslide” in the German Alps are described in the paper. Fibre optic strain sensing and TDR cables (Time Domain Reflectometer) were installed vertically parallel to inclinometer casings into the landslide in order to receive information on the location, thickness and movement rate of the sliding plane and at the same time making a direct comparison of the different measurement techniques possible. Horizontally installed fibre optic strain sensing cables can provide information on the development of the primary and secondary cracks on the surface of the landslide.

In the next stage of the project, the installation of strain and temperature sensing cables into an embankment dam is planned. Settlements will be measured using strain sensing cables and seepage can be evaluated by heating up a temperature sensing cable (heat-up method), a method that has successfully been used in canal facings and dykes for leakage detection. (in press).