## Mitt innlegg, jeg foretrekker: Muntlig presentasjon

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# Title: A Virtual reality tool for Quick Clay Landslide Disaster Awareness

# Sammendrag / Abstract

## Introduction

Immersive media technologies such as virtual reality (VR) has become popular to recreate realitylike scenarios including the dangerous ones. The immersive and interactive capability of these technologies enables a realistic environment without risk to users. Because of this potential, several studies have been conducted on the application of VR aiming at observing on how people react to natural and man-made emergencies or/and teaching how to deal with them (e.g., Kinateder et al., 2014; Benvegnù et al., 2019; Tarnanas and Manos, 2001; Hagita et al., 2020; Shendarkar et al., 2008; Ke et al., 2019; Fujimi and Fujimura, 2020). However, only few studies have been done for floods and almost none for landslides.

Quick-clay landslides are characterized by an abrupt change of state where the clay becomes liquid and can reach high velocity after loaded. Quick clay landslides are hid-den hazard that they get triggered suddenly and it is difficult to forecast. In Norway, more than 100,000 people live in areas that have been mapped as containing quick clay. Hence, awareness creation about the cause and consequences of quick clay landslide in such areas can have a paramount importance in reducing the cost of the possible disaster. In this work, a virtual reality tool for quick clay landslide disaster awareness is presented.

#### Methods

To recreate a realistic VR quick clay hazard area, a co-design approach was adopted to create an immersive and interactive virtual experience. The co-design comprised nine different experts from geotechnical engineering, hydrology, psychology, and electronic systems and virtual reality. The data and opinions collected from the experts are then further discussed to filter out which hazard elements should be incorporated into the VR. Unity game engine is used to create the virtual reality environment and run out simulation results from OpenFOAM are used to show the flow landslide. Oculus quest 2 was used as a head mounted display to experience the immersion and interaction.

### Results

The result of this work includes the recreation of a quick clay landslide in VR taking Gjerdrum landslide as a case study. It has two scenarios: one comprising situations before landslide and the other after the landslide. In both scenarios a user can be immersed and interact with VR environment.

Keywords: quick clay, landslide, Virtual reality, disaster, Awareness,

