

Bibek Neupane



Department of Geoscience
and Petroleum

2017 - 2021

Long-term impact
on unlined tunnels of
hydropower projects
due to frequent start
stop sequences

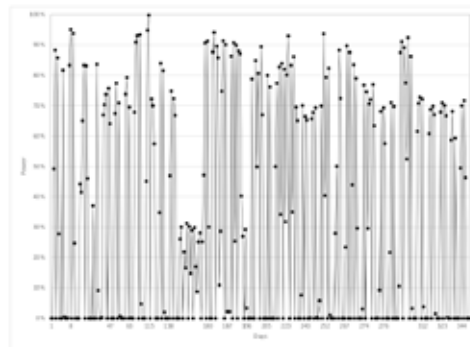
Supervisor:
Krishna K. Panthi



Background

In the future, most countries in Europe will be switching to renewable energy. In this context, water reservoirs in Norway are planned to be used as a “battery” for the European power grid.

Hence, the motivation of this research comes from the fact that unlined tunnels, which have been designed and constructed for base load plants, are now operating under dynamic loading conditions in terms of water pressure since the power market deregulation in 1991. This will further be increased with increasing market demands. This research aims to focus on the effect of such dynamic pressure changes on Norwegian hydropower tunnels.



Objectives

- Understand the effect of water pressure fluctuations in the rockmass and the tunnel.
- Identification of the mechanics of failure and engineering geological factors triggering failure to occur in the tunnel.
- Analyze the functionality of the rock mass along the periphery of the tunnel alignment in the long-term.
- Investigate state-of-art safe design of unlined tunnels, which can cope with the load fluctuations resulting due to the peaking operations and catering to the need of long-term durability of underground structures.

