

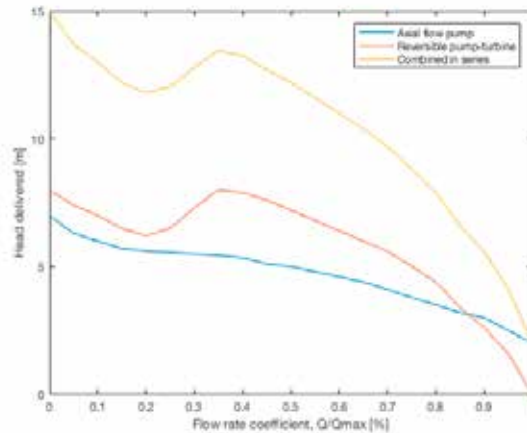
## Background

The purpose of this masters thesis is to investigate the possibility of introducing a booster pump in forefront of a reversible pump turbine to avoid cavitation when installing a pump turbine. With a rim-driven thruster as the booster pump. If successful, the necessary high cost procedure of lowering the waterpower plant when installing a reversible pump turbine, can be avoided.



This picture shows a rim-driven thruster developed by Brunvoll

The method of the master thesis is a theoretical approach, implementing and simulating the combined operation between the two pumps, using matlab. To implement the pump characteristics two approaches are tried. Firstly, an approach using suter characteristic curves, and secondly an approach implementing dynamic models of the pumps developed at the Waterpower Laboratory at NTNU.



This picture shows the combined characteristics of a reversible pump turbine and an axial flow pump

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**Simulation of a booster  
pump and a reversible  
pump turbine in series**

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