

# Flow analysis in mobile valves

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## Objective

The objective of this master thesis is to perform a theoretical investigation of front loader cycle behavior and produce simulation model concepts for future optimization strategies.

## Introduction

Nordhydraulic delivers hydraulic valves and controls for mobile systems where high quality and reliability is required. Customer satisfaction is important for Nordhydraulic, we provide our customers with highly advanced design solutions that aim to optimize controllability and performance of their machines.

Understanding flow forces and the nature of the fluid in hydraulic is important in order to design efficient and effective mobile hydraulic valves.

## Thesis description

In proportional directional spool valves it is important to understand the flow features that come to play during operation. The flow rate, discharge coefficient, and efflux angle all contribute to the resulting force on the spool, which is important to understand in order to optimize the valve performance. By use of CFD the underlying flow features can be simulated to find the optimal form of the spool and in particular the notches.

1. Theoretical summation from current literature on works concerning CFD, discharge coefficient, flow forces on spools with V and U notches.
2. CFD modeling of:
  - a. Center flow in open center valves
  - b. Meter in/Meter out flow in and efflux centre valve
3. Experiment verification of CFD model

## Additional information

*Scope:* Suitable for 1-2 master students

*Ref. Nr:* 900-1611-03

*Start date:* Jan-Feb 2017 or according to agreement

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