

Introduction

In large offshore equipment it is often required to rotate equipment with a high torque but very low speed. For example this can be slewing of cranes or rotating winch drums. In the solutions of today this is for example done with a rim gear and several hydraulic or electrical motors mounted with gear boxes and pinions. The solution of today has several challenges, but one is to reach sufficiently high torque and sufficiently low velocity for a reasonable price. The desired angular velocity is in the range of -5 to 5 rpm. One suggested concept is the ratchet mechanism shown on the figure. The idea is to have more cylinders and mechanisms placed around the winch drum. The flipper is thought to be either spring loaded or actively actuated to change direction of rotation. The hydraulic system can be either a digitally controlled system or a more traditional valve controlled system. Some of the requirements are:

- Continuous rotation of the winch drum in the range -5 to 5 rpm – meaning both clockwise and counter clockwise.
- Smooth transition between standstill and rotation
- Constant or near constant angular velocity through velocity control
- Safety feature against overrunning loads on the winch
- Brake when standing still

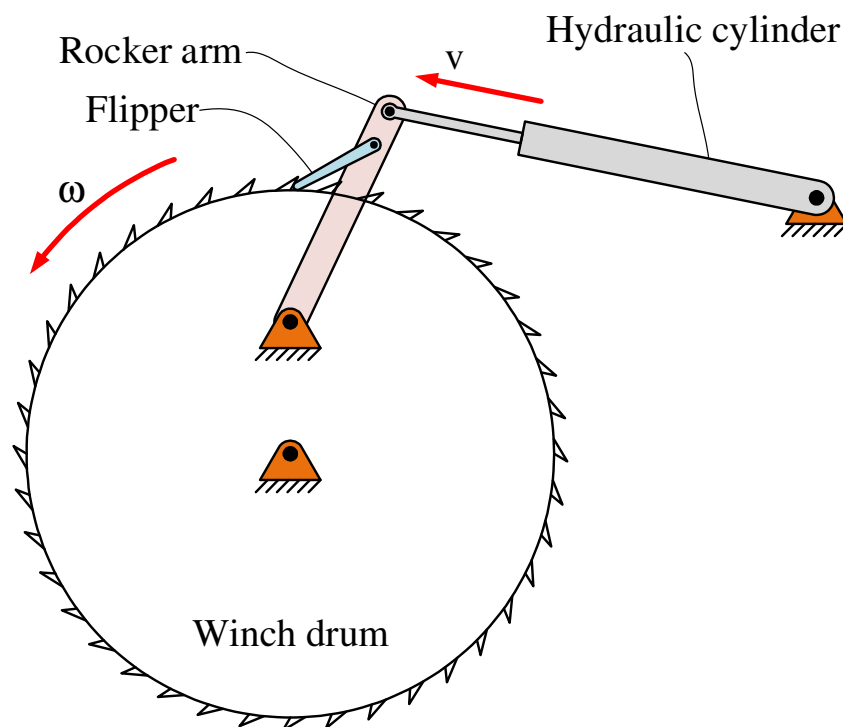


Figure 1. Concept for one way rotation.

Keywords

- *Design of mechanical concept*
- *Design of hydraulic system*
- *Design of controller concept*
- *Static computations*
- *Dynamic simulation*
- *Documentation*

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