

## Master's thesis

# Modeling and simulation of tandem operation in a hoist application

### Scope:

Future material handling and production systems will be open and adaptive, posing challenges for all layers, from the high-level IT-systems down to the machine control systems. A new integrated mixed-criticality controller is being developed in the ZIM-Project FOLSA ("Future oriented logistics safety application") by IFL together with project partners. The controller is aimed as an embeddable device for various material handling equipment, enabling safety functionality combined with IoT-communication capabilities in a compact form.

### Problem statement:

One target application in the FOLSA Project are hoist control systems. In order to develop and test these control systems, simulation models of the target processes are developed using Matlab Simulink. The aim of this thesis work is to extend an existing simulation model of a single hoist (electric drive, drive train and the crane bridge) for tandem operation with 2 or 4 hoists.

### Tasks:

- Study of relevant literature/theoretical background for the modeling work
- Building a mathematical model for the mechanics, including:
  - Mechanical interaction of 2 hoists operating on a single crane bridge
  - Mechanical interaction of 2 to 4 hoists lifting the same load
- Implementing the model in Matlab Simulink
- Simulation of selected operation scenarios
- Model validation

### Required:

- Interest in mechanical modeling and simulation
- Knowledge in Matlab Simulink is considered beneficial
- Independent and structured way of working

### Offered:

Possibility to work in the interesting field of safety-related machine control systems, with a view into current research problems.

The thesis can be written in either English or German.

### Field of study:

Safe mechatronic systems in intralogistics

### Thesis focus:

- Safety technology
- Experimental
- Theoretical
- Practical
- Simulation
- Construction
- Graphical design

### Study programme:

- Mechanical engineering
- Mechatronics
- Electrical engineering
- Computer science
- Infonomics
- Industrial engineering

**Begin:** As soon as possible

### Announcement date:

02/2018

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