



PLB exercise – CRANEBOT

Module title: Module 4: KETs (Key Enabling Technologies) for foundry 4.0
Learning Outcomes linked:
<ul style="list-style-type: none">-Define the advantages of collaborative robots.-Apply the safety features when working with collaborative robots.-Be responsible for creating the optimal safety features when working with collaborative robots.
Aims of the Activity:
<p>Automatization of operations is one of the biggest challenges to optimize operability. Due to limitations such as the reduced workspace of commercial robots, or high cost of large Gantry robots, manipulation over large workspaces is still done with traditional manual cranes.</p> <p>To find the solution to the problem of moving big weighs through the factory in small amount of time and without spilling the content of the transported material.</p>
Duration of the Activity:
<p>Individual work: 2 hour Team work: 14 hours Group reflection: 2 hours Total: 18 hours</p>



Introduction
<p>In foundries, one of the most repetitive and important process is to move the melted material in the ladle through the factory. This process has to be as quick as possible because of the material properties but has to be done with all the safety guaranties. The most common way to do it is to move it with a vehicle driven by a worker and to pour the material into the correct place.</p> <p>Doing it in this way, it is easy to have an accident or to lose a little bit of the material in the process due to the state of the vehicle or the road into the factory. The worker is to close to the melted material and in case of an accident the consequences could be very dangerous.</p> <p>That's why they should find another way to transport this heavy and dangerous melted materials through the factories in a fast and safety way. They need a solution that provides the following advantages to the factory:</p> <ul style="list-style-type: none"> • Fully control in position and orientation the load while it is being manipulated. • Precision load handling and movement without oscillations in any direction and in any operation. • Automation of operations throughout the production plant. • Sufficient hoist capacity. • Increase the productivity. • Enhance plant safety
Problem
<p>How to move large amount of material fast and safely through the factory.</p>
Learning objectives
<p>How to move big weighs and how to do it safely. Which type of automatization will be used, and if this could be chosen. Which type of material will be used to do make an effective solution.</p>
Resources
<p>An expert in robots. Catalogue of cranes. Website technical information. Simulation software.</p>
Product specifications
<p>A draft of how the crane will be. Simulation of the work done by the crane and possible moves of it.</p>
Guiding questions
<p>How can we move heavy loads through the factory? How can we move them safely? How can we move them more effectively than now? Is it possible to automatize the process?</p>
Assessment exercises
<p>Respond individually to the guiding questions. Discuss the answers together. Simulate in the software all the possible solutions.</p>



Time constraints
2 team work sessions (7 hours each) 2 group reflection. (1 hour each)