

TITLE: HEAT TRANSFER TO SLAB CARRIERS IN THE SLAB YARD OF THE HOT STRIP MILL

KEY WORDS OF ASSIGNMENT:

- Heat transfer – thermal load
- Physical modelling
- Data analysis

SUMMER APPRENTICESHIP

MASTER THESIS

WORK/SCHOOL APPRENTICESHIP

PROJECT

CONTENT OF ASSIGNMENT (POSSIBLY ILLUSTRATED WITH PICTURES/DRAWINGS):

ArcelorMittal Gent is a steel plant in the port of Gent. It produces flat steel products, used amongst others in the automotive industry.

At the steel shop of ArcelorMittal Gent, liquid steel is produced starting from hot metal and scrap by means of a treatment in a converter. After that, some additional treatments are realized, during which the liquid steel is cast into slabs at the continuous casting lines (CG's). These slabs are transferred to the slab yard of the hot strip mill, where they wait before being loaded into the reheating furnaces.

The transfer of slabs from the exit zone of the continuous casting lines to the slab yard, is realized by means of slab carriers (manufactured by Kress and Kamag). These are large vehicles (about 16x6x6 meters) which carry piles of slabs with significantly high temperatures. The slab carriers also receive heat while driving between other piles of slabs that are cooling down in the slab yard.

Each slab carrier can only be deployed for a certain number of consecutive hours because of the thermal load it receives. The heating of the vehicle affects the driver as well as the wear of the vehicle (steel frame, tires). Nowadays, the operational shift duration is determined by the dispatchers and the feedback of the drivers (+/- 2hours) but is not based on data or calculations.

The goal of this master thesis is to model the heat transfer from the slabs to the slab carriers and do a proposition for at which cycle time or temperature limit the vehicle should be cooled down, and for how long, depending on the slab temperatures it has been exposed to.

In the academic year 2018 – 2019, a master thesis was written to model the temperatures of the slabs in the yard that are cooling down after continuous casting. These calculations can be used and further developed in this thesis.

In this master thesis, you will design a physical temperature model to get an idea of which thermal load the slab carriers are exposed to. You will have the opportunity to get hands-on experience in a state-of-the-art-steel plant, work together with industry specialists in modeling techniques and contribute to technological innovation

OBJECTIVES:

- Development of a physical model to assess the thermal load





- Identify the thermal constraints determining the length of operations
- Suggest improvements to extend the operational time of the slab carriers

EXPECTED COMPETENCES (KEY WORDS):

- ✓ Physics of heat transfer
- ✓ Programming (preferably Python or C#)
- ✓ Data analysis and modelling

NUMBER OF STUDENTS:

- 1

TARGET GROUP: BACHELOR/MASTER/ ... & SPECIALIZATION(S):

- Master of science in electrotechnical engineering
- Master of science in physics

LOCATION:

- Systems and Models ArcelorMittal Gent, John Kennedylaan 51, 9042 Gent + at home

PROMOTORS:

- Industrial : Thomas Bogaerts
- Academic :

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