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Project MSc/Internship: Flow Pattern Simulation/Modeling in Square Silos

Top Silo Constructions
Top Silo Constructions (TSC) focusses on the design, structural- and detailed engineering, production and erection of square steel silo buildings for dry bulk goods. We serve different industries within the food chain, such as the grain handling, feed milling, premixes, flour milling, beer breweries and coffee roasters. TSC contributes to the huge challenge to feed up to 9 or 10 billion people within a couple of decades! We execute approximately 45 projects per annum all around the globe. With your knowledge you help us with interesting and large industrial projects. At TSC you will work in a dynamic international setting. We are a flexible and practical, down-to-earth company with a hands-on mentality. Although the culture is informal, we take our business very seriously.

Background assignment
It seems simple, you put something in a silo and it will come out. If it would be uncomplicated like that, we would not exist. Our silos excel in complicated processing environments and are always tailored to very specific circumstances. We will tell you a little secret, the product does not always come out of the silo. As you can imagine this has severe impact on the processes at our customers.
In line with the growth of our company and the increasing professionalism, TSC intends to expand her knowledge about flow patterns in silos in order to use this for optimizing silo designs. We want to predict in a better way how products will behave under specific designs and circumstances.

Description assignment
TSC aims to get a 3D simulation tool where flow patterns will be predicted based on several and variable input parameters.
Parameters
Whether the bulk product flows freely, hardly or not, depends on quite some factors. To give you an impression:

- *the silo design:* length, width, height, hopper angle, hopper shape, outlet size
- *bulk product characteristics*: internal friction of the product, friction from the product to the silo wall, humidity, shape of the product, degree of homogeneity, cohesion. Most of these parameters can be measured with lab equipment.
- *external*: climate, vibrations, duration of storage, discharge equipment

An important related topic is the influence of the flow pattern on the structural calculations for the silo.
Limitations
As you probably already notice, the pitfall here is that we want to study too much. The challenge will be to find out what is most important, for TSC as well as the most important parameters for the flow. You will maintain regular contact to our Structural Engineering Lead. TSC's Technical Manager and Commercial Manager will also follow your work with great interest.

Education

- University level with technical BSc or Pre-Master

Competences

- Analytical, Sharp mind, Ambitious!
- Great at math!
- Experience with modeling/simulations (finite- and/or discrete elements) is certainly a plus

University Contact:

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