

Master thesis

Investigation of flow characteristics of compressible particles using discrete element method (DEM)



BACKGROUND:

In order to produce high-quality agglomerates, many years of experience in the operation of pelleting and briquetting plants are necessary so that the requirements for the physical-mechanical fuel properties of ISO 17225-1 and -3. can be fulfilled. In addition to the raw material parameters (water content, particle size, etc.), plant parameters (e.g. design of the press channel) are also relevant factors influencing product quality. In recent years, the first steps have been taken towards modelling compaction processes. However, in order to better understand the process, especially on an industrial scale, further work is necessary, e.g. regarding the validation and description of the material behavior.

With this background, the theoretical principles for the compaction of woody biomasses are to be developed within the scope of a master's thesis and the compaction behavior of compressible spherical particles is to be transferred with the aid of particle simulations. A software tool based on the discrete element method (DEM) is available for processing. Theoretically as well as practically, the following key areas of work result from this:

YOUR TASKS:

- Determination of the state of the art in science and technology for the densification of woody biomass.
- Creation of laboratory experiments to determine material parameters from spherical validation particles (impact number, angle of repose, flowability, etc.)
- Simulation of the previously created laboratory experiments with the help of a 3D DEM-particle simulation tool (Aspherix®)
- Adaptation of the simulation for the determination of further material parameters and simulation-relevant parameters
- Evaluation of results and derivation of raw material- and process-specific recommendations for further development

YOU HAVE:

- bachelor degree in natural or engineering sciences
- Results-oriented work and ability to analyze tasks and problems fast

WE OFFER:

- A good introduction to the topic as well as competent and motivated support in the processing of the tasks
- A family-friendly, modern working environment in a collegial working atmosphere
- Good public transport connections

BEGINNING:

01.10.2023

DURATION:

16 weeks

LANGUAGE:

Writing in German and English possible

PROCESSING LOCATION:

Deutsches Biomasseforschungszentrum, Torgauer Straße 116, 04347 Leipzig

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APPLICATION DOCUMENTS:

Please submit your compelling application (in a single attachment, preferably as pdf, max. 5 MB)

e-Mail: bewerbung@dbfz.de

For an encrypted transmission of your application you can use the upload form Cryptshare.

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