REVIEW OF THE MASTER THESIS CTU-ITB

REVIEWER:

Dr. Nathanael Panagung Tandian
Assistant Professor in Faculty of Mechanical and Aerospace Engineering
Institut Teknologi Bandung, Indonesia

TITLE OF THE THESIS:

Drying of Biomass with a High Water Content

THESIS WRITER:

Mr. Pavel Kovarik, Master Student of Czech Technical University (CTU) and Institut Teknologi Bandung (ITB).

REVIEWER'S COMMENTS

The thesis project is very good because it is very relevant to the current energy efficiency issues, especially if we consider the limited availability of energy resources. Considering there are many aspects that have been considered in order to investigate and understand the phenomena, therefore the reviewer like to appreciate Mr. Pavel Kovarik for his effort, time, and energy in completing the thesis project up to the end and achieved good results. Mr. Pavel Kovarik's thesis project is a comprehensive engineering project covers a literature study about various aspects of drying processes, planning of experiments to get additional information for designing a biomass dryer, designing a biomass dryer for handling high water content biomass, and conducting an economical study of the new biomass dryer design.

There is a very old and well-known Indonesian saying *"tidak ada gading yang tidak retak"* or "there is no such un-cracked ivory" in English, so although the thesis project is very good and the associated experiment has been performed well, it still leaving several questions regarding the matters. The biomass water content that used for the boiler was given at 20%-weight could raise a question whether this 20% water content is the optimum water content for the considered process. The final evaluation conducted in the thesis project was based on a theoretical study, i.e. the economical study on the new biomass dryer. Therefore it is interesting if the project could be proceeds further in finding the optimum water content of the dried biomass before it is burned inside the boiler. An experiment investigation of the new system performance also needs to be done in order to know the reality of the processes involves in this project.

The aforementioned phenomena are complex, especially when two or more operating parameters are simultaneously changed during the experiment, so that it is very often difficult

to pinpoint the parameter that has the most significant effects to processes. Considering this situation, it is suggested to consider to utilize the factorial statistics, i.e. a parametric study technique, in this kind of study.

Mark: very good (B)

Bandung, February 14, 2017

Signature of the reviewer:

QUESTIONS: (***May choose one question – depends on the available time***)

(1) Please give a complete description about a drying characteristic curve, i.e. a drying curve on a moisture content vs drying time plane. Also explain about drying stages involved in the drying process, and explain why each drying stage usually has different drying rate compared to that of other stages.

(2) In the thesis, each drying curve shows a monotonically decreasing water content at a more or less constant drying speeds (Figure 5.3 in the thesis). Please explain why in this case seems there was only a single stage involved in each drying curves; and which drying stage involved in each drying curves.

Thank you.~