SOLID MATERIAL PROCESSING PLANT MODEL

Background

A good percentage of our alumni work in the industry in the surrounding Eastern Indonesia region. The result of our survey has shown that most industries in the Eastern Indonesia region implement some sort of solid material processes, for instance processes in the mining (nickel, copper, coal, etc.), the flour grinding and packaging and the cement industries.

One of the related courses in the Electrical Engineering Study Program is a third year level course entitled "Process Control Technology". To develop this course into a course applying the Laboratory-Based Education principles, it is proposed to build a mini-plant model of a typical solid material processing unit in industries.

The Proposed Plant Model

The attached Figure 1 shows the rough sketch of the proposed mini-plant model. The model is an iconic model of a typical solid material processing unit in industries. The solid material used in the mini-plant is dry sand, and the basic implemented processes are soaking and drying into a certain moisture or percentage of water content.

Using this mini-plant, students and interested faculty members can develop many research activities, and based on these activities a productive teaching-learning environment could be enhanced.

At the output portion of the mini-plant users can make several measurements, including the measurement of temperature, moisture, level and pressure, which are typical measurements in processes involving solid materials in industries. At the input portion, on the other hand, the users can apply control signals such as the opening of a valve, the speed of the belt conveyor, the speed of the stirrer, the furnace's heat-transfer, etc. These input-output measurements of the mini-plant will allow both students and faculty members to create reasearch projects on the instrumentation and monitoring systems. They will also be able to design a feedback control system by connecting the output monitoring system back into the input through a control algorithm such as PID control, neuro-fuzzy algorithm, adaptive algorithm, etc.