

Capability to Design a Factory: Main Competency of a Chemical Engineer

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As a country that has considerable amount of natural resources, Indonesia has a wide range of chemical industry, whether small, medium or large. There are five major oil refineries owned by state owned enterprise PT. Pertamina, 5 large-scale fertilizer plants, as well as several cement factories with a production capacity reaching several million tons per year. Everything is high-tech; these plants process natural resources into products that are needed by the society.

"Although some industries are partly owned by foreign investors, but all the factories are run by Indonesian experts. Even in the last decade the construction was totally done by Indonesian experts," said Prof. Ir. Rochmadi, SU, Ph.D at the Senate Hall on Monday (26/9).

Prof. Rochmadi said that during his inauguration as Professor of Faculty of Engineering, Universitas Gadjah Mada. Delivering a speech *Factory Design, Process and Product in the Field of Chemical Engineering*, he explains that when we see it more detailed, the establishment of these plants is based on a design factory, where the idea of raw materials process into products is realized in a series of process equipment that is designed based on chemical process knowledge, industrial tools, economics and humanities. "Therefore, the ability to design the plant is a main competency that must be mastered by a chemical engineer. The plant design is one of the main content of chemical engineering in higher education," he explained.

According to Rochmadi, with the varying levels of mastered ability, so far the design, construction, operation and management of chemical plants can be done by the Indonesian people themselves. In the field of plant construction, engineering and project management, some Indonesian contractors already had the experience and are able to compete at world level, such as PT. ReKayasa Industri (Industrial Engineering) and PT. IKPT. "Similarly, the ability in terms of the factory operation and management, the Indonesian people have proven their ability. Unfortunately, this has not been matched in the field of research and development of chemical industry that does not look strong," he explained.

Although it does not apply on everything, said Rochmadi, in general, the results of produced applied research are still far from the application on the industrial/commercial scale. Even arguably, the position of the research is still half applied, whereas the results of research and development processes that are ready to be used to design the plant need to cover many aspects, such as aspects of processes and equipment reliability, construction material, age of catalyst, byproducts and waste generated. "The problems are that research and development of these aspects sometimes do not consider having sufficient scientific value academically. Therefore, it is not surprising that

researchers from universities and research institutions in Indonesia did not complete their research until it has really become a process that is ready to be built commercially," said the husband of Dr. Ir. Aswati Mindaryani, M. Sc, and the father of three children.

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