

CHEMICAL ENGINEERING PRACTICE IN THE PHILIPPINES TODAY

by

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Chemical engineers are the molders of future colleagues in the profession. As molders, it is necessary to set the trend and direction to enable the students to realize their role as chemical engineers in the future. They should know their area of responsibility and limitations. But, foremost they should be aware of their environment to make them competitive.

R.A. 318, an Act regulating the practice of chemical engineering, provides in Sec. 12 the definition of the profession, to quote:

- a) "A person shall be deemed to be practicing chemical engineering or rendering chemical engineering service within the meaning and intent of the Act who shall, for a fee, salary or other rewards or compensation, paid to him or through another person, or even without such reward or compensation, render or offer to render professional chemical engineering service in the form of consultation, investigation, evaluation, planning, designing or preparation of specifications for or estimates of industrial plants; or undertake the supervision of construction, erection, installation, alteration of operation of industrial plants.
- b) the term industrial plants as used in this Act, shall mean any plant in which unit process and unit operation are involved.
- c) the term unit process as used in the Act, shall mean the type of chemical change which is involved in the manufacture of industrial products.
- d) the term unit operation as used in this Act, shall mean a type of physical operation by which a desired step in an industrial process is controlled or conducted."

From the definition as quoted, we could categorize the practice of the chemical engineer into the following categories, namely:

- a) as a consultant;
- b) as a management man; and

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- c) as an investigator, evaluator, planner, etc. or a person that can prepare a feasibility study.

Some chemical engineers are not aware of all the above potential areas where one could indulge in. I might be wrong but what usually is pictured by a chemical engineer to be his task is to supervise the operation of an industrial plant and ensure the smooth production of quality products/goods.

In the past two decades, the practice of chemical engineering has not been fully harnessed by the policy makers. This may be attributed to the fact that we have relied heavily on the importation of consumer and industrial goods than in developing our country's manufacturing capabilities. It was only in the latter part of the 60's when the industrial development was seriously considered and it was only then that chemical engineers found their proper place. You can find chemical engineers in the different fields of endeavor due to their special training and their flexibility to adapt in any type of situation. A chemical engineer can be both a manager and a technologist, thus, fitting perfectly in industrial management required by the new thrust of the government. A chemical engineer has an advantage over his colleagues in the other professions due to the fact that he has knowledge of the process involved tied up with profitability.

The profession of chemical engineering is so broad that it has unlimited potentials. However, this could be a disadvantage due to the present trend towards specialization. Our profession is being threatened by this development which in some ways limit the area of concern of a chemical engineer.

We can start with the Chemistry Act, R.A. 754, approved in June 18, 1952, which defines the practice of chemistry in Sec. 8 to quote:

- (a) "Chemistry may be defined as the science which studies the preparation of matter; the change in composition which substances undergo; the energy involved in: and the conditions necessary for the transformation of the matter."

"Scope of Chemistry—The analysis, synthesis, preparation and manufacture of chemical, biochemical and mineral products and materials; the sale of chemicals and chemical apparatus; and chemical equipment; consultation work or problems related to change matter, and/or to chemical or physico-chemical process or processes.

- (b) Chemist—Any person, who for a fee, salary of other compensation or rewards to himself or to another person renders professional service requiring the use and application of chemical knowledge, and/or chemical or physico-chemical processes."

During a public hearing and upon the representation of the Philippine Institute of Chemical Engineers (PICHE) and the Board of Chemical Engineering Examiners, a limiting provision was included in R.A. 754. Sec. 24 of R.A. 154 provided the definition of chemistry to quote:

“Act not affecting other professions. Any person who has passed the corresponding Board examination for practice or a profession already regulated by existing law shall not be subject to the provision of this Act if in the practice thereof he has to perform work or service by this Act.”

It will be noted that the chemical engineering practice has been in existence way back in 1939 but was formalized only in June 18, 1948, five years earlier than the chemistry practice.

Again, another R.A. 5921, approved in June 21, 1969 has some bearing with the practice of chemical engineering. This act regulates the practice of pharmacy in the Philippines which touches on the manufacturing of pharmaceutical products which is within the preview of the practice of chemical engineering. It could not be denied that unit process and unit operation are involved in such operation, though the products produced are pharmaceutical ones. To emphasize this point Sec. 23 of said Act is quoted, herewith:

*“Definition of practice of pharmacy—*A person who shall, for a fee, salary, percentage, or other reward paid or given directly to himself or indirectly through another, *prepares or manufactures*, analyze, assay, preserve, store, distribute or sell any medicine drug, chemicals, cosmetics, pharmaceuticals, devices or contrivances used in pursuance therefore; or render pharmaceutical service in an office or drug and cosmetic establishment where scientific, technological or professional knowledge or pharmacy is applied; or engage in teaching scientific, technological or professional pharmacy subject in a college of pharmacy; or conduct or undertake scientific and bacteriological testings and examinations.”

The latest law that is seriously affecting the practice of chemical engineering is P.D. 1536, regulating the profession of the metallurgical engineer, promulgated in June 11, 1978, which was passed and approved without any public hearing. Metallurgical engineering practice is actually chemical engineering as it involves the processing of mineral ores which is within the area of responsibility of the profession.

Ever since, the chemical engineers have managed the processing of mineral ores before the appearance of metallurgical engineers. The nickle processing plant at Nonoc, Surigao, one of the three biggest nickle processing plants in the world, is run by chemical engineers numbering about

120. This is also true with all the mineral processing plants in Marinduque, Cebu, Baguio and in other mining areas.

The passage of P.D. 1536 is a very big blow to the practice of chemical engineering since a great number of chemical engineers presently employed in various mineral processing plants are affected. The chemical engineers may even be misplaced as P.D. 1536, provides that only metallurgical engineering can manage and operate plant processing ores and metals. However, to soften the impact of the decree to chemical engineers, Sec. 15, 4(a) and (b) of P.D. 1536 provides, to quote:

- a) "Bachelor of Science in Metallurgical Engineering or Metallurgy or its equivalent, the course for which covers not less than the total number of credit units equivalent to the regular course in metallurgical engineering; or
- b) Bachelor of Science in Mining Engineering or Chemical Engineering and in addition has *had at least five years experience* in any or all of metallurgical engineering practice as defined in Section 12 of this Decree."

In the first place, the condition of five (5) years experience for chemical engineers to be able to take the examination is very stringent and the fact that metallurgical engineering is just a specialization of chemical engineering. Furthermore, the chemical engineers have been running all the mining processing plants since the beginning of the mining industry in the Philippines.

It may also be stated, that the passage of this Act was done in secrecy by the organizers knowing that it will affect other professions. Professional laws are usually promulgated upon proper consultation with related professions as was done in the case of the Chemistry Act.

Representations were made by the Board of the Chemical Engineers and a meeting was held at PRC where points of agreement were made, that is, a provision will be added in P.D. 1536 to allow professionals who are actually engaged in the practice to continue and be exempted from new regulations and examinations.

However, recently, things have changed and the agreement is set aside by the metallurgical group. It may also be said that the PICHE also wrote to the PRC about our stand on the matter.

I would therefore request and enjoin all those who are in a position to press for a public hearing of P.D. 1536, should try to cooperate and coordinate with us in order to protect the interest of the chemical engineers who have spent a long time in different mineral processing plants.

Furthermore, the metallurgical law even went to the extent of including the subject of "fuel technology" which is an entirely a special subject in

itself and different from metallurgy. Metallurgy uses fuel but it does not mean that fuel technology is also an exclusive property of the metallurgical profession.

Another instance where the chemical engineer is again being stripped by the more powerful mechanical engineer and the sanitary engineers, is in the abatement of pollution.

In the Rules and Regulation of the National Pollution and Control Commission (NPCC), after making the representation, the chemical engineers together with the mechanical and sanitary engineers, respectively, can sign plans for the abatement of water, air and other pollutants. Looking at the preparation and training that a chemical engineer has undergone, one would consider him to be the most qualified and in the profession which is the most relevant to environmental and industrial waste management.

However, with all these recent developments, we can still survive, but let us not allow such threats to the practice of chemical engineering. We can intensify our efforts towards the abatement of pollution and industrial waste management. The chemical engineer can consider a system to include the substance and the process and the environment together with the required equipment to make it operational. Thus, we can pursue the area without any conflict with other professions.

The educators and the policy makers in chemical engineering should emphasize on areas that are unexplored by other professions and to adjust the curriculum accordingly in order to support the national development thrust.

In line with the new developments, the area of petroleum technology including petrochemicals; ceramics and glass technology; and the processing of organic and inorganic materials together with the design of required equipment for chemical processing may be emphasized and developed.

The educators should expose themselves to these new developments in order to effectively impart to their students these new concepts and areas just enumerated above. Exercises in the preparation of design and specification for the construction of an industrial plant should be carried out in school preparatory to the students' embarking a new life outside the university campus.

In the codification of all professional laws prepared by the PRC, the PICHE has been actively involved. To strengthen the practice of chemical engineering, the word "management" was added. The present provision provides supervision which could be interpreted in its limited sense by other groups who are competing with our profession. Other subjects proposed in the professional code which is already incorporated in the curriculum are biochemical and environmental engineering. The introduction of new subject matters in the Code is only to formalize what is actually being

practiced by chemical engineers. We can cite chemical engineers in San Miguel Corporation, Soriano y Cia, Mabuhay Vinyl Corp., Maria Cristina Chemicals and such other corporations who are in the executive levels and are running efficiently the company and are performing or engaged in such endeavor.

It may be observed that the chemical engineers have not asserted themselves in the practice of their profession as provided for in the Act. It is high time that we exert efforts to package ourselves to make others aware and interested in the potentials of a chemical engineer. Probably we have not so emphasized it in our curriculum or even in lecture rooms, thus, we have missed the opportunities laid down for the chemical engineers.

The practice of chemical engineering is so broad and flexible that it embraces a wide spectrum. Probably this is the reason why new professions are being formed. To make the practice of chemical engineering more important, we must jibe its activities to the thrust and development efforts of the country. These could be in the priority areas set by the government, namely:

- a) design of effluent treatment plants for air, water and solids and liquid wastes or industrial waste management;
- b) design of processing plants for indigenous materials on cottage, small and medium levels;
- c) alternative sources of energy and the corresponding processing equipment;
- d) glass (optical, decorative and others) and ceramics technology;
- e) petrochemicals from mineral oils and other sources
- f) textile, pulp and papers;
- g) bio-engineering;
- h) chemical production; and
- i) others

The above areas are presently being undertaken in various laboratories and you will not be surprised to find chemical engineers involved in such undertakings. Emphasis should therefore be given to the above identified subject areas in the curriculum. This could be started in the preparation of theses which might eventually be the starting point of a small industry.

The practice of chemical engineering should not be equated with capital intensive and highly mechanized industrial plants. Efforts should be directed towards cottage, small-and medium-size industries which could be established and operated individually. Chemical engineers should not think

of just being employed in a large local corporation or a multinational corporation but rather on how they can start in a small way applying the chemical engineering principles acquired from schools and from books. It is not necessary to construct a large and sophisticated plant. A simple one would suffice for a start with local fabricated equipment that could easily be maintained in the area. Think of a processing system that is applicable to the rural areas, which is the target of the government.

Another aspect that could be given emphasis is on technical writing. Probably we are not good in projecting the things we can undertake, thus we are left in the background. Though we are qualified as engineers we often avoid writing reports. We should not justify the fallacy that engineers can not write, because we can if only we try.

Let us join forces and work harder for the betterment of our profession, if not, time will come when our profession will be obsolete. We have to be dynamic and be up-to-date with the latest development.

Let it not be said that we, chemical engineers are not dynamic and that we wake up each morning decades late! Rather, let us be models of dynamism . . . let us make others feel that in us is a force raring to meet every challenge that development may bring. Let not anybody tell us the latest development! This may seem an impossibility but not if we join forces and work harder for the betterment of our profession.