

# MANAGEMENT AND INDUSTRIAL ENGINEERING IN THE PHILIPPINES \*

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## INTRODUCTION

Since this is probably the first time that the Philippines has participated in a conference of the American Institute of Industrial Engineers, I would like to say a few words by way of introduction about its land, people and economic history so as to make it easier to comprehend the various factors that have affected the growth of industrial engineering in the Country.

The Philippines, often called the "Pearl of the Orient" and the "Window of Democracy in the Far East", is a group of over 7,000 islands of varying sizes with a total land area of about 115,000 square miles (approximately the size of the State of Arizona). These islands are grouped into three large regions—Luzon, to the north, which is the biggest island; the Visayas, the central and near-southern islands; and Mindanao, the islands at the most southern end. There are over 85 dialects spoken in the islands, most of them differing radically from one another, and it is very seldom that persons residing in one province can speak a dialect other than their own. There are, however, what could be considered three main dialects, namely, Tagalog, spoken in the central Luzon provinces; Ilocano, spoken in the northern provinces; and Visayan, spoken in the south. By legislation, Pilipino (Tagalog) has been adopted as the national language. The Philippine population of 29 million increase at a rate of 3.2%, or roughly a million people, a year—one of the fastest rates of population increase in the world. In 1963, the gross national product at market prices was estimated at ₱16.9 billion. Per capita income was about ₱460 or (at present exchange rate of ₱3.90 to \$1.00) \$141.

## THE ECONOMY

The Philippines is basically an agricultural economy, with agriculture contributing about one-third to its national income (based on 1962

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figures). The traditional export products of copra, sugar, abaca, lumber and minerals are the main sources of foreign exchange. At present, mining and manufacturing contribute nearly one-fourth to national income. A great bulk of manufacturing activities is confined to the processing of agricultural products. Other manufactured items include textiles, footwear, wearing apparel and madeup textile goods, paper products, printing, leather products, rubber products, chemicals, various non-metallic mineral products, metal products, electrical appliances and supplies, car and truck assembly and other miscellaneous durable and non-durable manufactures which can be classified as light industries. The Philippines has no blast furnaces, steel mills or copper smelters. The basic chemicals industry is just starting to develop.

#### ECONOMIC TRENDS

Since gaining political independence in 1946, the Philippines has always been aware that she must change from a purely agricultural to an agro-industrial economy. World War II taught her the tragedies of dependence on a few agricultural export products. In 1949 a crisis was reached in her international reserve position, necessitating strict control over imports and foreign exchange. With population increasing at the rate of a million people a year, she realized the desperate need to increase national productivity. Great efforts have been exerted to effect this change to an agro-industrial economy and to a small extent these efforts have met with success. From a contribution of 13% in 1950, manufacturing now contributes one-fourth of national income.

As mentioned earlier, strict controls had to be placed on imports and foreign exchange in 1949 in order to conserve our international reserves, preserve the stability and the convertibility of the currency and promote economic development through utilization of scarce foreign exchange resources for highly essential and productive uses. Under import controls, only those products deemed by the Central Bank of the Philippines (which was the controlling arm of the government) to be highly essential consumer goods and producer goods were allowed to be imported. Later, direct import controls were removed but exchange controls continued to be instituted. Under these controls, all foreign exchange transactions had to be approved by the Central Bank and only holders of import or foreign exchange permits or quotas were allowed foreign exchange. Such exchange was given at the rate of ₱2.00 to \$1.00. Black market rates of exchange ranged from ₱3.00 to ₱4.00 to \$1.00.

Under these conditions, the mere acquisition of an import or foreign exchange quota meant certain profit for both commercial and industrial users. This, plus additional tax incentives and other financial assistance

extended by the government to new industries and the virgin field for investment in domestic processing and packaging of import substitutes, spurred the establishment of these favored industries but did not encourage efficiency of operations. The market was assured and profits were high because of tax incentives and the low peso-to-dollar rate. Even firms with low efficiency could survive under such conditions.

In 1962, it was decided that the controls established in 1949 had outlived their usefulness and a program of decontrol or devaluation was instituted. Since that time foreign exchange rates have been determined by free market prices which average about ₱3.90 to \$1.00. This return to a freer economy has given the businessmen greater freedom to establish new ventures and greater responsibility for their success or failure. However, peso costs of imported raw materials, machinery and equipment and other imported materials have almost doubled. Furthermore, since imported consumer goods can enter local markets freely, even at increased costs, manufacturers have to compete both in price and quality with these goods. Efficiency of operations has now become vital to manufacturers. Furthermore, the more realistic rate of exchange has made it possible for Philippine industrialists to set their sights on foreign markets since they can now take better advantage of lower labor costs. The minimum wage in the Philippines is about 13¢ per hour for industrial workers and about 8¢ an hour for agricultural workers, although many industrial workers receive about 17¢ to 20¢ an hour\*. Increasing costs and the possibility of greater participation in the international market have made it imperative to keep costs and quality as competitive as possible.

It was also in 1962 that the government announced its Five-year Socio-economic Development Plan, the over-all goal of which is "...to insure that domestic production, augmented by imports, shall be adequate to provide for the needs of our growing population." Over-all investment target for the plan calls for an additional ₱12,053 million of gross fixed investments within the period of five years from 1963 to 1967. The industrial program as outlined by the plan envisions the attainment of two primary objectives—the expansion of import substitutes in terms of finished, intermediate and capital goods and the development of light industries which can be competitive on an international basis, considering the Philippines' low labor costs. These light industries include footwear, wearing apparel, wood and cottage industry products, pharmaceuticals, etc. The plan assures government assistance and cooperation in the establishment and promotion of these industries both here and in foreign markets, thus providing inducements to manufacturers to undertake new ventures in these fields.

\* Expressed in U.S. cents.

## INDUSTRIAL ENGINEERING

Under conditions outlined above, it is understandable why industrial engineering is still very much a newly emerging force in the framework of Philippine industry. Since 1952, there has been pending in the lower house of Congress, a bill to regulate the practice of industrial engineering in the Philippines. It was reintroduced in 1962 but has yet to be passed. Approval of this bill would mean that qualifying standards would be set for the practice of industrial engineering as a profession. The bill defines industrial engineering as that applying "to the technique of organizing and conducting an industry, or manufacturing useful products through the application of the principles of time and motion analysis for work simplification and standardization, and includes control of quality and quantity of production through modern mass production methods, establishment of cost standards and reduction of costs through improved methods of manufacture, and technical aspects of personnel management in such activities as job evaluation and wage incentive program." The bill requires all persons practicing industrial engineering to obtain a certificate of registration or certificate of proficiency from a Board of Examiners for Industrial Engineers. Certificates of registration would be issued only upon passing an examination given by the Board. This examination would cover such questions relating to industrial organization, administration and management, machine design, design and construction of factory buildings, theoretical and applied mechanics, engineering law, economics and ethics, and principles of industrial engineering, with the latter comprising 40% of the examination. Only persons 21 years of age or over, of good moral character and reputation and possessing a degree in industrial engineering would be entitled to take the examination. Certificates of proficiency would be given to qualified persons with at least two years teaching experience in the field of industrial engineering or five years of actual practice. Industrial engineers from other countries called in for consultation or establishment of industrial enterprises would not be required to obtain certificates of registration. It is significant to note that this bill, which would put the practice of industrial engineering on the same level as that of the accounting and other engineering professions, has not yet been passed.

To characterize the extent of the application of industrial engineering in the Philippines, the industrial structure may be divided into three levels. The topmost level comprises the firms wherein industrial engineering exists in a formal sense, that is, as staff departments. The largest of such Industrial Engineering departments is composed of 18 engineers. Subsidiaries of American and European corporations fall under this category, particularly those engaged in the highly competitive

here would consist of smaller foreign subsidiaries, large Filipino corporations and Filipino enterprises with foreign participation. Operational methods in these firms were generally established by foreign technicians who stayed on after supervising the installation of imported machinery and equipment. In these organizations, production standards are set by foremen and supervisors, machine improvements and layout are handled by the plant engineer, and job evaluation by the personnel department. Generally, no formal training program exists within the company although many firms enroll supervisors in courses offered by the University of the Philippines and encourage reading of industrial engineering articles in journals. For the most part, however, the line supervisor is left mostly to himself to discover solutions to internal plant problems. The standards used, if any exist at all, are not set in strict conformity with industrial engineering standard procedures. Wage rates are determined predominantly on a historical basis of averaging production during the day or for a longer period of time. Within firms in this category, the recognition of the potential contribution of industrial engineering to over-all profitability has already crystallized, but due to lack of qualified personnel and to other more pressing needs, industrial engineering has remained in the planning stages. Also, the performance of industrial engineering functions by other departments eases the pressure to set up a staff department. However, in these companies, it is common to find committees on cost reduction, product improvement, etc. It is believed that as current economic trends lead to changes in product lines, product improvement and expansion, change in personnel requirements and the inevitable increase in wages, these firms will be under greater pressure to develop an industrial engineering staff. Recently, a large Filipino-owned corporation began operations. The industrial engineer who was hired was assigned to study the most efficient ways of delivering the product to the consumer, to determine routes for expected repeat orders, to establish a system for maintaining equipment loaned to dealers, to determine the number of men required for various jobs, etc. This exemplifies the new spirit that is emerging in Philippine industry today — the trend toward the acceptance of industrial engineering as a basic part of operations.

In the third category, which comprises the numerical bulk of industrial establishments, industrial engineering is practically non-existent, and whatever does exist is performed by front line supervisors and technicians. In the small- and medium-sized factories falling under this classification, management is still preoccupied with more basic problems of production, product development and financing. The techniques of production have remained virtually unchanged since the start of operations

and there is still a great deal of improvisation and preoccupation with shortcuts which solve immediate problems but may be detrimental to the company in the long run. Most of the workers are still paid wage rates only slightly above the minimum levels set by law.

It is perhaps among these firms that Industrial Engineering holds the greatest promise. As will be more thoroughly discussed later, the AID and the National Economic Council of the Philippines have set up an Industrial Development Center which provides consulting services in various fields, including industrial engineering, for businesses such as these. The aforementioned Industrial Engineering bill is intended to give industrial engineers due recognition in industrial establishments where their technical services are needed in connection with our program of reconstruction and rehabilitation, and its passage should boost the acceptance of industrial engineering among these firms.

This breakdown has depicted a broad over-all view of industrial engineering practices in the Philippines. Although there are several graduates of industrial engineering from American universities, these persons normally do not confine themselves strictly to industrial engineering work but rather to the broader aspects of production management. Shortage of top management personnel in the Philippines enables these graduate industrial engineers to assume higher positions that would require and/or enable them to specialize in industrial engineering alone.

#### PROSPECTS OF INDUSTRIAL ENGINEERING

The tempo of increased productivity consciousness depends primarily on how soon and how many existing and future enterprises adopt well-defined training programs on the functions of industrial engineering, and secondly, on the extent to which these companies utilize available external facilities for management and industrial engineering development.

With regard to the latter, the University of the Philippines and two private universities have for the past twelve years been offering related courses in industrial engineering. At present the evening classes conducted by the Graduate School of Business Administration of the University of the Philippines, with Industrial Management as one of the major fields, has been drawing about three hundred working students yearly, some already occupying positions in middle management and making valuable contributions to productive efficiency. One such contribution was the introduction of the use of standard containers for fish in fishing boats, an innovation which cut unloading time down con-

siderably for this highly perishable product. This innovation has now become standard practice for the entire industry.

Professional training organizations, particularly the Industrial Development Center (IDC) and the Executive Training Institute of the Philippines (ETIOP), complement the universities in sustaining external management development. Supported jointly by the Philippine government and the Agency for International Development, the IDC has conducted a total of 568 training programs since 1955 and these were participated in by 11,810 executives and supervisors. These conference-type programs lasting for two months encompass fields from Executive Development and Supervisory Training to the specialized areas of methods improvement, wage and salary administration, industrial safety, etc.

A distinctive feature of the IDC is the concept of inplant consultation. Reinforced by the presence of foreign consultants and industry specialists in methods engineering, foundry and forging, and preventive maintenance, this activity is directed towards improving production methods in small- and medium-sized plants that cannot afford to hire consultants on a full-time basis.

The IDC uses standard operating procedures, e.g., work stations, functions, or situations that have the greatest potential for improvement are subjected to further critical analysis contingent upon the written consent and approval of the client firm. As a means of recording and compiling data in an organized manner, various charts showing "before" and "after" comparisons are prepared. In this way, evidences of wasted motions, materials, efforts, and time can be localized, the underlying causes bared, and the recommendatory corrective steps formulated and acted upon. The recommendations are translated in terms of both their direct and indirect impact on the productivity of the plant surveyed. Should the solutions to problems unearthed require highly specialized services not available at the IDC, the project team suggests where such specialized services can be acquired. In certain cases, the work of the team can go deeper. For example, the techniques of work simplification and/or standardization, plant layout, cost control, etc. may be demonstrated on a certain section or operation in the plant as a means of convincing the management of the effectiveness of such tools in reducing costs and improving productivity. At the same time, the concept of outside help in the form of consultation will be better appreciated.

The existence of these external training facilities augurs a better future for management and the practice of industrial engineering. The products of these institutions carry with them the challenge to apply

their newly-acquired skills. And when this is achieved, better plant management will result, not only in increased profits but also in increased output and will enable limited capital to go farther in improving standards of living. The success of enlarging this concept of productivity to encompass professional management will be realized the sooner these managers, formally schooled in business skills and disciplines, attain majority representation in policy-making decisions.

The speed at which industrial engineering is accepted as an essential part of operations, however, will depend largely on external economic factors. It is too early to gauge the effects of recent government monetary and economic policies on industrial productivity, but it is a certainty that existing firms have been forced and will be increasingly forced to pay more attention to increasing efficiency of operations. In addition, the Philippines has been faced with a chronic problem of unemployment and underemployment. About 20% of the labor force is still unemployed or underemployed. Underemployment is common because of the seasonal nature of agricultural labor. And the labor force continues to grow by about 350,000 workers a year. As a result, unions have not yet attained the stature of their counterparts in other countries. It is only in financially strong companies that fringe benefits paralleling those in more developed countries have been extended to workers. As industry develops and unemployment is eased, unions will grow in strength and wages will increase. This will have a two-fold effect on the acceptance of industrial engineering practices — one in the setting of wages and the other in keeping down production costs as labor costs rise. It is significant to note that at present, the common practice is to set rates based on historical performance that will allow the worker to earn a certain daily wage that would approximate the legal minimum wage rather than to set rates which provide incentive to workers for increased output. In other words, the difference between incentive rates and the legal minimum wage is so small that workers are not motivated to exert more effort. However, the process of setting wage rates, which was described earlier, still meets with the workers' acceptance. The Bureau of Labor Standards of the Department of Labor has the responsibility for regulating the setting of standards. However, because of lack of personnel, standards are actually examined only upon receipt of complaints.

The shift of the labor force towards non-agricultural production will require significant changes in skills, attitudes and orientation. The availability of cheap unskilled labor has not in a real sense contributed to greater productivity and has at times even served as a deterrent, since measures to reduce its use, though they may have reduced production costs, have tended to create unemployment. In other instances,



laws designed to promote employment have created some rather specious situations. For example, cigarettes packed entirely through mechanical means are taxed at a double rate compared to those packed manually. As a result, local cigarette manufacturers manufacture cigarette pouches and cigarettes by machine but use hand labor to pack the pouches. The government, in general, encourages projects which are labor intensive.

Ultimately, the widening of the industrial base will loosen the vise-grip of unemployment on economic progress. But this must be supplemented by the development of a skilled labor force. A bill now pending in Congress seeks the establishment of free technical training centers throughout the Country for young and adult workers. The courses to be offered will be related to the principal industries of the localities where such centers are located. The establishment of a Labor University designed to extend the opportunity for professional training and higher education to the children of poor families will also contribute to easing the shortage of skilled labor. The products of this university will be channeled to the industrial sectors by means of employment exchanges to be set up by the Department of Labor.

#### SUMMARY AND CONCLUSION

The practice of industrial engineering by the Filipinos has not kept pace with the industrial development of the Philippines due to several factors:

1. Government policies and control during the initial stages of economic development protected the operations of industries and allowed the entry of foreign technicians.
2. Control over foreign exchange prevented competition on an international scale, thus minimizing the pressure on producers to maintain quality and reduce costs.
3. The problem of unemployment has discouraged labor-saving measures and has been a deterrent to the strength of unions. Thus, union wage demands have been for a living wage rather than for incentive pay.

To the limited extent that it has been practiced in the Philippines, however, industrial engineering has already benefited workers through increased wages, management through greater output, and industry through the emulation by smaller companies of the examples set by the more progressive companies. The aggregate growth of all these represents the contribution of industrial engineering to our economic growth. But its greatest task lies in the immediate future. The Country is em-

barking on a program of economic development in which production will be of primary concern. The removal of foreign exchange controls has already started to "put the squeeze" on businessmen for greater efficiency. As production increases and unemployment is lessened, wages will increase. On the other hand, purchasing power may not increase in direct proportion to the increase in wages and this will mean added pressure on industrialists to maintain profits by keeping down costs. In addition, the freer economy will expose industries to foreign competition—another inducement for efficiency consciousness.

Meanwhile, education processes continue, thus assuring the Country of competent industrial engineers *to meet the needs of businessmen* who realize the absolute necessity of industrial engineering to the operations of an industrial enterprise.