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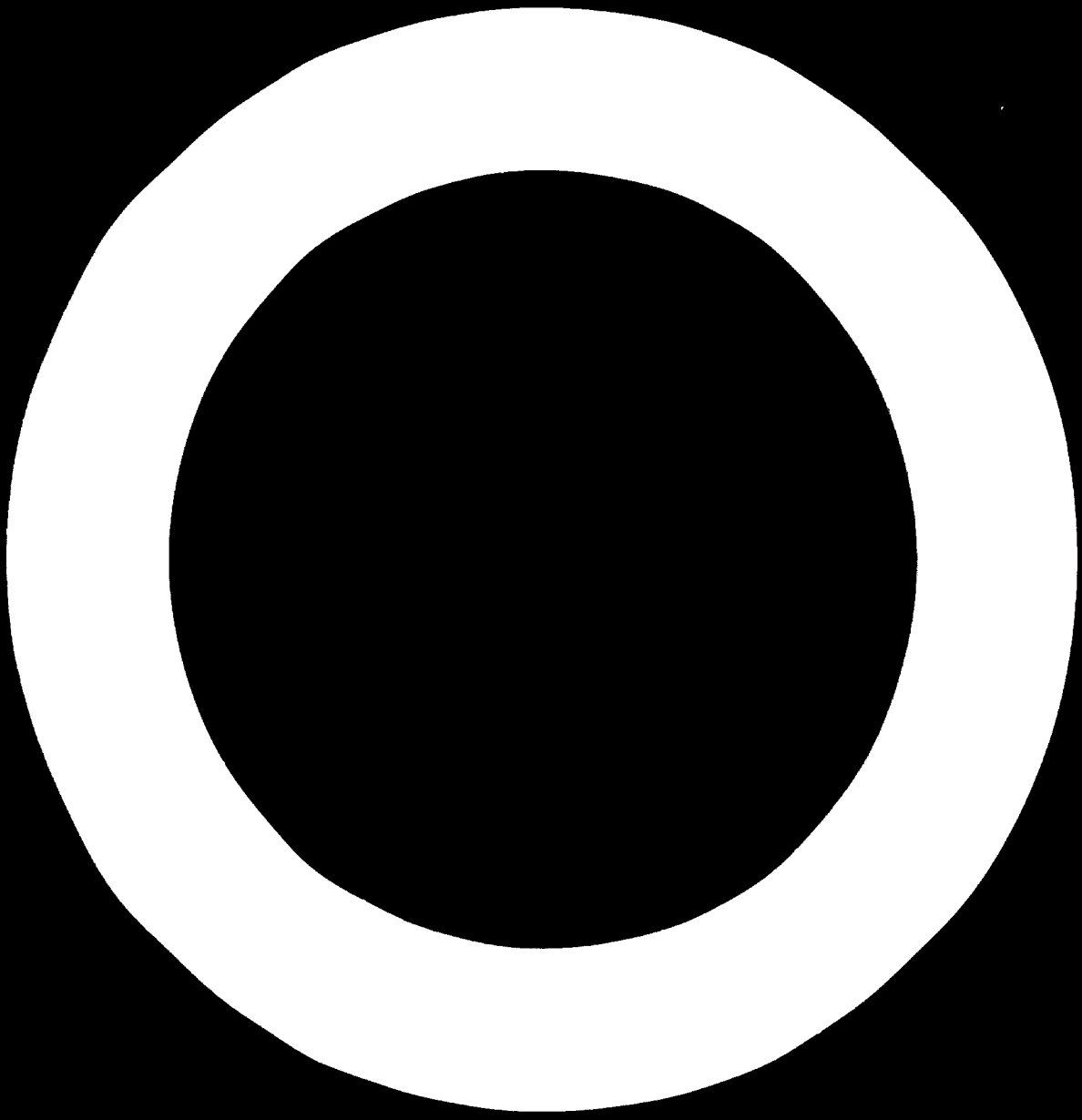
by

Albert Waterston



THE USE OF SECOND-HAND MACHINERY IN DEVELOPING ECONOMIES

Albert Waterston

Opposing Points of View

A United Nations publication of a few years ago[1] referred to the conflicting views of several U. N. experts about the advisability of using old or reconditioned machinery in underdeveloped countries. One U. N. expert in a Far Eastern country, a specialist in the production of ramie, proposed that second-hand decorticating machinery be used in a plant producing ramie fibre. "While the [reconditioned] machines will not be as efficient as new models," he pointed out, first quality fibre can be produced with them. It is obviously important that every possible economy be practiced in order to conserve foreign currency funds." An expert in another country also recommended installing used machinery in a plant which already had some old machinery because new machinery would "result in a serious imbalance in the flow of production." In contrast, a third expert advised against a proposal to install reconditioned textile machinery in a Middle Eastern country because "old machinery or even the best reconditioned machinery will produce only inferior goods". He saw "no reason why the country should be handicapped with worn-out theories or machinery which would only hamper its strides toward improvement ...."

Similarly divergent opinions are also found outside the United Nations. There are, indeed, two widely separate schools of thought on the subject. Those who favor the use of second-hand machinery

1/ United Nations, "Capital Intensity in Industry in Under-developed Countries," Industrialization and Productivity, Bulletin 1, April 1958, p. 18. All quotations in this paragraph are from this source.

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The views expressed in this article are the author's and do not necessarily reflect those of the Bank.

and equipment in developing countries argue for most if not all underdeveloped countries, as one U. S. official did in a recent report on his findings in India, that "considering the current stage of manufacture in India, the machine which is obsolete in the United States may well be economical for India at this time because: (1) it costs less; (2) [it] is less complicated and hence more useable by workers unaccustomed to a high degree of automation; (3) low labor cost in India makes automation less significant; and (4) India can do more tooling up by utilizing selective used equipment because of the great foreign exchange saving." Citing a specific visit he made to a large machine shop and automobile assembly plant which is using second-hand equipment from the United States, the same official wrote: "used machine tools...had proved entirely satisfactory and in fact were better adapted to the work which they were doing at this time in India than more modern automated machines would have been. This was the opinion not only of local engineers but of the two engineers...[from the United States]...who set up the shop for [the firm] and have been consulting supervisors of the company's operations during the past three years. In addition to being the right type of thing at this stage in India, their cost was between thirty and forty percent of the cost of new machines."

Advocates of greater use of second-hand equipment in underdeveloped countries contend that not only do firms using such machinery do well in the domestic market, but, because of low wages, they may be able to compete in export markets with companies in high-wage areas which operate with more modern machinery. In Calcutta, for instance, an old private firm, affiliated with a larger British concern, bought from its British associate a used semi-automatic machine for making wood screws. Under Indian conditions of low-wage rates, it not only undersells the British company in India, but also exports to neighboring countries at a lower price than its associate. An even more striking example is that of a foundry in Cleveland, Ohio, that shipped some of its old casting equipment (which in the United States required uneconomic amounts of high-cost labor to operate) to South America, where it was used to establish a foundry. Although steel for casting also had to be shipped from the United States, the company found that the South American castings could be delivered to Cleveland (a round-trip distance of 7,000 miles, including 700 miles of inland transport) at a lower cost than it could produce similar castings with modern equipment in its Cleveland plant.

Those who find little merit in the idea of using second-hand machinery and equipment in developing countries can also cite examples, but these point up the mistakes which can be made with old equipment. For example, machinery formerly used in South Africa was installed in a paper-board factory in Jamaica. The plant has never been profitable in spite of low wage rates in Jamaica because advances in technology have produced a great gap between the productivity of the

recent machines in the United States and the older machines used in Jamaica. Since Jamaica is near the United States and the Jamaican tariff is low, freight costs and duties on paperboard imports do not add enough to the cost to compensate for the lower costs of production of the more modern machines.

There are those who argue that it is uneconomic for developing countries to utilize old equipment under any circumstances. They contend that underdeveloped countries could accelerate their industrialization in the long run by equipping their industries with the most modern automatic machinery available, even if this means that the unemployment problem remains unsolved for a time. Proponents of this course of action believe that in this way underdeveloped countries can most expeditiously overcome the impediment imposed by their unskilled labor force and become internationally competitive with the industrialized nations. "The more advanced techniques," writes one well-known economist 2/, "tend to save both labor and capital. By the same token, capital-scarce countries can less afford losses through obsolescence than capital-rich countries; it is particularly important for the underdeveloped country to choose techniques that will not become outmoded soon. In any case, only unskilled labor is abundant; skilled workers, technicians, foremen, and managers are scarce even more scarce than capital. For this reason, one finds Stanvac installing a fully automatic refinery in Bombay, and the municipality of Djkarta choosing a fully automatic French design for its water filtration plant."

One must also take note that the Export-Import Bank and other agencies which finance development projects in underdeveloped countries generally shy away from providing funds for the acquisition of used equipment for the projects they finance. They feel that the use of second-hand machinery and equipment introduces an unnecessary uncertainty in a situation which already has many difficulties. In cases where loans have been made for used equipment, banks have usually required certification from a reliable source that the equipment is in perfect operating order, that it will last at least as long as the lifetime of the loan, and that spare parts will be available if needed.

The matter does not come up frequently because most borrowers prefer new equipment if they can get it. There are several reasons for this. There is the widespread view, by no means limited to the insufficiently-developed countries, that what is new is inherently better than what is old. This is not necessarily so, as everyone knows. Nevertheless, like the financing agencies, operators of plants in underdeveloped countries do not wish to add to their burdens unnecessarily by using second-hand machinery, even if they know where to get it; and it is not always easy to locate the right type of usable

2/ Benjamin Higgins, Economic Development, W. W. Norton and Company, Inc., New York, pp. 672-3.

second-hand equipment when it is needed. Furthermore, while a plant may be found where used equipment is pointed out to visitors, most operators take much greater pride in managing factories with the most up-to-date production facilities. This human frailty is frequently encountered in underdeveloped countries.

Indeed, in some underdeveloped countries, there is such a strong aversion to the use of anything but new machinery that entrepreneurs have been known to settle for lower financial returns in order to enjoy the psychological satisfaction derived from ownership of the latest equipment. Anyone who advises a developing country to acquire used machinery runs the risk that his motives will be suspected, and that he may be accused of wanting to saddle a country with the "castoff" equipment which another country wishes to scrap. If anything goes wrong in a factory which has installed second-hand machinery, the blame may be placed on the used equipment instead of on possible mismanagement or on other causes unrelated to the used machinery.

In any discussion of the advantages and disadvantages of used equipment for underdeveloped countries, one is likely to be as impressed with the arguments of those who oppose the idea as with those who favor it. Which of the contrasting views is "correct"? Are the two positions irreconcilable or is it possible that the "right" answer is that it depends on the circumstances of each case? If it does depend on circumstances, what are the conditions which determine when it is advantageous for an underdeveloped country to acquire second-hand machines or equipment and under what conditions is it inadvisable to do so? What are the opportunities for acquiring second-hand machinery and equipment and what is the outlook in the next five years in this field? Are there any general guidelines which developing countries can obtain from past experience which might help them decide how to proceed when confronted with opportunities to obtain used machines?

The Supply of Used Machinery and Equipment

The questions raised in the preceding paragraph are of special significance to the United States because, among the industrial nations of the world, it has the greatest surplus of used machinery and equipment and it is the greatest single supplier of second-hand equipment and machinery to the underdeveloped countries. No one knows exactly how much used machinery and equipment of all kinds is surplus to the needs of the United States economy and available for export, but everyone concerned with the subject agrees that it is considerable.

There are good reasons for believing that the supply of second-hand equipment and machinery in the United States will increase greatly in the next few years. A study published by the American Machinist in its issue of November 17, 1958 (Vol. 102, No. 24) concluded that the average age of machine tools in use in the United States has been increasing since 1945; that about 60 percent of the

machine tools in operation in 1958 in U. S. industry were at least ten years of age, 42 percent were between 10 and 20 years of age, and 19 percent were 20 years and older. Similar data are not available for production machinery and equipment, but it is generally agreed that there is no appreciable difference in the age of most other production machines and equipment in the United States.

The great age of most American machinery and equipment at a time of rapid technological advance has stimulated a movement toward large-scale modernization and automation of U. S. industry. It is, therefore, probable that a considerable amount of used machinery and equipment will become available in the United States in the next five years. Not all of this machinery is likely to be usable without rehabilitation, and that part which is workable will not consist wholly of the kind developing economies can put to effective use. Nevertheless, the fact that U. S. industry needs to modernize implies that it has too much "general purpose" equipment which needs to be replaced with "special purpose" equipment. Since "general purpose" equipment is the type most adaptable for use in developing economies, modernization of U. S. industry promises to make available a substantial amount of equipment needed by developing economies.

When U. S. Government machinery or equipment is found to be in excess of requirements of any agency, other Federal agencies may claim it for their use. The International Cooperation Administration, under the terms of sub-section 535 (b) of the Mutual Security Act of 1954, is authorized to claim U. S. Government surplus machinery and equipment for transfer to underdeveloped countries. Equipment transferred under this law is donated free of any charge except for the cost of inspection, rehabilitation (if requested by the receiving government), packing, crating, handling and transportation. Between 1956 (when the program began to operate) and 1960 inclusive, the International Cooperation Administration transferred surplus machinery and equipment of all kinds with an original acquisition value of about $90 million, an amount which constituted only a small fraction of the total value of U. S. Government surplus machinery and equipment during the same years. ICA officials explain they have found it difficult thus far to find the kind of used machine tools requested by developing countries among surplus U. S. Government machinery.

The growing amount of surplus equipment and machines in the United States, and the promise of an even greater accumulation in the next few years as U. S. industry is modernized, have given rise to plans for making some of these items available to less industrialized countries. A group of officials from the legislative and executive branches of the U. S. Government is actively discussing with representatives of the machine tool industry a plan for establishing a "tool Bank" to be operated under government auspices. As presently conceived, the Tool Bank would gather used machinery, tools and equipment from industry, agriculture, and government, and transfer

those which were both usable and suitable without any, or with a limited, charge to developing nations. The Tool Bank idea is still in a formative stage and many problems need to be resolved before it can be approved and put into operation, but its proponents are both optimistic about the potentialities of the plan and the likelihood of its adoption.

Meanwhile Technico, a private, non-profit organization, has been collecting used machinery from many business and other sources in the United States since August 1960; arranging for their repair when necessary; and donating them to trade and vocational schools, missions, refugee rehabilitation centers, and village cooperatives in underdeveloped countries requesting such equipment. Equipment shipped so far includes, sewing machines, machine tools, hand tools, and farm tools and implements.

The Meaning of Obsolescence

The idea that used machinery and equipment can be put to advantageous use in a developing economy can hardly be called new. In Asia, Europe, Latin America, and other parts of the world, the large amounts of used machinery and equipment which have been in operation for many years in cement, iron and steel, aluminum, electrical automobile, metal fabricating, textile, chemical, and other manufacturing plants, as well as in machine shops, foundries, sugar mills, mines, road building projects, and agriculture bear testimony to the usefulness and profitability of second-hand equipment in the less-developed nations.

It is sometimes forgotten that many prosperous industries in the United States started their plants with second-hand equipment. Indeed, many of these plants are still in operation, and there are some U. S. manufacturers who have never bought a new piece of equipment. Even today, no less than two second-hand machine tools are sold in the United States for every new one. In 1960, about 88,000 used machine tools were sold, with a dollar value that greatly exceeded the value of the 40,000 new machine tools sold. The use of second-hand equipment does not necessarily imply backwardness. Indeed, old equipment has been employed for the most modern purposes. According to the New York Times of June 3, 1961, "Lockheed Aircraft Corporation's outer space research is depending to a large measure on a fifty-two ton generator that formerly fed power to the inner reaches of Boston's subway system." The subway system, which had used the generator for 40 years, sold it because it had converted from direct to alternating current. Lockheed purchased the old unit at about one-tenth the cost of a new generator and has used it "on such projects as Agena B satellite vehicles and advanced versions of Polaris ballistic missiles."

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In an advancing industrial country, many pressures operate to make machinery and equipment obsolescent before they are worn down and

available for the purchase of old machinery. In calculating the benefits of used machinery, the would-be buyer must also satisfy himself that prospective savings in investment and consequent reductions in interest and depreciation charges more than offset increases in labor, material and fuel costs which may be due to the use of older equipment. Whether used machinery is better than new in any particular instance, therefore, depends on the circumstances in any situation. There are, however, some rules of general applicability where used machinery may be preferable to new.

Where local capital or foreign exchange funds are scarce, and interest rates are high relative to wage rates, the lower cost of used equipment is often an important consideration. The smaller the investment in equipment, the lower the amount of fixed costs. Highly-automated production lines can be supported only when they are running at or near capacity; otherwise, the fixed cost per unit produced is extremely high. This means that the market must be large enough to absorb the output of the automated machinery. However, markets in most underdeveloped countries are too small to permit automatic machinery to operate near capacity. Such machinery might easily turn out the yearly requirements of the market in a few days. Until demand caught up with production, the machinery would stand idle.

Moreover, a manufacturer may require from six months to two years to supply new machinery and equipment. The actual "lead time" depends on the size and complexity of the equipment ordered and the size of the manufacturer's backlog of orders. In contrast, used machines can usually be acquired immediately and installed quickly to start yielding returns. This difference in availability of new and used machinery has sometimes been used to advantage by entrepreneurs who, forced to wait for months or years for new equipment on order, meanwhile purchase, install and operate a used machine which they sell when their new machinery arrives.

While automatic machinery requires few workers, it demands more skilled and trained workers than older machines for operation, maintenance and repair. Repair parts for modern automatic machines are also likely to be costlier than for older machines and, unless a replacement is readily available when needed, the time the machine is laid up could greatly increase costs. Of course, used machinery may also require repair parts which may not be on hand but, since older machines cost less than the newer machines, their idle time is also less costly.

In discussions about the use of second-hand equipment in developing economies, limitations imposed by repair parts are often either overstated or understated. One side contends that, whatever the advantages of used machinery and equipment, they are more than counterbalanced by the fact that repair parts are usually unavailable. The

other side argues that the whole question of repair parts of used machinery has been grossly exaggerated. As in most arguments, the facts appear to lie between the extremes. If the manufacturer of the used machinery is no longer in business, the purchaser may indeed face problems, especially if there is no machine shop in his city or country. But in most developing countries, there are machine shops, some of them quite small, which are able to reproduce almost any part likely to be found in used machinery. Where the material used to machine the replacement is comparable in quality and hardness to the original part, the duplicated repair part has generally been found to function as well as the original. Difficulties have, however, been encountered with locally-manufactured repair parts where, because of attempts to save on the cost or because the proper quality of material was not easily obtainable, the replacement was made of low-tensile strength material, e.g., grey iron or cold-rolled steel instead of case-hardened or heat-treated steel. Where the original manufacturer is still in business, or has been merged with another firm which is still operating, it will usually be found that the manufacturer of the used machinery either can make repair parts available or can furnish blueprints or patterns from which repair parts can be made. Producers of machinery generally stock repair parts for machines of their manufacture for at least ten years. In the case of textile machinery, some manufacturers continue to make repair parts for machines they produced forty years ago.

When the technology of the latest machines in a specific field has not made great advances (when, for example, the new machines merely produce a product which is essentially the same as the one made by the older machines, but much faster or with greater economy in the use of manpower), there is a greater chance that the older machines can be put to profitable use in an underdeveloped economy than when improvements in the newer machines also result in improvements in the product. Obsolescent machinery incapable of producing a competitive product will generally be uneconomic to acquire at any price. Thus, an Indian factory with old (although originally acquired new) equipment producing spark plugs which are inferior to other spark plugs available in the Indian market is bound to be at a disadvantage. However, even machinery which makes products of less than the best quality has sometimes been found to be satisfactory in some markets. For example, used batch dyeing equipment in a textile plant in a Central American country could not be made to reproduce the exact shade of color from one batch to the next. Nevertheless, it operated profitably since consumers in this market did not mind variations in the shade of the material they purchased.

The use of machinery and equipment employing antiquated processes or producing goods inferior to those available abroad is more likely to be profitable in a protected market, or where there are restrictions on imports, or where there is a shortage of foreign exchange than in an open market or one without import or foreign exchange restrictions. However, even in a protected market, the operator of

inferior equipment must reckon with the chance that a competitor may establish a modern plant. Thus, machinery originally manufactured in the United States in the 1890's, first used in Spain and later in Mexico, finally came to rest in Nicaragua during World War II in a textile mill making coarse cloth. The mill was able to sell its output at a profit as long as there was a shortage of cloth, but after the war another plant with more modern equipment was built and the old plant could not compete.

What Makes for Success

Those who know the market requirements of a country and the kind of machinery needed to produce for the domestic market, and who also know how to obtain the necessary equipment and to assure that it is operable, stand the best chance of using second-hand machinery profitably in a developing economy. But, the very enumeration of these conditions makes it clear that they are difficult to realize. Few persons in underdeveloped countries are, by themselves, qualified to meet these conditions. Although they may know the market potentialities of their countries, they may not know exactly what type of machinery or equipment is needed. When a dealer in used machinery receives a request from abroad for "a metal-working lathe" or when the U.S. Department of Commerce receives a request from a North African country for "equipment to process dates for export" neither one is able to proceed without more specific information. The first rule for someone who wishes to acquire machinery (new or used) is therefore that he know or learn the exact specifications he requires to meet his specific needs. The more detailed the knowledge, the greater the possibility of locating the equipment wanted. One sometimes comes upon machinery unused and rusting out-of-doors in underdeveloped countries in mute testimony that someone was unfamiliar with what was needed.

Those who know machinery and equipment are just as subject to pitfalls if they are unfamiliar with market conditions in developing economies. Sometimes, plants established in developing economies. Sometimes, plants established in developing economies by U. S. companies are too large. Business Week, in its issue of December 24, 1960 (pages 57 and 58) reported that U. S. firms, accustomed to "pushbutton engineering" and production for mass markets, have had to learn to "think small" in Mexico and to remember "how we did it in the U. S. around the turn of the century". Thus, Diamond Alkali, "after some 'research in reverse,'" established a small DDT plant which produces about 6 to 7 tons daily, although "to make a profit... everybody told us we needed a minimum capacity at least five times larger than we have".

To overcome the disadvantages of one-sided knowledge, local entrepreneurs operating plants in developing economies sometimes

engage managers or consultants from abroad who help them acquire and operate usable second-hand machinery, while U.S. (and other foreign) firms operating plants in developing economies engage nationals of the developing nations in which they operate who are informed about the local market. An outstandingly successful example of the former is Altos Hornos, an iron and steel mill in Monclova, Mexico. With the aid of its able and experienced American General Manager, two blast furnaces, a billet mill, and other used equipment have been acquired in the United States, rebuilt in Mexico, and incorporated in the Altos Hornos plant. Since World War II, when the plant was started, it has operated competitively with other steel plants in Mexico and its capacity has risen from something over 100,000 ingot tons to over one million. From 25 to 30 percent of the equipment in the plant was purchased second-hand.

Another way in which used machinery and equipment, technical operating knowledge and an understanding of local conditions have been merged successfully is through the joint business venture in which both local citizens and foreigners own shares. Industrias Kaiser Argentina (IKA) is such a joint venture in which the Kaiser interest in the United States, the Argentine Government, and private shareholders in Argentina each have a one-third interest. The Kaiser contribution consisted of some $13 million of used machinery from its former Willow Run plant, as valued by independent appraisers, plus the cost of shipping the machines to Argentina. The plant, which has capacity to assemble 60,000 automobiles and employs 9,000 people, has proved to be a profitable operation. In another joint venture, the Firestone Tire & Rubber Company has entered into partnership with an Indian company, Synthetics & Chemicals, Ltd., to build India's first synthetic rubber plant. Synthetics & Chemicals has recently purchased a used U. S. Government butadiene plant located at Louisville, Kentucky. This purchase was made possible by an allocation of almost $4 million from the Export-Import Bank credit to India.

How to Do It Yourself

If, however, an entrepreneur in a developing economy is either unable or unwilling to enter into partnership with an outside firm, there are other ways in which he may go about acquiring used machinery and equipment. If he knows exactly what he wants and can qualify under the terms of the Mutual Security Act of 1954, he can request the item he needs through the appropriate official channels set up in his country for this purpose. However, the big problem in the past has been to match the machinery requested with what is available. In all probability he will have to wait for an extended period until the particular item he wants becomes available as U. S. Government surplus.

He may also attempt to locate the machine or piece of equipment he wants through private channels. Many technical magazines list available used machinery and equipment, and trade associations of the various industries may be able to help locate particular items. The U. S. Department of Commerce, when notified by a U. S. embassy of the specific interest of a foreign buyer, will try to put him in touch with a reputable seller of the used equipment he seeks. There are also several hundred established and reliable dealers of used machinery and equipment in the United States, many of whom are interested in exporting. However, the buyer from a developing country would do well ordinarily to avoid the "finders" or "brokers", who go about looking for a buyer or seller of a machine, a plant, or any other surplus equipment they may have come across. Since their purpose is merely to act as an intermediary to bring together a buyer and seller for a single transaction, rather than to establish a regular clientele, and since they know little about what they are selling, transactions made under their auspices need to be conducted with extreme caution.

In some countries, through importers who act as regular agents for foreign concerns, a buyer may be able to acquire good used machinery, but the results obtained depend on the extent to which the importer or the seller is prepared to guarantee the machinery and equipment. There are all kinds of guarantees given with used machinery, such as the guarantee that the machine will operate "to the buyer's satisfaction," or that defective parts will be replaced, etc. However, the best guarantee from the standpoint of a buyer in another country is one in which the seller certifies that the machine or equipment will either do a specified job or will be replaced by another machine or piece of equipment which will.

Some manufacturers of new equipment also sell used machinery and equipment of their own make which they have reconditioned or rebuilt. This source is a particularly desirable one, since the buyer usually gets a warranty or guarantee with his purchase and can expect to get repair parts for the rehabilitated machinery. Many manufacturers who sell only new machinery and equipment know which of their customers are planning replacements. These manufacturers are therefore in a good position to direct would-be purchasers of used machinery to potential sources of supply. From time to time, the U.S. Government also sells surplus machinery and equipment under sealed bids. These sales are widely publicized and anyone may have his name placed on the list to receive announcements. Under certain circumstances, negotiated sales of surplus equipment can also be arranged. Finally, many private plants have idle used machines and equipment which they would be glad to sell.

Since the condition of a machine or piece of equipment may vary widely, a buyer of used machinery or equipment would do well to engage an independent and qualified authority to examine the machinery he is considering for purchase. There are several well-known and reliable

companies which specialize in inspecting, testing, appraising and certifying equipment of all kinds. Sometimes the manufacturer of the equipment, if available, may be willing to do this, and for some types of equipment, e.g., boilers, insurance companies may be competent. The extra cost for this service is generally small in relation to the benefits.

However, even the best expert cannot determine exactly how good a piece of machinery or equipment is from its appearance. To evaluate properly the capabilities and shortcomings of a machine, it must be tested under power "analytically" and put through its entire cycle of operation in accordance with a standard test pattern (such as has been developed by the U. S. Defense Department) which indicates the machine's accuracy at designated important points. Testing under power is particularly important if a machine will be required to operate to fine tolerances.

The purchaser must also determine if the machine is both capable of using attachments and is equipped with a full complement of accessories and attachments. Otherwise, the machine may be useless for the purpose which the buyer has in mind. Many machines sold on an "as is" basis, including U.S. surplus, have vital parts and accessories missing.

The buyer who goes out on his own to purchase used large or special types of equipment must also be certain that it can be dismantled, packed, shipped and reassembled without injury. The fact that equipment operates well at its original location provides no certainty that it can be dismantled and reassembled at the new site and be made to operate as efficiently as before. When a lathe, drill press, grinder or other simple machine is involved, the difficulties may not be great. However, when the second-hand machinery or equipment is a complex grouping composed of multiple units, such as a blast furnace, a rolling mill, chemical equipment (other than separate units, like stainless steel vessels, vats or tanks), or a coffee-roasting plant, the task of appraising, dismantling, packing, shipping, rehabilitating and reassembling it becomes a major operation surrounded by greater risks than most buyers in underdeveloped countries should undertake. The blast furnace or rolling mill may require major rebuilding; the chemical equipment may be corroded; and in order to salvage the coffee-roasting plant, the building in which it is housed may have to be partly torn down and rebuilt after the plant is removed. These examples are not hypothetical; all of them have actually happened.

Summary

We may conclude that large amounts of used machinery and equipment are likely to become available in the next five years as

U.S. industry modernizes. The increase in the supply of such machinery will offer developing economies greater possibilities than before to acquire and use second-hand equipment to aid their industrialization. While there will be instances when developing countries will be able to make effective use of new and modern equipment, there will also be many instances when they can make effective use of used machines which are obsolescent in the more advanced industrialized countries. The use of such equipment need not involve "backward technology". Indeed, used machines may introduce advances which are easier for developing economies to assimilate than are the greater advances of the newer and more automatic machines. In appropriate circumstances, the use of second-hand machinery has already proved its worth in the developing economies, as it has in the more advanced.

It should be recognized, however, that to acquire the right kinds of equipment at "bargain" prices presents problems and pitfalls. The task calls for expertise which is often lacking in underdeveloped countries. It would be well, therefore, for the would-be buyer to acquire a knowledgeable employee, a partner, or to seek the assistance of those who are both impartial and qualified to help him select the equipment he needs for his particular purposes, and to ascertain that it is fully operable and otherwise capable of doing the job required.

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