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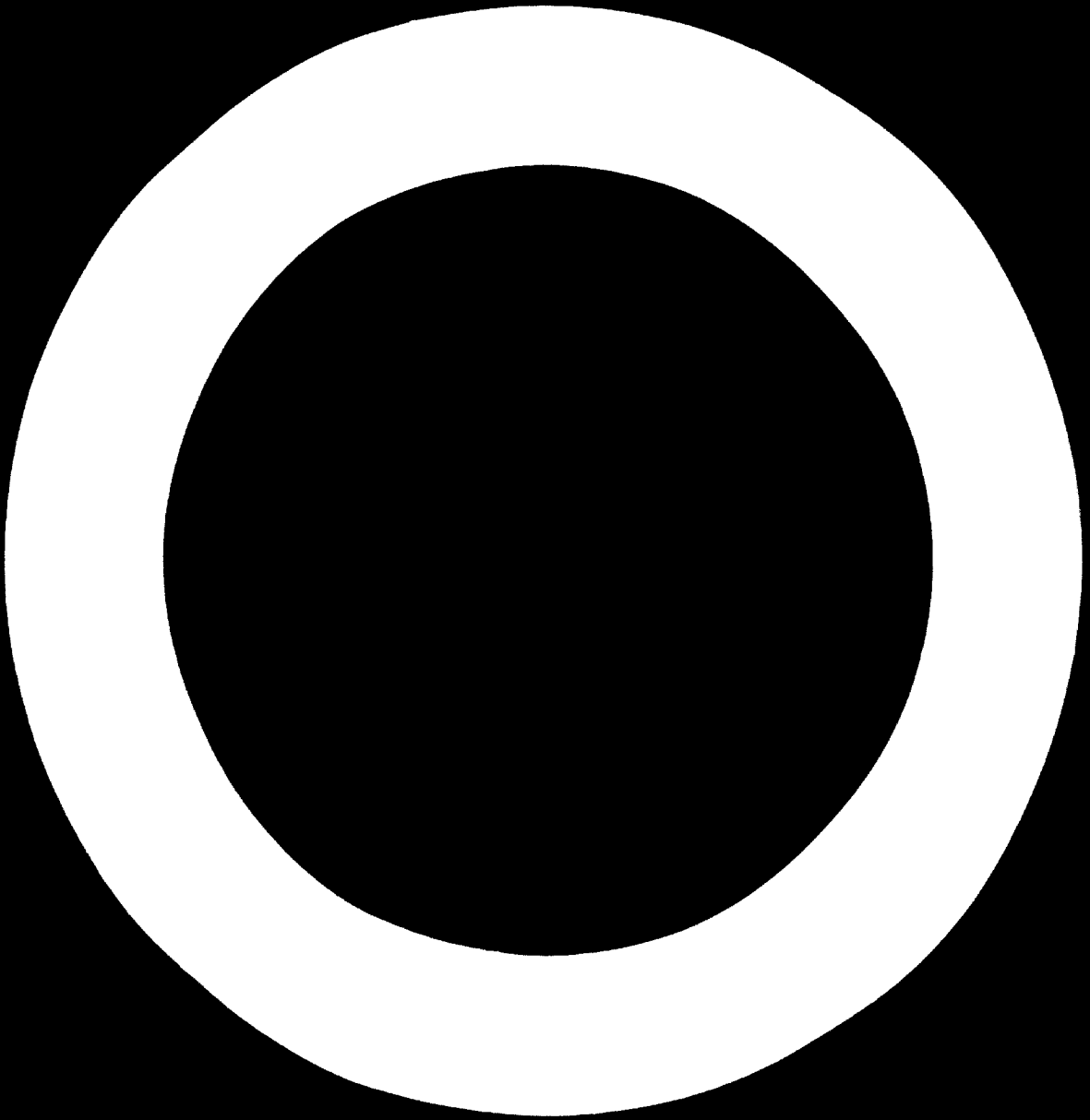
**EXPERTS GROUP ON SECOND-HAND MACHINERY
FOR DEVELOPING COUNTRIES,
7 - 24 December 1965**

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**THE USE OF SECOND-HAND EQUIPMENT
IN DEVELOPING COUNTRIES**

by the

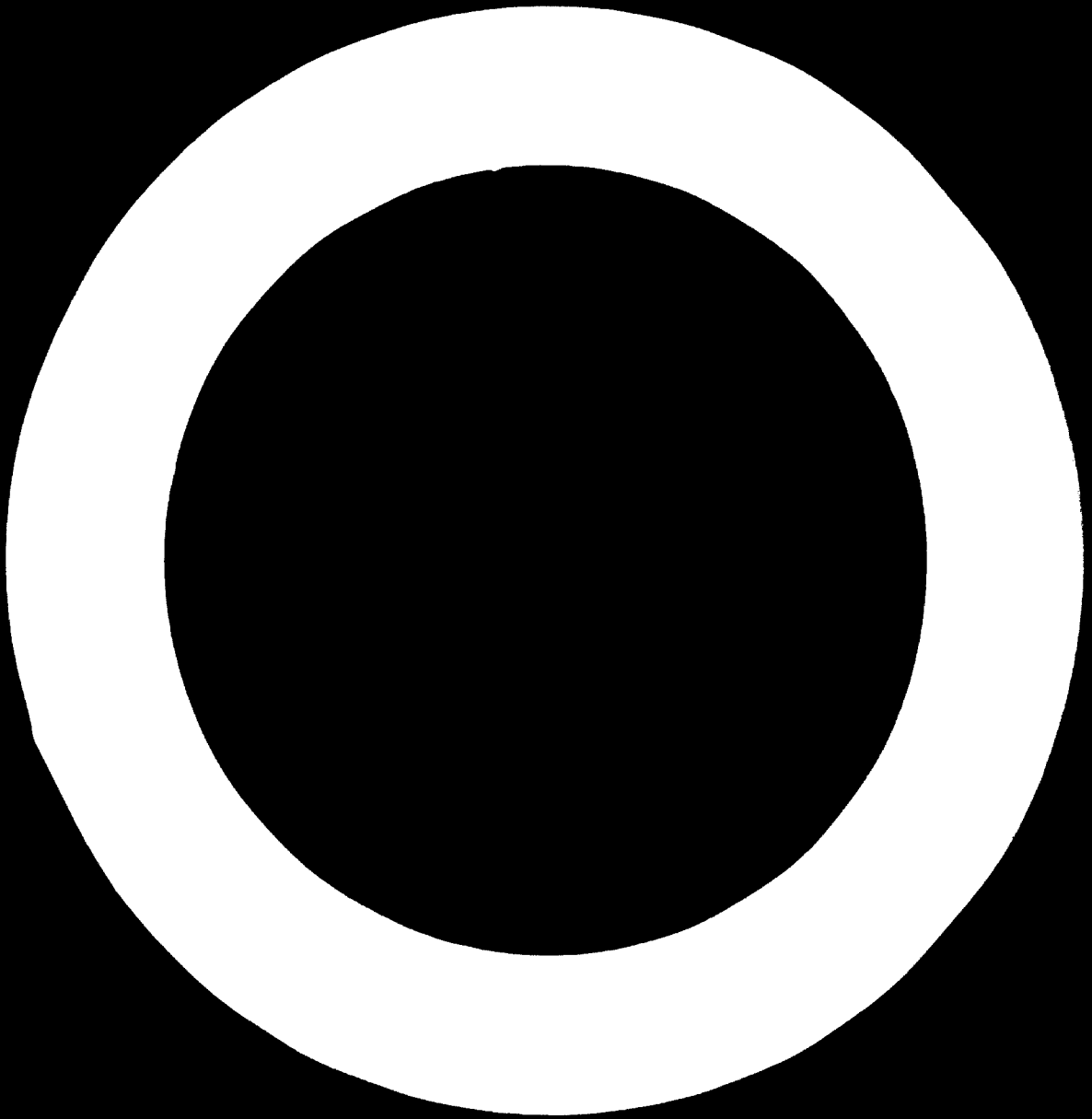
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Centre for Industrial Development**



THE USE OF SECOND-HAND EQUIPMENT
IN DEVELOPING COUNTRIES

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I. INTRODUCTION

The use of second-hand equipment in developing countries has been increasingly discussed in recent years by technical and economic experts, as well as in international organizations engaged in supporting industrialization in the newly developing countries.

Differences of opinion exist, however, as to the advisability of the use of second-hand equipment by developing countries. On the one hand it is argued that the second-hand equipment available is often inferior and obsolete, and encourages the production of low quality products to the detriment of the developing countries vis-à-vis the industrial world. On the other hand, numerous industrial producers have indicated complete satisfaction with second-hand equipment, emphasizing its cost advantages, and advocating the promotion of its use in developing countries.

Equipment that is economically obsolete in the industrial countries may be suitable and available to the developing countries at a much lower cost than equivalent new equipment and with consequent savings in foreign exchange. The extent of the use of second-hand equipment in the United States, where, in 1960, sales of used machinery were nearly double the domestic sales of new machine tools,^{1/} can testify to the value of second-hand equipment even in a highly industrialized country.

To determine the potential value of second-hand equipment to industry in the developing countries, it is necessary, however, to examine and clarify the situation in the world market for second-hand equipment. The possible long-run effect of any increased use of second-hand equipment on the industrial development of developing countries should also be thoroughly examined. How valid is the contention of some developing countries that their scarce capital resources can most efficiently be used by investing only in the most modern and automatic of machinery and equipment?

^{1/} Business Week, March 4, 1961, page 42.

It is important, moreover, to discuss the extent to which protection from imports of second-hand equipment is needed to encourage the production of such equipment in the developing countries themselves. As is discussed below, a number of developing countries have prohibited or restricted the importation of second-hand equipment. The reasons given have been various, including the need for infant industry protection, previous dissatisfaction with imported second-hand equipment, the belief that economic development is accelerated by forcing the use of the most modern machinery, and the desire for national prestige. The validity of these arguments needs to be examined before it will be possible to determine the countries and industries which could most easily benefit from the use of second-hand equipment.

If it is found that the promotion of the use of second-hand equipment is to the benefit of the developing countries, there are a number of steps which must be taken to facilitate the location, evaluation and acquisition of such equipment.

There is urgent need for a world-wide standard definition and classification of second-hand equipment to assist purchasers in their evaluation of particular items. There is also need for an authoritative review of the advantages and disadvantages in the use of second-hand equipment, of an outline of the necessary steps to be taken in procurement, and of the organizations in the industrial countries which handle second-hand equipment or which can be of assistance to purchasers in locating sources of supply.

The following paper is provided as a basis for the initial examination of these issues. A number of experts in the field have been asked to comment upon the questions raised, and to give their opinions of the possible role which second-hand equipment can play in the industrialization process, and their suggestions for the better organization of the world market in this equipment.

A similar study was carried out by the Organization of American States in which was listed the following impediments to the utilization of surplus equipment in Latin America:

1. There is as yet only limited knowledge of investment opportunities in which used equipment could be appropriately used.

/...

2. There is little knowledge among Latin American industrialists of the availability and advantages of surplus equipment.
3. There is not yet a sufficiently large cadre of skilled managers, technicians and skilled workers to solve the problems involved in selection, shipment, installation, operation and maintenance of such equipment.
4. International lending institutions will not, as a rule, provide credits for the purchase of used equipment.
5. In certain nations regulations discourage the importation of used equipment.

Their suggested solution included a programme in which... "the Secretariat of the OAS would undertake, in conjunction with governmental or private agencies of two or three member nations, to conduct a detailed survey of investment opportunities in several industrial activities."^{2/}

^{2/} Inter-American Economic and Social Council Special Committee IV: OEA/Ser.L/V/III. CIES/Com. IV/17, Rev. 26 July 1963.

II. OUTLINE OF THE PAPER

A United Nations study on the projection of demand for industrial equipment has estimated that by 1975 the annual equipment requirements of developing countries will amount to \$7.5 billion. Of this, \$2.5 billion will be supplied by the developing countries themselves and \$5 billion will have to be imported from industrial countries. In the same study it is also shown that the great bulk of expenditures required for industrial development are accounted for by machinery and equipment and that this expenditure, though it varies from industry to industry, amounts to approximately 50% of total investment requirements. It is clear that any reduction in the cost of machinery and equipment can make a substantial contribution to total investment.

Many developing countries are also experiencing a chronic shortage of foreign exchange. The reduction in cost attendant upon the use of imported second-hand equipment in developing countries has, therefore, the added advantage of conserving scarce foreign exchange.

This paper will first discuss the extent of the availability of second-hand equipment in the industrial countries, and the reasons for its existence.

Secondly, the need for a standard international classification of second-hand equipment will be examined. Second-hand equipment includes items which range in condition from new and unused, to items classified as scrap. Generalizations about the use of second-hand equipment as a whole, have, therefore, often led to misinterpretations about the potential use of such equipment.

The wide range of conditions in which second-hand equipment is available emphasizes the importance of extensive inquiries when the procurement of equipment is contemplated. This paper, therefore, suggests a number of advantages and disadvantages to be considered in the use of second-hand equipment.

Fourthly, the important steps to be taken in the procurement of second-hand equipment are suggested, and a number of organizations dealing with second-hand equipment in the industrial countries are reviewed.

Finally, suggestions are made on the steps which must be taken if the use of second-hand equipment is to be promoted in the developing countries.

Information for this study was obtained from secondary sources, interviews and from the answers to a questionnaire (a copy of which is appended) which was sent to users of second-hand equipment in developing countries.

1...

III. SOURCES OF SECOND-HAND EQUIPMENT

The industrial countries of the world are the present sources of second-hand machinery and equipment. The United States has the greatest potential surplus, and several suggestions have been made for the use of this reservoir of used machinery. E.C. Higbee of the United States Commerce Department has suggested a plan to send the equipment to the developing countries, and Frank Kowalski, Representative of the State of Connecticut, has presented a proposal for the creation of a "Developmental Machinery and Tool Bank" with a double purpose:

- A. To stimulate, by appropriate incentives, United States business activity and employment, through stepped-up modernization of the machine parts currently used by United States Government, industry and agriculture.
- B. To help equip the developing nations with machinery and tools, suited to their particular needs, environment and stage of development, and thus to accelerate their productive capacity and economic growth.

Second-hand equipment arises in the industrial countries for the following reasons:

- (1) Modernization
- (2) Automation
- (3) Obsolescence
- (4) Government surpluses
- (5) Liquidations of plants
- (6) Old age and physical deterioration

(1) Modernization

The process of modernization in the industrial countries involves the continuous adaption of new techniques and equipment in the interests of increased productivity, the introduction of new processes, and the production of new products. Equipment which is replaced in this process may be either used to supplement the new equipment, kept as a standby capacity or sold as second-hand. The rate of modernization will vary between and within individual industrial countries but is continuous in all of them.

(2) Automation

Although automation is a type of modernization, it deserves particular mention. The replacement of machinery due to automation creates a valuable supply of second-hand machinery which may be technically much more suitable to the developing countries than would the automatic machinery which replaced it.

(3) Obsolescence

Obsolete or discarded equipment can range in condition from new and unused to scrap. A machine becomes obsolete when it is replaced by a new machine or process, which does not imply that the replaced unit is necessarily old or worn. Obsolescence may occur for technical or economic reasons, and is related to the technical and economic conditions under which the particular machine is used. These conditions will vary as between firms, industries and countries. In other words, an obsolete piece of equipment in one industry or country may be both relatively new and economically valuable in another. The necessity to increase labour productivity because of high and increasing wage rates in industrial countries, for example, is one of the most important stimulants to the process of obsolescence. An example of technological obsolescence is given by Lockheed Aircraft Corporation whose 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.⁴¹

"Technological obsolescence" is the term increasingly used for the replacement of complex machinery still in excellent condition. Used computers in the United States, for example, are being increasingly sold at very low prices. Computers, which are generally leased for use, are returned to the manufacturer to be replaced by newer models. "They are technologically, not economically obsolete", noted the assistant to the Marketing Vice-president at Burroughs Corp. They do a good computing job and at bargain rate - often 25% to 50% of the original price of the computer."⁴²

⁴¹ New York Times, 3 June 1961.

⁴² Business Week, 3 September 1962, pp. 49-51.

(4) Government surpluses

Government surplus machinery and equipment includes not only industrial equipment but also military equipment which can, in many instances, be used in industry. In the USA, all government equipment listed as surplus is first offered to government departments and finally to the public. This machinery and equipment usually arises because of the deactivation of military equipment which has become obsolete, and consequently all the machinery used for its manufacture, service, maintenance and operation becomes surplus. Its physical condition ranges from new, unused to scrap. The General Service Administration in the USA publishes excess property catalogues which contain listings of equipment available including aircraft components, motor vehicles, metal-working machinery, service and trade equipment, measuring tools, agricultural machinery and equipment, construction, mining, etc. A substantial part of the equipment which the Agency for International Development utilizes in other countries comes from this source.

(5) Liquidation of plants

Liquidation of plants either for economic, technical or other reasons produces quantities of second-hand equipment of all conditions. Usually the plants are sold "As Is" and pieces of machinery in good condition can be obtained. Second-hand machinery dealers are the main buyers. There are numerous companies in industrialized countries which specialise in plant liquidation. An example in the USA is the Industrial Plants Corporation which specialises in appraising and liquidating complete industrial plants, including land.

(6) Old-age and physical deterioration

Most of the equipment discarded for this reason cannot be used except for odd jobs, and is sold as scrap, and is therefore not relevant to the present study.

IV. CLASSIFICATION OF SECOND-HAND EQUIPMENT

A number of misapprehensions have arisen because of the lack of a standard definition for and classification of second-hand equipment. The following definition is offered as being sufficiently comprehensive to cover all conditions of equipment from purchased but unused to scrap. Second-hand equipment is defined as that equipment which can be obtained from a party other than the manufacturer or its authorized dealers, which has, in other words, been purchased at least once by a potential user or users and sold at least once. It must be emphasized that second-hand equipment does not necessarily imply that the equipment is either used, obsolete or deteriorated.

Due to the great range of possible physical conditions of second-hand equipment some institutions have formulated their own classifications to assist in the description of equipment. Two examples are given here.

The Machinery Dealers National Association of the USA approved the following "terms and definitions" at the MDNA annual meeting, 7 May 1953:

New:	Machine never used and never installed for service.
Unused:	Machine never installed for service.
Rebuilt:	Machine completely disassembled, all worn or broken parts replaced, excessive wear compensated for, tested under power and subject to standard MDNA 50-day guarantee.
Reconditioned:	Machine operated under power, cleaned, painted, broken parts repaired or replaced.
As is:	Machine offered in its present condition with no warranty or guarantee expressed or implied.

A more complete classification of used equipment was established by the Department of the Army and the General Services Administration of the USA.^{2/} This

^{2/} Department of the Army Supply Bulletin, Washington, D.C., April 15, 1964.

was done in order to agree upon a uniform method of describing the condition of excess property. The condition coding as specified below is used by the General Services Administration and the Agency for International Development (AID).

Condition Code	Definition
N-1 (New-Excellent) - - - - -	New or unused property in excellent condition. Ready for use and identical or interchangeable with new items delivered by a manufacturer or normal source of supply.
N-2 (New-Good) - - - - -	New or unused property in good condition. Does not quite qualify for N-1 (because slightly shopworn, soiled, or similar), but condition does not impair utility.
N-3 (New-Fair) - - - - -	New or unused property in fair condition. Soiled, shopworn, rusted, deteriorated, or damaged and its utility is slightly impaired.
N-4 (New-Poor) - - - - -	New or unused property badly broken, soiled, rusted, mildewed, deteriorated, damaged, or broken and its utility is seriously impaired.
E-1 (Used-Reconditioned Excellent) - - - - -	Used property but repaired or renovated and in excellent condition.
E-2 (Used-Reconditioned Good) - - - - -	Used property which has been repaired or renovated and, while still in good usable condition, has become worn from further use and cannot qualify for excellent condition.
E-3 (Used-Reconditioned Fair) - - - - -	Used property which has been repaired or renovated but has deteriorated since reconditioning and is only in fair condition. Further repairs or renovation required or expected to be needed in near future.

/...

Condition Code	Definition
E-4 (Used-Reconditioned - - - - - Poor)	Used property which has been repaired or renovated and is in poor condition from serious deterioration such as from major wear and tear, corrosion, exposure to weather, or mildew.
O-1 (Used-Usable Without - - - - - repairs-Excellent)	Property which has been slightly or moderately used, no repairs required, and still in excellent condition.
O-2 (Used-Usable Without - - - - - repairs-Good)	Used property, more worn than O-1 but still in good condition with considerable use left before any important repairs would be required.
O-3 (Used-Usable Without - - - - - repairs-Fair)	Used property which is still in fair condition and usable without repairs; however, somewhat deteriorated, with some parts (or portion) worn and should be replaced.
O-4 (Used-Usable without - - - - - repairs-Poor)	Used property which is still usable without repairs but in poor condition and undependable or uneconomical in use. Parts badly worn and deteriorated.
R-1 (Used-Repairs required - - - - - Excellent)	Used property, still in excellent condition, but minor repairs required (repairs would cost not more than 10 per cent of standard price).
R-2 (Used-Repairs required-Good) - -	Used property, in good condition but considerable repairs required. Estimated cost of repairs would be from 11 per cent to 25 per cent of standard price.
R-3 (Used-Repairs required-Fair) - -	Used property, in fair condition but extensive repairs required. Estimated repair costs would be from 26 per cent to 40 per cent of standard price.

Condition Code	Definition
R.4 (Used-Repairs required-Poor) - - - -	Used property, in poor condition and requiring major repairs. Badly worn and would still be in doubtful condition and dependability and uneconomical in use if repaired. Estimated repair costs between 41 per cent to 65 per cent of standard price.
X (No further value for use as - - - - - originally intended but of possible value other than as scrap)	Salvage. Personal property that has some value in excess of its basic material content but which is in such condition that it has no reasonable prospect of use for any purpose as a unit (either by the holding or any other Federal agency) and its repair or rehabilitation as a unit (either by the holding or any other Federal agency) is clearly impracticable. Repairs or rehabilitation estimated to cost in excess of 65 per cent of standard price would be considered "clearly impracticable" for purpose of this definition.
Scrap - - - - -	Material that has no value except for its basic material content.

The formulation and general acceptance of a standard international classification is essential to assist in the evaluation of second-hand equipment, especially by developing countries considering purchases in industrial countries.

V. ADVANTAGES AND DISADVANTAGES OF
THE USE OF SECOND-HAND EQUIPMENT

It is essential that a prospective purchaser of second-hand equipment should be clearly aware of the general advantages and disadvantages which may arise with its use. A number of studies have discussed these issues, including a report by the Economist Intelligence Unit Ltd., "American Industry's Potential for Providing Used Machinery and Technical Assistance for Developing Countries",^{6/} a study by the Netherlands Economic Institute on the use of second-hand machinery for economic development,^{7/} and a book by A. Waterston on the Use of Second-hand Machinery in Developing Economies.^{8/}

Further information on this subject was obtained by the Centre for Industrial Development in answer to the questionnaire, mentioned above, which solicited information from purchasers of second-hand equipment in developing countries. As a result of the investigation the following main advantages and disadvantages of the purchase and use of second-hand equipment are suggested.

Advantages

A. Lower Initial Costs.

This is the main reason for the purchase of second-hand machinery and equipment. In developing countries importing equipment from industrial countries this also means a saving in foreign exchange. This saving can be further increased if the equipment is reconditioned in the country of destiny.

6/ The Economist Intelligence Unit Ltd., American Industry's Potential for Providing Used Machinery and Technical Assistance for Developing Countries, New York, 1962.

7/ Netherlands Economic Institute, Division of Balanced International Growth, Second-Hand Machines and Economic Development, Publication No. 15/3, Rotterdam, 1955.

8/ A. Waterston, The Use of Second-hand Machinery in Developing Economies, 1962.

The difference between the initial cost of new and used machinery can be substantial as is exemplified by the recent experience of the Ross Gear and Tool Co., Lafayette, Ind., U.S.A.²⁷ One hundred thousand dollars worth of used spindle bar machines, lathes and mills were bought in the United States and sent to the Ross Gear plant in Sao Paulo, Brazil. The cost of rebuilding the machines was \$25,000, but the cost of equivalent new machinery would have been \$300,000.

B. Lower Operating Costs.

In some cases the operating costs of used machinery with a simple technology, compares favourably with those of new and more complex machinery. In considering the purchase of used machinery the relative costs of all factors of production must be examined. A new and more expensive and labour-saving machine may be economical in an industrial country where the wage scale is high, may be uneconomical compared with an older more labour-intensive machine, in a developing country.

C. Small Scale of Operation.

Second-hand machinery which may have been discarded in industrial countries because of an increase in the scale of production with an expanding market, may be very suitable for a small-scale operation in a developing country.

In the United States most of the used equipment is purchased by small companies. An article in the Wall Street Journal states that "dealers estimate that as much as 75% of their sales are to companies with fewer than 100 employees, though large manufacturers also often turn to used units for their needs". Large manufacturers often acquire second-hand equipment for short production runs or single odd jobs, after which the equipment can be resold.

D. Shorter Delivery Periods.

Delivery periods for second-hand equipment are shorter than for new equipment. Especially is this the case if the equipment has already been

²⁷ Wall Street Journal, June 11, 1963. Page 14.

reconditioned or rebuilt. "If the difference between the delivery time periods for new and second-hand equipment is considered in terms of product lost, the faster delivery of second-hand capital goods may mean a considerable economic advantage."^{10/}

E. Easier Maintenance.

Most developing countries do not have ready access to field representatives of machine tool manufacturers, and therefore maintenance and repairs must usually be performed locally. The skill requirements, of course, are higher for the maintenance of more complicated equipment. A knowledge of electrical control circuits, hydraulics, pneumatic systems and electronics is often necessary for the maintenance of modern machinery, and such expensive modern machinery may stand idle for lack of maintenance in developing countries where these skills are in short supply.

Climatic conditions frequently aggravate the maintenance problems of complex machines. There have been instances where machinery in tropical countries has had to be kept running continuously because it was not designed to operate in a tropical environment. The electronic and electro-mechanical components of the machinery would otherwise corrode to the point where a major overhaul, beyond the capabilities of local personnel and facilities, would be required to restore the machine to operation.

While the machine offered on the second-hand equipment market are not specifically designed for operation in all climatic conditions, the vast majority of them contain far fewer components which are subject to deterioration under climatic extremes.

F. Parts can be more easily manufactured locally

Successful maintenance requires the availability of spare parts. Replacement parts may only be obtained from manufacturers in industrial countries, in which case it is easier to repair or locally fabricate a replacement for an old less complex machine.

^{10/} Netherlands Economic Institute, Division of Balanced International Growth, Op. Cit.

G. A more flexible replacement policy

"The depreciation period for second-hand equipment is shorter and, thereby, the firm has the possibility of shifting to newer or different equipment at an earlier date in the future that would have been the case if it has acquired new equipment. This may be an advantage especially in cases where markets are growing or quickly changing."^{11/}

H. More labour intensive

As mentioned in item (B) above, there may be a considerable cost advantage to a developing country in employing cheaper more labour-intensive used equipment.

I. Less skill needed for operation

In many cases, the operation of older second-hand equipment requires less skill than does newer machinery. The older machines are less complicated and are often more robust and able to withstand haulage by unskilled operators. The shortage of supply of skilled labour is perhaps the greatest bottleneck in the industrialization process in developing countries. Any economy in the use of this factor is to the advantage of these countries.

Disadvantages

A. Shorter Economic Life

To the extent that the remaining economic life of a used machine is shorter than that of an equivalent new machine, its effective annual cost is raised, depending on the purchase price, its expected life and the relevant interest rate. Normally, however, the lower purchase price of a used machine more than offsets the increased annual costs due to its shorter life.

^{11/} H.B. Maynard, Industrial Engineering Handbook, New York. McGraw Hill Publishing Co., Inc. 1956 (7-31) - (7-33).

B. The risk of obtaining a machine in unsound technical condition.

In any field of business considerable differences exist between various firms in their levels of competence, experience, reliability, and integrity. The used machine industry is no exception. Thus, it behoves the machinery buyer either to know that his suppliers are completely competent, experienced, reliable, and honest, or in the absence of sufficient information about his suppliers, to take adequate precautions that the machinery purchased conforms to his requirements. A buyer who frequently purchases equipment will soon develop dependable sources of supply. However, an infrequent buyer or one entering the market for the first time must take steps to insure himself against such risks.

C. Cost of inspecting, repairing, crating etc., may nullify the price advantage of used equipment.

In certain cases, if the costs of locating and ascertaining the condition of a used machine represent a high proportion of its total cost to the purchaser, a new machine may be a more economical proposition.

D. Higher maintenance costs.

The older a machine the greater the risks of break-down and consequent losses from reduced production and increased repair bills. Further losses are possible from the increased likelihood of a scarcity of spare parts as the machinery increases in age.

E. Lower ability to hold higher precision.

In general, present-day machine tools are capable of holding closer tolerances than machines which were built ten or more years ago. This feature is of great importance to manufacturers of instruments and other high-precision parts, and it may be necessary for these manufacturers to pay the higher price to obtain sufficiently accurate new machines. However, the great majority of products which will be manufactured in developing countries for some time to come - such as farm implements, transportation equipment, mining machinery, and consumer goods - do not require this degree of precision. Not all used machinery is capable of holding the same tolerance which it had when new. It is essential that a buyer satisfy himself that a used machine can provide the precision necessary for the planned job.

F. Difficulty in obtaining finance.

The difficulty in assessing the correct value and condition of second-hand equipment makes it difficult to obtain finance for its purchase.

The Economic Intelligence Unit^{12/} reports "Most, if not all, financing organisations try to avoid applications involving used equipment. For example, the Export-Import Bank adopted an iron-clad rule in the past that they would only begin to consider financing used equipment shipped abroad if the exporting company had a financial interest in the overseas buyer. As far as we could discover no loan has been made for this purpose for some time.

G. Difficulty in locating the precise machine needed.

This limitation must not be confused with the process of selection of the right equipment, new or used. The task of locating a particular piece of second-hand equipment is difficult, especially if the purchaser has not had previous experience in the field. There is need for more and better information on the second-hand market.

H. Resistance to the importation of used equipment.

The most serious bar to moving large quantities of used equipment into the developing countries is the strong resistance which has been built up in many areas by the fact that they have received, in the past, large quantities of unsatisfactory used plant. There is a tendency in many of the developing countries to equate used machinery with junk. The result of this distrust has been the imposition of strict regulations banning or restricting the entry of used equipment in certain countries. Many developing countries have also provided measures of protection for their infant engineering industries. The members of the Latin American Free Trade Association, for example (Argentina, Brazil, Colombia, Chile, Mexico, Peru, Uruguay, Ecuador and Paraguay), issued a partial import ban

^{12/} The Economist Intelligence Unit Ltd. New York, 1962.

For a discussion of international financing see Bibliography items No. 20 and 24.

through a proposal drafted by the metalworking industry section of the LAFTA in 1962. The proposal was to apply to these types of tools produced in the LAFTA zone. In reply to this proposal, the President of the Machinery Dealers National Association in the United States, Bedford A. Small,^{13/} stated that such a ban may jeopardize the operations of some companies in the area if the profitability of their production depended on the use of cheaper used machinery, which they would be denied. Prohibition on the importation of second-hand equipment exists in many other countries including Indonesia, Iran, Iraq, Somalia, Turkey, and India.^{14/}

Some developing countries prefer to encourage the use of new modern machinery for reasons of national prestige. The Netherlands Economic Institute paper on the subject states: "It sometimes happens that newly developing countries forbid the trade in second-hand capital goods, not only because of disappointments, but also because it is supposed to be unacceptable from the point of view of national pride."^{15/}

^{13/} "Partial Import Ban Might Hurt Nations", Metalworking News, August 5, 1963.

^{14/} Replies to United Nations questionnaire on the use of second-hand equipment in developing countries.

^{15/} Netherlands Economic Institute, Division of Balanced International Growth. op. cit.

VI. PROCUREMENT OF SECOND-HAND EQUIPMENT

One of the most important steps to be taken in promoting the use of second-hand equipment in developing countries is the provision of advice and facilities to facilitate the procurement of the equipment.

The following steps must be taken

- (1) The determination of the machine most suitable for the job,
- (2) The location of the second-hand equipment,
- (3) The determination of the condition of the equipment, and the conditions of sale such as financing, guarantees, etc.,
- (4) The evaluation of the use of second-hand equipment vis-à-vis new equipment.

1. Determine the machine which is needed for the job

The selection of equipment or line of equipment for a particular job will not be considered in this paper as the question is independent of whether the machine is new or second-hand.

2. Locate the second-hand equipment

To locate second-hand equipment a potential buyer must, at present, approach second-hand dealers or consult second-hand equipment directories. There is much work to be done in this area to identify the firms which are willing to undertake one or several of the activities involved and also to determine the reputability of their business dealings.

3. Determine the condition of the equipment, and the conditions of the sale such as financing, guarantees, etc.

Before purchasing an item of second-hand equipment it is necessary to assess the condition, the rebuilding, packaging, transportation, insurance, guarantees, testing and the assurance of receiving the machine in the same condition as when inspected. This assessment becomes very much more difficult when the equipment is to be purchased abroad.

The suitability of the machine for the customer's job must be established either by a competent technician from the buyer's organization, or obtained through the consulting services of a tooling engineer who specializes in the type of machinery involved. It is essential that such a consultant should have no interest in the sale.

Certification of the specifications, age, and other facts about the machine can be obtained by checking with the manufacturer. Additional information about completeness, condition, etc. can be obtained by inspection of the machine, which may be carried out by an impartial consulting service. There are a number of highly reputable inspection firms in any industrialized country who retain qualified engineers to inspect and report on all types of equipment. The inspection fee is generally nominal, and the report is rendered directly to the buyer.

Quality of repair, reconditioning, rebuilding, or other mechanical work done by the seller should also be ascertained and reported upon at the time of inspection. This should be done with the machine under power.

Adequate preservation and boxing of equipment for conditions to be encountered during shipment can be obtained by having the equipment packed by a competent packing and shipping firm if the seller does not have adequate facilities in his plant.

It is also necessary that the buyer be satisfied that the equipment can be reassembled without difficulty at its destination. This is a particular problem if 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".^{16/}

In a pamphlet published by the S. and S. Machinery Co. of Brooklyn, N.Y., the editors of the American Machinist have made the following suggestions for the prospective purchaser of second-hand machinery.

^{16/} Waterston, Albert. op. cit., 1962.

The inspection of a used machine tool should be carried out both by a plant owner or manager and the most experienced technicians available from the plant, who should take with them test equipment such as dial indicators, micrometers and test bars, vernier calipers, surfaces gauge, straight edge, precision level and height gauge.

The disadvantages of buying a machine tool "as-is" far outweigh the advantage of lower prices. An average production or tool and die shop does not have the facilities to properly recondition or rebuild an "as is" machine. A guarantee is seldom given with such a machine, and it is virtually impossible to make any total judgement about a machine unless it has been taken apart and thoroughly checked.

When buying a machine in any condition it should always be tested under power. Each individual machine tool requires a different process of testing and visual inspection, but the following is given as an example of the tests which should be undertaken in examining a lathe:

1. Put a piece in, take a cut, listen.
2. Check gears for quiet operation.
3. Look at bearing surfaces.
4. Check ways for visual wear, scoremarks, uneven wear. Don't be alarmed at small nicks - they have little effect on performance.
5. Look at the areas where wrenches and handles are applied. Are they all chewed up? Do the lead screws show sections uneven in lead? Can you see score marks? If not, the machine is in good shape.
6. Keep a sharp lookout for cracks and welds.
7. Check all alignment of headstock and tailstock. Are they parallel with the ways?
8. Inspect gears for excessive wear on the pitch line. Here again, watch for cracks and welds.
9. Check lead screw for excessive play.
10. Check cross-feed screws for wear.
11. Turn a bar under power; measure centre heights with a micrometer height gauge; measure diameter differences with a micrometer; test spindle runout with a dial indicator.

Many of these procedures can be used for inspecting milling machines, planer-millers, horizontal borders etc. with the addition of trammel tests. The machine's attachments must also be checked.

A buyer can expect that a rebuilt machine will perform as well as a new one, and the procedure for testing a rebuilt machine should be the same as for a reconditioned one except that the test criteria should be higher.

Both reconditioned and rebuilt machines usually carry a 30-day money-back guarantee of workmanship, materials and performance. The buyer usually frays the freight bill back to the dealer if the machine proves unsatisfactory.

In order to ensure that the machine is received in the same condition as when inspected, the dealer must deliver a clean bill of lading to the customer. In other words, he must see that the machine is properly loaded for acceptance by the carrier who is then responsible to the buyer.

4. Evaluate the use of second-hand equipment vis-à-vis new equipment

The main issue raised in the answers to the Centre's questionnaire on the use of second-hand equipment in developing countries was the necessity for a proper analysis and evaluation in establishing the advantage of second-hand equipment over new equipment.

Such an analysis closely resembles the well-known equipment replacement studies with the addition of inspection and reconditioning costs and the risks involved in these.

Questions to be analysed could be listed as follows:

(a) Acquisition

1. Inspection and/or evaluating cost (second-hand equipment);
2. Reconditioning or rebuilding cost (second-hand equipment);
3. First cost of the equipment including delivery costs (new and second-hand);
4. Installation cost of the equipment including labour, materials, overhead, and testing or running-in expense (new and second-hand);

/...

5. Future salvage value of the equipment (new and second-hand);
6. Future and present stand-by value of the equipment (new and second-hand);
7. Future cost of tearing out equipment when it is replaced (new and second-hand);
8. Cost of tools or equipment that may have to be purchased or rented in connexion with installation, salvage, or relocation (new and second-hand);
9. Cost and disposal values of auxiliary capital equipment that may have to be installed (new and second-hand).

(b) Operation

1. Direct labour, both quantity and quality;
2. Indirect labour, both quantity and quality;
3. Power costs including extra costs for peak loads and low power factor;
4. Taxes;
5. Insurance;
6. Space costs: floor space and vertical space including auxiliaries;
7. Usage of auxiliary equipment such as cranes;
8. Scrap and waste-material costs, including extra inspection costs not covered under indirect labour;
9. Cost of cutting tools, jigs, fixtures, dies, special hand tools, or handling apparatus;
10. Usage of cutting oils and similar expendable supply items;
11. Costs due to safety, fire, and accident hazards not covered under normal insurance policies;
12. Cost of other services such as compressed air, steam, and heat;
13. Down-time production losses due to adjustments and set-ups;
14. Cost of licences and permits;
15. Fuel costs, including ash and waste disposal;
16. Costs due to reduction or increase in outside subcontracting activities;
17. Sales and sales-promotion values.

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(c) Maintenance

1. Labour costs - both quantity and quality - for repairs and preventive-maintenance activities;
2. Lubrication costs;
3. Painting costs;
4. Cleaning costs;
5. Cost of spare-parts and spare-parts inventory;
6. Down-time production losses due to repairs and inspections;
7. Cost of special tools and devices used in maintenance.

The more systematic replacement studies are usually made on one of the following bases:

1. Annual cost
2. Present worth
3. Rate of return;

these bases are also relevant for an evaluation of the use of second-hand equipment.

A considerable amount of research and development work in the field of replacement studies has been done by the Machinery and Allied Products Institute (MAPI) and a book has been written by the Director, George Terborgh, on Dynamic Equipment Policy.

VII. ORGANIZATIONS CONCERNED WITH SECOND-HAND EQUIPMENT

There are several types of organizations concerned with second-hand equipment. Some of those well known for their activities in developing countries will be described below.

(1) Non-commercial Organizations:

In the United States, the Agency for International Development (formerly ICA) has, in recent years, very greatly expanded its programme of acquisition of surplus government property for use in developing countries. Acquisitions have risen from a value of \$1.54 million in 1956 to \$31.1 million in 1960 and \$45 million in 1961. For some years the major bottlenecks in the Excess Property programme has been the acquisition and handling of the equipment. In 1961, therefore, the President was authorized to maintain \$5 million in a separate account, free from fiscal-year limitations, to facilitate the acquisition, storage, renovation, rehabilitation, packing, crating, handling and transportation of this equipment. It is expected that AID's Excess Property programme will play an increasing role in the United States Government's strategy to accelerate economic development in developing countries.

Other United States non-commercial organizations are Self-Help and the Tools for Freedom Foundation.

Self-Help is a private organization which rebuilds and sells farm equipment to agriculturalists in developing countries. The equipment handled includes tractors, power units, welders, poultry incubators, cream separators, washing machines, etc. All the machinery is fully checked before being sold at from 1/5 to 1/5 of the original price. In the past the biggest share of equipment has been supplied through mission stations of every denomination, though it is hoped to develop and supply farmers' co-operative in the developing countries in the future.

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The Tools for Freedom Foundation is also a private non-commercial organization which includes among its objectives, "to make a significant contribution of tools and machinery urgently needed by almost every technical and vocational school in the developing countries", and "to put to effective use an untapped source of development assistance: the vast and self-renewing stocks of usable but obsolete equipment in American industry".^{17/} The Foundation hopes that American industry will be spurred to donate their obsolete equipment for use in technical schools in developing countries.

In the Federal Republic of Germany, the Government, under its foreign aid programme, supports the export of second-hand equipment to developing countries by providing financing and through its tax-policy. The Government's policy is to ensure that the equipment coming under this programme is technically and economically efficient, and that the constant availability of spare parts is assured.^{18/}

(2) Commercial Organizations:

Commercial organizations dealing in second-hand equipment are numerous in all highly industrialized countries, but not all of them are in favour of exporting to developing countries.

In the United States, the relevant trade association is the Machinery Dealers National Association (MDNA). The MDNA is interested in promoting the export of second-hand machinery and at its annual meeting in 1963 decided to draft a code of ethics and procedures to be followed by all member firms interested in exporting to developing countries. The dealers and second-hand equipment available in the United States can be located in a number of publications and directories, including the monthly Used Equipment Directory, which lists equipment, its condition and the dealer.

^{17/} "United States Firms Contribute Idle Tools to Schools in Developing Nations", Wall Street Journal, 26 September 1962.

^{18/} Letter to Centre for Industrial Development from Deutsche Gesellschaft für wirtschaftliche Zusammenarbeit, 3 December 1963. (German Society for Economic Co-operation)

In Germany the makers of machine tools are opposed to any plan for the export of second-hand equipment in the Federal Republic's foreign aid programmes. They are concerned that the use of second-hand machinery and the possible shortage of replacement parts will destroy their reputation for quality products and service.^{12/}

^{12/} International Business, March 1963.

VIII. CONCLUSIONS AND SUGGESTIONS

The potential importance of second-hand machinery in the industrialization process of developing countries has been stressed in recent years. It has been pointed out that much equipment which is considered obsolete in industrial countries is still economically and technologically sound and may be used advantageously in developing countries.

The present paper has raised some of the important questions involved in the selection and use of second-hand equipment. The potential supply of this equipment from the industrial countries is considerable, but if the developing countries are to make efficient use of this surplus, answers must be found to the following questions:

1. Can second-hand equipment play an important role in the industrialization process in developing countries? If so,
2. What would be the effect of using "obsolete" equipment on the economy of the developing countries?
3. What would be the effect of the importation of second-hand equipment on the growth of the industries manufacturing this equipment in the developing countries?
4. What is the validity of the restrictions placed on the importation of second-hand equipment by some developing countries?
5. Given the advantages and disadvantages discussed above, which industries could most efficiently and readily use second-hand equipment?

If the use of second-hand equipment is to be promoted in the developing countries, the following are urgently needed:

1. A standard international classification of second-hand equipment to facilitate the identification and initial evaluation of items,
2. Lists of reputable firms dealing in second-hand equipment to facilitate the location of needed items; the investigation of all other sources of equipment; the organization of an information centre,

3. Standard procedures for selection and equipment examination which should be drawn up to assist experts in evaluating the condition of the equipment and to facilitate communication between them,
4. The development of a set of procedures to be followed in the procurement of second-hand equipment,
5. The investigation and listing of all possible sources of financing, for the information of interested parties,
6. The co-operation of dealers, trade associations, international organizations, etc. should be sought and welcomed with the objective of establishing permanent and reliable channels for the procurement of second-hand equipment,
7. A system for obtaining information from consumers of second-hand equipment, to enable a check to be maintained on breaches of contract by suppliers, and to facilitate the collection of statistical data.

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QUESTIONNAIRE ON SECOND-HAND MACHINERY

Preliminary Note

1. The advantages and disadvantages of using second-hand machinery in the developing countries have been discussed sporadically in the literature. Most contributions come from economically advanced quarters and consist mainly of general discussions and a few qualitative examples thrown in as illustrations. Little or no research has been done in under-developed countries that have had experience with second-hand machinery and equipment.
2. The purpose of the survey that the Centre for Industrial Development has started is to get to the users of this equipment, and to find out about their experience and their general feelings on the matter. At the same time, information will be gathered on the potential supply of equipment which is economically obsolete but technically sound in the industrially advanced countries, and a review will be made of the present international flow of second-hand machinery and equipment.
3. The flow of second-hand equipment to under-developed countries may take place in the form of complete installations (and complete plants) or of individual pieces of equipment. In the latter case, the unit of equipment may be of high value (such as a ship, an airplane or a heavy machine-tool). It has been pointed out that this last category has the best prospects for trade in view of the large amounts of equipment which the United States industry will replace in the coming years, but at the same time, the collection, inspection, rebuilding and marketing of large amounts of low-value units present great difficulties if it is to be done economically and if some kind of guarantee is to be given to the purchaser about the quality of the second-hand units he buys.
4. International commercial transactions of second-hand equipment^{1/} may take place through intermediary dealers as well as through ad hoc arrangements - a company in

^{1/} Non-commercial transactions exist in a limited scale between United States sources (the Agency for International Development programs and a few voluntary organizations) and industrial and educational recipient organizations overseas.

an advanced country sending pieces of equipment, complete installations or a whole plant from its own holdings, to its subsidiary or to a local entrepreneur. This last type of transaction is said to give some assurance that the assets transferred are in adequate running order and can execute the tasks expected of them, so that the risks run by the recipient are reduced.

5. Here is a summary of the advantages and disadvantages in the use of second-hand equipment as compared to new equipment that have been put forth at various times

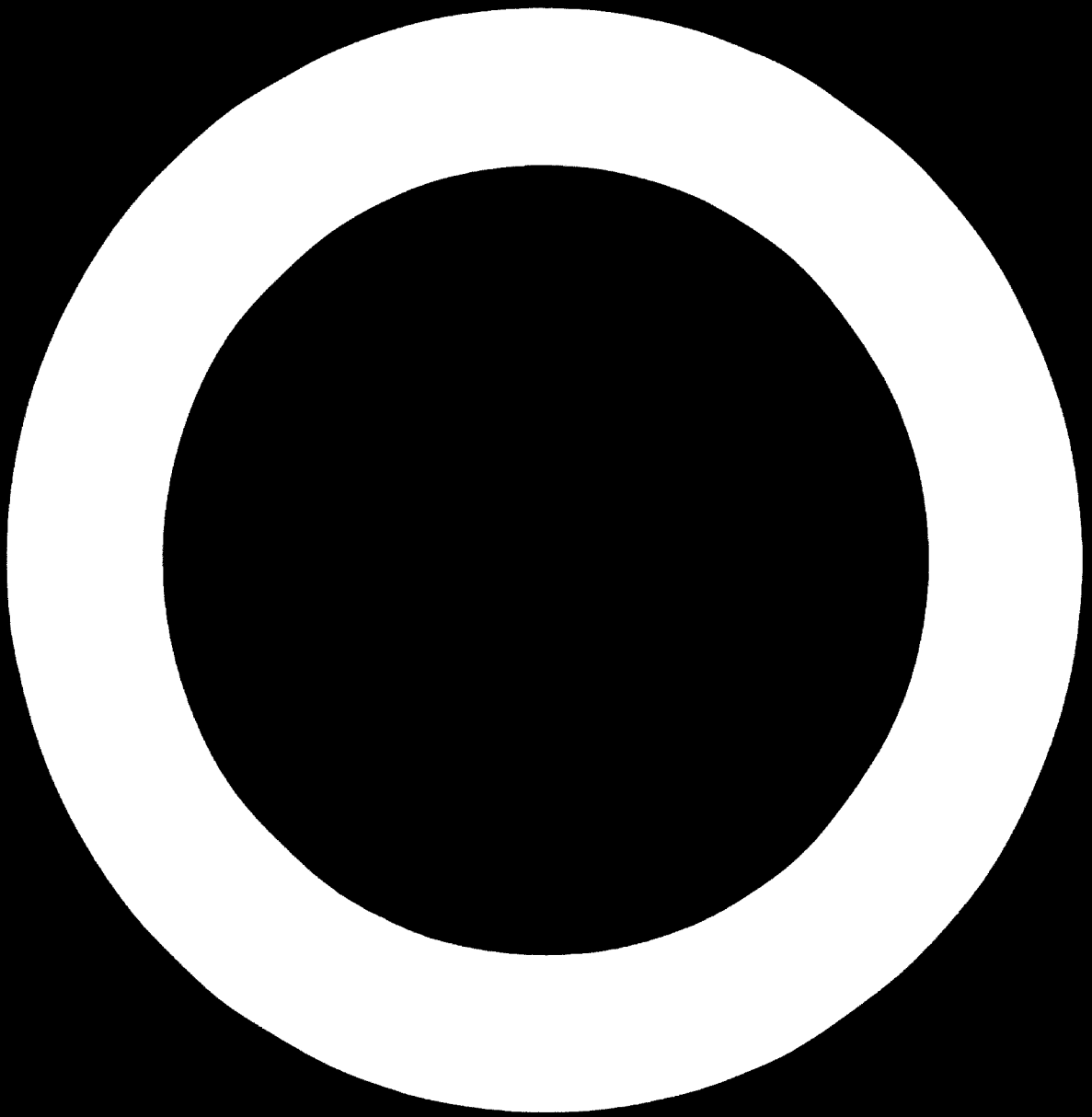
Advantages

- a. Lower price, hence more within the reach of the individual entrepreneur, and appropriate for countries where the rate of interest is relatively high.
- b. Savings in foreign exchange.
- c. Employment of more labour.
- d. Less skills needed for operation and for maintenance, in many cases, since the older vintage machinery is less complicated; more spare parts can be manufactured locally.
- e. Small scale of operation, making it more suitable for small national markets.
- f. Shorter delivery periods.
- g. More flexible depreciation; since the expected active life is not long, the firm can shift to new or different equipment at an earlier date.

Disadvantages

- a. The cost of dismantling, overhauling, inspecting, repairing, rebuilding, and crating may nullify price advantages.
- b. The buyer runs the risk that the machine may not be in sound technical condition. This may lead to breakdowns, stoppages, and repair expenses; in short, to a decrease in the efficiency of operation.
- c. Spare parts may be difficult to obtain.
- d. Higher maintenance costs.
- e. Some types of second-hand machinery may require higher operating skills than new, up-to-date models.

- f. Lower quality of production or satisfying different standards and specifications. This may be a serious disadvantage in the case of export products.
- g. Shorter economic life may be a disadvantage in some cases.
- h. Difficulty in obtaining loans for financing the purchase.
- i. Difficulty in localising the precise machine that is needed.
- j. Some theoretical economists argue that a developing country should install the most up-to-date equipment for fast economic development.



INSTRUCTIONS TO COMPLETE THE QUESTIONNAIRE

- a) The questionnaire should be answered by a responsible person in an establishment that has been operating second-hand machinery or equipment for some time in the past, or is to acquire such equipment.
- b) The second-hand machinery described in this questionnaire must have been imported second-hand from the country where it was manufactured. Local equipment obtained locally should not be included.
- c) The questionnaire itself is concerned with an individual piece of equipment, such as a machine-tool or a textile machine, or a complete productive unit, such as a heat-treatment unit or a bottling plant. Since the intention is to obtain a representative picture of the selection, purchasing and performance of the equipment owned by the responding firm or individual, several copies of the questionnaire should be filled up, if necessary, to cover the different second-hand units in an adequate manner. In case more than one copy of the questionnaire is completed, questions already answered once need not be repeated.
- d) It would be appreciated if the inquirer could help the respondent in selecting appropriate second-hand units for filling up copies of the questionnaire. The types of equipment which are of particular interest are:
 1. Equipment used in the metallurgical industry (iron and steel, non-ferrous metals, refining, foundry, etc.);
 2. Machine tools;
 3. Equipment used in the chemical industry (including cement, glass, soap, etc.);
 4. Equipment used in the generation and distribution of electric energy;
 5. Transportation, and materials handling, equipment;
 6. Earth-moving and construction equipment;
 7. Industrial engines, pumps, compressors and presses;
 8. Textile machinery and equipment;
 9. Food processing equipment.

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- e) It would be very desirable if the inquirer could help the respondent in filling up the questionnaire, ensuring that all answers are covered as correctly as possible.
- f) Replies may be sent in English, French or Spanish, but if this is not possible, other languages will be acceptable.
- g) Completed copies of the questionnaire should be returned, not later than 31 December 1963, to the Director, Technological Division, Centre for Industrial Development, United Nations, New York, to whom any inquiries and comments may also be addressed.

SECOND-HAND MACHINERY QUESTIONNAIRE

A. GENERAL INFORMATION ON COMPANY

1. Company Name
2. Product or Line of Products
3. Volume of Production
4. Total Number of Employees

B. INFORMATION ON SECOND-HAND MACHINERY OR EQUIPMENT

1. Type of Machinery or Equipment
2. Size or Capacity
3. Location when Bought
4. Age at Time of Purchase
5. Was it inspected before purchase? Yes No
6. Where?
 - a. Original Location
 - b. In Operation
 - c. During Dismantling
 - d. Elsewhere (Explain)
7. By Whom Was it Inspected?
Purchaser
Other
8. Other Precautions (explain):

State nationality and qualifications of inspectors. Also nationality of firm.

/...

C. REASONS WHY YOU PURCHASED SECOND-HAND EQUIPMENT RATHER THAN NEW EQUIPMENT

1. Economic: (Check as many boxes as apply; make two marks on most important item)

- a. Lower price (installed)
- b. Less foreign exchange needed
- c. Lower operating cost expected
- d. Uses cheaper labour
- e. Other (explain)

2. Technical:

- a. Use of unskilled labour less skilled?
- b. Easier maintenance
- c. Capacity of equipment closer to your requirements
- d. Type of power required
- e. Simpler operation
- f. Flexibility of output
- g. Other (explain)

3. Availability

- a. Easier to get or find
- b. Shorter delivery terms
- c. Simpler replacement parts^{2/}
- d. Other (explain):

4. Financial

- a. Easier terms
- b. Lack of money to buy new machines

^{2/} If parts not available, easy to manufacture locally.

- c. Greater depreciation allowances
- d. Other

D. PURCHASE

1. What was the cost installed as a percentage of the installed cost of similar new machinery?

2. How was the equipment purchased?

- a. Location site - installed
- b. Location site - dismantled
- c. FAS port of origin
- d. FAS port of destination
- e. Installed destination
- f. Other (explain):

3. Did it carry any type of guarantee? yes no
Explain:

4. Was it insured? yes no
By whom?

5. Was outside finance obtained? yes no
By whom was it financed?

- Selling company
- Foreign institution
- International institution
- Local institution
- Government
- Other (explain):

- 6. Was the equipment tested in operation before purchase? yes no
- 7. Did it satisfy specifications? yes no
- 8. Did it include necessary attachments and other accessories? yes no
- 9. What kind of repairing was needed
 - a. Minor adjustment
 - b. Parts replacement
 - c. Minor repairing
 - d. Complete overhauling
 - e. Rebuilding
 - f. None
 - g. Other (specify):
- 10. By whom was it repaired or reconditioned
 - a. Intermediary
 - b. Manufacturer
 - c. Purchaser
 - d. Other (specify):

E. INSTALLATION AND OPERATION

- 1. Who was in charge of installation and start-up?
 - a. Selling company
 - b. Manufacturer
 - c. Intermediary
 - d. Buyer
 - e. Contractor
 - f. Other (specify):
- 2. Was the equipment destined for its original function? yes no
- 3. Was it used at full originally rated capacity? yes no
- 4. Did quality of output stand up to expectations?

5. What is the expected useful life of the equipment years
6. Do you expect to use it for its lifetime? yes no
If answer is no, explain reasons:

7. System of Measurement

Was the machinery made for

Metric system

English system

Your country uses the

Metric system

English system

Both

Did you have any trouble with the different systems? (explain)

F. OPERATING AND MAINTENANCE CHARACTERISTICS
(Compare to new machinery whenever possible)

1. Total man-hours per year that the machine is used in production 2nd-hand _____ New _____
2. Type of labour (skilled, semi-skilled, unskilled, or specially trained) 2nd-hand _____ New _____
3. Idle time, as percentage of working time due to maintenance, repairing, overhauling 2nd-hand _____ New _____
4. Idle time due to other causes such as lack of work, strikes, accidents, etc. 2nd-hand _____ New _____
5. Average daily working hours (or shifts) 2nd-hand _____ New _____
6. Did you have any difficulty in operating the 2nd-hand machinery or equipment? yes no
7. How many times did the machine break down last year?
8. Did any major breakdown occur? yes no
9. Was the machinery or equipment stopped because of unavailability of spare parts?

10. How long, as a percentage of total repair time?

11. Parts were obtained from

- a. Local market
- b. Imported
- c. Locally manufactured
- d. Other (explain):

G. MANAGEMENT OPINION

- 1. Did second-hand machinery or equipment perform as expected? yes no
- 2. Did it achieve the economic results predicted when it was purchased? yes no
- 3. Was past experience any guide? yes no
- 4. Would you buy second-hand machinery again? yes no
- 5. Please state any suggestions or comments that you think will be helpful and should be considered before purchasing second-hand machinery.

ANNEX B

The questionnaire on the use of second-hand equipment was sent to the United Nations Technical Assistance experts in the developing countries with the purpose of obtaining from local industrialists information on types of equipment in use, procurement steps undertaken, and general performance of such equipment as experienced by the users of second-hand equipment. The experts were sought to locate, select and assist the industrialists using second-hand equipment in supplying the information requested. The experts not only obtained this information but also supplied views and opinions of governments and added comments of their own.

The answers to the questionnaire, although limited to twenty-one in number, represent what may be typical examples selected by the United Nations technical assistance experts in the developing countries. The following 11 industries and the following 15 countries were covered by the replies received:

<u>Industries</u>	<u>Countries</u>
Cement	Bolivia
Textile	Colombia
Pulp and paper	Paraguay
Woodworking	Burma
Vegetable oils	India
Oxygen manufacture and compression	Indonesia
Marine power	Malaysia
Durable goods	Ghana
Food processing	Somalia
Consumer products	Tunisia
Transport	Turkey
	Iran
	Iraq
	Israel
	United Arab Republic

The answers included 17 completed questionnaires and 11 letters indicating the attitude of governments with respect to import regulations of second-hand equipment.

The answers to the questionnaire cannot still be used as a basis for treating conclusions about trends in the use of second-hand equipment in particular industries in the developing countries. They provide only a general picture of the present use of second-hand equipment in the selected industries. From the result obtained, it is obvious that there is need for further investigation into the use of second-hand equipment in particular industries, in order to be able to draw definite conclusions about its potential use in the developing countries.

The answers to the questionnaire covered the following general and special purpose equipment:

A) General Purpose

- (a) Mechanical and Hydraulic Presses up to 500 tons
- (b) Steam boilers
- (c) Steam engines
- (d) Feeding pumps
- (e) Diesel generators
- (f) Electric motors, integral HP
- (g) Electric alternators
- (h) Reciprocal and centrifugal pumps
- (i) Gasoline engines
- (j) Hammer drills
- (k) Lathes
- (l) Drills
- (m) Punch presses
- (n) Electric compressors
- (o) Welding equipment
- (p) Heavy machine tools

B) Special Purpose

- (a) Cement mills, rotary kilns, crushing plant
- (b) Electric generator plant, auxiliary equipment
- (c) Pulp and paper machinery
- (d) Wrapping paper manufacturing plant
- (e) Oxygen production and compression plant
- (f) Automatic saw milling equipment, planers, cleaning and moulding machine
- (g) Vegetable oil plant
- (h) Automatic cigarette packing and stamping machinery
- (i) Food processing equipment, ice cream machine, bottle washer and cooler, chocolate and chocolate wrapping machinery
- (j) Spinning and weaving plants
- (k) Marine diesels

Employment in the plants surveyed ranged from 10 workers in an automatic cigarette manufacturing plant in Paraguay to 15,000 workers in a pulp and paper organization in India.

The following reasons were given for the purchase of second-hand equipment rather than of new equipment:

<u>Reason</u>	<u>Frequency</u>
Lower price (installed)	12
Shorter delivery terms	12
Lack of money to buy new	3
Less foreign exchange	7
Simpler operation	6
Flexibility of output	6
Easier to obtain	6
Simpler parts	5
Easier maintenance	4
Capacity of equipment closer to requirements	4
Easier financial terms	4
Type of power required	3

<u>Reason</u>	<u>Frequency</u>
Lower operating cost expected	2
Greater depreciation allowances	2
Market demand not high enough to merit new	1
Wider range of machines purchased with capital available	1

The over-all performances of second-hand equipment is shown by the answers to questions G-1, 2 and 4 on page 3 of the questionnaire. In 80 per cent of the cases past experience influenced the purchase of second-hand equipment, and the second-hand equipment purchased performed as expected by the new owners. Ninety per cent of industrialists surveyed would re-purchase second-hand equipment.

The industrialists interviewed held the opinion that it is better to purchase second-hand equipment through trustworthy and internationally reputed dealers with a wide knowledge of the equipment. It is important that the buyer should personally inspect the equipment if he has the necessary knowledge and experience.

It was suggested that second-hand dealers should obtain and make available complete operating manuals and spare parts lists for each machine, and that more attention should be paid to the crating and corrosion protection of the equipment for overseas shipments.

It was also emphasized that when precision work was required new machinery should be used in all cases, although second-hand equipment performed very well in work where small tolerances are permitted.

The comment was made that the questionnaire appeared to assume that all second-hand plants were "obsolete" but that, in some cases, "non-obsolete" plants were sold as second-hand because the original owners had installed larger units as their market expanded.

Among the comments offered by the technical assistance experts themselves, one expert was in the process of recommending an agreement involving second-hand equipment, to be brought from one developing country to another on the condition

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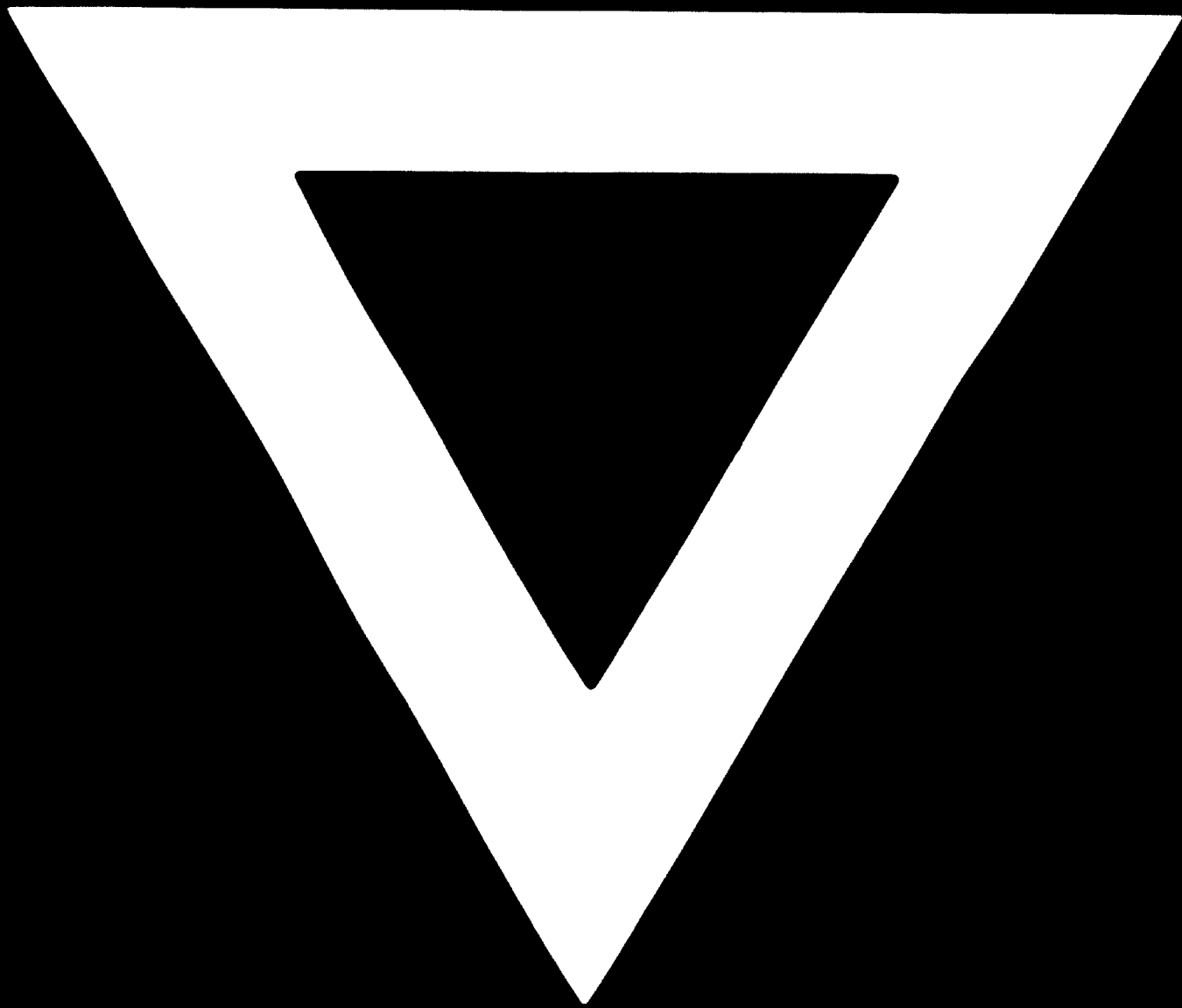
that the supplier should take the responsibility for installing the equipment. Among the reasons why second-hand machinery is purchased in preference to new equipment, the following points were mentioned:

- (a) Shortage of foreign exchange did not permit new imports
- (b) The capital available did not cover the cost of new machines and equipment
- (c) Quicker delivery was needed than could be obtained with new equipment.

The comments referring to productivity implied that the use of second-hand equipment could sometimes signify a great improvement over the equipment in use. Such was the case of a firm which replaced a 30-year-old machine with a 5-year-old one. The expert felt that in this case the firm concerned was enhancing its productivity less than a firm which exchanged a 5-year-old machine for a new one.

Some experts were of the opinion that second-hand equipment should be demonstrated in activities such as teaching and training showing in this way that second-hand machinery, although much cheaper, can be guaranteed to operate as well as its new counterpart. Several experts contended that one of the barriers against the use of second-hand equipment was the policy of certain governments (Turkey, India, Iraq, Indonesia, Iran, Somalia Republic and many countries in Latin America) restricting or prohibiting the import of such equipment. Nevertheless, industrialists in some countries had resorted to illegal schemes to import second-hand equipment by describing it as "new" or as "spare parts". Some governments, India for instance, were recently liberalising their attitude towards the importation of second-hand equipment. In some other countries, contrary to the official policy of restriction, specific exceptions have been permitted by governments, for their own undertakings. For instance, a textile mill is to be built on this basis in the Somali Republic by a German firm with the inspection to be made by a Swiss consulting engineer.





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