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NEEDS AND CONDITIONS OF THE WOODWORKING INDUSTRIES IN DEVELOPING COUNTRIES: SOME POINTS TO CONSIDER 1/

prepared by

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PREFACE

This paper attempts to identify some typical problems specific to woodworking machinery purchases in developing countries, and to channel consideration of solutions, recommendations and guidelines along profitable lines. It represents the experience gained by staff members themselves and relies heavily on the opinions and viewpoints expressed by representatives of both industry and governments of developing countries while attending seminars and meetings organised by the UNIDO.

The considerable knowledge of experts and consultants engaged by UNIDO for technical assistance assignments has also provided valuable insights into the problems involved and the most likely means of solving this extremely difficult and often frustrating question.

I. INTRODUCTION

1. Many of the problems facing potential machinery purchasers in developing countries are the same as those faced by their counterparts in more technically advanced parts of the world. However, they are also confronted with additional difficulties which are the subject of this meeting.

2. As the woodworking industries realize the need to expand to remain competitive, to diversify to capture additional home markets and to seek foreign exchange through exports, they must make important investment decisions which will affect their very existence as viable enterprises, for the entire life of the machine. Equipment purchases represent a large portion of capital costs and so the selection of the most suitable pieces of machinery must be done with great care and foresight.

3. Some of the more general problems encountered are related to limited exposure to alternatives - both with respect to available models and to performance expectations, language differences - which affect specification descriptions, negotiations and terms of contracts, and the general lack of unbiased technical advice. This last aspect is a feature of a sellers market where, quite often, information is sales rather than engineering oriented. Another problem in this general class concerns currency restrictions, hence governmental red tape involved in obtaining import licenses.

4. New models are introduced more and more often and the "half-life" of machines is becoming increasingly short. This is especially so since European manufacturers have solved the basic cutting problems for tropical species but new progress is often in the direction of increased automation. Dealers are frequently not available locally and brand names are thus not widely known.

5. And yet, the pressure to maintain a competitive position through expansion and improvement of existing facilities steadily increases.

6. Quality products require quality equipment !

II. THE PROBLEM CONSIDERED

1) Identification

7. It should be a truism that, before seeking a solution, we must first define the problem, but all too often the problem is but vaguely defined and the purpose to which a new piece of equipment is to be put only partly understood or decided upon. It is here that future production plans must be taken into account and present production facilities analysed. Objective criteria must be used in determining what is to be produced, how much, for how long (length of series) and to what degrees of precision: and the decision-maker must have clearly in his mind what his goods are. Are they to simply replace an obviously worn-out machine ? Are they to complement what already exists and either expand the production capacity or diversify the product line ? Or, is the intention to break into the export market with the accompanying higher standard of quality and consistency ?

8. Any individual expansion plan must comply with governmental policies on employment and sound benefits. Most manufacturers of machinery are trying to avoid labour for the markets of developed countries, but this tendency is often unacceptable for countries which place a high priority on employment of unskilled and semi-skilled people.

9. There is some feeling, in developing countries especially, that machinery should be chosen not only to employ, produce or exploit, but to complement the human resource.

10. The importance of this first step should not be underestimated, since clearly delineated objectives may often go a long way to actually solving the problem by avoiding extraneous and irrelevant considerations.

2) Alternatives

11. A rigorous economic evaluation of the potential alternatives requires reliable information from sales agents, a thorough investigation of perhaps unusual solutions, such as subcontracting, and a clear understanding of the terms of offers received. A somewhat difficult task is to ascribe comparative values to intangible considerations such as reliability of delivery, guarantees and service follow-up, assurance of continued supply of auxiliary products: tools, abrasives, etc., as well as projections of probable operating and maintenance costs under the actual plant conditions. This is usually complicated by the differences in models and actual functions and by many of the points mentioned in the introduction.

12. Local manufacture of all or parts of the equipment required must be considered as well. When drawing up specifications for calls for tenders, it should often be possible to eliminate much of the auxiliary loading, protective, supporting and waste disposal parts which could be made more cheaply by a local machine shop. An entrepreneur should, therefore, seek to purchase only the "bare machine" with its spare parts.

13. Finally, a "negative" solution must not be ignored. It may turn out, upon investigation, that another manufacturer has excess capacity on a similar machine who could supply components or do the work in his shop. Or, the most economical solution may be to hire extra workers and take advantage of the inherent flexibility and divisibility of manual work systems. That is to say that a machine representing a certain (large) investment exists as a fixed unit while workers can be shifted from one job to another, retrained or laid off as the case may demand. Extra shifts may be arranged too, although this may contribute to a lower overall quality due to lack of skill of the second shift.

14. The possibility of establishing centralized facilities for various commonly demanded jobs (copying lathes, drying, tool maintenance) should also be investigated if a manufacturers association exists which encourages such co-operation.

The multiplier effect

15. It can often happen that a piece of machinery can cause an unexpected chain reaction of expenses to follow. This can be anticipated to a certain extent by carefully analysing the production system of which it is a part, but nevertheless repercussions can occur. These can be due to extra capacity of the machine which creates either a bottleneck further down the line or which requires additional "feeding" equipment before it so that it may work close to its designed capacity. For example, a new press might necessitate a new boiler; and the use of carbide-tipped tools may necessitate investments in the tool room.

16. New equipment may simply put too great a strain on the auxiliary services such as the dust and waste extraction system or the power or compressed air supply. Careful analysis of the overall layout and future plans for expansion should prevent these occurrences.

III. LOCAL MANUFACTURE

17. One objective of this meeting is to examine the prerequisites and conditions for the manufacture in developing countries of woodworking equipment and machinery. As mentioned earlier, this need not entail the immediate production of sophisticated pieces of machinery, but should presumably be carried out at various levels depending on the stage of development of the foundry industry and of the engineering works in each country.

18. There must exist countless opportunities for improvising, modifying and adding to standard machinery to enable them to perform either particular operations or under different conditions than those originally intended. Brackets, mountings, supports, conveyor systems, stacking equipment, bins, carts and simple jigs and control systems (pneumatics) can often be produced by reasonably skilled but imaginative machinists or welders which would considerably reduce capital expenditure.

19. If we look at the potential of producing woodworking machines, one arrives at the conclusion that they can be classified in the following four groups:

1. Developed countries —— these can manufacture virtually anything;

2. developing manufacturing countries ——these have relatively advanced technologies and already manufacture certain kinds of woodworking machinery;

3. (a) potential manufacturing countries —— these could manufacture machinery but do not now for various reasons such as lack of markets, traditional ties with a country that exports good machinery; no currency problems;

   (b) developing countries with restrictive currency regulations —— these could manufacture some of the equipment they need, their markets are very small but since their currencies are regulated, the incentives to start production are there;

4. (a) developing countries unlikely to manufacture but with no financial problems —— these are not oriented towards a manufacturing economy;

   (b) developing countries incapable technically of producing machinery.

20. The difficulties of classification are compounded by the complexity of the equipment to be produced. For example, many countries could be classified under item 3 (a) for simple pieces of equipment and auxiliary parts and yet do not have a sophisticated industry and large foundries to fully qualify them for this heading.

21. Several companies are capable of producing sawmill and manufacturing machinery but the main problem is one of lack of technical knowledge. Technicians should be given a chance to visit manufacturing companies of developed countries.

22. It is most important to have the manufacturer right in the wood processing country to facilitate design modification and spare parts supply and technical advice.

IV. EXAMINATION OF PROBLEMS ENCOUNTERED

1. Problems related to machines themselves

23. The following is only a partial list of the sort of questions that a potential purchaser must answer or investigate to his satisfaction before making the final decision.

- What degree of sophistication or automation is appropriate, and what are the risks associated with possible obsolescence and inflexibility or production ?

  Most machines are too automated, especially since it is often a governmental policy to maximize employment. Power-hand tools should be seriously considered as an alternative to multi-purpose machines but the latter should be preferred over specialized machines.
- What precision is foreseen as this is often the prime determinant of cost ?
- What are the special input requirements which may be lacking in the existing facilities (air, power) ?
- Are cutting tools and basic parts interchangeable with those of other machines already owned and can they be serviced on the existing tool room equipment ?
- What particular spare parts inventory must be maintained that may differ from other machines ?

Service for low-cost machinery is usually much poorer than for more expensive brands. They have "no" spares, follow-up nor responsibility.

This produces an unfortunate and difficult choice between low-cost machinery which has the proper degree of automation/mechanization but poor service and follow-up, and expensive, overly sophisticated machinery which has good follow-up.

- Does the machine have special modifications in the design to withstand tropical (humid) and dusty or other extreme operating conditions ? Is it worker-proof from the maintenance point of view (i.e. how delicate is it) ?

Machinery must not require ancillary materials (glues, paints, hardware etc.) that is unobtainable or very expensive.

- Are special skills required to operate and to maintain it ? (see page 8)

2. Problems related to the factory layout and infrastructure

24. The following aspects must be considered in the light of the overall development plans for the enterprise:

(a) Although primary processing plants tend to have relatively fixed layouts and introduce technical changes in the machinery items themselves, secondary woodworking plants are much more differentiated and tend to maintain a flexibility to be able to meet customers' demands and changing designs. The ability of any given machine to fit into and link up with a variety of operating arrangements is therefore an important quality to assess.

25. A production line must often be interrupted for special orders so machinery should be versatile and suitable for a variety of jobs.

26. Machinery available in Europe is generally felt to be too highly specialized and automated for the conditions of many countries.

(b) The identification of major trends in the field of wood processing must be borne in mind as this affects the possible future layouts and inter-machine configurations. This means also the need to decide if and when products will be made for export.

(c) The location of the new machine must not restrict important buffer and intermediate stock storage areas. Storage space is often limited, and any encroachment, however gradual, often becomes a serious impediment to process control and to smooth internal transport.

(d) The individual questions listed under (1) above are also affected by some general decisions that impinge upon the selection decision. For example, a lowering in the grade (quality) of lumber being processed means a poorer yield of usable pieces and a consequent increase in the volume of lumber being processed and handled. Furthermore, the extra capacity of the machine might necessitate far more storage space - a machine must be utilized for more than just a small part of the day.

(e) Care must also be exercised in selecting large pieces of equipment as the local transportation and lading facilities may not be capable of handling such weights.

3. Problems related to purchasing

27. This type of problem can be the most intractable and yet offers hope for improvements. The limit to expansion of this sector in the developing countries is often financial assistance for factories presently manufacturing machinery be upgraded. There is a widening gap between the cost of machinery in the developed countries and the selling price of wood and wood products. One solution is to buy only stripped-down models without frills, and make attachments and modifications locally.

(a) The source of credit for investments in machinery is very often lacking for the small businessman since a woodworking shop is, in the eyes of most bankers, a relatively unstable enterprise. Producers of equipment in developed countries should consider selling machinery and technology and providing a market for the products to ease payment difficulties.

(b) It is very difficult to compare two offers when one offers a higher price but a five or ten years' interest-free period.

(c) Administrative red-tape has previously been mentioned, but should be emphasized once again as a real problem. Currency restrictions necessitating import licenses and the various forms and paperwork that go with them can spell the difference between an attractive offer from outside the country and a complicated procedure which forces the buyer to settle for a locally made product which may or may not suit his particular needs.

(d) Allied to this point is the possibility of obtaining duty-free privileges or tax-concessions often granted to "pioneer industries". Awkward procedural delays and complex applications can definitely affect the tendency to import machinery and thus affect the viability of the project.

28. Concessional loans at nominal rates are needed. No equipment maker can afford to sell machinery for more than 5 years deferred payment. This is especially important as governments are increasingly restricting the export of logs and are urging the further processing of wood to maintain foreign exchange earnings at the same or higher levels.

(e) Terms of contract, delivery and payment schedules and guarantees, "force majeur" and any other extra clauses, provisions for follow-up services must all be straightened out between the principals. Each offers its own peculiar difficulties.

(f) Is training of operators or maintenance personnel included in the offer for the more sophisticated types ? This question probably belongs in the next section, yet must be clearly agreed upon when negotiating the contract and may influence the choice of one type of machine over another more complicated model.

4. Problems related to labour/capital considerations

29. The most obvious problem of this nature is that of ensuring a reliable supply of personnel qualified to run the intended machine. There is usually an inevitable and difficult balancing required in deciding between expensive machinery requiring only a few skilled workers and less elaborate equipment that can be operated by the semi-skilled. Economies of scale may favour the higher capacity machinery over labour-intensive types (especially for export products which require consistent precision) yet the skilled operators or maintenance people may be unobtainable. Many workers are improperly employed due to hasty or ill-considered employment and placing practices. Most makers of machinery are trying to avoid labour while this tendency is not always advisable in developing countries due to social and other reasons.

30. A problem associated with machine selection, in that rational selection can be undermined by inattention to it, is that when a craftsman operation is upgraded by the addition of machinery to a semi-industrial level, the choice of foreman can be critical. It is a mistake to promote the senior

craftsman to a supervisory position in a mechanized shop unless he has a good familiarity with machinery and its maintenance.

31. Furthermore, transportation economies may dictate a plant location near the raw material source, thus making it hard to attract the often scarce skilled workers away from the towns and cities. One is forced to wonder if this suggests the purchase of simple machines needing semi-skilled operators or of sophisticated machines that need only - few skilled ones. (This problem is less acute for the smaller workshops normally located in towns and cities).

32. Technical magazines are rarely published in many local languages, nor are there possibilities for local training of wood-working technicians.

33. It is felt that a man must first work on good modern machinery using outside or expatriate help and then use the same equipment for training others. There is a tendency to opt for cheap labour in some countries, but a man who is poorly trained will never be productive enough to "pay for the machine".

34. At the present 10 - 12 national jounals must be subscribed to to keep abreast of new developments in machinery. A monthly bulletin covering the international market would be most useful instead. Efforts should be increased to bring information on both equipment and technology to the attention of interested entrepreneurs in developing countries.

5. Second-hand equipment

35. Second-hand equipment can offer an attractive alternative in terms of decreased depreciation expenses to the purchase of new machinery. However, along with this obvious advantage and the fact that many firms in developed countries have been forced by stiff competition to replace machinery that is still in very good operating condition, the following disadvantages must be considered:

(a) If equipment is not in good working condition and vital parts are missing; the cost of overhaul would be prohibitive and uneconomical.

(b) Maintenance costs will be higher (although repairs may be simpler).

(c) Operating costs (power, steam, raw materials, consumption, etc.) will be slightly higher.

(d) Labour requirements will be higher (but not necessarily labour costs) but skill requirements lower.

(e) The risks of breakdown and shutdowns might be slightly higher (although this is sometimes the reverse with older, slower moving machines).

(f) The quality of the end product might be lower (although this might also sometimes be the reverse with older, slower equipment).

(g) The equipment will most likely not be suitable for competition in the export market.

(h) The useful life of the equipment will be shorter.

(i) The purchase of second-hand equipment can be used for illegal export of foreign exchange by over-valuing the equipment.

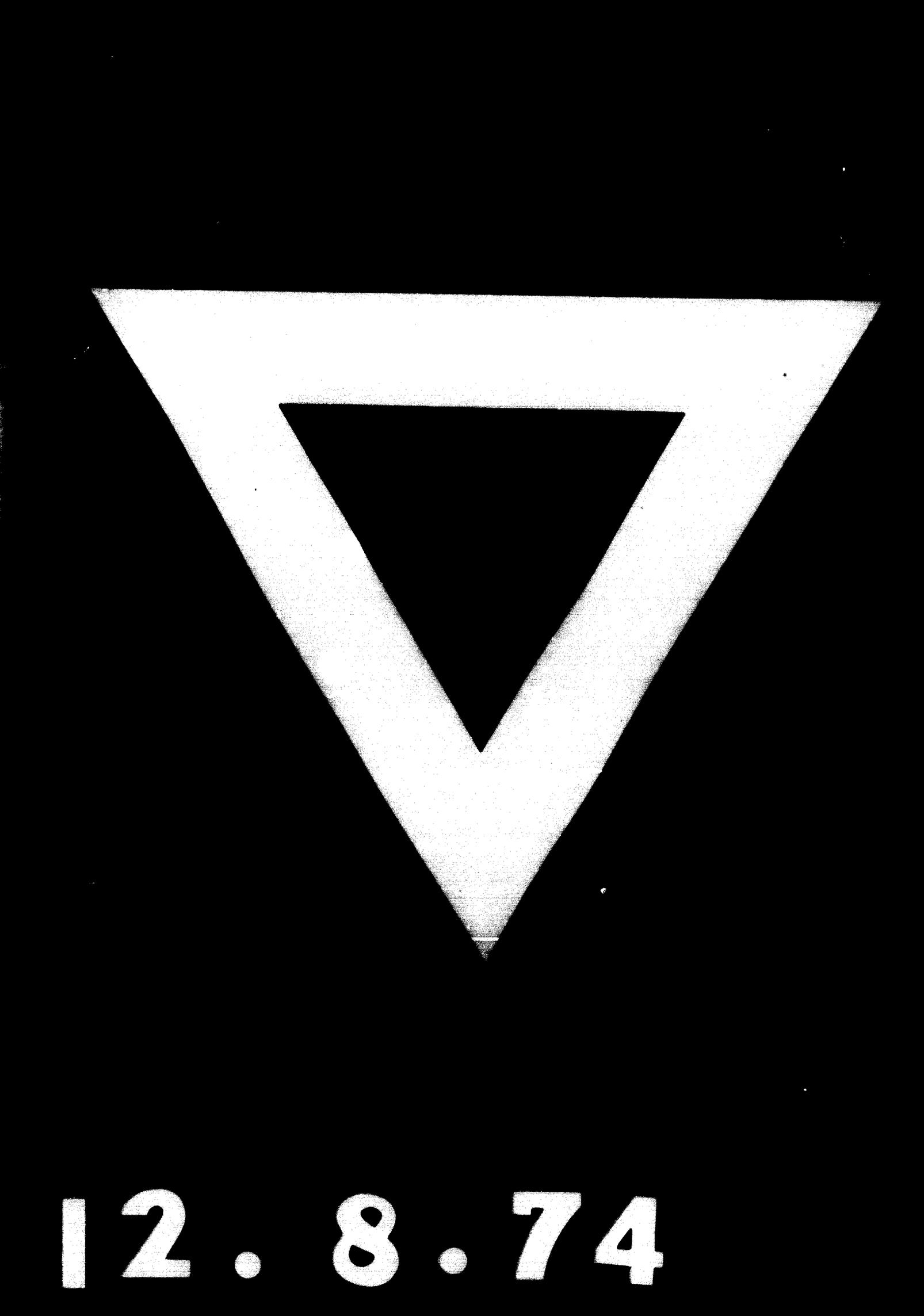
36. The use of second-hand equipment cannot be recommended indiscriminately but with appropriate warranties and qualified technical consultant advice, factory overhauled and reconditioned equipment must be considered as an alternative.

V. GENERAL RECOMMENDATIONS

37. Although many of the points in this paper have been directed at industry and governments in developing countries there are some further valid considerations for intergovernmental agencies and associations.

38. Exhibitions and technical seminars should be held more often in the raw material supplying countries where primary processing is now being done. This should help to ease the way into further processing using the latest and most suitable machinery and technologies.

39. Research institutes, manufacturers' associations or other similar bodies should be encouraged to screen technical publications and disseminate synopses of new developments and products in the woodworking machinery field to users.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