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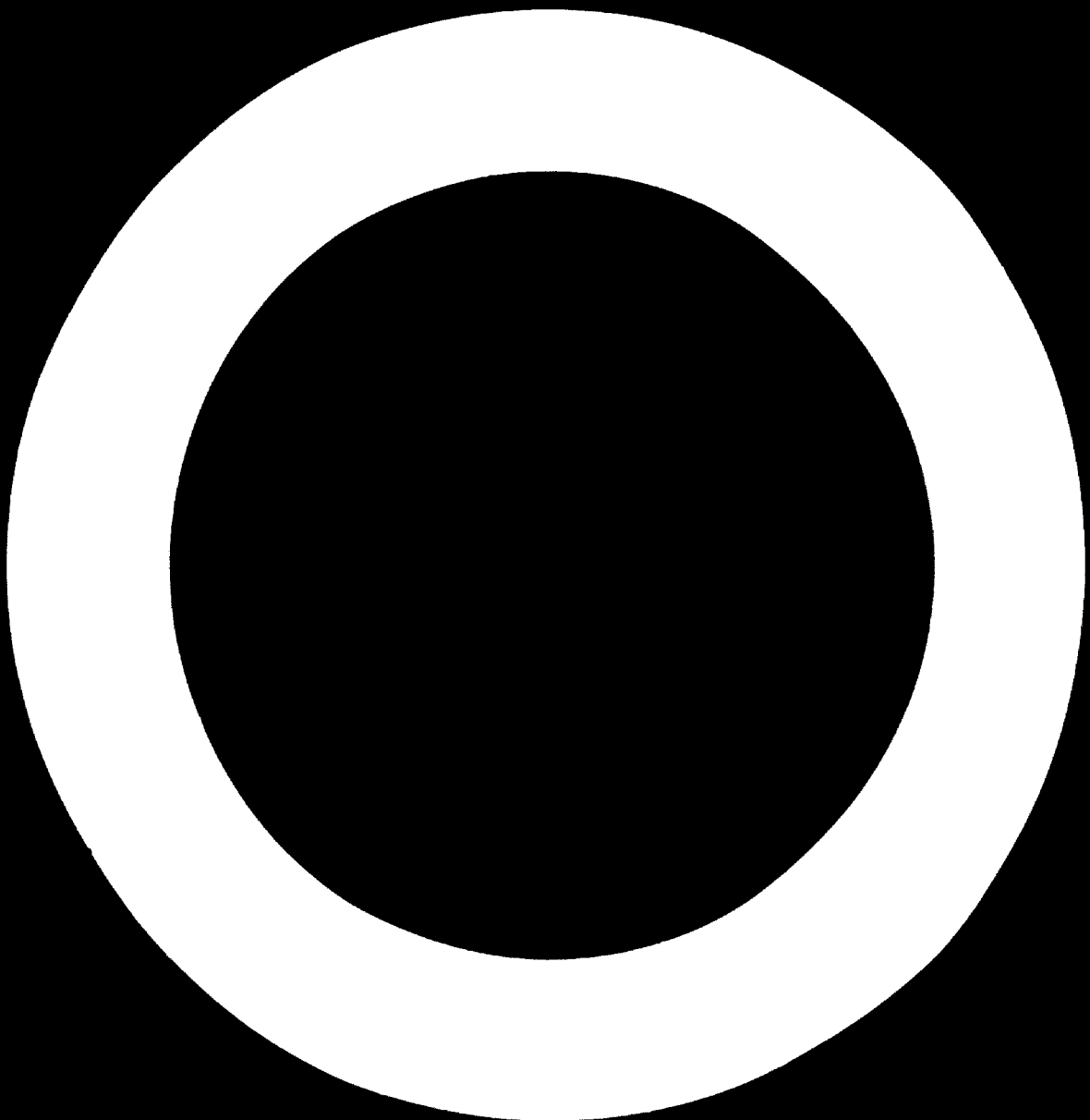

INTRODUCTION

In the sphere of this series of lectures about woodworking machine tools, it has been deemed as useful also to discuss about a rational introduction of the machinery in a firm.

This subject is obviously very wide, as the firm departments involved are many and therefore it is hard to hope to exhaust it adeguately in such a few time.

For this reason I have tried to locate all more significant elements and to stress their importance in the context of this problem. This is a rapid train of notes and hints which should stress different subjects to be deepened by personal reflections according to the importance given, and taking into consideration the working program sphere treated.

In the discussion following to this report, it is possible to deepen more carefully some aspects. I must specify that this report does not follow always classic schemes, to which the contents may be connected, but - on the contrary - it follows a succession and an illustration, suggested by the experience and by reality, exposed in a way which I deem practical and clear.

The succession of this report is shown in the enclosure N. 1, whereas in the chart (enclosure 2) I would represent a scheme of the Firm System with its relevant interconnections, having internal and external sub-systems, in order to offer an aid for the definition of our subject.

By the word 'machinery' I mean also equipment for varnishing, drying and similar. Besides, please note that the most of the exposed considerations concern also plants. The importance of a rational introduction of machinery clearly appears through the following argumentations, but it is characterized by the high value incidence of machine investments in comparison with the total investment. This value is more and more important because of the technological progress.

A rational introduction does not mean to purchase a machine, even if it has brilliant performances and to place it, in any case, in a workshop, but on the contrary to evaluate, to choose to buy, to set and to exploit it according to realistic requirements for an actual development of productivity and profit.

This increase does not depend only on intrinsic characteristics of the machine, but on the contrary on the firm context, which gravitates round the machine itself and which, if well organized, generates a synergy, exalting the efficiency of each single member of the productive system. Otherwise, also a new machine could change into a source of loss.

Therefore, as we shall notice, the speech widens and dilates from the machines towards other firm aspects, involving them in an interdisciplinary system, mentioned in our report.

Hence, it is very important to choose, after careful analyses, this represents the fruits of advanced managing techniques, connected with planning and short, normal and long control systems in accordance with the different reasons which started to entreprise initiative.

Owing to the wide range of cases which may occur our report will try to take into consideration a wide field of application without distinguishing between mini and macro firms.

1. REASONS DETERMINING THE PURCHASE

The reasons determing a purchase may be of different nature. We shall mention them, considering to give afterwards valid complements for a wider answer.

1.1 Replacement of a physically deteriorated machine

In this case the machine is out of use or the quality of the product is shoddy. The economic criterium for this choice is not determinant.

1.2 Replacement of an obsolete machine

The economic analysis must give as a result the determination of a profit, given by the difference between production costs of the new machine in comparison with the old one : better quality of the work, less discards, less consumption etc. (see charts of enclosures 3, 4, 5 and 6).

1.3 Additional machine for the production development

The economic analysis must ascertain the priority of the purchase in comparison with the possibility of facing the situation with additional working turns or with the aid of external firms.

1.4 Machine for the firm reorganisation and working method improvement

As for point 1.2 the economic analysis must identify a profit in comparison with previous working methods.

1.5 Machinery stock for the execution of a new industrial initiative

The economic analysis is part of general financial plans of investments.

2. FIRM AIMS AFFECTING THE CHOICE

In the previous section we have listed the main reasons determining the need of machinery, but it is necessary to check which actual productive requirements correspond to these reasons. Bearing in mind that the purpose of a firm is the profitable production, we deem indispensable to treat briefly the factor 'product', taking into consideration the aims that the producer must know concretely and exploit. Thus he will have the key elements allowing him to give his initiative an actual financial, physical, technical and operative sizes, suitable to the present and future situation. The undermentioned proposals mainly concern the "marketing", since the firm must grow according to its policy.

2.1 What we want to produce

The range of products of the woodworking industry is very wide and each of these presents its own problematic character. Examining the most elaborate ones of the third working cycle, we can state in advance that the functional conception and the aesthetical presentation of the product are extreemely important.
It is important that the marketing shows the market dynamism, the life of products, and the sale swings following promotional

activities in order to enable the firm to formulate a leveled and time integrated planning among several production possibilities.

As well as, it is important to know, suitably in advance, forecasts for the future development of the product, possibilities of diversified productions, possible developments or dangers inborn in the subsequent products (plastics, metals etc.)

2.2 At which price we want to sell

According to the fact that the price may be related solely to the cost, or to the market or to a monopoly position, production means could be proportionated according to the profit wanted; I should like to stress that this profit is not expressed solely in monetary terms. According to the purpose of our subject of discussion, we must consider the minimization of working is a primary aim. On this purpose it is necessary to pay attention firstly to the industrial Designer's creativity in the development of the constructive design, and in the contribution of the workshop technical department.

By a careful team-work, they have the duty, splitting up the product in groups, sub-groups and elementary pieces, to re-organize it, how much is possible, in components, which have been standardized in the firm environment or in any case which are such to be carried out by existing or foreseen means and methodology (see enclosure 7).

It should be also defined the quality standard, which is essential to the production philosophy and to the sale price.

It would be useful to submit the product, in full and in details,

to a constant 'analysis of value', rielaborating in relation to the function of the product itself its technology, in agreement with other firm interested bodies, in order to stress the reduction of costs, under the same function and quality.
The importance ascribed to the conception that the industrial Designer considers in its study of productive means of a firm, even if economically very effective, must not be assumed exclusively since the Designer's creativity must follow, on the contrary precede, pubblic requirements and his up-to-dating action myst be implicity as a stimulus for the firm renovation.
This renovation is not limited to the choice of new machines, but must affect, as a methodology, all systems constituting firm compages. Each of these acting upon its fancy, joining its experiences to the modernization perceptible through specialized magazines, must give a feasible contribution in order to activate and to enliven the innovating action for a progress, which - leaving the firm micro-environment - will have repercussions on the social macro-environment.

2.3 How much we want to produce

The production quality is an important factor in order to determinate the necessary equipment. Therefore it is necessary to know what follows :

2.3.1 If we want to manufacture only one prodict

2.3.2 If we want to manufacture different products and in case if simultaneously or successively

2.3.3 If we want to manufacture against orders or for stock

2.3.4 If we want to manufacture small, normal or large mass-produced items (repeating production)

According to the choice among the above mentioned solutions and then to the firm sizes, the workshop planning and scheduling shall be very careful and, according to the involved values, shall be formulated by modern techniques of Operative Research (Linear Programming, Queue Theory, Graphs etc.) and backed up by a Data Elaborating Centre.

It is understood that in the proposal 'how much we want to produce' must be considered as the temporal reference of the quantity, i.e. the day, the month or the year; from this the opportune deliveries are argued; this is one of the determining factors when evaluating the Reliability of a firm.

The previously examined aims define the firm sizes, according to which are proportionated all different financial, physical, structural and human parameters, that we shall examine later on.

It is important that the resulting sizes are the best ones, for the volume of foreseen work, i.e. that the profit results the maximum one (see enclosures 8 and 9).

3. FACTORS OF THE PRODUCTION

As I have previously mentioned this subject involves directly or indirectly all firm departments and is, in its turn, conditioned by productive factors contained not only in the firm en-

vironment, but also in the social environment.
Therefore, whether it is question of a new entreprise initiative or of an up-to-dating, it is not possible to disregard, at least as an approach to the problem, the most significant factors, which I have conventionally grouped under the following items :

3.1 - The financial factor (enclosure 10)
3.2 - Microenvironment factors (Firm) (Enclosure 11)
3.3 - Macroenvironment factors (Enclosure 12)

At present, it is not possible to deppen the problem of financial needs and their management, assuming obviously different aspects according to the firm sizes and to the specific aims, which characterize the initiative.
However, we may stress that, generally speaking, the evaluation of necessary funds for the promotion of a firm must take into consideration the following factors :

a) Project and installation expenses
b) Purchase cost of immovable estate
b.1) Lands
b.2) Infrastructures
b.3) Buildings
b.4) Machines
b.5) Plants
b.6) Equipment
b.7) Furniture

c) Initial circulating capital

d) Fihancial losses for the starting period

If it is question of a replacement or of a reorganization of an already existing firm (instead of a new initiative) the above mentioned elements could change ; above all, as far as machinery is concerned, it is necessary to take into consideration the recovery value (enclosure 6).
In order to attain the prefixed aims, a good management will work out the appropriate programs, constantly controlled by budgets of single firm systems and of the whole firm system.

4. CRITERIA FOR THE MACHINERY EVALUATION

As already mentioned, the machinery is a primary element conditioning the firm productive system, which may be considered as the counterpart of the machinery affecting, by its requirements, the choice of the same.
We have tried to focalize some criteria for an actual evaluation from an economical, productive, ergonometrical and technical point of view.

4.1 The Added Value

It is useful to take into consideration this conception which, related to the machinery, stresses its meaning. In the enclosure 13 has been materialized the conception of the Added Value,

as a difference between the valye of the piece, before the machining and the value of the same at the end of this process, owing to the changes undergone.

From where came this value contributions?

In the enclosure 14 has been schematized as 'input' the value contribution and as 'output' the product given by the machine. This scheme appears enough indicative, even if quite elementary and not perfect, as well as schemes of enclosure 15/16, concerning respectively the use of two working mass-produced items machines and a compound machine (transfer) carrying out two operations.

The diagram of enclosure 17 is the elementary graphic expression of the simple conception concerning the comparison between disparities, in order to stress the fact that attaining the same final commercial value, it is possible to employ less energies, i.e. to add less value (See at item 4.2 the conception of Productivity).

The aim of this simple demonstration, completed by the schemes of enclosures 10, 11 and 12, is to stress, under groups, all elements contributing to form the cost of the productive process and to notice that their incidence may change, if machine global characteristics change in their turn.

Obviously, each parameter, devided from its elements, will be the subject of a careful microevaluation in order to ascribe to the taken into consideration 'working phase' its right importance

in the firm environment.

It will be up to the Industrial Accountancy to create appropriate Cost Control Centres, in order to survey constantly the different incidences, to make the necessary imputations and to collect the relevant data, to be examined also in occasion of new purchases of machinery.

Who decides the new purchase, shall consider, comparing the different solutions, up to which extent the above mentioned factors contribute to form the production cost, in order to direct his choice obviously towards the giving an increased 'productivity' solution.

I have mentioned on purpose this algorhythm, in order to identify all input an output energies, which must be yaken into consideration when globally evaluating.

In concluding, I would like to add a deduction, that is not meant to be rethoric, but is based on true facts, as shown at point U.I.3; it is taken from "Il Capitale Umano nell'Impresa (the Human capital in the entreprise)" by Giuseppe Scifo (ed. ISEDI) : "Fatally hardware wears and transfers its value on the product, whereas know-how in turn is strictly dependent on the experience and increases the value of the product without diminuishing its own".

4.2 Conception of Productivity

Sometimes the conception of Production is confused with the Productivity one, therefore it is useful to remind it, owing to the importance it has in the choice of production means.

In fact, as it appears from the previous point, if two systems give between input and output a different increase in the actual (commercial) value, the added value (energies employed) being equal, the system giving a more elevated relation between $\frac{\text{actual value}}{\text{added value}}$ will have a higher produttivity.

Therefore is evident the importance of this conception, which is not possible to compare with the volume of the production, taken in an absolute sense.

There are several definitions of Productivity, but I deem that for our 'escursus' the one stated by the Productivity Italian National Committee is sufficient :

'The productivity index is the relation between a well defined produttion and one or more of its factors, for instance :

production / employed capital	production / raw materials	production / employed energies	production / labor hours

The variation of the productivity indew gives the efficiency evaluation of the operation, that we want to keept under control .

4.3 Ergonomy - New patterns of the production method

In considering as a definition of Ergonomy Prof. Cajo Plinio Odescalchi's one, president of the Italian Association of Ergonomy :

"The technique of procedures which, using interdisciplinar contributions, studies the relation in the man-machine

environment system in order to intercorrelate them according to human terms",

we notice which effect the machinery characteristics have for its introduction in the working environment, not only on productive aims, but also on worker's welfare.
Under this aspett, it is not question of judging a machine taking into consideration only its co-operation with man, i. e. a right coupling of man with the machine (considering the former as an antropometric and intellective dimension) but on the contrary it is question of deepening the introduction of the latter in the firm cycle in such a way, that its exploitation may be integral, avoiding the operator's superfatiguing. Therefore, it is necessary a careful study of the man-machine diagram, in order to check, up to which extent, man's time can be glutted by the machine and/or vice versa, avoiding that the physic and mental effort may exceed the fatiguing of a normal operator. In relation to the type of production, it is also important a machinery evaluation compared with the learning curve, in such a way that the constant rhythms of production can attain the minimum time with a less waste on energies for training.
Presently when choosing a machinery it is necessary to take into consideration also the emerging trends towards new patterns of the production method. These patterns, which were born in order to avoid the tediousness of the splitted work, have as a purpose to counterbalance the supposed major production cost, with an improved satisfaction of the worker.

The worker should feel an increased incentive and interest in his activity, a better capability of thinking and progressing, with beneficial effects on his physical and psychic health and on a steadier and more devoted presence in the firm, therefore this fact acts as an antidote against absenteeism.

I refer to:

a) Job rotation

Rotation of different jobs

b) Job enlargement

The connection of only one duty to two or more jobs, previously devided

c) Job enrichment

Enrichment of duties; i. e. to build up a job having a complete meaning

d) Work group

It is like the 'job enrichment'but it is achieved in group owing the job complexity and it has its specific autonomics: freedom of choice, of the producing method, participation to decisions, also at a high level.

4. 4. Collision with layout

From the above mentioned explanation of ergonomy rises the importance of the environment, which has presently assumed in the firm system a stronger importance than it had in the past, stressing in such a way considerably the human factor. Therefore it is extreemely important that the introduction of the machinery is made consistently both with the productive

process effeciency and with the consideration of the effect on the human factor.

Therefore it is not question only of having at our disposal production means according to a logical cycle of the process, but on the contrary it is question of exploiting them in such a way that both operator and operation give their best, from every material, human and organizing point of view.

For instance it is not rational to insert a high production machine , if it has not been prepared the suitable organization, in order to avoid blocking of materials, waste dispersion, harmful atmosphere, polluted exhausts, emergency electrical connections etc.

Therefore it is necessary to foresee the placing of machine and of all plants and equipments, contributing to their running by a careful study of material and energy flow, canalizing it in two or three dimensional patterns.

From this analysis, improved by production plans, will rise the choice of the suitable machinery among different alternatives, existing both as regards firm structure and as regards contemporaneity factors for a possible partial use of plants.

In this context, production and ancillary buildings will comply with these requirements in order to create an healthy environment, having confortable lighting, temperature and humidity, low noise and vibration level and with a functional, clean and orderly chromatism .

Such an environment gives the staff a feeling of confidence and

protection against dangers and pollution of whatsoever nature, both outside and inside, and carries out in the right way all physical arrangements, both in general and in detail, thus creating a perfect co-operation between man and structure. In such a way it is possible to carry out a fluent production, without any obstruction, useless wait and compulsory feed-back.

4. 5. Reliability

The machinery is getting more and more complex, and its purchase and management cost are constantly increasing. Damages due to machine rest are considerably increased by the higher performance of the machine; it is question of direct damages, as regards the non-exploitation of the machine and of indirect damages, as regards the effects on the whole production, obviously related to the machine. Therefore the reliability requirements are getting stronger and stronger. This reliability is evaluated in terms of "efficiency", assured in percentage of actual working hours during a certain period, with suitable warranties in force when the efficiency is no longer correspondent to the agreed percentage.

4. 6. Technical elements

As we have already mentioned at point 1, as regards the purchase of a machinery, we may face the possibility of choosing among different machines, designed for the same aim, but built in different ways; it is possible to be obliged

to purchase specific working machines and therefore special machines with or without competitors, or it is possible also to purchase machines with a flexible application use.
From the subjects previously discussed it is possible to deduce the elements for an evaluation of this problem, but I preferred to recapitulate in the enclosure N. 25 some aspects, which may help an analysis of the machinery to be purchased.

5. TEROTECHNOLOGY

In examining the program contents of terotechnology, the latest among the techniques ruling the firm management, we deem to be in a position to catalyze and to integrate in it all concepts previously mentioned about the introduction of the machinery in a firm and we judge it as an extreemely important landmark for the subject of this report.
Firstly in Great Britain, where it appeared in 1970, then at E.F.N.M.S. (European Federation National Maintenance Societies) terotechnology has been defined as follows:

"Terotechnology is a multidisciplinar technology dealing with all technical-economical procedures and technical production system activities, covering their whole life, from the beginning of economical and project studies, to the detailed planning, construction, installation, starting, maintenance and management until the dismantling, in order to minimise the cost of the entire system, during its life.

Terotechnology, and therefore the firm field, deals with the following problems

a) Study of plants, machines, equipments, buildings, infrastructures and generally of the entire production estate.

b) Profit examination of investments in relation of future maintenance costs (reliability and easy maintenance level). Therefore the choice of machines and plants is in accordance with their economical and technological characteristics.

c) Installation and preproduction

d) Maintenance

e) Economical evaluation and quantifying of the machinery and equipment life cycle planning , installation, starting, running replacement.

Therefore , the main purpose of terotechnology is the one to improve economically at the most the life cycle of patrimonial estate, taking into consideration all involved costs :for investment, management and missed production.

Therefore, it is essential the strict relation, which this new firm body shall keep with other firm fields in order to guarantee a constant examination of parameters contributing to determine the above mentioned costs.

The importance acquired by terotechnology is due to large production losses and therefore to missed profits, caused by the inefficiency of machines and equipments.

We have already stressed the fact that, when evaluating a

machine, it is necessary to examine not only the productivity and purchase cost, but also other factors, as the reliability and the easy maintenance, which in the past had not the present well-deserved importance.

As regards the reliability, the manufacturer has never given sufficient warranties. On the contrary the easy maintenance depends on machine characteristics and also on the maintenance service organization of the firm. As we have not the possibility to examine carefully the organization of this service, which existence and efficiency are essential, we should like - at least - to hint at some aims in order to make it timely, efficient and effective.

a) the maintenance department must be placed in a barycentral area in relation to intervention centres; if the firm is very large, it may have detached units in the centres of more frequent intervention.

b) It must be complete with men, machine tools , equipments and structures suitably proportionated to the sizes of pieces to attend to. It is useful to remind the rapid development of the technology, which , by the introductions of more and more complicated machines and plants, requires more and more numerous and specialized personnel.

c) It must have a card-index (or a file in the C. E. D.) with every information useful to the technical-operative-economical management of the machinery (see machine cards

enclosures 18 , 19 and 20).

d) It must be in a position to manage a valid programmed maintenance by graphs (Gandtt, pert etc.) with the CED backing up, if necessary.

e) It must have a suitably supplied and managed 'spare parts' stock

f) It must take care of the accident prevention, of the health of the staff, of ecological problems and of safety

g) As well as in all other firm departments, it must be worried about the constant technical up-to-dating by formative courses, magazines, publications, visits to exhibitions etc.

6. THE PROCESS OF PURCHASE

As we have already said, the determination of the purchase of a machinery, may have several motivations, but which is the most qualified firm body enable to start the action?

The organization chart of the enclosure 21 and the table of the enclosure 22 show schematically the evaluation routine generally used and the judgements at different functional and official levels.

This routine may be backed up by a specific form system, but in any case must be completed with sufficient and probatory information allowing the analysis.

If the firm has problems of reorganization, which , owing to

different reasons, must be devided during a time period, it is useful to create a small card-index, indicating (preferably by a conventional code) the priority scale of investments, we would like to effect in order to attain the already mentioned advantages.

Before purchasing, it is necessary to well-evaluate whether it is less risky and/or more profitable to increase temporally working turns or whether it would be better to entrust with the work external suppliers. this owing to possible strict delivery terms of the new production, as well as to doubts about the continuity of sales and in order to acquire during the preproduction period the necessary know-how from specialized firms.

The purchace must be always preceded by enquiries, extreemely clear and detailed in all aspects we intend to compare, in order to permit, already 'at initio', a comparison between terms, as much homogeneous as possible.

The purchace is the result of all these technical-productive-economical evaluations, determining the choice of that particular machinery, but it is necessary to follow carefully and with competence the purchase, in order not to cancel part of the economical advantages, when concuding the transaction.

In the enclosures 23, 24 is shown an example of "General Conditions of Sale", which may undergo some alterations according to the customs of interested countries and to the products discussed.

It is useful to remind the possibility of a payment, with a "leasing" formula, which sets a major cost against some advantages. Also the convenience of dealing with a blocked or subject to escalation price must be taken into consideration; in this case the parameter parcentages must be well-defined, as well as reference terms, shifting the dates according to the possible way of distribution of the manufacturer's burden, in order to allow the purchase of material and the right employment of labor.

Besides, it is necessary a suitable choice in order to deduct from tables the reference statistical indexes.

The purchase of complex and expensive installations, as full production lines , number controlled machines, machining centres etc. requires a careful transaction as regars what follows: - the efficiency (as above mentioned , it enables the Supplier to keep his engagements) - the service , carried out by the manufacturer as regards the installation, the starting and the testing; - the operative technical training of the staff attached to the equipment ; the technical literature both for the machine and for the equipments (as c/n), this literature should include:

- operating instructions
- electrical schemes
- installation schemes
- programming instructions
- maintenance
- list of spare parts (illustrated)

The Contract of Purchase has different aspects, the analysis of which is carried out by the firm management department; the purchasing body must be informed about these aspects in order to globally comparatively emphasize this operation.

CONCLUSION

After what we have previously said, it seems clear that the Purchase is the conclusion of a long collection and analysis of the data; this sets in motion the counter-reaction of the "introduction of the machine", that is, it gives a hint of the problems we have tried to qualify, we hope in a satisfactory way.

We would like to better quantify and explain, deepen and develop but, unfortunately, the limits of time necessarily given to this subject prevent us from doing it.

If, at least, some ideas, some hints have come out for an improvement in the firm economy, that is of your interest, we hope, in such a way , to have fulfilled the purpose that the organizers (ONUDI) planned with this meeting.

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(Enclosure 1.)

RATIONAL INTRODUCTION OF THE MACHINERY IN A FIRM

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- 1.3 Additional machine for the production increase
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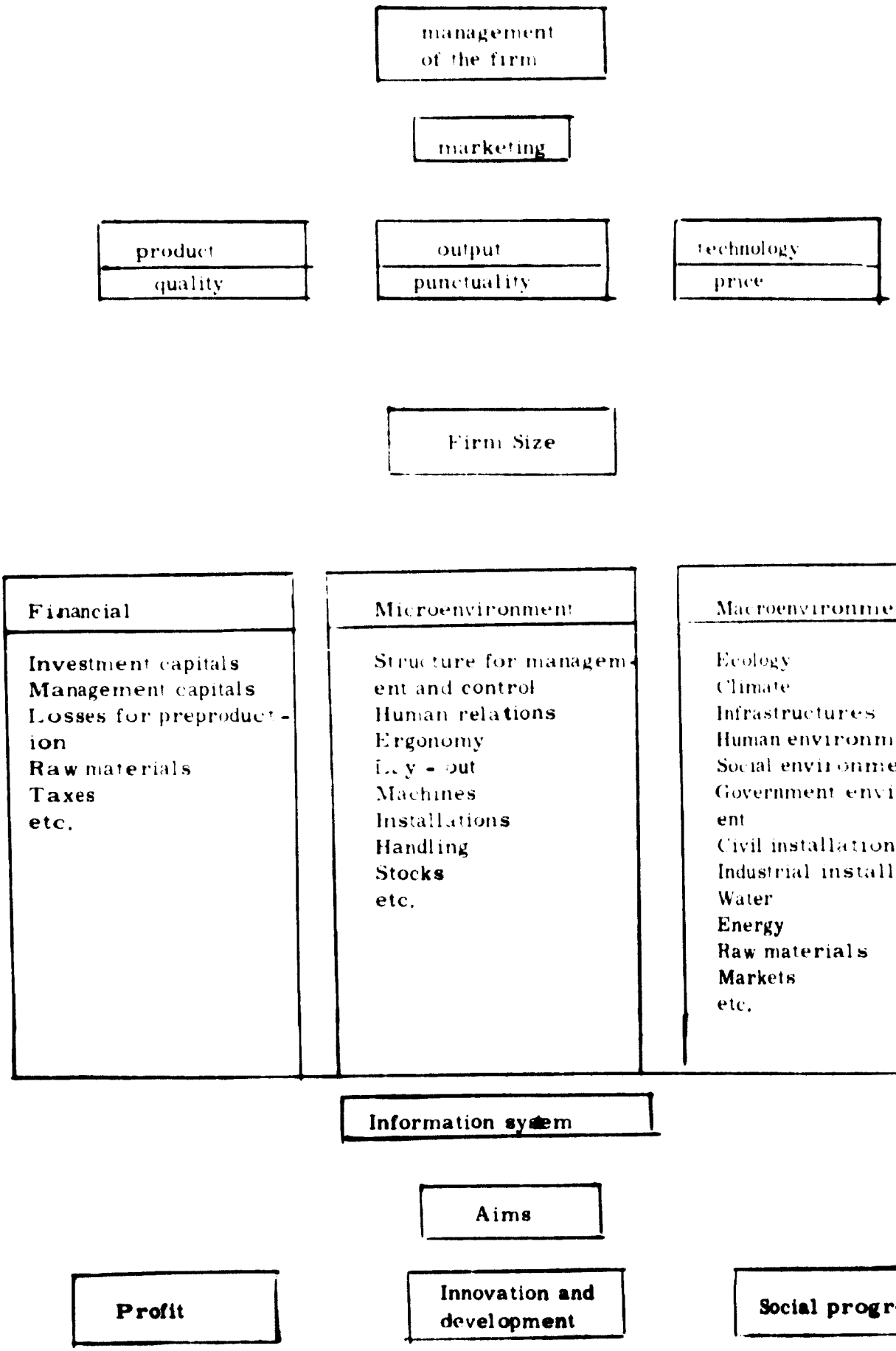
6) THE PROCESS OF PURCHASE

CONCLUSION

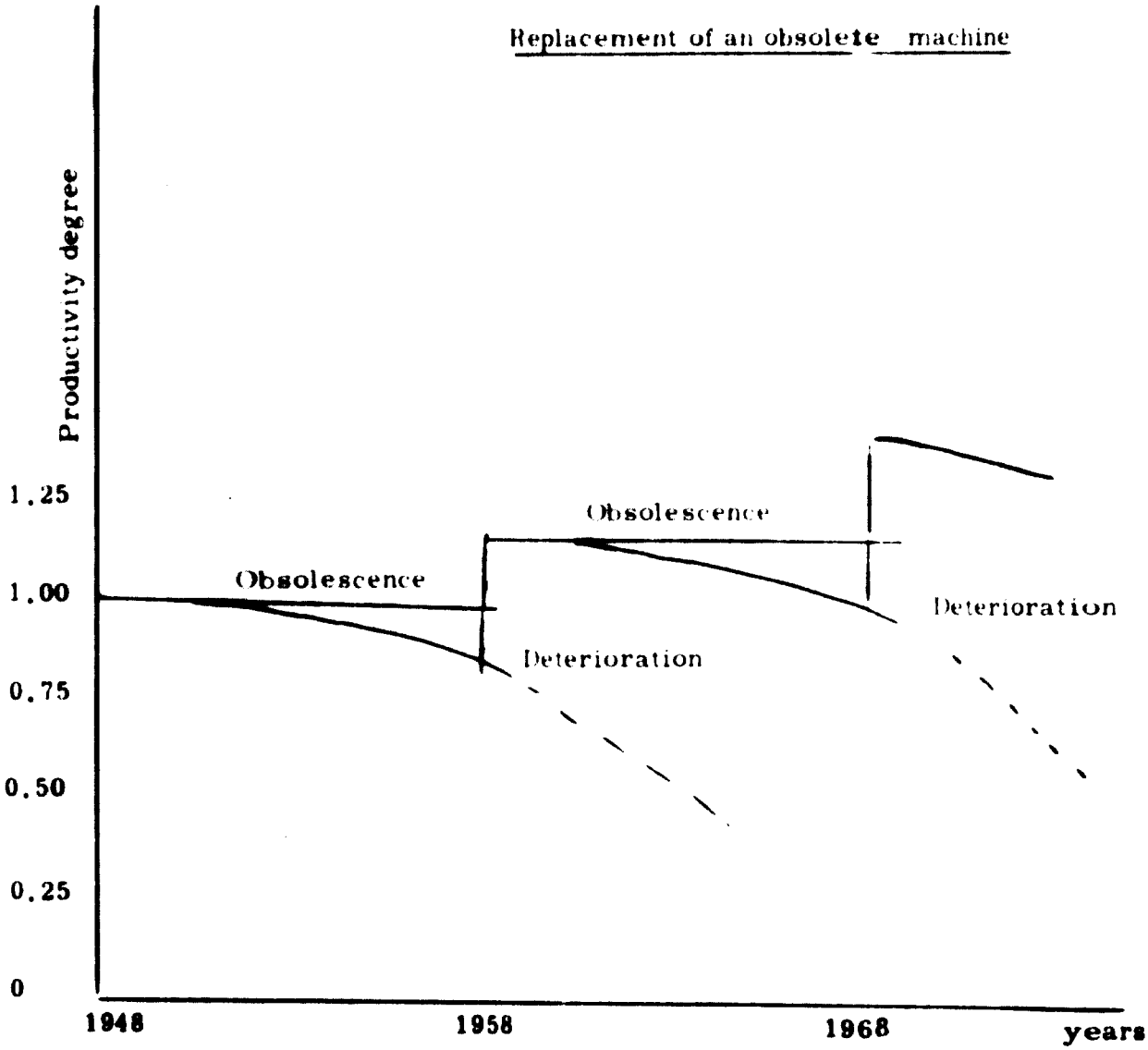
(Enclosure 2)

SCHEME OF A FIRM SYSTEM



(Enclosure 3)

Replacement of an obsolete machine



Two sources of productivity increase by modernization are the following ones:

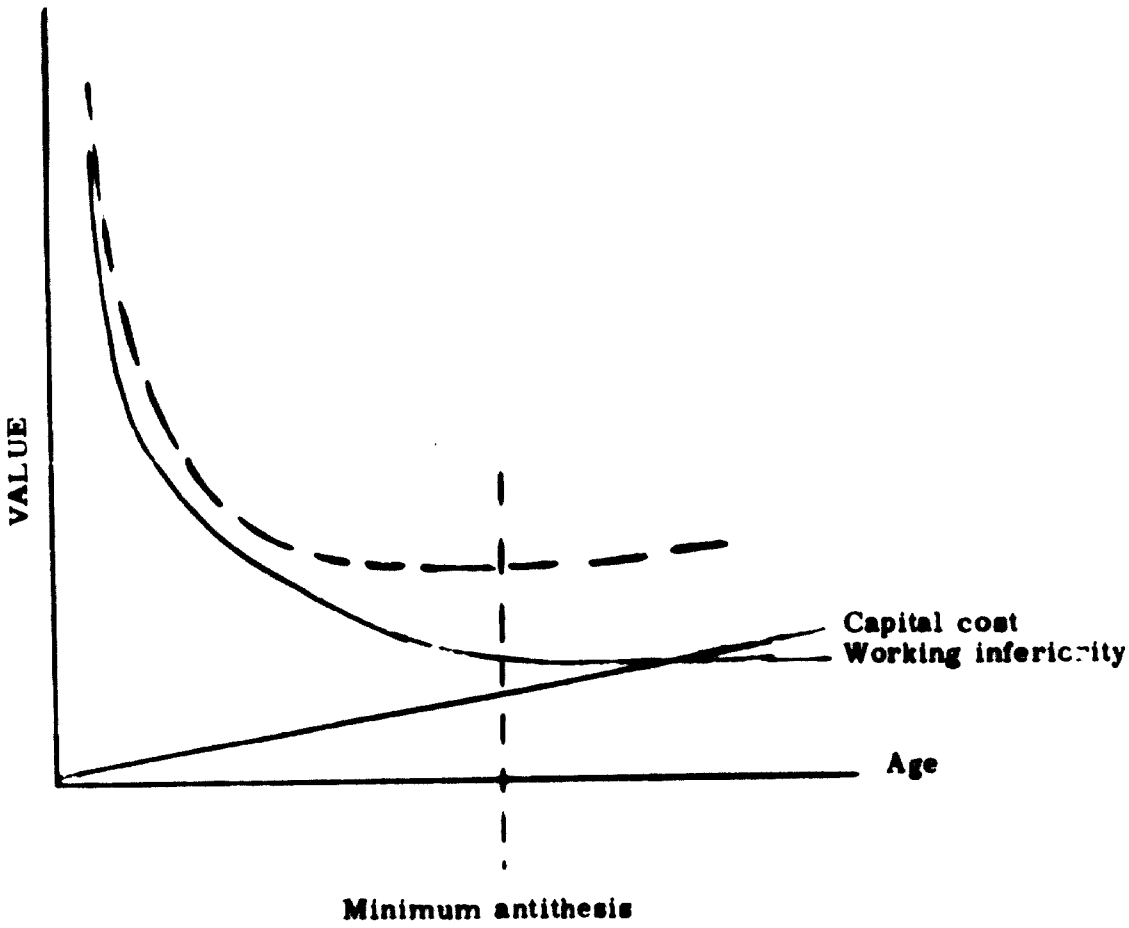
1. Project perfectioning let the new machine be better than the previous one, when it itself was new.
2. Old machine productivity decreases because of its physic deterioration

Obsolescence and deterioration as a whole form the working inferiority of the old machine in comparison with the new one.

(Enclosure 4)

Replacement of an obsolete machine

Obsolescence evaluation: the sum between working inferiority and capital cost gives a minimum.



(Enclosure 5)

Analysis and Comparison for equipment modernization

1. Subject of analysis . . . . . .

	A Present equipment - Holder	B Proposed equipment - Challenger
2.	Description	. . . . .
3.	Machine N. . . . AGE	On primary duty - Recover. value L . . . .
4.	Installed machine cost L	Cost L., Install. L . . . Tot. L. . . . .
5.	Recovery value Lit	Estimated life end value Lit. . . . .

6. Operating advanteges for next year	A HOLDER		B CHALLENGER	
	total	advantages	total	advantages
	Lit	Lit	Lit	Lit
7. Product superiority				
8. Increased production				
9. Advantages over operating cost				
10. Direct labor (included extra-work and rewards)				
11. Machine setting time				
12. Maintenance				
13. Repairs				
14 Tool cost				
15. Indirect materials				
16. Reprocessing of defective materials				
17. Defective processing (discards)				
18. Dow times-Work suspension				
19. Energy consumption				
20. Dimensions in plan (if usable)				
21. Taxes and insurance				
22. Miscellaneous				
23. Totals				

24. WORKING INFERIORITY OF HOLDER TOT. 23 A - TOT. 23 B

A		B	
25. Minimum antithesis - holder		Minimum antithesis - Challenger	
26. Working inferiority (24)	L.	Installed machine cost (tot. 4B)	L.
27. Loss on recovery value (5A)	L.	Life on primary duty (3B)	L.
28. Interest of . . % (5A)	L.	Final recovery value (5B)	L.
29. Additional expenses tot.	L.	Cost recovery in % (26B)	L.
30. Next year instalment	L.	Nomogr. . % int. . . Total Lit	L.
31. Interest of. . . % (28A)	L.	Total % for cost (30Bx26B)	L.
32. Total (excluded N. 29)	L.	Annual average of periodical additional expenses .	L.
33. Minimum Antithesis	L.	Minimum Antithesis (31B+32B)	L.

34. Earnings of next year owing to the replacement (33A-33B)

Per cent

Per cent

MAPI MONOGRAM N. 1
Forecast scheme - Standard

Operating instructions

1. Employ darker curves for both depreciation :"sum-of-digits" and "declining " and employ lighter curves for linear depreciation
2. Find the working life (in years) on abscissa center line, reading years from left to right for darker curves and from right to left for the lighter ones.
3. Vertically ascend up to the representative point of the recovery value.
4. Read the correspondent point on ordinate C. L. And now the percentage is found.
5. Write this percentage in the column B of the analysis card

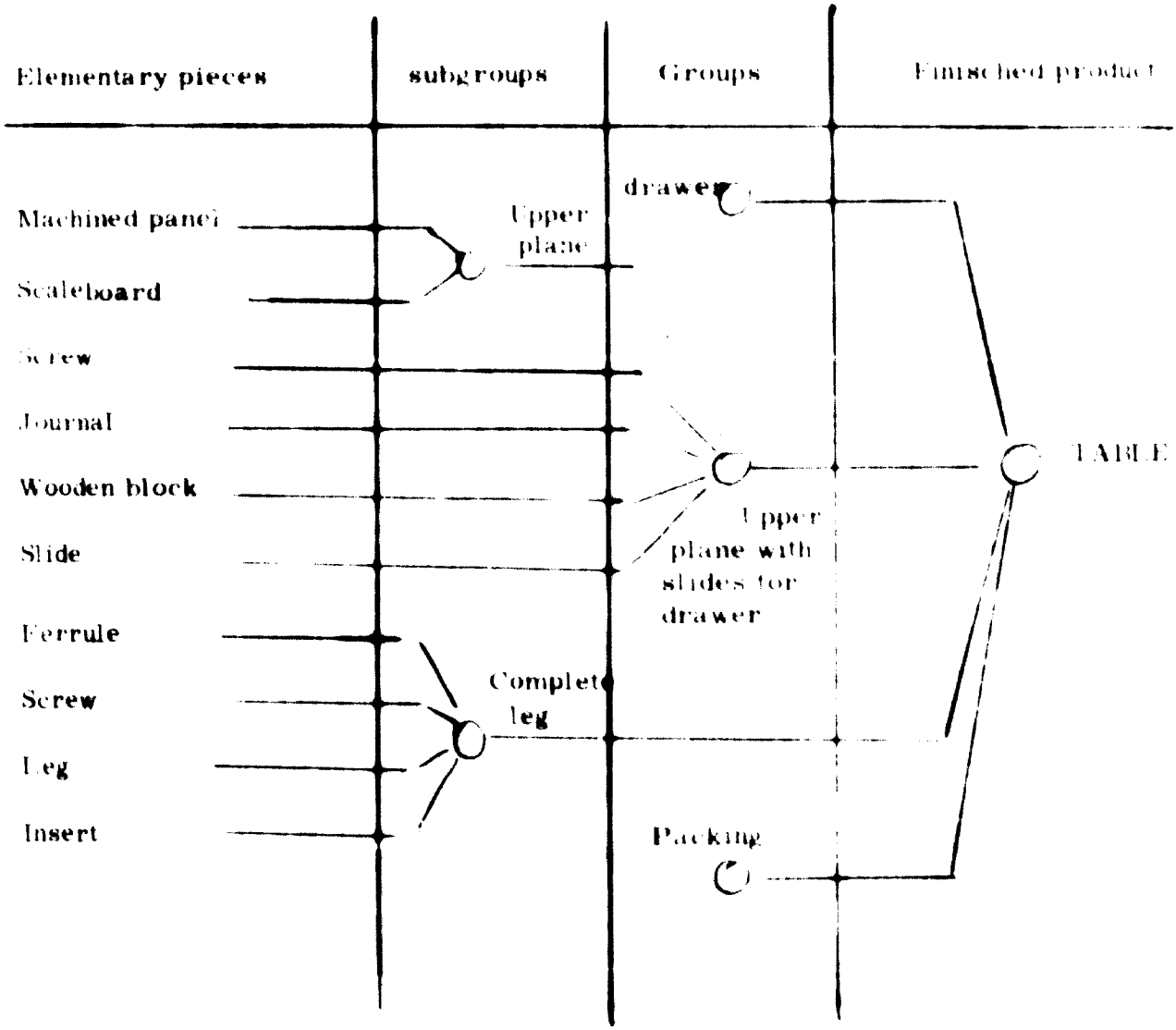
recovery value %

WORKING LIFE IN YEARS

(Enclosure 6)

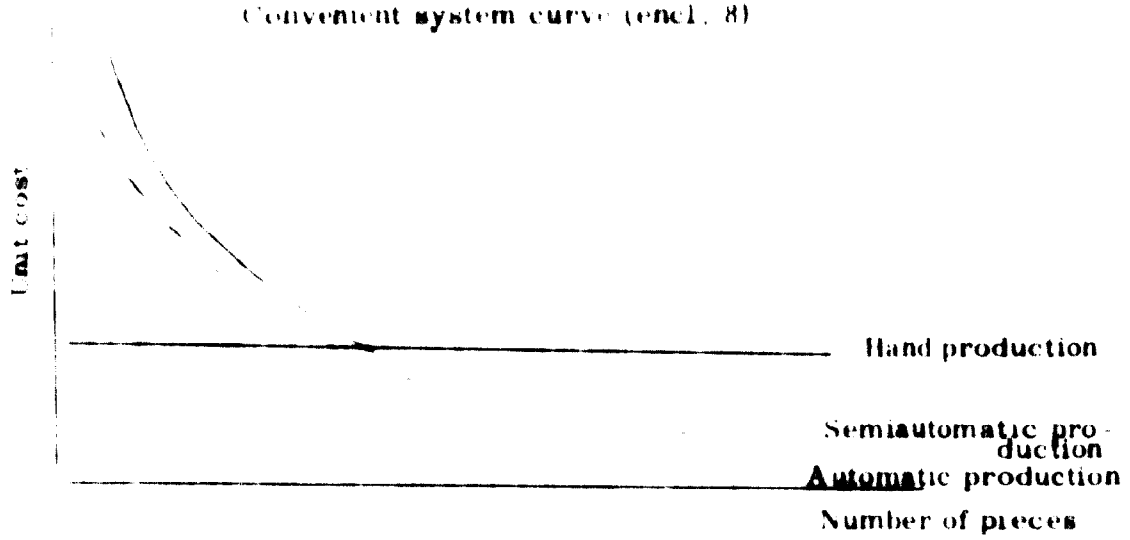
(Enclosure 7)

Example of extended representation of the product (Table)

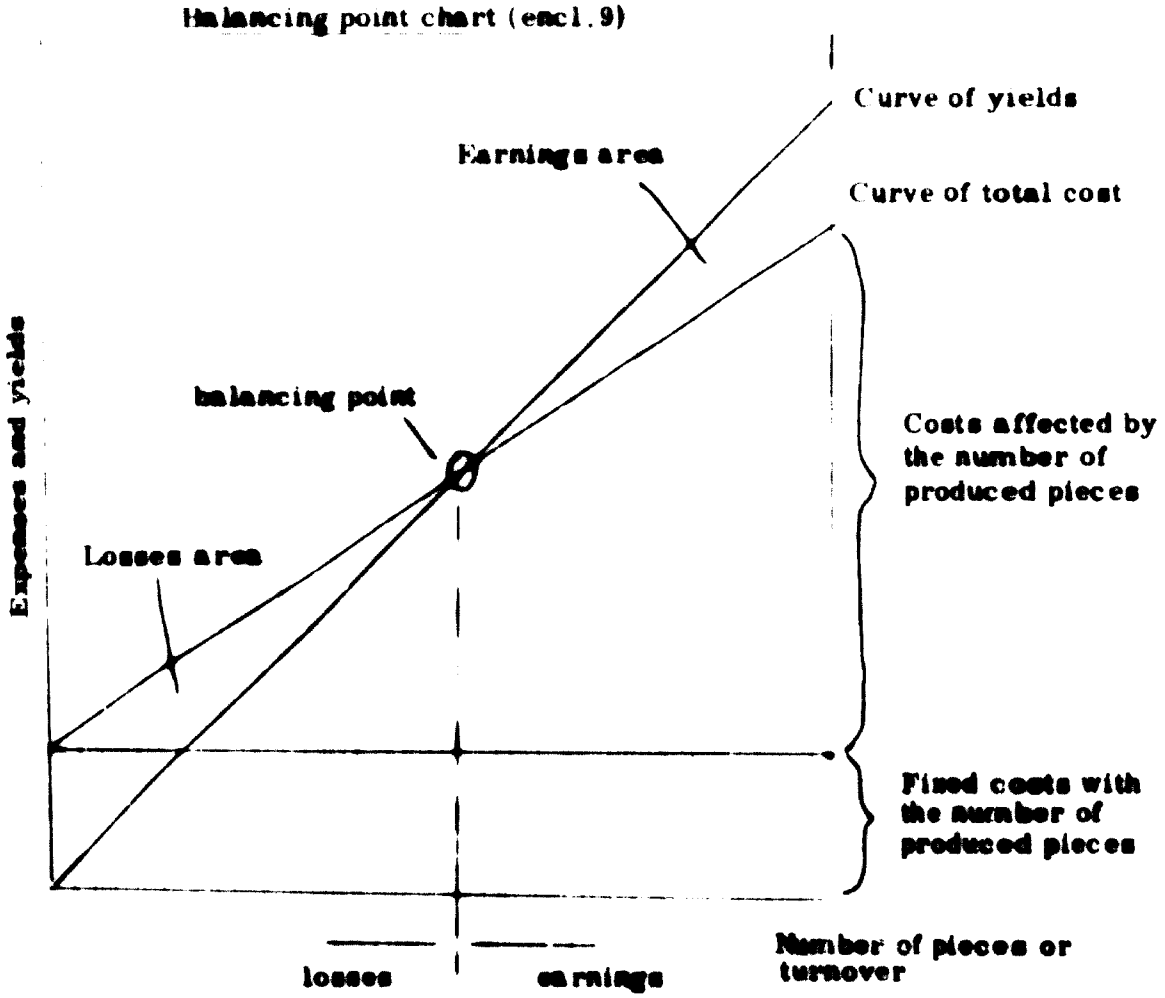


(Enclosure 8/9)

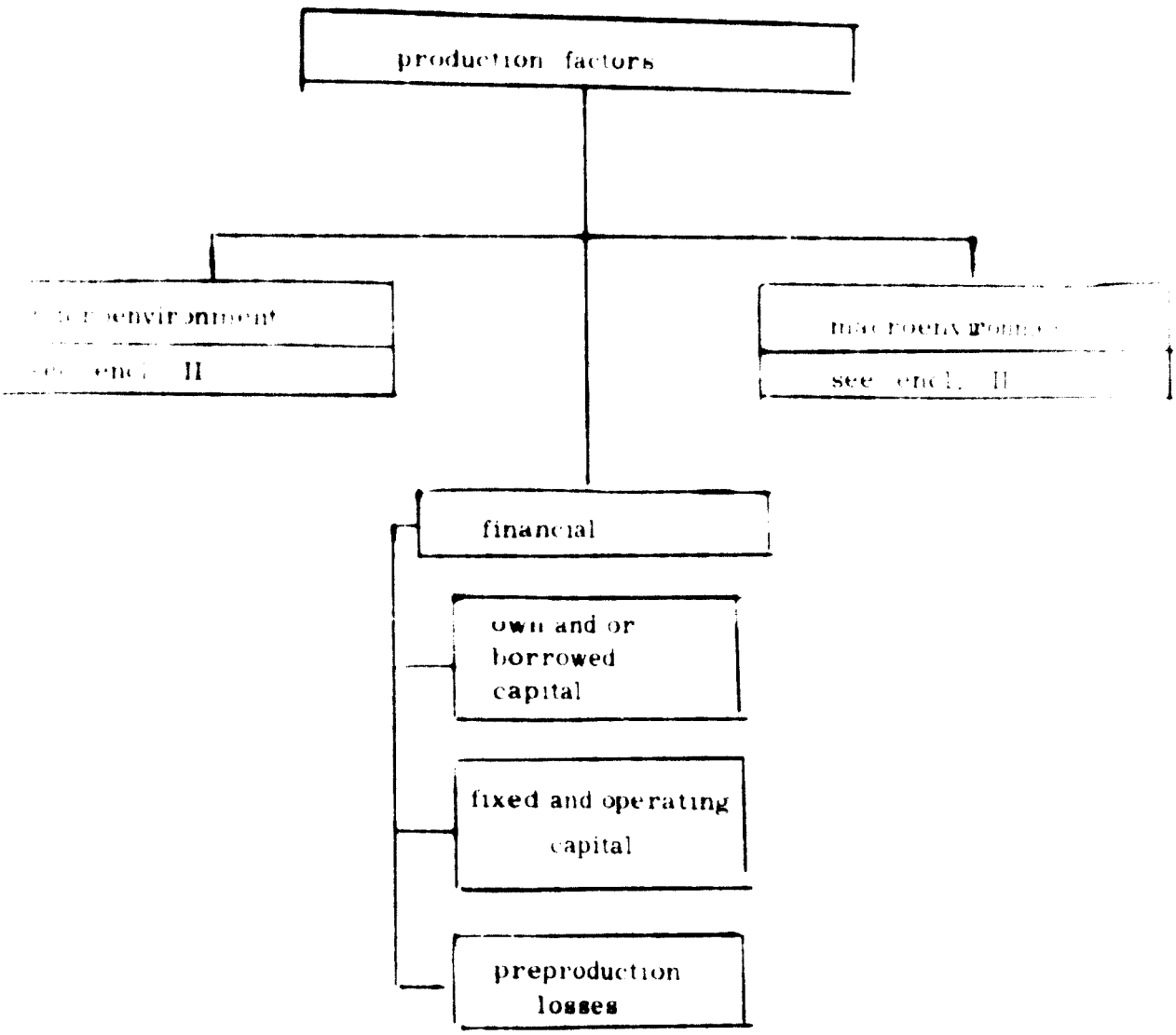
Convenient system curve (encl. 8)



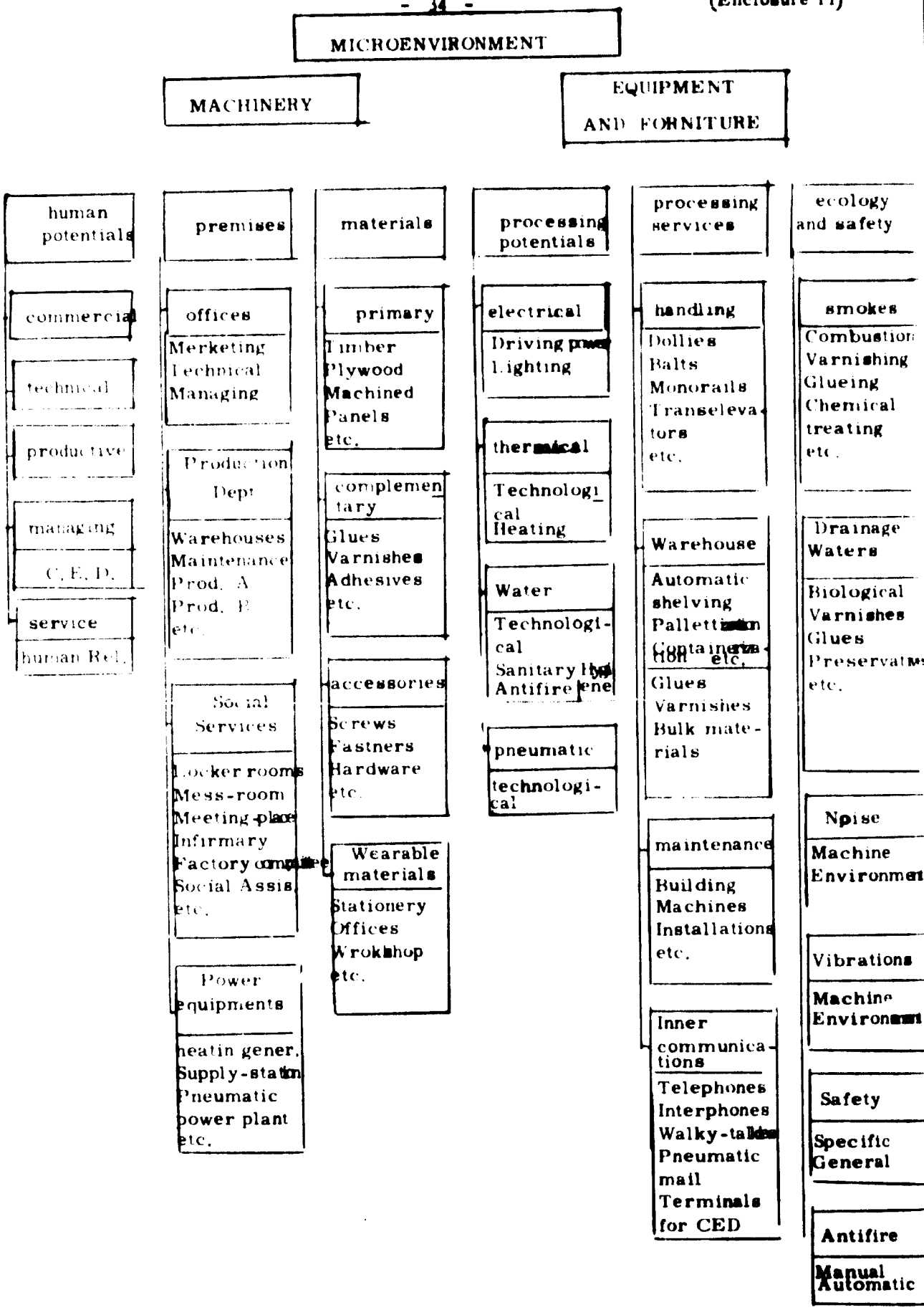
Balancing point chart (encl. 9)



(Enclosure 10)



(Enclosure 11)

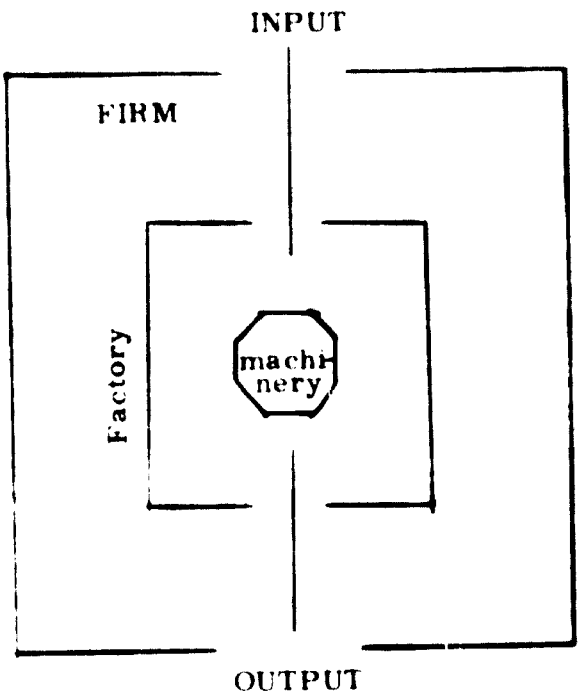


(Enclosure 12)

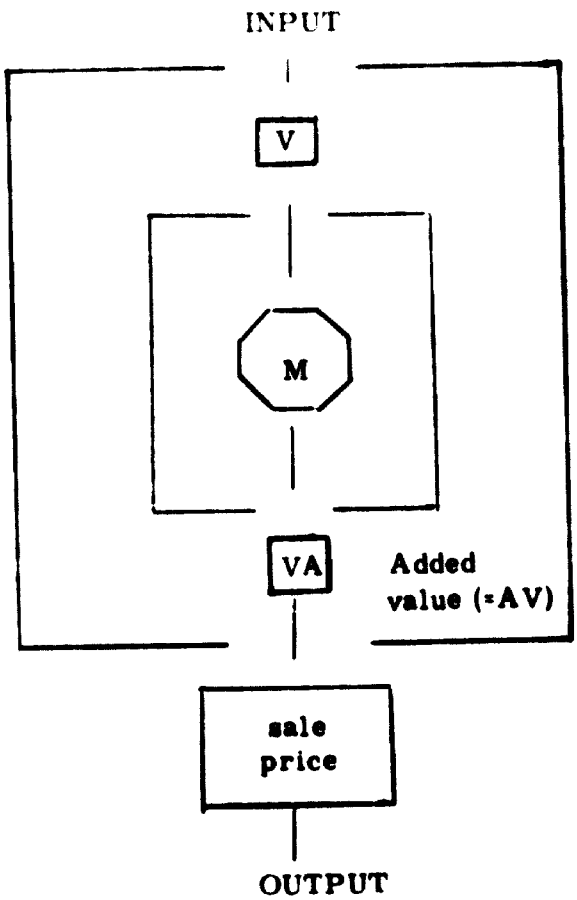
MACROENVIRONMENT

Physical environment	Human environment	Services & Sociality	Legal Government	[illegible]
Ecology Climate Soil Nature Infrastructures - Roads - Railways Ports Airports - Sewages Energy - Electrical - Water - Thermical	Labor availability Remuneration Education Absenteism Trade-Unionization	Communications - Railways - Mails - Telephones - Telegraphes Urban transports Shops and markets Houses Schools Churches Recreation Banks etc.	Legislation Protection Sanitary Antifire Police Industrial and commercial services Laws [illegible] business Taxes etc.	[illegible]

(Enclosure 13)

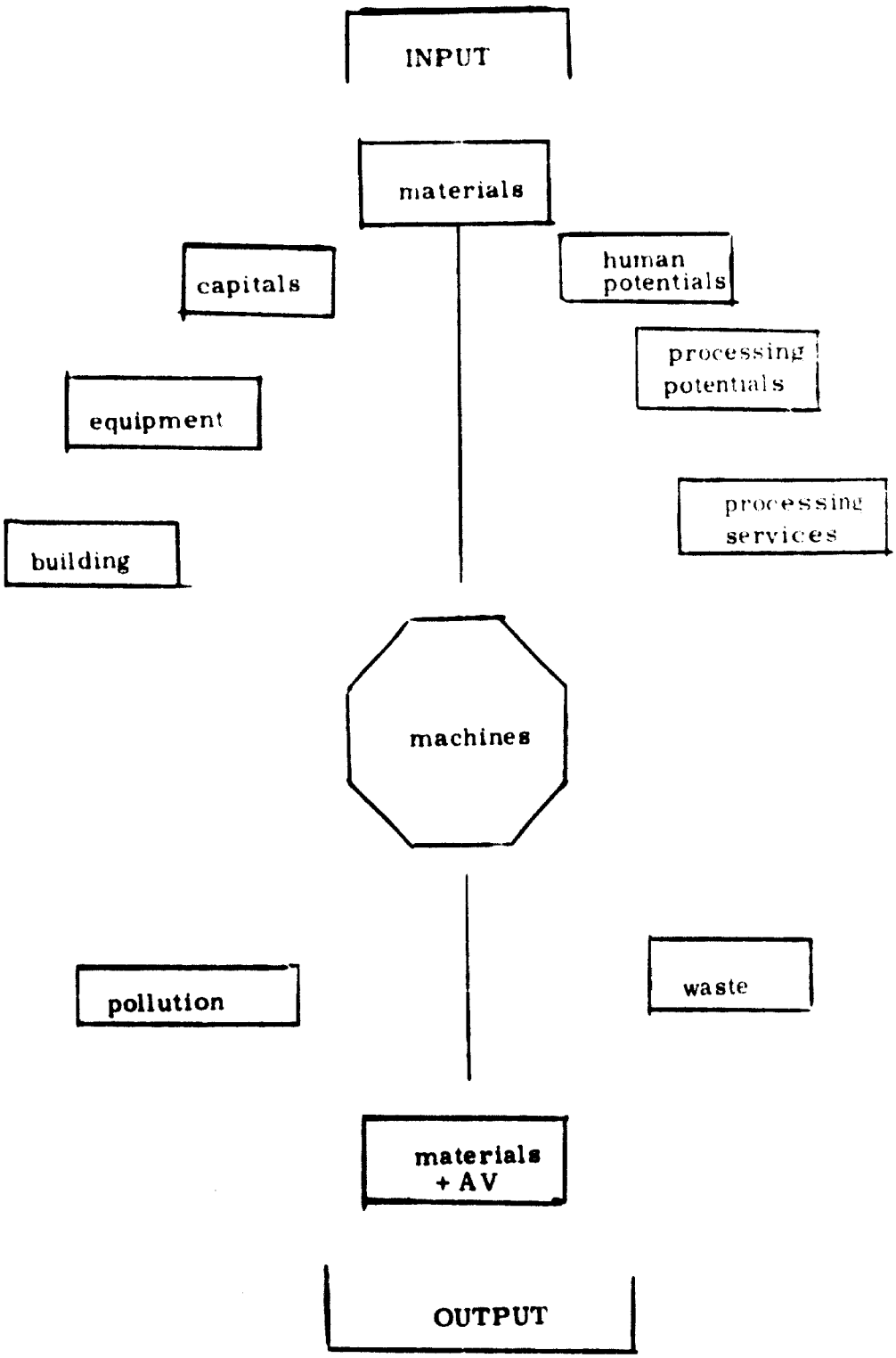


(a)

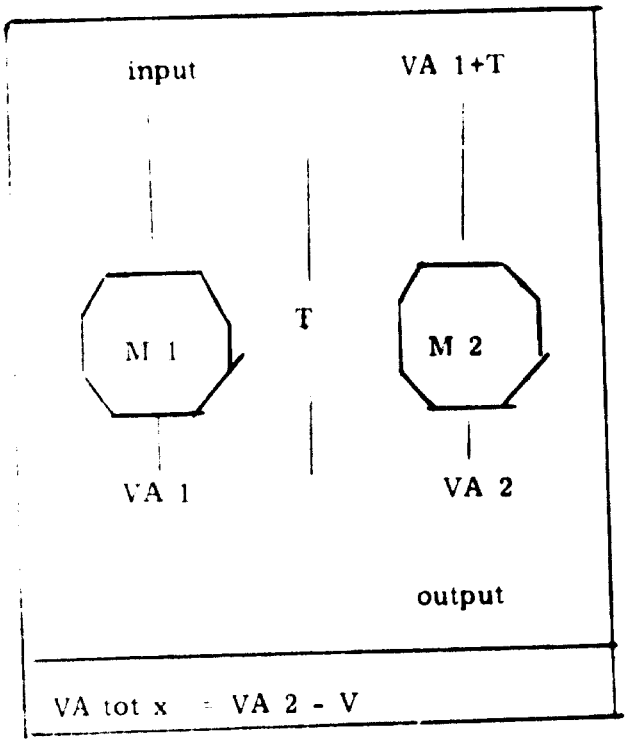


(b)

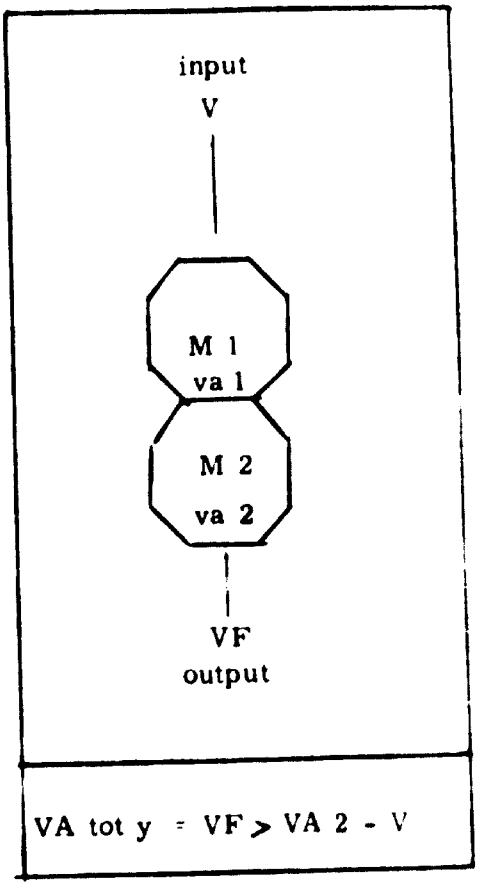
(Enclosure 14)



X (encl. 15)



Y (encl. 16)



(encl. 17)	X VA totX = VA2-V	Y VA tot Y = VF
Building		
Land		
Capitals		
Human potentials		
Processing potentials		
Processing services		
Pollution		
Waste		

FV = Final value or Actua
(Commercial) value

Less potentials employed for transfer machine (case Y)

(Enclosure 12)

ANAGRAPHIC CARD

		code number
Inventory N.	denomination	factory

Manufacturer
Agent
Date Order

Card list	reference N.
Parameter cycle card	
Parameter maintenace card	
Cost control dept. card	
Lubricant card	

Weight	mm
Length	mm
Height	mm
Width	mm
installed power	KW

Photograph of the machine

Department
Cost control dept.
Installed machine cost
Card filled out on the..
Signature

Drawings N.	Operating instructions Booklets N.

Machine importance in the production cycle		Operative reliability		Normally achieved tolerance degree	
1.	Key	1	excellent	5	IT 5
2.	Important	2	good	6	IT 6
3.	Everyday use	3	fair	7	IT 7
4.	As a lung	4	sufficient	8	IT 8
5.	As an aid	5	insufficient	9	IT 9

REMARKS

(Enclosure 19 -a)

Parameter card for boring and milling machines	Code N.

Inventory N.	Denomination	Reference N.

Geometrical Characteristics

Working Capacity	Max parallelepiped described by the spindle axis		
Table	surface mmxmm	max allowable weight	max revolving two direct.
splines	type	pitch	length

SPINDLES

Spindle	1	2	3	4
Type of connection				
Spindle Ø mm				
Shell Ø mm				
Rest dimensions mm				
Max. spindles stroke mm				
Max. shell stroke mm				
Max. revolving (°)				
Max. allowable Ø of cutter mm.				

List of equipment on issue

Dynamical characteristics -Working motions

spindle	revolutions	torques	powers	advancements
1				
2				
3				
4				

FEEDING MOTIONS (Enclosure 19 - b)

Motion specification	max stroke mm	Advancements					
		normal long.	normal trans.	normal vert	rapid long tran	rapid vert.	table rotation 360°
1							
2							
3							
4							

Automatic warehouse of tools

type of warehouse

tools replacement time

Max. number of tools

tool max allowable ø

REMARKS

(Enclosure 20)

MAINTENANCE CARD

Inventory N.	Denomination	Code n.	
		Reference N.	

ELECTRICAL FEEDING

Total power	KW
Tension	V
Type of stabilizer	
Current	A
Frequency	HZ

MECHANICAL FEEDING

Drawings N.	Operating instructions booklet N.
spare parts list	

INSTALLED POWERS

Engine	1	2	3	4	5	6
Manufacturer						
Agent						
Type of engine						
Power KW						
Tension V						
Type of connection						
Frequency HZ						
Part number						

ELECTRICAL EQUIPMENT

	Of control	Of power
Tension		
Type of stabilizer		
Drawing N.		
Operating instructions booklet N.		

SPARE PARTS LIST

ELECTRONIC EQUIPMENT

Manufacturer
Agent
Type
Tension (V)
Drawing N.
Operating instructions booklet N.

SPARE PARTS LIST

(Encl. 20)

INSTALLED PUMPS

Pump	1	2	3	4	5
Manufacturer					
Agent					
Type					
Capacity (l/h)					
N. of revolutions/min (t)					
Pump engine N.					
Max operating pressure atm.					
Operating tank capacity (l)					

TYPE OF EQUIPMENT

- Lubrication scheme N.
- Chassis - scheme N.
- Overhaul scheme N.

SPARE PARTS LIST

LUBRICATION

- Lubrication Scheme N.
- Lubricant point to be lubricated N.
- Lubricant table

MAINTENANCE ACTIVITY

- Routine - operative scheme N.
- Preventive - operative scheme N.
- Corrective - operative scheme N.

REMARKS

(Enclosure N. 21)

Organization chart showing the principle routine for the machinery supply

(Enclosure 22)

Scheme of purchasing process of machinery

	New product	New technology	Machinery Reneval
Proposing body	Marketing Planning	Production technical body	Production technical body or manufacturing dept
[illegible] examination	Production Technical Body	Production Technical Body	Production Technical Body
[illegible] examination	Technological Department	Technological Department	Technological Department
Financial examination	Administrative Department	Administrative Department	Administrative Department
[illegible] approval	General Management Department	General Management Department	General Management Department
[illegible]	Purchasing dept	Purchasing dept	Purchasing dept

(Enclosure 23)

U. C. I. M. U.

The General Conditions of sale of Machine Tools adopted by U. C. I. M. U. shall apply to this Contract unless otherwise agreed between the two Parties.
The Buyer declares to have duly noted the content of these clauses and to approve particularly the articles 3, 4, 5, 9, 11 and 12.

GENERAL CONDITIONS OF SALE OF MACHINE TOOLS
(in force since October 1964, replacing the previous ones)

Article 1 - THE CONTRACT

An order of the Buyer is considered as accepted only after the Supplier's written acknowledgement.
Any alteration, afterwards required by the Buyer, shall not be valid unless it is accepted in writing by the Supplier, stating the new possible delivery time.
The Supplier has the right to acknowledge an order within 20 days from the receipt of the same; during this period it is not possible to cancel the order. The contract cannot be transferred by one Party without the other Party's agreement.

Article 2 - PROJECTS AND DESCRIPTIVE LITERATURE

Sizes, illustrations, drawings, prices, payment conditions and any other information quoted in catalogues, leaflets, circular letters, advertisements and price lists are not binding. These data or information are binding only if expressly

quoted in the Contract. However, as regards weights of purchased goods, is allowed a maximum tolerance of $\pm$ 10%.

Any project or technical sheet used for the construction and for the assembly of the whole machine, or parts of the same, supplied to the Buyer before or after the stipulation of the Contract are property of the Supplier and cannot be used, copied, reproduced, transmitted or communicated to a third Party without the prior written consent of the Supplier. As regards the electrical equipment, are in force the supply conditions foreseen by electromechanical industries.

The Supplier is not liable for possible delays in delivery or for the quality of material (not for possible project deficiencies) if the Supplier of the electrical equipment has been imposed by the Buyer.

Article 3 - PRICES AND PAYMENT CONDITIONS

All prices are understood ex-works, packing excluded, which will be charged separately from the cost. All payments are understood net cash at the Supplier's domicile, and will be carried out according to the conditions settled in the Contract; usually the payment conditions involve the remittance of an advance payment.

The lack of devices or accessories, when it will not exclude or prevent the normal use of the machine, does not allow

the suspension , even if partial, of payment. In case the delivery is delayed, upon the Buyer's request or because of the Buyer's default, the same will be charged with all relevant expenses.

In this case, indipendently from the conditions quoted in the Contract, the 10th day from the availability notice will be considered as the beginning of payment. The non-fulfilment of the payment conditions exempts the Supplier from any delivery duty and it is at his option to recover its credit, which in such an eventuality is deemed as wholly matured, or to cancel the Contract, confiscating as a penalty all sums remitted until then by the Buyer. Anyhow, the Supplier has the right to require the compensation for damages. In case of payment delays compared with the settled dates, interest at the official rate, increased by 2%, will be charged.

Price revision is regulated by suitable rules quoted in the enclosed clause of price revision, which is integral part of the Contract.

Article 4 - PROPERTY

Machines are considered sold, with the reserve property clause until the payment in full of the sames (art. 1523 cc and following ones) (see appendix N. 1).

The Buyer has not the right to resell, to transfer, or to give as a warranty the purchased machine without having

wholly paid its price to the Supplier, to whon must be notified immediately by registered letter, all executive procedures which, at the instance of a third party, could affect these machines.

The transgression of duties settled herein involves the right of cancellation of the Contract. In this case the Supplier will inform the Buyer about his intention to avail himself of the cancellation clause. Besides it is foreseen the application of a penalty as a damage recompensation equal to the remaining amount due to the Supplier. Anyhow, the Supplier keeps his right to require the recompensation of further damages. Upon delivery all risks are at the Buyer's responsability. It is expressly understood and agreed that bills of exchange, accepted drafts and the possible renewed ones, if are not paid when matured, do not contravene the principle stated in the last paragraph of the article 1498 cc (see appendix N. 3) about the place of payment which must be carried out at the Supplier's domicile.

Article 5 - DELIVERY

The goods are delivered ex-works.

The delivery term is reckoned from the date of the advance payment and the date of goods availability for shipment, notified by the Supplier to the Buyer. The Buyer undertakes to withdraw the machine within 20 days from the receipt of the availability notice. The delivery term will

be adeguately extended according to causes beyond the Supplier's and the Buyer's liabilities, as strikes, of whatsoever nature, fire, flood, power failure or other causes of force majeure. It will be extended also in case of delays in obtaining the necessary authorizations from the relevant Authorities, of lack of documents or information necessary for the supply performance or further to alterations required afterwards by the Buyer. Part supplies are always allowed. The delayed delivery of devices or accessories, not excluding or preventing the normal exploitation of the machine, is not considered as a cause of delay.

The Supplier has the right to cancel the Contract if the above mentioned causes of force majeure prevent or delay excessively the performance of the Contract, in this case the Buyer has not the right of requiring a compensation or an indemnity of whatsoever nature. In case of a delay in delivery caused by the Supplier's fault, the Buyer (after the demonstration of having suffered damages because of this) may require a compensation or a paying off of any other right or claim, an indemnity at a maximum level of 0.5% of the value of delayed supply part for each week of delay; this indemnity may not exceed 5% of this value, however. The Buyer has the right to cancel the Contract if the above mentioned causes of force majeure prevent or delay excessively the performance of the Contract, in this case the Supplier has not the right to require a compensation or an indemnity of whatsoever nature.

Article 6 - PACKING

Return packing is not accepted. Failing exact instructions by the Buyer, the Supplier will arrange in his judgement the packing, which will be considered as perfectly carried out when accepted without reserve by the carrier.

Article 7 - TRANSPORT

Goods always travel for the Buyer's account and risk, unless free domicile delivery has been agreed. The Buyer has the right to check the goods before the withdrawal, pointing out his reserves. If the shipment of a supply is delayed - partially or in full - by the Buyer's fault , any risk and/or liability for the machine care will be with the Buyer starting from the day of the availability notice, independently from the fact that the Supplier has still his property right. In this case the Supplier may require the payment of storage expenses.

Article 8 - TESTING

The testing of the machine to be delivered will be carried out at the Supplier's factory before the delivery of the same. The testing will be performed according to techniques normally used by the Supplier or according to the techniques which will be agreed in writing every time between the Parties.

If the Buyer intends to be present at the testing, he must

require to be informed on this purpose in advance. Upon request of the customer an operating test may be performed by the Supplier's specialized technicians. In this case all test expenses will be born by the Buyer and will be recknoned according to the condritions for technical services issued by UCIMU.

Article 9 - WARRANTY

According to the bounds herein the Supplier undertakes to repair all possible construction defects, acknowledged during the warranty period of six months from the starting of the machine; in no case this period will exceed 10 months from the shipment preparation date.
A warranty period different from the above mentioned one may be settled for specific pieces quoted in the Contract.
In case of machines shipped unassemblied by the Supplier, the warranty herein is no more valid, if the assembly, at the Buyer's workshop, is not performed directly by or at least under the supervision of the Supplier's specialized technicians, according to conditions to be agreed every time.
Machine working time exceeding 48 hours by week will proportionally reduce the warranty period.
A further warranty, equal to the above mentioned one, will be applied to the pieces replaced according to the conditions herein . The new warranty will not be applied to

other machine parts for which the warranty will be extended only for the period during which the machine has not worked because of defects noticed according to the present article. Besides the warranty does not cover deficiencies and defects due to the normal wear of those pieces, which for their nature subject to a rapid and continuous wear, as for instance gaskets, belts, brushes and similar.

In order to enjoy the warranty herein, the Buyer shall notify the Supplier, with no delay, the noticed defects and shall enable the same to carry out the necessary surveys and repairs. The supplier shall carry out all repairs within a reasonable period. The Buyer shall ship to the Supplier the defective piece, covered by the warranty, in order to repair or replace it. The delivery to the Buyer of this piece, suitably repaired or replaced , will be considered as a whole fulfilment of warranty duties concerning defective pieces foreseen herein.

Unless otherwise settled, the cost and the risk of transport of the defective part and of the repaired or replaced one will be at the Buyer's charge.

If repairs or replacements must be carried out where the machine is installed, travel and accomodation expenses of the Supplier's employees and technicians will be invoiced to the Buyer according to the tariffs issued on this purpose by UCIMU.

If, after the relevant request, the Supplier rejects the fulfilment of his duties herein or does not act with the

necessary care, the Buyer may carry out all necessary repairs and replacements at the Supplier's risk and expenses.

The Supplier will not be liable for defects rising from materials or projects supplied by the Buyer. The Supplier will be responsible only for defects concerning the operating conditions foreseen in the Contract, if the machine has been correctly exploited and not for defects due to causes rising after the delivery. The Supplier will not be liable particularly for defects rising from a wrong exploitation of the machine by the Buyer or from alterations performed on the same without the Supplier's written consent or from repairs incorrectly executed by the Buyer, as well as in case of normal deterioration.

After the delivery, except for what herein stated, the Supplier will be free from any liability, also as regards defects due to causes existing before the delivery. It is expressly agreed that the Buyer will not make any claim concerning neither accidents occured to people, nor damages occured after the delivery to parts different from the subject of the Contract, nor missed profit, unless it turns out that the Supplier has incurred a "serious fault". "Serious fault" does not mean any lack of care or accuracy , but it means an act or an omission made by the Supplier involving both the non-evaluation of the seriuous consequences, which a Supplier usually should foresee,

and the firm carelessness of any consequence rising from this act or omission.

As regards material not manufactured by the Supplier, the Supplier grants to the Buyer the same warranty received by the producers of these materials.

Article 10 - SERVICE

Upon explicit request of the Buyer, the Supplier may arrange for the despatch of workmen, assemblers, demonstrators or technicians for explanation, instructions, tests, demonstrations of the machine under running conditions, as well as for practical working trials and for repairs or replacements, not foreseen in the contract warranty. These performances, unless otherwise agreed, will be in full at the Buyer's charge and will be reckoned according to UCIMU conditions, foreseen as regards technical service for metal working machine tools.

Article 11 - CANCELLATION

The Buyer may require the cancellation of the Contract in the following cases:

a) If the Supplier has not eliminated or repaired, in reasonable period, all defects covered by the warranty.

b) If the Supplier refuses to carry out the above duty.

c) If the repair or replacement of the defect is clearly impossible.

If , after having accepted or acknowledged the order, it is known that the Buyer is in financial troubles, the Supplier may ask for special warranties or cancell the Contract deducting from the received amounts all expenses born, as well as an amount equal to .... % of the machine cost, as a recompensation.

Article 12 - DISPUTES

The contract domicile is always the Supplier's one.
Any dispute concerning the performance and the interpretation of the Contract will be decided by three arbitrators, as friendly compositors, named the first by the Supplier, the second by the Buyer and the third by the Chairman of the Chamber of Commerce of ... The arbitration will take place in ....
All relevant expenses will be at the loser's charge.

Article 13 - LEGAL CONSTRUCTION

The order involves the acceptance of the general conditions of sale herein, for which no derogation is admitted, unless expressly agreed in writing. It is valid, even if some conditions could not be executed. These conditions of sale shall be governed by and interpreted in accordance with Italian law.

APPENDIX

1) Art. 1523 c. c. In the sale at installments with reserved property, the Buyer purchases the property of the machine by the last installment payment, but he undertakes all risks upon delivery.

2) Art. 1526, lic., c. c. If it has been agreed that paid installments would be kept by the Supplier as an indemnity, the judge may reduce, according to the circumstances, the agreed indemnity.

3) Art. 1498 c. c. The Buyer undertakes to pay the price within the term and in the place established in the contract. Failing this agreement or different customs, the payment must be carried out upon delivery, at the delivery place.
If the price must not be paid upon delivery, the payment is carried out at the Supplier's domicile.

(Enclosure 24)

CLAUSE OF PRICE REVISION

For usual series of machine tools having contract delivery terms exceeding 2 months the definitive invoiced price "P' will be reckoned conventionnally as follows :

$$P' = P\ 0,10 + 0,68\ \frac{S'}{S} + 0,15\ \frac{G'}{G} + 0,07\ \frac{A'}{A}$$

of which

"P" is the initial indicative price, as settled in the order acknowledgement

G is the average price of engineering foundry cast iron of good quality, known on the... according to UCIMU survey

G' is the average price of engineering foundry cast iron of good quality on expiry of 2/3 of the period starting from the date of the order placement and the date of availability notice.

A is the base price of hot-rolled steel, know on the... according to the steel mill price lists.

A' is the base price of hot-rolled steel under the date of availability notice

S is the number indicating the relevant salaries and charges in the Italian machine tools industries, according to UCIMU survey known on the...

S' is the average index value of the relevant salaries and charges in the last third of the period intervening between the date of the order placement and the date of availability notice.

The price alteration reckoning will be made upon availability notice.

The price P' will be ulteriorly increased, if in the contract period, changes concerning fiscal charge, transport costs, exchanges rates etc. occur.

The price of the electrical equipment could be optionally separated from the machine one; in this case it will follow its market swings.

Usually the application of this formula is not subject to any tolerance, immunity or increase.

The application of this formula involves the payment of 1/3 of the quoted price in occasion of the order placement, and of the settlement, including the above recknoned increase, before the shipment of the machine according to the UCIMU General Conditions of Sale.

As regards special machine tools, the Parties will agree particular arrangements in accordance with the circumstances.

(Enclusure 25/1)

Check list for a technical - economical evalutation of the machine introduction in a firm

1. In relation to technological qualities

1.1 Operative cost (direct labor)

1.2 Cost incidence for the use of special tools

1.3 Flexibility of use: useful dimensional space (max.and min.) for the piece to be processed

1.4 Characteristics of waste and losses for scraps

1.5 Perspectives of incipient obsolescence

2. In relation to the productive use and the maintenance (management)

2.1 Difficulty of use by a not particularly skilled operator

2.2 Prevention against accidents

2.3 Noise and vibrations

2.4 Protection against dust, chips, dirt , moisture and their easy mechanical removal

2.5 Wide use of sure devicee for feeding, blocking, regulation, progress of pieces and tools .

2.6 Feeding and discharge ease of piece under processing

2.7 Easy application of automatic feeders and dischargers in trasfer

2.8 Visibility and lighting of working area and easy feasibility

2.9 Coachwork studied in such a manner to avoid , to attenuate and to reduce just, sharp edges, and all other impact sources leading to unpleasant consequences.

2.10 Physiological and functional chromatism as regards the colour of the whole machine and of different parts, permetting a better and more instinctive axecution of duties (controls, working areas, electric, hydraulic equipment ;c.)

2.11 Lubrication system

2.12 Standardization of componenets and their easy availability

2.13 Easy maintenance, as regards an easy approach to the parts and the possibility of handling tools in order to carry out it

3. In relation to mechanical characteristtos

3.1 Quality of used materials and their technological processing

3.2 Sufficient scaling of the most stressed moving parts (shafts, bushes, bearings, gears, connecting rods etc.) and their accurate lubrication and cooling.

3.3 Earth, contributing to a good stability and fatigue life

3.4 Engine power, in relation to max foreseen loads and

their intrinsic quality , also as far as tightness, cooling ect are concerned

3.5 Application of operative units, permitting a more universal use

3.6 Easy performance and management of programs for digital controlled machines

3.7 Outfit of suitable instrumentation

3.8 Problems of basement

3.9 Dimensions in plan and in erection

4. In relation to the cost of purchase and installation

4.1 Cost of machine (+transport, customs, insurance etc.)

4.2 Cost of C/N units

4.3 Optional equipment

4.4 Cost of connection and/or setup of electric , hydraulic pneumatic etc. services (installations)

4.5 Installation cost of possible foundations, handling and important assemblies

4.6 Possible expenses for modifications and movements of other machines and installations

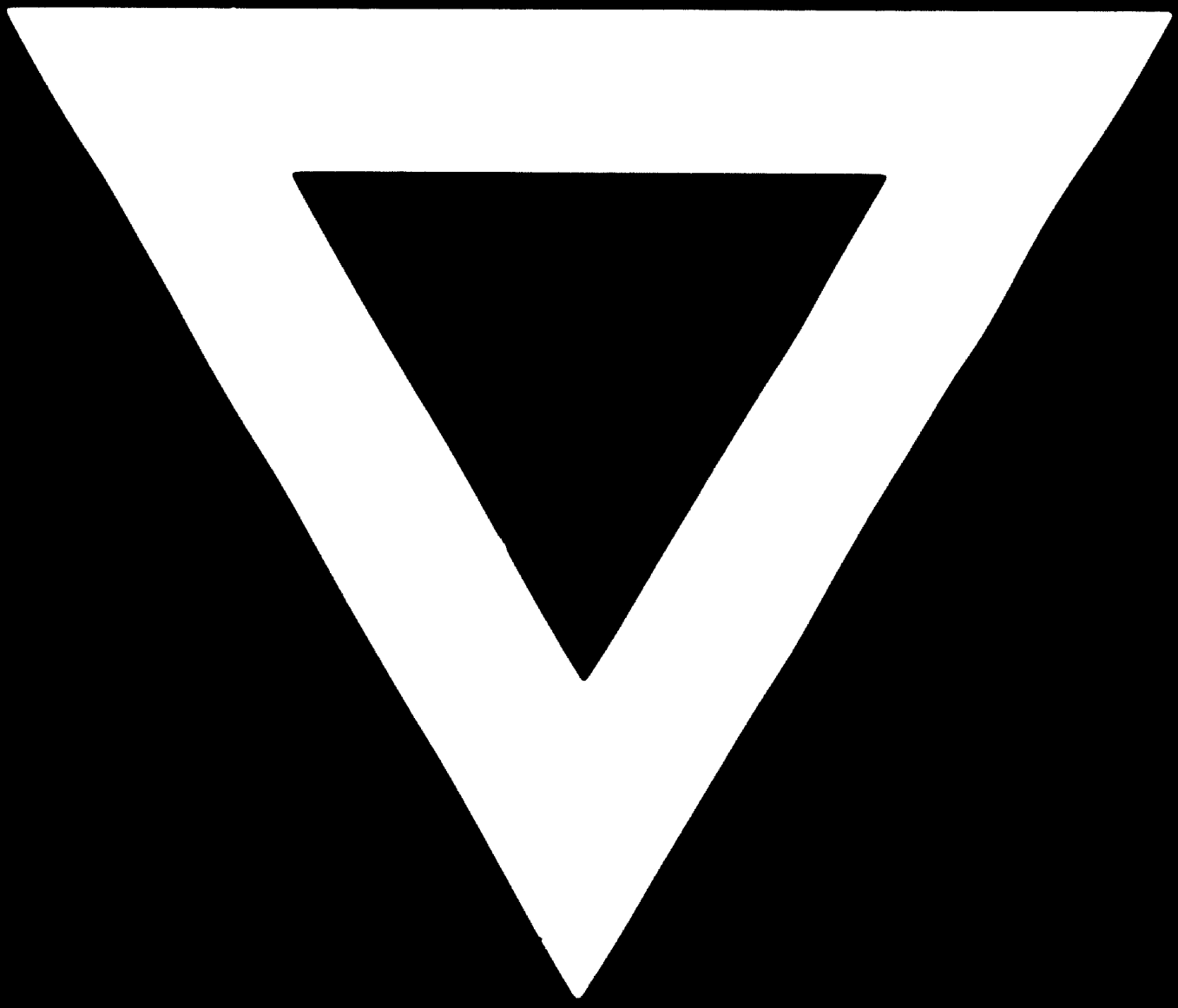
4.7 Costs of tests and preproduction

4.8 Cost of staff education

4.9 Cost of the engaged space

4.10 Cost of further power and potentials to be employed

4.11 Problems of dimensions and weight for the transport



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