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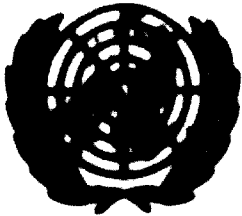
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D02326



Distr.
LIMITED
ID/WG.79/11
3 February 1971
ORIGINAL: ENGLISH

United Nations Industrial Development Organization

Seminar on the Development of
the Leather and Leather Products
Industries in Developing Countries,
Regional Project for Africa

Vienna, Austria, 22 February - 5 March 1971

THE DEVELOPMENT OF THE LEATHER FOOTWEAR MANUFACTURING
INDUSTRY IN DEVELOPING COUNTRIES

by

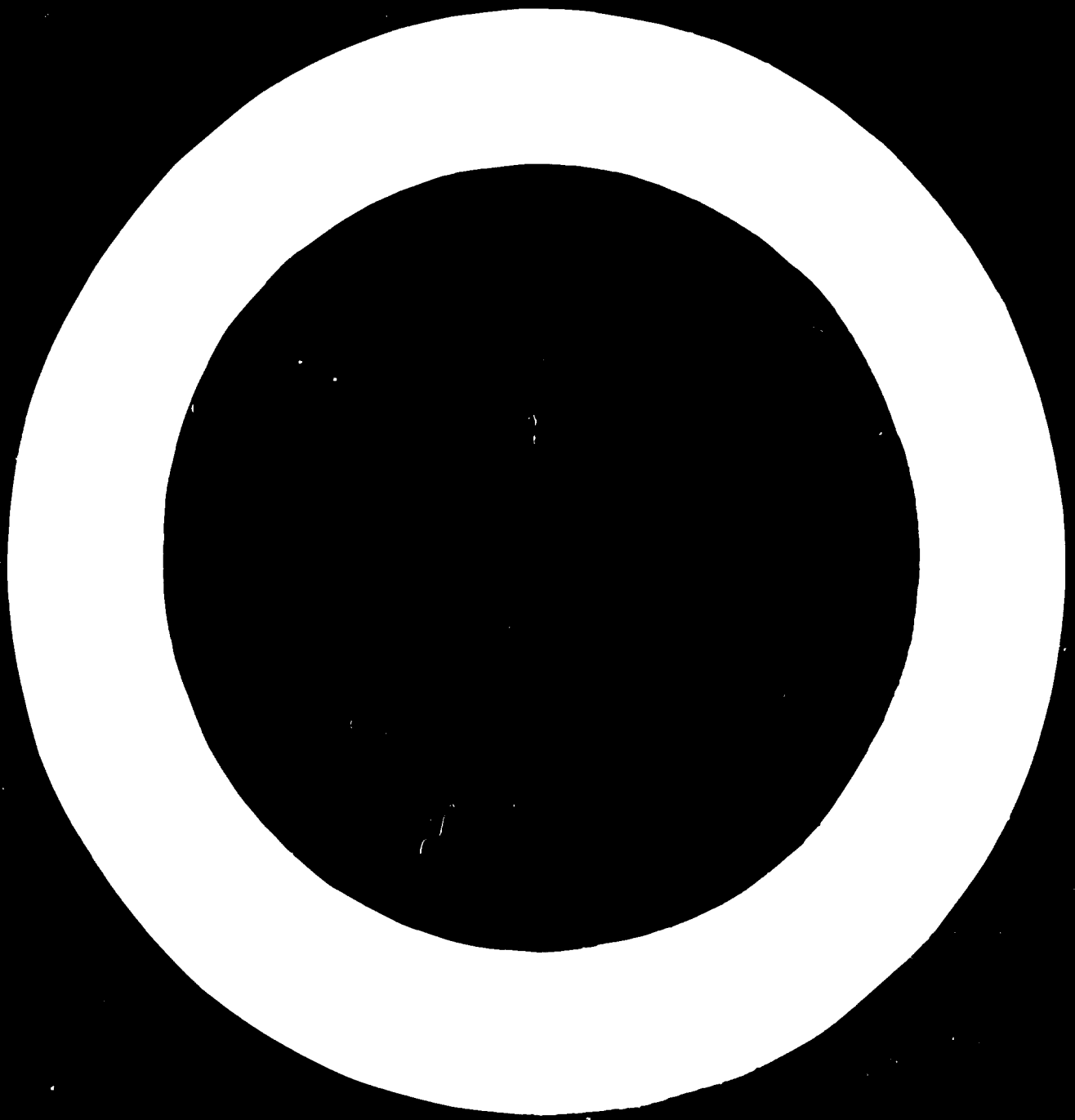
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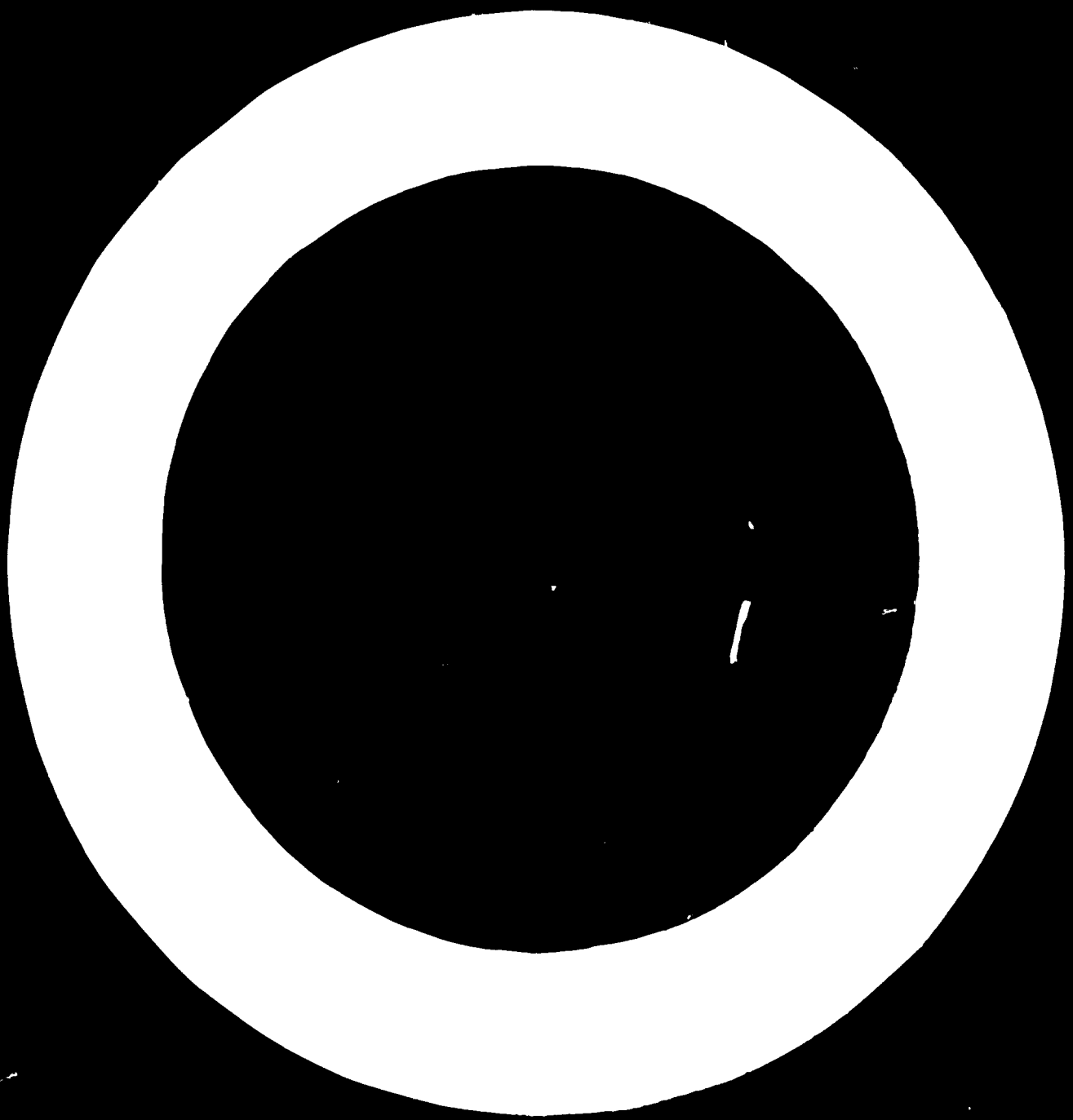
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BUILDING THE SHOE INDUSTRY IN DEVELOPING COUNTRIES

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Building the Shoe Industry in Developing Countries

I. Introduction

Leather, shoe and leather goods industry, the substantial part of which is formed by the shoe industry, is an important industrial branch because with its products it secures the most principle demands - shoe wearing, clothing and various supplements. The industry produces also technical articles for other industrial branches, harnesses for animals, upholstery products, etc.

It is a branch with thousand years' tradition. Rationalizing the industrial production of footwear was conditioned by the development of engineering industry, electro-technical industry and, in the last time, especially by the development of chemical industry.

The changes occurred since the end of fifties and the beginning of sixties were very substantial. They depended mainly on the utilization of new materials enabling the rationalization of the production processes together with keeping and in many cases with increasing the quality of the final product.

The production process is rationalized by aggregating the previously divided operations and by the maximum introduction of mechanisation and automation.

The present period is to a certain extent a crossing period. It can be expected that present ideas concretized in the plans of research and technical development will be realized latest in the second half of seventies. Today we still use machinery and equipment, which are of course improved and modernized, but have been designed about 40 years ago. After 1975 the number of these machines and equipment will be sharply diminished. Despite quick development of the shoe production the world demands for footwear are not yet and for a long time will remain unsatisfied. In the most developed countries the yearly consumption of shoes is higher than 4 pairs per capita whereas the world average is only 1.3 pairs per capita. Thus, it is quite obvious that the increase of

shoe production is expected in countries to which the shoes were mostly imported.

For the countries which want to be industrialized, the building of leather and shoe industry is in many cases convenient from the following reasons:

- the possibility of utilizing domestic resources of raw materials
- the products cover the most principle needs of people
- the products are of short-term consumption type, the need is ever lasting
- investment demands in comparison with other industrial branches are low
- also production costs in semi-products are not high
- the production cycle has a short-time interval
- also the cycle of capital circulation is of a shorter-time type
- returnability of the invested capital is quicker
- division of labour enables to employ a higher number of labourers
- owing to the divided production process it is possible more quickly and more easily to train the labourers.

So, those who decide to enterprise in the shoe industry, has a chance to be successful.

II. Enterprising Design

1. Marketing study
2. Capital possibilities
3. Outer conditions
4. Evaluation of all factors

1. Marketing Study

- a) Market analysis
- b) Competitors
- c) Perspective

a) Market Analysis

The success of the enterprising action depends not only on rational, economic and high-quality production, but also on a perfect analysis of the market. Under certain circumstances even a first-grade and cheaper product cannot be pushed forward:

- the market is full of products
- insufficient advertising and publicity
- improper business connections, improper organisation of sale

Only a perfect knowledge of facts enables a correct orientation. Therefore, we ascertain for example:

- existing level of footwear consumption per capita
- to what extent is the consumption covered with home production and import
- assortment of the purchased footwear according to types
- price level, if it is possible to reduce it
- available consumption of footwear under existing conditions
- consumption of footwear according to territories and groups of population.

b) Competitors

We mean home as well as foreign competitors. We are interested in:

- existing shoemaking plants, location, production
- their technical, technological and organisation level of production
- perspective plans in the production and sale
- what attitude will the competitors take up to our plant, the possibility of cooperation in the production, purchase and sale
- pre-supposed mutual relations of working teams.

In case of import we follow not only the quantity, price relations, but also the composition of imported footwear, which regions are not covered, tendency of development.

c) Perspective

Pre-supposed increase in footwear consumption per capita in, for example, 5-year periods, to what extent can the enterpriser take part in covering the need. If the extent of import is adequate or if it is disproportionately spread. The possibi-

lity of establishing new shoemaking plants.

2. Capital Possibilities

Capital possibilities are important but not quite decisive. Sometimes it is not purposeful to start a wide production. It is difficult to be managed, it means that money is barren for a longer time. The possibility of gradual increasing is more acceptable and just this is enabled in the shoe industry. Shoemaking production, as one of few industrial branches, enables to start the activity with minimum capital and only several labourers. However, objective criteria of economic effectiveness exist with certain optimum and reasonable production capacity.

3. Outer Conditions

The possibility to get all materials, semi-products and auxiliary agents from home production - dependency on import. If it is possible perspective to expect the possibility of development the material basis for the production of footwear, petty materials, semi-products, etc.

If a deficiency of the needed material on the market does not affect unfavourably the price of footwear or the variety in assortment. Communication of the shoemaking factory with the material basis, with sales areas and sources of manpower. Accessibility of energetic resources - electric current, gas, steam, if it is necessary to build local resources.

Interest of the government or foreign organisations in enterprising action, stability of the government, national authorities, orientation of the foreign policy, perspective, resources of manpower, qualification level, special education.

4. Evaluation of All Factors

Only on the basis of thorough investigation and evaluation of all important circumstances you can make the principle and relevant decision:

- where the plant will be built
- enterprising participation, who, extent
- production capacity in individual stages
- extent of cooperation in individual stages
- production program and its perspective development
- method of footwear purchasing
- expected investment costs
- expected production costs
- expected profit - amortization of investments
- schedule of preparing the realization and starting the production.

III. Organisation of the Shoemaking Plant

1. Development of the shoemaking industry in the world
2. Organisation of shoemaking plants - industrial large-scale production
3. Organisation of a middle-size shoemaking plant

1. Development of the shoemaking Industry in the World

- a) Small-scale production of footwear
- b) Large-scale production of footwear
- c) Trends of development

a) Small-Scale Production of Footwear

The idea of the small-scale production of footwear is very relative if we have the world scale in mind. In some conditions the plant having 200 to 500 employees is a large plant, in other conditions it is a middle plant and in Czechoslovakia where the shoemaking production is highly concentrated, it is a small plant.

Therefore, we can talk about the small-scale production only with respect to the conditions of certain country. We must also compare the degree of concentration of footwear production

in one country, such as Czechoslovakia, or another country, such as Germany or Austria.

If we talk about small-scale production or about large-scale production we have in mind the criteria in mind:

- machinery
- number of employees
- assortment of the production and the amount of production
- mass scale of production
- production per one worker.

At present there are hundreds of modern small-scale shoemaking plants with the daily production up to 2,000 pairs of shoes. These plants are equiped with the most modern equipment and the basic production units, i.e. the closing room and making room have identical organization of work and about the same output per one worker as obtained as in the basic production units - rooms - of shoemaking large-scale plants. Therefore, the small-scale production cannot be given together with lower level of technology, techniques or organization. The difference between the large-scale and small-scale production in these modern shoemaking plants consists in the necessity to have the departments for securing the needed cooperation.

Some of these plants have a high degree of the production specialization and reach even higher productivity of labour in the making rooms than the large-scale production plants.

Other smaller plants are oriented on the supplementary production which is not interesting for the large-scale producers, such as orthopaedic footwear, special sports footwear and working footwear or special types of luxury footwear. Machinery and equipment of these plants is adapted to the needs of technology, especially if the combination of machine work and hand work is used.

A special situation is in the countries in which the shoe industry is being built. For these cases is decisive the height of capital which is at the disposal. For certain conditions the combined small-scale production can be even very convenient and it is good to utilize the possibility of buying cheaper machinery from the firms which modernize their machinery. In the course of the time the manufacturers will surely buy new and more efficient machinery with respect to the possibilities and overall development.

The selected plants of the large-scale production which utilized the local sources of labor, power or other convenient conditions for the large-scale production.

b) Large-scale Production of Goods

In the final stages of development towards the integration process produced in the last few decades. A strong competition in the market does not prevent small-scale manufacturers from making their own contribution to development if these firms can take advantage of their own specialization of the production process. Large-scale manufacturers are usually specialized in the production process and are not dependent on the integration in a great degree. Their capital resources are often more or less tied to the requirements of the market, which is due to the change of production methods.

The large-scale manufacturers do not produce only the types of footwear for the widest section of population. With their collection of orders they often meet the requirements of even the most exacting customers.

Compared with the small-scale manufacturers they have usually the following advantages:

- in the vertical organization of the production they have the possibility to secure not only the supplies of all shoemaking raw-products and production equipment from their own production rooms, but they have often in their production program the processing of basic raw materials, the production of various synthetic materials, including sole materials, and they have even their own distribution network;
- complexity of the production organization secures them the profit from the spheres which were controlled by sub-suppliers;
- mass production of the basic materials for standardization, typifying, no matter what the size, the parts and shoemaking equipment. In this way they fully utilize;
- production equipment can be better utilized in greater numbers of pairs of shoes, if the number of shoes produced is smaller,

- a greater number of persons working in one operation can be replaced by automatic and semi-automatic machines,
- the extent of administration work gives the possibility of utilizing the computers and various mechanisation of administrative work,
- there is possible to build profitable auxiliary plants, such as transport department, energetic plant,
- lots of waste can be conveniently processed for the needs of the manufacturing production.
- in the inter-factory transport and in stores a high degree of mechanisation, automation and advantageous palletization can be introduced,
- Wholesale purchases of material, machinery and equipment have some advantages in the purchase,
- own development of research departments can be built,
- a greater number of manpower is at the disposal who can be utilized in the needed section.
- with a greater number of manpower in one profession there is a possibility of greater specialization and higher qualification.

Also the large-scale production has its sensitive points and certain disadvantages:

- in a large-scale production plant we must build communications, energetic plants, social and recreation facilities for the employees,
- the significance of the plant must be represented in the public
- fluctuations in the market reflect in a greater extent,
- hit-and-miss changes in the system of management, organisation and in the proper technology and technique have manifold negative effect.

c) Trends of Development

In countries with the developed shoemaking industry we can expect the formation of integration blocks. Smaller manufacturers fight against the competitors by building common production plants of semi-products, tests and production equipment, or they found common sales organizations.

However, the overall perspective of the shoemaking industry is promising. At present the shoemaking industry in the world produces about 1 pair of shoes per capita yearly. The consumption in the most developed countries is up to 4 pairs of shoes per capita yearly. It means that in many countries the consumption of shoes per capita is less than 1 pair yearly and there are countries in which the substantial proportion of population is barefooted. From this we can see what a great work is expected

to be done by shoemakers. Moreover, those who at the present wear shoes only for every-day use will want also the footwear for skiing, skating, football, tennis, golf, light athletic, tourism, shoes for the car, for the parties, for free time and for home. For every occasion they will want to have a special pair of shoes; maybe, one pair for the whole life, such as for skiing, hunting, but also two pairs of house slippers in a year.

The need of all people in the world will increase without respect to the social system of life, religion or even climatic conditions. Also in our industrially developed country the majority of village youths was barefooted 40 years ago. At the present time our children belong to strata of population wearing the greatest number of pairs per year. Therefore, we can expect the development of shoemaking industry, by using all conventional enterprising methods, in all countries where the needs of population in this respect are insufficiently met.

2. Organisation of Shoemaking Plants - Industrial Large-Scale Production

- a) Vertical organisation - concerns
- b) Horizontal organisation
- c) Principles of organisation
- d) Organisational division of an industrial shoemaking concern

a) Vertical Organisation - Concerns

The effort of larger shoemaking plants is to reach a certain degree of complexity in the production program in order to be dependent on the cooperations and sub-suppliers as less as possible.

Smaller shoemaking plants have usually:

- own shoe designing room
- clicking room of upper and lining parts
- clicking room and preparing room of insoles and soles
- closing room and making room.

They have not the other auxiliary productions and therefore they are dependent on sub-suppliers.

There are deliveries of the following materials and production means:

- lasts, clicking dies, perforating dies, moulds, nailing heads, trimming knives,
- adhesives, metal fasteners, abrasive material, finishes, polishes, stamping ribbons,
- heels, trimming, binding tapes, top lifts, packing material,
- all basic materials, leather, textile, man-made leather, sole and insole material.

Larger and large plants are equipped with auxiliary production rooms up to a certain acceptable degree according to the financial possibilities and also up to the profitability of the auxiliary production. Some of them reach the complexity of the concern.

However, there is not the main aim of the auxiliary production plant to be independent on sub-suppliers. The aim is to reach the maximum economy of the production. It means to provide all deliveries and needed production equipment for minimum prices. If the production equipment from our own plant is more expensive than from the sub-supplier, then, it is not reasonable to build such auxiliary production plant.

It also influences the requirement on organisation arrangement and accounting in the plant. All concerning the auxiliary production must be accounted separately to have the evidence on real expenses for the auxiliary production in individual rooms at the disposal.

We have the experience that the production of wooden lasts is profitable with the minimum capacity of 50 pairs

a day. It is the yearly output of 12,500 pairs of lasts. It can be sufficient for several smaller plants.

Today it is convenient to produce clicking dies from strip special steel in cold conditions also in smaller plants. For these plants it is less convenient to produce deep handle clicking dies for leather and textile by hot forging. Some manufacturers, in order to spare money for the clicking dies for textile use hand saws for cutting out these parts according to cardboard bound templates.

For smaller plants it is quite unprofitable to produce the moulds.

Heels are mostly produced from plastics at the present. For the production it is necessary to have the mixing and drying equipment, and above all the injection moulding machine. It is an expensive investment which must be utilized at least in two shifts, or even more. The capacity of big injection moulding machines is up to 200 pairs of heels per hour. The capacity of the unit for pre-finishing the soles is at least 4,000 pairs in one shift. In case of lower production it is better to buy the machine for trimming individual soles by hand feeding round the trimming cutter. Therefore, we must compare the capacities of auxiliary productions with the need of the factory.

Metal fasteners, abrasive paper, adhesive, finishes, decorative stamping ribbons and binding tapes are not produced even in middle and some large-scale plants. It is more profitable to buy this material.

Only the largest firms can afford to build their own shops. Assortment in the shops is completed by buying the footwear from other shoemaking firms.

Therefore the establishment of auxiliary production plants, or tannery and sales organisations must be decided very reasonably and purposefully only when it is immediately or prospectively economically convenient.

b) Horizontal Organisation

Generally, with the horizontal organisation we mean the relations between individual production and non-production sections and departments of the plant. If we consider the horizontal organisation of the plant as a long-termed trend of its development, then, this organisation form expresses certain specialization of the production or activity. The tannery is enlarged by new production departments but it is not bound to the newly established shoemaking or other leather utilizing departments.

The shoemaking plant is enlarged by further shoemaking rooms, rooms for the production of leather goods or garments, but its own tanneries are not built.

The advantages and disadvantages of the horizontal organisation can again be evaluated only in relation to certain territory and to certain circumstances. The extent of production, dependence on the market, manpower, competitors and the whole series of different circumstances is also very important.

Usually, the plant is enlarged first in the region of identical or very close production - i.e. horizontally, and after having reached a certain acceptable capacity it builds the production departments which precede or follow the proper production process - i.e. vertically.

c) Principles of Organisation - Generally

When dividing the plant into sections and units, the large as well as middle-size plants must observe certain necessary principles:

- we separate different activities (purchase, sale production, preparation of the production, auxiliary production),
- we divide the production process into main production (production of footwear), auxiliary production (production of lasts, production of heels, production of packing material) and departments ensuring the production (machine shops, maintenance shops, inter-factory transport),

- we separate the complete technological units (clicking rooms, preparation rooms, closing rooms, making rooms),
- large units are divided into smaller ones, which are better controlable - corporation - plant, plant - group of workshops, group of workshops - workshop,
- we follow the movement of material from the purchase up to the finished product,
- we follow the development and fluctuation of production costs in individual centres, outlet price - entrance price - costs of the centre,
- we determine the duties, rights, responsibility, subordination
- we determine functions,
- we secure the linking up of the production process and all plant activities,
- we determine the system of financial evidence linked up to the production and sales cycle.

The profitability of the division is the main criterion for our decision. If we have 2 or 3 last makers we shall not establish an independent department, but we include them into the shoe designing room.

We fuse the calculation department with the detailing department, the bottom clicking room with the bottom part preparing room. If there are several lines of belts in the making room we can make them independent. Making room and closing room can form an organisation unit.

Also detached workplace can form independent organisation units which, however, need not be subordinated to the higher organisation degree of management.

d) Organisational Division of an Industrial Shoemaking Concern

(See the appendices Nos. 1, 2, 3, 4, 5)

This organisation is convenient for the functional system of management. The economical, commercial, technical, production and personal directors manage their subordinated units but do not infringe of the management of the main or auxiliary production plants. Their directions, principles and suggestions are presented to the general director who considers them and issues them as binding direction for all subordinated plants and units. Thus, the principle of the only head is applied, as well as it does not affect his authority and his responsibility.

A substantial proportion of the directions, regulations and suggestions is relating to the production units and there they are also materialized. A certain advantage is the direct connection of the general director with heads of the plants and units in which is performed the main activity of the plant.

For the general director this system of management is very difficult and to some extent it is two-phase method of management. Above all, there are the consultations with functional directors and heads of functional units, and then, the sessions with the directors of individual main plants as well as auxiliary production plants.

The management of the production activity can be also secured through the director of the main production and the director of the auxiliary production.

The general director pays the greatest attention to those production plants which guarantee the existence of the corporation, i.e. the production for the market.

The suggestions, regulations and directions made out in the units of functional directors have the character:

- regular, periodical
- irregular, sporadical

Sporadic and irregular are:

- specifications about the change of technology, introduction of new machinery and equipment,
- information about prices,
- advices on the safety of work,
- regulation on the personal policy, training of employees.

All directions connected with the securing of the daily production plan are considered as regular and periodical ones.

3. Organisation of a Middle-Size Shoemaking Plant

- a) General organisation principles
- b) Statute
- c) Organisation manual
- d) Labour specification
- e) Organisation diagram of the plant

a) General Organisation Principles

Contrary to concerns and specialized shoemaking large-scale plants, the middle-size and small plant must consider the cumulation of functions and activities. The cumulation of functions and activities will be made both in the management of the plant and in individual workers.

It is impossible to employ, for example, one worker only for buying machinery and equipment when during the whole year only 2 or 3 new machines are to be bought. It is not rentabil to have an independent purchasing department and an independent selling department. It is better to organize only one commercial department. Preparation of the production and management of the production are combined in the production department. As the departments and units are relatively smaller, it is considered that the head of the department will not only manage and organize the work of individual workers but he himself will do a certain concrete function.

Also the work of individual manual labourers will be cumulated. For example, it will be the attendance of boiler house and the maintenance of the distribution of steam, water, gas

and all consuming machines for these energies. The stock keeper will take care of a greater assortment of material, he will present proposals for orders, he will accept material, store it, issue material and keep the needed evidence. Even in the proper production shops one labourer will do two or more operations, such as clicking insoles, soles, counters, or other parts. One labourer will last the whole shoe, pull up staples, iron the shoe bottom and rough the lasting margin, etc.

It is necessary to:

- make up the exact list of all functions and labours which must be performed
- divide the functions and labours to individual workers, generally
- determine the exact number of workers together with the demands for their qualification
- determine mutual relations, relations of subordination and superiority between individual workers
- make up the organisation diagram of the whole plant
- determine the relations of superiority and subordination between individual units, groups and workshops.

Naturally, it is purposeful to put all organisation relations and principles down on the paper.

In principles there are the following documents:

- statute of the plant
- organisation manual of the plant
- specification of labour and content of work of individual workers
- organisation diagram of the plant

b) Statute

The statute is a document on the establishing of the plant. It includes the necessary acknowledgements, permissions, registering the plant in various authorities and corporations, such as:

- Companies' register
- Chamber of Commerce
- State Bank

- tax and customs offices
- special security offices
- organs of public service, etc.

The statute should include the documents (photo-copies) or references to appropriate documents.

Further, the statute includes:

- purpose of the corporation, content of the enterprising activity
- who establishes the corporation, who has the right to change or cancel it and under what conditions
- where will be the place of the corporation or the headquarters
- what agreements can be concluded with other organisations
- financing the enterprising activity, partners, mutual relations
- extent of authority of state organisations and public authorities to encroach upon the activity of the corporation
- administrative and advisory organs of the corporation
- appointment and recalling the directors and managers.

On the basis of the statute the organisation manual of the corporation is made.

c) Organisation Manual of the Corporation

Organisation manual is the detailed inner organisation structure of the corporation in accordance with the basic directions of the statute. It includes:

- organisation division of the corporation to individual departments and units
- content of labour and purpose of individual departments, units and groups
- relation between individual departments and units
- superiority and subordination
- appointment and recall of persons to and from managing functions
- methods of managing and placing the tasks
- methods of control
- method of hiring and dismissing the employees
- rights to decide the special, personal, financial matters.

The organisation manual includes the additional regulations and clauses which are an unseparable part of it, such as:

- working regulations for the employees
- contracts of service with employees
- salary, wages and bonus regulation
- regulations for compiling various plans
- regulations and prescriptions for finance economy
- safety regulations to protect the employees' health
- safety regulations to protect the possessions
- fire safety (water safety) measures.

The organisation manual respects the government and local legal rules on labour law, bookkeeping, statistics, etc.

All new circumstances and conditions which will occur during the enterprising activity cannot be forecasted in regulations. Some of the existing regulations and prescriptions will be unsuitable in the future. Therefore, according to the need, amendments or changing paragraphs are issued.

d) Labour Specification for Individual Workers - Functions

Labour specification for individual workers are a very important part of the organisation manual of the corporation. They are especially important if disagreements occur between the employer and the employee and if one or the other part enforces his claims.

The difficulty of work, responsibility, duties, rights of individual workers are different. According to this also their salaries, special rewards and bonuses are charged.

The difference in the requirements made upon labourer in the production, upon the head of a workshop and upon the manager of a commercial group should be very high both in the education, in the overall qualification and overall knowledge.

The labourer is responsible for the quality of his work, he takes care of his machine and working place, he observes safety and other regulations.

The head of a workshop is responsible for the work off all his labourers, for the quality of products, for all machines and equipment in the workshop, for economy of production, for continuity of production, for the necessary evidence.

The commercial manager is responsible for the winning orders of the whole plant, for the purchase of needed materials, for profitable selling of final products, for all financial transactions.

Labour specifications should be properly evidenced with the personal manager and should be an inseparable part of the contract of service between the employer and the employee. It means that every employee should be properly informed about the contract and should acknowledge the exact content with his signature.

c) Organization Diagram of the Corporation

In order to make up the organization diagram it is first necessary exactly to state all activities that will be carried out in connection with enterprising activity.

Identical or very similar activities are to be included in certain function groups or units.

It is necessary to determine the responsibility and subordination for these groups and units to individual heads in the corporation.

One of the possible variants of combining the activities:

General director of the corporation:

- secretariat
- lawyer, secretary, personal officer,
- inspection
- special adviser

Commercial director: (

- marketing - sample room
- purchase of all materials for the production
- stock of materials for the production
- sale of footwear
- stock and expedition of finished footwear

Technical director:

- technical, technological and economic preparation of footwear production
- insurance of machines, equipment, production aids

- stock of machines and equipment
- fixed assets
- maintenance of fixed assets, machines, equipment, energetic distribution lines, transporting means, communications, courtyard
- security of work, protection of possessions
- research, technical development

Production director:

- detailing of the production according to the orders placed by the commercial department
- managing of the production, dispatching
- quality control, laboratories

Head bookkeeper:

- inter-factory bookkeeping
- issuing and accounting all invoices
- balance, evidence, statistics
- contact with the bank, customs, tax and state offices

Appendix No. 6 - Organisation diagram of a middle-size shoemaking corporation

IV. Technological and Technical Preparation of the Production

1. Preparation of the collection
2. Shoe designs
3. Technological and technical documents
4. Calculating the price of the product

1. Preparation of the Collection

- a) Extent of the collection
- b) Collection and standardization
- c) Collection - production and material possibilities

a) Extent of the Collection

The collection is a basis of the production program. Proper collection will guarantee the success, or if not, it can cause serious problems not only in the production, but also in selling what unfavourably influences the financial situation. Therefore,

our decision must be very careful before we offer the collection to our customers.

Some experience of western factories:

The collection of footwear is created usually for one halfyear. For the selection they prepare twofold up to fivefold number of models compared with the number they put into the production program. For example a firm with the daily capacity of 12,000 pairs of shoes prepared for the selection 200 models but for the production they selected 70 models. In another case, from 500 models they selected only 200 models for the production. In one of the largest factories I visited they prepared as much as 2,400 models for the selection but for the production they selected only 400 models.

Of course, the number of models is not identical with the number of the used models of lasts, because every manufacturer tries hard to use the lowest possible number of last models for the production. In the given example, in the first one it was 5 last models, in the second one it was 10 and in the third one it was 30 last models. One of the manufacturers was proud that no one model from the preceding collection was included in a new collection. He manufactured only a limited and exactly planned number of pairs which was not increased even on the wish of the customer.

It was convenient for him when the demand was permanently higher than the offer. He did not want and could not permit that the footwear which had remained in the sale for a longer period could fall to the lowest price category. Quite on the contrary, he can sell very convenient price in the factory which is not produced in the sufficient quantity and for which there is a demand.

The collection can be very variable, tasteful and attractive even with the limited number of shoe models and the models of lasts. The variability can be obtained above all by different combinations of the basic style, material combinations, rich assortment of trimmings, various shapes of soles or dyed heels. Also soles influence the variability of the

collection. Again, there are the combinations of different kinds of materials, colours, pattern, edge profiles, shapes and finishing of welts. The collection is decided by the manufacturer who has the requirements and taste of different groups of customers in mind.

Even if the manufacturer respects the opinions of business men, he must above all take in mind his own practical standpoints and production requirements if he wants to keep a certain acceptable profitability.

In the creation and approving the collection also the special opinions of fashion creators and medical specialists are utilized.

The interest in the collection is increased by attractive packing, information leaflet about the specific properties of footwear with the instructions on shoe preserving and cleaning.

b) Collection and Standardization

Even during the creation of the collection the stylists must respect the basic requirements of the production of clicking dies, perforating dies, trimmings, moulds, as well as the whole technological process. They must specify the roundness of the part shapes, widths of allowances, number of stitch rows, number of stitches per 1 cm and kinds of threads.

They standardize the punchers, trimming tools, heel and top lift attaching heads.

The collection creator is bound by some standardized shoe parts, such as insole, heel, counter, reinforcing parts, gussets.

Every manufacturer wants to have such collection in which he could utilize the existing production means to a maximum possible extent. He approves only those changes which distinctively influence the taste of the customer or favourably influence the rationalization of the production process.

c) Collection - Production and Material Possibilities

The collection must be always in accordance with the total possibilities of the corporation - it must ensure the planned production within the range of placed requirements. We cannot offer shoe styles for the production of which we have not the confirmed supply of materials.

Shoe styles having a complicated technological process in the production increase the need of manpower, often for only a certain limited periods what, sometimes, is nearly impossible to be realized.

Unacceptable are also the demands to purchase new machines and equipment for only a short-time utilization. Therefore, the collection must include only such shoe styles which can be produced with the use of the existing machinery which may be easily modified.

2. Shoe Designs

- a) Principles of shoe designing
- b) Technical description of the product
- c) Shoe part grading

a) Principles of Shoe Designing

Today, the methods of shoe designing are tabulated in detail including some dimensional data which must be respected. In order to keep the standardizing system it is convenient to use only one designing method and establish it as a binding Factory Standard.

Of course, the development cannot be limited with or adjusted to an existing prescription because new materials and technological processes are being developed. It is necessary to prove their application possibilities in the practice. Therefore, shoe designers make out experimental designs and styles and after practical trials the gained knowledge is added to the existing prescriptions.

As I mentioned above, in designing shoe styles utilizing the lasts which are being used in the production we suppose the use of insoles, soles, heels, counters or other shoe parts designed for other shoe styles which were or are still being produced on those lasts.

Shoe designers' patterns and drawings are an exact technical labouring and drawing of individual shoe parts. According

to these documents they make out the technical documentation for the production of clicking dies, perforating matrices, moulds, etc.

Therefore the patterns and drawings must contain all essentials which are usual in technical drawings and other similar documents. If this requirement is not respected, it cannot be supposed that the produced equipment will have all needed parameters.

b) Technical Description of the Product

Technical description of the product must be quite unequivocal without any possibility of another interpretation of the ideas included in the prescription.

Technical Description No. 16907 - 1970

1970 - Ladies' walking leather cemented shoes

Sole - Obolit.

No. 54406 - G/07/

Last: 54205 - G/07/

Include into the group No. 32a - 1970

736354

104705-1113/725465-48

<u>Material</u>	<u>1.6-1.8 mm</u>	<u>Linings</u>	<u>Sole</u>
Colaten-2223		Natural	Black
Web 8-005			
<u>Size 5</u>			
519			

Execution of the upper

Folded round the throat, top stitched with lining. Joints on inner side of the shoe cut out, inked, jointed by two narrow rows of stitches. Quarters jointed by lackstitching with a cross piece directed to the inner side of the shoe. Tongue folded, top stitched with lining. Across the instep is positioned decorative strap from the basic upper material, folded, inked, stitched by two narrow rows of stitches, on the outer side of the shoe there is a decorative button stuck onto a stitched on support.

Stitching

Threads in the basic colour.

Decorative button	WVL-25-2 per pair, gold colour.
Vamp lining	Valine WVL No. 0246, grey, boiled, unstuffed, with TL coat.
Quarter lining, vamp cuff, tongue lining	CEV SK 02-525, beige No. 0013/15, in the heel portion Valdon SP 1371/56, stitched.
Binding tape	WVL No. 250.
Heel pad	Fabric waste.
Sock	From quarter lining material, WVL-110, ODMF W 86 (beige)
Toe puff	Sprayed on.
Counter	Felted leather 1.8 mm.
Insole	Calctalon 2 mm.
Insole back reinforcement	Shank cardboard 2 mm, reinforced, blue.
Shank	Steel No. 10.
Bottom filling	Bottom filling cardboard.
Sole "0"	Shalit 230 2 mm, slicked out from sheets, colour according to description.
Heel No. 09-568-243	Polyamide, injection moulded.
Top lift No. 24612-23511-24514	WVL, 5 mm for the heel, 5 mm, colour according to the sole.
Bottom	Cleaned, sprayed.
Sole edge	Pre-stretched sole, sprayed edges, colour according to the top lift.
Bottom construction	Cemented, with high black heel.
Weight	480 g.
Produced in sizes - metric	22 1/2, 23, 23 1/2, 24, 24 1/2, 25, 25 1/2, 26, 26 1/2, 27, 28
English	2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6, 6 1/2, 7, 8
Marking	With factory Trade Mark onto the sock.
Packing	055/122/255/020.

To each pair put 2 pairs of spare top lifts according to the technical description, in polyethylene envelope No. 260.

c) Shoe Part Grading

Model of the shoe and all parts are designed for the model (middle) size. Therefore, the parts must be graded to the shapes of all sizes. It is not a mere increasing the shape by a uniform increment round the whole circumference of the part. In grading we utilize the possibility of centering the parts, i.e. one part for more sizes. The graded patterns of the parts can be bound and in case of smaller production lots they can be used directly for practical purposes.

It is necessary to note that grading begins to be carried out by computers.

In case of a smaller assortment it must be considered if it is not better to buy not only models, but also all designing documents of a new shoe style.

Then, the corporation will perform only some modifications and supplements of the technological and technical documents, and mainly, in the calculation of the price of the product.

3. Technical and Technological Documents

- a) Documents on materials
- b) Documents on technology and machinery
- c) Equipment and aids

a) Documents on Materials

Besides the technical description of the product they make out also an exact list of parts according to the following table:

Upper parts

Ser. No.	Part	Pen	cm ²	Material	Thickness mm	Denomina- tion
1	Vamp	2	450	Colaten	1.6-1.8	1240
2	Inner quarter	2	285	Colaten	1.4-1.6	1242
3	Outer quarter	2	298	Colaten	1.4-1.6	1242

Bottom parts

Ser. No.	Part	Pcs	cm ²	Material	Thickness mm	Denomination
1	Insole	2	278	Celstelen	2	C 218
2	Sole	2	298	Obolit	3.2	24-H-11

Gradually all designed parts together with the needed data are put down.

The so-called petty and auxiliary material, such as threads, laces, adhesives, eyelets, solvents, dressing agents, etc. are named with each individual operation as you will see later on.

Denomination of the material must be quite exact according to the Factory Standards, especially in cases where numerals, letters, etc. are used. A mistake in denomination would cause a considerable financial loss because the parts produced from unsuitable material might not have a purposeful utilization.

b) Documents on Technology and Machinery

The shoe designer makes out an exact technological process of the production of individual shoe parts and their completion. For example, he makes out separate technological processes for the production of insoles, counters, soles, heels, and also for assembling shoe uppers as well as for attaching shoe bottoms to uppers.

Example of the sequence of operations in the closing room:

Ser. No.	Operation	Machine	Needle	Threads Needle Shuttle	Number of Stitches per 1 cm	Distance of Needles	Auxiliar Material
1	Lining stitching	31 K 18	16xl-12	50/3 50/3	5		
2	Vamp lining attaching	BIMA ironing press	UFK-92	180°-200°C			Acetone 2-3 sec.

Sequence of operations in the making room:

Ser. No.	Operation	Machine	Drwg. No.	Type	Auxiliary Material, Standardized Part
1	Heel seat lasting	Semi-automatic machine	04042	P3n	Tacks D358-9 head/32 pcs Heel band H 16
2	Sock inserting	Standard bench	111	Pl	VULEP RS 00/182

In every operation it is necessary to state:

- exact name of the operation
- machine, bench, equipment needed for the operation, exact denomination
- working means and its exact denomination, such as needle, nailing head, trimming knife, mould, etc.
- operating temperature, pressure
- petty and auxiliary material, such as adhesives, dressing agents, solvents, nails, threads together with their exact denomination
- other data which are not mentioned in the form.

The given data are the basis for making out the demands for

- machines, equipment, tools and aids
- manpower
- needed materials.

The given data are also an important part of calculation documents.

c) Equipment and Aids

Besides the production equipment mentioned in the paragraph b), it is necessary to labour the documents for the production and for ordering the basic production equipment, such as:

- clicking dies of upper, bottom and reinforcing parts
- rollers for skiving insoles, counters and soles
- moulds for counters, heels, soles
- heel attaching heads
- perforating and embossing matrices
- wiping and clamping bands for lasting machines.

For the production of these types of equipment, unless they are in stock, separate detail technical documents must be made out.

In skiving rollers, attaching heads and other types of equipment we utilize the possibility of centering the parts.

It is necessary to say that the method of making out all documents and grouping certain data is not substantial, but complexity is very important in order not to omit anything.

4. Product Price Calculation

- a) Material norms - costs
- b) Output norms - wages
- c) Overhead
- d) Total costs

a) Material Norms - Costs

The methods of shoemaking calculations are laboured in very detail. The basis is the exact determination of the area, weight of individual parts of shoes together with the unnecessary waste. In shoe upper, lining, reinforcing and also in some bottom parts we determine the area, in other materials and parts we determine the weight. Some kinds of materials are calculated per piece - laces, trimmings, or according to the length - binding tapes, etc.

In the determination of the consumption of material we pay the attention even to the smallest values. The multiples of these values with respect to the quantities in which the footwear is produced, represent great amounts of materials.

The basis for the calculation of the consumption and price of the used material are the shoe designer's prescriptions - drawings, patterns, plots and exact specifications of the used material according to the price sample block.

The system of calculation of the consumption of material is usually identical with the organisation structure of the plant. The consumption is calculated for the centres where the material is consumed or prepared.

Upper leather	- upper leather clicking room
Lining leather	- upper leather clicking room
Lining textile	- textile clicking room
Insole textile	- textile clicking room
Soles	- sole leather clicking room
Insoles	- sole leather clicking room
Heels	- sole leather clicking room
Adhesives	- stores of petty materials
Nails	- stores of petty materials
Threads	- stores of petty materials
Hooks	- stores of petty materials
Boxes	- suppliers in the factory - auxiliary productions
Cases	- suppliers in the factory - auxiliary productions
Shanks	suppliers in the factory - auxiliary productions
Bottom filling	- suppliers in the factory - auxiliary productions.

The division also corresponds with the division of footwear into individual units, i.e. uppers, linings, bottom parts, petty material and other parts of footwear.

In every type of the used material we determine substantially the following values:

Serial number, Part, Number of pieces, Area-Weight, % of waste, Waste sq.dm-gr, Total consumption, Price per unit, Total price, and the Total of each value.

Area is given in sq.cm, weight in grams and tenths of grams. After determining the consumption and price of each individual part and type of the used material, the total consumption of material per 1 pair of shoes is determined.

Usually, the consumption is determined for the model size, in men's footwear No. 9. In large-scale production it is determined for each size of footwear. If the production program includes a greater number of pairs of greater sizes, the so-called "over-assortment" is calculated for the production specification, i.e. admissible greater consumption of material, of "under-assortment" if there is a greater number of smaller sizes there.

The modern shoemaking production respects the principles of an exact determination of the material consumption for 1 pair of shoes because the material forms a greatest proportion of the production costs.

The modern shoe production secures the reduction of material consumption by:

- determining the optimum thickness of individual shoe parts,
- designing such shapes of parts that the unnecessary waste between them is as low as possible,
- using large-area materials with the possibility of pre-drawing the parts to be clicked out, where the waste is reduced to 5 - 10% against 15 - 20% in leather,
- careful utilization of the whole area of material,
- determining the optimum allowances for assembling and processing parts,
- utilizing the marginal waste for clicking out smaller parts,
- sparing the material in the production rooms (drying-in of adhesives, contamination of threads and binding tapes),
- careful storing, and transportation to prevent depreciation,
- searching the substitution materials which should be of the same quality but more convenient in price.

b) Output Norms - Wages

The basis for the determination of wages in the price of footwear are exact technological processes and prescriptions for individual sections of the production.

Regularly repeating operations are usually normalized and only the needed deviations are calculated.

The determination of the output norm is also supported by relatively exact methods. In the operation they measure the time which is connected with the proper performing the operation, the time needed for the remaining movements, such as the preparation of material, preparation and adjustment of the machine, inspection, removing the products, etc.

The time for performing the proper operation is determined on the basis of a detail study in which the operation is divided into:

- working section and
- individual movements.

Example:

Taking the shoe from the conveyor, performing the operation, inspection - measuring, returning the shoe on the conveyor.

The needed time is calculated in seconds, e.g.:

Total working time in 8 hours' shift	28,800 sec.
Break 15 min.	900 sec.
Auxiliary works, adjustment of the machine, preparation of material, exchange and grinding of tools, removing of products	<u>1,800 sec.</u>
Time for the proper operation	26,100 sec.

Time for 1 working operation 15 sec.

Number of working actions per shift $\frac{26,100}{15} = 1,740 = 870$ pairs.

If the operation is included in the 7th class of the catalogue of wages, the operator earns 2 £ per hour, i.e. 16 £ per hour = 1,600£

Rate for 1 pair = $\frac{1,600 \text{ £}}{870 \text{ pairs}} = 2 \text{ £}$

The calculation is considerably simplified from the viewpoint of hour wages. All operations are included into certain class according to the physical exertion, needed qualification, etc. Each class has a determined basic hour wages, wages, which can be increased with respect to the sanitary conditions, the necessity of extraordinary knowledge, etc.

The determination of individual norms has the significance only in the cases where the output of the worker is not influenced by unremovable or insurmountable conditions.

Another situation is in the flow line. The output is determined by the capacity of the production conveyor. Therefore, the total wages is determined for the performance of the operation for certain number of pairs - daily plan.

The wages for the performed operation is calculated again according to the production departments -

- upper clicking room
- bottom clicking room and part preparation room
- closing room
- making room.

The total wage in the price of the product is increased by the additional tax for social charges, holidays, leave, or various kinds of bonuses.

The determination of the output and a piece rate is very important from several reasons:

- the working reserves are found and the shortage in manpower is prevented as well as the increase of wages,
- sufficient time is secured for quality performing the operation, the possibility is obtained to reach higher output.

We must be especially interested in a correct determination of the output norm in key machines - lasting machines, machines for pre-finishing soles, injection moulding machines.

A low fulfilling the output norms is the cause of high costs of investments, production as well as maintenance. Then, it is more convenient to pay higher wages and utilize the machines in more shifts.

c) Overhead

There are all expenses which cannot be included among the costs of material or wages. Usually, the overhead is divided according to the place of origin into:

- factory overhead
- plant overhead
- general overhead

Factory overhead includes the following expenses:

- electricity, steam, water, air,
- maintenance of machinery and equipment,
- indirect material (cleaning materials, oil, forms, writing materials),
- costs for rejects,
- wages of staff (chief, inspector, superintendent, planner),
- contribution to the overhead of the group of workshops, higher degree of management.

Factory overhead is calculated on the basis of long-year experience in a half-year budget for each cost period. The chief of the workshop can influence the overhead and together with other workers he takes part in the reached results.

Plant overhead is used above all for covering the expenses of auxiliary departments in which the proper final product is not processed, but for the production process the action of these auxiliary departments is unnecessary. It is the contribution to the expenses of:

- last making room,
- production and storing of the production equipment (clicking dies, moulds),
- maintenance of the machinery and equipment,
- inter-factory transport,
- units for the preparation of the production, including the shoe designing room, detailing and calculation departments.

Usually it is expressed by the so-called expense allowance, the uniform charge to the production price of footwear without respect to the height of production costs.

It is divided among individual departments in the proportion of the expense to all other auxiliary departments.

Also the auxiliary departments have their own whole year budgets of expenses and the basic items are again:

- material, wages, overhead

Ser. No.	Department	Yearly Budget /1,000/	%	Yearly Output of Pairs /1,000/	Allow-ance for 1 Pair	Contribution of the Department from 1 Pair hal.
1	Last making room	500	4.6			24.6
2	Production means	6,500	60.7			324.7
3	Maintenance	1,200	11.2	2,000	535	60.0
4	Inter-factory transport	1,500	14.0			75.0
5	Departments for the preparation of production	1,000	9.5			50.7
T o t a l		10,700	100			535.0

The contribution for the expenses of auxiliary departments for certain period is calculated as follows:
 allowance contribution per 1 pair x number of pairs produced.

This budget also may include the expenses of auxiliary departments. Every head of the auxiliary department must try not to increase the expenses in the department under the increased production of footwear, and thus to reach the profit.

General overhead includes the expenses of general units which serve for all plants

- expenses for the management of the corporation
- guarding of the corporation
- maintenance of buildings and communications
- general departments, accounting department, statistical department, checking department, personal department
- health and social facilities for employees
- training of the employees and apprentices
- advertisement and representative funds
- works canteens
- social funds for the employees
- contribution to a higher degree of management or to various trade organisations, etc.

Calculation of the general overhead and its distribution can be similar as in the plant overhead or it can be calculated according to the formula

$$\frac{\text{general overhead}}{\text{production price of all products}} = \% \text{ of general overhead}$$

The maximum economy must be respected also in these expenses which represent relatively high sum of money.

The production price does not include selling expenses which are expressed by the overplus to the production price and various kinds of taxes because by these items the production price and the sale price are increased.

General overhead nor plant overhead are not included in the production price in the production centres. In making up the production and financial orders it is diverted to the departments for which it is assigned. Thus, the useless number of financial transactions is limited.

It is clear that the corporation which has not more production plants will use only one general overhead. Its further division would not be purposeful.

d) Total Production Costs

After processing the detail calculations on the consumption of material, wages and overhead, they process the summary cards of expenses for each individual type (design) of footwear. The summary cards of the consumption of material, wages and overhead arising in the production of 1 pair of shoes in individual production centres are the pre-condition for making up the production and financial prescriptions for these centres. Every manufacturer tries to decrease the production costs per 1 pair of shoes, and therefore, very detail calculations are made which include even the smallest details. The more detail is the calculation, the easier are the analyses for finding the possibility of further cost reduction.

Though by the reduction of production costs we want to increase the manufacturer's profit, to gain better position than the competitor, this development leads to the increase in productivity of labour, to the increase in living standard of population, and thus, to qualitatively higher and higher development of the mankind. In the production is the basic cause of our success or failure. One of the reliable measures of the reached results are the production costs and their continuous and permanent mutual comparison.

V. Technical and Organization Preparation of the Production

1. Machines and equipment
2. Manpower
3. Production space
4. Organisation of transport

1. Machines and Equipment

- a) List of machines and equipment
- b) Energetic need
- c) Production - purchase of machine and equipment

a) List of Machines and Equipment

Under the term "machines and equipment" we mean not only the production machines but also all other machines we need for ensuring the production process. For example there are:

Machines for transportation - lifts, hand and driven carriages, pallets, tilting bridges, etc.

Machines and equipment for keeping the air, production areas and buildings clean - ventilation, effluent treatment, mechanized old material depots.

Store equipment of material and final products - uniform system of storing shelves, pallets, transporting systems, balances, packing machines.

Office equipment - tables, typewriters, counting machines, copying machines, refrigerators, heaters, cabinets, etc.

In short, all equipment which is not a direct part of the building.

Exact lists are necessary especially in the case of establishing a new plant or its parts.

The list is made out according to:

- sections, units, workshops, groups of workshops
- individual types of machines and equipment, series of clicking, lasting, copying, transporting machines, typified benches, cabinets, pallets, etc.

Upper clicking room:

Ser. No.	Operation	Machine, Equipment	Specification, Parameters	Pcs	Note
1	Upper clicking	Arm clicking machine	For leather	8	2 shifts
2	Fabric clicking	Beam clicking machine		1	
3	Blank splitting	Splitting machine	Fortuna A 10	1	
4	Tables for superintendents	Office table	Standard	2	

Gradually we include the requirements of all departments and units, such as bottom part clicking room, purchasing department, selling department, laboratory.

Typewriters:

Ser. No.	Unit-Workshop	Specification	Pcs	Note
1	Secretariat of the director	Electric typewriter with wide carriage	1	
2	Purchasing department	Electric typewriter with wide carriage	1	
		Standard	2	

Other series of machines and equipment can be for example: Standard office tables, standard cabinets, means for transportation, pallets, storing pallets, sewing machines, clicking machines, lasting machines.

We must take care of a maximum economy. For example, in the plant with lower capacity we can use the beam clicking machine for clicking all fabrics, insoles, soles from sheets or counters.

Intensive utilization of more expensive machines will force us

- to work in shifts
- to concentrate some operations to one place
- to eliminate all preparing and finishing operations to be done by a worker who is operating the machine in order to enable him to reach a higher output.

b) Energetic Need

In the modern industrial production the need of all kinds of energy are ever increasing. Those manufacturers who have the possibility to be supplied with the energy from public, i.e. state, district or local, resources have a great advantage. However, the corporation must build the connection line from the public network and distribute the power in the production plant.

The supply and distribution of energy is a costly investment, therefore, we must carefully consider the lay-out of machines and equipment needing much energy if there is no possibility to take energy from public resources, there are possibilities at the present time for the factory to establish its own local resources of power:

- aggregates for the production of electric power
- compressors for compressed air
- local water houses.

Local resources have various capacities:

- for the need of the whole factory
- for the need of a workshop - unit
- for an individual machine.

Today, the manufacturers of machines and equipment take care of the economy in energy distribution in the factory, and therefore, some machines are provided with compressors or with hydraulic aggregates. It would be very purposeless to build a

complicated distribution system for a certain kind of energy only for one or two machines, because the distribution system could be more expensive than the proper machine.

But for the purpose of an exact orientation, it is necessary to make out a list of needs of all kinds of energy. Again, it is done according to individual workshops, sections, units and offices.

Ser. No.	Machine, Equipment	Pcs	Need for Energy				
			Electric Current	Steam	Water	Air	Gas

Energetic resources and distribution lines must have certain capacity possibilities and reserves in order not to be necessary to rebuild the distribution lines when buying new machines.

The need of energy includes all illumination, heaters, refrigerators, consumption of water in washing rooms and hygienic facilities, etc.

Also here, we must consider the distribution of energy during the whole cycle of the day not to over-dimension the distribution network and resource of energy.

c) Production - Purchase of Machines and Equipment

Only few manufacturers have the possibility to arrange their own production of machines. At present only specialized corporations with long-looked experience have a hope to be successful in the market.

However, in mechanical workshops of the factory it is possible to carry out various modifications, the production of various shelves and pallets from standardized profiled material, or of a simple equipment.

Those manufacturers who want to get the most convenient machines must make a survey before they decide to buy a machine. It is necessary to study the offers of more corporations

and carefully to compare the offered parameters.

As a new equipment is concerned, it is necessary always to have in mind the delivery terms in order to place the orders or requirements in time.

2. Manpower

- a) Need of manpower
- b) Training of manpower
- c) Taking care of manpower - rewarding.

a) Need of manpower

The number of needed manpower is ascertained on the basis of output norms in individual operations and according to the pre-supposed production.

Shoe design - 1,000 pairs in the daily plan

Ser. No	Operation	Qualification Demand	Number of Pairs	Norm	Number of Workers	Wages Class	Men	Women
1	Pre-finishing soles	Machine attendance- 20 years	1,000	4,000	0.25	7	1	
2	Placing rands on soles	Training-in	1,000	500	2	5		2

The calculation is performed for all sections of the production in which the products or its portions are processed. As to starting a new production - the needs of manpower are collected from all auxiliary production plants in the factory as well as from non-production departments.

The obtained data are processed according to various aspects:

- age
- sex - men, women
- workers passing the apprenticeship, trained workers
- specialists
- education - high school, technical school, college

The requirements can be summarized also according to other aspects.

b) Training of Manpower

From the obtained lists on the need of qualification and training of the workers we consider the necessity to hire new employees considerable time before to have a chance properly to train them. The better is a worker trained, the higher profit has the manufacturer from his work and the worker has also higher wages, he is more satisfied and consequently he talks better about the corporation.

A well trained worker

- produces high-grade products
- takes care of his machine, he does not damage it
- reaches a high output and guarantees a perfect utilization of the machine
- does not damage the material
- observes safety regulations
- earns more money
- does not need supervision, he can be entrusted with more responsible functions.

It is necessary to increase the qualification of workers of all categories with a permanent character. Every worker should improve his theoretical and practical knowledge. Therefore, it is suitable to organize short-term or even long-term courses in the factory, or to organize the attendance of courses prepared by other organizations. Besides the education in the factory courses and seminars it is convenient to plan the hiring of new workers from apprentice schools, technical schools and colleges. Graduates of various types of schools and managing persons should have long-term plans of increasing their qualification in order to have a possibility to be entrusted with more responsible functions, e.g.:

- plan of practicing in various departments
- plan of studying special literature
- plan of studying languages
- business trips, excursions, fairs
- special training in foreign countries.

For the qualification of a working team is always responsible the leading worker.

More experienced workers should be entrusted with the function of instructors, teachers and they should publish their experience in journals.

c) Taking Care of Manpower - Rewarding

If we require the output and quality of the work done and the increased qualification, we must also appropriately reward the gained successes of the worker. The material and moral rewards must be fair. Therefore, it is necessary for the corporation to have

- stable wages and salary regulations
- regulations for bonuses and special rewards
- principles for appreciating workers
- principles for choosing workers to higher functions.

Appreciating the results of work mainly in managing persons should be regular - as a rule once in a year. It is convenient to make a record and file it.

A good corporation pays the interest in its employees even in their free time. It makes them a chance for recreation, amusement, sport and education. Various common-interest circles, works and sport clubs are very attractive especially for a younger generation. Old workers appreciate especially the care which the corporation pays them in time of their illness or in solving difficult private situations. Many corporations appreciate the faithfulness of whole families the members of which have been working in the corporation for several generations.

3. Production Space

- a) Production space and the organization of transport
- b) Lay-out of workshops, stores, offices and other objects
- c) Requirements for equipment of the production space

a) Production Space and Organization of the Transport

From the viewpoint of profitable management and economy of the production process, the linking up of the organization

structure and the location of production units in the given area of the buildings is very important.

The linking up the individual phases of the production is to a certain extent the sound controlling system. For a certain period of time we must respect the unchangeable plan of transporting routes, lines, equipment, including the time schedule linking up to the technological operations.

In the "process" of the factory transporting routes the production flow need not be already controlled and regulated. It is similar to the driver who perfectly knows the regulations of the traffic and leaves his car only to those points which are reserved for him in the traffic.

Like in the traffic where for its success is important not only the condition of the car but also the condition of communications and all the respective equipment, for the connection between individual production and auxiliary units the system and standard of the inter-operation and inter-factory transport are the decisive factors.

The standard, exactness and intricacy of the inter-factory transport directly depends on the quality of buildings, their location and the location of individual sections and units. Every manufacturer wants to keep a fluent flow of production without crossing the route of transport or useless returning. The production flow need not be interrupted even by horizontal transport in single-hall building combined with vertical transport in multi-floor building.

An ideal imagination of the uninterrupted production flow is the entrance of materials on one end of the plant and the expedition of finished product on the other end of the plant.

Proper location of units and the most convenient determination of the routes of transport and systems in the plant do not concern only the efficiency and the technological process.

The system is very important even for individual workers. The location of plant units, social conditions and conditions must be such, that the work points must be reached in the shortest possible time and the access to them should not be

interrupted by technological routes of transport and no danger of accidents should exist.

Also the location of stores of various types of material, issuing places of tools is important. It is a difference between the daily and weekly supply of material, or between the delivery of threads and leather. The manufacturers have only rarely a chance to adapt their production objects according to their imaginations and plans. Mostly they must adapt their plans to the given objects. The objects are built for several tens of years, but the technological and organization changes have much shorter cycles.

If the manufacturer has the possibility to build a new object and if he is not limited with the area, it is very convenient to build a hall building the utilizing of which gives him a number of possibilities.

To separate individual production and storing areas in the hall we use netting. By brickwork we separate only offices and special rooms.

Appendix No. 7 - The utilization of hall object.

b) Lay-Out of Workshops, Stores, Offices and Other Objects

Exact requirements for production spaces can be ascertained only on the basis of detail lay-outs of individual departments, offices, stores and auxiliary objects.

It is necessary to make out the lay-outs in a proper scale. Therefore we must know exact lay-outs of machines, equipment, benches, cabinets, conditioning means, all storing shelves, transporting pallets, etc.

Moreover, we must respect the safety regulations, requirements for the attendance, paths of transportation, access to machines for the purpose of repairs, access to all resources of energy, we must respect the fire-fighting regulations, etc. The total of all lay-outs is the real need of the production and other space.

Appendix No. 8 - Different lay-outs of a line for the production of cemented footwear with pre-finished sole.

Appendix No. 9 - Line for assembling the sole with the heel.

Besides the production and administrative objects it is convenient to labour in detail also the other objects, e.g.:

- Stores** - leather, fabrics, synthetic materials
insole materials, sole materials,
threads, needles, laces, bindings, eyelets,
trimmings, heels, soles, counters
adhesives, dressing agents, varnishes
packing materials
lasts, production means
office appliances, forms
finished footwear - expedition
machines, equipment, spare parts
electric material, installation material,
building material.
- Auxiliary units** - boiler house, water house, cleaning shop,
compressor house, gas plant, electric distribution
plant,
garage
fuel stores
wastes heap.
- Social facilities** - cloakrooms, washing rooms, dining rooms, club rooms.

c) Requirements for the Equipment of the Production Space

Every production, office, storing and other space has special requirements for the equipment:

- supply of motor current, water, steam, gas
- iron door protecting from fire
- fire-fighting equipment, hydrant, fire apparatus
- ventilation, conditioning, insulation against noise, vibration
- transporting routes, etc.

All types of equipment must be properly specified because additional arrangements are always very expensive.

4. Organization of the Transport

As it was already mentioned the location of storing, production and auxiliary objects is always solved with respect to the possibility of mutual easy connection with the means of transportation, especially if it is necessary often or even continuously to transport greater quantities of materials, semi-products and finished products.

An effort exists to solve the transportation between the objects in such a manner that the material should not be overloaded and the direction of transport should be identical with the direction of the technological process.

The routs of transportation can be determined in advance not only by marking but also by technical solution of:

- rail installation
- transporting conveyors
- ropeways
- chutes
- various types of lifts
- connecting corridors, overbridges, tunnels, etc.

The use of high-lift trucks together with a thorough palletization has been very proved at the present time.

Hall buildings are very convenient from the viewpoint of transportation. However, it is also possible conveniently to solve the transportation in the plant by the construction of several multi-floor buildings.

The system of transportation includes, of course, the connection with public communications, such as:

- railway siding
- connecting road
- small water canal

The transport between individual buildings is directly connected with the inter-operation transport including the back transport.

The factory transporting and palletizing system must be in accordance with the regulations and custom introduced in the public transportation.

Larger corporations have their own independent transportation departments. Then, it is necessary to solve also the maintenance of all means of transportation.

VI. Organisation of the Production Process

1. Communication system
2. Drawing up the production program
3. Production orders
4. Organisation of the production
5. Control and evidence of results

1. Communication System

In a large production complex a simple communication system must be introduced. It is the unseparable part of the organization structure as well as the proper process of management. It is impossible to describe by words

- kinds of products and semi-products
- machines and equipment
- units, sections and departments
- all activity
- financial transactions

Therefore a system of description by means of simple communication signs, consisting most often of groups of numerals, has been developed and is used for:

- a) Nomenclature
- b) Denomination of units and departments
- c) Storing and accounting evidence

a) Nomenclature

The literal description of certain product, machine and equipment can be replaced by a certain sign.

The sign can be formed by:

- colour or a combination of colours
- picture
- numeral or a system of numerals
- various combinations

This system of symbols is quite common in the technics (marking or drawings) in the traffic (traffic signs), but also in the production (colour designation of energetic distribution lines, switches, high voltage, etc.).

Certain symbols are used also in the evidence and in all administrative works.

In the production process hundreds of different materials are processed which are in different colours, thickness, physical and mechanical values. Hundreds of different types of parts, semi-products and finished products are in stock which are apparently very similar but are different in the size, colour, used material and execution.

If we want to give every worker all needed data in literal description we should need very great administrative team. Therefore, a certain system of designation and evidence has been introduced which is called nomenclature.

An extensive literal description is replaced by a system of numerals. In order to read the numerical information quickly and correctly, it must have a certain system in which each numeral has its own meaning.

The composition of numerals for every product must be such to express all needed values.

Therefore, in the products of identical category we want to find certain common signs, such as size, colour, used material, and for each value in the selected system we reserve one or two numerals. In the shoe production we do not designate by the nomenclature only footwear, but also semi-products, some materials, as well as machines and equipment.

These symbols must be very exact because by changing the symbols or by incorrect reading of certain numeral great troubles can occur.

These symbols are used uniformly in the whole country in all plants of the shoemaking industry and in sales organisations. At the present some symbols are used uniformly in the whole world, such as in the traffic, energizing system, chemistry, etc.

b) Denomination of Units and Departments

A great administrative and financial connections in a large factory demand also the designation of individual units and departments. Also here it is convenient to use numerical system. For example:

Managing departments of the factory	Plant	Group of departments	Departments
0	1	12	121

This designation is used mainly in the accounting and statistical evidence.

For an easy local orientation it is convenient to number the buildings, individual units and departments on the doors.

Also the property of the workshop is provided with the number of the workshop, especially various pallets with material and products which are transported inside the factory. The number of workshop is also stamped on the finished product in order to be clear in the case of reclamation which workshop is responsible for the fault.

The number of the unit or of the workshop is also used in the personal evidence of employees.

For a quicker communication the number of workshops can be identical with the numbers of phones ^{being} at the disposal in these workshops.

The system of designation must become customary in such a way that after hearing a number of the workshop I must immediately imagine the respective building, floor, space on the floor on which the workshop is located, the equipment of the workshop, production program, head and other technicians in this workshop and certain specific conditions.

c) Storing and Accounting Evidence:

The system of organisation and management includes also the accounting and storing evidence. The accounting evidence can have either inter-factory or factory character.

The factory system of accounting evidence must conform with the national system which in our conditions is uniform. Otherwise the authority and control organs could not be oriented.

Inter-factory accounting can agree with the factory system, but can respect special viewpoints of individual centres. It is an effort of the management to keep an evidence in individual centres about those financial items which are connected with the activity of the department and can influence that activity.

It has no sense to make an evidence on the general overhead in individual departments because the section of the department cannot influence it.

The principle of accounting in every centre is:

- purchase cost of material and semi-products
- production wages
- department overhead

selling price to another centre, department

All costs are calculated and prescribed in advance. The accounting evidence does not only record the real costs occurred in the production centres but evaluates the reached reality with the prescribed plan. The division and designation of analytic accounts conforms with general viewpoints.

Whereas the production orders and evidence are issued for every working day, the accounting evidence is made once in a week, decade, month. The accounting evidence conforms with the terms of paying wages. The time cycle of balancing should be such to give sufficient data for effective management provisions.

The accounting evidence should also be in a certain relation to the circulating cycle of the capital invested. The more frequent is the circulating cycle, the more successful is the manufacturer. Daily collection of receipts is a custom nowadays.

The frequency of the cycle is also depending on the degree of products being in the process. The accounting evidence should give us a permanent information on all sections of the production process.

2. Drawing up the Production Program

- a) Sale system
- b) Processing of orders
- c) Drawing up the production program

a) Sale System

A proportion of manufacturers sells the products through extraneous commercial organisations, a proportion has own shops and some manufacturers have common commercial organisations. The connection with the market, with the commercial organisation is very important for the organisation securing of the production process, and above all for the preparation of the production.

The most simple are the relations with the own sale organisation. But the coordination must be secured also with the commercial organisations belonging to other persons, because the orders must be executed regularly and quickly.

Moreover, every manufacturer is interested in export. The foreign exchange enables him to buy interesting materials, new machinery, and is also the source for undertaking in abroad.

The orders from retail shops include such small items that from organisational and economical reasons they cannot be included into the production program. They must be first sorted and summarized. Therefore, already the system of proper orders must enable the easiest possible sorting and summarization.

However, the retailer cannot wait a long time for the execution of the order. Therefore, the methods are studied how to execute the orders as soon as possible but retain a certain series or mass production.

The solution is in the system of work of commercial agents who must sent all orders immediately to the central office, as well as in the technique of administrative processing of the

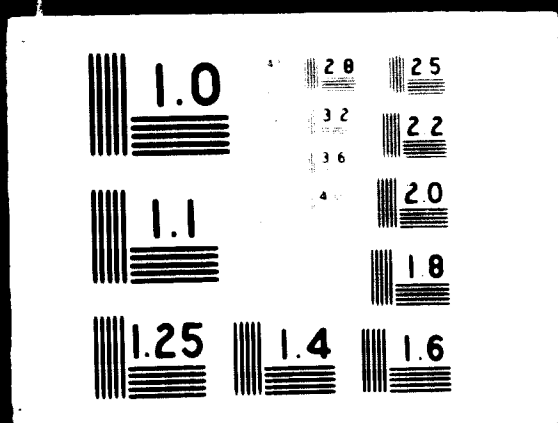


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order. The properly filled form of the order can be a sufficient basis for nearly automatic processing of the order up to the production specification and dispatching order.

b) Processing of Orders

The commercial agents send the orders on standard cards on which they cross in a digital system the needed data, such as:

- ordering organisation
- design of the footwear ordered
- number of pairs of individual sizes
- price
- date of order
- expected term of order acceptance.

Each shoe design must have its own ordering card. The crossed data are optically sensed from the ordering cards and are translated into the punch card system. The punched cards are summarized for the processing of the production specification as well as all directions for the factory suppliers and stores of various materials.

The results are automatically printed. The punch card system prepares also various calculation data on individual types and designs of footwear. Larger factories utilize

also computers for the processing of orders and production specifications.

c) Drawing up the Production Program

The shoe manufacturers offer only those shoe designs which are included in the collection, for which they have prepared the needed production equipment and have secured material. The orders are executed in the sequence in which they were evidenced, usually within 3 weeks. The production program is accounted to a prompt execution of orders. Some manufacturers have decided to take the gross as a basic quantity of one shoe design put into production which is then divided into dozens,

other manufacturers have chosen the five-pair system which is much used. As soon as the summarization of the received orders for a certain shoe design is near to a gross, it is put into production supposing that the remainder of the produced pairs will be sold to further customers.

This system of the execution of orders require a permanent production of all shoe designs included in the approved collection, and not only gradual production of one shoe design after the other in greater quantities.

The finished footwear is immediately dispatched to the customers without useless storing.

Shoe manufacturers very carefully calculate the optimum production capacity of the basic production unit - workshop which is sometimes identical with the capacity of the whole plant. They study the maximum utilization of the machinery and equipment, and above all, the manpower. They study the key points of the production process, the possibly full loading of the most expensive machines and equipment. Other sections of the production are only accommodated. The same is applied to the working output in individual operations.

Extent of the equipment in the production unit with a certain capacity is also influenced by the financial possibilities of the manufacturer. From these reasons the capacities of the basic production units - workshops - can be very different, namely from 1,000 pairs up to 2,800 pairs. However, the capacity of the basic production unit does not influence the output in individual operations. In lower production capacities of workshops the operator can perform two or even more operations.

3. Production Orders

- a) Production cycle
- b) Orders of production means
- c) Orders to production centres

a) Production Order

In smaller plants the preparation of the production and the control of the production process can be carried out by one operator. He personally can overhand the prescriptions and orders to his subordinate or directly to individual workers.

However, in the shoe-making large-scale production this method is quite unacceptable. The excessive number of organizers would arise and in individual production centres a chaotic desorganisation would occur. The workers would not know whom to respect. They would have to decipher the orders and documents because they would not be processed in one centre and on the basis of unified methods.

From these reasons the production and financial orders are made up in one centre - detailing department (planning department, dispatching, etc.).

The orders are made up for each production or supplying centre which is directly interested in the production of shoes. The orders are made up always for a certain number of shoes. As the stated number of shoes is produced according to the norms for individual operations and according to the determined output in individual workshops in a certain period, also the production and financial orders are issued for a certain period.

In the large-scale shoe production the production and financial orders are made up for every individual production day.

The number of pairs which are to be produced in the given working day is called the daily plan which is denoted by an independent number, usually by serial number.

The production and financial order for a certain production period, and thus also for the financial centre includes:

- what should be produced, exact specification (sole, from what material, how to prepare it),
- in what quantity, exact specification of the assortment, how many pairs of individual sizes,
- how much financial means can be consumed in the production for material, wages, overhead,
- when the goods should be finished,

- where and in what form they should be transported (to what making room).

If the semi-product, petty material, lasts, production means (clicking dies), pecking should be supplied to the making room for the certain given term, the production and financial order must be sent to the supplying production centre a certain period in before. This time equals the time which the centre needs to fulfill the order.

For the production of certain types of soles the production supplying centre must also:

- buy materials,
- secure the needed machinery and equipment,
- secure the needed manpower,
- make up the organizing preparation of the production.

The complete production cycle in the mass production lasts 2 - 3 weeks. This means that from the issuing of the production and financial order the finished footwear will be sent to the store within 2 or 3 weeks.

All production supplying centres will obtain the production and financial order either at one time or gradually depending on the time they need for fulfilling the given supply to the making room.

For some supplying centres the production, financial orders are detailed not for individual daily plans but for 5 to 10 production plans at one time. There are for example the supplies of petty material, such as threads, needles, adhesives, oils, nails. There are small quantities of materials the preparing of which every day would be a time and energy loss.

b) Orders of Production Means

The manufacturer of production means (clicking dies, moulds, lasts, perforating dies, mailing heads, trimming cutters) cannot be secured in the period of 2 to 3 weeks even with the best organisation of work. The production cycle lasts 2 - 3 months. The orders of the production means are made up by the department for the preparation of the production. The finished means

is supplied to the central store from which they are lent to individual production centres, again certain time before starting the production. As soon as the production centre does not need the means, it turns it back to the central store.

The central store also takes care of the maintenance or repairing of the production means. Lending and turning back of the production means is properly evidenced.

Production means must purposefully stored and evidenced for its utilization to be very operative.

Its long-termed utilization is also backed by a detail production specifications. Some production means, e.g. clicking dies for insoles and soles, are used for more types of shoes. The demands for lending the means could be uselessly concentrated in a certain period of time. In such a case it would be necessary to produce another set of the means what would increase the production costs. By reasonable shifting the production of certain shoe type to another term we can avoid the concentration of demands for the production means.

As the costs of the production means are the second or third highest item in the total production costs, it is required in the creation of footwear collection as well as in the designer's detail preparation of the shoe type that for the production or preparation of some parts the existing production means should be used.

The methods are also investigated how to reduce the need of production means directly in the production centres:

- Individual clickers are clicking out parts only for certain shoe sizes,
- Mechanical clicking machines are replaced by automatic clicking machines which have higher output and lower consumption of clicking dies,
- In the making rooms the production cycles is shortened, and thus, the need of lasts is lower,
- For different types of heels the uniform area for the top lift is designed,
- Several sizes are centred according to one uniform central function area, e.g. for nailing heads.

Also economic methods for the manufacturing of the production means are investigated, such as:

- production of clicking dies in cold condition,
- some moulds can be produced by using galvanoplastic method

A great problem is still the production of moulds for direct moulded footwear and injection moulded footwear.

c) Orders to Production Centres

The organisation principles of the mass production consist in that the centres of all supplies is the making room and the closing room in which the footwear is assembled. All other departments are considered for:

- factory suppliers, i.e. the departments which produce and supply various shoe parts, semi-products and petty materials, such as heels, boxes, shanks, etc. for the needs of the closing and making rooms,
- auxiliary departments which give various services to the production rooms, such as repair of machinery, transport of material, lending the machinery and equipment, etc.

The factory suppliers get the production and financial orders from the central managing organ of the production nearly in all cases for every individual day, for each production plan. The services from auxiliary production departments are ordered directly from the shoe production centres according to the need.

In our factory the production and financial orders are made up in the detailing department.

The detailing department also compiles various total summaries needed for example for buying material and chemicals, for the concentration of the production of identical types of semi-products. For example, the identical type of upper leather, lining leather or fabric is used for several shoe designs. The shoes are produced in different making rooms but the upper parts and lining parts are prepared in one clicking room. Therefore, the detailing department summarizes the consumption of identical type of material for the clicking room what faci-

litates the purchase in the stores. The consumption of material is summarized also for a longer period, because for example the textile is bought and sold in rolls which include often more than 100 m of material.

Fabric is clicked in layers the number of which can reach 20 or even more. It means that the parts for several plans and sometimes also for several workshops are clicked at one time.

Similarly, also the consumption of chemicals, pellets, etc. is summarized. The basic weight unit of rubber compounds is 40 kg. Higher quantities are usually the multiples of this unit. In the principle every compound contains identical chemicals but in different amounts. Therefore, for the manufacturer of the rubber compound the following is summarized:

- identical compounds from all workshops, eventually several plans,
- identical chemicals from all compounds.

For the processing of production and financial orders for the production also other important data can be summarized which could facilitate the organisation of work in the production centres or gives a survey on the consumption and stock of important raw materials.

It is not interesting to follow the situation in needles and threads, cardboard for packing, because we know that this material we shall need during the whole year or even in the next years with only a slight change in the assortment. Similar situation is in the basic chemicals. Therefore, we determine only the necessary stock standard the amount of which is then only maintained. This material suits substantially to all produced types and designs of footwear. Other situation is in leather which with its type, thickness, technological process of production and colour can be used only for certain types and designs of shoes. Therefore it is necessary to watch the stock carefully in order to have a sufficient quantity of leather for the production but not to keep too high quantities in stock.

2. Organisation of the Production

- a) In stores
- b) In clicking rooms
- c) In making rooms

a) In stores

The division of stores depends on the extent of the production, and thus, on the extent of material to be stored. In the mass production the following division is usual:

- stores of upper leather and lining leather
- stores of sole leather
- stores of man-made insole and sole materials
- stores of wood
- stores of textile
- stores of petty materials, threads, needles, bindings, hooks, buckles, pre-buttons, pegs, wire, adhesives, trimmings.

Petty material is supplied to the making rooms and to some supplying production centres on the basis of a production order.

Other materials are bought by the supplying production centres in the stores according to the need but in compliance with the production order.

In the case of necessity the production centres can buy more material in the store but only to the debit of the financial budget of the production centre. The stores belong to the purchasing department. The head of the store is the respective chief buyer who is fully responsible for the purchase, storing, selling and dispatching, and of course, for the financial result.

Every type of material has its own storing space and an independent evidence in which they systematically record the changes in material:

- balance
- receipt
- delivery the quantity as well as the value
- balance

In greater quantities of materials we must observe the economy of storing system - pallets, mechanisation, evidence.

For the receipt and storing every type of material a prescription must be issued in order to prevent the damaging of the material or to avoid accidents. The prescription concerns also the delivery, system of packing and method of transportation.

Petty material is prepared for individual making rooms into racks usually for several plans because the needed amounts for the production plan are relatively small.

Also large-volume material for clicking rooms is transported in racks, such as leather, textil, wood. The recipient of the material should immediately check the quantity. The reclams for quantity can be execute even later. The faults can be also invisible which will appear even during the technological processing.

b) In Clicking Rooms

After receiving the production specification the head of the clicking room must make the following provisions:

- summarize the production according to the types of products and according to the prescribed materials,
- buy the material in central stores and move it to his hand's store,
- divide the production task to individual workers and make a demand for manpower,
- make up the demand for machinery and equipment,
- make up the demand for tools, clicking dies, moulds, perforating dies, etc.,
- make up the production specifications for individual workers.

In making rooms the production specifications are not prepared for individual workers, but in the clicking rooms it is very necessary.

The production specification includes not only the specification of the product, assortment of parts, but especially the prescription and financial accounting of the consumption

of material. Some clickers of leather click the material in the value up to 10,000 Kčs daily and only one per cent of a loss in one worker represents the value 100 Kčs. On the basis of the production specification each worker gets the material per 1 working day, i.e. per one plan.

If the daily evidence and accounting is not performed, the loss for a short period could reach high amounts.

Therefore, the specification for the clicker of material includes:

- type of the product
- quantity
- consumption per 1 pair ---- total consumption
- material issued --- quantity --- value
- material returned --- quantity --- value
- consumption of material --- quantity --- value
- prescription of the
 consumption of material --- quantity --- value
- difference, loss, profit

Summarizing of results of individual workers gives the total situation in the department.

In clicking rooms is also important the utilization of wastes which is checked in each individual worker in the end of the shift.

The production specification is issued also for some other workers

- to carry out correctly certain operation, numbering of parts, decorative stamping,
- to use the prescribed production means, perforating dies, moulds,
- to prepare the material correctly and put it into racks in which the material will be sent to the making room.

The racks are provided with the identification card.

The organisational preparation of the production for preparing rooms is more complicated. Again, the products of an identical type and of an identical execution must be summarised and the division of work for individual working sections must be carried out.

In preparing rooms also other materials are used for the processing of parts, such as adhesives, wire, insole reinforcements, shanks, etc., and also the production means, such as trimming knives, moulds, skiving knives, etc.

The summarization of the production program is especially important in the textile clicking room or in clicking other large area material, because textile is clicked out up to in 20 layers which are up to 10 m long.

e) In Making Rooms

The head of the making room is interested in the organization of the production already after the detailing of the production capacities, before obtaining the production specification. The basic data for him are:

- reference shoe sample
- designer's drawings
- technological specifications
- specification of the machinery and equipment
- norms and rates for individual operations.

He orders the material for 5 to 10 pairs of shoes which he produces in his own making room if possible. Thus, he is perfectly acquainted with the technological process and individual workers come in the contact with the future production program. The head of the making room compares his experience with the specification obtained from the shoe designing room and reconciles eventual differences.

Then, he makes up the demand for:

- machinery, equipment and lasts
- supplementing and re-training of the operators
- moulds, stamps, trimming cutters.

Every demand is exactly specified including the term of fulfilling.

He makes up the plan of technological process with respect to the lay-out of machines and equipment together with eventual changes in the installation.

In the running production he creates a certain amount of shoes more in a shorter period in order to reduce the loss in the capacity when starting the production of a new shoe design.

The head of the workshop inspects also the semi-products with the factory suppliers to be produced in time and according to the specification. He tries to carry out the change of the production program as soon as possible, especially the change of machinery and equipment in order not to change the workshop in a store.

He takes care of the detailing of the production plan to 100 lots of pairs in order to guarantee the turn-over of lasts and packing the finished footwear according to the specified assortment.

Fulfilling the daily production plan in the making rooms is checked hourly and is recorded in the so-called time sheet of the making room.

5. Control and Evidence of Results

- a) Importance of the control and evidence
- b) System of the control and evidence

a) Importance of the Control and Evidence

It is necessary to have an evidence on fulfilling every order, especially on final results. Fulfilling is controlled by the person who has issued the order. The efficiency of control depends on its time limitation. Therefore, for individual kinds of activity such cycles of evidence evaluation of results must be planned, so that it would be possible by quick measures to eliminate the found faults.

By a daily control we ascertain:

- fulfilling the production plan in all sections both in individuals and in working teams (each hour)
- the issued quantities of various kinds of materials
- quantity of finished products delivered to stock
- quantity of finished products delivered to customers
- acceptance of purchased goods
- receipts, expenditures

- the staff (absenteeism due to illness, accident rate, engagement and dismissal of workers)
- business trips.

By weekly, decade and monthly control we ascertain:

- recapitulation of all above mentioned data
- state of material stock
- state of finished products
- inventories of handy stocks
- financial balances,
- debts, claims.

By half-yearly and yearly control we ascertain:

- recapitulation of above mentioned data
- financial balance
- inventory of fixed assets.

By periodical, systematic control we perform:

- control of quality
- control of observing technological specifications
- control of observing safety regulations on fixed assets
- control of observing safety regulations relating to work
- control of economy of work in central units
- control of economy of handling materials
- control of taking care of machines and equipment
- control of executing correspondence, etc.

Proper control, evidence and balance of a certain activity on a certain section and in a certain period can give us the only correct information on a real situation of the corporation as a whole, as well as of its individual sections.

b) System of Control and Evidence

The system of control and evidence must follow the administrative and organization system of

- production preparation
- calculation and detailing of production
- financial plan
- purchasing and selling plans

and must respect the uniform communication system. One term can have only one sense. Evidence must be simple and intelligible. The worker entrusted with a certain control, with evaluation of results and with evidence must know the work perfectly.

Every evidence and report must be checked when being overhanded. Linking up to the data from the preceding period must be observed.

Besides the evidence of

- materials
- products
- fixed assets, machines, equipment
- finance

also the evidence of persons must be kept.

The results of evidence and various balances are best evaluated if they are made out in statistical form.

VII. Present Technology and Techniques in the Production of Shoes

1. Aim of rationalizing the shoe production
2. Development of shoe production and application of chemistry
3. Development of new shoemaking machines
4. Organization of work in shoemaking workshops
5. Conclusion

1. Aim of Rationalizing Shoe Production

Above all there are the following main aims:

- decrease of the consumption of material
- decrease of the number of workers - increase of the production per 1 worker
- decrease of the number of machines and equipment
- decrease of the number of semi-products
- decrease of the needed storing, handling and production lay-out.

The aim is to reduce the production cost per unit and time to reach a higher economic result. Of course, also other standpoints are considered, such as safety of work, culture and hygiene of work.

The above mentioned factors are applied in all sections of the production process and also in servicing departments and in auxiliary production.

Fulfilling these factors affects

- the assortment of shoe production
- kinds of materials used in the production of shoes
- perfectness of machines and equipment
- perfectness of the production technology - division of the production process
- organisation of the production process, flow production
- system of storing, receipt and expedition
- extent of cooperation.

From the mentioned points it follows that the problems of rationalising the shoe production must be solved as a complex in connection with the preceding and also following processes.

We must permanently consider the unity of all processes especially the materials, technology, machines and organisation of work. We must fully utilize the advantages of novelties which we must put in accordance with the existing practice and accessible possibilities.

2. Development of Shoe Production and Application of Chemistry

- a) New kinds of shoemaking materials
- b) Applying the chemistry and new technology
- c) Applying the chemistry - technology - machinery and equipment

a) New Kinds of Shoemaking Materials

At the present it is generally known that the degree of chemistry applying has a great influence on the progressive development of the shoe production. The most successful are those manufacturers who began in time to use new materials in the production of footwear or who properly harmonised their use with classic materials.

If in the first stage the use of new materials for shoe bottom parts and later on for reinforcing parts was a charac-

teristic phenomena for applying chemistry in the shoe production, today we are witnesses of a direct attack of new materials on the region of shoe uppers and linings.

At the present we have at our disposal the following new materials as a result of applying chemistry in the production of footwear:

- variety of insole materials based on cellulose or synthetic fibres, with better physical, mechanical and hygienic properties than are the properties of leather insoles
- soling materials from PVC, rubber and polyurethanes, sheets for clicking soles, pellets for injection moulding and direct moulding, compound for slush moulding
- thermoplastic counters, thermoplastic toe puffs with textile backing layer or without it
- backing textile material for thin upper parts or considerably strained portions
- pellets of polyamide, polystyrene and polyethylene for the production of heels, lasts and insole back reinforcement
- various types of dispersion adhesives for fabric parts, thermoplastic adhesives for folding and lasting, solution adhesives for attaching soles or various reinforcements
- lining materials with hygienic properties with or without finishing foils, materials for socks
- upper materials finished with PVC foils and polyurethanes, in a considerable extent having hygienic properties, porous materials.

Moreover, we can use synthetic threads, trimmings, bindings, eyelets, etc.

Today it is possible to produce footwear only from synthetic materials which with its properties will be very similar to leather footwear. Moreover, the colour and embossing effects in synthetic materials can be produced more easily than in natural materials.

The extent of using synthetic materials for insoles, soles and heels exceeds 80% and in some products it reaches

100% of the total production, lining materials are utilized from 30 to 60% and poromeric upper materials to 30% within the total shoe production.

Applying the chemistry in the shoe production will increase quantitatively and also qualitatively.

b) Applying the Chemistry and New Technology

About 15 - 20 years ago the majority of leather footwear was produced in McKay, Goodyear welt and stitchdown construction, but also in pegged or nailed construction. The proportion of cemented footwear in the total assortment was low.

Today we can say that 80% and sometimes up to 100% of shoes is produced with cemented, direct moulded or injection moulded soles. It is a basic technological change which is visible in all sections of the production process. They change the technology of shoe upper assembling, instead of stitching the parts are assembled by means of adhesives, pressure, ultrasound, high frequency and also by ironing-on the parts coated with thermoplastic materials, or the upper parts are assembled by help of automatic injection of thermo-adhesives.

Different processing of leather soles and leather or wooden heels has been replaced by one-operation process in injection moulding machines.

Applying chemistry has its qualitative degree of development, for example in soling materials.

- Soling sheets, clicking out, cement attaching soles, processing soles on the shoe.
- Soling compound, clicking out, moulding a separate sole, cement attaching soles.
- Soling pellets, injection moulding or direct moulding or slush moulding onto the shoe.

It is obvious that also for new materials the existing technology and machinery are used at the beginning. Only later on, as soon as we perfectly recognize the properties of the

new material or as soon as we modify these properties, we can fully utilize the rational processing possibilities, we can adjust the technology and machinery to the requirements of these materials.

Of course, it was necessary to solve many problems before the present stage has been reached.

Pre-finished soles must have unchanged dimensions, their dimensions must not be deformed by heat which is needed for evaporating the solvents and for activating the adhesive coat. It must not be deformed by pressure applied in moulds in attaching soles. The shoe bottom must be adjusted in such a way that no unevenness must appear in the sole.

Rational processing of soles on semi-automatic and fully automatic lines supposes to use materials having a certain degree of stiffness and dimensional as well as area stability. In order to enable the pre-finishing of more soles at one time, it was necessary to change the profile of sole edge and to change the principle of edge trimming machine.

The process of applying chemistry is accompanied by similar problems as previous stages, though on another level. New upper materials are processed with the use of existing technology. In it we fully feel sometimes the necessity and sometimes the possibility of advantages of changing this technology. The first experiences were already published by shoe manufacturers.

The manufacturers of new materials stress only the merits. They nearly do not talk about the drawbacks of these materials or necessary measures in the technological process. These recognitions are reserved for shoe manufacturers and often they are very expensive.

c) Applying the Chemistry - Technology - Machinery and Equipment

The development of machines and equipment continues also independently on material changes. A typical example is lasting of the shoe upper over a last. An old dream of shoemakers to last the shoe upper with a lower number of operations is being

gradually realized. Today we last the shoe upper in two operations - tomorrow we shall last it in one operation.

The preparation of shoe upper for lasting was simplified. Original ideas on lasting with respect to the method of assembling the upper with the insole have changed. Instead of metal fasteners we use adhesives. Adhesives were used not only in the dependence on an easier technical solution of appropriate mechanisms, but especially on the technology of cement attaching soles - an easier processing of shoe upper lasting margin before being assembled with the sole.

At the beginning the cement lasting process was less productive than tack and staple lasting process. Adhesive was applied onto the insole and shoe upper lasting margin in advance. Only after its drying it was possible to last the upper.

Today we have at our disposal lasting machines provided with automatic injection of thermoplastic adhesives. Their use is economical only when we fully utilize their capacity possibilities, i.e. the machine must work with the quickest possible cycle. For this purpose the shoe upper must be perfectly prepared for the proper lasting process, so that the operator could be fully concentrated only to the proper operation and need not make various smaller or greater corrections of the shoe upper, because in these corrections he loses much time, and thus, reduces the number of cycles of the machine.

The shoe upper must be adjusted from the construction viewpoint, the shapes of individual parts must be adjusted in such a way to be in accordance with the function of individual working elements of the machine. The lines of joints and decorative seams of the lasted shoe upper must not be deformed and the width of the lasting margin must be uniform.

The machine cannot attach the lining and the upper to the insole separately. Therefore the lining must be narrower than the shoe upper round the edge of the lasting margin and must be firmly stuck to the shoe upper, so that after attaching the shoe upper to the insole also the lining must be firmly attached.

For a perfect folding of the surplus material of the lasting margin, as well as for performing the next operations, it is necessary that the thickness of material would be uniform even if individual parts are necessary to be evened. Especially in the toe portion the preparation of the shoe upper must be more perfect what is reached by an exact placing the toe puff. Careful inserting the counter and pre-moulding the backpart of the shoe upper enables to eliminate the process of heel seat fastening, i.e. pre-attaching the shoe upper to the insole by one tack.

Using thermoplastic materials for counters, the technology of lasting the shoe upper beginning from heel seat with the simultaneous pre-moulding the backpart of the shoe upper has been developed. Again, it is one of the examples of mutual relation and depending points of technique, technology, design of the product and also the used material. Imperfect preparation does not enable to reach the expected effect, i.e. savings in material by reducing the shoe upper lasting margin, elimination of a sock which is necessary for covering metal fasteners, and elimination of lost time together with the need of less number of machines.

3. Development of New Shoemaking Machines

- a) Machines for the production of bottom parts
- b) Machines in the lasting room
- c) Machines for applying adhesives
- d) Drying, setting and conveying systems

a) Machines for the Production of Bottom Parts

Large-area sheet materials with their standard dimensions and uniform properties throughout the whole area enable the clicking in more layers with the use of automatic programmed clicking machines which were developed in the last years.

Flat clicked out parts can be further processed, i.e. skived, split, marked, profiled, coated with adhesive, dried, in the through-feed automatic machines and automatic aggregated lines using a system

- magazine - machine - machine - machine - magazine.

These aggregated automatic lines are supplied by several outstanding firms. Of course, individual machines for discontinual processing of insoles and soles are at the disposal, too.

Moreover, machines for the processing of sole rands - making a bed in the sole, trimming the decorative indenting - inking - beading - have been developed.

Automatic presses for insoles - magazine - press - magazine - considerably increase the productivity of labour.

Extremely rapid development can be noticed in various types of injection moulding machines for soles. Latest machines are of a universal type as to the processed material - PVC - rubber - polyurethane. They have a high output and an automatic cycle. Similar is also the development in heel injection moulding machines.

b) Machines in the Lasting Room

An extraordinary progress has been reached in the development of lasting machines. At present there are possibilities of lasting the whole shoe upper in two operations with the simultaneous pre-moulding of backpart. In the near future we can expect the development of a machine for lasting the shoe in one operation, of course, at first on simple shoe designs.

Automatic spraying-on of thermoplastic adhesive will be probably simplified by the so-called cold adhesives. Also the automatic roughing machines of the shoe upper lasting margins have already been included in the production program of several firms. In new upper materials in connection with new technologies we can suppose that the bottoms of shoes will be cement attached to the upper without roughing.

c) Machines for Applying Adhesives

These machines are substantially new in the shoe production. Several types of these machines have been developed:

- for various parts
- for various operations
- for various adhesives.

With respect to a high output of these machines an effort exists to centralize the application of adhesives onto some parts before these parts are processed in the making room. Before sticking the part, the adhesive coat is activated. Cold adhesives simplify the technology of cement attaching even more.

- Adhesives are applied on moving parts
- throughout the whole area or in spots,
 - in the chosen area, round the circumference of the part, often utilizing automatic feeding of the part,
- and also on fixed parts
- in spot joining two parts,
 - in automatic spraying the adhesive onto the insole in the shoe upper lasting process.

- We have at our disposal also machines for applying adhesives onto the shoe upper lasting margin
- with hand feeding the shoe
 - semi-automatic
 - automatic, through-feed system.

For a special technology of sticking the following machines have been developed:

- for pressing on
- for ironing
- for welding.

d) Drying, Setting and Conveying Systems

Rationalizing of the shoe production cannot be realized without the intensification of drying and setting processes. Adhesive coats were dried freely in the working space of the workshop. The present extent of the technology of cement attaching forces us considerably to speed up the process of drying. Otherwise we should need large production areas. We must also consider the viewpoints of health. The drying of

applied adhesives has been shortened from several hours to minutes and sometimes even to seconds.

In the last time the shoes were set on lasts for several days or at least during one shift - today the process of setting has been shortened to 10 - 20 min. Setting chambers are accommodated to the needs of leather and synthetic materials.

New conveying systems respect all requirements for rationalization of the shoe production and the number of semi-products, being processed, is low. But they respect the organizing principles of the production process. Usually they are of a sectional type and can be accommodated to the given production space. The drying and setting chambers are a part of a conveying system.

4. Organisation of Work in Shoemaking Workshops

The extent of the production program, concentration of the production according to a technological method and also according to individual shoe parts, degree of standardization and unification is of an extraordinary importance for the choice of the most convenient system of organisation arrangement of the production flow, for the introduction of a purposeful conveying or other system of inter-operation transport, as well as for the purchase of individual machines and equipment.

Purchase of highly efficient modern shoemaking machines directly depends on the solution of the above mentioned points. If we do not consider these factors, even the most perfect machines and equipment are uneconomical for us and the workers operating them are the most expensive manpower in the factory.

Highly efficient lines for pre-finishing soles have the capacity of 6 - 8,000 pairs of soles in one shift. Only under such conditions they are economic units. Fully automatic programmed clicking machines do several thousands strokes per hour. Injection moulding machines have the possibility to produce several thousands pairs of soles in one shift. It is obvious that these machines cannot be moved to several production centres in the factory, but quite to the contrary, the

production must be concentrated to these efficient machines. With this fact are connected all necessary organisation measures.

Highly efficient semi-automatic or fully automatic machines are provided with exchangeable working means, moulds, guides, etc., the production of which is difficult, lasts long and is expensive. Moreover, often changes of this equipment considerably decrease the capacity possibilities of the machine. Therefore we want to keep the minimum possible number of changes in the production, and thus, the minimum number of the needed equipment to these machines. At the same time we consider the possibility of unifying for example insoles, heels and other parts. Today we often meet two principle methods of making room arrangement. Uninterrupted production cycle in one basic production unit beginning from insole attaching up to packing the finished product without any respect to the used conveying system or to the division of the production process into two up to four sections:

- preparation of the upper for lasting
- lasting section
- assembling section
- finishing section, usually with a higher production in a shift.

This division affects to a considerable extent also the problem of packing technique. Concentration of footwear from the foregoing section in the finishing section enables to solve packing of shoes by a rational method with a full utilization of an efficient automatic machine for the production of packings, as well as the organisation problems of expedition.

The organisation arrangement of machines and equipment in lines has always a certain delay after the development of a new technology and technique. With the utilization of all technological and technical novelties the making lines have been developed with the following effect:

- production cycle is substantially shortened to 20 - 60 min.
- the quantity of semi-products is reduced at the minimum to 20% compared with the situation on a classic conveyor
- also the need of lasts is decreased in the ratio mentioned in the above point

- the number of machines and equipment in the making room is decreased to the lowest possible extent
- the demand for lay-out is decreased - production per area unit is increased
- the production process remains uninterrupted, and thus, the basic element of the system of control is maintained
- a better information is gained about the progress of work in individual sections of the workshop from the control point of view and the conditions are formed for keeping the order and total appearance of the workshop
- the conditions are created for effective steps to maintain a good quality of the produced shoes and the danger of rejects is reduced. This danger exists in a great number of semi-products
- the conditions of certain forced production rythm are preserved with suitable working cycle enabling the operator to perform the operation well without excessive physical exertion.

The hygienic conditions are improved, especially:

- by the introduction of automatic machine in the lasting and assembling section which reduce the physical exertion of operators
- by excluding the trimming, old lasting, nailing and pounding up machines what reduces the noise
- by using the parts with pre-applied adhesive, by using solvent-free adhesives, by the introduction of drying and setting chambers, what eliminates unpleasant vapours from these agents and what reduces the level of toxicity in the air
- the machine and equipment including the conveyors which are not higher than is the average height of the operators enable to illuminate the workshop better, and thus, to make the workshop more pleasant for the operators
- by reducing the extent of the stored semi-products, lasts, packings, as well as finished products, the workshop will have cleaner appearance and also the danger of accidents will be lower.

5. Conclusion

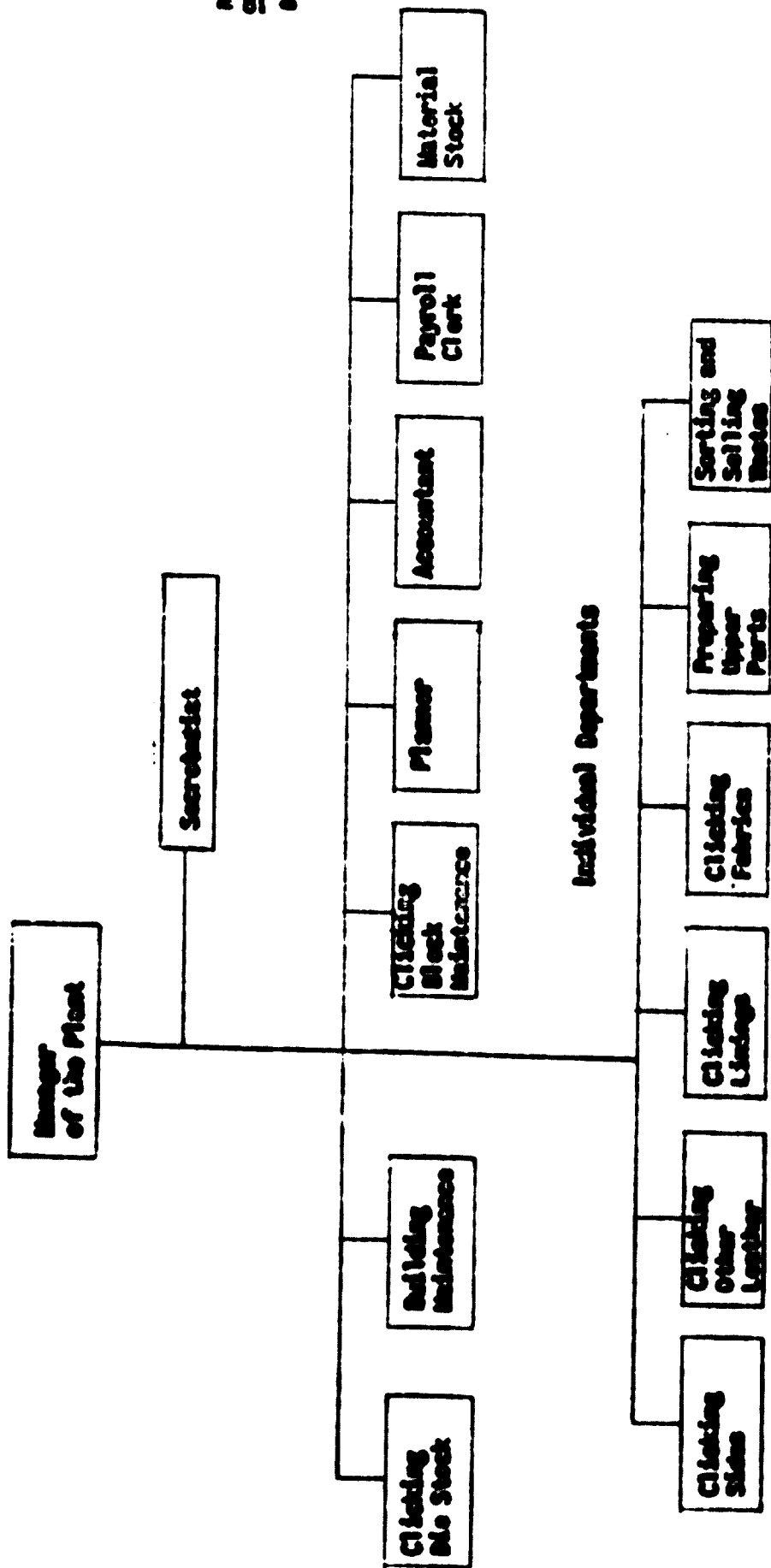
Rationalisation of the shoe production is a complex of influences and conditions mutually affecting one another and having a certain mutual dependency. The existing disproportions between the existing situation and objective requirements, between the existing results and possibilities with a full discovering and utilizing the reserves, must be solved by a uniform technology, utilised technique and organisation of work. Only then there is a hope to reach a goal we have planned.

VIII. Set of Projects for Building a Shoe-making Plant

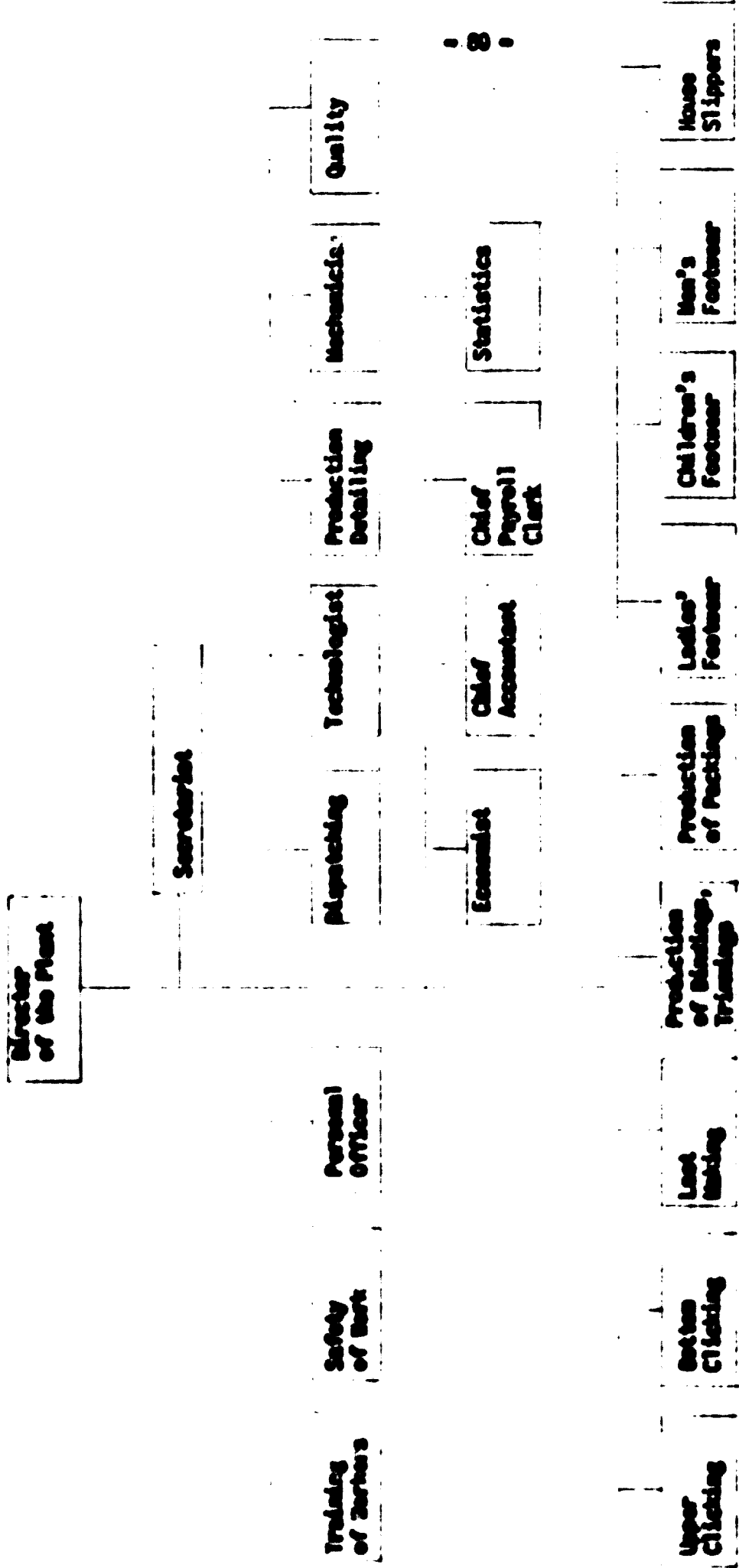
Appendix No. 1 - Organization of the Industrial Shoe-making Concern



Appendix No. 3 - Organization Division of Upper Clothing Room



Appendix No. 2 - Organization Division of the Shoemaking Plant



Appendix No. 4 - Organization Division of Boston Clothing Room

Manager
of the Plant

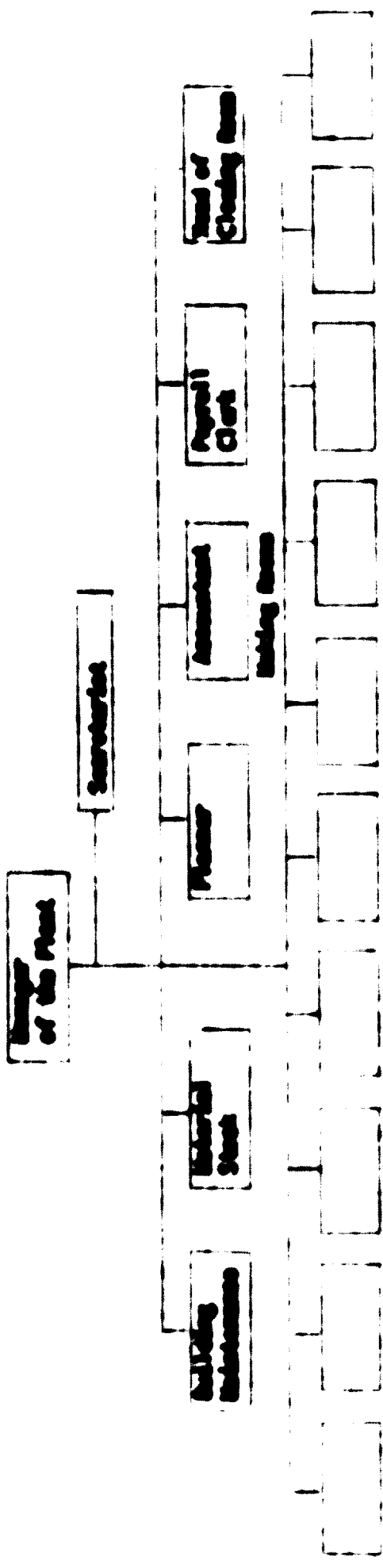
Secretary
Dispatcher

Clothing Old Stock Building Maintenance Clothing Stock Maintenance Planner Accountant Payroll Clerk Leather Stock Other material Stock

Individual Departments

Clothing Sales Clothing Machines Clothing Other Parts Preparing Sales Preparing Machines Preparing Tools Sorting and Selling Machines

Appendix No. 3 - Organization Division of the Group of Making Items (Ladies' Shoes)



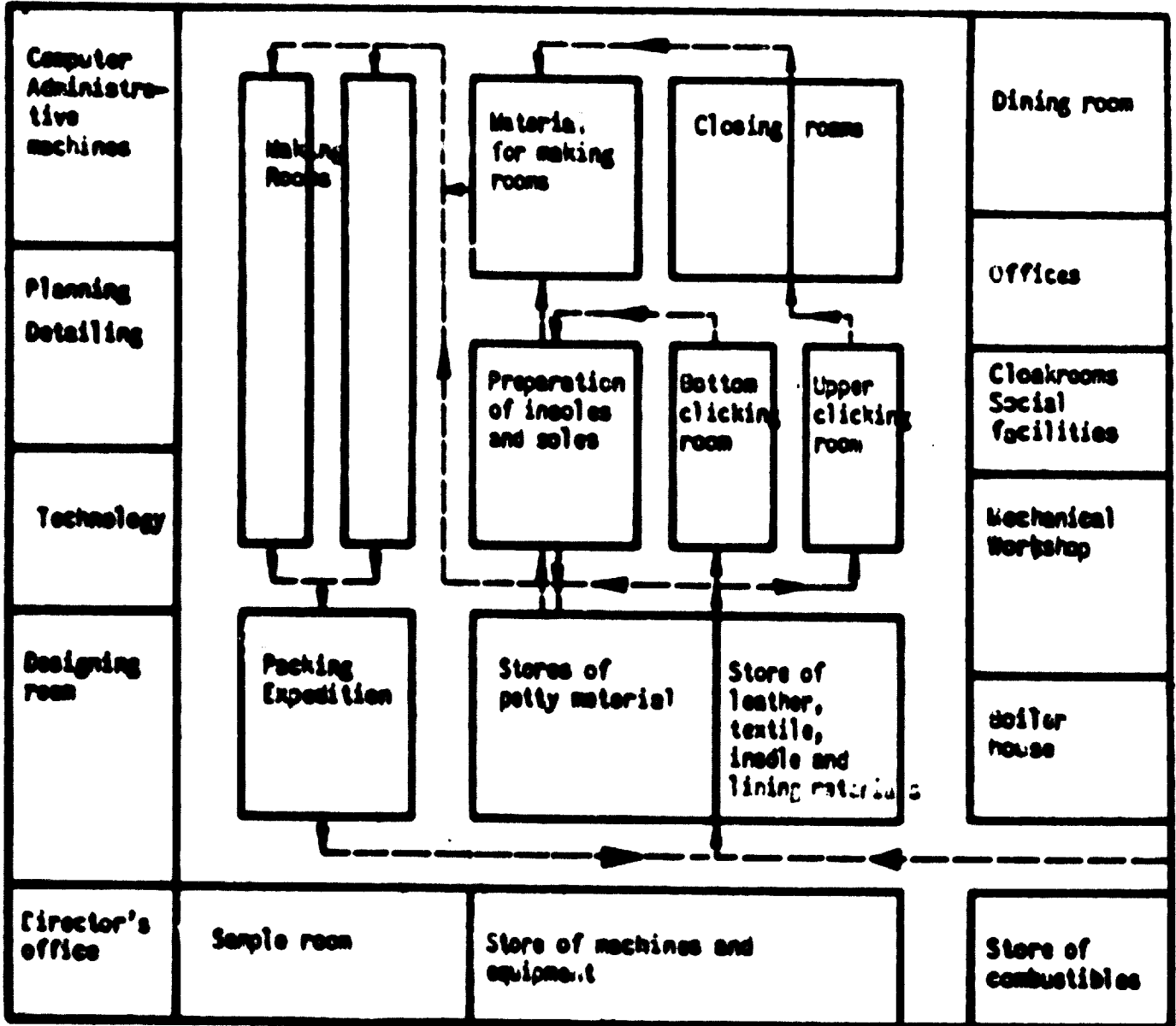
Organization Division of the M&P; Item :



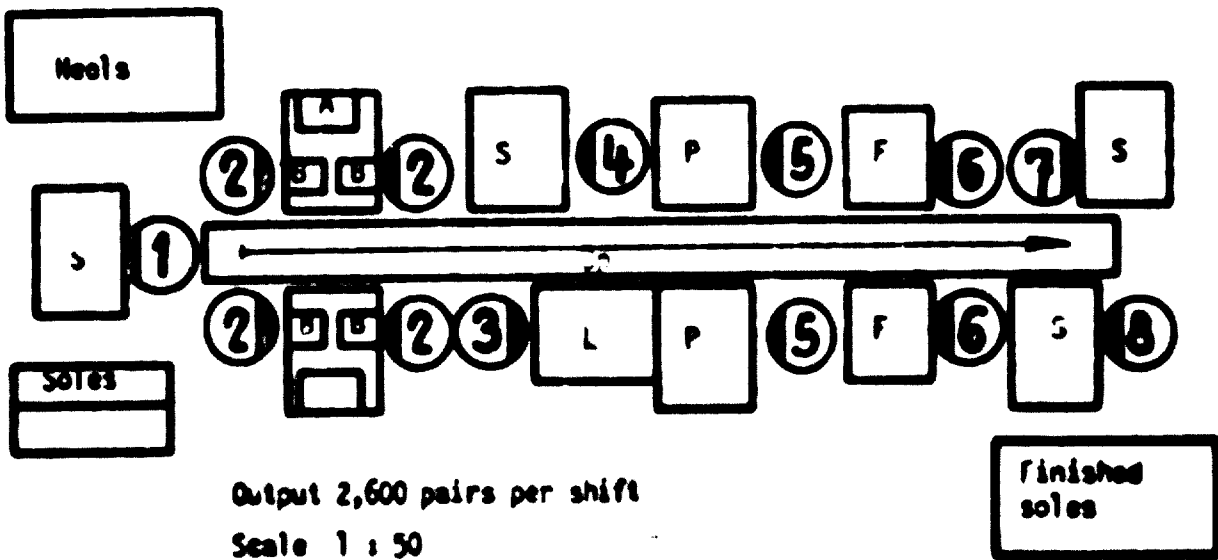
Appendix No. 6 - Organization Diagram of a Middle-size Manufacturing Plant



Appendix No. 7 - Utilization of a Hall Object



Line for Assembling the Sole and Heel

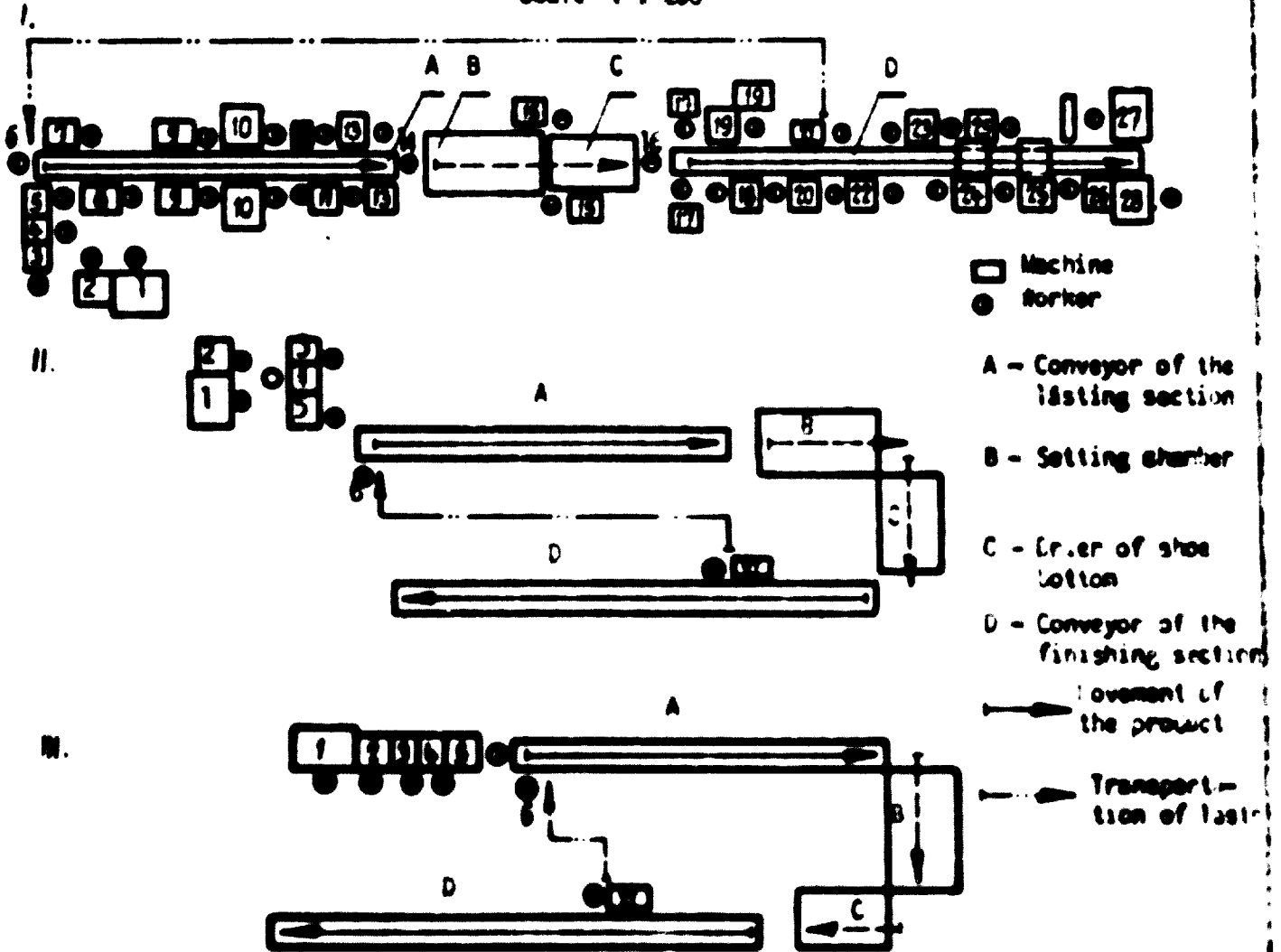


No.	Operation	Persons	Machine	Letter	Org.No.
1	Preparing and cementing heel breasts	1	Bench	S	08045
2	Cementing and assembling with the sole	4	Activating oven, assembling jack	A, B	
3	Breast pressing	1	Heel and sole assembling machine	L	05273/P1
4	Sole flap trimming and clearing the heel	1	Bench	S	08045
5	Attaching top lift	2	Top lift attaching machine	P	04064
6	Top lift trimming	2	Top lift trimming machine	F	08190/P3
7	Top lift edge linking	1	Bench	S	08045
8	Inspection and preparing	1	Bench	S	08045
			Belt conveyor (6 m)	Op	17235

Note: If using top lifts prepared in an exact shape, the operations nos. 6 and 7 are eliminated.

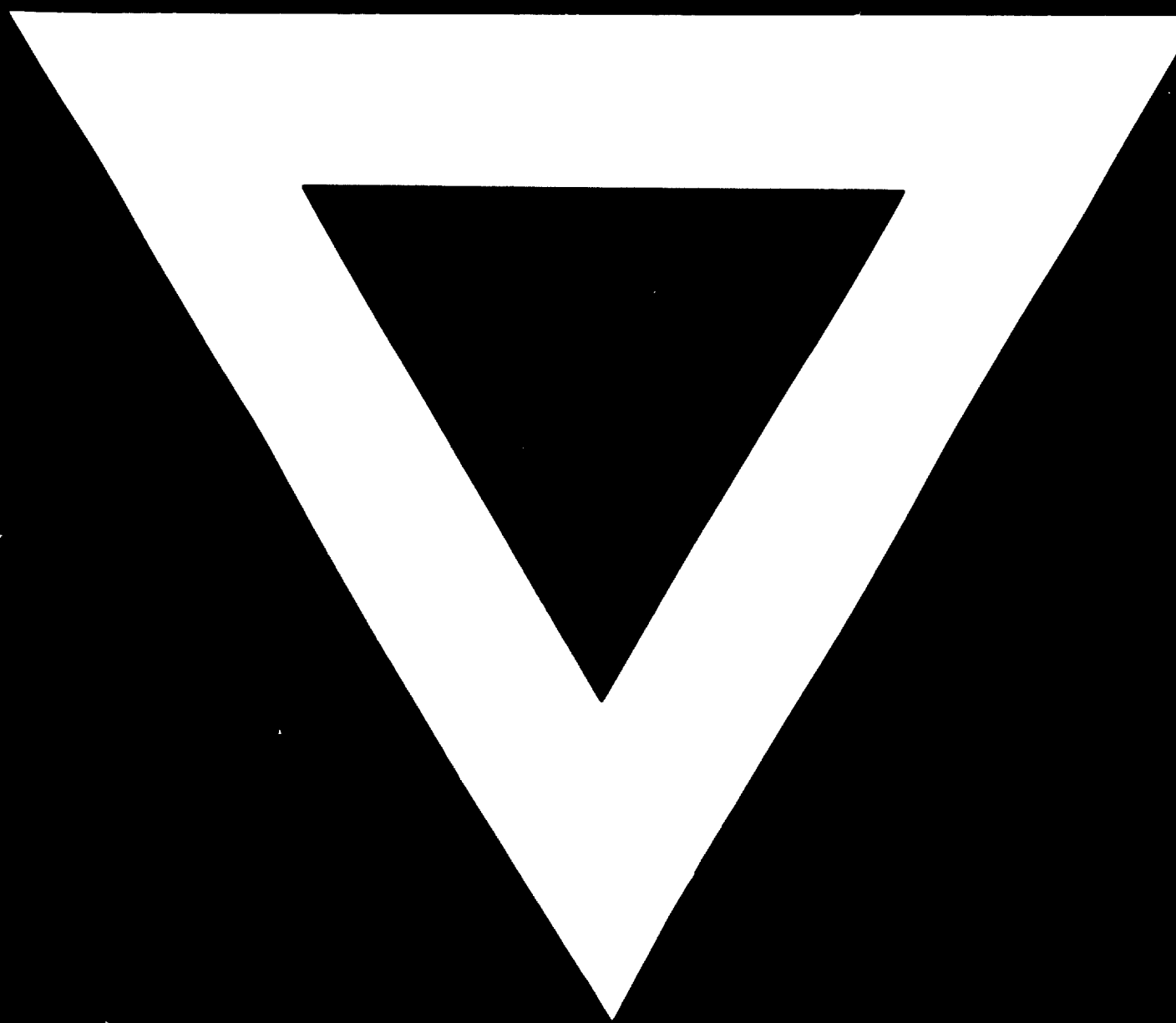
Various Arrangement of the Line for the Production of Cemented Shoes with Pre-finished Sole Assembled with the Heel

Scale 1 : 200



No. Operation	Persons	No. Operation	Persons
1 Upper mulling	1	15 Cementing the lasting, margin	2
2 Toe puff placing	1	16 Bottom filling and re-lacing	1
3 Counter shaping	1	17 Sole detaching and laying	2
4 Counter inserting	1	19 Heel screwing	1
5 Counter stretching	1	19 Sole pressing	1
6 Last transportation and preparing	1	20 Upper and sole cleaning	2
7 Insole attaching	1	21 Detaching	1
8 Sole fastening	1	22 Shoe repairing	1
9 Forepart lasting	2	23 Sole inserting	2
10 heel seat and waist lasting	2	24 Sole spraying	1
11 bottom lining	1	25 Upper spray dressing	2
12 marking for roughing	1	26 Lacing (trimming)	1
13 upper margin roughing	2	27 Inspection	1
14 staple pulling and re-lacing	1	28 Lacing	1





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