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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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# INVESTMENT AND MANAGEMENT CONSIDERATIONS IN ESTABLISHING NEW PLANTS OR EXPANDING EXISTING TANNERIES INCLUDING EQUIPMENT AND MACHINERY CONSIDERATIONS 1/

by

Jindřich Miller
Centroprojekt, Project and Engineering Organisation
Gottwaldov, Czechoslovak Socialist Republic

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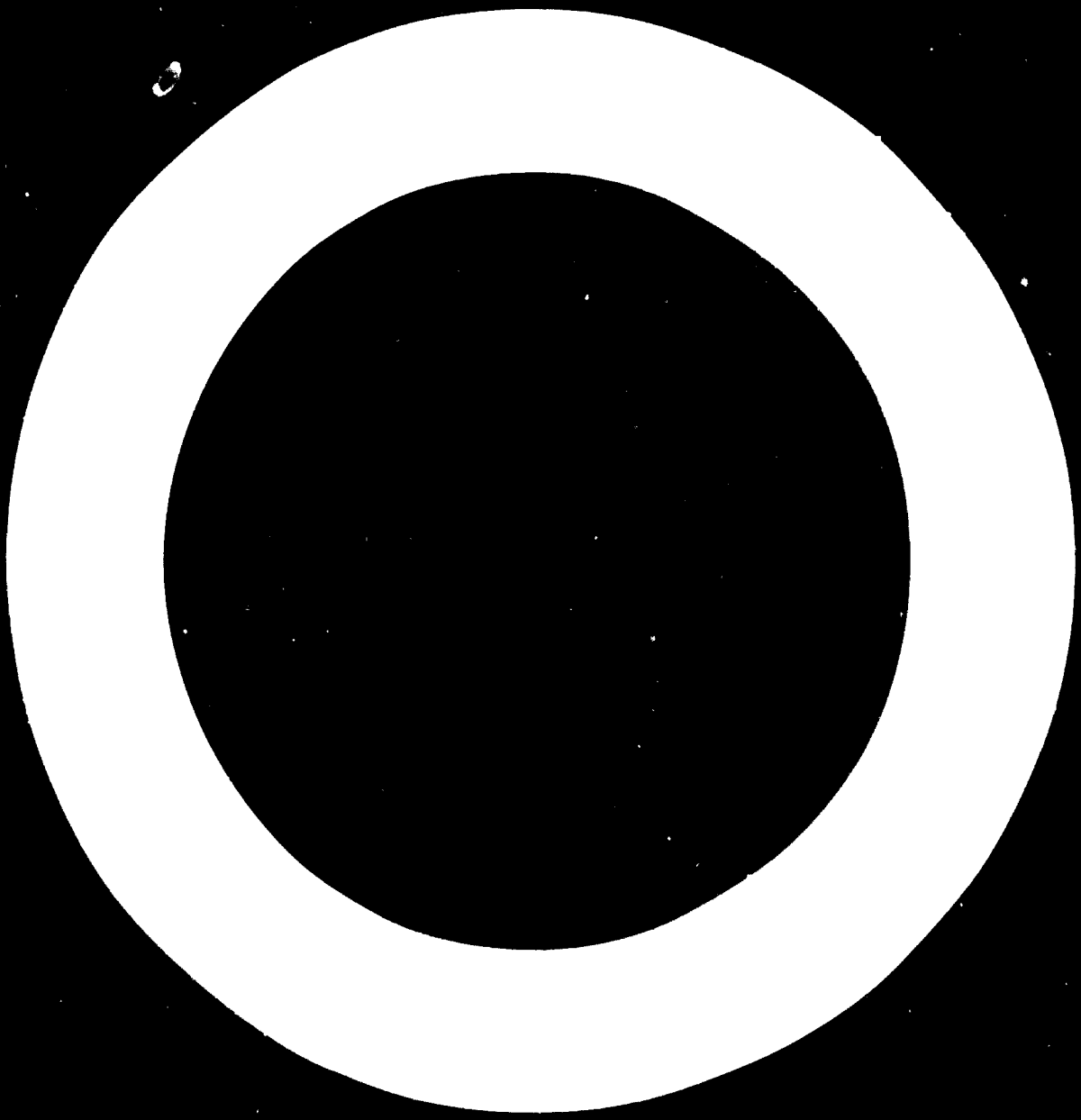

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## I. PROJECTION WORK FOR THE LEATHER INDUSTRY

The preparation of capital construction is a long-termed process preceding the proper building. This action is called projection work. It is divided into two groups of work: pre-projecting preparation and proper projecting preparation. For the industrial construction this work has a special character and in our consideration we shall deal with the problems of the leather industry.

This industry produces all types of leather .

The preparation of industrial construction must be paid great care and attention because in the industrial construction, besides building the workplace for securing the needed production capacity, we must see also the creating a good working environment for workers. Therefore, the industrial construction must meet not only the technical and economic requirements, but also the requirements and needs of workers who will work in the factory. In projecting we should try to create the best environment for the required production respecting all factors, above all the man and his needs.

The production process for securing the material production is at the same time a reproduction process of renewal and often also enlargement of the production and technical conditions. The period of rational utilizing the means of production becomes shorter and shorter. This reflects both in the production means in the industrial production and in the proper buildings. The scientific and technical progress goes towards more complicated technological equipment, and therefore, one of the requirements is a certain forethought in the choice and proposal of convenient structural portions of industrial buildings in time of their projecting. It is necessary to realize that even the best and most progressive technology proposed in the time of projecting is to some extent obsolete in the moment of starting the production in the new industrial building. From this it is obvious that the time of pre-projecting and projecting preparation should be paid a reasonable attention and that the qualification of workers as well as organisations to which we entrust this important section of the capital construction should be on the needed level being in relation with the requirements of these tasks.

The pre-condition for successful selving the projection works is the knowledge and respecting certain rules needed for projecting which are the result of theoretical considerations verified practically in analyzing the projecting activity.

By using the principles of projecting, this section of technical activity becomes scientifically based activity the aim of which is to find the optimum solution of the ordered problem.

The first principle of projecting is the complexity of solution. The complexity of solution requires a very close cooperation of all participants in the process of projecting.

By the complexity of solution we understand material relations /machines, equipment, buildings/, human relations /working environment and working conditions/, and time schedule relations /making the projecting work optimum, materialization of capital construction and putting into run/.

This complexity of solution can be secured only by a very closely colaborating team of designers who realize the necessity and need of common effort directed to a common aim.

Another principle of projecting is the method of using the variants of solution as a necessary basis for the selection of the optimum solution.

Every solution is a result of sectional solutions which in their complexity give the optimum total solution. Therefore, by investigating the sectional variants of the solution it is necessary to come to the total optimum solution. The main aspects are the optimum state of the technical solution, creating the best working conditions and environment, and the highest possible economical effect. In the majority of cases the decisive aspect is the economical effect, however, the other aspects must not be omitted. The selection of the optimum variant must be carried out on the basis of criteria the order of which we determine from one case to another, and usually we use the elimination method. We eliminate less convenient variants and by the combination of more convenient variants we gradually proceed to the most optimum solution. The principle of variant solution should be always used, and if this method is not used it is a sign of cursory solution.

The principle of projecting in stages as to the details is good especially in technological region and in making out the dispositions for machinery and technological equipment. The method from principle space considerations towards the details is used especially in the processing of plan or even spatial disposition of the machinery and technological equipment. This method of solution in stages saves much work in the detail solution and enables especially an immediate recognition and elimination of such considerations which in certain stage of processing are recognized as improper for optimum solution.

The principle of faithfulness to the project expresses the effort to prevent making permanent changes during the process of projecting according to the always new information in the field of production technology or in other field of technical progress. The practice of making permanent changes during the process of projecting should not be introduced. After having chosen the optimum conditions of solution, we should use the principle of faithfulness to the chosen variant of solution. The reason for this is the fact that

permanent changing results in re-processing of individual parts of the project what leads to a number of other changes. The endeavour to make changes is often the result of bad work with the variant solution which either was not used at all or whose appreciation was not correctly done.

The basic changes should be admitted only in such cases if a principle mistake is found in the solution, or in the case if the capacity, technical or economic original data are changed.

The principle of unifying viewpoint follows the harmony between individual sectional parts in the process of projecting work and subjects individual sectional solutions to the principle of unifying solution. However, in order to apply this principle we must accept certain standardizing and typifying provisions which we shall use in the application of the principle of unifying viewpoint as a basis. For example it is the acceptance of the uniform industrial raster as a starting basis for the selection of spans and dimensions of buildings parts. Then, to the chosen unifying viewpoints we subject our decisions in the period of performing the projecting work.

All mentioned principles for the projecting should help the projecting work to proceed in logical sequence and methodically in harmony with the considerations which in their complexity form a methodical system of projecting work. Every period of projecting work has its own specific methodical system. The projecting documentation on individual stages must substantially reply four questions:

what ?
where ?
when ? do I want to perform and materialize
how ?

Two main time as well as content periods in projecting work are the so-called pre-projecting preparation and projecting preparation.

A. The pre-projecting preparation

The pre-projecting preparation deals with formulating the demand for capital construction in the form of investment intention. As far as the intention is not univocal, the investment study is processed before this phase of pre-projecting preparation is finished by carrying out the projection proposition. By this phase we finish the decisions on principles of the capital construction.

Thus, the phase of pre-projecting preparation makes the conditions and pre-conditions for the proper projecting solution. The result of the projecting preparation depends to some extent on the quality of pre-projecting preparation. For this reason the pre-projecting preparation should be paid careful attention and also reasonable time in order to be possible to make

out the needed variants, to evaluate them and select the optimum solution.

The investment intention formulates the requirements for the construction in the region of industrial construction usually by the requirement for the capacity, assortment of the production and the basic data on the production technology and location of the production plant. As far as the investment intention is not quite univocal and clear, it is recommended to make out the investment study.

The investment study should make clear all problems connected with the investment intention, so that it is possible to formulate the optimum projection proposition.

The investment study can be differently directed according to the size and importance of the investment intention.

For principle decision we should always have at our disposal the perspective studies for the branch or sector in the respective industry. Usually, these studies have the character of technical and economic studies. They include the appreciation of the present state with respect to the perspective in the branch or sector. These studies give us a survey on the existing capacities, their utilization, condition and possibilities of further development with the complex view evaluating the perspective possibilities from all aspects as objective as possible. Studies of this kind should find and objectively evaluate all bonds relating to the investment intention from the viewpoint of perspective development of the branch or sector.

Investment studies can be also made out for production trusts and then they deal with the relations directly connected with the production trust. These studies serve the management of the trust and help to decide about the perspective development of the trust.

The proper investment study for the investment intention moves it to a certain place or to different variants of the local solution. Processing of the study must be the more detail the greater uncertainty we have in some section. The study must clear the problem in variants for objective appreciation. The perspective study includes also rough capital expenditures which are calculated on the basis of estimation. In the studies of production technology, special attention is paid to its perspective direction and to the expected perspective development in the technological region.

The projecting proposition specifies and justifies the requirements for the preparation and finishing the construction in the required time and place. Further, it specifies and justifies the requirements for its run and the resulting effect. The projecting proposition specifies the technical, economical and architectonic level of the construction, the conditions and means for it.

The principle is used that the projecting proposition should include always the whole construction. The projecting proposition serves for verifying

the necessity and technical reality, as well as final effectiveness of the construction.

On the basis of the projecting proposition the investor decides about further progress of operations in the preparation and carrying out the construction.

The projecting proposition serves also as a basis for the discussion on financing the construction and on conditions for eventual granting the credit.

The discussed and approved projecting proposition is the basic document for starting the work on projecting preparation of the construction.

The projecting proposition for an industrial construction must finish in an appreciation which expresses the complete effectiveness of the construction. Moreover, the construction must be also compared with the existing production capacities and their utilization, especially the utilizing of capital funds, i.e. buildings, machinery and equipment, serving the production.

The projecting proposition must respect the obtainable selling price of the products and put it into relation with the capital cost of the construction and with the production costs in the considered plant. It is also necessary to respect the factor of the time depending on the period of realisation the considered plant.

Besides the proper data on the production, production technology and securing the production, the projecting proposition includes also the data on the building part of the construction, on the proposed machinery and technological equipment, on the organisation and system of production. The projecting proposition expresses also the relation of the considered construction to the surrounding, namely from the viewpoint of the sources of water, thermal and electric energy, liquidation of wastes, harmfull products and exhalation, as well as not to harm the appearance of the nature and surrounding built-up space.

The projecting proposition includes also the basic information on suppliers' relations both in the proper building part and in the machinery and technological part. In order to process the projecting proposition well and in the considered extent it is necessary to make the respective investigations in order to gain the necessary information.

Making out the projecting proposition is secured by the investor usually with a special organisation. It can be for example the projecting organisation or engineering organisation, or the combined engineering and projecting organisation. The investor orders the processing of projecting proposition either in the form of inquiry proceeding or in the form of competition.

Of course, the investor must give all necessary data and documents to the projecting organisation. In processing the projecting proposition

the projecting organisation observes especially the following data:

- long-termed development of the branch or sector,
- long-termed development of the place in which the construction is to be built territorial plan,
- capacity and assortment of the main production, or the required quality of production,
- prices of products,
- term of putting into run,
- place or territory of the construction.

The projecting proposition consists of graphical part, text part, calculation part and special part dealing with the analysis of economic effectiveness of the construction.

The projecting proposition is the most difficult part of the pre-projecting preparation and includes all actions of this period of pre-projecting work for the investment construction.

In setting prices and costs the organisation projecting the investment proposition cooperates with the considered supplying organisations. The investor closely cooperates in their appointment. According to the method of managing the national economy in individual countries this section is very different - from the directive appointment of the main of general suppliter in countries with the planned economy up to inviting the tenders for suppliers in countries with free economy.

The projecting proposition determines also the course of building with respect to the time what must be discussed with the suppliers.

The projecting proposition must also express all relations as to the location of the construction which have an influence on the interests of neighbours or the surrounding.

All connection lines, especially in the engineering networks, which are to be used, must be properly documented in the investment proposition.

The projecting proposition must be discussed with the appropriate organs which perform the function of building authority, hygienic service, fire service and urbanistic and architectonic service.

The projecting proposition with its composition corresponds to the supplying system; the building part is divided into objects, the technological part is divided into production units with the closed function.

The discussed and approved projecting proposition becomes a basis for the processing further stage of projecting documentation. It is the proper projecting documentation which is followed by realisation documentation.

B. Projecting documentation

Projecting documentation is processed by that organisation which processed the projecting proposition in the technical part, and thus, it has bound itself to be a general designer of the action in the case when the investor decides that the construction will be built.

The proper projecting documentation is a complete technical, economical and architectonic solution of the construction coinciding with the projecting proposition. It has two stages:

- complete projecting solution,
- final stage for building the construction.

Complete projecting solution is not a separate unit, but it is only a stage in the whole process of projecting. In it the chosen solution should be technically discussed with the suppliers and with the investor. Also its price should be agreed in the calculation part.

Some parts of the complete projecting solution are exactly specified and their content is exactly determined. There are those parts which serve for the discussion of the projecting documentation under public law in the Building Department which grants the building permission.

Complete projecting solution includes:

- the lay-out plan of the construction together with site drawings. These drawings express the present condition of the site including the engineering and other constructions together with boundaries of the site, kind of culture, number of the plot, and identical data on neighbouring sites, or the sites which can by any way be influenced by the considered construction,

- protected zones, sites or objects are specially stressed in the documentation,

- newly proposed built up lay-outs with drawing the objects, their mutual bonds in conection to the engineering network, road or railway network, ground modification, stock of materials, fencing round the construction site both in the time of building as well as in the time of production.

Besides site drawings the complete projecting solution includes the building drawing - plan views, cross sections, or other drawings which should make the extent and complexity of the construction sufficiently clear. The extent of drawing documentation is chosen with respect to the complexity and difficulty of the building part and can differ according to individual objects.

In the technological part such drawings are presented which characterize with a sufficient manner the difficulty and complexity of individual pro-

duction units and make clear the arrangement of inner and outer elements including the industrial distribution networks. Besides the proper construction and the production units the complete projecting solution includes also the proposal for the equipment of the building site in time of building.

The documentation includes the linking up to the engineering networks and in technical reports there are claims for supplying water, electric power, demands for the transporation, as well as the data on effluents or exhalation produced in the plant.

The complete projecting solution also includes the time schedule according to which the construction will be built. Most often they use the form of building time schedule, but in the last time we often meet especially in large constructions the screen plots which show the time course of the building as well as the time sequence of individual types of activity. The introduction of these mathematical methods in building the construction is a substantial progress and contribution to performing first-quality control of the process of building. In countries in which it is possible to work with economically interesting penalties, it is practically impossible not to use the screen plots.

On the basis of the complete projecting solution the suppliers of individual parts discuss their supplies and thenafter the price agreement follows. After all these individual actions are finished, it is possible to start the practical securing which is carried out in such a way that on the basis of the complete projecting solution the agreements on supplies are concluded in the form of contracts or inviting the tenders. However the projecting work is not finished by the complete projecting solution and is immediately followed by the final stage of project for the building of construction. This part of the documentation can be secured by the general projectant, or he can agree with the suppliers on the processing of certain parts if they are able to do so. The extent and depth of the final stage of project depends on the agreement between the designer and the supplier. In every case they must consider the complexity and difficulty of the construction or the production unit. In it, it must be observed that the processing of the project would correspond with the purpose and function, as well as the requirements of the investor on the technical, economical and architectonic solution of the construction. The suppliers process the final stage of projecting documentation only in those parts which correspond with their supplies. The processed projecting documentation in its final stage serves for building the construction on one hand and for the author's supervision on the other hand.

The final stage of the project differs from the total projecting solution in that the documentation is more detail, it is backed by respective technological and statistical calculations, it contains the results and appreciation

of investigations. The majority of these documents is not enclosed to the final elaborate but remains in the general designer in the archives where it is at the disposal of the investor or suppliers.

In the technological part the general designer must observe the patent cleanness and is responsible to the investor for eventual execution of the claims of inventors, as far as their inventions are applied in the processed project.

The finished projection documentation in the final stage is presented for the discussion to the investor who compares it with the data of the complete projecting solution, especially in the calculation part.

The general designer processes the complete budget of the construction which consists of sectional budgets for individual objects and production units.

The suppliers, as far as they took part in the processing of projecting documentation in the final stage, continue in the processing of realizing documentation. If they were not in the function of designer they will get the projecting documentation in the final stage and process the realizing documentation.

The realizing documentation is such drawing and budget documentation which serves for securing the production and assembling preparation of the supply. This documentation must also contain the technical ability of the used materials and their properties. Further, this documentation includes the instruction how to maintain the machines and equipment in operation and how to put them in production.

In the processing of realizing documentation the suppliers must keep the technical, economic and creating conception of the project.

## II. RELATIONS IN THE CAPITAL CONSTRUCTION AND THE PARTICIPANTS

As it is obvious from the above mentioned, there are the following main participants of the investment construction:

- investor,
- general designer,
- suppliers' organisations,
- or organisations performing engineering work.

Investory work is usually performed by that organisation which intends to invest the means into the construction.

The investor expresses his wish in the form of investment intention which he processes by himself.

Pre-projecting preparation is processed by the investor usually in cooperation with some projecting organisation or with the organisation which deals with engineering work.

Thus, the relation between the investor and general designer in this period occurs, mostly for granting technical service in the processing of pre-projecting preparation, i.e. of projecting proposition or of the investment study which proceeds the projecting proposition. The investment study is processed according to the order and contract between the investor and general designer.

The general designer is the organisation which deals with the processing of projecting documentation. This organisation makes an obligation that according to the requirements expressed in the projecting proposition it will make the design of the intended construction.

The activity of the general designer in this period proceeds on the basis of concluded contracts.

The investor orders the processing of projecting documentation with the general designer and the extent of cooperation of the investor is contracted usually in the technological part which he can influence.

The general designer makes an obligation to process the project documentation in such a way to meet the requirements and factors included in the projecting proposition. Besides the complete projecting solution which is always processed by the general designer, the latter usually makes an obligation to process those parts of the projecting documentation up to the final stage of the project for which the suppliers' organisations are not so perfectly equipped. In every case the general designer makes the coordination of the final stage of the project.

The general designer is responsible to the investor for the technical correctness of the project and for the use of correct prices in the budgetary part, as well as for the calculations. The general designer is not responsible for the conception determined by the investor in the projecting proposition.

The activity of the general designer is not finished by the processing of the final stage of the project. It continues even in the period of realization in the form of the so-called author's supervision. The author's supervision includes a special appreciation of the construction during the whole period of its building from the viewpoint of meeting technical parameters specified by the project.

Making the authors' supervision does not concern the fulfilling of terms and amount of work according to the time schedule of the construction.

For these questions is responsible the so-called investor's building supervision. The duty of this investor's building supervision is to overtake the works as to the amount and terms contracted between the investor and suppliers on the basis of the time schedule of the construction.

Items of information of the comments of the author's supervision, building supervision and the supplier's representative are recorded in the so-called building diary. This diary is a part of documentation on the construction and all serious statements are written into it together with the proposals for further provisions. This diary must be paid the needed attention because it is an official document which can be used in the case of disputes.

A special situation occurs in buildings where the investor makes an agreement with the organisation making the socalled engineering works, that this organisation overtakes from the investor many or all duties except the duty of financing.

The engineering organisation can overtake all the works of the investor already from the period of pre-projecting preparation up to the putting of the plant into production.

A little different are the relations when exporting the complete plant equipment to abroad. In such cases usually the following phases occur: Investigation works in the country of the foreign customer which will make clear the probleme of the required investment construction up to the stage of projecting proposition. Partner of the foreign customer is usually the main supplier of the machinery and technological part who secures after the investigation works the specialists of some specialized projecting organisation.

Further stage is the processing of binding offer project according to the investigation performed. Offer project can have different depth of processing, according to the need of the foreign customer.

In every case it is possible to get price quotations on the basis of the offer project from the suppliers of those parts for which the offer project has been processed. Different depth of processing can be seen especially in the building part which can be solved from the ideological proposal of the construction up to the final stage of the project in cases when the supply of the construction is participated by the organisation from the same country as is the supplier of the machinery and technological equipment.

The third group of participants of the investment construction is a group of suppliers. This group is very heterogenous because the investment construction requires a great number of different supplies.

Basically there are two large groups of suppliers. The suppliers of the building part on one hand and suppliers of the machinery and technological part on the other hand.

Nearly ideal situation occurs if two general suppliers are found - each for one of the supplying regions - general supplier of the building and general supplier of the machine and technological part.

The suppliers of both building part and technological part are acquainted with the project in the period of processing the complete projecting solution which they discuss from the technical point of view and approve the prices. Thenafter the investor concludes the contracts with suppliers for supplies, building and assembling works.

In such cases when the investor concludes the contract with some organisation carrying out the engineering work, the latter can conclude the contracts in the name and to the account of the investor. This method of securing the investment construction is convenient especially for those investors who do not perform the investment activity very often, or in case of complicated constructions. This activity culminates in the delivery of the plant up to the key when the investor is represented in all matters by the engineering organisation and takes over only the finished plant.

The investment activity is finished by delivering the plant into run after carrying out sectional approbations. At the approbation are present: the investor, supplying organisations, the general designer and the representatives of the public administration who deals with the investment construction, i.e. building department, hygienic service, water-economy service and organs responsible for energy sources, canalization, communication, safety of work, etc..

## III. ARCHITECTONIC AND URBANIZING PRINCIPLES OF BUILDING THE LEATHER INDUSTRY

The leather industry includes a great number of original production branches which can be characterized by common signs. Also from the viewpoint of architectonics and urbanics it is possible to form groups in the leather industry which have certain, identical and generally valid principles.

In the leather industry one group is formed by the production of leather and by the production of furs. Both these productions from the architectonic point of view use the principle of choosing hall objects with relatively considerable overhead clearance with respect to the fact that there are so-called beam-houses in which there is a high relative humidity which needs a great volume of air in order to be reduced. Moreover, the great overhead clearance is necessary for the mechanizing means, usually for the bridge crane. It has considerably high bearing capacity and therefore its construction is considerably high. Also the plan of the halls for beam-houses has great dimensions because in the beamhouse for the production of leather as well as furs there are practically no points in which it will be possible to stop the production technology and transfer the production by a convenient method to the other hall.

These halls should have as few columns of supports as possible in the whole area of the hall. Under European conditions the span of halls fluctuates from 12 to 30 m. A great difference is in the length which depends on the size of the production unit as to the capacity of production.

The character of the environment, which we call as wet , has the influence on the architectonic solution which must respect this fact. According to the local climate conditions the building must be solved in such a way that in the cases that in some year season condensation could occur, such structures and building insulations should be chosen which would prevent the condensation. For hot climate it is possible to propose hall buildings from steel load-bearing structures like for mild climate. However, in the latter case it is necessary to consider a good insulation and demisting of the space in winter months. For cold zones iron-concrete buildings with a good thermal insulation are more convenient.

Other stages of the production of leather and furs can be also located in the hall buildings. However, in them it is not necessary to consider a great relative humidity because these production stages do not produce humidity. Hall type is in this case convenient because in enables variability of areas, and thus, the utilizability of the object is universal. Hall objects of this type do not require such considerable height because in these workshops the bridge cranes are not used. Ventilation must be perfect, however, demisting need not be considered.

In many cases the realization of hall building is impossible with respect to the lack of building site. In such cases we build multi-storeyed buildings. Their solution often depends on the supplier's possibilities. From the viewpoint of industrial architecture it is highly desirable to get as large production area as possible, because it has again the advantage of the area for variable lay-out of machinery and equipment as well as universal use. In the last time an effort is made to solve multi-storeyed large-area industrial buildings having the character of the production mono-block where on one floor the complete production process proceeds. These solutions are difficult from the viewpoint of illumination, ventilation as well as harmful noise. Ventilation must be paid a special care. The architecture of the object must be accommodated to the need of ventilation because in the leather finishing room also harmful agents are used which must be eliminated from the working environment. The same must be applied in the fur production - in its dry section.

Besides the proper production buildings the industrial architecture deals with the arrangement of the whole factory together with mutual connections between individual objects.

The generally used principle in the industrial building is the principle of zone building which concentrates individual parts of the factory in certain zones in order to be organisally bound together. Another principle is the respecting of the fact that the ways of employees to entrance should not be crossed with the ways of inlet and outlet of materials to and from the factory.

The usual method of building the factory when respecting the principles of zone building is that the first zone forms a transition between the surrounding and the entrance to the factory, and in this first zone, besides the entrance to the factory, there are all objects being related to the surrounding. For example there are administrative buildings, social and health centres, canteens and kitchen, training arrangements, research and development workplaces.

The second zone includes usually the production objects of the main production.

The third zone includes the auxiliary workshops serving the main production. In this zone or in the next independent zone there are also stores and objects securing the production.

An independent zone includes usually energy plants together with the supply of water, stores of fuel and other relating objects.

Outside the factory there are usually tanks of technological water and sumps of effluent treatment.

Entrance of workers to and from the factory in such cases is solved

through the first zone and the inlet and outlet of material through the third or fourth zone.

The industrial architect must also observe general rules of architecture also from the creative and esthetic viewpoint of individual objects as well as the whole unit. It must be proper combination of materials, correct proportion of built-in area to non-built areas, convenient choice of heights the near standing buildings, etc.

Besides this aspect of architecture the industrial architect must also solve the arrangement of inner spaces of the industrial objects. It is not only the convenient arrangement of the proper workshop but also a convenient connection with the social facilities, cloakrooms, wash rooms and water closets, proper location of the works kitchen and canteen, as well as health centre, proper connection to the administrative and technical part. Thus, he must contribute to the most rational production of the factory under respecting the principle of pleasant working environment.

There are many means how to make the working environment more pleasant. One of them is the colour adjustment. It is known that certain colour shades are "warm" and certain are "cold". Proper combinations of them together with respecting the working environment can help us to remove the unfavourable influence of some points and thus, to contribute to the satisfaction of workers. It is one of the method counting with the psychology.

Another fact which must be paid our attention are correct proportions of machines and equipment to the man and his dimensions. This is called ergometry. It also respects the differences between individuals. Thus, we must install for example chairs with adjustable height, machines with adjustable operating height, etc.

Besides the inner relations and the proper solution of the objects the architect must solve also the urbanic part of the industrial construction. In this region the architect especially applies his opinion in choosing the building site for the industrial plant.

For choosing the site of the plant we must above all apply the technological aspects such as near source or convenient supply of raw materials and materials, or a convenient position with respect to the consumer of finished products.

For individual types of leather production certain principles corresponding the character of production are valid.

For example, plants for the production of leather and furs must be located in places where it is possible to secure the needed amount of technological water and to secure the canalization of effluents. Further, it is necessary to respect the location in a proper height with respect to the surroun-

ding living places and to locate the tannery in such a place that the prevailing winds should blow from the living place to the tannery and not vice versa. Moreover, it is good to respect a certain protecting zone of green plants between the tannery and the living place.

Wider relations are applied by the industrial architect already in the period of the processing of the projecting proposition or in the period of investment study.

Building of the leather industry which is included in the light industry, should correspond also in the architecture and urbanism of these buildings with the character of this industry and the buildings and plants of this industrial branch should be solved sensitively to represent the character of our branch.

We can say that well solved building of the leather industry is always a complex work of a great number of specialists among them the industrial architect and urbanist are the synthetizing elements.

## IV EQUIPMENT AND MACHINERY CONSIDERATIONS

The technologist who is taking part in the processing of the investment project should have a good knowledge of perspective technological trends, the knowledge of results of the development and research works and the knowledge of the present production machines and equipment and the trends of their development. It is necessary to have a survey on machines and equipment in the world scale. It cannot be supposed that the technologists of the investor would have such complex knowledge and survey. Also the technologists of the projecting organisations who very often process the investment studies and projects must be in a close cooperation with the development workplaces and research institutes, as well as with the manufacturers of machines and equipment in order to be able with the use of thus gained knowledge well process the technological part of the investment study or project. Besides the designers-technologists the study or project is processed by a great number of special designers from different branches to which the study or project concerns. The investment study or project cannot be seen only from the viewpoint of production technology. It is necessary to follow the whole conception of the construction, its relations, influences and consequencies. They cannot also omit the wider relations to the surrounding, urbanistic relations, traffic, respecting the situation in manpower. The investment study or project considers usually several variants of solution, it evaluates and mutually compares them. To this purpose they use both the calculation study and economic study. The study expresses both expected investment expenditures and production costs. Therefore, the investment study can be a basis for the investor and his decision is then objective and technically as well as economically justified.

The basis for processing the technological part of the investment study must be the effort for the maximum universalism of the construction and the maximum variability enabling the construction to be accommodated without great expenditures during its whole service life to the needs of developing technology. In the practice the production technologies develop quicker than is the service life of the construction. This disproportion must be compensated by forethoughting both in the technology and in the choice of convenient constriction solution which must be effective during the whole time of its existence.

The technological part of the projecting proposition in divided into complete production plants, production groups and production units.

In the tannery an example of a complete production plant can be the plant for the production of upper leather, of a production group can be the beamhouse, of a production unit can be the tanning drum.

The technological part of the projecting documentation consists of the following main parts:

- Data on production capacity and assortment
- Considered time fund per year
- Description of the considered production cooperation
- Detail description of the technology of production according to complete production plants, production groups and production units
- List of machines and equipment needed for the main production
- Need of raw materials, their quality and composition, of chemicals and auxiliary materials supported by calculations
- Need of electric power, steam, water, other media, supported by calculations and charts of the fluctuation during the day
- Data on wastes and exhalation occuring during the production, and proposals how to remove or eliminate them
- Proposal of handling with material, either as a part of the proper production technology or as an indeperdent part completing the technological part
- Proposal of the needed measuring and control for technological purposes
- Need of manpower for the production.

The technologist specifies the organisation of the production process in the project and calculates the need of manpower. In the calculation of the need of manpower it is necessary to consider the real outputs of machines and manpower in processing the respective raw material by the respective machine during the eights-hours shift what is influenced also by preparing operations, necessary lost time and breaks in the work. This method is used and the shift outputs, reached in Czechoslovakia in that times, will be reduced on the base of the respectively agreement with the customer or investor in relation to the local conditions of clima and the experience of the local manpower. He divides the workers in the shifts, according to sex and completes the manual labourers also with the proposal of the technicians and administrative workers needed for securing the production.

On the basis of the chosen technology of production and the chosen machinery and technological equipment the technologist starts to process the plan as well as space dispositions as to the lay-out of machinery and equipment.

In this period of processing the projecting documentation the technologist must also take care of obtaining all data on the machines and technological equipment from the suppliers. There are the elements of the so-called initial technical documentation which is usually processed by the manufacturers of machines and equipment in form of dimensional sketches containing the data on connection parameters and methods of inlet or outlet of waste. All data must be exact and binding.

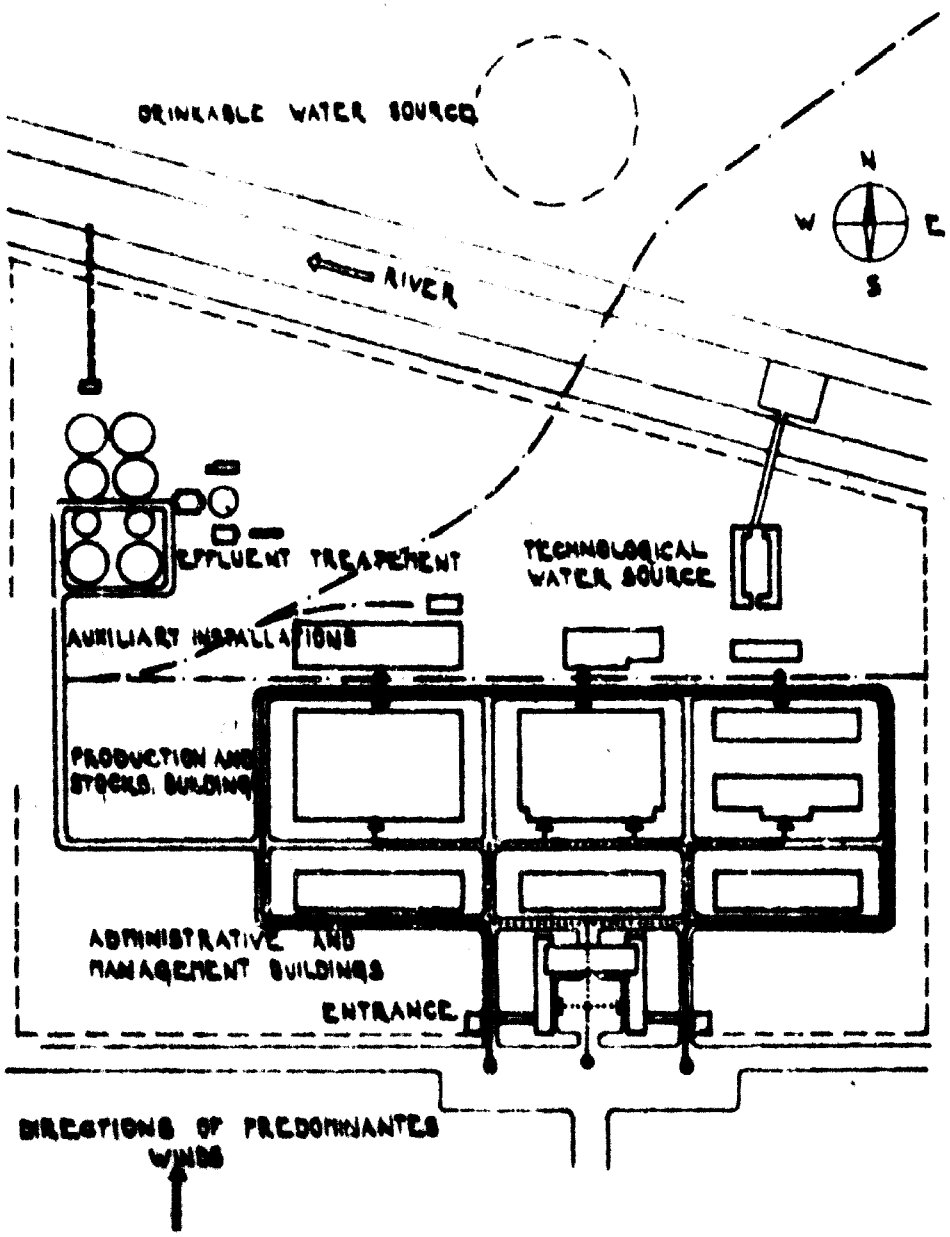
In processing the floor space disposition in the lay-out of machines and equipment the technologist in cooperation with the architect sets the places for operators, their social facilities, and places for supplying material and its delivery for further processing.

It is necessary to consider the influence of these decisions on the living conditions on the working site. It is also necessary to observe some principle requirements which are especially: continuity of the production flow, well arranged individual production sections for easy managing them. Convenient transporting sequences, and last but not least the space for, emergency exit in case of fire. However, all these requirements can be solved only in a close cooperation between individual professions in the projecting activity. The technologist substantially influences the complete projecting solution, however, he must respect the needs and requirements of other professions.

Only in this way the final work may be a good balanced plant assembly satisfying not only the requirements of technology and production but also create a pleasant working environment.

# ANNEX I

## IDEA LAY - OUT OF A TANNERY



## ANNEX II.

## LIST OF DEMANDS FOR THE ESTABLISHING OR RECONSTRUCTION OF A TANNERY

- Types of leather you wish to produce
- Numbers of the individual types of leather you desire to produce
- Daily working hours, shift production and number of working days in one year
- Kinds of raw hides which should be processed, their provenience, weight classes, sex and method of curing
- Spaces you have at your disposal for the production,
  in case of new building - give a layout plan of the building site,
  in case of reconstruction - give the plan of existing production spaces together with the description of the existing production equipment.
  If you desire to use this equipment in new production, specify to what extent
- Sources of water, steam, electric power, their technical parameters. In case of water, specify the yield of the source, its feature /quell or surface water/. In case of steam, specify the pressure, overheating and amount. In case of electric power, specify the voltage, kind, frequency, describe the source proper of electric power or the method of connection to the distribution network.

## ANNEX III.

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