



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org



DO1282



Distribution
LIMITED

ID/WG.14/17
2 July 1969

ORIGINAL: ENGLISH

United Nations Industrial Development Organization

Second Interregional Symposium
on the Iron and Steel Industry

Moscow, USSR, 19 September - 9 October 1968

Summary out of print

E-2

ECONOMIC ANALYSES AS AN INSTRUMENT OF THE MANAGEMENT
SYSTEM IN METALLURGICAL PRODUCTION 1/

by

O. Fiala,
Czechoslovakia

The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. The document is presented as submitted by the author, without re-editing.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

Contents

	<u>Page</u>
<u>Introduction</u>	3
Functional application of economic analyses to the practice of management	4
Analyses of the development conceptions	6
Perspective economic analyses	9
Preventive economic analyses and analyses for planning purposes	11
Economic control analyses	12
Analyses obtained by inter-plant comparison	19
Methods and techniques of economic analyses	19
Organization of economic analyses	23
<u>Conclusion</u>	25

Tables

1. Indexes of partial analyses in the production of pig-iron	<u>27-28</u>
2. Indexes of partial analyses in steel production	<u>29-30</u>
3. Indexes of the analysis of the volume of pig-iron production	<u>31-33</u>
4. Indexes of the analysis of the volume of steel production	<u>34-35</u>
5. Indexes of the analysis of the volume of rolled material production	<u>36-37</u>
6. Terms of elaboration of written reports on analytical results	38

INTRODUCTION

Economic analyses constitute an important part of the modern management system in metallurgical production.

The necessity of a timely and systematic foresight and influencing the development especially from the point of view of the newly arising needs and demands in metallurgical products as well as from the point of view of the extinction of existing elements regarding their quantity, structure and quality, all that inevitably contributes to the importance of special analyses of the character of marketing.

The results of these analytical studies must be closely connected with the perspective analyses aiming at a correct establishment of the metallurgical research programme, of the development of new technologies and products, of the investment planning of the production equipment and facilities, of the reconstructions and modernization of existing production capacities which must be entirely in conformity with the corresponding programme of measures in the sphere of rationalization and organization of production, management and administration.

The analyses must make it sure to carry out the realisation of the above-mentioned activities in due surpass of time as well as in pertaining material linkage with the forthcoming needs and demands in products.

In its features, the management of economic processes in the metallurgical production nowadays turns into an ever growing systematic process of innovations being carried through correct aiming, in purposeful extent and in due time. Preventive analyses of the future possibilities and difficulties as well as the control analyses of existing reserves and premises created in the past enable a right aiming of all component parts of the plan together with the most successful fulfilment of existing plans with a special regard to a permanent systematic innovator.

Another characteristic feature of modern management is the fact that it assumes a shape of the systematic decision making regarding the choice of the only solution from the entire variety of other possible alternatives which

rather than with other in a more and more complicated way by the whole range of technical and technological features as well. As a result, the economic analysis - especially after the introduction of mathematical methods and order techniques - is a more significant part in decision-making and management.

It is therefore clear enough - that the main reason to carry on the economic analyses does not consist in the possible danger of unfavourable results, in the continuousness of competition of failures in fulfilling the production tasks of separate enterprises only. A more substantiated motivation consists in the fact that each phenomenon and each process within the economic practice form a certain unity of antitheses. The basic task of economic analyses therefore is to disclose timely these antitheses to the purpose of suppressing negative factors and encouraging the positive ones so as to obtain a synthesis on a higher level.

Economic analyses in the metallurgical production become thus one of the fundamental instruments of the permanent innovation and systematic improvement of the standard of production as well as of the efficiency of production.

1. Practical application of economic analyses to the practice of management

As we already stressed, the substance of the modern management technique of the metallurgical plant consist in a systematic and permanent innovation which is continuous to the selection of the most efficient solution of all possible alternatives, i.e. to enable, to promote and to premeditate the realization of continuous changes which appear to be desirable on the basis of forecasts of the future needs and possibilities resulting from the forthcoming conditions or whose feasibility will be ensuing from existing possibilities or, let us say, is already given by the newly arisen conditions and discovered reserves.

At the same time, the economic analysis is one of the fundamental instruments of the modern management technique conceived in this way, concerning both production and further activities of an enterprise.

Its initial function is to serve as an instrument for evaluating the recognized realities from the economical point of view which is determined by the effort to obtain the optimum economic result with the minimum of means used. It differs from the technological, sociological and other analyses just through this criterion of evaluation and not through its subject. It is commendable to assume critically the result of technical and other analyses as far as they are endowed with economical aspect too.

Economic analyses should be also an authoritative starting point for all kinds of economic prognoses, conceptions, schemes and plans.

The analyses and evaluations both of the future and present evolution should contribute to the elaboration of the basic data for determining progressive and real tasks.

Another function of the economic analyses is to serve as a basic instrument for the economic control in realizing the conceptions, designs and plans. To this purpose they must ensure timely discoveries of new possibilities and their exploitation to disclose imminent difficulties and the ways how to prevent them and finally, to establish given possibilities and to deduce pertaining conclusions of the new conception solutions and decision-making. With this another of the economic analyses is closely connected to serve as an instrument of management in a more concise sense of the word, especially to help in a timely recognition and prevention of the menacing shortages and failures by suggesting preventive rationalization, technological and organizational measures, by disclosing new possibilities in view of the most successful solutions and by mastering the economic and technological processes of production. Consistent junction of the control and preventive analyses must lead to an expressive improvement of the efficiency of analyses. Shifting the centre of gravity of the analysatory activity into the preventive one will help to create the conditions of the most prosperous work.

As for the task of the economic analyses to enable the most correct survey of the development tendencies of the market and of the concrete demands of customers and to determine the right programme for scientific research and technical activity investment planning which is in favour of the progressive improvement of technological and economical indexes of production and products

as well as of the profitability of production we made a pertaining mention in our introduction already.

Under the conditions of the socialist enterprises another important function of economic analyses comes into consideration: servicing as a means to increase the participation of working people in management activity - to raise motions and concrete suggestions regarding the development of the socialist competition, of personal engagements, of staff suggestions, etc. on the basis of analyses of indexes fulfilled which characterizes the activity of separate workshops.

A similar significance has the economic education of workers and the development of economic autonomy, especially because of the fact that a concrete establishment of causes and determining of those who are guilty in bringing about the failures facilitates to differ the external influences from the internal ones. It is necessary to investigate the cases of infringement of the productive activity by the co-operating working units and to try recognizing more important economical interests from the point of view of the enterprise as well as of the whole national economy.

Another important role of the economic analyses further consists in improving the level of the management organization and in the efforts to find out as well as to remove the faults in planning and in elaborating data which refer to the reality regarding both the initial records, book-keeping and statistics.

2. Analyses of the development conceptions

Setting-up the possibilities of the sales expansion strengthening the position on existing markets, acquiring further markets, introducing new articles with progressive indexes, ability to face the plans, schemes and measures of the competition in the field of assortment, prices of products, etc. all that represents one of the most important premises of a metallurgical plant development.

Marketing analyses of the domestic and foreign markets are in this respect very important means leading to the establishment of the sales possibilities and to clearing up necessary or expedient measures both in the field of expor-

tation and sales where pertaining services for the customers as advertising, etc. are included and in the field of the scientific and technical development of products and production.

Economic analyses in this sphere have one task in common: to strive for the objectively motivated development conceptions of the plant. Their results affect the development of the material and technical basis of production, of production devices and production processes as well as the products themselves through the investment policy, reconstructions, modernizations, general repairs, mechanization and automation of production, through research and development of new articles, through mastering new processings, introducing new technologies, innovation of management methods, etc.

The principal task of these special analyses of the economical efficiency of separate technically feasible alternatives of solution is to establish and to propose development measures liable to exploit material, human and financial sources at their maximum rate for the benefit of the general development of the enterprise.

The analyses of the vast measures aiming at a production development usually evaluate with preference the attainable changes as for the volume and composition of products being sold as well as for the desirable and available level of technical and economical indexes of products with a special regard to processing costs of the further use and further demands of the user.

As far as the proper construction is concerned, it is necessary to analyse above all the definite expenses of the preparation and realization of respective measures. In the metallurgical production - which is extraordinary pretentious and challenging especially from the point of view of material and energetic supplies, it is necessary to stress the need of respecting both direct and in-direct investments / for instance the share of oxygen production costs, ore exploitation, transport etc./

From the possibilities and from the ways of how to assure especially the raw materials energetic and transport sources and supplies very often originate more expressive consequences for economic evaluation of those alternatives of solution which should be taken into consideration than from the proper construc-

tion of technological equipment for the metallurgical plant.

Another important subject of the analysis is the issue of securing the labour power, the problems of its structure, qualification, of ensuring the necessary training and education as well as the question of the available productivity of work.

The analysis of the main technical and economical parameters makes especially investigations into available extensive and intensive exploitation of the basic metallurgical aggregates, into the specific consumption of raw materials, energy etc. The proper costs of separate groups of products or of average products and their trends after the introduction of the proposed measures constitute to a considerable extent a very complex index.

It is very important not to ignore the increasing costs during the trial periods while introducing large scale measures. While evaluating the alternatives of possible solutions it is necessary to take into consideration even some differences in economic vitality which are more expressive. The economic vitality is to be understood as a time-period after the expiring of which the losses resulting by scrapping out-dated devices and the costs of new, up-to-date equipment will be compensated by savings obtained from the new facilities/ for instance, 1-2 years in the case of innovation and modernisation measures of the more limited extent, 3 - 5 years and in several cases 7 years if greater investments are concerned/.

It is possible to determine the probable profits by comparing the costs with the receipts and sales to be expected. The efficiency of separate alternatives is being usually established with the use of the time which is necessary to refund the additional costs of the more expensive variant/ from the point of view of investment with higher saving rate of the production costs./

The difference between separate investment costs will be divided with the difference of the year savings of proper costs. The inverse value will be designated as a coefficient of effectivity. One of the alternatives of the rationalization investments is the present state.

The basis for comparison in the case of larger undertakings form the best comparable domestic and foreign results as far as they are available.

The conditions of the socialist economy further enable to consider also

the consequences outside the production plants themselves and to evaluate the corresponding measures from the point of view of the entire national economy.

The effects of the non-economic character of development tasks as for instance the security of work, the improvement of the defence-ability of the state, of the hygiene of the milieu of human living, etc. are being likewise respected.

The less significant rationalization and innovation endeavours are being evaluated mainly by the productivity of work indexes, by the indexes of proper costs and by other technological and economical indexes directly concerned /as for instance aggregates efficiency, specific consumption of raw materials, fuels energetic supplies etc./ with the application of precalculated coefficients of effectivity.

Among other things, the subject under discussion comprises rebuilding of aggregates, mechanization, measures aiming at prolongation of service life of aggregates, reducing the losses of the blast wind and blast furnace gas, ore enrichment, ore agglomeration etc.

An extraordinary significance in increasing the efficiency of the development analyses assumes the application of principles which are valid in carrying out the evaluation analyses / Complex groups and teams charged with the realization of such analyses seeking for new conceptions as to how to secure the given requirements regarding the function of products, brain-storming conferences etc./

In carrying through the analyses of the development conceptions a vast and important role play the consultation service institutions in the field of the rationalization and organization of production, administration and management.

3. Perspective economic analyses

The results of the separate development trends are an essential foundation for the analyses of the ^{pro}perspective development of metallurgical works and plants as a whole.

A basic starting point again is the analyses of demand and sale or exportation of metallurgical products.

Within the framework of the planned economy a very important source of information about the development perspectives of the customers enterprises and branches, of the investment planning as well as for the foreign trade in the basic structures are at least: the share of steel, plates, side faces etc.

The perspective of demands is an important method for the analysis of sources specifying the main indexes / time survey of the exploitation and efficiency of the furnace aggregates, productivity of work etc./ as well as for the analysis of separate sectors / production, investment planning, technological development etc./ As a result we obtain a complex analysis of the long-termed development which serves as a basis for compiling development studies and perspective plans of respective enterprises.

On the quality of elaboration of these analyses depends the correct aiming of investment planning as a whole, the relation between financial demands and production of sources and a right programme of research and development of products, of production devices and production technologies.

Perspective analyses again are to be elaborated in several alternatives which should express, above all, alternative possibilities of technology.

To the important corrective factors of the planned socialist economy belong among other things: nation-wide considerations and discussions about the development of production in separate spheres of production and the linkage of production between separate productive phases / coke, pig-iron, steel, rolled material / and the possibilities of ascertaining and realizing finished products.

Long-term trend surveys of the fundamental technological and economical parameters of products and production as well as deviations from the universal standards must create a platform for analyses of causes and finding the ways to attain a higher level.

The structure of a written elaboration on results of these perspective analyses could be determined by following component parts: perspective of demands and sale of products, of production, investments and reconstructions, of the technological development, of the raw material, energetic and fuel supply, transport facilities, maintenance etc.

4. Preventive economic analyses and analyses for planning purposes.

Additionally carried out analyses of results obtained in recent period are a very important information source and a point of issue for measures to be made in view of proposing and realizing arrangements to stop undesirable evolution and repeated defaults.

These analyses are only seldom likely to lead to a removal of resulting defects and damages.

It is therefore utmost advantageous to carry over the centre of gravity into preventive analyses of future process and phenomena. One of the foremost purposes of these analyses is to serve as a basis for setting up respective elements of the year and quarterly plans. Another aim is to help in securing the planned tasks respectively in a year, quarterly and monthly periods.

It is essential not to separate the succeeding control analyses from the preventive one. In evaluating and analysing each result obtained in the past it is necessary to study at the same time to what degree is the fulfilment of the tasks both of the present and future period safeguarded. Deepening the preventive analyses means a substantial simplification of the subsequent analyses.

The analysis of the forthcoming evolution in favour of the regulative measures enabling as efficient exploitation of all alternatives as possible as well as preventing all defaults and damages is virtually the substance of all preventive analyses. The necessity to carry out the analyses in the connection with the elaboration of plans is undisputed and obvious. The adequacy of preventive analyses aiming at maximally successful realization of planned tasks is determined as experiences demonstrate - mainly by the fact that no plan is likely to discover all the reserves and further by the circumstances that the realization of plans is frequently accompanied with changes in a number of premises.

Another method of preventive analyses is to compare the plan with the future state on the basis of concrete informations about facts which will necessarily or probably arise or whose existence could be presumed in view of different, indirect informations or extrapolation of the present evolution.

One of the most important fundamentals of preventive analyses are the surveys of the structure of orders pertaining to the rolled material cumulated following separate kinds of products within a quarterly or monthly period. The consequences reflected in the principal indexes / volume of production, of sales, costs, wages, charges, profits, etc. / will be evaluated with the help of computers or mathematical machines.

Another useful document for rolling-mill plants are balances of ingots and semi-finished articles with a special regard to costs, volume and composition of production, wage, funds, etc.

Furthermore the deviations in the composition and in respective physical and chemical indexes of coal, coke, blast furnace ores, limestone, agglomeration, scrap, malleablizing ores, lime etc. are equally to be analysed and evaluated.

The same applies to technological fuels and energetic supplies, to other materials, pans, rollers etc. A very particular role play the analyses of deviations from the planned kinds of products by introducing new articles into production, the analyses of repairs of the equipment and of the actual state of aggregate, of the transport services, of changes in the volume, terms and effects of measures in the field of technique, technology and organization of production including deviations resulting from co-operative relations.

5. Economic control analyses

The basis of subsequent economic analyses being carried out in the contemporary practice of the economic management of metallurgical production form partial analyses of fulfilment of separate indexes. At listeners disposal are placed some surveys of indexes coming into consideration in blast furnaces and steel works. In all plants of this kind there are usually currently analysed and watched following sectors: the volume and assortment of production, the time exploitation of main aggregates, their capacity, the composition and quality of raw materials, the output of the charges, the standard consumption of principal materials of fuels and energetic supplies, the quality of products rates, productivity of work, number of employees, drawing of wage funds, fluctuation, absenteeism and finally the fulfilment

of several indexes of the socialist competition.

Under the conditions of the socialist economy are of a particular importance the analyses of the fulfilment of economic indexes carried out directly in workshops and during the consultations with the workers. The evaluation is being carried out currently with the use of technical units and the results are being publicly proclaimed in workshops immediately after the end of the shift.

Evaluation of indexes usually covers respective periods of past weeks and decades in view of the monthly tasks to be fulfilled.

The choice of indexes depends on their significance for the management of respective workshops, on the role of respective indexes in compiling plans, in registering fulfilment of these plans as well as on the circumstances how far the fulfilment could be influenced by the workers.

The manager of the plant / enterprise / has corresponding functional units and departments at his disposal. In increasing the efficiency of work in separate sectors of the functional management it is very purposeful to bring about complex analyses of fulfilment of the indexes which define the activity of the given sector of management.

The analysis within separate sectors of management of the production is being organized by the chief of production of the plant. Especially the fulfilment of the production tasks regarding their volume is being analysed. As a basis of the value analysis serves the analysis in technical units.

All the influences within various phases of the metallurgical production are being usually divided into pertaining groups following the fact whether they affected the extensive or the intensive exploitation of the main production aggregates.

The enclosed table shows the indexes of this analysis of the pig-iron production.

The methods of this analysis could be defined following these principles:

1. Re-counting the obtained volumes of production of separate furnaces on the basic type of pig-iron.

2. Enumeration of deviation consequences in the extensive exploitation.
3. Concrete analysis of the causes during the extensive exploitation.
4. Analysis of the intensive exploitation of furnaces / consequences resulting from the changed enrichment of the permeability of charges, fastness, consistency, combustibility of the coke etc. /

The indexes of crude steel production analysis are likewise at the disposal. The concrete analytical proceedings are being explained in pertaining articles of the author's publication / Ing. O. Fiala: Economic analyses in metallurgical production, Prague 1961, Moscow 1965 /.

Among the influences which come especially into consideration there are mainly the deviations regarding the quality of pig-iron, troubles and defects of pig-iron mixers, of blast furnaces, shortages of coke gas supplies etc.

The analysis of the volume of rolling-mill production is being divided again into the analysis of the extensive exploitation of tracks / mainly regarding the time which is necessary for track repairs and for the exchange of rollers/ as well as into the analyses of the intensive exploitation. It is very important to analyse first the influence of deviations in the composition of rolled materials from the planned tasks in a close relation to the deviations regarding the laboriousness of separate products.

The analysis of the assortment of production studies the observance of the plans of assortment and the execution of orders as well. Another important factor is the qualitative analysis of production and the introduction of new products. The analysis of the equability of production studies the losses resulting from the insufficient exploitation of production devices and equipment currently coming into effect at the beginning of each month and from the overburdening of this exploitation taking place towards the end of each month.

Another task is the analysis of the state and exploitation of the production equipment. A very important index here is the extent of corrections in book-keeping and their relation to the value of equipment /worn-out state co-efficient/, the index of the technical equipment / the share of the value of equipment falling on one worker /, the index of the exploitation of

equipment/ the share of the value of production falling on one unit of the value of equipment / and the index of supplies with different kinds of energetic terms and quality of repairs, of their costs, of general repairs and of the proper maintenance activity is concerned.

Heads of the supply department must secure the analyses of supplies regarding their quantity and quality as well as their terms including the material handling analyses.

The object of the technological analyses is above all to study the obtained values and results of the basic technical and economical indexes of production characterizing the efficiency of the metallurgical production. The results of these analyses are of a basic significance for the analyses of production and economic indexes. The question is about the analysis of blast and steel furnaces exploitation, of the time exploitation and the analysis of outputs of the main production aggregates, of the productivity and consumption of raw materials, basic materials and fuels. The analysis of the consumption of coke is especially of great importance.

The analysis of the fulfilment of research and development tasks being solved by research institutes is to be carried out separately.

Under the conditions of Czechoslovak enterprises a considerable attention is being attached to the analysis of the situation within the sphere of the innovator and rationalisation movement / registration and realization of staff suggestions and the security of work problems./

The analysis of the quality of production studies the causes of inferior quality products. Very important are the analyses of spoilage rates in steel works which are being studied according to the kind of steel, defects, places where these defects have been established / rolling-mills and the departments of further processing/ and according to the causes and professions of those who are to blame for neglecting some of their duties / founders, chargers, smelters, etc./.

The majority of works carry the analyses of the preparation and realization of the rationalization measures included into the plan of technical and organizational measures separately. It usually concerns the measures which

do not result from other parts of the technical development plan and which are aimed mainly at the production, productivity of work, lowering the costs and speeding up the turnover of circulating means.

Metallurgical works are very important producers and consumers of energetic sources. According to this fact, a foremost significance have especially the analyses of energetic system. Among the subjects treated are the consumption efficiency the efficiency of the proper production and of all kinds of energies as well / of blast furnace gas, coke gas, electricity, oxygen, compressed air etc./ including the exploitation of secondary or derived energies.

The analyses of transport examine the ways of how to secure the needs of the main production by ensuring transportation means in the field of supplies, sales and in the inter-operational transportation of raw materials, materials and semi-finished articles.

The analyses of work and wages pursue the problems of the numeric state of workers, of the exploitation of the working time, shifts, over-time, absenteeism etc. Very detailed analyses of the present state and further trends of the productivity of work including the situation in the fulfilment of the efficiency standards are being also made. Very important for the management of the wage trends is the analysis of average wages, their relation to the growth of the productivity of work, drawing the wage funds and premium funds of respective enterprises including the factors resulting from the situation in the socialist competition, from introducing new methods of work, from the efficiency of applied wage systems etc.

The analyses of the investment planning of investigating the preparation, proceeding and completing of the investments including their introduction into the practice as well as the actual state in their financing. Very important is the analysis of the efficiency of investments under operation including the analysis of how the projected indexes are being obtained.

The consumption of the live as well as of the materialized work finds its utterance in the costs.

Analysis of the costs therefore has a very particular position because it is being accompanied by a certain uniting and co-ordinative function in

relation to other sector analyses. Its task is to investigate critically, to receive and to complement the results of analyses from other sectors so far as they are influencing the level of costs.

From the analysis of costs the pressure on all kinds of activities and on workers regarding the maximum of economy and improvement of the level of work must be apparent.

The starting point is the comparison of real and planned costs of the finished production / pig-iron for casting and steel-making purposes, tempered or untempered steel, carbon steel etc., rolled material following the tracks, etc./ as a whole divided per 1 ton according to the calculation formule being used. A very important question of the methodology in executing such analyses was the circumstance whether the results of the analyses are to be grouped following the items of the calculation formula or according to the causes involved.

The first method is easier; - it does not however issue from the complex operation of the given cause / e.g. higher oxygen consumption in steel production / which could mean the surpassing of planned costs in one item / in the given case - in the item of the technological fuel / and in other cases savings / as for instance in the item of the continual costs, in the item of malleable ores etc./

The results of the analysis costs may be grouped as follows:

Influences resulting from the material ensuring of the production - quality and physical properties of the metalliferous charge, of technological fuels, of non-metallic charge and of other materials - changes in the structure of charges/ price influences if the prices do not correspond to the utility of separate raw materials from the point of view of metallurgical production/.

Influences resulting from the technological field

- technology
- technical level and the quality of equipment
- maintenance

Influences resulting from the organization of production

- organization of work under the conditions of operation

- volume of the production / influence exerted on the level of constant costs / and the structure of production

Rate of the turnover of circulating means / credit interests / Circulation and wear of the wagons / penalties for delays, repairs/

Influences from the sphere of work and wages

- Drawing the wage funds
- Development of the initiative of workers

Influences of prices and of methodology

- Structure of charges
- changes of prices
- composition of production

Other influences

- natural influences
- insufficiencies, shortcomings in the methodology of planning

Another task of the analysis is to pass under review except the accounting results of a production unit or centre - the results corresponding to the real merits / i.e. including the interoperational penalty which has not been registered in accountancy documents, including the settlement of costs and expenses caused by other operational units etc. The adjusted result forms thus a basis for premiums.

The analysis of sales examines the volumes of sales as a whole as well as the composition of sales, complaints and claims of the customers, equability in dispatching etc.

Another task of the analyses of profits and sales consists in examining the main influences on the basis of costs and expenses / including expenses standing outside the production sphere / and on the basis of analyses of sales including the analysis of price influences.

Several enterprises currently carry out the analyses of the state and of the turnover of circulating means and of the organization of the productive activity.

All the mentioned sector analyses are being elaborated in the form of complex analyses covering separate quarterly and annual periods.

The main of the annual analyses is to examine the indexes whose state of development cannot be established within a shorter period with a sufficient trustworthiness / as for instance the state of maintenance of the production equipment/.

The results of these analyses serve as a very essential basis for planning and granting annual premiums or remunerations to managing personnel.

6. Analyses obtained by inter-plant comparison

A number of new incentives how to increase the efficiency of production, administration and management can be obtained through the analyses executed by comparing the results of different operational units, plants and enterprises.

These analyses are covering either the whole unit or certain sectors only or even some groups of indexes according to the aim of the analysis itself.

It is in the aim of the comparability to exclude from the values under examination all the influences of the outside factors which shall not be subject to the analysis / for instance the influences of natural conditions, of the size of aggregates, of the richness of charges, price influences, wage tariffs /. It is comprehensible that the circle of the factors to be excluded varies from case to case.

7. Methods and techniques of economic analyses

The methodology of economic analyses must enable a correct cognition of all phenomena examined regarding their trends and mutual influencing to the purpose of establishing objectively those factors which assume, in their relation to the analysed changes, the character of causes. One of the tasks of the scientific management is to exploit the acquired notions and informations so that the desirable causal relations could be introduced into practice and, on the other hand, the undesirable relations be suppressed.

From the general methods induction is being used in the case of conclusions from the separate towards the common of universal phenomena. Deduction in

contrary is being used in inverse direction.

The method of abstraction enables the isolation of separate properties or relations between the analysed subjects so that their proper substance could be made comprehensible. Further, as regards the general principles, there is necessary to mention the principle of complexity which is to be understood as mastering all the substantial aspect of the subject of analysis in its basic coherence.

This method should be properly combined and connected with the method of the main element, e.g. concentrating on the principal focal centres of defaults or their possibilities.

A typical method of the economic analysis is the method of comparing. Its application comes into effect by comparing the indexes of the plan with the realities obtained / standards, normatives, values of projects, data of documentation, parameters of competitive enterprises, universal standard rates, theoretically established values and results obtained within the past periods/.

The application of the comparative method leads to the establishment of antagonisms, contradictions, discrepancies, disproportions. Determining the cases of the latter is the foremost task of the analytical method. Its application is practically inseparable from the competitive method because this analysis runs simultaneously with the comparison of the still smaller and smaller sectors.

It is necessary to summarize the factors obtained by the analysis according to their significance into a synthesis. The quantity and correctness of the partial results obtained by the analyses decides on the rightness of this synthesis.

A current method of this analysis is to proceed from the global results to the partial causes. For instance from the surpassing of the planned costs of steel production to the surpassing of scrap norms and to the final causes from the field of furnace attendance.

The indicated proceeding is to be complemented by the inverse proceeding too, e.g. in the direction from the partial causes to the global results.

One of such means is a current establishment of how far the partial factors are exerting their influence, possibly automatically, without interference of the human factor with the use of a measuring device in the primary records and in the operative technical registration.

A serious danger, however, consist in the coincidence of results of the separate causes regarding the fact that the commonly operating causes may lead not only to the cumulation of their effects but also to the compensation or annulment. As far as the details of established causes are concerned, the practical criterion here is as detailed establishment as possible which could enable to propose and to realize efficient measures.

A fundamental and still growing significance has the application of mathematical methods, of mathematical models, of the simulation methods, etc. in deciding on the conception problems of an enterprise. From the point of view of the operative management the methods of the correlative calculations linear and non-linear are of a particular importance. These methods are suitable for examining mutual dependences between separate elements of the analysed process, e.g. in connection with the analyses of the steel furnace efficiency under the condition of different properties of charges or fuels. For the optimum decision - making very important are the methods of mathematical programming leading to the most effective exploitation of limited demand, e.g. maximum exploitation of the track capacity by the intensity and the volume of orders, exploitation of the deficient raw materials, ingredients, admixture etc.

Under the present conditions of Czechoslovak metallurgical works are currently being made into the exploitation of the methods of non-linear and dynamic programming.

The development of these methods to a considerable extent depends on the exploitation of automatic computers but even the use of other more simple mathematical machines enables a substantial deepening of the mathematical methods and acceleration of economic analyses without increasing the administrative apparatus. For instance it is possible to set up planning and perspective calculations following the kinds or limited groups of products. It is possible to express more precisely in figures how the composition of production and separate causes of the changed composition as well as the deviations in quali-

tative indexes of raw materials and changed composition of charges influence the main indexes.

The economic analyses of the metallurgical production are examining a multitude of causes whose operation is in several cases repeated and in others lasting. In the aim of the acceleration and simplification of the analyses it is purposeful to express their results of calculations or the values which have been established empirically in the tables and to use them in the analytical work. Currently are in use table surveys of economic consequences / as regards the level of production, costs, etc. / of the stand-stills of separate aggregates resulting from the stoppage of the supply of gas or electricity, or caused by the repairs or reconstruction of the tracks, of the changes in the composition of production / e.g. re-counting co-efficients of pig-iron on steel etc. / Regarding the use of continual cost rates for the event of deviations in the volume of production it is necessary to stress the fact that a linear re-counting is justified in a limited scale only.

For the concrete conditions of the given operation unit it is necessary to calculate the limits of an uneconomically low as well as the limits of an uneconomically high production. In the field of the proper metallurgy there are being used the values of indexes of the technical and economic dependences defining the influences for instance in the production of pig-iron as follows: Changes in the richness of charges - under Czechoslovak conditions there are opinions that a change in richness of a charge by 1 % / in the limits 25-30 % of the richness of a charge corresponds to a change in the measured consumption of coke by 3,3 % within the limit of 30-35 % the figure 3 % is being considered and within the further limits 35-40 % - 2,7 %, 40-45 % - 2 % and more than 45 % - 1,7 % / Changes in the content of ashes in coke change by 1 % corresponds to 2 % in the change of the measured consumption of coke and to 2 % in the volume of production; Changes in the content of powder substances in coke-changing by 1 % corresponds to 1,25 % in the consumption of coke and in the volume of production; changes in the content of sulphur in coke-change by 1 % corresponds to a change in the measured consumption of coke by 1,8 % and in the volume of production by 2 - 4 %;

changes in the temperature of wind-deviation by 100°C corresponds to a change in the measured consumption of coke by 3,5 %; and so on in all cases if there is a question about the changes in the content of oxygen in the blast wind, in the humidity of air about the changes of basicity of slags etc.

Analogous dependences prevail in steel production^{1/} too, for instance regarding the influence of the molten pig-iron amount in charge on the output of steel furnaces, the influence of the wear of furnaces on their efficiency the influence of the quantity of light scrap material on the length of melting time etc.

It is conceivable that the said linear linkages used in analyses are valid to a limited extent only and in case of aggregates for whose purpose they were established. It goes without saying that regarding to their correctness they assume only an informative character.

Finally, of a considerable significance for the practical realization of economic analyses is the use of graphic methods / nomograms etc./

8. Organization of Economic Analyses

Should the economic analyses happen to assume a character of a genuine instrument of management, it is indispensable that each leading worker would include them into the sphere of his own activity and responsibility. According to this principle, the analyses of production in Czechoslovak metallurgical enterprises are being carried out by directors of the production sectors, the analyses of technology - by technical director etc. The economic directors, on the other hand, are heading the realization of complex analyses in separate plants and workshops besides the analyses carried out directly in sectors managed by themselves analyses of work, wages and costs/.

In socialist enterprises a particular importance assumes the participation of workers and their initiative in realizing the analyses by arranging the discussions on production tasks etc. The results obtained by analyses are equally being discussed during conferences being held on economic and technical topics.

^{1/} See the abovementioned publication

For your information, a survey of terms necessary for the realization of separate kinds of currently used economic analyses in one of the Czechoslovak metallurgical enterprises is enclosed.

Elaboration of a survey of total results forms a basis for proceedings which are necessary for obtaining economic analyses. Among other items, the result should contain a determination of the structure of analysis as well as a specification of documentation and data which are to be secured. The preparation of foundations must equally include an appreciation whether the informations serving as a basis for establishing a plan are correct or not. It occurs very often that the groups of products serving as a basis for elaboration of a plan are too broad, that a due linkage between the plans of production and those of costs, supplies, repairs, technological development, productivity of work etc. is missing.

Checking-up the documents on accountancy, statistics and technological operations above all means a matter-of-fact correctness in weighing in a proper control of measurement etc.

Usually, the proper analysis is being performed on the basis of a harmonogramme containing a survey of supplies of separate kinds of informations in conformity with the balancing terms. After obtaining the results of an analysis it is necessary to draft measures containing the essence of the task, its term as well as a person who is responsible for its fulfilment. It is recommendable to discuss the draft measures in advance with the competent workers involved.

Should the measures be efficient enough, it is necessary to shift their centre of gravity into the prevention. The imposed measures of an operative character are to be performed immediately. Written orders are to be used in imposing essential, long-term and complicated measures only.

The matter-of-fact correctness of a measure depends on the matter-of-fact correctness of the analysis. Further, the proposed measures must be realizable complex, concrete and must be aimed at the final cause.

Consequently, the surplus quantity of the outlet surpassing the fixed plan cannot be considered as a cause of a failure in fulfilling the plans of costs

of blast furnaces because in itself it is a consequence of shortages in the run of the furnace resulting from the primary cause which may consist in neglecting the planned composition of a charge.

The most difficult task to determine is to establish the primary cause within the inter-operational relations.

See for instance the very known chain: scrap in rolling-mills - steel defects - quality of pig-iron blast furnace run - quality of ores.

The survey of data pertaining to the fulfilment of tasks of the analysed summary of phenomena, to the causes of deviations and shortages as well as the draft of desirable measures form the content of the report on the results of analyses performed.

This report is subject to discussions on a consultative conference of workers interested in respective sectors.

As a last item it is possible to quote the control of fulfilment of the imposed measures.

It is very important that a measure should not be considered as to be satisfactorily accomplished unless a competent worker or a body which requested its fulfilment would express their opinion. The principal and long-term measures are to be projected into respective divisions and parts of the plan or technological proceedings.

Conclusion

From the point of view of the application of the mentioned notions and cognitions in the practice of management of the metallurgical production in developing countries it is recommendable to introduce successively separate kinds of analyses. As far as the available quality of analyses is concerned a principle of a direct proportionality between the quality of analysis and the culture of production, administration, and management of an enterprise comes to the validity here. Of a particular importance is the education and the growth of the professional level of economic and technical workers.

It is possible to draft correct measures only after the real causes have

been properly established. For these reasons, the economic analysis cannot remain a matter of concern merely for an economist or technician. In contrary, it should result from their common effort. A technician gets thus acquainted with the economic linkages and principles and the economist is able to penetrate into technical problems.

The real sense and the practical meaning of economic analyses depends of course mainly on the circumstance whether their conclusions are being applied by leading workers to real practice or not. If the economic analyses are not being applied to practical management, they fail to accomplish their proper task and they remain useless.

A basic requirement at the same time is the concentration of the analyses carried out in the practice on the analyses of the future development with the aim of systematic innovations and applications especially of mathematical methods capable of determining the optimum solution from all alternatives coming into consideration.

Table 1

Index of partial analyses in the production of pig-iron

Index	Economic checking	Period of evaluation	Unit	Being evaluated by	Basis for comparison	Note: who is responsible for the measures to be done
1	yes	daily, in decades	%	Technical Control and supply department	prescribed composition	Technical Control and supply department
2	yes	daily, in decades	% of share under 10 m ³ /m	Technical Control	prescribed values	Technical Control and supply department
3	-	daily, in shifts	%	Technical Control and production	prescribed values	leader of production, of supply department and of technical Control
4	-	daily, successively	%	Technical supervision of the shift	norm (standard)	leader of a shift, leader of a sector, leader of production
5	-	daily, successively	kg/t	Technical supervision of a shift	norm (standard)	leader of a shift, leader of a sector, leader of production
6	-	in shifts, daily, in decades	°C	leader of a shift, technologist of production	norm (standard)	leader of a sector, leader of a shift
7	yes	in separate tappings	hour, min.	foreman, leader of a shift	schedule	leader of a sector, leader of a shift

Table 1 (to be continued)

Indexes of partial analyses in the production of pig-iron

Index	Economic checking	Period of evaluation	Unit	Being evaluated by	Basis for comparison	Note who is responsible for the measures to be done:
8	-	in separate tappings	relation CaO + MgO SiO ₂ + Al ₂ O ₃	Laboratory	norm	technologist supervising the shift
9	yes	daily	gr/m ³	Laboratory	norm	leader of a sector
10	yes	in shifts, in decades	t not re-counted	Dispatching, Operational Plan	Plan	leader of a shift, leader of production
11	-	in separate tappings	%	Laboratory technological supervision of shift	norm	leader of shift, leader of a sector, leader of production
12	-	in decades	m ³ /t/24 hours	technologist of production	norm	leader of production
13	-	in shifts	kg/t	leader of shift technologist supervising the production	norm	leader of a sector, of a shift
14	yes	in shifts daily	Czechoslovak crowns (Kčs)	Dispatching, technologist supervising the shift	Reality in past period	leader of shift, leader of production

Table 2

Indexes of partial analyses in steel production

Index	Economic checking	Period of evaluation	Unit	Being evaluated by	Basis for comparison	Documents
1	yes	daily, in decades	t VC	Department of economy	Plan	Melting schedule, schedule of block weight, Bill of delivery
2	yes	daily	t/h	Department of economy	norm	Melting schedules
3	yes	daily	h	Preparation of production	Plan	Graphic survey of furnaces operation, Melting schedule
4	-	daily	h	Preparation of production	Plan	Graphic survey of furnaces operation, Melting schedule
5	-	daily	%	Department of economy	norm	Graphic survey of furnaces operation, Melting schedule
6	yes	daily	t, melting %	Preparation of production	Plan	Melting schedule, Daily orders of rolling-mills
7	-	daily	t, kg/t	Department of economy	norm	Reports of scrap yard

Table 2 (to be continued)

Indexes of partial analyses in steel production

Index	Economic checking	Period of evaluation	Unit	Being evaluated by	Basis for comparison	Documents
8	yes	daily	t, kg/t	Department of economy	none	Report of material handling department, Schedule of mixing aggregate
9	yes	daily	t, kg/t	Department of economy	none	Schedule of melting, Reports of scrap yard
10	yes	daily	kg	Technologist of alloy additions	none	Schedules of melting, Bills of release of alloy additions
11	yes	daily	t	Department of economy	none	Schedules of melting
12	yes	daily	Nm ³ /t	Department of economy	none	Report of oxygen preparation department
13	yes	daily	t, kg/t	Department of economy	none	following the indication of the oil-tanker
14	yes	daily	t, kg/t	Technological Control	none	following the reports on scrap - rate
15	yes	per decades	kg/t	Technologist of charges	none	following the melting schedules

Table 3

Indexes of the analysis of the volume of pig-iron production

Index	Furnace N° 1		Furnace N° 2		Furnace N° 3		Operation of blast furnaces	
	Plan	Reality	Differen-	Plan	Reality	Differen-	Plan	Reality
1 Useful content, m ³	1.000	1.000	-	1.000	1.000	1.000	3.000	3.000
Production, t	40.000	43.000	+ 3.000	36.000	37.000	+ 1.000	25.000	30.000
2 pig-iron for steel-making, t	40.000	43.000	+ 3.000	36.000	37.000	+ 1.000	-	76.000
2 pig-iron for foundry purposes, t	-	-	-	-	-	-	25.000	30.000
3 Production re-counted on pig-iron for steel-making, t	40.000	43.000	+ 3.000	36.000	37.000	+ 1.000	28.750	34.500
4 Calendar time, days	30	30	-	30	30	-	30	30
Planned lost time, days	-	-	-	3	2	-1	9	-
5 general repairs, days	-	-	-	-	-	-	9	-
medium scale repairs, days	-	-	-	3	2	-1	-	3
current minor repairs, days	-	-	-	-	-	-	-	2

104.750 114.750 + 9.750
90 90 2 - 10
- 9 - 9 - 9
- 3 2 - 1 - 1
- - - - -

Table 3 (to be continued)

Indexes of the analysis of the volume of pig-iron production

Index	Furnace N°1		Furnace N°2		Furnace N°3		Operation of blast furnace				
	Plan	Reality	Differen-	Reality	Plan	Reality	Differen-	Plan	Reality	Difference	
Un-planned lost time, days 1)	-	2	+2	-	1	+1	-	-	3	+3	
mechanic defects, 6 days	-	1	+1	-	-	-	-	-	1	+1	
energetic disorders, days	-	0,5	+0,5	-	0,5	+0,5	-	-	1	+1	
operation defects, days	-	0,5	+0,5	-	0,5	+0,5	-	-	1	+1	
7 Operation time, days	30	28	-2	27	27	-	21	30	78	85	+7
8 Calendar meter- days units 2)	30.000	30.000	-	30.000	30.000	-	30.000	30.000	90.000	90.000	-
9 Operation time 2) meter-days units	30.000	28.000	-2.000	27.000	27.000	-	21.000	30.000	78.000	85.000	+7.000
10 Exploitation of the useful content in calendar time	0,750	0,698	-0,052	0,833	0,811	-0,022	1,043	0,870	0,859	0,786	-0,073
11 Exploitation of useful content within operation time	0,750	0,651	-0,099	0,750	0,730	-0,020	0,730	0,870	0,745	0,742	-0,003
12 Daily production within the operation time, t	1333,33	1535,71	+202,38	1333,33	1370,37	+37,04	1369,05	1150-	1342,95	1347,06	+4,11
13 Consumption of coke, t	32.000	33.110	+1100	27.720	28.120	+400	23.000	28.290	82.720	89.520	+6800
14 Specific consumption of coke, kg/t	800	770	-30	770	760	-10	800	820	790	782	-8

Table 3 (to be continued - end)

Indexes of the analysis of the volume of pig-iron production

Index	Furnace N ^o 1		Furnace N ^o 2		Furnace N ^o 3		Operation of blast furnaces	
	Plan	Reality Difference	Plan	Reality Difference	Plan	Reality Difference	Plan	Reality Difference
Intensity of melting within the operation time 3)	1,087	1,182 + 0,095	1,027	1,041 + 0,014	1,095	0,943 - 0,152	1,062	1,053 - 0,009

- 1) Being stated in minutes - for greater simplification in round day figures
- 2) Product of the useful content and of the time of furnace run in days
- 3) Following the kinds of the pig-iron.

100
100

Table 4

Indexes of the analysis of the volume of steel production

Index	Furnace N°1		Furnace N°2		Furnace N°3		Furnace N°4		Steelwork/as a whole						
	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference			
1	60	60	-	60	60	-	60	60	-	240	240	-			
2	110873	105977	-1896	113256	109135	4121	108112	100702	-7410	115060	101220	-13960	447301	419934	-27387
3	Calendar time, h	8760	-	8760	8760	-	8760	8760	-	8760	8760	-	35040	35040	-
	Morning rest, h	75	-	16	15	-	87	87	-	107	107	-	285	285	-
	General repairs, h	180	-30	-	-	-	218	202	-16	102	104	+2	500	456	-44
	Cold patching, h	444	-39	346	330	-16	576	556	-20	410	456	+46	1776	1747	-29
	Heat patching, h	106	+2	82	78	-4	50	52	+2	110	105	-5	348	343	-5
	Decace repairs, h	284	-19	278	240	-38	289	290	+1	366	380	+14	1217	1175	-42
	Drying-out of furnaces, h	127	-	178	178	-	183	183	-	189	189	-	677	677	-
	Gross operation time, h	7544	+66	7860	7318	+58	7357	7390	+33	7476	7419	-57	30337	30357	+120
4	Defects and shortages, h	-	+203	-	185	+185	-	121	+121	-	199	+199	-	708	+708
	due to improper operation, h	-	+114	-	70	+70	-	60	+68	-	77	+77	-	329	+329

Table 4 / to be continued/

Indexes of the analysis of the volume of steel production

Index	Furnace N°1		Furnace N°2		Furnace N°3		Furnace N°4		Steelwork as a whole						
	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference			
due to improper maintenance, h	-	53	+ 53	-	75	+ 75	-	25	+ 25	-	58	+ 58	-	211	+ 211
due to the operation of other workshops	-	36	+ 36	-	40	+ 40	-	28	+ 28	-	64	+ 64	-	168	+ 168
5 Net operation time, h	7544	7427	-117	7860	7733	-127	7357	7269	-88	7476	7220	-256	30237	29649	- 588
6 Time exploitation, %	86,1	84,7	-1,4	89,7	88,2	-1,5	83,9	82,9	-1-	85,3	82,4	-2,9	86,2	84,6	-1,6
7 Net operation time, days	314,33	309,45	-4,88	327,50	322,20	-5,30	306,54	302,87	-3,67	311,50	300,83	-10,67	125,87	1235,37	-24,50
8 Net operation time measured in meter-days	18859,8	18567,-	-292,8	19650-	19232-	-318-	18392-	18172,2	-2292	18690	18049,8-	640-	75592,2	74122,2	-1470
9 Quantity of meltings within the calendar time	1500	1450	-50	1500	1400	-100	1600	1560	-40	1600	1410	-190	6200	5820	-380
10 Weight of melting, t	73,915	75,157	+1,241	75,504	77,954	+2,450	67,570	64,553	-3,017	71,925	71,716	-0,209	72118	72154	+0,006
11 Length of melting in of the net operation time	5,0293	5,1221	+0,0938	5,2400	5,5236	+0,2836	4,5981	4,6596	+0,0615	4,6725	5,1206	0,4481	4,8769	5,0943	+0,2174
12 Output in t/h of the net operation time	11,636	14,673	+0,023	14,409	14,112	- 0,297	14,695	13,853	-0,842	-15,393	14,005-	1,388	14,793	14,163	-0,630
13 Exploitation of fire basis in h of net operation time	5,879	5,869	-0,010	5,764	5,645	- 0,119	5,878	5,542	-0,336	6,157	5,602	-0,55	5,418	5,665	-0,253

D/W: 11/3/

Table 5

Indexes of the analysis of the volume of rolled material production

Index	Blooming mill			Billet train			Medium small mill train			Rolling-mill (total)		
	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference
1 Train production, t	100000	100000	-	40000	50000	+10000	30000	25000	-5000	170000	175000	+5000
Co-efficient of labouriousness	1,1	1,2	+0,1	1,3	1,3	-	1,2	1,3	+0,1	-	-	-
2 Re-counted production, t	110000	120000	+10000	52000	65000	+13000	36000	32500	-3500	198000	217500	+19500
Calendar time, h	720	720	-	720	720	-	720	720	-	-	-	-
Unproductive time, h	240	200	-40	120	100	-20	100	100	-	-	-	-
3 Gross operation time, h	480	520	+40	600	620	+20	620	620	-	-	-	-
Other lost time, (total) h	20	40	+20	40	40	-	20	30	+10	-	-	-
Of these technologically necessary, h	20	10	-10	40	30	-10	20	20	-	-	-	-
Defects, h	-	30	+30	-	10	+10	-	10	+10	-	-	-
4 Net operation time, h	460	480	+20	560	580	+20	600	590	-10	-	-	-

Table 5 /continued/

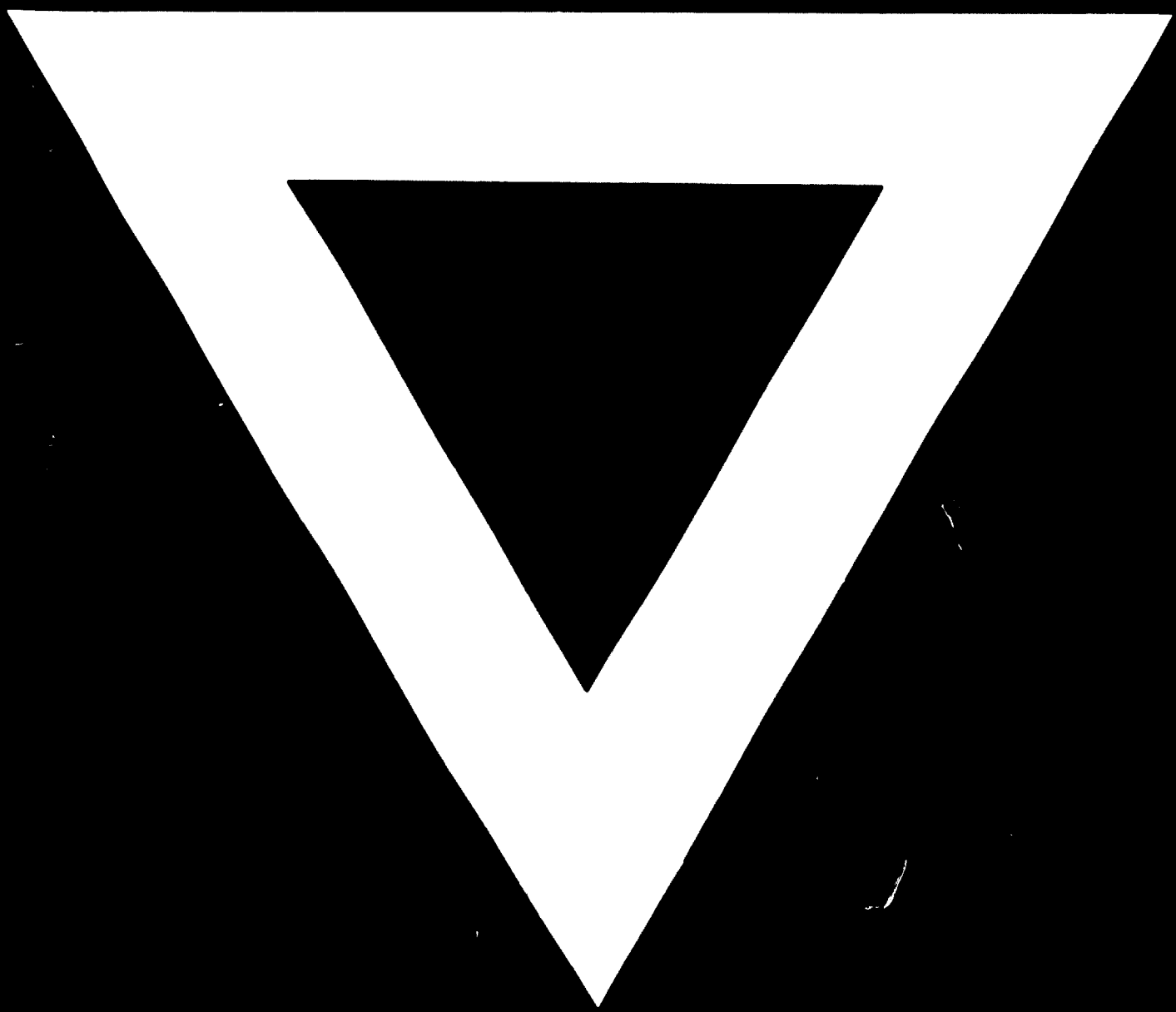
Indexes of the analysis of the volume of rolled material production

Index	Blooming mill			Billet train			Medium small mill train			Rolling-mill (total)		
	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference	Plan	Reality	Difference
5	239,13	250	+ 10,87	92,86	112,07	+19,21	60	55,08	-4,92	-	-	-
6	-	-	-	-	-	-	-5000	+ 2000	+ 7000	-5000	+ 2000	+ 7000
7	110000	120000	+ 10000	52000	65000	+13000	41000	30500	-10500	203000	215500	+12500
8	57200	72800	+ 15600	39600	35100	- 4500	-	-	-	96800	107900	-13100
9	52800	47200	- 5600	12400	29900	+17500	41000	23000	-18000	106200	107600	+ 1400

Table 6

Terms of elaboration of written reports on analytical results

Kind of analysis	Preventive monthly and quarterly analyses		Control analyses	
	Monthly	Quarterly	Monthly	Quarterly
Partial analyses	Until the end of the last month	Until the 4 th day of the forthcoming month	Until the 5 th day after the end of a quarter of a year	annual Until January 20 th
Sector analyses				
Production	Until the 2 nd day of a current month	7 th day	8 th day	January 20 th
Technology				
Including energetics, investments	2 nd day	11 th day	12 th day	January 22 nd
Quality of production	2 nd day	8 th day	9 th day	January 22 nd
Maintenance and basic funds	2 nd day	11 th day	12 th day	January 22 nd
Supplies	1 st day	7 th day	8 th day	January 22 nd
Technical and operational measures	2 nd day	11 th day	12 th day	January 22 nd
Work and wages	3 rd day	12 th day	13 th day	January 25 th
Costs	3 rd day	12 th day	13 th day	January 28 th
Sale and results from the realisation of the				
Industrial production	3 rd day	12 th day	13 th day	January 29 th
Circulating means	3 rd day	12 th day	13 th day	January 29 th
Complex analyses	4 th day	13 th day	14 th day	February 2 nd



2 . 4 . 74