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USSR Report

MACHINE TOOLS AND METALWORKING EQUIPMENT

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MACHINE TOOLS AND METALWORKING EQUIPMENT

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Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 Oct 83 p 2

[Article by V. Vasil'yeva, deputy editor of the newspaper's machine-building and new equipment department: "No Discounts on Considering Current Business"]

[Text] Three years have passed since the previous election-report party meeting in the Ministry of Machine Tool and Tool Building Industry [Minstankoprom]. During that time, noticeable progress has been made. In two-and-a-half years of the five-year plan period, the output increased by 17.7 percent for a 16.4 percent plan, the productivity of labor increased by 18 percent for a 12 percent plan. Tasks on reducing the production cost and profits were fulfilled. During these years, output rose sharply and series production of automatic manipulators with programed control was started. Machine tool builders also began the creation of flexible automated production facilities.

It would seem that these achievements would give cause to the Communists gathered at the regular election-report meeting to be in a placid frame of mind. However, in the words of L. Chuprakov, secretary of the partkom of the ministry, to whom I spoke a day before the meeting:

"In the last few years, the Minstankoprom was among the leading three machine-building ministries. However, I think we do not need to talk about that at the meeting."

The sharp, critical mood of the report set the tone for the discussions. Afterward, the Communists of the ministry told me that they could not recall such a meeting, so business-like, so specific in evaluating the work of the sector and the management. The main thrust of the talk at the meeting was a discussion of the style and methods of the work of the party organizations and the ministry's apparatus work.

Emphasizing that a change began in management style in the ministry in accordance with modern requirements, the Communists openly uncovered the faults in, and the costs of the work of the apparatus; criticised impartially cases of formal, bureaucratic attitudes toward the solution of individual problems; indicated that over a thousand telegrams and sacks of mail are received daily at the ministry. A huge flow of paper. How does it originate?

For three years, the Minstankoprom corresponds with the Zhitomir party obkom about modernizing the Berdichev "Komsomolets" Machine Tool Plant. Without adopting a specific solution, ministry workers evaded a direct answer. Finally, they found themselves in an awkward situation, having said in one of the letters that the reason for the delay was the lack of an architectural planning task. To which an answer followed from Zhitomir: such a task was approved over a year ago.

The formal apporach to the solution of the most important problems is attested to by the practice of spreading advanced experience. The "Soyuzlitprom" VPO [All Union Production Association] system has two plants -- the Kaunas and the Gomel' " Tsentrolit." For a long time, over 90 percent of their output was supplied over direct long lines. Their supply plans are strictly in accordance with contracts, and both enterprises cope ably with their tasks. It would seem that the association workers and, especially, I. Smykov, the VPO chief, would take measures to spread this experience among their other enterprises. Yet, two other plants in this association -- the Tbilisi and the Rustava supply only less than 10 percent of their products over direct lines, and there is total confusion in their plans. The Rustava "Tsentrolit," for example, must supply the Gomel' "Gidroavtomatika" PO [Production Association] with 960 tons of castings, although they had a contract for only 640 tons. Should one be surprised that the Tbilisi and the Rustava plants are among the lagging ones?

Other demonstrations of the bureaucratic style were also discussed at the meeting. Thus, for example, one of the inquiry forms, introduced by the transportation department, contains 921 (!) lines. How much time and effort is expended by association workers on this not very useful work?

Analyzing the work of the ministry's partcom, V. Arutyunov, secretary of the "Soyuzkuzmash" VPO, and other speakers stressed that in recent times, its meetings have become more diverse, decisions more specific and monitoring their implementation stronger.

"It is difficult to overcome people's inertia," noted L. Chuprakov in his report, "We were in no hurry, at first, to punish, and tried to scrutinize the situation more deeply and help."

This made it possible for the partcom to implement a number of significant measures. Thus, the assimilation of capital investments in the "Soyuzgidravlika" VPO improved; the main quality control developed additional measures on raising the technical standard of the products; and plans were implemented on creating auxiliary facilities; the partkom also helped several VPO with their manpower problems.

However, far from everything is solved rapidly and painlessly. Take, for example, reequipment of the sector -- a most important problem for the machine tool builders. Not solving it, not taking measures for the efficient utilization of our own production potential will hardly help machine tool builders to solve their problem -- to provide the creation and production of equipment

in quantities sufficient for accelerating the reequipment of the machine-building sector of the country to a high technical standard. After discussing this question at one of the party meetings, the partkom charged A. Naumov and N. Stepanov, managers of two administrations, technical-designer and capital construction, to outline measures to improve reequipment planning. However, only after several months, after the partkom twice returned to this question, instead of a scientific-technological concept of the sector... they presented a status of developing plans and projects.

Communists stressed bitterly that customers are reluctant to acquire some of the equipment manufactured by the Minstankoprom enterprises, evaluating it as outdated and not meeting modern requirements.

The speech by G. Ginzburg, chief of the "Soyuzlitprom" VPO, contained especially many censures of the "Soyuzlitmash" output. Its chief, N. Semenov, cares little about the development prospects of a subsector and about the comprehensive mechanization of one of the most difficult productions, namely, the foundry.

Mainline, promising questions are very frequently beyond the imagination of association managers and ministry administrations. The reason is the fact that much time and effort is absorbed in considering current affairs, and specialists demonstrate little independence. As noted in the speech by R. Marulidi, deputy chief of the "Soyuzstankoprom," related associations cannot at times negotiate with each other on current questions without the interference of the ministry's managers.

While the speakers noted that the activity of the management apparatus is becoming more purposeful, there was obvious dissatisfaction with the rate of the change. The meeting showed that Communists of the ministry report shortcomings and omissions to themselves and they are aware of the serious claims about their sector. They also see ways of overcoming those shortcomings. Yes, great responsibility lies on the staff of the party organization of the sector, which is rightly called the heart of machinebuilding. On how successfully the change in the ministry is implemented according to modern requirements and how fully the Communists are able to eradicate shortcomings and implement the proposals made at the election-report meeting, will greatly depend the further development of the sector.

2291
CSO: 1823/85

GOSPLAN OFFICIAL ON CAPACITY UTILIZATION IN MACHINE TOOL INDUSTRY

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 11, Nov 83 pp 40-46

[Article by N. Konovalova, chief of a sector of the Scientific Research Institute of Planning and Norms attached to the USSR State Planning Committee: "The Planning of Production Capacities and the Reserves of Production Efficiency"]

[Text] The 26th party congress posed the task of improving the utilization of production capacities and fixed capital and increasing the shift coefficient of machines and equipment. The fulfillment of the decisions of the congress and the November (1982) CPSU Central Committee Plenum on the intensification of social production and on this basis the increase of efficiency is inseparably connected with the increase of the efficiency of fixed capital and the improvement of the utilization of capacities.

In spite of the fact that this problem is at the center of attention of experienced workers and scientists, it is being solved slowly. During the 10th Five-Year Plan the fixed production capital of industry increased by 44 percent, the production of output--24 percent, the capital-labor ratio--36 percent, while the output-capital ratio continued to decline. Thus, at the end of the five-year plan 14 percent less output was obtained per ruble of fixed capital than in 1975.

The potential output-capital ratio depends on the magnitude of the production capacity, since the latter determines the maximum possible production of output by the given enterprise. The increase of the level of the output-capital ratio involves the improvement of the planning of production capacities and the improvement of their utilization.

The starting point of planning is the determination of the available capacities. The basic statutes on their calculation over the past 20 years have been repeatedly revised and supplemented. In 1960 they were a component of the Instructions on the Taking of a One-Time Inventory of the Available Production Capacities of Operating Industrial Enterprises as of 1 January 1960, while starting in 1963 they were formed into an independent document, which was revised in 1977. At the same time some questions of the planning of production capacities remain controversial (the choice of the products list for the calculation of the capacity, the leading unit, the available amount of time and so on).

The improvement of the procedural provisions is called upon to solve a practical problem--to increase the role of the indicator of the production capacity in the planning and evaluation of the efficiency of the work of enterprises, associations and the sector and to envisage the most complete utilization of all resources. The basic function of this indicator serves as the objective basis of the plan of production, which also predetermines the content of individual instructions.

The question of the products list (planned, specialized, optimum and so on) for the calculation of the production capacity has been repeatedly raised in the press, the practice of its calculation according to the planned products list has been criticized. A problem exists here; for before determining how much output can be produced on the given equipment, it is necessary to know, what items will be produced, since the creation of each unit of use value requires the expenditures of a different number of machine-hours of individual groups of tools of labor.

In our opinion, the question of the products list for the calculation of the production capacity should be settled on the basis of the purpose of this indicator in planning. If the magnitude of the capacity is the basis of the establishment of the planned volume of production, both indicators should have a single products list--the planned products list, which reflects, of course, the national economic need. The calculation of the production capacity in any other products list would lead to incomparability of the capacity with the plan of the production of output and the uselessness of this indicator for enterprises.

Consequently, the use of the planned products list for the determination of the capacity stems from the practice of using the indicator. For the purpose of ensuring the maximum possible utilization of machines and units under the conditions of the formed national economic need for products the planning organs when establishing the planned products list have to take into account to a greater extent the specialization of the enterprises and the composition of their equipment. In this connection for the units of management during the preplanning period it would be useful to make calculations of the capacities in accordance with the optimum (from the point of view of the assurance of the greatest utilization of the equipment) products list and to use the results of such calculations when breaking down the products list by enterprises.

The underutilization of equipment, which is being observed at present, is a consequence, in particular, of the change of the specialization of enterprises as compared with the planned specialization, the lag in the formation of its pool for new products, the existence in it of disproportions, which lead to the decrease of the efficiency of fixed capital, which requires urgent steps in the area of production management. The best utilization of equipment is noted at specialized works, the creation of which remains an urgent problem of the development of industry.

The definition by procedural documents of the concept of the production capacity as the maximum production of output always included an addition--"in case of the complete utilization of the production equipment." The realization of this provision in practice signifies that both all the equipment and the entire effective available operating time of each unit of it is included

in the calculation of the production capacity. However, equipment which is not included in the calculation of the production capacity (reserve equipment, equipment of pilot experimental and special sections for vocational and technical training) is envisaged by the procedural documents, which already predetermines its incomplete utilization. Moreover, it is recommended to ministries and departments to approve in the sectorial instructions the standard level of the utilization of machines and units (which no longer implies a 100-percent level), in accordance with which the production capacity of the enterprise should be calculated, while the value of the standard shift coefficient of the equipment should be established at the level, which was adopted in the plans for the construction of similar works.

The analysis of the plans of machine building enterprises shows that the utilization of the equipment in the machining shops comes on the average to 70-85 percent and in the assembly shops to 70-80 percent. In conformity with the plan of the Plant of Automatic Manipulators (Shuya), which was approved in 1981, the utilization in the assembly process is 84 percent, including in the shop of base and flat parts--86 percent, the shop of parts of bodies of rotation--83 percent, the assembly shop--75 percent and the wiring shop--73 percent. Here in the first shop in individual sections it ranges from 82 to 86 percent, in the second shop--from 58 to 86 percent. In accordance with the plan of the expansion of the Ivanovo Plant of Heavy Machine Tool Building imeni 50-letiya SSSR (which was also approved in 1981) the utilization of machine tools at the assembly works comes to 83 percent, including in the shop of location and base parts--78 percent, the shop of parts like bodies of rotation--82 percent.

These data as a whole conform to the recommendations of design documents. Thus, in conformity with the handbook "Proyektirovaniye mashinostroitel'nykh zavodov i tsekhov" [The Designing of Machine Building Plants and Shops] the level of utilization of equipment in mass flow line and large-series production is equal to 65-75 percent, in series production--80-90 percent and more. It is hardly possible to regard as standard the planned underutilization of 25-35 percent. Therefore in case of the designing of new enterprises and the calculations of the production capacities of operating enterprises it is advisable to proceed from common norms and standards of the utilization of equipment both by individual kinds and as a whole by types of enterprises. When evaluating the plans it is important to analyze the indicators of the use of means of labor and to compare the planned output-capital ratio and the output-capital ratio of similar enterprises which are being operated and the efficiency of the new and operating equipment.

Indicators of the utilization of equipment--ones which are common for the planning and determination of the production capacities--already exist in the practice of planning. These are the amounts of available working time of individual types of equipment, which are recommended by the All-Union Norms of the Technological Designing of Enterprises of Machine Building, Instrument Making and Metalworking.

It is most difficult to establish the standard value of the utilization of all the equipment of an enterprise. In the machine building industry the shift coefficient of the equipment, which is calculated in conformity with the

procedural instructions by the ratio of the number of machine tools available per unit of output to the estimated (effective) available time of all the installed equipment of the basic shops per shift, can be used for this purpose. However, the enterprises include in this indicator not all the installed machines and units, but only those used in the calculation of the capacity, which leads to its overstatement.

In 1980 for 11 machine building ministries the shift coefficient of equipment, which was determined by such a method, came (according to the reporting data) to 1.42. Here the amount of equipment, which was not used in the calculation of the production capacity, amounts to 22 percent of the metalworking equipment of the basic shops, including in the Ministry of Heavy and Transport Machine Building--38 percent, the Ministry of the Electrical Equipment Industry--27 percent, the Ministry of Instrument Making, Automation Equipment and Control Systems--47 percent and so on. There are enterprises at which more than half of the machines and units of the basic shops are not used in the calculation of the capacity, that is, do not form it.

The recorded reporting data are necessary for the evaluation of the efficiency of the utilization of fixed capital and capacities, the planning and management of their reproduction and the distribution of capital investments. The elimination at present of such reporting, in our opinion, is groundless. It would be useful to revive the appendix to the annual report balances of production capacities, in which data on the shift system of the operation of the equipment of the basic shops would be contained; similar indicators exist in the planning materials, but their value is depreciated by the lack of reporting data.

A number of enterprises do not include in the calculation of the capacity for the planning period the equipment, which is being changed over into new assemblies, has been freed as a result of the reduction of the production program, is intended for transfer to other shops, is obsolete, is to be written off, performs auxiliary operations which are necessary in accordance with the technological process and so on. Consequently, a subjective approach to the question of the equipment which determines the capacity occurs. It seems that it is possible not to include in the calculation of the capacity the batch-operated equipment, to which workers are not attached, but it is advisable to establish its standard amount.

The reserves of production efficiency consist both in the most complete quantitative reflection of the equipment in the capacity of enterprises and in the increase of its utilization. At present for 11 machine building ministries about 30 percent of the available time of equipment, which is used in the calculation of the capacity, is not being utilized, including in the Ministry of Heavy and Transport Machine Building--34 percent, the Ministry of the Machine Tool and Tool Building Industry--32 percent, the Ministry of Machine Building for Light and Food Industry and Household Appliances--35 percent.

The cited data attest that the operating capacities reflect far from completely the possibilities of the accumulated production potential of the sector. Machine building has excessive equipment for the achieved production volume; a portion of the capital investments are being used ineffectively.

The questions of the increase of the efficiency of the utilization of fixed capital require an increase of attention. It is well known that the production capacity of machine building enterprises is determined, although with respect to the leading equipment, as a rule, with respect to the group which has the least production possibilities. This also predetermines the underutilization of other, more extensive units.

In many instances equipment with a long serive life and, consequently, worn out equipment is a bottleneck. Under such conditions it is hardly possible to regard the production capacity as the maximum possible production volume. Thus, at the Riga Diesel Building Plant two three-spindle planer-type milling machines, which were put into operation in 1951, are included among the leading equipment which determines the production capacity of the enterprise; their service life has greatly exceeded the standard service life. The utilization ratio of the equipment of the machine shops is 47 percent. The age of nearly half of the metalworking equipment exceeds 20 years. Machine tools with increased wear do not ensure the production of parts in conformity with the requirements, which entails an increase of the labor intensity and the production cycles.

At the Odessa Plant of Presses and Automatic Machines three planers, the service lives of which are 30, 27 and 24 years, are grouped with the leading equipment which determines the capacity. The production capacity of the Lvov Milling Machine Plant was established with respect to 2 percent of the equipment of the entire enterprise. It was taken in accordance with the line of base and location parts, the possibilities of which are determined by eight planer-type milling machines (with a utilization ratio of 0.99) and four planer-type grinding machines (the utilization ratio is equal to 1.0); the average utilization ratio of the equipment of the entire line is 0.91, the utilization ratio of all the metalworking equipment of the machine shops is 0.80.

At the Leningrad Machine Tool Building Association imeni Ya. M. Sverdlov the proportion of machine tools with a service life of more than 20 years comes to nearly 20 percent of the entire pool. These are mainly heavy and single-design machine tools of the leading groups of equipment of machine shops Nos 38 and 39, which determine the capacity of the enterprise. Bottlenecks are being created due to the unsatisfactory state of the machine tools, frequent breakdowns and the length of repairs. The planer-type milling machines with a planing width of 1,250 mm and the planers with a planing width of 1,800 mm are bottlenecks of leading Shop No 38, their utilization ratio comes to 100, and a portion of the operations are being transferred from them to other equipment. The association has been ordering machine tools for a number of years, but the orders are not being filled. The average utilization ratio of the equipment of the machine shops at the end of 1981 was 0.63, including Machine Shop No 33--0.54, Shop No 40--0.53 and so on.

The determination of the capacity in accordance with the bottlenecks is a consequence of a number of factors. The lack of specific clear definitions by the sectorial instructions of the leading unit as applied to the types of enterprises and the establishment of the production plan from what has been achieved are of importance. It seems that it is advisable to select the leading unit on the basis of its role in the technological process and according

to some technical and economic attribute (the greatest machine-output ratio, capital-output ratio and so on), regardless of whether this place is broad, average or narrow. It is impossible to take into account the quantitative characteristics of the individual units and their discreteness when planning the utilization of production capacities.

Under the conditions of established practice this signifies the consideration of the disproportions, which are unavoidable during the planning period, the shortage of raw materials and workers, the lack of demand and so on when planning the production volumes. Strictly speaking, the calculation of the utilization of the production capacity is being inadequately used in planning practice as an independent stage.

Frequently the apparent success with the utilization of production capacities conceals the great underloading of equipment already at the stage of the drafting and approval of the plan, which attests to the need for the increase of the soundness of planning decisions. The level of the utilization of capacities is determined by the production volume and their amount, while the latter is determined by the methods of calculation and the quality of the standard indicators, which are the basis for their determination. Consequently, the check of the correctness of the calculation of this amount by the quantitative and qualitative reflection of all the factors determining the capacity and the specification of the utilization ratios is necessary in order to reveal the deep-seated reserves of production. Therefore in case of a thorough analysis of the efficiency of the production apparatus in addition to the examination of the given ratios it is impossible to avoid the questions of the method of the calculation and the standard base of the capacities.

The standard base remains the weak link in planning, for the present the proper attention is not being devoted to it. The indicators of the utilization of capacities at present do not reflect the degree of influence of the factors which determine them (first of all the equipment) and, hence, also do not fully reveal the level of utilization of the production apparatus. In our opinion, it is expedient to regard the capacity of an enterprise to be properly installed from the standpoint of the reflection in it of the possibility of the entire set of the means of labor of the given enterprise only if in this case the standard utilization of the equipment as a whole is envisaged, that is, the standard level of the utilization of equipment, which is the material base of the production capacity, corresponds to the 100-percent utilization of the capacities.

It is not easy to achieve such a situation. The constant improvement of the methods of planning and management at all levels of the organization of production, the comprehensive replacement of the fixed capital of the enterprises, the assurance of the interdependence of the production shops, specialization and so on are required. Here the determination of the functions and the increase of the responsibility of each unit of management are necessary.

The sectors of industry in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement of the economic mechanism have to draft more actively within the five-year plans the balances of production capacities. At present the indicator of the capacity in general

is lacking in the five-year plans of enterprises. It is necessary to have at every enterprise 5-year planning balances of the production capacities (with their calculation by years). Long-range calculations will make it possible to detect disproportions in good time, to plan and implement in good time comprehensive measures on their prevention, to expand and replace fixed capital in coordination with the tasks of the increase of production capacities. Obviously, the ministries should also bear on equal terms with the enterprises the responsibility for the utilization of fixed capital and first of all equipment.

At times the standard utilization of machines and units cannot be achieved in case of the products list set for the enterprise. Consequently, the question of the cooperation of the utilization of underloaded equipment awaits its settlement. In this connection the suggestion of V. Vorotilov and V. Cherevan' merits attention. "Calculations show," they write, "that if the production program were formulated not only for its own production capacity, but also for the entire set of metalworking equipment, which has been installed in different sectors of the city, the machine building of Leningrad could by means of the cooperation of the utilization of equipment additionally increase the production of output by 4-5 percent, improve the utilization of the pool of machine tools by 6-8 percent and in many ways eliminate what is called the problem of bottlenecks."[1]

Such cooperation in the utilization of equipment up to the standard level, apparently, should be taken into account when calculating the capacities. It is advisable, in our opinion, to introduce in practice the concept of the standard production capacity, which signifies that the installed capacity of an enterprise is substantiated by the standard level of the utilization of equipment. Owing to this it will become possible to evaluate the intensity of the plan and the results of the work in accordance with the utilization ratios of the capacities.

At present such a process has been complicated by the fact that the capacity is installed in case of a different degree of use of the means of labor, and high ratios do not yet imply the efficient consumption of the resources being allocated to the enterprise. At individual enterprises along with high indicators of the utilization of production capacities lower indicators for equipment are being observed. Thus, at the Zhitomir Plant of Automatic Machine Tools the production capacity is being utilized at the level of 99.7 percent, while the equipment is being utilized at the level of 58 percent. At the Pinsk Plant of Automatic Forge and Press Lines in case of the worse utilization of the capacities (66 percent) the utilization of the equipment was higher (67 percent). At the Chistopol, Petrodvorets and Minsk Timepiece Plants the utilization of the capacities is equal (100 percent), while the shift coefficients of the equipment, which were taken for their calculation, are different (1.59, 1.75, 1.91).

A high level of the utilization of the capacity at times conceals a lower shift coefficient of the equipment. For example, at the Bazarnyy Syzgan

1. V. Vorotilov, V. Cherevan', "A Full Load for Equipment," KOMMUNIST, No 17, 1980, p 44.

Teplopribor Plant at the end of the 10th Five-Year Plan the production capacity was utilized at the level of 76.5 percent, while at the Blagoveshchensk Amurelektropribor Plant it was utilized at the level of 65.4 percent, but the shift coefficient of the equipment at the former enterprise came to 1.01 and at the latter--1.46.

Consequently, when evaluating the activity of enterprises it is important to take into account the indicators of the utilization of both the capacities and the equipment. The intensification of production is reflected in the simultaneous increase of these indicators. The analysis shows that the complete utilization of the production capacities is encountered as an exception, while this attests to reserves of their utilization at practically all enterprises.

As in known, as a whole for the ministry and the sector the capacities are specified by products. In machine building their underutilization occurs for nearly all items, which confirms the existence of reserves of the increase of production.

Along the with tasks on the improvement of the utilization of production capacities the questions of the intensification of their reproduction merit greater attention. In the decisions of the 26th CPSU Congress it is indicated: "To begin the construction of new enterprises and the expansion of operating ones if the needs of the national economy for the given type of products cannot be met by the improvement of the utilization of production capacities with allowance made for renovation and retooling."[2]

However, with respect to many products these forms of reproduction for the present do not occupy the proper place, and new construction is being carried out in case of the underutilization of the available capacities. During the 10th Five-Year Plan 62 percent of the increase of the production capacities for the production of milling equipment was provided by means of new construction in case of their utilization in 1975 at the level of 86 percent and in 1980--77 percent; for main-line freight cars the corresponding data are 70, 90 and 81 percent, for back hoes--76, 91 and 86 percent.

It is important to direct special attention to the decrease of the production capacity due to the increase of the labor intensity in case of a change of the products list, which is being observed with respect to the majority of items in machine building. At times the introduction of capacities by means of capital investments is "eaten up" by the increase of labor intensity. However, their decrease in case of a change of the products list is not substantiated by the calculations of the efficiency of new products for the national economy.

The improvement of the utilization of production capacities and fixed capital holds an important place in the implementation of the policy of the November (1982) CPSU Central Committee Plenum of continuing the work on increasing the efficiency of the economy. The collectives of enterprises have to direct their efforts at the mobilization of resources and the assurance of the increase of the output of each unit of equipment. In this the importance of the increase of the level of planning work in all units of management is becoming even more significant.

2. "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 174.

7807
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RECENT STEPS AT RATIONALIZING LABOR, PRODUCTION, EQUIPMENT COSTS

Moscow PRAVDA in Russian 22 Nov 83 p 2

/Article by V. Mel'nikov, deputy chief of the Planning and Economics Department of the Construction Administration of the Krastyazhmash Association, Krasnoyarsk: "A Bonus For What?"/

/Text/ With each passing year, more expenditures are required for the construction of new enterprises. On the whole, this process is quite proper: industrial production is becoming more complicated and more improved and costly equipment is required, equipment that is in keeping with the best international standards. The expenditures are also increasing owing to the fact that the new enterprises being erected are located in sparsely settled areas. But quite often the increases in prices are caused by entirely different factors.

One half of the expenditures required for erecting the Krasnoyarsk Plant for Heavy Excavators was used for equipment. A large portion of this equipment consisted of non-serially produced items, for which there were no approved wholesale prices. How can these be determined? This year the following system is being employed: the chief price forming element is the wages of the production workers, with all other expenditures being dependent upon them -- excluding expenditures for material resources. The labor expenditures are computed by simply multiplying the norm-hours by the wage rate for the worker. We obtain such information over the signature of the chief or engineer of the labor and wages department of the plant-producer. Hence there are no computations or proof as to exactly how many norm-hours were actually expended. "Coordination" of the price leads to a simple formality with the conditions being dictated by the supplier. We attempted to obtain additional computations for the wages and norm-hours, but we were accused of being bureaucratic: we were told that never in the past had anyone expressed such interest until suddenly we did so.

And the time had arrived for such interest to be displayed. The price increases greatly owing to expenditures for the maintenance of departmental, all-plant and other administrative elements. Under these conditions, a temptation arises to add hundreds of rubles worth of wages, which automatically are converted into thousands of rubles of net profit.

The Yegoryevsk Komsomolets Machine-Tool Plant sent us a plan for the wholesale price for a horizontal gear-milling machine, in which the wages for workers

amounted to 4,500 rubles and planned profits -- greater by almost twofold. When we rejected it based upon instructions from USSR Stroybank, which held that the planned profit may not exceed one fifth of the production cost, the plant sent us the profitability norms for determining the wholesale prices for Minstankoprom /Ministry of the Machine Tool and Tool Building Industry/ products, approved in September 1982. Our claims were denied based upon this document, since other enterprises of the branch are also establishing a high planned profitability.

It is clear that artificially high income cannot serve as a stimulus for improving the economic indicators. Why are the enterprises troubling themselves over lowering production costs by 3-4 percent or reducing waste when it is completely legal, with the aid of one's own department, to obtain several times more? It is believed that the planned profitability must be limited to 12-15 percent of the production cost.

It is also wrong to include the maximum bonus for workers in the price, since a portion of the bonus fund is formed by means of deductions from the profits, including from planned profit. When determining the planned profitability, both the material and fuel-energy resources should be excluded from the production costs. However, since these expenditures in the majority of instances are being taken into account in the departmental or all-plant expenses, not one plant is excluding them. In short, the time is at hand for defining more precisely those instructions which are still incomplete. Owing to the fact that the prices for equipment have increased (at times by a factor of 1.5-2), the estimated cost for our plant is also increasing. This is an unprofitable development as far as the state budget is concerned.

The builders are trying to withdraw more money from the pockets of the client and, it follows, the state. Here an "effective" lever for them is use of the job contract plus bonus wage system. Actually, in accordance with the existing statute, the payment of awards to workers for having shortened the periods required for carrying out tasks or for improving the quality of construction must be made by the client. Last year, some bonuses at our construction site amounted to almost 3 million rubles, or approximately 4 percent of the cost of the construction-installation work. There would be no objection to this if labor productivity increased proportionately or if an acceleration took place in the schedules for placing projects in operation. Alas, the plan for construction-installation work was fulfilled by only 71 percent and the figure for labor productivity was even worse -- 53 percent. The quality of the work was low and the planned capabilities were not placed in operation. And if we proceed on the basis of job contract order tasks, then it turns out that the normative period of construction was reduced by a minimum of 25 percent.

How is it possible, in the face of such a progressive wage system and a reduction in the normative period, for labor productivity of the workers to be frozen somewhere in the vicinity of the level for 20 years ago? The secret is a simple one: the job contract plus bonus wage system in construction has been converted into a "legal" meal-ticket for those subunits where the level of labor organization is low, where the plans are not being fulfilled and where, as a result, the wages of the workers are low.

An inspection carried out at the Krasnoyarskekskavatortyazhstroy Association uncovered a number of violations associated with the computation of bonuses. During a consultation with the kray office of Stroybank, we were shown documents from still another inspection concerned with the use of the job contract plus bonus wage system at the Krasnoyarskpromstroy Trust of Glavkrasnoyarskstroy. Here it was expected that more than one half of the awards would be returned to the clients as having been illegally paid out.

But, certainly, nobody returned them. The builders have become accustomed to the "system": regardless of the bonus amount computed -- the client pays all. He pays even though he cannot even indirectly affect the schedules or the quality of the work. On one occasion we attempted to intercede, only to be told by Stroybank that we did not have the right to do so -- the action was not provided for in the statute. At times, the problem is handled in a strange manner. At some projects the incentive for job contract plus bonus orders amounts to from 20 to 30 percent of the volume of construction-installation work. Thus, in February of this year, a brigade of carpenters and concrete workers of Construction Administration No. 90 was awarded a bonus of 872 rubles for having carried out 3,389 rubles worth of work. During the period from April to September of last year, Construction Administration No. 93 was awarded a bonus in excess of 13,000 rubles, with a similar violation being involved. This entire amount was included in the bookkeeping record and paid for by the plant. During the inspection we prepared a document which the contractor refused to sign and in fact he never even replied to a complaint which we addressed to him.

In response to our inquiries, USSR Gosstroy replied that the situation with regard to the use of job contract plus bonus wages would be changed. What type of change would the party responsible for paying out the money like to see implemented?

As is known, under modern conditions primary importance is attached to the task of devoting thought to and consistently implementing measures capable of providing a great expanse for action by the colossal creative forces embodied in our economy. These measures must be realistic and prepared in a thorough manner. Moreover, during the course of developing them, steady reliance must be placed upon the laws governing the development of the economic system of socialism. The objective nature of these laws requires the elimination of all attempts aimed at controlling the economy using methods alien to its nature.

The existing conditions for issuing compensation can be retained in those instances where reductions in the construction schedules have truly been achieved. That is, bonuses are issued only at those times when the projects are placed in operation ahead of schedule or at least within the planned periods. The new document must obviously reflect the fact that the contractual organizations lose their entitlement to compensation if the plan for raising labor productivity, established at the beginning of the year, is not fulfilled. This merges quite logically with the goals of the job contract plus bonus wage system. The award computed in such instances must apply to the production cost for the work, with the contractual organizations responding to one stimulus -- they must fulfill their tasks for productivity, since if they do not the production cost will jump sharply and very quickly.

Many problems can be solved if a new form of cost accounting is introduced. Contracts between an administration and a brigade or group of brigades must be concluded not for a particular type of work but rather for a project as a whole or at least for a large "center." In such cases, the collectives will be oriented towards the final result and towards the production of finished construction output.

Today many unfortunate problems develop at a construction site, even when the client is dealing with only one general contractor. We have a "baker's dozen" -- 13 general contractors, which comprise approximately 100 construction organizations. Naturally, financial relationships have been established with each one of them. To transport personnel to work and back. Last year the plant paid out more than 2.5 million rubles to the transport organization. However, there is very little order in the work being performed by the motor buses. The idle time of the motor buses is also paid for by Krastyazhmash. The motor transport workers make thousands of entries to the payment accounts, the authenticity of which cannot be validated.

The builders are disturbed by this fact. They simply rewrite the accounts presented to them for the benefit of the payor-client. Our attempts to organize control arouse bewilderment. Thus, at a trust for the construction of railroad track, we were besieged by questions: "What are you, bank workers? Where is it written that you must carry out checks upon us?" True, nowhere could we find instructions which stated that those who provide reimbursement for expenses are entitled to check upon the legality of bookkeeping information -- this magical paper on the basis of which money is withdrawn unconditionally and on a non-cash basis from a client's account. It is possible that a requirement exists here for some other form of accounting, for example one based upon payment charges following an inspection of a contractor's documents.

A large number of diverse types of compensation are presently available in capital construction. True, the summary estimates for construction call for limits to be established for them. On the other hand however, instructions handed down by USSR Stroybank on 26 November 1980 authorize the use of funds for issuing compensation with no limitations and the contractors are willingly taking advantage of this fact. Long before the end of the year our limits have already been exhausted and it becomes necessary to pay first for one thing and then for another.

It is obvious that the limits for so-called "other" expenditures must be more effective and realistic. Understandably, the expenditure ceiling for different construction projects will vary and here the specific conditions must be taken into account. But a limit is nevertheless required. In addition to other control measures, it serves to guard against the thriftless expenditure of capital investments.

7026
CSO: 1823/82

POOR QUALITY OF MACHINE TOOLS, HEAVY MACHINERY DUE TO LOW PLANT STANDARDS

Kishinev SOVETSKAYA MOLDAVIYA in Russian 17 Dec 83 p 3

[Article by A. Litvinov, senior engineer of the Bel'tsy Laboratory of State Inspection for Technical Supervision of Standards and Measurement Techniques: "Scrap from the Conveyor"]

[Text] In their socialist obligations for the third year of the five-year plan, the Bel'tsy "Moldsel'mash" Production Association collective devoted much attention to raising the quality of the product. To implement them means developing and transferring specimens of new highly efficient agricultural machines to series production and increasing the reliability of the manufactured equipment and spare parts.

The trade committee of the association in organizing socialist competition under the slogan "At each working position -- excellent quality of work," is concerned about involving production, as well as design brigades in it. Summaries of labor competition at the enterprises are made regularly and leading workers are awarded morally and materially. A number of brigades evaluate the contribution of each one and use a coefficient of labor participation.

Yet, as shown by a check of our laboratory, products with the "Moldsel'mash" brand do not always meet standards and specifications.

What is the cause here? Perhaps, the coefficient of labor participation in individual brigades is applied formally?

In my opinion, with rare exceptions, such suspicions are unsubstantiated. The situation is that imperfect machines and assemblies, not meeting modern requirements, are manufactured with the knowledge of the engineering service and the quality control department of the enterprise.

Judge for yourself. In the spring of this year, the Moldava machine testing station had already established that it receives hydraulic outdated drills. Moreover, the agricultural machine builders did not even consider it necessary to introduce those modernization components which the station had already recommended last year. As a result, in many hydraulic drills, as before, rods

fail, handles of the valve mechanism deform, there are frequent cases of breakage of nozzles and levers of housings, Moreover, there are cases when stand pipes unscrew by themselves and liquids seep through packings.

Obviously, the station demanded that the output of outdated products be stopped and that the products be modernized. But "Moldsel'mash" managers did not consider the opinion of the testers this time either. The manufacturing of the nonstandard products continued until the middle of October, when the enterprise was punished by a 54,000 rubles fine and eliminated from a plan to sell 3600 hydraulic drills.

One also is put on guard by such a case. In September, a group of workers in our laboratory checked how the requirements of GOST 15.001-73 are observed when developing the MPR-4 transplanting machine. It was found that the designers neglected even the specifications.

True, at the first stage of preliminary tests, there were no serious objections to the new machine. However, later in the process of departmental tests, large defects were found in it. Mainly, the experimental lot was received with 13 indicators of reliability and observance of agricultural practices being less than required by the specification. Naturally, it did not pass state tests and was returned to designers for finishing off.

If not for the vigilance of the laboratory, the engineering service of the association would surely have started the incomplete machine in series production. There would be nothing the workers could do to assure that the machine would serve the tobacco planters reliably.

Of course, in the process of assimilation, machine designs are frequently improved and brought up to the level of the best specimens. Nevertheless, it is less expensive to the state and more advantageous to the user if this is done during development or, in the extreme case, during testing. It is about time for the "Moldsel'mash" GSKB [State Special Design Bureau] collective to understand this simple truth.

The quality of series production depends greatly on how efficiently the OTK [Quality Control Department] fulfills its functions. In this association, its workers do not always manufacture the machines strictly in accordance with existing standards and specifications. Thus, of five standards, we checked only two were observed.

All this speaks of the necessity of strengthening the technological discipline in the collective, increasing the responsibility of the engineering service, the OTK and the brigades for the quality of each manufactured product.

2291
CSO: 1823/77

PRODUCTION, QUALITY OF NEWEST BORING MILLS FROM KRASNODAR LAUDED

Moscow SOVIET EXPORT in English No 6, Nov-Dec 83 pp 13-17

[Article by Yu. T. Slyusarev]

[Text]

"This is the world's biggest manufacturer of vertical boring and turning mills, unmatched in production capacity," such is the view of two Japanese businessmen, T. Sakaguchi, Manager of the Machinery Import Department, Mayekawa Kawasho Co., and Yo. Abe, the company's representative in the USSR.

I met them at the Sedin Machine-Tool Plant in Krasnodar, one of the major industrial and cultural centres in the North Caucasus region. The plant makes vertical boring mills and vertical turret lathes for work from 1,250 to 3,200 mm in diameter, and accounts for over 60 per cent of the world's output of such machines.

"We build some 1,500 machine tools every year," said Aleksandr Elizarov, Director of the plant, Cand. Sc. (Econ.).

"Most of them, over 1,000 units, are vertical boring mills. We also produce vertical multispindle semiautomatic lathes, special railway wheel lathes, lathes for turning large abrasive wheels and some other large-diameter rotational parts. Our productivity went up 5 to 8 per cent annually over the past few years.

"We began producing for export back in 1949, and today our machines operate in more than 60 countries," A. Elizarov went on.

"In certain years, in response to world market demands, we sent abroad some 300 and more vertical boring mills.

"Quite a number," I observed, "especially having in mind that there is an invariably strong home demand for such machines."

"Yes," Elizarov agreed, "small wonder, for we are the only builder of machines of this type and size in this country. In fact, you can see a vertical boring mill of our make at every large Soviet engineering plant, and there are hundreds of them, as you know. Take, for instance, such giants as the Atommash Works, the Leningrad Metalworking Plant, the Kirov Works, the Dnepropetrovsk Mining Equipment Factory, the Krasnoyarsk Heavy-Excavator Building Works, all well known internationally. By the way, we have recently built a batch of vertical boring mills for the Nevski Power-Plant Engineering Factory. The machines are to be used to produce components for GTN-25 gas pumps which will go to the Siberia-Western Europe gas pipeline.

"Speaking of export," the director went on, "traditionally, our biggest customers come from socialist countries. About a third of our export products is sold to industrially developed capitalist countries, such as Austria, Great Britain, Belgium, Italy, Canada, France, West Germany, Sweden and Japan.

We supply many machines to developing countries: Brazil, India, Mexico, Turkey and some others. A network of consultation centres has been set up abroad, where experts from our plant provide assistance in running our machines and training local workforce."

"And what do foreign users think of your products?"

Instead of giving an answer, A. Elizarov rummaged in his desk drawer and produced a reprint from the Metalworking Production magazine. I read the underscored lines. According to the report, a Kuban vertical boring mill (Kuban is the trade mark of Krasnodar machine tools marketed abroad) had worked at a French factory for ten years 17 hours a day without failures. In Britain a similar machine worked, to the surprise of machine-tool specialists, with the oil in its lubrication system unchanged for half a year. These instances are not few and far between: Krasnodar machine tools have been sucessfully run in many countries for as long as ten to twelve years.

"Our plant has been building vertical boring mills for 45 years, so we have gained a wealth of experience. Our products are being constantly refined. In 1961—1964 we developed and launched vertical boring mills with numerical control. In 1969 we started a new line of single-and double-column machines with two tool-heads and multistation turrets. One of these, Type 1516, with a d.c. main-drive motor and thyristor control, was awarded a gold medal at the Leipzig Fair. In 1973 we launched production of three new models featuring coordinate preselection and digital readout systems for the tool heads. About that time we also began production of vertical boring mills with positioning NC systems, and 1978 saw the first of the 1512F3 and 1516F3 mills with contouring NC. The plant has now launched a new line of vertical boring and turning mills of improved accuracy and vibration resistance, with a high level of automation."

Accuracy, Productivity, Reliability

"It isn't the first time that I'm here, and I can see that a lot has been done to improve the plant's products," Mr. Yo. Abe told me as we were shown round the plant. "Machines of the new line are very promising and I believe they will comply with the users' requirements."

I decided to find out more about the new machines, so I first addressed Vyacheslav Shvetsov, Chief Design Engineer.

"Machines of the new line considerably differ in design from the previous models," said V. Shvetsov. "Our primary objectives were to improve their accuracy and resistance to vibrations, and to increase cutting speeds and feeds. All that called for higher overall stiffness of the machine. We succeeded by introducing a number of significant changes in both the areas of design and production methods. For example, the table-to-column interface in a vertical plane has been changed to that in a horizontal plane. The crossrail has been reinforced by additional ribs. Use has been made of steel slideways hardened to 50—60 BHN. The vertical slide moves on antifriction way bearings. Vertical and horizontal motions are effected by means of ballscrew mechanisms. The spindle of the table runs in antifriction bearings."

"And what have you got from these innovations?"

"Tests have shown that in terms of machining accuracy our machines are equal and, sometimes, even superior to modern foreign makes. Thus, for instance, the 1A525MF3 vertical boring mill is capable of turning 2,500 mm dia. parts round to under 7 μm, whereas similar machines made abroad give a roundness of 8 to 12 μm. The variation in diameter along the axis is no less than 15 μm for a part up to 2,400 mm high, and the end face is flat to 18 μm in radial directions. Finish turning produces a surface whose roughness is no more than 2.5 μm."

"Accuracy is not all that is important to prospective buyers. There's also productivity. What can you say about that?"

"We estimated that machines of the new line can outproduce the previous models by 2.5 to 2.9 times."

"What have you done to achieve that?"

"First of all, we have increased the main drive power to 55—100 kW. As a result, the table torque has gone up to 28—35 kNm and the cutting force has risen to 50 kN in single-column machines and to 77 kN (overall) in double-column machines. Just look at this,"—he handed me a piece of bluish chip 35—40 mm wide and about 3 mm thick.—"This is what is normally removed by the 1A525MF3 on a roughing cut.

"The table speed range has been extended," V. Shvetsov continued. "Take, for instance, the 1A512MF3 boring mill and its predecessor, the 1512F3. The first has a table speed ranging from 1 to 335 rpm, whereas the second, had it from 5 to 250 rpm. The speed is now infinitely variable owing to a thyristor-controlled d.c. motor in the main drive. The tool head is driven on both axes by high-torque motors with thyristor controls; the feed ranges have also been widened (0.1 to 1,000 mm/min) and the feed rate change is now stepless. The infinitely-variable cutting speeds and feeds allow end faces and tapered surfaces to be machined at a constant cutting speed. Form and tapered surfaces can also be machined in the automatic mode."

"If I got it right, all that made for shorter cutting time. And what about the non-cutting time?"

"Well, in particular, the speed of rapid traverse of tool heads has been increased to 5,000 mm/min, and the heads can now be moved into position along the shortest path. We furnish our machine tools with 10-station automatic tool changers. The crossrail fine adjustment mechanism has been automated."

"According to your customers, the principal advantages of your products were reliability and long service life. Might all those innovations adversely affect these qualities?"

"By no means," V. Shvetsov insisted. "You see, a higher rigidity and a stronger machine structure only make for increased reliability and a longer useful life. The strength of the materials used for machine parts, which over long periods of service proved to satisfy the most stringent requirements, also contributes to durability. The use of d.c. motors has resulted in shorter gear trains, that is, fewer shafts and gears and no magnetic clutches. Hence, improved reliability and, in addition, less noise. Our previous models functioned 14 years before general overhaul. I believe it's an optimal term, and with our new machines it will be no shorter."

"Although your new models have already been moved into batch production, the designers seem to go on updating them, don't they?"

"You can't set a limit to perfection," smiled the Chief Design Engineer. "One of the problems we are now tackling is the development of hydrostatic table ways. If you introduce oil in between the table and the base on which it rests, the table will rotate on an oil "cushion". That gives significant advantages over antifriction bearings which have been used so far. First, large antifriction bearings—about a metre in diameter for machines handling 4 m dia. work—are very expensive. Second, a hydrostatic oil film drastically reduces friction in table rotation, and that, among other things, improves the accuracy of its azimuthal positioning. The axial runout of the table can be reduced to 5 μm and less."

"But are there any difficulties?"

"Oh, we have many problems here. For example, at high rotational speeds the oil film develops something like a lifting force, and the table "rises". Then, the pressure of the oil must be regulated in some way or other to compensate for load or cutting force variations. Or take, for instance, the problem of providing stable thermal conditions. The point is that during heating the oil undergoes changes in volume and viscosity, and the extent of the changes varies with the table speed. At present some foreign companies use hydrostatic table ways, but only on a very limited scale. These are special machines designed for specific applications, with cutting speeds, feeds, and forces varying within a limited range. We can also build such machines to individual orders. But our aim is to develop hydrostatic ways that are suitable for batch-produced general-purpose machines."

Components of Quality

"The quality of a machine that is provided for by its designers through engineering drawings has to be materialized "in metal" by production engineers. That is the reason for my keen interest in manufacturing processes," explained Mr. Abe. "We have seen that the plant is well equipped with modern machinery, and the production methods used quite measure up to current standards in machine tool building. The workforce at all levels is highly skilled and competent."

"You get to know a lot more about the product when you see it being manufactured," added Mr. Sakaguchi.

I asked Anatoly Seletsky, Chief Process Engineer of the plant, to show me around the shops where vertical boring mills were being made.

"Let's lose no time in looking at standard, conventional production processes," he suggested. "We at the plant see to it that all manufacturing procedures are followed strictly, and our ramified quality assurance system covers all parts and operations. I'd rather show you some processes that have a significant effect on the quality of the most critical machine assemblies and components.

"I don't expect to impress you much with NC machine tools," he said as we were passing through the machine shop. "I'll merely say that we have two hundred NC units, and they are used for the most complex and critical operations that require maximum accuracy. I'd also like to call your attention to the fact that instead of thread cutting we widely employ thread rolling with surface strengthening. Wherever possible, we produce gears by broaching with subsequent strain hardening.

"By the way, let's drop in here for a minute," suggested Seletsky, opening a door that led from the shop into an adjoining room. There I saw a rather small installation with a cylindrical vaccuum chamber as its main part. "This is Bulat, an apparatus for depositing wear-resistant coatings on cutting tools. It was developed by the Kharkov Physical Engineering Institute."

"I've heard a lot about this installation," I said in reply. "As far as I know, V/O LICENSINTORG offers licences for its production abroad. But until now I've never seen it in action."

"It has just been loaded with a batch of tools," explained Seletsky. I looked inside through a small observation window and saw racks with twist drills. "Some 1,000 drills 5 to 10 mm in diameter get coated in two hours. At first the tools undergo ion cleaning and activation. Then the chamber is filled with a chemically active gas, and the surface of the tools is hit simultaneously by ions of metal plasma and by atoms of the gas. Various chemical compounds are formed, depending on the metal and gas which are used. If they are titanium and nitrogen, for instance, titanium nitride is synthesized on the tool surface. As a result, tool life extends 2 to 5 times, depending on the type of tool, workpiece material, and cutting conditions. We are pleased with this installation. I'm sure those who get it stand to gain."

We then walked along one of the machine shop bays. Seletsky halted at a large surface grinder.

"See," he said, "here we finish machine slide blocks. We have changed from grinding to milling with a cutter having Elbor-P inserts. The reason is that the conventional finishing operation, that is, grinding, has often led to workpiece overheating and, hence, warpage after machining. In milling, the heat generated during cutting is absorbed by the chips, so that the workpiece does not heat up much. In this way we managed to upgrade the geometrical accuracy of these critical parts and, in addition, to increase production rates."

I ran my fingers along the machined surface. Seletsky immediately saw what I meant.

"As you can feel, the surface finish is in no way inferior to grinding, thanks to Elbor."

In the forging-and-welding department, we visited after the machine shop, no single welder working by hand was within sight. All welding operations (carbon-dioxide shielded metal-arc welding, to be specific) were performed entirely by semiautomatic machines.

Then we proceeded to the paint-coating

department, where a shot-blasting installation caught our attention.

"Before painting," Seletsky commented, "all parts are cleaned here of rust and grease to ensure a high-quality durable paint coat, protecting the machine in heavy service conditions."

A large casting was fixed on the table of a device with functions at first unclear to me, and the drive was started up. A uniform hum and slight tremors of the floor indicated that it must be some vibratory test bed.

"No, in fact it isn't," explained the Chief Process Engineer. It's a machine for vibratory treatment of our regular cast components. Castings often develop internal stresses in the metal and, consequently, get deformed during machining. Instead of relieving these stresses by thermal treatment, we use the vibratory process, which has proved advantageous as it considerably improves the strength of castings."

Upgrading the quality of products by all means is the aim of many novel manufacturing methods introduced at the plant. And that became increasingly evident to me as I was being shown around the plant's departments. I can't help mentioning still another installation, which has been designed and built at the plant. This is a special machine for stretching the blanks of machine-tool shafts and lead screws.

The blanks up to 7 m long and 90 mm in diameter are stretched with a 380 ton force to the yield limit. As a result, the adverse effect of residual stresses is eliminated, the structure of the metal is improved, the part lends itself to machining easier and serves longer.

"To keep abreast of modern production technology and make it work for us," Seletsky concluded at the end of our tour, "we cooperate with major research organizations and higher educational institutions. At the top of the list are Moscow University, the Bauman Higher Engineering School, the Engineering Materials Research Institute, the Superhard Materials R & D Institute under the Ukranian Academy of Sciences, the Cybernetics Institute under the Byelorussian Academy of Sciences, ENIMS, and, of course, there are many others."

Catering to Customers' Wishes

"Our trading company, Mayekawa Kawasho, has been set up recently," Mr. Abe said, "but we have already bought 24 vertical boring and turning mills built by the Krasnodar plant. Altogether, there are about a hundred Kuban machines operated in Japan. Some are employed in machining couplings and flanges for oil and gas pipelines. Quite a number are in use at Japan Steel Working. At Yamadzaki, a machine-tool manufacturer and one of our biggest clients, Kuban boring mills are employed to machine indexing tables for machining centres, which is a critical operation. We have proposed to fit machines of the new Kuban line with Masatrol F1 manual-data-input CNC, which allows a "dialogue" between the programmer and the machine. Machines of this kind are used in small-lot production, where changeovers from job to job are frequent. MDI control systems are better suited for such machines. Since new vertical boring mills proved to be well compatible with up-to-date NC systems, the management of the Krasnodar plant studied our proposal and agreed."

"We are always trying hard to satisfy our customers, Svet Dovbnya, Chief Engineer, joined in our conversation. "On request, we make design changes, equip our machines with NC systems specified by the customer, and so on. Machines of our new line have been designed for operation with practically any NC system. But the main type of control that is supplied with our machines is Razmer-4, a well-proven NC system with linear and circular interpolation. Coordinates can be put in with a 0.001 mm increment; there are also the options of tool-head feed rate and table speed correction. Inductosyn-type positioning scales are used as feedback linear transducers.

"We widely use the benefits of international cooperation," the Chief Engineer continued. "Direct-current motors with thyristor controls are supplied to us by the Electrotechnica Factory in Bucharest. Complete feed drive systems are made from Soviet

blueprints by Bulgarian enterprises: the Dynamo in Sliven and Electrodvigatel in Trayan. We also have an agreement with Schiess of West Germany, which buys our machines and provides some components for them, and then puts them on the market with both its own and our name on the nameplate."

I asked the Chief Engineer about the plant's prospects for the coming years. "Our output is to increase by 5 to 8 per cent annually, as in the past years," he replied with confidence. "We have everything for that, primarily a rise in productivity due to modernization of our production equipment and the introduction of new manufacturing techniques. Machine tools of our previous line which are in steady demand will be produced for another two or three years. Generally speaking, I believe there are a lot of users who want relatively simple and inexpensive vertical boring mills. We are going to continue making such machines, providing them with coordinate preselection and readout systems for the tool heads. Meanwhile, machines of the new line with contouring and MDI numerical controls will gradually come to the fore in our product list.

"These new machines serve as a base for developing machining centres of several types and sizes," said the Chief Engineer in conclusion. "We are also designing a range of single-column vertical turret lathes, which will be eventually used for developing various machining centres."

* * *

Some time later I met Mr. Abe again, this time in Moscow. He told me:

"My colleague Mr. Sakaguchi and I reported to the management the results of our mission to Krasnodar and our talks with the plant and Stankoimport people. Our report was met with approval, and I think that new contracts will follow soon."

PHOTO CAPTIONS

1. p 14. Machine tools with the Kuban trade mark are used in 60 countries. Photo: this 1525 vertical boring mill is giving efficient service at the Hoesch Maschinenfabrik company in Dortmund, the FRG.

2. p 14. The Sedin plant employs modern highly-efficient equipment. Vertical boring mills' stationary base members are worked by means of machining centres.

3. p 15. Preparing the table of a 1A532 vertical boring mill for assembly.

4. p 15. Grinding the ring of a 1525 machine tool's face plate.

5. p 16. The high quality and reliable operation of the Kuban machine tools are due to advanced manufacturing processes.
The crossrail of a double-column vertical boring mill being machined (left). The induction hardening of guideways (above).

6. p 17. Yo. Abe and T. Sakaguchi of Japan's Mayekawa Kawasho company being shown around the machine-tool plant by its managers.

7. p 17. An 1A532MF3 machine under assembly.

CSO: 1812/117

MODERNIZATION OF TURBINE DESIGNS, PRODUCTION MACHINERY IN UKRAINE

Designer's Broad Support Network

Moscow EKONOMICHESKAYA GAZETA in Russian No 48, Nov 83 p 8

[Article by Vitaliy Fedorovich Abramovskiy: "Designer and Advanced Equipment (Khar'kov)]

[Excerpts] Recently, we shipped a million kilowatt turbine to the Yuzhno-Ukrainskaya GES. The following figures gives one an idea of this plant: 100 flat cars and 37 gondolas for shipping its units. Similar large turbines are in the process of being manufactured for other nuclear power plants being built.

The collective of our association strives to make a full-weight contribution to the implementation of the Energy Program adopted by the party. Competing for the successful fulfillment of the five-year plan, we produced 28 percent more products in 9 months of this year than for the same period in 1980. This achievement was almost entirely due to higher productivity of labor.

Thus, positive results in the competition for high efficiency of production is obvious. However, there are also problems. The association's management is criticized rightfully, in particular, in connection with some lag in manufacturing the second "million" turbine for the Zaporozhskaya AES.

The production of consumer goods is still developing slowly; we did not provide for the construction and putting in operation of a shop for products for cultural-everyday life. There are also other shortcomings.

The main thing to us is improving the equipment being manufactured. We are guided by the decree of the CPSU Central Committee and the USSR Council of Ministers "On measures for accelerating scientific technological progress in the national economy."

New Generation of Turbines

In the recent past, nuclear electric power plants were equipped basically with 220,000 and 500,000 kilowatt turbines. Now, 750,000 and million kilowatt turbines of the new generation are being manufactured. At the same time, designers are working on the creation of more efficient "million" turbines.

Using the achievements of scientific technological progress in the association is an indispensable condition for the development of the entire production. What do I have in mind here?

The creation of new equipment in our association is done systematically. This process is coordinated at all stages, from design to assimilation of the product, by a special structural subdivision of the technical service. It has a small staff, but has certain influence on planning and introducing new equipment. All design subdivisions are given targets for the very near future on carrying out scientific research and other work.

In connection with the decree on scientific technological progress in machinebuilding, the use of the target-programing method of planning is being expanded. Our association was also involved in its orbit. The Khar'kov turbine builders participate in the implementation of the "Energiya" regional program which directs the efforts of collectives of many Ukraine institutes, enterprises and establishment in the area of creating power equipment on the level of best specimens in the world.

I described the general principles of the system used in the association. I will illustrate its efficiency by several examples. The creation of modern turbines assumes close cooperation between production people and scientists, and staff workers of industrial institutes. We take that into account.

Thus, 42 organizations participated in the creation of the 750,000 kilowatt steam turbine, while 58 organizations participated in the creation of the "million" turbine. We, together with a number of institutes of the Ukraine Academy of Sciences, are assimilating calculation methods, using design and technological solutions, as well as introducing modern progressive materials. At the same time, a highly skilled team of designers and technologists is growing in the association itself. Among them, 43 of the specialists have the degree of candidate of technical sciences.

In our opinion, the trend toward simplifying the designs and thermal arrangements of the steam turbines must be supported more actively and be developed more rapidly. In the very near future, the USSR Ministry of Power must solve the problem of using million kilowatt and 550,000 kilowatt turbines with a smaller number of cylinders.

Now, we will talk about the technical base of the turbine builders and their bottlenecks. In recent years, the main plant, which will be 50 years old, was intensively supplied with specialized and special design metal-cutting equipment. It is intended for machining large parts. We praise the machine tools of the Ul'yanov and Novosibirsk plants. But, in our opinion, the turning lathes of the Kramatorsk Plant should be improved, so that they meet the modern technical standard more fully.

New specialized and special design equipment supplied by the Ministry of Machine Tool and Tool Industry are not supplied with complementing fixtures and tools. We are compelled to supply the additional equipment for these machine tools. As a result, their release for operation is delayed and it is impossible to utilize them to the full rated capacity.

The many diverse systems used on machine tools with numerical control cause serious difficulties in operation. At present, we have at our main plant machine tools with numerical control equipped with ten various systems which cannot be considered right.

The largest reserve of the Khar'kov turbine builders is a maximal reduction of the time for creating and assimilating new turbines of higher (within optimal limits) unit capacities reducing, at the same time, their material consumption and labor-intensiveness, as well as taking into account reductions in the cost of manufacturing, construction and operation. We are striving to realize these reserves in the process of competition for the successful fulfillment of the goals of the five-year plan.

Large NC Lathes Developed

Moscow EKONOMICHESKAYA GAZETA in Russian No 4, Jan 84 p 7

[Article by V. Pokasyuk, chief of the "Soyuzstankoprom" All Union Production Association: "New Series of Machine Tools"]

[Text]

V. Abramovskiy, general director of the "Khar'kov Turbine Plan" Association, in his article "Designer and advanced equipment," (No 48, 1983) along with other interesting thoughts, made a number of just remarks which were addressed to the Kramatorsk Heavy Machine Building Plant. One cannot disagree that the machine tools of this enterprise must be improved.

At present, in accordance with an agreement with the Khar'kov Turbine Plant, a technical proposal is being developed here on modernizing the largest turning lathe in the USSR for machining rotors 5000mm in diameter. It will be equipped with the numerical control system. A plan is being prepared to modernize the heavy turning lathe for machining rotors 2500mm in diameter.

Along with improving traditional products, the collective began assimilating the series production of turning lathes of a new series with numerical control for machining solids of revolution parts, including rotors 1250 to 2500mm in dia. Larger lathes are also being planned. It should be stressed that the lathes of the new series fully meet modern technical standards and take into account all the wishes and suggestions of all basic consumers, including the "Khar'kov Turbine Plant.

2291
CSO: 1823/111

VERSATILE MACHINING CENTER DEVELOPED AT KIROV PLANT

Minsk SOVETSKAYA BELORUSSIYA in Russian 1 Feb 84 p 2

[Article by A. Shablyuk: "New Machining Center"]

[Text] Regrettably, we were unable to see in operation the first machine tool with numerical control of the "machining center" type, manufactured at the Gomel' Machine Tool Building Plant imeni S. M. Kirov. There was much to regret. It alone does what perhaps ten machine tools could do -- drill, mill, bore...

By the time I arrived, it was taken apart into individual units, packed in crates ready to send to the "Metalloobrabotka-84 International Exhibition which will be held in Moscow this spring. The only thing they were able to show me was a part made by the machine tool in only one setting. It did it much faster than if it had been done by the traditional method. On the picture, the part looks like a toy, but it weight 150 kilograms. On it is the "autograph" of the machine tool. And, it seemed to me, its "writing" was confident.

Machine tools of this kind will become a base for creating fully automated production facilities. This machining center can replace eight of its "colleagues" in individual operations. It is sufficient to say that its tool magazine contains 30 different tools which, at the needed moment, according to the program in the machine memory, are changed automatically. The change in intermediate products occurs in the same manner.

It remains only for the operator to follow the indications of instruments and the condition of the tool. But soon these operations will also be entrusted to smart machines by specialists of the Odessa Design Bureau of Special Machine Tools who created the new machining center. The designers, technologists and production people were successful in incorporating skillfully in their "child" advanced ideas and technical solutions that made it possible to rank it as among the best specimens in the world. Up to now, there has been nothing like it in machine tool building practice in our country. It would take too long to enumerate all the positive advantages of this innovation. But I would like to mention the following. The machine tool has a double-turning table which makes it possible to machine a part

Fig. 2. Part with "autograph" of machine tool.

Fig. 1. At one of production sections where machine tools are assembled.

on five sides with one set-up. A "ceiling" fixture for holding the intermediate product makes it possible to solve efficiently the problem of the automatic removal of chips.

The assembly of the initial lot is now beginning at the plant. Specialists calculated that the annual saving from introducing just one new model machine tool will be 37,000 rubles.

2291
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OTHER METALWORKING EQUIPMENT

NEW ABRASIVE BELT GRINDING MACHINES DEVELOPED AT YEREVAN PLANT

Yerevan KOMMUNIST in Russian 2 Nov 83 p 3

[Article by M. Gasangalyan, engineer of Information Department of the Transcaucasian branch of the ENIMS]

[Text] The Transcaucasian branch of the Experimental Scientific Research Metal Cutting Machine Tool Institute [ENIMS] and the Yerevan Experimental Machine Tool Building Plant, are two links in the "Armstanok" Scientific production Association, which confirms the high efficiency of cooperation between science and production.

One of the leading departments of the Transcaucasian branch of the ENIMS is the department of Abrasive Grinding Methods, guided by S. Babayan, candidate of technical sciences. Here new models of jet-abrasive and belt-grinding machine tools are designed. They are greatly needed by industry: many labor-intensive processes, such as trimming, removing burrs, polishing, are done manually.

The department designers work to improve the technology and develop more perfect solutions for future machines.

Tests were completed successfully on an experimental lot of jet-abrasive grinding of large parts of the "disk" type. A special feature of the new model EZ-164 machine tool is that it is furnished with a device for the mechanized loading of parts into the chamber.

The authors of the development--designers, R. Dokhikyan, S. Kakosyan and M. Akopyan -- increased by several times the labor productivity of the machine tool by mechanizing manual labor. Soon the new devices created by Armenian machine tool builders will begin operation at loading machine tool building enterprises in the country.

Tests began recently on still another innovation of machine tool builders -- a universal model EZ-160 belt-grinding machine tool and there is nothing like it in domestic machine building. It is designed for finishing-trimming

operations, such as removing burrs, trimming welded joints, grinding and polishing. The first lot of these machine tools developed by specialists L. Martirosyan, G. Kalenchyar, E. Agadzhanyan and A. Poladyan will be built next year at the Leninakan Grinding Machine Tools Plant.

Experimental specimens are passing tests successfully, while developments of promising models of future high productivity machines are being continued in the department.

2291
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MECHANIZATION OF MANUAL LABOR AT LITHUANIAN PLANTS PROCEEDS SLOWLY

Vilnius SOVETSKAYA LITVA in Russian 15 Nov 83 p 2

[Article: "Reduce Manual Labor"]

[Text] In the industry department of the Lithuanian Communist Party Central Committee, the activity was discussed of a number of machinebuilding enterprises of the republic on solving problems in the area of reducing manual labor as defined in corresponding decrees of the Lithuanian Communist Party Central Committee and Lithuanisn SSR Council of Ministers.

It was noted that certain work was done on intensifying industrial production, raising the productivity of labor and reducing the number of workers doing manual labor, on the basis of automation and comprehensive mechanization of technological processes. Since the start of the current five-year plan period, 6,200 workers in industry were freed from manual labor and the labor mechanization level increased to 55.2 percent.

Positive experience of the operation of the Alitusskiy Refrigerator Plant was approved. Here was developed and successfully implemented a program for reducing manual labor in 1981-1985. Since the start of the five-year plan period, six comprehensively mechanized lines were put in operation in the enterprise, almost 200 technical and organizational measures were introduced as a result of which 74 workers were freed from manual labor, heavy physical labor was eliminated entirely and working conditions of 214 workers were improved considerably.

However, at the Kapsukskiy Provision Machine Tool imeni 50-letiya of USSR, the Mazheyskskiy Compressor Plant, the Kibartskiy Commercial Equipment Plant and the Klaipeda "Zapremmash" Mechanical Repair Plant, there are several shortcomings in the organization work on raising the level of mechanization work. Classification of manual labor which is a basis for developing purposeful programs for reducing nonmechanized labor, was carried out which violated the set requirements. The Kapsukskiy, Kibartskiy and Klaipeda plants did not take the necessary measures for introducing order in accounting for workers who do manual labor. The evaluation of the introduced measures is frequently performed incorrectly or is absent in general. Not enough attention is given to questions of planning and coordinating the activity of structural subdivisions in carrying out work on the mechanization of manual labor. Comprehensive

programs on reducing manual labor at several enterprises are of a formal nature, and no organizational measures were taken for their implementation.

At these enterprises, the proper conclusions were still not drawn from the instructions on the necessity of accelerating the mechanization of labor in auxiliary production, especially in materials handling and transport-warehousing work. Moreover, the number of individual categories of workers doing manual work even increased. The share of heavy physical labor at the Kapsukskiy Plant is decreasing slowly.

Enterprise managers were instructed to eliminate these shortcomings and omissions and utilize available reserves on reducing the use of manual labor more fully.

The party committees and the party bureaus were advised to monitor the administration systematically on realizing the posed problems in the matter of mechanizing and automating production processes, as well as improving working conditions. The necessity was stressed of increasing the personal responsibility of enterprise specialists involved in these questions.

A. Brazaukas, Secretary of the Lithuanian Communist Party Central Committee and Yu. Rusenko, Deputy Chairman of the Council of Ministers of the Lithuanian SSR spoke at the meeting.

2291
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FUNCTION OF RIGA'S ROBOT, AUTOMATION R & D CENTER DISCUSSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 1, Jan 84 p 8

[Article by Yuriy Ivanovich Kokt, director of Robot Center of the Physics Institute of the Latvian SSR Academy of Sciences, candidate of technical sciences: "Robot Equipment Center"]

[Text] The Central Interindustrial Technological Design Bureau of Robot Equipment with experimental production (Center of Robot Equipment) of the Physics Institute of the Latvian SSR Academy of Scientists was created in 1981. In two years, its collective developed and introduced many equipment innovations at enterprises. About 50 disclosures of inventions have been made. The Robot Equipment Center is headed by Yuriy Yanovich Kokt. He graduated in 1964 from the Moscow Engineering Physics Institute, then was in the Electronics and Computer Institute of the Latvian SSR Academy of Science where he advanced from engineer to deputy director of scientific work. Yu. Ya. Kokt is a candidate of technical sciences and is the author of 12 inventions.

Machinebuilding ministries were the robotization leaders in our country from the very beginning. Each one of them, as a rule, created their robot equipment complexes using industrial robots of their own manufacture. The reasons for such an approach are obvious: prestige, sector standards, limited possibilities for manufacturing automatic manipulators and finally, the specific requirements of "their own" consumers.

True, the situation began to change in recent years. Several robots stepped over departmental barriers as happened, for example, with the MP-9S automatic manipulator at the Volga Automobile Plant. However, machinebuilding ministries, naturally, are not much interested at present in the robotization, say, of making shoes or reducing manual labor in the furniture industry.

Not a Tribute to Fashion. But to the Command of the Times

So what happened? Without doubt machinebuilders will cope with their problems. A tailor, so they say, will not remain naked. But his destiny is much broader -- he must make clothes for others. The customer, alas, does

not want to take his measurements. As a result, robotization can touch the light, food and local industry only slightly. It is hardly necessary to speak of the importance of this matter, taking into account the tense situation with labor resources and the high level of manual labor in the enumerated sectors and several other industrial ones.

Briefly, industrial robot users today can be divided into current and potential. The first manufacture the robots themselves, while the second do not even have the possibility of ordering them. Therefore, the necessity of having an executive body whose activity is directed mainly toward the robotization of non-machinebuilding industrial sector is obvious to us. Precisely this goal was posed before us by the Latvian Central Committee of the party, in determining the status of the newly created organization.

The basic problems of the Robot Equipment Center are as follows:

coordination of cooperation between enterprises and organizations in designing, manufacturing and introducing industrial robots and providing technical facilities for them;

carrying out planning-design and technological work on robot equipment;

development, manufacture and introduction of prototypes of robot equipment sets -- RTK;

creation of typical auxiliary equipment for industrial robots (loading-orienting devices, grips and control systems);

development of recommendations on the most effective application of industrial robots and RTK;

provision of technical consultations.

The Robot Equipment Center coordinates its plans with the Latvian SSR Gosplan and interacts closely with the Republic Robot Equipment Commission in the methodological guidance of robot introduction.

In Our Collective

Innovation without usefulness means nothing in inventions. In its practical activity, the collective of the Robot Equipment Center as a design-technological organization proceeds on the basis of introducing, sequentially in production, scientific investigations including those by the Physics Institute of the Academy of Sciences of the Republic. It may be stated that the platform on whose basis the center was created became the developments under the trade mark EMAGO -- electromagnetic orientation of parts.

The development of robot equipment inspired new life in this direction. Thus, within the framework of the republic program "Reduction of manual labor on the basis of introducing EMAGO automated equipment" we, in cooperation with the "Radiotekhnika" Association and the "Avtoelektropribor" Plant, are

manufacturing standardized loading devices for robot equipment sets used in republic enterprises. The plan for this year is to produce 100 such devices which we will implement successfully.

Moreover, we develop, manufacture and supply trackers for loading devices on individual orders. High productivity, rapid readjustment for feeding various types of products, low metal content and other advantages of our loading-orienting devices are also valued highly at enterprises in other republics.

The robot equipment center also participates in performing tasks of the all-union scientific technological program on automatic manipulators and provides solutions to customers for robot equipment sets for stamping, assembling and monitoring.

On the basis of a study on introducing robot equipment, the Council of Ministers of the republic approved for us the planned tasks for the current five-year plan period on assimilating automatic manipulators with programed control, balance manipulators and automatic operators for electroplating for Latvian enterprises.

It should be noted that as experience is being accumulated and methodology is being developed, the quality of investigating enterprises of various industrial sectors, in order to identify sections needing robot equipment is improved. On this question, it may be said that our specialists adhere, as much as possible, to the medical precepts where investigation without healing is only statistics. As applied to the Robot Equipment Center, this means that having identified the "painful spots," we begin the predesign work.

In two years, together with specialists of respective industrial sectors, investigations have been carried out in enterprises in the construction materials, food and light industries. Work is being completed in the meat and milk industires and the "Zapryba" All Union Association.

Robotization of production is a new concept and in its success an important role is played by the relationship between the designer and the customer, bringing automation ideas up to all levels -- from the workers to the director and from the director to the worker. The main point, of course, is always the attitude of the collective's manager toward this or another technical innovation. We meet with full mutual understanding at the majority of enterprises. We have close business relationships with the Riga RR Car Building Plant, the "Al'fa" NPO [Scientific Production Association], the "Kommutator" Association and the Olaynskiy Plastic Plant.

It is precisely the close contacts between the two sides that are a pledge of success of creative solutions. Regrettably, so far we have no approved methods at our disposal for calculating the economic effect of introducing robot equipment. And they are needed more and more.

In 1984, we are also planning to investigate enterprises in various sectors of the national economy to identify places for robotization. We also plan to continue manufacturing component parts for the RTK and their mating with industrial robots.

Optimal Solutions are Necessary

Our center was created as a cost accounting organization. As far as investigations of sectors are concerned, they are carried out on a contract basis. As far as help to individual enterprises is concerned, certain difficulties originate in planning and financing. This involves numerous jobs, each individually brief in nature. The existing order of contract financing does not provide for making available an insignificant volume of consultation and preliminary planning to a large number of customers.

Actually, the volume of preliminary research is not large. However, the final result, a sharp increase in technical-economic indicators of the enterprise, depends on its quality. What solution can be proposed?

Based on the experience of other socialist countries, the most acceptable for stimulating robotization is to transfer preliminary planning to centralized financing. For this, it is necessary to define organizations that have the right of "executor" and "customer," develop corresponding instructions and allot money quotas to the executors.

Related to the above is still another problem which, to a certain extent, also appears to be a proof in favor of the above-proposed solution.

Each production facility, large or small, has its specifics in technology, as well as products. There are, however, entire groups of enterprises where some technological operations are very similar. For example, operations of secondary stamping used in metalworking. The Robot Equipment Center, being an interindustrial design technological bureau, should not, in our opinion, be limited by contract work to creating individual RTK for this or another enterprise. Its contribution will be more effective when, on the basis of production facilities existing in the region and the actual level of domestic robot equipment, it proposes universal means or standard devices. With minimal modifications, they can be adapted and efficiently utilized at the majority of plants that have the given technological operation. To do such work, the center must have a customer.

So far each enterprise must order and pay for such devices that are suitable only for it. Individual large associations, for example, the "VEF" [Riga Electrotechnical Plant imeni V. I. Lenin] or the "REZ" [Riga Electric Machine Building Plant] do this work themselves. Small enterprises refuse such work because they cannot afford it as an individual order. Centralized financing of such work may increase considerably the yield of the organization that develops such devices and, therefore, will accelerate the automation of production.

Preparation has begun of a comprehensive program "Development and creation of flexible automated production systems using automatic manipulators, robot equipment, machine tools with numerical control and microprocessors," in order to combine the efforts of all organizations, enterprises and specialists for accelerating the introduction of scientific technological achievements in robot equipment.

The collective of the Robot Equipment Center, in implementing the problems posed before, it will strive constantly to work jointly and harmoniously with enterprises. This is the best way to intensify social production.

2293
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ROBOTS RAISE PRODUCTIVITY AT VORONEZH FORGE-PRESS PLANT

Moscow PRAVDA in Russian 8 Dec 83 p 2

[Article by Candidate of Technical Sciences V. Karzhan, director of the All-Union Experimental Scientific Research Institute of Forging and Press Machine Building (Voronezh): "Give a Hand to the Robot"]

> [Text] Not that long ago at an international machine tool building exhibition in Paris a robotized complex based on two 100-ton presses, which a three-armed robot attends, was demonstrated among the best examples of press forging equipment. The complex was produced by the Voronezh press builders. It is not the first time that the Production Association imeni M. I. Kalinin has presented interesting new items at international exhibitions. And this is not by chance.

Voronezh is the largest center in the country and Europe for the production of press forging equipment. Two base associations of the sector, which include the All-Union Experimental Scientific Research Institute of Forging and Press Machine Building (ENIKMASh), two planning and technologial institutes and a special design bureau, as well as two plants, are located here. The machines with the Voronezh stamp are being used everywhere in the national economy, specially at enterprises of the automotive, tractor, chemical and aircraft industry and road and agricultural machine building.

Today automated units, industrial robots and manipulators are operating on one scale or another at many plants. These advanced means are being used extensively in welding, heat treatment and galvanizing, the transfer of parts, the installation and assembly of various assemblies and devices. Here the expenditures of manual labor are being reduced to a minimum or are being entirely eliminated. The decisions of the 26th CPSU Congress and the subsequent CPSU Central Committee Plenums also bind us to the immediate introduction of such an efficient type of equipment.

That is why the collective of the Voronezh Association of Press Forging Equipment imeni M. I. Kalinin, having received the assignment for the series production of robots, set to work on the matter with enthusiasm. The basic difficulty at first consisted in the fact that robots had previously not been "born" at a single enterprise of our sector and we could rely in everything

only on ourselves. But the plant specialists, having joined efforts with scientists of the All-Union Experimental Scientific Research Institute of Forging and Press Machine Building, were able to develop quite rapidly the first prototypes of mechanical assistants of man.

Having produced since the beginning of the current five-year plan 300 robots instead of 276 according to the plan, the collective has begun the series production of new, more "intelligent" manipulators, which are intended for the stamping of parts from piece blanks. Many sectors of the national economy, first of all those in which flow line production has been organized, have inquired of them. There is nothing surprising: each complex frees 2-3 workers who are engaged in difficult labor and yields an economic impact of up to 130,000 rubles a year.

It would seem that everything is going according to the book. True, when the new equipment began to be delivered to the client, difficulties with adjustment and with its skillful introduction arose. But the interested users very quickly achieved the outlined goal. Tens of specialists and workers came to us in order to familiarize themselves on the spot with the operating conditions and to learn something.

That is precisely how they acted at the Voronezh Elektrosignal Plant, where they are using robots with full efficiency on the conveyor which produces parts of color televisions, at the plant of gas equipment and cocks in Donetsk Oblast, at the Kiyevtorgmash and Rostsel'mash Plants and others. Just a single robotized section, which was equipped at the Elektrosignal Plant, freed 12 stamp operators.

Within the framework of daily activity our production association is devoting more and more attention to the introduction of its products at other plants. A contract supervision service headed by experienced specialist N. Belenov was organized here long ago and is operating productively. Its duty is to install the equipment at the enterprises of the client and to turn it over "turnkey" on time and ready for operation.

A letter, in which it is reported that 12 automatic lines with the Voronezh stamp had replaced 144 people of 12 occupations: stamp operators, welders, calibrators, inspectors and so forth, arrived from the specialists of one of the motor vehicle assembly plants.

The fact, the author of the letter, which was addressed to the collective which was the producer, adds, that the installed equipment is operating with a high productivity, is also pleasing. It is simple to maintain, they are mastering it quickly in the shops.

The increased responsibility for the end result of their research is prompting the Voronezh press builders to follow attentively the fate of the automatic machines in the process of their use by clients. And very frequently we become witnesses to extremely alarming situations. For example, the Voroshilovgrad Motor Vehicle Assembly Plant, having ordered and received 3 years ago an automated complex, is using it as a simple, unequipped press with manual control. We have attempted to ascertain the reason why the manipulator was

disengaged. An unsound response followed--in all this time the motor vehicle assemblers had not found time to train the operators.

A similar fate befell the automatic complexes at the Baku Plant of Specialized Motor Vehicles, the Dzhankoy Machine Building Plant and several others. Without troubling themselves with either an elementary analysis or doubts, there they discarded from the "intelligent" machines their very essence--the robots and manipulators, the highly productive and expensive equipment, they put into operation, as they say, "bare" presses.

The clients explain the cause of such facts in an oversimplified way: automated equipment, they say, is not for small-series production. Meanwhile at the enterprises of various sectors precisely the same kind of complexes are also being used with enviable efficiency in the production of small series of products. The reason lies in another thing, it lies in inertness, in the routine habit of working like yesterday and the day before yesterday, that is, in the old way. Not by chance at the Ulyanovsk Motor Plant, where there is large-series production and where, it would seem, one simply cannot do without the proposed innovations, did the administration consider it expedient to use the press without the robot. The diagnosis suggests itself: under the conditions of the scientific and technical revolution some technical managers managed to catch the "robot disease." Individual enterprises went even farther: having once placed an order, they renounced altogether the receipt of the automated complexes. Among they are the Batumi Kavkaztransformator Production Association, the Altayskiy Tractor Plant and the Krasnoyarsk Production Association of Grain-Harvesting Combines.

Perhaps, we are doing something in the wrong way, the products do not conform to the demand? Alas, not a single complaint or explanation for the flaws of the products of the press builders followed on the part of the clients. And, consequently, there is one conclusion: it is too much trouble to deal with new equipment. From several main administrations and ministraties they are looking calmly at what is happening.

And here I would like to recall that such a thriftless approach to the accomplishment of a burning economic task in principle is at variance with the recent decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy." It is clearly recorded in it: "The client bears material responsibility for the rejection by the consumers of the equipment produced in accordance with their orders or the lengthy period of its placement into operation." The measures are necessary. However, they, obviously, are not yet being utilized fully.

In my opinion, the factors, which are hindering the introduction of advanced equipment at some enterprises, also attest to shortcomings in the planning of scientific and technical progress. For the impression is being created that the sectorial planning and supply organizations are studying poorly the needs of enterprises for individual types of equipment and far from always check the soundness of the orders for it. For it is no secret that specific conditions are needed for the installation and 100-percent operation of new complexes. So why, then, are the ministries, to which the clients are subordinate, not getting to the heart of the matter?

To be sure, the checking of both the soundness of the plans of the technical development of enterprises and their fulfillment should be tightened up. Since the robotization of production is a complicated matter, it must be carried out without haste, which is capable of compromising an advanced idea. But, let us emphasize, the "robot disease," the lack of psychological preparation of some managers for everything new, which radically changes the nature of production, threatens to cause no less harm. It seems that the introduction of automated equipment also requires serious changes in the very structure of the organization of production and in the methods of management. The lack of a well thought out set of measures gives rise among managers to a lack of faith in the extensive possibilities of the equipment of tomorrow.

Now, when the collective of Voronezh press builders has gained some experience and has a scientific, design and technological stockpile, the further prospects of robot building have been specified. The two-armed robots, which have already been checked in practice, are being improved and modernized. The specialists are testing modular line robots on a stand under the supervision of honored designer B. Chagin. By the end of the five-year plan in cooperation with the scientists of the All-Union Experimental Scientific Research Institute of Forging and Press Machine Building the production workers will begin the production of advanced, multi-armed devices.

The sections equipped with complexes, which in turn consist of such machines, will make it possible to introduce widely flexible automated processes for the necessary number of operations and will completely supplant the labor of stamp operators and the bulk of the operators. Given the shortage of manpower it will be possible to a significant degree to eliminate the use of the manual labor of people. Manipulators with a lifing capacity of 16, 50 and 100 kg as component units of automated complexes will be put into production in the immediate future. This means that the Association imeni Kalinin will be able to fit all the press forging equipment, which it produces, with robots and manipulators.

The creative search of scientists, engineers and workers is aimed at the solution of the urgent design, technological and production problems which are connected with the considerable increase of the productivity of labor. And a hand should be extended with gratitude to the robot.

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BRIEFS

ROBOTIZED MACHINING SYSTEM -- Kharkov -- Like the Vladimirsk "Tekhnika" Production Design Association whose work was described by A. Nemontov, its general director in No 43 of this weekly, our collective also makes the means of production for many sectors of the national economy. The administration of the association and the following included in it, the Kharkov Aggregated Machine Tool Plant, the Special Design Bureau of the Glukhovsk Aggregated Units Plant (Sumy Oblast),the Rovno Machine Tool Centers Plant (Voroshilovgrad Oblast) and party organizations are trying to inculcate great responsibility in each worker for performing the job entrusted to him. During ten months, we manufactured about 700 machine tools for an annual plan of 850. We are completely confident that the plan for three years of the five-year plan period will be fulfilled. We are also trying for a further increase in the efficiency of the new equipment. A robot equipment group we created is already in operation at the customer (the Livensk "Prompribor" Production Association). This group consists of two 41,000 rubles and the labor of 20 workers is saved. Work is being continued on improving designs, expanding technological possibilities and increasing the productivity of all the manufactured equipment. This requires the creation of a strong laboratory-experimental base which, regrettably, we do not have. It is desirable that the Minstankoprom [Ministry of Machine Tool and Tool Industry] and the "Soyuzstankoprom" All Union Production Association find possibilities for having such a base. [By V. Khitsan, general director of the Aggregated Machine Tools Production Association [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 46, Nov 83 p 6] 2291

ROBOTICS DEPARTMENT -- Minsk -- The Belorussian Polytechical Institute created the first "Robots and Robot Equipment Systems" Department in the country. Its graduates will create and operate practically unmanned automatic shops. The department has qualified instructor cadres. The department has about 50 doctors and candidates of sciences. Engineers of four specialities are trained here. The closest ties were established with the production people. The preparation of cadres of the new profession is combined with intense scientific research work in the department. This is understandable: the future specialists will have to solve the most complicated problems on accelerating scientific technological progress in the national economy with wide automation about the technological processes. An "Industrial Robots" laboratory was

established using robot equipment sets. Very promising investigations are carried out by various sections of the department. For example, the physics section is beginning to investigate robot equipment systems with artificial vision (second generation robots). Scientists visualize third generation robots with artificial intelligence that are capable of adapting to external conditions. [By M. Shimansky] [Text] [Moscow IZVESTIYA in Russian 9 Nov 83 p 6] 2291

SIMPLE ROBOTS -- Izhevsk -- The Votkinsk Plant of Radio Technological Equipment in Udmurtiya has a far from ordinary problem in the all-around renovation of many enterprises in the industry. There is a great future for the output of the new robot equipment shop. The mechanical workers created here feed intermediate metal products to automatic stamping machines and conveyor lines; they insert parts for machining into chucks of machine tools with numerical control. Readjustment makes it possible for them to cope with other machining operations. In the current year, the plant plans to build almost 300 such robots. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 6 Jul 83 p 1] 2291

CZECH ROBOTS -- In Czechaslovakia during the 7th Five-Year Plan period, it is planned to introduce in production 3000 robots and manipulators. Some 1500 automated technological work positions will be provided for them. This was reported by the economic weekly GOSPODARZHSKE NOVINY of the Czechoslovakian Communist Party Central Committee. The use of robots and manipulators will free 5500 persons from heavy and monotonous physical labor. By 1990, it is planned to introduce in industry 13,000 to 15,000 robots and manipulators produced with a domestic component base. Czech specialists see further improvement in robot equipment in the modernization of existing designs, in raising their technical standard and reliability. It is proposed to use a modular design and standardized units whose output is envisaged within the CMEA framework. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 83 p 8] 2291

ROBOTS IN FOUNDRY -- Cheboksary -- The first economic effect was obtained in the local "Prompribor" Production Association as a result of using robots and manipulators. They are already used in three shops: mechanical, foundry and stamping. Man's electronic helpers took it upon themselves to do a number of labor-intensive and monotonous jobs. It is remarkable that some of the robots and manipulators were created directly at the enterprise. A small designer collective at the association is now creating a technological robot group at one of the foundry shop sections. A manipulator has already been developed which is called upon to pour nonferrous metal into compression molds, a robot-oiler will also lubricate equipment in this section. [By Yu. Knyazev] [Text] [Moscow PRAVDA in Russian 23 Sep 83 p 1] 2291

SMART ROBOT -- A new design of second generation industrial robots -- so-called adaptive manipulators, was developed in the "Kompleks" Production Association. This machine is much "smarter" than its forerunners. They are equipped with artificial tactile organs, a more perfect electronic brain and can adapt to changes in surrounding conditions. The new robot is capable of doing three

simultaneously: monitor, reject and pack finished products in containers. At present, this innovation is in experimental-industrial operation in an automatic line for manufacturing magnetic cores. In the future, the original manipulator will be used effectively when creating flexible, rapidly readjustable automated production facilities. [By V. Troyanovskiy] [Text] [Moscow IZVESTIYA in Russian 16 Oct 83 p 1] 2291

NEW CONTOURING ROBOTS -- Leningrad -- Controlling devices for robot equipment whose series production began in the "Leningrad Electromechanical Plant," have larger memories. The new products are designed to control so-called contour robots, capable of not only simple movement like "forward-back" or "right-left," but also along a complicated trajectory. Such manipulators are designed for painting automobile bodies and other labor-intensive operations which are harmful to the health of people. [Text] [Moscow PRAVDA in Russian 16 Oct 83 p 3] 2291

COST-BENEFIT DISPUTED -- Leningrad -- I read with interest in No 16 of the EKONOMICHESKAYA GAZETA the article by Comrade Karzhan, director of the Voronezh Production Association, "Robots in intermediate product production," although I do not agree with his all remarks and proposals. In this five-year plan period, enterprises of the Ministry of Electric Equipment Industry plan to produce 12 robotized complexes of which 10 are being created by our institute. By a complex, we mean those automated sections where all operations for making a certain part of a unit or a product as a whole are robotized. It is stated in the published article that the economic effect of operating a robotized complex will be 130,000 to 150,000 rubles. I would be careful in naming such a sum because it may confuse a potential customer. I understand that Comrade Karzhan had in view the national economic effect, but the customer is primarily interested in the actual saving produced by freeing workers. The author is correct in indicating the causes that interfers with the introduction of robots. It is important that all enterprise managers believe in them. I remember that the Riga Electric Machine Building Plant ordered two manipulators from us. Then, having felt a real benefit, it asked us to manufacture ten more at once. Robotized complexes are already being used in the electric equipment industry. Thus, at the Tomsk "Sibelektromotor" Plant robots are used not only in the basic processes, but also for transport-warehousing work. The effect is very considerable. From our viewpoint, there are still gaps in the plans of new plants being built. They have sufficient production areas and their machine tool equipment is most modern. But there is an entirely insufficient-representation of robot components. [By A. Yelizarov, director of "Elektro" All Union Design-Technological Institute] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 19, May 83 p 8] 2291

TWO-HANDED MANIPULATOR -- Manipulator specimens that are several times more agile than robots were created in the Riga Polytechnical Institute imeni A. Ya. Pel'she. These devices, designed in the machine and devices dynamics problems laboratory, are designed for servicing closed-die forging presses. Connected by a mechanical drive to the basic equipment, they operate simultaneously with two "arms." One arm is used to remove machined metal

intermediate products from the die and stacks them up, while the other arm puts new ones in the die. Each manipulator moves along a very complicated trajectory and does 40 double operations per minute. A pair of skillful, reliable mechanical arms can free three-four press operators from monotonous, tiring and dangerous work. The institute concluded a contract with the First State Ball Bearing Plant (Moscow) on designing automatic lines which it is planned to equip with not only such manipulators, but also with transporters and other auxiliary devices. To fill the order, institute students were enlisted along with staff workers. [Text] [Riga SOVETSKAYA LATVIYA in Russian 26 Aug 83 p 2] 2291

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