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USSR Report

TRADE AND SERVICES

(FOUO 16/79)

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USSR REPORT

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MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

INCENTIVE FUNDS FOR QUALITY/RENEWAL OUTPUT RATE

Moscow VOPROSY EKONOMIKI in Russian No 9, Sep 79 pp 33-42

[Article by V. Shalimov: "Providing Incentives for the Quality and kenewal Rate of Output"]

[Text] One of the basic tendencies in the development of the mechanism of the economic administration of scientific-technical progress is its increasingly closer interaction with the overall system of providing material incentives for production. Since the beginning of the Ninth Five-Year Plan there has been a substantial change in the role played by cost-accounting incentive funds in providing incentives for the quality and renewal rate of output. The incentive funds of the production associations (combines), enterprises, and organizations have been put into a definite dependency upon the measures involving scientific-technical progress: the mandatory fund-forming indices include an assignment for increasing the percentage of output of the highest category of quality in the overall volume of output produced.

In individual branches of industry, experiments are being carried out to determine the further intensification of the role played by the incentive funds of the production associations and organizations in the acceleration of scientific-technical progress. In this regard, experience which might be of interest is that of Minelektrotekhprom. The application of incentive funds to the encouragement of scientific-technical progesss is, in essence, a component element of the new system for the planning and economic encouragement of projects involving new technology which is in effect in the branch. This is assured, first of all, by the introduction of additional deductions to be paid into the incentive funds for overfulfillment of the plans (for volume of production of commercial output; profit or profitability; and increase of labor production) by means of markups to the wholesale prices of new high-quality articles; and, secondly, by the establishment of the dependence of the size of those funds upon the percentage of output of highest and second category of quality.

The results of the experiments being carried out in a number of branches, and the generalization of the accumulated experience in the work of the

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industrial ministries under the new conditions, found their reflection in the July 1979 decree of the CPSU Central Committee and the USSR Council of Ministers, "Improving the Planning and Intensifying the Effect of the Economic Mechanism upon Increasing the Effectiveness of Production and the Quality of Work." Among the set of measures for the further development of cost accounting and the intensification of the role played by the economic levers and incentives, it was deemed necessary to define the norms for the formation of the incentive funds (the material incentives fund; the fund for social-cultural measures and housing construction), primarily according to the indices established in the plan for the quality of the work performed by the production associations (enterprises), for example, the increase in labor productivity and the production of output with the highest category of quality (or other index of quality of output, as established for the particular branch). For the production associations (enterprises) which considerably increase the output of new highly-effective output intended for production and technical use and of new consumer goods, increased norms are being established for the formation of incentive funds.

Let us consider the mechanism of additional deductions for overfulfillment of the fund-forming indices: the increase in labor productivity; the volume of production of commercial output and profitability, which overfulfillment is influenced by the production and sale of new highly-effective technology. The plans for the fund-forming indices are developed without taking into consideration the incentive markups, and the evaluation of their fulfillment is carried out on a factual basis, with a consideration of the received markups and the rebates that were employed. In the ministries and departments, when determining the extent of deductions to be paid into the incentive funds of the production associations (combines), enterprises, and organizations, there is excluded from the actual volume of sold output and profit the entire amount of additional profit obtained as a result of the markups to wholesale prices, as being profit having an ear-marked purpose.

In Minelektrotekhprom, the incentive markups received from the production and sale of output with the highest category of quality render a substantial influence upon the dynamics and level of the fund-forming indices and create a source for additional deductions to be paid into the incentive funds of the associations (enterprises). For example, with fulfillment of the plan for volume of production of commercial output, the increase of labor productivity and profit (profitability) without a consideration of the incentive markups, when evaluating the results of their economic activity, they are completely taken into account, except for the deductions paid into the funds for the providing of economic incentive for new technology. These deductions are reflected in the reports as profit having ear-marked purpose. In the event of nonfulfillment of the plan for the indices which were mentioned (without a consideration of the incentive markups) for the computation of incentive funds (of associations, enterprises) and when summing up the results of the nationwide socialist competition, the total amounts of the received markups are not taken into consideration. When computing the incentive funds, the profit that is assumed for the determination

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of the computed profitability is not reduced by the amount of the actual deductions paid into the funds for economic incentive for new technology.

This procedure assures substantial economic advantages for those enterprises which produce considerable volumes of high-quality output or which rapidly increase the production of such output. For example, when evaluating the results of the economic activity at enterprises that produce more than half their output with the highest category of quality or which doubled their production of such output as compared with the corresponding period last year, with the nonfulfillment of the plan for the most important indices (increase of labor productivity; profit; volume of production of commercial output), part of the obtained incentive markups is taken into account. When computing the incentive funds and summing up the results of the nationwide socialist competition, one considers 50 percent of the additional profit obtained from the production of the output with the highest category of quality. Correspondingly, from the profit assumed for determining the computed profitability, there is excluded only half the total amount of deductions paid into the funds for the economic incentive for new technology.

A change in the size of the incentive funds of the production associations and enterprises of the electrical-engineering industry depending upon the percentage of the output of the highest and second categories of quality, in conformity with the methodology that has been in effect since 1971, must be carried out in two stages: when refining the annual plan, as compared with the assignments of the five-year plan; and when evaluating the fulfillment of the annual plan. The enterprises have the opportunity to increase (decrease) the cost-accounting incentive funds at the stage of preparing (refining) the annual plan, that is, when assuming in it increased (decreased) pledges for the production of output of the highest category of quality as compared with the assignment of the five-year plan for the period being planned. The maximum change in the size of the funds in the direction of an increase or decrease depending upon a change in the planned volume of production of output with the highest category of quality cannot, however, exceed 10 percent of their planned total.

The limitation of the increase of the incentive funds at the first stage, with the acceptance of increased assignments, in the annual plan for the production of output with the highest category of quality has been called upon to encourage the development and approval of intensified five-year plans. Moreover, if the enterprise stipulated in the annual plan lower assignments for the reduction of production of output in the second category of quality as compared with the five-year plan, its cost-accounting incentive funds are reduced in conformity with the adopted scale, but by no more than an additional 10 percent. Thus, if the enterprise stipulates in the annual plan a lesser volume of output of production of the highest category of quality and a greater volume of production of articles of the second category of quality as compared with the assignment in the five-year plan, its funds can be reduced as a whole by 20 percent.

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However, the size of the cost-accounting incentive funds at the stage of preparation of the annual plans actually, as a rule, does not change depending upon the acceptance in them of increased pledges for the production of new high-quality output (as compared with the assignments of the five-year plan). Change in the size of the incentive funds of the production associations and enterprises is carried out, for the most part, only when evaluating the fulfillment of the annual plan. Such changes in 1975 were carried out, for example, at 93.1 percent of the total number of enterprises in the branch which had plans for the production of output based on quality categories; and in 1977, at 92.4 percent. The reason for this lies in the fact that the enterprises continued to have no self-interestedness in the acceptance of intensified plans for raising the technical level of the output being produced.

The absolute majority of enterprises in the branch make additional deductions to be paid into the incentive funds based on the results of the evaluation of the actual fulfillment of the plans. In conformity with the statute which is in effect, when there is overfulfillment of the accepted annual plan for the production of output with the highest quality category the enterprises can make additional deductions to be paid into the cost-accounting incentive funds on the basis of reduced norms; the maximum size of these deductions is limited only by the extent of the profit in excess of plan. According to the corresponding scale, one monitors strictly the fulfillment of the accepted pledges for the production of the output with the highest category of quality. In the event of nonfulfillment of the plan, the decrease in the size of the funds is carried out according to the highest norms: for each point, from 3 to 10 percent of the total amount of the funds. With the actual reduction of the volumes of production of output with the second category of quality as compared with the planned volumes, the cost-accounting incentive funds are not increased, but with an actual increase in output they are reduced according to the highest norms. The maximum decrease of the funds as a result of nonfulfillment of the accepted plan for the production of output with the highest and second category of quality cannot exceed 60 percent of their planned total.

When evaluating the considered procedure for encouraging the quality and renewal rate of output, it should first of all be noted that the establishment of this kind of dependency between the size of the cost-accounting incentive funds and the technical level of the output being produced is, in our opinion, economically substantiated. True, certain authors find that the application of the index of the percentage of output with the highest category of quality can lead to the appearance of contradictions between the interests of the national economy and those of the enterprise, and they propose using, when controlling the quality of output, its in-kind indices[1]. However, the index of percentage of output of the highest category

[1]See, for example, Z. I. Bushuyeva, "Providing of Economic Incentives for the Quality of Output" (in the collection *Sotsialisticheskoye vosproizvodstvo i problemy upravleniya* [Socialist Reproduction and Problems of Control], Izdatel'stvo MGU, 1973, p 65).

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of quality in the overall volume of production reflects sufficiently fully the results of the activities of the collectives of the enterprise with regard to the assimilation of the production of the new technology, the improvement of quality, and the acceleration of the renewal rate of the output being produced. In addition, not only the index of the percentage of output of the highest category of quality is planned for the enterprises, but also the products list of that output, and this substantially limits them in the selection of "profitable" articles.

Sometimes a shortcoming of the index of the percentage of the output with the highest category of quality is seen in the fact that it does not reflect the economic effectiveness of the new technology. But the function of that index in this instance is somewhat different. The economic effect of the new technology is taken into consideration when forming the special funds for the economic encouragement of new technology. But the additional deductions to be paid into the cost-accounting incentive funds are supposed to "catch" the influence of the factors that are not taken into consideration during the formation of the special incentive funds.

A positive factor in the considered methodology for changing the extent of the cost-accounting incentive funds depending upon the technical level of output is the fact that it stipulates the influence not only upon the production of the new high-quality output (of the highest category of quality), but also presupposes the encouragement of removing from production the obsolete articles (of second category of quality). This assures the complete effect upon the composition and structure of the output being produced by the enterprise.

When evaluating as a whole in a positive manner the methodological foundations of the dependence of the extent of the cost-accounting incentive funds at Minelektrotekhprom upon the percentage of output in the highest and second categories of quality, it is necessary to point out the certain lack of substantiation of the methodology for computing those indices that are used in the system of encouragement. The percentage of output in the highest and second categories of quality is taken into consideration on the basis of a comparison of the volumes of production of the articles of definite quality and the overall volume of production of output, which can include the output that is not subject to certification. Possibly the application of percentage indices computed in this manner is justified when planning the increase in the quality and the acceleration of the renewal rate of output at the levels of enterprise, association, branch, and national economy. However, in order to encourage a rise in the technical level of output, it is economically more substantiated, in our opinion, to use indices of the percentage of output according to categories of quality, which percentage is computed in proportion to the volume of output that is subject to certification. The dynamics and level of the proposed indices will reflect more precisely the results of the enterprises' activities in improving the quality and accelerating the renewal rate of output.

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When analyzing the experimental procedure of encouragement as introduced at the USSR Ministry of the Electrical-Engineering Industry, it should be noted that it exerts a real influence upon improving the quality and accelerating the renewal rate of output. At most enterprises in the branch, there is a change in the size of the incentive funds, depending upon the actual fulfillment of the plans for the technical level of the output being produced. For example, during 1972-1977 at an average of 91-92 percent of the enterprises in the branches that had plans for the production of output based on categories of quality, the size of the incentive funds was changed depending upon the fulfillment of the planned assignments for the production of output in the highest and second categories of quality. Most of the enterprises (from 81 to 83 percent), as a rule, increased their incentive funds. And at a comparatively insignificant number of enterprises (from 7 to 11 percent), the incentive funds were reduced as a result of the nonfulfillment of the plans for raising the technical level of output being produced. The extent of the additional deductions to be paid into the incentive funds of the production associations and enterprises for overfulfillment of the assignments for the production of output with the highest category of quality is sufficiently large to assure that the collectives have a self-interestedness in improving the quality and accelerating the renewal rate of the output being produced. For example, in 1975-1977 the additional deductions to be paid into the enterprises' incentive funds for overfulfillment of assignments for the production of output with the highest category of quality constituted -- in comparison to the funds for providing economic incentives for new technology which were formed from incentive markups -- from 86.8 to 99.6 percent.

In addition to the noted positive factors in the currently effective methodology for changing the extent of the incentive funds depending upon the increase in quality and the accleration of the renewal rate of output are also typified by definite shortcomings and contradictions. The change in the size of the incentive funds at production associations and enterprises depending upon the technical level of the output being produced, as a rule, is of a one-sided directedness, namely -- the size of the incentive funds, for the most part, increases as a result of the overfulfillment of the planned assignments for the production of output with the highest quality category.

The factual reduction in the incentive funds with respect to the actual additional deductions represented a rather insignificant figure and, for a number of years, constituted from 8 to 15 percent. A substantial reduction in the incentive funds in 1974 (22.5 percent in relation to the increase) was caused by the reduction of the percentage of the output of the highest category of quality as a result of the changeover from the branch to the nationwide system of certification of the quality of output.

A study of the change in the size of the incentive funds at the production associations and enterprises depending upon the technical level of the output

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Ratio of the increase and decrease of incentive funds, by branch (in percentages)

	1972	1973	1974	1975	1976	1977
Ratio of reduction of incentive funds, in proportion to their increase	9.0	8.2	22.5	13.1	15.0	8.7
Computed decrease of incentive funds, total	100	100	100	100	100	100
including as a result of:						
reduction of percentage of output of highest quality	18.0	34.8	72.7	54.4	84.4	86.9
increase in percentage of output of second category of quality	82.0	65.2	27.3	45.6	15.6	13.1

being produced indicates that the dynamics of these incentive funds depends, for the most part, upon the fulfillment of the planned assignments for the production of output in the highest category of quality. Firstly, the additional deductions to be paid into the incentive funds are completely formed as a result of the overfulfillment of the plans for the production of output in the highest category of quality. Secondly, the reduction of the incentive funds is determined, to a greater degree, by the reduction of the percentage of output in the highest category. For example, in 1976-1977 as a result of underfulfillment of the planned assignments for the production of output in the highest category of quality, an average of more than 85 percent of the computed reduction in the total amount of incentive funds was carried out. Consequently, the influence of the percentage of the output in the second category of quality upon the change in the size of the incentive funds of the production associations and enterprises is extremely insignificant.

Obviously, for the greater self-interestedness of the enterprises in removing from production the obsolete technology it is necessary to change the qualitative correlation of the schales according to which changes are made in the incentive funds depending upon the percentage of output in the highest and second categories of quality. For this purpose the norms for the change in the funds depending upon the percentage of the obsolete technology must be raised as compared with the norms that take into consideration the percentage of output in the highest category of quality. In addition, in the currently effective scale for the dependence of the incentive funds upon the production of output in the second category of quality, the percentages of that output at a level of from 20 percent or less are subdivided into only two intervals, and the remaining four intervals contain large percentages. The analysis of the technical level of the output being produced shows that at most enterprises in the branch these four intervals, practically speaking, do not work, since the actual percentages of output in the second category of quality constitute, as a rule, less than 20 percent. As a result, it

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would be desirable to have the proportion of the output in the second category of quality at the level of up to 20 percent broken down into 5-6 intervals (instead of the two existing ones), and having the larger percentages contained within one or two intervals. This restructuring of the scale, in our opinion, would substantially intensify its encouraging effect upon the removal of obsolete technology from production.

In the scales that are in effect, the reduction of the incentive funds of the production associations and enterprises is carried out according to identical norms for each point (for example, the reduction of the percentage of the output in the highest category of quality) both when refining the annual plan as compared with the assignment for the five-year plan, and when nonfulfillment of that plan occurs. The analogous principle is used when reducing the funds depending upon the increase in the proportion of the output in the second category of quality. In our opinion, it is necessary to take a differentiated approach to the establishment of norms for the reduction of the incentive funds at the stage of refinement of the planned assignments and at the stage of evaluating their fulfillment, and the norms that are employed when evaluating the fulfillment of the annual plans must be higher than the norms at the stages of formation of the planned assignments.

Another shortcoming of the employed methodology for changing the size of the incentive funds of the production associations and enterprises is the discrete nature of the scales that are in existence. The norms according to which the increase (decrease) in the size of the incentive funds is carried out are substntially changed when going from one interval of percentage of output to another. Moreover, one norm extends to a considerable area in the entire interval. For example, when the percentage of output with the highest category of quality changes from 25 to 50 percent, the norm that is in effect is a single 5-percent norm for increase in incentive funds for each point of increase of percentage in the plan as compared with the assignment for the five-year plan, etc. The scale for the dependence of the incentive funds upon the percentage of output in the second category of quality is also constructed on similar principles.

At the present time in the electrical-engineering industry, as a result of the changeover starting in 1979 to the new conditions for planning and economic encourages, draft versions of scales which are of a continuous nature have been developed. Apparently it would be desirable to give to all the scales that are in effect at the stages of formation of the five-year plan, the refinement of the annual plans, and the stage of evaluating their fulfillment, a continuous nature by establishing the corresponding norms for attainment of the lower limit of the intervals and additional norms -- which are reduced as compared with them -- for each point of surpassing that limit.

The procedure for changing the size of the incentive funds of the production associations and enerprises depending upon the technical level of the output being produced, which procedure is employed in the electrical-engineering industry, does not encourage the acceptance of intensified planned assignments. This is caused primarily by the fact that these changes were not provided for

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at the stage of preparing the five-year plan. Therefore it would be advisable, in our opinion, to develop scales for the determination of the change in the incentive funds for each percentage of the counter plans for raising the technical level of the output being produced, as compared with the assignments for the five-year plan which are established by the superior organization. At the stage of formation of the five-year plans, it would be desirable to stipulate the possibility of increase in the incentive funds in the event of acceptance of counter plans not only for increasing the percentage of output in the highest category of quality, but also for reducing the share of the output in the second category of quality. Provision must also be made simultaneously for a reduction in the incentive funds at that stage of planning.

The change in the incentive funds of the production associations and enterprises during the formation of the five-year plan must be made on the basis of the highest norms, that is, those that have been increased as compared with the norms that are employed at the subsequent stages of refinement of the annual plans and the evaluation of their fulfillment. When accepting the refined annual plans and evaluating their fulfillment, the incentive funds are increased if there is an increase in the percentage of output in the highest category of quality, and they are decreased if there is a reduction in that percentage and an increase in the share of the output in the second category of quality.

Computed and actual additional deductions to be paid into the incentive funds for overfulfillment of the assignments for the production of outut with the highest category of quality (in percentages)

	1972	1973	1974	1975	1976	1977
Ratio of actual additional deductions to computed	57.2	66.2	73.6	62.5	77.5	94.0
Deviation of actual additional deductions from computed, total	100	100	100	100	100	100
including that caused by: insufficiency of profit in excess of plan	60.0	72.45	52.3	73.2	35.65	69.2
Branch enterpises for which an increase in incentive funds was assumed, total	100	100	100	100	100	100
including:						
those that made deductions in conformity with computation	58.3	60.0	66.2	61.9	74.9	87.0
those that carried out deductions partially	27.8	29.5	15.2	23.5	13.5	5.5
those that did not make deductions	13.9	10.5	18.6	14.6	11.6	7.5

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The incentive effect of the addtional deductions (to be paid to the cost-accounting incentive funds depending upon the percentage of output in the highest category of quality) upon the renewal rate of the output being produced is, to a definite degree, lessened by the fact that their computed value, as a rule, differs from the deductions that are actually made . For example, in 1972-1975 the actual additional deductions to be paid into the incentive funds for overfulfillment of the planned assignments for the production of output in the highest category of quality constituted an average of 65 percent of those which had been assumed on the basis of computation. And only approximately 62 percent of the enterprises carried out an increase in the incentive funds in conformity with the computation. In 1976-1977 the ratio of the actual and computed increase of the funds improved. In 1977 the actual additional deductions came to 94 percent of the computed ones; and 87 percent of the enterprises carried out the increase in the incentive funds that they were supposed to (see table on preceding page).

The reason for the deviation of the actual additional deductions to be paid into the incentive funds for overfulfillment of the planned assignments for the production of output with the highest category of quality, as compared with those deductions that had been computed, is the lack of the necessary profit at the enterprises. For example, in 1977 the deviation of the actual deductions from the computed ones -- a deviation of 69.2 percent -- was influenced by the complete lack at 7.5 percent of the enterprises of the necessary profit in excess of plan; and the deviation of 30.8 percent was influenced by the insufficiency of that profit at 5.5 percent of the enterprises. In order to carry out additional deductions to be paid into the incentive funds in conformity with the actual results of improving the quality and accelerating the renewal rate of output, it is necessary, in our opinion, to carry out a number of interrelated measures. First of all, it is necessary to improve the existing procedure of using profit in excess of plan in such a way that it becomes a more "sufficient" source of increasing the incentive funds. At the present time a considerable part of the profit in excess of plan, in our opinion, is channeled to purposes that do not correspond to its economic nature or function. For example, at a number of Minelektrotekhprom enterprises in 1973-1977, from 15 to 30 percent of the profit in excess of plan was used to repair schools, to replace the above-plan losses in the housing and communal economy, to pay bonuses connected with the socialist competition, etc.

It would seem that it would be more substantiated to have a considerable part of the payments of bonuses connected with the socialist competition to be made by drawing on the money in the material incentives fund. The expenditures for repairing the schools and replacing the losses incurred in the ZhKKh [housing and communal economy], to an even greater degree, should not be linked with profit in excess of plan. They should be carried out by drawing on the appropriate sources, for example, the state budget, the fund for social-cultural measures and housing construction, etc. The improvement of the use of profit in excess of plan by means of

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excluding the economically unjustified trends in expenditure will make it possible to increase its reliability as a source of additional deductions to be paid into the incentive funds and to intensify its role in encouraging scientific-technical progress, and that completely corresponds to its economic nature and function. In the event of a shortage of profit in excess of plan, the source of additional deductions to be paid into the incentive funds for overfulfillment of the planned assignments for the production of output with the highest category of quality (in addition to increasing the funds at the stage of refinement of the five-year and annual planned assignments), obviously can be a centralized reserve fund for the ministry, which fund should preferably be formed from the undistributed part of the incentive markups and the corresponding reserves of the nationwide industrial associations.

The necessity of intensifying the role of profit in excess of plan in the formation of the additional deductions to be paid into the incentive funds is also determined by the circumstance that, from the theoretical point of view, profit in excess of plan is the source of them which has the greatest economic substantiation. It reflects the results of the activity of the enterprises to improve the quality and accelerate the renewal rate of the output being produced. For example, in 1975-1977 in Minelektrotekhprom, practically all the profit in excess of plan was formed from the incentive markups added to the wholesale prices of the new articles with highest category of quality. The establishment of the link between the additional deductions to be paid into the cost-accoutning incentive funds and the amount of the profit in excess of plan provides an economic self-interestedness on the part of the enterprise in improving the effectiveness of production.

In the eletrical-engineering industry as a whole there operates a complicated four-channel system for encouraging the quality and renewability of output. First of all, the index of the percentage of output with the highest category of quality in the overall volume of production of commercial output is a mandatory fund-forming index and exerts a substantial influence upon the formation of the incentive funds (material incentive fund and the fund for social-cultural measures and housing construction) at the associations and enterprises. Secondly, the incentive markups on the wholesale prices of the output with the highest category of quality exert a noticeable effect upon the overfulfillment of the plans for the most important fund-forming indices (increase in labor productivity, profitability, increase in the volume of production of commercial output), assuring additional deductions to be paid into the incentive funds. Thirdly, the amount of the incentive funds at the associations is additionally adjusted depending upon the acceptance and fulfillment of the plans for the percentage of output in the highest and second categories of quality. Fourthly, the deductions from the incentive markups to the prices of output in the highest category of quality are a very important source of formation of the funds for economic encouragement of new technology. It would seem that the questions of the optimal correlation of the indicated stimulating levers, the determination and delimitation of the functions

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of their action, require further elaboration and their well-substantiated resolution.

The methodology for changing the size of the incentive funds depending upon the improvement of quality and the acceleration of the renewal rate of output, which methodology is in effect in Minelektrotekhprom, represents one of the possible ways to orient the overall system of encouragement toward the acceleration of scientific-technical progress. In its turn, this orientation of the overall system of encouragement toward economic problems of the development of science and technology reflects a tendency toward the formation of a single system of encouragement that is typical of all branches of industry.

The necessity of the gradual rapprochement of the special and the overall systems of encouragement and the creation, in the long view, of a single system of encouraging the increase in the effectiveness of production was noted long ago in the literature[2]. However, a number of authors, in our opinion, take a one-sided approach to the question of the rapprochement of these systems, and consider it necessary to have a concentration of bonus funds for new technology in the material incentives fund[3]. Thus, they propose the mechanical unification of the funds for the economic encouragement of new technology and the material incentive funds. It should be noted that attempts were undertaken to implement these proposals by way of an experiment in the practical situation. For example, at the Uralelektrotyazhmash Production Association since 1973 the funds coming in from the existing systems of bonus payment into the association (plants and institute), other than the bonuses connected with the nationwide socialist competition, are channeled into the single material incentives fund.

This kind of methodology for the formation and use of the single material incentive fund does not introduce, essentially speaking, anything new into the system of encouraging production. The procedure for the formation and

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[2]See, for example, L. Gatovskiy, "Economic Science and Certain Problems of Technical Progress" (in the collection *Problemy ekonomicheskogo stimulirovaniya nauchno-tekhnicheskogo progressa* [Problems of the Economic Encouragement of Scientific-Technical Progress], Izdatel'stvo "Nauka," 1967, pp 47-49); G. A. Yegiazaryan, L. S. Kheyfets, *Problemy material'nogo stimulirovaniya v promyshlennosti* [Problems of Material Encouragement in Industry], Izdatel'stvo "Ekonomika," 1970, pp 23-26. This problem is studied in particular detail in L. M. Gatovskiy's monograph *Ekonomicheskiye problemy nauchno-tekhnicheskogo progressa* [Economic Problems of Scientific-Technical Progress], Izdatel'stvo "nauka," 1971, pp 327-373.

[3]See, for example, N. I. Yashen'kin, *Sovershenstvovaniye upravleniya i puti uskoreniya nauchno-tekhnicheskogo progressa* [Improvement of Control and Ways to Accelerate Scientific-Technical Progress], Leningrad, 1975, p 100; *Stoimostnyye rychagi povysheniya effektivnosti proizvodstva* [Cost Levers for Increasing the Effectiveness of Production], Izdatel'stvo "Ekonomika," 1977, p 125.

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use of the funds constituting the single material incentives funds remains fundamentally unchanged. The experimental checking of the functioning of the single material incentives funds at Minelektrotekhprom, in our opinion, showed the formal nature of that measure. For example, at Minelektrotekhprom, following the Uralelektrotyazhmash Production Association, the single material incentive fund began to be created at five additional associations. However, in 1978 four associations rejected this methodology for the formation and use of incentive funds, since it creates unjustified difficulties in the payment of bonuses to the workers at the plants, NII [scientific-research institutes] and KB [design bureaus] and does not contribute to the intensification of the self-interestedness of the collectives in the acceleration of the rates of technical progress. It would seem that neither the one-sided improvement of the overall system of encouragement, nor the mechanical combination of both systems which are based on different principles, can resolve the problem of creating a single system for encouraging the increase in the effectiveness of production.

The implementation of measures involving the further improvement of the economic mechanism of the control of scientific-technical progress, which were stipulated in the decree of the CPSU Central Committee and the USSR Council of Ministers, entitled "Improving the Planning and Intensifying the Effect of the Economic Mechanism Upon Increasing the Effectiveness of Production and the Quality of Work," will be an important reserve for increasing the effectiveness of production not only when fulfilling plans, but also when developing them. When evaluating the activities of enterprises, and when forming and using the funds for economic encouragement, there is an increase in the role played by the qualitative indices, The broad application, in the branches of industry, of the procedure by which the incentive funds are put in a definite dependence upon the production of new high-quality output (of the highest category of quality) and the removal of obsolete output from production, will create definite conditions for the formation of a single system of encouraging production and the acceleration of technical progress.

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MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

THE BALANCE BETWEEN JOB POSITIONS, LABOR RESOURCES AND CAPITAL INVESTMENT

Moscow VOPROSY EKONOMIKI in Russian No 10, Oct 79 pp 44-55

[Article by G. Mikheyev and N. Markova]

[Text] The securing of balanced growth of the economy is constantly at the center of attention of the party and the government. In the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Improvement of Planning and the Strengthening of the Influence of the Economic Mechanism on the Increase in the Efficiency of Production and the Quality of Work", it is written that, beginning with the 11th Five-Year Plan, a stable five-year plan for capital construction will be established, which will be balanced with the resources of materials, technical and energy equipment, with labor and financial resources, and even with the capacities of the building and assembly organizations. In this connection, one of the urgent problems is the attainment of balance between the new job positions to be created and the labor resources, on the one hand, and the balance between the capital investments to be allotted and the cost of the job positions to be created, on the other. All of these categories are closely linked to one another, and the level of their balance in many respects predetermines the effectiveness of the development of the national economy.

The correlation that has developed between the number of job positions, the quantity of employed workers, and the available labor resources is assessed differently in the economic literature--which is explained, above all, by the absence of a generally-accepted definition of the category of "job position". From the standpoint of technology, a job position has come to mean "a spatially limited section of the production area, which is equipped with all necessary equipment, instruments, appropriate appliances and auxiliary equipment and which is used by one worker or a group of workers for executing a certain part of the technological process".[1] However, this technological definition of job position is not acceptable since it follows from it that one job position may provide employment for one or several workers, with their number remaining undetermined.

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Other authors regard "job position" as "the sum total of the means which are necessary and adequate for one worker for the output of production with standard efficiency".[2] The totality of means is understood as meaning the fixed production capital and the wage fund, and, depending on concrete conditions, the criterion of efficiency may be output, capital-output ratio, prime cost and other indices. In addition, it is suggested that the job position has three characteristics: the cost of the fixed production capital, the wage fund, and the announcements about the workers wanted. Depending on which of these characteristics is taken into account in the calculation of the reserve of job positions, the size of this reserve, as well as the possibility and necessity of creating new job positions, will differ.

Lately more definite characterizations of the job position are being cited in the economic literature. Thus, "from the socio-economic point of view, the job position is characterized not only by a certain mass of means of production, with the aid of which the functioning of one worker during the course of a working day is guaranteed, but also a category of work and a sum total of functions which the worker in the enterprise is obligated to carry out in conformity with the labor contract."[3]

Such a definition of the category "job position", in our opinion, to a greater degree comes close to the true understanding of the content and the form of the category under consideration. However, we imagine that it, too, requires concrete definition and refinements of the connection between the concept of "job position" and the political economy definition of the productive force of national production. It is well-known that the productive forces are the means of production with the aid of which material goods are created and people who set into motion these means and carry out the production of material goods. Every production is broken down into plants, sectors, the latter, in turn, consist of sum totals of job positions, which are connected to each other by certain technological and organizational functions. The concept of "job position"represents the "primary cell" of a given production, which is capable of providing the appropriate output only in the presence of the necessary degree of capital equipment of labor, its provision with raw material, materials, unfinished work pieces, and other objects of labor, as well as a certain professional preparation of the workers who are capable of setting the means of production into motion.

Thus, the job position is a unit of the productive force, which is characterized by a certain aggregate of the means of production and living labor. This treatment of the concept of "job position" combines the material basis of the job position (the mass of the means of production) and living labor of a certain "quality", which is necessary for the effective utilization of the means of production. Only the sum total of the means of labor, the objects of labor, and labor forces converts the

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job position into an effective production cell, capable of creating a product for society.

The job position as a unit of productive force is a dynamic concept and, with the intensification of production, constantly undergoes changes in connection with the perfection of the means of labor, the use of more effective objects of labor, and the application of more qualified living labor in conditions of uninterrupted improvement of the organization of labor and the entire production process. This is what makes for the constant increase in the productive capacity of one job position, which creates the preconditions for the reduction of the number of job positions and, consequently, of the number of employed.

Purposeful influence on the number of job positions with regard to industries and all of material production as a whole may be exerted in many directions. The most important among them is the distribution of capital investments among new construction, reconstruction, and technical reequipment of enterprises in operation. The placing into service of new enterprises requires the attraction of additional labor force; therefore, all other things being equal, an increase in the share of new construction leads to a significant increase of people employed in material production. Technical reequipment and reconstruction of operating enterprises, as a result of which a liquidation of job positions with low technical equipment of labor takes place, frees a large quantity of those working, in connection with which the total additional demand for manpower decreases. The influence of reconstruction on the growth of labor productivity and the number of workers employed is being observed in many enterprises.

For the textile and light industry, which are experiencing a manpower deficit, technical reequipment and reconstruction are practically turning into the basic source of the provision of manpower. This problem is also pressing for other sectors of industry. Thus, if technical reequipment and reconstruction had not takenplace in ferrous metallurgy, 240,000 additional people would have been required for it in the 9th Five-Year Plan. As a result of technical reequipment and reconstruction, such labor-intensive sectors of industry as the fuel and timber industry are already now developing with a reduced number of workers employed in them.

The change in the proportions in the distribution of capital investments between new construction and reconstruction of enterprises in operation in favor of the latter means that capital investments will be directed, above all, not toward the creation of additional job positions, but toward their technical reequipment, the replacement of obsolete equipment with the most modern highly-productive technology. In this case, the growth being planned is secured through a smaller growth in the number of those engaged in material production.

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Table 1. Technical-Economic Indicators of a Number of Reconstructed Enterprises of the RSFSR Textile Industry

		(1) Увеличение основных фондов к первоначальной стоимости (в %)	(2) Сокращение численности после реконструкции (чел.)	(3) Выработка на одного рабочего (в руб.)		(4) Рост производительности труда (в %)
				(5) до реконструкции	(6) после реконструкции	
(7)	Прядильно-ткацкая фабрика имени Л. Б. Красина	28,6	341	6 826	8 842	129,5
(8)	Вычугская ордена Трудового Красного Знамени прядильно-ткацкая фабрика имени В. П. Ногина	22,9	489	7 893	12 850	163,0
(9)	Фурмановская прядильно-ткацкая фабрика № 1	37,5	370	6 203	8 486	137,0
(10)	Кохомский ордена Октябрьской Революции хлопчатобумажный комбинат	112,0	381	10 756	17 550	163,0
(11)	Ивановская прядильно-ткацкая фабрика имени Ф. Э. Дзержинского	107,0	762	7 867	11 268	143,0
(12)	Ивановская ткацкая фабрика имени Н. К. Крупской	84,0	80	7 514	12 309	164,0
(13)	Ивановская ткацко-отделочная фабрика имени рабочего Ф. Зиновьева	162,0	544	17 818	24 157	136,0
(14)	Суконная фабрика «Коллективное творчество»	14,0	128	27 407	37 278	136,0
(15)	Суконная фабрика «Творец рабочий»	35,0	72	26 667	34 414	129,0

Key:

1. Increase in fixed capital added to the initial value
2. Reduction in numbers after reconstruction (people)
3. Output per worker (in rubles)
4. Growth of labor productivity (in percent)
5. Before reconstruction
6. After reconstruction
7. Textile Factory imeni L. G. Krasin
8. Vychugskaya ordena Trudovogo Krasnogo Znameni Textile Mill imeni V. P. Nogin
9. Furmanovskaya Textile Mill No 1
10. Kokhomskiy ordena Oktyabr'skoy Revolyutsii Cotton Combine
11. Ivanovskaya Textile Mill imeni F. E. Dzerzhinskiy
12. Ivanovskaya Weaving Mill imeni N. K. Krupskaya
13. Ivanovskaya Textile Finishing Factory imeni Rabochego F. Zinov'yev
14. Kollektivnoye Tvorchestvo Cloth Factory
15. Tvorets Rabochiy Cloth Factory

In assessing the influence of the distribution of capital investments on new construction and reconstruction of operating enterprises from the

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point of view of the long-term demand for manpower, still another point must be taken into account. Inadequate rates of the renewal of fixed capital result in a situation where the share of not only spiritually but also physically obsolete assets in the composition of the operating productive apparatus is great. Such a situation leads to the growth of irrational expenditures for major repair of equipment, as well as to an increase in the quantity of workers engaged in repair jobs. At the present time, every tenth worker in industry (in ferrous metallurgy--every second) is engaged in repair work. In this sphere, there are significant manpower reserves that can be freed, one of the directions of the realization of which being the increase in the share of capital investments oriented toward the reequipment of operating enterprises.

The growth (or reduction) in the number of job positions in an industry, and consequently also the additional demand for manpower, depend not only on the proportion of new construction to reconstruction of operating enterprises in the composition of capital investments, but also on the distribution of capital expenditures among different forms of reconstruction and technical reequipment. Calculations show that the investment of 1 million rubles for mechanization of auxiliary processes frees 4-5 times more workers than in basic production.[4]

Technical equipment, partial reconstruction, aimed at the replacement of obsolete, active fixed capital on a new technological basis, as well as complete reconstruction, with the replacement of active and passive fixed capital, are accompanied, as a rule, by the freeing of manpower (in connection with a reduction of its expenditure per unit of production). In those instances where the necessity arises to increase the production output of a given product assortment, it is expedient to carry out reconstruction along with expansion, that is along with the creation of new job positions, which may be staffed at the expense of the workers which have been freed in the reconstruction.

Calculations of the State Institute for the Planning of Enterprises of the Textile Industry show that if during the years of the 10th Five-Year Plan the growth of production by means of the expansion of operating enterprises is brought up to 40 percent on the average in such industries as the cotton, wool, and silk industries, then in so doing the average proportionate capital investments for the growth of production are lowered to 7.5 percent, which saves approximately 350 million rubles of production capital investments and almost 320 million rubles in terms of civil construction.

The proportions of capital investments with regard to investment forms in the intensification of national production are basically determined by the free labor resources. Since in the future period the growth of employees in many sectors of material production is practically excluded,

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the creation of new job positions must be limited and be admitted only when this is economically justified.

Taking these considerations as our point of departure, in the presence of a stable or even decreasing number of employed in individual sectors of material production of the national economy, such investment forms as technical equipment, the partial or complete reconstruction of operating enterprises must be acknowledged as expedient.

At the cost of the investment forms mentioned, the following tasks must be solved first of all: the intraproduction and intrasectorial balance of the capacities of basic and auxiliary production; increase in labor productivity; the freeing of workers from material production; increase in the quality of production; specialization of production; output of a new type of production of a needed product assortment; growth of the final product.

The decree mentioned above sets forth that the means for the construction of new and the expansion of presently operating enterprises may be apportioned in cases where the demands of the national economy for a given type of product cannot be provided for by presently operating enterprises, taking into account their reconstruction and technical reequipment.

New construction is also expedient in connection with the exploitation of deposits of natural resources, basic changes in the technology of production, outstanding achievements in science and technology, the development of industry in new regions, for example, in Western and Eastern Siberia, in the Far East, and the North.

In examining the basic factors which influence the number of job positions, it is necessary to consider that the reduction in the number of job positions is of great significance and, consequently, the freeing of manpower from operating enterprises as the result of the improvement in the organization of labor and the entire production process. The experience of the Shchekinskiy Chemical Combine is indicative of the significant reserves of such reduction and freeing of manpower. In the first phase of the experiment, the release of manpower was realized mainly by virtue of the perfection of the organization of production and of labor. Thus, 83 percent of the total release of workers in the combine during the first 3 years of the experiment that was carried out, beginning in 1967, was obtained by virtue of the combination of professions, the expansion of the service zone of equipment, the perfection of the structure of management, the centralization of repair and other auxiliary services and only 6.5 percent by virtue of automation and the mechanization of manual work.

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Now the method developed at Shchekino is utilized by more than 1,000 enterprises, including 150 plants and associations of the chemical industry, 23 enterprises of the automobile industry, 46 enterprises of the Ministry of Chemical and Petroleum Machine Building. As a result, in the chemical industry alone 60,000 people were released for new factories. In the enterprises of the Ministry of Petroleum Refining and Petrochemical Industry in only three years of work according to the Shchekino model, more than 18,000 workers were released, the volume of production sold increased by 19.8 percent, labor productivity by comparison with the plan increased by 8.8 percent. The service zone of approximately 47,000 workers expanded.[5]

The majority of enterprises working in accordance with the Shchekino method do not produce additional recruitment of workers, although with the launching of construction of plants, factories, machine units, and installations in these enterprises new job positions are created. The workers who have been released in individual sectors of production are being rationally used in the given enterprise or other enterprises, and thus the shortcoming in the growth of manpower in the national economy is made up, additional production output and an increase in national income are secured.

At the present time, the improvement in the organization of labor and production frequently produces such an effect, but sometimes even a greater effect than technical reequipment and reconstruction. For example, in the 10th Five-Year Plan, the growth of labor productivity throughout the RSFSR Ministry of Light Industry in connection with the improvement in the organization of labor and production will amount to 45.4 percent of the total growth, and by virtue of an increase in the technical level of production --42.6 percent (see Table 2). Thanks to an improvement in the organization of production and labor, an increase of 32.7 percent should be obtained in labor productivity by the RSFSR Ministry of Textile Industry.

For the actuating of existing reserves with regard to the release of manpower and the attainment of balance of the number of job positions by industries and all of material production with the available labor resources it is necessary to perfect the planning of the number of employed in the sectors of material production. One of the shortcomings in this sphere is the calculation of the number of employed "from the base". However, it must be acknowledged that in many enterprises, simultaneously with a shortage of cadres, irrational use of workers is observed, as well as large intraproduction reserves of manpower and even a surplus of it. As a result, the planned number of those working is not always sufficiently well-founded.[6]

Lately a series of propositions have appeared in the economic literature with regard to the perfection of the methodology of the determination of the demands of the sectors of material production and industry for manpower in the future. Thus, it is proposed that the data on the projected development of machine building and metal working be taken as the initial base for consolidated calculations of the numbers of workers in industry.

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Table 2. Factor Analysis of the Increase in Labor Productivity in 1976-1980 (in Three RSFSR Ministries)

	(1) Министерство легкой промышленности РСФСР			(2) Министерство мясомолочной промышленности РСФСР			(3) Министерство текстильной промышленности РСФСР		
	(4) условное высвобождение работников (в тыс. чел.)	(5) повышение производительности труда (в %)	(6) доля отдельных факторов в повышении производительности труда	(7) условное высвобождение работников (в тыс. чел.)	(8) повышение производительности труда (в %)	(9) доля отдельных факторов в повышении производительности труда	(10) условное высвобождение работников (в тыс. чел.)	(11) повышение производительности труда (в %)	(12) доля отдельных факторов в повышении производительности труда
(13) Всего	201,7	24,9	100,0	43,7	22,3	100,0	224,5	21,4	100,0
(14) в том числе:									
(15) повышение технического уровня производства	110,2	10,6	42,6	12,9	14,9	66,8	81,4	7,8	36,5
(16) улучшение организации производства и труда	71,2	11,3	45,4	16,4	3,4	15,2	73,8	7,0	32,7
(17) из них:									
(18) совершенствование управления производством	-	-	-	3,4	1,0		18,0	1,7	
(19) внедрение НОТ	27,5	3,4		11,4	2,0		51,0	4,8	
(20) сокращение потерь рабочего времени	43,7	7,9		1,6	0,4		2,8	0,2	
(21) прочие							2,0	0,3	
(22) изменение структуры и объема производства	4,2	0,5	2,0	6,5	3,3	14,8	63,9	6,1	28,5
(23) отраслевые и прочие факторы	16,1	2,5	10,0	7,9	0,7	3,2	5,4	0,5	2,3

Key:

1. RSFSR Ministry of Light Industry
2. RSFSR Ministry of Meat and Dairy Industry
3. RSFSR Ministry of Textile Industry
4. Standard release of workers (in thousands of people)
5. Increase in labor productivity (in percent)
6. Share of individual factors in the increase in labor productivity
7. Standard release of workers (in thousands of people)
8. Increase in labor productivity (in percent)
9. Share of individual factors in the increase in labor productivity
10. Standard release of workers (in thousands of people)
11. Increase in labor productivity (in percent)
12. Share of individual factors in the increase in labor productivity
13. Total
14. Including
15. Increase in the technical level of production
16. Improvement in the organization of production and labor
17. Among them [Key continued on following page]

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18. Perfection of the management of production
19. Introduction of Scientific Organization of Labor (NOT)
20. Reduction of losses of labor time
21. Others
22. Change in the structure and volume of production
23. Sectorial and other factors

In so doing, the necessary increase of workers and employees in industry in the future is determined as the product of the increase in the number of workers and employees in machine building and metal working and the so-called coefficient of interdependence in industry, by which is understood the increase in the number of workers in a sector which falls to the share of the increase of one worker in machine building and metal working.

The increase in the number of workers and employees in other sectors of material production and their total number are calculated in an analogous manner--on the basis of the increase in the number of workers in sectors of industry and appropriate coefficients of interdependence. But questions remain open, first of all, with regard to the determination of the number workers in machine building and metal working, and, secondly (this is the main thing), with regard to the calculation of the coefficient of interdependence. The determination of these coefficients for the future presents itself as an independent and difficult task, with the possible approaches to its solution not being indicated in this methodology. Simple extrapolation of the coefficients that have developed in the period under review in the long run would mean the extrapolation of the structure of employment that has developed.

It seems to us that the need for labor resources must be determined on the basis of the number of job positions that have been or are being created. Moreover, it is important that the number of job positions and the necessary number of employed be determined in accordance with a single methodology. The index of labor productivity may serve as such a methodological basis.

The important independent significance of the index of labor productivity is enhanced in conditions of a tight balance of labor resources. This indicator acquires still greater significance in the socialist economy in connection with the necessity of increasing the volume of production and improving the quality of products by enterprises and associations not only in the presence of a stable number of workers employed in them, but also in the presence of a steady reduction of that number and the release of a part of the workers in a given enterprise for the supply of manpower to new enterprises and construction projects. Such an indicator, first of all, strengthens the orientation of technical progress toward economizing living labor and, secondly, intensifies attention to the further perfection of the organization of production and labor, where enormous reserves for the growth of labor productivity are concealed, whose utilization does not

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require significant capital investments (as is shown by the Shchekino experiment in industry and the Orlov method and the brigade contract method in construction).

The utilization of the achievements of technical progress and the perfection of the organization of labor and the production processes permits the reduction of the number of job positions in enterprises now operating, with the volume of production output of a needed product assortment and quality having to remain the same or to be increased. This makes it possible constantly to increase the productivity of living labor, the level of which as a whole is determined by the number of workers employed. Thus, in our view, the number of job positions and, consequently, the number of employed at all levels of the national economy may be determined for any period in accordance with the technologically grounded, progressive labor productivity given a set volume of production of a final product.[8] Consequently, several workers may work in one job position, and for complete staffing of the job positions a greater number of workers is required, which can be calculated in accordance with the following formula:

$$Ch_{pl} = M_{pl} \times K_{sm},$$

where Ch_{pl} is the number of workers required for the complete staffing of job positions during the plan period; M_{pl} is the number of job positions in the plan period; K_{sm} is the planned coefficient of the shift system.

The utilization of the indicator of labor productivity for the determination of the number of job positions requires the perfection of the planning of this indicator taking into account the achievements of technological progress, the full utilization of operating potentials, the expansion of the application of technically grounded norms, the improvement of the organization of labor and production processes, the specialization and cooperation of production, the concentration of the service and repair economy, above all in the territorial production complexes.

The practice of planning the indicator of labor productivity "from the level achieved", as is also done in the case of other economic indicators, is condemned in the decree we have mentioned, where reference is made to the necessity of developing plans on the basis of economic and engineering calculations. The utilization of the indicator of labor productivity indirectly gives an idea of the presence of job positions through the number of employed with correction by the coefficient of the shift system and the coefficient of personnel staffing. If, for example, the price of net production (Ch_k) produced is 100 million rubles, labor productivity (P) is 10,000 rubles, the actual coefficient of the shift system ($K_{sm.f}$) is 1.2 and the coefficient of personnel staffing (K_p) is 0.9, then the number of job positions can be approximately determined in accordance with the formula:

$$M = \frac{Ch_k}{P \times K_{sm.f} \times K_p} = \frac{100{,}000}{10 \times 1.2 \times 0.9} = 9{,}259 \text{ job positions.}$$

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The planned and proportional development of the national economy requires agreement between the cost of the job positions being created and the volume of capital investments allotted. In economic literature one still does not find a precise determination of the category "cost of job position"--which to a certain degree is due to the vagueness of the very concept of job position. Most often the cost of a job position is identified with the cost estimate of the capital equipment of labor. Such an interpretation does not correspond to the real expenditures of society for the creation of a job position, not to say anything about the fact that the indicator of the capital equipment of labor itself includes elements of vagueness since it depends on the coefficient of the shift system.

Proceeding from the concept of "job position" we have examined, its cost must reflect not only the expenditures for the capital equipment of labor, but also the full expenditures of society for the efficient functioning of "a unit of productive force" being newly created, that is the sum total of means of production and living labor inherent in a given job position.

Thus, the component elements of the cost of a job position, in our view, must be the following expenditures: for capital equipment of the job position, for supplying the job position with the objects of labor, for the training and involvement in production of one worker.

The expenditures for the capital equipment of the job position constitute direct capital investments in the creation of active and passive fixed production capital in the calculation for one job position.

The expenditures for providing the job position with the objects of labor are associated capital investments in the production sphere, called upon to provide each job position with the necessary materials and raw materials, unfinished work pieces, semimanufactures, components, electric power, fuel, etc. In sum, the expenditures for the capital equipment of a job position and the provision of the job position with the objects of labor constitute complete specific capital expenditures in the production sphere:

$$K_{up} = K_o + K_s,$$

where K_{up} is the complete specific capital expenditures in the production sphere in the calculation for one job position; K_o is the specific capital expenditures in basic production (equal to the cost estimate of the capital equipment of labor, multiplied by the coefficient of the shift system); K_s is the specific capital investments in associated sectors in the calculation for one job position of basic production.

The volume of capital investments in associated sectors, which is necessary to provide one job position of basic production with the objects of labor, may be determined from the calculation of the volumes of raw material and materials processed in one job position in a unit of time in accordance with technically established norms, and the standards of specific capital

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investments for the creation of a unit of capacity with regard to the production of raw material and materials in related sectors, taking into account the possibilities of satisfying part of the demand for the objects of labor by virtue of their delivery from operating enterprises. Including the complete specific capital expenditures in the calculation of one job position makes it possible to avoid disproportions i the further development of the national economy.

Expenditures in associated industries of a productive purpose are exceedingly significant and are fluctuating between 25 and 500 percent and more of the expenditures for basic production. Thus, in the petrochemical industry in the production of synthetic rubber, expenditures in associated raw materials industries surpass expenditures in basic production by 2.5-5.5 percent.

Since the periods of time required for the construction of projects of basic production and projects of associated industries may be different, it is important in avoiding imbalances in the commissioning of basic and associated capacities to apportion capital investments in good time for all projects, to subject the investment process for all related projects to strict coordination.

Finally, the cost of the creation of one job position must include the expenditures of society for the involvement of every new worker in production. These expenditures include the outlays of society connected with the professional training of cadres and the increase of their qualifications, outlays for moving, and also proportionate over-all expenditures for the social and everyday services infrastructure (calculated for one worker, taking into account the coefficient of the shift system). Taking this as our point of departure, the proportionate over-all expenditures for one worker, who is drawn into production, can be calculated in accordance with the following formula:

$$K_{ut} = K_{upk} + K_{per} + K_{usb},$$

where K_{ut} is the proportionate expenditures for one worker who has been drawn into material production (in rubles per person); K_{upk} is the proportionate expenditures for the training (retraining) on the average for one worker (in rubles per person); K_{per} is the expenditures for moving workers (in rubles per person); and K_{usb} is the proportionate expenditures for the social and everyday services infrastructure in aggregate terms (in rubles per person).

The most important part of the public expenditures for drawing a worker into material production are the expenditures for his professional training. The effective utilization of modern technology requires the use of skilled labor, a certain professional training of the worker. A new type o f skilled worker with a high level of general and specialized education

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is appearing.

The expenditures incurred by the state for the training of one specialist in an institution of higher education amount on the average to 5,300 rubles, in an institution of specialized secondary education--about 2,500 rubles. The average cost of training a skilled worker in a professional-technical school with a study length of 1 year comes to about 700 rubles.[9] The data cited reflect only current expenditures for the training of a worker. If the expenditures for the construction of educational institutions are taken into account, the public expenditures for training a worker will be significantly greater.

The second component part of the over-all expenditures of society for bringing a worker into material production are the expenses for moving him to his place of work. These expenditures are incurred in the staffing of new job positions through organized forms of redistribution of manpower (by way of transfer, organized recruiting or transmigration).

Finally, the third component part of specific expenditures for bringing a worker into material production are expenditures for the social and everyday services infrastructure. Consideration of this particular type of expenditures makes it possible to carry out planning and construction of enterprises in a comprehensive manner (with residential housing, pre-school institutions, cultural projects, public health care, education, trade, municipal services and everyday services). In so doing, it is necessary to take into account not only the expenditures for the worker himself, but also for the members of his family, since only in this case the attachment of the worker to his new job position is obtained.

Thus, the specific over-all expenditures for the social and everyday services infrastructure calculated for one worker can be determined in accordance with the following formula:

$$K_{usb} = (N_{zh}S_{zh} + \Sigma N_{gs}S_{gs})\ K_{sem},$$

where N_{zh} is the standard with regard to the provision of living space (in square meters per person); S_{zh} is the cost of 1 square meter of general space of housing in the base district (in rubles per square meter); N_{gs} is the standard with regard to providing one resident with the projects of civil construction (pre-school institutions, schools, etc.); S_{gs} is the cost of one place of the projects of civil construction; K_{sem} is the coefficient of family situation.

An example of the calculation of specific expenditures for social and everyday services infrastructure (provisionally, based on an incomplete set of sectors of housing and civil construction) is cited in Table 3.

Specific over-all expenditures for the social and everyday services infrastructure for regions which differ from the base region (the Central

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Table 3. Calculation of Specific Expenditures for the Creation of a Complex of Projects of the Social and Everyday Services Infrastructure for One Worker on the Average in the USSR (Without Consideration of Territorial Differentials)*

	(1)	(2)	(3)	(4)	(5)	(6)
	Единица измерения	Норма обеспеченности на 1000 человек	Стоимость строительства единицы мощности (в руб.)	Капитальные затраты на жителя (в руб.: гр. 3 × гр. 4 / 1000)	Коэффициент семейности	Капитальные затраты на одного работающего (в руб.: гр. 5 × гр. 6)
(15) Жилищное строительство	кв. м (7)	13 500	167	2 254,5	2,4	5 410,8
(16) Общеобразовательные школы	мест (8)	144	800	115,2	2,4	276,5
(17) Детские дошкольные учреждения	»	80	1 400	112,0	2,4	268,8
(18) Больницы	койки (9)	12	11 000	132,0	2,4	316,8
(19) Поликлиники	посещений в день (10)	26	1 500	39,0	2,4	93,6
(20) Предприятия общественного питания	мест (11)	28	1 240	34,7	2,4	83,3
(21) Магазины	кв. м торговой площади (12)	185	540	99,9	2,4	239,8
(22) Предприятия бытового обслуживания	рабочих мест (13)	11	4 500	49,5	2,4	118,8
(23) Всего затрат в социально-бытовую инфраструктуру	руб. (14)			2 836,8		6 808,4

*The calculation utilizes the consolidated standards for the development of plans for the comprehensive economic and social development of cities, compiled on the basis of effective building norms and rules (see "Planirovka i zastroyka gorodov, poselkov i sel'skikh naselennykh punktov" [The Planning and Building of Cities, Settlements, and Rural Populated Places], SNiP [Construction Norms and Regulations] P-60-75, Part II--"Normy proyektirovaniya" [Planning Norms], chapter 60. Stroyizdat, 1976).

Key:

1. Unit of measurement
2. Maintenance norm for 1,000 people
3. Construction cost of a unit of capacity (in rubles)
4. Capital expenditures per resident (in rubles; column 3 x column 4) divided by 1,000
5. Coefficient of family situation
6. Capital expenditures per worker (in rubles; column 5 x column 6)
7. Square meters
8. Places
9. Beds
10. Visits per day

[Key continued on next page]

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11. Places
12. Trading area
13. Job positions
14. Rubles
15. Housing construction
16. General education schools
17. Pre-school institutions for children
18. Hospitals
19. Polyclinics
20. Public eating facilities
21. Stores
22. Enterprises for everyday services
23. Total expenditures for social and everyday services infrastructure

Region), are determined on the basis of coefficients which take into account the increase of the standard and the rise in the cost the construction of living space, and also the introduction of other civil projects in the pertinent regions by comparison with the base region.

The expenditures for the creation of projects of social and everyday services infrastructure calculated for one worker will be highest in the regions of new industrial development, where the staffing of newly built enterprises with work cadres requires the introduction of an entire complex of projects of social and everyday services infrastructure. In individual oblasts and economic regions the expenditures for one worker will vary depending on the possibilities of staffing newly created job positions from local labor resources, and also on the level of the actual provision of the population of a given territory with the projects of the social and everyday services infrastructure. The expenditures for the social and everyday services infrastructure, which are necessary for the attainment of the standard well-being of the population, must be taken into account along with production capital investments even in those cases when the staffing of newly created job positions does not objectively require the enlistment of additional manpower (if reserves of unemployed able-bodied population are available or, what is more probable, in the event that the enlistment of manpower for new job positions is proposed by virtue of its release from operating enterprises). Such a situation is connected with the fact that the actual provision of the projects of social and everyday services infrastructure in the majority of regions in the RSFSR is still below the norm. This permits the conclusion that in order to hold manpower, to lower the level of the instability of cadres, it is necessary in all cases to take into consideration the expenditures for the social and everyday services infrastructure in the determination of of the cost of a job position. Only in regions of new industrial development, they will include the entire complex of expenditures for the projects mentioned, but in existing populated places will be reduced to the expenditures for an increase in the level of provision of the entire population with projects of social and everyday services infrastructure and to the full expenditures for the creation of a complex of projects in the calculation for workers who are attracted from other regions, oblasts and populated places.

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Proceeding from what has been said, the over-all public expenditures for the creation of one new job position (cost of job position) will be:

$$S = K_{up} + K_{ut}.$$

The necessary volume of capital investments for the creation of new job positions (K_n) can be determined on the basis of the specific capital expenditures in the calculation for one worker who is drawn into material production ($\frac{K_{up}}{K_{sm}} + K_{ut}$), and the number of workers being planned (Ch_{pl}), which is required for the staffing of the new job positions (if there is new construction or reconstruction with an expansion of an operating enterprise):

$$K_n = \left(\frac{K_{up}}{K_{sm}} + K_{ut}\right) Ch_{pl}.$$

The necessary volume of capital expenditures calculated in accordance with this formula is compared with the allotted (planned) volume (K_p); on condition that $K_n \leqslant K_p$, the expenditures for the creation of new job positions are coordinated with the possible apportionment of financial and material resources for the period under review.

The methodology we are proposing for the determination of the cost of one job position will make it possible to balance the volume of capital investments being planned with complete public expenditures for the creation of new job positions, which must guarantee a more effective utilization of the production apparatus being created.

FOOTNOTES

1. "Ekonomika truda" [The Economics of Labor], Izdatel'stvo Ekonomika, 1967, p 151.

2. I. Malmygin, "Problemy intensifikatsii proizvodstva" [Problems of the Intensification of Production], Izdatel'stvo Sovetskaya Rossiya, 1975, p 8.

3. I. S. Maslova, "Ekonomicheskiye voprosy pereraspredeleniya rabochey sily pri sotsializme" [Economic Questions of the Redistribution of Manpower under Socialism], Izdatel'stvo Nauka, 1976, p 16.

4. Cf. VOPROSY EKONOMIKI, No 8, 1978, p 43.

5. Cf. VOPROSY EKONOMIKI, No 10, 1977, p 104.

6. The planned demand of enterprises, organizations and institutions for manpower was increased at the beginning of the 9th Five-Year Plan by

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1.4 million workers and employees, and toward the end--by 2.5 million (cf. VOPROSY EKONOMIKI, No 6, 1978, p 34).

7. Cf. S. I. Divilov, "Chislennost' i struktura zanyatykh v narodnom khozyaystve (metodika perspektivnykh raschetov)" [The Quantity and Structure of Employed in the National Economy (Methodology of Long-Term Calculations)], Izdatel'stvo Ekonomika, 1976.

8. We do not dwell here on the methods of calculating the index of labor productivity, that is an independent question.

9. Cited from the statistical collection "Narodnoye khozyaystvo SSSR v 1977 g." [The National Economy of the USSR in 1977], Izdatel'stvo Statistika, 1978, pp 487, 495, 562.

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MANPOWER: LABOR, EDUCATION, DEMOGRAPHY

LABOR RESOURCE PROBLEMS IN AN INDUSTRIAL REGION

Moscow VOPROSY EKONOMIKI in Russian No 10, Oct 79 pp 56-66

[Article by L. Korolev: Labor Resources of an Industrial Region]

[Text] The rational use of labor resources is one of the main directions for raising the efficiency of national production and the quality of the work in all subdivisions of the national economy under conditions of developed socialism. The new, qualitatively higher phase of the progress of the Soviet economy, which is characterized by the transition to intensive methods of management, caused an increase in attention to the study of the process of manpower use. As was noted at the November (1978) Plenum of the CPSU Central Committee, this is also connected with the sharp contraction of extensive factors of growth, including the reduction in the growth of labor resources during the 11th Five-Year Plan.

During the past few years, a number of questions concerning the distribution and use of manpower have arisen in many industrial regions of the European part of the USSR and the Urals, where the basic productive and technological potential of the country and the most skilled labor resources are concentrated. The national economic complexes of such regions, as a rule, are distributed over comparatively small territories, have a multisectorial structure, and are distinguished by the dynamic character of their development.

The contemporary problems of labor resources of an industrial region, where the employment of the able-bodied population in national production is higher than the average level for the Soviet Union, where the population is predominately urban and industry is the leading sector of the economy with regard to the number of employed and the volume of production, are complex and multi-faceted. On the basis of the most general indications, these problems may be brought together in two groups, which are organically interrelated by the unity of the object to be studied. The first includes the longterm perfection of the territorial organization of productive forces, the optimal distribution of the able-bodied population among industries and spheres of activity, the second includes an increase in the efficiency of manpower use, an improvement in the organization of labor and the management of production on the level of the

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individual enterprises.

One of the highly-developed industrial regions is Moscow Oblast, which occupies a prominent place in the economic and social-political life of the country. Moscow and the capital city oblast constitute the largest industrial, scientific and cultural center. In the formation of the area around Moscow, where--in the picturesque expression of V. I. Lenin--all processes are manifested most clearly, as though under a magnifying glass,[1] the dynamic character of the development of the country was reflected. The industry of the oblast, particularly machine building and metal working, chemical, light, and textile industries, constitutes the All-Union base for the production of efficient machines and equipment, modern means of automation and instruments, the assimilation of progressive technological processes and new technology, the industrialization of agriculture, the output of a broad assortment of products of high quality for the satisfying the demands of the population. Approximately 2,000 descriptions of products of the oblast's industry are being exported to 80 foreign countries. The volume of industrial and agricultural output being produced in the oblast calculated for one employed worker exceeds analogous indicators of the majority of regions in the country. In terms of the growth of the volume of production, industry by 1979 reached the level of targets of three years of the five-year plan, with 95 percent of the growth being obtained thanks to an increase in labor productivity. All of this is proof of the consistent introduction of intensive factors of development of the national economy into the economy of the oblast, and also of the systematic increase in the efficient use of labor resources. At the same time, because of its high industrial development and rapid process of urbanization, there remains in Moscow Oblast, like in some other industrial regions, a right situation with regard to labor resources. This found expression in a failure to staff a number of plants and factories, construction projects and state farms, trade and transportation enterprises, with cadres, in the contraction of traditional additional sources of manpower supply, in the relatively high levels of mechanical movement of the able-bodied population and in the instability of cadres.

The character of the organization of the productive forces of the industrial regions that has developed reflects the tendencies--most prevalent in the recent past--of the mutual influence of the distribution of population and production--the influx of the population into industrial, agricultural, and scientific centers that are being newly built, and the construction of enterprises, especially of processing industry, in regions of the greatest population concentration. The area around Moscow is no exception in this regard. According to data of the All-Union census of 1979, 14.4 million people lived in Moscow and Moscow Oblast, including 88.8 percent in cities, and almost 63 percent of them in the oblast center. The total number of the urban population of the oblast increased by a factor of more than 1.7 during the last two decades, which exceeds the corresponding indicators for the republic and the USSR as a whole. Prior to 1970, the

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small towns in the oblast experienced the primary growth, and subsequently the medium size and large cities.[2] The number of large cities increased from 4 in 1959 to 14 in 1979, the total number of inhabitants in them during this same period increased fourfold. The relative weight of the inhabitants of small cities decreased from 38.2 percent to 20.2 percent. Thus, the tendencies in the development of small and large cities are in line with the tendencies of urban settlement in the world, and the process of the "maturing" of medium-size cities is not yet complete. The urban population increased by almost 3/4 by virtue of the migration of rural residents into cities. More than half of the entire urban and rural population is concentrated in a suburban zone, i.e., on the territory of the Moscow city agglomeration, which constitutes only 1/4 of the oblast's area. During the 8th Five-Year Plan, more than 1/3 of all new industrial enterprises of the oblast were built here. During subsequent years, the scales of industrial construction in the suburban zone were limited; however, the expansion and reconstruction of individual factories were accompanied by a significant increase in the output of production, which required the attraction of additional contingents of manpower.

The concentration of the population and labor resources in the territory of a few suburban regions stimulated the accelerated development of an infrastructure: public transportation, municipal and everyday services, trade, a network of pre-school institutions for children, education, public health care, and others, which, in its turn, led to the creation of new job positions and, since the able-bodied population was already engaged in production, to the exacerbation of the demand for additional manpower. Earlier the demand for labor resources was partially satisfied by virtue of the attraction of the rural population for work in the industrial centers, the economies of cities and settlements, but this still further aggravated the problem of labor resources in the agricultural production of the region and the adjacent oblasts.

In the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Regional Planning Scheme for Moscow Oblast" (1973), the principal purposes of the over-all development of this region were set forth with the aim of the creation of the best conditions for work and for the life of the workers. Among other important measures envisaged by the decree are the partial regulating of the settlement of the population of the oblast with the simultaneous solution of these problems in the territory of Moscow, the reorganization of the socio-economic conditions of the life of the rural population, the purposeful territorial development of city-forming industries with a view to the reduction of the excessive streams of the mechanical movement of labor resources, especially from the peripheral regions of the oblast to the center of the agglomeration. The preliminary results of this difficult work, which is without parallel in world practice, make it possible to speak with conviction of the weakening of the tendencies, the operation of which during the preceding phase contributed to the aggravation of the problems of labor resour-

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ces. The most important among them are: The slowing down of the rates of increase of the population in the regions of the first zone, the reduction of its swelling from the peripheral regions, the reduction in 1971-1976 in the number of migrants coming to the cities by 7 percent of the number of residents of other RSRSR oblasts, the reduction in the intensity of the pendulum migration of the population in the area around Moscow.

The changes that have taken place are directly connected with structural advances in the city-forming industries of a number of peripheral regions, where new capacities of the food and the printing and publishing industry were placed into service, with important improvements in the material and socio-economic conditions of life and work of the sovkhoz workers and collective farm workers. Evidence of the seriousness of the changes in the agriculture of the oblast is the increase in the share of young people among those working in the village. During 1973-1977 alone, 50,000 young men and women went to work in industry. However, questions relating to holding young people in agricultural production, creating stable production collectives in the state and collective farms on the model of progressive farms, remain urgent as before.

The reduction of the mechanical movement of labor resources in the territory of Greater Moscow was also encouraged by the limitation in 1974-1979 of new industrial and administrative construction within the bounds of the agglomeration, the move of dozens of enterprises outside the city limits of Moscow, the gradual smoothing of the one-sided economic structure of several cities in the Greater Moscow area, the creation in large cities of job placement offices, the establishment of better order in information about manpower demands, etc.

In conformity with the plan for the distribution of housing, cultural and everyday services construction in the 10th Five-Year Plan, the over-all development of 35 small cities is being carried out in Greater Moscow, 2/3 of which are located outside the limits of the suburban zone. To their share fall 37 percent of the construction of new living space and 31 percent of the planned demolition of delapidated housing. In the territory of the peripheral regions, a network of educational and public health care institutions is developing at accelerated rates of speed, increased attention is being given to road and municipal construction.

The rayon centers, the large and medium-size cities in the conditions of today have not lost their role of centers for the concentration of population and labor resources. The number of residents of rural populated places, and also of urban-type settlements in the remote regions of the oblast, is decreasing, and for the most part at the expense of their able-bodied portion. It is natural, therefore, that the relative weight of the able-bodied population in the peripheral regions is lower than in the suburban zone and the large cities as a whole, but in the structure of

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the rural population this difference is exceedingly significant. Among the internal migrants, there are still a significant number of young people whose labor is not being utilized everywhere the way it should be and is indadequately stimulated by material and moral means.

The perfection of the territorial organization of the national economy, the optimal distribution of the population and the labor resources of the Moscow industrial region will become impossible without the strict regulation of vacant job positions depending on the contingents of unemployed or the labor resources released from production. The underestimation, just like the overestimation, of the circumstances mentioned in practice leads to an increase in the level of migration of the most capable part of the population from the work settlements, villages and hamlets of the remote regions. New possibilities for the further migration of the able-bodied population from settlements of this type are opened up by the use of the experience of Chelyabinskaya, Permskaya, Vladimirskaya and a number of other industrially developed oblasts of the RSFSR, although the character of the movement of labor resources in their territories has its own specific features.

Already in 1970 it became obvious that because of the reduction in the output of coal in the forthcoming five-year plan in the Urals coal-fields more than half of the workers employed in this industry must be released. It was necessary not to permit the transfer of tens of thousands of released workers and members of their families from regions which had possibilities for the further development and the perfection of the sectorial structure of national production. The beginning of the new industrial specialization of the coal regions of the Urals was preceded by the execution of preliminary elaborations, in which the necessary number and structure of the population were specified, as well as the presence of free labor resources in cities and settlements, the dimensions of the proposed release of workers, the natural growth of labor resources, the study of transportation conditions, and other resources. The plans then projected envisaged an increase of job positions by virtue of reconstruction and the expansion of machine-building factories, the building of enterprises of the electric power, chemical, petrochemical and textile industries, the professional training and retraining of workers.[3] The realization of these plans in the 9th and 10th Five-Year Plans became one of the factors which was conducive to the improvement of the use of labor resources, the prevention of unjustified migration of the population. The lowering by 2 percent of the intensity of the migration of the urban population of Chelyabinskaya and Permskaya Oblasts during the period of 1971-1977 testifies to this.

In Vladimirskaya Oblast, the enterprises and factories located in workers' settlements, state and collective farms, have a high level of profitability and do not experience a shortage of cadres. As soon as a surplus of manpower begins to show in a settlement, production is ex-

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panded to create the required number of job positions.[4] In more than half of the collective and state farms (in 90 out of 173) of the oblast, auxiliary enterprises and businesses--which provides the opportunity of using the seasonal surplus of manpower in agricultural production.[5]

The consistent development of small towns on the basis of their reconstruction, the expansion of operating factories and the construction of small branches and new plants of enterprises located in the large centers or in the suburban regions, the intensive construction of housing, cultural and everyday services facilities, and roads in a rural locality, the development of auxiliary factories in state and collective farms--all of this will contribute to the approximation of production to the labor resources, the stabilization of labor collectives and the elimination of seasonal manpower surplus in collective and state farms.

The successful solution of the tasks with regard to the perfection of territorial organization of the productive forces of an industrial region in many respects depends on the condition of the material-technical base and the organization of capital construction. During the past few years much has been done in Moscow Oblast to strengthen the material base and to increase the efficiency of construction output, the building up of the capacities of the enterprises of building materials, the training of skilled cadres of workers and specialists. On the initiative of party and Soviet organs, an additional 13 general building and specialized trusts with a total of 25,000 workers have been created during the 10th Five-Year Plan. However, the plan target of the last three years with regard to the assimilation of capital investments for the main directions of construction have not been met. The building up of the rate of capital construction is being held up by the imperfection of the structure the management of the industry, the low level of specialization of production, the weakness of many mechanized columns and building administrations.

The first step in the perfection and in the increase of the efficiency of construction may be the creation of specialized construction and construction-design associations, the enlargement of the lower construction organizations, the introduction of the method of continuous planning, the introduction of common planning schedules, staffing and construction schedules of projects for a number of years. During the following phase it is expedient to go over to the creation of territorial-construction and assembly associations, each one of which would have as a sphere of production activity a group of administrative regions--a zone. After a short time, the zone may see the creation and successful development of a local base of the construction industry, high-capacity specialized construction organizations capable of providing the modern level and scales of industrial construction. In addition, besides operating agricultural construction combines, new ones may be built in every territorial zone. Such enterprises must be distinguished by a high level of mechanization and automation of production processes, the application of labor of a not numerous personnel. The starting in 1977 in the settlement of Lotoshino of Moscow Oblast of an auto-

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matic cement plant with a capacity of 50,000 cubic meters of materials a year, which is serviced by only 4 workers, and the construction of another 8 analogous plants planned for the near future will make it possible to satisfy the requirements of rural construction of the oblast with regard to mortar and cement, and to bring about a substantial increase in the rates of construction work.

Centralization in the distribution of capital investments will contribute to the solution of the tasks of perfection the territorial organization of the region, taking into consideration its peculiarities, the availability of labor resources and the character of their use. At the present time, questions concerning the distribution of new factories and the development of cities are being considered by the USSR State Planning Committee, the USSR State Committee for Labor and Social Problems, industrial ministries and local organs. In economic practice, many cases are known where the ministries gave superficial consideration to the factor of providing enterprises being built or expanded with labor resources. The choice of the location of new construction is frequently not buttressed with scientifically based arguments, which are based on a thorough study and a scientific prevision of the development of the objective processes of the state of labor resources by the time of staffing the enterprise with cadres. It appears that the strengthening of the leading role in the sphere of capital investments and in construction behind the local organs--by the Soviets of Poeple's Deputies and their planning commissions, the strict observance by them of the principles of the operative schemes of regional planning, will assist the successful solution of the tasks of optimizing the distribution of the productive forces of the region.

The sectorial structure of the national economy, especially of industry, exerts an important influence on the efficiency of the use of labor resources in the national production of an industrial region. Nonproduction sectors, the sphere of service, are developing during the current phase at at higher rates, as a consequence of which there is a higher growth in them not only of the number, but also the relative weight of the workers. Thus, in the national economy of Moscow Oblast during 1961-1977, the share of labor resources employed in the sphere of nonmaterial production increased by 8.5 percent. For the sphere of material production of the oblast, a constant lowering of the relative weight of workers and employees is characteristic, including the greatest in industry (7.6 percent). The industry of Moscow oblast is faced with a particularly acute problem of the optimal combination of the growth of the accumulation fund, the expansion of the volume of capital investments, and the reduction of the number of job positions. Taking into account the shortage of manpower, it would be preferable to develop less labor-intensive industries in the territory of the region.

In every subdivision of the national economy, in every sector of industry there are correlations among the fixed production capital, gross produc-

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tion and manpower, which reflect the specific peculiarities of production. On the basis of calculations it has been established that the general coefficient of the output-capital ratio and labor-intensiveness in the sewing industry is 7.4 times higher than on the average throughout the entire industry of the oblast, in the printing and publishing industry--and in the production of metal products--4.7 times as high, in instrument-making--4 times as high, in the machine-tool, fuel and glass industries and in the production regarding the repair of machines and equipment--3.5 times as high. It is precisely these sectors and factories which have at their disposal the greatest reserve for the release of labor resources on the basis of the intensification of specialization, mechanization, and automation of labor with the goal of satisfying the manpower demands of other sectors of the national economy. In Moscow and Moscow Oblast, thanks to the attainment of full employment of the able-bodied population in national production and the reduction of additional sources of manpower, the task of improving the use of labor resources by virtue of the mobilization of internal reserves of production has been put in the forefront.

In the Summary Report of the CPSU Central Committee to the 25th Party Congress, it is indicated that the successful solution of the diverse economic and social tasks can be assured only through the sharp increase in the efficiency of all of national production. The problems of labor resources, which have become more aggravated, suggest as a necessary condition for the growth of the economy an increase in labor productivity by virtue of the reduction of manual labor on the basis of complete mechanization and automation. The course that has been taken with regard to the intensification of production finds expression in the primary development of industry by means of technical reequipment and reconstruction of operating enterprises, in the strengthening of the material-technical base of agriculture, construction, transportation, in the increase in the growth of production or work with an unchanged or smaller number of workers on the basis of speeding up scientific-technological progress.

During the years of the 9th Five-Year Plan, about 600 large projects were newly constructed in the territory of Moscow Oblast. The 10th Five-Year Plan saw the commissioning of projects and capacities of basic and auxiliary production at 85 enterprises, the complete mechanization of 1,633 plants and sectors, the introduction of 1,593 mechanized flow and automatic lines, the assimilation of the production of more than 400 new types of progressive technology. The realization of the over-all plan for the mechanization and automation of labor envisaged by the five-year-plan, which was elaborated on the basis of urban and regional plans, during the past three years permitted the conditional release of 40,000 workers from production and securing of an economic effect totaling more than 300 million rubles. The general staffing shortage with regard to cadres in enterprises of industry, agriculture and construction in 1971-1978 was lowered approximately by a factor of 1.5-2.

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As a result of the reconstruction of the Kurovskii Industrial Fabric Association, the equipment inventory was renewed by 93-95 percent, and the relative weight of manual labor by virtue of automation and mechanization of work processes was lowered to 18 percent. In the course of the execution of a two-year plan of mechanization, approximately 7 percent of the workers were conditionally released in the Stroyplastmass Combine. In the Ramenskii Instrument-Building Plant, after only one year, the labor intensiveness of work was decreased in dimensions which are equivalent to the release of 700 workers from production. Successful work is being done with regard to the technical reequipment and reconstruction of production at the Uspenskii Plant for Plastic Products, where production is mechanized to the extent of 80 percent and at the present time the comprehensive mechanization of the freight flow operations from the arrival of raw materials to the departure of finished products is being completed. The press has illuminated in detail the experience of the technical reequipment and reconstruction in the Kuchinskii Combine for Ceramic Decorative Materials, where in less than a year a new large plant was created--which allowed the collective to increase the volume of production by 28 percent, to mechanize all technological operations, practically to eliminate manual labor, to improve the working conditions of the workers, to expand the product assortment and to increase the quality of products. During the 10th Five-Year-Plan, for the first time in the USSR, the transfer of the entire enterprise to flow-conveyor lines was realized here.

It must be noted that the release of industrial production personnel and the reduction of the number of job positions are being delayed by the unsatisfactory course of the reconstruction of individual enterprises. The time periods required for reconstruction and reequipment at times exceed the established standards 2-3 times. There is a slow reduction in the share of manual labor, in a number of cases the production cost in reconstructed enterprises is high, not everywhere are measures being taken with regard to the efficient use of capacities, the increase of the coefficient of the shift system of equipment. A number of ministries and departments give little attention to the development and specialization of plants and factories, the number of which amounts to about half of all enterprises of the oblast. They fulfill an important function in the system of the national division of labor--they turn out approximately 10 percent of industrial production, including cultural and everyday products and food products. The over-all conduct of work with regard to the technical reequipment and reconstruction of enterprises, the active participation of the producers themselves in reconstruction permits labor collectives to to fulfill production tasks successfully, to master the output of new products, to attain a steady growth of labor productivity and production volume with a smaller number of production personnel.

In conditions of the dynamic development of the economy there is immeasurable growth in the role of the analysis of the technical level of production on the basis of the calculation of the distribution of workers ac-

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cording to types of mechanized, automated and manual labor. The absence of a profound scientific basis in plan elaborations regarding the mechanization and automation of labor, and the underestimation of the attained technical level of production lower the possibilities of realizing the projected measures within the established time frames. In some industrially developed regions, in spite of the considerable means invested in the automation and mechanization of production, a significant reduction in the share of manual labor is not taking place. It is evident that it has become necessary to change the classification of workers by the level of mechanization and automation that is used by the USSR Central Statistical Administration, to elaborate and introduce a new procedure for calculating heavy manual and labor intensive work. In this regard the work undertaken in Kurganskaya Oblast deserves great attention, where, on the basis of experience accumulated by the scientists of the Institute for Economics of the Latvian SSR and the Chelyabinsk Polytechnical Institute, a methodology of calculating work with regard to the mechanization of manual labor, making use of special cards, was worked out and is being used. In Zaporozhskaya Oblast, this work is being carried out successfully on the basis of the introduction of a passport system of technological operations.

The increase in the level of mechanization and automation of labor, the significant reduction in this sphere of the number of workers employed in manual labor, will be promoted by the realization of the measures provided for in the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Further Development of Machine Building in 1978-1979" (1978). The assimilation of the production of machines, instruments and means of automation envisaged in this decree will make it possible to speed up the work with regard to the provision of complete mechanization and automation of production processes in all sectors of the national economy. By way of the expansion of the production of complete technological lines, integrated sets of machinery and installations of high plant and assembly readiness, a significant increase in the volume of head-assembly jobs with regard to their assemblage and adjustment. The current level of scientific knowledge, practice and experience of our country's machine building make it possible in the coming years to go over to the creation of processing complexes, and then--automatic plants, the management of which will be carried out with the aid of electronic and computer technology.

One of the most important conditions of fulfilling the above-mentioned decree is the perfection of the organization of the labor process. As the experience of a number of sectors of industry shows--the chemical and petrochemical machine building, electric power, non-ferrous metallurgy--an appreciable saving of labor expenditures can be attained by virtue of the realization of a complex of measures with regard to the scientific organization of labor. Among these measures the perfection of the organization of labor on the basis of standardization is of special

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significance. The elaboration of scientifically-based standards of labor expenditures in basic and auxiliary industries makes it possible to work more efficiently, will promote the strengthening of cadres and the reduction of their instability.

For example, in the USSR Ministry of Chemical and Petroleum Machine Building, the development of service norms was carried out in three phases, which envisaged for every profession of auxiliary workers the elaboration and introduction of at first plant, then subsector and sector norms of service. The stated standards take into account the rational composition of jobs, progressive experience in the sector, the specific characteristics of the organizational-technical conditions of labor, and stipulate the optimal load for workers. In the norms of service are reflected the obligations of every worker, the daily routine, rational routes of movement, consistency in the execution of operations. The introduction of sector norms of service was carried out in stages, simultaneously with the transfer of the enterprises to new conditions of the payment of labor and was completed in 1976. By virtue of the transition to local, subsector, and sector norms of service, the number of auxiliary personnell in plants of the USSR Ministry of Chemical Industry during the 9th Five-Year-Plan was reduced by 10,000 people; in 1974-1975 alone, about 4.500 auxiliary workers were released and transferred to basic production.[6]

By way of the saturation of production with contemporary technology, the growth of the capital-labor ratio and the power-worker ratio, labor productivity increases, the price of a unit of working time rises. The struggle for the economy and rational use of working time, the inadmissibility of its loss acquire great economic and social meaning in these conditions. In his speech at the 16th Congress of Trade Unions, L. I. Brezhnev said: "And what significance the economy of working time has now acquired! . . Losing only one minute of working time on the scale of the country is equivalent to the loss of the results of the daily labor of 200,000 workers."[7]

The study of the dynamics and structure of the loss of working time in the national economy of Moscow Oblast over an extended period of time testifies to the improvement of the situation. At the same time, it is impossible not to note that the losses of working time in connection with the leaves of absences granted by the management, day-long and intra-shift idle time, the violation of labor and production discipline, are decreasing slowly, and in industry and in construction in 1977 they even increased. According to the results of an analysis of the use of working time in a number of enterprises of the oblast in 1978 it was established that 70-80 percent of the losses of working time were connected with the absence of workers in production with the permission of the management, 13-15 percent --with the idling of equipment, 10-12 percent--with the violation of labor discipline.

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Work with regard to the reduction of losses of labor time help the collectives of enterprises to secure a steady rhythm of work, to build up constantly the rates of production and to improve the technical and economic indicators. Alone because of the increased sick rate of workers, leaves of absence with permission of the management, and loafing, the collective of the automated-mechanized shop of the Krasnogorsk Mechanical Plant in 1972 lost more than 4,500 hours. In the subsequent five years, a great deal was done here in order to improve labor conditions and to bring about good working conditions with high levels of production; a significant part of the equipment was replaced with more modern equipment, a new sector of highly productive automatic machines was put into operation. By comparison with 1972, the level of sick rate among workers was decreased in 1977 by a factor of 4, the losses of working time due to leaves of absence with permission of the management decreased by a factor of 1.5, and the losses because of violations of labor discipline decreased. With the growth of the technical equipment of production, the increase in the skills of the workers, the perfection of the organization of labor, the price of working time has practically doubled. During a single hour, a shop now puts out a complete set of components for the "Zenit-E" camera, the labor intensiveness of whose manufacture is 2-2.5 times as high as the labor intensiveness of the manufacture of the previous model.

In the Dedovsk Textile Mill, the transition to multi-machine service secured the fulfillment of sector norms in spinning to the extent of 186 percent, in weaving--130 percent. By virtue of the multi-machine service of the machine park, the deficit in manpower was eliminated in both enterprises, the output of production is growing steadily, during the past 12 years annual production output has increased by a factor of 1.5, labor productivity has increased by a factor of 2, and the instability of cadres has decreased by about 5 percent. In the textile enterprises of the oblast, 90 percent of the spinners and 83 percent of the weavers are now servicing zones above the established norms.

Among the progressive forms of the organization of labor, widely used in the industries of Greater Moscow, the brigade method of work according to a single work order occupies a special place. At the present time in machine building and in the metal working industries of the region, 27 machine operators out of 100 are working in accordance with this method. Such a form of labor organization gave each brigade the possibility to increase productivity by 15-30 percent--thanks to the fuller utilization of equipment, the reduction in the intrashift losses of working time, the intensification of specialization, and the assimilation of associated professions by the workers. The greatest advantages are obtained through the creation of complete through brigades, whose composition includes machine operators of various professions, who service the complete technological cycle. The inclusion in the composition of the complete brigades of basic and auxiliary workers not only creates the preconditions for the combina-

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tion of professions and multi-machine servicing, but also removes the division of jobs into advantageous and disadvantageous. Work in brigades according to a single work order helps young workers to acquire professional mastery more quickly and to master a selected trade more successfully. The confirmation in the brigade of relations of mutual assistance and collectivism have important social consequences. The brigade form of organization of work cultivates responsibility for the entrusted work, teaches people to think about their daily input into the fulfillment of the production program, encourages their attraction to active participation in the management of production. The application of collective forms of labor in the Kriogenmash Scientific Production Association, in the Kolomenskii Plant for Heavy Machine Building made it possible to solve the problem of a shortage of machine operators, at the Dmitrov Excavator Plant the losses of labor time due to loafing were reduced by a factor of 8, at the Lobnenskii Electrotechnical Plant the return of low-quality products was lowered by a factor of 2.

Great possibilities for the attainment of high efficiency of labor are blocked up in the application of the initiative of the textile workers of the town of Monino near Moscow with regard to the organization of socialist competition on the basis of personal and brigade accounts of efficiency. The first personal accounts of efficiency were developed by a group of workers and specialists of the Moscow Worsted Production Association. The personal account contains parts which characterize the production output, including first-rate production, usable waste, etc. Here are shown the results that were obtained by comparison with the plan target for the month and since the beginning of the year. Every part contains a cost estimate of material expenditures for a unit of production and its wholesale price, and also of the saving or overexpenditure in cost terms. The personal account completes the index of general efficiency. The clearness of the personal accounts makes them intelligible for all workers, and the account of the most important technical-economic indicators creates the basis for the objective comparison of labor results, the achievements of individual work brigades and shifts. The organization of competition on the basis of personal accounts of efficiency in combination with the system of material rewards induces workers, engineering and technical workers persistently to increase production output by virtue of technical reequipment, modernization of equipment, the use of advanced methods, the expansion of the service zone, to obtain an increase in the volume of output of high-quality products, economy of raw material, materials and working time. In the Monino Worsted Combine, all 389 brigades of basic production work according to personal accounts of efficiency. During the past year, the combine sold above-plan products in the amount of 17.5 million rubles. In spinning and weaving a level of labor productivity was attained which exceeds the average sectorial level by 30-40 percent, the output of fabric with the State Emblem of Quality increased by a factor of 2.3. In all sectors of the national economy of the oblast, 27,000 brigades, 476,000 workers, including in construction and agriculture, compete on the basis of brigade and personal accounts of efficien-

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The increase in the intensification of national production, the fuller use of the possibilities of the national economy is the most important direction of the economic policy of the party in the present stage, the strategic task of the development of the country in the long-term perspective. The aggravation of the problem of labor resources, the presence of a deficit of work cadres in the industrially developed regions suggest as one of the first and foremost tasks the perfection of the system of labor management which is developing in our country. The realization of the complex of measures with regard to the perfection of the management of the national economy envisaged in the recently adopted decree of the CPSU Central Committee and the USSR Council of Ministers "On the Improvement of Planning and the Strengthening of the Influence of the Economic Mechanism on the Increase in the Efficiency of Production and the Quality of Work", which include an increase in the moral and material interest of the economic managers and the work collectives in the economy of labor, an increase in the role of state and local Soviet organs in the management of labor, will contribute to the solution of the problem of labor resources and their efficient use.

FOOTNOTES

1. Cf. V. I. Lenin, "Polnoye sobraniye sochineniy" (Complete Collected Works), Vol 24, p 352.

2. On the basis of the classification of urban settlements accepted in the USSR, small towns include towns with a population of less than 50,000, medium-size towns--from 50,000 to 100,000, large cities--from 100,000 to 250,000 inhabitants.

3. See "Problemy povysheniya effektivnosti ispol'zovaniya trudovykh resursov" [Problems of Raising the Efficiency of the Use of Labor Resources], Izdatel'stvo Nauka, 1973, pp 49-56.

4. See PRAVDA, 25 Dec 1977.

5. See EKONOMICHESKAYA GAZETA", No 16, 1977.

6. See I. G. Degtyarev, "Reglamentatsiya truda vspomogatel'nykh rabochikh" [Regulation of the Labor of Auxiliary Workers], Izdatel'stvo Ekonomika, 1977, pp 45-46.

7. L. I. Brezhnev, Sovetskiye profsoyuzy--vliyatel'naya sila nashego obshchestva" [The Soviet Trade Unions: An Influential Force of Our Society], Politizdat, 1977, p 9.

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TRANSPORTATION

HAZARDS OF MIXING ALCOHOL WITH DRIVING REVIEWED

Alma-Ata AVTOMOBIL'NYY TRANSPORT KAZAKHSTANA in Russian No 7, 1979 signed to press 14 Jun 79 pp 28-29

[Article by M. Udartsev, chief of the Traffic Safety Administration of the Ministry of Motor Transport for the Kazakh SSR: "There Are No Safe Dosages for Alcohol"]

[Text] A Russian proverb holds that a drunk could not care less. Truly, the uncontrolled actions of a drunken individual are harmful not only to himself but also to those in his immediate vicinity. In particular, this vice is completely intolerable in the case of motor transport drivers. An absolute majority of the motor vehicle drivers are carrying out their work in a highly responsible manner and remain loyal to their chosen profession. However, there are also worthless individuals who think nothing of sitting down behind a steering wheel with a hangover or in an intoxicated state. As a result, tragedies occur out on the highways. Last year, 18 percent of the highway-transport accidents were caused by drunken drivers. Unfortunately, efforts directed towards preventing hard drinking are still not being carried out in all areas and proper attention is not being given to the task of strengthening labor discipline. The lovers of alcohol at the Andreyevskiy ATP [motor transport regiment] of the Taldy-Kurganskaya Freight Motor Transport Administration enjoy a great amount of freedom. The leaders close their eyes to these malicious violations and they tolerate intoxication on the part of some of their drivers. Here is a typical example. On 29 March, driver Menyaylov operated his autobus in an uncontrolled manner for more than 3 hours and subsequently he organized a drinking bout with friends. The dispatcher, M.A. Popov, instead of removing the drunkard from work, allowed him to continue driving. A short time later, Menyaylov's vehicle struck three pedestrians. Two of them were killed and the third was severely injured. Menyaylov fled the scene of the crime in an attempt to avoid responsibility. He overturned his autobus on the outskirts of Andreyevka.

A scandalous lack of control and the absence of systematic efforts against alcoholism is considered to be the cause of many DTP's [dorozhno-

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transportnoye proisshestviye; road-transport accident] occurring at Motor Vehicle Combine No. 1 of the Alma-Ata Freight Motor Transport Administration.

Driver Lysenko, assigned to work for a quarry, did not take his work seriously. After turning over the controls of his MAZ [automobile made by the Minsk Automobile Plant] to two juveniles, he proceeded to spend the day drinking with friends at a weighing facility. This crude violation of discipline ended tragically: the motor vehicle assigned to the drunken Lysenko fell into the quarry working. One of the juveniles died from wounds sustained.

Quite often one hears the following statement being made by those who love to imbibe alcohol: "Think of it! I drank 100 grams and still my hands are steady and my eyes vigilant." Let us see if this is really true.

Alcohol in an organism, similar to other narcotics, disrupts the normal functioning of the central nervous system; an intoxicated individual loses control over himself. As a result, 20 percent of all domestic injuries and 46 percent of all injuries sustained out on the street are associated with alcoholic intoxication. Data obtained from the Central Institute of Traumatology reveals that 90 percent of all hooligan actions are committed by intoxicated individuals.

In the case of an individual who has consumed a large amount of alcohol, his working efficiency is seriously impaired on the following day.

The making of a decision is a key moment in the formation of the most ideal reaction to constantly changing environmental influences in the central nervous system, which at any moment must select the best possible solution from a number that are available. Analysis has shown that even the smallest dosage of alcohol exerts an extremely adverse effect on the decision making process. According to studies carried out, the reaction of an adult individual to external irritants is weakened: sound, light (thus a driver will be late in noticing the parking lights of a vehicle and he will not hear the signal issued by another driver, and so forth). Moreover, logical and mathematical reflection is inhibited. For example, a sober individual can add 1,215 numbers in just 10 minutes. However, this number drops to 960 after 60 grams of vodka have been consumed. In addition, such mathematical capability is not restored until 3 days later.

There are not nor can there be safe dosages of alcohol when it comes to the operation of motor vehicles. Any wine, including dry and grape wine and even beer, contain alcohol. The same rule must be followed by all drivers: not a drop of wine, beer or any type of alcohol beverage is to be consumed on the eve of a motor vehicle trip and certainly not during the carrying out of such trips.

In the opinion of specialists attached to the Tyumen' State Medical Institute, no less than 36 hours are required for the complete restoration

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of all functions of an organism after 200 grams of vodka have been consumed. Thus, such an individual can resume his seat behind the controls of a motor vehicle only after 1.5-2 days have elapsed and no earlier!

An analysis of the accident rate for vehicles operated by intoxicated drivers, at motor vehicle enterprises of the ministry during the past year, forces the conclusion that, in addition to intensifying educational work with the drivers aimed at combating drunkenness and acquainting them with the terrible consequences, the work of the special medical service must also be reorganized.

Within our system, 440 special medical points have been organized. During 1978, they inspected 15 million drivers before they departed on trips, or roughly one half of all those who departed on trips. This number was unacceptably low. This situation has developed owing to the fact that the medical points of a majority of the freight motor transport administrations have only one medical worker on their staffs. The official structure of the medical points must be such that all of the drivers departing upon or returning from trips undergo special inspections, with intra-shift inspections being organized at passenger motor transport enterprises.

Despite the fact that such medical inspections covered only one half of the drivers departing on trips (the figure for those returning from trips was even lower), approximately 16 thousand drivers were withdrawn from the list of those authorized to make trips. This is an alarming fact! What does it testify to? First of all, to the unsatisfactory status of the alcohol prevention measures being undertaken at many motor transport enterprises. This situation must not be allowed to continue.

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TRANSPORTATION

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EXPERIENCE IN THE USE OF HEAVIER, LONGER TRAINS

Moscow ELEKTRICHESKAYA I TEPLOVOZNAYA TYAGA in Russian No 8, Aug 79 signed to press 20 Jul 79 pp 9, 10

[Unattributed article: "Give the Green Light to the Muscovites' Initiative!"]

[Text] Competition for running heavier and longer trains, which was initiated by the Muscovites, is now in its eighth month on the network's railroads. As is well known, this initiative was approved by the CPSU CC and recommended for dissemination everywhere. A seminar in Moscow has summarized the results of what has been done and discussed the problems that have arisen in the course of adopting and disseminating the initiative.

This initiative of the capital city's railroaders has already yielded substantial results. The average train weight rose by 105 tons between January and June on the network as a whole; for the initiators of the movement the figure was 140 tons. The collectives of the Oktyabr', Transbaykal, Southern Urals, Odessa-Kishinev, Northern, Belorussian, and other railroads are actively involved in the movement.

Thus, heavier trains are being run in all directions on the Oktyabr' Railroad. The entire locomotive capacity reserve is being used on some of them, and close to it on others. Such trains are running primarily on freight-intensive lines and lines of insufficient pass-through capacity and locomotives. Workers on the railroad reviewed the constancy of freight flows for each type of freight, worked out traction calculations, and made sure that the reception-departure tracks matched the intended train length on all lines and sections. They took account of the experience of the leading engineers, train dispatchers, and station personnel with respect to handling heavy-weight and extra-length block trains.

Now, block trains carrying mineral fertilizers from Arctic sections beyond the bounds of the Oktyabr' are formed at 1,000 tons above the scheduled weight, and tank trains from Kirishi Station are formed at 500 tons above. On some electrified sections, where the critical norm is below the established higher train weight, double traction has been introduced. The experience of the Moscow railroaders is being used especially widely in the

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Volkhovstroy Department. There the weight of each freight train has been increased to the calculated level and exceeds the scheduled weight by 1,100 to 1,400 tons. For such trains, with a provisional length of 120 cars, special schedule lines and pass-through regulations have been set.

In June of this year the railroad carried a daily average of 400 or more trains hauling more than 200,000 tons of freight above the norm. If it were not for these heavy-weight trains it would be necessary to introduce considerable numbers of extra locomotives and crews daily.

With the help of scientists in the Khabarovsk Institute of Rail Transport Engineers, railroaders on the Transbaykal and Far Eastern railroads redeployed locomotives, introduced double traction and pushers, transferred signals, and carried out other work to achieve a train weight increase to 4,000 tons on the even line from Baykal to the Pacific. Thanks to these measures, the Transbaykal railroad alone will save more than three million rubles per year and be able to release about 100 engineers, assistants, and repairmen. It will also ease the work of the neighboring railroad, which almost always experiences difficulties in receiving the daily train norm.

Staffs have been set up on the Eastern Siberian Railroad to coordinate efforts in adopting the Moscow experience. Many of the railroad's administration commanders have visited the line. They have explained the essence of the initiative in the section and junction stations where the success of the matter is largely determined.

The railroad has issued an order stipulating that the weight norm of trains is increased to 3,700 tons from Irkutsk as far as Slyudyanka and to 4,000 tons to Petrovskiy Zavod.

Leading engineers of the locomotive depots Inskaya, Moskovka, and Barabinsk have already mastered how to run the heavier and longer trains. In the first half of this year alone they ran more than 14,000 such trains hauling an additional five million tons of freight.

Experience in running "6,000-tonners" has demonstrated the potential of running them regularly on the Western Siberian Railroad.

The Sverdlovsk Railroad is actively involved in creating conditions for running block trains of standardized weight. Five to seven heavy-weight trains per day are being run from Kamensk-Ural'skiy to Sverdlovsk. Tracks are open to heavy trains from Nazyvayevskaya to Druzhinino as well.

The Southern Urals Railroad is one of the most freight-intensive in the network. For this reason, dissemination of the Moscow initiative with respect to the formation and movement of heavy-weight trains is of special importance there. The railroad's technical-economic council has discussed organizational-technical measures designed to increase train weights and lengths. They call for hauling coal and ore in large-load trains weighing

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6,000 tons and lengthening trains coming onto the railroad to 140 standard cars.

In addition, they have critically reviewed the weight norms for the various lines and conducted experiments and made careful engineering calculations to seek out reserves. On the 380-kilometer Orenburg-Kinel' Section, for example, the train weight was immediately increased by 1,000 tons by instituting pushing on two stretches.

The Southern Urals railroaders are approaching the problem of increasing train weights from the standpoint of locomotive fleet maintenance. They have carried out a number of technical and organizational measures with respect to compliance with the system of planned-preventive locomotive repairs, the adoption of new technological processes, and further mechanization of labor-intensive operations. As a result, the number of diesel locomotive breakdowns dropped by 23 percent in the first half of 1979 compared with the same period last year.

Having analyzed the results of traction and heat tests and having compared them with traction calculations, the locomotive operations service of the Pridneprovsk Railroad has drawn up recommendations on running heavy-weight trains of 5,000 tons on the Krivoy Rog Shunting--Vecherniy Kut--Verkhovtsevo and Krivoy Rog Shunting--Dolinskaya sections, 7,200 tons on the Verkhovtsevo--Nizhnedneprovsk Terminal section, and 4,000 tons on the Kerch'--Vladislavovka section (with pushing from Kerch' to Presnovodnaya). They are studying the possibility of running trains on other sections.

Thanks to the initiative of the leading locomotive crews, dispatcher staffs, and station collectives in the past three years the Southwestern Railroad has increased train weight norms on almost all sections. On the Mironovka--Zdolbunov line, for example, weight norms have been increased by 600 tons in the uneven direction and 300 tons in the even direction; on the Zhmerinka--Vapnyarka section norms have been raised by 800 tons.

Following the Moscow example, this railroad has begun to increase train weight to the critical level in accordance with locomotive capacity and to form double trains. This has made it possible to pass more than 15,000 full-weight and long trains in the past two months alone.

It must be kept in mind that in all cases increased train weight leads to increased mechanical operation of the locomotive and intensive wear as well as extra load on the main components. If these conditions are at the maximum with respect to component strength or capacity, increasing the loads will lead to breakdown that is frequently incommensurate with the effect gained from increasing the train weight.

On locomotives of older design, for example, in which the capacity of the electric traction engines does not exceed the value of the wheel's adhesion

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to the rail, increasing the loads causes a rise current (to above the maximum), heating of the electrical windings, a sharp decline in the electrical insulation and its test, or rupture of soldered places.

In cases of repeated engine overheating during train operation there is a gradual decline in the insulation which substantially shortens the engine's service life.

The characteristics of traction engines are such that prior to the onset of current overload, another factor comes into play--the adhesion of the wheels to the rails is broken. In running trains of increased weight, spinning--especially runaway spinning--poses great danger to the electrical machinery. Engine stoppage also has its consequences. A severe dynamic shock shortens the service life of all components of the motor-axle block. And the intensive application of sand leads to rapid wear of the wheel pairs and the rails.

Experience has shown that prior to running trains of increased weight it is advisable to carry out the following operations.

On the basis of train weight tests on the various sections by means of dynamometric cars in the winter and summer it is necessary to determine the critical places and pass-through procedures for such trains in accordance with Directive T-22008 dated 2 July 1976 (on the run [skahodu] when reaching speeds that are safe in terms of overheating and slippage, pushing, replacement of locomotive series). It is necessary to draw up charts for running heavier trains and to train engineers in their theoretical and practical use.

It is necessary to review and tighten up locomotive technical maintenance and current and capital repair cycles and train repairmen in practical work at technical maintenance stations involving technical maintenance and current repairs. Excess locomotive kilometrage must not be allowed.

On railroads where changing weather conditions cause sharp changes in rail conditions and a lower adhesion coefficient (signaled by extreme slippage and strain), it is very important to take prompt steps to eliminate these conditions. The track must be kept in condition so as not to reduce traffic speeds; the rails must be ground to remove wavy wear and cleaned to remove coal grit. The locomotive wheel pair tread bands must be well run in for winter and must not be allowed to deteriorate during the winter.

If slippage and strain occur, however, in the critical places it will be necessary to introduce pushing and multiple traction or, in extreme cases (at temperatures of minus 30 degrees or more) to reduce the train weight.

When train lengths are increased the work of the locomotive compressors becomes more intensive, especially if the capacity of the brake and pressure lines of the locomotives and cars is inadequate or if the setting of the pneumatic valves and pressure regulators is not precise.

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In conjunction with locomotive and car braking equipment that is not in good working order and poorly-adjusted lever transmission, these defects can create great difficulties in the running of heavier and longer trains, leading to breakdowns or damage to the locomotive and car wheel pairs. To prevent such occurrences it is necessary to comply strictly with the stipulations of Instruction TsV--TsT--TsNII/2899 and Directive No S--24354.

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