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USSR Report

CONSTRUCTION AND RELATED INDUSTRIES

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USSR REPORT

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CONSTRUCTION PLANNING AND ECONOMICS

INTERVIEW WITH USSR CONSTRUCTION MINISTER ON PLAN FULFILLMENT

Moscow TRUD in Russian 5 Mar 84 p 3

/Interview with G.A. Karavayev, USSR minister of Construction, by V. Golovachev; date and place not specified: "Not To Search For Reasons, But To Carry Out the Work"/

/Text/ His movement up the official ladder was swift. After 24 years -- a master, after 28 -- a deputy chief engineer for a construction project, 4 years later -- the deputy minister and still 4 years later -- minister. For the past 17 years, Georgiy Arkad'yevich Karavayev, who began his career as a worker at the Goznak Factory in Leningrad, has headed the USSR Ministry of Construction. In addition to being a talented and purposeful individual, he is completely enthused over, obsessed by and truly devoted to his work. There were those who considered him to be an "unsuitable" worker for his unwillingness to compromise, for maintaining high principles right to the very end and for defending his position even as the order was being signed. And he never made up to anyone or displayed fear over "losing his position" and life rewarded him.

G.A. Karavayev is still not one who likes to cut corners. Our discussion began with figures, the likes of which another individual sitting in his place would not even have drawn attention to.

"Of 284 projects and production capabilities of a national economic nature which we should have placed in operation last year, only 243 were introduced" stated the minister.

It must be confessed that this statement came as a surprise. In preparing for the discussion, I naturally acquainted myself with the status of affairs in the branch. Last year, many changes for the better took place with USSR Minstroy /Ministry of Construction/. This was borne out by the economic indicators. The volumes of construction-installation work increased by 4.8 percent. The annual plan for housing construction was over-fulfilled, all of the nature-protective projects called for in the task were placed in operation and the production of industrial goods amounted to 101 percent. The plan for erecting agricultural projects and projects of allied branches in the nonchernozem zone of the RSFSR is being fulfilled in a stable manner. The ministry is successfully coping with the annual tasks for placing hospitals and schools in operation.

"I did not choose to touch upon the positive aspects of our construction work" stated the minister almost as though he had read my thoughts, "owing to the fact that it is more useful to concentrate attention on our problems rather than successes. This is particularly true in view of the many shortcomings which we have in capital construction. During the December (1983) and February (1984) plenums of the party's central committee, in a speech delivered by the General Secretary of the CPSU Central Committee Comrade K.U. Chernenko and during a meeting with voters, emphasis was placed upon the importance of improving economic administration and reorganization of the economic mechanism along a broad front. This relates directly to construction. An honest attempt must be made at revealing everything that is delaying the development of capital construction and restoring the order needed here.

Question In your opinion, why was it that 41 projects were not placed in operation last year?

Answer We studied this problem in detail. It was a surprising development -- on the board, some leaders of republic ministries, main administrations and territorial administrations explained the non-fulfillment of the plan on the basis of "external" causes: they were let down by those responsible for carrying out deliveries. Certainly, these "external" causes exist and I could say more regarding them. But nevertheless the erection of 15 projects of the 41 not placed in operation was held up mainly by shortcomings in the organization of the work. Frequent references are made to a shortage of working hands."

Question But is this really an objective cause?

Answer Let us see. Certainly, when a client, taking full advantage of his authority, "pushes" through USSR Gosplan the construction of a plant in an area where there is a shortage of manpower (presenting mythical estimates on the availability of manpower in the domestic economy and God knows where else), this is very poor. And there is nobody to build this plant and, later, nobody to operate it. Many such examples could be cited. The Motordetal' Plant of Miravtoprom /USSR Ministry of the Automobile Industry/ was built at Kostroma -- it operates at 50 percent of its capability owing to a personnel shortage. A huge complex of modern buildings for the Torgkholodmash Plant of Minleppishchemash /Ministry of Machine Building for Light and Food Industry and Household Appliances/ was erected in the city of Volzhsk. It would have been better if it had not been built -- the plant is almost completed and no personnel are available. There is no use for it whatsoever.

But if we take the situation as a whole, then it would appear that the turnover in personnel and worker shortages are influenced mainly by the working and living conditions. And this to a large degree is dependent upon the leaders of the main administration, the territorial administration and the trust.

Question Thus the 15 projects that were not placed in operation can be blamed upon USSR Ministry and what about the remaining 26?

Answer Here, just as in a drop of water, many shortcomings are apparent that are typical of capital construction. The chief ones -- delayed deliveries of

of equipment, absence of technical documentation, failure on the part of the client to carry out the start-up and adjustment work and shortcomings in logistical supply.

We are firmly convinced: today the organization of capital construction requires further improvements. On more than one occasion I have discussed this matter during business conferences and in the press. And yet the work does not improve.

Examine, if you will, this paradox. As minister, I must bear responsibility for the placing in operation of planned projects, while actually I cannot be responsible for anything other than our own construction work. A poor plan -- the planners are the guilty parties; a building is erected in a swamp and it "moves" -- the researchers or the client are responsible, in short, anybody but not Minstroy. The installation work is delayed and USSR Minmontazhspestroy /Ministry of Installation and Special Construction Work/ is reproached.

But this indeed is wrong -- to separate artificially construction work from the planning and installation operations. They are all elements in the same chain. And they must be operated by the same hands. This is the way the work is handled in specialized construction ministries. But in our case nobody is individually responsible for the final result, all blame one another and the financial organs exact fines from the contractor.

In listening to G.A. Karavayev, I recalled an incident that took place in connection with the construction of an installation in the Altay Kray. A decision was made to build an industrial complex in an area where the foundation consisted of sagging soil. During the research work, this danger was for some reason or other not fully detected or taken into account. The builders, relying upon their own practical experience, spoke to the client: there is some doubt concerning the research work, the building should not be erected in accordance with the approved plan, special piles are required.

The minister personally attempted to convince the hosts of the complex regarding the need for refining the plan. But without success. He was presented with new documents which indicated that the soil in the region was normal. The work was begun, the first building was turned over for operation, it began to sag and reinforcement work had to be carried out. It turned out that the builders were right! The second building was built according to a new plan. But in the meantime considerable amounts of additional forces and resources had already been expended.

"No, no and once again no" stated Georgiy Arkad'yevich with great conviction, "This system is less than perfect. The builders must bear considerably greater responsibility for a project than is the case today. But in order to do this they must be given more extensive rights."

Let us start at the beginning -- with selection of the site. Today it is determined by the client jointly with the planning organs. And I am of the opinion that it should be this way. The client and the builder select the site jointly and only jointly. Moreover, there should be more than one variant. Similarly, it is advisable to have two or three variants for the plan for a plant, especially a large plant. The funds thus expended will be returned a

hundredfold. Meanwhile, owing to errors the country is losing tremendous amounts of resources.

We are proud of the fact that our planning costs have decreased to 4 percent of the overall capital investments. (It is noted that in international practice this proportion is 6-12 percent). Thus we are certainly thrifty! But who is computing the losses caused by the use of obsolete decisions?

In the interests of economy, the technical-economic justifications for plans have been eliminated. And we are not in agreement with this decision.

As a result, we built, for example, a textile combine at Sachkhere (Georgia), with the cotton to be brought in from Uzbekistan. Does this make any sense?

Many plans have to be revised completely. For example, an institute of USSR Minstroy had to revise almost completely the plan for the foundations for the installations of a metallurgical plant. Was this really cheaper in the long run?

It seems to me that it would make more sense to transfer the planning directly over to the builders. Certainly, I have in mind the research and construction portions of plans. This is logical and advisable -- not to disrupt the cycle, but rather to unite it in the one set of hands. The construction portion should be given to the builders!

Question In developing this idea, should the installation work then be transferred over to the same hands?

Answer Precisely! This is how it is being done at the present time in the specialized construction ministries. Today the installation work often constitutes a bottleneck. And this is partly owing to the fact that discrepancies arise at times at the "departmental junction points." We summon sanitary engineers, chemical protection installation and industrial ventilation specialists and also electrical installers and they do not arrive on time but rather they find many reasons to offer as explanations. On other occasions, they arrive on time but the builders are not prepared (indeed we must provide the scaffolding for them, present a front of work and so forth). And is it not possible that all of this not too complicated work could be performed by the builders themselves? There would be great savings in both time and resources! And the mechanical installation work (for example, blast furnaces, chemical plant, production line or a rolling mill) would remain to be carried out by the organizations of USSR Minmontazhspetsstroy.

Question Will you thus succeed in reducing the number of construction organizations operating in the same region?

Answer To a certain degree. But special measures are required if we are to achieve a true solution for this problem. I do not grow tired of repeating: there is something wrong, for example, when 16 construction organizations representing various ministries and departments are operating side by side in the same city. Such a picture is to be seen in almost all areas. Some organizations import reinforced concrete to a given point, while others export

this material from the same point. This certainly is not profitable! All of the industrial, agricultural, housing and socio-cultural projects in an oblast, kray or republic must be built by the same ministry, with the exception of power engineering, gas, aquicultural and other specialized projects. The advantages will be tremendous!

Question A troublesome problem -- supply and deliveries. How do you achieve a proper rhythm in the carrying out of this work?

Answer Fine results are being realized from the conversion of construction organizations over to the system of all-round supply through the territorial organs of USSR Gosstroi (at the bases of which all of the resources are concentrated) in conformity with the requirements set forth in the plans and estimates. However, of 32 territorial organizations of USSR Ministry, only 13 have been converted over to this system.

Allow me now to say a few words concerning equipment deliveries. Today this is the responsibility of Soyuzglavkomplekt /Main Administration for Ensuring the Supply of Complete Sets of Equipment, Instruments, Cables and Other Manufactures for High-Priority Construction Projects in the Coal, Petroleum and Other Branches of Industry/ of USSR Gosstroi and its territorial organs and production plants and the boards of directors of enterprises under construction. But, as the saying goes -- too many cooks spoil the broth. Many responsible parties but very little order. It is believed that responsibility for deliveries of all types of equipment and special materials should ideally be entrusted to a single completion organization of the client-ministry.

Question Georgiy Arkad'yevich, recently we went to the Mary ASSR to attend a meeting with voters. For the fifth time they have nominated you as a candidate for the post of deputy to the USSR Supreme Soviet. Five years ago, during a similar meeting, you were assigned serious tasks as a result of a voter mandate. How is this mandate being carried out?

Answer These tasks were truly extremely complicated ones. At issue here was a sharp increase in the construction volumes, especially housing and projects of a socio-cultural domestic nature, including some which were not included in the plan. Serious work was required in order to carry out these tasks.

In particular, the mandate stressed the need for building the second phase of a student dormitory and service center at the Mary State University in Yoshkar Ola. This mandate was carried out.

During our last meeting with the voters, a discussion also took place on the need for erecting a student dining hall. This facility was also placed in operation.

There is no need for enumerating all of the other points of the mandate. I will mention only one more. A need existed for constructing a highway connecting Zarechnyy Rayon of Yoshkar-Ola with its central part. Only 156,000 rubles were allocated for this purpose, that is, only for starting the work. But the builders resolved not to drag out the construction project for years and thus they carried out a broad complex of operations at a cost of more than 1.1 million

rubles. A highway was built in the Sombatkhey microrayon. At the present time, a roadbed is being laid in the Dubki mikrorayon region.

As the minister tells it, everything seems so simple -- a command is issued and the work carried out. But this impression may arise only in those who are not familiar with capital construction. In life, everything is considerably more complicated. For example, the question concerning a university at Yoshkar-Ola. During a recent meeting with voters, they expressed resentment over the fact that the republic still lacks a university. The personnel are available and the need for a university has existed for some time. What then is the problem? To proceed following the usual method -- requesting authorization for the construction and creation of a university, providing the necessary justifications and obtaining the resources required and including them in the plan -- will take years and years. Karavayev resolved to ignore the existing system and to accept complete responsibility himself. A pair of standard school buildings and a dormitory were built and in this manner the conditions were created for the founding of the first university in the Mary ASSR. Similarly, hospitals and clubs were built at Yoshkar-Ola on the same terms. Had the minister taken a risk. Beyond any doubt. He could have been punished and rather seriously -- order is order. But he concentrated his attention on the chief consideration: a specific endeavor and furnishing assistance to the republic and to the people.

A white sheet of Whatman paper occupies an eminent position in the minister's office. It contains the inscription: "Who wishes to fulfill at task -- searches for the means and methods and who does not wish to -- searches for excuses." G.A. Karavayev is one of those who always strives to fulfill his task.

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CONSTRUCTION PLANNING AND ECONOMICS

IMPROVING FINANCING OF CONSTRUCTION ORGANIZATIONS

Moscow FINANSY SSSR in Russian No 1, Jan 84 pp 25-26

[Article by R. Khisyametdinov, director of the credit department, Tula office of the USSR Stroybank [Bank for Financing Capital Investments]: "Improving the Conditions for Crediting Construction Organizations"]

[Text] At the present time the institutions of the USSR Stroybank are extending credit to contracting construction organizations in a differentiated manner, i.e., they are not issuing individual or all types of loans, and are charging a different percentage rate for using credit depending on the facility being credited. Increasing the differentiation in percentages charged for credit given for expenditures on unfinished production of construction-installation work, from an economic standpoint, has a positive effect on the concentration of resources by contracting organizations at sites under construction. Termination of credit in most cases has a negative effect on the financial-economic mechanism.

For example, in the Glavpriokskstroy [Construction in Oka River Area Main Administration] of the USSR Minpromstroy [Ministry of Industrial Construction] in 1980 (before transition to accounting for commodity building production), the plan for contract work at facilities under construction was fulfilled to 84.4 percent, and at facilities not scheduled for operational introduction — by 85.4 percent. In 1981, (when the Minpromstroy was changed over to this system of accounting) the level of plan fulfillment at operational facilities comprised 90.8 percent and in 1982 — 92.9 and 70 percent, respectively. While in 1980, 21 out of 41 facilities subject to operational introduction according to the plan were actually introduced, in 1982 the figure was 30 out of 39. Unfinished production of construction-installation work in 1982 was reduced by 5,800,000 rubles (from 192,800,000 rubles to 187,000,000 rubles).

The effective order presupposes the mandatory participation of borrowed funds in the economic turnover of working capital, since the contractors have their own capital in a minimal amount necessary for ensuring their production activity. However, the need for funds by contracting organizations is always increasing (in connection with changes in delivery conditions, work conditions, etc.), and this need is met by means of the attracted funds. Moreover, construction organizations, as a rule, are not allocated their own or matching funds for covering expenditures in unfinished production. Thus, attracting capital for turnover is an objective necessity.

The basic type of borrowed capital is bank credit. Among the contracting organizations credited by the Tula Oblast office of the Stroybank, it comprises 70-80 percent. The inadequacy of this source leads to the over-extension of credit indebtedness by numerous suppliers, and also holds up the rotation of capital at all its stages. Thus, throughout the organizations of the USSR Minpromstroy Glavpriokskstroy on 1 May 1983, a volume of unfinished production and production reserves in the amount of 6,500,000 rubles were not credited for various reasons. This was the basic reason for non-payment of suppliers alone in the sum of 3,700,000 rubles.

For shortcomings in the economic-financial activity of the contracting organizations and their allowed violations, the bank, invoking sanctions, limits or stops extension of credit. In these cases the bank, complicating the relationship of the organization with its supplier, attempts to force the borrower to take measures for eliminating the shortcomings. However, under conditions of a socialist economy, products are supplied by plan, and this supply depends little on the financial condition of the payer. As a result, when the sanctions are imposed on the contractor, it is primarily the supplier who suffers (possibly one who honestly fulfills his responsibilities), i.e., such a sanction by the bank also entails an unjustness which cannot be regulated. Thus, the issuance of bank credits has been fully cut off effective August 1982 to the Novomoskovskiy Construction-Installation Train No 252 of the "Mostransstroy" Trust for unsatisfactory work results and gross non-payment to the bank. However, the suppliers have not stopped their deliveries, even though the organization has an overdue bill to seven suppliers in the amount of 358,000 rubles.

The situation at the "Mosbassshakhtostroy" Combine is similar. Since August of 1982, seven of its organizations are under special crediting conditions. Their overall debt to suppliers comprises three million rubles. Therefore, for further improvement of the acceptance method of payment and increased responsibility of buyers for maintaining payment discipline, provision has been made in cases of absence of funds in the accounts of the payers to give them credit to pay for the acceptance accounting documents, even if their payments to the bank are overdue on previously issued loans. Such an approach to the solution of this problem is most expedient with consideration of the national economic interests. It is better to be in debt to one bank than to numerous suppliers, who have their own accounting-finance relations with suppliers, superior organizations, a budget, the bank, etc.

At the current stage of development of cost accounting in the national economy, a course has been taken for strengthening the role of economic methods of production management. Under these conditions, the principle of differentiated conditions for issuing credit must be manifested primarily in the differentiation of percentages charged for credit and must influence the processes of production, formation of reserves, etc. through profit, profitability, and economic incentive funds. It is necessary to maximally limit and strictly regulate cases of cutting off credit. Such a measure, in our opinion, should be used only in the case of complete economic mismanagement and serious infringements of state discipline. In all other cases, the right of using credit should be maintained, but the scale of percentage payments should be significantly expanded. For

example, credit issued to a borrower for the purpose of creating above-plan reserves should be given at such a percentage rate as to make obtaining these reserves economically inexpedient.

At present the Stroybank is broadly implementing measures of credit influence on contracting organizations which are diverting resources from facilities scheduled for operational introduction to those which are not. When the level of fulfilling the plan for contract work at non-operational construction sites exceeds that at the operational sites, the relative sum of diverting resources from the operational construction sites is correspondingly determined, and the contractor's expenditures are not credited in this sum, even through the plan for the non-operational facilities is often not overfulfilled. Such an approach is most often not justified.

Research materials show that effective maneuvering of resources by the contractor is complicated to a significant degree by the influence of a number of factors: the individual make-up of the material-technical resources of the facilities under construction; the natural-climatic conditions; the specialization of labor by the work brigades, sectors and administrations within the trust and their cost accounting isolation; a large number of subcontracting organizations in the technological chain of construction, etc. These factors determine the distribution of workers and material-technical resources, and they sometimes lead to exceeding the construction times at facilities not scheduled for operational introduction. In any case, however, the indicated expenditures are spent on facilities which are included in the plan. Therefore they are included in the statistical accountability, give legal right for expenditure of the due wage funds, etc. However the bank, as a rule, does not recognize these expenditures.

In order to ensure credit influence on the processes of concentrating reserves and avoid contradiction (when the useful expenditures of the contracting organization are not credited), it is expedient to change the conditions for issuing this type of credit. Even if the organization has allowed diversion of resources from construction sites scheduled for operational introduction, credit should nevertheless be issued for the sum of the diversion, but under conditions of 4-10 percent annual rate. Such a measure should be used only in those cases when the plan for contract work on the operational construction sites has not been fulfilled, but the fulfillment exceeds 100 percent for stockpiling work. Effective 1 January 1984 there will be a transition in construction to accounting according to new estimate prices, which will allow most contracting organizations to achieve normal levels of profitability. It is also expedient to charge increased percentage rates for credit (4 percent annually) effective in 1984 on all sums of load indebtedness for facilities where the schedule for their operational introduction has been disrupted.

If the reason for payment of increased percentage rates by the contractor is non-fulfillment of the contract responsibilities of the supplier or customer, then this will increase the significance of filing complaints in construction. The organization placed under such crediting conditions will regulate the processes of concentrating resources based on the ultimate economic result.

With the further development of cost accounting in construction and the transition of the ministries to self-financing, the stimulating role of a differentiated percentage rate for credit will, in our opinion, increase even more. This also confirms the expediency of using the differentiated credit issuance conditions primarily through differentiated percentage rates for credit. If the data in this proposal are adopted, this will require changes also in other legal norms, particularly a change in the degree of material responsibility of the persons in charge.

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CONSTRUCTION PLANNING AND ECONOMICS

BANKS TO HAVE MORE CONTROL OVER CONSTRUCTION PROCESS

Moscow KHOZYAYSTVO I PRAVO in Russian No 12, Dec 83 pp 61-63

/Article by M. Kovalev, honored economist of the RSFSR and manager of the Irkutsk Oblast office of USSR Stroybank and V. Tatarnikov, state arbitrator of the State Arbitration Commission, Irkutsk Oblast: "Credit for a Construction Project"/

/Text/ Timely and efficient financing plays an important role in ensuring a high level of efficiency in construction production. A number of measures have recently been adopted aimed at increasing the importance of the financial organs in controlling the course of construction work and reducing the volumes of unfinished production. A new development during the current five-year plan is the erection of projects using credit extended by USSR Stroybank /All-Union Bank for the Financing of Capital Investments/.

Today we are presenting two articles on the same theme, with the discussion centering on the new system for extending loans and on the need for further improving those norms which regulate the relationships which arise under this form of construction financing.

The 12 July 1979 Decree of the CPSU Central Committee and the USSR Council of Ministers entitled "Improving Planning and Intensifying the Effect of the Economic Mechanism on Improving Production Efficiency and the Quality of Work"* calls for a number of measures aimed at accelerating the placing in operation of projects under construction, raising the effectiveness of capital investments, reducing the number of newly begun construction projects and having the volume of unfinished production operations conform to the established norms. The conversion over to erecting projects using credit extended by USSR Stroybank, as set forth in the mentioned decree, is increasing interest on the part of the contractual organizations for accelerating the placing in operation of these projects and it is also promoting a reduction in the number of carry-over construction projects.

An analysis carried out by the Irkutsk Oblast office of USSR Stroybank has shown that positive changes have taken place in capital construction throughout

* See USSR SOVETSKOYE PRAVO, No 18, 1979, p 118.

the oblast during the comparatively brief period that has elapsed since the decree was adopted. First of all, a noticeable reduction has taken place in the volume of unfinished production.

The conversion over to accounts between a client and contractor for fully completed construction and for enterprises, pilot complexes and phases which have been turned over for operation is stimulating the contractual organizations into concentrating their resources on underway projects and not tolerating a dispersion of resources. This is having a very definite effect on plan fulfillment. Thus, at Glavvostoksibstroy /Main Administration for Construction in Eastern Siberia/, the fulfillment of the task for placing projects in operation in 1982 amounted to 108.3 percent. A similar situation prevailed for other contractual organizations.

However the introduction of the new system of crediting and accounts in capital construction calls for the solving of new problems concerned with the legal regulation of individual aspects of the relationships between contractors and clients.

As already mentioned, the decree calls for financing the expenses of contractual organizations up until the planned period for the turning over of the completed construction projects, using bank credit. Moreover, the loan is continued following the expiration of the planned period, but at a raised interest rate for use of the loan. This occurs as a result of a violation by one of the parties concerned of obligations undertaken in connection with the agreement.

Experience has shown that a disruption in the placing in operation of a project often occurs as a result of the unconscientious fulfillment of obligations by just one of the parties involved -- contractor or client. As a rule, they are both guilty in this regard.

Rather significant in this regard is a case which was handled by state arbitration in Irkutsk Oblast based upon materials of the Sverdlovsk Branch of the Irkutsk Oblast office of USSR Stroybank. It concerned the untimely placing in operation of a furniture factory by the Irkutskpromstroy Trust. Here the guilt of both parties was taken into account. But let us look at this more closely: only the contractor paid the raised interest rate for use of the loan, that is, he paid for the unproductive expenses.

Although it does not happen too often, nevertheless there have been times when the placing in operation of a project was delayed owing to fault on the part of the client. However, even in these instances the contractor is required to make a payment for use of the bank loan. Indeed, these expenditures by a contractor in terms of their legal nature are losses, sustained as a result of improper fulfillment by the client of his obligations. Hence he is justified, in conformity with Article 219 of the Civil Code of the RSFSR, in demanding reimbursement for them.

But actions of this type are never pursued. And indeed the contractual organizations sustain considerable losses in this regard. For example, in 1981 Glavvostoksibstroy paid a raised amount of 2,152,000 rubles for the use of credit and the Administration of Bratskgesstroy -- 7,652,000 rubles.

Why is it that the contractual organizations do not attempt to obtain reimbursement for such losses? It is believed that the problem here is that of difficulty in proving their demands. In this regard, it would seem that the question concerning the basis and system for handling contractual losses caused by paying raised interest rates for the use of credit requires detailed legal regulation. It is our opinion that the appropriate normative documents should provide a list of violations which give the contractor the right to refer such losses, either partially or fully, to the client (losses such as the untimely presentation of planning-estimates documentation, a delay in the transferring of materials and equipment, a delay in the opening of financing, the allocation of annual appropriations which do not conform to the norms for the duration of construction and so forth). Moreover, ideally it should be established that a mandatory condition for presenting such demands must be the findings of the financing bank with regard to the violations tolerated by the contractor or client and their influence on the course of construction. As is well known, not every violation hinders the erection of a project. For example, a delay in the delivery of equipment by a client, when the contractor is not in a state of construction readiness, does not of itself disrupt the schedule for placing the project in operation. It also makes sense, during the course of resolving problems of this nature, to expand upon the questions raised in the instructional letter of USSR Gosarbitrazh. It is believed that the implementation of such recommendations will promote increased responsibility for the improper carrying out by either side of their contractual obligations.

We are of the opinion that it is hardly advisable to establish sanctions for the untimely completion of quarterly work volumes. The rejection of sanctions for the non-fulfillment of annual work volumes appears to be a debatable issue.

As is known, the goal of this type of sanction is to ensure rhythmic work by a contractor throughout an entire construction period and to eliminate rush work, which seriously affects the quality of the completed projects. In addition, a disruption in the annual plans creates serious difficulties with regard to planning appropriations for subsequent construction periods. It sometimes happens that the clients are unable to procure the resources required for eliminating backwardness which developed in previous years.

This can be seen very clearly using as an example the construction of the Irkutsk Furniture Factory. Its introduction into operations was planned for 1981. Towards this end the client was allocated 8,230,000 rubles worth of capital investments. However, as already noted above, the contractor disrupted the placing in operation of this project: in 1981 the amount of work carried out on the construction project was valued at being 4,960,000 rubles less than the figure called for in the task. As a result, the client -- The Ministry of the Timber, Pulp and Paper and Wood Processing Industry for the USSR -- found itself in a difficult situation: in order to ensure the placing in operation of the project in 1982, the volume of capital investments required exceeded by more than threefold the planned volume. Since the ministry was unable to procure the funds for covering the difference, the placing in operation of the factory was postponed until 1983.

This is why the system in use at the present time -- with the accounts being maintained for a project as a whole -- by no means reduces the requirement for

carrying out the annual work volumes. A prolonged and slow preparation for work on the part of a contractor during the initial period of construction, as we saw in the preceding example, often results in a disruption in the plans for placing the project in operation. In addition, the refusal to establish sanctions for non-fulfillment of the annual work volumes -- especially for projects having a normative duration of construction in excess of 1 year -- removes the period for the onset of responsibility and this dampens the enthusiasm of the contractor. It is our opinion that the responsibility must be both inevitable and sufficiently effective.

The introduction of a new system for extending credit and maintaining accounts in capital construction has raised a number of questions concerned with improving the norms which regulate the procedures for concluding contracts and opening up financing. At the present time, the parties to a contractual agreement for capital construction conclude a general agreement and thereafter an additional covenant is added to it each year. The financing of carry-over projects is also opening up each year.

A number of conditions are required for the commencement of financing: the client must have at his disposal funds for capital construction, approved planning-estimates documentation, a finalized agreement, a coordinated intra-building title list and so forth. Experience testifies to the fact that the schedules for concluding contractual agreements for capital construction are systematically being violated. In this regard, the opening up of financing is being delayed. True, so-called preferred financing prevails for a period of time. However, in many instances the agreements have still not been concluded upon the expiration of such financing and this seriously delays the course of construction. In order to prevent this from happening, it is considered advisable to reject additional covenants to a general agreement and to establish the fact that the financing is to be opened up upon the concluding of a general agreement in conformity with the title list for the entire period of construction.

The following reasoning can be cited in the form of an additional argument in favor of such a solution. As is known, the basis for an additional covenant is the intra-building title list coordinated by the parties involved and approved in the established manner. However, at the present time, in view of the conversion over to the maintenance of accounts for finished construction output and payments being made for finished projects, the intra-building title list has lost its importance. Whereas earlier it served as a control over each construction project included in it, at the present time, coincidental with the appearance of underway complexes, there no longer is any need for a detailed breakdown of the projects included in an intra-building title list. Thus the maintenance of the existing system for concluding contractual agreements for capital construction and the opening up of financing is hardly considered advisable.

The fear may arise that the course of construction of projects, the financing of which is opened for an extended period of time and functions continuously, may fall from under the control of the USSR Stroybank /All-Union Bank for the Financing of Capital Investments/ institutes. In order to prevent this from occurring, it is believed that the institutes of USSR Stroybank should be authorized to terminate financing in the absence of annual appropriations or

the allocation of such appropriations in lesser amounts compared to the title and a lack of readiness of planning-estimates documentation for subsequent years of construction work and so forth.

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CONSTRUCTION PLANNING AND ECONOMICS

USSR STROYBANK CONTROL OVER CAPITAL CONSTRUCTION

Moscow KHOZYAYSTVO I PRAVO in Russian No 12, Dec 83 pp 63-65

/Article by N. Kirillov, candidate of economic sciences and manager of the Leningrad Oblast office of USSR Stroybank and L. Talmach, department head at Lenoblstroybank: "The Controller -- Stroybank"/

/Text A study of the status of affairs in capital construction reveals a number of shortcomings in this sphere of material production, the chief one of which is a dispersion of resources among numerous projects. Harm is being caused to the national economy by the incorrect practice of distributing capital investments when composing the title and intra-building title lists, at which time the funds allocated are directed towards newly begun construction projects rather than underway or carry-over projects. In particular, a large dispersion of funds takes place when erecting projects costing less than 3 million rubles, since the ministries and departments do not allocate these funds in conformity with the established norms.

As workers attached to the Stroybank system, we are obligated to combat the mentioned and other shortcomings, using for this purpose our entire arsenal of financial-credit and legal means. Just how effectively we use the rights so extended can best be judged based upon certain results of the past year.

Each incident of non-fulfillment of the plans for underway and important construction projects is examined by the bank's workers. As a result, the volume of unfinished production at Glavzapstroy of the USSR Ministry /Ministry of Construction decreased by 41 million rubles. Success was achieved in reducing the number of projects being erected simultaneously and in increasing the average volume of capital investments per construction project to 1.3 million rubles. This is 400,000 rubles more than the figure for 1981.

Punitive measures of a financial-credit nature are being employed against those organizations which are systematically failing to carry out their tasks and which are diverting their resources and funds for use on secondary projects. Thus, owing to a breakdown in the underway construction program for 1982 alone, credit was prohibited for 28 organizations and terminated for 18 others. Limitations were placed upon loans for unfinished production in excess of 1 million rubles and the issuing of accounting-monetary credit was terminated.

When required, use was made of a special system of crediting. Following this, improvements were noted in the work of a number of organizations and a majority of them were converted over once again to the general system of crediting.

The strengthened business contacts between the Stroybank institutes and organs of state arbitration are playing an important role in the timely holding of violators of capital construction obligations strictly accountable for their actions. Joint measures are promoting the more extensive use of property sanctions as a means for bringing influence to bear upon those economic organs which do not fulfill their contractual obligations. During last year alone, based upon initiative displayed by Lenoblstroybank, gosarbitrazh handled 90 cases, following which more than 1 million rubles were added to the budget income.

However the role played by the institutes of Stroybank in improving the work involving claims is limited merely to formulating the question, including for gosarbitrazh, concerning the handling of cases involving the use of sanctions. Actually, the amount of the fines and the manner in which they are levied are regulated at the present time by the rules governing contractual agreements for capital construction and are not covered by the rules for the financing of construction. It is believed that in the new rules for financing, the institutes of the bank should be authorized to levy penalties (financial sanctions or fines) for delays in the formulation of agreements or in the schedules for placing projects in operation.

The total amount of the penalty should ideally be levied equally against the client and the contractual organization in like manner as a fine is levied based upon the results of controlled measurements. If a client is an active enterprise, then the total amount of the penalty must be obtained from the resources of its principal activity. If this role is played by the board of directors of the enterprise under construction, then the total amount of the fine should be withdrawn from the ministry's (department's) fund. In any case however, the question as to whom the sanction should be addressed must be resolved by arbitration.

We have already stated that a dispersion of funds among numerous projects leads to an increase in the volumes of unfinished production. "Dolgostroy" is the true scourge in our work. According to estimates by specialists, each ruble that is invested in construction but does not produce a return produces a loss of 15 kopecks annually.

Where can we find the means for solving this problem?

We are of the opinion that they are to be found in improvements in the legal, planning, organizational, economic and technical support for construction. And here a great deal can be accomplished through the use of legal and financial-credit levers. In particular, supplements should be added to existing legislation which will increase the responsibility of clients for the timely formulation of financing, the presentation of a front of work and the installation of equipment. If the placing in operation of a project is disrupted because of their fault, then the raised interest rates for bank credit which the contractor is presently paying should be applied to the operational results of the client.

Moreover, today the client is economically not interested in lowering the volumes of unfinished construction. Thus it would be useful in our opinion to introduce a payment for an above-normal residue of "unfinished work," similar to the payment for fixed and working capital.

It is believed that the institutes of USSR Stroybank should also be given the right to apply the raised interest rates, when there is a disruption in the construction schedules, against the true guilty party, as stipulated in the new rules for financing and in the rules governing a contractual agreement for capital construction. Simultaneously, the time is at hand for the planning organs to establish the volume of marketable output as a mandatory evaluative indicator not only for the contractual organizations but also for the clients.

In speaking before the November (1982) Plenum of the CPSU Central Committee, the General Secretary of the CPSU Central Committee Comrade Yu. V. Andropov noted that further improvements in the efficiency of public production can be achieved if use is made of all reserves uncovered as a result of accelerated scientific-technical progress and the extensive and rapid introduction of scientific and engineering achievements and leading experience into production operations. In capital construction, we have in mind mainly the use of resources for the modernization and technical re-equipping of existing enterprises. This is of considerable importance, for example, to Leningrad. Indeed, there are many factories and plants here that were erected long ago. And although they are modernized from time to time, nevertheless not all of them are in keeping with the modern requirements.

Analysis reveals that in many instances the clients and contractors are not devoting adequate attention to the technical re-equipping of existing enterprises, they are dispersing forces and material and financial resources among many projects being erected and they are carrying out new construction under the guise of modernization. For example, at the Leningrad plant for artistic glass the decision was made to erect a new department for the production of high quality dishware. After studying the technology employed in the production of such products at similar enterprises, the engineers of our bank proposed the re-equipping of existing areas instead of new construction, with two complete lines to be installed that will ensure an increase in output. The Ministry of the Construction Materials Industry agreed with the bank's recommendation.

And the effectiveness of technical re-equipping and modernization is beyond dispute. At the Leningrad Metal Plant Association, two pilot complexes were erected using only funds that were allocated for technical re-equipping. Moreover, in both instances the expenses for equipment amounted to 97-98 percent, with only 2-3 percent being used for construction-installation work. It is understandable that the higher the proportion of equipment and the lower the proportion of construction-installation work, the greater will be the economic results and, it follows, the greater the advantage to the national economy.

Meanwhile, the absence in the norms of such quantitative evaluations precludes the possibility of utilizing the control function of the financial-credit mechanism. In our opinion it would be advisable, in the general capital

investments at existing enterprises, to reflect the maximum norms for the proportion of construction-installation work, with an appropriate differentiation for them by branches of the national economy and types (modernization, technical re-equipping, expansion). Such norms could appear in the form of coefficients of the extent of construction-installation work and this would make it possible for the bank workers, in the event this extent was exceeded, to refuse to open up financing using funds allocated for the modernization and technical re-equipping of existing enterprises.

It is noted that during modernization and technical re-equipping, long-term credit is utilized to a greater degree than in the case of new construction. But its repayment commences only after the projects have been accepted for operations and, it follows, at times the normative construction schedules are ignored. It is believed that the repayment of long-term credit should ideally commence following the expiration of the normative period for placing a project in operation. This will ensure the timely placing in operation of fixed capital and the observance of the principles of crediting (mainly reimbursement to the bank for loans issued).

Still another reason for failure to observe state planning and financial discipline in capital construction is the fact that state plans which have been approved are being corrected throughout the year. In addition to adversely affecting the production-financial activities of construction-installation organizations and the effective functioning of the financial-credit mechanism, this also leads to the formation of surplus logistical resources among the contractual organizations. Every attempt must be made to close the paths for by-passing the existing system, which prohibits a change in the construction plans after 15 February, the date established by law, and also, in the event the plans are nevertheless changed, the implementation and correction of funds for logistical and labor resources.

In connection with the conversion over to the maintenance of accounts according to marketable construction output, the expenses of a contractual organization for unfinished production are covered, as is well known, by bank credit. However, the extension of credit is so complicated that difficulties are encountered in making arrangements for it.

There is a solution for this problem. For example, the method of unified credit has been employed successfully over a period of 10 years in Leningrad and in some other cities. It simplifies considerably the system of crediting (instead of 12-14 loans, only 1-2 are formalized). It is believed that today, with all elements of the national economy recognizing increased responsibility for the observance of state, planning, financial and contractual discipline, this method should be employed on a more extensive scale.

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CONSTRUCTION MACHINERY AND EQUIPMENT

GOSSTROY MECHANIZATION CHIEF ON EFFECTIVE USE OF MACHINERY

Moscow MEKHAUZATSIYA STROITEL'STVA in Russian No 3, Mar 84 pp 2-5

[Article by P. I. Moyiseyev, chief of the Construction Mechanization Section, USSR Gosstroy [State Committee for Construction Affairs]: "To More Fully Utilize Production Capacities"]

[Text] The tasks presented by the December (1983) Plenum of the CPSU Central Committee require from all construction organizations an intensification of organizational work and an improvement in production activity.

At the present time, extensive work is being performed on increasing labor productivity by one percent and on reducing production cost by an additional 0.5 percent. This work is also being performed at the construction organizations. Along with improving the utilized project design decisions, industrialization and organization of labor at the construction sites, a most important direction in increasing the growth of labor productivity and reducing the cost of work performed is the further improvement in mechanization of construction-installation work and the improved application of construction technology.

Year after year, the production and supply of hydraulic excavators for construction is being increased. These are equipped with hydraulic hammers, grabbers, suspended equipment for planing work and for excavation of holes for bored pilings. The output of hydraulic cranes with telescopic booms and mobile tower cranes with increased load lifting capacity and high load lift is also increasing.

The output of automated installations for making concrete, mortar and asphalt concrete mixtures is increasing, as well as the output of concrete mixing trucks and loaders. The series production of concrete pump trucks, vehicles for installing bore-driven piles, powerful bulldozers on T-330 tractors, and other construction technology has been introduced.

In recent years, domestic industry has mastered the output of highly effective construction-finishing machines and mechanized construction-installation instrumentation. Airless paint sprayer assemblies, machines for preparing and supplying plastering compounds and mixtures, electric hammers and perforators, impact wrenches and electric drills, wood screw drivers with electronic rotation speed regulation, construction-installation air guns, pneumatic punches, etc. are already being supplied to construction sites by the thousands instead of by units.

The new machines supplied to the construction sites have a better technical description in terms of their productivity, reliability and fuel expenditure.

Construction ministries, departments and organizations in the union republics are performing work on improving the level of mechanization of construction-installation work, improving the application of the pool of construction technology, and improving repair and technical servicing of construction machines.

In the first six months of 1983, the mechanized method was used to perform 7.05 billion cubic meters of earthwork, install 173.4 million tons of building structures, and place 34.4 million cubic meters of concrete and reinforced concrete.

As a result of the implementation of measures for further development of mechanization and automation of construction-installation work, introduction of progressive technology, and improvement of organizational forms of management and technical servicing of the pool of construction technology, the volumes of work performed manually were reduced by 0.6 percent for earthwork in the first six months of 1983 as compared with the corresponding period last year. For cargo handling operations the reduction was 6.9 percent, and for plastering and painting work respectively the reduction was 10 and 2.3 percent.

The output by single-bucket excavators in contract construction for this period increased by 1.8 percent, by scrapers -- 6.2 percent, bulldozers -- by 2.9 percent, and tower cranes in residential construction -- by 6.8 percent.

The increase in the number of construction machines and their cost, as indicated by the analysis, is not accompanied by a greater increase in their output. Individual construction organizations allow a reduction in work indicators as compared with those achieved. Thus, there has been an increase in the volumes of work performed manually in the first six months of 1983 for earthwork in the construction organizations of the USSR Minvodkhoz [Ministry of Land Reclamation and Water Resources], USSR and RSFSR Minugleprom [Ministry of the Coal Industry], and for concrete work in the organizations of the USSR Minenergo [Ministry of Power and Electrification] and the USSR Minvodkhoz. The building organizations of Mintransstroy [Ministry of Transport Construction] have also allowed an increase in manual labor in the performance of plastering work.

A number of construction ministries and departments are still poorly utilizing construction machines.

In the construction organizations of the USSR Minenergo, the output for single-bucket excavators and tower cranes has dropped, in the USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises] -- for single-bucket excavators, and in the USSR Minvodkhoz and Mintransstroy -- for tower cranes in residential housing construction.

Caterpillar track and pneumatic wheel cranes are being poorly utilized in the USSR Mintyazhstroy, USSR Minpromstroy [Ministry of Industrial Construction], Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] and the USSR Minmontazhspetsstroy [Ministry of Installation and Special

Construction Work. As a result, the output of these cranes has dropped by 1.5-3 percent on the whole throughout the contracting construction organizations.

Analysis has shown that the application of machines in terms of time is improving at an extremely slow rate. The work duration of machines per 24-hr period comprises 8-11 hrs, and intra-shift idle times of machines are not being reduced. Long idle times of technology are often the result of an unprepared work front, untimely and incomplete delivery of structures, parts, and materials.

To being to act fully, with a high return on the available production and scientific-technical potential of the country -- that is the task which Yu. V. Andropov presented at the December (1983) Plenum of the CPSU Central Committee.

Improved organization of work production with the application of machines at construction sites opens up great possibilities for further increasing labor productivity and reducing cost due to the application of foremost work methods, organization of labor, and improvement of work performance technology with the application of progressive technology at the construction sites.

In the current year, builders will have to work at a forced pace to fulfill the planned volumes of work and to introduce into operation the fixed capital for all sectors of the national economy.

Based on the planned volumes of contract work, builders at the ministries and departments will have to perform the following physical volumes of basic work in 1984:

Work	1984 (plan)	1984 in percentages of 1982
Earthwork, million cubic meters	15,117.5	116
Cargo-handling operations, million tons	1,815.9	113.9
Concrete and reinforced concrete work, million cubic meters	79.03	105.8
Plastering work, million square meters	368	104
Painting work, million square meters	914.98	102.1

The plan for comprehensive mechanization and automation of construction-installation work for 1984 which was developed by the USSR Gosstroy in conjunction with the construction ministries and union republics provides for the realization of presently available reserves and the further development of mechanization of labor consumptive construction processes. It is directed primarily at fulfillment of the planned volumes of construction-installation work, improvement of the utilization of the pool of construction machines and trucks, and improvement in the repair and technical servicing of construction technology.

The increased assignments for 1984 on reducing the volume of manual labor which have been established by the plan (computed per one million rubles of construction-

installation work) in percentages of the work volume for 1980 are characterized by the following indicators:

Work	Volumes of manual labor per 1 million rubles of SMR [Construction-Installation Work]		1984 in percentages of the 1980 level	
	1980 (actual)	1984 (planned)	by five-year plan	planned reduction
Earthwork, cubic meters	1,185.8	960.5	17.5	19
Cargo-handling operations, tons	47.5	38.9	16.2	18
Concrete work, cubic meters	78	65.1	15.8	16.5
Plastering work, square meters	1,672.8	1,398.6	15.5	16.4
Painting, square meters	3,800.8	3,135.7	16.5	17.5

For successful fulfillment of the construction program for 1984, it is necessary to make broad use of the available internal reserves for reducing the expenditure of labor, material and fuel-energy resources.

The plan for comprehensive mechanization, being part of the general measures for increasing labor productivity and reducing construction cost, provides for tasks aimed at reducing the volumes of work performed by hand.

The level of reduction in the volume of work performed manually planned for 1984 exceeds the assignments of the five-year plan. This is determined by the fact that in recent years there has been some improvement in the qualitative make-up of the machine pool, an improvement in the level of supply of construction organizations with means of small-scale mechanizations, and an improvement in their application due to expansion of the network of sectors and administrations of small-scale mechanization and the widespread introduction of brigade standard complements.

The percentage of workers performing manual labor is highest for carpentry, fitting, stoneworking, plastering, painting and facing operations. The reduction in the expenditures of manual labor for these operations is directly dependent on how successfully the construction organizations and plants within the construction industry resolve the problems of plant readiness of building structures and parts, as well as on the proper organization of the application of means of small-scale mechanization and mechanized instrumentation at the construction sites.

The experience of leading construction organizations shows that with proper organization of the instrument management, the question of supplying the workers with tools and means of small-scale mechanization is solved much more successfully. The creation of special subdivisions (sections and administrations) for the application of means of small-scale mechanization within the system of trusts (administrations) for mechanization or within the make-up of general construction territorial glavks [main administrations] makes it possible to more broadly utilize these effective means in work production. It also facilitates a significant reduction in the expenditure of manual labor at the

construction sites. Glavkrasnoyarskstroy [Construction in Krasnoyarsk Main Administration], Glavomskstroy [Construction in Omsk Main Administration] and a number of other organizations have created specialized managements for small-scale mechanization, which supply the construction work brigades with sets of the necessary tools and means of technological equipment.

The experience of organizations of the USSR Minenergo, USSR Minstroy, Glavmospromstroy [Industrial Construction in Moscow Main Administration] and a number of organizations deserves attention. These organizations have created specialized sectors, brigades and crews for performing work on drilling openings in reinforced concrete using diamond-tipped instruments, channeling through ground structures using pneumatic punches, installing anti-corrosion and fire protective structures, lowering water levels, and placing concrete with the use of vibration vacuuming, installing hydroinsulation and thermoinsulation in building structures, etc.

The work experience of such sectors proves conclusively that new progressive types of work implementation may be successfully mastered only by the method of specialization. Such specialized sectors perfect the work technology with the use of stock equipment and modern means of mechanization, and achieve a high output and work quality.

Finally, the concentration of technical means in specialized subdivisions makes it easier to implement their repair and servicing and to systematically increase the qualifications of the workers and the level of engineering preparation of the work performed.

The most important direction in increasing the effectiveness of building production is the automation of construction processes.

Preparing mixtures in the production of concrete and reinforced concrete work is among the most difficult and labor consumptive construction processes. The quality and durability of the products and structures depends on the technical level of this process. The application of the automated method of preparing concrete mixtures and progressive methods of their placement ensures a sharp reduction in labor expenditures, as well as a reduction in their cost.

However, the level of automated preparation of concrete and mortar is still low. Therefore, the plan for 1984 provides for transferring 357 stationary and 305 stock operating concrete-mortar units, shops and installations over to automated work conditions.

The volume of concrete mixture preparation by the automated method in 1984 is planned to be up to 105.1 million cubic meters. This will make it possible to increase the level of automation of concrete mixture preparation to 57.4 percent and of mortar to 49.2 percent, as well as to improve their quality and ensure a savings of cement.

The construction ministries must perform extensive work in the current year on transferring the operating enterprises over to automated management conditions.

In recent years, the number of concrete pump trucks, concrete mixing trucks, automatic machines for road construction, trenching and multi-bucket excavators with automatic control has increased significantly in the construction organizations. The fuller utilization of this technology is a great reserve for increasing labor productivity and reducing the cost of construction work.

The delivery of machines with hydraulic drive, sets of machines for mechanized installation of rolled roofs, new types of plastering and painting stations, airless paint sprayer assemblies, hydraulic hammers, boring-crane machines, frontal loaders and other means of mechanization which facilitate increased level of mechanization of labor consumptive construction processes has been expanded for construction.

In 1983-1984 the construction ministries and departments will deliver new road construction machines.

The plan for comprehensive mechanization and automation of construction-installation work for 1984 provides for checking out the reliability and effectiveness of application of the first industrial batches of new construction and road machines made at Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] enterprises] under production conditions.

The most important section of the plan are the assignments for further improvement in the application of construction machines and cargo vehicles. The assignments for the output of construction machines on the whole throughout contract construction in 1984 will increase as compared with the output achieved by the beginning of the five-year period.

The application of machines and their output depend on the organization of work production, technical servicing and repair of the machines, as well as on the quality and operational reliability of the machines supplied for construction. An analysis of these factors shows that there are significant reserves for further increasing the output of machines in building production.

Random samplings have shown that the losses in machine work time in the first six-month period of 1983 comprised an average of 16 percent in the organizations surveyed. Thus, at facilities of the USSR Minpromstroy the intra-shift losses were 16 percent, of Glavmosinzhstroy [Construction of Engineering Structures in Moscow Main Administration] -- 25 percent, and of the USSR Minsel'stroy [Ministry of Rural Construction] -- 17 percent. The idle times of individual sampled machines comprise from 30 to 60 percent. A large part of these losses was associated with the absence of a work front, lack of provision with materials, and other reasons.

No less important are the factors of further improvement in management of the machine pool, planning of their work and increased technical level of utilization and repair.

It is a generally accepted fact that the concentration of machines at the administrations and mechanization trusts ensures an increase in the output and an improvement in the technical condition of the machines.

However, at some construction sites, further concentration of the machines at specialized organizations is still maintained, and this reduces the effectiveness of their application. As a result, the growth rate of output of basic construction machines has dropped in recent years, and for a number of machines the output has become lower than that previously achieved.

Undoubtedly, the machine output indicators are also influenced by the fact that, with expansion of the application of various types of interchangeable working equipment (hydraulic hammers, grabbers, special buckets, etc.), part of the machine time is spent on performing operations which were previously done by hand (cleaning the bottom of trenches and foundation pits, digging straight-line excavations, feeding concrete to inter-story coverings, etc.). Another factor is that there is no noticeable improvement in the supply of spare parts to the operating machine pool. Nevertheless, little has been done by the organizations of the USSR Gossnab [State Committee for Material and Technical Supply] in this direction in recent years.

In order to reduce the machine idle times during repair and increase the technical level and quality of repair, the plan for 1984 calls for assignments for increasing the level of centralization of machine capital repair.

On the whole, the level of centralized repair of construction machines (the relation of the number of machines repaired at plants to the overall volume of repairs in percentages) for 1984 as compared with the anticipated fulfillment of tasks for 1983 is characterized by the following data:

Machines	1983 (anticipated fulfillment, percent)	1984	
		according to five-year plan	plan project, percent
Single-bucket excavators	69	75	75
Bulldozers	71	73.6	74
Scrapers	65	--	68
Tractors	77	--	81
Truck-mounted cranes	68	73.6	74
Pneumatic tire cranes	64	--	64
Motor graders	80	73.5	83
Pipe layers	69	--	73

We must note that the development of centralized repair of complex construction machines is being hindered by the absence of centralized planning for the work load of repair-mechanical plants of the construction ministries and departments, with allocation of the necessary material-technical resources.

The plan provides for assignments to be coordinated with the ministries and departments for introduction at repair-mechanical plants of an integrated system of product quality control at enterprises for the repair of construction machines (KS UKP RP).

In 1984, KS UKP RP is to be introduced at 77 enterprises and developed at 27 others.

The introduction of KS UKP RP increases the technical level of production, improves the quality of machine repair, and reduces the time which the machine spends in repair.

The plan for comprehensive mechanization and automation of construction and installation work for 1984 provides for assignments for the development of progressive methods of technical servicing of the rolling stock in the construction ministries and the development of model designs of specialized auto transport means.

In 1984, a growth in volume of construction load transport in the amount of 1.8 percent is anticipated over that expected for 1983, as well as a 2.9 percent in cargo turnover. Over 3.7 billion tons of construction loads, or 63.7 percent of the overall volume of shipments, will be implemented by the centralized method. This is 8.5 percent greater than the amount achieved in 1982. An increase of 123 million tons of shipment by auto trailers is envisioned.

In order to increase labor productivity, reduce manual operations and losses during cargo-handling operations, it is necessary to increase the volume of container and packet shipments to 122 million tons.

Shipments with the use of the brigade order will increase from 1307 to 2234 million tons, which will comprise 38.4 percent of the overall volume of shipments, as compared with 23.3 percent in 1982. This includes shipments by integrated contract brigades in the excavation and transport of dirt -- from 843 to 1111 million tons.

In order to increase the technical level of servicing and repair of cargo vehicles, the plan project provides for the introduction of 71 lines and stations for comprehensive mechanized servicing, 71 diagnostic stations, mechanized washing stations with recycled water to serve 15,700 automobiles. Moreover, the manufacture of over 6,500 units of specialized auto transport means for shipping construction loads is being planned at the auto repair plants of the construction ministries and departments.

The construction organizations also have other reserves at their disposal for increasing production effectiveness and saving on fuel-energy and other resources.

An exceptionally great role belongs to improving the organization, technology of production and planning of construction work and to precise and mutually interrelated work of all the specialized organizations participating in the construction process. The timely and comprehensive preparation for fulfillment of earthwork under winter conditions is also necessary.

Protecting soil from freezing, performing planning work when the ground has thawed, and organizing the use of soil loosening by the explosive method all ensure a 2.5-3 time reduction in the labor expenditures and fuel expenditure.

Expanding the volumes of work in construction with the use of foundations placed on bore-driven piles, "wall in the ground" structures, trenchless placement of communications lines using pneumatic punches and horizontal passage machines exclude the necessity of excess movement of dirt using motor transport or expenditure of labor and materials.

A particularly important place in solving the problems of improving building production belongs to the work force in the central link. They are in the thick of practical matters and constantly in contact with workers and brigade leaders from production sector collectives engaged in construction.

The transition of building production to an industrial base, its intensification, specialization and cooperation are all accompanied by an expansion and complication of the ties between all the links in the building complex. Therefore the significance of united efforts and the role and responsibility of contiguous labor collectives for the end results of construction have increased. This forces the participants in building production to review their activity from these standpoints and to increase discipline and responsibility for work at all levels.

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CONSTRUCTION METHODS AND MATERIALS

DISCOVERY OF NEW DEPOSITS OF CONSTRUCTION RAW MATERIALS VIEWED

Moscow STROITEL'NAYA GAZETA in Russian, 1 Apr 84 p 1

[Article by correspondent V. Druyanov: "Prospectors of the Depths -- For the Construction Industry"]

[Text] Today Soviet geologists are celebrating their professional holiday. The time of field work and expeditions is drawing near. Prospectors of the nether regions are conducting operations in all regions of the country, seeking and finding deposits of petroleum, gas, coal, ferrous and non-ferrous metals. An important direction in their activity is the search for deposits of building materials. How successful are these efforts in the present five-year period?

This question, presented by our non-staff correspondent V. Druyanov, is answered by the chief of the Nonmetallic Minerals, Construction Materials and Mining and Chemical Resources Administration of the USSR Ministry of Geology, A. Fil'ko.

The country's geologists have found a strong raw material base which allows us to produce cement, facing materials, reinforced concrete structures, ceramics, glass, and asbestos cement products in large quantities. In the three years of the present five-year period alone, over 100 deposits of various construction materials have been given over for industrial exploitation.

The prospectors of the depths consider the discovery of deposits for territorial-production complexes under construction to be an especially important task. Major deposits of high-strength construction stone, keramzit and brick clays, sand and sand-gravel have been turned over for exploitation. Forty deposits have been found for the regions of the non-chernozem area alone. Among these is the Oktyabr'skoye with reserves of sand and gravel material in the amount of 120 million cubic meters.

Large deposits of building materials have been discovered in regions where they were previously in short supply. Thus, deposits of building stone have been discovered in Belorussia and Kaluga Oblast, of gypsum in the Donbass and the Latvian SSR, and of cement raw material in Magadan Oblast.

In the present five-year period, geological survey work on facing stone has taken on great scope. There have been 27 confirmed deposits of syenite, tuff, granite and marble... Deposits of facing stone which are varied in their color and hardness have been discovered in all the republics of Zakkavkaz'ye, Central Asia, in Kazakhstan and in the Ukraine, as well as in a number of rayons within the RSFSR. This raw material base will fully supply the growing need for these materials.

It is true that geologists have not yet fully satisfied the demand of builders for raw materials. There is a shortage of building materials in Tyumen Oblast. There is not enough gypsum in regions of the Far East, of limestone -- for the Magnitogorsk Cement Plant, or of high quality quartz sand for the glass industry in Siberia and the Far East. Our primary task is to satisfy the demands of the construction industry.

However, joint efforts are needed for successful work in this direction. The departmental approach in the development of numerous deposits often deprives "foreign" enterprises of quality construction materials which are obtained nearby. As a result, it becomes necessary to bring in additional thousands of tons of cargo for great distances. It would be realistic to transfer the glass plants in Siberia to the use of local raw material. It is true that this raw material requires enrichment. This operation is not so expensive as compared with shipments from afar. However, the solution to this problem is still being put off. The excavation of the Cheremshanskiy quartz sandstone deposit in Buryatiya may be begun with great benefit.

In many countries of the world, expanding rock -- vermiculite and perlite -- is in great demand by builders. Wollastonite is widely used in building ceramics and as a substitute for asbestos. Diatomites, opoka, vermiculite, volcanic tuff, and pumice are used as porous fillers in the production of lightweight sound and heat insulating panels and coverings. Unfortunately, this raw material is not popular in the domestic building industry.

Strip mined rock from deposits in the KMA [Kursk magnetic anomaly], Krivorozhye, Northwest, and the Urals, as well as slag from metallurgical plants and ash from power and boiler installations are used in small quantities.

The construction industry's turning to new types of mineral raw materials and the involvement of deposits of traditional building materials already surveyed by geologists in the economic turnover will make it possible to accelerate the fulfillment of plans and to solve the problems indicated by the special February (1984) Plenum of the CPSU Central Committee.

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CONSTRUCTION METHODS AND MATERIALS

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LIGHTER MATERIALS, MORE PREFABRICATION FOR RURAL BUILDING

Moscow BETON I ZHELEZOBETON in Russian No 12, Dec 83 pp 2-4

[Article by A.A. Isayev, USSR deputy minister of Rural Construction, "Reinforced Concrete for Rural Construction"]

[Text] Great and crucial tasks were posed for rural construction workers by the May (1982) CPSU Central Committee Plenum to put into effect the country's Food Program. Suffice to say that by 1990 the USSR Ministry of Rural Construction organizations should increase the work volume in the rural area 1.4-fold. At the same time the proportion of housing and social-everyday-living construction is considerably increasing and there is a growth of the building volumes of large-scale complexes for storing and processing grain and fruit and vegetable products, construction of highly mechanized feed-preparing plants and fertilizer warehouses. Much also remains to be done to reinforce the material-technical base for repair and operation of agricultural equipment.

The structure of rural construction, having changed in the last few years, makes possible a considerable increase in the efficiency of capital investments directed toward developing the rural economy, but requires considerably greater labor and materials input per million rubles of construction and installation work. Under these conditions, the problems of raising the level of rural construction industrialization on the basis of improving volume-planning and structural decisions and introducing efficient structures and materials must be solved at an accelerated pace.

Items made from concrete and reinforced concrete are some of the basic types of items and structures for industrial rural construction. Through the use of units made up of lighter efficient concrete and reinforced concrete structures now, every year, 4 million square meters of agricultural buildings are built, and the basic construction volume of elevators, mixed feed plants and mills and over 60 percent of the housing and social-every-day living projects are completed.

The problem of developing and introducing structures of this sort is solved by the head institute in the rural construction sector--TsNIEPsel'stroy [Central Scientific Research Institute of Experimental Planning for Rural Construction], in cooperation with institutes of USSR Gosstroy, the USSR

Ministry of Agriculture and other ministries and departments. Within the system of the USSR Ministry of Rural Construction, instead of the heavy traditional reinforced concrete structures, those made of light concrete are now being developed and introduced, and using them for agricultural production buildings makes it possible to cut the steel and concrete utilization to 30 percent, and reduce labor input at the construction site by 15 percent.

The accumulated experience in designing and building agricultural buildings, however, attests to the fact that the limit has not been reached. Work is continuing on improving the existing and developing new structures to adopt new norms, take into consideration more fully the statics of the work of the structures and the use of new materials. Preliminary estimates show that the material-intensiveness of structures can be reduced by another 10-15 percent.

The use of efficient foundation structures, particularly pile, gives a considerable saving in labor and material resources. Suffice it to say that introducing 1 cubic meter of pile foundations in a rural building makes possible an average saving of up to 90 kilograms of cement and a reduction of labor-intensiveness by 12 man-hours, at the same time considerably reducing the amount of excavation and earth-moving. Considering the high efficiency and industrial quality of work done on constructing the underground section of buildings with pile foundations, in the 12th Five-Year-Plan the volumes of using them are planned for a considerable increase.

The efficient types of foundations developed make it possible to carry out the construction of production buildings with various structural schemes on different soils. For buildings with support-girder structural systems, these are pile-pillars and prop-blocks, and for buildings with a framework made of triple-hinged frames--piles of T-sections and prop-blocks. Such piles and blocks are manufactured and used in constructing the production buildings of the Novosibirsk and Slutsk rural construction combines, etc.

For low-story rural buildings and farm houses, structures with a shallow-cut foundation have been designed for ordinary soil or soil subject to frost heaving, instead of block strip foundations. Use of this makes it possible to reduce the concrete volume by 40-60 percent and the labor input by 20-30 percent.

Experience in experimental construction showed the high efficiency and reliability of these foundations. For example, using shallow-cut foundations for two-apartment farm houses and two-story farm barns up to 5 meters high when building the settlement of Shurskol (Rostovskiy Rayon, Yaroslavskaya Oblast') in 1982 permitted a saving amounting to 120,000 rubles. In 1983 the RSFSR Ministry of Rural Construction plans to build over 500 buildings on this type of foundation.

For designs without a foundation mat, foundations made of short prop and drill-packed piles for farm houses are competitive with shallow-cut ones.

Improved structures, the mastering of which does not require developing new technology and considerable readjustment of the equipment at enterprises, have been designed.

Based on the heightened estimated resistances of fittings and more efficient reinforcement, steel input in standard frames of the 1.822-2 series has been reduced by 10 percent, while retaining the concrete form dimensions. The use of these frames in regions with a seismicity up to 8 points ensures a steel saving up to 1.2 kilograms per square meter as compared with buildings using the prop-girder design.

Transition to production of lighter T-section frames makes it possible to reduce the steel input by 15 percent, and the concrete input--by 10 percent, as compared with the standard frames.

Methods developed to protect the reinforcement from corrosion in structural-insulating concretes made it possible to eliminate panels of the type-series 1.832.1-9 of the insulating concrete layer Grade M200 in the structure and switch to using single-layer corrosion-proof panels. At the same time, the mass of the panels is reduced by 25-30 percent, and the labor-intensiveness of their manufacture--by 15-20 percent. Transition to the production of these panels was carried out in 1982 at the Krasnokamsk Reinforced Concrete Products Plant of the Permskaya Oblast Rural Construction Administration and at the Georgian Rural Construction Industry Trust of the GSSR Ministry of Rural Construction.

The use of complete roof slabs for agricultural production buildings with asbestos cement and rolled roofing materials makes it possible to reduce the labor input when installing the roofs by 40 percent. These slabs are produced at SSK in Novosibirsk, Kapchagay, Slutsk, Mirgorod and the Soldato-Aleksandrovskiy Settlement.

Work is being done on further raising the level of industrialization of agricultural construction. The use of lighter supporting structures for the frame with a pitch of 6 meters, roof slabs and wall panels combined with precast faces, vestibules, partitions, large-sized structures for the floor, etc. have made it possible to bring the prefabricated level of new buildings up to 80-85 percent.

Raising the level of prefabrication for buildings with basic purposes, however, is still clearly insufficient to solve the problems posed in rural construction. If one examines the complexes as a whole, where the cost of basic-purpose buildings constitutes about 30 percent, the level of their prefabricated nature is still high and constitutes 40-50 percent. In connection with this, work is being done to raise the prefabrication level of utility-production and auxiliary buildings included amongst the agricultural complexes and farmsteads.

Methodologically this work is based on the "Fundamental Premises for Standardization and Unification of the Planning Decisions for Production Agricultural Projects," affirmed by the directive organs. Specifically, in

conjunction with the institutes of the USSR Ministry of Rural Construction, RSFSR Gosstroy and others, nine plans for completely prefabricated complexes are being developed. Among them are dairy farms for 400 and 800 cows kept tethered and in stalls, to raise heifers for 3000 places, to raise and fatten 12,000 hogs, sheep farms for 5000 ewes, poultry farms for 3 million broilers and 400,000 laying hens. When the development is completed the plans will be distributed to the zonal planning institutes for adoption at sites in consideration of regional conditions and the possibilities of the production base.

In the plans for a farm for 800 cows to be kept tethered, raising calves up to 20 days, fully prefabricated unitized buildings (with a milking-dairy unit) were used for the cowbarns, sanitation-veterinary check point, calving section, dispensary, etc. The prefabrication level for the complex as a whole rose to 75 percent, and the prefabrication level of individual utility-auxiliary buildings--to 70-80 percent.

The Central Scientific Research Institute of Experimental Planning for Rural Construction, in conjunction with the State Institute for the Planning of Flour-Milling and Groats Industry Establishments, Elevators and Storage Facilities, is working on improving the supporting structures and also raising the prefabrication level of buildings for utility-production and auxiliary purposes for groups of elevators and mixed feed plants, mills and other projects of the USSR Ministry of Procurement.

Dual, hollow blocks measuring 3 X 6 meters with a structural guard for the joints instead of blocks measuring 3 X 3 meters have been developed and are being put into use, which makes it possible to reduce the concrete input by 10 percent and decrease the labor input by almost 30 percent.

Planning documentation with partial replacement of unitized concrete by unified perforated blocks (UDB) has been developed and put into use to build the underground sections of installations to receive grain from motor vehicle transport and the railroad and railroad scales. Using them at one project makes possible an average saving of about 22 tons of steel, 54 cubic meters of lumber and 260 man-days and a 17,000 ruble reduction in the estimated cost. Prefabricated-unitized structures for receiving assemblies utilizing UDB in 1982 were used at 42 projects of the RSFSR, UkSSR and Kazakh SSR ministries of Rural Construction.

Practical experience shows that putting into practice efficient developments--interlocking blocks, dual blocks for silos and modifications of prefabricated underground assemblies to receive grain--for construction of an elevator with a capacity of 120,000 tons reduces the cost by 10-12 percent and the labor-intensiveness by 17 percent.

The growing volumes of housing construction in the rural areas has required a rise in the level of industrializing farm-house construction. One of the main tasks is not only to increase the rates of building housing in the rural locality, but also to reduce its cost, ensure a saving of materials and labor

input and accelerate the introduction of advanced models of houses. Work is being done by institutes of the USSR Ministry of Rural Construction, USSR Gosstroy and Gosgrazhdanstroy to improve sets of structures, volume-planning and structural designs for houses, above all the farm type of the most widely used models 17, 25 and 135. The planning solutions are made in accordance with the possibilities of the production base and the product mix and inventory of structures and metal equipment are being reduced. On this basis an improvement in the standard plans for houses is being worked out.

The Central Scientific Research Institute of Experimental Planning for Rural Construction, in connection with UkrNIIPgrazhdansel'stroy [Ukrainian Scientific Research Institute of Experimental Planning for Civil and Rural Construction?], on the basis of the product list of structures issued by the Berezanka Rural House Building Combine, has developed plans for three- and four-room farm houses. The product list of structures in them is reduced by 10 percent as compared with the standard plans. Experimental construction of several such houses is specified for 1983, and in 1984 a residential settlement will be constructed in Kiev Oblast. The product list of structures for building farm houses made of large light concrete blocks, Model 24, widely used by the UkSSR Ministry of Rural Construction, has been reduced 2.5-fold.

For houses of models 17, 25 and 135, roof modifications are proposed, using lighter reinforced concrete rafters and spans with a bevelled upper edge, strengthened by unwelded seams, and reinforced concrete frames for the length of the pitch 1.6 meters wide. Using these structures, as compared with the analogous ones, gives a reduction in steel by 8 percent, in concrete--by 50 percent and in labor-intensiveness--by 12 percent per square meter of horizontal projection of the roof.

Using extrusion panels, which combine the functions of rafters, lathwork and a water-resistant ceiling, in the assembly of roofs makes it possible to eliminate the utilization of timber and to reduce the labor-intensiveness of the construction by 28 percent. The first farm houses with this type of roof were constructed in Saratovskaya Oblast .

Mastering the output of lighter and the introduction of new and improved structures for rural production and housing construction is being carried out on a wide scale due to a considerable development of the material-technical base during the last few years. In consideration of the achievements of science and technology, institutes of the USSR Ministry of Rural Construction are working on further improving the production technology of precast reinforced concrete and light concrete structures and items on the basis of modernizing existing and introducing new industrial equipment, improved technology, etc., which makes it possible to ensure the output of highly plant-finished items, save fuel, power and material resources and raise labor productivity.

Various types of chemical additives are being increasingly widely used at rural industrial construction enterprises in the preparation of concrete mixtures to reduce the cement input, improve the rheological properties of

the concrete and reduce the labor-intensiveness of the molding processes. The equipment for receiving, storing and preparing the mixtures with chemical additives into concrete was developed by TsNIIEPsel'sstroy and manufactured by the Aprelevka Experimental Plant of TsNIIEPsel'sstroy, and successfully put into operation at the Engel's, Kapchagay, Mirgorod, Ostrov and Slutsk SSK [Rural Construction Combines?] and a number of ZhBI [Reinforced Concrete Product Plants] (Molodechno, Grodno, Byaz'ma, etc.). Beginning in 1983, series production of sets of equipment was mastered by the experimental plant and has been directed to the Kalinin, Berezanka, Kurovskoye, Bryansk and other SSK and ZhBI plants.

Using chemical additives made it possible to reduce cement input by 10-15 percent and the cost of 1 cubic meter of items by 1.5-2 rubles at the enterprises. Work is now being done on expanding the product list of chemical additives for various regions of the country, improving their properties and obtaining modified plasticizers. In the end, this will make it possible to reduce the cement input still further due to increased plasticity of the concrete mixtures and better compacting of the concrete, and to obtain items with increased high-quality plant finishing.

A great deal is also being done to introduce power and material-saving techniques for producing precast reinforced concrete. The USSR Ministry of Rural Construction has approved a comprehensive program to put into operation heat and moisture processing of reinforced concrete items in environments with a regulated gage pressure (RD).

The introduction of RD does not require substantial capital investments and can be carried out by virtue of the minor repair and maintenance funds.

In 1982 the Aprelevka Experimental Plant of TsNIIEPsel'sstroy manufactured and sent to the rural construction industry plants of the USSR Ministry of Rural Construction 384 sets of equipment which made it possible to put into use the given method of heat and moisture processing at 16 plants. In 1983 it has been put into use at 45 plants, and by 1985--at 180 plants, which will make it possible to produce by the given method of heat and moisture processing some 6 million cubic meters of items, and at the same time, 246,000 tons of standard fuel will be saved.

Using direct heating chambers for heat and moisture processing of reinforced concrete items in an atmosphere of natural gas combustion products makes possible a two-thirds decrease in fuel input and a 15-20 percent increase in the turnover rate of the industrial lines, and a rise in the quality of items made of light concretes with standard moisture.

Using perlite sand as a filler in light concretes when manufacturing wall panels permits a reduction in the material-intensity of the walls of 20-25 percent and of 5-10 percent in cost, as compared with ordinary keramzit-concrete panels. Work done in Nal'chik and Chita showed that when replacing wall panels made of keramzit-concrete with a volumetric mass of 1200 kg/m^3 by keramzit-perlitic-concrete ones with a volumetric mass of 1000 kg/m^3 , for each 1000 m^2 of housing and production facilities respectively 5-8 and 3-4 tons of standard fuel are saved.

For waste-free cutting of reinforcement bars, Giproorgsel'sstroy [State Planning Institute for the Organization of Rural Construction and the Rendering of Technical Assistance] developed a semi-automated line for welding and measured cutting of core reinforcement that is being operated successfully at many SSK. The line saves about 1 ton of reinforcement in processing 100 tons of steel.

The Aprelevka Experimental Plant of TsNIIEPsel'sstroy is mastering a line for straightening and cutting reinforcement bars with even and variable shapes up to 16 mm in diameter, supplied by the metallurgical industry in coils. Along with new straight-cutting machines and machine tools and automatic tools to cut the reinforcement, the use of this line ensures a saving of up to 4 percent of processed steel, reduces the manual labor input and considerably raises productivity.

A transition is being made to the production of prestressed reinforced concrete volumetric components, with the aid of stuffing machines, which gave a reduction in steel of up to 30 percent (29 kg per 1 m³ of precast reinforced concrete). The production of these items has been mastered at the Ivanteyevka, Atbasar, Girey and other ZhBI plants. In 1983-1985, 32 reinforcement-stuffing machines will be put into operation.

Work is being done on using efficient stamped insertion pieces, permitting a saving in steel of up to 20-25 percent. The TsNIIEPsel'sstroy has drawn up a catalogue of stamped insertion pieces for mass types of structures and is now working on including them in the standard blue prints for items. Manufacture of the stamped insertion pieces will be organized in the USSR Ministry of Rural Construction system.

Efficient equipment has been developed for bonding insertion and fastening pieces, enabling the carrying in a semi-automatic system of protective aluminum or zinc coverings to lengthen the life of items and structures.

Only a part of the developments have been enumerated that permit a rise in the technical level of agricultural construction. Much remains to be done for rural construction to become more efficient, so that the builders cannot only increase the work rates in the rural area, but also make the cost considerably less, and the quality higher. The workers of the USSR Ministry of Rural Construction are making their own specific contribution to solving the country's Food Program.

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CONSTRUCTION METHODS AND MATERIALS

WASTE FROM PRODUCTION OF FERTILIZER USED TO MAKE GYPSUM

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[Article by V. Krotkov, engineer; A. Korablinov, engineer; and A. Volzhenskiy, professor MISI [Moscow Order of Red Labor Banner Engineering-Construction Institute] imeni V. V. Kuybyshev: "Raw Material With a Prospect"]

[Text] When phosphorus fertilizers are produced, waste remains -- phosphogypsum. Every year, up to 12 million tons of this product are dumped. The expenditures for the organization and maintenance of the dump sites comprise almost one-third of the expenditures for basic production.

The main component of this waste -- dihydrous calcium sulfate similar to the natural mineral gypsum -- may be processed into construction grade or high-strength gypsum. As we know, the former material is obtained by firing in cooking kettles and rotating furnaces. The low expenditure of fuel and the simplicity of the technology also ensure reduced capital consumption and cost of gypsum, which is widely used in construction.

It would seem that the manufacture of these types of semi-hydrous gypsum from the phosphogypsum by-products according to the existing technology opens up prospects for rejecting the mining of the natural raw material and its pulverization and refinement into powder with the traditional heat processing. However, the high moisture content of the by-products (up to 40-45 percent of the mass of dry substance), the presence of admixtures, and even their high current output acutely complicate the problem of rational application of this raw material.

Therefore, the need has arisen for creating not only economical methods of using phosphogypsum in the national economy, but also such directions which would ensure full utilization of the annual output of this material.

With consideration of these facts, the MISI imeni V. V. Kuybyshev, in conjunction with other institutes and enterprises, is conducting research on the problem of rational application of phosphogypsum. [These studies are aimed] primarily at manufacturing construction gypsum by roasting at atmospheric pressure in continuous action apparatus without rinsing the harmful admixtures out of the initial raw material.

According to the initial research results, an experimental continuous action installation has been designed and built for roasting phosphogypsum at 150-180°C. Using the casting method, the obtained product was used to make masonry stones 9x19x38 cm in size with strength of 40-60 kG/cm². An installation with capacity of up to one ton of the product per hour is currently being assembled. Light concrete masonry products with frost resistance of 15-20 cycles are suitable for use in one- and two-story construction.

The tests conducted by MISI have also shown the principle possibility of viewing phosphogypsum raw material as a filler, which in combination with binding substances could yield mixtures suitable, for example, for placement in mining excavations. The demand for filling mixtures fed into the excavations in the form of a highly mobile mass is figured in hundreds of thousands of cubic meters. At present, expensive cement mixtures with sand and gravel are now being used for this purpose.

It has been established that mobile mixtures containing raw phosphogypsum, lime and ash from burning coal possess the property of gradually hardening in a moist environment and attaining the necessary strength in 28 days. The mixture may also be prepared as a combination of phosphogypsum and cement.

The tests open up the possibility of using a mixture of non-roasted phosphogypsum with lime or cement for making masonry stone with compression strength of up to 40-60 kG/cm². Their molding may be done in molds using vibration. The molded products are subjected to gas drying at 80-100°C to a tempering moisture content of no more than 6-8 percent. This method is distinguished by its particularly high economy, since it excludes the necessity of roasting the phosphogypsum and uses ash.

A binding material obtained by roasting phosphogypsum by-products at temperatures of up to a thousand degrees may also be used in road construction. After pulverization into a powder and mixing with water into a plastic mass, the material hardens like cement, attaining a strength of 50-80 kG/cm² after seven days, and 150-200 kG/cm² after 28 days. This material, which is called "hydraulic anhydrite", may be fired like cement in rotating furnaces, but with a significantly lower fuel expenditure. In the future it may also find application in reinforced structures.

Phosphogypsum mixed with clay (or ash) may be used to make portland cement and sulfuric acid, which will return to the basic production of mineral fertilizers.

The manufacture of cement and acid in a single cycle by roasting gypsum materials with clay has long been known, but it deserves further creative development as applied to a large-scale utilization of harmful by-products.

In conclusion we must stress that research on the utilization of harmful phosphogypsum by-products performed according to a single plan by a number of scientific institutions and enterprises will aid in rapidly solving this problem with a high national economic effect.

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CONSTRUCTION METHODS AND MATERIALS

NEW HEAT-PROTECTIVE GLASS FOR USE IN TURKMENISTAN

Moscow STROITEL'NAYA GAZETA in Russian 30 Mar 84, p 3

[Article by V. Azarov: "Who Will Protect Protective Glass?"]

[Text] "To Korpeyev, Selective Coatings Laboratory" -- envelopes addressed this way are now prevalent in the mail of the scientific-production association "Solntse" in the Turkmen Academy of Sciences.

"You have become famous, Bayram, like a movie star," joke his co-workers.

However, Bayram Korpeyev, 34 year old candidate in technical sciences and the association's "chief lab tech" is in no mood for jokes. The letters ask, demand, plead: send us quickly that remarkable glass which you have created. Acquaint us with the technology of flow-line production of the new material. Let us know which enterprises are manufacturing it...

The authors of all these letters are builders who have read a small notice in the papers stating that Turkmenistan scientists have developed a glass "which is practically impermeable to sunlight."

But Korpeyev has no answer for them.

...The young, energetic specialist Bayram Korpeyev has for several years been working on problems of reflecting heat irradiations. As he himself says, he "made a mirror from iron." Glass was in no way part of Korpeyev's professional tasks. But he is such a person -- enthusiastic, non-apathetic, and a chance story about how almost a decade and a half ago in Ashkhabad efforts were made to organize the manufacture of light and heat protective glass gave him a unique "hobby."

Nothing came of that old venture, the Ashkhabad Glass Combine was unable to fulfill this task. It was very embarrassing when the "light-protective" glass decorating the Gosbank [state bank] in the capital of Turkmenia turned the building into a virtual hothouse. It was replaced by ordinary glass with venetian blinds and awnings.

"I didn't invent anything," stresses B. Korpeyev. "I simply tried to give new life to an old idea."

The coating on which Korpeyev worked in his free time was to perform two tasks: to pass through visible light and to reflect heat irradiation. How important are these properties? Try going to Turkmenia, where a temperature of plus 45 is an everyday occurrence from May to September. Remember the computations of specialists. In residential buildings the portion of solar radiation is 30 percent, in industrial units it is even higher. Read the testimony of doctors: high temperatures reduce labor capacity by one-third and increase the danger of traumatism by about the same amount...

Glass which "inhibits" the sun's rays guarantees an entire series of positive factors. It reduces the air temperature inside the building by 3-5 degrees. It allows designers to freely plan wide windows and glass walls -- naturally, reducing the expenditure of metal, concrete and other construction materials in this process. Electrical energy for heating the buildings in the winter and for air conditioning in the summer is saved.

Korpeyev also found precise figures in the special literature: 50,000 square meters of selective glass ensures an economy in the sum of 220,000 rubles.

Korpeyev took the glass -- thin squares the size of a matchbox -- out of the safe. It was ordinary sheet glass covered with a reflective film. The film was made up of semiconductor materials and was capable of reflecting up to 50 percent of the heat radiation.

"The idea was not mine," again repeats Korpeyev stubbornly. "I simply analyzed the question..."

He analyzed it captiously, not trusting the initial result. Hundreds of tests and computations armed him with absolute certainty. He finally showed the glass -- a test sample -- to "interested parties." At the same time, he also proposed his own variants for industrial production.

... What could be simpler. A man with a good idea and with finished plans promising obvious benefit walks into a high department. And the departments themselves -- the Gosstroy [State Committee for Construction Affairs] of Turkmenia, the republic's Minstroy [Ministry of Construction] and Minstroy-material [Ministry of the Construction Materials Industry] -- are clearly interested in the wonder-glass.

This makes the outcome even more remarkable. Or rather, the absence of any indication of an outcome.

At the republic Gosstroy they thanked him for his initiative and referred him to Minstroy-material. There they sincerely thanked him and added: "If we try your glass at the Ashkhabad Glass Plant, everyone will run from there. The combine is in an extremely difficult position as it is."

"Oh, what a remarkable glass," they greeted him at the Minstroy. "Give us as much as you can. We'll take it all. Oh, you can't give us any? You need more

research? We're sorry, but we don't have any money for science. There is a specialized institute on glass, why don't you ask them..."

What is Korpeyev asking for? First of all, to substantiate the standards for different types of buildings and "different" sun. Or, simply stated, to find the "right" glass for each facility so as to yield maximal effect. Secondly, it is necessary to set a task for creating a technology for continuous production of such glass. Third, a curator is needed who would be responsible for the introduction -- the republic's Gosstroy or Minstroyaterial?

As yet there are no volunteers.

And so Bayram Korpeyev answers the letters: Yes, I do have the glass, but as yet it is not available for the entire sector. I can't say when it will be...

Unfortunately, this is a truthful answer.

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CONSTRUCTION METHODS AND MATERIALS

BRIEFS

CEMENT INDUSTRY FUEL CONSERVATION—Whoever has been present even once at cement production knows what heat emanates from the huge rotary furnaces. One cannot even come near. The temperature of the metallic body of the drum furnaces reaches 300 degrees or more. A huge amount of heat is lost into the air in this way. This comprises around 15 percent of all the consumed technological fuel. In order to more clearly represent the value of the "extra" 15 percent, it is enough to say that even a one percent reduction in fuel expenditure would make it possible to save up to 280,000 tons of specified fuel at cement production enterprises, or about five million rubles per year. Therefore, it is understandable that Soviet scientists and manufacturers attribute such great importance to the problem of limiting heat losses in roasting furnaces. The senior scientific worker of the binding agent sector of NPO [scientific-production organization] on Stone and Silicates, T. Shakhbazyan, has devoted many years of his scientific activity to this problem. Numerous methods of coating the furnace body with a heat-protective layer were tried. However, all of them entailed high capital expenditures and yielded low effectiveness. Recently, however, this scientist narrowed his choice to a special anti-corrosion compound -- an organosilicate composition. By itself, the compound does not have any heat-insulation properties. However, when a small amount of aluminum powder is added to it, its indicators are sharply altered. The effect is unexpected -- the body of the furnace cools its blaze by almost a hundred degrees! In other words, this makes it possible to reduce the fuel consumption by four percent. At the same time, the expenditure of the coating compound per square meter of furnace surface comprises only 0.6 kilogram. The aluminum organosilicate compound has already been used to coat the furnaces of the Leningrad Giprotsement Plant and the Yerevan Gas Removal Plant. [by E. Simonyan] [Text] [Yerevan KOMMUNIST in Russian 7 Mar 84 p 2] 12322

NEW PHOSPHATE-BASED MATERIALS--Moscow--The associated "Construction" pavilions of the USSR VDNKh [Exhibition of the Achievements of the National Economy] are presenting an exhibit of materials which use phosphate binding agents in their manufacture. Unlike plastics, these non-organic polymers not only do not burn, but can also serve as refractory materials. They withstand a temperature of plus 1750 degrees. They make it possible to develop materials with predetermined properties, as well as to use waste-free, resource saving technology. The exhibit displayed samples of effective thermoinsulation materials, wood-splint slabs, and fire protective coatings. [by T. Sergeyeva] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 25 Mar 84 p 3] 12322

NAVOYI CEMENT PLANT --Navoyi, Uzbek SSR--This cement plant, located in the young Uzbek city of Navoyi, is the largest one in the republic. Its first production line went into operation six years ago. The output of portland cement with mineral additives was perfected at the same time. It soon found widespread application in making prefabricated reinforced concrete structures. Also, the Navoyi residents used the so-called "dry" method, which is more economical than traditional methods of producing this cement. Today the product is being manufactured with the State Seal of Quality. Last year the plant sent over one-and-a-half million tons of grade "400" portland cement to its consumers. [by Sh. Zaydekov] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 25 Mar 84 p 3] 12322

CERAMIC MATERIALS -- The use of ceramic materials for paving roads, streets and for facing buildings has been known since ancient times. These materials have great operational properties: long life, great strength and resistance to cold, low water absorption and wearability. They may be used repeatedly after repairs if it is necessary to lay underground pipes; they do not discharge harmful gases when heated by the rays of the sun which happens when asphalt or tar coatings are used. The development of housing, cultural-personal service and road construction, the scarcity of natural stone materials and the possibility of producing various architectural compositions necessitated the organization of the wide production of ceramic materials for paving roads. The NIISMI [Scientific Research Institute of Construction Materials] developed a technology to produce ceramic road products for paving surfaces, streets, intracity thoroughfares etc. The products may be manufactured with smooth or shaped facing surfaces. [Text] [Moscow STROITEL'NYE MATERIALY in Russian No 2, Feb 84 p 13] [COPYRIGHT: Stroyizdat, 1984] 2291

KERAMZIT PLANT -- Novolukoml -- The largest keramzit gravel plant in the republic will make it considerably cheaper, and accelerate the building of houses in Belorussian villages. Yesterday it was put into operation at full capacity. By using local clays, the new automated enterprise manufactures the cheapest construction material in the republic. The plant capacity is 500,000 cubic meters of keramzit gravel per year. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 25 Feb 84 p 1] 2291

KERAMZIT GRAVEL -- In the process of the production of keramzit gravel, a mineral powder additive is introduced into the rotating furnace. The technology developed by specialists of the Mosorgstroyaterialy Design Technological Bureau (Moscow, 121019, Volkhonka Street, 11) increases the productivity by 10 percent, reduces the bulk density of the product and saves 70,000 cubic meters of natural gas per year. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 11 Dec 83 p 3] 2291

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