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# USSR Report

CONSTRUCTION AND RELATED INDUSTRIES

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USSR REPORT

CONSTRUCTION AND RELATED INDUSTRIES

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## USSR REPORT

### CONSTRUCTION AND RELATED INDUSTRIES

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## CONSTRUCTION PLANNING AND ECONOMICS

### OVERVIEW OF CONSTRUCTION INDUSTRY IN FOURTH YEAR OF PLAN

Moscow EKONOMIKA STROITEL'STVA in Russian No 1, Jan 84 pp 3-10

[Article by V. A. Balakin, deputy director of the Building and Construction Industry Department, USSR Gosplan [State Planning Committee]: "Builders in the Fourth Year of the Five-Year Plan"]

[Text] In realizing the decisions of the 26th Party Congress and the November (1982) and June (1983) Plenums of the CPSU Central Committee, builders, as well as the Soviet people as a whole, are diligently working at fulfilling the tasks of the 11th Five-Year Plan. In the elapsed three years of the five-year period, fixed capital in a volume of over 360 billion rubles has been introduced into operation due to state capital investments alone.<sup>1</sup> The volume of its annual introduction today exceeds the volume of fixed capital introduced in all the years of the 6th Five-Year Plan combined. In this period, around 600 major industrial enterprises, as well as a large number of new shops and productions at expanded and reconstructed enterprises have been placed into operation. The significant growth in production capacities of all sectors of the national economy has been achieved due to technical retooling.

In 1981-1983 the Kurpsayskiy Hydroelectrical Station and the Dniester Hydraulic Unit were introduced in their full capacity. A turbine with capacity of 640,000 kW at the Sayano-Shushenskiy GES [Hydroelectrical Station], five power units of 500,000 kW each at the Ekibastuzskiy GRES-1 [State Regional Power Station] and a power unit with capacity of 800,000 kW at the Ryazan GRES were all placed into operation. Units at the Smolensk, Zaporozhye, South Ukrainian, Chernobyl, Kursk, Kolsk and Rovensk Nuclear Power Stations have also become operational.

Twenty-seven thousand kilometers of main gas lines have been built, including the major transcontinental lines Urengoy-Petrovsk, Urengoy-Novopskov, Urengoy-Pomary-Uzhgorod. Installations for preliminary processing of petroleum have been placed into operation at the Baku and Achinsk Petroleum Processing Plants,

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<sup>1</sup>Here and henceforth the volumes of capital investments, construction-installation work, commodity building production and contracting work are presented in estimated prices effective to 1 January 1984.

as well as capacities for gas processing at the Mubarek and Lokosov Gas Processing Plants, and the Dolzhanskaya-Kapital'naya mine for mining 3,000,000 tons of coal with a group dressing factory with capacity for processing 6,800,000 tons of coal.

Construction has been successfully completed on the first and second phases of the Kostomuksha Ore Dressing Combine, each having a capacity of 8,000,000 tons of iron ore, 3,250,000 tons of concentrate and 2,840,000 tons of pellets, as well as on the mill "2000" at the Cherepovets Metallurgical Plant. Two coke banks, each with capacity of 930,000 tons of coke, have been introduced at the Altay Coke-Chemical Plant, as well as a tin shop at the Karaganda Metallurgical Combine, capacities for ethylene production at the Gor'nefteorgsintez and Angarsknefteorgsintez Production Associations, capacities for mineral fertilizer production at the Kemerovo Production Association "Azot" [nitrogen], at the Krasnodar and Meleuz Chemical Plants, at the Perm Production Association Permmefteorgsintez and at the Berezniki Nitrogen Fertilizer Plant, the Leningrad Cardboard Factory, and other production capacities.

Over 200 enterprises for the production of consumer goods have been built and reconstructed. Among these are the cotton spinning factory at Dzhizak, cotton combines at Bukhara and Tiraspol, the Berdyansk Tricot Factory and a tricot-wear factory in Nakhichevan, the Sterlitamak Leather Footwear Combine, the Rubezhnoye Stocking and Sock Factory, the Zolotukhino Sugar Plant, the Priluki Meat Combine and a meat combine in Dimitrovgrad, the Gomel Ore Crushing Plant, and others.

The transportation network is being developed and improved. In the three years of the five-year period, 1,550 km of new railroad lines have been introduced, as well as 2,570 km of secondary routes. Around 3,000 km of railroad lines have been electrified, and 7,170 km have been equipped with automatic blocking and centralized dispatch. Thirty-nine thousand kilometers of automobile roads with hard paving have been built. In Western Siberia alone, 830 km of automobile roads with hard paving are introduced annually.

The Baykal-Amur Main Line is being constructed ahead of schedule. The builders have only to lay around 300 km of line in order to provide free movement of trains along the entire main line.

The social program is being successfully realized. From all sources of financing in 1981-1983, around 380,000,000 m<sup>2</sup> of overall area for residential housing was introduced, as well as children's preschool institutions for a capacity of almost 1,400,000 students, schools for 2,500,000 students, hospitals with 155,000 beds, etc.

The scope of capital construction in our country is huge. In 1983 the overall volume of contracting work fulfilled by state construction-installation organizations exceeded 71 billion rubles.

It should be noted that all the construction ministries attained an increase in work performed last year as compared with 1982. On the whole throughout the national economy, the growth in volume of contracting work in 1983 comprised

2.6 percent and was higher than in 1982. The greatest growth was achieved by Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], whose organizations significantly overfulfilled their annual plan and the plan for the first three years of the five-year period. The USSR Mintransstroy [Ministry of Transport Construction and Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] also successfully fulfilled their annual plan. The organizations of the USSR Minstroy [Ministry of Construction], USSR Minpromstroy [Ministry of Industrial Construction], USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], USSR Minsele'stroy [Ministry of Rural Construction], Minvostokstroy [Ministry of Construction in the Far East and Transbaykal Regions] and the USSR Minenergo [Ministry of Power and Electrification] all improved their work.

In the three years of the five-year period, labor productivity in construction increased by 7.3 percent. The growth rate of labor productivity has increased somewhat as compared with the last five-year period. The greatest success was achieved by organizations of Minneftegazstroy. Due to accelerated introduction of the achievements of scientific-technical progress into production and improved organization of labor and management, they showed a 20 percent growth in labor productivity for these years throughout the ministry as a whole.

There has been some improvement in the indicators for reduction of production cost for construction-installation work, level of material expenditures, etc. Construction sites were better supplied with material resources than in 1982, including supply of sheet metal and cement.

Nevertheless, the state of affairs in capital construction is still not at the necessary level. This is an inhibiting factor in the development of a number of other sectors and of the national economy as a whole.

The tasks for the operational introduction of production capacities and fixed capital on the whole over the first three years of the five-year period, as well as in 1983, have been underfulfilled. The number of facilities under simultaneous construction is still too large. Financial, material-technical and labor resources continue to be dispersed over numerous facilities and the necessary concentration of funds is not provided at construction starts. The volumes of unfinished construction are being gradually reduced. At the same time, the inventory of semi-finished products at construction sites scheduled for introduction in 1983 was half of that envisioned by the norm. Resources in considerable amounts are being diverted for the overfulfillment of plans at secondary facilities, as well as at construction sites which are being built through non-centralized over-plan sources of financing. Construction cost is increasing at an unsubstantiated rate.

There are still major shortcomings in the work of construction organizations. The general contracting ministries performing the main volume of work for the leading sectors of industry -- the USSR Mintyazhstroy, USSR Minpromstroy, USSR Minstroy and Minvostokstroy -- are not fulfilling the plans for commodity building production and contracting work. The underfulfilled volumes of

contracting work have comprised around four billion rubles at these ministries over the three year period. They have allowed particularly long delays at construction sites in the metallurgical and chemical industries, mineral fertilizers, building materials, and a number of machine building sectors.

Many organizations underfulfilled their tasks on the growth of labor productivity. In connection with this, it was impossible to reach the limits set in the five-year plan for this indicator. This was conditioned by inadequate rates for further increasing the level of industrialization in construction, reduction of volumes of manual labor, and incomplete utilization of major reserves in organization of labor, production and management. At the same time, the growth in capital-labor ratio exceeds the growth of output value, and yield on capital continues to decline because of the unsatisfactory utilization of building technology.

The number of organizations who have not fulfilled their plan assignments on reducing the production cost of construction-installation work or have exceeded the estimated cost is still very great.

According to the plan adopted for 1984, the limit of capital investments from all sources of financing is set in a volume of 149.6 billion rubles. This includes 74.1 billion rubles for construction-installation work, which is respectively 3.9 and 4.7 percent higher than the actual fulfillment in 1983 (not counting work fulfilled over the state plan at the expense of non-centralized sources of financing).

The plan provides for the necessary capital investments for realization of the Food Program, for intensification of work on the development of fuel and power sectors, metallurgy, chemistry and machine building. Over a third of the overall volume of state capital investments into industrial construction and purchase of equipment is directed toward technical retooling and reconstruction.

The introduction of fixed capital from state capital investments is defined for 1984 in the volume of 129 billion rubles. The volume of unfinished construction at the end of the year must be reduced to 75 percent of the annual volume of capital investments.

Of the overall limit for construction-installation work, over 80 percent will be directed to construction sites of production function which are to be introduced in 1984-1985. The number of new construction starts has been significantly reduced. All this has made it possible to foresee higher goals for operational introduction for the remaining years of the five-year period as compared with the average annual rates of operational introduction actually achieved during the first three years of the five-year period.

Thus, capacities totalling 12,300,000 kW are to be introduced at power stations in 1984. This includes scheduled units at the Smolensk, Zaporozhye, and South Ukrainian Nuclear Power Stations and primary units at the Kalinin and Balakov Nuclear Power Stations. With the introduction of two turbines at the Sayano-Shushenskiy GES in 1984, this power station will become the largest

in the country. The first two turbines will be introduced into operation at the Zagorsk Hydraulic Accumulator Power Station, which has great significance for the stable operation of major power units at nuclear and thermal power stations. The operational introduction of the first turbine at the Surgut GRES-II is planned, as well as the last power unit at the Ekibastuz GRES-1. With the introduction of this unit, it will become the largest thermoelectrical station in the country.

In the current year, over 11,000 km of main gas lines and branches from them are to be placed into operation. This includes over 3,000 km of the Urengoy-Tsentr-1 gas line and around 700 km of branch lines to the GRES for use as gas fuel, as well as 4,300 km of main petroleum lines and petroleum product lines. Among these will be 1,500 km of petroleum pipeline in the northern rayons of Tyumen Oblast -- European part of the USSR.

The third phase of the Kostomukshk Ore Dressing Combine will become operational, as well as capacities for the output of 500,000 tons of steel, 500,000 tons of rolled stock, and for the processing of 400,000 tons of metal scrap at the Belorussian Metallurgical Plant.

Provision must be made for the introduction of capacities for the production of 2,450,000 tons of synthetic ammonia, and 7,800,000 tons of specified units of mineral fertilizers. The introduction of capacities associated with the realization of the Food Program is increasing significantly in the current year. Specifically, this includes capacities for the manufacture of agricultural machines and spare parts for them, fodder yeast, and combined fodder.

The social program defined by the 26th CPSU Congress is being sequentially realized. In the current year, more capital investments are being directed toward the development of sectors in the non-productive sphere than were apportioned for this purpose in 1983 and planned for 1984 in the five-year plan. The introduction of over 109,000,000 m<sup>2</sup> of overall residential housing area is envisioned, as well as children's preschool institutions for almost 580,000 pupils and schools for over 800,000 students.

Based on the limits of construction-installation work established for 1984 (with consideration of the additional volumes of construction-installation work authorized for fulfillment over those provided in the plan for capital investments) and on the volumes of capital repair performed by the contract method, the overall volume of contract work throughout the national economy is set for the current year in a sum of over 75 billion rubles, or with a 5.8 percent growth rate over that actually performed in 1983.

Considering the significant underfulfillment of plans for contract work by the USSR Mintyazhstroy, USSR Minpromstroy and USSR Minstroy in 1983, as well as the higher growth of limits for construction-installation work ratified by the client ministries as compared with the national economy as a whole, and for which the basic executors were the indicated construction ministries, the plan growth of contract work for these ministries is above the average for the national economy and comprises 8.5-10 percent.

In connection with the realization of the program for accelerated development of production forces in the eastern regions of the country, the plan for contract work by Minvostokstroy is established for 1984 with a growth rate of over 12 percent as compared with the actual fulfillment in 1983.

The growth in the production program for contracting organizations of the USSR Minenergo must comprise around 10 percent. This is associated primarily with the significant increase in the work volumes on construction of nuclear power stations. The increase for contracting organizations of the USSR Minsel'stroy performing the basic volume of construction-installation work on developing capacities of organizations and enterprises in agriculture and the agro-industrial complex must comprise over six percent.

The growth in overall volume of contract work for Minneftegazstroy and Mintransstroy for 1984 is lower than for other construction ministries. At the same time, the work plan of Minneftegazstroy for one of its main clients -- Minnefteprom, on which significant volumes of work were underfulfilled in recent years, is increased by over 20 percent. Mintransstroy is systematically underfulfilling plans for its main client -- the Ministry of Railways -- on sites and facilities along the operating railway network. The plan of contract work by Mintransstroy for 1984 along the operating railway network is being increased by 13 percent.

It must be noted that in a number of regions with concentrated building, the plans for contract work have higher growth rates than the average for the corresponding ministry, and comprise over 10-15 percent. This is associated to a certain degree with the realization of a number of large-scale target programs and programs for the development of new territorial production complexes. In connection with this, there are high growth rates in the volume of contract work at Glavkrasnoyarskstroy [Construction in Krasnoyarsk Main Administration], Glavsevkavstroy [Construction in the Northern Caucasus Main Administration], Glavastrakhanstroy [Construction in Astrakhan Main Administration], Glavtyumenpromstroy [Tyumen Industrial Construction Main Administration], Glavnovosibirskstroy [Construction in Novosibirsk Main Administration], the Moldavian SSR Ministry, and others. As in many years past, the contracting organizations in those regions where the construction ministries do not take necessary measures for increasing their capacities remain overloaded. Among these, specifically, are the Vologdatyazhstroy and Kurgantyazhstroy Associations, the Kalugastrov Administration, Glavpriokstroy, [expansion unknown], Glavzapaduralstroy [Construction in Western Urals Main Administrations], Glavvostoksibstroy [Construction in Eastern Siberia Regions Main Administrations], Glavivanovstroy [Construction in Ivanovo Main Administration], and a number of territorial administrations of the USSR Ministry in the Chernozem zone of the RSFSR.

Equally intensive tasks for 1984 have been set for builders in regard to the operational introduction of production capacities and facilities of non-productive function and volumes of commodity building production.

Specific measures have been defined in the ratified plan which are directed toward ensuring the fulfillment of tasks for the operational introduction of

production capacities and facilities envisioned for 1984, and for the creation of an inventory of semi-finished products for the 1985 construction start program. We must remember that the improvement in the work of the contracting organizations must be implemented on the basis of effective measures in the current period, as well as by means of the goal-oriented creation of prerequisites for their successful development and for increased operational effectiveness in the long run, which is no less important.

Significant capital investments are being allocated for the development and technical retooling of production capacities of building organizations and their production base. The limit for capital investments in the sectors of "Construction" and "Building Structures and Parts Industry" for 1984 is set at a volume of 3.9 billion rubles (which is 11.7 percent more than the sum envisioned for this year by the five-year plan). This includes 396 billion rubles for construction-installation work. Moreover, capital investments in a volume of around 500,000,000 rubles have been given over to builders for their per-unit participation to be used in developing the capacities of building organizations at the expense of other sectors. This includes 420,000,000 rubles for construction-installation work. Also, considerable funds are provided for the creation of construction bases in the total estimates of a number of major construction sites.

In 1984, production capacities for the output of 5,500,000 m<sup>3</sup> of reinforced concrete structures and 9,300 tons of steel structures will be introduced.

We must note that the funds allocated to the construction ministries are not being used most effectively. The construction times for facilities at the ministry's own production base are drawn out. Their production cost increases, and newly introduced capacities are slowly mastered. The factor for application of capacities at enterprises in the construction industry remains low.

A limit of capital investments in the volume of 3.1 billion rubles is provided for the purchase of equipment which is not part of the construction site estimates. This is compared with 2.9 billion rubles allocated according to last year's plan. In the current year, the contracting organizations are to be supplied with 7,400 single-bucket excavators, 5,400 bulldozers, and around 9,000 cranes. At the same time, the volumes of delivering more powerful technology are also increased, specifically bulldozers of the 10 and 30 ton tow class, truck-mounted cranes with load capacity of 10 tons, and others.

We must also remember that the technology at the disposal of the construction ministries is still being used unsatisfactorily. The average daily number of work hours for basic types of construction machinery does not exceed 10-12 hrs. Therefore, along with renovating the pool of construction technology at construction-installation organizations, it is also necessary to take effective measures for increasing shift application, reducing full-shift and intra-shift idle times, and improving the repair and organization of operation of machines and mechanisms.

One of the most important questions in the reality of the plan for capital construction is the balance of work volumes with material resources. In

determining the need for materials in construction, the average expenditure norms, the sectorial structure, and the directive tasks for economy of materials were all considered.

At the same time, construction organizations and enterprises of the construction industry must step up work in 1984 on the realization of the resolution issued by the CPSU Central Committee and the USSR Council of Ministers, "On Intensifying Work on the Economy and Rational Application of Raw Material, Fuel-Power and Other Material Resources" and must implement effective measures for the economic expenditure of building materials, the expanded application of effective structures and materials, the introduction of waste-free technology at enterprises in the construction industry, and the application of significant above-norm reserves of materials and by-products in building production. They must also eliminate losses and instances of material misuse or waste.

A major shortcoming in the work of construction organizations is the slow transition to intensive methods of economic management. This is primarily true for the rates of growth in labor productivity. Under the conditions of limited labor resources which may be involved in building production, the growth in volume of work performed may be provided only on the basis of accelerating the rate of increasing labor productivity. Considering the fact that in the first three years of the five-year period builders did not provide for the growth in labor productivity envisioned in the plan, the assignment for this most important economic indicator for 1984 is set in the amount of 3.3 percent, with consideration of partial compensation for the delay which had been allowed. For individual construction ministries, the assignments for growth in labor productivity are differentiated from 3.8 to 4.4 percent, depending on the indicators achieved for 1981-1983, the planned growth in work volume and structure, the available production reserves and the possibilities for their realization. The tasks set for 1984 on growth of labor productivity must be viewed as minimal, since it will be necessary to provide for a 1.5-2 time increase in the growth rate of labor productivity at the organizations of the main construction ministries in order to fulfill the five-year indicators in 1985.

Improvement in the work of construction-installation organizations is associated with strengthening and developing cost accounting and with further improvement in the incentive system. The basis for these measures is the systematic reduction in production cost of construction-installation work. Last year in the construction ministries, work on production cost reduction was improved and the number of primary contracting organizations who had exceeded planned production cost and estimated cost was reduced. However, construction organizations still have significant reserves for reducing production cost at their disposal. Thus, for example, the growth rate for overhead expenses in the construction ministries still exceeds the growth rate for work volume. Non-productive expenditures are not declining. Moreover, their volume increased by 1.5 times at the USSR Mintyazhstroy in 1983 as compared with the 1980 level. At the USSR Minstroy it increased by 1.6 times, at the USSR Minsel'stroy -- by 1.7 times, and at the Mintransstroy -- by 1.3 times. Nevertheless, at a number of organizations, the necessary

attention is not being given to questions of further reduction in work production cost.

In the current year, provision is being made for ensuring a reduction in the production cost of construction-installation work according to prices effective to 1 January 1984 by 0.2 points. This includes a reduction in the level of material expenditures by 0.15 points. Expenditures per one ruble of construction-installation work are planned in the amount of 91.8 kopeks, including 55.55 kopeks for material expenditures.

The underfulfillment of tasks on reduction of production cost and profit of construction organizations was often explained by incomplete compensation for additional expenditures associated with increased wholesale prices for industrial production and tariffs. We may expect that the transition to new estimated prices and norms will create real prerequisites for improving the economic and cost accounting conditions in the economic management activity of contracting organizations and will increase the role of production cost and profit indicators in stimulating the effectiveness of building production.

The decisive factor in increasing the effectiveness of building production must be the accelerated introduction of achievements in scientific-technical progress into production. The resolution by the CPSU Central Committee and the USSR Council of Ministers on measures for accelerating scientific-technical progress in the national economy notes that the fulfillment of plans and assignments for the development of science and technology is included in the most important indicators of economic management activity of enterprises and organizations.

The basic directions for the development of science and technology in construction for 1984 include: mastering new types of industrial production and expending their introduction into building production; introducing progressive technology, mechanization and automation of production processes; experimental construction; improving the basic indicators for technical level of production and the main types of manufactured production.

The economic results anticipated from the realization of the plan are characterized by the following data: annual economic effect -- 2.1 billion rubles; relative reduction in average annual number of workers as compared with 1980 -- 209,000 people; economy of metal -- 417,000 tons, economy of cement -- 564,000 tons.

The plan for 1984 provides for: increasing progressive types of construction, including a 2.3 percent increase in fully prefabricated construction and a 2.4 percent increase in large-panel residential housing construction; bringing the manufacture and application of structures made from concrete of grade 500 and above to 1,150,000 m<sup>3</sup>, the manufacture of load-bearing and enclosure structures made of lightweight concretes up to 24,100,000 m<sup>3</sup>, the output and application of industrial partitions for industrial buildings up to 6,450,000 m<sup>2</sup>, of prestressed "spanner" slabs for spans of 12m or more -- to 133,500 m<sup>2</sup>, of high strength steels for the manufacture of steel structures -- to 1,060,000

tons, of lightweight metallic structures delivered as sets -- to 3,900,000 m<sup>2</sup> of area, and the manufacture of triple-layer enclosure structures with effective insulation -- to 3,525,000 m<sup>2</sup>.

As part of the introduction of progressive technology, the plan provides for building structures by the "wall in the ground" method -- 153,000 m<sup>2</sup>, by application of monolith reinforced concrete in progressive stock casing -- 22,100,000 m<sup>3</sup>, and by the installation of rolled roofs with the application of precoated ruberoid -- 80,600,000 m<sup>2</sup>.

The plan for 1984 includes the construction of 48 experimental facilities which will be used to test new overall planning and design decisions for buildings and structures which provide for the application of effective engineering and technological equipment for various sectors of the national economy.

As Comrade Yu. V. Andropov indicated, huge sums are being directed toward the development of the economy and the creation of new capacities in residential and cultural-domestic construction. Their effective application is a task of exceptional importance. Nevertheless, many problems remain in the sphere of capital construction. We must be more decisive in combatting the dispersion of efforts and funds over a multitude of facilities, in increasing the portion of capital investments directed toward reconstruction and technical retooling, and in reducing the number of new construction starts.

Year after year, the shortcomings present in the organization of construction lead to the underfulfillment of tasks for the operational introduction of production capacities and facilities, as well as underfulfillment of plans for commodity building production. In many cases, the quality of construction-installation work remains low. The year 1984 must become an important step in eliminating these shortcomings.

The production program which the contracting organizations must fulfill in 1984 is higher than that envisioned in the five-year plan. The tasks for start-up construction sites and facilities are much more intensive as compared with last year. Much work lies ahead of the economic managers and on-site social organizations in terms of realizing practical measures directed at improving the activity of organizations and enterprises in the construction industry, strengthening production and labor discipline, increasing responsibility for plan fulfillment, developing socialist competition for ahead-of-schedule fulfillment of tasks on the operational introduction of production capacities and facilities under construction, and creating the necessary stockpile of semi-finished products at carry-over construction sites.

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## CONSTRUCTION PLANNING AND ECONOMICS

### BELORUSSIAN EXPERIMENT TO RAISE TECHNICAL LEVEL OF CONSTRUCTION

Moscow STROITEL'NAYA GAZETA in Russian 19 Oct 83 p 2

[Article by V. Yevtukh, chairman of BSSR Gosstroy [State Committee for Construction Affairs], Minsk: "The Belorussian Experiment"]

[Text] As we know, the CPSU Central Committee and the USSR Council of Ministers recently adopted a resolution regarding the acceleration of scientific-technical progress for the purpose of increasing the effectiveness of social production and the well-being of the Soviet people. The comprehensive scientific-technical program "Trud" [labor] is also aimed at the solution of this important problem. It presents assigned tasks for all the republic's construction ministries and departments, for the BSSR Minlesprom [Ministry of the Timber and Wood Processing Industry], and for each institute, enterprise and trust. Provision has been made for increasing the level of industrialization and mechanization of production, for improving its organization, for the development and application of new progressive materials, for the widespread creation of proper working and living conditions, and for the training of qualified personnel. In short, all the most important factors influencing the effectiveness of production have been covered.

Realization of this program will make it possible to achieve a 14.8 percent growth in labor productivity over the five-year period. Also, the mass of buildings and structures will be reduced by four million tons. Over 200,000 tons of metal will be saved, as well as 340,000 tons of cement, and 330,000 cubic meters of timber. 2.5 million kilowatt hours of electrical energy will be conserved, as well as 20,000 tons of fuel.

The most important component part of the "Trud" program is the increased level of comprehensive mechanization of construction work. An important contribution to the solution of this problem is being made by industrial enterprises outside the field of construction. In the first two years of the five-year period they manufactured over 2,100 units of various machines and mechanisms. This is a 1.9-time increase over the same period of the last five-year period. Construction organizations have received 1,300 standardized sets of inventory and accessories. This was greatly facilitated by the initiative of Gomel residents, who offered to manufacture means of mechanization through the internal reserves of [their] machine building enterprises. This initiative was taken up in all the oblasts of the republic.

Work in the sphere of containerization and materials packaging is being conducted in a goal-oriented fashion in the republic. Specifically, a good solution has been found to the problem of transporting dry pourable loads.

The local target program "Monolit" [monolith] has been developed and is being implemented to aid in the development of the comprehensive "Trud" program. It provides for further increase in the technical and organizational level of work on the installation of structures made of monolith concrete and reinforced concrete. We see three main directions in this work. First of all, it is necessary to solve the problem of creating industrial casings. When manufactured at the plant, these casings will withstand not three to six usage turnovers as they do at present, but 20 or even more. Their high quality will make it possible to achieve a better facing surface of the structures.

The second problem whose solution is provided in the "Monolit" program is the improvement of the technology of placing concrete mixture. Its essence is reduced to a decisive transition from the bucket to the concrete pump truck. This, of course, also entails a radical improvement in concrete production work management and in the transport of its products.

Finally, the last link in this chain is the coordination of planning and construction of sites with the application of monolith concrete.

A program of technical retooling and reconstruction of enterprises manufacturing prefabricated reinforced concrete products is also aimed toward increasing the level of industrialization in construction.

The successful realization of the "Trud" program is bearing fruit. In two and a half years, on the whole the primary construction ministries have fulfilled their tasks on growth of labor productivity, and its growth rate has comprised 10 percent.

Nevertheless, despite the generally positive results, we must acknowledge the fact that it has not been possible to implement all that has been planned. Certain tasks associated with the application of new effective materials and structures, high productivity machines and mechanisms have not been fulfilled. Considerable reserves remain unfulfilled also in the sphere of production organization. The reasons for this vary. They are subjective as well as objective. In analyzing and studying them, we are now trying not only to eliminate the hindrances in the course of the work, but also to look ahead to prevent the occurrence of similar problems in the future. We might add that the BSSR Gosstroy in conjunction with construction and other interested ministries and departments in the republic has already begun work on the development of an analogous program for the next five-year period. According to the computations of specialists, its implementation will make it possible to utilize only 5/7 of the labor expenditures as compared with the plan for the present five-year period.

In order to attain such results, it is necessary to resolve an entire series of problems, many of which can be solved only by the union ministries and departments. We are speaking primarily of the significant improvement of

material-technical provision for capital construction. As provided in the well-known resolution of the CPSU Central Committee and USSR Council of Ministers regarding the improvement of the economic management mechanism, this work must be conducted in strict accordance with the needs and timetables determined by project plans and estimates. This is true not only of quantity, but also by nomenclature. Paradoxical as it may be, it is a fact: today many materials which are needed at the beginning of construction, as for examples pipes for laying communications lines, are delivered to the site only in the year of its operational introduction.

In our opinion, such lack of coordination may be eliminated by means of transferring the supply organizations to an improved system of planning and evaluation of their activity. The basis for this system must be settlements for materials delivered to the builders in complex and on time, which are determined by contract agreements. For the period between payments for realized capital, the supplying organizations should be given credit from the financing bank with differentiated payment for its utilization. If the planned schedule for delivery of material resources as a whole or by their individual types is disrupted, the issuance of credit must continue at increased percentage rates for the use of the loan. A similar system should also be introduced for transport organizations engaged in shipping construction loads. In this case, obviously, provision should be made for a corresponding material responsibility also on the part of the construction organizations for fulfilling their contractual responsibilities.

In construction, as in any other sphere of the national economy, the success of the work greatly determines technical progress. All that has been said here regarding the creation of effective means of mechanization by the capacities of the construction organizations and industrial enterprises themselves is, of course, of great help in solving this problem. Nevertheless, the scientists, designers and workers of Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] must play the decisive role here. The time has come to speak loudly of equipping concrete placers, finishers, roofers and installers with such mechanisms and attachments which would ensure the comprehensive mechanization of all types of work. The need has also arisen to master the output of various universal multi-purpose construction machines with a set of interchangeable equipment, as well as mobile and compact concrete-mortar units, plastering and painting stations capable of operating under winter conditions, vibration rollers and vibration packers with manual control, etc.

The level of effectiveness of building production is determined to a significant degree by the progressiveness and quality of production manufactured by enterprises in ferrous metallurgy, the chemical, wood processing, automobile and other sectors of industry. Let us say that the organization of the output of progressive industrial casings is impossible without the interested participation of the USSR Minlesprom [Ministry of the Timber, Pulp and Paper, and Wood Processing Industry] in this matter. The aid and support of the union planning organs, ministries and departments are also necessary in the provision of raw materials and in creating capacities which are in short supply for the production of cement, gypsum and parts made of it, high strength mineral wood slabs, heat-insulated linoleum, and various plastics products necessary in construction.

Economic levers are necessary which would stimulate in every participant the desire to achieve the best results. Yu. V. Andropov commented on this very clearly and precisely at the June (1983) Plenum of the CPSU Central Committee: "Developing such a system of organizational economic and moral measures which would interest both the managers, the workers, and of course the scientists and designers in the renovation of technology would make work according to the old method inexpedient -- and therein lies our task."

The experiment which has been performed in our republic since September 1982 is aimed toward its solution. Its basis is the strengthening of economic interest of designers, contractors and customers in the maximal reduction of material and labor expenditures and the reduction of estimated cost of construction due to accelerated introduction into production of scientific and technological achievements and foremost experience. The mechanism of its action has already been described in the pages of STROITEL'NAYA GAZETA. I invite [the reader] to become acquainted with the preliminary results.

In 1983 there were 49 project planning and 80 construction-installation organizations participating in the experiment. These covered 350 facilities with an overall estimated cost of around 400 million rubles, which comprises almost one-fifth of the overall volume of construction-installation work in the republic. Thus, in the project plans for 101 facilities, whose reworking has already been completed, there has been a savings of 4.6 percent of the initial overall estimated cost. This includes provision for the reduction of metal expenditure by more than 2,200 tons, of cement -- 5,500 tons, and of lumber materials -- over 6,600 cubic meters. The greatest reserves are found at facilities of production function. For example, in constructing the overpass for the Gomel-Sortirovochnaya station, the savings in estimated cost comprised 21.9 percent. The savings for a complex of water purification structures at one Brest enterprise was 36.2 percent.

The preliminary results are encouraging. Presently measures are being taken in the republic for the further development of the experiment for the purpose of increasing the effectiveness of capital investments.

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## CONSTRUCTION PLANNING AND ECONOMICS

### NEW INDICATOR BASED ON FINISHED CONSTRUCTION EVALUATED

Moscow EKONOMIKA STROITEL'STVA in Russian No 1, Jan 84 pp 42-46

[Article by N. K. Kovalev, deputy manager of Trust No 7, Voronezh TUS [Territorial Construction Administration], USSR Ministry of Construction: "Inventory of Commodity Building Production and Order of its Planning and Accounting Must be Defined"]

[Text] A new indicator of production volume -- the commodity building production -- is already in its fourth year of application in construction. Sufficient experience has been accumulated to compile a rather substantiated judgement regarding the role and significance of this indicator in the system of the economic management mechanism, as well as the advantages and shortcomings of the methodology for planning and accounting for production volume according to this indicator.

In this connection, the widespread discussion by the press of questions associated with the application of the commodity building production indicator is in our opinion very timely and current. Among recent publications, the article by Doctor of Economic Sciences L. M. Kaplan, "Necessity of Improving Planning and Accounting of Commodity Building Production" (EKONOMIKA STROITEL'STVA, 1983, No 2, p 49-53) is of particular interest. It is devoted to the problems of improving planning and accounting of commodity building production.

Let us examine the substantiation and expediency of the proposals presented in this article based on the experience in practical application of the commodity building production indicator at Trust No 7 of the USSR Ministry [Ministry of Construction] Voronezh Territorial Construction Administration.

Trust No 7 performs construction primarily of industrial facilities, as well as residential houses and facilities of social, cultural and domestic function. The annual program of construction-installation work on general contracting comprises 15-16 million rubles, including 6-7 million rubles of work performed by [the trust's] own capacities. The trust includes four construction-installation administrations which are located in various rayons of Voronezh oblast. The trust organization and management of the production-technological staffing are located in Voronezh. The trust's construction-installation administrations perform all general construction work, including finishing

work. Generally, all special jobs are done by the organizations of the USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] with the exception of work on vertical planning, foundation pit excavation, installation of piling foundations, external networks for water lines, sewers, regular water supply and improvements, which are performed by the organizations of Special Trust No 3 -- an in-house subcontractor within the system of the territorial construction administration. Every year the trust fulfills all assignments on the operational introduction of production facilities as well as residence and social, cultural and domestic facilities, as well as fulfilling the plans for commodity building production.

In the course of its practical activity, the trust has to one degree or another had occasion to encounter almost all the problems touched upon by L. M. Kaplan in his article. Since evidently all construction organizations encounter analogous problems in the planning and accounting of commodity building production and the correct solution to these problems may be found by studying the experience of introducing this indicator, we consider it expedient to express our ideas regarding these problems based on the operational experience of our trust under the new economic management conditions.

First of all, we would like to deal with the role of the commodity building production indicator.

In reality, the introduction of this indicator has greatly restructured the economic relations in capital construction, even though it has no direct relationship to change in some of these.

At the present time, efforts are being made to ascribe the primary role to the commodity building production indicator in evaluating the work of a construction organization. In our opinion, under the presently existing system of its planning and accounting, [this indicator] will not be the important lever with which it is possible to ensure radical change and improvement in the economic management mechanism of construction. This is true primarily for general contractor construction organizations. After all, under the new conditions as before, the general contractor is presented with a plan for the introduction of capacities, and the evaluation of his activity is and must be performed primarily according to this indicator. If the commodity building production indicator is understood as the cost expression of part of the introduced fixed capital at the construction sites and facilities submitted for operation, then its role in evaluating the activity of the general contracting organization will be secondary and its effect, as the cost equivalent of introduction, will be felt to an insignificant degree only in determining the material incentive fund.

Recently in the industry there has been a marked tendency away from the gross (cost) indicator of production realization, with an expansion of the nomenclature plan ratified by the enterprises. However, for builders, along with the introduction of the indicator of overall volume of commodity building production (it may be equated to the gross indicator of realization in industry), its isolation from the introduction indicator, i.e., the nomenclature plan, is observed. This may lead to the situation whereby the indicator of commodity

building production may be successfully fulfilled, while the indicator of capacities introduction is not. We already have the first examples of this. The question arises: why can we believe that that which does not justify itself in industry may be a great help to builders in improving the economic management mechanism?

Now let us deal with problems of planning and accounting of commodity building production. In his article, L. M. Kaplan outlines four problems. The first is the order of application of the new production volume indicator at subcontracting organizations. In our opinion, the adopted order of computing and planning commodity building production of subcontracting organizations has become a definite hindrance to the construction process. The operational experience of our trust tells us that the general contractor is not interested in the subcontractor's departure from the facility under construction before its operational introduction. This is because even with full completion of the work, a number of imperfections arise in the pre-operational period or questions arise whose liquidation and resolution require his presence. Sometimes this happens because the general contractor or even the customer's service cannot ensure competent acceptance of the work from the subcontractor. As a result, many questions arise in the course of performing start-up and adjustment work, and there is no one to resolve them. The subcontractor, having received documentation of work submission and payment for work completed, has left the site. This marks the beginning of lengthy correspondence, clarification of causes and search for the guilty parties, all of which are detrimental to the cause.

Under the adopted order of planning commodity building production, the subcontractor strives to finish his work complex as quickly as possible, sometimes even provoking the general contractor to disrupt the construction technology. We know that many special jobs require technological separation. For sanitary engineers these are plumbing installation and installation of sanitary ceramic fixtures, for electricians these are electrical light and power conduits and the installation of light fixtures and lamps, etc. However, the efforts of the subcontractor in such cases to complete all the work as quickly as possible and to "leave" leads to the situation where he presents requirements, for example, to submit to him even small sections of clean floors where he can install the ceramic products, or to prepare ceilings for the installation of lamps, etc. even before the walls are plastered. All this gives rise to negative occurrences in the relations of the general contractor with the subcontracting organizations and leads to deterioration of work quality.

The general contractor takes out a bank loan to pay for the work completed by the subcontractor. He pays interest on the use of this loan, and if for some reason the facility is not submitted in time the interest rate is even higher. It is practically impossible to correctly and exactly plan the sum of payments for bank credit within the financial plan for the year. Therefore, this sum is estimated according to the preceding year. Often it is not enough for the general contractor and this leads to an unsubstantiated loss of part of the profit and material incentive fund. One of the basic reasons for this is early payment for work performed by subcontracting

organizations before the facility is submitted for operation. Early payment for this work also disrupts the principle of equal interest by all the construction participants in the timely operational introduction of the facility.

Being in full agreement with the opinion of the indicated author's article, we feel that this question must be resolved unambiguously. Commodity building production for the subcontracting organizations, except those which complete their work at the very beginning stages of construction, must be computed and planned in the same way as for general contractors. Its volumes for a given facility, which are included in the plan of commodity building production for the general contractor, must at the same time be included in the plans for all the executors and participants in the construction of this facility. Aside from all else, this will simplify the planning of commodity building production.

However, a question arises in this regard. Why do the subcontracting organizations have to bear expenditures for the time after completion of their work and before operational introduction of the facilities as a whole? First of all, these outlays will consist only of payment of bank interest for use of credit. Secondly, the growth of uncompleted production will be felt only in the year of transition to the new method of computing commodity building production, since in the future its volume and the sum of payments to the bank for use of credit will become stabilized. For the most part, this process has already been introduced at general contracting organizations. As a result, all the participants in construction will find themselves under equal economic conditions.

At the same time, as the author of the above-mentioned article stated, we believe that a different order of planning and accounting for commodity building production must be used for those subcontracting organizations which participate in construction of the facility only in the very initial stage and do not return to the building site until its completion. Sometimes the gaps between completion of work at such complexes and the date of submission of the facility for operation comprise years. Of the subcontracting organizations performing work at the construction of facilities implemented by our trust, this group may include organizations performing work on digging foundations for buildings and structures with the necessary volume of planning work, work on installing foundations, and soil drainage. In this case, for organizations performing foundation pit excavation, the work complex related to the commodity building production must also include backfilling, since the calendar gap between these operations is usually insignificant. In this case, the basis for inclusion of work performed into the volume of commodity building production by the subcontractor may be the document form No 2, signed by the general contractor.

So that the general contractor does not have to take out a bank loan for payment of this work and does not bear additional expenditures, L. M. Kaplan believes that the payment for this work by the customer must be performed before operational introduction of the facility and that the work must be included in accounting of commodity building production by organizations

comprising the entire chain: subcontractor -- general contractor -- customer. We believe that these "commodities" should not be included in the accounting report to the customer. They are very far from his concept of a "commodity". It would be more expedient, in our opinion, to let the general contractor take out a bank loan to pay for this work without charging any interest for the plan period until the facility is submitted for operation.

The author of the above-mentioned article notes that at present there are three established indicators of commodity building production. He proposes, with the condition of adopting the new methodology of computing commodity building production for subcontracting organizations, to discard one of these indicators -- the volume of commodity building production throughout the enterprises and facilities submitted to the customer. It would seem that there is a certain lack of correspondence in this proposal. In this case, where would we class the commodity building production for those subcontracting organizations for whom the above-mentioned exceptions are proposed? After all, this production must be accounted for not only by the subcontractors, but also by the general contractors, and, if we adopt his proposal, by the customers as well. This means that it must find reflection in an indicator such as the overall volume of commodity building production. This situation confirms the need for such an indicator. An indicator of the volume of commodity building production fulfilled by their own efforts is also necessary for all construction organizations. This indicator is used in computing the level of profitability and in determining material incentive funds. Thus, it would be expedient to have not one indicator of commodity building production, but two -- an indicator for the overall volume of commodity building production and for the volume which is fulfilled by the organization's own forces.

However, considering the fact that under the proposed order of formulating commodity building production for subcontractors, its indicators on overall volume and on submitted enterprises and facilities will differ insignificantly, in practice only by the volume of capital repair, in our opinion it does not make sense to have two almost identical indicators. It would be more correct to leave one indicator, but not the volume of commodity building production according to enterprises and facilities submitted to the customer, but rather the overall volume of commodity building production since it is the indicator which most fully corresponds to the proposed methodology of [production] planning.

We agree with L. M. Kaplan's proposal that the volume of commodity building production on capital repair should be determined by the same principle as for new construction. However, we believe that its overall volume should be subdivided into the volume of capital repair performed for enterprises in the industrial base of construction allocated as an independent balance, and the volume of capital repair performed for other customers. In the capital repair of one's own buildings and structures, there is no need to compile an estimate for the entire facility and the entire work complex at once. Considering the specifics of financing capital repair and the capacities of the organizations for performing this work not all at once, but by stages, we may limit ourselves to the compilation of estimates for individual work complexes for each building and upon their completion -- to include them

in the established order into the accounts of commodity building production. For example, such work complexes may be: repair of roofs, finishing work, repair of sanitary-technical installations, etc. In our opinion, there is no need to earmark commodity building production on capital repair in the accounts of an individual construction site, since this indicator differs in no way for the contractor from the volume of commodity building production on new construction.

In his article, L. M. Kaplan presents the question concerning the different order of reflecting volumes of commodity building production in the reports on forms No 1-ks and No 2-s. Based on practical experience, we may ask: is this indicator necessary at all in the accounting of production cost? The indicators of this accounting, particularly the realized volume of construction-installation work performed by the organization's own forces, are tied in with the data of bookkeeping accounting. In this case, the volume of realization includes, aside from the volume of commodity building production performed by one's own forces at the facilities submitted, also the paid work on delayed and suspended construction sites, as well as the paid work on unfinished production given over to other executors when the facility under construction is handed over from one contractor to another. Moreover, we must also remember the fact that payment for work on submitted facilities by far does not always coincide with the times when it is submitted. This happens for various reasons: in connection with correction of defects or fulfillment of additional work noted in the acceptance commission documents, with delays in ratifying documents for acceptance into operation, with the absence of monetary funds for full payment by the customer, and others. This time gap between the date of signing the documents permitting the inclusion of corresponding volumes into the accounting on commodity building production and their payment by the bank makes it impossible to tie in the data on this indicator on forms No 1-ks and No 2-s. We believe that it would be more correct not to complicate this question and to consider on form No 1-ks only the volume of commodity building production, and on form No 2-s -- the realized volume of construction-installation work.

In view of the facts presented and considering the great importance of the problem of improving planning and accounting of commodity building production for all participants in construction and the fuller utilization of this indicator for increasing production effectiveness, we believe that it is necessary to also consider the following questions which arise in the course of practical application of the new production volume indicator.

If we assume that it is unnecessary to complicate matters where this can be avoided, we are inclined to believe that the inclusion of the commodity building production indicator into the number of indicators ratified by the customer is not some significant achievement in improving the economic management mechanism. The commodity building production indicator in no way reflects the results of its economic management activity and does not touch upon any of its economic interests. For the customer, the volume of commodity building production, which is determined by the estimated cost of construction-installation work, is merely a part of the introduced fixed capital which is provided for him in the plan on capital construction. With the transition to the new

order of planning, he was and is currently responsible for fulfillment of tasks according to this indicator. Therefore, why is it necessary to set forth tasks for him in the plan for part of the overall indicator -- the introduction of fixed capital -- and to force him to bear the responsibility separately for this portion? For him this indicator is indivisible. In our opinion, it is not a new indicator for the customer which is necessary, but a close coordination of the plan for introduction of fixed capital by the customer with the plan for commodity building production by the contractor. This would avoid the situation whereby a certain commodity building production is planned for the contractor for a certain period, while the corresponding introduction of fixed capital is not planned for the customer during this period, or planned with a different quarterly schedule.

In order to increase the customer's responsibility for fulfilling the plan on introduction of fixed capital according to reproductive structure, it is necessary to designate these in his plan and in the accounting report, "including the introduction of fixed capital at enterprises and facilities under construction." Here, the basis for inclusion of the cost of introduced fixed capital into work actually fulfilled must be the same documents which are used for inclusion of commodity building production volumes into the contractor's accounting reports. In this case, there is no longer a need for changing the form of the acceptance commission's documents or for needless complication of accountability. An indicator which does not touch upon economic management activity will take time to get used to and accept. For the present time, the commodity building production is for the customer merely an indicator for its own sake. Practical experience always verifies the correctness and expediency of one innovation or another. In this case, planning commodity building production for the customer, in our opinion, has as yet not yielded any positive result.

We would also like to deal with the question of operational introduction of individual facilities which are component parts of construction sites, lines and complexes under construction before operational submission of the site as a whole, as well as with the planning and accounting of the volume of commodity building production completed at such facilities. The list of such facilities is difficult to regulate in working out the construction organization work project. Therefore, in practice we often encounter a situation whereby an acute need arises for the operational introduction of one or another facility in the process of construction, while the calendar schedule for work completion does not provide for its introduction before completion of the entire site. For example, being unable to place an order for the manufacture of non-standard equipment for one reason or another, the customer decides to manufacture it himself. A building is needed for this purpose, and it may be found within the facilities of the construction site. However, the contractor is not always interested in accelerating the construction of such facilities and completing work on them before completion of all work to be done at the site. In certain cases he cannot include this volume of work into the commodity building production, and the bank will not finance this work separately. Such a facility may be listed as operational for the customer in the intra-site title list. However, almost always, and particularly at large construction sites, the introduction of such facilities also requires

the operational introduction of part of the engineering communications. Therefore, the question of its operational introduction reaches a dead end, since this becomes a small start-up complex. Moreover, banks, as a rule, object to such complexes because in this case there is no operational introduction of the production capacities provided in the title of the construction site.

We believe that the development and operational introduction of such start-up complexes must be implemented in the process of construction, before the introduction of basic production capacities. The operational acceptance of such complexes must be performed by the work commissions, and after the acceptance documents are signed the work performed [on these complexes] must be included in the volume of commodity building production and paid by the bank. The affirmation that this is not yet a "commodity" is in our opinion incorrect. After all, the facilities are already functioning, and generally in accordance with their direct purpose. However, they service not the future production capacities, but the current activity of the builders and the customer, thereby serving to fulfill state tasks.

Some scientists and practical workers have expressed the fear that this will lead to the break-up of construction sites and enterprises into small start-up complexes. First of all, this fear seems groundless, since the customer will not accept a facility onto his balance if he does not need it before the introduction of the production capacities. Secondly, the introduction of individual facilities will not change the overall time of operational introduction of the enterprise, while the operation of part of the "unfinished project" ahead of schedule will yield at least some return for the state.

A comprehensive discussion of the problems of planning and accounting for commodity building production from the standpoint of practical application of this indicator will make it possible, in our view, to work out optimal solutions aimed at increasing the effectiveness of building production.

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## CONSTRUCTION PLANNING AND ECONOMICS

### TAJIK SSR ADOPTS NEW CONSTRUCTION FINANCING PROCEDURES

Moscow FINANSY SSR in Russian No 6, Jun 83 pp 44-47

[Article by M. M. Ikramov, deputy chief of a department of the Tajik CP Central Committee, doctor of economic sciences: "Problems of Improving the Effectiveness of the System of Payments for Finished Construction Projects"]

[Text] The use of the indicator "finished construction job" increases the effectiveness of capital investment only if the system of payments for that job is properly applied and bank credits ably utilized. Interest payments on bank loans received by contractors to cover the cost of unfinished construction and installation work are differentiated according to how they comply with the deadline for completion of enterprises, complexes, phases or projects. Switching contractors and subcontractors to direct financing by the bank allows the bank to exercise greater control over the integrity or completed construction projects.

In the Tajik SSR much effort was put into preparing contractor organizations for a switch to the new system of payments. The republic office of Stroybank organized special courses on the subject for workers of the relevant departments (of enterprises, organizations, ministries). In charge of the groundwork for transition to the new system was a commission working directly under the government of the republic. By 1980 the new system had already been adopted by three construction trusts and one primary contractor organization with a combined output of 107.3 million rubles or 28 percent of the overall program and 59 percent of all industrial construction. In that same year of all construction and installation work 205.8 million rubles or 93.3 percent were covered by the new system, of which sum 159.7 million were for finished projects and commissioned complexes (72.4 percent of all such payments). Thirty-five construction sites and industrial projects received payment for finished construction jobs, among them such major projects of the South Tajik territorial and industrial complex as the Tajik Aluminum Works, the Nurek GES and the porcelain factory in the city of Tursun-Zadeh. Payments on these projects alone comprised 42.2 million rubles or 38.2 percent of all payments for industrial projects.

An analysis of industrial construction projects financed by the Tajik office of Stroybank proved the obvious merit of the new system of payments. We see from the table presented below that in 1970 payments for completed projects comprised only 5 percent of the cost of construction financed by the bank and the average

duration of construction was 6.8 years. In subsequent years, thanks to the concentration of funds and resources on about-to-be commissioned or carry-over projects, better training of skilled builders (drawn for the most part from the local population), the introduction of new technology and other measures, not least among which was the transition to the new payment system, the duration of industrial construction was reduced by over 2 years. Reality has proved the high effectiveness of the new system of settlements. For example, the "Sredazdorstroy" construction trust used to take out bank loans to make up for inadequate working capital and had significant debts outstanding. After 1 year of work under the new system of payments it not only overfulfilled its plan for projects commissioned, but also fully repaid the bank its short-term loans and turned an above-plan profit. With the transition of all contractor organizations to payment for finished construction jobs the republic's capital construction indicators began to improve. In 1981 the state construction and installation contractors whose work was planned and evaluated by the 'finished construction job' indicator increased their combined output over the previous year by 5 percent; labor productivity rose 4.9 percent (this factor accounted for two-thirds of the increase in output, or volume). In 1982 state contractor organizations came through with 573.7 million rubles' worth of finished construction jobs.

Payment for finished construction jobs are connected in the most direct fashion with the indicators used to evaluate contractor organizations' performance. This payment system can produce the required results only if the system of indicators is completely overhauled to comply with CPSU CC and USSR Council of Ministers decree No 695. However, practical experience has shown that the hoped-for effect is very hard to achieve because of: the absence of a unified quarterly indicator for finished construction jobs; the overly slow tempo of reduction in the number of construction starts; disproportions in contractor organizations' planned production capacity; the surviving practice of providing credit to constructors based on the amount of money the client has available.

In his speech at the November (1982) Plenum of the CPSU Central Committee Yu. V. Andropov pointed out: "...neither are we satisfied with many aspects of the construction industry itself. The shortcomings in this area lead year after year to nonfulfillment of plans for commissioning new production facilities. A number of construction ministries are actually decreasing their output even though the government assigns significant funds, machinery and equipment to bolster their material and technical base. Bringing order to capital construction is one of the central tasks of the national economy."

Introducing the new indicator without having a quarterly plan for projects commissioned so complicates the assessment and stimulation of the contractor's performance that instead of improving effectiveness it may well do the opposite. Here is an example: in the first quarter of 1979 the value of production facilities commissioned was 47 million rubles, in the second--139.5 million, in the third--121.3 million and in the fourth--299.2 million rubles. A similar picture emerged in the following year: correspondingly 60.3 million, 126.6 million, 123.3 million and 368.3 million rubles. In 1981 the republic was handed down a plan whereby over 70 percent of production facilities and

Years	Proportion of payments for the project as a whole and in phases (in percentages of estimated cost of paid construction and installation work)		Mean factual duration of construction, years
	Overall	For the project as a whole	
1970	20.1	5.0	6.8
1971	34.5	7.3	6.6
1972	66.0	11.3	6.3
1973	87.7	16.7	5.9
1974	93.1	23.6	5.6
1975	94.5	30.6	5.4
1976	94.9	36.1	5.3
1977	95.1	42.8	5.2
1978	95.4	46.8	5.1
1979	96.6	50.2	5.0
1980	96.0	60.1	4.9
1981	96.4	71.0	4.7
1982	96.9	74.0	4.6

finished construction jobs were to be commissioned in the second half of the year. As a result, 50 percent more projects went onstream in December than the 11 preceding months. The Ministry of Construction (Minstroy) TaSSR came through with 9.1 percent of its output for the year in the first quarter, 14 in the second, 22.3 in the third and the remaining 54.6 percent in the fourth quarter. The main reason for such uneven performance is flawed planning of finished construction. For example, the breakdown of the "Promstroy" construction trust's (Minstroy TaSSR) yearly target was as follows: first quarter--1,503,000 rubles, second--2,260,000, third--2,331,000, and fourth--16,812,000 rubles. Last year's plan was likewise unevenly distributed. Slated for commissioning in the first quarter were only 10 percent of the year's figure for fixed capital, 11 percent of residential housing, 2 percent of pre-school facilities and 10 percent of finished construction jobs. General education schools, vocational training schools, hospitals and polyclinics were not even planned for the first quarter. All this means that the construction industry is underutilized in some periods and heavily overloaded in others, there is a glut of building materials in some months and shortages in others. A study of ongoing construction in Tajikistan revealed that quarterly plans for projects commissioned are not coordinated with the parameters of the title list, the intraconstruction title list and form No 7 (of the capital construction plan).

A reduction in the number of construction starts would allow the construction ministries and departments of the republic to concentrate material and manpower resources on the most important underway projects. Nevertheless, of the 314 projects being built by the republic Ministry of Rural Construction in 1980, 68 (21.5 percent) were starts, in 1981--84 out of 279 (30 percent). On the other hand, Minstroy TaSSR and the major construction trust "Tajikgidroenergostroy" have in recent years achieved positive results in this respect. Compared to 1980, last year saw a drop in the number of starts, correspondingly, 18 and 30 percent.

Planning an overly large number of construction projects without due consideration of the contractor's production capacity leads, as a rule, to an overload and dooms the contractor to nonfulfillment of the target for projects commissioned. Thus, at the beginning of last year the active fixed capital of the construction trust "Leninabadoblspekssel'stroy," Ministry of Rural Construction (Minsel'stroy TaSSR) had a mean annual value of 2,840,000 rubles as against 1,429,000 rubles for 1980 (an increase of 98.7 percent), its machine-worker ratio rose nearly 2.5 times, yet the trust's planned volumes of non-subcontractable construction and installation work was reduced from 7,430,000 to 6,040,000 rubles, or almost 20 percent. At the same time the planned 1982 nonsubcontractable volume for construction trust "Sel'stroy-3" was increased over 1980 by 30.5 percent whereas its machine-worker ratio and own working capital remained practically unchanged. This resulted in a significant underfulfillment of the assignment and a shortage of skilled workers. The construction trust "Khimstroy" (Minstroy TaSSR), after achieving an output of 33 million rubles in 1979, had 15 million rubles planned for 1981 and a mere 6.4 million for 1982. The plan handed down to construction trust "Sel'stroy-2" (Minsel'stroy TaSSR) for 1982 was 35 percent below the 1980 level, but for 1983 it is above that figure. Such ups and downs in contractors' workloads worsen their financial and production indicators and lead to the loss of skilled workers.

Before the transition to payments for finished construction jobs, when advance payments to the contractor were made by the client himself, the strict linkage between the client's financial position and the approval of bank credit was justified. Today it is not. Under present conditions it is sufficient for the client to have the wherewithal to pay for actual finished volume. In our opinion, the Stroybank and Gosbank of the USSR should change the existing system of providing loans to contractor organizations. The proper course of action would be to extend credits to them no matter what the client's financial position.

An illustration of this thought can be seen in the erection of the largest industrial project in the republic, the Yavanskiy electrochemical plant. The financial situation of the organizations doing the building is unsatisfactory. Because the plant is strapped for funds, the construction trusts "Khimstroy" and "Promstroy" (both Minstroy TaSSR) are unable to pay off their debts to suppliers and the bank, a total of about 7 million rubles. The indebtedness of the plant itself to suppliers, contractors and the bank is close to 40 million rubles. Consequently, the extension of credit to contractor organizations in amounts not exceeding the client's accumulated funds worsens the financial position of the contractor; the sanctions the bank can impose affect the guilty party almost not at all. The way it works now, it is the contractors who are punished by the bank instead.

Further improvements in the extension of bank loans for unfinished production must reflect all the positive changes relating to economic ties between participants in the investment process, to planning methods and material incentives in capital construction. Motivation should be provided for all participants to have the project commissioned on schedule. For their part, bank credits must come to play the role of a tool conducive to decreasing the duration of construction.

Contractors, subcontractors and project designers should have a common interest in achieving the best national economic results, and this can be helped along by material incentives for timely and qualified commissioning of projects into production. To eliminate the shortcomings mentioned above, the designers, in our opinion, must include in their plans for organization of construction (POC) and for integrated supply of construction assemblies and parts a requirement that all work relating to a given construction cycle be carried out in full. The financing bank, to our mind, should extend credit only after completion of a scheduled cycle. If Stroybank were to control the progress of construction on the basis of POC, integrated supplies of assemblies and parts and the work-phase schedule, it would have broader opportunities to influence the time frame of construction by raising or lowering its interest rate. Such an approach would impel contracting organizations to strive for a more even commissioning of projects over the entire year. We think the following principle of charging interest rates would be expedient: if construction lags behind POC or the workphase schedule, the bank levies a higher rate (4 percent) until such time as the contractors resume a rhythmic workspace and fully meet their quarterly targets for projects commissioned; running ahead of schedule would, conversely, bring the interest rate down.

The experience amassed in industrial construction, reconstruction and the retooling of industrial plants reveals that one of the most serious causes of delays in commissioning production facilities and bringing them onstream is incomplete and late deliveries of technological equipment. About one-half of all underway projects are not commissioned on time for this one reason. In our republic a number of very important projects which were to be commissioned in 1982 were not--the complex of electrolysis shops No 11 and No 12 of the Tajik aluminum works under construction. No settlements or loan systems have made much headway in liquidating these construction bottlenecks. Given the current intensification of the economy, such a situation may worsen the economic indicators not only of capital construction, but of the national economy as well. The time has come for planning estimates to include a detailed schedule of integrated deliveries of assemblies, parts, equipment, and to settle all accounts between suppliers of precast reinforced concrete constructions, technological equipment and contractor organizations, and between the latter and their clients after full completion of the job and the achievement of the end objective. Also effective would be settlements between general contractors and subcontractors engaged in installing equipment not only after the project in question attains full planned capacity. During the period of assimilation the interest rate on loans should continue at 0.5 percent, after assimilation time has run out it should be raised to 4 percent, and if there are any further delays--to 10 percent. Investing contractors and subcontractors with responsibility for achieving full planned capacity will allow for improving the quality of the work, incorporating new technology into production and supplying the economy with needed goods on schedule and in planned nomenclature. Project design institutes, too, will be charged with greater responsibility for errors in scheduling integrated deliveries of assemblies and equipment. Losses incurred in correcting these errors must be borne by the institutes concerned. Bonuses to the project designers should, in our opinion, be paid out thus: one part after completion of construction, the rest after reaching full planned capacity.

In the future, as payments for finished construction jobs come into general use, the system of loan coverage of unfinished production till full assimilation of the project should also be extended to relations between all participants in the investment process inside the country. This will require changes in the methods of extending credit to contractor organizations. In accordance with instructions handed down by Stroybank (No 209) and Gosbank (No 387) on 21 August 1981, interest payments on loans for unfinished construction and installation work on enterprises, underway complexes and projects not currently scheduled for commissioning (these loans are entered by Stroybank in balance account No 313, in Gosbank the account number is 19) are fixed at the annual rate of 0.5 percent. When these enterprises, underway complexes or projects are handed over to the client behind schedule, and if the contractor's costs are incurred after the deadline for commissioning, the debt is transferred to account No 317 and a higher rate is levied (4 percent annually). Our proposal on this score boils down to the following: certain additional changes should be made in Stroybank instruction No 209 and Gosbank's No 387 to cover payments for work accomplished by subcontractors responsible for installing equipment: charge 0.5 percent and list credits in account No 313 for construction projects where planned capacity has been achieved, and 4 percent per annum for projects where it has not.

The most urgent task confronting all participants in the investment process today is to search for the most effective means of developing capital construction.

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## INDUSTRIAL CONSTRUCTION

### COVERING ALLOWS WORK TO CONTINUE DURING PLANT RENOVATION

Moscow STROITEL'NAYA GAZETA in Russian 29 Jan 84 p 3

[Article by K. Mikhaylov, director of USSR Gosstroy [State Committee for Construction Affairs] Scientific-Research Institute of Reinforced Concrete and doctor of technical sciences; and I. Lyudkovskiy, laboratory director and doctor of technical sciences: "Without Stopping Production; A New Method of Replacing Outdated Structures"]

[Text] The reader is aware of the fact that a plan for the country's economic and social development for the year 1984 was ratified at the recently held 9th session of the USSR Supreme Soviet. For us, builders, it is of particular interest because of one notable trait. It provides for an increase in funds for the reconstruction and retooling of operating enterprises. This is explained by the fact that the effectiveness of capital investments in modernization and reconstruction of operating enterprises is significantly higher than in the construction of new ones.

Practical experience has shown that in many cases reconstruction is associated with replacement of the coverings of industrial buildings. Constructed in the years of the first five-year periods, they have exhausted their amortization schedules and are in need of renovation. There is also one other aspect. Capital repair of industrial buildings, as a rule, has been carried out with prolonged gaps in production. In most cases, new buildings were built into which the equipment was transferred from the old units, and only then were they rebuilt.

Recently an important experiment was concluded at the Moscow "Kompressor" Plant which proved that it is possible to replace a temporary covering for a large-span steel and reinforced concrete one without stopping production, and thereby to essentially transform the building. This was done with the use of plans developed by the Scientific-Research Institute on Concrete and Reinforced Concrete (NIIZhB) of the USSR Gosstroy.

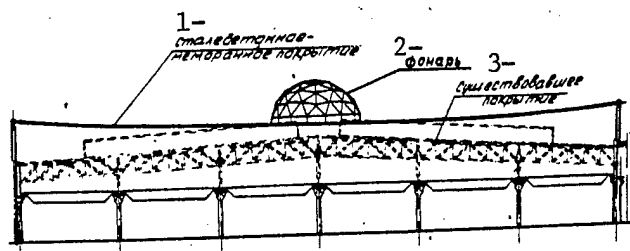
Let us acquaint ourselves with the history of the reconstructed building. Unit No. 2 of the "Kompressor" plant was built in 1933 and had 66 sections with a column span of 6x13.5 meters covered with wood trusses. The new covering, which is 5,500 square meters in size, is built over the old one and has no inside supports. The building structure has become higher and the illumination

the work stations has increased due to side lighting and the installation of a skylight in the covering which had an area of 150 square meters. Consequently, the operational qualities of the building and the labor conditions of the people working there have improved significantly.

This experiment, aside from its purely utilitarian goal -- to radically reconstruct the operating enterprise without stopping production -- also served to confirm the conclusion drawn at our institute based upon a practical example. This was that a large-span steel and reinforced concrete covering with sheet reinforcement (membrane) and with a rectangular outline may be just as economical as one having a circular outline.

This deserves some thought. In those singular cases where membranes were used to cover rectangular buildings, various structural means were used which complicated the matter. Specifically, it was necessary to erect heavy corner pylons and to increase the weight of the contour.

The experiment proved that it is possible to reject such artificial means. We proceeded from the assumption that there is a self-regulation of the stresses in coverings which employ membranes. As a result, only compression stresses arise in the support contours. This concept is difficult to understand for a person who is unschooled in engineering. However, we believe that the professional reader will be interested in knowing in greater detail how this achievement in engineering is attained.



Key to figure: 1) Steel-concrete membrane covering  
2) Skylight  
3) Existing covering

Thus, since the membranes gently sloping, they transmit horizontal stresses to the contour which are 8-10 times greater than vertical stresses. It would seem that this leads to certain dangers. However, the membranes themselves hinder deformations of the contours in a horizontal direction, since they are inflexible biaxially extended slabs which cannot lose their stability. This yields the engineering result and the scientific achievement -- only compression stresses arise in the contours and flexion in a horizontal direction is practically absent. Consequently, there can be no loss of stability in this direction. In order to clarify this for the general reader, let us repeat ourselves somewhat in saying that with the use of membranes the difference in the stressed states in the contours of a circular and rectangular form is

practically eliminated.

One other result arises from this. Thanks to the preceding assumption, the sections of support contours for steel-concrete suspended coverings (with the use of membranes) become very light and economical with any contour outline.

The reader who is interested in this important experiment will, of course, also want to know about other details of the adopted engineering decision. Let us relate some of these. The support contour for the covering over unit No 2 of the "Kompessor" plant was made of concrete-filled pipes 630 millimeters in diameter. The support contour pipes were filled with concrete while in project position with the aid of pumps. The membrane was welded to the support contour and installed of rolled material with area of 500 square meters (width 6 meters, length 81 meters) each. (Installation was done by the Stal'konstruktsiya Trust of the USSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work]).

According to the project plan, the membrane was flat during installation, and its sag occurred due to gravitational forces (its own weight). The membrane sheet was rolled out over temporary supporting structures installed over the existing covering. The rolls were unwound from ground level.

Here are a few more details. The roll was set in a frame on which it rested with the aid of an axle inserted inside it. Then the end of the roll was lifted by crane to the level of the covering, and a cable attached to it. This cable, with the aid of a winch and partially also the crane, pulled the sheet onto the supporting structure. The rolls were joined together by welding, after completion of which the membrane was formed. Then the support structures were disassembled, and the flat membrane took on the form of a suspended double curvature casing. A layer of reinforced concrete with thickness of 30-40 millimeters was installed over the membrane. It was reinforced with rolled mesh welded to the membrane at certain points. Thus, the covering became a steel-reinforced concrete casing.

But what is the purpose of the reinforced concrete layer? It imparted high rigidity, fire and corrosion resistance to the covering. Then the covering was insulated with a layer of foam polystyrene, over which a roof comprised of one layer of ruberoid and polyisobutylene was installed. However, the support contour also had to be insulated. This was done with the aid of a spray-coated layer of foam polyurethane.

The problem of water removal from the covering still had to be solved. This is how it was done. The water goes into a ring collector from funnels located around the central skylight in the shape of a hemisphere. From the collector the water is channeled to the rain gutters with the aid of water lead-off pipes suspended from the covering.

In order to achieve total success, any engineering decision must possess the quality of economy. According to the project plan, the thickness of the membrane is equal to 2.5 millimeters. Here the overall expenditure of steel per one square meter of covering is equal to 29 kilograms. However, due to the

fact that the USSR Minmontazhspetsstroy plans (manufacturing the rolls for reservoirs) is equipped for welding rolls consisting of sheets with thickness of no less than four millimeters, it was necessary to make the membrane this thickness. Therefore, the actual expenditure of steel comprised 42 kilograms per square meter. The presented concrete thickness is 4.3 centimeters per square meter. However, even these figures which randomly have been made less favorable are better than the indicators for a number of analogous spanner coverings.

The total economic effect from the application of a steel-concrete suspended casing, which made it possible to replace the existing covering at the "Kompressor" Plant without ceasing production, comprised around one million rubles.

We should like to note the technical foresight of the managers of the "Kompresor" Plant, the specialists of the Stal'konstruktsiya, Khimneftemashstroy, Proyektelniispetskhimmash and Promstal'konstruktsiya Trusts who decided to undertake this complex scientific-technical experiment which was actively supported by the USSR Gosstroy.

The conclusions drawn from this successful experiment are extensive. The experience gained gives us a basis for recommending that temporary coverings of industrial buildings be replaced without stopping production. As concerns the configuration of the buildings in the plan, it may be most varied, and the span width may significantly exceed 100 meters. Large-span suspended casings may be used to cover several relatively small buildings at one time, along with their adjoining driveway sections. This is also very important.

We must think through all the following work. It seems expedient for the USSR Gosplan [State Planning Committee] and the USSR Gosstroy to oblige the ministries and departments who are in charge of production enterprises to give their assumptions regarding the replacement of old coverings over shops of operating enterprises without interrupting production. After the facilities subject to such reconstruction are defined, it will be necessary to compile a work plan for performing the design work. We believe that it is necessary to create at one of the institutes of the USSR Gosstroy Glavpromstroyproyekt [Construction and Planning of Industrial Enterprises Main Administration] a specialized group which, with the aid of NIIZhB, will have to develop the methodology of computing and designing such coverings. The NIIZhB is also ready to render such aid to the departmental project planning institutes.

This is still not all. It is still necessary to request much from the USSR Minmontazhspetsstroy: to master the welding of large-size sheet steel rolls with thickness of two millimeters, as well as their welding during installation using electric riveting in this process; to apply the capacities of the VNII-PIPromstal'konstruktsiya [expansion unknown] in developing stock temporary support structures for the installation of the membrane coverings, and to have one of its trusts (preferably the Stal'konstruktsiya Trust) specialize in the installation of such membrane coverings. Finally, it is necessary to ask the USSR Minchermet [Ministry of Ferrous Metallurgy] to master the output of rolled steel having a thickness of two millimeters with an aluminum or zinc spray coating.

## AGRICULTURAL CONSTRUCTION

### PROBLEMS WITH AGRICULTURAL CONSTRUCTION PLANNING IN KHARKOV DETAILED

Moscow STROITEL'NAYA GAZETA in Russian 12 Oct 83 p 2

[Article by V. Blagoveshchenskiy, deputy director general for capital construction, "Kharkov Tractor Plant" production association: "Against the Tide"]

[Text] Like hundreds of other plants in the country, our Kharkov Tractor Plant is undergoing renovation. We have learned first hand that plant reconstruction and retooling can bring about a veritable economic and social revolution.

Suffice it to say that we spent only 96 million rubles to build all the facilities needed for the production of T-150 K tractors. A new plant of similar capacity would have cost about 2 billion rubles. Simultaneously with the reconstruction we also erected a vocation and technical school complex, a polyclinic, an electric, mud and water treatment center, an indoor track and field arena, locker rooms that comply with new norms and requirements and an administrative and service building. And all this, as a matter of fact, out of those same 96 million rubles.

The comprehensive approach to reconstruction and retooling has allowed the plant to annually expand facilities for the production of energy-laden T-150 K tractors and to improve working and rest conditions. However, the technical renovation of the plant could have been accomplished even more successfully were it not for a number of difficulties.

Let us begin with the contractors we so respect, that is--the construction people. They do accept orders for technical renovation, but very unwillingly, and it is not too difficult to see why. We all know that using construction machinery in a functioning plant is no easy job. There is not enough space for them in the plant's shops. The labor productivity of the builders drops sharply to a point well below the figure for new construction.

Take, for example, the casting shop, vintage 1930s. Not only is it impossible to "squeeze" into, you can't even drive up to one. Yet the reconstruction must be done, and without halting production either. The same applies to the machine assembly shop. Conditions here are extremely cramped,

traditional construction mechanisms cannot be deployed, you can't even use any of the standard reconstruction procedures. Nevertheless, the builders' wages are based on average coefficients which do not take into account the special conditions that prevail here. More than that, the installation of, say, ventilation systems takes place atop, under the shop's very roof where it is much more difficult to breathe. Yet the construction men are not entitled to the special nutrition all operating personnel get.

Keeping the builders adequately supplied with material resources is another area that, in our view, needs improvement. At the present time these are pegged to every million rubles' worth of construction and installation work. This is not right, it is not the money value that should be taken into account, but the physical volume of the work done, on reconstruction jobs this more accurately reflects the actual outlay.

In my opinion, overall cost estimates for reconstruction and re-equipment of functioning plants must set aside reserve sums for unforeseen work and expenditures, and at least half of these sums should be included in project estimates. It would not be a bad idea to permit the client to pay the contractor for actual expenses which cannot or can only partially be provided for by the overall project plan and cost estimates. And to do so with, say, part of the emergency funds that the enterprise is allowed to keep. The payments would be authorized by an official report co-signed by the client. The price could be arrived at through itemized cost estimates or individual rates drawn up by the contractor and okayed by the client.

And, of course, a serious reason why builders have little desire to tackle reconstruction jobs is the obsolescence, low level and ineffectiveness of the prevailing corrective coefficients. At new construction sites wide use is made of progressive industry-produced assemblies and materials, but it is almost impossible to utilize them for reconstruction. Naturally, this slows down the work process.

The client is also beset by problems. We have a host of unresolved issues in our relations with contractors, project designers and planning organs. I will dwell on the main problem--drawing up an application for equipment, receiving the necessary documentation on the object of reconstruction and getting final approval of the cost estimates by way of their inclusion in the capital investment plan for the year in question.

Yes, yes, all this is done in precisely the order listed. And, please note, in the following time frames. The applications for equipment we submit in February-March of the preceding year. The documentation is supposed to be delivered to us by July 1 which, as a rule, does not happen. Finally, the capital investment figures are determined only in the first quarter of the year the reconstruction is planned for.

Such a sequence: application--documentation--capital investment actually knocks clients and builders, in fact, the whole reconstruction process head over heels. How can you file the correct application when you don't know the size of the funds you will be assigned? And by the same token it is practically impossible to draw up the proper documentation: in what sequence and for what machinery?

Obviously, then, the right course of action would be first to determine once and for all where you stand moneywise, then prepare your documentation (construction plan, project estimate) accordingly. And only after that, having carefully counted the cost, file an application for equipment, materials etc that reflects your actual needs and not just a wild guess.

Let me illustrate this with a concrete example. Next February-March, following established procedures, we will be drawing up our applications for equipment and materials for 1985. How can this be done when nothing is known at this juncture about actual capital investment figures and not even approximate (let alone accurate) project estimate documentation exists? Of course, we will stick to the guidelines of the five-year plan, but...

According to the five-year plan handed down to us by our senior organization, production association "Soyuzsel'khoztraktor" of Minsel'khoz mash, capital investment for construction and installation work in 1981 was set at about 17 million rubles, but the actual allocation was 11 million. The picture is the same for the following years. For 1984 the five-year plan has us down for 13 million rubles. At this point the intention is to cut it down to about 7 million, how much it will actually be nobody knows yet.

Given such planning, can reconstruction work be conducted without mistakes by builder and client alike? Because the applications we submit are in the full sense of the word just a shot in the dark. The suppliers of the equipment also end up in the unenviable position of 'go there, don't know where, bring that, don't know what'. Later on they will be forced 'as an exception to standing rules' and in line with the 'state significance' of the project to feverishly look for resources to fill our real, not dreamed-up, needs.

As a result, large stocks accumulate of equipment we don't need at all or will need only in the distant future. Conversely, the most badly-needed machinery is just not there, which fact unexpectedly comes to light when plans and technical documents are changed at the very height of the reconstruction work. Naturally, we fall flat on our faces and drag the hapless builders down with us.

We also, and let me stress this once again, disrupt the work of our suppliers in that we submit our applications (the final ones, that is, not the original hogwash) well nigh a year and a half after they are due.

How can all this be remedied? The problem falls under the jurisdiction of Union planning organs, above all Gosplan. I can only express a wish: we need a firm monetary commitment. It does not have to be for a five-year period, even a two-year time frame would be welcome. It would enable us to earmark expenditures with a fair degree of accuracy, draw up all the necessary project estimates and order the materials and equipment we really need. I am pretty sure that this proposal will be supported not only by clients, but by project design organizations and contractors as well. There can be no proper reconstruction without solid preliminary planning.

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## AGRICULTURAL CONSTRUCTION

LACK OF SUFFICIENT RURAL HOUSING, SKILLED LABOR, MATERIALS NOTED IN ESTONIA

Tallinn SOVETSKAYA ESTONIA in Russian 4 Oct 83 p 1

[Article: "Rural Construction"]

[Text] New construction in rural areas is today a sight as familiar as it is in the cities. Time and again the work of the project planners and builders of our republic has won the highest awards at all-Union contests and reviews.

Special attention is devoted to construction in kolkhozes and sovkhoses in the resolutions adopted by the 26th Congress of the CPSU and the May (1982) Plenum of our party. The May plenum, for one, set new goals in the matter of improving the effectiveness of capital investment in agriculture. The decree it issued stresses the need to raise "...the level of responsibility of party, soviet and agricultural organs, managers of construction organizations, as well as enterprises and farms for the effectual utilization of capital investments, the timely commissioning and assimilation of production facilities in agricultural construction projects.

Experience has shown that capital investments yield meager returns when they are spread over a large number of projects or when limited resources are unwisely channeled into the erection of major industrial complexes. Significant economic results can, therefore, be achieved by following the optimum course in allocating funds. This boils down to a rational, economically sound and expedient combination of new construction with a reconstruction of existing farms and buildings that makes wide use of the block method (the subjoining to functioning blocks of more advanced types) and the phased creation of production and social conditions necessary for their effective operation. Calculations and experience have both shown that implementing this optimal course saves time and resources (by about one third) in achieving the planned objective.

In our republic the leading organization for rural construction is the republic association "Estkolkhozstroy." The management of the association and its subdivisions in the rayons have done much of late to fulfill their production plans; special attention is now paid to filling orders by kolkhozes and sovkhoses, the socialist competition statutes introduced a

year ago authorize bonuses for builders who meet their target figures for rural construction. "Estkolkhozstroy" which erects almost 70 percent of all Agroprom projects in the republic has successfully implemented its plan for the first six months of the year both in money terms and in the nomenclature of the construction and installation work carried out.

These facts notwithstanding, there are many shortcomings in the work of the association and of Interkolkhoz construction organizations (MSO). Not infrequently managers' lack of organization results in worker or machine stoppages and there are cases of absenteeism and drinking on the job. Not everywhere are materials properly stored or rationally expended, deadlines for the commissioning of projects are not met, overexpenditures of wage funds are allowed to happen. The Viru MSO, for example, has long failed to fulfill its plans and hardly ever commissions rural enterprises, housing or socio-cultural institutions on schedule. The leadership of "Estkolkhozstroy" and Agroprom ESSR is well aware that one of the causes of the current situation in the collective is the low level of responsibility, the inadequate knowledge and experience of a number of production managers, yet remedial measures have still not been undertaken.

Our republic, like a number of other regions in the country, is experiencing a shortage of manpower in the rural areas. The problem here is not to increase the quantity, but to improve the qualitative structure of the workforce, to bring it into accord with the contemporary industrial phase of agricultural production. It is a problem that cannot be resolved by merely raising wages. What is required is an upgrading of the social infrastructure in the rural communities: a consistent effort to narrow the gap between living conditions and social services in the rural areas (with allowances made for the specific nature of rural life) and those of the urban centers.

It is, therefore, altogether fitting and proper that special emphasis is being put of late and for subsequent years on the construction of housing, cultural establishments and consumer-service facilities. The Eleventh Five-Year Plan originally envisioned the commissioning of 600 thousand square meters of housing and close to 160 thousand square meters of schools, kindergartens, clubs, consumer service pavilions and so on. To comply with the resolutions adopted by the May (1982) Plenum of the CPSU CC the governing organs of the republic raised the target figure for rural housing construction by another 10 thousand square meters. This means that the level achieved in the Tenth Five-Year Plan will be exceeded by almost 40 percent. Moreover, preference will be given to one-family cottages with every amenity and all the structures required to work a private farm.

Nevertheless, the current situation with regard to the commissioning of new housing and socio-cultural projects is unsatisfactory. Thus, the contractor work carried out by "Estkolkhozstroy" on housing construction in the first eight months of the year adds up to only 51 percent of the annual plan. Especially bad results in this area were chalked up by the Yyegev, Paide and Kokhtla-Yarve MSOs where the figures were 31, 42 and 43 percent

respectively. It is the duty of the leadership of "Estkolkhozstroy" and the rayon MSOs, of party organizations and all builders to undertake the most resolute measures to ensure that their target figures for commissioning cultural and consumer-service facilities are met.

For a long time the construction of farmstead-type housing with private funds was seriously hampered by the fact that no material resources were allocated for these credit-financed projects. Now at last the situation is beginning to see some movement. Next year this type of housing construction will be provided with 4.8 million rubles' worth of material resources and the projects themselves will be included in contractor's production plans. In the future the material supply of credit-backed farmstead construction will expand and by 1990 will reach 12 million rubles.

Calculations and experience have shown that it is economically more sound to invest in capital repairs of buildings and installations than to erect new ones. Nevertheless, to this day repairs, whose annual volume measures in many millions of rubles, are supplied with materials on a scale very much below normative requirements, and some materials--silicate brick, mineral cotton and bitumen--are not allocated at all. This abnormal situation should be corrected the quicker the better.

In addition to the faulty system of supplying rural construction there is another factor that sometimes impedes the timely commissioning of construction projects, and that is the prevailing shortage of cadres. Up to this year not a single vocational and technical school trained workers for the rural construction industry. The current academic year has seen the first group of future builders enrolled at the Kose rural vocational and technical school. The network of schools turning out cadres for rural construction must be significantly expanded.

The magnitude and importance of the tasks facing rural builders obliges every person involved in the erection of new or the reconstruction of functioning facilities and projects to take a new, principled look at his own work and increase its productivity. Such an approach will go a long way to ensure that rural construction plans are fulfilled in every aspect and on schedule.

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## CONSTRUCTION MACHINERY AND EQUIPMENT

### CONSTRUCTION MACHINERY INDUSTRY IN CEMA COUNTRIES

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 11,  
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[Article by Vladimir Yeletskiy, deputy minister, USSR Ministry of Construction, Road and Municipal Machine Building: "Development and Production of Equipment for Construction"]

[Text] At the present time, further accelerated economic growth and social progress of each fraternal country are impossible without the application of the latest achievements in science and technology available in other countries. In connection with this, scientific-technical and economic cooperation within the framework of the CEMA countries takes on primary importance. Joint research by scientists and specialists facilitates the successful solution of the cardinal problems of economic construction, the reduction of time and expense for the realization of developments, the increased technical level of machines, and the elimination of duplication of effort in creating new types of highly productive equipment.

There is already a considerable amount of experience in interaction within the indicated spheres. In coordinating the plans for the socio-economic development of the USSR and other CEMA member states for 1981-1985, the current thematics of scientific-research and experimental design work in construction, road, and municipal machine building were agreed upon. These correspond to the tasks presented by the Comprehensive Program and the DTsPS [expansion unknown] on machine building, and provide for an expansion of economic cooperation on the manufacture and mutual delivery of new and progressive technology.

Two mutually interrelated problems are presently facing the sector:

to create systems and complexes of modern machines;

to provide specialization and cooperation in the manufacture of their basic types.

The CEMA member states manufacture around 1,500 types of construction and road machines, on the basis of which about 60 technological complexes may be formulated. These machines make it possible to mechanize earthwork, concrete, cargo

handling and other types of operations. For example, each year in the USSR plants manufacture an average of over 40,000 excavators, 50,000 bulldozers, 12,000 scrapers, 8,000 motor graders, 30,000 auto and pneumatic tire cranes and 4,000 tower cranes, as well as a large volume of modern technology for the cement industry, fully prefabricated house building and the production of reinforced concrete structures. By volume of production and nomenclature, the Soviet Union has surpassed the West European countries, and in excavators, bulldozers and scrapers it has also surpassed the USA.

Comprehensive mechanization has reached a high level in the USSR. In earth-work it comprises 98.2 percent, in concrete work -- 92.5, in the installation of structures -- 96.1, and in building automobile roads -- 96 percent.

Every year the specialization between CEMA member states is expanded in the output of construction and road technology. In 1971-1975 it included 259 types of machines, in 1976-1980 -- 566, and in the current five-year period it is already 1050 of the 1500 types of machines manufactured in these countries. The commodity turnover of the Soviet Union with the fraternal countries on products in this sector comprises respectively 1459 million, 2552 million and 3500 million rubles (in accordance with agreements). Of these, over 70 percent goes toward specialized and cooperative production. The growth of cooperative supply is especially dynamic (80 million, 327 million and 800 million rubles).

The Soviet Union exports over 400 types of different construction-road machines to the CEMA member states and in return receives 84 types. Among these are installation cranes and vibration rollers (from the GDR), loaders (CzSSR), brick-making equipment (PRB), equipment for the production of reinforced concrete sleepers (HPR), excavators (PPR) and others.

The interaction is implemented within the framework of long-term multi- and bilateral agreements on specialization and cooperation of production and on joint scientific-technical work. At present, 14 such agreements have been concluded in the sector. Six of them have total participation by all the CEMA member states and by the SFRY [Socialist Federative Republic of Yugoslavia].

On the basis of international socialist division of labor, the sector is developing rapidly in almost all the CEMA member states. The possibility has been created for concentrating efforts and funds on the manufacture of the most important and progressive types of equipment, for increasing their series output, and on this basis for introducing foremost technology and automation of production. It is important to note that most of the machines are of the highest level and compete favorably with the production of the leading capitalist companies.

Our specialists render significant aid to the fraternal countries in servicing Soviet machines and in achieving record outputs on them. These specialists not only ensure daily uninterrupted high productivity operation of the equipment, but every year also train over 1,000 of their colleagues from these countries.

The Soviet technical centers, which have been created in recent years in the CEMA member states and staffed with representatives of the manufacturing plants, have also proven themselves highly. Trouble-shooting and repair of the delivered products is performed here, as well as training of the local work force. Such centers are presently operating in the PRB and CzSSR, are being built in the GDR and the PPR, and are being planned in the HPR, the Republic of Cuba, and the MPR. Stations for servicing construction technology delivered from the CEMA member states have also been organized in our country.

The expansion of machine output, the development of new models, and the joint solution of scientific-technical problems is done in the countries according to coordinated plans. These are drawn up for a five-year period and for a more long-range perspective. The basic directions of the so-called sectorial subprograms have also been coordinated to the year 1990. This facilitates increased effectiveness of production and leads to a growth in mutual deliveries.

The cooperative ties are developing most dynamically. We are referring here to mutual provision of complementing assemblies and parts. In the USSR, for example, more and more products are being manufactured with gear boxes and axles from the PPR, motor housings from the GDR, and hydraulic equipment from the CzSSR.

In 1981-1985, it is envisioned that the mutual export of complementing units will more than double. Their portion in the overall commodity turnover of production in the sector will comprise around 30 percent. In accordance with the agreement, the Soviet Union will ship four times more of such products to the other CEMA member states than in the preceding five years.

Cooperation is achieved by two methods. According to the first, the manufacture of the end product is concentrated in one country on the basis of units, assemblies and parts obtained from the other partner countries. According to the second method, it is manufactured in each interested country on the basis of division of labor and mutual deliveries of individual complementing products.

Let us cite several examples. Ten types of road construction machines are series produced at seven of our ministry's enterprises using Polish standardized gear boxes, drive shafts and axles. Thirteen types of mechanized electrical instruments and construction finishing equipment with the trademark of the Soviet association "Soyuzstroyinstrument" are made with Bulgarian micro electric motors. In turn, our units and assemblies (crane winches, support turnplates and turn mechanisms) are used in the PRB for tower cranes. In the PPR, self-propelled cranes with caterpillar treads are made using support turnplates and engines for boom and hydraulic equipment obtained from the USSR. Mutual deliveries of complementing parts have made it possible to develop the output of cranes having a special automobile type chassis in the USSR and in the PPR.

Good results have been obtained from mutual cooperation with the HPR. Based on the patent for high-pressure paint spraying units jointly purchased from the Wagner Company (FRG), cooperation on assemblies and parts is being developed. New modifications are being readied for introduction, which will find broad application in the national economies of both countries.

The production of pneumatic hammers has been mastered in the USSR and GDR on the basis of principally new designs developed in the Soviet Union. These have twice been awarded the Gold Medal at the Leipzig exhibition. Based on a Soviet patent, a technological line for the manufacture of products from dense silicate concrete has been created jointly with the GDR. This has made it possible to significantly increase the output and reduce the cost of building structures.

Cooperation in the manufacture of equipment for the production of building materials has made a significant contribution to solving such an important social problem as provision of workers with housing.

The machine complexes delivered by our ministry have proven themselves well in the PRB, HPR, GDR, MPR, PPR, SRR, and CzSSR. They are also operating successfully under the difficult tropical conditions of the and the Republic of Cuba. Since the time of the 8th Five-Year Period and to the present day, this equipment, as well as technological lines in the fraternal countries, as been used to equip 93 major industrial facilities. Among these are:

15 cement plants with overall capacity in excess of 20 million tons per year;

50 house-building combines with an annual volume of over 5.5 million m<sup>2</sup> of residential housing;

four reinforced concrete products plants manufacturing over 500,000 m<sup>3</sup> of structures annually.

Moreover, during this period and with the aid of the Soviet Union, enterprises have been built for the production of reinforced concrete pressure pipes, gypsum, mineral wool, keramzit gravel, brick, ceramic and asbestos cement products, dense silicate concrete, etc.

These enterprises occupy an important place in the sector, providing for the rapidly developing industrial and residential construction in the fraternal countries. Thus, at the PRB almost 2,000,000 tons of cement per year is produced on Soviet technological lines installed at plants in the cities of Devnya and Temelkovo. For many years, Soviet machines have been used in Bulgaria to manufacture gypsum, gypsum plastering, mineral wool and keramzit gravel. This provides raw materials and semi-finished products to 12 house-building combines, which are also equipped with Soviet equipment.

In turn, the USSR enterprises receive Bulgarian technological lines. In 1976-1980, 20 such lines were imported with a total capacity of 600 million units of brick per year. A long-term agreement for 1981-1985 provides for the delivery of 46 more lines for a capacity of approximately one billion units.

In the HPR in 1980 a plant for dry method cement production was placed into operation. The basic equipment for it was obtained from the Soviet Union. It yields 1,100,000-1,200,000 tons of production annually. At the present time, Soviet and Hungarian specialists are working together on the operation and improvement of the furnace unit.

The output of slate has more than doubled in the HPR, and the output of reinforced concrete pipes has almost quadrupled. This is the result of the operational introduction of enterprises in the cities of Nergeshuyfal and Sentender. Around one million square meters of housing area per year is "assembled" in Hungary from elements made at nine house-building combines in the cities of Budapest, Miskolc, Debrecen, Szegéd, Veszpren, Kecskemet, and Győr, which are also outfitted with Soviet equipment.

Technological lines for the production of reinforced concrete sleeper ties are supplied by the HPR to the USSR, which has a huge extent of railway lines. In the 9th and 10th Five-Year Periods, the USSR received 24 such lines, which made it possible to fully satisfy the needs of the Ministry of Railways services.

With the technical assistance of the USSR, six plants for large-panel house building having an overall capacity of 840,000 m<sup>2</sup> of living space per year were built in the GDR in the cities of Bautzen, Zwickau, Erfurt, Noibrandenburg, Dessau, and Potsdam.

The GDR exports equipment for the cement industry and the manufacture of fine and coarse ceramics to the Soviet Union. In 1971-1975, 50 million rubles worth of this equipment was received, and in the current five-year period 110 million rubles worth will be supplied.

The construction industry of the MPR is developing according to plan. Production which provides for the intensive growth of cities and large settlements is being developed here at a rapid rate. With the gratuitous help of the USSR, two house building combines with capacity of 140,000 and 70,000 m<sup>2</sup> of residential area annually have been built in the cities of Ulan-Bator and Darkhan. Plants producing brick, ceramic slabs, keramzit gravel and mineral wool have been placed onto operation. At the present time, a large cement-lime enterprise is being built in the region of Khutula.

In the PPR, 23 percent more cement is being manufactured in the country thanks to the operational introduction of the "Varta II" and "Stshel'tse-Opol'ske" Plants. There are four technological lines in operation here which turn out around four million tons of production annually. In the 9th and 10th Five-Year Periods, the Soviet Union has also supplied equipment for nine plants for large-panel house building located in the cities of Warsaw, Bydgoszcz, Gdansk, Lodz, Szczecin-Plona, Suchi-Liasye, Legionowo, and Zabrze-Mikulczicze. Their total productivity is over one million square meters of residential housing area per year. In turn, the PPR has sent 25 technological lines for the manufacture of silicate brick and 10 lines for making mineral wool products to the USSR.

In the CzSSR, with the technical help of the USSR, plants for large-panel house building have been constructed in the cities of Brno, Novomesto, Usti-nad-Laba and Mikhaylovec, with total capacity of over 500,000 m<sup>2</sup> of residential housing area per year. For its part, in the current five-year period Czechoslovakia will provide Soviet cement and lime enterprises with machines for a sum of over 100 million rubles.

In the SRV [Socialist Republic of Vietnam] the USSR is building the following plants: "Bim-Shon", which turns out 1,200,000 tons of cement per year and a large-panel house building plant in the city of Suan-Mai with productivity of 130,000 m<sup>2</sup> of living space annually.

In the Republic of Cuba, the construction of a plant for the capital repair of road construction machines is nearing completion in the city of Cienfuegos with the participation of the USSR. It is scheduled to begin operation in early 1984.

The cooperation of the scientific-research and design organizations of the CEMA member states is developing in an ever more intensive and goal-oriented manner. The primary task is to provide progressive and highly effective technology first of all for those sectors of the national economy which satisfy the growing demands of the countries for power, fuel, raw materials, food and transport. It is solved on the basis of DTsPS adopted at the 32nd and 33rd meetings of the CEMA Session.

Agreements and contracts are being concluded for purposes of rational utilization of the scientific-technical potential of the fraternal countries for individual problems of greatest importance. Research in the field of cement equipment is being conducted within the framework of the Coordination Center. If necessary, joint design bureaus and temporary working groups of specialists are formed. For example, the Soviet-Polish group on the development of heavy cranes formed in 1975 is functioning effectively. Through the efforts of the two fraternal countries, models of cranes with load capacity of 63 and 100 tons with caterpillar drive and special chassis have already been developed. Their production will begin in 1984. The series manufacture of such machines with load capacity of 24 and 40 tons has already been perfected.

Joint work has made it possible to reduce the time necessary for equipping the sector with modern technology by about five years, as well as to reject purchases from capitalist states.

Another example of the effective cooperation of the fraternal countries is the Soviet-Bulgarian scientific-technical association "Elektroinstrument" which has been in operation since 1975. Within its framework, an entire series of micro electrical motors with various modifications has been developed, as well as new types of instruments which were not previously manufactured by domestic industry. Today, the enterprises of the USSR and PRB produce over 400,000 of these products annually on a cooperative basis.

Soviet and Hungarian designers have achieved great successes. They are improving high pressure painting units and expanding the spheres of their application. Over 50,000 such units, used in the HPR and USSR, have proven themselves well in various sectors of the national economy.

The integrated line for making products of dense silicate concrete developed jointly with the GDR has proven to be especially effective. It has made it possible to use 165-185 kg of lime instead of 300-350 kg of cement in the production of one cubic meter of product. High quality fillers (gravel and

rubble) which are in short supply are replaced with ordinary sand.

On the whole, at the present time the USSR is developing scientific-technical ties on a bilateral basis with other socialist countries on 53 topics within the sector. These provide for the development and creation of:

new designs for electrical hand-held machines and high productivity equipment for mining, cutting and polishing natural stone (with the PRB);

new modifications of high pressure painting units, including those with internal combustion engines, units for electrostatic application of paint as well as dual-component compounds (with the HPR);

new designs of presses for making ceramic pipes 150-500 mm in diameter with tilter and conveyer lines for the production of ceramic facing slabs (with the GDR);

cranes on a special chassis with load capacity of 160 and 250 tons and equipment complexes for making products out of cellular concrete (with the PPR and SRR);

a self-propelled stump-cutting and cross-cutting machine on the basis of a Czechoslovak wheeled tractor, as well as elevators for residential buildings (with the CzSSR);

a new progressive design for a universal electric perforating machine (with the SFRY).

A characteristic peculiarity of the mutual interaction at the current stage consists of the fact that 80 percent of the topics encompass the entire cycle, from scientific research to the organization of specialized or co-operative production.

As a result of the realization of joint plans, 54 types of machines and equipment assemblies will be created in 1981-1985, as well as nine types of complementing assemblies and units. The introduction of new and progressive technologies for mechanical processing, welding and painting parts with the aid of robots is planned. Thirteen international standards will be compiled on various types and models of machines.

Along with bilateral cooperation, scientific-technical cooperation on a multi-lateral basis is also being implemented. Standardized axles for construction and road machines are being developed through collective efforts, as well as technological lines for manufacturing reinforced concrete elements for large-panel house building and equipment for the utilization of domestic waste, dry cleaning and communal laundries. Hydraulic transformers and transmission gear boxes, support turnplates for excavators and cranes, and assemblies for tower cranes and lifts are being developed. A unified methodology for testing and evaluating the technical level of machines and equipment is being introduced. It is of extreme importance in evaluating the quality of mutually supplied production and in increasing its technical level and ability to compete in the world market.

The course of implementation and the scope of plans for scientific-technical cooperation show that a significant scientific stockpile has been created in the CEMA member states, which is ever more widely embodied in the technology which corresponds to new requirements.

For the fastest possible introduction of the results of research and experimental-design work into production, proposals are prepared at the primary stages for comprehensive solution of problems with consideration for organization of specialized production and possible cooperation. Particular attention is given to the development of capacities for the future period for the purpose of most fully meeting the needs of the CEMA member states for modern construction and road technology.

This is significantly facilitated by new forms of interaction which make it possible to unite the efforts of production and scientific organizations of the fraternal countries. We are speaking of establishing direct ties between plants, design bureaus and other organizations.

At the present time, measures are already being implemented for establishing such ties between the Vilnius Production Association for Construction-Finishing Machines (USSR) and the "Mekhanika-Myuvek" Association (HPR), between the Odessa Production Association Plant imeni January Uprising, the Nikopol Construction Machine Plant imeni V. I. Lenin, certain special design Bureaus (USSR) and the experimental research center in the city of Kobylka, the "Steleva-Volya", "Lebendy", "Famaba", Plant imeni Varynskiy, "Fablok" and "Radomsko" Plants (PPR); between the Volga Association of Cement Machine Building "Volgotsemash" and the Bulgarian Heavy Machine Building Combine in the city of Rusa.

Direct ties facilitate joint planning of production of specialized and cooperative products, including new machines, as well as the coordination of scientific-research developments. They play an important role in improving manufactured production and increasing its ability to compete, as well as in the organization of socialist competition and exchange of foremost experience.

All this serves to concentrate the efforts of the fraternal countries in solving the problems facing them in the production of construction and road machines, equipment and building materials, and creates prerequisites for the further development of comprehensive mechanization in the sector in accordance with the directives of communist and worker party congresses.

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