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East Europe Report

SCIENTIFIC AFFAIRS

(FOUO 5/81)

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CZECHOSLOVAKIA

CSR RUBBER, PLASTICS INDUSTRY TARGETS FOR 1981-1985

Prague PLASTY A KAUCUK in Czech No 1, Jan 81 pp 1-3

[Article by Adolf Marsalek, CSR Ministry of Industry, Prague: "Development of the CSR Rubber and Plastics Industry, 1981-1985"]

[Text] This article describes the main directions of development of the CSR rubber and plastics industry during the Seventh Five-Year Plan and the key problems which must be solved in order to achieve the assigned objectives.

Following great successes in past five-year plans, and particularly in the Sixth Five-Year Plan, which was the most demanding of all, the CSR rubber and plastics industry is entering a new epoch of its development.

The conditions under which the Seventh Five-Year Plan for development of the rubber and plastics industry are being prepared differ greatly from those of past midterm plans. In recent years economic development has brought forth new factors in Czechoslovakia which determine the pace of development of the chemical industry as a whole, including not only basic chemistry and petroleum refining but also the rubber and plastics industry.

Specification of the pace and structural changes of Czechoslovak industry is based on objective internal economic conditions and manmade external conditions, as well as on the CPCZ's economic policy objectives aimed at assuring the further development of our developed socialist society.

The universal limiting factors which determine the future of development of Czechoslovak industry are real fuel resources and the chemical industry's resultant focus on developing products which are less energy intensive, slower creation of resources for accumulation, limitations on capital construction, a decrease in consumption of raw materials imported from nonsocialist countries, an increase in exports, and limited sources of new manpower.

These universal factors, together with additional specific factors imposed on the chemical industry as a whole, such as the high priority accorded to exporting plastics to nonsocialist countries and the limited development of new capacities for plastics processing, as well as additional influences such as the insufficiency of certain domestic raw materials, the load on critical production capacities and the like, mandate a substantially slower pace of development of the rubber and plastics industry

during the Seventh Five-Year Plan. This does not mean, however, that the assignments will be less demanding as regards production and management than in the previous five-year plan. On the contrary, they will be much more complex and difficult and will impose even greater demands on each worker in the sector and in the supplier organizations.

The current proposal for development of the rubber and plastics industry during the Seventh Five-Year Plan calls for achievement of the following main tasks by 1985 by the VHJ CZGP [Czech Rubber and Plastics Plants]:

Index	Ratio, 1985/1980, percent
1. Commodity output	118.1
2. Deliveries for domestic commerce:	
retail price	110.5
wholesale price	110.5
3. Deliveries for export to socialist countries	
wholesale price	116.2
all charges paid	114.2
4. Deliveries for export to nonsocialist countries	
wholesale prices	118.1
all charges paid	115.0
5. Imports from socialist countries	156.9
6. Noninvestment imports from nonsocialist countries, total	86.0
7. Profitability of production assets	123.7
8. Profit	155.0
9. Materials costs	94.2
10. Labor productivity in terms of gross output	116.4

Increasing commodity production by 18.1 percent during the Seventh Five-Year Plan will be an extremely demanding task which will have to be accomplished with essentially the existing facilities, with the exception of an increase coming from the new pipe-production capacities of the Optimit national enterprise in 1982-1983 and to some extent from new capacities built during the Sixth Five-Year Plan and put into operation in the Granitol and Kordarna national enterprises. Commodity production will focus on plastics processing using existing fixed assets and performed in the existing molded rubber groups (total growth of about 25 percent), because the increase in output of tires will be insignificant.

As regards deliveries for consumer goods inventories it will be necessary to direct our main efforts toward innovation, making products with greater functional and esthetic value. Particular attention will have to be devoted to the production of materials which are the basis of innovation and of greater utility value of consumer commodities by the supplier organizations (synthetic polymer leather and lightweight leatherette for the production of shoes, for haberdashery and for upholstery, plastic materials for packaging and the like).

In the case of automobile, bicycle and matorcycle tires it is universally expected that the rubber industry will make a particular effort not only to meet the delivery targets for consumer goods inventories but also to exceed them, since even current consumer demand is not fully met for certain varieties. A greater role in resources for consumer goods inventories must also be played by the development and production of radial automobile tires, particularly long-life tires for type S 105 and 120 vehicles.

In exports to socialist countries, sales of most products are established by bilateral agreements with the CEMA countries; the rest of the tasks will be met within the context of annual contracts concluded by OZO Motokov [supply and marketing department]. But to perform the task successfully it will be necessary that the producers in the VHJ CZGP fulfill their annual delivery assignments and devote more attention to product quality and to innovation within the product assortment.

An extremely demanding task is export to nonsocialist countries, particularly of tires. In spite of the increasing demands for delivery of truck tires for the domestic market, which have already been increased as a result of modern-design tires on new vehicles, it will be necessary to try to meet the requirements for export production, for example, of tractor rear tires (high protection levels and exhaustion of sources of new tires), radial automobile tires (increased lifetimes of tires on S 105 and 120 vehicles and a steady increase in the output of steel-belted radial tires). In exports to nonsocialist countries, it will also be necessary to effect structural changes in the molded rubber group by exporting high pressure piping, selected molded rubber products, consumer commodities, rigid PVC sheet, dipped rubber goods, printed packaging materials and the like.

One of the most important tasks in the present stage of preparation of the plans for the Seventh Five-Year Plan period is that of securing foreign exchange for imports from nonsocialist countries, because the difference between the VHJ CZGP's requirements and the planning organizations' resources still fluctuates widely in the case of other noninvestment imports and selected items. It will be necessary to concentrate maximum effort by leadership personnel and the initiative of all workers in rubber production and plastic and asbestos processing on the complete accomplishment of this task. Chemists, process engineers and economists must work in comprehensive fashion on the problems of conserving all kinds of materials, but particularly on conservation of raw materials imported from nonsocialist countries. Involved are such problems are as replacing natural rubber, conserving nylon cord and industrial fabric, and textile base materials for leatherette, greater utilization of rayon cord fabrics and steel cords, conservation of plastics by use of fillers, replacement of imported plasticizers, conservation of isocyanate systems for the production of PUR [Asbestos yarn] products, replacement of long-fiber asbestos and asbestos thread, conservation of reinforcing materials by better design of tires, hose, V-belts and conveyor belts, decreased tolerances in the production of all rubber intermediate and plastic end products, a decrease in the reject rate, and thus an achievement of absolute savings of raw materials, particularly in rubber and asbestos production.

But none of these changes and savings of raw materials can be achieved at the expense of quality; instead they must be accomplished while improving the utility value of products of the VHJ CZGP would be further aggravated.

The directive of the CSR government and the assignments of the CSR Ministry of Industry devote great attention to the construction of new production capacities in the Seventh Five-Year Plan; their effectiveness should manifest itself in a higher pace of development of the plastics industry during the Eighth Five-Year Plan and in a change in the breakdown of certain key products. One of the most important complexes will be State Special Program No 13, "Development of New Types of Truck Tires and Disk Wheels"; the CSSR government's decision to develop the project was published in Decree No 246/79.

State Special Program No 13 includes the following construction projects:

In the CSR Ministry of Industry

--the new No 2 tire plant of the Tudy rijen [Red October] national enterprise, for the production of wide tubeless radial tires (commencement 1982);

--the rolling mill of the Mitas national enterprise in Prague, for the production of rubber compounds (commencement 1985);

--production of S.5 R 17.5 narrow tires in the Mitas national enterprise in Prague (commencement 1986);

--construction of the Barum center in Prague (commencement 1985);

In the SSR Ministry of Industry

--stage 2 of Gumalna Vranov [Vranov Rubber Plant], for production of tires (commencement 1986);

In the Federal Ministry of Metallurgy and Heavy Engineering

Construction of a disk wheel production facility in NHKG [Klement Gottwald New Metal Works] Ostrava.

Accomplishment of State Special Porgram No 13 will have an important effect throughout society. The use of new types of tires and disk wheels will mean, when fully applied in traffic:

--an annual saving of 8,000 tons of rubber compounds with a value of 86.4 million korunas;

--an annual saving of 15,600 tons of steel worth 78 million korunas;

--a net annual foreign-exchange gain of 2,335,000,000 korunas (all charges paid).

Other important benefits will be realized in highway safety, in manpower savings, in a decrease in physical labor in tire maintenance and the like.

Current work on the plans for State Special Program No 13 indicates that it will now be necessary for VHJ CZGP to concentrate its attention on further improving the effectiveness of the resources committed to new investments and on preparing for experimental production of the S.5 R 17.5 narrow tires at the Mitas national enterprise and for experimental production of narrow tires at the Red October national enterprise.

In addition to investment construction, State Special Program No 13 also calls for an expansion of other capacities in VHJ CZGP by carrying out the following investment projects:

--reconstruction of the Rubena and Nachod national enterprises (commencement 1982);

--reconstruction of the Gumokov national enterprise (commencement 1984), and some other construction projects.

The development proposal for 1981-1985 assumes investment limits of 1,341,000,000 korunas and 1.2 billion korunas for work and deliveries budgeted at over 2 million korunas. During further preparation for the Seventh Five-Year Plan we may expect certain changes and transfers of investments as a result of overall inability to satisfy the demand for construction work in Czechoslovakia, the unavailability of steel structural members and the like. But these changes will not affect the beginning of construction projects in the VHJ CZGP in 1981. Even though investment activity in the VHJ CZGP will be higher in the Seventh Five-Year Plan than it was in the sixth, this VHJ still has several unsolved problems to which greater attention will have to be devoted. The main projects include rigid PVC sheet rolling lines, a technically and economically beneficial solution for modernization and expansion of the production of leatherette, preparation of a proposal for innovation in PVC floor coverings (particularly insulating coverings with a high degree of use of secondary raw materials and waste materials), perfecting the production of waterproof sheeting and the support of further projects associated with modernizing existing production facilities using the DNU form.

This exposition of the most important directions of development of the rubber and plastics industry indicates how demanding the accomplishment of the tasks of the Seventh Five-Year Plan will be in all areas of activity. But a particularly important task falls to the lot of research and development workers, technicians and economists who are responsible for timely preparation for production and capital construction. In compliance with the 18th CPCZ Central Committee session it will be necessary in particular to accelerate the science-research-development process. In addition, it will be necessary to make much greater use of the experience and knowledge of other research and development organizations and advanced schools, as well as scientific and technical results which emerge from bilateral and multilateral cooperation with the CEMA countries. Licensing policy will have to be used more thoughtfully than in the past for innovation of important products and for modernization of manufacturing processes.

It will be necessary to accomplish research and development tasks in a much more comprehensive manner not only with regard to production itself but in relation to the use of products as well. Particular attention is required in resolving the tire-vehicle-traffic conditions connection, where failure to take account of objective relationships has important effects throughout the society. Effective research and development also requires that assignments be broken down into shorter performance intervals, and that new forms of cooperation between the partners involved be found so as to achieve higher production and use effectiveness.

In accomplishing all the production tasks of the Seventh Five-Year Plan, particular concern and attention must be devoted to the labor and social conditions of workers, to material production workers in particular, and to education of the younger generation and accomplishment of the tasks of long-term personnel policy in the areas of management, science and technology.

The preparation and implementation of the individual plans for the Seventh Five-Year Plan period is likely to be successful under the new conditions only insofar as it

proceeds in accordance with the Set of Measures for Improving the System of Planned Management of the National Economy After 1980 and takes account of the activity of all workers.

The previous results achieved by the workers in the VHJ CZGP give no one grounds for misgivings as to whether the demanding tasks of the Seventh Five-Year Plan will be fulfilled without exception as regards both quantity and quality and that the rubber and plastics industry will, by its participation, aid in the comprehensive development of the Czechoslovak Socialist Republic.

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CZECHOSLOVAKIA

MINISTER VIEWS METALLURGY, HEAVY ENGINEERING IN SIXTH FIVE-Y[illegible] PLAN

Prague AUTOMATIZACE in Czech No 2 Feb 81 pp 29-31

[Article by Eng Ladislav Gerle, minister of metallurgy and heavy engineering of the CSSR: "Assessment of the Tasks Assigned to the Ministry of Metallurgy and Heavy Engineering for the Sixth Five-Year Plan by the CPCZ Central Committee"]

[Text] Czechoslovak metallurgy and heavy engineering play the key role in the development of the national economy of the CSSR. They are the preconditions for a rapid growth of the social productivity of labor on which depends the higher quality of the standards applied in construction, renewal and modernization programs for the technological production base of our economy. In our ministry, engineering production represents a progressive factor in the development of social forces of production and promotes technological progress in all other branches for which it provides the required technology. This function of engineering production is further enhanced by the fact that it represents an integral task in the development of our foreign economic relations, in the creation of most of the funds to pay for the imports our economy needs, and in enriching our domestic market.

Therefore, our party considers engineering a vital branch even at the current stage, and furthermore, the 15th CPCZ Congress outlined the preconditions for increasing engineering production statewide by 48-51 percent, approximately 70 percent of which is to be in Slovakia.

The tasks of heavy engineering in the Sixth Five-Year Plan are focused on the most vital areas of our national economy, above all on foreign economic relations, deliveries for the development of the Czechoslovak fuel and energy base, construction of new power engineering capacities and capital investment as well as supply of machinery and equipment for domestic consumers. Successful accomplishments and shortcomings in the fulfillment of the tasks during the Sixth Five-Year have, therefore, decisively affected the overall achievements of our economy.

The 15th CPCZ Congress specified that during the Sixth Five-Year Plan our engineering raise total exports by 72-74 percent. The exports included mainly products with traditional high export efficiency. Engineering was also assigned the task to become competitive in exports and highly efficient in those branches of engineering production that had not previously participated in exports. In the framework of the coordination of plans, an agreement was concluded for the Sixth Five-Year Plan with the CEMA member states to raise foreign sales of machinery by almost 60 percent over the Fifth Five-Year Plan. Deliveries of machinery and equipment to the USSR were up by 68 percent over the Fifth Five-Year Plan. Exports of investment units were among the most difficult tasks in engineering exports to capitalist markets.

The Sixth Five-Year Plan, therefore, assigned to the Federal Ministry of Metallurgy and Heavy Engineering [FMHTS] a considerable share in Czechoslovak exports to both the socialist and nonsocialist countries. That share also corresponded with the dynamism of material exports which was more progressive than the average dynamism in other branches of industry. For instance, the plan for 1980 envisaged that the supplier organizations of the FMHTS would increase exports by more than Kcs 3.6 billion over the 1979 level, with most of that increment, namely, Kcs 3 billion, produced by heavy engineering. Quite extraordinary efforts, therefore, necessary by the manufacturers and foreign trade organizations to raise purchase orders above the consumer-supplier relations thus far negotiated.

It appeared at that time that, even under the unusually difficult external conditions developing since the beginning of the second half of the Sixth Five-Year Plan, our metallurgy and heavy engineering proved their ability to fulfill and overfulfill the demanding tasks in volume of deliveries of finished products.

The growth of volume in exports delivered to the socialist countries in a very demanding structure proved outstandingly successful. Machinery and equipment particularly for metallurgy, chemical industry, nuclear power plants and engineering industry, and conveyances were delivered to the USSR. Among the most noteworthy deliveries were four-high rolling-mill stands, models 3000 and 3600, for the Azovstal plant, equipment for urea production, reforming machinery, electric and motor locomotives, streetcars, large-lot oil engines. In order to fulfill deliveries for the Soviet chemical, petrochemical, rubber and plastic industries, our ministry implemented all efficient technical and organizational measures, especially in the machine engineering works in Kralovo Pole, in the Victorious February Works, in the Skoda VHJ [economic production unit] and other cooperating enterprises representing the center of gravity in the fulfillment of exports to the USSR.

In the same way, our ministry exported machinery and equipment to other people's democracies, for example, to the GDR; hydroturbines delivered to the waterworks in Markersbach, Riesa tube-rolling mills and equipment for the urea-producing plant in Piesteritz should be mentioned as some of our outstanding achievements. Other important deliveries to other socialist countries were, for example, machinery for the heating plant in Sofia, rolling equipment for the Metallurgical Works in Katowice, equipment for steam power plants in Romania and Yugoslavia, all of them significant in terms of trade policy because they represent a certain contribution to the economic development in those countries.

Some deviations from the original tasks in the volume of exports to the socialist countries occurred due to specifications in schedules for certain programs, as for example, in cooperation with the USSR in the production of nuclear equipment, by switching contracts, etc.

Among noteworthy deliveries of investment units to the capitalist states were especially oil refineries in Salahuddin, Iraq, a concrete factory in Brainha, Brazil, a tire factory in Hama, Syria, power plants in Meshat, Iran, and in Soma, Turkey, and so on. In the final years of the five-year plan, however, our heavy engineering failed to achieve much of the initially planned growth in exports to the nonsocialist countries, mainly due to inadequate preparations for realizable exports of investment units.

Nevertheless, the FMHTS enterprises delivered higher volumes of technological equipment for almost every branch of our national economy, particularly for the fuel and energy base, on a scope substantially greater than commensurate with export volumes.

Giant technology, including KU 300 and KU 800 giant excavators, belt transport, stowers, RK 400 excavators and many other types of equipment were ordered for delivery to coal basins in the Krusne Hory area. All giant machinery was delivered during the five-year plan, and the remaining equipment will be delivered on schedule in the nearest future. Before the end of 1980, KU 300/24 machinery was put into operation in the Czechoslovak Army Giant Open Coal Cast and KU 300/25 equipment in the Druzba [Friendship] quarry. KU 300/26 will be operating before the end of March 1981 in the Vrsany quarry and in October, KU 300/27 will begin operation in the Merkur quarry and KU 800/28 in the quarry in Most.

Nevertheless, operations of the KU 800 giant excavators and long-distance belt transport for strip mining failed to fully satisfy. However, the schedules for assembly of the excavators were able to be cut, which benefits coal production, as in case of the assembly of KU 800/11 excavator in Vrsany which was cut by 5 months and the assembly of 6600/11 stowers cut by 4 months. The record assembly time of the KU 300/19 giant excavator in the quarry in Most, and of excavators, stowers and long-distance belt transport in the quarry of Chabarovice should be mentioned.

Heavy engineering was given an important task in the construction new 3,500-4,000 MW power capacities. Thus far, 4,487 MW in power-generating capacities have already been launched, particularly in power plants in Detmarovice, Pocerady II, Chvaletice and in the V 1 nuclear power plant in Jaslovske Bohunice. Test runs are taking place in the first 500 MW unit in the power plant of Melnik III. Furthermore, toward the end of 1980 tests began with the first set in the repumping hydroelectric plant of the Cierny Vah River. The set in the power plant of Dalesice is now under way.

In the Sixth Five-Year plan, very vital capital investment in metallurgy and heavy engineering focused mainly on building of capacities for the production of equipment for nuclear power engineering. Construction projects of numerous new metallurgical and engineering capacities were completed; especially important among them is the equipment for the development of the so-called tube program in metallurgical works and of the nuclear program in metallurgical works and engineering. The construction of tube-rolling mill No II in the Sverma Iron Works in Podbrezova and the first and second stages in the construction of the anticorrosive tube-rolling mill in the Tube-Rolling and Iron Works in Chomutov were completed; the construction of the equipment for the production of anticorrosive steel in the POLDI SONP [United Steel Works, national enterprise] in Kladno was finished, and the construction of equipment for continuous steel casting which will have a particular economic impact was launched in the Sverma Iron Works in Podbrezova in 1978. Also, the construction of the equipment for threaded welding tube manufacture in the iron Works in Veseli na Morave and for the production of welding oil pipes in the New Metallurgical Works of Element Gottwald in Kuncice was completed.

In addition, our heavy engineering is now operating new capacities for the development of the nuclear program on the basis of the USSR-CSSR agreement on cooperation in the production of equipment for nuclear power plants. Czechoslovak metallurgy and heavy engineering received orders to produce and deliver essential units of the primary circuit for the VVER 440 and VVER 1000 nuclear power plants and some other components.

This task was entrusted primarily to the Skoda VHF in Plzen and Vitkovice. The production of vital components, such as the drum of the pressure tank, its inner core, upper unit and control mechanism of fuel cells, was included in the production program of the Skoda VHJ. A reactor hall with 49 auxiliary and power facilities had to be built expeditiously in the Skoda sectorial enterprise. In accordance with the interstate contract, the first pressure tank for the construction of the Paks nuclear power plant in Hungary was delivered in March 1980.

A demanding reconstruction project was completed and the existing production base was expanded for the operation of the nuclear program in the sectorial enterprise in Vitkovice, particularly the production of ingots from special types of steel, sheet processing, shaping of forged pieces, machining of individual parts, and assembly of finished products (steam generators and volume compensators).

The cycle of key investment programs launched during the Sixth Five-Year Plan in Czechoslovak metallurgy and heavy engineering in the production of equipment for nuclear power plants was closed with the construction of two new capacities for the manufacture of separators and condensers in the Slovak Power Engineering Works NP in Tlmace and Zeliezovce, with the work on eight projects and reconstruction of the manufacture of fittings in the Sigma VHF, a new plant producing welding materials in the Antonin Zapotocky Iron Works NP in Vamberk. The Ministry of Metallurgy and Heavy Engineering launched the construction of additional facilities and capacities in Vitkovice, in the New Metallurgical Works of Klement Gottwald, in the East Slovakia Iron Works, in the Iron Works of Trinec, which will begin operation during the Seventh Five-Year Plan. However, due to general restrictions in the distribution of investment funds in annual plans, it was necessary to transfer to the Seventh Five-Year Plan certain operations of the reconstruction and modernization program in the heavy engineering production and technological base.

As for deliveries to other consumers, I shall list here the most significant construction projects. Operations launched in the petrochemical facilities of the Slovnaft NP in Bratislava, Spolana in Neratovice, Kaucuk in Kralupy and the CSSP [Czechoslovak-Soviet Friendship] Chemical Works in Zaluzi proved outstandingly successful.

The reconstruction of the transit gas pipeline will increase the transport capacity of the gas system up to 37 billion cubic meters of gas per year. Our construction industry gained additional cement plants in Zahorie II and Prachovice. The Sigma VHF also delivered to full satisfaction irrigation equipment for our agriculture. However, all large-capacity silos for grain storage could not begin full-scale operation and the envisaged increment in their storage capacities could not be reached.

Serious shortcomings in deliveries of investment units stem from our insufficient capacity in the manufacture of boilers and water-treatment plants. This kind of equipment frequently holds back the completion of investment units and their scheduled operation, as do the deliveries of transformers, cranes, distributors, fittings and pumps.

Heating equipment for apartments in housing developments has not always been delivered on schedule during the Sixth Five-Year Plan. Problems in the construction of boiler rooms in housing units are related mainly to the coordination of operations

between construction enterprises and suppliers of technological components. Thus, due to the shortfalls in construction planning, consecutive assembly and technological operations are sometimes all crammed into short periods of time.

Changes and adjustments in the planned management system of metallurgy and engineering assumed a very special place in the measures planned and gradually implemented upon the incentives of the third session of the CPCZ Central Committee. Efficiency of the intensified planning system of sectorial structure, construction, sales, technological development, control of quality and planning, and investment regulation was introduced and tested in recent years. An accounting system was planned in detail and specified mainly in terms of material relations in the replacement process; the coordinating system was expanded and enlarged. Thoroughly detailed measures pertaining to the capacities of higher supplier functions helped further intensify the system of supplier-consumer relations; expedient changes were introduced in the organization of management of the technological production base in metallurgy and engineering; efficiency of adjusted economic tools, particularly in terms of export incentives, standards of innovations and improvement of quality, was tested and extended first to individual adjustments and then in the framework of the comprehensive experiment in controlling efficiency and quality in selected economic production units. All such measures helped fulfill objective tasks of the plan and by the same token, they enabled us to gain experience necessary for the development of the Set of Measures for Improving the Planned Management System of National Economy After 1980.

Summary reviews of the fulfilled tasks assigned to the FMHTS for the Sixth Five-Year Plan by the 15th CPCZ Congress, therefore, underscore many positive achievements as well as certain shortcomings and problems.

One of the negative aspects of development so far is the fact that, despite numerous regulations introduced in the sector of capital investment, metallurgical and heavy engineering economic production units failed to entirely avoid delays in planned schedules of construction of internal investment programs and to reach promptly the outputs planned for the new capacities. Furthermore, consumption in production could not be fulfilled in the volumes and in the necessary structure of deliveries from supplier ministries, which created a problem that has not been completely resolved. Many problems arose from the activation of internal research and development, which was reflected in the low level of innovations of the production in enterprises of heavy engineering and in the quality and reliability of its products.

In conclusion, it should be affirmed that all decisions and incentives of the third session of the CPCZ Central Committee, further expanded in the discussions and decisions of the subsequent sessions of the CPCZ Central Committee, have objective long-term applications in the further development of metallurgy and heavy engineering.

The plan for 1981 and the economic program for the Seventh Five-Year Plan are based on the application of our previously gained experience and its further elaboration and specification of issues initially drafted for the solution of lasting problems in the development of metallurgy and heavy engineering.