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USSR Report

MACHINE TOOLS AND METALWORKING EQUIPMENT



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21 AUGUST 1986

USSR REPORT
MACHINE TOOLS AND METALWORKING EQUIPMENT

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INDUSTRY PLANNING AND ECONOMICS

MINISTER ASSESSES IMPACT OF MINISTRY'S REORGANIZATION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Feb 86 p 2

[Article by M. Shkabardnya, minister of Instrument Making, Automation Equipment, and Control Systems, delegate to the 27th CPSU Congress: "The Reconstruction Mode"]

[Excerpts] We instrument-builders feel these changes particularly acutely. There is virtually no industry in the national economy that could along without our products. This is understandable: only extensive introduction of automation, modern computers, and equipment with programmable control into industry can realize our hopes for any appreciable progress in the economy and, therefore, in social development.

On January 1, Minpribor [Ministry of Instrument Making, Automation Equipment, and Control Systems] switched to a two-part management system. Sixteen all-union industrial associations were eliminated. Some of their staffs were absorbed by ministry subdivisions; more than 170 people are now working at our Moscow enterprises; and some of them have retired.

A scientific-technical center has been created for instrument-building and automated control, uniting the ministry's leading scientific forces. Its task is to develop the vital trends which define the acceleration of scientific-technical progress, to coordinate everything in the industry related to this work, to conduct promising research, and to devise unified principles for building instruments, computer equipment, and control systems. Now we are forming a similar scientific-technical complex which will develop and produce specialized process equipment.

It is here in the industry's powerful nerve center that its technical policy should be formulated and concrete goals for elevating the technical level and quality of goods and ways to reach them that are typical of intensive management methods should be defined. Hence, scientific-technical management of institutes and design organizations must be accomplished.

There are almost no independent institutes and design bureaus left in the industry: except for leading research institutes, they have been incorporated into production or scientific-production associations. The number of independent enterprises and associations has been halved as well. Behind these changes is a very complex and painful process. It was

necessary not simply to consolidate enterprises, but to take into account their territorial distribution, existing relationships, specializations, and personnel profiles. Of course, these mergers did not always succeed in being organic or natural, and perhaps we will have to go back to some of the associations which were created. However, the industry restructuring is basically complete, and we believe that it is creating conditions favorable for intensifying instrument building.

The experience of our production and scientific-production associations confirms this. They have long had their own specialized research institutes or design bureaus, such as, for example, the "Impuls" Northern Don Scientific-Production Association and the "Sigma" Production Association in Vilnius. There, it takes an average of a year less to create new equipment, the equipment is world-class, and production is being restructured rapidly and competently. We have now created opportunities for general dissemination of this experience. The activity of our scientific-technical complexes is a powerful impulse for the industry's accelerated development. The two-part system will make it possible to raise the efficiency of enterprise management and strengthen interaction with management, giving it new meaning.

Of course, only man can realize this potential. Now we basically have to change our style, primarily overcoming the habit of seeking not answers to problems as much as the reasons used to justify unwillingness to solve them. Unfortunately, this sickness plagues quite a few of us, even in the Ministry and at enterprises. The problem is further aggravated by the fact that few newly created production and scientific-production associations have management apparatus ready to perform new functions: planning the activity of subordinate enterprises, financing them, compiling status reports, etc. The problem is not so much lack of personnel as the lack of competence and professional training. It is precisely this incompetence which is the source of that most faulty style, by which problems are not solved, but tossed from one department to another, while every comma requires a document.

This is why problem number one for us today is the personnel problem -- primarily top management. If we only had enough directors like A. Chuplinskis ("Sigma" Production Association) and L. Kulik and G. Kligerman (Orlov and Saransk "Prompribor" Production Associations), who know how to select competent, self-starting specialists and to teach them the art of "tackling problems themselves," many of our problems would be solved more easily and more quickly.

It's true that, to a certain extent, restructuring is helping us to accomplish this: having sharply reduced the number of associations and abolished all-union production associations, we have gained the ability to select the best personnel and promote promising young people. Nevertheless, the problem is still acute. It is sufficient to say that, in some cases when, according to all the rules, a scientific-production association should

be created , we have taken a temporary measure and subordinated an institute to a plant because the research institute's director and his staff were not ready to head and manage a scientific-production association.

Recognizing the importance of this work, we are giving it undivided attention. In close contact with association, city, and oblast Party committees, we are actively involved in selecting promising specialists, taking them on, and preparing them for advancement. The industry institute for personnel retaining has introduced a major course in new management methods using management automation and computer-aided design systems. We are using to the fullest the capabilities that the main management training center -- The USSR Academy of the National Economy -- offers the industry.

Speaking of changes in industry management organization, we cannot ignore the general problems of structuring management mechanisms and improving planning. At the CPSU Central Committee's April (1985) Plenum, the Party Central Committee's meeting on accelerating scientific-technical progress emphasized the need for comprehensive restructuring of the economic management system at its upper echelons and for altering the functions of planning agencies. However, there are still no signs of substantial progress in this area. As before, hundreds of indices have been established for the Ministry -- there are more than five hundred for new equipment and production process alone. And we, naturally, have to get all this to the associations. What kind of initiative and independence is this?

Unfortunately, the process of improving planning is still a one-way street: measures taken are those developed by planning agencies, while ministries' feedback on improving the planning system and expanding their rights are not only not considered, but are often not even discussed. I think that it is this subjective factor and the inertia of existing methods that today are among the primary hindrances to comprehensive restructuring of the management mechanism.

This is the second month of the new five-year plan -- the five-year plan of restructuring. Industry association and enterprise collectives have made a good start: they successfully fulfilled January's planned goals, and competition in honor of the 27th CPSU Party Congress reached its peak during that time. Instrument builders are fully committed to marking this important event in the life of the Party and the country with a further boost in acceleration.

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INDUSTRY PLANNING AND ECONOMICS

USSR, BULGARIA ENDORSE CLOSE TIES IN MACHINE TOOL PRODUCTION

Machine Builders Unite Efforts

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 p 18

[Text] The further development of coordinated efforts by CEMA member nations requires a creative and innovative approach, it was emphasized at the 27th CPSU Congress. Congress documents call for direct and decisive interaction between branches and enterprises, the development of direct economic ties, and the creation of joint associations, design bureaus and laboratories.

An important step in this direction was the signing in late 1985 of an intergovernmental agreement to establish two joint Soviet-Bulgarian scientific production associations in the field of machine tool construction.

Correspondents of EKONOMICHESKAYA GAZETA and the BCP Central Committee weekly, EKONOMICHESKI ZHIVOT, asked leaders of the ministries and enterprises in both countries to comment on the targets, tasks and initial steps of these associations.

Plant Conveyors in Rhythm

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 p 18

[Statement by V. P. Kabaidze, general manager, Ivanovo Machine Tool Production Association and Here of the Soviet Union]

[Text] Many years of friendship tie us to the Bulgarian machinists. The first models leaving the Sofia Metal-Cutting Machine Tool Combine were designed with the help of Soviet specialists. A qualitatively new principle of joint activity will enable the unification of resources and scientific potential for raising the technical level of production and standardization of products, which will significantly increase the labor productivity.

The tentative program of Soviet-Bulgarian work entails the creation of 2,700 "machining centers" of 15 types, a broad assortment of assemblies for mutual cooperative shipment, including NC systems and programmed controllers in the amount of 172.3 million rubles, during the term of 1986-1990.

An object of special concern of the Soviet-Bulgarian NPO [scientific production association] will be to outfit the equipment with NC systems, command controllers, data units and accessory parts and instruments manufactured by the EMA member-nations, which will greatly reduce the import of these articles from the capitalist nations.

Our ties to the Bulgarian machinists are growing each day. The partnership is quite dependable. In no more than four months the Bulgarians have created a new machine and set up its series production. This is an excellent pace, and we should work no less well.

At the 27th CPSU Congress I twice had the opportunity of meeting the general secretary of the BCP Central Committee, Todor Zhivkov. Our proposals for further solidification of the scientific-technical cooperation in the context of intergovernmental NPO received total support. The Soviet and Bulgarian machinists are united in their desire to provide the national economy of the friendly nations with the most advanced machine tool technology.

Demand of Times

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 p 18

[Statement by S. I. Pavlov, general manager, "Red Proletariat" Machine Tool Production Association, Moscow]

[Text] Cooperation in the context of modern production is the order of the day. Both we and our Bulgarian colleagues have arrived at such a conclusion. The unification of our efforts promises equal benefits to both partners.

Today, the most important thing is to create a maximum-effective, efficient, dependable and simple mechanism of managing the joint Soviet-Bulgarian association during its daily operation. There have been no forerunners in this respect, and everything must be done from scratch. We shall consistently search for advanced forms and methods of collaboration.

In the current five-year period, our Bulgarian partners will provide us with various assemblies and control units for robots and manipulators and NC machine tools with assembled electric actuators in the total amount of approximately 320 million rubles. "Red Proletariat," in turn, will use these items in the production of more than 16,000 machine tools for working of body-of-revolution type parts.

We have already held several work conferences with our Bulgarian colleagues on routine matters of the collaboration within the framework of the NPO. A

plan of measures has been worked out to upgrade the designs of robots. Specialists of the "Red Proletariat" have submitted specifications for future projects to the partners. A unified viewpoint on the development of robot engineering is being worked out in common.

One of the important tasks is swift adoption of major new projects. Having fortified its design bureau by the unification, the NPO also gained the capability of deciding where to introduce the series manufacture of innovations. The mutual economic benefit of such approach is obvious.

We are also deciding how to bring together the collectives of our enterprises and increase their awareness of each other. For example, "Red Proletariat" is planning an exhibition devoted to people and events, "Beroye." The library has already begun to fill with literature on Bulgaria, its history, science, industry and culture.

During the 27th CPSU Congress, a delegation of the Bulgarian Communist Party headed by general secretary of the CBP Central Committee and chairman of the Council of State of the People's Republic of Bulgaria, Todor Zhivkov, visited "Red Proletariat." The envoys of the friendly neighbor acquainted themselves with the achievements of the plant in fulfilling the tasks of social-economic development and creation of new technology on the basis of cooperation with the PRB in the context of the newly created Soviet-Bulgarian scientific production association.

Course of Scientific Progress

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 pp 18, 19

[Interview with K. Stanilov, first deputy minister for machine construction, People's Republic of Bulgaria; time, place, and interviewer not given]

[Text] [Question] Describe, if you will, the general level of economic and scientific-technical contacts between the PRB and the USSR in the area of machine tool construction.

[Answer] Nearly all the Bulgarian economic organizations and scientific institutes involved in the production of metal-working equipment are cooperating with more than 40 plants and 15 scientific and design organizations of the USSR. The cooperation has been especially successful in the past five year period.

During this period, Bulgarian machine construction provided transportation systems, special integrated machines and gantry manipulators as accessories for more than 300 automated production lines manufactured by the USSR Ministry of the Machine Tool Industry for the needs of Soviet industry. The Bulgarian machinists are actively involved in the cooperative production of equipment for the second phase of the Kamsk Automotive Plant and a number of other machine building enterprises of the USSR.

Such cooperation, based on long traditions and successful interaction at various levels, has opened extensive prospects for further intensification of specialization, scientific-production and economic cooperation.

[Question] Why were the joint Bulgarian-Soviet scientific production associations created?

[Answer] Scientific-technical progress is placing increasing demands on multi-lateral cooperation between Bulgaria and the other socialist nations and increasing effectiveness of the international socialist division of labor. An economic conference of the CEMA member nations and subsequent meetings of the leaders of the friendly nations, especially the 41st (extraordinary) session of the CEMA, outlined the main directions in the future development of specialization and cooperative production.

A long-range program of development of economic and scientific-technical cooperation between the PRB and the USSR for the term up to the year 2000, signed by comrades P. Zhivkov and M. S. Gorbachev on 7 June 1985, opened up new prospects of intensification and enlargement of the integration ties between our countries. A specific expression of this was the intergovernmental agreement for creation of two joint Bulgarian-Soviet scientific-production associations in the field of machine tool construction.

One of these created the Bulgarian State Economic Association "Metal-Cutting Machine Works" (GKhO ZMM) (Sofia) and the Ivanovo Machine Tool Production Association. The other instituted the "Beroye" Scientific Production Economic Combine of Robot Engineering (Stara-Zagora) and the Moscow "Red Proletariat" Machine Tool Production Association.

The joint associations are founded on the basis of Bulgarian and Soviet economic organizations with a solid resource base and excellent personnel, which have been very successful in the development and production adoption of new types of promising metal-working equipment.

Both associations are a new integration form, an important experiment, which is verifying the mechanism of the future development of close cooperation between friendly nations on a bilateral basis. Conditions are being created not only to improve the cooperation, but also to elevate direct contacts between the enterprises of the two countries to a qualitatively new level and intensify the cooperation and specialization between them.

[Question] What in the activity of the joint associations will be fundamentally new?

[Answer] The administrations of the scientific production associations have the status of independent legal entities and broad powers in the area of management. The NPO will operate under a single leadership, exercised by the general directors of the economic organizations. The associations on the foundation of unified, jointly developed annual and five year plans will implement a

general coordinated scientific-technical policy and carry out a program of development and manufacture of products in a cooperative framework. They have been granted the power to conclude specific agreements on the basis of international contracts and carry out a direct interchange of integrated products, subassemblies and materials. In this way, conditions are created for an accelerated fulfillment of the goals set by the associations. They have the possibility of efficient exchange of experts and workers and a mutual training of personnel. For purposes of fulfilling the first-priority tasks in the development of new and promising types of machinery, joint scientific design bureaus and temporary teams of specialists have been organized to operate within the associations.

And another important goal is achieved: elimination of duplication of research and production. An optimal development, specialization and cooperation of production are obtained, which assists in more complete satisfaction of the needs of both countries for high-efficiency machinery which meets the progressive international standard.

[Question] What are the specific goals of the new scientific production associations?

[Answer] Strategically, the goal is to multiply the quantitative and qualitative impact in the production of modern "manufacturing centers," metal-cutting NC machine tools, robots and manipulators, and on the basis of these, flexible manufacturing modules and systems.

The scientific research projects are aimed at both joint associations modernizing their production in the just-begun five year period in accordance with the latest progress in science and technology.

New Degree of Coordination

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 pp 18, 19

[Interview with N. A. Panichev, first deputy minister of the USSR Tool and Machine Tool Industry; time, place, and interviewer not given]

[Text] [Question] It probably would not be an exaggeration to call the Soviet and Bulgarian machinists pioneers. But the stereotype of a "first step" is usually associated with the word "difficult." In fact, it is difficult to be the first to start from scratch, as the saying goes.

[Answer] I don't know whether life has ever been easy for the machinists. As for a "zero production cycle," we are not beginning the construction of the Soviet-Bulgarian scientific production associations on barren ground. My colleague, first deputy minister of machine construction of the PRB, Kristo Stanilov, has rather accurately described the state of economic and scientific-technical cooperation between the USSR and Bulgaria in the field of machine construction. I may add that, in the past five year period, we not only cooperated profitably, but also laid the fundamental principles of our

collaboration. In the first place, we are focused on the end result: from the scientific research, development, construction and testing of models to the organization of mass production. The links in this chain have been largely strengthened by direct and immediate contacts between the enterprises and organizations of our ministries. The establishment of close working contacts enabled a more than 2.8-fold increase in circulation of machine tool goods between the USSR and the PRB in the last five-year period.

The Bulgarian machinists are reliable partners with an excellent international reputation. To equip those 300 automatic production lines for the needs of the USSR industry as mentioned by comrade K. Stanilov, the PRB has developed and organized a mass production of six types of transport system and gantry manipulators of various load capacity. In 1981-1985 our Bulgarian friends have supplied us with around 18,000 meters of transport systems and 300 special and integrated machine tools.

The USSR and the PRB are mass producing seven jointly developed types of hydraulic equipment with a unified documentation. In the past five year period, the shipment of these to our country exceeded the sum of 130 million rubles. The Bulgarian machinists produce electric actuators for NC machine tools and robots. Around 90,000 such products have already been manufactured by 17 factories of the Ministry of the Machine Tool Industry.

I won't overwhelm the readers with numbers. Let me just say that the transition to a qualitatively new basis of joint activity is a natural stage of the friendly Soviet-Bulgarian scientific-technical collaboration and has a rather solid foundation beneath it.

[Question] The priority in creation of unified scientific production elements in the CEMA framework has been given to the machine tool industry. Why this in particular?

[Answer] Let's take a look at the Basic Directions of Development of the Country approved by the 27th Party Congress, noting these words in particular: "The first priority is a radical redesign and progressive development of the machine construction complex, primarily machine tool construction...." You see: "primarily." Machine construction is the foundation of scientific-technical progress. In the 12th Five-Year Period we must increase the volume of production of machinery and tools by more than 1.5 fold, that of NC machines and flexible modules by 2.3 fold, and automatic and semiautomatic machine tool lines by 43 percent. Nor should we forget the production of modern tools to outfit this machinery.

Reality convincingly demonstrates that socialist integration in the field of machine tool construction is highly effective. Judge for yourself: In 1985 the Moscow "Red Proletariat" production association received a volume of accessory parts from the CEMA member nations equaling one fifth of its entire production volume. The primary suppliers were the Bulgarian machinists, including the "Beroye" combine. It was logical that these two enterprises should be the ones to combine forces.

The Soviet and Bulgarian machine tool builders have been set the task of creating new and progressive machinery: "machining centers," flexible manufacturing modules and systems. We are best able to handle certain elements of this task, and our partners--others. For example, the Soviet machine tool builders have a great potential of scientists and technicians who know how to develop and design new machines. We also have trained, modern-oriented technologists and experience in automation of industrial processes.

Our Bulgarian friends have achieved much in the creation of a number of sub-assemblies and articles as machine components: electric actuators (which I already mentioned), hydraulic and pneumatic equipment, integrated subassemblies, various appliances and much else. It is obvious that the combination of forces with clear division of labor and close cooperation is the shortest route to a mutually profitable end result.

[Question] What are the goals of the Soviet-Bulgarian associations in the present five year period?

[Answer] The main goal is maximum satisfaction of the USSR and PRB need for the most modern types of machinery necessary in the re-outfitting and redesign of the major machine construction enterprises. In our country, the associations AvtoZIL, GAZ, AZLK, the factories of the Ministry of Farm Machinery and the Ministry of Stock Breeding Machinery, and other ministries are awaiting the products of the Soviet-Bulgarian NPO in our country.

The preliminary work programs involve an increase in the overall volume of manufacture of products during the current five year period at the MSPO associations "Red Proletariat"/"Beroye" and the Ivanovo SPO/GKhO ZMM by more than twofold. As you can see, this is beyond the level of numbers specified by the Basic Directions.

Solid Foundation

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 p 19

[Statement by Basil Tyurkedzhiyev, general Manager, Stara-Zagora Scientific Production Management Combine]

[Text] Intensification and increased effectiveness of production on the basis of improved international socialist division of labor, intensified cooperation and direct contacts, and acceleration of the scientific-technical progress are the primary ideas behind the agreement to create a joint Bulgarian-Soviet scientific production association for the manufacture of NC machines, flexible manufacturing modules, industrial robots and manipulators.

The association is founded on the basis of the Bulgarian scientific production economic combine for robot construction Beroye (Stara-Zagora) and the Moscow "Red Proletariat" production association.

The goal of the association is the manufacture of high-efficiency competitive products at a modern level, which should enjoy an increased demand both in the PRB and USSR and on the international market. The goal should be reached by combining the scientific potential of the founders in carrying out joint scientific projects and research and in the unification of the design of the products. The combination of production capabilities permits the organization of a more narrow specialization of each industrial enterprise, an efficient exchange of finished subassemblies and parts, a closer cooperation in manufacturing, an improved supply of materials and technology, and a solution of a number of problems concerning the operation and maintenance of the products.

The realization of these goals should bring about a sharp improvement in the production and an enhanced labor productivity, better quality and performance of the manufactured products and, consequently, a higher economic impact.

Worthy Partners

Moscow EKONOMICHESKAYA GAZETA in Russian No 15, Apr 86 p 19

[Statement by Shiliyan Petrov, general manager, Metal-Cutting Machine Plant of the State Economic Association in Sofia]

[Text] Considerable scientific potential, solid resource and technical base, and expanding production of the latest technology characterize the State Economic Association "Metal-Cutting Machine Works." This has made it a worthy partner of the Ivanovo Machine Tool Production Association in the job of creating a joint Bulgarian-Soviet scientific production association for the development and manufacture of "machining centers," flexible manufacturing modules and systems. The two major economic organizations, well known among the CEMA nations, have combined forces in the joint work of prognosis, research and development, production, sale and technical servicing of the latest models of machinery and systems manufactured by them.

By combining efforts in the entire production cycle, both economic organizations are creating conditions to enable an updating of the full production in the shortest time and supply of new, high-performance, reliable machines and systems to the machine construction enterprises. This enables a rational modernization of the technological processes of machining, which are currently the most labor intensive.

The international association, abbreviated as the "Ivanovo SPO/GKHo ZMM," will produce "manufacturing centers," modules and flexible automated manufacturing systems, organize the development and production of new machinery for thermal processing and measurement by laser and other techniques in the just-begun five year period.

The possibilities of developing direct contacts between the enterprises of the association and the consumers and participation of the latter in the development and adoption of new technology are enlarged. This creates the preconditions for faster set-up of production and adoption of modern high-performance machines in the economy.

The main attention of the new international association is directed at solving the most urgent problems of the machine construction industry in Bulgaria and the Soviet Union. Nor is the foreign market neglected, where both organizations of the new association already have rather strong positions. A unified foreign trade policy on the basis of the latest technology will allow the association "Ivanovo SPO/GKhO ZMM" an even stronger position on the world market.

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INDUSTRY PLANNING AND ECONOMICS

PARTY CENTRAL COMMITTEE CONFERENCE ON IMPROVING MACHINE BUILDING

Moscow IZVESTIYA in Russian No 143, 23 May 86 p 1

[Text] In the Central Committee of the Communist Party of the Soviet Union on May 21, a conference was held on the question of further development of machine building industries, and of heightening the technical level and quality of products that are being manufactured.

Taking part in the work of the conference and addressing it were comrades N.I. Ryzhkov, L.N. Zaykov and N.V. Talyzin, deputy chairmen of the USSR Council of Ministers A.K. Antonov, I.S. Silayev, Yu. D. Maslyukov and G.I. Marchuk, and ministers of the USSR, chairmen of state committees, and responsible workers of the Central Committee of the Communist Party of the Soviet Union.

M.S. Gorbachev, General Secretary of the Central Committee of the Communist Party of the Soviet Union, gave a major speech at the conference.

It was noted at the conference that following the April (1985) Plenum of the Party Central Committee, active work was launched in the country on implementing a nationwide program for the advancement of machine building in the 12th 5-Year Plan and up to the year 2000.

Machine building industries have reached a status of stable work. In doing so, the best success is being achieved where the attitude toward business has changed, and where labor collectives have become actively engaged in seeking out new ways and are solving problems of the design, production and introduction of advanced equipment and technology with initiative and in a responsible way.

Special attention was devoted to supplying machine building industries with high-quality materials and products, to building up their own machine-tool stock more quickly, and also to priority development of instrument building, electrical equipment and electronics. Every institute and every design bureau must have a system of objective assessment of the technical level which takes into account the dynamics of the scientific-technical revolution. Introduction

of domestic inventions must be accelerated, and the whole system of scientific-technical information must be improved.

It was emphasized that leaders of machine building ministries, associations and enterprises, as well as scientists and specialists, must solve in a short period of time a fundamentally important task--advancing domestic machine building to leading positions in the world.

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INDUSTRY PLANNING AND ECONOMICS

LITHUANIA'S AUTOMATION BARRIERS, PROBLEMS DISCUSSED

Vilnius STROITELNAYA GAZETA in Russian 6 Jun 86 p 2

[Article by LiSSR Gosplan NIIEP [Scientific Research Institute of Economic Planning] Construction Planning Section Manager and Candidate of Economic Sciences Yu. Kuplyauskas, Vilnius, under the rubric "The Management Mechanism: Experience, Problems": "The Truth of Fact"]

[Text] Planning calculations in construction were appreciably simplified with the advent of computers. Many routine operations have been automated. A completely automated system of planning calculations (ASPR) has taken shape. On the agenda is the question of combining it with other automated systems--construction ASUs [management automation systems] and ASGS (state statistical) [management systems]. We are doing that here in our republic, although not as quickly as we would like. There are obstacles enough. There are also departmental barriers here and imperfections in some norm documents.

Among the tasks we are resolving, a leading place belongs to the determination, utilization and forecasting of production-capacity development. We have encountered great difficulties here, basically of methodological procedure. We even had to introduce corrections in the existing technique of the Interim Recommendations for Determining the Productive Capacity of Construction and Installation Organizations, approved in 1981 by USSR Gosplan, USSR Gosstroy [State Committee for Construction Affairs] and USSR TsSU [Central Statistical Administration].

In fact, how does a contract organization determine its capacity if data required to calculate it do not exist?! The discussion concerns intra-shift and full-shift time losses of construction machinery and equipment. The collection of such information is envisaged neither by statistical reporting nor by intra-departmental accounting. As for time-study observation, it has a fragmentary nature and is not distinguished by great precision. But without these data, the formula for average annual capacity cannot be worked out.

It is necessary to apply flexible algorithms that permit the execution of calculations in the absence of this or that indicator.

The calculation of the utilization factors of labor and machinery resources should be simplified. The former is determined today based on the grouping of workers by specialties, and the latter for each group of leading construction machinery and equipment. Such detail is not only not worth the large labor expenditures, but is simply superfluous: the calculations are possible at a more aggregated level. The precision will not be missed here.

The determination of the coefficient of change in the structure of operations must be approached in an analogous manner.

In the calculation of productive capacity, we also encountered difficulties of another sort. Part of the information stipulated by statistical reporting is not reliable. Take, by way of example, this indicator: "worker intra-shift idle time." As proven by practice, contract organizations have no vested interest in presenting reliable information. In the statistical reporting in Form ZT--"Labor Plan Fulfillment in Construction"--the value of the indicator on line 26, "number of man-hours of intra-shift idle time," as a rule, is greatly decreased, and some construction organizations do not show it at all. For example, a number of organizations of LiSSR Ministry [Ministry of Construction] (Klaypeda Construction Trust, Klaypeda DSK [House-Building Combine], Shaulyay DSK, Mazheykyay Construction Trust and others), according to the reporting, did not have a single hour of intra-shift idle time over the course of 1985. They were not much outdone by the Kaunas Construction Trust, which indicated 14 man-days of idle time in all, which totals 0.0019 percent of the time worked. For the ministry overall, the losses mentioned over the year totaled 328 man-days, or 0.0047 percent of the time worked. The picture is roughly the same among the construction organizations of other republic departments.

Based on observations and expert estimates, however, intra-shift idle time totaled 8-12 percent of the time worked, and much more for some construction sites.

All of these difficulties in using the Interim Recommendations cannot have a positive effect on improving planning. Many construction organizations refused to calculate productive capacity. Some construction departments tried to create their own methodological recommendations--unsuccessfully, by the way.

In order to improve fundamentally the situation, the construction planning sector of the NIIEP of LiSSR Gosplan developed an interim technique, within the framework of the ASPR, and carried out calculations for determining the productive capacity of construction organizations.

We had difficulties, however, with the introduction of standards that permitted the disclosure of additional reserves of work time.

In determining the coefficient of the extensive utilization of labor resources, for example, we took into account time losses due to an increased rate of illness, as well as absences from work with administrative permission. We began to calculate them as unutilized reserves of work time.

Setting standards for absences from work due to illness was undertaken by the republic committee of the construction and building-materials industry trade union. The contract organizations, however, ignore these standards in their planning work. The actual time loss is usually 10-15 percent greater than the norms. For LiSSR Minstroy, for example, absences connected with illness in 1985 totaled 334,000 man-days, or 5 percent of time worked.

Can standards be set for this type of time loss at all? It is essential. The amount of absences from work here depends greatly on administrative activity. It is no secret that where this area of work is neglected (the violation of equipment-safety rules, the unpreparedness of the facility for operations under winter conditions), the number of absences due to illness, as a rule, is appreciably greater than usual.

Standards for absences from work with administrative permission have also not yet been established. Many managers, wishing to embellish the state of affairs at the construction site, include absentees and other violators of labor discipline in the reporting column "work absences with administrative permission." Time losses for this item total an average of 0.1-0.8 percent of the time worked, and almost half of them are groundless.

In determining the extensive utilization coefficient of machinery resources, time reserves for repairing and awaiting the repair of construction machinery and equipment were also taken into account. The actual data are reflected in statistical reporting Form 1-NT. The norms for the duration of repairs and the time waiting for the repair of construction machinery and equipment, however, are not reflected in this report. Accordingly, no one is properly monitoring them. Can it be surprising, for example, that time expenditures on repairing construction machinery and equipment in 1985 for LiSSR Minstroy alone exceeded 86,000 machine-days, or 16 percent of the machine time worked?

We had to develop interim norms for repair and awaiting the repair of construction machinery and equipment for each organization overall.

It is unnecessary to prove that the contractor organizations should be occupied with the development of such norms. The planning organs and TsSU cannot withdraw from the resolution of the given issue.

Research on productive capacity was at an inadequate level in the last five-year plan. The available calculations for the 12th Five-Year Plan confirm that it is essential that the planned volume of construction and installation work be more closely coordinated with the productive capacity of construction organizations and in this way ensure the utilization of all reserves for increasing the intensification of construction work.

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INDUSTRY PLANNING AND ECONOMICS

ACADEMICIAN DISCUSSES SLOW ADOPTION OF INNOVATIONS

Moscow IZVESTIYA in Russian 17 Apr 86 p 2

[Interview with USSR Academy of Sciences Vice President Academician Konstantin Vasilyevich Frolov by IZVESTIYA correspondent Kim Smirnov under the rubric "The 27th Party Congress: A Strategy of Growth": "Science, Machinery, Man"]

[Text] In the Institute of Machinery Science of the USSR Academy of Sciences, in the exhibit hall dedicated to the 27th Party Congress, are the ideas embodied in metal that will be operating in the machinery of the new millennium. Couldn't it be sooner? In essence, the whole exhibit is a direct reproach to industry: such excellent work, brought, as they say, "in hand" to the plant gate and--left standing at the gate. How to open the way for the new?

[Question] Konstantin Vasilyevich! My first question for you is both as the vice president of the academy and the director of the Institute of Machinery Science. It is possible, of course, to see just the individual exceptions in the fact that necessary innovations are not incorporated for decades. But wouldn't it be more useful to look at the general mechanism of delay which must be investigated, which must be surmounted, so as to ensure acceleration?

[Answer] I agree: that which you call delay and I would call advancement at an insufficient speed is caused by serious objective circumstances. This is the weakness of the experimental test bases of scientific organizations. This is the disparity which has taken shape over the years among the academic, sectorial and educational sectors of research work, especially in the resolution of interdepartmental problems. This is, finally, the absence of effective economic incentives and controls, both requiring the incorporation of the new and the stimulation for that incorporation.

Take machine building. It is this sphere, where the contours of the automated computerized production of the 21st century can already be discerned, where the practicality of the fundamental knowledge is especially apparent.

And although Soviet machine builders have reason to be proud, so many of the products of our machine building, however, still do not correspond to the best world prototypes, are obsolete and are long due to be removed from production.

At the same time, so many innovations that revolutionize production remain as immobilized scientific capital. And the issue is really not individual ideas, machinery and technology. The creation of reliable, economical and long-lasting machinery should proceed on a unified broad front. Progress here cannot be accelerated if the development of electronics and electrical equipment is not correspondingly accelerated, if highly efficient structural, frictional and antifrictional materials are not produced in the needed quantity and variety.

Today, in executing the resolutions of the 27th CPSU Congress, the turning of science toward the needs of the national economy is beginning to be conducted more energetically. But another aspect is important here: industry should be more interested in the incorporation of all that is new than it is today. Often production itself is not prepared for this. If we want to make a high-precision instrument, we need high-precision machine tools, measuring equipment etc. This is a whole chain. It means that production must be retooled and rebuilt. And the enterprises do not have the capital for this. Or it is not planned. We are not planning to what quality level to bring production, to what level of materials consumption, power consumption, reliability, mean times between failures.

Of course, that is not the case everywhere. In some places life itself forces one to do it. Take the aviation industry. If you are not fond of science here, you will fall. And from a great height. Although, of course, it is necessary to raise the requirements for aircraft reliability and flight safety in the aviation industry as well.

A second indicator that is lacking today is accountability not only by gross count, but also by quality, by what demand the products of the plant enjoy.

We sent a plant, let's say, a turbine. And two days ahead of schedule. We received all of the bonuses due for the overfulfillment of the plan. But the station for the turbine is not yet built--what a situation! And what good is it, it can be asked, to send it, if it will sit for two years and two days in the rain and snow?

The plant does not study its offspring, its "behavior." It gave birth to it--and that's it. Like bad parents: let others think about it now. Whence--poor reliability. Whence--plant repair for a number of series-produced designs is really not organized.

A computer center is needed in which all product defects would be entered. And as a result the accounting would be presented to the producer. This should concern electric shavers, and internal combustion engines, and shoes, and clothing--any products. If the plant did not provide the necessary quality, let it receive a serious blow to the welfare of all--from the director to the worker--for this. That is when the production workers will come to the scientists, will leave no stone unturned at exhibits like ours.

[Question] In the congress documents, serious attention was devoted to interdepartmental scientific and technical complexes (MNTK). You head up one

of these--Machinery Reliability. What problems are arising in this regard today before their organizers and before science and industry as the formation of MNTKs proceeds?

[Answer] Every complex is supported by three fundamental principles: basic ideas, applied research and the production of fundamentally new products brought, at a minimum, to the level of test lots of machinery, equipment, materials and instruments. The organizational structure of the MNTK follows from this. It includes scientific, design and technological organizations and experimental enterprises of various sectors of the national economy. It seems that our complex is one of the most topical, since we already have many developments that have reached the stage where it is time for circulation.

It is impossible to diminish any one of the three interconnected principles on which MNTKs are based. For all the revolutionizing role in production that the new principles, phenomena and effects have, they will be able to play that role only when engineering solutions for their embodiment "in metal" are found.

On the other hand, in orienting the MNTK toward the end result, it is very important not to lose the fundamental and research nature of the work of the complexes, not to do a series of utilitarian work, to which, unfortunately, many sectorial NIIs [scientific research institutes] are headed.

The idea of complexes--for the formation of which the experience of collaboration with the industry of the Ukrainian, Belorussian, Lithuanian and other academies and the USSR Academy of Sciences along with the earlier experience of implementing nuclear and space projects in our country had a great effect--this idea is brilliant in and of itself. But the road to its realization is not easy. And there is no need, of course, to think that MNTKs will resolve all and everything. Complexes are created only for the principal, priority areas of scientific research, which will make it possible to seize bridgeheads for systematic rapid advancement on the whole national-economic front.

All is in our hands here: Either we organize matters as they should be, or we limit ourselves to glorification of the ideas. This is, unfortunately, also a real danger which lies in wait for any new cause.

[Question] Are the measures envisaged in the regulations for complexes developed by GKNT [State Committee of the USSR Council of Ministers for Science and Technology] adequate from this point of view?

[Answer] Although the establishment of our complex and others is getting serious and businesslike support, it is nonetheless very important not to discredit the idea from the very beginning.

Strong financial management must be arranged first and foremost in such a way that the organizations making up the complex receive all necessary funds and materials and the opportunity of living, working and developing only through the leadership of the MNTK.

A most acute question is the priority supplying of complexes and their full support. If USSR Gosplan and USSR Gosstab do not provide materials and electronics, nothing will be obtained. Nothing comes from nothing. It is essential that the complexes be written into the state plans as a separate line item and that this line be strictly followed. Only in this case can not only end products, but a serious effect on the creation of a "climate of especial favor" for the new in the most varied spheres of our lives be expected of the MNTK.

The first practical question that will have to be resolved by our MNTK is the creation of modern testing, diagnostic and balancing equipment, stands, sensors, instruments and methods of measuring with the aid of lasers, automated robots and the like. If this does not exist in science, then quality will not exist in production. We are ready to place many such innovations into series production. You saw our exhibit. We can increase it tenfold.

[Question] You spoke of the danger of limiting ourselves to the glorification of ideas. How can we avoid drowning the excellent idea of complexes in paper? There are those "sober-minded philosophers" who are ready to applaud the new idea, but still suppose that "everything will calm down" and they will return to the old, accustomed way of life....

[Answer] Nothing will calm down! Nor return to the old. And whoever thinks that way and wants to live in the old way will inevitably be thrown onto the side of the road in a sharp turn. That is the very significance of the 27th Party Congress, that the acceleration is not only declared, but is of paramount importance in real, everyday work. There is no other way for us.

A series of substantive measures has recently been adopted in the country against the generation of paperwork. And these measures should be uncompromisingly executed in life to the very end. They should fully eliminate formalism and multi-stage coordination and forestall the overwhelming of scientific creation in a paper wave of reporting on multitudinous indicators and the substitution of the labor of the scientist with unaccustomed functions of business activity.

[Question] I was especially interested in the section of your exhibit on "man-machine" systems. Doesn't it seem to you that when the discussion concerns the technology of the 21st century, that no less (if you take deeds rather than words) than the new generations of machinery, it is necessary to think about the new generations of people who will create and control them?

[Answer] It is a very important question. The uniting of electronics with technology and with working processes--that is tomorrow's machine building. The role of man in it is becoming immeasurably more crucial. It is becoming qualitatively different.

The new complicated equipment costs the state much. It sometimes requires a jeweler's attitude. And it is being operated in barbaric fashion in a whole series of sectors of the national economy. One designer complained to me that "we can propose the most interesting solutions, but this would also require

the highest operating conditions. We have to create equipment that is calculated for a person that is absolutely indifferent: he breaks one machine and he gets another."

Yes, such a problem exists. Today we are placing ever finer control and monitoring equipment in machinery. And this requires a new attitude toward the equipment, a new type of person interacting with it. The degree of civil responsibility and the level of economic knowledge of this person should correspond to the spirit and the letter of the times. This is important, by the way, not only for engineers, technicians and workers, but also for the specialists with the highest qualifications. In a candidate's or doctor's dissertation that expounds new technical ideas, extremely essential, for example, is a section on technical and economic analysis and forecasting. The author himself will only grow with such an approach to the matter and, correspondingly, will have an economically well-founded proposal for the form of incorporation of his developments.

A person must prepare for new equipment not only professionally, but physiologically and psychologically as well. We are located--I want to stress this--on the threshold of the automated 21st century, of automated machine-building production. And it is namely here that new and progressive ideas can be incorporated most quickly. Would that man does not lag behind!

It is time, very much so, for the reform of higher education. It is unsuitable to spend 15 years teaching young people basically to execute commands. It is unsuitable to mass-produce average engineers who are unprepared for work under conditions of sharp acceleration both in science and in industry. It is unsuitable to train them on antediluvian equipment. They will have to be retrained later all the same.

They must be cultivated in business, in research inquiry directed toward a specific result. It is quite justified in this regard to include higher educational institutions as well in the makeup of MNTKs. This will allow the student to participate, right from the third level, in the work of scientific collectives and to form within himself the traits of a researcher and engineer oriented toward the resolution of topical problems in science and economics.

Overall, research creativity is becoming one of the characteristic traits of modern youth and an important form of preparation of scientific workers and specialists of the new generation. It is time to place it on a planned state footing. The Academy of Sciences supports the proposal of the All-Union Komsomol to create a unified system of scientific and technical creativity for youth in the country. This system, however, should be built not only on enthusiasm, but on the most modern knowledge as well.

And here I return once again to the MNTK. Scientific forces can be unified on the basis of it and modern educational courses can be created (many chapters on the technical sciences have become obsolete) along with good reference texts. So that every engineer, student and innovative worker has at hand a book on the newest ideas and methods that is accessible in content and form and without complex Aesopian language.... In being concerned that such ideas

be circulated in material form, "in metal," they must be circulated in minds. That is why the MNTKs should be support points for the reshaping of higher education and the training and retraining of the specialists that work with the new equipment, as well as a school for leading scientific and technical experience and a touchstone of the work of the USSR Academy of Sciences under the new conditions.

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INDUSTRY PLANNING AND ECONOMICS

ACADEMICIAN NESTERIKHIN: BARRIERS TO QUALITY MACHINE TOOLS LISTED

Moscow IZVESTIYA in Russian 30 Jun 86 p 2

[Interview with Academician Yuriy Yefremovich Nesterikhin conducted by IZVESTIYA science commentator B. Konovalov under the rubric "New Equipment-- From Idea to Series Production": "'What Hinders the Achievement of the World Level?'"]

[Text] The chief barrier on the road to achieving a world level in many scientific and technical areas is the monopolistic position of departments, Academician Yuriy Yefremovich Nesterikhin feels. This discussion with him was devoted to those unresolved problems that stand on the path of the successful development of our machine building industry which, as was emphasized at the June Plenum of the CPSU Central Committee, plays a key role in uplifting the entire national economy.

[Academician Nesterikhin] The creation of modern new machinery, as a rule, is inconceivable without the participation of several departments. And if even one of them does not contribute to the "common pot" of peak achievement, it is impossible to create machinery on a world level. And today, the related industry workers have no economic interest in meeting the needs of "somebody else's" ministry.

The state allocates wage funds, means of production and other material resources to the sectors in planning procedure. And they feel that if something is done "on the side," it "tears away" some of their resources and hinders the resolution of their own tasks. That is how departmentalism arises, the chief trait of which is to get as much as possible from the state for one's own department, and for the others--give them what was long ago postponed, preferably in large batches. The department is usually not interested in whether its products are fundamentally improved, if they go out as component parts.

[Question] Yes, it has been related in the press that, for example, the Ivanovo Machine-Tool Building Association has shown for ten years that machining centers can be produced that are competitive on the world market if foreign component parts are used. But for ten years, neither

has Minelektrotekhnika [Ministry of the Electrical Equipment Industry] supplied the necessary electric motors to the machine-tool makers, nor has Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] the necessary high-class numerically controlled instruments. Therefore, without relying on its traditional partners, Minstankoprom [Ministry of the Machine Tool and Tool Building Industry] buys abroad for numerically controlled production and sets up closer cooperation with the fraternal socialist countries. In particular, cooperation was organized with Bulgaria, and the Ivanovo-Sofia International NPO [Scientific Production Association] was created.

[Answer] This is a wholly realistic way of overcoming departmental indifference toward the striving of some sector to reach a world level. The point must be reached, however, where a domestic mechanism works well first and foremost.

For ten years, the partners have been unable to give the machine-tool industry the component parts for the production of competitive machine tools. And all this time the world level of machine-tool building is going up and up. New-generation machine tools are now being created that should produce a revolutionary jump in the achievement of machining precision.

The control of these machine tools is much more complicated than modern numerical control. In place of one, there should be several microprocessors, combined on the hierarchical principle, and chiefly--in the machining of parts with a laser system--should carry out the control of "motion" precision of the cutting tool in relation to the work piece. And these measurements should be automatically linked with the overall machine-tool control. There are other serious innovations, and in order to create such a machine tool, the sum of all technologies that Minstankoprom is not accustomed to is needed.

At the June Plenum of the CPSU Central Committee and at a session of the USSR Supreme Soviet, the question was sharply posed of the lagging of our machine-tool building, which in essence is the "heart" of all machine building.

It would seem that in this situation the lead department should be troubled by this backwardness. We have been trying to overcome the indifference of Minstankoprom itself for fifteen years now and striving for the creation of machine tools with a built-in laser measurement system. It is interesting that departmentalism allows one to find the "extreme" and point one's finger at it: I myself, they say, want to, but he won't let me. In the given instance, Minstankoprom is "hindered" by Minelektronprom [Ministry of the Electronics Industry], which does produce sufficiently reliable lasers with a stable wavelength. And they don't care--large lots are taken from them, so as to change lasers more often.

But this can be overcome with an active position, and a reliable laser can be created or obtained from another department. The main thing is that enthusiasts of the new matter be found and that the scientists unite with producers who want to realize their idea. We started from the fact that it was proposed to use a laser for the static control of long lengths. At the Tyazhstankogidropress [Heavy Machine Tool and Hydraulic Press] Plant imeni

Yefremov in Novosibirsk, enthusiasts were found that were interested in this. And they have long been using "laser rules" there for controlling the most crucial parts--guiding heavy machine tools.

The next step was successfully taken recently--using laser measurements in the dynamic processes of parts manufacture on machine tools. The specialists of the Sasovo Branch of the Ryazan Machine-Tool Building Plant supplied our laser measuring system on their own new semi-automatic lathe. It was shown that with its assistance, the error in parts manufacture can be decreased by nine tenths. The tests were done very simply: a thousand parts using the built-in laser system and a second thousand without it. Comparative measurements showed that the machining precision on one and the same machine tool was increased by ten times.

This means that the machine tool is moving into a new class and is opening up fundamentally new opportunities for machine building.

[Question] And what's next?

[Answer] The machine tool is on display at VDNKh [Exhibition of the Achievements of the National Economy of the USSR] and all can become acquainted with it. At the 27th Congress, the task was posed of sharply increasing the reliability and quality of machine-building products. It is clear that it can be resolved only with precision machine tools. But Minstankoprom has not yet displayed great interest in the laser system of dynamic measurement. And this is psychologically understandable. For the machine-tool builders, the laser system is foreign and unfamiliar, and they do not really hope for real assistance from the related-industry workers.

We can wait for new machine tools to come to us from overseas, as has already occurred more than once. At first we will purchase machine tools, and then the technology of their production. This is the rational course from the point of view of the department. After all, it gets money from the state. No one is interested in why the domestic development has not been brought to industrial production.

There are as many examples of this type as you please. Laser discs and players are now becoming the fashion all over the world. A "sound track" in digital code is placed on the disc by a laser "cutting tool." The laser player system "computes" the recording, which is reproduced with very high quality. All of this is compact--there is an enormous amount of recordings on on 12-centimeter disc. Work in this area began here as early as 1972. There is already a functioning laser machine tool at the institute that can make much more complicated things than laser discs. But this is an isolated example. It has not yet been transferred to industry for circulation. Now, apparently, we will acquire foreign technology. But you never move into the lead following in the track of others.

[Question] Maybe departmentalism has been displayed here on the part of the Academy of Sciences itself, which feels that its concern is only basic research, demonstrating the basic possibility of making a new process, instrument or machine tool, and the rest is up to the sectors. The very

structure of academic institutes is geared toward obtaining "paper results" first and foremost, rather than real ones embodied in industrial technology.

[Answer] Yes, figuratively speaking, the scientists are in the position of people who are writing about how to teach yourself to play the accordion without having the accordion itself. It is at least apparent that the institutes of a physics and technical nature should definitely have powerful experimental design subdivisions that allow basic ideas to be realized in the form of specific technical applications. We posed the question several years ago of merging our institute with the Special Design Bureau of Scientific-Instrument Building of the Siberian Branch of the USSR Academy of Sciences and the organization of a scientific and technical association on that basis.

[Question] But didn't the management of the USSR Academy of Sciences Siberian Branch announce more than once that the question will be resolved very soon?

[Answer] But it's still there.

The incorrect structure of the academic institutes and the paucity of their productive base and, conversely, the excess financing of industry science leads to the fact that academic scientists are basically writing articles and making solitary prototypes, and the sectors frequently undertake to resolve complex problems without the proper qualifications, giving rise to wretched, but at least "their own," developments.

[Question] But aren't intersectorial scientific and technical complexes (MNTK) being organized today on the most important problems, which should unite the efforts of academic, sectorial and educational science and industry for an acceleration of development?

[Answer] This is a very useful matter, of course. But the "underwater reefs" are already clearly visible today. After all, each participant in the complex still finances "his own" department, and this will certainly give rise to problems. We have experience that is similar in miniature to the MNTKs of today. Some 14 years ago we created two intersectorial design departments at the plants of two departments that were to work in "harness" with us.

We sent our specialists to industry so as to assist directly at the plants and, as they say, bring the matter to concrete products. And what next? The industry arranged the output of the products only on the scale necessary for its own sector. One "intersectorial" department was occupied with completely different tasks, and another was quickly transformed into a sectorial institute which began to "modify" joint developments in such a way that they were completely dissociated from their academic beginnings.

The economic conditions must be changed so that the "science--production" conveyor for the production of intersectorial equipment begins to work and is able to give new quality to products and raise labor productivity.

It must be emphasized that economics itself today pushes enterprises and sectors to improve slightly their products and pass them off as new, without undertaking serious reconstruction.

I recently had a candid discussion with the director of a certain major enterprise: "Why don't you take our developments?"

"Do you know what kind of plan I have? About half again as much as capabilities. Everything runs on crash work and overtime. What do I need new equipment for? After all, nobody will decrease the plan. Take a look--practically any enterprise will try to fulfill the plan without fail, but the new-equipment plan is disrupted. Because the former means a 33-percent bonus for the collective, while the latter is only 8 percent. We lose, but just a little. And until the state procedure plans a reduction in production volume for us for the time to produce new equipment or specially allocates reserve capacity for this--sorry, there's nothing I can do."

It is time to acknowledge that if an enterprise does not obtain real benefits from the output of equipment that exceeds the world level, the situation will not change fundamentally.

But that is not much. Maybe, the most complicated thing in the making of leading technologies is the process of transmitting information to a sector that is new to it. Departmental development along a smooth track hinders the growth of a broad outlook among people. The mechanical inclusion of specialists from other departments is not very efficient, because they feel like a "fish out of water" in the new sector. There are different traditions, terminology and equipment there.

To my mind, fundamentally new equipment should be created somewhere on neutral "territory" along with the training of cadres that will give the initial impetus for its development. The academic institutes and institutions of higher education are very suitable for this purpose. Let's say we have already been developing computer and laser technology for many years. From the point of view of the state, it would be expedient to send us young engineers who have finished school, train them and then organize an energetic assault that can "land" on some enterprise of an old sector for the output of fundamentally new equipment that was created in an academic environment.

It is no accident that an old Soviet saying--"The cadres decide everything"--can be encountered at some Japanese firms that produce the newest equipment. If we are able to achieve a situation where the newest developments are carried over into industry along with people who have already mastered leading technology, then the cause will, of course, be accelerated.

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INDUSTRY PLANNING AND ECONOMICS

INDUSTRIAL VIBRATOR SHORTAGE, UNRELIABILITY DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Jul 86 p 2

[Article by O. Savinov, Professor and Doctor of Engineering Sciences (Leningrad): "They Let Matters Take Their Course"]

[Text] The first vibrators, still poorly improved, appeared at construction sites half a century ago. Since then vibrator technology has made gigantic leaps, and it can be asserted without exaggeration that it is precisely this that determines the face of the modern construction industry. A sharp rise in labor productivity and reduction of total labor expenditure, savings of materials, and new operating processes that were impossible for any one of the previously existing methods to perform--vibration technology has brought all this. It has become the basis for the modern technology of construction, enabling the constructional structure and methods for erecting structures of the most varied kinds and purposes to be constantly improved in all construction fields.

But, however, the longer it is used, the more it is that vibration technology impedes growth of construction-industry effectiveness. There is no paradox here. The constant improvement of operating processes and the appearance of new construction methods require an anticipatory growth in the operating potential of vibration machinery and installations. In practice, the reverse phenomenon occurs: the quantity and quality of vibration equipment lag behind the requirements. And this gap is ever-increasing.

Let us take, for example, concreting. This is better equipped with machinery than other types of work. But even here things are far from favorable. What's more, our construction projects suffer chronically from a shortage of manual vibrators for compacting hydraulic-engineering concrete, yet the operational potential of these machines is reduced. Industry does not produce the pendant vibrators with built-in electric motors that were created by VNIISTROYDORMASH [All-Union Scientific-Research Institute for Construction and Road Machinery]. For it is precisely these machines that are most promising--they allow operations in thicker layers and they can be easily adapted for compacting sandy soils. We have absolutely no one that produces equipment for this latter operation.

The overwhelming majority of vibration-forming machines that are used in the prefabricated reinforced-concrete industry has for a long time lagged behind

modern requirements--they have poor efficiency and productivity, require the use of difficult manual labor and do not meet hygienic norms. But although the first models of new-generation machines have appeared, for example the compaction and vibratory stations, the builders see them only at exhibitions.

The business of performing pile operations is going not much better. At one time we were pioneers in introducing vibrating equipment for driving piles. Today we lag greatly behind other countries....

There is no need to continue this sad listing. One of the main causes of the situation that has been created is the absence of a single coordinating center that is responsible for creating vibration-technology equipment. From the very start, the development of this promising area has been left to drift. As a result, vibrator production has been dispersed over many branches of industry. Each works according to its own plan, guided by only its own interests and without coordination of them with the actual needs of the national economy.

Four ministries--Minstroydormash [Ministry of Construction, Road and Municipal Machine Building], USSR Minenergo [Ministry of Power and Electrification], Mintransstroy [Ministry of Transport Construction] and Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] are the main producers of vibrators. Only the first works for all construction branches, and basically it produces small vibrators and vibratory hand tools serially. And, in only an extremely limited variety, larger machines. The other three ministries, which make vibratory pile drivers of various kinds, vibratory hammers and vibratory tools, work only to supply their own urgent requirements. The lack of cooperation between researchers and design developers, an inadequate exchange of information among developers, and shallow patent research prevent most types of equipment from reaching the modern level.

Definite blame for this situation lies with USSR State Committee for Science and Technology, which, let's say it frankly, has ignored the development of vibrators and did not take this matter under monitoring in good time. It would seem also that GKNT [State Committee for Science and Technology] should correct the situation, assuming the role of an organizing and coordinating center.

One of the sharpest questions of the new five-year plan is acceleration of the reequipping of existing production facilities. This task was set at the June 1986 CPSU Central Committee Plenum. In the vibrator area, in our opinion, a start must be made with designation of one of the above-named ministries to take the lead on the problem and be responsible for developing vibrators for construction on the national-economy scale. This will let the existing uncoordinated plans for scientific research and design development be implemented within an integrated specific program that will define the most promising paths for developing the branch and will consider not only today's but also tomorrow's construction requirements. This will also permit cooperation among vibrator-machinery producers to be so conducted that each one will manufacture a definite type of machine and will ship them to all the customers.

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ECONOMIC STIMULATION OF TECHNICAL PROGRESS IN CASTING INDUSTRY

Baku IZVESTIYA AKADEMII NAUK AZERBAYDZHANSKOY SSR: SERIYA EKONOMIKI in
Russian No 3, Sep-Oct 85 pp 26-28

[Article by A.G. Gadziyev and E.A. Aliyev]

[Abstract] One way to improve the performance of the casting industry, as that of any other industry, is to introduce a better pricing system along with more progressive production methods which will ensure not only a more efficient operation but also a better product quality. The two main quality indicators in the case of castings are geometrical precision and surface finish, maximum of metal being achieved by weight reduction and closeness to the final shape. Both depend largely on the production method, most effective in this respect being die casting, centrifugal casting, shell molding, lost-wax investment casting, and cold casting. Equipment for the petrochemical industry is overwhelmingly produced by sand casting, however, which requires a larger volume of raw metal and more machining operations for attainment of desired precision and surface finish so that the cost is correspondingly high. According to data provided to the USSR Ministry of Petrochemical Equipment Manufacture, in 1983 as much as 82.5 percent of all production was done by sand casting. Only 12.2 percent was by cold casting, 2.0 percent by die casting, 1.6 percent by centrifugal casting, and 0.9 percent by lost-wax investment casting, production by these other methods having increased by only 7.2 percent, 16.5 percent, 0.2 percent, 24.8 percent, and 20.2 percent respectively since 1980. At the Baku Steel Casting Plant sand casting is used for production of reducers made of St30 carbon steel and weighing 600 kg a piece. The price of such reducers according to the new No 25-01 price list is 1,114,100 rubles for 5,500 pieces. The price could be lowered to 827,000 rubles for 5,500 pieces, if they were produced by cold casting. Lowering the price only half way and letting the producer keep the other half as income would provide the needed incentive for improvement of production methods, while still giving the customer a better product at a lower price.

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INDUSTRY PLANNING AND ECONOMICS .

NORMS FOR METAL ECONOMY IN MACHINE MANUFACTURE

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 3, Mar 86 pp 85-91

[Article by A. Zaytsev, deputy department head, and Ye. Guryev, senior expert, USSR State Planning Committee]

[Abstract] Beginning in the 12th five-year-plan period 1986-90 and continuing beyond to the year 2000, 40-45% more machinery for the food and other light industry will have to be manufactured with less metal per 1,000,000 rubles worth of produced goods: 27-29% less rolled ferrous metals, 20-22% less steel tubing, and 21-23% less rolled nonferrous metals. The new norms for metal consumption are established on the basis of factorial production and cost analysis, taking into account past performance and projections as well as planned changes and inevitable deviations. The main three factors involved here are economy of metal with attendant increase of the product manufacturing cost, increase of the production volume, and tightening of the allowances. Standard compounding formulas are used for determining the norms for any given year, with data on implementation of norms in the year 1984 as reference. Numerical calculations for rolled ferrous metals are shown, to demonstrate the procedure by which these norms are arrived at. Tables 2.

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COMPANY RESPONSIBILITY FOR REPAIR OF MACHINERY

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 3, Mar 86 pp 99-104

[Article by A. Khalaberda, subdepartment head, V. Kvetkin, deputy subdepartment head, K. Dementyev, chief specialist, and K. Maksimov, VNIKTEP (All-Union Scientific Research Institute of ????) section manager, USSR State Planning Committee]

[Abstract] Assigning to the producer of machinery the responsibility for its repair is proposed, as a way to not only improve the reliability of equipment but also reduce the size of repair crews and thus the operating cost. In an analysis of cause-effect relations, motivation is reduced to economic

incentives for both producer and user. These incentives should motivate better product design and quality control at the manufacturing plant, more efficient purchase and more careful operation by the user. The feasibility of introducing this principle into a socialist economy is considered in the specific case of the West Siberian Petroleum and Natural Gas Complex, in dire need of a better and more economical repair service under severe environmental conditions. The three alternatives are leaving the organization of repairs as it has been, assigning the responsibility for repair to separate regional repair enterprises billing their expenses to the equipment manufacturers, or assigning this responsibility directly to the manufacturers. The last alternative appears to be the best, but whether it actually will be or which other one would be is still to be decided on the basis of a thorough cost and price analysis. Important factors affecting such a decision are life expectancy and obsolescence of equipment, trade-off between repair and replacement, and overall benefits to the state in terms of the national economy. Other methods of dealing with the problem of machine repair may be considered, but assignment of the responsibility to the company (manufacturer) directly offers the most drastic solution. It will, however, require several modifications and refinements of management techniques. References 3: all Russian.

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METAL-CUTTING AND METAL-FORMING MACHINE TOOLS

SOVIET-BULGARIAN FLEXIBLE PRODUCTION MODULE

Moscow KOMMUNIST in Russian No 125, 27 May 86 p 1

[By Ye. Verlin, K. Stel'mashev, correspondents (Moscow)]

[Extract] Right after coming to the "Stankokonstruktsiya" Plant, a numerically-controlled circular grinding machine developed by Bulgarian machine-tool builders changed its name. By mating it with an industrial robot, designers of the Moscow research-and-production association "Enims" (Experimental Scientific Research Institute of Metal-Cutting Machine Tools) transformed the semi-automatic machine tool into a flexible production module.

This has increased the productivity of the machine by 20 percent. In conditions of two-shift operation, each such module frees three highly skilled grinders.

Candidate of Technical Sciences V. Shuvalov, an "Enims" section head, said: "The development of this equipment, which was in collaboration with Bulgarian colleagues, is bound to contribute to the fastest possible introduction of highly efficient technology in the economy."

In its capacity as the USSR Ministry of the Machine-Tool Building and Tool Industry's chief organization for the formulation of technical policy in the area of metal-working equipment, "Enims" is establishing close collaboration with related enterprises in fraternal countries. In cooperation with specialists of the German Democratic Republic and Hungary, flexible modules based on new machine tools have been developed, and a joint design bureau has been set up with Polish machine-tool builders.

The machine-tool builders' task is to speed up significantly the introduction of results of designers' creativity in industry. The association intends to achieve this through the active use of a computer-aided designing system and, what is very important, through the restructuring of the very process of mastering new technology. It has been decided to begin production of groups of parts as individual development stages are completed, in order to have the entire set of assemblies of the future machining aggregate available by the time the project is completed.

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OTHER METALWORKING EQUIPMENT

ELECTRONICALLY CONTROLLED PRESS SYSTEM

Riga SOVETSKAYA LATVIYA in Russian 25 Dec 1985 p 1

[Article by N. Yampolskaya: "A Press Controlled by Electronics"]

[Text] The Riga based VEF [State Electrical Equipment Plant] production group is confidently and purposefully implementing the program of further increasing production. After the flexible stamping production complex at the Stuchinskiy telephone appliance factory and the automatic stamping system at the "Tranzistor" factory, the mechanization and automatization of the blanking process was started, where the whole production cycle of the enterprise begins.

For the stamping of parts the mechanical workshop of this department will soon receive a numerically controlled (NC) press equipped with microprocessors and made in its entirety by the VEF specialists.

The press control system is also a novelty for the enterprise. In addition to the usual control of the actions required for manufacturing the parts according to the prescribed process, it insures the machine's function, advises of its errors, checks for incorrect operator action and whether it works within the prescribed modes.

"Our control system based on the 'VEF micro-1022' computer is more user friendly than its prototypes, which had a rigid logic and a clumsy 'thinking'" says one of the creators, Nikolay Fonin, design engineer in the technical-research department. "It has a flexible 'personality,' a broad range of working functions and can accomplish what humans require of it."

The reliable control system permitted a substantial increase in the productivity of the new press. The speed of making parts increased eightfold by comparison to the manual controls. Accuracy of the operation was brought to 25 microns. The field of the stamping operations was changed. It became wider and, most important, the machine can now perform several operations simultaneously. The list of the parts made is practically unlimited. The expected economic effect of the introduction of this technical novelty in production is R100,000.

The 'brain' of the new numerically controlled press was created by a team of engineers, in addition to Nikolay Fonin, working on control systems for

robots, under the management of one of the leading specialists of the technical-research department, Laureate of the State Prize of the Latvian SSR Valdis Strods. The actual detail work on the system and the training were completed by Ayvar Vinters and Victor Panov. The creators of the new machine were well served by the experience which they accumulated while introducing robots in the Stuchkinskiy telephone appliances plant and the "Tranzistor" plant.

It is hard to overstate the contribution by qualified mechanic Yan Eglitis of the auxiliary machine repair shop to the creation of the first robotized stamping press for the blanking of the VEF. He produced the complete mechanical part of the press.

The present NC press with its microprocessor control system, which has as its only disadvantage the manual feed of the blanks, is only the first link in the chain of setting up a production flow line of similar machines, which, in time will become the foundation for flexible automated manufacturing.

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OTHER METALWORKING EQUIPMENT

TOMSK CENTER COORDINATES DATA ON MATERIALS HARDENING EXPERIMENTS

Moscow KRASNAYA ZVEZDA in Russian 4 Jan 86 p 1

[Article by TASS correspondent A. Ruskiy, Tomsk: "Formulas for Renovation"]

[Text] How to extend machine life? Scientists in Tomsk managed to renovate them by means of hardening processes. The method developed in Tomsk's academic town [akademgorodok] by the engineering-technical center for reconditioning and strengthening machine parts and mechanical systems, permits the rapid introduction into production of laser, ion plasma and gas-thermal methods of hardening.

The Institute for the Physics of Material Strength of the USSR Academy of Science became the nucleus for the newly created center in Tomsk.

"In the future the center's computer bank will have information about scientific developments in this field from all the institutes of the Russian Federation, about enterprises capable of quickly realizing them," says V. Pamin, corresponding member of the USSR Academy of Sciences. "But even today the center has become a connecting link between academic science and the sectoral institutes and enterprises in RSFSR."

In the workshops of "Tomskneft" [oil industry], "Tomsklesprom" [wood industry], "Tomskstroymateryaly" [construction materials] in a number of other plants experimental work is being done before introduction of the novelties. For example in the enterprises of the RSFSR Minpromstroymaterialy the blades of clay mills for the manufacture of bricks are coated for a tenfold increase of their life. In the "Tomskstroymateryaly" organization alone the yearly savings as a result of the introduction of novelty represented R100,000.

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OTHER METALWORKING EQUIPMENT

SOVIET-FRENCH SEMINAR OF NUCLEAR EQUIPMENT WELDING PROCESSES

Kiev PRAVDA UKRAINY in Russian No 133, 12 Jun 86 p 2

[Extract] The employment of advanced welding processes in machine building for nuclear power was the topic of discussion at a Soviet-French scientific-technical seminar which has taken place in Kiyev. It was organized by the Ukrainian Academy of Sciences' Institute of Electric Welding imeni Paton, France's "Pequet-Tesson" firm, and the French Institute of Welding.

"Our main purpose for taking part in the seminar was to exchange technical information in the field of welding with the Kiyev scientists," said Francois Tesson, the firm's director. "We wish to cooperate with the Soviet Union, and this is impossible unless personal contacts are established with partners. We are glad that Kiyev's Institute of Electric Welding, which is renowned in many countries of the world for its research, has become one of these partners.

The French specialists and scientists visited laboratories of the Institute of Electric Welding imeni Paton, where they were familiarized with the latest developments of scientists.

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OTHER METALWORKING EQUIPMENT

MAGNETIC-PULSE METHOD FOR BONDING, METALWORKING

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian No 136, 12 Jun 86 p 3

[Text] Leningrad--The two ends of a cable were bonded together right before our eyes, with no visible action from the outside, as if they were under a powerful press. A magnetic-pulse unit which has been developed at the All-Union Planning-and-Design Institute of Electrical-Equipment Production Technology operates in this manner.

"Its main operating element is a ring-shaped inductor," explained I. Saprykin, deputy director of this institute. "A pulsed current of several hundred microamperes is fed, and a powerful field forms around the inductor. This field acts uniformly on metal placed inside the ring. The process is literally instantaneous. This results in a sharp heightening of labor productivity as compared with mechanical compression, welding or soldering, which require dressing of contacts, tinning and pickling."

Unbelievably, the reliability of the butt joint was higher than the strength of the cable itself. Thus it is with good reason that the magnetic-pulse unit has been employed for welding superconductors of a cryogenic generator. The unit has competed successfully with such advanced processes as explosive welding for this task.

In the opinion of specialists, a wide range of specialized equipment for various purposes, such as assembling and pressworking, can be designed using the magnetic-pulse principle. A modified model of the unit is now being built for the Leningrad Optical-Mechanical Association.

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OTHER METALWORKING EQUIPMENT

BRIEFS

SERIES PRODUCTION OF LASER SYSTEM--Leningrad--A steel (not paper) sheet is cut with a light beam like scissors cut paper. And the indefatigable laser is already completing its next task--it is fusing powders. After that it goes over to welding and heat treatment. This is how it demonstrated its truly universal capabilities at the testing completed yesterday by the All-Union Institute for Electrical Welding Equipment. The system which replaces an entire set of specialized equipment has been recommended for serial production. [Text] [Moscow SELSKAYA ZHIZN in Russian 8 Jan 86 p 1] 12814/12899

ALTAY INSTITUTE DEVELOPMENTS AWARDED--Among the novelties of the scientific production association of the Altay Scientific-Research Institute for Machine Building Technology: an explosion welding chamber, a slit rolling machine M-265, technology for making three layer corrosion resistant metal sheets, and an installation for friction welding of bimetallic valves for internal combustion engines. They were awarded gold medals and diplomas at last year's Leipzig Fair. The introduction into industrial production of the Altay scientists' developments has already brought profits of millions of rubles to the national economy. They permit a considerable reduction of the production costs of farm machinery, and increase their quality and reliability. The pride of the institute is the technology of producing axially symmetrical rolled shapes. The machines made by the Altay scientists permit production of slots with all kinds of shapes and sizes. [Text] [Moscow PRAVDA in Russian 3 Jan 86 p 3] 12814/12899

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ROBOTICS

ROBOTS WITH GRIPPING DEVICES THAT ADAPT TO SHAPE OF OBJECTS

Moscow PRADVA in Russian No 142, 22 May 86 p 1

[By T. Yesil'bayev, correspondent (Alma-Ata)]

[Extract] Working models of robots of an original type have been developed and built in the republic robotics center at the Kazakh University.

Authors of the inventions call them 'toys.' These miniature mechanisms really do look like toys for kids' play. What is original about them?

"Important ideas are incorporated in these small models," explained member of the Kazakh Academy of Sciences U. Dzholdasbekov, who is president of the university and director of the robotics center. "As a result of long research, we have introduced changes in the mechanics of robotics manipulators and have developed mechanisms of a high class."

The principle which served as the basis for development of a lifting device is the one used in artificial limbs for humans. The main advantage of these prostheses is that they are convenient for amputees: they simulate the movements of arms or legs to the maximum possible extent.

Of most interest is a working model of a manipulator gripping mechanism. Specialists of the university developed a manipulator which is capable of changing the contours of its 'fingers,' depending on the shape of the object that they are supposed to grip.

"When robots are in series production, technical quality control of them takes a good deal of time and requires a large amount of manual labor," said docent L.I. Slutskiy, one of the authors of the invention. "For the first time we have succeeded in making automated test stands which expedite this process appreciably. Information from these stands is processed by a micro-computer. The stands can serve as simulators for teaching operators how to program industrial robots."

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ROBOTICS .

SMALL SCALE MECHANIZATION COMPLEMENTS ROBOT SYSTEMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 27, Jul 86 p 14

[Article by S. Ivanov, candidate economic sciences, Leningrad, under the rubric "Reserves of Acceleration": "Allied With the Robot: Small-Scale Mechanization"]

[Text] When the question is raised about the reasons for the slow reduction in manual labor, the workers themselves without fail, refer to the shortage of small scale mechanization -- mechanized tools, light floor transportation facilities, load lifting devices and rigging.

*Why are simple mechanized aids looked at askance?

*Together with automatization

*Not in substitution for giant machinebuilding complexes

Builders and workers in various industrial sectors, as well as workers in everyday services, agriculture and commerce are unanimous in this.

Statistics show that we produce considerably more electrical motors, tractors, grain-harvesting combines, metal-cutting machine tools and many other machines than highly developed capitalist countries. Yet we lag considerably in the production of small scale mechanization devices for everyday servicing. But, in fact, this simple arsenal of mechanical helpers could sharply reduce the share of manual labor in many sectors of the economy.

So far the requirements of the national economy for small scale mechanization devices have been met by not more than 40 to 50 percent. In industry, within the jurisdiction of the RSFSR Council of Ministers, this indicator is 45 percent and has hardly changed in the 11th Five-Year Plan period. The shortage of mechanized tools is of special concern. Thus, according to data of ministries and departments of the RSFSR the supply of mechanical saws of all brands is 33 percent of that required, of power wrenches -- 34 percent, of all brands of shears -- 23 percent, drills -- 43 percent and grinders -- 47 percent.

The reasons for such small supplies are insufficient production volumes, poor studies of demands made by union ministries, and planning being done for only an extremely limited group of products. As a result, the USSR Gosstab and its territorial administrations cannot satisfy orders.

The renovation and expansion of the small scale mechanization facilities pool are amazingly slow. In fact, the achievements of electronics and microprocessor equipment determine one of the special features of scientific technological progress -- equipment miniaturization. Many formerly "large" mechanization facilities are changing over to the class of "small" ones. It is not by accident that in industrially developed countries the production of small scale mechanization devices facilities is now booming. The expansion of their markets is facilitated by their relatively low cost, universality, availability to small enterprises and shops and high productivity. The expansion of the organization of work done at home also increases the demand for corresponding small scale mechanization devices. In 1984, the number of home workers exceeded 140,000 persons in enterprises of the RSFSR Minmestprom [Ministry of Local Industry] alone.

The task of accelerating the reduction of manual labor and a reduction in its share of the production area to 15-20 percent by the year 2000 is posited in the Basic Directions. In the 12th Five-Year Plan period, it is necessary to reduce the number of manual laborers by more than 5 million. There are many ways to solve this problem.

As a rule, industrial robots free workers at machines and devices. However, in finishing work in construction, materials handling, warehousing operations, servicing areas there is a great deal of manual labor which is still practically not mechanized. Robots will not soon replace man here. Here, the use of small such mechanization devices is especially needed. It will ease hard labor, make it more diversified and more interesting, and will free many workers by increased productivity. All this at comparatively low costs.

The latter is especially important. In fact, the concentration of the capital in decisive directions of scientific technological progress makes it necessary to search for reserves everywhere to increase efficiency that are not costly to implement. Society is far from indifferent to the cost of reducing manual labor. It is not necessary to have industrial robots where labor can be mechanized by simple machines. Economics wins when future and current strategic and tactical problems are validly combined.

For example, in construction, ten units of mechanized tools at a total cost not greater than 1000 rubles will make it possible to save on the average the labor of one worker with an annual wage of 2,500 rubles. However, judging by preliminary estimates, the cost of changing one worker over from manual to mechanized labor in RSFSR construction in the 12th Five-Year Plan period will be 19,000 rubles.

Of course, it would be wrong to compare the introduction of robots and automation of production to the utilization of small scale mechanization devices. These processes must proceed in parallel, supplementing each other and substantiated by technical and economical expediency.

Regrettably, in spite of their advantages, small scale mechanization devices are having great difficulty in building a road through to production. An opinion took root about them as being "trivial," which could not be used to prepare a plan and which could not be of interest to substantial machinebuilding ministries. As with materials handling facilities, there is no single boss here who is responsible for meeting the requirements for this product and its scientific technological progress. It is even less possible to justify the fact that, due to insufficient production and the poor quality of small scale mechanization devices, labor conditions are not easier for the manual laborers.

Domestic machinebuilding, especially the Mintyazhmash [Ministry of Heavy Machinery], the Ministroydormash [Ministry of Road Building Machinery], the Minavtoprom [Ministry of Automotive Industry] and the Minelektrotekhprom [Ministry of Electrical Equipment Industry] must sharply increase the production of small scale mechanization devices for multisector application in the shortest possible time. It is also necessary to assimilate new progressive models of such equipment for the comprehensive mechanization of most labor-intensive work in construction, industry, commerce and everyday services.

No less acute is the problem of quality. Several types of mechanized tools are too heavy to lift. Noise and vibration in operation frequently exceed the allowable norms. Guaranteed operating life is not achieved.

Small scale mechanization devices are manufactured by almost all ministries -- machinebuilding, as well as nonmachinebuilding. It is necessary that, in their composition, there are equally represented interindustrial and narrow-industrial applications and, most important, the production of these and others must be of equal priority.

Nonmachinebuilding sectors strive to acquire their own machinebuilding bases for the production of special technological equipment, mechanization devices and accessories. This in particular, involves the light, textile, food industry, commerce, construction and other sectors. At first glance, this seems to be an infringement of the specialization principle and leads to greater production costs. However, such enterprises are no substitute for machinebuilding giants. Their advantages lie in the rapid reactions to the demands of "their own" sector in the production of accessories and small scale mechanization devices. In combination with a high supply of equipment and an efficient structure of manpower, they themselves are found to be very efficient and facilitate an increase in the effectiveness of the entire sector.

Enterprises for the repair and servicing of technology should be available as a base for the production of smallscale mechanization devices for narrow sector operation. We are speaking about plants of nonmachinebuilding ministries and machine shops and production facilities of nonmachinebuilding enterprises and organizations where 45 percent of the entire metalworking equipment pool is concentrated.

The experience of creating its own production base for the manufacture of small scale mechanization devices is available in the USSR Ministry of Construction

and the BSSR Ministry of Industrial Construction. Problems of the comprehensive mechanization of construction, for example, are solved on the basis of creating norm sets of accessories, devices, and tools for each kind of work. In 1984, the "Rostmashmestprom" Association of the RSFSR Minmestprom manufactured small scale mechanization devices in an amount of more than 3 million rubles. The RSFSR Minbyt [Ministry of Everyday Services] plans to organize a republic industrial association with a main design bureau for the production of nonstandard equipment and tools and small scale mechanization devices. And this is not one single experience.

However, in machinebuilding as a whole, the base for manufacturing small scale mechanization devices is extremely weak. In 1985, enterprises of the RSFSR Minmestprom, the former RSFSR Ministry of the Food Industry and a number of other ministries and departments in the republic manufactured small scale mechanization devices in an amount of 15-17 million rubles. This was less than 10 percent of total requirements which were estimated at 200 million rubles in 1985 and will increase to 250 million rubles by 1990.

In the 12th Five-Year Plan period, with the planned by RSFSR ministries and departments production volumes and increases of three percent in annual fund allotments by the USSR Gosplan, the requirements of the annual small scale mechanization devices will be met by 50 percent (53 percent in 1985). This means that during the five-year plan period, this level will decrease and will reflect negatively on the rates of reduction of manual labor.

The problem was studied by the RSFSR Gosplan with the participation of the Leningrad Financial-Economic Institute scientists. It was found that the quickest way to meet the requirements of RSFSR ministries and departments in small scale mechanization devices lies through enlarging existing production facilities and organizing new specialized ones for their manufacture in the republic.

The creation of such production facilities is possible in two ways. First, by the organization of basic shops and enterprises by individual ministries and departments to meet narrow-sector requirements in small scale mechanization devices. Secondly, by forming a scientific production association at the RSFSR Council of Ministers on small scale mechanization devices. Such an association will be able to assume the responsibility for meeting the demands for some types of small scale mechanization devices for intersector application. It could also produce narrow-sector small scale mechanization devices for republic ministries and departments that do not have a material equipment base for independent production.

This way seems less radical although it permits a quicker start of the production of the equipment. But this version meets with a negative response from the basic ministries -- the Minmestprom and the Minbyt. Obviously, both versions should be taken into account in solving the problem.

It is advisable that planning organs begin planning the production of small scale mechanization equipment. This would make possible better control of the production of this equipment, improve the development of the production base and, in the final result, accelerate the reduction of manual labor. But

a number of problems still must be solved: provision of production resources, norms for material consumption and complementing products. Current and especially future requirements of small scale mechanization equipments by ministries and departments must seriously be made more precise.

The development and production of small scale mechanization will make it possible, in the 12th Five-Year Plan period, to free from manual operations hundreds of thousands of persons in the RSFSR economy alone and accelerate an increase in the productivity of labor. The possibilities for this exist in all oblasts, krays and republics.

Caption to omitted photo:

Certification and efficiency promotion of working positions are some of the conditions for the development of small scale mechanization devices. The photo shows a self-propelled cart for transporting loads over flights of stairs and other uneven surfaces. Specialists of the "Dneprovsklift" Repair Construction Administration developed and manufactured the cart.

Several opinions exist with respect to the form of the organization of the association. Thus, it is possible to build an enterprise with a capacity of 150,000 to 200,000 units of mechanized tools annually, which includes strong planning-design and economic subsections directly subordinate to the RSFSR Council of Ministers. Thus, from the very start, a course will be taken on the creation of a centralized intersector production facility. The product list of the most important mechanization devices includes 15 to 20 items.

Another version specifies the stage-by-stage creation of such an association on the basis of one of the industrial associations of the republic. Enterprises of various ministries could be transferred to the association with the preservation of their departmental subordination at the first stage.

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ROBOTICS

MACHINE TOOL INSTITUTE TESTS ROBOTS FOR FLEXIBLE MACHINING

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian No 129, 4 Jun 86 p 1

[By V. Veprik, correspondent (Odessa)]

[Extract] The largest 'brigade' of robots in the country has begun to operate at a test facility of the Ukrainian Scientific Research Institute of Machine Tools and Tools in Odessa. Altering working conditions and making them more complicated, specialists here are developing flexible resettable systems (GPS) on the basis of the latest machine tools and machining centers, electronic devices and transport equipment.

"Not all of the robots passed the first phase of trials," said Candidate of Technical Sciences N. Reshetnev, director of the institute. "Out of 80 models, 20 of the most promising ones were chosen. We will continue to work on their improvement together with manufacturing plants. The ultimate goal of this work is to create the country's first flexible resettable system for lathe working.

"At the present time robots and automatic manipulators produced by different enterprises are not providing the desired effect in machine building. We have undertaken to unite them into a complete, composite system which will be capable of machining parts throughout a full cycle, without human participation. The institute's specialists are developing various accessories, mechanisms and assemblies, with which individual modules will be interconnected and robots will be 'taught' to interact in a reliable fashion."

The first GPS, which is now taking shape at the test facility, is planned to be ready by the end of this year.

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ROBOTICS

INDUSTRIAL ROBOTS AT TEKHNOPRIBOR PLANT

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 1, Jan 86 pp 16-17

[Article by A. Prokopishek, chief designer, "Tekhnopribor" Plant]

[Abstract] Since over two years ago, the "Tekhnopribor" Instrument Manufacturing Plant in Mogilev, which produces special manufacturing equipment with intricate kinematic linkages and electronic equipment with control computers as operating base, has been tackling the problem of also producing industrial robots. These are the PR5-2 family with 0.32 kg load capacity for automatic assembly in instrument production. They have a modular structure, each module independently designed and independently functioning for interchangeability to suit customers' requirements. The modules are interconnectable through standard interfaces or adapters without a need for any redesign or reinstallation. One of these industrial robots is the PR5-2P with a pneumatic drive using compressed air and with cyclic control by means of an electric switch, on a cam motor with a distributor and interchangeable gears for setting 3, 4, 5, or 6 s cycles. A small-size member of this family, the PR5-2E, includes an MKP-1 programmable microcontroller consisting of a microprocessor-programmed electronic control switch. Among the users of PR5-2 industrial robots are the Industrial Associations "Soyuzchasprom" (All-Union Trust for Manufacture of Clocks), "Soyuzyuvelirprom" (All-Union Trust for Manufacture of Jewelry), and "Soyuzprompribor" (All-Union Trust for Manufacture of Industrial Instruments). Another model of industrial robot produced at the "Tekhnopribor" plant, the first of a different family, is the TUR-10 for spot welding and assembly as well as for auxiliary operations such as loading machine tools equipped with numeric program control, orienting blank parts, and transporting parts from one tool to another. Its three main components are an automatic manipulator with five degrees of freedom provided by rotational kinematic pairs, controls for the electric drive, and UPM-772 numeric program controls. It is coupled to the electromechanical drive through a flexiwave reducing gear set, a special variety of a planetary gear set developed by the manufacturing engineers A.P. Pakhomenko, R. Z. Rubents, and B.Ya. Meyerson as a successful solution to the most difficult problem regarding this new robotics product line. An improved version is the TUR-10K with contour control, capable of tracking trajectories with an error not larger than 2 mm. Another general-purpose industrial robot, the TUR-2.5, will be added to this family in 1987 and larger ones with more than five degrees of freedom are being designed. Figures 2.

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PROCESS CONTROLS AND AUTOMATION ELECTRONICS

ARMENIAN SEMINAR-CONFERENCE ON AUTOMATION OF MACHINE BUILDING

Moscow KOMMUNIST in Russian No 143, 17 Jun 86 p 3

[Extract] The Communist Party views the task of qualitatively transforming productive forces and transferring the economy to the path of comprehensive intensification as a strategic direction of the further advancement of all social production and higher efficiency. Reconstruction and pacesetting development of the machine-building complex must be ensured on a first-priority basis. This pertains primarily to machine-tool building, production of computer technology, instrument building, and the electrical-equipment and electronics industries.

These questions were the subject of businesslike discussion by participants of a republic seminar-conference organized jointly by the Yerevan City Communist Party Committee, the committee on automation and mechanization of the Armenian republic council of scientific-technical societies, and the Yerevan Polytechnical Institute.

Reports were given by Professor V. Push, head of a chair of instruction of the Moscow Machine-Tool and Tool Institutes; M. Kas'yan, member of the Armenian Academy of Sciences; and S. Geodakyan, general director of the Armenian Machine Tool (Armstanok) Research and Production Association. The speakers discussed main trends and stages in the development of flexible automated systems, questions of training specialists for flexible production systems, and specific paths and prospects for introducing such systems and their components at enterprises of Yerevan.

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PROCESS CONTROLS AND AUTOMATION ELECTRONICS

PLANT TOOLS UP TO PRODUCE INDUSTRIAL LASERS

Moscow MOSKOVSKAYA PRAVDA in Russian No 136, 14 Jun 86 p 2

[Text] Reconstruction work has begun at the Moscow Electrothermal Equipment Plant. When it is completed, the plant will transfer to production of new equipment--technological laser units.

Tests for putting one of the first of these units, which has a capacity of 1.2 kilowatts, into series production are now in progress here. The technological lasers will be used for heat treatment of parts in the automotive industry, machine-tool building and other industries, increasing the strength of the parts from two to five times.

(The photograph [omitted] shows three participants in the testing of the laser unit: Ya. Budovnits, head of the plant's technical department; A. Ratnovskiy, chief designer of the All-Union Scientific Research Institute of Electrothermal Equipment; and Yu. Shcherbakov, senior science associate of this institute.)

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TECHNOLOGY PLANNING AND MANAGEMENT AUTOMATION

COMPUTER-AIDED DESIGNS TO HASTEN PRODUCT MARKETING

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 1, Jan 86 pp 10-11

[Article unsigned]

[Abstract] One very important step in automation of production is computer-aided design, for a long time neglected but recently perfected to a fairly high degree. First of all, therefore, is now needed advance experience in integration of all components into one system and in layout of flexible automatic production. While in the past year 150 scientific research and design engineering enterprises as well as 14 higher educational institutions in Minsk, with a staff including 733 doctors and 8,890 candidates of technical sciences, were engaged in solving problems of production mechanization and automation and helped develop an advance technology, this is not enough. The causes of underachievement are excessive fractionalization and departmentalization of effort with an attendant loss of goal orientation. One factor to consider in overcoming these difficulties is the approximately 3-4 year lead time from the date the demand for a new product has been made known to the date it will become commercially available. Much of this time is expended on product design and production setup, despite the fact that the productivity of manufacturing equipment has increased more than fivefold during the past 5-7 years. Today a device can be designed in one minute, but blueprinting and documentation by conventional techniques require tens of hours. The problem needs to be addressed immediately and the solution ought to be sought in the computer system. A typical case in point is use of a YeS-1022 computer, capable of solving design and setup problems with the aid of its dialog subsystem using the engineer as the creative link. Important items to be considered are standardization of computer subsystems, to ensure usability of all on a large general-purpose scope, integration of all components involved in product design and production setup, and development of software with adequate programming of equipment control. A sufficiently high degree of design engineering automation without complete elimination of the human link is expected to be reached soon. Eventual 100% automation will require universal assignment of all design and setup function to the computer. When this stage has been reached, then the lead time from product conceptualization to product realization will be appreciably shortened and a changeover to flexible automatic production will become more widespread. Figures 1.

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