JPRS-UMM-86-016

16 SEPTEMBER 1986

USSR Report

MACHINE TOOLS AND METALWORKING EQUIPMENT

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-UMM-86-016

16 SEPTEMBER 1986

USSR REPORT

MACHINE TOOLS AND METALWORKING EQUIPMENT

CONTENTS

INDUSTRY PLANNING AND ECONOMICS

Machine Tool Classification, Coding for CAD Assembly Systems Discussed
(B. M. Arpentyev, A. G. Zilber; STANDARTY I KACHESTVO, No 4, Apr 86) 1

Future NC Tools Call for Higher Skill Personnel, Training
(NTR: PROBLEMY I RESHENIYA, No 10, May-Jun 86) 6

Academician on Career Choices, Igor Alekseyevich Glebov Interview 6
LIAP Student Laboratory Instruments 11

Need for Quality NC Tools Stressed in Modernization Plan
(Editorial; PRAVDA, 8 Jul 86) 12

Need for High-Speed, High-Quality Output, FMS in Tool Industry
(MASHINOSTROITEL, No 5, May 86) 15

Intensification, Greater Coordination Exhorted, Editorial 15
New Metalworking Processes Introduced, by V. P. Slobodyanyuk, M. Ye. Kats 17

Innovation, Efficiency Incentives System Critiqued
(Ye. M. Trenenkov; MASHINOSTROITEL, No 6, Jun 86) 23

USSR-GDR Cooperation, Machine Tool Purchasing Discussed
(Y. Presher Interview; TEKHNIKA I NAUKA, No 4, Apr 86) ... 29

OTHER METALWORKING EQUIPMENT

NPO Armstanok Develops Automated Rotor Balancing System
(A. Kalantar; KOMMUNIST, 11 Jun 86) 32

Briefs
ENIMS Develops Assembly, Welding Module 33
Semi-Automated MF-31-P Unit 33
Modernization of MB-13 Machine Tool 34
Combined Machining Method Developed 34

ROBOTICS

Panichev on Flexible Systems, Interrobot NPO's Future Role
(Nikolay Panichev Interview; TEKHNIKA I NAUKA, No 6, Jun 86) 35

/9986

UDC 025.4:621-229.001.33

MACHINE TOOL CLASSIFICATION, CODING FOR CAD ASSEMBLY SYSTEMS DISCUSSED

Moscow STANDARTY I KACHESTVO in Russian No 4, Apr 86 pp 33-34

[Article by B. M. Arpentyev and A. G. Zilber of the Ukrainian Correspondence Technical Institute imeni I. Z. Sokolov: "Basic Principles in the Technological Classification and Coding of Assembly Systems"; material in capital letters in boldface type in original]

[Text] One of the principal tasks of modern machine-building production is improving the technology of assembly with the maximum automation of both the design processes themselves and their planning. The development of standardized (grouped) manufacturing processes for various types of combinations facilitates the successful resolution of this task to a considerable extent. The variety of design solutions for combinations and assembly process techniques requires the development of appropriate process classifiers.

The use of classifiers makes it possible to reduce time periods and labor intensiveness in the preparation of production processes, which is especially important in the development of manufacturing processes for the assembly of combinations with interference with thermal influence (heating and cooling or combinations of heating and cooling). Besides the calculation of time standards, it is essential here to calculate the conditions of thermal influence, select the heating or cooling apparatus for minimizing power consumption and determine the precision of the assembly tooling.

Insofar as the first stage of any type of assembly is the combination of parts by this or that manufacturing process, the development of standard or grouped manufacturing processes should be based on the grouping of individual types of combinations.

The VNIINMASh [All-Union Scientific Research Institute of Standardization in Machinery Manufacture] methodological directives "Basic Principles of the Technological Classification and Coding of Assembly Units in Machine and Instrument Building" recommend taking the type of assembly unit as a basis. In any specific assembly unit, however, there can be various types of combinations of two or several parts that are not assembly units in the design documents. In the development of the standard (grouped) manufacturing process, individual (similar) types of combinations must be grouped in such a

way that in the future they are employed in various specific assembly units. Therefore, a process indicator for types of combinations is essential.

Proceeding from what has been indicated, basic principles for process classification were developed that had at their foundation the methodological directives of VNIINMASh. The entire process code has 14 designators, of which the first six are general indicators (Fig. 1) for all types of combinations, and the last eight are designators that are characteristic of only the given type of combination.

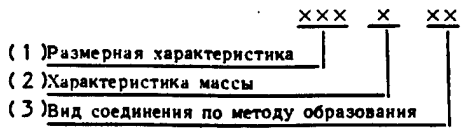


Fig. 1. Key: 1--Dimensional features; 2--mass features; 3--type of combination by method of formation.

Let's review these indicators.

DIMENSIONAL FEATURES. Coding is carried out by three designators that characterize the overall dimensions of the combination: the first designator is width or diameter (from 1 to 9); the second is length (from 1 to 9); and the third is height (from 1 to 9).

In combinations where the first designator of the code is a diameter, a 0 is put into the third spot. This signifies that the first designator, in the given instance, is not width but diameter.

MASS FEATURES OF THE COMBINATION. Coding is carried out by the fourth designator (from 0 to 9). Grouping is conducted in order of mass build-up (Table 1).

Table 1—Coding of Combinations by Mass

Mass, kilograms	Code	Mass, kilograms	Code
from 5	0	more than 250 to 500	5
more than 5 to 10	1	more than 500 to 1,000	6
more than 10 to 50	2	more than 1,000 to 5,000	7
more than 50 to 100	3	more than 5,000 to 10,000	8
more than 200 to 250	4	more than 10,000	9

TYPE OF COMBINATION BY METHOD OF FORMATION (from 01 to 99). Coding is carried out by the fifth and sixth designators. Two designators for the characteristics of the type of combination are adopted with regard to the fact that more than 25 types of combinations by method of formation are presented in GOST [All-Union State Standard] 14.320-81 and 24887-79 (threaded, tapered, pin, pressed, welded, soldered etc.), but they do not encompass all types of combinations. Therefore, for further grouping, additional indicators are

essential that can differ depending on the type of combination by method of formation. For combinations with the interference method of thermal effect, for example, additional indicators are presented in Fig. 2.

Fig 2. Key: 1--Nature of the thermal effect on the assembled parts; 2--quantity and relative disposition of combinations; 3--features of the complexity of the combinations; 4--additional dimensional features; 5--value of interference.

Let's consider these indicators in more detail.

THE NATURE OF THE THERMAL EFFECT ON THE COMBINED PARTS (coded by designator from 1 to 9):

heating the female part in heating ovens--1;

heating the female part in an oil bath--2;

heating the female part in an induction heater--3;

cooling the male part--4;

combined thermal effects on the part--5.

THE QUANTITY OF PARTS AND THE RELATIVE DISPOSITION OF THE COMBINATIONS (coded by designator from 1 to 9):

single-sided and single-stage at the last stage--1;

single-sided and multi-stage at the last stage--2;

single-sided and single-stage not at the last stages--3;

single-sided and multi-stage not at the last stage--4;

two-sided and single-stage at the last stages--5;

two-sided and multi-stage at the last stages--6;

two-sided and single-stage not at the last stages--7;

two-sided and multi-stage not at the last stages--8 etc.

FEATURES OF THE COMPLEXITIES OF THE COMBINATIONS (coded by designator from 1 to 9):

simple combinations of two parts mated along one fitting surface--1;

the same along two fitting surfaces--2;

complex combinations of three parts mated on two fitting surfaces--3;

the same along three fitting surfaces--4 etc.

ADDITIONAL DIMENSIONAL FEATURES (coded by three designators):

fitting-surface diameter from 0 to 9;

fitting-surface length from 0 to 9;

diameter of the bore of the male part from 0 to 9.

The coding is presented in Table 2.

Table 2--Coding of Additional Dimensional Features

Code	Nominal dimensions, millimeters		
	Diameter of fitting surface	Length of fitting surface	Diameter of the bore of the male part
0	10-18	6-10	0
1	18-30	10-18	10-18
2	30-50	18-30	18-30
3	50-80	30-50	30-50
4	80-120	50-80	50-80
5	120-180	80-120	80-120
6	180-250	120-180	120-180
7	250-315	180-250	180-250
8	315-400	250-315	250-315
9	400-500	315-400	315-400

MAGNITUDE OF THE RATED INTERFERENCE (coded by two designators, the most (from 0 to 9) and the least (from 0 to 9).

The coding is presented in Table 3.

Table 3--Coding of Rated Interference

Code	------Interference value------ micrometers Greatest	Least
0	more than 29 to 34	more than 11 to 13
1	34-41	13-16
2	41-49	16-19
3	49-57	19-22
4	57-65	22-25
5	65-75	25-29
6	75-84	29-32
7	84-93	32-36
8	93-103	36-40
9	103-115	40-45

The structure of the overall design and process code is presented in Fig. 3.

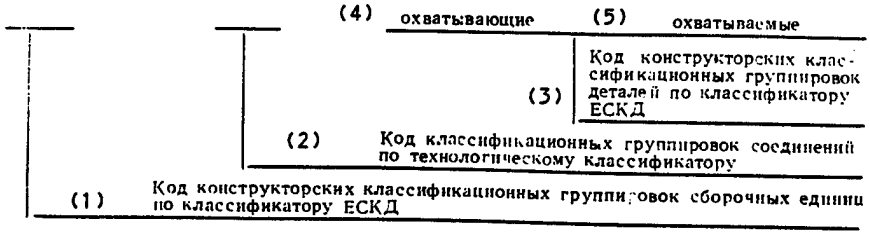


Fig. 3. Key: 1--Design classification assembly-unit grouping code according to YeSKD [Unified Design Documentation System] classifier; 2--classification grouping code of combinations by process classifier; 3--design classification parts grouping code by YeSKD classifier; 4--female; 5--male.

Thus, the process classifier is the link joining the specific unit of assembly, the individual combinations within them and the parts that are included in these combinations. This allows the grouping of assembly combinations, which is essential for the development of standard (grouped) manufacturing processes and is the first step in the creation of SAPR [computer-aided design] of the manufacturing processes of assembly.

12821
CSO: 1823/296

FUTURE NC TOOLS CALL FOR HIGHER SKILL PERSONNEL, TRAINING

Academician on Career Choices

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 10, May-Jun 86 p 6

[Interview with USSR Academy of Sciences Leningrad Science Center Presidium Chairman Academician Igor Alekseyevich Glebov by V. Kovichev under the rubric "Youth and Creativity": "Time Favors the Youth"]

> [Text] The last bell will ring in the schools at the end of May. The graduates will have to choose their life's path. What is practically their most crucial moment has arrived.
>
> The choice is exceedingly difficult. They must determine their fate today, when the national economy and all of society are at a drastic turning point. Not just a good parting speech is needed here, but a skilled one, the authoritative opinion of one who knows well the look of the professions of the future.
>
> For this we turned to one of the authors of Intensification-90, the first territorial sectorial program in our country, and chairman of the presidium of the Leningrad Science Center of the USSR Academy of Sciences, Academician I. A. Glebov.

[Question] Igor Alekseyevich, if you take into account that not only are no fewer than five years required to master a profession (I think that is correct for those who do not intend to continue their studies in a higher educational institution or a tekhnikum as well), then today's school graduates will enter independent life right at the start of the 1990s. It is precisely then that the results of the first intensification program will have an effect. How will the typical production that these young people enter look then?

[Answer] Typical? Well, let's consider one typical, say, for Leningrad industry in the sphere of metalworking. Up to this time, the personnel are mostly machine-tool operators. Turners, milling machine operators... This is the first thing many think of connected with working in a plant.

For a long time, in reality, the whole problem of training personnel for machine building came down to attracting a sufficient quantity of youth into PTUs [professional and technical schools] or production. The rest, as they say, is a technical matter--with that equipment, naturally, that we have grown accustomed to. It quite a simple matter to prepare a worker to service a universal machine tool, if not at a high skill level. I am not speaking, of course, of virtuoso turners and ace milling-machine operators--people aspire to this level of skill all their lives. But we are, after all, discussing the typical. Overcoming universal machine tools at metalworking enterprises forces us to "fight not with skill, but with numbers."

Thus the tasks before us--neither quantitative nor qualitative--can be resolved in this manner today. And that is why another route was chosen.

The Intensification-90 Program envisages the introduction of 2,600 automation facilities, equipped moreover with robots and automated devices, for more than individual workstations, and the transition to the thorough automation of the whole "research--production" cycle.

Already today, universal machine tools are being replaced by machine tools with NC [numerical control] and more complicated ones--automated sections and NC modules controlled from a single workstation. The next stage is the formation of shops from these sections, and then automated plants for, as is sometimes said, "unattended" production. That is, some of today's graduates will get a workstation in an "unattended" shop as soon as the beginning of the 1990s, and others will get to participate in the tooling of such workstations.

[Question] They'll be measured for white collars, as they say?

[Answer] It's not all that simple. This improved and, it must be said, extremely expensive equipment justifies the expenditures and has the anticipated effect only with the observance of certain conditions. If things are well with them, then things are well overall.

But any failure turns into unrecoverable losses. Flexible machine systems [GAP] cannot be "pressured," catching up for omissions, working without regard for one's own poor condition, cannot be replaced, cannot note that what was fed that is not right, is of the wrong quality, the wrong quantity of materials and the like. A GAP is uncompromising: its produces exactly as much product and it is programmed to--no more, no less. And categorically: if there is a breakdown in one insignificant section, in some link, the whole automated line stops. From that second the losses begin to total up. And they are many times more wasteful than, say, one universal machine tool. They are difficult to imagine.

[Question] Let's try to imagine...

[Answer] All right, the machine tool has stopped. The situation is familiar: no great misfortune has occurred--the shop continues to operate as if nothing happened. The turner, if he cannot eliminate the defect himself, either goes to another machine tool (this is not a problem, in that there is such a

shortage of machine-tool operators that there is always an excess of machine tools) or sends for the mechanic. And then either along with him, or relying on him, he will await the completion of the repairs. It is best if this takes only minutes, but it happens that it takes hours sometimes. The shop, however, will be working. But an automated one won't be. And that is why this situation is inadmissible in principle in it. Even the minutes the worker spends looking for the mechanic cost thousands of rubles. This means that even these losses must be eliminated.

The reckoning here is in seconds. Accordingly, the worker controlling the module or the GAP (the operator) should know how to eliminate defects himself.

[Question] You mean you can't just push buttons even in the "unattended" shop?

[Answer] Whoever has that impression had better choose another profession, far removed from production.

The automated systems ease the labor of the worker, but do not simplify it. The most important thing is to master precisely whatever requirements are presented by modern production. They are incomparably greater than before.

Yes, we do say that we are trying to create "unattended" production. But "unattended" is more of an image, and applies literally only to the machine-tool operators. The need for them really will decline. But you can't manage entirely without workers.

[Question] "Different" workers, apparently.

[Answer] Yes, their knowledge should be an order of magnitude, or several orders of magnitude, greater.

In the first place, the new-generation equipment is incomparably more complex. It is essential to study electronics, the principles of effect, the automated machine-tool apparatus, robots and automated systems deeply. In the second place, as I was saying earlier, the consequences of defects--both economic and technical or technological--are much more severe.

The worker should know his system overall and each of its sections individually, how to envisage consequences and how to determine the cause of breakdowns. And most importantly of all--know how to eliminate any defects independently.

Actually, he should operate with knowledge on the level of, perhaps, a modern engineer with the practical skills of the most highly qualified worker. That is, both a clear head and skilled hands are important to him at the same time.

[Question] So it turns out then that the eternal justifications of the negligent students--"I don't need book knowledge for anything, they'll still take me at the plant"--has become obsolete?

[Answer] Exactly! I fear that not only students, but even educators, dividing students into those dreaming of going on higher institutions and those who will "go to the PTU anyway, and there's no reason to torture them with science" are poorly representing the extent to which that distinction has become outmoded.

[Question] But can it be that today's students won't be able to get places at simple universal machine tools?

[Answer] At the start of their working lives, they could get them. It's a little early to be taking down the "Help Wanted" signs from the plant gates.

But then what? The Intensification-90 and the already operating Intensification-2000 programs, promising plans for economic and social development up to the beginning of the 21st century, already answer this question quite definitively. In the current five-year plan, fundamental technical solutions are being developed and tried out. Amassing them, in the 13th and 14th Five-Year Plans we will be able to retool production completely, circulating and developing that which will replace the accustomed equipment and technology.

Thus, the basic work profession of the future is clearly not the machine-tool operator, and even not an operator at all, but a broad specialist for servicing automated production systems. This is what the youth--if they don't want to undergo an apprenticeship at an advanced age--should be preparing for. This is not tomorrow's task, but today's.

[Question] Up to now we have been discussing those who are choosing their professions. But what should be the selection criteria for the young people who plan to go to technical school?

[Answer] The reorganization of engineering labor is an acute question for our economy. The prestige of the engineer has declined, his labor is losing its creative character and is becoming ever more a "paper" job. There are a number of reasons for this.

One of them is completely objective and consistent: the modern planning engineer has to "stew" over such a quantity of information that he really doesn't have the strength to study all kinds of papers or the time for creativity. Mountains and fields of handbooks with GOSTs [All-Union State Standards] and standards! Many years are required to learn where to look for something. And often the engineer and the specialist are judged precisely by their skill at orienting themselves in this vast paper-and-standards ocean.

The new planner need not spend time on this science. All of the information included in the handbooks will be stored in computer memories, and it will be a matter of minutes to extract what is needed. Computer equipment also relieves the engineer of the execution of detailed plans and cumbersome calculations--the main things that time is spent on now.

It is well known that the "man--machine" system doubles or triples the labor productivity of planners. The Intensification-90 programs envisages a

doubling of SAPR [computer-aided design] output. Thus the complete retooling of the planner's workstations is quite an imminent prospect.

When the modern equipment frees the engineer of routine mechanical work, new opportunities open up for him to think, advance ideas, and create, that is to be occupied with his direct specialty according to which his professional qualities will be evaluated.

Thus the specialists in moving paperwork around and composing documentation will hardly have a place among the engineers of the future. Let this be a warning to young men and women who intend to enter technical schools.

[Question] It is obvious that scientific work will be reconstructed as well?

[Answer] Undoubtedly. The chief problem of science is reducing the time for research and the incorporation of the results into production.

What is so complicated here?

It is impossible, of course, to rush along an idea that has not yet been created. But as practice shows, the major portion of time is not spent on this. Prolonged calculations, multitudinous drawings, the manufacture of a mock-up, then a prototype, testing, and then, according to the test results--more calculations, drawings etc. (with the inevitable coordinations at every stage). As a result, when an idea comes to mind, you see how imperfect it is. But don't undertake everything at once...

Modern automated systems for scientific research (ASNI) make it possible to dispense with this multistage route. They also open up the possibility of conducting testing and incorporating corrections without the actual article on hand, and getting by without drawings even in the manufacture of a prototype. This does not only accelerate the research process. The ASNI allows the study of a multitude of hypotheses and the choice of the optimal variant almost without error. The computer presents an almost unlimited expanse to the inquisitive mind.

[Question] That is it frees man from routine for creativity?

[Answer] Yes, and one can only envy today's youth. They are starting on their creative path at a happy time. They can dispose themselves toward creation, rather than redispose themselves toward it.

Many preceding generations did not discover such short routes to the heights of inquiry. Now one need not spend time acquiring routine but once essential experience. Let's not waste time--let's research.

Speaking frankly, scientific organizations, design bureaus and plant shops have a vested interest first and foremost in an influx of youth that are free of the baggage of obsolete methods, stereotypical traditional thought and outmoded skills at work.

Never before in history have there been such opportunities for the creative and professional growth of youth. Time favors the young. But time today moves quickly. And one should cultivate qualities that meet it.

[Question] And what are these qualities?

[Answer] The main thing, to my mind, is inquisitiveness. Questions should always come up: Why is that so? Can't it be otherwise? Obvious things should be doubted--only then are productive ideas born. One must believe in the unknown--and it turns out that much was unable to be thought through without you, many ideas are not yet finished. After all, improvement has no limit...

LIAP Student Laboratory Instruments

Moscow NTR: PROBLEMY I RESHENIYA in Russian No 10, May-Jun 86 p 6

[Unattributed feature: "The Student Laboratory"]

[Text] The Student Experimental Laboratory (STELA) of the Leningrad Avionics Institute (LIAP) is quite active. More than seventy unique instruments have been developed there that are now in operation in various cities of the country.

The LIAP students have close contacts with the 1st Medical Institute, the Institute of Physical Culture, The Institute of Philology imeni I. P. Pavlov of the USSR Academy of Sciences and the All-Union Cardiological Center of USSR AMN [Academy of Medical Sciences]. Instruments created by the students assist doctors in treating people, biologists in making experiments and sportsmen in reaching new records. The Trener-2 apparatus, for example, determines instantly and precisely the pulse of the athlete. The VARIO-K instrument quickly displays the predisposition of the patient to irregularities in heart activity.

12821
CSO: 1823/280

NEED FOR QUALITY NC TOOLS STRESSED IN MODERNIZATION PLAN

Moscow PRAVDA in Russian 8 Jul 86 p 1

[Unattributed editorial: "The Retooling of Machine Building"]

[Text] A foundation, a catalyst of progress, a key link in the new technical reconstruction of the national economy--such is the role the party assigns to the machine-building complex. It is namely here, as was noted at the June (1986) Plenum of the Central Committee, that all of the topical problems of economics are focused today. Without the rapid implementation of the modernization of machine building, without its reconstruction for the output of new systems of machinery and progressive equipment for all sectors of the national economy, we will be unable to resolve the tasks posed by the 27th CPSU Congress.

Major capital investment is being allocated for the development of the sector in this five-year plan as never before--almost twice as much as in the 11th. But if it is used in the old manner, the tasks before us will not be resolved. These funds must be directed chiefly toward the technical retooling and reconstruction of enterprises. Particular attention is required of those where experience has been accumulated in the rapid assimilation of new progressive equipment and where there are highly qualified engineering and worker personnel.

Take, for instance, the old and honored enterprise--the Moscow Krasnyy Proletariy Machine-Tool Building Association. One out of three lathe operators in the country works on a machine tool with its brand name, and its products are known in dozens of countries. New capacity for the plant is going up on a new site, but at the old one the machine-tool makers are using quite obsolete equipment and are laboring in facilities that were built before the revolution and in the years of the first five-year plans. There exists a resolution for the reconstruction of the enterprise for the annual output of almost a thousand machining centers here--most necessary equipment today! But the workers of Minstankoprom [Ministry of the Machine Tool and Tool Building Industry] and the plant management cannot get started on the development of the plan, and spend months and years in endless coordination. It is necessary to finish the planning first and foremost in order to implement the reconstruction by the end of the five-year plan.

One of the decisive issues in the modernization of machine building today is the quality of the plans projected for the realization of technical retooling and reconstruction. In the 12th Five-Year Plan, Minstankoprom projects the construction of 18 plants according to plans created as early as the 9th and 10th Five-Year Plans, as does Minelektrotekhprom [Ministry of the Electrical Equipment Industry] for 10 plants. Moreover, the plans of the planning organizations do not include a reworking of these plans. The responsibility of the planners and experts is too low, as is that of those management workers of the ministries that "give their blessing" to the realization of obsolete plans. USSR Gosstroy [State Committee for Construction Affairs] and the USSR State Committee for Science and Technology have found serious omissions in 40 percent of the plans approved by the departmental expert commissions. It is necessary to deal in all severity with those parties that permit the incorporation of wasteful and inefficient technology in the plants that will determine the economics of machine building by the year 2000. An extradepartmental expert review should be conducted immediately of plans for the construction, reconstruction and technical retooling of machine-building enterprises.

Much is still being done to pass off as reconstruction the simple expansion of production on the previous technological basis, with an increase in the number of workstations. It must be stated that the trend toward their growth has still not been overcome. But after all, outmoded workstations, taking into account a two-shift mode of operation, make up a third of all the workstations of machine building. That is why it is not "islands" of automation at each enterprise that are needed, not localized measures, but comprehensive programs for continuous technical reconstruction. These programs must be oriented toward the output of high-quality products, the broad utilization of the newest equipment and technologies, the elimination of outmoded workstations and the achievement of high technical and economic indicators.

The broad utilization of multi-function equipment and numerically controlled machine tools, flexible modules, rotary and rotary-conveyor lines, automated systems for planning and management and robot equipment--that is the technical basis on which the machine-building complex should be developed. Party committees and the managers of machine-building enterprises must follow more boldly the example of the Leningrad workers who resolved to achieve the two- and three-shift utilization of of progressive highly productive equipment based on the elimination of outmoded workstations. The simultaneous development of the social aspect of the enterprises and the creation of the essential conditions for the labor, everyday life and relaxation of the people must not be forgotten in this.

More metal is smelted in our country, as is well known, than in the United States, but it is still utilized less efficiently. The basic technology of machine building remains cutting, due to which much metal goes in the form of chips. Meanwhile, low-waste methods for the shaping of parts with pressure, welding and precision casting have long been known. In the 12th Five-Year Plan, it is essential to lay the foundation for the radical reshaping of machine building aimed at metals conservation. For this purpose, capital

investment in low-waste and waste-free technologies should be more than tripled. Progressive base technologies--plasma, impulse, electron-beam, membrane and others--must be assimilated more persistently as well.

For the reconstruction of machine building to produce the desired results, it is essential that the scientific and design-planning potential of the sector be developed as fast as possible. Until now, practically only series production has been developed, while the NIIs [scientific research institutes] and KBs [design bureaus] are extremely poorly equipped with experimental, research and testing equipment. Many of them have also created "paper" plans instead of prototypes ready for series assimilation. It is important today first of all to equip the experimental bases, test benches, proving grounds and test plants with the newest equipment. For the current five-year plan, however, the Ministry of Heavy and Transport Machine Building, the Ministry of Tractor and Agricultural Machine Building, the Ministry of Machine Building for Animal Husbandry and Fodder Production and other ministries have been stingy in allocating funds for these aims. This must be corrected.

Specialization and cooperative operation are an enormous reserve for progress in the sector. The majority of the machine-building plants were built earlier according to the "self-contained facilities" principle with a full set of blank-preparation, machining, assembly and auxiliary shops. This sometimes conceals work done by primitive methods, low labor productivity and the overconsumption of resources. Due to the scattered nature of blanks production alone, every year the cost of machine-building products is 1.7 billion rubles greater. It is essential to triple the output of general-purpose machine-building articles in the upcoming years, which will permit the freeing up of almost half a million workers and the raising of product quality in the sector to a new level.

The 27th Party Congress and the June (1986) Plenum of the Central Committee have appealed to the labor collectives of the machine-building complex to retool the national economy on a new basis more quickly. It is a matter of honor for communists and for all machine-building workers to embody in life the plans of the party and to reach the point where the sector itself is a model for the rapid reshaping of production based on the newest equipment and technology.

12821
CSO: 1823/301

NEED FOR HIGH-SPEED, HIGH-QUALITY OUTPUT, FMS IN TOOL INDUSTRY

UDC 62.001.7

Intensification, Greater Coordination Exhorted

Moscow MASHINOSTROITEL in Russian No 5, May 86 pp 1-2

[Editorial: "Acceleration Is a Requirement of the Times"]

[Text] The 27th Congress of the Communist Party of the Soviet Union is being assessed everywhere as the greatest event of today. Its significance is determined by the exceptionally important--in essence transitional--stage in the historical development of both our society and the modern world as a whole.

"Today, the first-priority task of the party, and of the whole people," it was emphasized at the congress, "is to conquer the unfavorable trends in the economy's development, to impart the proper dynamism to it, and to give elbow room to the initiative and creativity of the masses and to authentically revolutionary transformations."

Majestic but realistic tasks are contemplated. Suffice it to say that in the next 15 years we must create a production potential approximately equal in scale to that which was built up during all the preceding years of Soviet power, and, in so doing, transform it qualitatively, almost double the national income, and increase labor productivity 2.3-fold to 2.5-fold. The essence of the changes is a shifting of the center of attention from quantitative to qualitative indicators and from intermediate to final results, in a radical transformation of the whole national economy on the basis of the newest achievements of science and technology, a breakthrough in the most progressive areas, and a radical restructuring of the system of economics and management.

The party's strategic course consists in converting to an economy of better organization and greater efficiency. After approving absolutely the concept of an acceleration of the country's social and economic development which was worked out by the Party Central Committee, the 27th CPSU Congress required party, soviet, economic and social organizations to make unfailing execution of the program formulations for converting the national economy to an intensive path of development the basis for all its activity.

"As the main lever for intensifying the economy," states the 27th CPSU Congress Resolution on the Central Committee's Political Report, "the party is promoting a fundamental acceleration of scientific and technical progress and the wide introduction of new-generation equipment and basically new technologies that will provide for the highest productivity and effectiveness. The congress set as first priority the execution of a thorough technical rebuilding of the national economy, based upon the most modern achievements of science and technology."

Transferring to the intensification route requires important structural changes in the economy. Our national economy should be reconstructed flexibly and in good time in accordance with the progressive achievements in science and technology and the requirements of society and the individual. Industries that support scientific and technical progress and the successful solution of social tasks will be developed at a more rapid rate. In this connection, new requirements are being set for investment policy. It is being called upon to insure rapid growth in capital-investment effectiveness, a concentration thereof in the decisive areas, and the attainment of higher growth in output and national income per ruble of expenditure. For this purpose, the center of gravity will be shifted from new construction to the reequipping and rebuilding of existing enterprises.

Transformation of the Soviet economy into the world's most modern and powerful requires further development of the basis of economic might--heavy industry. In so doing, the party allots a key role to machinebuilding, which is called upon to produce systems and sets of machines, equipment and instruments that are on the highest technical and economic level. The genuine catalysts for speeding up scientific and technical progress--machine-tool and tool output, toolmaking, the electrical-equipment industry, microelectronics, computer equipment, instrumentmaking and the informatics industry--will receive priority development. In order to achieve success in the development of these branches, qualitative advances are needed in metallurgy, chemicals and other branches that produce structural materials.

The 12th Five-Year Plan is called upon to become a great step in converting the national economy to the rails of intensive development, based upon a speeding up of scientific and technical progress. Thus, it is planned to expand the use of progressive basic technologies 1.5-fold to 2-fold during this period, achieving a qualitatively new stature not only for individual types of production but also for whole industries. The radical restructuring and the development of the machinebuilding complex beforehand are viewed as a first-priority matter. The level of production automation for the national economy will, on the average, double. Growth in volume of computer-equipment output will increase 2-fold to 2.3-fold, and the pool of industrial robots will triple. The pace of development of machinebuilding will be almost double that of industry as a whole. The updating of machinebuilding output each year is planned to reach up to 13 percent by 1990 versus the 4.5 percent of 1985.

Social tasks will be resolved successfully on the basis of the development of social production. The highest purpose of the party's economic strategy, it was noted in the Main Directions, has been and will remain an unswerving rise in the material and cultural level of people's lives.

The Soviet people wholeheartedly approve the 27th CPSU Congress's decisions and are expressing an enthusiastic striving to work with inspiration, displaying a high degree of organization, initiative and skill. Their labor efforts are aimed at the timely and practical realization of the plans of the party, whose aims are a further strengthening of the country's economic might and an all-around rise in the people's welfare.

The chief things right now are to achieve a rapid breakthrough in the work, to execute a turnabout in all spheres of economic activity and to use the potential created more effectively. The main thing, a reserve that is, in essence, inexhaustible, which consists in the human factor, the people, their skill and their desire to work skillfully and creatively should be brought fully into action, and high states of organization, discipline and order should be provided for in every working collective.

The documents and the decisions of the 27th CPSU Congress constitute a concrete program for workers, for all Soviet people. The greater the degree of organization, harmony and coordination in our daily work of creating, the more successfully will we realize the majestic program of transforming society that the party congress planned.

UDC 658.52.011.56
621.001.7

New Metalworking Processes Introduced

Moscow MASHINOSTROITEL in Russian No 5, May 86 pp 4-5

[Article by Engineers V. P. Slobodyanyuk and M. Ye. Kats: "The Main Direction"]

[Text] VPTIenergomash [All-Union Industrial-Design Institute for Power Machinebuilding] and its scientific and technical society, in participating in fulfillment of the Intensifikatsiya-90 program, took part in developing and introducing at the industry's enterprises automated and roboticized production complexes, based upon the wide use of highly productive NC equipment, robots, control computers and automated transport systems and storages, which enable conversion to the creation of versatile automated production facilities (GAP's). The institute is now working on the creation of industry's GAP's for the machining of turbine blades, casing parts and parts of the shaft, rod and bushing type, and it is also designing GAP's for metallurgical reduction processes, particularly for departments that precision cast meltable (destructible) patterns. Definite successes have already been achieved in the comprehensive automation of casting production, which is confirmed by the creation of a flow line for manufacturing precision cast blanks.

A flow line has been created for the Leningrad Turbine-Blade Plant imeni 50-Letiya USSR PO [Production Association] (PO LZTL) for the molding of casings with dry filler, for the calcining, teeming, cooling and shaking out of flasks with separations, and for the cooling of supporting fireclay crumb. The line manufactures precision cast blanks (turbine casings and turbine

blades) made of corrosion-resistant and heat-resistant steels. The line's productivity is 800-1,000 tons of cast blanks per year (with good surface quality and adequate geometric precision). In considering the line's high effectiveness (an annual economic benefit of more than 130,000 rubles), the institute's specialists are continuing to improve its design and to develop new lines based upon it. Thus, a line for vacuum casting and a specialized line for making the blades of propellers and water turbines are planned for introduction.

Important results have been achieved with modernization of the traditional technology for machining turbine blades. Thus, for example, that same association has developed and introduced high-speed broaching of the root portion of GTN-25 turbine blades, together with the milling and grinding thereof. Three groups of mechanized accessories for the integrated machining and a corresponding number of replaceable components for reset-up for a specific blade have been created. Each attachment consists of a mechanism for distributing the allowance and strengthening the blade, a drilling head, a platen and a control system. Broaching is done by means of a tool that consists of conversion platens and precision extension blocks with cutting sections.

With the introduction of broaching, such operations as milling, grinding and drilling during mechanical machining of the profile of the root portion of the blade are precluded. This enabled labor productivity to be raised 10-fold to 15-fold and an estimated saving of 10,000 rubles per turbine.

For a number of years the association has been machining the main surface of turbine blades on model SM-939 (a.s. [innovator's certificate] 471957) machine tools. While machining, the blank is automatically installed in the position at which the allowance for metal for the next mechanical machining is distributed uniformly along the whole profile. Instead of three operations, the new technology calls for only one. The economic effectiveness from introducing it is more than 100,000 rubles.

Specialists of the Institute and of PO Nevskiy Zavod imeni V. I. Lenin worked jointly to improve the technology for manufacturing compressor disks for the high- and low-pressure GTN-25 turbine. As a result, mutually replaceable disks go into the assembly, alignment and manual work for assembling the rotors are precluded, and, in so doing, labor productivity has risen 1.4-fold to 1.6-fold.

The introduction of NC equipment has enabled a new ganged manufacturing process for programable mechanical machining of important and complicated parts to be created, and a production process for the assembly of rotors without additional alignment by element to be developed. The use of a surfacing lathe with a CNC type control system (minicomputer) during final machining of the disks permits GAP's with centralized computer control to be organized.

The modular principle of design was applied when the institute's specialists developed a manufacturing process and control program for the final machining of the disks, enabling the time for technical preparation for production operations to be reduced 2-fold to 3-fold.

A rise in the level of domestic machinebuilding depends greatly upon high quality in the manufacture of machine-tool accessories. A large number of specialized NC machine tools at turbinebuilding plants have now been equipped with modern accessories developed by the institute. Thus, for example, the PO Nevskiy Zavod equipped the model UF0908 model NC machine tool with rapidly resettable accessories for machining the casings of the GTN-25 turbine and reduction-gear covers.

A ganged accessory for machining, trueing and fastening the cast halves of turbine-cylinder casings on the model NS72F2 industrial complex has been developed and is in the mastery stage at the PO Turbomotornyy Zavod imeni K. Ye. Voroshilov. The economic benefit from using the attachment is roughly more than 95,000 rubles.

A new technology has been mastered for making water-turbine parts (Kaplan-turbine blades and large rings for water turbines) that is based upon machine tools of the machining-center type. This enabled difficult manual labor to be eliminated and labor productivity to be raised by 50 percent.

The manufacture of such basic parts as casings, crankshafts, connecting rods, sleeves and camshafts on NC machine tools of the machining-center type enables operations to be concentrated to the maximum and the workload of the machine tools and the coefficient of multiple-machine tool servicing to be increased, in comparison with the traditional manufacture of these parts on special and ganged machine tools that have been tooled for one operation. A rise in the quality of the manufacture of these parts and in stability of the technology will be provided for by the use of NC monitoring and measuring machines.

The PO LZTL has introduced an installation for monitoring the profile part of large blades by using a program-control system which precludes the necessity for monitoring and measuring accessories with templates (more than 100 templates are required for monitoring one turbine blade alone). The economic benefit from introducing this device is more than 50,000 rubles. It is planned in the long term to plug the device into a computer which will enable the control program to be changed during machining of the working portion of the blade on NC machine tools, by analyzing the monitored results. This will provide for the precision of shape and dimensions of blades in accordance with the requirements of the drawings.

The association has introduced a centerfinder with two indicators (a. s. 965626), which is intended for use when setting the spindle of a jig-boring machine along the axis of an opening of a part, and also for determining noncoaxiality during setting up, along the two coordinates between the axes of the spindle and the opening. Time for setting the spindle has been cut to a third where precision in placement of the part and the axis are ±0.01 mm.

Specialists of the institute and of PO Nevskiy Zavod have developed and introduced electrodes for hard-facing dies for cold and hot forming and also of equipment parts damaged by intense wear. The electrode coating does not contain scarce tungsten, and low-carbon wire is used for the rod.

The deposited metal, after annealing, is machined well by cutting. It is recommended that the electrodes be used during deposition of the die impressions for turbine blades, the teeth and buckets of excavators, knockouts of presses, and so on. Use of the electrodes enables alloy steels to replace carbon-based alloy steels without reducing the efficiency of the design and the service life of the equipment to be increased because of the working implements' increased resistance to wear and because of the possibility of repeated complete rejuvenation of them. The economic effectiveness of introducing the new composition for the deposition electrode is more than 300,000 rubles.

The institute has developed and successfully introduced at PO Izhorskiy Zavod imeni A. A. Zhdanov an antisandburning-pickup paint for sand molds and cores (a. s. 926840). It is used when producing large steel castings. The combination of high-refractory filler, heat-resistant polymer binder and stabilizing additives provides high thermal stability of antisandburning-pickup coatings, and the combination of organic solvents provides for high-speed in drying out the paint applied.

The special technology of preparing the paint, which any casting department can realize, provides for the paint high sedimentation stability (settling) and stable operating characteristics (capability for penetration and covering, adhesion to the mold and core materials, thickness and density of the coating, and so on). In comparison with known paints, the proposed composition is distinguished by faster drying (20-25 minutes between the first and second coatings and a maximum of 40 minutes between the second coating and assembly of the form), by a 15-20 percent reduction in labor intensiveness for cleaning and casting, and by a reduction in defects in large steel castings.

In recent years the institute has continued to work on the introduction of previously developed designs for mechanized lines for machine gas cutting of rolled plate. The introduction of these lines at the Syzran Turbinemaking Plant, the Sibtyazhmash Plant and the Kharkov Turbine Plant imeni S. M. Kirov has enabled the utilization coefficient of gas cutting machines to be raised greatly and more than 400,000 rubles to be saved. The institute's specialists have now finished the introduction of designs for automated lines for the Volgodonsk Nuclear-Power Machinebuilding Plant. They are supplied with a highly effective system of local exhaust ventilation for each workplace, which was created in collaboration with VNIIavtogenmash [All-Union Scientific-Research Institute for Autogenous Grinding of Metals] specialists. Use of this system enables expenditures on dilution-type ventilation and on heating of a department to be reduced and the hygiene of working conditions to be improved.

As a result of joint work, a bench was built for cutting plate metal (a.s. 818784 and a.s. 967705) and was introduced at the Kharkov Electrical Machinery Plant imeni 50-Letiya Velikaya Oktyabrskaya Sotsialisticheskaya Revolyutsiya.

Built-in ventilation at thermal cutting lines is being introduced at the Leningradskiy Metallicheskiy Plant of the Turbinemaking PO at the Transport Electrical-Equipment Plant (the city of Brezhnev), and other enterprises. The economic benefit from the introduction is more than 50,000 rubles.

With introduction of the automated system for controlling industrial processes (ASUTP) that the institute developed for manufacturing blanks from rolled plate, a large number of specialists engaged in the operation of controlling the thermal cutting, marking and dressing (grinding) processes and of specialists engaged in industrial preparation for production (ASTPP) have been provisionally released. The ASTPP system cuts the time spent on industrial preparations for production, improves the quality of norm-setting, raises the labor productivity of engineers and workers 1.5-fold to 2-fold, and enables current operating information that is used for production planning to be obtained. It can be used in the work of preparing for welding operations at any machinebuilding enterprise that produces at least 5,000 tons of welded structure per year and that plans more than 10,000 technological processes per year. ASTPP was introduced successfully at the PO Leningradskiy Metallicheskiy Plant, with an economic benefit of more than 90,000 rubles.

The association is introducing technical documentation developed by the institute for welding departments, based upon mechanized tooling, with the use of permanent magnets. The economic benefit from it is, roughly, at least 60,000 rubles.

A working technology for manufacturing welded GTN-25 components which will raise the level of mechanization of welding work was created at PO Nevskiy Zavod. Savings from introducing it are 72,000 rubles.

A promising technology for rebuilding the industry's plants that the institute has developed is aimed at creating ganged industrial processes that will be used at comprehensively mechanized sections for manufacturing parts and components for power-engineering equipment. For purposes of mechanizing elevating and conveying operations in preparatory and welding departments, the institute has developed and introduced in PO Leningradskiy Metallicheskiy Plant, the Syzran Turbinemaking Plant and other plants load-gripping accessories based upon permanent magnets, with automatic gripping and releasing. The annual economic benefit from its introduction will be 8,000-10,000 rubles.

The institute has developed two types of cable clamps that will provide for reliable joining of branches thereof and prevent the cables from rubbing (a. s. 863936).

As a result of the joint work of VPTIenergomash manufacturing engineers and of specialists from the NPO [Science and Production Association] TsKTI [Central Scientific-Research and Design Development Institute for Boilers and Turbines] imeni I. I. Polzunov, TsNIITmash [Central Scientific-Research Institute for Machinebuilding Technology] and PO LZTL, a technology for thermal treatment in a protective atmosphere of blanks for precision-cast blades was developed. In so doing, the defects (the forming of scale and of a surface layer that is changed in chemical content) that arise during heating are eliminated, enabling the allowances for semifinished items to be reduced and the operating reliability of the turbine blades to be raised. When the new technology is used, the thickness of the changed surface layer does not exceed 0.05-0.2 mm for materials of various grades, enabling dimensionless machining of the profile of the turbine blade to be performed by the band-grinding method. The new technology was introduced in the precision-casting department of PO LZTL with an economic benefit of more than 200,000 rubles.

The institute's innovators, jointly with production workers of PO Nevskiy Zavod, the Nuclear Turbinebuilding PO of the Kharkov Turbine Plant imeni S. M. Kirov, and the Syzran Turbinebuilding Plant, successfully introduced during the last five-year plan automated systems for organizing the centralized intraplant hauling of loads with a great economic benefit.

The main direction of the institute's activity and of its scientific and technical society during the 12th Five-Plan plan is to automate production comprehensively and to eliminate labor-intensive operations. Comprehensively automated operations for the mechanical machining of turbine blades is to be introduced into PO LZTL, and automated sections and automated lines are to be introduced at PO Nevskiy Zavod, PO LZTL, the Urals Turbine Motor Plant imeni K. Ye. Voroshilov and other enterprises.

11409
CSO: 1823/264

UDC 338.246
658.310.138

INNOVATION, EFFICIENCY INCENTIVES SYSTEM CRITIQUED

Moscow MASHINOSTROITEL in Russian No 6, Jun 86 pp 3-5

[Article by Ye.M. Trenenkov, deputy director, department of wages and economic work, VTsSPS [All-Union Central Trade Union Council]: "Incentives for Scientific and Technical Progress: Problems, Quests, Finds"]

[Text] In the "Basic Directions for the Economic and Social Development of the USSR for 1986-1990 and for the Period to the Year 2000" the speeding of scientific and technical progress is defined as a key political and economic problem. The question is one of a sharp increase in the role of science and engineering in the fundamental transformation of the forces of production, shifting the economy onto the rails of thorough intensification, an increase in the efficiency of public production, and the socioeconomic development of the country. The successful solution of these problems requires in-depth restructuring of the system of planning and management and of the economic machinery. The introduction of cost accounting, the improvement of commodity-monetary relationships, and of the entire arsenal of economic levers and incentives take on special importance here.

Various measures have been adopted recently for providing incentives for the advancement of scientific and technical progress. For example, in the course of the wide-scale economic experiment, a mechanism has been worked out, in particular, for the optimal providing of labor collectives and individual workers with incentives for the development and mastery of new high-efficiency products. In accordance with the provisions of the experiment, quotas for the output of such products and for raising the technical level of products are some of the most important planning and evaluation indicators for the economic activity of enterprises. With this, the growth in the wage fund depends on the saving gained in the national economy from the realization of these products, and the increase in the material incentives fund, on markups on wholesale prices for products of the highest quality. The experiment has put into action additional morale incentives and has considerably expanded the opportunities for applying them.

The value of the economic experiment consists in what serious lessons will be derived in carrying it out. Generalization of the results of the wide-scale experiment in heavy machine building and the electrical equipment industry has shown, first, that the insufficient effectiveness of the economic machinery

in solving problems of intensification of the reduction of the resources intensiveness of production was associated with the fact that the leading role of indicators of scientific and technical progress was not taken into account in planning, evaluating the work of ministries, associations and enterprises, and in the formation of economic norms. Secondly, in reducing the numerical strength of production process design services by more than 11 percent, there was no substantial increase in the amount of design and production process developments, which testified to the irrationality of a quantitative relationship between the developers of ideas for technical progress and their executors. Thirdly, the numerical strength, approved as of the start of the experiment, of associations was sufficient for the purpose of raising the wage level of workers making a decisive contribution to the development of high-efficiency equipment and production processes. In the preparatory period of the introduction of the experiment, association managers not without justification approached with great caution the question of reducing the numerical strength of designers and process engineers. So, many enterprises, having shifted to the experiment, in due time became enthusiasts of the extensive introduction of the Shchekin method, which was based on a production plan and wage fund stable for a number of years, as well as on the right to manage its saved portion for the purpose of providing incentives for workers for the intensification of labor. However, higher-level economic agencies did not ensure the stability of production plans, wage funds and numerical strength limits, and did not secure the right of enterprises to manage themselves the saved portion of the wage fund. As a result, the collectives of enterprises which worked according to the Shchekin method, in achieving high production figures, turned out to be in a difficult financial situation, since the saving gained at the end of the year in the numerical strength of workers and the wage fund shortened the "base" for the new plan, and the planned numerical strength and wage fund were reduced each year.

Changes occurred in the investment policy. This became reflected at enterprises primarily in the formation and utilization of a production development fund, the size of which came to depend more on an increase in efficiency: The better an enterprise works, the more capital allotted for the development of its production. Deductions for the reconstruction of production were set in relation to the technical level of fixed assets. Previously, enterprises which worked on relatively new equipment were in a more favorable situation. Now more money is being allotted for retooling to those enterprises which need it more.

Opportunities for associations and enterprises to update their fixed production assets at the expense of their own money and bank credit were considerably expanded. By the decree of the CPSU Central Committee and USSR Council of Ministers titled "On the Broad Dissemination of New Methods of Management and Intensification of Their Influence on the Speeding of Scientific and Technical Progress," managers of associations and enterprises were given the right to use, with the consent of labor collectives, the money of the production development fund for retooling, the reconstruction of existing production processes, preparing for the production of new products, the introduction of new production processes, and other similar purposes.

It is important that the production development funds for associations and enterprises are formed according to norms stable for a five-year plan period, depending on the results of the economic activity of these associations and enterprises, and they can be accumulated for subsequent use.

The pricing procedure has been changed for the purpose of strengthening the interest of associations and enterprises in the mastery of new technology. The high quality of products made and the saving gained in the process have taken on great importance in the setting of prices. For example, 50 percent of the saving gained can be included in the price markup, and up to 70 percent in the manufacture of robots or products developed on the basis of inventions. With this, the interest not only of the workers of enterprises in the production of new technology is increased, but also of its developers, since about half of the total price markup can be channeled toward giving them bonuses.

The time taken to develop and introduce new technology into production depends to a great extent on the activity of labor collectives, and on the ability of trade union and business managers to manage them and mobilize them toward seeking optimal ways for further development. For example, a new form for the implementation of innovative developments in production has been found in the Ukrainian SSR Academy of Sciences. An engineering center has been formed here which acts in direct contact with the scientific team, and unites the efforts of scientists, designers, process engineers, and pilot-production-base specialists for the speediest implementation of scientific developments. The system of material incentives for all participants in the creative process deserves attention here.

Well known are the achievements in speeding scientific and technical progress which have been made already for several years in a row now by the collective of the Frunze Instrument Making Plant imeni the 50th Anniversary of the Kirghiz SSR. Contract obligations are being fulfilled punctually here; the achieved rates of growth in labor productivity far exceed the planned. One reason for the success is the skillful providing of incentives for any initiative helpful to the enterprise. The maker of any suggestion, even a minor one, but one which makes it possible to improve working conditions, receives a bonus of 10 to 50 rubles. Workers who achieve high results in the totals of the competition under the motto "Progressive Thinking for Production" win the right to special free rest at the plant's resort hotel or health center. A whole series of other privileges are provided by the terms of the socialist competition. All this helps mobilize the collective toward a constant and purposeful quest for potentials.

Unfortunately, there are facts of another kind. For example, at the Cheboksary Industrial Tractor Plant work on improving product quality is in short supply and morale and material incentives are having little influence, which is one of the reasons for constant violations of the production technology.

At the Leningrad Petrodvorets Timepiece Plant production association violations are being committed in calculations of deductions for the material incentives fund from the profit gained in the introduction of scientific and engineering

solutions (the plan saving is being used instead of the actual). As a result, 24 measures with an economic "efficiency" of greater than 670,000 rubles have been included illegally in the calculations. An audit demonstrated that calculations of economic efficiency are being performed at the association selectively, and not for a year's time (12 months from the moment of introduction or the end of the standard test period). In orders regarding the awarding of bonuses for the introduction of new technology it is not indicated specifically for what the worker is being given a bonus, and this represents a violation of the established procedure and provides an opportunity to use these funds not for their rightful purpose.

The speeding of scientific and technical progress depends to a considerable extent on the place an engineer occupies in modern production. At the April 1985 Plenum of the CPSU Central Committee and at the CPSU Central Committee's conference on questions relating to speeding scientific and technical progress, justified alarm was expressed concerning the lowering of the prestige of engineering labor.

The experience of leading enterprises has demonstrated that the greatest successes are achieved by collectives whose composition includes specialists of various backgrounds. Their labor is organized on the basis of an engineering (research) contract with payment for the end result, and relations with customers are set up on a cost accounting basis. Such a format for scientific production collectives is provided, of course, by the decree of the CPSU Central Committee and USSR Council of Ministers titled "On Measures for Speeding Scientific and Technical Progress in the National Economy." However, many legal questions have not yet been solved in various industries; for example, this relates to the work of specialists holding down two jobs in so-called temporary groups formed for the purpose of solving some important scientific and technical problem.

The managers of enterprises and trade union committees are poorly utilizing the rights granted to them by the new management provisions. One of them is to raise the salary of engineering and technical personnel by a factor of 1.5, and by 24 percent for workers, for high-productivity work. At the majority of enterprises these raises are as a rule set at 10 to 15 percent of wage rates and salaries. The incentive-providing capabilities of raises are thereby considerably reduced. The central committees of trade unions and ministries and the trade union committees and managers of associations and enterprises must urgently eliminate the wage leveling in this case.

The decree of the CPSU Central Committee, USSR Council of Ministers and VTsSPS titled "On Improving Wages for Scientific Personnel, Designers and Process Engineers in Industry" introduced a more flexible system of salaries for personnel in these categories. Instead of the rigid salaries used, in this decree it is permitted to change (raise or lower) salaries.

The shift to the new wage provisions requires the implementation of serious measures for improving the system of incentives, strengthening the influence of the economic machinery on the improvement of work quality, and improving the organization of work. At the same time, the restructuring of work along

this line is proceeding slowly in many scientific research, design and technology organizations and at industrial enterprises. Concrete measures for improving the structure of management, for increasing the efficiency of the work of scientific personnel, designers and process engineers, for performing certification, and for finding the necessary funds for increasing salaries have not been developed everywhere.

It causes concern that many councils and committees of trade unions and business managers look on the decree of the CPSU Central Committee, USSR Council of Ministers and VTsSPS only from the viewpoint of raising wages and do not take into account the fact that the main purpose of the measures designated in it is to make possible the speeding of scientific research and experimental design developments, their speediest introduction into production, and the development of high-efficiency, economical and reliable models of new equipment corresponding to the highest achievements in the world.

Verifications have shown that managers and trade union committees of enterprises and associations of Minavtoprom [Ministry of the Automotive Industry], Minlegpishchemash [Ministry of Machine Building for Light Industry, the Food Industry and Household Appliances], Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] and of several other ministries are taking a temporizing stand in these questions, figuring that they will be allotted funds from centralized sources for the introduction of the new wage provisions. This is an improper stand. It was given a critical assessment at the 27th CPSU Congress. In a report titled "Regarding the Basic Directions of the Economic and Social Development of the USSR for 1986-1990 and for the Period to the Year 2000" USSR Council of Ministers Chairman N.I. Ryzhkov noted: "It is difficult to explain the fact that as of today not more than about 10 enterprises and associations have changed to the new wage forms. All this demonstrates how sluggish scientific and technical progress has been, and how necessary energetic large-scale actions are."

It must be admitted that the incentives in existence at the majority of enterprises are based as a rule on the sense of discipline, awareness and conscientiousness of workers, and on socialist competition. Experience has demonstrated that more skillful solutions are necessary in the development of strongly effective incentives which will objectively and inevitably motivate each enterprise to proceed along the road of scientific and technical progress. Of such solutions it is possible to name the following: the introduction of a collective contract for enterprises; payment of compensation for work in accordance with the year's results, depending on scientific and technical innovations introduced during the year; and finding a mechanism which on the one hand will eliminate the contradiction between the volume of the output of products and new equipment, and quality, and, on the other, will support and advance the pressure of developers on associations and enterprises in the task of the speediest mastery of the production of new equipment.

The approach to organizing and summing the results of a socialist competition between scientific collectives and the personnel working in them should be changed. The critical comments made in the speech by CPSU Central Committee General Secretary M.S. Gorbachev at a meeting with veterans of the

Stakhanovite movement, concerning the making by scientific and engineering and technical personnel of personal creative plans in which often obligations for the fulfillment of straight-forward auxiliary duties are contained, have not been taken into account enough. In this matter much depends on the managers of engineering services and primary NTO [scientific and technical society] and VOIR [All-Union Society of Inventors and Efficiency Experts] organizations. Their task is to reach the point that a personal creative plan is based on an efficiency expert's thinking, and on a scientific quest.

Requiring very speedy solution are problems associated with the strengthening of incentives for the performance of development work by members of scientific and technical societies and VOIR organizations. It would be timely and very helpful to establish under the auspices of the central committees of trade unions and ministries special prizes to be awarded for the results of competitions to people who have introduced serious scientific achievements, measures for improving quality, and for the improvement of technology. Besides, it is high time for a positive solution to the problem of giving bonuses from the material incentives fund at enterprises and in associations to exempt personnel of NTO and VOIR organizations.

One new approach to organizing competition can be the special and appreciable awarding of incentives to collectives and individual workers for exceeding the highest world limits for labor productivity, product quality and economizing on resources. At the same time it is necessary to introduce obligatory sanctions for the non-utilization of real opportunities for improving efficiency because of miscalculations and errors in the management of industries, associations and enterprises.

It is possible to establish a procedure for approval of the drafts of plans of industries and enterprises, primarily for retooling, only if it is proven that the achievements of scientific and technical progress and of leading world and domestic know-how have been taken into account to a maximum in them, and the optimal alternative for utilizing them has been chosen, enabling the greatest saving and social effect. It would be helpful to introduce into practice the defending by planning agencies of the drafts of plans before the labor collectives of enterprises and the appropriate trade union agencies. Thus, it is necessary to utilize any reasonable suggestion for improving incentives for the birth of engineering ideas and their implementation for the purpose of speeding the country's socioeconomic development on the basis of scientific and technical progress.

8831
CSO: 1823/249

USSR-GDR COOPERATION, MACHINE TOOL PURCHASING DISCUSSED

Moscow TEKHNIKA I NAUKA in Russian No 4, Apr 86 pp 12-13

[Interview with Y. Presher, general director of "VMV" by correspondent E. Muravyev; in Moscow, date not given: "Machine Tools from the GDR"]

[Text] The German Democratic Republic is in third place in the world in the exportation of machines with 60 to 65 percent of them being exported to the USSR. Metal-cutting machine tools, forge-press equipment, casting equipment -- 25 to 30 percent of all this machinebuilding output in the GDR is renovated annually. In Moscow recently the GDR Trade delegation opened a department with a technical center "Machine Tools and Forge-Press Equipment" of the "VMV" Foreign Trade enterprise. Our correspondent was present at the grand opening of the "VMV" department and asked several question of Comrade Y. Presher, general director of the enterprise.

[Question]: Are other CEMA countries participating in the exports from the GDR?

[Answer]: Yes, we use the cooperation of the CEMA countries widely in machinebuilding. Thus, we make NC machine tools which have a number of units and parts manufactured in socialist countries, in particular, microprocessors made in the USSR and ChSSR. A forge-press equipment design bureau created jointly by the USSR, the ChSSR and the GDR is working successfully. Individual machine tools used in flexible systems are also made cooperatively. In this area we have a comprehensive agreement with the USSR. We not only export machine tools to the USSR, but also buy them in your country, for example, spindle machine tools made by the "Krasnyy proletariy", turret machine tools and diamond tools. This cooperation is very effective; this is possible, of course, in a planned economy.

[Question]: What technical achievements are being used in machine tool building in the GDR?

[Answer]: In the following five-year plan period, 70 to 80 percent of our

metal-cutting machine tools will be NC; 25 percent of the metal-cutting machine tools are earmarked for flexible automatic production. Technological processes at these sections will be NC or computer controlled. Machine tool loading, optimization of ways of transportation and organization of warehousing -- all this will be computer controlled. Production lines for which, in the 12th Five-Year Plan period, we plan to make forge-press and casting equipment will be fully automatic.

[Question]: What are the problems in creating a tecnnical center at the Moscow department of the "VMV"?

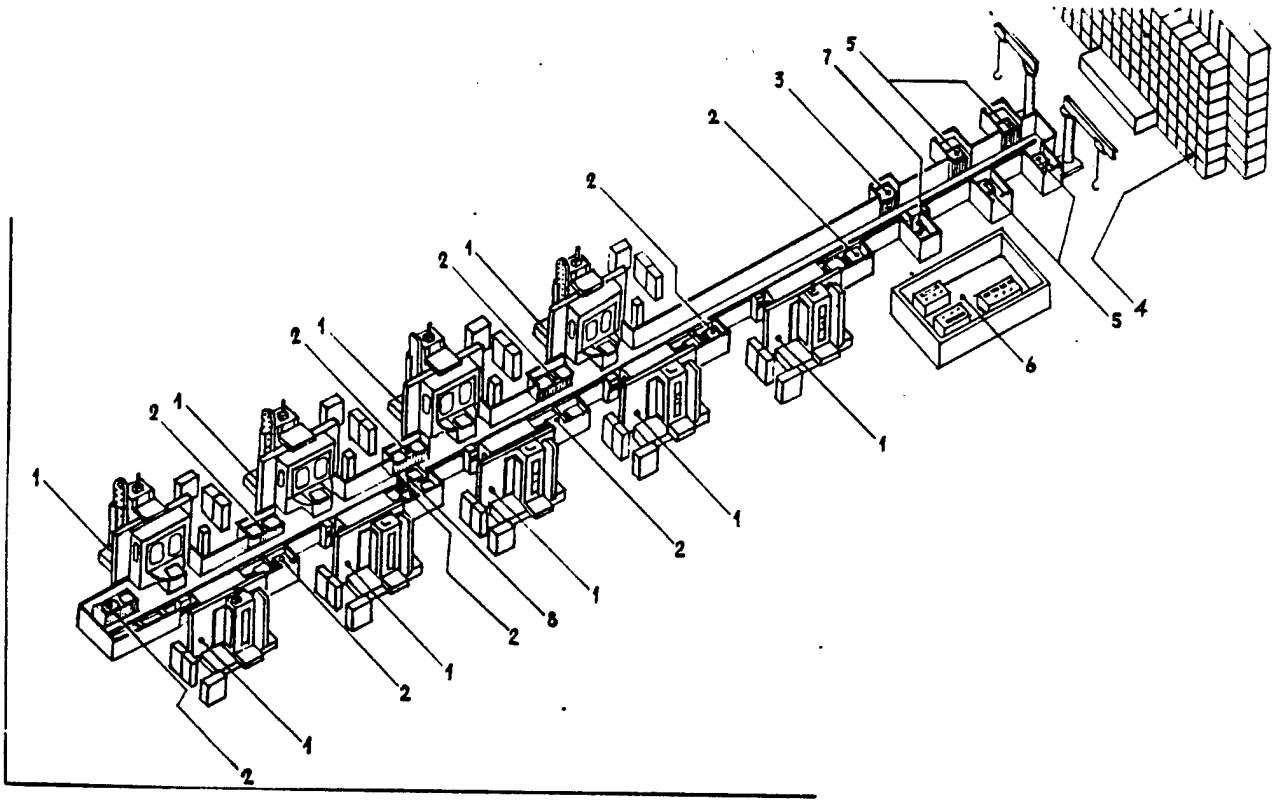
[Answer]: The main problem of the center is to insure zero-defect operations of our machine tools. We are oriented toward a three-shift equipment operation -- otherwise it would be unprofitable. Our servicing is based on that: we have corresponding specialists here and a certain reserve of necessary repair parts. Technical help will be available for 24 hours for enterprises which use our machine tools.

[Question]: But is such a time realistic, say, for a plant in Sakhalin?

[Answer]: We do not plan to send a specialist without fail from Moscow to any point in the Soviet Union -- its territory is too large for that. We will train Soviet specialists at our center and they, having received the necessary knowledge to program machine tool operation and their structural features will be able to provide technical help to any enterprise in their industrial region. Therefore, if a Soviet engineer comes to us from Sakhalin he will take and pass a training course and, for 24 hours, will be able to help any Sakhalin enterprise, remove defects if they arise when operating our machine tools.

Caption for a photo not shown

SVKo NC machining center for comprehensive high precision machining of parts. The center has a high speed hydraulic device for clamping the tool; the tool can be changed by an electrical-hydraulic device. The drilling spindle has hydrostatic bearings.



Flexible FMS-1000 machine tool system
1 -- CW 1000 horizontal machining center; 2 -- magazine; 3 -- basic tray; 4 -- warehouse for storing products on high shelves; 5 -- clamping position; 6 -- central control panel; 7 -- servicing position; 8 -- track cart for transporting products.

This a fully automatic system consisting of machining centers, technological cells, devices for transporting intermediate products, centralized supply and removal of chips and wastes, intended for machining prismatic and housing products with edges up to 1000 mm long. The system permits an increase in the production of 150 to 200 percent, can be used in three shifts, reduces production cycle time and operating costs.

2291
CSO: 1823/269

NPO ARMSTANOK DEVELOPS AUTOMATED ROTOR BALANCING SYSTEM

Yerevan KOMMUNIST in Russian 11 Jun 86 p 1

/Article by KOMMUNIST correspondent A. Kalantar: "Motors Will Become More Reliable"/

/Text/ NPO Armstanok has designed and built an experimental model of a new automated line for dynamically balancing the rotors of AIR-type asynchronous electric motors.

KOMMUNIST correspondent A. Kalantar asked the general director of NPO Armstanok, /initial illegible/ Teodakyan, to tell about the new equipment.

"The developers of the line -- candidates of technical sciences S. Sarkisyan and V. Mikayelyan and designers O. Bondarenko, A. Kirakosyan, and S. Markaryan, under the direction of candidate of technical sciences L. Vartanyan -- employed a number of original technical solutions.

The line consists of four machine tools designed to measure a disbalance and to correct it by means of boring, by finish balancing using the blast application of molten copper method, and by making corrections in accordance with classes of precision. It is equipped with input and output transporting units and with manipulators for moving parts from one position to another and it is capable of working both together with the Mikroza type of line for mechanized machining of rotors, produced in East Germany, and by itself.

The automated line turns out one completely balanced rotor every 22 seconds, which is impossible to do using manual labor.

Up until now, the country's industry has produced only guage balancing and semiautomatic machine tools, which have been controlled by human beings. Now everything has been laid on the shoulders of automated equipment. The productivity of the new line is 500,000 components a year and its economic effect is 140,000 rubles.

The plant has already received an order for the manufacture of two analagous lines for the Uzhgorod Elektrodvigatel plant."

13032
CSO: 1823/277

BRIEFS

ENIMS DEVELOPS ASSEMBLY, WELDING MODULE--An electronic grinding machinery unit with programmed control and automatic tool change has been produced at the Stankokonstruktsiya plant on the basis of designs by specialists at ENIMS [The Order of Red Banner of Labor Experimental Scientific Research Institute of Metal Cutting Machine Tools]. Also, the collectives of the Novgorod Volna and Start production associations and the Planeta PTO [production engineering section] collaborating on the basis of interdepartmental cooperation with the Novgorod Polytechnical Institute, have developed and manufactured an experimental model of a flexible robot module for assembling and welding radioelectronic equipment components. The innovative makes use of the latest achievements of science and technology by employing a vision system, laser welding and computer technology. The new unit can replace more than 6 workers in labor-intensive operations. [Text] [MASHINOSTROITEL No 4, 1986 p 8] [COPYRIGHT: Izdatelstvo "Mashinostroyeniye", "Mashinostroitel", 1986] 13032

SEMI-AUTOMATED MF-31-P UNIT--A semi-automatic model MF-31-P (serial 953541) unit for evaluating the quality of heat treatment following volume tempering and high-temperature production of components has been developed at the Volgograd scientific research institute for machine building tecnology. The means of control is based on differences in residual induction from the two poles of magnetization, the intensity of which corresponds to 0.6...0.8 and 1.2 percent of the field intensity of maximum permeability. Checking for hardness is accomplished for the three categories of "soft", "normal", and "hard". Using the unit, 600 components can be checked per hour. Its operation is fully automated. It can be installed on automatic heat treatment lines which deliver parts for control with an interval of not less than 6 seconds. Use of the MF-31-P unit has made it possible to increase the reliability of checking the quality of heat treatment of components, to increase the productivity of control by from 5- to 7-fold, to eliminate manual labor, to reduce dust in production spaces, and to lower noise levels by operating cleaner machine tools. The annual economic effect from its introduction came to 50,000 rubles and 17 persons were freed for other work. (USSR Exhibition of Economic Achievements). /Text/ /MASHINOSTROITEL no 4, 1986 p 20/ [COPYRIGHT: Izdatelstvo "Mashinostroyeniye", "Mashinostroitel", 1986] 13032

MODERNIZATION OF MB-13 MACHINE TOOL--The Ukrorgstankinprom GPTEI /not further identified/ has modernized the model MB-13 machine tool used for multistart cutting of threads for M4 and M5 nut tap-borers with the use of elbor cutting disks. For this purpose, a low revolution cutting-disk drive gear, consisting of a worm reducing gear and a bypass coupling, a device for multistart setting of the disks and a unit for controlling the automatic cutting cycle were installed. To achieve high productivity, cooling is achieved by an aperture jet having a 1...2 mm aperture and a lubrication/cooling liquid under a pressure of 0.05 MP. Protective casings were installed as protection against spattering of the lubrication/cooling liquid on the machine tool. Number 20 industrial oil is used as the lubrication/cooling liquid. As a result of modernization, the machine tool's output has increased to 1200 tap-borers with high quality threaded surfaces per shift. The durability of the disk between settings is 1200 units. /By engineer G. Ye. Kachkin/ /Text/ /MASHINOSTROITEL NO 5, 1986 p 35/
 13032

COMBINED MACHINING METHOD DEVELOPED--The thermal friction method of cutting metals with a metal cutting disk, developed at the Voroshilovgrad Machine Building Institute, is a combined machining method which makes use of a tool's heating and mechanical actions. With a cutting disk it is possible to machine graduated shafts [stupenchatyye valy], aperatures, and flat components on any type of machine tool which ensures sufficient rigidity of the machine tool - cutting disk system to avoid the development of vibration. The use of cutting disks to machine surfaces (instead of face milling) makes it possible to increase the productivity of the operation 1.5-fold. The economic effect from introduction of thermal friction machining of components at the Voroshilovgrad motor assembly plant imeni 60th Anniversary of the Soviet Ukraine amounts to 185,000 rubles. /Text/ /MASHINOSTROITEL NO 5, 1986 p 5/ 13032

CSO: 1823/277

PANICHEV ON FLEXIBLE SYSTEMS, INTERROBOT NPO'S FUTURE ROLE

Moscow TEKHNIKA 1 NAUKA in Russian No 6, Jun 86 pp 23-27

[Unattributed interview [on the basis of materials of the CEMA Press-Bulletin Secretariat] with Nikolay Panichev: "Interrobot : Assured Steps into the Future"]

> [Text] In the course of the special meeting of the CEMA session in Moscow, government heads of the NRB, VNR, the Republic of Cuba, PNR, USSR and ChSSR signed a multilateral agreement to establish the "Interrobot" International Scientific Production Association. This event is being commented on by Nikolay Panichev, Chairman of the Coordination Council on Flexible Production Systems and Industrial Robots of the CEMA Committee on Cooperation in the Area of Machinebuilding, First Deputy Minister [Minister as of 14 July 86] of the USSR Machine Tool Building and Tool Industry.

[Question] Nikolay Aleksandrovich, the adoption on one and the same day of a comprehensive program for scientific technological progress, (KP NTP) and an agreement to establish "Interrobot" is not simply a coincidence in time. Is that so?

[Answer] Actually, we are dealing with the start of the practical realization of a Comprehensive Program, the organization of cooperation at a higher level of the second priority KP NTP direction -- comprehensive automation. I want to remind here that this includes interaction between CEMA nember countries to create and introduce widely, in the national economy, industrial robots, flexible production systems (GPS), automated design systems (SAPR), technological process control systems (ASUTP), production control systems (ASUP), devices and means of automation, and many other kinds of modern high productivity equipment. Specialists have calculated that the implementation of the outlined plans will make it possible to introduce, in the CEMA countries, about 200,000 industrial robots by 1990 and more than sextuple the number of new equipment with built in microprocessors in 1990-2000. For these plans to become reality, cooperation in this area of a multilateral "Interrobot" Scientific Production Association was created for the first time in history.

[Question] Obviously, it must be taken into account that its activity will not start from zero, that there are achievements in individual countries, the results of bilateral and multilateral cooperation accumulated in previous years?

[Answer] This stockpile is very substantial of domestic robots and cooperatively produced robots are manufactured and used in many fraternal countries. Thus, for example, USSR and ChSSR specialists organized the production of the UM-160 robot that services metal-cutting machine tool and press equipment. The RB-251 welding robot was made by Soviet and Bulgarian scientists, while a solution for the creation of a technical robot complex for metalworking was found by partners from the USSR and the GDR in the course of cooperation.

Besides bilateral agreements within the CEMA framework, the following General Agreements are being implemented: on multilateral cooperation in developing and organizing specialized and cooperative production of industrial robots from 10 June 1982 and an agreement from 27 July 1985 on multilateral cooperation for the development and organization of specialized cooperative production of flexible production systems for machinebuilding and their wide introduction into the national economy.

A Soviet-Czechoslovak Scientific "Robot" Technological Association has already been functioning for almost a year with headquarters at Preshova -- the industrial center of Eastern Czechoslovakia.

As we see, even before the "Interrobot" there was no lack of programs for scientific technological cooperation. But at times they were of too general a nature. Often there were situations where we did not fully utilize the advantages of socialist integration. As a result, robots for the same purpose were manufactured, say, in Bulgaria, Hungary or the USSR, different from each other and made up of different sets of complementing products.

So far production scales have been insignificant and losses from this situation were not too great. The adoption of the Comprehensive Program for scientific technological progress, its priority direction -- comprehensive automation -- requires the reevaluation of importances. We must enter the 21st Century together, consolidating the entire intellectural and production potential. The "Interrobot" was conceived specifically for this. For the same purposes, two Soviet-Bulgarian scientific production association were created recently whose promise was evaluated highly by N. I. Ryshkov, Chairman of the USSR Council of Ministers in his appearance at the 41st special meeting of the CEMA session.

[Question] What is the main problem faced by the new scientific production association?

[Answer] To unite the efforts of the designers and developers to create new, promising specimens exceeding the best world indicators.

It will be necessary to develop specifications for the new robot equipments that guarantee an advanced level; determine and approve the typical series of promising models along all accepted directions; implement a block-modular design principle; standardize complementing articles and devices; and create controlling devices of higher reliability.

Captions for omitted photos:

1. ENIMS [Experimental Scientific Research Institute of Metal-Cutting Machine Tools]staff workers discuss the design of an experimental specimen of a new industrial robot for the assembly of machine units. From left to right: designers I. M. Dvoskin, V. P. Sobolev, T. V. Nikolayeva and B. L. Samorodskikh, deputy manager.

2. Conference of socialist country representatives on robot building problems.

3. Automatic helper is trained in operations for gripping parts.

4. Mechanical arm--part of the system for the automatic search and grip of parts.

5. Industrial robot with an electrical drive.

6. Robotized RTK-05 line.

To organize the most efficient international division of labor, participating country members must determine specific executors -- institutes, planning-design and technological organizations and enterprises.

The basis for successful interaction will be single five-year and annual plans developed by the countries within the framework of independent activity on the program of a new NPO [Scientific Production Association].

Today, when a huge requirement originated in robots for flexible production modules and automatic lines supplied by the CEMA partners to each other, this requires the carrying out of a single scientific technological policy increasing robot equipment. Problems of standardization require special importance. The solution of these and other problems will facilitate the development of specialization and cooperation of production.

[Question] What is the organizational structure of the "Interrobot" NPO?

[Answer] The leading organ is the council of the association consisting of member country representatives. The administration located in Moscow is involved in operational problems. Each country has one voice here as in the council.

NPO participants are scientific research, experimental-design and production establishments and enterprises specially appointed by the countries, as well as international organizations, previously established by participants in the agreement.

It should be noted that all members of the association preserve national ownership of their property. There is an agreement that special scientific production centers (or such functions as are given to already existing organizations) will be formed in countries for the creation of individual types of robot equipment and complementing products for them. Specialists from other participating countries can enter the composition of these centers.

[Question] Has the head organization of the "Interrobot" NPO which will coordinate work on the entire program already been determined?

[Answer] We have the general approval of all participants in the agreement that such functions were given to a recently created "Robot" Intersector Scientific Technological Complex (MNTK) in the USSR which will simultaneously play the role of the "Interrobot" Scientific Production Center in the Soviet Union. The MNTK "Robot" is among 16 such organizations. Their functions emerge beyond the framework of any one ministry and span the problem as a whole to accelerate the NTP and advance the most important developments in the given area to world level.

The "Robot" MNTK unites organizations, enterprises and institutes of the USSR Ministry of Machine Tool Building and Tool Industry, the USSR Ministry of Instrument Making, Automation Equipment and Control Systems, the USSR Ministry of Electrical Equipment Industry, the USSR Ministry of Automotive Industry, the USSR Ministry of Heavy and Transport Machinebuilding, the USSR Ministry of Higher and Secondary Specialized Education, as well as the USSR Academy of Sciences.

The head organization of the "Robot" MNTK became the widely known ENIMS (Moscow) in the world. The following participated in the MNTK activity: the NII [Scientific Research Institute] of the Machine Tool Building and Tool Industry (Odessa), the Moscow "Stankokonstruktsiya" Plant, the Mukachevsk Machine Tool Building Plant and the Sterlitamaksk High Precision Machine Tool Plant.

As we see, a powerful national complex has appeared in the USSR, which acts on a single plan, provides for scientific research, design and experimental work and makes prototypes and small series of robot equipment and their testing. It will also train personnel who will create and operate robot equipment in machinebuilding.

But let us return to the "Interrobot." A council of chief designers will operate in the NPO to insure a single scientific technological policy. It will have the function of coordinating scientific research and planning design work.

[Question] Are there any plans already made for the international division of labor and some specialization of countries within the "Interrobot" framework?

[Answer] So far only preliminary plans have been made. Changes and additions are possible for some of them. The situation today is as follows: NRB will create robots to paint and spray; robots and manipulators for the assembly of small and medium size parts in machinebuilding; robots -- manipulators for automatic lines, hydraulic equipment, electrical drives and control devices. VNR specialists will develop robots for monitoring measuring operations and assembling devices, as well as for pneumatic equipment and other complementing devices.

PNR will specialize in robots to weld electrical drives and control systems; USSR will specialize in robots for metalworking equipment and casting, as well as complete control systems; ChSSR -- robots for pressure die casting, assembly work and to control, monitor and measure modules.

Of course, in the process of preparing joint programs and plans, there may be refinements and additions. The main attention will be given to the specialization of participants on the creation of promising designs and complementing products and units for robot equipment.

In a short time, the "Interrobot" countries must form national scientific production centers, tie in their work with international organizations and solve financing problems. Briefly, the "Interrobot" is taking the first organizational steps into "tomorrow," in which equipment obtained by its help will promote the scientific technological progress of CEMA country members efficiently.

[Question] The last question in this connection, Nikolay Aleksandrovich: what is a "robotized" future?

[Answer] Rapidly readjustable flexible production systems with built-in robots and manipulators will be able to change over to the manufacture of more progressive products in a short time. Their use will increase the productivity of labor 1.5 to 4-fold, increase equipment loading by 30 percent and reduce unit costs by 15 percent.

The wide use of robots in the national economy will free a great number of persons from the regrettable presently existing monotonous and tiring labor, give them the possibility of increasing their skills and changing over to more creative work. This side of robotization, difficult to express monetarily or in percentage of growth is no less important than the purely economic factor under the conditions of socialism.

Practice indicates that scientific technological progress is unthinkable without the wide use of robot equipment. Appreciation of this forced us to unite our efforts to find solutions to this burning problem.

2291
CSO: 1823/228

END