

4662

FILE  
COPY

MAIN FILE

JPRS: 4662

29 May 1961

**SURVEY OF SOVIET HEAVY INDUSTRY (18)**

**Reproduced From  
Best Available Copy**

RETURN TO MAIN FILE

19991005 191

**DISTRIBUTION STATEMENT A**  
Approved for Public Release  
Distribution Unlimited

Photocopies of this report

PHOTODUPLICATION SERVICE  
LIBRARY OF CONGRESS  
WASHINGTON 25, D. C.

---

U. S. JOINT PUBLICATIONS RESEARCH SERVICE  
1636 CONNECTICUT AVE., N.W.  
WASHINGTON 25, D. C.

JPRS: 4662

CSO: 1300-S/18

SURVEY OF SOVIET HEAVY INDUSTRY (18)

This is a series report, published approximately biweekly, which contains items of interest on Soviet heavy industry as reflected in articles, short news items, announcements, etc., appearing in various USSR and other publications. The items contained in this report fall under the broad categories listed below in the table of contents.

TABLE OF CONTENTS

	<u>Page</u>
Machine Tools	1
Miscellaneous Machine Construction	26

## MACHINE TOOLS

### Grinding Wheels

The Moscow Abrasives Plant manufactures different size and type electro-corundum grinding wheels. The plant is being reequipped. High-production equipment is being installed and the initial processing department is being remodeled. A semiautomatic turret press has been set up in the forge shop. It will manufacture 5000 to 6000 grinding wheels per shift. (Vechernyaya Moskva, 18 October 1960)

---

### New Lathe

The Izhevsk Machinery Plant produced its last Model 1I61 lathe in September 1960 and has begun the production of the Model IZh250P small high-precision lathe instead. The plant recently manufactured an experimental model with programmed operation. The plant is now working on an automatic line for the production of motorcycle parts. (Sovetskaya Rossiya, 16 October 1960)

Housing Line

The Machine Tool Plant imeni Ordzhonikidze has produced the 1L-85 automatic line for machining the transmission housings of ZIL-130 motor vehicles. The line was designed by Special Design Bureau No 1 and is composed of 32 machine tools. The line, which is operated by five men per shift, will be sent to the Moscow Motor Vehicle Plant imeni Likhachev. (Sovetskaya Litva, 30 October 1960)

---

Diamond Tools Plant

A diamond tools plant is being built in Roslavl' in the Smolenskaya Oblast. (Izvestiya, 7 January 1961)

### Lithuanian Machine Tools

Machine tool construction in Soviet Lithuania is developing rapidly. New, powerful enterprises have grown up, there are highly skilled cadres of workers and engineers. In the first year of the Seven Year Plan the plants of the Lithuanian Economic Rayon produced 6.5% of the total number of metal-cutting machine tools produced in the country. The main course followed by the Lithuanian machinery builders is the organization of the production of machine tools requiring little metal and high skill. These are small accurate machine tools. The series production of 15 models of various types has been organized at the plants of the republic, including overhung-milling, multi-purpose milling machines, gear-hobbing machines for the production of small gears, automatic lathes, drilling and circular grinding machines. This year the enterprises of the Sovnarkhoz will produce test models of 13 new tools. An important role in the further development of machine tool construction is played by specialization. A plan for the specialization of machine tool plants has been drawn up and is being incorporated. According to this plan a defin-

---

### Lithuanian Machine Tools (cont'd)

ite profile and type category for machine tools produced has been established for all enterprises. In all corners of our great land, the People's Democracies, as well as India, Lithuanian machine tools with the Zhal'giris brand are famous. Zhal'giris is the pioneer of the republic's machine tool construction. It was started in 1947 and in 13 years has become a powerful, modern enterprise. Right now the plant is specializing in the production of overhung-milling machines of normal and increased accuracy, as well as automatic machines and semiautomatic machines.

The "40 let Oktyabrya" produces gear-hobbing machines of normal, increased and extra high accuracy, as well as specialized gear-machining tools for the watch industry and instrument plants. Production of machinery for machining extra high-accuracy parts is being expanded by the Vil'nyus Grinding Machine Plant. The Kaunas Machine Tool Plant specializes in the production of jig drilling and jig-grinding machines with programmed operation. The Vil'nyus Komunaras Plant has begun to produce multi-purpose milling machines. In Shyaulyay a plant for precision machine tools

Lithuanian Machine Tools (cont'd)

has been organized which produces longitudinal turning, single-spindle automatic lathes and high-accuracy and extra-high accuracy profile-detachable automatic tools. The perspectives for Lithuanian machine tool construction are particularly broad for the Seven Year Plan. Besides the above-mentioned machine tool plants, the republic will build several new enterprises. These are automatic line plants, diamond boring machine, grinding machine and wire-drawing machine plants. Thus, the comparative weight of machine tool production in the total plant production of the Machinery Construction Administration will be about 27% by the end of the Seven Year Plan.

We should note that all machine tool plants in the republic, except for the Zhal'giris Plant, up to the present have been duplicating plants and have not created new model machine tools. Measures are now being taken to speed up the creation, incorporation and production of new highly productive Lithuanian machine tools. The All-union plan for our republic outlines the concentration of the production of high-accuracy machine tools, which will comprise about 40% of the total production of high-accuracy machine

---

Lithuanian Machine Tools (cont'd)

tools in the Soviet Union. Considering the importance of the task of expanding the production of high-accuracy machine tools, we have already begun the groundwork in planning special facilities for their production. The Orgstankinprom Institute is drawing up plans for machine tool plants with thermal constant shops and all necessary conditions for the production of high-accuracy machine tools. The grinding machine plant is to receive this year a special design bureau, which in coming years will become a powerful organization in the planning of new design machine tools. It will include an experimental base for studying the dynamic and static characteristics of machine tools, as well as the testing of newly designed machinery. Machine tool plants are to expand existing machine tool laboratories and organize new, specialized ones. Soviet Lithuania is truly becoming a republic of machine tool construction. (Sovetskaya Litva, 23 October 1960. Partial translation)

### Vitebsk Machine Tools

The Vitebsk Plant imeni Kirov is a unique enterprise. It produces centerless-grinding, face-grinding and ball-bearing machining tools for the country's bearing industry. This equipment is essential. Much has already been done. The designers of the newly-formed Vitebsk Special Design Bureau No 13 have developed several plans for new, highly-productive machine tools. Models 371M1 and 3180 obsolete, low-productivity machine tools have been removed from production. They have been replaced by the 3B71 surface-grinding machine and centerless-grinding machines for the bearing industry. Nevertheless, the level achieved by us in planning and design and the slight increase in productive capacity cannot be considered sufficient for the plant to fully supply the bearing industry with high-productivity machine tools. The unfortunate fact is that the technical and plan tasks for the production of special machine tools are given to us after great delays. But even after this constant and major changes are introduced into the plans, and this causes haste in planning and production. This is why certain of our machine tools lack finished design. This naturally does not lessen the responsibility

---

### Vitebsk Machine Tools (cont'd)

of the plant collective, primarily the designers,. However, this type of planning is causing great damage to us. The USSR Gosplan "Soyuzglavmash" should take us into consideration.

For several years a few design organizations,-- the Odessa Special Design Bureau No 3, the Moscow SDB No 6, the Experimental Scientific Institute for Machine Construction and our plant's design bureau -- have worked on designing machine tools for the bearing industry. This has caused unnecessary duplication and a lack of coordinated solutions. In our opinion, these are the main reasons for the fact that our bearing industry does not possess machine tools of high accuracy and productivity. Now design has been transferred to the SDB No 13 in Vitebsk. Its designers are now working on a large number of face-grinding and ball-bearing machine tools, as well as doing initial design work on high-accuracy centerless-grinding machines. This work is quite extensive. It requires the efforts not only of the SDB No 13 and the plant specialists, but the workers of other organizations. We need the practical aid of the

Vitebsk Machine Tools (cont'd)

Experimental Scientific Institute of Machine Construction and the Belorussian Sovnarkhoz. The production of new machine tools is hindered greatly by the lack of sufficient reliable, small electric and hydraulic equipment. Without it it is difficult to decrease the weight and size of machine tools. There are also shortcomings which do not depend only on us. As is well-known, in order to achieve high machine tool accuracy, large base parts must be subjected to a natural aging process. This should last up to two years. But these parts come to us for assembly sometimes hot off the production unit. Can it be that the Belorussian Sovnarkhoz considers this a normal state of affairs? Certain censure should be directed at the workers of the abrasives industry, because of which we lack decent broad category abrasive wheels for grinding machines. No, in particular, wheels for grinding at a speed in excess of 50 m/sec, large-diameter wheels, etc.

The problem has also not been solved on the production of instruments which should be incorporated in centerless-grinding tools for the automatic measurement of the work-piece during the grinding period. How is it possible to

---

Vitebsk Machine Tools (cont'd)

achieve full automation without these instruments? Another situation which is abnormal in our opinion must be mentioned: the Experimental-scientific Institute of Machine Construction and the Committee on Standards, Measures and Measuring Instruments have not yet drawn up a GOST

for accuracy norms of precision and high-accuracy centerless grinding machines for the machining of bearing parts. This is a serious defect which should be corrected immediately. (Ekonomicheskaya Gazeta, 20 October 1960. Partial translation)

### Bearing Industry

During the Seven Year Plan the production of bearings should be almost doubled. This will be achieved not so much by the construction of new enterprises as by the incorporation of progressive technological processes which are advantageous from the economic point of view, mechanization and automation of production. One should note that right now approximately one third of all bearings produced by us are mass-produced, in series of 2-2½ million units. This naturally makes it possible to use at bearing plants the most improved forms of production organization, fully automatic lines and to build fully automated shops. No matter what the expenditures, they would be fully amortized. This is why the task placed before the workers of this important branch of industry -- to automate the production processes to 75-80% -- is an urgent one, and its solution is one which must be faced immediately.

By 1965 180-200 automatic and 66 mechanized transfer lines will be set up at plants, as well as about 800 special automatic machine tools for polishing rings, assembling bearings, lubricating them and packing them, and 14 shops will receive complete mechanization. This is a

---

### Bearing Industry (cont'd)

large program, and for its completion it is necessary to have the cooperative efforts of production men, designers and scientists. The ENIIPP (Eksperimental'nyy i Nauchno-issledovatel'skiy institut podshipnikovoy promyshlennosti -- Experimental and Scientific Research Institute of the Bearing Industry) recently developed a new and more progressive technology, which can be used as the basis for producing this automatic equipment. One of the most important links in the production of these parts are the blank-forming operations. ENIIPP, in cooperation with the collectives of plants, has developed the technology of preparing ring blanks by the die method. The blanks coming out of the die retain only allowances for grinding. The metal use coefficient is increased from 0.44 to 0.70. The number of lathes decreases in the shops, and labor productivity increases 25-30%. Next year this technique will be used in one of the new shops of the First State Bearing Plant, and, according to estimates, will save approximately 10 million rubles per year.

Bearing Industry (cont'd)

Thermal treatment of parts at bearing plants has been mostly mechanized and automated. However, the technical level of thermal shops still lags quite a ways behind the rate of development of capacity in the machine and assembly shops. The ENIIPP has developed a new heat treatment technique, with which parts warping is decreased considerably and allowances for grinding are decreased to a minimum. A new method of parts grinding has also been developed for speeds up to 50 m/sec, which causes labor productivity to increase 15-20% and abrasives expenditures to decrease up to 70%. For the most effective practical implementation of these and many other scientific research developments, special equipment is essential. However, up until recently bearing plants received insufficient quantities of such machinery. Now equipment categories and types have been developed for producing various bearing parts. On this basis technical tasks have been prepared for planning 74 models of machine tools, of which only one model has been produced and tested up to the present. If this rate continues in the future, it will be difficult to fulfill the task for complete automation of bearing production. Such a danger

---

Bearing Industry (cont'd)

does exist.

The production of centerless-grinding machines and finishing machines has been handed over to the Vitebsk Plant imeni Kirov, which is obviously not capable of coping with this great task. The Saratov Machine Tool Plant is not yet producing internal-grinding machines, which would satisfy industry completely. The same must be said about the Voronezh plant. The only solution is specialization. In particular it seems expedient to specialize several new Moscow machine tool plants in the production of automatic high-accuracy grinding machines for bearing production in order to organize large-series line production. For successful complete automation it is also necessary to carry out maximum specialization in existing bearing plants, to build a large number of standard multi-purpose automatic lines, to broaden the practice of assembling automatic lines from standard equipment. Particular attention should be devoted to a broad range of standard control mechanisms (Pneumatic, hydraulic, electric and electronic) and the

Bearing Industry (cont'd)

organization of the mass production of such mechanisms. It is obviously time to organize assembly-planning organizations specially, as well as enterprises for producing automatic washing, lubricating and packing machinery. We think that the planning of automatic equipment for bearing production should be delegated to Special D SDB No 6, freeing it from all other projects. (Ekonomicheskaya Gazeta, 26 August 1960. Partial translation)

---

Grinding Machines

Internal-grinding machines are essential for the enterprises of the bearing industry, where the most mass-nature and perhaps the most labor-consuming grinding operations are carried out. These operations should be mechanized and automated. The job of furnishing the bearing industry with this equipment was given to the Saratov Machine Tool Plant. But even in the shops of the Third State Bearing Plant, situated in the same city, one cannot find locally-produced machine tools. "We had some," M. Kreps, Chief Technologist of the bearing plant, said to us. "However, due to poor quality, it was necessary to reject them: they do not assure accurate grinding." An unflattering opinion of the Saratov Machine Tool Plant production is also given by the Fourth Bearing Plant in Kuybyshev. Why is it that the Saratov machine tool builders have won such a poor reputation? We shall come right to the point: right up to the present there has been no sense in talking about high-accuracy machine tools. They could not even handle the production of ordinary multi-purpose equipment: last year they produced dozens of machine tools short. Recently, after a change in

Grinding Machines (cont'd)

management at the plant, a change for the better took place: the enterprise is carrying out its production program. But as far as production of high-accuracy machine tools, which would meet the requirements of the bearing industry, is concerned, as previously nothing is happening. It is true that some new models have been prepared, but it is impossible to begin series production. The fact is that in the planning organization of the SDB No 5, in the Saratovskiy Sovnarkhoz, as well as at the plant itself, they are too slow about solving problems connected with the development of new internal-grinding machines. An example can be given in the story of the development of the 3A227B semiautomatic tool. It was designed by the Saratov SDB No 5. A long period of coordination, consultation and collaboration ensued. Five years were required for the semiautomatic tool to make its way from the drafting tables of the design bureau to the shops of the Saratov Machine Tool Plant. It is not necessary to be a specialist to understand that in such a long period of time at least various components must have become obsolete if not the entire machine tool. The story did not come to an end with this. The plant was to produce

---

Grinding Machines (cont'd)

a test model to deliver to the State Commission in the 3rd quarter of last year, and this was actually completed only two months ago.

Now, judging by the resolution of the Sovnarkhoz, the machine tool is to be series produced. But... the test model, although it provides the planned accuracy, grinds little more than half as many rings per shift as the old model. In addition, in machining certain types of rings, the semiautomatic tool produces a cut surface instead of cylindrical. The reason for this is considered at the plant to be insufficient stability and power of the electrospindle, with which the machine tool is equipped. Naturally complaints are being sent to the institutes of the Experimental-Scientific Institute of Machine Construction and the Experimental Scientific Research Institute of the Bearing Industry. It is about time to produce a modern-design high-speed electrospindle. At the same time major imperfections should be eliminated in the basic design of the semiautomatic machine tool. The matter is aggravated also by the fact that

Grinding Machines (cont'd)

SDB No 5, although it is located in a major machine tool construction center, does not possess an experimental base. And yet many good decisions were made with this. This is, to a considerable degree, due to the fact that new models are assembled by guess, and subsequently months go by filled with adjustment and design improvement. What about the plant itself? It has neither a machine tool nor technological laboratory. It is true that a machine tool laboratory existed at the plant until 1959, but the former director abolished it. Adjustment of the 3A227B semiautomatic machine tool, as other new machine tool models, is carried out in the midst of the mechanical and assembly shops. Parts are kept in bulk on the lathe operators benches... It would be incorrect to blame the plant alone for poor production organization. The Saratov machine tool builders are hindered by cramped quarters and a lack of production space. One more thing makes plant operations difficult. It receives from its supplier plant an insufficient quantity of castings, and these are of poor quality. During the past eight months the machine tool builders were forced to reject more

---

Grinding Machines (cont'd)

than 16% of all castings received -- this is almost a month's consumption of the plant! If one considers that the supplier plant under-supplied 400 tons of castings, it becomes evident what a difficult position this places the machine tool builders in. Naturally the sovnarkhoz is well aware of the situation. They are aware of it, but everything remains as formerly. If this situation continues our bearing industry, as well as other branches of the national economy, will not receive high-accuracy machine tools for a long time. We cannot allow this. (Ekonomicheskaya Gazeta, 20 October 1960. Full translation)

### Programmed Machine Tools

Machine tools and machinery with programmed operation -- this is modern technology. The machinery builders of the Ukraine have built the first 14 models of metal-working programmed machine tools. These include Kiev turret lathes, Lugansk vertical milling machines, Odessa jig drilling machines, hydro-copying-milling, diamond-boring, radial-drilling, and hydraulic presses. Some of them have been put into series production. The problem of the further development of the technique of programmed operation of metal-working machine tools was the main one at the Odessa Republic Scientific-technical Conference of specialists working in this field. The conference, which lasted three days, was attended by 150 engineers and scientific workers of Moscow, Leningrad and other cities. 27 reports were read. The exchange of information aided the designers of "thinking" machines to work out specific recommendations, on the basis of which they will coordinate their efforts in the development of more effective and economical systems of programmed operation. (Baku, Bakinskiy Rabochiy, 1 November 1960. Full translation)

---

### Multi-purpose Milling Machine

The Yerevan Milling Machine Plant is becoming a model in its field. Construction has not yet been completed, and incorporation of new technology is already under way at the enterprise. Last month the test model of model 676 multi-purpose milling machine was produced. Right now the collective is engaged primarily in the production of 675 milling machines. In order to organize series production at the plant, production lines are being set up for the machining of parts and assembly of machine tools. It has been decided to put three lines into operation by the 40th anniversary celebration of Soviet Armenia, and the remaining lines will be ready by the end of the year.

Further development in the young enterprise is being hindered by the slow construction of the new buildings. Building No 1, where the assembly shop is located, is only half finished. It is cold in the shop, because the heating has not yet been installed. Building No 2 was begun long ago. All the deadlines have passed, but the construction administration of the Tsetpromstroy Trust has not the slightest intention of completing it right now. A shortage of

Multi-purpose Milling Machine (cont'd)

equipment is felt. All of this prevents the expansion of the plant's production capacity. (Yerevan, Kommunist, 28 October 1960. Partial translation)

---

Gear-shaving Machine

At the Machine Tool Plant imeni Komintern a test model of the original 5A 714 gear-shaving machine has been built. It is designed for shaving cylindrical gears with straight and oblique gear teeth. It can do finish work on parts with a diameter of 45-320 mm. Its productivity, in comparison with other machine tools designed for the machining of similar parts, is 1½ times greater. This year the plant removed from production obsolete models of machine tools and shifted to the production of new automatic and semiautomatic machine tools which correspond to the modern level of domestic and foreign technology. The new machine tools which are produced by the collective of the enterprise are smaller in size, have greater operational qualities, higher productivity and are more easily operated. (Sovetskay Belorussiya, 20 October 1960. Full translation)

### Abrasives Plant

The buildings of an abrasives plant have risen in the course of one year on the edge of the city of Volzhskiy, near Stalingrad. The plant will produce grinding wheels, whetstones, segments and other abrasive tools for the needs of industry. The most modern equipment has been set up in the shops, distance-control and television will be used. The enterprise is being constructed by the construction men of the Stalingrad Hydroelectric Power Station, and it will first go into production at the end of this year. (Ekonomicheskaya Gazeta, 13 October 1960. Full translation)

---

### Milling Machines

High-accuracy heavy milling machines of eight new brands are being produced this year by the machine tool builders of the Leningrad Plant imeni Sverdlov. One of the latest is model LF-32 five-spindle longitudinal-milling machine. This is truly a giant: it is more than 11 m long, 5.6 m wide and 4.6 m high. It weighs 66 tons. Other heavy milling machines are designed for the tractor builders: models LF-36 and LF-37, weighing 70 tons apiece. A range of heavy milling machines is being produced on order by electrical power machinery builders. This is equipment for machining turbine blades, the productivity of which will be twice as great as that of machine tools now in use. (Murmansk, Polyarnaya Pravda, 15 September 1960. Full translation)

### New Automatic Line

During the pre-holiday socialist competition, the machine tool builders of the Moscow Plant imeni Ordzhonikidze completed testing on the large 1L35 automatic line. It is made up of 32 aggregate machine tools, connected by transfer mechanisms, auxiliary mechanisms, hydraulic and electric units. The aggregate is designed for the complete machining of gear boxes for trucks at the Moscow Motor Vehicle Plant imeni Likhachev. This is the 17th automatic line produced this year by the machine tool builders.

The grinding machine plant is producing almost 80 models of machine tools. Each fourth machine tool is a design which is being incorporated for the first time. On the eve of the holiday the first group of multi-purpose series surface-grinding machine tools, model 3B-722, was produced. Differing from previously produced equipment, all operating processes on the new machine tools are mechanized. Their power and machining accuracy is considerably higher. Parts and components produced by new blueprints have made the model more convenient and simpler for care and operation. An important technical problem was solved

---

### New Automatic Line (cont'd)

during the pre-holiday labor shift by the workers of the Moscow Jig Drilling Machine Plant. The Soviet Union's first unique high-accuracy model MV-24 machine tool was built, for grinding rack and pinions and large worm gears of complex configuration. Such parts were previously produced by hand or with the help of special equipment, a process which was extremely expensive and required great labor expenditure. Model 928 pivotal automatic machine, with the brand of the Moscow Casting Machinery Plant, "Krasnaya Presnaya", is 3½ times more productive than existing sand-blasting machinery. The country's first high-productivity sanding and rope machinery is being built, the production of which is being prepared by the Presnenskiy Machinery Plant. (Ekonomicheskaya Gazeta, 10 November 1960. Partial translation)

### Kirovakan Equipment

In the casting shop of the Kirovakan Machinery Plant two mould machines have been installed, but they are not being used, due to the technical direction of the enterprise, although they are needed. It is no coincidence that the plant produces low-quality castings and defective castings reach high proportions. 20% of castings produced for the Kirovakan Precision Machine Tool Plant becomes defective during machining. This shop does not use modern methods of casting and there is no mechanization of labor-consuming processes. Manual labor is predominant as well as outmoded methods of organization of work production. It is not surprising that one ton of castings here costs 6560 rubles, many times higher than the planned cost. There is also incomplete use of equipment at the Precision Machine Tool Plant. 1A112 and 1A136 automatic lathes are not in operation here, as well as two semiautomatic turret lathes, which are needed badly by the Yerevan Machine Tool Parts Standards Plant. Absolutely unnecessary equipment has been installed at these plants, which occupies production space. At the Precision Machine Tool Plant, in the mechanical assembly shop broaching machines and gear-hobbing

---

### Kirovakan Equipment (cont'd)

automatic machine tools have been installed. These machines are not used and are not necessary for the plant. At the Kirovakan Avtomatika Plant finishing and slotting machines only take up space. In the words of the plant directors, they did not order these machines and have repeatedly raised the question of transferring unnecessary and unused equipment to other enterprises. The question arises as to what the chief mechanical engineers of the electrotechnical industry and instrument administration as well as the machinery and machine tool administration think of this, for this is one of their main functions -- the correct distribution of equipment among subordinate enterprises and attainment of the maximum use from it. Not one machine tool should stand idle at enterprises. Each machine should be used according to its designated purpose and produce a maximum effect. (Yerevan, Kommunist, 3 November 1960. Full translation)

### Internal-grinding Machines

The main supplier of internal-grinding machines for machining apertures with a diameter from 6 to 500 mm is the Saratov Machine Tool Plant. But it naturally cannot fill all the needs of industry. The necessity has arisen to introduce new production. It has been decided to begin production of such equipment in Voronezh, where a plant has been under construction for 20 years. The specialization of these enterprises has also been planned. The first of them should produce machine tools for grinding apertures of a diameter of up to 100 mm, the second -- for large diameters. The matter of cooperation has been handled intelligently. At first, while the construction of the Voronezh Plant has not yet been completed, the Saratov Plant is to produce model machine tools for it. Voronezh is required only to organize series production. In the procedure of cooperation and lending of technical aid, the Saratov machine tool builders produced for the Voronezh plant two model 3A229 machine tools, and will produce more machine tools, model 3A228, by the end of the year.

But the directors of the Voronezh Sovnarkhoz and the plant are presently occupying a rather strange position.

---

### Internal-grinding Machines (cont'd)

For two years they have planned the production of internal-grinding machines for the enterprise, but up to now not one has been produced. In addition, they are not even preparing for production! Not taking state interests into consideration, these directors decided to obtain sets of ready-made parts for 3A227 machine tools, which were to be produced not in Voronezh, but in Saratov. They have their eye on the finished product... They intend to assemble several machine tools from these parts. Why? The Saratov Machine Tool Plant is producing them now by the hundreds. Why is this stunt necessary? The strange thing about it is that the RSFSR Gosplan supported this. Forgetting about specialization, the RSFSR Gosplan planned for 1961 for the Voronezh and Saratov Plants, production of identical machinery. The Voronezh Plant will be forced to produce model 3A227 internal-grinding machines by primitive methods. At the Saratov Plant this equipment has been assembled on conveyor lines for a long time. One asks why is such planning necessary? It cannot be considered intelligent that the Sarat-

Internal-grinding Machines (cont'd)

ov Plant is to produce model 3260 machine tools, which are obsolete. At the same time, production has been arranged for the improved model 3A229, the production of which is planned for 1961. Thoughtless planning creates great difficulties for both enterprises. The only correct path to take for increased production of high-productivity internal-grinding machines is the path toward specialization. This was also thought out previously. Why should this course not be followed? (Ekonomicheskaya Gazeta, 25 October 1960. Full translation)

---

Automation

Individual methods of producing special equipment are of course characteristic for machine tool construction. Almost all automated equipment produced at present, including automatic lines, is produced as original equipment, specially designed for the machining of some specific product. This equipment cannot be adjusted from machining a part of one type size to machining a part of another type size. It is of irreversible design, which, as a rule, excludes the possibility of multiple use after the item being produced is changed. Under present methods of producing special automated equipment, the periods required and cost of equipping production with them are extremely high. In order to produce the average special machine tool 2-3 years are required and for a heavy machine tool -- 3-4. The average cost of special machine tools produced by machine tool plants is much higher than the cost of multi-purpose machine tools. The reason for the lengthy cycle of building special equipment, and, consequently, the high cost, consists in the fact that actually the planning of each new specialized machine tool for each new automatic line is undertaken from

Automation (cont'd)

scratch. At best individual components are borrowed from previously designed equipment. The main defect in special equipment produced by machine tool enterprises is its irreversibility, the impossibility of repeated, multiple use of its component elements.

In the branches of mass and large-series machine construction, the use of special automatic equipment of irreversible construction impedes more and more the replacement of parts produced, draws out the periods required for preparing them and incorporating series production. In small-series machine construction, the automation of processes with the use of special equipment of irreversible construction, as a rule, does not pay off. Such equipment cannot be used when the item produced is changed, and production on a small scale will not amortize capital expenditures. Under these conditions the branches of small-series machine construction are forced to orient themselves primarily on the use of low-productivity multi-purpose equipment. As a result the proportionate weight of special and specialized machine tools in the total number of metal-cutting machine tools of the enterprises of several branches of

---

Automation (cont'd)

small-series machine construction comprises only 4-5%. Present methods of building means of automation confine machinery plants to the passive role of receiving finished equipment, limit the possibilities of their direct participation in furnishing production with the means of automation, lead to a non-efficient use of the productive capacities of machine tool construction.

The low level of standardization and unification of design of special automation equipment causes the piece-rate, individual nature of its production at machine tool plants. The labor consumption required for the production of this equipment is extremely high, and its quantitative production lags far behind the requirements of machine construction. In the total number of metal-cutting machine tools of USSR industry, the proportionate weight of special and specialized machine tools comprises a total of 7.3%. For comparison we shall mention that in the United States, even in such a mobile branch of machine construction as the aviation industry, according to data of 1958, it comprised more than 20%. In order to achieve during the Seven Year Plan the

Automation (cont'd)

present level of the United States in furnishing industry special and specialized machine tools, it is necessary to increase their production approximately by four times. The task of rapidly furnishing machinery enterprises with means of automation and mechanization of quick reassembly design, cannot be solved successfully by the efforts of the machine tool industry alone. It can be solved only under conditions of mobilization of all reserves available in machine construction as a whole, including machine tool construction.

Quick reassembly designs from interchangeable standard and unified elements can give equipment the quality of reversability with the possibility of multiple repeated use of these elements in new components. In cases of necessity the equipment can be partially or completely dismantled, and the standardized elements can be used in new combinations for the building of new equipment. In order to insure a rapid equipping of machinery construction enterprises with the means of mechanization and automation, it is necessary to find a new approach to the solution of problems connected with the building of equipment of reassembly

---

Automation (cont'd)

design. This new approach consists in the first place in spreading the principles of unitization to all types of special and specialized machine tools and automatic lines, as well as to other types of equipment (welding, riveting, blank-punching, casting and others) and, in the second place, in the broad standardization of all basic elements of equipment design. Considerable work has already been done in this direction. In some branches of domestic machinery construction special and specialized machine tools and automatic lines with fully reversible design have been developed and are being incorporated successfully. These lines are composed almost completely of standardized elements: bed-plates, tables, brackets, power heads, control units, automatic units and others. Experience gained in this field by scientific research and planning organizations, in particular, the Branch Scientific Research Institute of Technology and Production Organization, shows that the level of standardizing design elements in machine tools, automatic lines and other types of automated equipment can be achieved

Automation (cont'd)

to 80-90% of the total number of component parts and units forming them, including elements of automatic control and programmed operation mechanisms.

In past years considerable work has been done in building specialized equipment in machine tool construction and in several other branches of machine construction. Work on producing specialized machine tools and automatic lines of reversible design is of particular significance. The peculiar features of their design are the presence of various rapidly removable and adjustable elements, spare and adjustable brackets, capstan heads, self-activating feeding units, spare spindles, separation tables, etc. The advantage of the method of unitization and standardization consists in the fact that it makes it possible to decrease the present variety of types and sizes of all basic elements of equipment design by ten times. Thanks to this it is possible to concentrate the construction single-type standardized elements of equipment at specialized enterprises of the machine tool construction and other branches of industry. Thus, it is possible to go from individual, single production of automated equipment and automatic lines to ser-

---

Automation (cont'd)

ies, and in a number of cases, to mass production of standard elements involved in their design. This will make it possible, with no increase in machine tool construction capacity, to increase the quantity of automation equipment produced by several times and to decrease production costs by two to three times as a minimum.

It is particularly important that the new method allows a completely new approach toward expanding the front of the automation of production in machine construction. Conditions are being created for increasing the role of machinery enterprises in the production of the machine tools and automatic lines essential to them. All large and average machinery plants will be able to use their own resources to plan and assemble automatic machine tools and lines of ready-made standardized elements, delivered to them by specialized machine tool enterprises. In changing production, in changing equipment design and improving technological processes, the plants will be able to dismount unnecessary equipment and assemble new components of the same standardized elements. Unitization and standardization

Automation (cont'd)

of elements of equipment thus makes it possible to make a transition to a new, more progressive system of furnishing production with the means of mechanization and automation. The outstanding feature of this system consists in the fact that the entire process of building special and specialized machine tools and automatic lines breaks down into several independent stages, the implementation of which is not joined one to another and which can be effected by various organizations. First stage -- development of type-component machine tools and lines and designs of standardized elements by machine tool design bureaus. Second stage -- production of standardized elements for machine tools and lines by machine tool plants. Third stage -- assembly of machine tools and automatic lines of ready-made standardized elements by the enterprises which use these machine tools and lines according to blueprints drawn up for them of the basis of type-groupings. With this method of building automated equipment, the time necessary for equipping production is decreased 8-10 times. In planning and assembling heavy special machine tools and automatic lines, 6-10 months are required instead of 3-4 years, and for light and medium

---

Automation (cont'd)

machine tools -- from 2-4 months instead of 2-3 years. The method of grouping special and specialized equipment of standardized elements by the plants themselves which are using this equipment is winning more and more recognition and support among plant workers, scientific research and planning organizations. As everything new, it also has its opponents. Transfer to machinery plants of part of the work in building the necessary means for mechanization and automation (assembly of equipment from ready-made elements) is designated by some sceptics as "primitive", "antispecialization idea", etc. They fail to realize at least the following three facts. In the first place, it is the broad application of the principles of unitization of equipment design which assures the possibility of a true specialization of production of special and specialized equipment. The concentration of production of single-type standardized elements at specialized enterprises and their series and mass-production, instead of parts and component production of equipment by each machine tool plant, with its own resources and its own production methods -- is

Automation (cont'd)

this true specialization? In the second place, it is a matter of transferring to machinery plants not all, but only the final assembly of equipment. The assembly of all components and units will take place at specialized enterprises. In the third place, and this is extremely important, the possibility of grouping and multi-grouping equipment by their own means will make it possible for machinery plants to retool production rapidly for putting out new items with a preservation of a high level of process automation. The last item is particularly significant from an economic point of view.

Some specialists doubt the possibility of using in practice the new method of building special and specialized equipment. They ask if the machinery plants can really handle such a complex matter as the assembly of automatic machine tools and lines. In view of this we shall recall first of all that the assembly of equipment from ready-made standardized elements is to be effected only at large and medium machinery plants: for small enterprises this work should be carried out by specialized planning-assembly organizations which should be formed in economic rayons with

---

Automation (cont'd)

a well-developed machinery construction industry. These doubts are apparently formed on the one hand by a lack of understanding of the fact that assembly of machine tools and lines of ready-made, adjusted and interchangeable elements is much less complicated than the assembly of such machine tools and lines under present conditions, with a piece-work, individual nature to production, and, on the other hand, by an underestimation of the rising level of skills of the workers of our machinery plants. A few years ago, when the new method was just being formed, these doubts would be understandable, but now experience has proved them false. In many branches of machinery construction much experience has already been gained using the new method. In particular, several enterprises of the Moscow City Sovnarkhoz, including the Brake, Carburetor, Dinamo, Headlight plants and others, learned the methods of planning machine tools and lines from normalized components and at present are producing and assembling 15 automatic lines and 62 aggregate machine tools. In 1960, on the initiative of the Moscow City Sovnarkhoz, 28 more plants began work on mech-

Automation (cont'd)

anization and automation of production processes on the basis of the use of special and specialized machine tools of standardized components. A large number of special reversible design machine tools, assembled by plants from standardized elements, has also been incorporated in the plants of the Tatarskiy, Kuybyshevskiy, Bashkirskiy, Voronezhskiy and other sovnarkhozes. The initiative of the Moscow City Sovnarkhoz in incorporating the new method of furnishing machinery plants with specialized machine tools and automatic lines was approved by the July Plenum of the CC of the Party. The resolutions of the Plenum indicated the necessity of disseminating the experience of the enterprises of the Moscow Sovnarkhoz. In the resolution passed recently by the bureau of the Moscow City Party Committee, measures were outlined for the development and incorporation of the new method at the machinery enterprises of Moscow and the organization of centralized production of standardized elements of machine tools and automatic lines.

The nomenclature of standardized components produced by machine tool builders is extremely limited, and there are no such components for small and precision machine tools.

---

Automation (cont'd)

Various plants are producing in their own way standardized components for identical machine tools and automatic lines. These components are not interchangeable, they have no common standardized bracket fittings and assembly sizes, and this is intolerable. For example, 1.7-2.8 kw power heads are produced by the Minsk Machine Tool Plant and the Moscow Plant imeni Ordzhonikidze. The bracket position for the Minsk power heads is 250x300 mm, and for the Moscow head -- 250x250 mm. The diameter of the shaft of one of the heads is 30 and that of the other -- 20 mm, the width of the base of the sliding blocks is 250 mm for the first head, and for the second -- 280. Even enterprises and organizations of one economic rayon (for example, the Plant imeni Ordzhonikidze, the Plant imeni Likhachev, the Moscow Small Motor Vehicle Plant and others) produce standardized components with sharply differing junction sizes. This happens because we have no single type standards for such equipment for all plants. The "series of basic parameters for power heads" ratified in 1959 by the State Committee on Automation and Machine Construction cannot eliminate this defect. These

Automation (cont'd)

series do not include basic data characterizing the head types. Other machine tool components (separation tables, supporting elements and others) are not included at all in these series. It is necessary to form a single All-union type system for standardized elements for various types of equipment (metal-cutting, welding, riveting, etc.). Without this it is impossible to organize the centralized production of standardized elements on a large scale at specialized enterprises and to assure the efficient operation of interchangeable equipment. The creation of a type system in the form of national standards or parts standards for machine construction is an imperative task at the present time. An all-union type system must be developed on the basis of generalizing branch type systems for special and specialized equipment and standardized elements comprising them. A summary of branch type system plans will aid in a more rapid development of a type system on an all-union scale, which will make it possible to arrange series and even mass production of this highly efficient equipment, using present capacity of machine tool construction enterprises. In this manner one of the most critical

---

Automation (cont'd)

industrial problems would be solved.

The broad incorporation of this method naturally need not oppose other directions in mechanization and automation of production processes. In particular, we think that there is a great future also for that way of thinking which tends toward the creation of adjustable rotary automatic lines and specialized machine tools suitable for incorporation in automatic lines. However, the maximum possible use of principles of unitization should be used in these ideas. Furnishing plants with specialized equipment of standardized elements will lead to a basic change in the correspondence between expenditures for capital construction: expenditures should go chiefly for the construction of new production space, and for equipping the plant with more productive specialized equipment. Production area decreases approximately 30% with the same capacity.

Under conditions of planned socialist economy the broad application of the principles of unitization and standardization of equipment design, without a doubt, will have a much greater economic effect. For the time being

Automation (cont'd)

88

this is being developed very poorly. The time has come where it is necessary to carry out several measures on a national scale on the course of the USSR Gosplan, State Committee on Automation and Machinery Construction, the State Scientific-technical Committee and the Committee of Standards, Measures and Measuring Instruments with the aim of a broad incorporation of the new method of building special and specialized equipment. This will aid, in a very short period of time, and with the least amount of expenditures, in carrying out the directives of the XXIst Party Congress and the July Plenum on the total mechanization and automation of all branches of the national economy.  
(Ekonomicheskaya Gazeta, 28 October 1960. Partial translation)

---

MISCELLANEOUS MACHINE CONSTRUCTION

Kazakh Plants

In the resolutions of the July Plenum of the CC of the Party (1960) it was indicated that "decisive significance for speeding up the rate of technical progress and timely incorporation of new productive capacities is possessed by the rapid development of machinery construction, expansion of production and raising the technical level of machinery, apparatus, instruments, means of mechanization and automation and other equipment." These instructions by the Plenum of the CC of the Party have particular significance for our republic, where the proportionate weight of machine construction in the total industrial production is approximately 2.8 times less than for the country as a whole. At the same time Kazakhstan possesses a tremendously high potential for the broad and rapid development of multi-branch machine construction. A large metallurgical base is being formed in the republic, the production of iron alloys is being expanded, non-ferrous metallurgy is developing. In addition, one must take into consideration that the needs

Kazakh Plants (cont'd)

of the republic economy will grow from year to year for various types of machinery. Taking these factors into consideration, the Seven Year Plan provides for an increase in machinery production of 400%, which is almost double that for the growth of this branch in the country as a whole. More than 3 billion rubles are allocated for the construction of new and reconstruction of existing enterprises of the sovnarkhozes in the current Seven Year Plan. This is about 4.5 times greater than the size of capital investments for the past seven years.

Construction should be completed on eight plants, including the country's largest Pavlodar Refrigeration-compressor Equipment Plant (former combine), the Ust'-Kamenogorsk Machinery Plant, three instrument plants, and others. Besides this, 50 new, large enterprises are to be built. They include the Karaganda Foundry, for producing spare tractor parts from steel castings, with a production of 200,000 tons per year, the Akmolinsk Mill-elevator Equipment Plant, plants for producing cable, fittings, machinery for the food industry, small electric motors and others. In 1962 construction in the city of Petropavlovsk should be-

---

Kazakh Plants (cont'd)

gin on a large rolling equipment plant. As is evident from the above, large and honorable tasks have been placed before the republic in machine construction development. How are these tasks being fulfilled? During the first year of the Seven Year Plan the workers of the machine construction industry improved the use of production potential, did much to incorporate mechanization and new technology. As a result the state task for seven months of the current year was fulfilled by 106.1%.

The capital construction plan is being overfulfilled by the machine construction enterprises of the Kustanayskiy and Semipalatinskiy sovnarkhozes. The Yuzhno-Kazakhstanskiy Sovnarkhoz fulfilled 2/3 of the yearly construction work plan in seven months of 1960. The construction of the Semipalatinsk Cable Plant is proceeding at a good rate, as is the construction of the Transformer Plant in Kentau, the Chimkent Elektroapparat Plant and many others. However, for the republic as a whole, the construction plan for machine construction enterprises has been fulfilled only by 74% for seven months. Thus the situation is even worse than

Kazakh Plants (cont'd)

last year. Let us take the Alma-Atinskiy Sovnarkhoz. UNR-229 (Office of the Supervisor of Work -- 229) of Construction Trust No 75 (director, Rakov) in two years has been constructing a boiler room, charging shop and block of auxiliary and mechanical assembly shops for the Alma-Ata Heavy Machinery Plant, and none of these installations has been completed. If the boiler unit is not put into operation for the first frosts, work will stop on the others. The director of Trust No 75, Zavelenko, should increase the number of construction workers immediately at the plant, and he should also start organizing work at the Alma-Ata Casting-mechanical Plant.

The reconstruction of the Ural'sk Fittings Plant of the Aktyubinskiy Sovnarkhoz is proceeding very slowly. The past year delays were caused by lack of a plan, but now the plant has a plan and construction materials. But nothing is happening. There is an analogous situation in the reconstruction of the Ural'sk Mechanical and Repair Plants, which are to increase considerably the production of equipment and spare parts for the republic's agriculture. In the Vostochno-Kazakhstanskiy Sovnarkhoz, in seven months only 37.5% of

---

Kazakh Plants (cont'd)

capital investments have been achieved. Deputy Chairman of the sovnrarkhoz, Varonenkov, and head of the sovnrarkhoz OKS (Otdel kapitalnoy stroitel'stva -- Capital Construction Section) Ryazanov, have promised repeatedly to increase the rate of construction at the Ust'-Kamenogorsk Instrument Plant and to insure the beginning of operations this year. However, their words and deeds do not coincide. In seven months the capital investment plan for this enterprise has been fulfilled by only 9.7%, and for construction work -- 13%. This installation is still in the beginning stages. In addition, the instrument plant has no management of its own. Its functions are temporarily in the hands of the Ust'-Kamenogorsk Machinery Plant, but this attachment is of a purely formal nature, since these are two technologically differing enterprises. In addition, the plants are situated at quite a distance from one another.

Besides a common management, these plants, unfortunately have only one common feature -- years of delay in construction. In seven years only three blank-production shops have been built at the machinery plant: the foundry, the

Kazakh Plants (cont'd)

forge-press and metal structures shop. Their capacities are used at a low degree because of the lack of a mechanical assembly shop. The foundation is now in the second year, although with modern mechanization and intelligent organization construction would not require more than a few days. As a result, the production of drilling and mining equipment, which is so essential for the republic, has not yet started, as well as the production of large, heavy spare parts for crushing-grinding equipment. This is no isolated case. It is caused to a considerable degree by the fact that this branch of industry in the Vostochno-Kazakhstanskiy Sovnarkhoz has no head up to the present. The enterprises are subordinate administratively to the Administration of Heavy Industry, while the technical direction is delegated to the Chief Mechanical Engineer Division, which does not contain a sufficient number of machine builders, nor rights of administrative influence. As a result we have a situation where too many cooks spoil the broth. In the Karagandinskiy Sovnarkhoz serious fears are caused by the slowdown in the construction rate of the Pavlodar Machinery Plant. 20,000 sq m of production space with all auxiliary facil-

---

Kazakh Plants (cont'd)

ities and communications were to be completed in the fourth quarter of this year at this plant in order to begin series production in 1961 of industrial refrigeration units. However these plans can be torn up due to the delay in building the heating plant, plumbing and water supply. The directors of the Karagandinskiy Sovnarkhoz should lend immediate aid to the plant and furnish it lacking materials and other items. The Kazakhsel'mash is particularly significant for the development of the republic's agriculture. This plant specializes in the production of machinery for haying. Here a real threat has formed for the beginning of operations by the end of the year of 12,000 sq m of forge-press shop space. The construction site regularly runs short of such basic materials as bricks, cement, and ballast. Tremendous difficulties are caused by the lack of reinforced concrete due to the low capacity of the construction base of the Akmolinskstroy Trust.

Kazakhsel'mash should begin full-scale production during the Seven Year Plan. Capital investments have been allocated for this purpose, exceeding expenditures by

Kazakh Plants (cont'd)

three times for the entire period<sup>of</sup> existence of the plant, from 1942 to the present. A powerful construction base should be formed in Akmolinsk. This is especially important due to the fact that during this Seven Year Plan a large plant for the production of mill-elevator equipment is also to be built in Akmolinsk. In order to assure fulfillment of the resolution of the Plenum of the CC of the Party for rapid development of machine construction, the directors of the republic sovnarkhozes should basically change their attitude toward the development of this extremely important branch of industry. (Kazakhstanskaya Pravda, 15 September 1960. Full translation)

---