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STRIVE FOR WIDER APPLICATION OF ELECTRIC-SPARK, HIGH-SPEED METHODS, MECHANIZATION, AND AUTOMATIZATION

INSTITUTE HELPS METALWORKING PLANTS DEVELOP NEW METHODS, DEVICES -- Minsk, Sovetskaya Belorussiya, 11 Apr 51

Scientists and scientific workers of the Physicotechnical Institute of the Academy of Sciences Belorussian SSR have joined forces with workers of a number of plants of the metalworking industry to solve scientific problems having an important bearing on the technical progress of the republic's enterprises.

Under the leadership of S. I. Gubkin, director of the institute, a very important project on the introduction of transverse rolling (poperechnaya prokatka) in the production of forgings for the manufacture of automobile and tractor parts is being conducted at the Minsk Tractor Plant. Solving this problem will transform forging technology and pave the way for its further development. Gubkin also went to the Mogilev Metal Combine to help set up electrical polishing of nickel-plated products produced by that combine. The application of electrical polishing made it possible for the combine to save more than 900,000 rubles per year.

I. G. Nekrashevich, candidate of physicomathematical sciences; N. V. Afanas'yev, senior scientific associate; A. V. Yushkov, candidate of technical sciences; and S. P. Mitkevich and M. K. Mitskevich, junior scientific associates, in cooperation with leading engineers and Stakhanovites at Minsk metalworking plants carried out an important project on the perfection and introduction of electric-spark methods of metalworking and electrical hardening of cutting tools and dies.

Electric-spark hardening of cutting tools has been introduced at the Minsk Automobile Plant, Tractor and Bicycle plants, plants imeni Voroshilov, imeni Chkalov, imeni Molotov, and other enterprises.

Electric-spark removal of broken tools (drills, taps, reamers) from metal has proved a big help at the Minsk Automobile Plant.

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N I Karpovich, a scientific associate at the institute's laboratory, has mastered the production of three-dimensional (ob'yemnyy) dies by the electric-spark method and has developed the technology of their manufacture. This method has been recommended to Minsk plants by the institute, since it hardens cutting surfaces of dies and has great advantages over the conventional method of manufacturing dies. The electric-spark method eliminates the need for complex metal-working machine tools and expensive cutting tools; it also eliminates the drop in quality of dies after heat treatment.

On request of the Minsk Tractor Plant, a very important study was conducted by I. G. Nekrashevich and M. K. Mi'skevich on the possibility and expediency of using the electric-spark method in finishing the inside surface of small-diameter jig bushings.

The research conducted showed that electric-spark finishing of jig bushings gives a high-quality finish and that its use in production is fully possible and expedient.

A great deal of work was done by M. M. Svirshchevskaya, senior scientific associate, and M. M. Galkovskaya, scientific associate, on the introduction of a magnetic defect detecter for checking the quality of products manufactured by plants of the metalworking industry. A number of magnetic defect detecters were designed at the institute's magnetics laboratory. They are simple in structure and can be manufactured at any plant. A magnetic defect detecter has been introduced at the Minsk Bicycle Plant for checking bicycle parts, and at the Minsk Tractor Plant for checking tractor crankshafts and other parts.

Workers at the Minsk Machine-Tool-Building Plant imeni Kirov have asked the scientific workers of the institute's magnetics laboratory to develop a magnetic defect detecter for checking the quality of 25- to 30-centimeter-diameter pipes required in machine-tool building. At present, hidden and difficult-to-determine defects in pipes are costing the plant large material losses which are reflected in labor productivity. The magnetics laboratory of the Physicotechnical Institute will develop a method for checking pipes by means of a magnetic defect detector and suggest plans for its manufacture.

DISCUSS ECONOMIC SIGNIFICANCE OF HIGH-SPEED METHODS -- Moskovskaya Pravda, 6 Apr 51

Although the application of high-speed methods has expanded tremendously during the past 3-4 years, many problems in this field still remain to be solved. For example, labor productivity at the Moscow Krasny proletariy Plant has more than doubled during the past 2 years, yet it is difficult to evaluate the economic significance of this fact.

High-speed cutting at machine-building enterprises is far from being fully utilized. For the most part, this method is applied in lathe operations. Other types of operations continue as before. This naturally creates disproportion in production among machine shops. Such a condition is not economically desirable.

It would appear from this "one-sided" introduction of high-speed methods that chief technologists at various plants are deeply involved in individual production problems and are losing sight of the plant's operation as a whole.

The application of high-speed cutting inevitably leads to the destruction of norms which have been developed. It does not simply decrease the time for machining one part or another, but disrupts the very make-up of norms, since it changes the ratio between machining time and time required for auxiliary operations. Where the time required for hand operations at ordinary speeds comprised 30-50 percent of total time required for processing a part on a universal lathe, under high-speed conditions, it frequently reaches 65 or even 80 percent.

Let us assume that according to a norm, 60 minutes are required for processing a part at a cutting speed of 40 meters per minute. Twenty-five of the 60 minutes comprise machining time and 35 minutes, manual work. This means that in the course of one shift, the machine will operate 200 minutes and 280 minutes will be consumed for installation and securing of parts and tools, for changing speeds, for checking the size of work, for removing the parts from the machine, etc.

Now, supposing that this part is machined at a speed of 200 meters per minute. Machining time is then cut five times and consequently will take only 5 minutes of total processing time. Time for auxiliary operations remains unchanged.

According to this example, the time for processing one part will not be 60 minutes, but 40 minutes. Manual operations will then comprise 87 percent of total time instead of 58 percent as formerly. In other words, in a 480-minute shift, the machine is in operation for only 63 minutes and stands idle the rest of the time.

It is true that a high-speed worker in such a case produces $1\frac{1}{2}$ times the number of parts produced by a lathe operator working at conventional speeds. However, this in no way justifies the low degree of machine-tool utilization.

Designers, technologists, machinists, innovators, inventers, and Stakhanovites are faced with the task of mechanizing and making automatic to the maximum degree the technological servicing and control of machine tools and checking of parts being machined.

This task boils down to the modernization of manually controlled machine tools, equipping them with highly productive attachments, quick-acting (mechanical, hydraulic, or electrical) clamping devices, electric dials [electric comparators?], stops, multicutter heads, etc.

The introduction of high-speed methods of metalworking is not only a technical problem but also an economic one. At many enterprises the achievements of Stakhanovites and high-speed workers are not taken into account in the compilation of technological data for general utilization.

Enough material has been accumulated at plants to compile new handbooks for technologists and norm setters. Such handbooks should be printed. It is possible that they might be short lived, since the rate of progress might outdate them, in which case they must be reviewed again. It is quite unsuitable to be using a book written 20 years ago, Spravochinka metallista (A Metalworker's Handbook), for selecting the cutting speeds to be used at present.

INNOVATORS AIM AT MECHANIZATION, AUTOMATIZATION -- Leningradskaya Pravda, 1 Apr 51

At present, 993 operations are performed on 520 machine tools by high-speed methods. Of these, 326 machine tools and 645 operations have been converted to high-speed methods during the past 2 years.

Simultaneously with the expansion of high-speed metalworking, attachments and tools have been modernized. During 1950, 3,000 special fixtures, 600 cold-stamping dies, and 7,200 various types of tools were designed. The following

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principles were incorporated into the designs of the fixtures: multiposition machining and pneumatic, magnetic, and hydraulic clamping of parts. These fixtures practically eliminate physical labor and increase productivity up to ten times.

Engineers' and innovators' direction of thinking is toward mechanization and automatization of manual labor.

The introduction of a machine tool developed by P. A. Zaychenko, a Stalin Prize winner, in cooperation with Raldugin, technologist, has decreased labor consumption in machining large parts five times. A gear-chamfering machine has freed 12 workers from heavy manual labor. A. N. Somov designed a belt-grinding machine for polishing not only outside surfaces but also internal curvilinear surfaces. This decreased labor consumption from 16 to 2.5 man-hours per part.

Several instruments for automatic checking of parts during machining have been designed and introduced at the plant.

Together with the modernization of cutting methods, other highly effective methods are being introduced extensively; in particular, cold stamping of parts; 556 tractor parts are already being manufactured by this method. During 1950, the production of 263 parts was converted to cold stamping.

At present, 92 conveyer lines for machining parts are in operation at the Leningrad Kirov Plant. The conveyer principle is also used in the assembly of tractors and their mechanisms.

The struggle for improving new machines is not weakening. Designers and tractor builders headed by Stalin Prize winners L. Ye. Sychev and N. V. Kurin are constantly working on the improvement of the skidding tractor. Recently, a modernized tractor with extended frame was dispatched for field testing. This work was accomplished together with students of the Leningrad Forestry Engineering Academy imeni S. M. Kirov. The new design not only increases the tractor's productivity but also decreases the consumption of ferrous rolled stock by 162 kilograms per tractor. Seventeen fewer types of parts go into the tractor. Designers are striving to decrease the consumption of metal for each tractor by an additional 500 kilograms and eliminate 38 more parts.

Metallurgists at the plant have set a goal for the production of a new ingot for a high-quality Kirov steel and for the introduction of new grades of steel in the production of the tractor. The struggle is on for the introduction of pressure steel casting, for decreasing rejects in metallurgical and casting production, and for lowering labor consumption.

Technologists are striving also for expansion of high-speed cutting. Hundreds of new machine tools are slated for conversion to high-speed methods. Electrical technology is assuming new positions in production. Electric-spark broaching machines are being introduced. Grinding and polishing of parts are being done by a new, highly productive method. Automatic control on lathes and sandblast cleaning of cold rolled stock are being introduced. -- N. Smirnov, director, Leningrad Kirov Plant

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