MAR 1952 51-NC

(20)

CLASSIFICATION CONFIDENTIAL
SECURITY INFORMATION
CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY USSR

SUBJECT Economic; Technological - Machine tools, metal saving

DATE OF INFORMATION 1952 - 1953

HOW PUBLISHED Monthly periodicals

DATE DIST. 25 Sep 1953

WHERE PUBLISHED Moscow

NO. OF PAGES 5

DATE PUBLISHED Apr 1952, Mar 1953

LANGUAGE Russian

SUPPLEMENT TO REPORT NO.

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES, WITHIN THE MEANING OF TITLE 18, SECTIONS 793 AND 794, OF THE U.S. CODE, AS AMENDED. ITS TRANSMISSION OR REVELATION OF ITS CONTENTS TO OR RECEIPT BY AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW. THE REPRODUCTION OF THIS FORM IS PROHIBITED.

THIS IS UNEVALUATED INFORMATION

SOURCE Periodicals as indicated.

PROGRESS IN METAL-SAVING DRIVE; SOVIET MACHINE-TOOL SPECIFICATIONS

50X1-HUM

REDUCE SPECIFIC WEIGHT OF MACHINE TOOLS -- Moscow, Za Ekonomiyu Materialov, Mar 53

One of the indexes of proper metal utilization in machine building is the specific expenditure of metal per kilowatt of rated power. For example, the weight of a group of lathes for machining parts up to 400 millimeters in diameter has been changed regularly at the Krasnyy Proletariy plant. Model 1D62 with a 4.3-kilowatt electric motor and 600 rpm weighs 2,700 kilograms; in the modernized Model 1A62, the power has been increased to 7.[illegible] kilowatts, the speed to 1,200 rpm, and the weight to 2,700 kilograms. In a new model of this size, Model 1620, the power of the electric motor has been increased to 14.5 kilowatts, the maximum speed to 3,000 rpm, and the weight to 6,000 kilograms. Thus, in the new model, the power has been increased 3.[illegible] times, while its weight has been increased only 2.3 times.

A new design of a high-speed milling machine has also been worked out successfully in the Model 6A54 milling machine (Gorkiy Milling Machine Plant). In the new design, as compared with [illegible] produced earlier, the power has been doubled and the speed has been increased four times, while the absolute weight has been increased only 4 percent. This means that the specific weight of the new model has been cut almost in half.

It must be noted, however, that a decrease in specific expenditure of metal is not being effected in all new models of machine tools. Among these machine tools are certain cut-off, bolt-cutting, planing, and slotting machines. -- A. Prokopovich, chief engineer, Experimental Scientific Research Institute of Metal-Cutting Machine Tools

50X1-HUM

REDESIGN HEAVY MACHINE TOOLS -- Moscow, Za Ekonomiyu Materialov, Mar 53

Formerly, the Model 5330 gear hobbing machine, a product of the Kolomna Heavy Machine Tool Building Plant, was manufactured with two slides. One slide, known as the main slide, was for machining gears with hobs or cutters with radial feed and the other, known as the tangential slide, was for machining gears with tapered hobs or fly cutters with axial feed.

Experiments were conducted to discover whether the two slides could be combined into one. This was found to be possible by increasing the rigidity of the slide for axial tool feed and by reinforcing the tool-arbor support. As a result, not only was the design of the machine tool improved but the following amounts of metal were saved: 617 kilograms of cast iron, 584 kilograms of steel, and 75.6 kilograms of bronze. In addition, the total weight of the machine tool was decreased by 1,200 kilograms and the number of parts in the machine tool by 757. At present, the new slide is in the manufacturing stage.

An improved design of the back-column slide has increased the rigidity of the unit and decreased its weight by 70 kilograms in Model 5330 and 400 kilograms in Model 5353.

A new design of cabinets for the electrical equipment and control panels for machine tools has been developed at the plant. As a result of replacing light-bulb fittings with purchased plastic ones and as a result of a better arrangement of the electrical equipment, the weight of the units has been decreased, a saving in copper effected, and the labor consumption in installing the electrical equipment reduced. The new design of cabinets and control panels has made it possible to reduce the weight of gear hobbing machines by 83 kilograms and of the Model 1565 vertical boring mill by 15 kilograms.

A calculation of bending stresses on the spindle of an LT-2 facing lathe has shown that the steel spindle can be replaced by one made of SCh21-40 cast iron with the incorporation of certain design changes. This measure will make it possible to save up to 700 kilograms of metal per lathe. /According to a report in 00-W-26971, 125 kilograms of steel can be saved by this measure./ At the same time, it has been found that the bronze spindle bearings can be replaced by SCh15-32 cast-iron bearings with a saving of 106 kilograms of bronze in each machine tool.

Other computations have established that steel change gears (for the indexing, feed, and differential quadrants) for the Model 5370 horizontal gear hobbing machine can be replaced with gears made of modified cast iron, MSCh28-48.

The designers at the plant have conducted research on the use of SPCh-P-45 extra-hard cast iron instead of steel in the manufacture of rams for the Model 1556 vertical boring mill. Although the possibilities of saving metal in this way are many, the experience in the field of manufacturing large castings from extra-hard cast iron is still inadequate, which hampers the introduction of this cast iron into machine-tool production.

The major shortcomings in the matter of saving metal are the length of time required to manufacture experimental models and the slow introduction of measures for saving metal into production. The experimental models are manufactured and tested under production conditions, together with the fulfillment of the production program. Naturally, the manufacture of an experimental model coupled with the pressure of fulfilling a basic plan complicates good organizational order. The answer to this problem would be to set up an experimental shop or section at the plant which would speed up and facilitate the manufacture of experimental models.

It is hoped that the ministry will soon aid the plant in this regard. -- B. Kudinov, chief designer, Kolomna Heavy Machine [Tool] Building Plant

REARRANGE MACHINE-TOOL UNITS; DEVELOP CAST-IRON SUBSTITUTES -- Moscow, Za Ekonomiyu Materialov, Mar 53

A basic trend in machine-tool planning is varying the arrangement of units in a machine tool to minimize the amount of metal used in lightly loaded parts and permit maximum utilization of cavities in large parts such as the bed where certain units can be housed.

The designing division at the Moscow Machine Tool Building Plant imeni Ordzhonikidze is working on a group of universal semiautomatic multitool lathes. The basic model in this group is Model 1731. Its maximum workpiece diameter is 320 millimeters. The machine tool has a hydraulic drive for the feed mechanism. The water tank of the experimental machine tool is an iron casting 226 kilograms in weight which is mounted in the pan in the rear right corner of the bed.

In working out the design of a subsequent machine tool, a semiautomatic for machining parts up to 200 millimeters in diameter, the carefully worked out arrangement of the machine tool made it possible to eliminate a solid-cast pan and a separate water tank. This was achieved by mounting the bed of the new machine tool on two legs, the front one serving as a reservoir for the coolant and the rear one as the housing for the water tank. A tray made of thin sheet steel was installed between the legs to catch the chips. As a result, the weight of the bed has been considerably reduced.

Frequently, a critical analysis of an experimental machine tool makes it possible to introduce a number of constructive changes which effect a decrease in the weight of series-produced machine tools. For example, in the experimental Model 1731, the electrical control equipment was housed in a metal cabinet 1,005 x 735 x 1,900 [millimeters] in size and 420 kilograms (without the electrical equipment) in weight which was installed alongside the machine tool.

Further work by designers in planning the model for series production made it possible to eliminate the cabinet by placing the electrical equipment inside the bed. As a result, more than 200 kilograms of metal have been saved and the dimensions of the machine tool have been decreased.

A very effective method of decreasing the weight of a machine tool is by simplifying the design of its units without compromising their operating qualities. For example, the Model 1731 has two slides which are driven by two separate hydraulic systems, each of which is served by twin pumps. For another new machine tool, also having two slides, a simplified hydraulic system was developed which operated from one pair of pumps having a greater rate of discharge. As a result, the reduction unit for driving the pumps was eliminated and the number of pumps required was cut in half. This made it possible to save a total of 150 kilograms of metal.

Another example can be cited. The design for a special multitool semiautomatic lathe, Model MR50G for machining ball and roller bearing rings was developed on the basis of Model MR5 produced by the plant in 1948. A 28-kilowatt electric motor was used for the main drive in the new model, as compared with a 20-kilowatt motor in Model MR5. A larger workpiece diameter could be machined on the new model and, as a result of simplifying the drive-shaft unit, the weight of the gear box was reduced considerably.

In redesigning the Model S212 wire-drawing machine for series production, radical changes were made in its emergency braking system. As a result, 15 surplus parts were eliminated including two iron castings.

Another effective method of decreasing the weight of machine tools has been the introduction of windows in the walls of the beds. This has been done on the special multitool semiautomatic lathe, MR4. Such a method has also increased the rigidity of the bed.

In addition to decreasing the weight of large parts which must withstand heavy loads, the weight of smaller items such as covers and guards is also being reduced. As a result of this measure, the weight of machine tools is being reduced 100-150 kilograms.

Interesting research work has also been done on developing a substitute for cast-iron counterweights in machine tools. The difficulty in this task was to find a substitute which would have a specific weight close to the specific weight of cast iron. After a multitude of experiments, a substitute for the cast iron in counterweights was developed. It consisted of pressed steel chips, with poured cement, in a steel casing. At present, the designers at the Plant imeni Ordzhonikidze, utilizing the experience of the machine-tool builders of the Plant imeni Sedin, are working out variations of band springs for balancing machine-tool slides which will eliminate the need for counterweights.

Another example of metal substitutes is the use of piston rings made of oil-resistant rubber instead of cast iron in hydraulic cylinders of machine tools. Laboratory testing has shown that the wear resistance of these rings is very good. In addition to the metal saved in the manufacture of rings, this substitute will also decrease the length of the cylinder and piston, which in turn will further decrease the consumption of metal. -- I. Rostovtsev, chief designer, Moscow Machine Tool Building Plant imeni Ordzhonikidze

SPECIFICATIONS OF MODEL 1731 MULTITOOL LATHE -- Moscow, Stanki i Instrument, Apr 52

The specifications of the Model 1731 multitool lathe are as follows:

Maximum workpiece length	800 mm
Maximum workpiece diameter	320 mm
Spindle speeds	50-1,100 rpm
Power of electric motor	40 kw
Feed of bottom slide	13-600 mm/min
Feed of top slide	6-300 mm/min
Dimensions	1,650 x 3,500 mm
Weight	7 tons (without electrical equipment)

Slides and mechanism for moving and securing tailstock spindle have hydraulic drive.

The chief designer of the lathe was Ivan Aleksandrovich Rostovtsev; the leading designer, Yakov Pavlovich Mezivetskiy.

50X1-HUM

Declassified in Part - Sanitized Copy Approved for Release 2012/02/08 : CIA-RDP80-00809A000700130518-1