CLASSIFICATION CONFIDENTIAL CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY	USSR
SUBJECT	Economic; Technological - Machine tools, measuring instruments
HOW PUBLISHED	Monthly periodical
WHERE PUBLISHED	Moscow
DATE PUBLISHED	Feb 1950
LANGUAGE	Russian

DATE OF INFORMATION	1950
DATE DIST.	17 Jul 1950
NO. OF PAGES	4
SUPPLEMENT TO REPORT NO.	

THIS IS UNEVALUATED INFORMATION

SOURCE Mekhanizatsiya trudoyemkikh i tyazhelykh rabot, No 2, 1950.

SOVIET PRODUCTION OF INSTRUMENTS BY CONVEYER METHODS

M. I. Cherkasskiy

The Moscow Instruments Plant produces approximately 300 types and sizes of both alternating and direct-current electric measuring instruments.

Until recently, the plant's volume of production was far from adequate in satisfying the demands of the national economy. Without the construction of additional production areas production methods then in use could not noticeably increase the simultaneous output of different types of items in the instrument-building industry.

Personnel of this plant resolved to increase production by extensive mobilization of internal reserves, introduction of new technological methods, mechanization in construction, and adoption of conveyer methods of production. They worked out a complex of organizational and technical measures which effected a rapid increase in production on existing production areas. The entire production of electric measuring instruments was converted to conveyors operating at a set rhythm.

Technological principles of mass production had not been used previously in instrument building, in the manufacture of products of many types and sizes. In the transition to mass production methods, great difficulties arose creating a conflict between conveyer methods of production and production of many types of instruments. Parts had to be standarized to the greatest extent possible, designs of special units and parts had to be changed to conform with uniform technological processes, the processes which would not lend themselves to conveyer methods had to be revised, high-production special equipment, checking apparatuses, etc, had to be designed and manufactured.

Conveyer production with set rhythm was first used in the manufacture of bodies and stands and in the assembly of switchboard-type measuring instruments, since this involved a long production cycle and labor-consuming operations.

CLASSIFICATION CONFIDENTIAL

STATE	X	NAVY	X	NSRB		DISTRIBUTION	
ARMY	X	AIR	X	FBI			

The technological process for manufacturing the body consisted of 26 operations, and body parts traveled a distance of 258 meters from the material stockroom to the assembly shop. Nineteen operations were required for manufacturing the stand, and its parts traveled a distance of 274 meters to the assembly shop. The production cycle for manufacturing the body and stand took 13 days. Transfer of these parts by hand, from one operation to the next, kept 10 men busy.

An analysis of the technology in use showed that the only way to increase production was to streamline the technological process, shorten the distance that the parts had to travel, and mechanize the transfer of parts from one operation to the next. In addition, the technological processes had to be standardized.

In accordance with the standardized technology which was developed for the production of all instrument bodies and stands, a conveyor, along which presses were installed, was built. All subsequent operations of drawing cylindrical-shaped parts were performed on these presses. However, a number of operations, A. C., annealing between drawings, degreasing and pickling the body, were not included in the set rhythm. This plant then started to manufacture the specified parts not from pickled iron but from structural steel, which is cheaper. As a result, annealing, pickling, and other obstacles encountered in converting to conveyer methods were eliminated.

The bodies and stands had to be washed and dried in order to remove the layer of grease after forming operations. Previously, the bodies of large-size parts were prepared for painting in separate tanks, pickling, washing and degreasing, and in drying cases. This equipment and the process itself required large isolated areas which excluded the possibility of including the process in a conveyor. The problem was solved by building a completely mechanized washing and drying conveyer unit and incorporating it in a general conveyer line. The unit consists of a metal-net transport conveyor, which passes through chambers containing a caustic solution, hot and cold water, and then through a drying case. It puts out clean, dry parts which, while still on the conveyer belt, undergo welding operations, including welding on of glass holders.

Under the old technology, painting required a multitude of preliminary hand operations. Now this process has been made automatic. Priming, painting, and drying of the part is performed on a painting and drying conveyer unit. Labor-consuming hand operations such as applying the first coat of paint and sandpapering, which were difficult to include in a conveyor, became unnecessary as a result of using high-production drawing dies. These dies draw parts without any flaws.

After painting and drying, the bodies go on the assembly conveyer belt. Their assembly and the threading of the stands are included in the conveyor run. It was designed for a 15-second operating rhythm, but at present, a finished item comes off the conveyor every 10 seconds.

As a result of revising the technology and introducing mechanization of the production cycle of bodies and stands, only 4 hours are required instead of thirteen 24-hour days by the old technological process; rejects, which reached 20 percent previously, were lowered to 2-3 percent; labor-consumption in manufacturing the body decreased more than 3.5 times, and for instrument stands, more than a half; the distance that the part now travels is only 79 meters. It is particularly important to note that on this conveyor, nine parts are manufactured at the same time, not only one as is usual in conveyer production.

From the assembly conveyor, the parts go onto a sloping elevator which transfers them to the assembly shop. The uninterrupted conveyer lines stretch out one after the other from floor to floor of the plant building.

According to the old technology, the assembly of instruments was theoretically conveyer-type. However, this conveyer did not have a set rhythm, as a result of which a large number of post-operation delays arose, the operators transferred parts from hand to hand, frequently the instruments were returned for repair (defects occurred in up to 35 percent of the items), the assembly cycle lasted from 480 minutes to 25 days. Many other bottlenecks arose.

At present, instrument assembly takes place on two conveyors with set rhythm. Their total length is nearly 80 meters. On the alternating-current instrument conveyor, 95 different types and sizes are assembled, and on the direct-current instrument conveyor, 188 types and sizes. The rhythm of the first is 30 seconds and the second, 2.3 minutes. The instrument assembly and testing cycle comprises 25 and 45 minutes, respectively.

New universal gaging and checking units have been installed on the conveyors which are suitable for any instrument and which have intermediary checking and repair points.

Manufacture of instruments in series can involve from 5-10 to several thousands of pieces. The conveyor permits simultaneous assembly of several types and sizes of parts, and can start producing instruments of other dimensions without stoppage. This is made possible by proper selection and synchronization of operations. Both conveyors are equipped with high-production assembly tools. Instrument units are assembled on them, the quality of the units are verified, the instrument is balanced, tested, and scales are stamped on it. A total of 49 operations are carried out on the assembly conveyors.

The inspection of instruments and their delivery to the storehouse for finished products was also reorganized. The technical inspection section and the state inspectors check the instruments directly on the assembly conveyor, on which the instruments are also packed. The assembled and packaged parts are transferred to the storage space by a transport conveyor. The checking, testing, and packing operations have been shortened from three 24-hour days to 20 minutes.

The plant itself has manufactured a total of six production conveyors and four transport conveyors having a total length of 320 meters (see appended sketch).

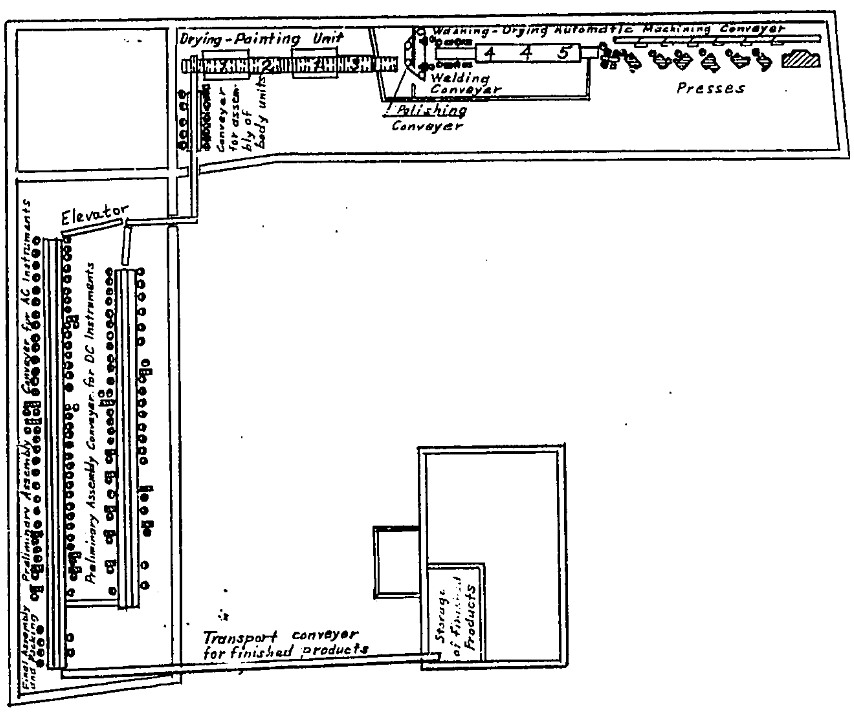
All fastenings which are required in large quantities on lathes and turret lathes are now made on upsetting automatics and knurling machines; pins are also manufactured on these machines.

In 9 months the plant shifted to the new technology of manufacturing instruments without stoppage or disturbance in its natural flow of production.

During one year labor productivity doubled, the cost of instruments was cut almost in half, output per square meter of production space doubled. Decreasing the labor input, utilizing cheaper materials without impairing the quality of products, rapid decrease in loss due to flaws, etc, will make it possible for the plant to reduce production costs 12,000,000 rubles in 1950 as compared to the 1948 costs.

/Appended sketch follows./

50X1-HUM



Sketch of Conveyor Method of Producing Electrical Measuring Instruments
1 - drying; 2 - painting; 3 - priming; 4 - washing with hot and cold water; 5 - washing with alkali.

- E N D -