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SOVIET INDUSTRY SUBSTITUTES
GLASS PIPES FOR METAL PIPES

Numbers in parentheses refer to appended sources.⁷

In an effort to save metal, Soviet scientists have tried to find new materials for the production of pipes. Until now, extremely large quantities of metal pipes have been used, both for civilian needs and in industry. For example, 50,000 tons of steel pipe were laid in the construction of the Saratov-Moscow gas main. The chemical industry, which deals with corrosive liquids, including acids and alkalies, uses pipes made of expensive metals, such as copper and lead.(1)

Scientists are working on the problem of substituting glass pipes for metal pipes. Glass pipes have a number of advantages: they are cheap, durable, sufficiently strong, and corrosion-proof, and they have good dielectric qualities.(2)

A large amount of experimental work in the manufacture of glass pipes has been done by the All-Union Scientific Research Institute of Glass, Ministry of Construction Materials Industry USSR. Scientists visited a number of plants and cooperated with leading plant workers in finding new methods to produce glass pipes. The Bytosh', Bucha, Gomel', Lisichensk, and "Krasnyy Oktyabr'" glass plants organized the production of pipes with an inside diameter of 12 to 100 millimeters and a length of 3 meters. The pipes are able to stand an inner hydraulic pressure of 8 to 20 atmospheres.(1)

The Bucha Glass Plant has started production of seamless glass pipes. Over 60,000 meters of glass pipe were manufactured as an experiment. They can stand a pressure up to 25 atmospheres, and they are acidproof and much cheaper than metal pipes. The products of this plant have been shipped to more than 50 enterprises of the food industry.(3)

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The glass industry now uses three different methods for manufacturing glass pipes: vertical or horizontal stretching (drawing), and a method which consists of winding a thin jet of melted glass around a rotating metal shaft.

The most commonly used method is that of vertical stretching, based on an invention of Stalin Prize laureate S. I. Korolev.(1)

One of the most productive methods for manufacturing glass pipes is horizontal stretching, which makes it possible to produce 250-300 meters of pipe per hour; however, for the time being, the diameter of these pipes has to be limited to 50 millimeters, and the thickness of the walls to 4-5 millimeters.(2)

The Misheronkiy Glass Plant in Moscow Oblast recently installed a machine for horizontal stretching. This machine is to have an annual productivity of 800 kilometers of glass pipe with a diameter up to 50 millimeters.(1)

Pipes with a larger diameter and thicker walls are produced either by the method of vertical stretching, or by the "winding" method mentioned above. The two latter methods still require considerable improvements to increase their productivity. Glass-making experts and scientists are continuing to work on this problem.(2)

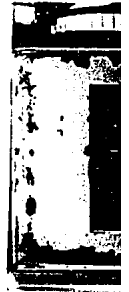
The glass ingredients used for the production of pipes have to be somewhat different from those used in the production of window glass, as the latter would be too expensive. The Institute of Glass suggested making alkali-free or alkalescent glass. A glass mixture containing sand, kaolin, dolomite, and fluorspar was developed. By adding a small quantity of sodium sulfate, alkalescent glass was obtained. Many regions of the USSR have large reserves of clay, furnace slag, etc., which can be used as raw material for the production of this type of glass. The process of manufacturing pipes of alkali-free and alkalescent glass is now being mastered. This type of glass is much cheaper than window glass; it has great mechanical strength and chemical resistance, and can withstand sudden temperature changes up to 100 degrees.

Until recently, a serious obstacle to large-scale production of glass pipes was the lack of reliable methods for joining the pipes. However, this problem has now been solved.(1) Sleeve joints of asbestos-cement, cast iron, or glass with rubber gaskets have been developed. Experiments have also been made in the use of thread joints. To improve the strength of threaded pipe ends, scientists have studied the possibilities of covering them with a plastic or metal coating. With the help of a special device, the ends of glass pipes are covered with a layer of iron, aluminum, or other metal, which has been pulverized in a jet of oxyacetylene flame. This metal dust firmly adheres to the glass, forming a 2-3 millimeter layer in the required place. Plastic also provides a good coating material. Threading of metal and plastic presents no difficulties. The over-all mechanical strength of glass pipes can be improved considerably by hardening processes.(2)

A 150-meter water main made of glass, built in Izmaylovskiy settlement of Moscow, is now being tested. Glass water pipes at the Bytosh' and Misheronkiy glass plants are also being tested. A 30-meter water standpipe made of glass was installed in the wall of a new nine-story apartment building in Moscow. This pipe was able to stand a pressure of 10 atmospheres.

The Moscow Experimental Vitamin Plant is now using 3-inch glass pipes for draining waste products, such as acids and organic substances. This had reduced production costs considerably, as the metal pipes in this industry were constantly being corroded by acids, and had to be replaced.

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A glass pipe installed in one of the petroleum refineries has successfully passed a 3-month test. It is used to conduct kerosene catalyst, a very corrosive product.

Glass pipes have a great future. The Soviet national economy plans to use them in large quantities, thereby releasing hundreds of thousands of tons of metal. Scientific tests have proved that glass pipes can be used successfully not only for water mains and sewage systems, but also in laying telephone and electric cables, concealed electric wiring, and in the chemical, petroleum-refining, food, and other industries. In the not too distant future, it should be possible to replace metal pipes completely by glass pipes.(1)

SOURCES

1. Ashkhabad, Turkmenskaya Iskra, 8 Apr 52
2. Moscow, Znaniye-Sila, No 3, Mar 52
3. Tashkent, Pravda Vostoka, 10 Jan 52

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