

# BEYOND THE IRON CURTAIN



**Mr. Vladimir Yakovlevich Alekhin**

Looking back upon my life in slow motion, it seems that I have always been fortunate to be involved in metallurgy and mechanic industry. My name is Vladimir Y. Alekhin and I was born in 1928 in Voronezh, Russia. In 1931 my parents had to move to another small village not far from Moscow. After two years of military service (1948-1950) I was accepted at the Gold and Non-Ferrous Metals Institute, still Russia's primary technological university in the field of metallurgy. In 1956 I was the foreman in the Tashkent Cable factory located in the Uzbekistan Republic where I worked for almost 30 years. The Tashkent Cable factory has been witness to my experiments and inventions particularly with the first Continuous-Properti Copper Rod Line which was purchased by Tashkent Cable in 1962, during the Chrušev period and shortly after the Cuban missile crisis.

Recently I have worked for several different private companies, often crossing paths with Continuous-Properti, and today, at the age of 85, here I am again with Continuous-Properti telling my memories.

The Tashkent Cable plant in Uzbekistan was the only cable producer for the railway system in the USSR, from the end of World War II until the 1960s. Particularly for the BAM (Baikal-Amur Mainline) 3,400 km long, a second Trans-Siberian line ordered by Josef Stalin but built during the 1950s.

At that time Tashkent Cable produced wire rod from wirebars with a looping rolling mill. The technology included:

- >> Copper wirebars of 90 kg each and hot rolling to 17 mm diameter
- >> Rod ends were connected by Ag welding then coiled on steel drums
- >> Rod was drawn to produce conductor wire then coiled on wooden drums

Copper rod welding with Ag solder caused increasing the temperature of the welding point up to 1000 °C with additional rough treatment of the rod surface by filing to remove excess material from the weld. Rod welding was a weak spot of wire and the quality control of those years could not give a full guarantee of the working process, and unfortunately this sometimes caused tragic accidents on the newly electrified railways.

With the increased demand of the BAM project, it was of fundamental importance to create a new continuous method to produce copper wires.

## *Continuous Copper Rod Production with Continuous Casting and Rolling Method*

During the 1950s, thanks to the Italian inventor, Mr. Ilario Properzi, a new method of continuous casting and rolling for Al rod production was pioneered. He began experimenting with copper in 1954 and encouraged the international copper industry to join him in developing the system.

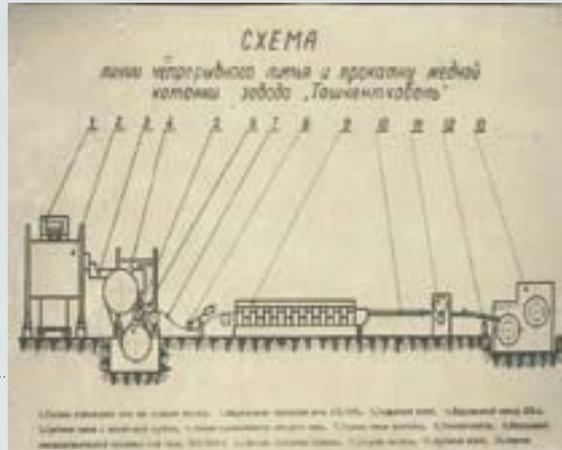
In 1962, in USSR, Mr. Adolf N. Zharov, Head of Department n° 8 of All-Russian Scientific Research & Development Cable Institute (VNIKIP), proposed using the Italian CCR technology for copper rod production with the objective to avoid the necessary rod welding inherent in the wirebar process. The Director of Tashkent Cable Factory, Mr. Konstantin F. Safonov, warmly supported this idea and the Chairman of the Central Asian Economic Bureau, Mr. Martynov, granted permission. The Project was subsidized from the State Reserves by order of Foreign Trade Minister, Mr. Patolichev.

On December 14, 1962 the Contract was signed and the equipment arrived to "Tashkent Cable Factory" about 18 months later taking profit from the early tests done in Carrolton, GA with the first copper line ever sold by Properzi. Mr. Donini, Commercial Director of Continuous-Properti, assured us that they were ready to provide all necessary support to develop a new technology. Unfortunately, there were far too many bureaucratic obstacles, visa problems and almost impossible direct communication for an open and fruitful exchange of ideas and information.

Let me emphasize that the Soviet government was very interested in applying all possible novelties in industry - in competition with the Capitalistic West - and to study foreign experience. In our case, the All-Russian Scientific Research & Development Cable Institute (VNIKIP) addressed the purchase of a new CCR Copper Rod Line to the Committee of Science and Technology (as it was foreign equipment and technology), and the latter passed the Project to the Prices Committee; in fact, if one Russian factory produced a new type



Picture1 - The scheme of continuous casting and rolling of copper rod at Tashkent Cable



Picture 1. The scheme of continuous casting and rolling of copper rod at Tashkent Cable.

- Gas-powered cathode heating furnace
- Induction melting furnace ILK-16M
- Transfer launder
- Induction holding furnace ILK-6
- Tundish with pouring spout
- Properzi wheel and belt casting machine
- Bar loop & bar sensor
- Properzi 17 stand rolling mill
- Rod cooling system
- Flying rod shear
- Continuous coiling machine OTT

Picture 2. Properzi rolling mill for 17 mm copper rod at Tashkent Cable plant (the last 8 stands had been removed from the mill).



Picture 2 - Properzi rolling mill for 17 mm copper rod at Tashkent Cable plant (the last 8 stands had been removed from the mill)

To be continued ...

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(as translated by Continuus-Properzi S.p.A.)

of product, only the Prices Committee could decide its price. That's why the USSR economy was based on stable prices. This new Project, after many bureaucratic steps, was assigned to Mr. M. Ioff, Director of Tashkent Cable. In my capacity of Chief of the "Nonferrous Metals Laboratory (soon Deputy Chief Engineer) I was responsible for the technological part of the Project.

In the early sixties I was a member of the official delegation of Soviet Union Engineers and have had an opportunity of visiting some metallurgical facilities in France, in reciprocity with the French Engineers. Thanks to the permission of Mr. Egorov, Head of the Soviet delegation (that was also the Head of the Non-Ferrous Metals Committee of USSR), Mr. Egorov and I visited the OTT Company (France) which produced the rod coilers for Continuus-Properzi rolling mills. I was pleasantly impressed.

Back in Moscow, I participated in the negotiations with the French Company OTT about coiling six different diameters ranging from 7 to 22.5 mm. The OTT representatives didn't want to make a "universal" coiler for all the diameters and instead offered us two coilers: one for small diameters and another for large diameters. After a long discussion between Soviet and French parties we finally convinced them to produce one reel coiler for all diameters.

The line for Tashkent Cable was completed with:

- >> Foundry part: "ILK - 16M" induction melting furnace (16 Ton capacity) with 6 inductors each having 500 kW of power + "ILK - 6" induction holding furnace (6 Ton capacity) + launders. All foundry equipment was made by All-Union Institute of Electro Thermic Equipment (VNIETO).
- >> Casting machine and rolling mill (17 three-roll rolling stands) with ancillaries from Continuus-Properzi S.p.A., Italy
- >> Continuous coiling machine (coiler) from "OTT", France

The line was supported by two additional gimmicks:

First. A tip-over table (provided by Construction Bureau of the Tashkent Cable) – was installed to convey the rod to the manual pinch-roll of the rolling mill. After the first rolling stand has "captured" the rod, the folding table reclined and then tilted down to allow the cast bar to sag for engaging a loop regulator sensor (supplied by Continuus-Properzi) that synchronized the casting machine with the rolling mill.

Second. A rod cooling system, of my own design, was implemented between the rolling mill and the coiler.