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a five-page survey of Czechoslovak communications engineering

the report appears to have been prepared by a person conversant with Bloc communications developments and may have some use as a ready reference.

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Communication Engineering, State of Development

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Communication Engineering

1. The available communications equipment has been improved and further developed.

2. In the first place, transistorization has been carried through very consistently, whereby reductions in dimensions, weight and power consumption as well as optional battery operation were realized in most cases. Regarding the use of semi-conductors, Czechoslovakia definitely holds the first place among all Soviet Bloc countries. The building block principle on the basis of printed circuit plates generally prevails in the construction of equipment, resulting in an increase of reliability and a reduction of maintenance requirements.

3. The trend in world communications towards higher frequency ranges has also been followed - successfully - by Czechoslovakia. Where appropriate high-frequency semi-conductors are not yet available, the Czechoslovakian industries can go back to reliable microwave electron tubes, which are available in sufficient quantity and for all applications (from the "Scheibentriode" (disc triode) to the carcinotron).

4. With respect to development and production, the most important enterprise of the Czechoslovakian communications industry is the State-owned factory Tesla. Whereas research and development have been more and more concentrated in the Prague plants, the Tesla production plants are located in all parts of the country.

5. Within the framework of COMECON decisions, Czechoslovakia is to (and wants to) take over the production of large telephone exchange installations (with the exception of PBXs) as well as of radio transmitters (with the exception of ship radio installations) of all power ratings. So far, only Poland has

announced transmitter building. The Soviet Zone of Germany (Köpenick Radio Plant) has not yet discontinued the production of transmitters, but has considerably limited the production of large switchboards.

Wire Communications

7. Decisive technical advances have not been made in the field of wire telegraphy. The new developments of the preceding year have been improved, their operational reliability has been increased. The crossbar system, which, in 1962, was first employed in the PAX USK 5/25/4, is now also being used at post office exchanges. Moreover, this system is on the way to be introduced in the exchanges used for the transmission of radio and television broadcasts.

8. The Tesla audio-frequency long-distance dialling system DVT 54 (four-wire circuits without attenuation from branch connection to branch connection) for two-way automatic through and terminal traffic (audio frequency 2,280 c/s) between railroad central and branch telephone offices was improved, too. Since recently, push-button switches have sometimes been installed in railroad telephone installations instead of dials.

9. The satisfactory tests made in the preceding year with purely electronic dialling systems seem to have been discontinued. The test models have disappeared. Only the prototype of a semi-electronic ringing and signalling installation was shown. However, in the fall of 1963, no decision had yet been reached whether this installation was to be produced in series.

10. In Czechoslovakia, telephone and telegraph long-distance dialling between cities (through dialling), at present, only exists on a small scale and is of experimental nature. A system for automatic through dialling from one country to another is under construction - at present between Prague, Warsaw, Moscow and East Berlin. The East Berlin exchange, which was designed by Czechoslovakian experts and equipped with Tesla installations, is to be completed this summer. The Warsaw exchange will probably be completed in the fall of 1964. The Moscow and, at last, the Prague exchange will follow. Tesla hope that it will be possible to start official through-dialling traffic between the above four cities as early as in the fall of 1965.

Carrier-Frequency and Radio Engineering

Some developments and improvements, above all in the modernization of tube complement, can also be mentioned, although they are not very important, in the field of remote-action techniques and carrier-frequency transmission via high-tension lines (LW telephony). Still most frequently used, however, is the well proven and reliable single-sideband system JVT2 (Tesla). On the low-frequency side, the JVT 2 can work with dynamic compression and/or expansion, thus attaining a very high signal-to-noise ratio. Due to their circuitry, all Tesla E. systems require only about half of the frequency width of other systems, including some Western equipment, and, at the same time, can carry even more remote-action channels.

Partial transistorization is still in the experimental stage with the Tesla remote-control units DSO 1 and DS02. It has not yet been completed.

For the transistorized carrier-frequency telephone system KNK 6, Tesla transistors are now used instead of imported transistors (partly from Japan) installed until recently.

The radio relay installation MT 11 A (frequency range 8,050-8,650 Mc/s, transmitting power 100 or 600 mW) and the radio broadcasting multiplex system RM 22 (carrier frequencies: 3,3 - 3.9 - 4.5 - 5.1 - 5.7 - 6.3 Mc/s), which were introduced as novelties, were already available as prototypes in 1962. However, series production (with some technical improvements) did not start before the spring of 1963.

The radio relay system DT 21, which is in use with many radio relay links, is to be replaced by the successor type DT 22, the prototype of which was shown by Tesla in Brünn. The new installation is said to be more powerful and able to link distances of up to 100 km without the use of a relay station. The DT-22 installation is designed for automatic operation. Up to four unmanned relay stations can be reached and remote-controlled by one control station.

A genuine novelty is the ZVP-4 receiving installation with automatic volume control. This double-diversity system, which was shown as a prototype, is designed for the types of service A1 to A4, F1, F4 and F6 and covers the frequencies from 1.5 to 30 Mc/s in six ranges.

Radio Broadcasting

In Czechoslovakia, as in all other countries, transistorized broadcast receivers are very popular. In the fall of 1963, however, production could not always satisfy the demand, because HF transistors were not available in sufficient quantity. The available production output was first of all used for non-private equipment, and only the small remainder of HF transistors was then released for broadcast receivers. There are, however, some models of portable receivers whose HF stages are equipped with imported transistors, mainly of Japanese origin. The production rate

is poor, as, due to the foreign-exchange situation, the allocations of imported transistors are very limited. Thus, transistorized radio receivers are hardly available on the market. However, there is good reason to believe that the bottleneck will have been overcome by the summer of 1964: in Rožnov additional production lines are being installed to speed up production of HF transistors.

18. In addition to six transistorized pocket and portable sets, a transistorized table set is manufactured in two models, differing in their frequency ranges. A small percentage of these table sets is equipped for VHF reception.

19. The new pocket receiver 2810 B for HF, MF, LF and VHF operates with nine transistors and five diodes, the output power being about 750 mW. The dimensions are 27.5 x 16.5 x 8 cm. The new pocket receiver 2809 B for HF, MF and LF operates with seven transistors and two diodes, the output power being 750 mW. The dimensions are 28 x 17.5 x 7.5 cm. The smallest transistorized set available (22 x 16 x 6.7cm) is the model 2803 B for MF and LF, equipped with seven transistors and one diode.

20. The long-frequency range of all receivers, including the non-transistorized types, lies between 800 or 1,000 and 2,000 meters, the medium-frequency range generally between 187 and 570 meters. High-frequency sets operate in a band ranging from about 19 to 72 meters. For receivers with two high-frequency ranges, separation is at about 37 meters. Sets with only one high-frequency range preferably operate between 17 and 50 meters. VHF devices are designed for a reception range between 4.1 and 4.58 (or 3.43 and 3) meters.

21. All broadcast receivers are products of the Tesla plants. In their basic circuitry as well as their receiving power they are approximately equal to the standards of the corresponding Western units. As a rule, finesse in circuitry and special tuning aids are not provided, whereas the mechanical quality is good. All portable transistorized sets are too big and too heavy.

22. A negligible portion of the receivers is exported, above all to the Middle East. A small number of mains receivers is supplied to Federal German department stores and mail order houses.

4. Television

23. What was said before about the Czechoslovakian broadcast sets, is, more or less, also true for the Czechoslovakian television receivers, which are built in six models, also exclusively by Tesla. In their basic circuitry as well as the shape and finish of their cabinets, the Czechoslovakian television sets are similar to Western designs and patterns. The mechanical quality and the layout are, more or less, of the same standards as Western products. However, partial transistorization of the circuits has not yet been started, and the television sets, like the broadcast sets, are lacking

every finesse in circuitry and all extra tuning aids. The receivers are built with 12-channel selectors in accordance with CCIR or OIR Standards. About half of them are equipped with 43-cm picture tubes, the other half with 53-cm tubes (deflection 110°). At present, 59-cm tubes are not envisaged.

24. For television studios, Tesla developed a camera chain of very high standards regarding circuitry and mechanical quality. This camera chain includes: superorthicon camera TKO 401 with electronic viewfinder, lens turret and aperture are provided with remote control; camera control unit TJK 401 supplying two blanking and synchronizing signals of 1 V_{sn} / 75 Ohm and two video and blanking signals of 0.7 V_{sn} / 75 Ohm, power pack TNX 401 for the camera and the control unit. The first development model of the camera had already been built in 1962. Production of all three units was started in the summer of 1963.

25. The synchronizing-signal generator TGS 401 for outside broadcasts and television studios and the monitor TMO 401 are also new developments. The TGS 401 generates line synchronizing, equalizing and video synchronizing pulses as well as horizontal and vertical blanking pulses.

26. Although all the afore-mentioned equipment was primarily developed for instalment in the television O.B. van of type TQP 601, it can be used for stationary studios as well.

27. The electric and transmitting equipment of the television O.B. van TQP 601 was considerably improved during the last year. Eight vans of the modified type have already been completed, another five are being built.