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SELECTED TRANSLATIONS ON TELECOMMUNICATION IN EAST GERMANY

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SELECTED TRANSLATIONS ON TELECOMMUNICATION IN EAST GERMANY

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TRANSITION TO TOLL-LINE DIALING

Die Deutsche Post
(The German Post)
Vol. V, No. 1, January 1960, Leipzig
Pages 7 - 12

Rolf Albers,
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Ministry of Postal
& Telecommunication
Systems, Berlin (MPF:
Ministerium fuer Post-
& Fernmeldewesen).

The V. partyday of the SED (Sozialistische Einheitspartei Deutschlands: Socialist Unityparty of Germany) established the direction and basic aims for the national economy until 1965. On this basis the Seven Year Plan was worked out and resolved on by the Peoples Chamber on Oct. 1st 1959. Thus it becomes possible to create the material-technological basis for the victory of socialism in the DDR (Deutsche Demokratische Republik: German Democratic Republic) and to satisfy ever better the growing demands of the population.

In the Seven Year Plan it was determined also, that the German Post Office has to increase communication capability in 1965 to 126% of the 1958 level. At the end of the Seven Year Plan 80% of the national and international telephone system is to be carried on without waiting period by means of reconstruction of the cable grid and through the employment of semiautomatic and automatic exchanges. To achieve this, the MPF provided increase in the installation of self-dial service (SDS). By 1965 at least 45% of the telephone service is to be automatic.

SDS can not be introduced suddenly, but only in gradual transition. Here for some time hand-operated and selfdial service will exist side by side. The most economic method of transition is to be found. All measures do however have to aim at the final goal, i.e. later reconstruction is to be avoided, be it for reasons of inexact planning or lacking anticipation of future development.

DEVELOPMENT

The German telephone system originated under auspices of hand-operated service. Service was exclusively by preplaced calls, so that an efficient use of cables resulted. The necessary waiting time was accepted and one achieved communications with relatively few lines, so that the investment in

lines and exchanges was limited. Time-consuming and costly was the transit service, i.e. the establishment of connections involving several interchanges. To minimize this traffic, one installed, wherever possible, direct lines, thus creating the strongly branched mesh.

Soon however, dial systems entered the toll service. In 1923 already, in Weilhoim, Bavaria, the first automatic toll exchange of the world was taken into service. To form this net group as this form of automatic toll service became known, the local nets belonging to it were collected together (fig. 1) and the exchange of the largest and most important net was elevated to become the net group main exchange. The net thus was star-shaped. Because of the increased grouping of the current paths inherent in the star net, individual lines are better loaded. It was therefore possible to manage, as a result of careful calculation of traffic, with an only minor increase of current paths. The advantages of the net group technique led to the introduction of numerous further groups in the following years. Within the DDR the net group combine of Halle is best known, there are also groups in Weimar, Rudolstadt etc. A number of groups, some of them very large, exist also abroad.

The expansion of net groups was however limited for a number of reasons. For the general introduction of nationwide SDS it is therefore not suitable and new paths had to be entered toward this goal.

After lengthy examination one decided upon SDS with counting during the call. When complete, each subscriber in the DDR is to be able to contact any other subscriber in the DDR by SDS, regardless of location. This corresponds to the known principle of local dial service, extended to toll traffic. This state of automation is generally denoted as "National Dial System".

Transition from manual service to SDS proceeds in various stages. The first stage consists in the introduction of semi-automatic traffic, bringing about service substantially free from waiting time (fast service). The transit selection was a further step toward the simplification of service in toll exchanges, bringing faster connection. The next stage now undertaken by the German Post Office (GPO), is the introduction of SDS on the level of area exchanges (AE: Knotenamt), using the technology Ia, to be described in the next section. The main exchanges, which are to be equipped with modern

coordinate switches in place of the present selectors, form the final phase toward automation of the telephone system in the DMR.

In the fully developed SDS net, three levels are envisaged; the level of the final exchange (FE), the area exchanges (AE) and the main exchanges (ME). Here the AE's correspond roughly to the transit exchanges, and the ME's to the toll exchanges, (according to fig. 2 and 3). According to present selection grid plans, 13 ME's and 200 AE's are to be installed. Since the ME's are inter-connected and in part take over the function of central exchanges, no central exchanges are required. The final exchanges are star-connected to the corresponding area exchange, the AE to the respective ME, whereby liberal connections between AE's are to be provided. (More about the network may be found in the essay by W. Kuntze: "Fundamentals of the SDS net" in the "Mitteilungen aus dem IPF" special issue "The net for SDS" 1958, page 9, so that further details are not necessary.)

The first AE's become particularly economical, if very soon neighboring regions are likewise automated and inter-connected. Through such measures it becomes possible without particular outlay, to automate up to 75% of the total traffic during stage I. There remains however in any case hand-operated service, which makes toll exchanges a continued necessity.

To unify and simplify tariffs, only 3 tariff zones are provided for SDS (see "Directives for telephone-toll arrangements" addendum to 3,4, 1959, GSI. I, No. 29, dated 12.5.1959, page 446). Thus it became possible to depress costs for the accounting apparatus (counting during the call) and keep them small compared to net group methods (counting after the call by means of a time zone counter).

The following tariffs were established:

zone I = 60 sec.

zone II = 20 sec.

zone III = 10 sec.

Zone I comprises the FE's of one respective AE and the neighboring AE's, independent of their ME dependence.

Zone II comprises the FE's of the respective ME and the neighboring ME's where ever the tariffs of zone I do not apply.

Zone III comprises all remaining FE's.

The limit of the AE and ME regions are to be determined by the GPO.

Counting is done by time pulses (D.C. integrating pulse), which - inaudible to the participants - are impressed upon the counter of the caller. There they are read together with local calls. Counting of tariffs in the SDS begins when the callee lifts his receiver and thereby initiates the first timing pulse. The second pulse occurs at the earliest after 30, 10 and 5 seconds respectively in zones I, II and III. A limit upon the time of call is not provided, likewise there is no 3 minute limit on the tariff as there is on the hand-operated service. If the caller, despite the possibility of SDS, chooses to register his call with a toll exchange, his call will be treated and charged as an urgent one, providing SDS has been available in this area for at least 3 months.

CONSTRUCTION STAGE Ia

The technology for this stage had its forerunner in the FE's Schwerin (1956), and Gadebusch (1958, fig. 4). In the essay of M. Zinke "Experiences with SDS in the district Schwerin-Mecklenburg", which was published in No. 9, 1953, of the "Deutsche Post", both of these exchanges are described, both are experimental and were erected to collect experience with SDS. While the AE Schwerin is still equipped with relays selectors, the AE Gadebusch contains motor selectors. In the latter exchange, central members I and impulse repeaters were used. The grouping in both cases is adjusted to a local conditions and does not correspond to the present numbering plan.

Typical for the SDS in stage Ia is counting during the call. Thus, in place of the complicated timesone counters, counting will be done by simple counting transformers, respectively counting pulse generators.

Stage I employs a 2 wire system. Only during the latter extension to national SDS, the AE's will be provided for connections to higher net levels with 4 wire systems. This will apply in the first instance to particular groups of AE's.

To select a callee in another FE, the first number to be selected is 0, this is the separation number, through which the local exchange is bypassed and the AE selected.

Then there follows the AE number, which may consist of 2, 3 or at most 4 numbers. The traffic separation number applies to every MDS call and is always a 0. In the following discussion, this number will be disregarded.

For clarity, the individual digits in the AE number are labeled in their sequence A, B, C, D and E. The first digit thus is A, the second B and so on. This simplified the explanation of the task of those figures materially.

In laying down the FE numbers, one started with the consideration that for FE's with heavy service a short number is practical, while a longer number is permissible for FE's with low traffic. Therefore the FE's, located near a main office (FE1) as a rule those near a district capital receive a 2 digit number, consisting of AB. FE's with lower traffic will have numbers A, B, and C. Most FE numbers will however include A, B, C and D. For A digits 3 to 9 only are available, since step I is reserved for subsidiary services, step II for local traffic and step O for manual traffic (toll exchange). Following the number 2 as the local separation figure, there will be one or two further numbers, according to the number of FE's belonging to the group. If there are not more than 10, then the local characteristic number will consist of two digits. For 11 to 19 FE's, it will consist of A, B and C. In the latter case B will always be a 2. The FE situated at an AE or ME will principally be selected by 1 as the last digit.

The technology of stage Ia envisages the following selection steps:

AES (area exchange selector)

Each FE connection, going away from an FE, is permanently assigned an AES. It evaluates the digit A and is located at the AE.

CGS (central exchange group selector)

It evaluates the digit B, which is repeated in the AE from the central number 1, in order to identify the ME row respectively the subsidiary services in the ME and is located at the ME.

MEGS (main exchange group selector)

It evaluates digit C and is located at the ME or AE.

AECS (area exchange group selector)

It evaluates digit D and is located at the ME or AE.

FEGS (final exchange group selector)

It evaluates digit D or C and D where an AE has more than 10 FE's and is located at the AE.

IGS (local group selector)

It selects the local number.

MS (mixed selector)

This collects a cable strand.

TSGS (toll service group selector)

It is reached by dialing 1 from the AES and selects subsidiary services.

The following equipment is provided for accounting:

CM 1 (central member 1)

The CM 1 are connected to the CIG (Counting impulse generators) via a feeler relay. They store and evaluate the selection pulses and pass these on after frequency- and ratio-adjusting them. The evaluation of the selection pulses is done in order to choose the correct tariff zone in the CIG and to correctly adjust the direction switch of the CIG. To this end the first digits (B and C) of the AE characteristic number are utilized at the CM 1. The CM 1 has a further task which will be entered into here.

CIG (counting impulse generator)

These are entered in the channels behind the AES of the characteristic numbers of the branch paths and subsidiary service. In cooperation with the CM 1, they take over the reception and transfer of the selection pulses as well as the return pulses. They transfer the counting pulses corresponding to the respective tariff zones.

CT (counting transformer)

These are entered in the channels behind the AES belonging to the local service and partly of the branch paths as well as subsidiary services. Their task is the acceptance and transfer of the selection impulses. The transfer of the counting pulses as well as the evaluation of the return signals. They do not permit individual counting, since an individual evaluation of the counting does not take place. The time signal of a particular zone is permanently assigned to them.

PG (pulse generator)

It generates the pulses necessary for counting, corresponding to the tariff zone for night and day rates.

Stage Ia permits AE's with two methods of grouping:

1. Service via characteristic numbers and branch paths. (fig. 5)

After selecting 0, the caller is placed onto a AES. In the AES channel 1 (subsidiary services), CIG's are selected with CML. These serve for distribution and direct the traffic to the SGS in the ME or to a TSGS in the ME. Through dialing 2 (local traffic) the service is directed via the CT's with fixed distribution to the LGS. The first LGS is mainly used for neighboring AE's, the second is used for the FE's of the AE region. The terminals of the second LGS are to agree with the AES, in order to maintain as far as possible uniformity of the numbers.

The service to the corresponding ME goes over a channel, here denoted with "X₁". First a CIG is occupied by a CM 1. The CM 1 now repeats the characteristic digit A and occupies the CGS in the ME. If the FE's of the own ME are dialed via direct branches, then the MEGS in the AE is occupied and the CML suppresses digit A.

Over the channels X₂ and X₃ other ME regions are dialed via characteristic numbers. Via the directing number 0 the toll exchange is reached. This may be a day exchange, i.e. one which is out of commission at night and whose tasks are then shunted to another exchange (usually in the district capital). The exchange could also be a permanent one at the AE, which is generally desirable, the AE is constructed without a remainder toll exchange and the remaining hand-operated traffic is routed via the nearest major toll exchange. Remainder toll exchanges may stay, where they are, actually remainders of existing toll exchanges. Under no conditions are new remainder exchanges to be constructed.

The connections, which come from the ME's and the inter-mediating exchanges, end directly in the EFGS and so do the secondary channels of FE's of neighboring AE's and those of neighboring ME's.

The FE of the AE must be reached in local service, since higher tariffs are collected, when the characteristic channels are used.

2. Traffic along branch paths only (fig. 6).

In contrast with the AE, described above, with service via characteristic numbers and branch paths, the AE with traffic over branch paths only possesses CIG's and CMI's, it is therefore simpler in construction. The later incorporation of the dial system with CIG's and CMI's is however entirely possible. The FE's of the corresponding AE region are reached by means of channel 2, the neighboring AE's are reached over a free channel X_2 of the AES. A subsequent alteration of the characteristic number in this part of local service may therefore become necessary. In the AES channel X_1 , MEGS are reached via CT's, which lead to direct branches to nonneighboring AE's of the own ME region, providing these lie in the same tariff zone as the FE_M .

Dialing of the manual toll exchange is done essentially as described under 1. If more than 10 FE's (up to 19) are to be connected to an AE, then a second FECS is placed behind the first and may be reached from the first MEGS by means of step 2. The collection of all channels of all AES is however only possible, when the twostep AE forms a tariff unit. If that is not the case, corresponding groups have to be formed.

Each AE, as described in 1, automates about 6.5% more of the traffic than those described under 2, costs however from 18 to 25% more. To this must be added, that the 6.5% can not always be fully utilized, because the necessary conditions are not always fully met at the destination. The AE's, described under 2, with traffic over branch paths only, therefore constitute the most economic solution and are to be used as a rule. The AE, described in 1, can operate only together with an ME, these would therefore be required already in the first phase, which will not be discussed here. In the literature and language one often finds the concept "Intertownservice" or "Towndistancedialing". This refers to SDS between two local nets, not belonging to a AE. The technology to be used is always hazily understood. We therefore attempt to elucidate the concepts.

It will not always be possible to automate all of an AE region at once. Now to avoid extensions of toll exchanges while yet improving service, one provides in such cases SDS only between 2 FE's of the AE, the remaining FE's follow suit, as soon as conditions are suitable. Similarly SDS may be established between 2 FE's not belonging to the same AE.

These may or may not be neighboring. In this case, the AE belonging to each FE is to be erected and the two are to be connected by branch paths. Town-distance-dialing is thus only a connection between 2 AE's, each of which has only 1 FE connected to it. Usually these will be the FE's, since most traffic goes to these. In practice one will, wherever possible, include more than one FE into the SDS in each AE region; because if one builds a complete AE, then 1 or 2 further FE's increase the cost only minutely and are in any case quickly amortized.

The connection of the 2 AE's is done as described under 2, i.e. service over branch paths. A change in local code is however in general not avoidable, when the ME's are constructed and the branch paths are changed into characteristic number paths. It must be carefully examined therefore, whether the initially cheap method is to be used, since it leads usually to later changes.

These difficulties do not arise, if from the beginning characteristic numbers (with complete numbers including the ME code digit) are installed. This is mainly recommended for connections between AE's of different ME's. In this case one AE (usually the AE₁) has to undertake functions of an ME. The AE's here have to be equipped with CIG and CGL. If the final AE lies in the same ME region, but is not neighboring, then it is, according to the scheme, brought to the AEGS as a branch path connection. "Town-distance-dialing" is to be introduced wherever there is lively service, i.e. mainly to the district capitals and above all from there to Berlin. In this way the toll exchanges can be substantially relieved and large sections of the service can be automated. But also between smaller communities, "Town-distance-dialing" may be economic.

So called "Town-distance-dialing", or better, SDS, between particular FE's is an important intermediate stage along the road toward general SDS and should be undertaken on a generous scale, because relatively small means are required and because substantial improvements in service are effected. As major objectives SDS is projected first between Berlin and Cottbus and Berlin and Dresden.

In this connection it still needs to be pointed out, that the concept "District-service" or "Automatic District-service", which unfortunately has found favor with many colleagues, is misleading. SDS in the AE region is not

bound by districts. Principally, an AE in each district was desired, but for a variety of reasons, which would lead too far afield, exceptions were permitted. The expression "District-service" should not therefore be used and should disappear from official literature. To bring about uniformity of code numbers for subsidiary services, the following were established for SDS:

0111	empty
0112	empty
0113	telegram service
0114	telephone customer service
0115	empty
0116	(recorded) announcements
0117	malfunction service
0118	information service
0119	timer service
0110	empty

In the large community grids, in which f.i. subsidiary services already exist, it is possible to manage with two digits. It is still to be determined, to what extent this may be maintained, when introducing SDS. The new empty numbers 0111, 0112, 0115 and 0110 are provided for later services and may not be used for other things. The emergency services 110 (police), 112 (fire), and 115 (DRK: Deutsches Rotes Kreuz: German Red Cross) are not to be confused with the above mentioned, have purely local character, are integral part of the FE and need no separation digit.

It is intended to conduct international service over the number 0311. The introduction of semiautomatic international service requires language groups in the foreign service exchange, for which additional digits are required.

REMAINDER LDE'S (Long distance exchanges)

The introduction of SDS will entail fundamental changes in the operational methods and in the layout of long distance exchanges. The decisive factors are dial-service and the type of the remaining traffic at the LDE. The number of such exchanges will decrease substantially. The remainder LDE's will be adjusted technically to the new conditions. The following conditions may be regarded as resulting from SDS:

- Caller establishes his own long distance connection as a rule.
- Sufficient cables are available.
- The LDE is required in special cases only.

By suitable measures it is to be achieved that callers actually do establish their own connections. It certainly must not become the custom for callers, to establish their calls through an LDE for reasons of convenience, where possibilities of SDS exist, since this would make impossible the savings in LDE equipment and personnel. The LDE employs the same channels of connections as the caller. In this way preregistered calls are giving way to instant connections. Transit- and incoming calls no longer arrive at the LDE, since in full automatic service no manual operations are required for these.

The LDE's are therefore much simpler. The incoming, and transit desks disappear, only the A-desks remain and handle the entire remaining service. The registering exchanges become uneconomical already, when "Fast Service" has reached a certain extent and may be removed. An important question for the economy of SDS is the best size of the remainder LDE's. In the region of the DLR there are at present LDE's with 2 to 150 long distance positions. This situation arose organically out of the development of telecommunications; wherever for reasons of completeness of the grid it seemed necessary, a long distance exchange was installed. During the introduction of SDS, these varying sizes of LDE's must be unified and it must be determined right from the beginning of the transition, within what limits the number of positions must remain.

Investigations in a series of LDE's have shown, that optimal performance occurs for 40 to 80 positions. This means that LDE's should be projected in the plan, wherever such numbers are the requirement. The service, conducted over the remainder LDE, will be largely of a difficult kind. Simple connections will be made by the caller himself, if only for reasons of economy. There remain therefore primarily calls, which are connected with a particular type of work (XP-calls: (Person to person?), R-calls: (Government?) and others). Furthermore, in case of emergencies, the LDE has to take over the entire service. The personnel will therefore on the average deal with more difficult tasks than before. It is therefore important to prepare the future telephonist for her task. She requires not only operational, but also technical knowledge, to enable her to fully exploit all possibilities, offered by the automatic toll system. The level of knowledge of all exchange personnel has to be raised.

FINAL CONSIDERATIONS

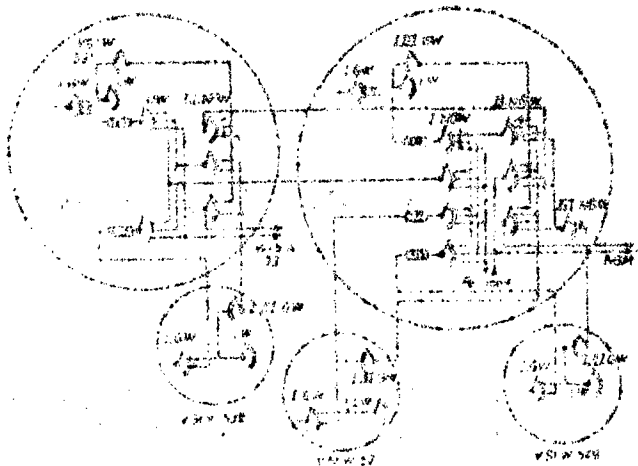
The speedy introduction of full automatic service is a prime task for all telephone workers. SDS has priority at economic centers and at grid points, already possessing some of the conditions for it. Here, effective improvements are quickly possible and noticeable advantages over present service accrue to the user. Introduction of SDS, particularly the later extension to 4-pole and switching techniques, requires also higher qualifications of the colleagues, charged with the care and maintenance. Measures have to be taken therefore, to acquaint them with the new technology.

As a result of sensible cooperation of all concerned, the full automation of long distance service can be carried out fast and free from friction. Here a significant contribution to socialist reconstruction of telecommunications will be made, permitting a significant increase in productivity.

exchange 53

netgroup central office (NOM)5

Figure 1: Schematic of a netgroup.



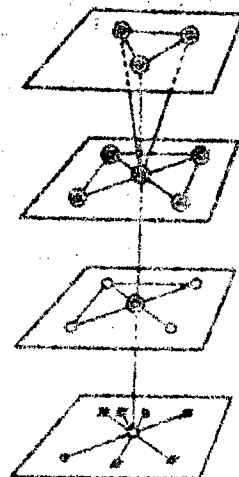
Level of the transit exchanges (completely interconnected)

Level of the intermediary exchanges (largely interconnected)

Level of the final exchange (sparsely interconnected)

Local level (not interconnected)

Figure 2: Levels in manual exchange operation



Level of main exchanges (partly with central exchange functions)

Level of area exchanges

Level of final exchanges

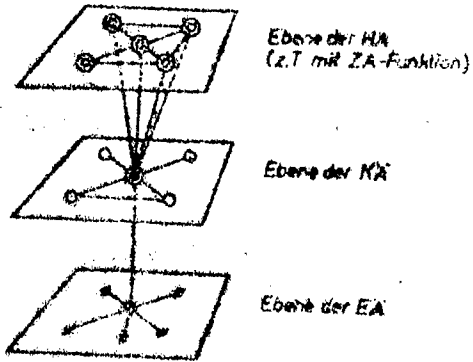


Figure 3: SDS-exchange levels

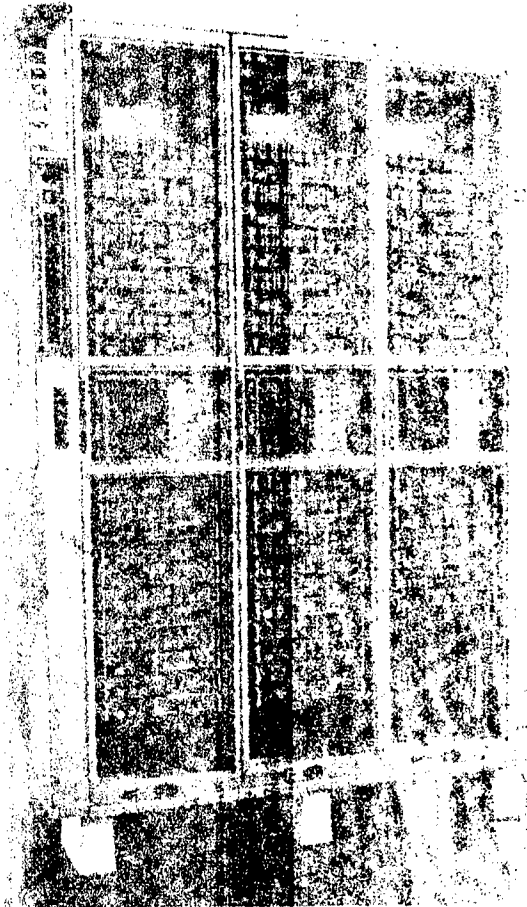


Figure 4: View of the time pulse generator in the AE Gadebusch

(cabinet doors removed); (photo by IPF)

x_1 code digit "A" of the own ME code number

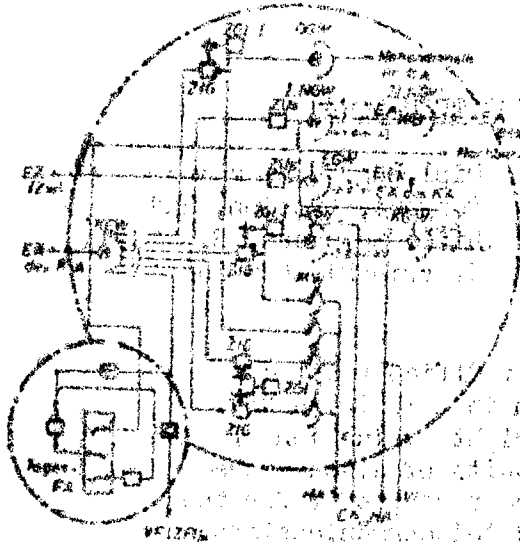
x_{11} code digit "B" of the own ME code number

$x_{2,3}$ further ME code digits

*) connections to non-neighboring AE's of the own ME

*) neighboring AE's

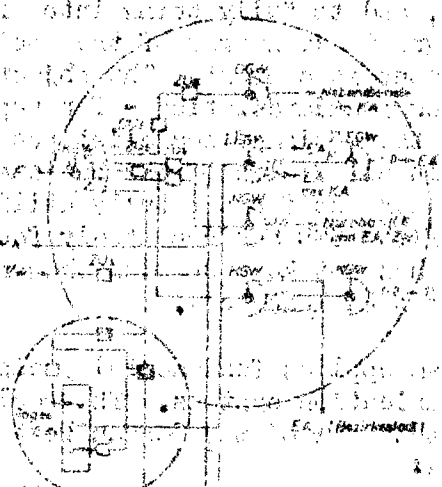
Figure 5: Service via area codes and branch interconnections (AE with at most 10 FE's)



- x_1 code digit "A" of the own ME code number
- x_{11} code digit "B" of the own ME code number
- x_2 at present not utilized code digit of another central office region

- 1) branch connections to the AE's of the own ME, where these lay in the same tariff zone as the EA_H

Figure 6: Service only via interconnections (AE with at most 19 FE's)



STANDARDIZATION AND SOCIALIST TEAMWORK

Die Deutsche Post
(The German Post)

Vol. V. No. 1, January 1960, Leipzig
Pages 5-6

Dipl.Eng.Econ. Heins
Bergart, Dresden, and
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Many employees of the German Post Office visited the Educational Show of Standardization in Leipzig in Nov. and DEC. 1959. Now it depends on the right evaluation of stimulations received there and the results of discussions in offices and workshops to draw the greatest profit for the future standardizing work in postal and telecommunications.

The most important condition for the concentration and specialization of the production, the mechanization and automation is the socialist standardization. It must therefore be one of the first measures for the socialist reconstruction. With its help, especially through the "Development of Standardized Products and Technologies of Building Units and Building groups" (as called in the resolution of the 5. party day of the SED) (SED: Sozialistische Einheitspartei Deutschlands: Socialist Unityparty of Germany) is it possible to slowly conquer the deviation of production (into small units), which we regard as the inheritance from the capitalist past, and to fully bring into effect, also in this field, the great advantages of the socialist order of society in the economic contest. The objective conditions of an embracing standardization - far superior to capitalism- are, on the basis of socialist production conditions- to be found in all fields of the national economy. These possibilities were so far not fully utilized. The Central Committee of the SED has repeatedly found that the standardization has not kept up with the speed in the development of the national economy.

This criticism applies fundamentally also to the postal and telecommunication systems. The neglect of standardization in the area of the German Post Office has primarily two causes:

Up till now many were of the opinion that the standardization for the German Post Office is of minor importance because

communication systems - in contrast to industry - do not produce real articles. For this reason the knowledge of the problems of standardization is still lacking in the offices, plants and also on the management levels.

Standardization and uniformity of types was hitherto regarded largely as a technical-organizational task of the small staff of standardization agencies.

Since these concepts are wrong, the following important tasks arise for the German Post Office in this field:

1. Establishment of technical specifications and quality demands for industrial products of assigned type.

The German Post Office is a main user of certain kinds of products. Through rationalization of types of technical installations used by postal and telecommunication systems, such as instruments, building blocks and materials, it can contribute significantly to an improved utilization of the capacity of industry and a consequent reduction in cost of the products. This results in a saving for the German Post Office in investments as well as in simplification of procurement and the stocking of parts, which in turn results in a lowering of the operating capital.

Through the establishment of technical and quality specifications as standards in this field, the German Post Office must contribute toward directing the development and construction of industrial production toward the latest state of the art. Thereby a high quality of installation is assured and socialist reconstruction of postal and telecommunication systems on the basis of the highest scientific and technical progress is guaranteed.

2. Standardization of working methods, test-and measuring procedures and technical processes.

Through the widespread cooperation within the postal and telecommunication systems it follows that offices and plants have to employ uniform methods. The procedures laid down by official directives-as a rule in a binding manner- however, no longer suffice for present requirements in all cases. The stormy development of communication technology requires employment of modern installations and with it the development of new technical processes, f.i. in the telecommunication construction as well as in the use of mechanical devices in the postal and telecommunication service.

Only the exact determination of a rational technology enables the establishment of technically founded work standards, standards of material use and standards of financial cost.

By means of technically correct standards a good quality of performance is guaranteed and the operational reliability of the installations necessary for the performance of communication services is likewise guaranteed by the establishment of measuring and test procedures.

3. Standardization of special devices and equipment for postal and telecommunication services.

In all branches of the German Post Office devices are used which have a high technical and economic utility only when standardized in accordance with utility and uniformity. It is therefore necessary that in the construction and procurement of specialized equipment the uniformity of the installation is maintained in order to make possible the interchangeability of individual apparatus and building blocks as well as the increase of capacity of entire installations according to the building module principle.

Under socialist conditions standardization is not only a technical matter, but is based on the broad participation of the workers and upon their experience and suggestions. Through standardization productivity is increased and our living standard raised, so that there is a close connection between personal and social interest. In order to bring about a change in standardization it is necessary to conduct the politico-ideological argument concerning the basic questions, nature and importance of socialist standardization, also in the offices, plants and scientific centers of the German Post Office.

Similar realization resulted also in standardization in other fields of the national economy. For this reason the "Educational Show of Standardization" was carried out during the months of Nov. and Dec. 1959 in Leipzig upon suggestion of the Polit Bureau of the Central Committee of the SED. Its goal was to arouse in our workers an understanding for standardization and to show them that the decisive means toward accelerated standardization is socialist cooperation.

Together with 500 000 workers 2000 postal employees studied the show. It is now important that the delegates communicate the knowledge gained to all postal employees in order to work out suggestions for the improvement of standardization,

in their area through discussions and consultations in all offices. Recently measures were taken for enforcing socialist style of working in the postal field. Thus was established the basis for a close relation between management and employees and their education to take part in shaping of production founded on socialist cooperation. The demand of the hour is to utilize the wave of readiness to take active part in the solution of our great tasks.

The exploitation of the educational show can take many forms:

P r o d u c t i o n C o n s u l t a t i o n s

Problems of standardization are to be discussed in production and cost conferences in accordance with the conditions and possibilities of the respective field of activity.

The result of these discussions is to be utilized in the regular production meetings and technical-economic conferences in cooperation with the technical-economic counselors of the BPF (Betriebe des Post- und Fernmeldewesens (?): Operational plants of the postal and telecommunication systems). These authorities have to condense the suggestions of the workers according to the three fields (post and newspapers, telephone and teletype system, radio and television) and further within these fields according to the complex task of standardization in postal and telecommunication (technical specifications and quality requirements for industrial products, technical processes, special devices) and then to discuss them in a meeting at the district level.

These sessions, to be held for the exploitation of the standardization show, should form the basis for the overhaul respectively the new formulation of the standardization plan 1960.

I n v e n t i o n - a n d S u g g e s t i o n S y s t e m

To further technical progress in postal and telecommunication systems, district offices for the suggestion- and invention system were instituted and suggestion experts and delegates in offices and plants were charged with the maintenance of certain tasks in the field of standardization. These collaborators have to support the managements in cooperation with the plant party organizations of the SED and the mass organizations in the politico-ideological enlightenment and education.

The inclusion of standardization into the invention- and suggestion system is important because of the stimulation of the workers and their suggestions, which result in working out standards and are of economic utility, and which are essentially improvement suggestions.

Furthering of standardization by collaborators in the suggestion- and invention system depends largely on how the workers are orientated with regard to the importance of socialist reconstruction in their field of work as judged by the central coordination of subjects. In this way complex standardization is assured to proceed along the reconstruction plan.

Research Working Groups and Working Groups of Socialist Work

There is a close connection between research development and standardization. In future no research or development may take place, which does not simultaneously solve problems of standardization. To satisfy this requirement much can be done by the working groups in research and socialist work. The voluntary cooperation of production workers, activists, inventors, scientists and members of the technical intelligentsia in socialist working groups makes possible the solution of concrete tasks in the shortest time. A pressing measure is therefore the inclusion of standardization into the tasks of existing or newly arising working groups.

Cooperation with the Chamber of Technology

The Chamber of Technology is the carrier of socialist community work in questions of standardization. The leaders of the technico-scientific centers, the BPF and the offices and plants must therefore maintain a close connection to the plant sections and professional groups of the Chamber of Technology, in order to utilize the experience of the 80,000 members of that organization in furthering standardization in the postal and telecommunication systems. This is true particularly also for technical engineering consultation and training.

Training and Qualifications

Standardization must be placed in the fore more than ever as a subject during training and in qualifying new workers. The curricula for professional education and for instruction in

engineering schools and in the highschool for traffic as well as those for qualification training are therefore to be examined by managements to see if they meet this demand.

C e n t r a l G u i d a n c e a n d C o n t r o l

The central organ for coordination of standardization in all realms of the postal and telecommunication system is the Central Office for Standardization of the German Post Office. To it falls furthering of socialist community work and the fulfillment of the tasks contained in the plans of standardization. Particular attention has to be paid here to a close link between the technico-scientific centers, such as the Institute for Postal and Telecommunications, the Plant Laboratory for Radio and Television, the Planning Bureau of the German Post Office and so on, on the one hand, and standardization work in the region of the BPF and in special offices on the other. These tasks are to be solved in cooperation amongst others with the technico-economic counsel of the MPF (Ministry for Postal and Telecommunication systems) by exploiting of all available information.

O r g a n s o f t h e P a r t y a n d T r a d e U n i o n

The leader of the economic commission in the Polit Bureau of the Central Committee of the SED, Erich Apel, has explicitly laid down the tasks of the functionaries and members of the SED during his important speech before the secretaries of the national economy-districts and circuit leaderships of the party of the working class- during the Educational Show of Standardization. This example of the new form of political leadership activity must be spread to all institutions of the postal and telecommunication service.

Activity of trade union organs is essentially to be directed toward the improvement in the quality of production consultation. Standardization applies without exception to all branches of postal and telecommunication systems. The workers of the German Post Office, who in practice work day by day with existing means and with partially still varying technological processes, are therefore above all other employees able to give valuable suggestions for necessary standardization of their work. Out of the multitude of possibilities of such pointers, some examples are to be mentioned:

Postal- and Newspaper System

Enforcement of standardized size of envelopes as a

condition for the rational use of letter distribution machines:

- standardization of post office rental boxes in adjustment to the standardized packing in consumer industry;
- standardization of post office installations and furniture;

- standardization of technical processes in the use of mechanical transport- and distribution devices with due regard to technical and personnel safety regulations (f.i. letter and parcel distribution devices, conveyor belts, lifting devices, stamping machines);

- standardization of mailboxes.

Telephone and Teletype system

- Standardization of cables for the different grid levels (limitation of types);

- standards for technological measuring and test services;
- standardization of building blocks with particular regard to miniaturization;

- a standard series for instrument racks and frames for telecommunication equipment;

- standardization of modern technological processes for work procedures in telecommunication construction under due regard of operational and personnel safety regulation (f.i. application of glueing technology, employment of cablelaying machines, pole hole drillers and so on);

- standardization of switchboard connecting cables, dials, terminals and terminal strips.

Radio and Television

- Standardization of the mechanical parts of transmitters (f.i. power supply substitutes and current generators, cooling towers and so on);

- standardization of transmitter building blocks;
- standardization of subsidiary equipment (f.i. measuring and control installations);

- standardization of high structures (f.i. directional antennas)

- standardization of instruments which may find stationary and mobile use.

General

- Standardization of elevated structures (f.i. garages for motor-vehicles, basic types of post and teletype offices of different capacity);

devising of technical acceptance standards and tests for industrial products;
standardization of equipment of tools and machines in shops.

We intended in these lines to provide an answer, even if incomplete, to the question as to how the "Educational Show of Standardization" should be utilized in the plants and offices of the German Post Office. We further point out that the editors of the journal "Die Deutsche Post" as well as the Central Office for Standardization of the German Post are at any time ready to answer further questions.

The standardization must become a concern for all postal employees. It will contribute toward a maximum gain of time in the socialist reconstruction as well as in the solution of the economic main task and the fulfillment of the Seven Year Plan as it effects the German Post Office.

The New Central Office for Toll Line Equipment

Die Deutsche Post

(The German Post)

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Martin Franko, Berlin

The "Zentralamt für Fernleitungsanlagen" (ZAF: Central Office for Long Distance Installations) of the German Post Office (GPO), situated in Berlin, has commenced operation on 1.1.1960. It is a special office of the Ministerium für Post und Fernmeldewesen: Ministry for Postal and Telecommunication field.

The necessity to form this office arose out of the increasing tasks of telecommunication systems in the organization and construction of long distance service. In the execution of the resolution of the Council of Ministers, concerning measures for the completion of work and for the improvement of the organization of the GPO, this area was collected together, in accordance with its political and economic significance, into a single field of responsibility. The resolution of the committee of the MPF of the 23.10.1959, concerning the formation of the ZAF, is based to a large extent on the suggestions of the workers of the VEB (volkseigener Betrieb: peoples own plant) FKAB () and of the Office for Long Distance Grid. They had recognized, that the present organization of work in the field of the main long distance net had remained behind the overall development of telecommunication systems and had to be improved. Their suggestions for improvement of the work started at these points:

- To simplify administration in both plants of the GPO,
- to create clear areas of responsibility,
- to further increase operational safety in the long distance communication grid,
- to execute the extension of the telecommunication cables with minimum cost and according to plan.

At the same time, the present splintering in the work of the technical intelligentsia and the specialists in the telephone service, who were employed in various independent agencies, is obviated and the path has been cleared for true socialist communal work. All deficiencies and weaknesses,

which have become manifest during the work in the past, led to a certain retardation in the construction of the long distance cable network. For some time they were however not strongly felt and were only partially recognized, because there was a certain retardation coexisting in the development and production of communication-technological installation.

All workers, engineers and employees, united in the ZAF, will now struggle united for the fulfillment of their operational plan. The goal of this common effort will be, to construct and operate by means of high productivity, a modern and safe communication network, requiring the least social cost; a network, which should suffice for the steadily rising communication requirements and all the demands of the night of the toilers and peasants. The extension of the grid will simultaneously accomplish important conditions for the introduction of self-dial service within the DDR (Deutsche Demokratische Republik: German Democratic Republic) and abroad.

The workers of the ZAF will however do justice to their future tasks only, if they will continue to operate closely beyond this organizational synopsis with the workers of the district managements, telecommunication offices and telecommunication construction offices, the area of radio and television and the planning bureau of the GPO. At the same time, it will be necessary to deepen the socialist ties, developed to the IPF (Institut fuer das Post- und Fernmeldewesen?: Institute for Postal- and Telecommunication Systems) and the communication industry, and to cooperate with them on all problems arising in this area.

*

Collecting together responsibility and tasks within the GO results in the following advantages:

- a) Uniform leadership and responsibility for project planning, technical planning, projecting, investments and their supervision as well as the execution of construction and installation of the main communication network by a single office of the GPO.
- b) Simplification of administration and consequent saving of unproductive administrative personnel.
- c) Better delimitation of the tasks, which are assigned to the BPF (Betriebe des Post- und Fernmeldewesens?: Operational plants of the Postal- and Telecommunication

Systems) and IPF and the planning bureau of the GPO.

d) Development of cadres and all qualification measures will be carried out uniformly in correspondence to the tasks of the office.

e) The formation of the ZAF provides further means for political education, making possible more systematic and direct prosecution of the tasks of the mass organizations in the party organization of the SED (Sozialistische Einheitspartei Deutschlands: Socialist Unityparty of Germany).

f) Because of the direct cooperation between workers and technical intelligentsia in a single office, a better basis is provided for further development of socialist cooperation.

g) The experiences of the service and technical functions in the main long distance network are passed on to technical planning and construction without the necessity of agreements outside the plants.

h) The entire strength of the toilers and the intelligentsia can be directed better toward the expeditious solutions of central issues and toward the elimination of malfunctions.

i) Conditions were created for a scientific perspective in the development planning of the network.

k) By uniting the three spheres of planning, projecting and execution of construction, the entire process is so simplified, that planning and projecting are carried out in practically one operation with projects corresponding to the requirements of preparations.

l) By close cooperation of the planners with the cable laying operations, the planned cable routes will be more likely adjusted for mechanical cable laying, so that productivity is increased.

m) The expensive and large stock of instruments, which was hitherto needed separately for the technical service by the office for telecommunications and for the mounting by the telephone cable plant, will be consolidated into one rationally employed unit.

n) The section for telephone and teletype has to advise the ZAF. The coordination between agencies, hitherto active in the net, is obviated, and sole attention can be paid to basic questions.

o) An office of the GPO now analyses thoroly and regularly the experiences gained in the operation, construction and installation of the main long distance net for the purpose of improving technical equipment and installation.

The ZAF was charged only with such central tasks by the resolution of the Council of the MPF as are not of a character to make them the responsibility of the BPF

(Betriebe des Post- und Fernmeldewesens: operational plants for postal- and telecommunication systems (?)) and are largely matters of trans-district service.

It includes further working out directives, concerning uniformity in the planning of district nets and for the execution of the operation of long distance service. The responsibility of the BPF for the planning of its nets as well as the conduct of district and trans-district are not thereby restricted, instead the BPF have in the ZAF now a central organ, which supports them in their work through uniform directives.

The ZAF essentially has these four main tasks:

1. Planning, provisional, preliminary as well as detailed, of the telecommunication net.

Corresponding to the numbers confirmed by the MPF for the development of trans-district and interstate tele-communications, ZAF works toward the extension planning of the telephone and teletype net. This includes the provision of modulation for radio transmitters and provision of co-axial cables for television transmission. This is followed by working out details of the tasks and the preliminary planning for complex undertakings under employment of the most modern techniques.

This field of technical construction tasks places high demands upon the ZAF members in the areas of transmission, since the means available for communications have to be largely employed for the network with the view to introducing SDS (self-dial service).

The net comprises the cables with the intermediate and final amplifying sections, respectively multichannel systems, including those conducted over microwave relays as well as long distance connections for the trans-district telephone and teletype services.

The ZAF projects independently cables and technical installations, while the operational service of the GPO will continue its responsibility for planning exchange installations, power supply and buildings. Also the wireless relays for the internal and international service will continue to be operated by the section Radio & Television according to tasks, set and planned by the ZAF.

The ZAF will also be financially in charge of its own projects. To increase the responsibility of the BPF and at the same time endow the ZAF only with central tasks, some of the tasks previously assigned to the AFT (Amt fuer Fernmeldewesen? Office for Telecommunication systems), FKAB and PB(Post Betriebs? Post Offices) of the GPO. In future the the BPF are themselves responsible for the planning of the netgroups and district cable installations within their regions, which are to be carried out in the new FBAE (Fernbezirks Amt? Long Distance Exchanges?).

To carry this work on uniformly and economically, the ZAF will work out the necessary directives and regulations for technical planning as well as for the designing of cable installations, including the necessary technical installations, such as multi-channel systems. Thereby it becomes possible to plan and design district networks in a single operation at the FBAE and to transfer full preparation for investments in this field to the BPF.

2. Construction and Installation of the Main Long Distance Net.

The ZAF will carry on the major part of maintenance and expansion operations in the net. This includes rerouting and installation of cables, the construction of unmanned amplifying stations, of the multichannel systems operating over cables and microwave relays, radio amplifiers and AC-telegraph installations. Further the ZAF will carry out on its own rerouting and laying of marine- and river cables in their own cable-laying ships, as well as the plowing-in of earth cables by means of large cable-laying plows. Special plants of the peoples own economy will be commissioned with the execution of construction work.

The construction of cables in the district net is in future to be done by the newly formed FBAE. Until these however have the necessary prerequisites for this work, the ZAF will continue to build these installations, or at any rate, parts (f.i. installation and equalization of TF cables) as ordered by the BPF.

The time for the take-over of these installational tasks by the FBAE will be determined essentially by the professional qualifications of the employees and the equipment, such as instruments and large cable-laying machinery. Here speed is of the essence, since the change-over of these tasks of the FBAE can save in investment costs, because costs arising in the construction by the ZAF, such as long distances to and

from the construction site, erecting of construction offices, overnight compensation, essentially are eliminated for such district projects.

3. Technical Service in the Long Distance Net.

The technical operation of the net will be carried out as at present by the FMAE (Fernmeldecenter?: Long Distance Offices) with their personnel in amplifying stations and cable measuring offices. The ZAF supports the FMAE in this task by establishing technical directives for the service and the evaluation of personnel. The issuing of uniform directives for the care of cable installations and transmitting equipment forms the basis for economic operations and a condition for maximum operational security for the internal and international long distance net.

The ZAF works out courses and specialist training for the introduction of the latest techniques in the field.

Through courses for the technical personnel of the FMAE and the amplifying stations, concerning operation and care of the latest equipment, the ZAF contributes to the technical education of the long distance net personnel. In the ZAF, all improvement suggestions in installations of the net are processed. It is responsible for the comprehensive introduction of such suggestions.

A further task of the ZAF is the systematic evaluation of malfunctions in the net as a basis for the constant improvement of operational security, economic improvement of the technical operations and improvement of equipment by the development agencies of the telecommunication industry.

The engineers of the ZAF further regard it as their task to aid at any time by means of their well equipped store of instruments their colleagues in the amplifying stations and cable stations in the location of complicated disturbances.

4. Central Regulation of the Operation of the Long Distance Lines.

The ZAF has been given important tasks for the regulation of the operation of long distance lines. These will be taken care of by the newly formed ZFB (Zentrale Fernleitung Betriebstelle: Central Long Distance Line Operational Office).

The area of tasks extends to the regulation of operation of all long distance lines as well as the national and international service. This includes examination of present technology in telephone service of the general telegraph and telegraph express service, the economic and purposeful utilization of the cable nets as well as the issuing of service manuals for an enforcement of a uniform and economic service on the lines. To guarantee a widespread exploitation of the net, the ZFB guides the lines for the transdistrict service on the basis of its evaluation of the traffic. It establishes loading- and normal parameters for cable strands.

Further tasks of this department are trans-district- and international traffic analysis, which form the basis for scientific and therefore economic planning for the extension and utilization of the net;

the detailed working out of proposals for the improvement of the international telecommunication service;

the preparation of licenses for the construction and operation of telecommunication installations, not belonging to the GPO;

working on proposals for the formulation of charges in the interstate traffic as well as

the issuing of tariff lists for calls abroad.

As resolved by the Peoples Chamber in the Seven Year Plan law, the telecommunication service in the DDR is to be largely automatic by 1965. An important step is the extension of the main lines. The ZAF will therefore carry on with vigor the already commenced laying of cables and the equipment of the net with the most modern carrier systems. This will permit the operation of a large number of channels and the transmission of television by cable. This cable system, operating with strong strands, must suffice for all requirements to be based upon a modern system. It forms the basis for the introduction of national and interstate SDS. Furthermore the interstate telecommunication net will be extended. Here particularly the steadily increasing demand for telecommunication ties to the socialist countries, which arises out of the increasingly close cooperation of these countries, must be insured. After completion of new cable installations for interstate service, such service will at first be semiautomatic. This modern interstate service method will enable us at the same time to exchange television transmission by cable and so to further strengthen existing cultural ties between the socialist countries.

The Seven Year Plan further charges, that ZAF increase the economy of telecommunications by further extending telecommunication service by means of microwave relays in close cooperation with the radio and television service.

For the extension of the main line net and for securing uniform operations, the ZAF does not dispose over additional personnel. A fast increase in productivity is therefore necessary and the mechanical installation of cables, which has already begun, must be so extended as to include most of the cable laying operations. This requires new modes of training teams, of planning cable paths, of mounting the cables and of the installation and operation of technical equipment. The further development of the socialist community work, already undertaken, is therefore an important task of the BPO ()?, of the trade unions and of the management of the ZAF.

Further it is necessary, that a definite orientation to more standardization, normalization and rationalization of all instruments and installations within the long distance main net be taken in the plan.

An important place in the work of the engineers of the ZAF must be taken by the development of new techniques for production and operation as based upon the experiences of the latest techniques.

Socialist reconstruction as a condition for the solution of the task contained in the Seven Year Plan, demands of all workers the full exploitation of all the advantages of socialist society.

The obligation undertaken by six more construction teams during a discussion of the plant collective contract 1960, to take part in the competition for the title "Brigade of Socialist Labor", to live, work and learn socialistically, as well as the formation of a number of socialist working teams (which, among others, have set themselves such tasks as the introduction of modern production techniques, the preparation for the introduction of "Objekt Lohn" (object compensation?) or new ways in the planning of cable paths), are sure guarantees, that the employees of our newly formed ZAF will solve the problems placed upon them in the Seven Year Plan successfully.

NEW TELEVISION TRANSPOSER IN THUERINGEN

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INTRODUCTION

Despite the advances and systematic erection of main television transmitters in the DDR (Deutsche Demokratische Republik: German Democratic Republic), there still exist some areas without television reception. Particularly inhabitants of mountainous regions, living in locations unfavorable for television reception, such as deep valleys behind mountain chains, are without reception.

The means for providing such towns and communities with the program of the German television are frequency transposers, or, in special cases, active repeater antennae. The television transposer is a combined receiver transmitter, which, together with an antenna, receives the video and audio signal of the nearest major transmitter and retransmits both these signals on a different frequency in a suitable different channel, in order not to disturb the propagation of the main transmitter in the area concerned. The transmitting antenna is directed toward the region, to be supplied and has a propagation angle, adjusted accordingly. When a strongly directional antenna is used, ranges of 6 to 8 km (kilometer) may be obtained. If the region, to be supplied, exceeds the propagation angle of one antenna unit, it becomes necessary to use a number of them and to include a distributor between them. The range of the transposer may, if required, be increased by an additional power amplifying stage. Until 1959, the German Post Office, together with the VEB Rafona, Radeberg, has put into operation 11 transposers:

location	receiving channel	transmitting channel	polarization
Goerlitz	Dresden	7	horizontal
Gera	5	11	horizontal
Saalfeld	5	11	horizontal
Sonneberg	5	11	vertical
Plauen	8	5	vertical
Stalinstadt	5	9	vertical
Zittau	Dresden	10	horizontal
Jena	5	11	vertical
Suhl	5	11	horizontal
Oelsnitz	8	11	vertical
Bad Elster	8	5	horizontal

By means of active television repeater antennae the reception in deep laying valleys may under certain conditions be effectively improved with only minor expenditure in material and money.

Such an antenna receives video and audio of a neighboring transmitter and retransmits these on the same channel after a minor amplification.

The employment of active repeater antennae is however only possible, where on the one hand, there exists a suitable elevated point with a strong and undisturbed signal level of the main transmitter does not exceed 1/200th of the level produced by the repeater. Furthermore, such repeaters can not be established without limit in neighboring villages, since their radiations in the same channel causes interference. Thanks to the initiative of the employees of the VEB "Fernmeldeamt Bad Blankenburg", who developed and engineered the repeaters, and in cooperation with several local committees of the "National Front of the Democratic Germany", the following repeaters were placed in experimental

operation until the beginning of 1959: Schwarzburg, Sitzendorf, Rudolstadt, Schwarzsa and Jena.

TASKS FOR 1959

In accordance with experience gained, concerning the effectiveness and operational capability of the transposers taken into operation since 1958, the Government of our Republic, in evaluation of the resolutions of the 5th party congress of the SED (Sozialistische Einheitspartei Deutschlands; Socialist Unityparty of Germany) charged the section "Radio and Television" of the Ministry of Postal- and Telecommunication Systems, to erect, for the further improvement of the television supply in Thueringen, another 20 transposers in the districts of Gera and Suhl during 1959.

The following locations and channels were provided with due attention to the main reception deficiencies and the channels available:

District Gera:

location	receiving channel	transmitting channel	polarization
Hirschberg	11	5	vertical
Ziegenrueck	5	9	horizontal
Saalburg	8	5	vertical
Lobenstein	8	11	horizontal
Wurzbach	5	7	horizontal
Blankenstein	11	7	horizontal
Probstzella	5	11	vertiole
Leutenberg	8	5	horizontal
Eichicht	5	7	horizontal
Froessen	8	11	horizontal

District Suhl:

location	receiving channel	transmitting channel	polarization
Lauscha	5	11	horizontal
Schalkau	5	9	horizontal
Steinach	11	9	horizontal
Mengersgereuth Haermern	11	7	horizontal
Holdburg	5	11	horizontal
Hildburghausen	5	11	horizontal
Ilmenau	5	11	horizontal
Schleusingen	5	9	horizontal
Eisfeld	5	7	horizontal
Zella-Mehlis	5	9	horizontal

Where it did not seem possible to install the transposer and its antennae in an already available building or look-out tower, regular 20 to 35 meter high steel masts were planned.

The height is determined by the conditions of the terrain, respectively by the trees at the location of the equipment. 15 meters from the center of the antennae, in the cross section of the masts, there should be a protecting cabin for the equipment, and the necessary power of 220 Volts must be supplied by an overhead transmission line.

DESCRIPTION OF THE COMPLETED INSTALLATIONS

When available structures are used, the antennae are mounted on a telescope type steel tube, developed for this purpose. For most of the installation to be built in 1959 however, steel grid masts, originally belonging to high tension lines, were used (fig. 1).

These masts are at present not fully statically loaded, so that they can take up further antennae.

The foundations, almost without exception, had to be blasted into massive rock, 2.5 to 3 meters deep and 1.5 meters in diameter. The anchor foot consisted of prefabricated mushroom shaped foundations, which, according to the locality, were filled with concrete or sand. Masts of less than 25 meters were erected in one piece by means of hinges and supporting boom, using pulleys and tractors. Higher masts were erected in stages.

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The receiver antennae, as a rule, are 13- or 26-element -Yagi, made by VEB "Fernmeldeamt Bad Blankenburg", and the transmitting antennae are dipole arrays of the PGH (Produktionsgenossenschaft des Handwerks: Trade Cooperative) "Funkwerkstaette Bernburg". The antennae are mounted so as to permit horizontal and vertical changes. Two-, three- or fourfold distributors were used to connect several dipole elements, to broaden the area to be supplied.

To facilitate maintenance, particularly during the winter, windowless wooden cabins were arranged in the cross sections of the masts. The cabins have interior lights and are provided with power plugs for instruments, soldering irons and so on.

For lightning protection and grounding of the center conductor, service ground in the form of galvanized sheet steel was deployed in the shape of rays and ringing the suspension pole approx. 30 cm below ground and connected by galvanized steel plates of approx. 0.5 m² area. A ground resistance of 2 Ohm was desired. Grounding of the center conductor was done at the last suspension pole.

To supply power, overhead power lines of between 0.1 and 2 km length, having a cross section of about 70 mm² aluminum, had to be constructed. When crossing high tension lines or areas, in which heavy icing occurs, buried cables are used. Lightning arrester discharge tubes at the last pole provided surge protection. Power consumption is accounted on a term basis and no supply meters were built in.

TECHNICAL DATA OF TRANSPOSER TYPE FSU 896A

All installations, built in 1959 in the DDR, were equipped with transposers FSU 896 A, built by VEB "Rafena, Radeberg" (fig. 2). This instrument, suitable for frequency transposing in channels 1 & 3, is a simple transposer, i.e. there is no demodulation. Power output is 0.2W

across 60 Ohm, corresponding essentially to international standards in this field.

The arriving HF signal, which has to be available at the input with an amplitude of at least 250 μ V, is amplified in an input amplifier by means of 2 double triodes E 88 CC in cascade arrangement. The output is accomplished by means of the steep pentode #180 F to achieve the overall gain of 60 dB (1000 times) (fig.3). To make the output substantially independent from the variable input, the second stage of the input amplifier is regulated via an avarc device, connected to the output. Alterations of the input signal of 6dB are thereby reduced at the output to less than 1 dB. The amplified input signal is now fed to a ring modulator and there transformed by the oscillator frequency without IF amplification. The necessary difference frequency is generated in a quartz oscillator, equipped with tube EC 92 and fed to the ring modulator via a tube EF 860. After the transposed signal has been amplified a further 60 dB in the transmitting amplifier (which is identical to and interchangeable with the input transformer), it reaches the output stage which amplifies the signal a further 10 dB by means of 2 EL 95 tubes in push-pull arrangement. The transposer is designed for 220 volts, the supply may vary between 176 V and 240 V. Power consumption is about 280 VA.

HOW WAS THE PLAN 1959 REALIZED?

The VEB "Anlagenbau fuer Rundfunk und Fernsehen" (Radio and Television Construction), a plant subordinated to the section "Radio and Television" of the Ministry for Postal and Telecommunication Systems, was charged as the main contractor for the installation of the 20 transposers, planned for 1959. Since, at the beginning of the year, valuable time for the preparation was lost due to administrative deficiencies of the state, the task had to be accomplished within 6 months by the workers of this plant. If a far-reaching cooperation between the subsidiary plants, supplying parts such as quartz crystals, tubes and so on, and the VEB Rafena was required, an even greater urgency faced those responsible for finishing the installations in view of the varied aspects of the tasks and the wide area of operations, requiring complex planning as well as true socialist cooperation.

Very soon it became apparent, that effective local support could be obtained only, when bringing into play the

district and area leadership of the party of the working class, the apparatus of the state, the power plants of Gera and Suhl and offices of the German Post Office on levels ranging from district directorates up to the telecommunication office.

The timely completion of the foundation ditches was accomplished only, because many colleagues of the telecommunication construction offices as well as local PGH's mastered this heavy work in special task groups by means of pneumatic hammers and other tools. Things were particularly difficult at the location Ziegenrueck, which, situated on a mountaintop, falling off steeply in all directions, offered hardly any approaches for normal means of transportation. Unfortunately, the planned employment of a helicopter of the German "Luft-hansa" (air lines) had to be dropped, because technical conditions for such a flight were not ripe. For this reason, an almost unusable path over the steep parts of the mountain, was made usable in a period of 6 days by a construction team of the German Post Office. Also exemplary was the work of a brigade, consisting of students of the Forestry-school Schwarzburg, who, under the direction of their comrade director, cut paths for the overhead supply line through several locations in the forest in record time.

The active cooperation of several PGH's of the districts Gera and Suhl, who were engaged as subcontractors by the VEB "Anlagenbau fuer Rundfunk and Fernsehen", was a big help. In digging foundation ditches and holes for the power supply masts as well as during the construction and mounting of the cabins, the following PGH's helped: "Elektro" in Rudolstadt, "Isolator" in Saalfeld, "Elektro-nik" in Koenigsee and "Freundschaft" in Bad Blankenburg. In some cases voluntary teams for ground construction could be organized from the citizens of neighboring villages.

It must be mentioned also, that workers of the section "Radio and Television" also helped intensively by laboring up to 4 weeks in the ground construction. Valuable help was the untiring contribution of the colleagues from the sections "District Telegraph Maintenance" of the telecommunications offices Saalfeld and Sonneberg. The steel construction workers of the firm "Frey" (under state administration), Altenburg, and the installation workers of the VEB "Energiebau" Radebeul, made great efforts beyond the plan with regard to the transport and mounting of the steel masts, which in many cases was very difficult.

Special problems arose over and over again, when transporting the masts to the wooded and unapproachable mountaintops; also materials for foundations, the prefabricated mushroom foundations, the masts themselves, tools and equipment and so on, had to be transported to the mountaintops with great difficulties.

RESULTS AND CONCLUSIONS

It may be said in retrospect, that the VEB "Anlagenbau fuer Rundfunk und Fernsehen", recognizing the political significance, has solved the task well. The engineers and construction workers of that plant did their work with enthusiasm and often under extended sacrifice of personal comfort.

Despite initial difficulties, those taking part succeeded to install and put into operation all 20 transposers, provided by the plan for 1959, within that year in the location and over the channels planned! Thus a further step has been taken successfully to close in Thuringia many of the existing television gaps. Hundreds of new or existing television subscribers will now be in a position to receive the German television program in these regions with feasible costs for antennae and with sufficient technical quality.

The net of television transposers will be made more dense in Thuringia during 1960. This work, begun so successfully in 1959, must therefore be carried on increasingly in the following years and will place new and high requirements upon all those concerned. For the further successful execution of this work, apart from improving and modernizing the technical equipment of the main transmitters Katzenstein and Inselsberg, it will be necessary even more than hitherto, to secure the delivery of the required transposers and attendant equipment as well as the services of the peoples own plants, to be employed locally for the erection of the transposers, and those of the telecommunication construction offices and the PGH's by means of timely orders and contract closures. Furthermore an even broader recourse to teamwork and the extensive rendering of socialist help will contribute to a faster mastering of any difficulties and will lighten many heavy manual tasks and will make possible economic use of available materials.

Looking ahead it may be said, that the transposers, which have been erected (fig. 4) will in future find application not only for the television program on channel 3. When in the near future channel 4 will be introduced for television in the DDR, essential conditions for the reception of these transmissions by the major part of the population in the areas of our Republic, which are difficult to supply, will already have been created in the antennae carriers now existing.

END

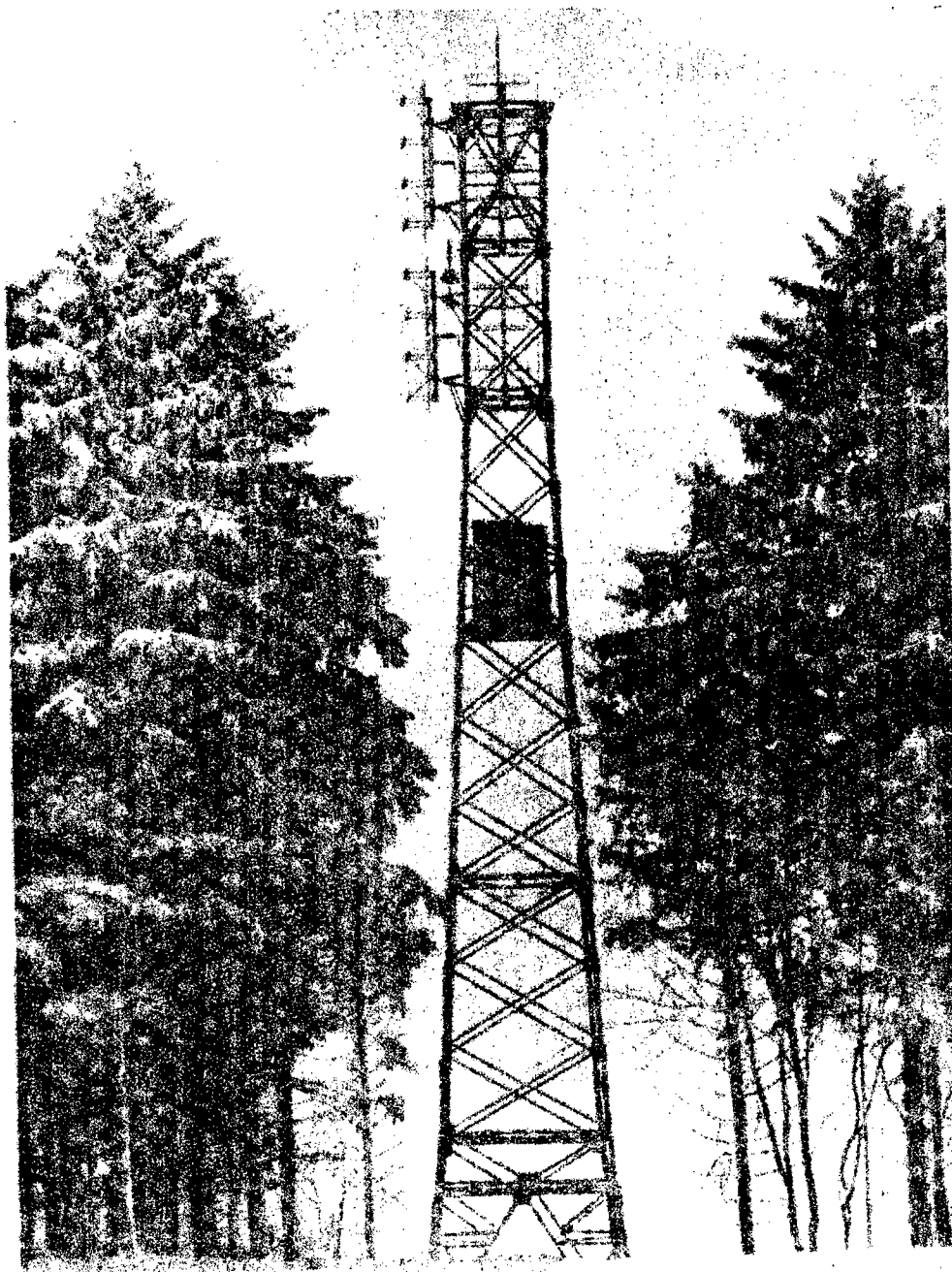


Figure 1: Television transposer Froessen (photo by Jaehkel,
ARF, Berlin)

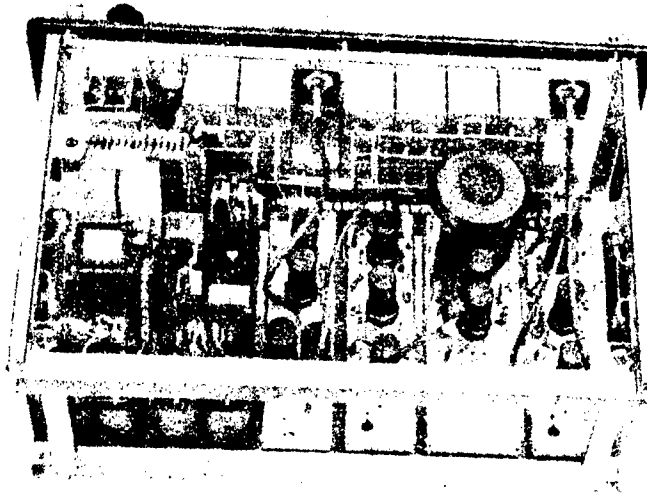


Figure 2: Television transponder FSU 896 A (plant photo Rafena, Radeberg)

receiving amplifier

ring
modulator

transmission
amplifier

power
stage

power
supply

crystal
oscillator

avc
amplifier

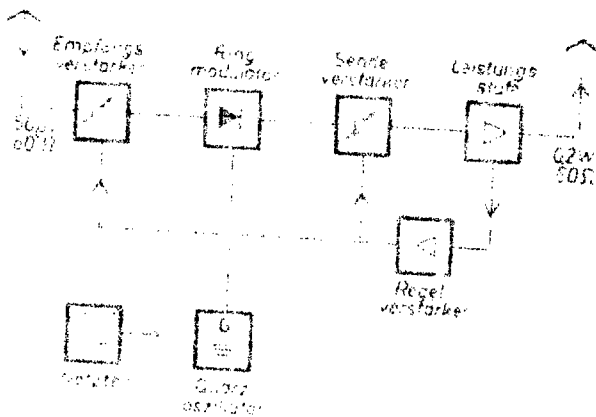


Figure 3: Schematic of a transponder

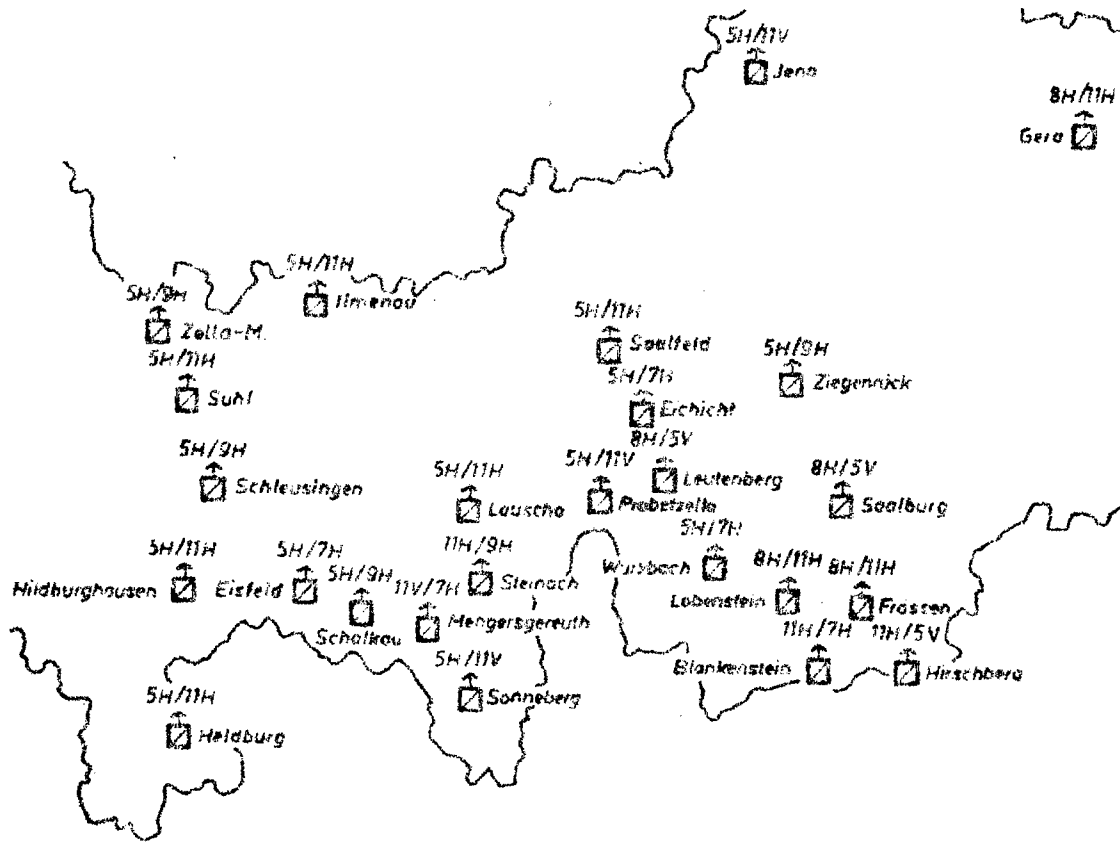


Figure 4: Transponders in Thuringia at the beginning of 1960