STAT

UNCLASSIFIED
CLASSIFICATION

STAT

AIR INTELLIGENCE INFORMATION REPORT

COUNTRY OR AREA REPORT CONCERNS
USSR

STAT

DATE OF REPORT
25 June 1958

SUBJECT (Descriptive title. Use individual reports for separate subjects)

STAT

ELECTRIFICATION OF THE USSR RAILROAD NETWORK

DISTRIBUTION BY ORIGINATOR (Except USAF and file. Indicate Dupl M/O and copies w/o

AF FORM 15 SEP 54 112 REPLACES AF FORM 112, 1 OCT 52, WHICH MAY BE USED

GPO 933657

UNCLASSIFIED
CLASSIFICATION

LIST OF ENCLOSURES

1. Fig. 1 - Schematic map of Northern System, showing the electrification of Aleksandrov-Vspol'ye section.
2. Fig. 2 - Schematic map of Gor'kiy System and electrification of Moskva-Fryazevo-Noginsk section.
3. Fig. 3 - Schematic map of Moskva-Ryazan' System; electrification of Ramenskoye-Ryazan' line.
4. Fig. 4 - Schematic map of Moskva-Kursk-Donbass System and Electrification of Moskva-Kursk and Ozherel'ye-Pavelets sections.
5. Fig. 5 - Schematic map of Moskva-Kiyev System; electrification of Aprelevka-Maloyaroslavets section.
6. Fig. 6 - Schematic map of Kalinin System and electrification of Golitsyno-Mozhaysk and Novoyerusalimskaya-Volokolamsk sections.
7. Fig. 7 - Schematic map of October System; electrification of Klin-Kalinin section.
8. Fig. 8 - Schematic map of the suburban lines near Leningrad and electrification of Leningrad-Mel'nichnyy Ruchey and its Piskarevka-Peri branch line.
9. Fig. 9 - Schematic map of the lines near Kiyev; electrification of Kiyev-Darnitsa-Brovary line.
10. Fig. 10 - Schematic map of the suburban lines near Riga and electrification of Riga-Mangali-Vetsaki-Saulkrasty section.
11. Fig. 11 - Schematic map of Stalin system and electrification of Pyatikhatki-Dnepropetrovsk-Yasinovataya line.
12. Fig. 12 - Schematic map of Donets System and electrification of Lozovaya-Slavyansk stretch.
13. Fig. 13 - Schematic map of Southern System; electrification of Khar'kov-Merefa and Merefa-Lozovaya sections.
14. Fig. 14 - Schematic map of Kirov system.
15. Fig. 15 - Schematic map of L'vov System; electrification of Lavochne-Mukachevo.
16. Fig. 16 - Schematic map of the Dudinka - Noril'sk Line.
17. Fig. 17 - Schematic map of Caucasian Systems.
18. Fig. 17a- Schematic map of the Belorechenskaya-Tuapse-Sochi-Sukhumi Line.
19. Fig. 18 - Schematic map of Sverdlovsk System.
20. Fig. 19 - Schematic map of Kuybyshev System.

UNCLASSIFIED

STAT

OF 99 PAGES

ELECTRIFICATION OF THE USSR RAILROAD NETWORK

(Supplement: September 1956-January 1958)

INTRODUCTION

This report is a supplement to the report AF 1098543c on the subject of the USSR railroad network electrification, which covered the state of the electrification of the Soviet railroads up to September 1956. The present report covers the subsequent period of September 1956 to January 1958.

According to the resolutions of the XXth Congress of Communist Party and the general electrification plan, all heavy freight traffic sections, mountainous rail lines, lines with heavy passenger traffic as well as suburban lines of large industrial centers in the Soviet Union are to be transferred to electric traction during the Sixth Five-Year Plan. Special attention will be paid to the electrification of lines, connecting the central parts of the country with the Urals, Siberia, Far East and Donbass (1).

The main goals of electrification operations in the Sixth Five-Year Plan will be: 1) Reduction of electrification cost. At a meeting held in Moskva, on December 27, 1957, dedicated to the development of electrification of rail lines, a delegate from the "Transelektroproyekt" Institute stated that the reduction of electrification cost will be one of the most important goals in the future electrification operations, with 40,000 km of rail lines to be electrified, 1,500 new traction substations constructed, 4,000 mercury arc rectifiers, hundreds of A.C. current transformers assembled, and 120,000 km of contact network suspended in the next 15 years. The reduction of electrification cost by only 1% would enable the electrification of additional 400 km of rail lines (2); 2) Equipment of traction substations with STsB and remote control systems. By January 1956 only two rail sections were equipped with the remote control system: Moskva-Ramenskoye of Moskva-Ryazan' system (3) and Moskva-Tsaritsino of Moskva-Kursk-Donbass system; and 1,072 km of rail lines were equipped with automatic block systems by the end of 1957 (4). 3) Reconstruction and adaptation of steam locomotive enginehouses for the electric traction (5) and 4) Electrification of rail lines on A.C. single phase current. It was planned to electrify more than 20,000 km using A.C. single phase current by the end of 1970 (6).

Information on the electrification of railroad lines during 1956 and the first 8 months of 1957 reveals serious lags. The main reasons were: poor planning, unsatisfactory completion of preliminary work in 1956, tardy completion and assembly of power supply lines and disagreement among the numerous construction-assembly organizations. However, by the end of 1957 the rate of electrification operations was sharply increased and total electrified trackage exceeded in the 1957 electrification plan by 87 km (planned electrification amounted to 1,258 km and actualy electrified were 1,343 km) (7).

The following developments point to the possibility, that the sharp increase of electrification operations could be the most vital and significant task of the Ministry of Transport Construction and all subordinated organizations in the coming years (8): a) production of rolling stock; in 1957 industrial enterprises of the USSR produced 281 electric locomotives and 117 electric motor cars (9), b) training of additional personnels; 1,420 engineers, 2,000 technicians and more than 4,000 assemblers will be trained for the upkeep and servicing of lines slated for electrification in Sixth Five-Year Plan (10); c) sharp increase of freight turnover during the first six months of 1957; the turnover of railroad transport increased by 15 percent comprising 590,000,000,000 ton-km as compared with the same period of 1956 (11); d) discontinuation of production of steam locomotives; output of steam locomotives and, the reconstruction of steam locomotive enginehouses ceased in 1956 (12).

The progress of the electrification in different regions of the country had a different pace with the greatest speed registered on the main lines from Moskva to the Urals and beyond (via Kuybyshev, Ufa) and from Moskva to Khar'kov (via Orel, and Kursk). (See maps, inclosures no. 69 and no. 70)

Electrification of the Moskva Junction-which includes the Northern, Gor'kiy, Moskva-Ryazan', Moskva-Kursk-Donbass, Moskva-Kiyev, Kalinin, October and Belt systems (the Belt system will be dieselized during the Sixth Five-Year Plan), made little progress, except for Moskva-Kursk-Donbass where the electrification was completed up to Skuratovo (13). The workers pledged to complete electrification of the second stretch, Skuratovo-Orel, by November 1958, although electrification of this section was originally scheduled for completion in 1959 (14). The most serious delay occured on the Moskva-Mozhaysk trunk line of the Kalinin system, which was electrified up to Golitsyno station in 1953 (15); in 1955, plans were made for the electrification of the Golitsyno-Mozhaysk line but by the end of 1957 the electrification of this section was still under way and only 19 km were completed by that time. (16) Small progress was also made on the Ozherel'ye-Pavelets section which was the first USSR electrified line to operate on single-phase A.C. current, and although electrified during 1957, still remained in an experimental stage with many shortcomings and unfinished work (17). The Moskva-Leningrad trunk line of the October system was divided into two parts: Moskva-Kalinin, which was electrified by 30 December 1957, and Kalinin-Leningrad, where the introduction of diesel traction was planned by the Main Committee of the Locomotive Management. (18)

Not much progress was made on electrifying suburban lines near large cities such as Leningrad, Kiye, Tallin Kuybyshev, Sverdlovsk, Baku and Tbilisi since the Fifth Five-Year Plan, except Riga, where after electrification of the Riga-Kemeri line in 1951 (19), the 11 km Riga-Mangali and Mangali-Vetsaki sections were electrified by the end of 1957, (20) and the electrification of the 30 km Vetsaki-Saulkrasty section was nearing completion (21).

Electrification of the 25 km Khar'kov-Merefa section of the Southern system was completed on 30 June 1957, but electrification of Merefa - Lozovaya, planned in 1955, progressed at an extremely slow pace and some sources expressed doubt that it would be completed even in 1958 (22).

The only electrified section of the L'vov system, remained the 77 km Mukachevo-Lavochne stretch, completed in 1956 (23); the planned electrification up to Stryy station never took place (24).

Electrification of the Yasinovataya-Pyatikhatki of the Stalin system began in March 1957, but there was little hope that the date line of 1958 would be met (25).

During 1956 - January 1958 period intensive electrification was conducted on the western parts of the Moskva-Vladivostok route. The following lines were electrified during this period:

1) the 19 km Kinel'-Smyshlyayevka section - in February 1957 (26)
2) the 136 km Kuybyshev-Syzran' section - in November 1957 (27)
3) the 250 km Rayevka-Pokhvistnevo section - in January 1958 (28)
4) the 130 km Kurgan-Makushino section - in December 1956 (29)
5) the 260 km Kurgan-Chelyabinsk section - in November 1957 (30)

Thus the total trackage of lines on this route electrified during this period amounted to 795 km.

These newly electrified section are located within the three following systems: Kuybyshev, Ufa and South Urals system.

The Kuybyshev System: the 22 km Kuybyshev-Smyshlyayevka section was electrified in previous period (31) and the 155 km (19 km Kinel'-Smyshlyayevka (32) and 136 km Kuybyshev-Syzran' section) in this period (33). The 118 km Kinel'- Pokhvistnevo section was scheduled for electrification in 1958 (34) and the 396 km Kovylkino-Syzran' line sometime during 1959-1960 period (35).

The Ufa System: the 170 km Dema-Kropachevo (36) and the 115 km Dema-Rayevka sections were electrified in the previous period (37); and the 250 km Rayevka-Pokhvistnevo section in this period (38); thus the entire Ufa trunk line was placed under electric traction (39).

The South Urals System: the 268 km Kropachevo-Chelyabinsk section was electrified during previous period (40); while the 130 km Kurgan-Makushino (41) and 260 km Kurgan-Chelyabinsk sections put in operation during this period (42). As a result the entire South Urals trunk line is electrically operated (43).

The Omsk System*: the entire trunk line was dieselized and electrified in the previous period (45). Electrification of the dieselized Isil'-Kul' - Makushino section is planned for distant future (46).

The Tomsk System: the Novosibirsk-Chulymskaya section was electrified by 1955 and described in the previous report (47), and electrification of the 339 km Novosibirsk-Mariinsk line is planned for 1958 (48).

The East Siberian System: the only electrified section is the 134 km Irkutsk-Slyudyanka stretch, described in previous report (49). The 123 km Irkutsk-Cheremkhovo section is planned for electrification in 1958 (50), and the 1,340 km Cheremkhovo-Tayshet-Mariinsk trunk line (of East Siberian and Krasnoyarsk systems) in 1958-1959 period (51).

Conversion of the 150 km Noril'sk-Dudinka line located in the northernmost part of the USSR was nearing completion and the last preparation for electric operation were in process in October 1957 (52).

The production of electric locomotives (see Report AF 1105581), their operation and the operation of electric locomotive enginehouses are not discussed in this report.

*Electrification of the Omsk system is not discussed in this report. This system has 778 km of electrified tracks: the Nazyvayevskaya-Omsk section and the Isil'-Kul' - Omsk-Tatarskaya-Chulymskaya trunk line, all discussed in Report AF 1098543c (schematic map included here in Fig. 22, Inclosure No. 23) (44).

CHAPTER I. GENERAL

In the Sixth Five-Year Plan it is planned to step up the freight turnover by 42%, the working efficiency by 34%, but the transportation costs are to decrease by 17%. Such an increase of freight traffic will require a broader introduction of modern railroad practices, above all, greater electrification and dieselization of railroad transport. The share of electric traction in the transportation of freight is supposed to reach 22% by the end of the Sixth Five-Year Plan (1).

The Sixth Five-Year Plan called for the electrification of 8,100 km of railroad lines, or 3.6 times as much as during the Fifth Five-Year Plan. The plan called for electrification of the following trunk lines: Moskva-Kuybyshev, Chelyabinsk-Omsk-Novosibirsk up to Irkutsk, Moskva-Kursk, Khar'kov-Lozovaya-Slavyansk, Chelyabinsk-Sverdlovsk, Kizel'-Perm', Inskaya-Belovo, Belorechenskaya-Tuapse-Sochi-Sukhumi, Pyatikhatki-Nizhnedneprovsk-Chaplino-Yasinovataya and other rail lines. It is also planned to electrfy the suburban lines of the Leningrad, Khar'kov, Kiyev, and Baku networks. By the end of the Sixth Five-Year Plan steam traction will be completly replaced by electric traction in the Moskva Junction on the following lines: Klin-Kalinin, Lyubertsy-Kurovskaya, Golitsyno-Mozhaysk, Aprelevka-Maloyaroslavets, Novoyerusalimskaya-Volokolamsk, Aleksandrov-Vspol'ye. The Moskva Belt system, however, will be dieselized (2).

A source dated January 1957 indicated, that the length of electrified lines would reach 13,500 km* by the end of the Sixth Five-Year Plan. The total length of electrified lines in the Soviet Union on January 1, 1957 was said to be 6,325 km (3). In December 1957 was 7,700 km, thus about 6,000 km must be electrified in order to reach the goal of 13,500 km by the end of the plan. (5) It is planned that in 1970 electric trains would run from Moskva to Pacific Ocean, on the longest electric line in the world.

The progress of electrification during the first and second years of the Sixth Five-Year Plan, however, indicates that the fulfillment of these goals is somewhat doubtful.

Although in 1956 almost 1,000 km of tracks were electrified, only 88% of the appropriated funds were utilized (6). The 1957 electrification plan called for: 1) the electrification of 1,258 km of tracks** (8), including the following sections:

Rayevka-Pokhvistnevo-250 km
Chelyabinsk-Kurgan-259 km
Serpukhov-Skuratovo-185 km
Khar'kov-Merefa-22 km
Klin-Kalinin-78 km
Kuybyshev-Syzran'-136km
Belorechenskaya-Tuapse-126 km
Belovo-Promyshlennaya-86 km
Zheleznodorozhnaya-Noginsk-44 km (9) (see map, Fig. 69)

* This figure was given by Beshchev, Minister of Transportation, to be 13,461 km (4)

** This plan was not only met, but exceeded with 1,343 km of tracks reportedly electrified in 1957 (7)

2) the construction of 56 traction substations (10), 3) installation of 56,000 contact network supports, including 40,000 made of reinforced concrete (11), 4) assembly of 4,000 km of contact network, 5) suspension of 10,000 km of contact network wire (12) 6) appropriation of 1,170,000,000 rubles or 17% of the funds destined for the construction and development of railroad transport (13) 7) and the completion of preliminary work for the amount of 300,000,000 rubles in connection with the electrification program of 1958 (14).

The above figures showed that the volume of work in 1957 considerably exceeded that of 1956. A comparison with 1956 will illustrate this difference.

Number of Supports	Number of Traction Substations	Length of contact network (in km)	Year
25,000	37	1,700 km	1956
56,000	89*	4,100 km	1957 (15)

In order to cope with such an increased assignment the speed of electrification operations had to be sharply increased. In a speech delivered at a conference of electrification and power supply service personnel, Minister Beshchev stressed the importance of the electrification program urging the participants to enlarge and step up the electrification in order to fulfill successfully the 1957 electrification plan (16). The slow progress of electrification operations in 1957, however, showed serious lags. Gudok of January 16, 1957 stated that the entire 1957 electrification plan was in jeopardy. (17)

During January and February 1957 only 6.6% of the annual plan was completed (18). By the end of April 1957, only 16.4% of this plan was fulfilled. From 29 traction substations, which had to be ready for assembly by May 1957, only 19 were completed; of 506 km of contact network only 480 km were completed, and only 26 stations out of 42 were built (19). Only by 12.5% the preliminary work of the 1958 electrification program was completed during the first four months of 1957 (20).

A further survey of the development of electrification operations showed only slight improvement. On June 20, 1957, the annual plan was realized only by 42.2% and for preliminary work by 23.3% (21). Another report stated that only 35% of the yearly electrification plan was fulfilled by July 1957 (22), and under normal conditions the plan should have been completed by that time by 50% (23).

By 20 September 1957 the construction-assembly plan was fulfilled only by 69% (24). Under such conditions the fulfillment of a pledge to complete the electrification operations of 1957 ahead of time seemed to be hardly possible. In order to fulfill this obligation it was necessary to spend 130,000,000 to 140,000,000 rubles monthly during the last 3 months of 1957. But only 63,000,000 rubles were spent in April, 97,000,000 in May and about 114,000,000 in June 1957 (25). In August 1957 the situation improved somewhat and 119,300,000 of rubles were expended (26).

*56 of this number will be completely equipped in 1957 (15).

The delays in the delivery of necessary material for railroad lines under electrification also hampered the electrification. Poor planning of the "Glavsnab" of the Ministry of Transport Construction (27) and of the Ministry of Electro-Technical Industry was blamed for this failure (28). During the first quarter of the year, "Uralelektroapparat" Plant delivered only 35 mercury arc rectifiers instead of the planned 60 and only 38 high speed switches instead of 75 (29). Delayed delivery of transformers was blamed on the Zaporozh'ye, Yerevan and Moskva plants (30).

A slight improvement in the progress of electrification operations was made after the XXth Congress of the Communist Party. It was decided to prepare 600 km of tracks for the electrification program of 1958, in addition to the electrification of 1,258 km planned in 1957. But at the same time, it was pointed out, that hasty, "shock" work, during recent months lowered the quality of work and caused many subsequent shortcomings on the electrified sections (31). The Ministry of Transport Construction was blamed for such uneven and defective work (32).

One of the main reason for the delays in 1957 was given as the unsatisfactory fulfillment of preliminary works in 1956. All preliminary and final electrification operations had to be completed in 1957 (33). The importance of efficient completion of the preliminary work in the future electrification plans was stressed, considering the fact of increasing electrification programs up to 2000 to 2,500 km yearly (34).

The 1958 plan calls for the electrification of 1,694 km* of rail lines. The preliminary work for the 1958 program advanced very slowly and during the first 3 months of 1957 only 5% of the yearly assignment was completed (35).

During April 1957 the volume of preliminary work increased somewhat and by the end of the month reached 12.5% of the plan. (37) In September the yearly plan for preliminary work was fulfilled by 45% (38). The Moskva-Ryazan' and Kalinin systems especially were falling behind in the fulfillment of preliminary work program. (39)

Another reason for delays in electrification operations was tardy completion and assembly of power supply lines (40). Frequently datelines for the commencement of electric operations on railroad sections were violated, because transmission lines or electric power stations were not ready (41). The construction and assembly of supply lines should always be carried out before the electrified lines are ready for operations, with a 2 months interval between the completion of construction of power supply lines and the beginning of electric operations for testing of traction substations. (42) This time-schedule is not always maintained and many lines ready for electric operations remain on steam traction, while waiting for the completion of power supply lines. Up to now, the State Planning Commission failed to work out a complex electrification plan, including not only the electrification of a certain amount of tracks, but also a coordinated schedule for the completion of power supply lines and the construction of new or reconstruction of old electric power plants. Lack of such a plan results in excessive intervals between the completion of electrification projects and of power supply lines (43).

*Zhel. Transport reported that 1,700 km of railroad tracks will be electrified in 1958 (36).

The example of the Moskva-Ryazan' is given to illustrate the point. This line is to be completely electrified in 1958-1959 if the power supply lines are installed by that time (44). The construction of this line is delayed by interministerial misunderstandings between the Ministry of Power Stations and Ministry of Transportation. The construction of substations in Tuchkovo and Maloyaroslavets was delayed this way (45).

The example of the Moskva-Ryazan' is given to illustrate the point. This line is to be completely electrified in 1958-1959 if the power supply lines are installed by that time (44). The construction of this line is delayed by interministerial misunderstandings between the Ministry of Power Stations and Ministry of Transportation. The construction of substations in Tuchkovo and Maloyaroslavets was delayed this way (45).

CHAPTER II. MOSKVA AREA RAIL LINES

A. Northern System

1. Aleksandrov-Vapol'ye Section

B. Gor'kiy System

1. Zheleznodorozhnaya-Fryazevo-Noginsk Section

C. Moskva-Ryazan' System

1. General Information
2. Ramenskoye-Voskresensk Section
3. Voskresensk-Ryazan' Section

D. Moskva-Kursk-Donbass System

1. General Information
2. Moskva-Tula-Kursk Line
3. Ozherel'ye-Pavelets Line

E. Moskva-Kiyev System

1. Aprelevka-Maloyaroslavets Section

F. Kalinin System

1. Golitsyno-Mozhaysk Section
2. Novoyerusalimskaya-Volokolamsk Section

G. October System

1. General Information
2. Klin-Kalinin Section

CHAPTER II. MOSKVA AREA RAIL LINES

(See map, Inclosure No. 1)

A. Northern System

1. Aleksandrov-Vspol'ye Section

The 113 km Moskva-Zagorsk-Aleksandrov line was electrified during the Second Five-Year Plan (1), and the 170 km double track Aleksandrov-Vspol'ye section is scheduled for transfer to electric traction operation in 1958 (2); most of the preliminary work was to be done in 1957 (3).

The 1957 plan called for 79 km of the contact network and 4 traction substations, located in Balakirevo, Petrovsk, Koromyslovo and Vspol'ye - to be ready for assembly work. However, many shortcomings and much mismanagement prevented the implementation of this plan and the yearly construction plan was fulfilled only by 73% by November 23, 1957 (4). In July 1957 complaints were voiced about the slow utilization of funds. In 1956 only 1/13 of the total sum was planned to be used and this plan was not met (5). The 1957 plan called for 30,000,000 rubles to be used, which is less than 1/4 of the total. The "Moselektrotyagstroy" Trust was criticized for inefficiency and poor management. Mismanagement and delays in the electrification occurred at the Semibratovo station and near Rostov and Aleksandrov stations, where erection-assembly trains Nos. 251 and 250 were in operation. The substations in Rostov, Petrovsk, Beklemishevo and Shushkov were not completed as scheduled(6).

One of the main reasons for the delays was untimely and deficient delivery of construction material. The 1957 plan called for completion of about 2,000 reinforced concrete and 300 metal supports on the Aleksandrov-Vspol'ye section. But in June 1957 only 108 contact network supports were delivered to the #250 and 251 construction trains (7). There was no improvement in delivery of the supports in July 1957, and only 50% of the required number were delivered by October 1957. (8) Only 657 contact network supports instead of the planned 856 were installed on the Rostov-Koz'modem'yansk section and on the Rostov-Itlar' section 702 out of 896 by November 1957 (9).

In November 1957, technical readiness of traction substations was estimated at 75 to 95%, but their completion, was said to require still many labor consuming operations (10).

According to the 1957 plan, all 7 stretches and 4 traction substations of the Aleksandrov-Vspol'ye line should have been prepared for assembly work by the end of 1957 (11). Many subcontractors, however, were behind schedule in their work. The construction of cable trenches and installation of foundations for transformers and oil circuit breakers was not completed. "Moselektrotyagstroy" Trust was behind schedule. The Vladimir and Yaroslavl' line-technical communication centers of the Ministry of Communication fulfilled the yearly plan only by 26.4% and "Transenergomontazh" Trust, which was charged with the reconstruction of power supply lines at Vspol'ye and some other points only by 26.7%.

The electrification of this line will not be completed in 1958 as scheduled, if the work is conducted at the present pace (12).

B. Electrification of the Gor'kiy System

1. Zheleznodorozhnaya-Fryazevo-Noginsk Section
(See map, Inclosure No. 2)

The electrification of this 44 km line, final link between Moskva and the important industrial area of Elektrostal', was planned for 1957 (13) and completed in September 1957 (14).

In February 1957 assembly train #102 was working on this section, erecting steel supports near Kudinovo, building concrete piers, rearranging tracks and suspending the catenary network. The building of a traction substation was under way in Fryazevo (15). In February 1957, the crew of the train started to work on the Kudinovo-Noginsk section and pledged to complete the whole Noginsk-Zheleznodorozhnaya section by the 40th anniversary of the October Revolution in November 1957. (16) A slow down in operations was reported despite the fact that 12 construction and assembly subdivisions of 9 construction trusts were engaged in the task (17). In August 1957, erection of a power substation in Fryazevo was not yet completed. The reconstruction of receiving-departure tracks and of an interlocking system was also delayed. It was stated, that at this pace electrification of the Moskva-Fryazevo-Noginsk line would take several years. Of 240 contact network supports only 10 were installed at the Fryazevo station. The track reconstruction plan was fulfilled only by 50%. The poor development of station tracks hampered the electrification program. The installation of contact network supports at Fryazevo and other stations was postponed. A complaint was voiced about the untimely and deficient delivery of power transformers and mercury arc rectifiers. In August 1957, some 140 contact network supports remained to be installed on the various stations and sections of Moskva-Noginsk line. The construction of passenger loading platforms at Khrapunovo, Elektrostal'-1 and Elektrostal'-2 stations was not even started. (18) Installation of an automatic block system was also delayed, due to poor cooperation between railroad crews and communication workers. The reconstruction of the Saltykovskaya traction substation proceeded very slowly and the construction of a boiler shop at the Zheleznodorozhnaya station was interrupted. Lack of cooperation among numerous subcontractors was said to be one of the main reasons for the unsatisfactory progress of electrification operations (19). It was reported in September 1957, that a newly constructed machine for the installation of reinforced concrete foundations for the contact network used by the constructors of the line considerably speed up the electrification of this line and reduced the labor input for these operations 30 to 40 times. More than 100 reinforced concrete pile foundations were installed on the Zheleznodorozhnaya-Noginsk line using the new machine (20).

The electrification of the Zheleznodorozhnaya-Fryazevo line with a branch line to Noginsk was completed and regular electric train traffic resumed on 28 September 1957. More than 1,000 km of the rail tracks in the metropolitan area of Moskva have been electrified with the electrification of this line (21).

Passenger traffic was considerably facilitated with the electrification of this line with 11 electric trains in place of the former 6 steam locomotive trains operating between Moskva and Noginsk. (22)

C. Moskva-Ryazan' System

1. General Information
(See map, Inclosure No. 3)

The 55 km Moskva-Ramenskoye section of the Moskva-Ryazan' main line was electrified in 1933 (23) and the Ramenskoye-Ryazan' line is scheduled for completion in 1958 (24). The electrification of the 200 km Moskva-Ryazan' section is a difficult task. Some sections of this line consist of 2-3 and 4 tracks and the installation of contact network foundations and supports is conducted during heavy traffic. It will be necessary to install 5,000 contact network supports, suspend 600 km of contact network, construct 6 and reconstruct 4 existing traction substations. (25)

By September 1957, the preparatory work, was making a slow progress and only 800 contact network supports were installed during 18 months period of 1956 and 1957. Only 5 traction substations were under construction and 6th substation was not started yet. The general contractor, "Tsentrotransstroy" Trust with its 10 subcontractors used only 41.5% of the allocated funds by 1st September 1957. The main reason for lagging was unsatisfactory delivery of construction material and mismanagement of the part of the "Tsentrotransstroy" personnel. Electrification of this section should be completed by 1958. (26)

Electrification of the Ramenskoye-Ryazan' section of this system started in January 1956 and not much was done by July 1956, when only 1/5 of the appropriated funds was utilized. (27) By the end of October 1957, this line was still under electrification and there was little hope that electrification of it will be completed in 1958 as originally planned (28).

2. Ramenskoye-Voskresensk Section

The electrification of the 35 km Ramenskoye-Voskresensk section was conducted by the erection-assembly train #200 during the period of 1 1/2 year. It installed 850 bases out of the total 998 and erected 807 supports out of 1,216 by July 1, 1957 (29). The section was not prepared for the assembly work in September 1957, because of the delayed delivery of metal supports in the fourth quarter of 1957 (30). Electrification included the reconstruction of the Ramenskoye station, where new tracks were laid and old tracks shifted. Construction of the second detour track was delayed, because the transfer of land ownership from the sovkhoz to the station was not legalized. (31) The reconstruction plan also included the erection of an electric enginehouse and the construction of a dwelling house in Ramenskoye. By July 1957, a crew of the train #200 has laid the foundations for both buildings and completed the first story of the house. Then work was stopped, because of misunderstanding in deliveries of reinforced concrete columns. The construction of the Bronnitsy traction substation was delayed in 1956, due to untimely delivery of concrete structural parts from the Tuchkovo Plant. A delay was also caused by the lack of approach tracks in Bronnitsy, the construction of which was prevented by the communication line obstructing clearance. It took two months to transfer this communication line at the Bronnitsy station.

The construction of the Voskresensk traction substation and nearby residential buildings was also delayed and it took the entire 1956 to prepare these two traction substations for the assembly work. By the end of September 1957, the Ramenskoye-Voskresensk section was still incompleted in spite of 18 months of efforts. (35)

3. Voskresensk-Golutvin-Ryazan' Section

In the third quarter of 1957, the electrification continued on the 108 km. Voskresensk-Golutvin-Rybnoye-Ryazan' Section. The major part of work was assigned to the newly organized erection assembly train #321. In order to fulfill the assigment of 1957, over 1,000,000 rubles more than originally planned had to be spent. The "Tsentraltransatroy" Trust was critisized for inefficiency and mismanagement. The installation of contact network supports on the Voskresensk-Golutvin section started only by the end of July 1957, although it was scheduled for completion already in April 1957. Also the reconstruction of the Voskresensk and Golutvin stations was delayed, due to shortage of switches, rails and other material (36).

Electrification of the Golutvin-Rybnoye section made a slow progress. Lack of approach tracks at Rybnoye hampered the delivery of building material and the trucks had to be used for this purpose (37). By the end of September 1957, due to shortage of construction material and lack of cranes the construction works conducted by construction train #321 were fulfilled only by 35 to 45%, thus prolonging the completion of electrification into 1958 (38).

D. Moskva-Kursk-Donbass System

1. General Information
(See map, Inclosure No. 4)

There will be a reorganization of locomotive operational runs in connection with the introduction of electric traction on Moskva-Serpukhov-Tula-Skuratovo-Orel-Kursk line. The Ministry of Transportation decided to extend the length of the locomotive runs up to 230 and 250 km. This arrangement will abolish short runs on this line and reduce the number of locomotive enginehouses. In November 1956, there were 7 enginehouses on this line but the Main Administration of Locomotive Service suggested to reduce the number to 5, with 2 passenger enginehouses in Moskva and Khar'kov and 3 freight locomotive enginehouses in Tula, Orel and Belgorod. Another suggestion was made to retain only 3 enginehouses: one passenger enginehouse in Orel and two freight enginehouses in Tula and Kursk. Under this system the freight locomotives would operate on the Moskva-Tula-Orel and Orel-Kursk-Khar'kov runs and passenger locomotives on the Moskva-Orel-Khar'kov "ring" system run. The introduction of such a system of operation would increase the average daily locomotive run by 39% as compared with the previous short run system. It would reduce the number of electric locomotives by 17.5% (39).

2. Moskva-Tula-Kursk Line

The Moskva-Serpukhov section of this line was electrified by May 1955 (40).

The "Mosdonbasstransstroy" Trust (Moskva-Donbass Trust for Transport Installations and Structures and Railroad Feeder Lines), received 35,000,000 rubles in 1956 to prepare the 185 km. double-track Serpukhov-Tula-Skuratovo line for electrification. This sum was provided for the construction of two electric traction substations, and erection of contact network supports on 60 km of the line (41). In 1956 the following operations were completed: 970 bases were laid (plan provided for 1,884 bases); 158 metal supports and 217 reinforced concrete supports were erected. But this work was of no immediate use for assembly workers, since all supports were dispersed (42). The electrification

of the whole Serpukhov-Skuratovo line was scheduled to be completed by the end of 1957 (43). The cost of this electrification was estimated at 137,000,000 rubles. The 1957 plan appropriated 90,000,000 rubles although only 17,000,000 rubles were expended in 1956. Thus 30,000,000 rubles worth of construction were left for 1958. This plan was worked out in accordance with the rate of construction (44). Complaints were expressed about the fact that the construction of 8 traction substations was started and none finished, while only two had to be prepared for assembly work. The assembly workers were seriously concerned, that they will not be in position to complete their assignment as scheduled. (45) In spite of some delays, however, the workers of this line pledged to fulfill their task ahead of time. They promised to open electric traction on the Serpukhov-Tula section in August 1957 and on the entire Serpukhov-Tula-Skuratovo line on November 7, 1957 (46).

A report from April 1957 indicated that the installation of the contact network supports on the Serpukhov-Tula-Skuratovo line proceeded rather slowly. In 1 1/2 to 2 hours only 4 to 5 contact network supports were installed on this section (47). The speed was considerably increased by September 1957, when 18 to 20 supports were installed in this period of time, although only 9 were required by the norm (48). In May 1957 the monthly electrification plan was met by 101% and in June by 119% (49). The plan called for 638 km of contact network to be assembled and 8 traction substations erected and equipped by the end of 1957. (50)

In July some 500,000 rubles of appropriated funds were used above the plan. The Tarusskaya substation was completed and at the Revyakino and Tula substations assembly of equipment inside and outside of the buildings was nearing completion. The installation of cantilevers was delayed, because the Lyubertsy plant failed to deliver parts of equipment (51).

The suspension of contact network at the Tula-1 station was completed and the assembly of contact network began at the Tula-2 station on 14 July 1957 (52). The erection of supports on this section started at the end of February 1957 and by the middle of July 1957 over 400 supports were finished, and the workers started building the supports at classification yard of Tula-2 station (53).

The 94 km Serpukhov-Tula line was electrified and electric train traffic was resumed by 21 October 1957 (54), and on the 6th of November 1957 the first electric train made a round trip on the Moskva-Tula run (55). Electrification of this section required the building of 3 traction substations, assembly of 300 km of contact network (56), installation of 3,200 foundations for contact network supports (57) and erection of 2,600 reinforced concrete and 600 metal supports (58). The electrification operations were conducted by construction trains no. 247 and 248 of the "Mosdonbastransstroy" Trust (59).

The completion of the Serpukhov-Tula section speed up the electrification of the Tula-Skuratovo line, where the construction trains #247 and #248 were transferred to work in addition to the electro-assembly train #707 on November 1957. By that time the construction workers already had completed the installation of the contact network supports and traction substations and had prepared them for the assembly work (60). The installation of reinforced concrete contact network supports was completed at Yasnaya Polyana (61) and the workers moved to the Kaznacheyevka station (62). The workers pledged to complete the assembly of the contact network on the Tula-Skuratovo section by 1 December 1957. The complaint was expressed that shortage of the 1 and 1.5 inch-diameter gas pipes and ShT-35 insulators hampered the installation (63).

The "Uralelektroapparat" plant delayed delivery of 12 transformers for the Lazarevo and Skuratovo traction substations (64). By the middle of December 1957 the electrification workers assembled a considerable part of the contact network and two units of the Serpukhov traction substation (65). At that time they were doing assembly work on the Pasechnaya-Sumarokovo run and at the Patochnaya station with completion expected during December 1957 (66). Preliminary calculations showed that the cost of the electrification of the Serpukhov-Skuratovo line will be amortized within 3 years after completion (67).

Electrification of the 91 km Tula-Skuratovo line was completed by 29 December 1957 and thus the whole 300 km of Moskva-Serpukhov-Tula-Skuratovo line was switched to electric traction (68).

The plans for the electrification of the Skuratovo-Orel-Kursk line and the necessary surveys were almost completed in 1957 (69). The workers of construction assembly trains #247 and #248, which work currently on the Skuratovo-Orel line pledged to complete their assignment ahead of time by 7 November 1958 and by 1 May 1958 respectively. (70) Originally, the completion of electrification of this section was scheduled for 1959. The transfer of this section to electric traction in 1958 will reduce the operational cost by 12,000,000 rubles. It will also raise the weight norms of freight trains and reduce the operational cost on the Orel-Kursk-Khar'kov line (71). To complete the electrification of the 99 km Skuratovo-Orel section by 7th November 1958; it should be included in the 1958 electrification plan and the necessary material (metal, concrete, lumber) should be supplied in the first half of 1958 (72). Many industrial enterprises in Orel decided to help the electrification workers and supplied them with tools and spare parts (73). The Orel steam locomotive engineers pledged to provide the required number of steam locomotives and to perform the repair of cranes without delay. (74)

The Orel and Mtsensk sections supplied the project with rails for the construction of approach lines to the Skuratovo and Orel traction substations. The communication workers of the division decided to reconstruct the STsB system with their own resources at the Dumchino, Otrada, Optukha, Stal'noy Kon' and Orel stations (75). The railroaders appealed to the Ministry of Power Stations to put in operation the Cherepets Power Supply Line ahead of time in order to secure the supply of electric power to Chern', Mtsensk, Otrada and Orel traction substations (76). The electrification of the Moskva-Donbass route via Orel-Kursk to Khar'kov will permit the replacement of steam locomotives by electric locomotives in all main enginehouses of the system (77).

3. Ozherel'ye-Mikhaylov-Pavelets Line

This 136 km section is a part of the second trunk line of the Moskva-Kursk-Donbass system, which begins in Moskva-Passenger-Paveletskiy Terminal and runs via Rastorguyevo, Domodedovo, Barybino, Mikhnevo, Zhilevo, Kashira, and Ozherel'ye to Mikhaylov and Pavelets or Uzlovaya Valuyki. The electrification of this line started in 1946 (78) and in 1955 reached Mikhaylov station, when 85 km Ozherel'ye-Mikhaylov section was accepted for permanent electric operation (79).

Since that time a little progress was made and the electrification of Mikhaylov-Pavelets stretch advanced extremly slow. The completion of electric operation on this stretch was scheduled for October 1956 (80), but only on January 1st 1957 the section was transferred to electric traction (81). The

delay was caused by late assembly of the Mshanka traction substation and slow construction operation at Ozherel'ye and Pavelets enginehouses (82). The monthly "Elektricheskaya Tyaga" of August 1957 reported that there was still much unfinished work on this section and many parts of the contact network got out of order during their operation (83). In October 1957 the installation of STsB system was in process (84). This section was the first electrified rail line in the Soviet Union to operate on single-phase alternating current of industrial frequency (85). By the end of 1957 the line was still in an experimental stage and many improvements were imperative, but there was no doubt that single phase A.C. current will be broadly applied in the future electrification operation (86).

E. Moskva-Kiyev System

1. Aprelevka-Maloyaroslavets Section
(See map, Inclosure No. 5)

Electrification of the Moskva-Aprelevka-Maloyaroslavets-Bryansk trunk line of this system started in 1951 and the first 38 km Moskva-Aprelevka section was electrified by the end of 1951 (87).

Electrification of the 79 km Aprelevka-Maloyaroslavets section was started on 17 November 1957 and was scheduled for completion by the end of 1958 (88). The 1957 electrification plan called for the completion of preliminary work at the Nara and Maloyaroslavets traction substations and the installation of contact network supports. The basic electrification works, however, were scheduled for 1958. The sum of 40,000,000 rubles was appropriated for completion of the 1958 preliminary works. This amount will cover all road construction works, reconstruction of the STsB system, construction of traction substations at the Ochakovo, Vnukovo, Aprelevka and Nara stations, assembly of contact network on the 28 km Aprelevak-Nara run and construction of power supply lines. There were also plans to reconstruct the previously electrified 38 km. Moskva-Aprelevka line, thus enabling the transfer to electric traction of freight traffic on this section as well (89). Progress reports for January and February 1958, showed, that electrification proceeded rather slowly. The "Transelektroproyekt" Trust delayed the delivery of the plans and lack of agreement regarding the construction of traction substations in Ochakovo, Aprelevka and Nara, hampered the operations. The "Moselektrotyagstroy" Trust, which conducted the construction work on this section, used only 3 million rubles instead of the planned 10,000,000 in 1957. There was no indication that this gap would be compensated in the future. Moreover the trust decided to utilize only 50% of the appropriated resources in 1958 (90).

It was reported in February 1958, that the electrification operations on this section had improved somewhat and that completion of electrification up to Nara station seemed possible already in 1958. All preliminary work on this section was already completed and the only obstacle to further progress could be the shortage of equipment for traction substations and of wire for contact network (91).

F. Kalinin System

(See map, Inclosure No. 6)

The Kalinin system consists of two trunk lines: Moskva-Kuntsevo-Golitsyno-Mozhaysk-Smolensk and Moskva-Nakhabino-Novoyerusalimskaya-Volokolamsk-Rzhev-Riga. The 11 km Moskva-Kuntsevo section was electrified in November 1943 (92) and electrification reached Golitsyno station and Zvenigorod, located on the branch line from Golitsyno in 1953 (93).

In 1955 the plans were made for further electrification of this line, but no progress was reported in available publications (94).

1. Golitsyno-Mozhaysk Section

In 1957 the electrification of the 85 km Golitsyno-Mozhaysk Section was reported to be in process with its completion scheduled for 1958 (95). The first part of this section, the 19 km Golitsyno-Kubinka stretch had to be ready for the assembly of contact network already in 1957. In January 1958 assembly of the contact network on this section was begun (96).

Electrification of the 66 km Kubinka-Mozhaysk section made slow progress in 1957, since primitive manual methods of work were used (97). In September 1957, the Zolotonosha Mechanical Repair Plant delivered a new ditch digging machine, which speed up the excavation of foundation ditches, and a new C-80 t. crane with extended crane beam, which made it possible to install contact network supports from the "field" (98). In January 1958 Tuchkovo traction substation was nearing completion and the construction of the Mozhaysk traction substation was started (99). Electrification of the 18 km Kuntsevo-Usovo branch line was completed and the first 9-unit electric train bound to Usovo departed from the Moskva-Belorussian terminal on July 26, 1957. This train was built in the Riga Plant and only recently released. The regular electric train operation on this line was started on July 27, 1957 (100).

2. Novoyerusalimskaya-Volokolamsk Section

The electrification of the second trunkline of this system Moskva-Nakhabino-Guchkovo-Novoyerusalimskaya-Volokolamsk-Rzhev-Riga advanced much faster. The Moskva-Nakhabino-Guchkovo section was electrified in 1945 and 1946 (101) and electrification of Guchkovo-Novoyerusalimskaya was completed in January 1955 (102). The electrification of the Novoyerusalimskaya-Volokolamsk section was in process by the end of 1957 and its completion was scheduled for 1958 (103).

In August 1957, the electrification of the 9 km Nakhabino-Pavlovskaya Sloboda branch line was started with completion planned for the middle of December 1957 (104). This line was completed in January 1958 (105). The electrification of this section was accomplished within the resources of the system and without any help of the central organizations. The Nakhabino Mechanical Plant delivered the necessary material and cantilever beams, the Dmitrovo Reinforced Concrete Construction Plant delivered the reinforced concrete contact network supports and the SKSD Nakhabino Plant delivered lumber for the fastening of foundation pits (106). This was the second branch line of the Kalinin system which was electrified in excess of the plan with the system's own resource (the first was Kuntsevo-Usovo) (107).

G. October System

1. General Information
(See map, Inclosure No. 7)

This system will be intesively electrified in the Sixth Five-Year Plan. It had been planned to electrify the Klin-Kalinin section of Moskva-Leningrad trunk line of this system and some suburban section of Leningrad (108). The whole Moskva-Leningrad trunk line has to be reconstructed and adjusted in 1958 for the operation of passenger trains running at speeds of up to 140 km ph. For that purpose the reconstruction of tracks (replacing light weight rails with heavy), and exchange of old switches with the new was begun (109).

The 1958 reconstruction plan also provides for the equipment of the entire line with automatic block system. However, the reconstruction plan prepared by the Main Administration of Track Management, omitted 67 km of this line (100).

The Main Administration of the Locomotive Management decided to introduce two kinds of traction on this line: diesel traction on the Leningrad-Kalinin section and electric traction on the Kalinin-Moskva section, with the same average actual speed of trains on both sections. This, however, will be hardly possible since it was decided to operate VL-19 electric locomotives with a top speed of only 90 km ph on the Kalinin-Moskva section, whereas the speed of diesel trains can be raised to 140 km ph. This inconsistency could be avoided, if more powerful electric locomotives were operated on this line (VL-22) (111).

2. Klin-Kalinin Section

Electrification of the Moskva-Leningrad trunk line started in 1950 and the Moskva-Klin was electrified by March 10, 1954 (112). Electrification of the 78 km Klin-Kalinin section was at a standstill for some time and was mentioned in a March 1956 publication as scheduled for completion in the future (1 3). In 1957, it was reported, that the electrification of this section was in process and its completion was scheduled for November 7, 1957 (114). The electrification was actualy completed on 30 December 1957 (115).

In the beginning of 1957 the electrification of this section advanced rather slowly and the Chupriyanovka-Kalinin run was ready for the assembly work on May 16, 1957, instead of March 10. The assembly of the Chupriyanovka station was postponed to June 1957. In June and July the operations were stepped up and monthly plans were considerably overfulfilled. At that time 4 runs were completed, except for cantilevers and teebars. (116) In November 1957, this section was nearing completion, although the "Moselektrotyagstroy" Trust had still to complete the construction of 6 dwellings and to abolish some shortcomings in the buildings of traction substations (117). In the morning on December 30, 1957, regular electric passenger and freight traffic was begun on the Moskva-Kalinin line (118). Many stations on the newly electrified line were completly electrified and 3 traction substations assembled and put in operation (119). The Ministry of Power Stations constructed 53 km of power supply lines in order to secure the supply of electric power to this section. The longest feeder lines are: Redkino-Kuzminka and Redkino-Zavidovo (120).

The introduction of electric traction on the entire Moskva-Kalinin line will save yearly hundreds of thousands of tons of coal and will sharply reduce the cost of upkeep of locomotive crews (121).

CHAPTER III. SUBURBAN RAIL LINES

A. Lines near Leningrad

B. Lines near Kiyev

C. Lines near Riga

CHAPTER III. SUBURBAN LINES

A. Lines near Leningrad

(See map, Inclosure No. 8)

Electrification of the suburban Leningrad-Mel'nichnyy Ruchey line and its Piskarevka-Peri branch, totaling 57 km started in April 1956 (1). It was planned to complete the electrification during the Sixth Five-Year Plan (2). This project is part of the 188 km Sixth Five-Year Plan electrification program in the Leningrad suburban area (3).

The reconstruction of Leningrad-Passenger-Finlyandskiy station, with many new station tracks to be laid, started in connection with electrification of the Leningrad-Mel'nichnyy Ruchey line (4). After completion of the reconstruction, work will begin on the electrification of the Leningrad-Piskarevka line and its Piskarevka-Peri branch (5).

B. Lines near Kiyev

(See map, Inclosure No. 9)

Electrification of the suburban lines near Kiyev was initiated in the Fourth Five-Year Plan. The Kiyev-Boyarka-Vasil'kov-Motovilovka line was electrified in 1953 (6) and the electrification of Kiyev-Darnitsa-Brovary section was planned at that time. There was not much progress in 1955. In 1956 electrification of the 30 km Kiyev-Darnitsa-Brovary section was in progress. In April 1956 it was reported that the 14 km Kiyev-Darnitsa section was scheduled for completion in July 1957 and Kiyev-Brovary section by 7th November 1957 (7). However in 1957 the workers speeded up the work and completed both stretches by the end of June 1957 (8).

Electrification of the Kiyev-Darnitsa-Brovary section involved: the erection of 16 passenger loading platforms and 9 pavillions, construction of Darnitsa traction substation, installation of contact network supports on the entire line and building of a residential house. Assembly workers strung 80 km of catenary network and installed equipment at the substations (9). On June 29th the line received electric current and it was opened for permanent operation with 14 pairs of electric trains on July 5, 1957 (10).

C. Lines near Riga

(See map, Inclosure No. 10)

The suburban rail line near Riga, which is routed via Zasulauk, Dubulty, Sloka, to Kemeri, totaling 45 km, was electrified by the end of the Fourth Five-Year Plan (11).

The Sixth Five-Year Plan stipulates the beginning of rail electrification on the northern section of Riga coast line (12). In June 1957, electrification of the 11 km Riga-Mangali section was begun and completed on July 21, 1957, the 17th anniversary of proclamation of Soviet Latvia. It was electrified in a short time using its own resources and labor without any assistance from special construction organizations (13).

Electrification of the next Mangali-Vetsaki section began by the end of July 1957 and was performed in a short time and completed on 6 November 1957. Meetings dedicated to the opening of electric train traffic on this section were held in Mangali and Ziyemel'bazma cities on 5 November 1957. (14) The electrification of the 30 km Vetsaki-Saulkrasty section was in process and nearing completion in November 1957 (15).

CHAPTER IV. STALIN, DONETS, SOUTHERN, KIROV, L'VOV SYSTEMS AND NORIL'SK DUDINKA LINE

A. Stalin System

1. General
2. Pyatikhatki-Dnepropetrovsk-Yasinovataya Section

B. Donets System

1. Lozovaya-Slavyansk Section

C. Southern System

1. Khar'kov-Merefa-Lozovaya Section

D. Kirov System

1. Murmansk-Kandalaksha Section

E. L'vov System

1. Lavochne-Mukachevo Section

F. Noril'sk-Dudinka Line

CHAPTER IV. STALIN, DONETS, SOUTHERN, KIROV, L'VOV SISTEMS AND NORIL'SK - DUDINKA LINE

A. Stalin System

1. General
(See map, Inclosure No. 11)

In 1956 the voltage of the catenary system on the electrified lines of the Stalin system was boosted by 250 to 300 v. (1) Electrification of the Stalin system was making a good progress in 1957 (2). The workers were fulfilling their assignments by 160 and 170%. In the short traffic intervals (30 to 40 minutes) they were able to install 3 to 4 contact network supports. The workers of the third section of "Dneprotransstroy" Trust fulfilled their yearly plan by 90%. But many subcontractors fulfilled the plan by 75%. The Dolinsk Brick Plant failed to deliver material for two traction substations. In spite of some difficulties the "Dneprotransstroy" Trust accomplished the workfor 14,000,000 rubles out of planned 15,000,000 and prepared a 28 km run for the assembly of contact network (3).

Numerous subcontractors of the "Dneprotransstroy" Trust, however, were lagging in their work. The "Transtekhmontazh" Trust, for example, used only 325,000 rubles out of planned 930,000 and the "Transsvyaz'stroy" Trust only 228,000 rubles out of planned 520,000 by November 1957. The "Transsignalstroy" Trust appropriated 800,000 rubles and the "Transenergomontazh" Trust 250,000, but none of these trusts was active by November 1957 (4).

2. Pyatikhatki-Dnepropetrovsk-Yasinovataya Section

Electrification of the Stalin system was begun in 1932-1933 (5) and the 182 km Zaporozh'ye-Nikopol'-Dolgintsevo line was electrified during the Second Five-Year Plan period (1933-1937) (6). Electrification of the 75 km Dolgintsevo-Pyatikhatki and Pyatikhatki-Nizhnedneprovsk Uzel sections was slated for completion in the Third Five-Year Plan (7). However, in 1956, the Zaporozh'ye-Dolgintsevo section remained the only electrified line of the Krivoy Rog-Donbass route (8).

Pravda of March 23, 1957, reported that electrification of the Nizhnedneprovsk-Uzel-Pyatikhatki line has been started (9). Electrification began by rebuilding the station tracks at the traction substations in Nizhnedneprovsk Uzel, Verkhovtsevo, and Pyatikhatki (10). The completion of electrification on this section was scheduled for 1958 (11). In June 1957 started the construction of a new scientific experimental research base at the Dnepropetrovsk Scientific Research Institute of Railroad Engineers. This new base will have its own 6.2 km electrified line, a traction substation, and electric enginehouse and dispatcher remote control point (12). In September 1957 the installation of reinforced concrete contact network supports was in process at Nizhnedneprovsk Uzel (13).

The planning of the electrification program for the Nizhnedneprovsk Uzel-Yasinovataya section (Donets system) was underway in March 23, 1957 (14) and the locations for traction substations have been already established and assigned (15). The electrification of the Pyatikhatki-Nizhnedneprovsk Uzel-Yasinovataya will require thousands of contact network supports, therefore a new plant for their manufacture was erected at the Podstepnoye station (16).

The electrification of the Donbass-Yasinovataya line is planned for 1959 (17).

reinforced concrete contact network supports were installed out of the total of 1,310. Poor supply of the material delayed the construction. The Osnova "Stroydetal'" Plant manufactured only 500 supports instead of planned 1,665 and therefore less economical and obsolete ZhBD-model contact network supports were installed (33).

D. Kirov System

1. Murmansk-Kandalaksha Section
(See map, Inclosure No. 14)

The Murmansk-Kandalaksha section with the Apatity-Kirovsk branch line (total 300 km long) remains the only electrified rail section of the Kirov System (34). It is serviced by electric locomotives of the Murmansk and Kandalaksha main electric locomotive enginehouses and by the Lyandra turn-around enginehouse. Hauling of heavy trains is successfully practiced there (35).

The electrification of the Kandalaksha-Loukhi section was planned sometime ago, and special courses for training of electric locomotive enginemen initiated (36). This electrification project seems to have been never realized, because in November 1957 it was reported that the Kandalaksha-Loukhi section will be converted to diesel traction in 1958. Already necessary steps were taken at the Kandalaksha electric locomotive enginehouse to train personnel in the operation and maintenance of diesel locomotives (37).

E. L'vov System

1. Lavochne-Mukachevo Section
(See map, Inclosure No. 15)

The Sixth Five-Year Plan provided for electrification of 150 km of the L'vov system (38). In 1956, after construction of second tracks on the 77 km Lavochne-Mukachevo section was completed, started the electrification of this section, which was completed on 31 October 1956 (39).

The electrification of this very difficult gradient, mountaineous line was a very difficult task and demonstrated examples of high efficiency and outstanding performance. The project called for the installation of 2,730 metal and reinforced concrete contact network supports and erection of 4 traction substations (40). This was the first line in the Soviet Union, which used the same feeder line for the contact network and for the "STsB". All line objects, stations, light signals, bridges, line buildings etc. received electric current from the power line strung on the contact network supports (41). In November 1956, it was suggested to electrify the entire 149 km Mukachevo-Stryy line, but nothing was done about it (42).

F. Noril'sk-Dudinka Line

(See map, Inclosure No. 16)

This 150 km line was originally built as a narrow gauge line in 1937, which was replaced by normal gauge line in 1952 (the converstion lasted from 1945 to 1952). A recent report stated that electrification of this line was begun and that its convertion into electric traction has to be expected during 1957 (43).

STAT

It was reported in October 1957, that electrification of this line was making a good progress. Day and night the ships of the Yenisey river delivered the necessary material and equipment. By the end of October 1957, 9 new electric motor cars destined for this line arrived at Dudinka Port, and the last preparations for the transfer to electric traction were heading to completion (44).

[redacted]

34

STAT

CHAPTER V. CAUCASIAN SYSTEMS

(Ordzhonikidze, Transcaucasian, Azerbaydzhan and North Caucasian Systems)
(See map, Inclosure No. 17)

A. General Information

B. Current Program of Electrification

1. Belorechenskaya-Tuapse-Sochi-Sukhumi Line

   a. Sochi - Sukhumi Section
   b. Belorechenskaya - Tuapse Section
   c. Tuapse - Sochi Section

2. Zestafoni - Chiatura Branch Line

3. Navtlugi - Leninakan Section

4. Baku Suburban Railway

5. Yerevan - Sevan Line

6. Alabashly - Kushchi Branch Line

CHAPTER V. CAUCASIAN SYSTEMS

A. General Information

The Caucasian group of railroad systems, as discussed in this chapter, is composed of Ordzhonikidze, Transcaucasian, Azerbaydzhan, and North Caucasian systems.

In the period covered by this report (September 1956 - January 1958) electrification of the Ordzhonikidze System remained confined to the Mineral'nye Vody - Kislovodsk line (in operation since 1956) and its Beshtau - Zheleznovodsk branch (in operation since 1941) (1), and the trunkline operated by diesel locomotives (2); it was planned to change over to electric traction on this trunkline in 1959 (3).

The Transcaucasian System received the greatest development of electric traction of all Caucasian systems. August 1957 marked the twenty-fifth anniversary of the introduction of electric traction on this system, at 5 km Surami Pass (4). Eventually the Surami Pass became an experimental track for testing electric traction equipment, rolling stock, electric power supply facilities (5) and recently the system of power regeneration subsequently adopted on a nationwide scale (6).

Meanwhile electrification of the Transcaucasian System was continuously underway. By the beginning of 1956 there were about 1,000 km of electrified lines (7). With completion of electrification of the Zestafoni-Chiatura line in June 1957, the total length of electrified lines in the Gruzinskaya SSR was brought up to 865.2 km, or 65 percent of its total rail length (8). By the end of 1957 the entire trunkline from Veseloye to Akstafa and a great number of branch lines (Ochemchiri-Kvezani-Akarmara, Ingiri-Zugdidi, Tskhakaya-Poti, Samtredia-Batumi, Brotseula-Tskhaltubo, Rioni-Tkvibuli, Khashuri-Surami, Khashuri-Borzhomi) were electrified, as well as the Sanain-Leninakan Section (9).

Electrification of rail lines of the Azerbaydzhan System was limited to the Apsheron peninsula. By 1954 electric locomotives operated on all sections of the peninsula (10): the Baladzhary-Baku-Artem-Kala-Buzovny-Mashtagi-Baku ring (11).

Electrification of the North Caucasian System is in progress on the Belorechenskaya-Tuapse-Sochi section (12).

During the period covered by this report (September 1956-January 1958) the electrification of the following lines in the Caucasus area was completed:

In December 1956 - the 136 km Sochi-Sukhumi line (13)
In May 1957 - the 8 km Navtlugi-Soganlugi section (14)
In June 1957 - the 38 km Zestafoni-Chiatura line (15)
In November 1957 - the 20 km Sumgait-Khurdalan section (16)
In December 1957 - the 130 km Belorechenskaya-Tuapse line (17)

The project for future electrification includes complete conversion to electric traction of the Moskva-Khar'kov-Rostov-Armavir-Tuapse-Tbilisi route by 1965 (18); this section eventually will be extended to Yerevan at a later date (19).

B. Current Program of Electrification

1. Belorechenskaya - Tuapse - Sochi - Sukhumi Line
(See map, Inclosure No. 18)

Electrification work on the Belorechenskaya-Sochi-Sukhumi line was started in 1955 (20). Electric operation on the 136 km Sochi-Sukhumi section began on 31 December 1956 (21) and a year later, on 31 December 1957, on the 128 km Belorechenskaya-Tuapse section (22). The dateline for commencement of electric operation on the 80 km Tuapse-Sochi section was not set by January 1958, as reported in Gudok 9 January 1958 (23).

a. Sochi - Sukhumi Section

Electrification plans for this section were prepared by the "Kavgiprotrans" (Caucasus Transport Planning Institute). They contained numerous mistakes and omissions, which required corrections and slowed down the rate of electrification. For instance, voltage data for transformers at the Adler traction substation were changed three times (24), all power substations were designed too small to accomodate the equipment, and contact network watch points were too spacious (25), construction of a 3 km approach track to the Gudauty substation was omitted, hampering thus the delivery of equipment (26).

The Sukhumi-Adler section was scheduled for electric operation in 1956 (27). On 22 June 1956, the first part of it, the Sukhumi-Gudauty stretch, was electrified and the electrification continued on the Gudauty-Adler stretch. Installation of steel supports and assembly of contact network was in full swing. Workers of assembly train no. 703 decided to prepare the Gudauty-Gagry run for electric operation by 25 October 1956 (28).

The delays in deliveries and lack of cooperation constantly complicated and hampered the work of builders. Thus steel sections for supports for the Gagry-Adler and Adler-Sochi sections should have been delivered in August 1956, instead, they were received only in November 1956. It was revealed that the Ministry of Transport Construction did not provide for steel units in 1956 and only after persistent requests an order was placed. The entire second quarter of 1956 was spent in finding funds to finance this material, meanwhile the Tbilisi Plant produced steel units sporadically utilizing local material. As a result the Gagry-Adler section received broken sets of steel units. Many consoles and anchors were made incorrectly and needed readjustment(29).

In October 1956, erection of supports began on the Adler-Sochi section (30) and in November 1956 serious delay was anticipated on this section, because the concrete for numerous support bases was improperly poured (31). In December 1956, electrification progressed to the Sochi-Khosta run, where electric operation was expected to start on the January 1957 (32).

Electrification of stations proceeded meanwhile. The stringing of the catenary system at the Museri and Gagry station was nearing the completion in October 1956 (33). However, in November 1956, a serious disagreement cropped up between assembly workers and operators of the civil airport at the Adler station about the height of supports for contact network in this area. As a result 600 meters of contact network had to be dismantled and the work stopped. This is one of the problems which should have been solved by the Transcaucasian System and "Kavgiprotrans" administrators long ago (34).

Power substations of the Sochi-Sukhumi line were to begin operation by November-December 1956 (35). By 26 October 1956 the Gudauty and Sukhumi substations were almost ready to receive current, while the Bzipi and Gantiadi substations were under construction (36).

As of November 1956 the construction of the Adler substation was nearing completion, with only a few finishing jobs remaining to be done. Although the completion was scheduled for 1 January 1957, the workers pledged to put the substation in operation one month ahead of time (37). Actually this substation could have been ready a long time ago, if it had not been for lack of electric equipment, such as transformers and high speed automatic devices (38). As a matter of fact all substations of the Sukhumi-Sochi line still lacked many storage batteries and 13 six-kw distributory devices, as reported in November 1956 (39).

On 29 December 1956 the first electric locomotive arrived at the Sochi station and an inspecting commission checked the electrification of the Sukhumi-Sochi line (40). On 31 December 1956, the line was approved for electric operation, however regular electric operation began only on the Sukhumi-Adler section by electric motor-car trains (41) because the power lines were not ready (42).

On 8 April 1957, the first long distance electric train arrived from Tbilisi at the Sochi station (43).

b. Belorechenskaya-Tuapse Section

According to the electrification plan the 128 km Belorechenskaya-Tuapse stretch was scheduled for completion in December 1957. Construction and assembly workers, however, decided to take a pledge to complete the Belorechenskaya-Kurinskiy section by Railroaders' Day (early August 1957) and the Kurinskiy-Tuapse section by 7 November 1957. A petition was sent to the Zaporozh'ye Transformer Plant to deliver the equipment for power substations in the second quarter of 1957 instead of the third (44).

By the beginning of 1957 the section should have been ready for assembly work, however by April 1957, not a single run was completed, because hundreds of contact network supports and foundations were improperly installed (45). Later in the month it was reported that installation of contact network supports was completed and that the electrification was progressing satisfactorily (46). To provide adequate overhead clearance for the passage of pantographs in tunnels it was proposed to lower the roadbed. This method hastened the reconstruction process and saved over 200,000 rubles (47). In June 1957, the contact network on the Belorechenskaya-Tuapse section was prepared to receive electric current (48).

The "Sevkavtransstroy" (North Caucasian Transportation Construction) Trust started erection of the Belorechenskaya, Tverskaya, Kurinskiy, Tuapse, and Goytkh substation buildings, and was to prepare them for assembly work in 1956. In August 1956 inside work had yet been done and the buildings had many structural faults (49). However, in April 1957, good progress in erecting the Belorechenskaya, Tverskaya, and Kurinskiy substations was noticed (50).

The Goytkh power substation was to be completed in 1956, but only 33 percent of construction work was done by March 1957. The walls of the substation were not completed, the outside area was not prepared, and the driveway was not constructed. The construction of the nearby residential building was at a standstill. During 1956 the contract to build the substation building was transferred from one organization to another. By February 1957 the fourth organization took over the construction work. The dateline for completion was not indicated and the 25 workers on the construction site frequently were forced to slow down for lack of building materials (51).

Meanwhile other substations on this line were under construction during November-December 1956 and assembly was in full swing in March 1957 (52). The assembly of the Belorechenskaya traction substation was nearing completion in August 1957. The substation would not be put in operation at that time due to failure of the Tbilisi Electromechanical Plant to deliver current relay, control panel equipment, and vacuum-apparatus transmitters (53). The Belorechenskaya substation was scheduled for operation by 25 October 1957 (54).

The assembly of power transformer and oil curcuit breakers at the Tuapse substation was nearing completion in June 1957 (55). In December 1957 the assembly work at the Tuapse substation was still not completed (56).

The assembly of the contact network at the Belorechenskaya junction was to be completed in April 1957 (57), but in September 1957 it was still in process with the daily work norms regularly fulfilled by 160-170 percent. The workers have pledged to complete the assembly work by 1 October 1957 (58). The Tuapse junction was under electrification in October 1957, with construction-assembly trains No. 162 and No. 703 participating in this project (59).

The Tuapse electric locomotive enginehouse was under construction for two years and was still not ready in July 1956. Machines available at the construction site, were not used to their full capacity and most of the work was done manually, thus delaying the construction (60).

The construction-assembly crew of the "Sevtransstroy" Trust installed supports on the 90 km of the 130 km Belorechenskaya-Tuapse section, constructed three substations, three residential buildings, and other structures by October 1957. They promised to put this section in operation by 7 November 1957 (61). The postponement of dateline, however, became inevitable, because the power transmission lines were not finished on time (62).

Construction of the 77 km transmission line for the Belorechenskaya-Tuapse section started in March 1957. The 110 kv line, which will go through the Goytkh Pass crossing mountaneous areas, will require considerable earth moving and numerous concrete installations, using about 120 carloads of steel units for supports and 35 carloads of wires (63). The first 5 km of the double chain line, leading to Tverskaya traction substation was put into operation on 3 October 1957. This transmission line branches off the Afinskaya-Apsheronskaya main line. The Tverskaya substation was the first on the section to receive electric power (64).

On 5 November 1957, the first electric train ran on the Belorechenskaya-Kurinskiy section (65). The first electric passenger train was to make a trip on the Kurinskiy-Tuapse section on 31 December 1957. The entire 130 km Belorechenskaya-Tuapse section was placed in operation in January 1958 (66). The regular passenger traffic of electric trains began in April 1958 (67).

c. Tuapse - Sochi Section

In April 1957 a survey party worked on the electrification project of the 80 km Tuapse-Sochi section (68). The exact deadline of this project was not set (69), but was stated to be sometime in 1958. Little preliminary work was accomplished due to delays in the delivery of building materials, and mismanagement (70). Lack of any remarkable progress and improvement was reported later, in January 1958. Only 5,100,000 rubles were actually spent on this construction out of 8,500,000 rubles assigned (71).

The 1957 plan provided for the "Sevkavtransstroy" Trust to complete installation of contact network supports on 50 km of tracks. Actually supports were installed on 53 km Tuapse-Yakornaya Shchel' section, but failure to place 50 anchor towers prevented assembly workers to start their job. Many examples of mismanagement were noted (72). The installation of supports for the contact network on the Tuapse-Lazarevskaya run was reported to be in process in October 1957 (73).

Erection of the Lazarevskaya, Yakornaya Shchel' and Dagomys substations should have been completed in 1957, but actually only the Dagomys substation was ready. In January 1958, not even the walls of the Yakornaya Shchel' substation were finished (74). Assembly train No. 703 was assigned to commence assembly work at substations in January 1958. Because the order for equipment had not been placed beforehand, the volume of work for 1958 was not planned and subcontractors' assignments were not distributed (75).

The electrification projects prepared by the "Kavgiprotrans" had many shortcomings. The blind tracks to Yakornaya Shchel', Lazarevskaya and Dagomys substations were omitted in the blue print stage, and the cost sheets contained omission of equipment, necessary for proper operation (76).

By February 1958, since the substation buildings at the Lazarevskaya and Dagomys were not quite finished when assemblers began to mount electric equipment, the timetable was coordinated for construction and assembly operations to be conducted at the same time (77).

It was decided to suspend the network up to Yakornaya Shchel' by 16 March 1958. In February 1958 supports were being installed on the Chemitokvadzhe - Yakornaya Shchel' run. Electrification workers pledged to complete electrification of this line in six months (78).

2. Zestafoni - Chiatura Branch Line

In September 1956 construction of the 38 km new wide-gauge Zestafoni-Chiatura line was completed by workers of the "Zaktransstroy" (Transcaucasian Transportation Construction) Trust. The new line runs along the Kvirily River, parallel to the old narrow-gauge line and crosses it at several points. The construction and electrification of this line was done without interrupting traffic on the narrow-gauge line (79).

The assembly workers installed 1,050 supports, assembled 64.5 km of network (80) and equipped the Chiatura traction substation (81). The plan called for completion of electrification of this newly constructed line in the fourth quarter of 1957, but construction workers and miners of the "Chiaturmarganets" (Chiatura Manganese) Trust decided to complete the assignment five months ahead of the plan (82).

On 30 June 1957, the Zestafoni-Chiatura line was approved for electric operation. Meanwhile electrification continued on the 5 km extension of the line to the Perevisi station (83). The entire 38 km electrified Zestafoni-Chiatura-Perevisi line was put in permanent operation in August 1957. The new line was included into the Samtredia division of the Transcaucasian System (84).

3. Navtlugi - Leninakan Section

The 107 km Sanain-Leninakan section was electrified before 1957 (85). On 3 May 1957, electrification of the 8 km Navtlugi-Soganlugi section was completed and regular electric operation began on the Tbilisi-Soganlugi section (86). In July 1957, electrification of the 53 km Sognalugi-Sadakhlo section was nearing the completion (87).

4. Baku Suburban Railway

July 1957, marked the 31st anniversary of electric operation on the 42 km Baku-Sabunchi-Surakhany rail section (88). Since that time the length of electrified lines on the Apsheron peninsula continued to increase. In 1934 the Sabunchi-Zarbat section was electrified and a year later electric trains began to run up to Mashtagi station, and as far as the Buzovny station in 1939. Electrification was especially intensive in the post-war years. In 1948 the Surakhany-Kala and Kala-Buzovny sections were converted to electric traction (89), thus closing the 75 km ring of electrified track on the Apsheron peninsula (90).

In April 1953 the first electric train ran to Artem Ostrov (Island) and in September 1953 electric trains started to run on the Baku-Baladzhary section (91). By 1954 electric locomotives already operated on all sections of the Apsheron peninsula (92). By 1957 the length of electrified sections on the peninsula increased over two and a half times over 1926 figure (42 km), (93).

During the past 12 years (1945-1957) the contact network was changed, tracks reconstructed, outdated motor-generators replaced by new mercury arc rectifiers, passenger loading platforms enlarged, and new terminal buildings and an electric locomotive enginehouse erected. By means of electric train the remotest oil field could be reached in 30-40 mins instead of 2-3 hours (94).

Latest information on electrification in this area concerns the 20 km Khurdalan-Sumgait section. In July 1957, it was reported, that electrification of this section was nearing completion (95). In October 1957 first test run with electric locomotive was made on the Baku-Sumgait section (96)* and on 6 November 1957 the Khurdalan-Sumgait section was officially opened for electric traffic (97).

After a long period of construction the new Beyuk-Shor electric locomotive enginehouse** was finally completed in 1957. The new enginehouse is equipped with comfortable workshops, overhead travelling crane, track-wheel crane, 25-ton lifting jacks, washtub for wheel pairs, and sparying machine for washing rail cars. Basic power is supplied by electricity. The new enginehouse is provided with inflow-exhaust ventilation, central heating system, technical laboratory and technical office. Workers moved equipment from the Baku (old) enginehouse to the Beyuk-Shor enginehouse without interruption of their regular duties (98).

*Evidently the Baladzhary-Khurdalan section was electrified at some earlier date.
**About 10 km from Baku.

The Sixth Five-Year Plan provides for complete electrification of all suburban lines in the Baku metropolis area (99). By 1960 the Baku suburban electric train will haul 15,750,000 passengers daily some 362,200,000 passenger/km. By 1970 the total length of electrified suburban lines in the Baku area is expected to reach 89 km and the average daily intensity of traffic will be 13,500 passenger-km/km (100).

5. Yerevan - Sevan Line

The new 84 km wide-gauge Yerevan-Sevan line was under construction in December 1957 (101). The line was planned for electrification since 1956 (102). In December 1957 the 60 km Yerevan-Akhta section was completed and following railroad stations built: Arabkir, Abovyan, Elar (has an engine-house), Arznya, Lusavan (17 km from Akhta), and Akhta. Freight and service trains already operated on the section. Meanwhile construction continued on the Akhta-Sevan section and at the Dtmashen, Tsakhkunk, and Sevan railroad stations (103). Future extension of the line from the Sevan to Akstafa station (on the Tbilisi-Baku trunkline) was under consideration in January 1956 (104).

6. Alabashly - Kushchi Branch Line

The 35 km Alabashly-Kushchi branch line links the Dashkesan magnetite mining center with the Tbilisi-Baku trunkline. Its major freight traffic consists of Dashkesan iron ore delivered to the Rustavi Metallurgical Plant (105). This branch line is scheduled for electrification in 1958 (106).

CHAPTER VI. SVERDLOVSK SYSTEM

A. General Information

B. Current Program of Electrification

1. Kizel - Perm' Line
2. Aziatskaya - Kachkanar Branch Line

C. Electric Enginehouses

1. Sverdlovsk Enginehouse
2. Nadezhdinsk Enginehouse
3. Chusovskaya Enginehouse
4. Usol'skaya Enginehouse
5. Perm' Enginehouse
6. Kushva Enginehouse

A. General Information
(See map, Inclosure No. 19)

In the past 40 years (1917-1957) the length of electrified tracks of the Sverdlovsk System was brought up to 1,185 km, which comprised 22 percent of the total length of the system (1). In addition to the previously electrified sections of Chusovskaya - Kizel (since 1933), Perm'-Chusovskaya-Kizel-Solikamsk, Sverdlovsk-Goroblagodatskaya-Chusovskaya, Goroblagodatskaya-Nadezhdinsk-Bogoslovsk lines the electrification was extended (in 1942) to suburban lines of the cities of Sverdlovsk, Perm', and Nizhniy-Tagil (2).

Current electrification projects of the Sverdlovsk System include the 160 km single-track Kizel-Perm' line which was electrified by January 1957 (3) and the 45 km Aziatskaya-Kachkanar branch line (4), which is under construction. The Sixth Five-Year Plan also provides for electrification of the Chelyabinsk-Sverdlovsk line (5)* and the Perm'-Balezino section, the survey and blue prints for which with plans for single phase (a.c.) current were finished in 1957 (6).

B. Current Program of Electrification

1. Kizel - Perm' Line

The 165 km Kizel-Perm' line was under construction since 1948 and was scheduled to be put in operation when completely electrified (7). The electric operation was to commence by the end of 1956 (8) in the following order: the 26 km Levshino-Div'ya section in June, the 33 km Div'ya-Kukhtym section in July and the 52 km Kukhtym-Parma section in August 1956 (9). The actual completion of electrification took place five months later than anticipated (10), and the line was approved for operation on 31 January 1957 (11).

There were many shortcomings and delays in this construction. Assembly train No. 705 was assigned to undertake installation of transmission lines, contact network, and assembly of electric equipment at traction substations (12). However, when it arrived in March 1956, none of the objects were ready for assembly and several projects were not even started. The assembly work finally commenced in May 1956 (13), but shortages of necessary materials (insulators, cables, wires), equipment (14), and mismanagement delayed the construction (15).

In October 1956, and inspection commission established many shortcomings that had to be eliminated or corrected before the line could be put in operation: transmission line poles had to be installed at the Kyzh, Tabory, Tikhaya, Parma, Shestaki, Mal'tsevka, Ugleural'skaya and Polovinka stations; 24 contact network supports were missing on the 60 km transmission line; passenger platforms had to be constructed at Pal'niki, Div'ya, Yarino, Kukhtym, and Zagar'ye stations, and a terminal building completed at the Ugleural'sk station (16).

In November 1956, the contact network on the Levshino-Div'ya run was approved for operation and the first electric train made a test run. The assembly and adjustment of the contact network on the Div'ya-Kukhtym run, and on the Zagar'ye-Shestaki run was nearing completion and on the Ugleural'skaya-Nyar run was progressing rather slowly (17).

*No information was available that electrification of this line was started or conducted.

The assembly of the Div'ya traction substation and of the transformer substation at Levshino was completed, and at the Kukhtym substation was nearing completion (18). In November 1956, traction substations still lacked four 110 kv transformers, seven sets of high-voltage switches, protecting equipment and many other devices vital for substation operation (19). Transformers arrived only on 12 December 1956 and rush work began to complete the job in 1956. An additional 70 workers were sent to speed up the assembly and a large group of electricians came from Sverdlovsk, Perm', Nizhniy-Tagil (20) and other places (21). This rush work greatly increased the cost of electrification (22).

On 27 December 1956, the 165 km Kizel-Perm' newly electrified line was approved for operation and freight traffic began (23) and was officially put into operation on 31 January 1957 (24). The new rail line has 225 artificial structures, two railroad junctions (Levshino and Ugleural'skaya) (25), eleven railroad stations (26) and turnout points (27)*. It shortens the length of shipment and relieves traffic congestion on the Kizel-Chusovskaya-Perm' line. The line is equipped with an semi-automatic block system (28).

2. Aziatskaya - Kachkanar Branch Line

Construction of a new 45 km electrified branch line was initiated by the Kachkanar Ore Concentration Kombinat (iron-vanadium ore and iron ore). The line was planned to connect the Aziatskaya railroad station with the Kachkanar mountain. The construction was assigned to the "Sverdlovsk-transstroy" (Sverdlovsk Transportation Construction) Trust. As reported in May 1956, the first construction group was sent on location (29).

The plan provides for construction of a machinery repair shop, thermal electric power plant, and electric locomotive enginehouse at the kombinat (30)*.

C. Electric Locomotive Enginehouses

In the past years several old steam enginehouses of this system have been reconstructed and converted to electric enginehouses, including Chusovskaya, Kushva, and Usol'skaya, and also several new electric enginehouses have been built, such as Sverdlovsk-Classification, Nadezhdinsk-Classification, and Perm', and turnaround enginehouses at Smychka, Proletarskiy, and other stations (31).

The electric locomotive park assigned to main enginehouses basically consists of VL22^{m} series and partly of VL19 and Ss series electric locomotives (32). The Sverdlovsk, Chusovskaya, and Perm'II electric enginehouses are the only ones on the system which do all three types of repair: medium, lifting, and periodical (33).

The locomotive operational characteristics of this system were poor for several years: average daily locomotive run norms were not met, and locomotives exceeded their standing time norms at turnaround enginehouses and intermediate stations. A "group servicing" method of electric locomotives was introduced at the Sverdlovsk-Classification and Perm'II enginehouses to overcome this inefficiency. This method increased the daily locomotive run by 20-30 km, but still much time was wasted while the crew waited for a locomotive of their group, or the locomotive waited for the crew assigned to it (34).

*Construction of the Kizel-Perm' and Aziatskaya-Kachkanar lines is described in Report AF 1141201

In summer 1956 a new "collective" method of operation was introduced at the Chusovskaya, Perm', and Sverdlovsk enginehouses, according to which, crews were no longer permanently assigned to locomotives and locomotive maintenance became the responsibility of special maintenance units (35). This method raised the average locomotive run by 52 km, and permitted to reduce the electric locomotive park by 18 engines (36).

1. Sverdlovsk Enginehouse

The Sverdlovsk-Classification electric locomotive enginehouse was built as an electric enginehouse (37). It has an operational park of 22 locomotives (38) and well qualified and experienced operational and repair personnel. (39) It performs two medium and two lifting repairs monthly and services not only its own locomotive park, but also that of the Nadezhdinsk and Kushva enginehouses (40).

2. Nadezhdinsk Enginehouse

The Nadezhdinsk-Classification electric locomotive enginehouse was built as an electric enginehouse (41) and serves two single-track runs: the 42 km Bogoslovsk-Nadezhdinsk run and the 94 km Nadezhdinsk-Verkhotur'ye run (42). Since summer of 1955 a ring run method of operation was introduced. In 1956 the operational park was reduced by 2.8 electric locomotives while freight traffic increased 7 percent (43). Average daily locomotive runs continued to improve through 1956 and were 512 km in October with some enginemen making 900-1,000 km per day (44). In 1956 electric locomotives of this enginehouse hauled 7,000 heavy trains (70 percent of the total) in which they delivered 3,500,000 tons of excess freight (45).

The Nadezhdinsk enginehouse has a skilled staff, but the quality of repair is inadequate. This small enginehouse lacks numerous measuring devices and repair tools. It sends its locomotives for repair to the Sverdlovsk enginehouse (46), and for major repairs to the Tbilisi and Perovo repair plants. Complaints were made that the quality of repair performed by these plants was poor and that locomotives frequently needed another repair soon after they were returned to service (47).

3. Chusovskaya Enginehouse

The Chusovskaya electric locomotive enginehouse was reconstructed from a former steam enginehouse (48). It serves the Goroblagodatskaya-Chusovskaya (181 km) and the Kizel-Chusovskaya (113 km) sections (49), and has 52-55 electric locomotives for freight traffic (50). In six months of 1957 electric locomotive enginemen shipped 280,000 tons of excess freight in heavy trains (51). Traction substations of the sections serviced by Chusovskaya locomotives are equipped with motor-generator conversion devices which make possible to use regenerative braking. As a result a total of 7,203,000 kwt/hr of electric power was saved in 1956 (52).

The Chusovskaya enginehouse has a well equipped repair base, able to do two medium and two lifting repairs monthly. It repairs locomotives of the Usol'skaya enginehouse and partly of Perm' enginehouse, in addition to its own (53). Efforts were made to reduce the time of locomotive repair (54).

4. Usol'skaya Enginehouse

The Usol'skaya electric locomotive enginehouse was reconstructed on the base of the old steam enginehouse (55). This enginehouse can undertake only small periodical repair of electric locomotives, because it has only a small repair base and no bridge crane. For larger repairs locomotives are dispatched to the Chusovskaya enginehouse (56).

5. Perm' Enginehouse

The Perm'II electric locomotive enginehouse was under construction since 1945. In 1955 partly reconstructed workshops with some structural defects were used for electric locomotive repair. In September 1956 the enginehouse was approved for permanent operation, but it still lacked equipment and tools necessary for capital and medium repair of electric rolling stock. Parts had to be sent frequently to other enginehouses and the Perovo Plant for repair. However, a work plan was set up and the enginehouse was expected to keep up with repair of electric rolling stock for the Sverdlovsk and Tomsk systems and the new Kizel-Perm' line (57).

In 1956 the repair quota was exceeded and locomotive operational park reduced by 10 locomotives, while freight traffic increased (58). In May 1957, it was reported, that this enginehouse was specializing in medium and lifting repair of the electric units. It served not only the Sverdlovsk System, but also the Tomsk, Omsk, South Urals, and Ufa systems. In addition it mastered medium and lifting repairs of electric locomotives, but at the same time some of its own locomotives were sent to the Chusovskaya enginehouse for repair (59).

The daily locomotive run in this enginehouse was increased to 375 km by reducing standing time of locomotives at turnaround points in 1957 (60).

6. Kushva Enginehouse

The Kushva electric locomotive enginehouse was reconstructed from a former steam enginehouse (61). Electric locomotives of this enginehouse are repaired at the Sverdlovsk enginehouse (62). It serves the Kushva-Smychka (46 km) and Kushva-Verkhotur'ye (102 km) sections. The ring system of operation was introduced (Kushva-Smychka-Verkhotur'ye and back to Kushva), with a total ring of 298 km (63). In May 1957, electric locomotives increased the average daily run to 412 km, while the norm was 393 km (64).

STAT

CHAPTER VII. KUYBYSHEV SYSTEM
(See map, Inclosure No. 20)

A. General Information

B. Current Program of Electrification

1. Kinel' - Syzran' Line

a. Kinel' - Smyshlyayevka Section
b. Kuybyshev - Syzran' Section

2. Kinel' - Pokhvistnevo Line

3. Syzran' - Ruzayevka Line

a. Syzran' - Inza Section
b. Inza - Ruzayevka Section

C. New Electric Enginehouses

1. Kinel' Enginehouse

2. Kuybyshev Enginehouse

3. Ruzayevka Enginehouse

CHAPTER VII. KUYBYSHEV SYSTEM
(See map, Inclosure No. 20)

A. General Information

The Sixth Five-Year Plan provided for electrification of the entire Kuybyshev trunkline, extending from Kovylkino (Moskva-Ryazan' System) to Pokhvistnevo (Ufa System) border stations, a distance of 690 km (1). Prior to this electrification program electric traction on the system was limited to the Kuybyshev-Bezymyanka section, which was electrified in 1941 and later extended to Smyshlyayevka station (in 1952), in all 22 km, operated by the suburban electric trains (2).

The current electrification program proceeded along the following lines: the 177 km Kinel'-Syzran' line, electrified during 1956-1957 and put in electric operation on 6 November 1957 (3); the 118 km Kinel' - Pokhvistnevo line, under electrification in 1957 and scheduled for completion in 1958 (4); the 308 km Syzran'-Ruzayevka and the 87 km Kovylkino-Ruzayevka lines, still in initial stages of electrification (5) and scheduled for completion sometime during the 1959-1960 (6).

In view of the extensive electrification program on the Kuybyshev System many locomotive enginemen and assistant enginemen were trained in electric locomotive operation by the system administration. In all 407 persons were undergoing training in February 1957 (7).

B. Current Program of Electrification

1. Kinel'-Syzran' Line

In January 1956 work has been started on the whole Syzran'-Kinel' line (8). The central section of this line, the 22 km Kuybyshev-Smyshlyayevka section, was electrified before 1952 and operated by suburban electric trains (9). Thus electrification was confined to the 19 km Kinel'-Smyshlyayevka section and the 136 km Kubyshev-Syzran' section (10). The assignment was given to the "Kuybyshevtransstroy" (Kuybyshev Transportation Construction) Trust as the main contractor, and to 17 specialized organizations as subcontractors (11).

Electrification of the Kinel'-Smyshlyayevka section was completed and on 5 February 1957, when an electric train made a test run on both tracks (12), but actual operation began a year later, when the entire Kinel'-Syzran' line was electrified (13).

Electrification proceeded in a rather disorganized manner. In 1956 lack of building materials, dispersion of works (14) and shortage in labor force (there were 1,500 workers on the site instead of the needed 3,000 in June and 2,200 in September 1956) hampered fulfillment of the plan (15). In the first three months of 1957 only 9 percent of the annual plan was accomplished (16), and in May 1957 the monthly assignment was not met (17). The deliveries of material from the reinforced concrete casting yards at Kinel' and Syzran', and from the Perevoloki and the Zhiguli Metal Construction plants were constantly delayed (18).

By the middle of February 1957 construction workers and railroadmen pledged to put the line in electric operation by 7 November 1957. The Kuybyshev Oblast Party Committee gave all possible assistance, including delivery of additional construction materials from local supply sources, help in preparation of reinforced concrete blocks and installation of high-voltage transmission lines (19).

In 1956 none of the seven traction substations was ready for assembly work (20). In April 1957, erection of buildings for the substations was still lagging. Workers were frequently forced to remain idle due to untimely delivery of material (21). Shortage of equipment for substations was responsible for many delays. Only five 110 kv oil-circuit breakers arrived instead of nine, and a dozen of each, mercury arc rectifiers and traction transformers, instead of 20 of each by September 1957 (22). Most of the installation operations had to be done manually due to lack of machinery. Even the 3-ton pieces of equipment had to be installed without crane (23).

The 1957 electrification program included lengthening and adding of station tracks, which contributed to the operational improvement and greater throughput capacity. But this important task was frequently neglected (24). Originally 103,000,000 rubles were appropriated for the electrification of the Kinel' - Syzran' line, later this sum was reduced to 95,000,000 rubles, and finally to 92,000,000 rubles. In consequence, the Kinel' and Kuybyshev enginehouses were not prepared for operation when the line was finished (25). The final total cost of the Kinel'-Syzran' line electrification was 6,200,000 rubles above the planned one (26), and amounted to 1,175,000 rubles per km of tracks (27).

The Kinel'-Syzran line was officially opened for electric operation on 6 November 1957 (28). The Kinel' and Kuybyshev enginehouses dispatched their first electric locomotives, one from Kinel' to Syzran', and another from Kuybyshev to Syzran' (29). In a short period of time much work was accomplished: seven traction substations were built, 7,914 tons of steel structures were produced and assembled, 6,700 supports for contact network were installed, and 724 km of contact network and 180 km of high-voltage transmission lines were assembled and suspended (30). In addition, considerable work of reconstruction of stations, roadways, and automatic block system was completed (31). A peculiarity of this line was the great total length (open length) of contact network. It reached 3.7 km per one km of operational length. Reinforced concrete supports of the ZhBK series were used for the contact network (32).

In December 1957 it was reported, that the newly electrified line retained considerable degreee of its steam locomotive traction in freight and passenger traffic, because of an insufficient supply of the electric locomotives. Immediate action was demanded from the Ministry of Transportation to supply the Kuybyshev System with the necessary number of electric freight locomotives and electric units for passenger traffic (33).

In 1958 remote control of traction substations will be introduced on the Kinel'-Syzran' line (34).

a. Kinel' - Smyshlyayevka Section

Electrification of this 19 km section was planned for the end of 1956 (35), but the "Kuybyshevtransstroy" Trust promised to open the section for electric operation on 7 November 1956 (36). Erection train No. 238 was assigned to the construction of the Kinel' station tracks, Kinel' substation building, residential houses and other projects. Very little was done during the first quarter of 1956, and in order to catch up with the plan, the following schedule was worked out: to prepare Kinel' traction substation for assembly work by 1 June 1956 and to fulfill the entire annual erection-assembly program by 20 December 1956 (37). This program was later completely disregarded due to the late delivery of parts and supply materials (38), and mismanagement (39). The electrification was actually completed in February 1957 (40).

Though the electrification of this line was completed in February 1957, the regular operation of electric trains started only a year later, in February 1958 (41), when the entire Kinel' - Syzran' line was electrified (42). Even the local (suburban Kuybyshev) traffic was not permitted to extend electric operation to Kinel' in this period (43).

b. Kuybyshev - Syzran' Section

It was the last and the longest section of the Kinel'-Syzran' line to be converted to electric traction. Completion of this project was scheduled for the end of 1957, but in May 1957 workers of the "Kuybyshevtransstroy" Trust pledged to open the section by 7 November 1957 (44) and despite the great deal of work involved and many difficulties, this was accomplished (45).

The electrification project included construction and assembly of equipment at six traction substations (Tomylovo, Lipyagi, Bezenchuk, Syzran', Pravaya Volga, and Myl'naya) and erection of residential buildings with a total area of 12,824 sq m (46). In addition to regular construction work, directly related to electrification, extensive reconstruction, lengthening and expansion of station tracks had to be done at Bezenchuk, Novo-Kuybyshevskaya, Lipyagi, Zhiguli, Tomylovo, Chapayevsk, and Batraki stations (47). A total of 92,000,000 rubles was alloted for the entire project (48).

The electrification proceeded as follows: In March 1957 some 500 supports were installed during 72 traffic intervals (49). In April volume of work performed doubled the results of March, with a total of 1,200 supports and foundations installed on Bezymyanka-Kuybyshev, Kryazh-Lipyagi and other four runs, between Novo-Kuybyshevskaya and Zvezda cleared for assembly work. The suspension of contact network was completed on the Kryazh - Lipyagi - Novo-Kuybyshevskaya section by 5 May 1957 (50). In May 1957 the following plan of work was adopted: to erect and prepare for assembly work the Tomylovo, Lipyagi, Bezenchuk, Syzran', Pravaya Volga, and Myl'naya traction substations by June 1957 and to complete assembly of equipment by October 1957 (51).

In November 1957 the electrification of the entire Kinel'-Syzran' line was completed (52) and the first electric locomotive made a test run. Steps were taken to secure transfer of all passenger and freight traffic to electric traction during December 1957 (53).

2. Kinel' - Pokhvistnevo Line

The 118 km Kinel' - Pokhvistnevo line was scheduled for electrification in 1958. A total of 26,000,000 rubles was alloted for electrification work (54). This project was approved by the Main Administration of Electrification and Electric Power in July 1956 (55), but there were no preliminary works initiated during the first three months of 1957 (56), and in nine months of 1957 the annual assignment was accomplished by 13.4 percent. Monthly assignments were not met systematically which was blamed on the shortage of labor. Trushnikov, Chief of the "Kuybyshevtransstroy" Trust, promised to catch up with the plan during the second half of 1957 (57).

The Kinel'-Pokhvistnevo line remained the sole non-electrified section on the entire heavy traffic Syzran'-Makushino route, therefore early electrification was of especially great importance. In December 1957 construction workers and railroadmen suggested that electrification could be completed in the first

half of 1958, which is considerably ahead of plan (58). In March 1958 a definite plan and dateline for completion of works was set. It was decided to prepare the line for test run sometime after 1 July 1958, and to open regular electric traffic by 1 August 1958 (59).

Electrification work was assigned to several construction organizations. Construction-assembly train No. 246 of the "Ufimtransstroy" (Ufa Transportation Construction) Trust was made responsible for electrification of the Pokhvistnevo-Krotovka section. Train No. 239 of the "Kuybyshevtransstroy" Trust was to electrify the Krotovka junction and adjacent runs, while train No. 238 of the same trust was to work on the Georgiyevka-Kinel' section and at the Kinel' junction (60).

The preparatory works were already conducted in 1957. In December 1957 train No. 245 was preparing the Pokhvistnevo-Podbel'skaya and Podbel'skaya-Tolkay runs for assembly of contact network, but its progress was unsatisfactory due to shortage of materials. During the first half of November 1957, only about a dozen supports were delivered to the sites (61). Train no. 238 was more efficient and installed 245 (out of planned 690) reinforced concrete supports, 163 (out of 208) steel supports and 210 (out of 260) monolithic and pre-assembled bases during December 1957 (62). By 20 December 1957 the Kinel'-Turgenevka run was ready for assembly work (63). The electrification of the Pokhvistnevo station by train No. 245 showed a poor progress in December 1957 (64). Almost all switches were wrongly connected and all foundations for supports had to be reshaped (65). The Kinel' station, on the other hand, was ready for assembly work and Turgenevka station was nearing completion (66). Faulty planning hampered construction of the Pokhvistnevo substation building (67).

In March 1958, it was stated, that all preliminary work on the Kinel'-Pokhvistnevo line was completed in 1957, and construction-assembly works started in the first days of 1958 (68). It was decided to open the line for permanent electric operation by 1 August 1958. The following program of work was set up: To complete substation buildings at Tolkay and Podbel'skaya by 25 March and 15 April, respectively; to put in operation traction substations at Pokhvistnevo - in March, at Turgenevka and Krotovka - in May, at Tolkay - 25 June, and at Podbel'skaya - by 25 July; to prepare the contact network on runs for operation by 1 May 1958 and at the stations in June; to complete installation of transmission lines to the substations by 15 May 1958 (69).

In connection with this program reconstruction of station tracks, and automatic blocking, as well as erection of residential buildings and other jobs, should be done at a faster rate. In March 1958 assembly work had already commenced at the Pokhvistnevo, Turgenevka, and Krotovka traction substations. Supports were installed for the assembly of the contact network at the Turgenevka, Georgiyevka, Krotovka, and Mukhanovo stations and on adjacent runs. (70)

A petition was sent to the Ministries of Transportation and Transport Construction to make necessary provisions for timely delivery of equipment and other materials. Test runs should start by 1 July 1958 and the line scheduled to be opened for permanent electric operation by 1 August 1958 (71).

3. Syzran' - Ruzavevka Line

a. Syzran'-Inza Section

Electric operation for this 196 km section was planned to begin in 1959. However preliminary work was postponed, because the "Kuybyshevtransstroy" Trust (main contractor) refused to begin large scale electrification before the second tracks are laid, and the dateline for laying second track was not set, as of February 1958 (72).

Workers of construction-assembly train No. 239 proposed to start electrification of the heavily travelled Syzran'-Naleyka section (which includes the Naleyka-Polivanovo dense traffic run) right after the Kinel'-Pokhvistnevo line switched to electric traction. It is possible to proceed with electrification simultaneously with the laying of the second track since the roadbed and artifical structures were already completed and installation of supports for the contact network was not expected to interfere with track laying. The Zhikharevka and Racheyka substation buildings were already under construction and the "Volgoelektroset'stroy" (Volga Electric Network Construction) Trust agreed to install the high-voltage line to Naleyka in current year (1958). Also the electric locomotives of the Kinel' enginehouse could easily serve this section. They averaged 650-700 km in daily runs in February 1958 (73).

b. Inza - Ruzayevka Section

Electric operation on this 112 km section was planned for 1960 (74). In October 1957 electrification work was underway on the Syzran'-Ruzayevka section (75). The Inza-Ruzayevka section was recently double tracked and could be electrified before the Inza-Syzran' section, but this was delayed, because the transmission line was not extended from Syzran, i.e. 310 km (76).

C. New Electric Enginehouses

It was planned to reconstruct the Kinel' (77), Kuybyshev (78), and Ruzayevka steam locomotive enginehouses and to adapt them for electric locomotive service (79). Due to faulty planning, there were no funds for this purpose in 1957. As a result, at the time of electric locomotive operation the Kinel' and Kuybyshev enginehouses were not ready for servicing electric locomotives (80).

1. Kinel' Enginehouse

The Kinel' electric locomotive enginehouse, as reported in July 1957, was being reconstructed at a very slow rate. In fall 1957 it was to receive the first electric locomotives, but the construction of technical inspection points and reconstruction of other facilities was delayed (81). By September 1957 works were still carried out without plan and datelines were regularly broken and much of the work still remained to be done (82). However according to Gudok (5 February 1958), electric locomotives of the Kinel' enginehouse made 650-700 km daily runs (83).

2. Kuybyshev Enginehouse

The Kuybyshev electric locomotive enginehouse was to serve as the main repair base of electric locomotives of the system. The technical inspection point was to be converted to a small periodical inspection point for electric

locomotives and to be located in the same buildings with the auxiliary shops (storage battery, machine, and tool shops). One of the lifting repair units was to be re-equipped to serve as large periodical inspection point and to repair wheel lining (without separating it from the wheel pair) and panthographs. In 1957 construction workers dug some ditches for the foundations of the technical inspection point, but nothing was constructed (84).

3. Ruzayevka Enginehouse

Ruzayevka enginehouse was to be reconstructed from steam to electric enginehouse. As of 5 February 1958 this was still in a stage of planning (85).

STAT

(54)

CHAPTER VIII. UFA SYSTEM
(See map, Inclosure No. 21)

A. General Information

B. Current Program of Electrification

1. Rayevka - Pokhvistnevo Section

C. New Electric Enginehouses

1. Dema Enginehouse

2. Abdulino Enginehouse

3. Rayevka Enginehouse

STAT

(55)

CHAPTER VIII. UFA SYSTEM
(See map, Inclosure No. 21)

A. General Information

The main line of this system, extends eastward from Kropachevo (of S. Urals System), to Dema, Rayevka, and Pokhvistnevo (of Kuybyshev System), a distance of 525 km. In the past few years it underwent extensive electrification which resulted in electric operation on the entire trunkline as of 30 December 1957 (1).

The sections were electrified in an eastward direction: The 170 km Dema-Kropachevo section was converted to electric traction in February 1955 (2); the 115 km Dema-Rayevka section in October 1956 (3); and the 250 km Rayevka-Pokhvistnevo section on 30 December 1957 (4).

Detailed information concerning progress of electrification on the Dema-Kropachevo and Dema-Rayevka sections was the subject of the Report AF 1098543c. The present report covers the period of September 1956 to January 1958, and is concerned primarily with electrification of the Rayevka-Pokhvistnevo section, which was completed in December 1957 (5).

B. Current Program of Electrification

1. Rayevka - Pokhivstnevo Section

The electrification of the double track 250 km Rayevka-Pokhvistnevo section (6) started in 1956 (7). The assignment was given to the "Ufimtransstroy" (Ufa Transportation Construction) Trust, which is main contractor, and 15 other organizations (subcontractors) (8). The scope of work included installation of some 8,000 contact network supports (9), suspension of 720 km of catenary wires (10), and erection and equipping of 12 traction substations (11). In March 1957, workers pledged to complete electrification of the line by 7 November 1957 (12), but actually the line was opened for electric operation on 30 December 1957 (13). The datelines for completion were set the following way: the 60 km Rayevka-Glukhovskaya section in August 1957; the 75 km Glukhovskaya-Abdulino section by 1 October 1957; and the 115 km Abdulino-Pokhvistnevo section by 7 November 1957 (14).

In 1956 the assignment for preliminary work was not met. By January 1957 out of five substations (included in 1956 plan) none was built and not a single run was ready for assembly work. Mismanagement, shortage of building materials (15) and labor force short of 700 workers constantly delayed the construction (16).

By 1 April 1957, only 24 percent of contact network supports were installed and none of substation buildings completed (17). The Shafranovo substation was ready for assembly by 5 April 1957. The Lyubertsy Electric Equipment Plant failed to deliver on time some equipment to the Shafranovo, Aksakovo, and Abdulino substations (18). All supports were finished on the Shafranovo-Aksenovo and the Glukhovskaya-Aksakovo runs by 10 April 1957 (19). The monthly electrification plan for April was fulfilled by 93 percent, which tripled the March figure, with a total of 117 km out of planned 216 km of tracks ready for assembly work (20).

STAT

In June the Buguruslan substation building was completed and in July installation of supports started on the last Buguruslan-Pokhvistnevo run. The failure on the part of the "Ufimtransstroy" trust to supply adequate amount of supports, stopped the work and workers had to be assigned to other tasks (21).

Serious delays were reported at the Priyutovo, Taldy-Bulak, and Saray-Gir stations, and only 37 supports installed and 130 bases finished at the Abdulino station in July 1957. The supports erected on the Aksenovo-Glukhovskaya, Glukhovskaya-Aksakovo, and Taldy-Bulak - Abdulino runs were of inferior quality and had to be replaced (22). The Asekeyevo, Filippovka, and Saray-Gir substation buildings were not finished. The Glukhovskaya substation building still lacked a roof, while the completion of open parts of the Glukhovskaya, Shafranovo, and Aksenovo substations was delayed due to lack of structural steel and other building materials (23).

In August 1957 electrification of the entire line continued to lag and only three runs were turned over to the assemblers (24). On 21 August 1957 the Chief of the "Ufimtransstroy" Trust announced that the first section of the line could not be completed in time because much of the equipment for traction substations was still undelivered (25). In September 1957 it was reported that lack of necessary materials and electric equipment continued to hamper rate of electrification, making its completion by 7 November 1957 questionable (26).

In October 1957 electrification of the Rayevka-Pokhvistnevo line was nearing completion, and electric locomotives were already used as pushers on the Rayevka-Glukhovskaya run (27). All basic construction work was completed and the line was turned over to the assemblers, the Glukhovskaya-Aksakovo run was prepared for a test run, and the assembly of the catenary system was nearing completion on the Priyutovo-Taldy-Bulak and Aksakovo-Priyutovo runs. Irregular deliveries of equipment hampered the progress (28). The Shafranovo and Aksenovo substations were finished and received electric power and some assembly work remained to be done at the Taldy Bulak, Aksenovo, and Priyutovo substation (29). The assembly of the Priyutovo substation was completed by 6 November 1957 (30).

On 4 November 1957 the first electric train ran on the 135 km Rayevka-Abdulino section (31). In December 1957 traction substations began transmitting electric power to the contact network of the 115 km Abdulino-Pokhvistnevo section and, finally, five electric locomotive freight trains made runs on the line in both directions on 30 December 1957 (32). The line was officially opened for operation on 13 January 1958 (33).

C. New Electric Enginehouses

1. Dema Electric Locomotive Enginehouse

The Dema enginehouse has been under construction for several years and its dateline for completion was postponed several times. By August 1956 only walls of the shop were erected (34). In February 1957 half of the electric locomotive park operating on the Dema-Kropachevo and Dema-Rayevka runs required lifting repair, but the enginehouse was not yet equipped to perform these services. The periodical repair of locomotives was done in the former roofless steam locomotive repair shop (35). In September 1957, the periodical repair and lifting repair shops, testing station and utilities buildings were still not constructed (36). In November 1957 the lifting repair shop was finished, but its structural defects greatly impaired operations (37).

STAT

2. Abdulino Electric Locomotive Enginehouse

The reconstruction of this enginehouse was scheduled to be finished by 1 November 1957, with the locomotive repair facilities to be in operation by 15 November 1957 (38). About 150 electric locomotive enginemen, and, later, 240 enginemen will be employed to operate locomotives based in this enginehouse. Only 72 mechanics were trained by September 1957 and 61 persons will complete their training in the Spring of 1958 (39).

3. Rayevka Electric Locomotive Enginehouse

The Rayevka servicing and turnaround enginehouse was constructed in September 1957 (40), but it was not quite ready for operation due to many structural defects in November 1957. It became an important servicing point since the electrification of the Rayevka-Abdulino section (41). It seems that lengthening of the locomotive run to Abdulino (240 km from Dema) will eliminate the necessity of a turnaround enginehouse in Rayevka (105 km from Dema), thus making a waste of 2,000,000 rubles already spent in the construction of the Rayevka enginehouse (42).

STAT

CHAPTER IX. SOUTH URALS SYSTEM
(See map, Inclosure No. 22)

A. General Information

B. Current Program of Electrification

1. Makushino - Kurgan Line

2. Kurgan - Chelyabinsk Line

a. Kurgan - Shumikha Section
b. Shumikha - Chelyabinsk Section

3. Magnitogorsk - Abdulino Line

4. Berdyaush - Bakal Branch Line

C. New Electric Enginehouses

1. Kurgan Enginehouse

2. Chelyabinsk Enginehouse

STAT

(29)

CHAPTER IX. SOUTH URALS SYSTEM
(See map, Inclosure No. 22)

A. General Information

The entire 746 km trunkline of this system from Kropachevo to Makushino (of Omsk System) underwent extensive electrification (1). The 268 km Kropachevo-Chelyabinsk section was switched to electric traction sometime before 1953 (2), and was the subject of the Report AF 1098543c. The other two parts of the trunkline, the 131 km Makushino-Kurgan and the 260 km Kurgan-Chelyabinsk sections, were electrified later and are described in this report. Thus the Makushino-Chelyabinsk section was electrified on 30 December 1956 (3) and the Kurgan - Chelyabinsk section on 7 November 1957 (4).

In addition, electric traction was adapted on the Berdyaush-Bakal branch line sometime during the Fifth Five-Year Plan (5). Plans for future electrification include the 260 km Chelyabinsk-Sverdlovsk line (connection between South Urals and Sverdlovsk systems) (6) and the 512 km Magnitogorsk-Sterlitamak-Abdulino line which is still under construction (7).

B. Current Program of Electrication

1. Makushino - Kurgan Line

The 130 km Makushino-Kurgan section was scheduled for completion by the end of 1956. By that time seven traction substations were to be erected, equipped and put in operation, 131 km of catenary network strung, and more station tracks laid (3).

Serious shortages of building materials caused construction delays and postponed the installation of supports (9). The Ministry of Transport Construction and Ministry of Transportation ordered establishment of reinforced concrete casting yards at Sladkoye, Vargashi and other stations and preparation of the Kolchadan and Moskovka plants for production of reinforced concrete blocks, but this order was left unfulfilled. As a result by 20th May 1956 only 230 bases were installed, instead of 3,700 planned for this months, and only 10 percent of the electrification plan was fulfilled (10).

To make up for the lack of concrete blocks, substations were constructed partly of blocks and partly of brick, whichever material was available at the time, but nevertheless, the lack of other materials delayed construction work. In addition, construction sites for substation buildings were poorly mechanized, lifting facilities were lacking and unloading was entirely manual (11). Reconstruction of station tracks simultaneously with electrification was accomplished only on the Makushino - Lebyazh'ya Sibirskaya section. It was revealed that this operation seriously hampered the progress of electrification (12).

In October 1956, assembly work on the Yurakhly-Vargashy run could not start for two weeks because no blind track was built by the assembly train No. 704 (13). To speed up electrification 160 additional assembly workers were sent to assemble the contact network and 20 workers to work on traction substations (14). By 14 December 1956 the catenary network was suspended on the entire Makushino-Kurgan line (15) and adjustment of overhead wires was in progress by electric-assembly trains Nos. 702 and 704 (16). The Makushino, Kurgan, Lebyazh'ya Sibirskaya, and Vargashy substations were all prepared to receive electric power by December 1956 (17).

STAT

On 29 December 1956, after testing all stations and the overhead catenary system, the Kurgan-Makushino line was approved for permanent electric operation (18). In January 1957 it was announced, that regular electric operation of the line would begin, inspite of the numerous defects, as soon as the second turbo-generator of the Kurgan TETs (thermo-electric power plant) would be ready (19). It was estimated that unfinished work amounted to 15,000,000 rubles. Thus in addition to other equipment, nine sets of mercury arc rectifiers and traction transformers were not yet installed at Kurgan, Vargashi, Yurakhly, Lebyazh'ya Sibirskaya, Konovalovo, and Makushino substations. The work was also not completed on several construction sites in January 1957 (20). Enginemen were trained in operation of electric locomotives at the Chelyabinsk and Zlatoust enginehouses, as well as in the local Kurgan enginehouse (without interruption of regular duties) (21).

In July 1957 the electric traffic of passenger and freight trains, was reported, to have started in February 1957 (22).

Remote control of traction substations on the Kurgan-Makushino line will be introduced sometime in 1958, as reported in February 1958 (23).

2. Kurgan - Chelyabinsk Line

The 260 km Kurgan-Chelyabinsk line was scheduled for electric operation in 1957. The electrification plan provided for completion of the first half of the line, the Kurgan-Shumikha section, in October 1957 and the second half, the Shumikha-Chelyabinsk section, in December 1957. However in March 1957 electrification workers pledged to open electric traction on the Kurgan-Shumikha section three months ahead of plan (by Railroader's Day) and on the Shumikha-Chelyabinsk section two months ahead of plan (by 7 November 1957) (24); both sections were actually electrified ahead of time (25).

In 1957, in less than a year, eleven traction substations were erected and equipment assembled on the Kurgan-Chelyabinsk line. Over 8,000 bases and 9,000 supports were installed, and over 2,000 km of contact network cables were strung (26). Some 840 km of contact network were assembled, communication lines and STsB system reconstructed, and station tracks expanded. The traction substations of the line were provided with electric power by newly installed 110 kv transmission lines (27). Installation of supports and preparation of the line for assembly work was completed in four months, which was twice as fast as on the Kurgan-Makushino line in 1956 (28).

Electrification of the Kurgan-Shumikha-Chelyabinsk line was one of the largest electrification projects undertaken on the South Urals System. A total of 190,000,000 rubles was appropriated for this project and more than 15 (29) (another source mentions 20) different organizations were entrusted with electrification (not counting the small ones) (30). The "Yuzhuraltransstroy" Trust (main contractor) handled only 30 percent of the entire construction-assembly operation, while all other operations were performed by subcontractors, including "Kurganstroyput'" (Kurgan Track Laying) Trust, "Sverdlovskstroyput'" (Sverdlovsk Track Laying) Trust, and "Molotovstroyput'" (Molotov Track Laying) Trust. Assembly work was completely transferred to 10 subcontracting organizations not subordinated to the main contractor, which resulted in poor organization of work and mismanagement (31).

STAT

As of March 1957 only 8.3 percent of the annual electrification plan was fulfilled (32). By that time six runs and four traction substations had to be ready for assembly work on the Kurgan-Chelyabinsk line, but actually none was ready. There were some 1,200 supports installed, but since they were dispersed throughout the line, assembly work could not commence (33). Tractors, excavators, mobile cranes and mobile electric power plants were badly needed on the line (34).

a. Kurgan - Shumikha Section

The 137 km Kurgan-Shumikha section was electrified two months ahead of schedule, on 26 August 1957. By that time five substations were built and equipped, 309 km of contract network mounted and about 8,000 steel and reinforced concrete supports installed (35). Six trains and five mechanized groups were participating in installation of foundations and supports on this section. Every installation train consisted of an "E" series steam locomotive, a steam or diesel lifting crane (up to 18-ton capacity), two 4-axle flat cars and 2-3 shelter box cars (36).

Only one half of the preliminary work was completed on the Kurgan-Shumikha section in 1956. Instead of 2,000 supports, only 575 were installed because the Overty and Kolchedan reinforced concrete plants failed to fulfill their orders (37). In March 1957 installation of supports was almost completed on the Yurgamysh - Sladkoye and Butyrskoye - Shumikha runs (38), and continued on the Mishkino - Sladkoye run despite heavy snow drifts (39). By 26 May 1957 all supports were installed and the contact network suspended on the Butyrskoye-Shumikha and Butyrskoye-Mishkino runs (40). However, due to constructional incompleteness and lack of parts for the contact network on the Sladkoye-Mishkino and Mishkino-Butyrskoye runs, final adjustments could not be made. Also some 150 foundations on the Yurgamysh-Sladkoye and Mishkino-Butyrskoye runs turned out to be defective and had to be changed (41). By 16 June 1957 out of 372 km of contact network, 267 km had already been rolled out and 21 km of tracks were ready for a test run. The Yurgamysh-Vvedenskoye run was already prepared for assembly work and foundations and supports were being installed on the Vvedenskoye-Kurgan run (42). This project was completed, with no traffic intervals required, by 25 June 1957 (43). In June it was planned to adjust 200 km of contact network on the section, but actually only half of it was accomplished, because many supports still lacked anchor ropes. The annual assembly plan was fulfilled by only 21 percent (44).

Many supports on the Yurgamysh-Sladkoye and Sladkoye-Mishkino runs were poorly fastened, tilting and pulling anchor towers out of place. Therefore assembly work was postponed until all supports were checked, as reported in July 1957 (45). At that time overhead cables were being adjusted on the Butyrskoye-Sladkoye and the Vvedenskoye-Kurgan runs (46). The Logovushka, Sladkoye, and Butyrskoye substation buildings were constructed in May 1956, but they still lacked roofs and floorings in March 1957 (47). The Shumikha substation was ready for assembly since 27 March 1957 (48), but it began only in July (49). Also the Butyrskoye substation building was nearing completion in March (50).

In June 1957 the outside equipment of the Logovushka, Sladkoye, and Butyrskoye traction substations was not ready for assembly. Much of the electric equipment was still lacking (51). In July 1957 the installation of equipment at the Shumikha and Yurgamysh substations was completed (52). By 9 August 1957 the

STAT

Shumikha, Yurgamysh, Logoyushka, and Sladkoye substations were approved for operation, while the assembly of the Butyrskoye substation was nearing completion (53). The suspension of contact network was completed on six substations and seven runs. The workers of electric assembly train No. 704 were checking and adjusting the contact network on the Yurgamysh - Sladkoye and the Kurgan - Kurganka runs, as well as at the Vvedenskoye, Sladkoye, and Mishkino stations (54).

On 24 August 1957 the current for the Kurgan - Shumikha contact network was switched on. The test run showed that the section was ready and electric operation commenced (55). However, mixed traffic, electric and steam, was expected to be maintained until the third turbo-generator at the Kurgan TETs is placed in operation (56).

b. Shumikha - Chelyabinsk Section

According to electrification plan this 127 km section was scheduled for completion by the end of 1957 (57), however, workers decided to prepare it for electric operation by 7 November 1957 (58). This was eventually accomplished (59).

The installation of supports and preparation of the entire Kurgan-Chelyabinsk line for assembly was completed in four months (60). In September 1957 the assembly work proceeded on the entire line and some shortage of contact network parts was felt due to delayed deliveries from the Chelyabinsk Electric Locomotive Plant (61).

Three out of six traction substations of this section were ready for assembly work by September 1957 (62). The Kozyrevo supporting traction substation (opornaya podstantsiya) was considered to be the most important substation on the entire Kurgan - Chelyabinsk line. It will supply power to the entire Kurgan-Shumikha section (63). Installation of equipment began there on 20 August 1957, and continued through October 1957 (64). On the last substations of the section the plan provided for installation of improved designs of high speed automatic devices for remote control operation, automatic feeders and modern type electric blocking system. Thus assembly workers constantly had to familiarize themselves with improved or completely new equipment (65).

On 6 November 1957 the first electric train made a trip from Shumikha to Chelyabinsk and line was put into operation (66). With completion of electrification of the 127 km Chelyabinsk - Shumikha section, the entire South Urals trunkline from Makushino to Kropachevo, via Kurgan, Shumikha, Chelyabinsk, and Zlatoust stations was using electric traction (67).

3. Magnitogorsk - Abdulino Line

The 512 km Magnitogorsk-Sterlitamak-Abdulino line was planned for construction and subsequent electrification during the Sixth Five-Year Plan (68). Construction began in the Spring of 1956 on the Magnitogorsk-Beloretsk section (69). By 7 January 1958 a total of 80 km of tracks had been laid (70)*.

4. Berdyaush - Bakal Branch Line

Work on the electrification of the Berdyaush-Bakal branch line was under way since 1954 (71). The 52 km branch line was to be supplied with power from the

*Analyst's note: Information on progress of the construction of the Magnitogorsk - Abdulino line was included in special report entitled: "Magnitogorsk-Abdulino RR Line", Report AF 1161087.

Satka and Bakal traction substations. By 9 July 1955 all basic work was completed, the contact network received electric current and the first electric locomotive ran on the line. However, this test run revealed so many defects on the line that the system administration refused to approve the line for operation (72). It was not determined when the branch line was finally approved but several sources list it among the electrified lines of the South Urals System (73).

C. New Electric Enginehouses

1. Kurgan Enginehouse

Reconstruction of the Kurgan enginehouse from steam to electric began in 1956. In July 1957 it was reported, that in one year of work only one unit of the periodical repair shop was finished, even though the dateline was 1 August 1957. Most of the delay was due to non-delivery of building materials from the Kolchedan Plant. The foundation for the electric equipment workshop was not laid and construction of two other shops did not begin (74). In November 1957 electric locomotives of the Kurgan-Makushino section were sent to Zlatoust enginehouse (400 km away) for lifting and periodical repairs (75).

2. Chelyabinsk Enginehouse

Reconstruction of the Chelyabinsk steam locomotive enginehouse for electric traction was falling behind the schedule in August 1957. Loginov, Chief of the "Yuzhuraltransstroy" (South Urals Transport Construction) Trust, wanted to postpone the reconstruction of the second enginehouse, however, the repair of electric locomotives of the Chelyabinsk Junction would hardly be possible, if the auxiliary shops of the second enginehouse remained unequipped. The working schedule was not yet set at that time (76).

STAT

CHAPTER X. TOMSK AND EAST SIBERIAN SYSTEMS

A. Tomsk System

1. General Information

2. Novosibirsk - Tayga - Mariinsk Line

   a. Novosibirsk - Tayga Section
   b. Tayga - Mariinsk Section

3. Novosibirsk-Inskaya - Belovo - Novokuznetsk Line

   a. Belovo - Promyshlennaya Section
   b. Promyshlennaya - Inskaya Section

B. East Siberian System

1. Cheremkhovo - Irkutsk Section

[redacted]

STAT

CHAPTER X. TOMSK AND EAST SIBERIAN SYSTEMS

A. Tomsk System
(See map, Inclosure No. 24)

1. General Information

The Tomsk railroad system consists of the trunk line Chulymskaya-Novosibirsk-Tayga to Mariinsk of the Krasnoyarsk system and the major branch Novisibirsk-via Inskaya and Belovo to Novokuznetsk, which is the center of the coal basin and metallurgical industry of this area (1).

The sections from Chulymskaya to Novosibirsk and Novosibirsk-Inskaya were electrified in 1955 (2). The 141 km double track of the mountainous Belovo-Novokuznetsk section was electrified in 1937 (3).

During the Sixth Five-Year Plan the Tomsk system will be almost completely converted to electric and diesel traction (4). The plan calls for the electrification of 700 km of tracks of the Tomsk system. Radio-relay communication, dispatcher centralization, and other modern methods in automation and telemechanics will be used. The trunk line of this system will carry 5,000 and 6,000 ton trains. In 1960 turnover of the trunk line will increase by 55% and volume of freight by 46% (5).

2. Novosibirsk-Mariinsk Line

a. Novosibirsk-Tayga Section

Electrification of this 190 km section started in January 1957 (6) and according to the electrification plan of the Tomsk system the electrification of Novosibirsk-Tayga section should be completed in 1958 and the Tayga-Mariinsk section in 1959 (7). Later, however, the workers of the construction-assembly train #198 pledged to complete the electrification of both sections in 1958. (8)

Electrification of the 190 km Novosibirsk-Tayga section will require the construction of 12 traction substations, installation of 10,000 contact network supports and erection of numerous residential buildings (9). During the first months of 1957, electrification of this section advanced rather slowly, due to insufficient documentation, which was provided by the "Sibgiprotrans" during the first 6 months of 1957. Lack of working plans delayed the distribution of assignments, thus affecting the rate of work. Moreover, standard documentation was constantly changed. (10) By July 1957, operations have improved, and the rate of work stepped up. The construction workers of the "Tomsktransstroy" Trust erected substation buildings at Moshkovo, Oyash, Bolotnaya and other traction substations and installed bases for contact network supports. (11)

By the end of November 1957, the best workers already fulfilled their annual assignments and performed 700,000 rubles worth of work above the quota. They completed the concrete laying for bases of the contact network supports at the 12 stations and installed 1,000 supports (12).

The rate of construction could be faster, if it were not for poor delivery of supply materials. In November 1957, the Kolchedan plant sent only 400 reinforced concrete supports instead of the required 900, and the Iset' plant only 48 instead of 600 (13). The plans were made to prepare this section for

STAT

the assembly work by January 1, 1958, and complete the electrification of Novosibirsk-Bolotnaya by the Railroader's Day and the Bolotnaya-Tyaga section by November 1958 (14).

b. Tyaga-Mariinsk Section

Electrification of the 149 km Tyaga-Mariinsk section was planned to be completed by the end of 1957 (15) but it was reported in January 1958 that the completion of this task in 1958 is rather questionable (16). Delays in documentation, with the most documents to be prepared between January and July 15, 1958, (17) and necessity to reconstruct the bridges across Berikul' and Jaya rivers in connection with electrification operations, caused the deferment of plans (18). The annual economy of electrification of the Novosibirsk-Mariinsk section will reach 122,000,000 rubles, thus paying off all capital investments in the electrification in two or two and half years (19).

3. Novosibirsk-Inskaya-Belovo-Novokuznetsk Line

The Belovo-Novokuznetsk section was electrified in 1937 (20), and the Novosibirsk-Inskaya section in 1955 (21). The electrification of the Inskaya-Belovo section was scheduled for completion during Sixth Five-Year Plan (22).

a. Belovo-Promyshlennaya Section

Electrification of the 86 km Belovo-Promyshlennaya section was begun in 1956 (23) and was scheduled for completion by October 1957 (24).

This task required installation of 3,500 steel supports, construction of four tractions substations and suspension of 240 km of contact network (25). The works were conducted by the construction-assembly train #827 and assembly train #706. (26) The construction of traction substations was hampered by untimely delivery of equipment. The Sverdlovsk "Uralelektroapparat" Plant was short on delivery of 110 kilovolt oil switches and the "Zaporozh'ye" Transformer Plant delayed the delivery of three 110 kilovolt step-down transformers (27). Delays also occurred in re-equipping the automatic block system on the line. Thus, during the first quarter of 1957, only 10% of the work has been performed on this section (28). There were some changes in the designed capacity of the traction substations, which were originally designed in 1952, and had to be redesigned for new conditions of the increased train weight and traffic flow (29).

By the end of June 1957 all basic electrification work was completed and the assembly of traction substations and contact network was in process at the Proyektnaya, Yegorovo, Kontrol'nyy and Promyshlennaya stations (30).

The assembly work was conducted in difficult conditions, since the section had a dense traffic and hard profile of the road with many curves (31). In October 25, 1957, the final test of equipment was made and the first electric train made the trip (32). The section was put in permanent operation on November 6, 1957 (33).

b. Promyshlennaya - Inskaya Section

Electrification of Promyshlennaya-Inskaya was scheduled for completion during the Sixth Five-Year Plan (34), but no progress was made, since the electrification of Belovo-Promyshlennaya was completed. The completion of electrification, operation on Promyshlennaya-Inskaya section will considerably improve the transportation facilities between Kuzbass and Ural and the center of the country (35). The improved operational conditions will reduce the locomotive park by 15 engines and increase daily electric locomotive run up to 780 km (36).

B. East Siberian System
(See map, Inclosure No. 25)

1. Cheremkhovo-Irkutsk Section

Electrification of the 134 km double track Irkutsk-Slyudyanka section was completed by the end of June 1956 (37). It was the first electrified section of the East Siberian system (38).

In July 1956, the plans were made for electrification of the 123 km. Cheremkhovo-Irkutsk section, the next link of the East Siberian system (39). This section is scheduled for electric operation in 1958 (40). The 1957 electrification plan on this section called for the erection of 5 traction substations, preparations for double tracking 50 km of the Irkutsk-Kitoy and 25 km of the Cheremkhovo-Kas'yanovka sections and investment of 23,000,000 rubles. (41,42). The electrification plan also provided for the installation of remote control posts on the whole Irkutsk division and the reconstruction of the Irkutsk electric locomotive enginehouse, thus adapting this enginehouse for the servicing of freight, passenger and suburban traffic on both runs: Irkutsk-Slyudyanka and Irkutsk-Cheremkhovo (43). Electrification of this section was assigned to the "Vostsibtransstroy" Trust and three special construction - assembly trains, stationed at Irkutsk-2, Sukhovskaya and Grishevo stations. Their staff consisted of 300 persons more than half of which young people from Voronezh and Kursk cities (44). Study of projects greatly delayed the operations and actual work began only in 1957 (45). In February 1957, the workers started the construction of approach tracks to Grishevo, Polovina, Tel'ma and Sukhovskaya traction substations (46).

In April, the construction of approach tracks was making a good progress and their completion was expected in May 1957 (47). The reinforced concrete supports were planned in place of steel ones as on the first (Irkutsk-Slyudyanka) section. During the following months, construction operations slowed down, due to mismanagement, great turnover in personnel and poor quality of work. The substations were built with great deviations from technical norms, necessitating subsequent corrections at Grishevo, Polovina and Sukhovskaya substations (48). Extension of Mal'ta station tracks has been delayed, because three different reconstruction projects were sent to the station, one contradicting the other. (49) In July 1957, it was expected, that the construction of traction substations would be completed by the end of 1957, permitting transfer to electric operation of the Irkutsk-Cheremkhovo section in 1958 (50). But the 1957 construction plan on this section was fulfilled only by 50% and only 14,000,000 rubles out of 23,000,000 were spent. From the 5 traction substations, scheduled for completion in 1957 not a single one was fully completed andonly 640 reinforced concrete supports out of 1,500 were installed (51).

STAT

The conversion of Cheremkhovo-Tayshet-Mariinsk line to electric traction with the application of single phase current has been planned for 1958-1959. Technical assignments and plans for such electrification were already given in 1957 (52), but no progress was reported and the electrification of this section had not started by the beginning of 1958 (53).

STAT

REFERENCE NOTES

INTRODUCTION

1. Elektricheskaya i Teplovoznaya Tyaga, No. 1, 1957, p. 5 (further referred to as Tyaga)
2. Gudok, 28 December 1957, p. 1
3. Beshchev, B.P. Zheleznodorozhnyy transport SSSR v shestoy pyatiletke, 1957, p. 65 (further referred to as Beshchev, 1957)
4. Zheleznodorozhnyy Transport, No. 2, 1958, p. 26
5. Gudok, 13 November 1957, p. 3
6. Tyaga No. 5, 1957, p. 39
7. Zhel. Transport No. 2, 1958, p. 26
8. Ibid, No. 11, 1957, p. 82
9. Tyaga No. 2, 1957, p. 3
10. Ibid, No. 7, 1957, p. 8
11. Gudok, 21 July, 1957, p. 2
12. Ibid, 1 November 1957, p. 3
13. Pravda, 30 December 1957, p. 1
14. Gudok, 9 January 1958, p. 3
15. Vechernyaya Moskva, 20 June 1953, p. 3
16. Gudok, 18 January 1958, p. 3
17. Tyaga, No. 8, 1957, p. 10
18. Gudok, 13 August 1957, p. 3
19. Ibid, 9 July 1955, page 2
20. Ibid, 6 November 1957, p. 1
21. Ibid, 14 November 1957, p. 2
22. Ibid, 13 November 1957, p. 3
23. Ibid, 2 November 1956, p. 1
24. Ibid, 22 November 1956, p. 3
25. Ibid, 6 March 1958, p. 1

STAT

26. Gudok, 6 Feb 57, p. 3

27. Ibid, 7 Nov 57, p. 4

28. Ibid, 31 Dec 57, p. 1

29. Ibid, 1 Jan 57, p. 2

30. Ibid, 27 Mar 57, p. 1

31. Ibid, 20 Nov 57, p. 2

32. Ibid, 6 Feb 57, p. 3

33. Ibid, 7 Nov 57, p. 3

34. Tyaga, No. 2, 1957, p. 34

35. Gudok, 5 Feb 58, p. 3

36. Ibid, 18 March 55, p. 2

37. Ibid, 21 Nov 56, p. 1

38. Ibid, 31 Dec 57, p. 1

39. Ibid.

40. Ibid, 25 Dec 54,

41. Ibid, 1 Jan 57, p. 2

42. Ibid, 1 Mar 57, p. 1

43. Ibid.

44. Tyaga, No. 2, 1957, p. 34

45. Gudok, 15 Feb 58, p. 3

46. Ibid, 2 Oct 57, p. 3

47. Pravda, 23 Aug 55, p. 2

48. Gudok, 14 Dec 57, p. 1

49. Ibid, 11 July 58, p. 3

50. Ibid, 2 Oct 57, p. 3

51. Tyaga, no. 7, 1957, p. 5

52. Gudok, 22 Oct 57, p. 1

STAT

CHAPTER I. GENERAL

1. Tyaga, No. 5, 1957, p. 38
2. Beshchev, 1957
3. Tyaga, No. 5, 1957, p. 39
4. Beshchev, 1957
5. Ibid,
6. Gudok, 16 January 1957, p. 2
7. Zhel. Transport, No. 2, 1958, p. 26
8. Gudok, 16 January 1957, p. 2
9. Tyaga, No. 2, 1957, p. 3
10. Ibid, p. 21
11. Ibid, No. 4, 1957, p. 3
12. Ibid, p.
13. Zhel. Transport, No. 6, 1957, p. 4
14. Tyaga, No. 4, 1957, p. 7
15. Gudok, 26 March 1957, p. 1
16. Ibid, 4 May 1957, p. 2
17. Ibid, 16 January 1957, p. 4
18. Ibid, 19 March 1957, p. 3
19. Ibid, 7 May 1957, p. 2
20. Pravda, June 19, 1957, p. -
21. Gudok, 11 August 1957, p. -
22. Tyaga, No. 7, 1957, p. 5
23. Gudok, 17 August 1957, p. 4
24. Ibid, 5 October 1957, p. 3
25. Tyaga, No. , 1957, p. 4-5
26. Gudok, 5 October 1957, p. 3
27. Zhel. Transport, No. 3, 1957, p.

STAT

28. Gudok, 24 April 1957, p. 3

29. Ibid.

30. Ibid.

31. Tyaga, No. 7, 1957, p. 4-5

32. Zhel. Transport, No. 3, 1957, p. 4

33. Tyaga, No. 4, 1957, p. 9

34. Gudok, 5 October 1957, p. 3

35. Tyaga, No. 4, 1957, p. 9

36. Zhel. Transport, No. 12, 1957, p. 12

37. Pravda, 10 June 1957, p. 2

38. Gudok, 5 October 1957, p. 3

39. Ibid.

40. Ibid, 2 October 1957, p. 3

41. Pravda, 10 June 1957, p. 2

42. Gudok, 2 October 1957, p. 3

43. Ibid.

44. Ibid.

45. Ibid.

CHAPTER II. MOSKVA AREA RAIL LINES

A. Northern System:Aleksandrov-Vspol'ye Section

1. Knachaturov, T.S. Razmeshcheniye transporta v kapitalisticheskikh stranakh i v SSSR, 1939.

2. Gudok, 11 October, 1956, p. 2

3. Ibid., 6 July 1957, p. 2

4. Ibid, 23 November 1957, p. 3

5. Ibid, 6 July 1957, p. 2

6. Ibid.

7. Ibid.

8. Ibid, 5 October 1957, p. 3

STAT

9. Ibid., 23 November 1957, p. 3

10. Ibid.

11. Ibid.

12. Ibid.

B. Gor'kiy System

13. Tyaga, 2 February 1957, p. 2

14. Izvestiya, 29 September 1957

15. Ibid.

16. Moskovskaya Pravda, 23 February 1957, p. 2

17. Gudok, 14 August 1957, p. 3

18. Ibid.

19. Ibid.

20. Ibid, 12 September 1957, p. 3

21. Izvestiya, 29 September 1957, p. 6

22. Tyaga, No. 11, November 1957, p. 29

C. MOSKVA-RYAZAN' SYSTEM

1. General Information

23. Gudok, 22 October 1954, p. 2

24. Ibid., 19 September 1957, p. 3

25. Ibid.

26. Ibid.

2. Ramenskoye-Voskresensk Section

27. Gudok, 31 July 1956, p. 3

28. Ibid, 2; October 1957, p. 1

29. Ibid, 1[illegible] July 1957, p. 3

30. Ibid, 27 October 1957, p. 1

31. Ibid, 1[illegible] July 1957, p. 3

32. Ibid.

33. Ibid, 31 July 1957, p. 3

STAT

34. Gudok, 5 March 1957, p. 3

35. Ibid.

3. Voskresensk-Ryazan' Section

36. Gudok, 18 July 1957, p. 3

37. Ibid, 5 March 1957, p. 3

38. Ibid, 19 September 1957, p. 1

D. MOSKVA-KURSK-DONBASS SYSTEM

1. General Information

39. Gudok, 11 November 1957, p. 3

2. Moskva-Tula-Kursk line

40. Gudok, 15 May 1955, p. 2

41. Ibid., 7 August 1956, p. 3

42. Ibid, 1 February 1957, p. 3

43. Sovietskaya Rossiya, 2 December 1956

44. Gudok, 1 February 1957, p. 3

45. Ibid.

46. Ibid, 30 March 1957, p. 4

47. Tyaga, No. 4, 1957, p. 10

48. Gudok, 5 September 1957, p. 1

49. Ibid, 25 July 1957, p. 3

50. Ibid, 1 February 1957, p. 3

51. Ibid, 25 July 1957, p. 3

52. Ibid, 14 July 1957, p. 4

53. Ibid.

54. Ibid, 22 October 1957, p. 3

55. Ibid, 19 December 1957, p. 3

56. Ibid.

57. Ibid, 22 October, 1957, p. 4

58. Ibid, 19 December 1957, p. 3

STAT

59. Gudok, 22 October 1957, p. 1

60. Gudok, 13 November 1957, p. 3

61. Ibid.

62. Ibid, 5 November 1957, p. 2

63. Ibid, 13 November 1957, p. 3

64. Ibid.

65. Ibid, 19 December 1957, p. 3

66. Ibid.

67. Ibid.

68. Pravda, 30 December 1957, p. 1

69. Gudok, 27 February 1957, p. 2

70. Ibid, 9 January 1958, p. 3

71. Ibid.

72. Ibid.

73. Ibid, 17 January 1958, p. 3

74. Ibid.

75. Ibid.

76. Ibid.

77. Tyaga, No. 11, 1957, p. 29

3. Ozherel'ye-Mikhaylov-Pavelets line

78. Obraztsov, V.E. 'History of Rail Development of Moskva", 1948, p. 23

79. Gudok, 4 December 1956, p. 3

80. Zheleznodorozhnyy Transport, No. 3, 1957, p. 3

81. Gudok, 1 January 1957, p. 2

82. Zheleznodorozhnyy Transport, No. 3, 1957, p. 3

83. Tyaga, No. 8, 1957, p. 10

84. Gudok, 3 October 1957, p. 3

85. Stroyitel'naya Gazeta, 16 November 1955, page 4

86. Gudok, 21 March 1957, p. 3

E. Moskva-Kiyev System

Aprelevka-Maloyaroslavets section

87. Gudok, 30 December 1951, p. 1

88. Izvestiya, 29 September 1957, p. 6

89. Gudok, 4 January 1958, p. 3

90. Ibid.

91. Ibid, 18 February 1958, p. 3

F. Kalinin System

1. Golitsyno-Mozhaysk section

92. Rakov, V.A. Lokomotivy zheleznykh dorog Sovetskogo Soyuza, 1955 (further referred to as Rakov, 1955)

93. Vechernyaya Moskva; 20 June 1953, p. 3

94. Rakov, 1955, p. 345

95. Izvestiya, 29 September 1957, p. 6

96. Gudok, 18 January 1958, p. 3

97. Ibid, 12 September 1957, p. 3

98. Ibid.

99. Ibid, 18 January 1958, p. 3

100. Ibid, 27 July 1957, p. 1

2. Novoyerusalimskaya-Volokolamsk section

101. Rakov, 1955, p. 345

102. Gudok, 4 January 1955, p. 1

103. Ibid, 16 January 1958, p. 1

104. Gudok, 11 December 1957, p. 1

105. Ibid, 16 January 1958, p. 1

106. Ibid.

107. Ibid, 11 December 1957, p. 1

STAT

G. OCTOBER SYSTEM

1. General Information

108. Leningradskaya Pravda, 22 July 1956

109. Gudok, 13 August 1957, p. 3

110. Ibid.

111. Ibid.

2. Klin-Kalinin section

112. Gudok, 10 March 1958, p. 1

113. Zhelez, Transport, No. 3, 1956, pp. 11-13

114. Gudok, 16 August 1957, p. 1

115. Pravda, 31, December 1957, p. 4

116. Gudok, 16 August 1957, p. 1

117. Ibid, 27 November 1957, p. 2

118. Pravda, 31 December 1957, p. 4

119. Ibid.

120. Gudok, 1 December 1957, p. 1

121. Pravda, 31 December 1957, p. 4

CHAPTER III. SUBURBAN LINES

A. Lines near Leningrad

1. Gudok, 5 April 1956, p. 1

2. Ibid.

3. Ibid, 18 October 1956, p. 2

4. Ibid.

5. Ibid.

B. Lines near Kiyev

6. Trud, 24 November 1953, p. 1

7. Gudok, 12 May 1956, p. 3

8. Ibid, 3 July 1957, p. 1

9. Ibid.

10. Ibid, 7 July 1957, p. 1

STAT

C. Lines near Riga

11. Naporko, A. Ocherki razvitiya zheleznodorozhnogo transporta SSSR, 1954, p. 262

12. Sovetskaya Latvia, 22 July 1956, p. 2

13. Gudok, 21 July 1957, p. 3

14. Ibid, 6 November 1957, p. 1

15. Ibid, 14 November 1957, p. 2

Chapter IV. Stalin, Donets, Southern, Kirov, L'vov and Noril'sk-Dudinka Line

A. Stalin System-General

1. Zheleznodorozhnyy Transport, No. 3, 1957, p. 33

2. Gudok, 13 November 1957, p. 3

3. Ibid.

4. Ibid.

Pyatikhatki-Dnepropetrovsk-Yasinovataya section

5. Gudok, 4 November 1954, p. 2

6. Ibid.

7. Electrification of Rail Transport, No. 1, 1932, p. 6

8. Ibid.

9. Pravda, 23 March 1957, p. 2

10. Gudok, 16 March 1957, p. 1

11. Ibid.

12. Ibid, 11 June 1957, p. 3

13. Ibid, 3 September 1957, p. 3

14. Pravda, 23 March 1957, p. 2

15. Gudok, 6 March 1957, p. 1

16. Ibid, 1 November 1957, p. 3

17. Ibid, 16 March 1957, p. 1

STAT

B. Donets System

Lozovaya-Slavyansk section

18. Gudok, 28 August, 1957, p. 3
19. Ibid.
20. Ibid.
21. Ibid.

C. Southern System

Khar'kov-Merefa-Lozovaya section

22. Gudok, 1 May 1956, p. 3
23. Ibid, 13 June 1957, p. 3
24. Ibid, 2 July 1957, p. 2
25. Ibid, 13 June 1957, p. 3
26. Ibid.
27. Ibid.
28. Ibid, 7 July 1957, p. 1
29. Tyaga, No. 7, 1957, p. 14
30. Ibid.
31. Ibid.
32. Gudok, 13 November 1957, p. 3
33. Ibid.

D. Kirov System

Murmansk-Kandalaksha

34. Zhel. Transport, No. 11, 1957, p. 22; Tyaga, No. 11, 1957
35. Gudok, 7 July 1956, p. 1
36. Ibid, 25 May 1956, p. 2
37. Ibid, 28 November 1957, p. 3

STAT

E. L'vov System

Lavochne-Mukachevo

38. Gudok, 15 November 1955, p. 2

39. Pravda Ukrainy, 2 November 1956, p. 1

40. Ibid.

41. Gudok, 10 January 1957, p. 3

42. Ibid, 22 November 1956, p. 3

F. Noril'sk Dudinka Line

43. Gudok, 3 July 1957, p. 1 col. 3

44. Gudok, 22 October 1957, p. 1

CHAPTER V. CAUCASIAN SYSTEMS

(Ordzhonikidze, Transcaucasian, Azerbaydzhan, North Caucasian Systems)

1. Golovanov, I.I. Elektricheskaya tyaga i eye effektivnost', 1956, p. 8 (further referred to as Golovanov, 1956)

2. Gudok, 1 Aug 56, p. 2
Sarantsev, B.L. Geografiya putey soobshcheniya, 1957, p. 144 (further referred to as Sarantsev, 1957)

3. Ibid, 22 August 1956, p. 3
Zhel. Transport, no. 7, 1957, p. 68-69

4. Tyaga, No. 8, 1957, p. 2

5. Ibid.

6. Gudok, 16 Aug 57, p. 1

7. Golovanov, 1957, p. 8

8. Gudok, 5 July 57, p. 3

9. Tyaga, No. 8, 1957, p. 2

10. Gudok, 18 Dec 54, p. 2

11. Lyalikov, N.I. Ekonomicheskaya geografiya SSSR, 1957, p. 290 (further further referred to as Lyalikov, 1957)

12. Gudok, 8 Oct 57, p. 3

13. Ibid, 11 Apr 57, p. 4

14. Ibid, 5 May 57, p. 1

STAT

15. Ibid, 4 July 57, p. 2

16. Ibid, 12 Nov 57, p. 1

17. Ibid, 31 Dec 57, p. 1

18. Ibid, 2 Mar 58, p. 2

19. Ibid, 5 July 57, p. 3

Belorechenskaya - Tuapse - Sochi - Sukhumi Line

20. Gudok, 24 March 56, p. 3

21. Gudok 11 Apr 57, p. 4

22. Ibid, 31 Dec 57, p. 1

Sochi - Sukhumi Section

23. Ibid, 9 Jan 58, p. 3

24. Tyaga, No. 7, 1957, p. 5

25. Gudok, 8 Feb 57, p. 3

26. Ibid, 20 Nov 56, p. 3

27. Zarya Vostoka, 27 June 56, p. 2

28. Gudok, 23 Oct 56, p. 1

29. Ibid, 20 Nov 56, p. 3

30. Ibid, 23 Oct 56, p. 1

31. Ibid, 20 Nov 56, p. 3

32. Ibid, 11 Dec 56, p. 1

33. Ibid, 23 October 56, p. 1

34. Ibid, 20 Nov 56, p. 3

35. Ibid.

36. Ibid, 23 Oct 56, p. 1

37. Ibid, 14 Nov 56, p. 3

38. Ibid, 30 Nov 56, p. 3

39. Ibid, 20 Nov 56, p. 3

40. Ibid, 30 Dec 56, p. 1

STAT

41. Ibid, 11 Apr 57, p. 4

42. Zhel. Transport, No. 7, 1957, p. 67

43. Gudok, 11 Apr 57, p. 4

Belorechenskaya - Tuapse Section

44. Gudok, 7 Apr 57, p. 1

45. Ibid, 6 Apr 57, p. 3

46. Ibid, 11 Apr 57, p. 4

47. Ibid, 11 June 57, p. 3

48. Ibid, 19 June 1957, p. 1

49. Ibid, 16 Aug 56, p. 3

50. Ibid, 7 Apr 57, p. 1

51. Ibid, 12 March 57, p. 3

52. Ibid.

53. Ibid, 14 Sep 57, p. 3

54. Ibid, 8 Oct 57, p. 3

55. Ibid, 19 June 57, p. 1

56. Ibid, 8 Dec 57, p. 3

57. Ibid, 7 Apr 57, p. 1

58. Ibid, 14 Sep 57, p. 3

59. Ibid, 13 Oct 57, p. 3

60. Ibid, 11 July 56, p. 3

61. Ibid, 8 Oct 57, p. 3

62. Ibid, 2 Oct 57, p. 3

63. Ibid, 16 March 57, p. 3

64. Ibid, 3 Oct 57, p. 3

65. Ibid, 6 Nov 57, p. 1

66. Ibid, 31 Dec 57, p. 1

67. Ibid, 8 Apr 58, p. 1

STAT

93. Gudok, 16 July 57, p. 3

94. Bakinskiy Rabochiy, 7 July 57, p. 2

95. Gudok, 16 July 57, p. 3

96. Ibid, 18 Oct 57, p. 1

97. Ibid, 12 Nov 57, p. 1

98. Ibid, 26 Feb 57, p. 2

99. Tyaga, No. 1, 1957, p. 5

100. Zhel. Transport, No. 6, 1957, p. 50

Yerevan - Sevan Line

101. Gudok, 28 Dec 57, p. 1

102. Kommunist, 22 Jan 56, p. 3

103. Gudok, 4 Aug 57, p. 2

104. Kommunist, 22 Jan 56, p. 3

Alabashly - Kushchi Branchline

105. Sarantsev, 1957, p. 14[illegible]

106. Tyaga, No. 4, 195[illegible], p. 4

CHAPTER VI. SVERDLOVSK SYSTEM

General

1. Zhel. Transport, No. 11, 1957, p. 87

2. Ibid.

3. Sarantsev, 1957, p. 159
Gudok, 16 Oct 56, p. 3

4. Ibid, 22 May 56, p. 2

5. Tyaga, No. 1, 1957, p. 1

6. Ibid, No. 7, 1957, p. 9

Kizel - Perm' Line

7. Gudok, 24 Oct 56, p. 3

8. Ibid, 4 Mar 56, p. 3

9. Ibid, 19 June 56, p. 2

STAT

Tuapse - Sochi Section

68. Gudok, 11 Apr 57, p. 4
69. Ibid, 9 Jan 58, p. 3
70. Zhel. Transport, No. 4, 1957, p. 9
71. Gudok, 9 Jan 58, p. 3
72. Ibid.
73. Ibid, 8 Oct 57, p. 3
74. Ibid, 9 Jan 58, p. 3
75. Ibid.
76. Ibid.
77. Ibid, 26 Feb 58, p. 3
78. Ibid.

Zestafoni - Chiatura Line

79. Gudok, 4 July 57, p. 2
80. Tyaga, No. 7, 1957, p. 14
81. Gudok, 9 May 57, p. 3
82. Gudok, 4 July 57, p. 2
83. Ibid.
84. Pravda, 20 Aug 57, p. 1

Navtlugi - Leninakan Section

85. Tyaga, No. 8, 1957, p. 2
86. Gudok, 5 May 57, p. 1
87. Ibid, 5 July 57, p. 3

Baku Suburban Railway

88. Gudok, 16 July 57, p.
89. Bakinskiy Rabochiy, 7 July 57, p. 2
90. Pravda, 25 Jan 59, p. 3
91. Bakinskiy Rabochiy, 7 July 57, p. 2
92. Gudok, 18 Dec 54, p. 2
Sarantsev, 1957, p. 145

STAT

10. Gudok, 28 Nov 56, p. 3

11. Promyshlennaya Ekonomicheskaya Gazeta, 3 Feb 57, p. 3

12. Gudok, 16 Oct 56, p. 3

13. Ibid, 24 Oct 56, p. 3

14. Ibid, 24 Oct 56, p. 3

15. Ibid, 19 June 56, p. 2

16. Ibid, 28 Nov 56, p. 3

17. Ibid.

18. Ibid.

19. Ibid.

20. Ibid, 24 Apr 57, p. 3

21. Ibid, 23 Dec 56, p. 1

22. Ibid, 24 Apr 57, p. 3

23. Prom. Ekon. Gaz., 28 Dec 56, p. 1

24. Ibid, 3 Feb 57, p. 2

25. Gudok, 3 Jan 57, p. 1

26. Trud, 9 Feb 57

27. Gudok, 3 Jan 57, p. 1

28. Prom. Ekon. Gaz., 3 Feb 57, p. 2

Aziatskaya - Kachkanar Branch Line

29. Gudok, 22 May 56, p. 2

30. Ibid, 21 Aug 56, p. 2

Enginehouses

31. Zhel. Transport, No. 11, 1957, p. 88

32. Ibid, p. 87

33. Tyaga, No. 5, 1957, p. 11-12

34. Zhel. Transport, No. 6, 1957, p. 69

35. Ibid, p. 70

36. Ibid, No. 11, 1957, p. 90

STAT

37. Zhel. Transport, p. 38

38. Ibid, No. 6, 1957, p. 70

39. Tyaga, No. 5, 1957, p. 12

40. Ibid.

41. Zhel. Transport, No. 11, 1957, p. 88

42. Tyaga, No. 3, 1957, p. 28

43. Ibid, p. 29

44. Gudok, 10 Nov 56, p. 3

45. Ibid, 28 Dec 56, p. 1

46. Tyaga, No. 5, 1957, p. 12

47. Gudok, 12 Jan 57, p. 3

48. Zhel. Transport, No. 11, 1957, p. 88

49. Tyaga, No. 2, 1957, p. 24

50. Zhel. Transport, No. 6, 1957, p. 70

51. Gudok, 7 July 57, p. 1

52. Tyaga, No. 2, 1957, p. 23

53. Ibid, No. 5, 1957, p. 12

54. Gudok, 5 May 57, p. 3

55. Zhel. Transport, No. 11, 1957, p. 88

56. Tyaga, No. 5, 1957, p. 12

57. Gudok, 31 Oct 56, p. 3

58. Tyaga, No. 2, 1957, p. 16

59. Ibid, No. 5, 1957, p. 12

60. Gudok, 29 Dec 57, p. 1

61. Zhel. Transport, No. 11, 1957, p. 88

62. Tyaga, No. 5, 1957, p. 12

63. Zhel. Transport, No. 6, 1957, p. 69
Gudok, 25 May 56, p. 1

64. Ibid, 21 June 57, p. 1

STAT

CHAPTER VII. KUYBYSHEV SYSTEM

General

1. Gudok, 6 Feb 57, p. 3
   Ibid, 26 Dec 57, p. 3
   Ibid, 19 Sep 56, p. 3
2. Gudok, 20 Nov 54, p. 2
3. Gudok, 7 Nov 57, p. 4
4. Ibid, 2 Oct 57, p. 3
5. Ibid, 5 Feb 58, p. 3
6. Ibid.
   Ibid, 26 Dec 57, p. 3
7. Ibid, 1 Feb 57, p. 3

Kinel' - Syzran' Line

8. Zhel. Transport, No. 1, 1956, p. 36-37
9. Gudok, 20 Nov 54, p. 2
10. Gudok, 5 Feb 58, p. 3
11. Ibid, 26 Dec 57, p. 3
12. Ibid, 5 Feb 57, p. 3
13. Ibid, 5 Feb 58, p. 3
14. Pravda, 10 June 57, p. 2
15. Zhel. Transport, No. 3, 1957, p. 4
16. Tyaga, No. 4, 1957, p. 6
17. Gudok, 19 June 57, p. 1
18. Ibid, 13 Sep 57, p. 3
19. Ibid, 26 Dec 57, p. 3
20. Pravda, 10 June 57, p. 2
21. Tyaga, No. 4, 1957, p. 7
22. Gudok, 13 Sep 57, p. 3
23. Ibid, 14 Jan 58, p. 3
24. Ibid, 11 June 57, p. 3
25. Ibid, 5 Feb 58, p. 3

STAT

26. Zhel. Transport, No. 1, 1957, p. 11

27. Gudok, 19 March 57, p. 3

28. Ibid, 7 Nov 57, p. 3
Sovetskiy Flot, 12 Nov 57, p. 1
Pravda, 12 Nov 57, p. 3

29. Gudok, 16 Nov 57,

30. Pravda, 12 Nov 57, p. 3
Prom. Ekon. Gaz., 13 Nov 57, p. 4

31. Izvestiya, 12 Nov 57, p. 2

32. Tyaga, No. 12, 1957, p. 10

33. Gudok, 26 Dec 57, p. 3

34. Tyaga, No. 2, 1958, p. 22

Kinel' - Smyshlyayevka Section

35. Gudok, 13 Nov 56, p. 2

36. Ibid, 19 Sep 56, p. 3

37. Ibid, 6 May 56, p. 1

38. Ibid, 23 Nov 56, p. 3

39. Ibid, 19 Sep 56, p. 3

40. Ibid, 6 Feb 57, p. 3
Prom. Ekon. Gaz., 10 Feb 57, p. 2

41. Gudok, 16 Oct 57, p. 3

42. Ibid, 5 Feb 57, p. 3

43. Ibid, 16 Oct 57, p. 3

Kuybyshev-Syzran' Section

44. Gudok 14 March 57, p. 1

45. Ibid, 7 Nov 57, p. 3

46. Stroitel'naya Gazeta, 12 Apr 57, p. 1

47. Gudok, 26 July 57, p. 3

48. Ibid, 3 July 57, p. 1

49. Ibid, 16 Apr 57, p. 3

50. Ibid, 5 May 57, p. 1

STAT

51. Gudok, 14 March 57, p. 1

52. Ibid, 7 Nov 57, p. 8
Pravda, 12 Nov 57, p. 3
Gudok 16 Nov 57, p. 1
Izvestiya, 12 Nov 57, p. 2
Sovetskiy Flot, 12 Nov 57, p. 1

53. Izvestiya, 12 Nov 57, p. 2

Kinel' - Pokhvistnevo Section

54. Gudok, 14 March 57, p. 1

55. Zhel. Transport, No. 3, 1957, p. 6

56. Tyaga, No. 4, 1957, p. 8

57. Gudok, 5 Oct 57, p. 3

58. Ibid, 26 Dec 57, p. 3

59. Ibid, 13 March 58, p.4

60. Ibid, 24 Dec 57, p. 3

61. Ibid, 12 Dec 57, p. 3

62. Ibid, 24 Dec 57, p. 3

63. Ibid, 1 Sep 57, p. 2
Ibid, 24 Dec 57, p. 3

64. Ibid, 1 Sep 57, p. 2

65. Ibid, 24 Dec 57, p. 3

66. Ibid, 2 Oct 57, p. 3

67. Ibid, 12 Dec 57, p. 3

68. Ibid, 13 March 58, p. 4

69. Ibid.

70. Ibid.

71. Ibid.

Syzran' - Inza Section

72. Gudok, 5 Feb 58, p. 3

73. Ibid.

Inza-Ruzayevka Section

74. Gudok, 5 Feb 58, p. 3

75. Ibid, 2 Oct 57, p. 3

STAT

76. Gudok, 5 Feb 58, p. 3

Enginehouses

77. Gudok, 25 July 57, p. 1

78. Ibid, 1 Sep 57, p. 2

79. Ibid, 5 Feb 58, p. 3

80. Ibid.

81. Ibid, 25 July 57, p. 1

82. Ibid, 1 Sep 57, p. 2

83. Ibid, 5 Feb 58, p. 3

84. Ibid, 1 Sep 57, p. 2

85. Ibid, 5 Feb 58, p. 3

CHAPTER VIII. UFA SYSTEM

1. Gudok, 31 Dec 57, p. 1

2. Ibid, 18 Mar 55, p. 3

3. Gudok, 21 Nov 56, p. 1

4. Ibid, 31 Dec 57, p. 1

5. Ibid.

Rajevka - Poshvistnevo Section

6. Gudok, 5 Apr 57, p. 3

7. Pravda, 10 June 57, p. 2

8. Tyaga, No. 4, 1957, p. 3

9. Gudok, 20 March 57, p. 1

10. Tyaga, No. 11, 1957, p. 29

11. Gudok, 5 Apr 57, p. 3

12. Ibid, 21 Mar 57, p. 1

13. Ibid, 31 Dec 57, p. 1

14. Ibid, 22 May 57, p. 2
Ibid, 4 Sep 57, p. 1

15. Pravda, 10 June 57, p. 2

STAT

16. Tyaga, No. 11, 1957, p. 3
Gudok, 9 Mar 57, p. 3

17. Ibid, 17 Apr 57, p. 2

18. Ibid, 5 Apr 57, p. 3

19. Ibid, 10 Apr 57, p. 3

20. Ibid, 15 May 57, p. 1

21. Ibid, 20 July 57, p. 2

22. Ibid, 31 July 57, p. 3

23. Ibid.

24. Ibid, 21 Aug 57, p. 3

25. Ibid.

26. Gudok, 3 Sep 57, p. 3

27. Ibid, 3 Oct 57, p. 3

28. Ibid, 26 Oct 57, p. 3

29. Ibid.

30. Ibid, 6 Nov 57, p. 2

31. Ibid, 5 Nov 57, p. 2
Ibid, 6 Nov 57, p. 1

32. Ibid, 31 Dec 57, p. 1

33. Izvestiya, 14 Jan 58, p. 4

Enginehouses

34. Gudok, 21 Aug 56, p. 3

35. Ibid, 2 Feb 57, p. 3

36. Ibid, 26 Sep 57, p. 3

37. Ibid, 21 Nov 57, p. 3

38. Ibid, 30 Oct 57, p. 3

39. Ibid, 26 Sep 57, p. 3

40. Ibid.

41. Ibid, 21 Nov 57, p. 3

42. Zhel. Transport, No. 2, 1958, p. 5

STAT

CHAPTER IX. SOUTH URALS SYSTEM

General

1. Gudok, 7 Nov 57, p. 8
   Tyaga, No. 12, 1957, p. 10
2. Gudok, 25 Dec 54, p. 2
3. Ibid, 3 Jan 57, p. 1
4. Ibid, 7 Nov 57, p. 8
5. Beshchev, 1957, p. 16
6. Ibid, p. 53
7. Ibid, p. 102-103

Makushino - Kurgan Section

8. Gudok, 30 May 56, p. 3
9. Ibid, 30 Jan 57, p. 3
10. Ibid, 30 May 57, p. 3
11. Ibid.
12. Ibid, 13 May 57, p. 2
13. Ibid, 10 Oct 56, p. 3
14. Ibid, 25 Dec 5 , p. 3
15. Ibid, 14 Dec 5 , p. 3
16. Ibid, 15 Dec 56, p. 2
17. Ibid, 27 Dec 5 , p. 1
18. Ibid, 1 Jan 57, p. 2
    Ibid, 3 Jan 57, p. 1
19. Ibid, 10 Jan 57, p. 2
20. Chel. Transport, No. 3, 1957, p. 3
21. Gudok, 10 Jan 57, p. 2
22. Ibid, 7 July 57, p. 3
23. Tyaga, No. 2, 1956, p. 22

Kurgan - Chelyabinsk Line

24. Gudok, 27 March 57, p. 1
25. Ibid, 4 Sep 57, p. 1

STAT

26. Gudok, 7 Jan 58, p. 3

27. Tyaga, No. 12, 1957, p. 10

28. Gudok, 29 Dec 57, p. 1

29. Ibid, 14 Apr 57, p. 3

30. Tyaga, No. 4, 1957, p. 11

31. Gudok, 14 Apr 57, p. 3

32. Ibid, 2 Apr 57, p. 2

33. Tyaga, No. 4, 1957, p. 8-9

34. Zhel. Transport, No. 3, 1957, p. 4

Kurgan - Shumikha Section

35. Gudok, 27 Aug 57, p. 1

36. Ibid, 7 Jan 58, p. 3

37. Ibid, 30 Jan 57, p. 3

38. Ibid, 27 March 57, p. 1

39. Ibid, 29 March 57, p. 3

40. Ibid, 26 May 57, p. 1

41. Ibid, 23 June 57, p. 2

42. Ibid, 16 June 57, p. 1

43. Ibid, 25 June 57, p. 1

44. Ibid, 2 July 57, p. 1

45. Gudok, 3 July 57, p. 3

46. Ibid, 6 July 57, p. 3

47. Ibid, 12 March 57, p. 3

48. Ibid, 27 March 57, p. 1

49. Ibid, 30 Aug 57, p. 1

50. Ibid, 27 March 57, p. 1

51. Ibid, 23 June 57, p. 2

52. Ibid, 6 July 57, p. 3

53. Ibid, 9 Aug 57, p. 1

STAT

54. Gudok, 9 Aug 57, p. 1

55. Ibid, 27 Aug 57, p. 1

56. Ibid.

Shumikha - Chelyabinsk Section

57. Gudok, 27 March 57, p. 1
Ibid, 30 July 57, p. 3

58. Ibid, 19 March 57, p. 3
Pravda 10 June 57, p. 3
Gudok, 13 Aug 57, p. 3

59. Ibid, 7 Nov 57, p. 3
Pravda, 15 Nov 57, p. 4

60. Gudok, 29 Dec 57, p. 1

61. Ibid, 4 Sep 57, p. 3

62. Ibid.

63. Ibid, 23 Oct 57, p. 3

64. Ibid, 4 Oct 57, p. 1

65. Ibid.

66. Gudok, 7 Nov 57, p. 8
Pravda, 15 Nov 57, p. 4

67. Tyaga, No. 12, 1957, p. 10

Magnitogorsk - Abdulino Line

68. Pravda, 23 May 56, p. 1

69. Gudok, 15 Sep 56, p. 1

70. Ibid, 7 Jan 58, p. 1

Berdyaush - Bakal Branch Line

71. Gudok, 2 Dec 54, p. 2

72. Gudok, 24 July 55, p. 3

73. BSE, vol. 47, 1957, p. 115
Beshchev, 1957, p. 16
Golovanov, 1956, p. 8

Enginehouses

74. Gudok, 3 July 57, p. 3

75. Ibid, 13 Nov 57, p. 3

STAT

76. Gudok, 13 Aug 57, p. 2

CHAPTER X. TOMSK AND EAST SIBERIAN SYSTEMS

A. Tomsk System

1. Pravda, 23 August 1955, p. 2
2. Ibid.
3. Rozenfel'd, V.E. Elektricheskiye zheleznye dorogi, 1951, p. 8 (futher referred to as Rozenfel'd, 1951)
4. Gudok, 23 December 1956, p. 3
5. Ibid.

Novosibirsk-Tayga Section

6. Gudok, 18 January 1958, p. 3
7. Ibid, 14 December 1957, p. 1
8. Ibid.
9. Ibid, 21 November 1957,
10. Ibid, 18 January 1953, p. 3
11. Ibid, 6 July 1957, p. 3
12. Ibid, 21 November 1957, p. 3
13. Ibid.
14. Ibid.

Tayga-Mariinsk Section

15. Gudok, 20 December 1957, p. 3
16. Ibid, 18 January 1953, p. 3
17. Ibid.
18. Ibid, 19 March 1957, p. 2
19. Ibid, 20 December 1957, p. 3

Novosibirsk-Novokuznetsk Line

20. Rozenfel'd, 1951, p. 3
21. Pravda, 23 August 1955
22. Beshchev, 1957, p. 53

STAT

23. Gudok, 1 December 1956, p. 1

24. Ibid, 11 April 1957, p. 3

25. Izvestiya, 20 November 1957, p. 1

26. Gudok, 1 December 1956, p. 1

27. Ibid, 11 April 1957, p. 3

28. Ibid.

29. Ibid.

30. Ibid, 29 June 1957, p. 3

31. Ibid, 15 September 1957, p. 1

32. Ibid, 26 October 1957, p. 1

33. Ibid, 20 November 1957, p. 1

34. Beshchev, 1957, p. 53

35. Tyaga, No. 12, 1957, p. 10

36. Zhel. Transport, No. 2, 1958, p. 5

B. East Siberian System

Cheremkhovo-Irkutsk Section

37. Gudok, 11 July 1956, p. 3

38. Ibid, 3 January 1958, p. 1

39. Ibid, 28 July 1956,

40. Ibid, 2 October 1957, p. 3

41. Ibid, 24 April 1957, p. 3

42. Ibid, 16 July 1957, p. 3

43. Ibid, 28 July 1956,

44. Ibid, 26 January 1957, p. 1

45. Zhel. Transport, No. 3, 1957, p. 6

46. Gudok, 23 February 1957, p. 3

47. Gudok, 24 April 1957, p. 3

48. Gudok, 16 July 1957, p. 3

STAT

49. Gudok, 16 July 1957, p. 3

50. Ibid, 2 October 1957, p. 3

51. Zhel. Transport, No. 3, 1958, p. 67

52. Tyuga, No. 7, 1957, p. 9

53. Gudok, 3 January 1958, p. 1

STAT

BIBLIOGRAPHY

BOOKS

Beshchev, B.P. Zheleznodorozhnyy transport SSSR v shestoy pyatiletke (Railroad Transport of the USSR in the Sixth Five-Year Plan). Moskva, 1957. 173 pages.

Bol'shaya Sovetskaya Entsiklopediya (Great Soviet Encyclopedia), Vol. 1, 1949; Vol. 2, 1950; Vol. 4, 1950; Vol. 13, 1952; Vol. 24, 1953; Vol. 38, 1955; Vol. 47, 1957.

Golovanov, I.I. Elektricheskaya tyaga i eye effektivnost' (Electric Traction and its Effectiveness). Moskva, 1956, 50 p.

Khachaturov, T.S. Razmeshcheniye transporta v kapitalisticheskikh stranakh i v SSSR (Distribution of Transport in the Capitalistic Countries and the USSR). Moskva, 1939. 715 pages.

Lyalikov, N.I. Ekonomicheskaya geografiya SSSR (Economic Geography of the USSR). Moskva, 1957. 340 pages.

Naporko, A. Ocherki razvitiya zheleznodorozhnogo transporta SSSR (Outline of Development of the Railroad Transportation of the USSR). Moskva, 1954. 284 pages.

Obraztsov, V.N. Istoriya razvitiya transporta Moskvy (History of Transport Development of Moskva). Moskva, 1948. 30 pages.

Rakov, V.A. Lokomotivy zheleznykh dorog Sovetskogo Soyuza (Locomotives of the USSR Railroads). Moskva, 1955. 455 pages.

Rozenfel'd, V.E. Electricheskiye zheleznye dorogi (Electric Railroads). Moskva, 1951. 536 pages. and 1957 (edition). 431 pages

Sarantsev, B.L. Geografiya putey soobshcheniya (Geography of Communication Lines). Moskva, 1957. 251 pages.

Tarifnoye Rukovodstvo (Handbook of Tariffs). Vols. 1 and 2, 1954.

Vedenisov, B.N., Sologubov, V.N., Syromyatnikov, S.P., Khachaturov, T.S. Kratkiy technicheskiy zheleznodorozhnyy slovar' (Short Technical Railroad Dictionary). Moskva, 1940. 606 pages.

MAGAZINES

Elektricheskaya i teplovoznaya tyaga (Electric and Diesel Traction). Moskva, 195-, 1958.

Elektrifikatsiya zheleznodorozhnogo transporta (Electrification of Rail Transport). Moskva, 1932.

Zheleznodorozhnyy transport (Railroad Transportation). Moskva, 1957, 1958.

STAT

NEWSPAPERS

Bakinskiy Rabochiy, 1956, 1957

Gudok. 1951 - 1958

Izvestiya. 1956, 1957, 1958

Kommunist. 1956, 1957

Leningradskaya Pravda. 1956, 1957

Moskovskaya Pravda, 1956, 1957

Pravda. 1949, 1956, 1957

Pravda Ukrainy. 1956, 1957

Promyshlennaya Ekonomicheskaya Gazeta, 1956, 1957

Rossiya. 1956

Sovetskaya Latviya. 1956, 1957

Sovetskiy Flot. 1956, 1957

Stroitel'naya Gazeta. 1955, 1956, 1957

Trud. 1953, 1956, 1957

Vechernyaya Moskva. 1953, 1957

Zarya Vostoka. 1956, 1957

STAT

NORTHERN RR SYSTEM Aleksandrov-Vspol'ye section

(Scheduled for completion in 1958)

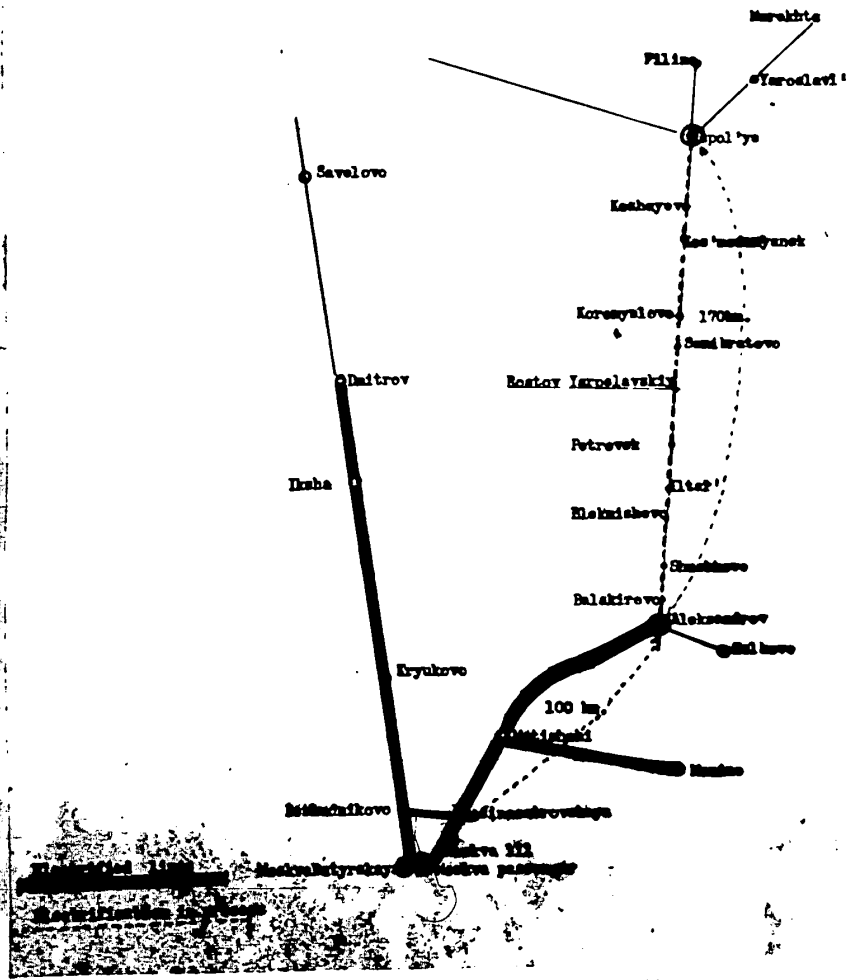


Fig. 1 - Schematic map of Northern System, showing the electrification of Aleksandrov-Vspol'ye section.

STAT

II

GOR'KIY RR SYSTEM ELECTRIFICATION

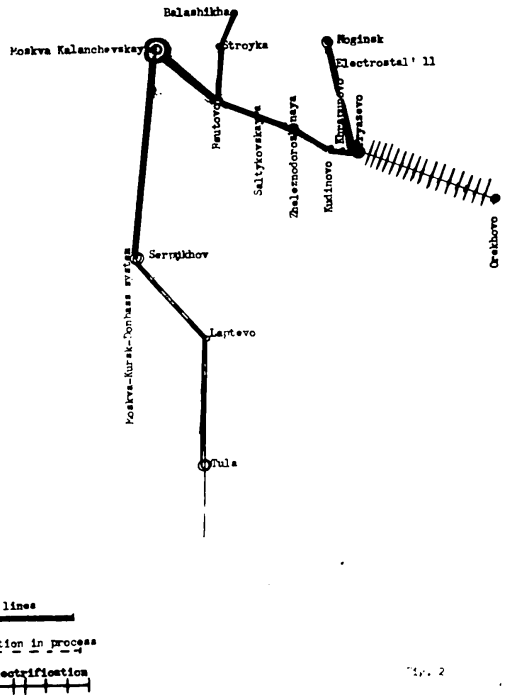


Fig. 2

Fig. 2 - Schematic map of Gor'kiy System and electrification of Moskva-Fryazevo-Noginsk section.

III

MOSKVA RYAZAN' SYSTEM

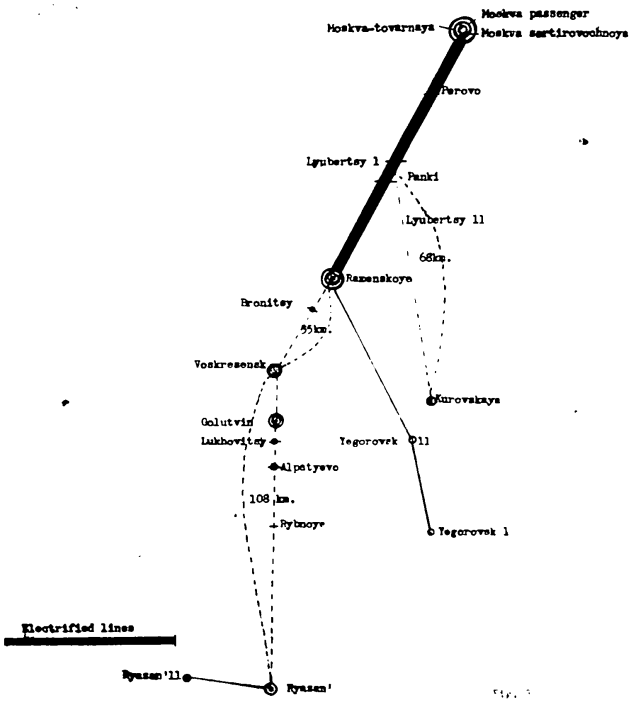


Fig. 3 - Schematic map of Moskva-Ryazan' system; electrification of Ramenskoye-Ryazan' line.

[redacted]

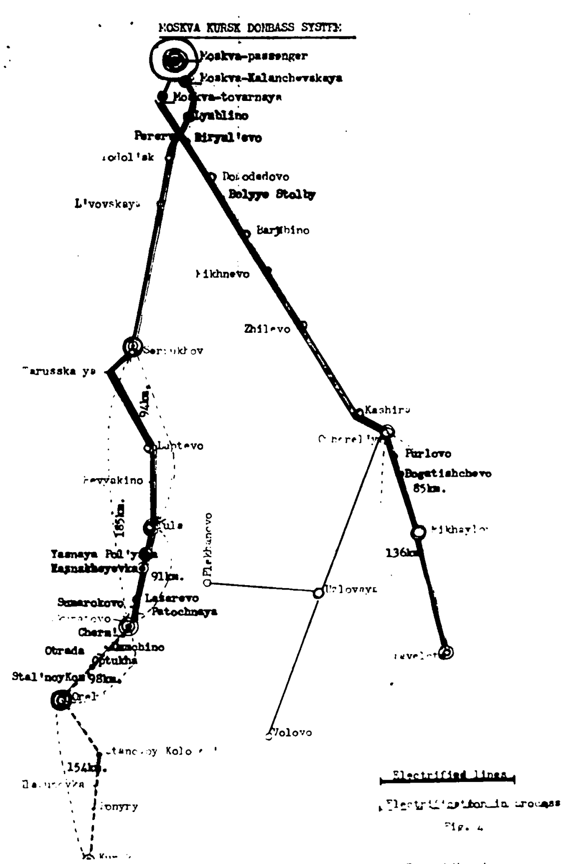


Fig. 4 - Schematic map of Moskva-Kursk-Donbass System and electrification of Moskva-Kursk and Ozherel'ye-Pavelets sections.

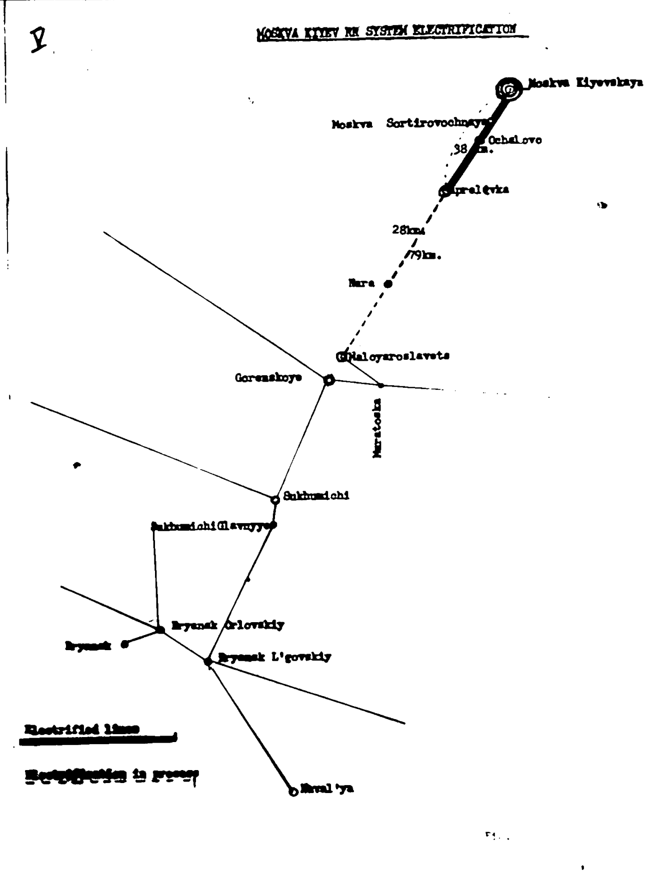


Fig. 5 - Schematic map of Moskva-Kiyev System; electrification of Aprelevka-Maloyaroslavets section.

Declassified in Part - Sanitized Copy Approved for Release @ 50-Yr 2014/01/31 : CIA-RDP81-01043R002900240006-4

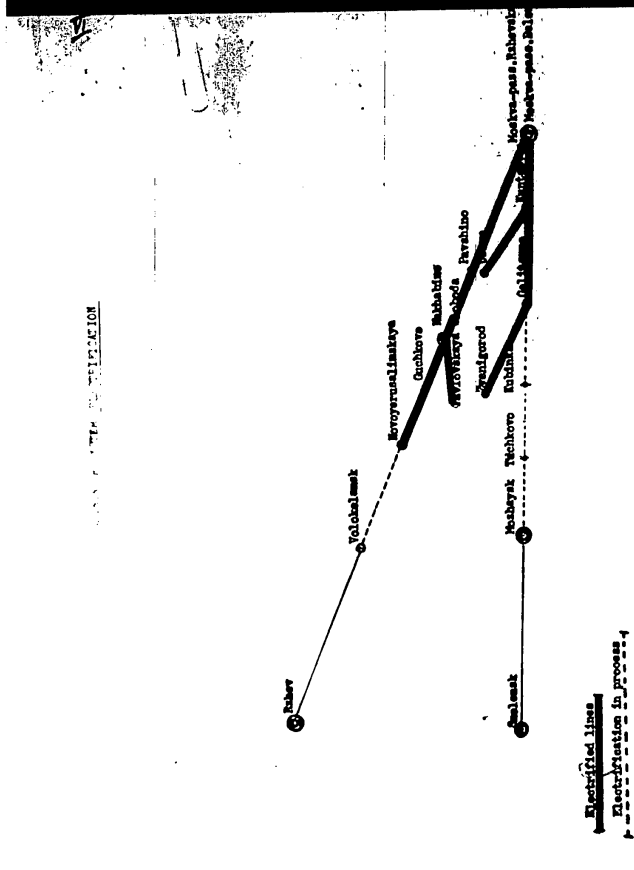


Fig. 6 - Schematic map of Kalinin System and electrification of Golitsyno-Mozhaysk and Novoyerusalimskaya-Volokolamsk sections.

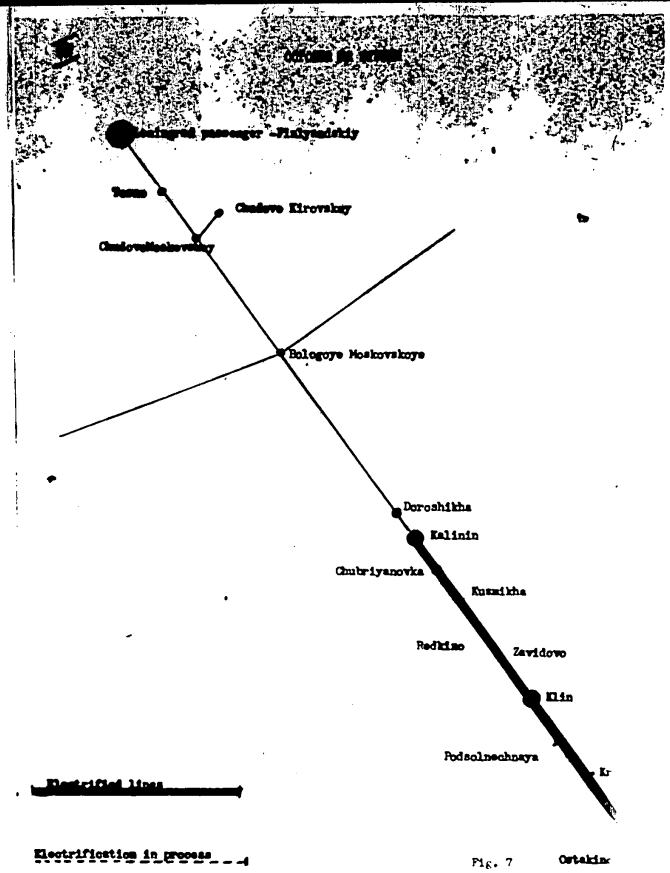


Fig. 7 - Schematic map of October System; electrification of Klin-Kalinin section.

STAT

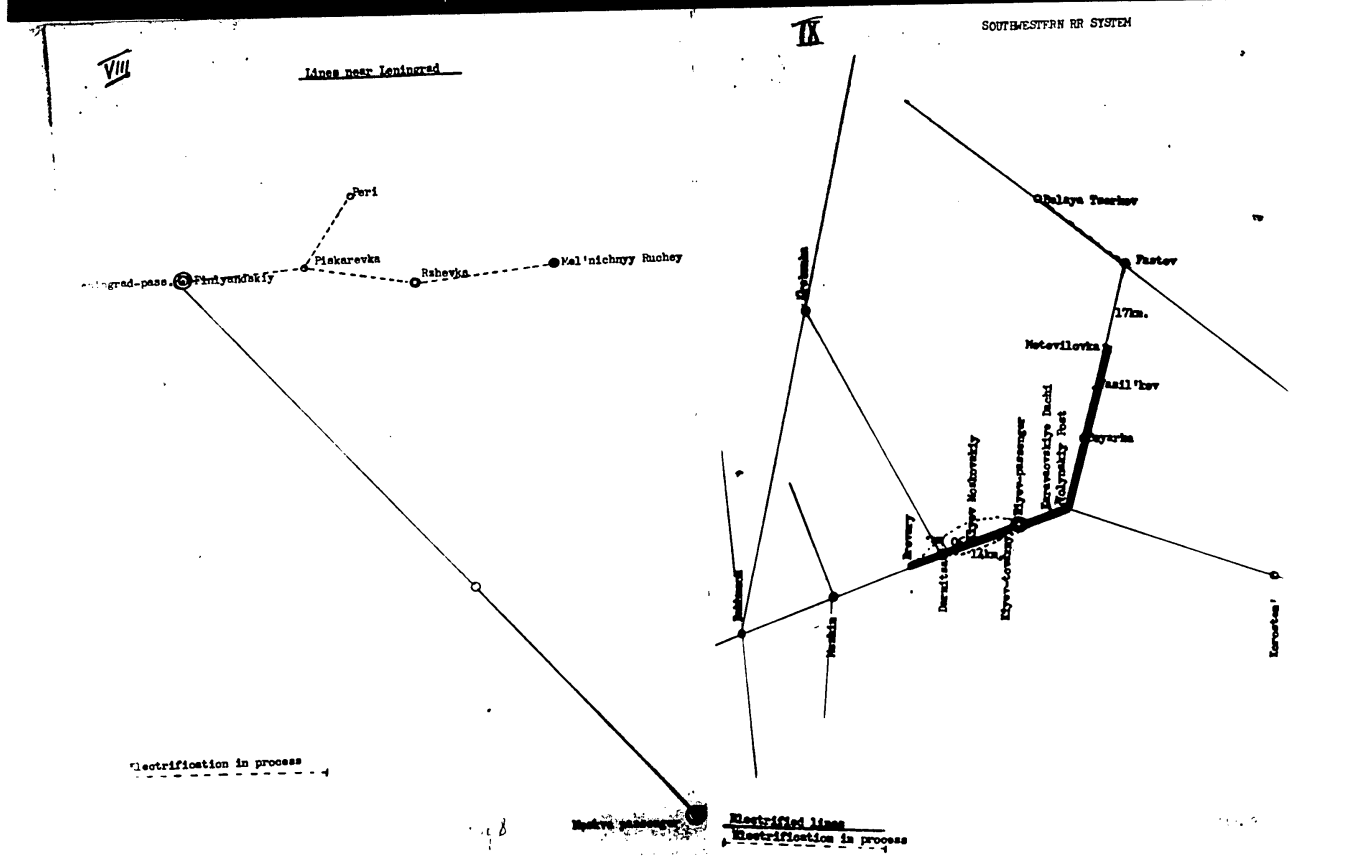


Fig. 8 - Schematic map of the suburban lines near Leningrad and electrification of Leningrad-Mel'nichnyy Ruchey and its Piskarevka-Peri branch line.

Fig. 9 - Schematic map of the lines near Kiyev; electrification of Kiyev-Darnitsa-Brovary line.

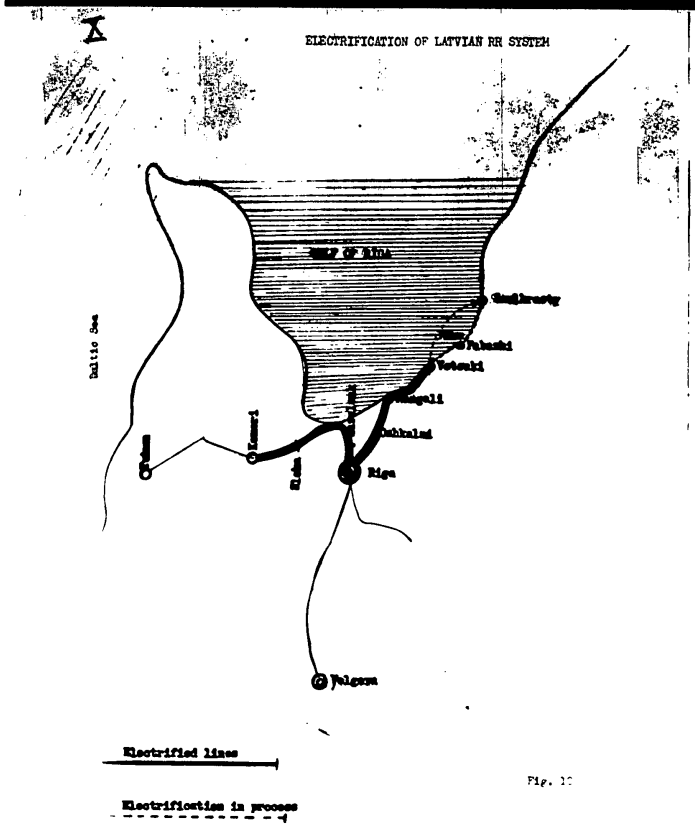


Fig. 10

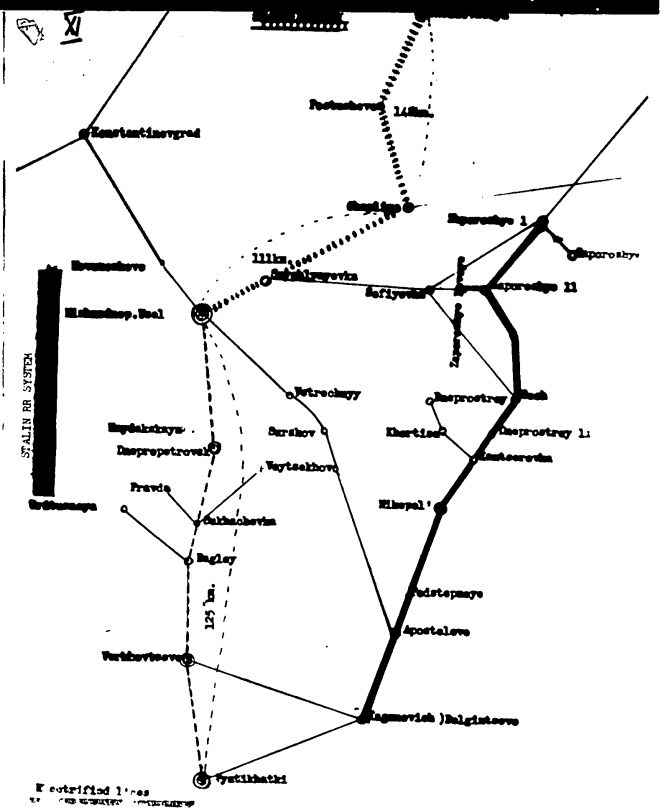


Fig. 11

Fig. 10 - Schematic map of the suburban lines near Riga and electrification of Riga-Mangali-Vetseki-Saulkrasty section.

Fig. 11 - Schematic map of Stalin system and electrification of Dnepropetrovsk-Yasinovataya line.

STAT

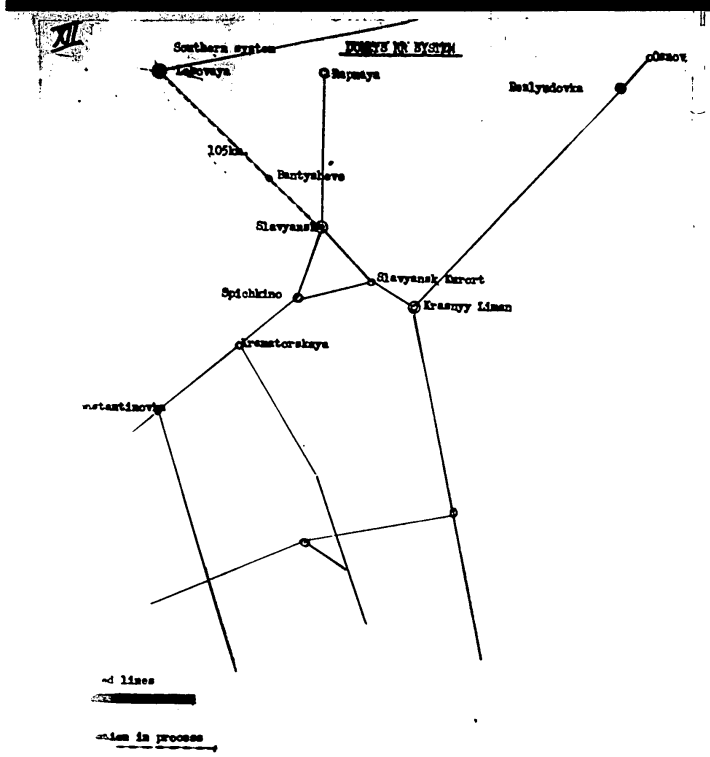


Fig. 12 - Schematic map of Donets System and electrification of Lozovaya-

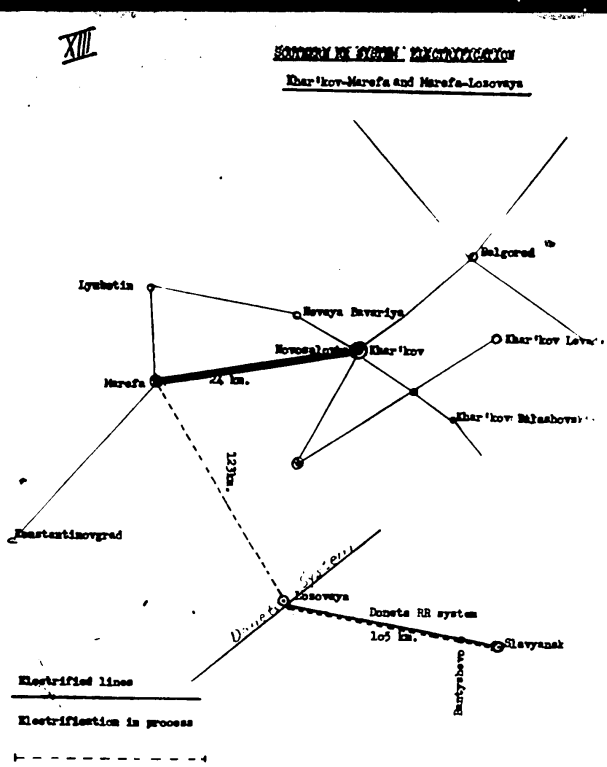


Fig. 13 - Schematic map of Southern System: electrification of

STAT

XIV

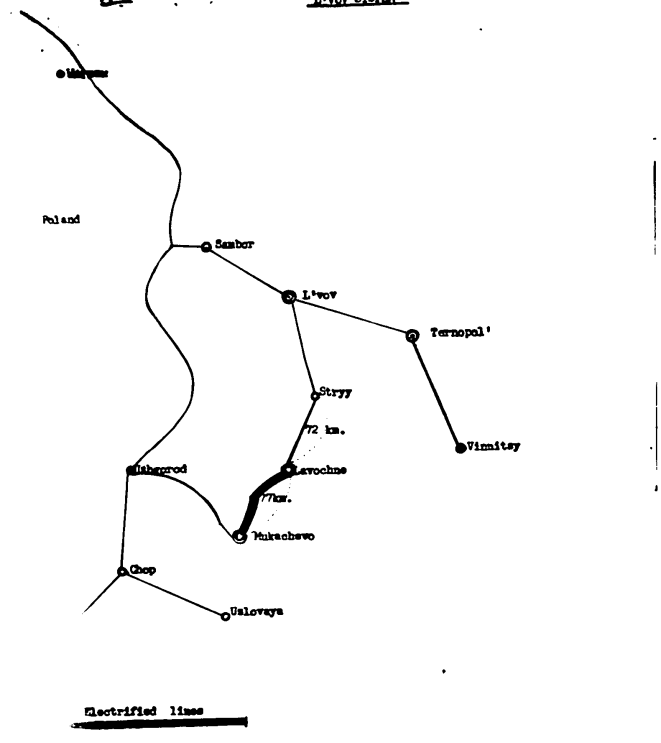


Fig. 14 - Schematic map of Kirov system.

XV

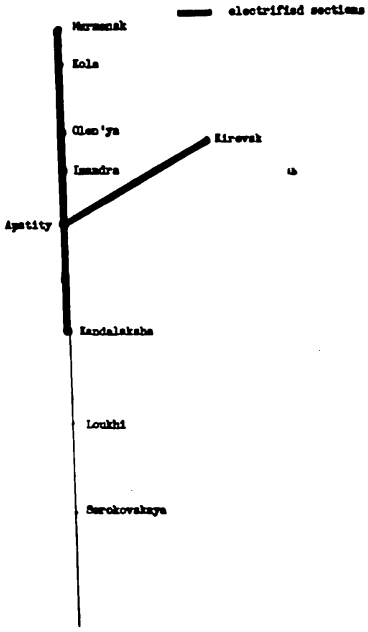
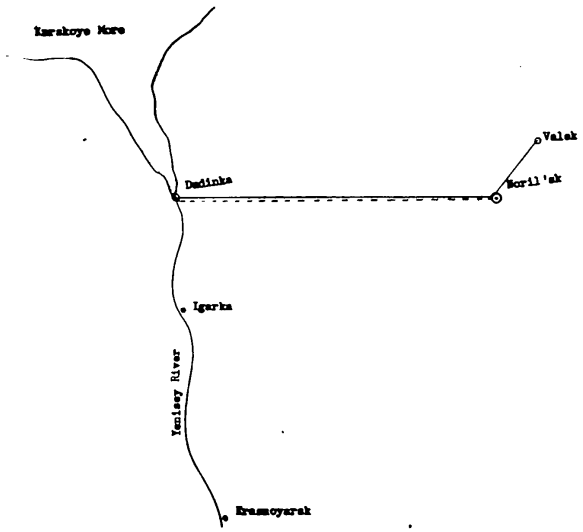


Fig. 15 - Schematic map of L'vov System; electrification of lav...

XVI

DUDINKA - NORIL'SK LINE (150 km)

---- under electrification



XVII

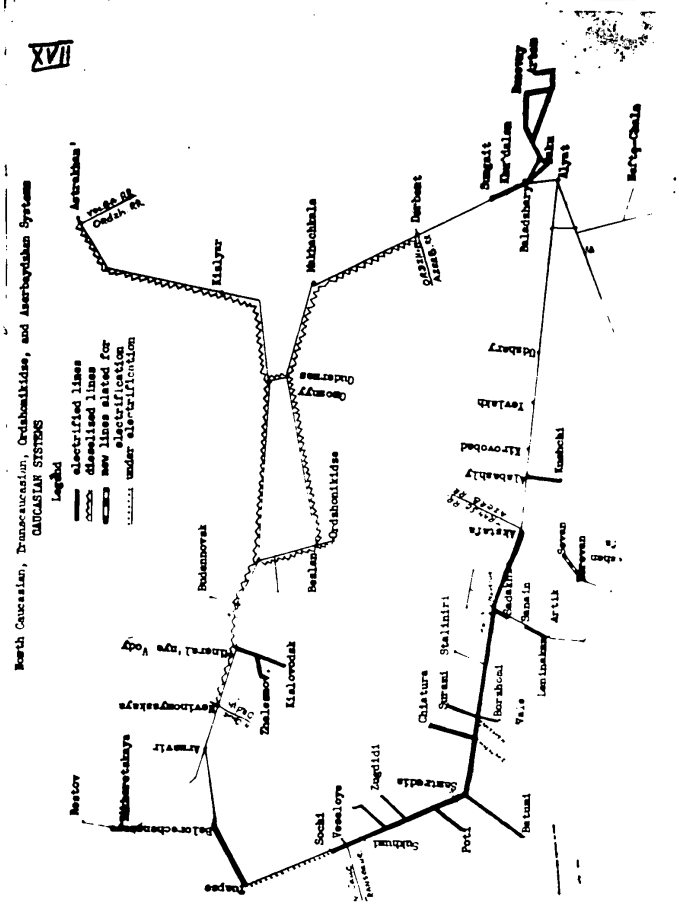


Fig. 17 - Schematic map of Caucasian systems.

STAT

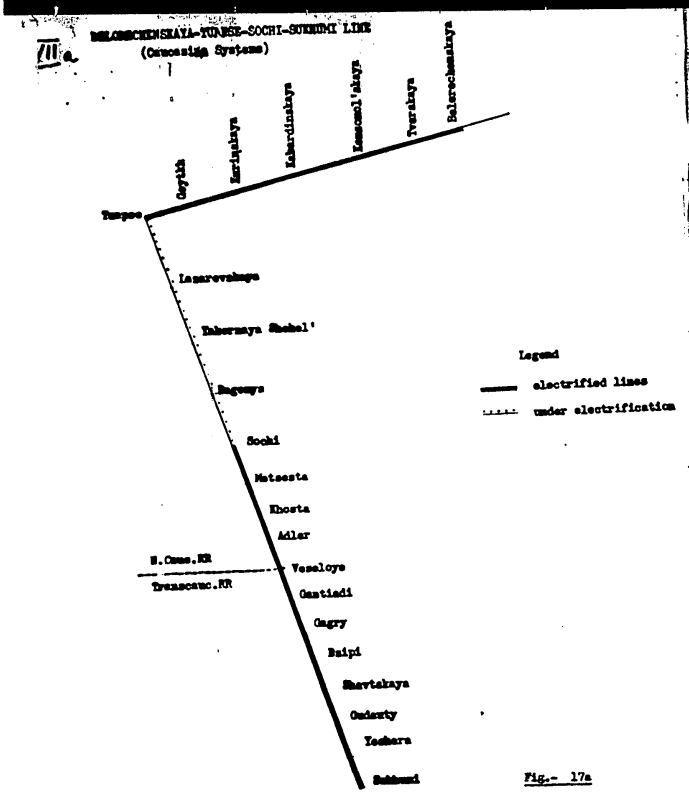


Fig.- 17a

Fig. 17a - Schematic map of the Belorechenskaya-Tuapse-Sochi-Sukhumi Line.

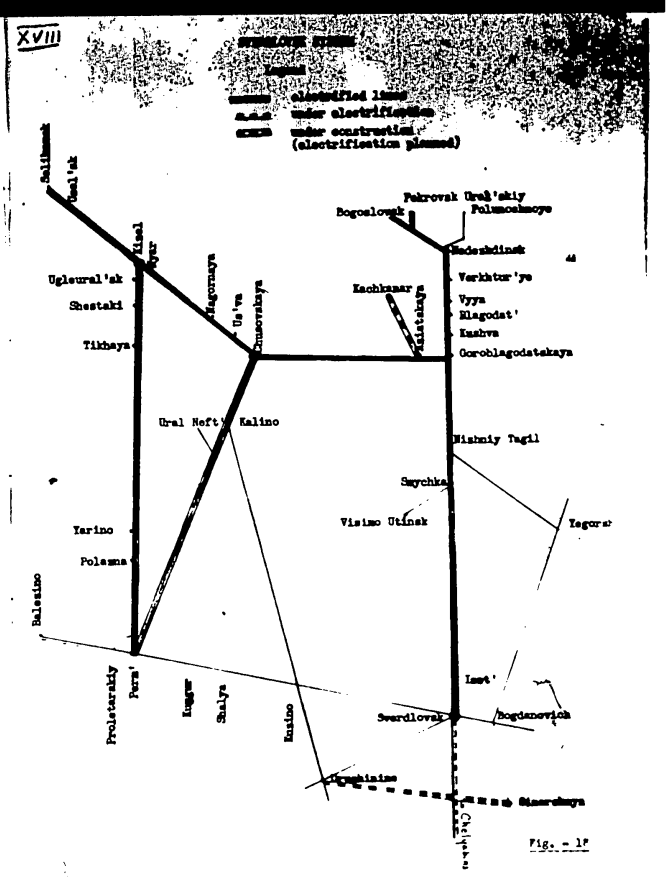


Fig. - 18

Fig. 18 - Schematic map of Sverdlovsk System.

STAT

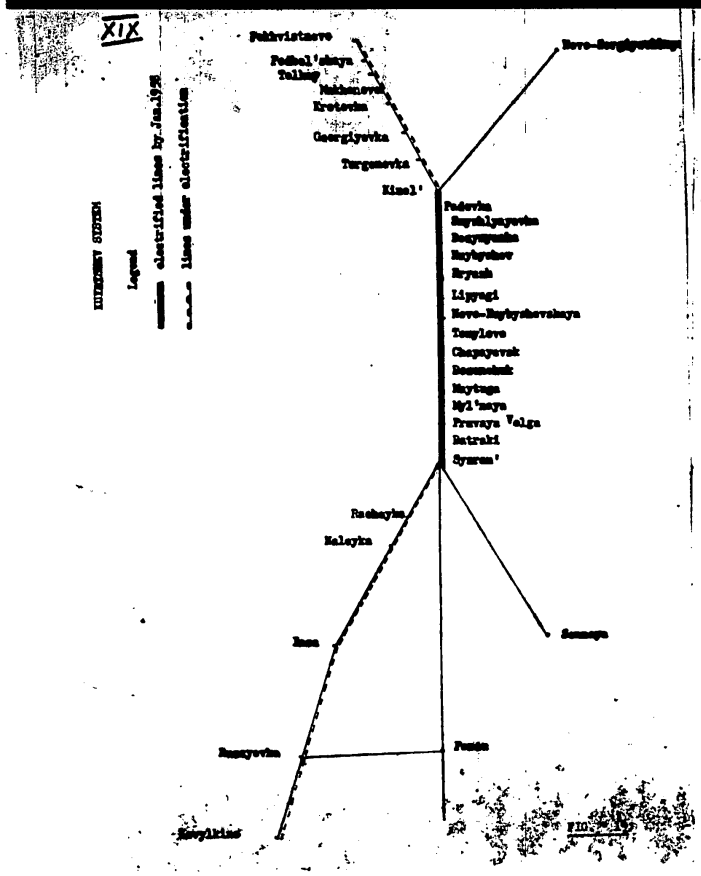


Fig. 19 - Schematic map of Kuybyshev System

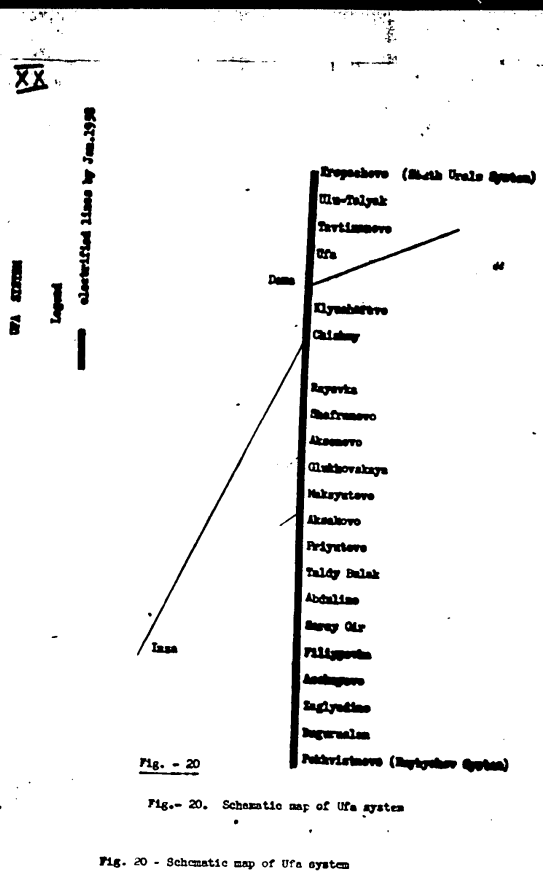


Fig. - 20

Fig.- 20. Schematic map of Ufa system

Fig. 20 - Schematic map of Ufa system

STAT

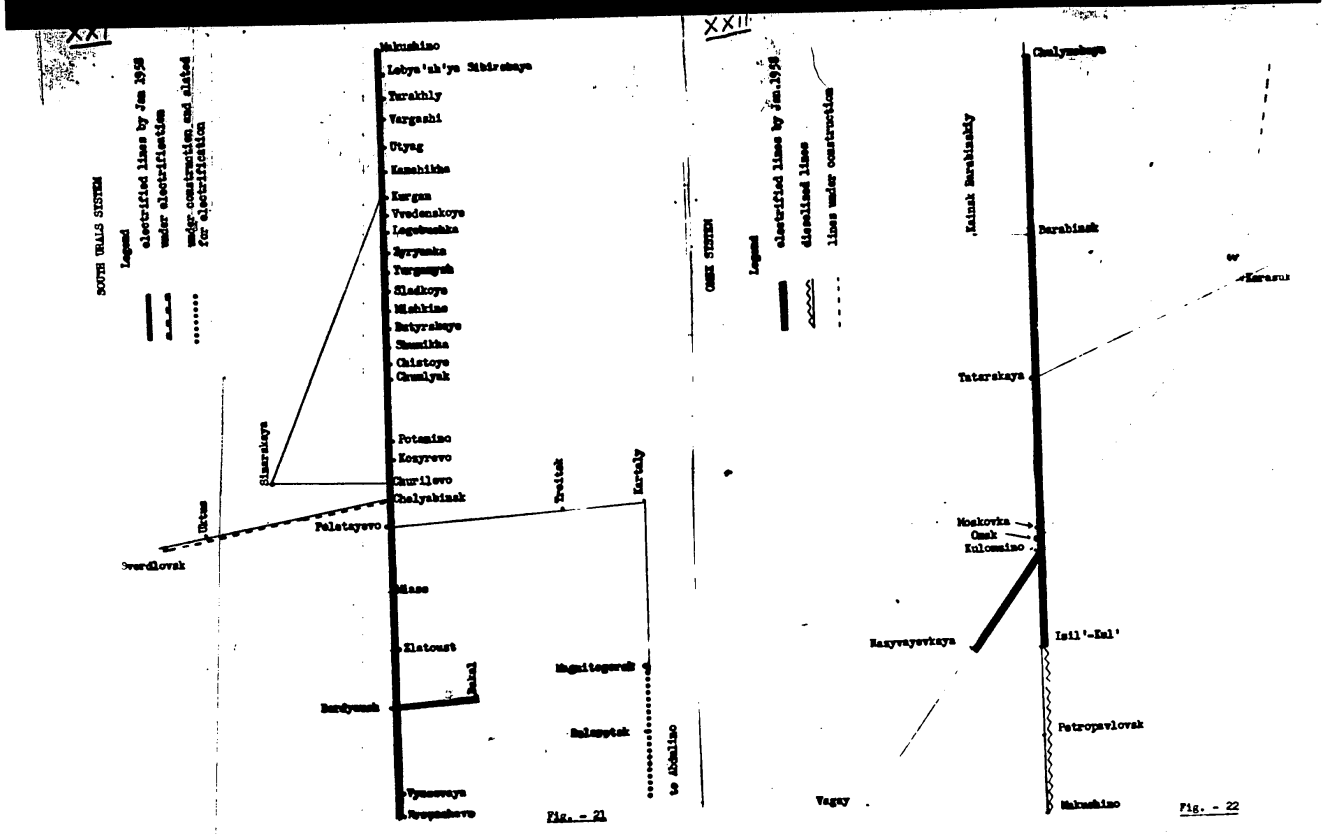


Fig. 21 - Schematic map of South Urals System

Fig. 22 - Schematic map of Omsk System

STAT

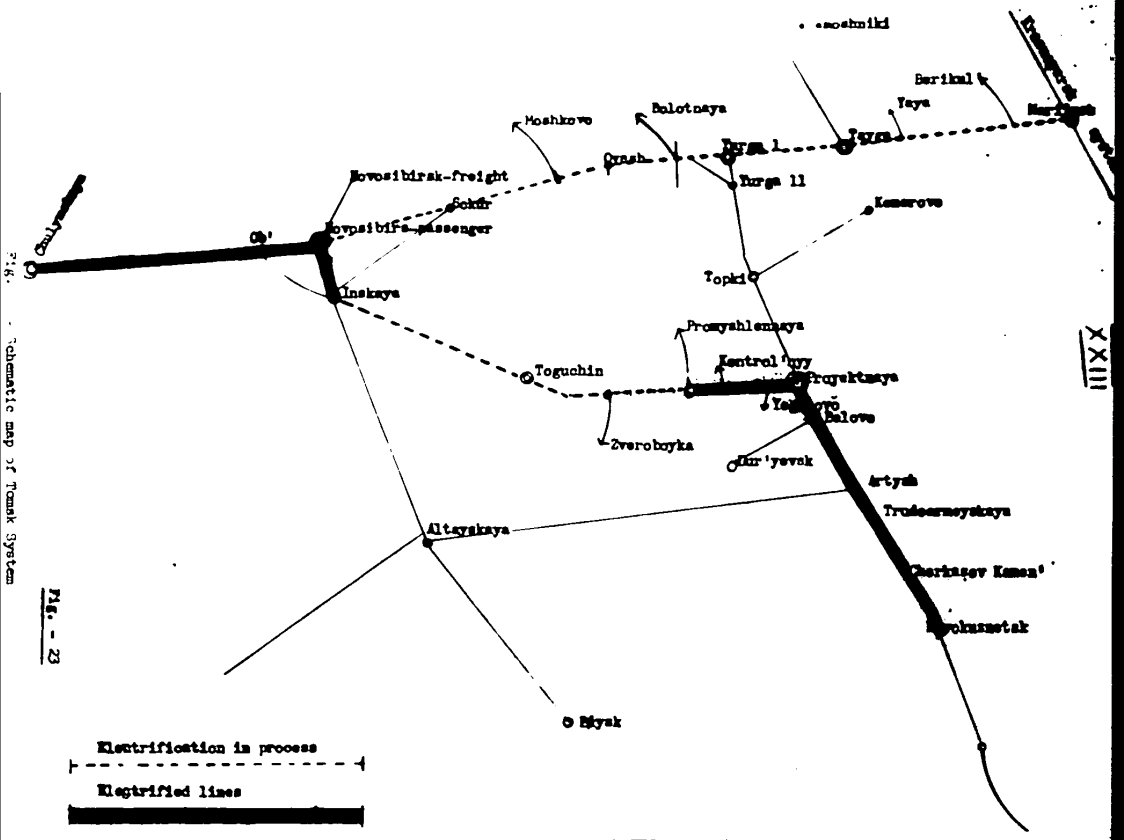


Fig. - 23 Schematic map of Tomsk System

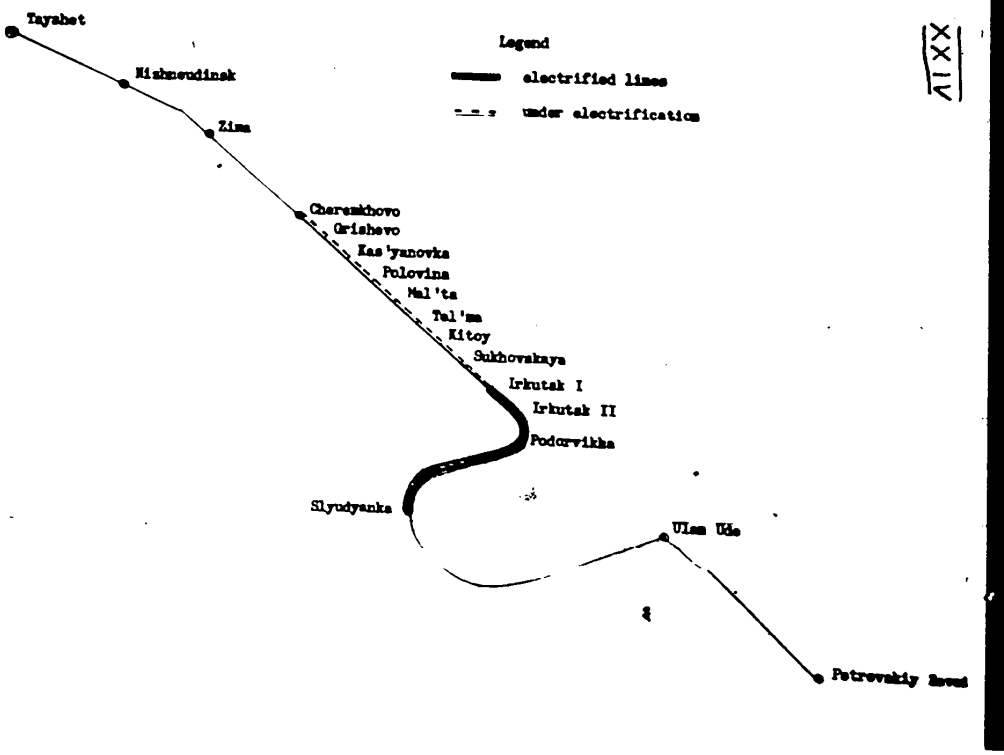


Fig. 24 - Schematic map of East Siberian System

STAT

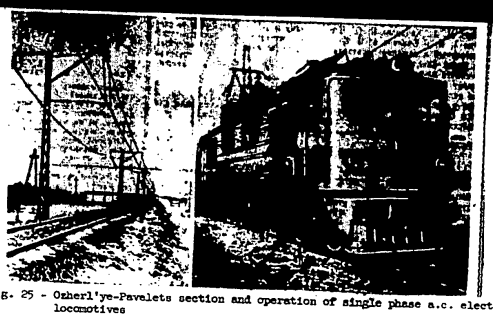


Fig. 25 - Ozherl'ye-Pavelets section and operation of single phase a.c. electric locomotives

Source: Gudok, 8 February 1957, p. 3

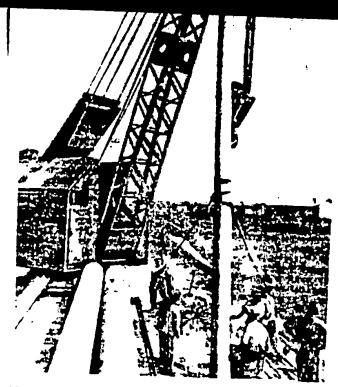


Fig. 27 - Installation of reinforced concrete contact network supports at Nizhnedneprovsk Usel station (photo)

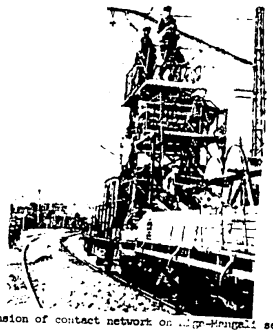


Fig. 26 - Suspension of contact network on [illegible]-Krasnyy section

Source: Gudok, 4 July 1957, p. 2

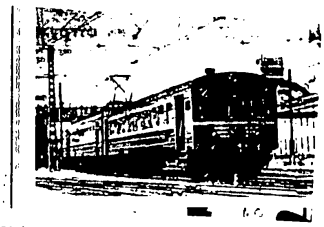


Fig. 28 - Departure of the first [illegible] train from Khar'kov station

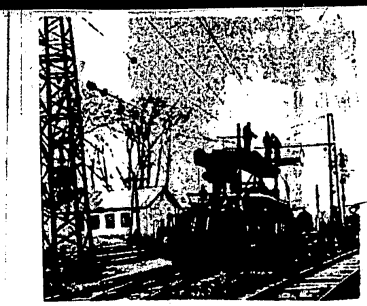


Fig. 29 - Assembly of contact network at Kalinin station
Source: Gudok, 1 December 1957, p. 1

Fig. 31 - Assembly service train is checking contact network on the newly electrified Sochi-Adler run

Source: Gudok, 23 August 1957, p. 1

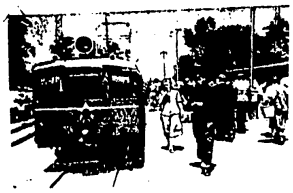


Fig. 30 - The first electric locomotive arriving in Brovary station

Fig. 32 - Electric train at Sochi Terminal

Source: Gudok, 23 August 1957, p. 1

STAT

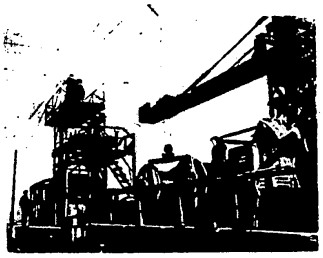


Fig. 33 - Rolling out of overhead cables at Adler station

Source: Gudok, 30 December 1956, p. 1

Fig. 35 - Testing of high-voltage breakers at the Belorechenskaya Station

Source: Gudok, 14 September 1957, p. 3

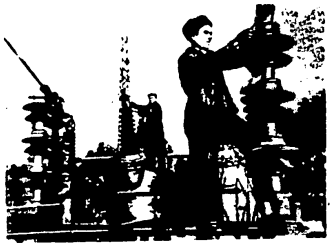


Fig. 34 - Assembly of breakers at the substation of the Sukhumi-Sochi Section

Source: Gudok, 30 December 1956, p. 1

Fig. 36 - Assemblers at work on the Belorechenskaya-Tuapse section.

Source: Gudok, 14 September 1957, p. 3

STAT

Fig. 37 - Assembly train departing from Krivenkovskaya station for work

Source: Gudok, 19 June 1957, p. 1

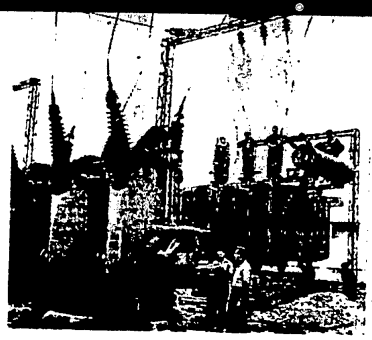


Fig. 39 - Assembly of power transformers and oil breakers on the open part of Tuapse substation

Source: Gudok, 19 June 1957, p. 1

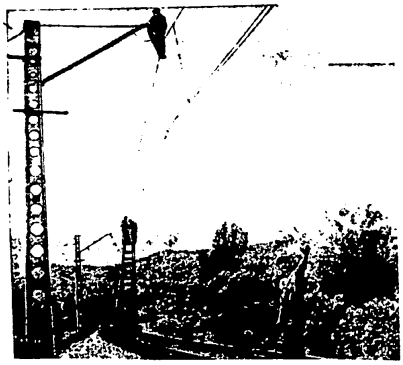


Fig. 38 - Assembly of contact network on the Belorechenskaya-Tuapse Section

Source: Gudok, 19 June 1957, p. 1

Fig. 40 - Tuapse-Sochi-Adler Section

Source: Gudok, 4 June 1957, p. 2

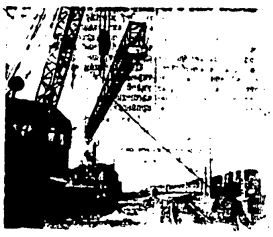


Fig. 41 - Installation of sturdy cross over reinforced concrete sup at the Lazarevskaya station Tuapse-Sochi section

STAT

Fig. 42 - Installation of contact network supports on the Tuapse - Lazarevskaya run.

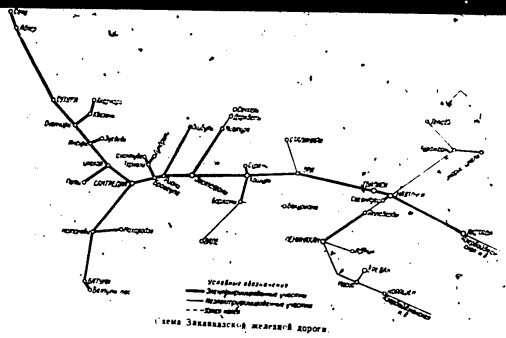


Fig. 43 - Schematic map of Transcaucasian System

Source: "Elektricheskaya i Teplovoznaya Tyaga," No. [illegible], 1957, p. 2

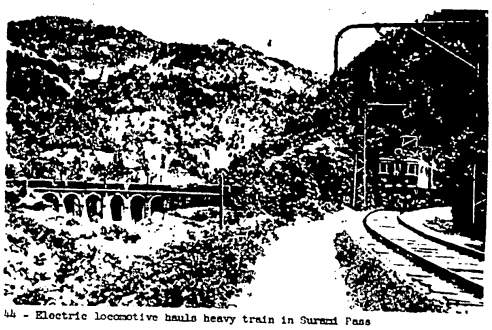


Fig. 44 - Electric locomotive hauls heavy train in Surami Pass

Source: Gudok, 16 August 1957, p. 1

STAT

Fig. 45 - Newly constructed and electrified Zestafoni-Pereval run of the Zestafoni-Chiatura line. In the lower right - an old narrow-gauge line.

Source: Gudok, 9 July 1957, p. 2

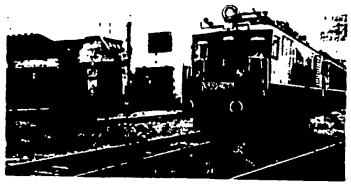


Fig. 47 - Sverdlovsk-Classification Electric Enginehouse

Source: "Zheleznodorozhnyy Transport", No. 11, 1957, p. 88

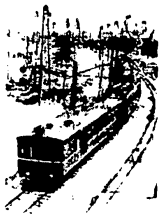


Fig. [illegible] - Electric railway on Apsheron peninsula

Source: Gudok, 21 July 1957, p. 1

Fig. [illegible] - The machining of wheel tires of electric [illegible] at Sverdlovsk Electric Enginehouse

Source: "Elektricheskaya i Teplovoznaya Tyaga", No. [illegible], [illegible].

Fig. 49 - Repair of electric units at Perm'II Electric Enginehouse

Source: "Elektricheskaya i Teplovoznaya Tyaga", No. 5, 1957, cover

Fig. 50 - Outside view of the Chusovskaya Electric Enginehouse

Source: "Zheleznodorozhnyy Transport," No. 11, 1957, p. 32-33 insert

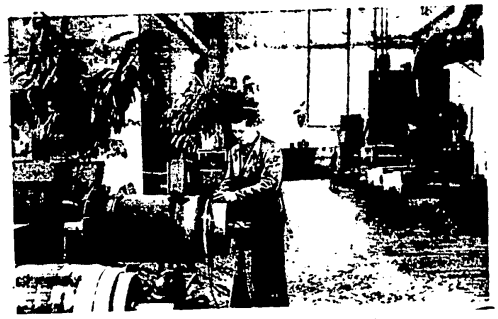


Fig. 51 - Machine shop for electric equipment at Perm' Enginehouse

Source: Gudok, 29 December 1957, p. 1

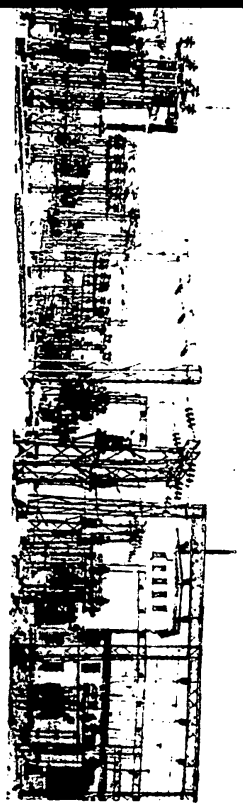


Fig. 52 - Open part of the Kinel' traction substation

Source: Gudok, 22 May 1957, p. 1

STAT

Fig. 53 - Building of Tomylovo traction substation

Source: Gudok, 28 March 1957, p. 3

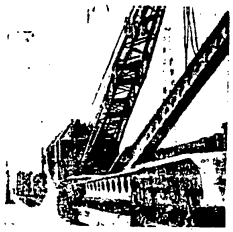


Fig. 54 - Installation of supports on the Novo-Kuybyshevskaya - Zvezda run, of Kuybyshev System

Source: Gudok, 28 March 1957, p. 3.

Fig. 55 - Installation of conta ct network supports on the Smyshlyayevka-Kinel' Section of Kuybyshev System

Source: Gudok, 18 August 1956, p. 3

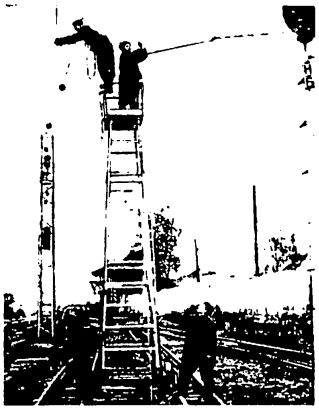


Fig. 56 - Assembly workers of the electric-assembly train no. at work on the Kinel'-Syzran' line of Kuybyshev System

STAT

Fig. 57 - Electric locomotive train on the Dema-Kropachevo Section

Source: Gudok, 23 August 1956, p. 1

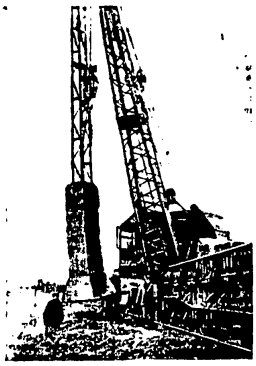


Fig. 58 - Installation of support with base on the Rayevka-Kashkinovo line of Ufa System

Source: Gudok, 10 April 1957, p. 3

Fig. 59 - In the hall of Rayevka traction substation of Ufa System

Source: Gudok, 5 October 1956, p. 1

Fig. 60 - Dema-Rayevka section of Ufa System is electrified

Source: Gudok, 7 October 1956, p. 1

STAT

Fig. 61 - Installation of support bases on the Shumikha-Chistoye run of South Urals System

Source: Gudok, 28 June 1957, p. 3

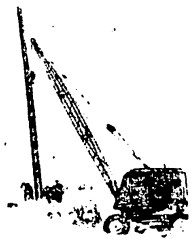


Fig. 62 - Installation of supports on the Mishkino-Sladkoye run of South Urals System in heavy snow drifts.

Source: Gudok, 29 March 1957, p. 3

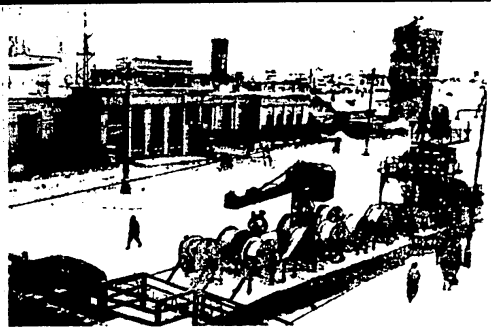


Fig. 63 - Stringing of contact cables at the Kurgan station of South Urals System

Source: Gudok, 15 December 1956, p. 2

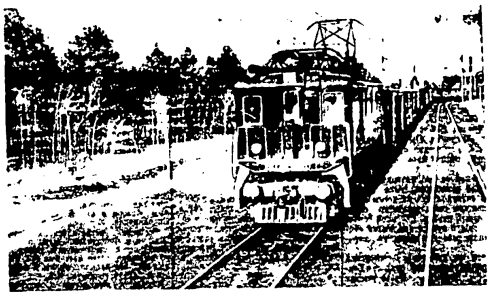


Fig. 64 - Electric locomotive hauls heavy train on newly electrified Kurgan-Makushino line of South Urals System

STAT

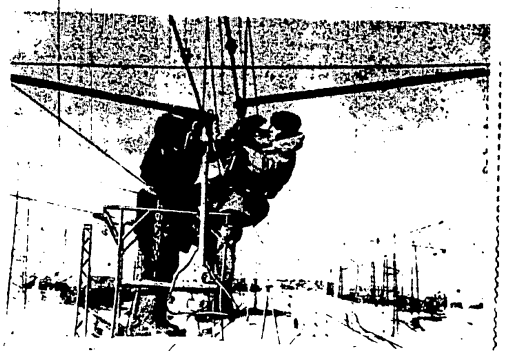


Fig. 65 - Electrification of Belovo-Promyshlennaya section of Tomsk System

Source: Gudok, 20 November 1957, p. 1

Fig. [illegible] - Irkutsk-Bludynaya section of East Siberia. [illegible]

Source: Gudok, July [illegible], p. [illegible]

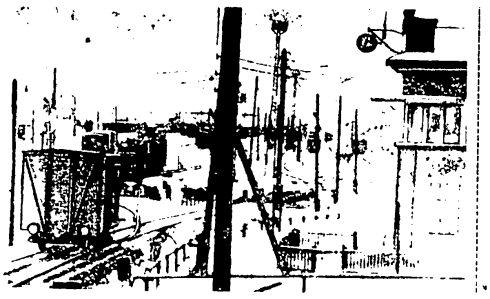


Fig. 66 - Inskaya station of Tomsk system

Source: Gudok, 13 December 1956, p. 1

Fig. [illegible] - Part of mountainous Irkuts[illegible] main [illegible] of the East Siberian System

STAT

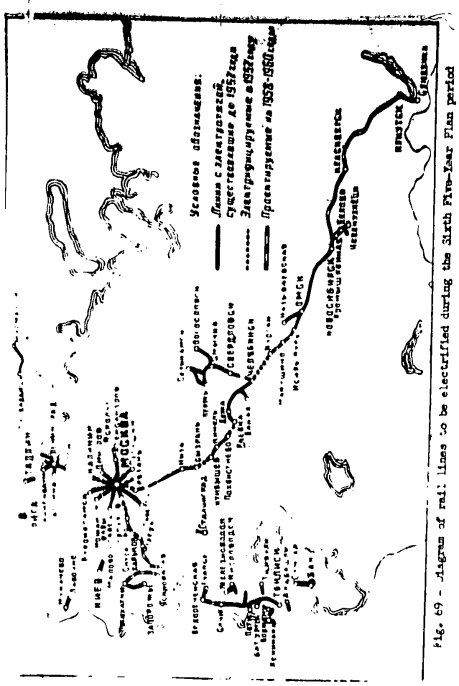
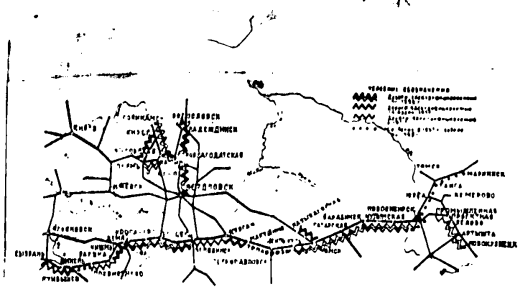


Fig. 69 - Diagram of rail lines to be electrified during the Sixth Five-Year Plan period

Source: Gudok, 27 April 1957, p. 1



Legend:

Lines electrified before 1957

Lines under electrification in 1957

Electrification in projects for 1958-1959

Fig. 70 - Diagram of rail lines to be electrified during the Sixth Five-Year Plan period

Source: Gudok, 17 November 1956, p. 1

Legend:

lines electrified before 1956

electrification according 1956 plan

electrification according 1957 plan

..... preliminary work completed in 1957 for final electrification in 1958

STAT