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SUBJECT *(Descriptive title. Use individual reports for separate subjects)*
DIESELIZATION OF THE USSR RAILROAD NETWORK: I. CENTRAL ASIA (ASHKHABAD, TASHKENT, ORENBURG, RURKESTAN-SIBERIAN AND KARAGANDA SYSTEMS)

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SUMMARY *(Give summary which highlights the salient factors of narrative report. Begin narrative text on AF Form 112a unless report can be fully stated on AF Form 112. List inclosures, including number of copies)*

1. Submitted herewith is the first part of a report on the dieselization of the USSR railroad network. This report attempts to describe the dieselization of the railroads of the Central Asia and Kazakh SSR, including the Ashkhabad, the Tashkent, the Orenburg, the Turkestan-Siberian, the Karaganda and "Druzhba" (Aktogay - China border line) railroads.

2. The report is based on Soviet open sources of 1945 - 1957 period. The appendix contains sketched maps of railroad systems. The legend of the first one applies to all other maps.

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# DIESELIZATION OF THE USSR RAILROAD NETWORK:

## I. CENTRAL ASIA

## Ashkhabad, Tashkent, Orenburg, Turkestan-Siberian and Karaganda systems

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# DIESELIZATION OF THE USSR RAILROAD NETWORK

## I. Central Asia:

## Ashkhabad, Tashkent, Orenburg, Turkestan-Siberian and Karaganda systems

### CHAPTER I: INTRODUCTION

The introduction of diesel traction in the USSR was initiated on the railroads of Central Asia and Kazakh SSR, including the Ashkhabad (beginning in 1931), the Tashkent, the Orenburg, the Turkestan-Siberian and Karaganda systems (1). Since they represent a chain of rail lines, connected with each other and servicing specific areas, and the total length of their dieselized sections represents about 80 per cent of the entire length of dieselized lines in the USSR (2), a separate report is given herewith, being the first part of the report on the dieselization of USSR railroad lines. Detailed information is given on dieselization and operations of the Ashkhabad, Tashkent, Orenburg, Turkestan-Siberian systems. Information on the Karaganda system is included in the introductory chapter. A separate chapter is dedicated to a new railroad, now under construction and to be dieselized, the so-called "Druzhba" (Friendship) line, which will extend from Aktogay to Gosgranitsa and will connect the USSR and China.

The Sixth Five-Year Plan set the goal of accelerating the production of all branches of the national economy of the Kazakh, Uzbek, Kirgiz, Tadzhik and Turkmen Republics, and resulted in a growth of freight and passenger traffic on the railroads which service the republics. According to the preliminary calculations during the plan period, the freight turnover on these railroads will increase 35 - 45 per cent, and on some sections of the railroad lines even higher than that (3).

The use of diesel traction on the railroads of Central Asia and Kazakh SSR was acknowledged to be the most effective method of hauling the growing traffic, particularly in existing favorable local conditions (4), as stated by M.N. Belen'kiy, noted writer on diesel traction in the USSR, and by I.G. Beskrovnyy, Candidate of Technical Science (5).

The total length of railroad lines of the above mentioned systems comprises 14,700 kilometers, of which 5,400 km were serviced by diesel locomotives (6), in 1956. It is planned to transfer these systems entirely to diesel traction during the Sixth Five-Year Plan period (7).

Technical and economic calculations made by the Tashkent Institute of Railroad Engineers and engineers of Ashkhabad, Tashkent, Turkestan-Siberian and Orenburg systems, indicated that the railroads of Central Asia and the Kazakh SSR must be converted to diesel traction for all types of operations, i.e. freight, passenger and shunting (8). Nevertheless, on such railroads as the Ashkhabad and Orenburg, which had the largest diesel

locomotive parks (9), and where the participation of diesel traction in traffic is already very significant, about thirty per cent of the operational length of rail lines were still serviced by steam traction by November 1956 (10). The Turkestan-Siberian system (with the exception of the Mointy - Chu line) and the Karaganda system, will switch to diesel locomotives and will eventually be totally converted to diesel traction, as stated by M.N. Belen'kiy (11).

On the Karaganda system, diesel traction is to be introduced on a large scale during the 1957 - 1958 period. The entire Akmolinsk - Pavlodar - Kulunda line is to be converted to diesel traction in the future (12), extending also to Barnaul of the Tomsk system (13). A diesel repair shop will be built in Pavlodar to service diesel locomotives from Karaganda and Tomsk systems (14). Maintenance repair shops will be built at Yeremen'Tau station, and the Ekibastuz station will be connected by rail with the Kulomzino station of Omsk railroad (15).

The Karaganda - Mointy line is to be transferred to diesel traction in the coming years, B.P. Beshchev announced in an article published in "Electric and Diesel Traction" in 1957 (16).

In 1956 a group of "TE-2" diesel locomotives were received by Karaganda railroad to speed up grain shipments on the Akmolinsk - Atbasar - Kushmurun trunk line (17). Preparations were made at Atbasar station for the servicing of these locomotives and a number of trained railroaders were sent from Orenburg system to give assistance. Adequate supply of fuel was furnished, as well as pumps for fueling, also spare parts and other necessities (18). Diesel locomotives were also sent to the Karaganda system from the Ishim diesel locomotive enginehouse of the Omsk system (19). In 1957, operations of diesel locomotives were reported on Yesil' - Derzhavinskaya section of the system (20) and diesel traction was introduced at the Atbasar-narrow-gauge enginehouse (21).

Diesel traction proved very effective on the Karaganda system (22) and also on the sections of other railroads which service Central Asia and Kazakh SSR (23).

The utilization of diesel locomotives permitted to increase the through-put capacity of lines by acceleration of the speed and weight of trains (24). It is expected that the utilization of diesel locomotives on the railroads of Central Asia and Kazakh SSR will increase during the two forthcoming Five-Year Plan periods the speed-including-stops by thirty to eighty per cent, and even higher, especially on the Orenburg system (25).

The transfer to diesel traction already brought considerable savings in operational expenses. Calculations showed that the annual savings amounted to about 200,000,000 rubles (26). The effect will be especially great on the Turkestan-Siberian system, where steam locomotives in most cases pull trains in double-headed traction combinations and where each train-kilometer costs twenty to twenty-two rubles. Diesel traction will cut the cost

to ten and twelve rubles (27). It is estimated that the capital expenditures connected with the changeover to diesel traction on the Tashkent, Ashkhabad, Orenburg, and Turkestan-Siberian systems will be paid for in two to three years (28).

The introduction of diesel locomotives for shunting operations on the railroads of Central Asia and Kazakh SSR will save about 50,000,000 rubles annually (29). Another source stated that up to 100,000,000 rubles can be saved (30). The "TE-1" diesel locomotives may be used successfully for this purpose until the special diesel switchers are produced (31).

The use of "TE-1" diesel locomotives showed its superiority over the "E" and "Shch" steam locomotives which are usually used for shunting (32). The Tashkent system was the first system on the entire USSR railroad network which began to use diesel switching locomotives (33), a method which proved to be very effective. However, most dieselized sections still use steam traction for shunting operations. This involves the upkeep of steam locomotive enginemen, repair and servicing facilities (34). At present the volume of diesel locomotives engaged in shunting operations is very insignificant even on railroads which use diesel traction in train operations. For example, only twenty per cent of all shunting locomotive-hours are performed by diesel locomotives on the Ashkhabad system, and even less on other railroads (35).

In connection with the wide use of diesel traction on Ashkhabad, Tashkent, Orenburg, Turkestan-Siberian and Karaganda systems, the railroaders are faced with the problem of lengthening locomotive operating runs, because the existing runs do not permit full utilization of diesel locomotives (36). In recent years, when steam traction was still in use, the runs on these systems were shortened, many new terminals were built, and great sums were spent for new terminal and servicing facilities. This was done without consideration of an eventual changeover to diesel traction. As a result the average length of traction runs on all main routes of these systems is now less than 110 km (37).

The importance of lengthening the runs for diesel locomotive operation was stressed by V. Povorozhenko, well known authority in railroad transportation, in his article published in Gudok in April 1957. He criticized the fact that even after the introduction of diesel, the length of operating runs and methods of operations often remained unchanged and identical to those used for steam traction (38).

S.I. Bagayev, Deputy Minister of Transportation, declared that diesel traction is introduced on separate small sections of the lines without taking into consideration the length of locomotive runs, and as result diesel locomotives cannot be fully utilized (39).

One of the basic problems in dieselization is the creation of a unified method of locomotive operations in train traffic which would permit full utilization of diesel locomotives (40). Even

after the transfer of main routes of the Central Asiatic direction to diesel traction, the system of traffic movement remained unchanged in many instances and until very recently (41).

Another important matter is the development of station tracks. Station tracks should be not less than 850 meters long to handle trains weighing up to 3,200 tons. To reconstruct the necessary stations of the four systems so that the receiving and dispatching tracks correspond to this length would require relatively small capital expenditures. However, with the future growth of weight norms to 4,000 - 5,000 tons, anticipated between 1960 and 1970, the tracks will again have to be lengthened to 1,050 meters. To avoid repeated reconstruction, consideration should be given to the expediency of changing the length of tracks in the near future to 1,050 or 1,250 meters, especially on exits from systems of the Central Asia and the Kazakh SSR to the Volga River region, the Ural Mountains, and Siberia (42).

The lengthening of station trackage should be accompanied by the strengthening of the road-bed. On many sections the capacity of the upper part of the road-bed is higher than that at the stations and the speed of trains must be reduced (43).

According to M.N. Belen'kiy, and I.G. Beskrovnyy, the most effective type of diesel locomotive to operate on main routes of Central Asia and Kazakh SSR is the "TE-3" which secures the movement of 3,200 t and 2,800 t trains in loaded and empty movement respectively. This weight of trains is thirty to fifty per cent higher than the existing weight norms (44). However, 2,500 hp and 3,000 hp capacity diesel locomotives, and 6,000 hp gas-turbine locomotives are considered more advantageous for operations on some sections of railroads with difficult topographical routes, such as those on the Orenburg and Turkestan-Siberian systems (45).

Efficient utilization of diesel (and electric) traction is obtained with the "ring" system of operations and when locomotives by-pass the main enginehouse during their trips except for repair. However, this method requires construction of servicing facilities on the receiving-departure tracks at base enginehouse stations. Only two such experimental points were built so far in the USSR, one of them at Tashkent (46).

The disadvantages of diesel traction are the high cost of diesel locomotives compared with steam and electric locomotives, the use of expensive liquid fuel and the necessity to provide special repair bases (47). But, the changeover of Ashkhabad, Orenburg, Tashkent and Turkestan-Siberian systems to diesel traction, places diesel operations close to diesel fuel supply centers of nearby refineries which process petroleum from the Ishim, Emba, Fergana and Western-Turkmen fields, while fuel for the steam locomotives must be transported mainly from the Karaganda Coal Basin at a cost of several million rubles (48).

Lack of overall planning in dieselization program of the USSR railroad network has been stressed on many occasions. The lines are dieselized in short sections, sometimes steam traction remaining on a section between two dieselized lines. Such was, for example, the case of dieselization of the bordering Tashkent and Orenburg systems where diesel locomotives operate on Tyura-Tam - Dzhusaly section, while the next stretch from Dzhusaly to Kzyl-Orda station is still operated on steam (49), and only in 1957 the Kzyl-Orda division was being transferred to diesel traction (50).

There seems to exist a shortage of diesel locomotives. There are instances when diesel locomotives are assigned to newly dieselized lines not from the reserve park of the Ministry of Transportation, but transferred from other railroad systems. Such was the case with locomotives from the "Druzhba" line, which were transferred from the Tashkent system (51), and with locomotives assigned to the Karaganda system which were transferred from the Ishim diesel locomotive enginehouse of the Omsk system (52).

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## CHAPTER II. THE ASHKHABAD SYSTEM

### A. Dieselization

The Ashkhabad system is the southernmost system of the USSR. It begins at Krasnovodsk, a large railroad junction of great significance in the operations of the Ashkhabad system (1). Industrial and agricultural equipment, consumers' goods, petroleum and its products are shipped through Krasnovodsk from the Caspian Sea and via Ashkhabad railroad system lines to various districts of Central Asia and Siberia (2). The operations of the Ashkhabad system are extremely important in the development of the industry and culture of Central Asia (3). Basically, this railroad is a transient one, with the exception of dense freight section from Kagan to Ziadin, a 116 kilometers stretch (4).

The Ashkhabad system is one of the longest in the USSR. Its main line extends from Krasnovodsk to Ziadin - the commencement point of the Tashkent system (5). The entire length of the main line is 1,377 km (6). According to a July 1957 issue of Turkmenskaya Iskra the length of all lines included into the Ashkhabad system increased during the Soviet regime from 1,700 km to 2,100 km (6a).

The first branch line diverges from the Nebit-Dag station southwest to Vyshka station, a distance of 25 kilometers (7). At Mary station a side line branches off to Kushka station, the southernmost point of the USSR railroad network. The line is 313 km long (8). Other branch lines are: 588 km Chardzhou - Urgench - Khodzheyli, 735 km Kagan - Karshi - Samsonovo - Termez - Stalinabad - Yangi Bazar, 122 km Karshi - Guzar - Kitab, 13 km Kagan - Bukhara (9).

The Ashkhabad system was the first railroad in the USSR to use diesel traction in regular operations (10). In 1931 the June Plenum of TsK VKP (b) decided to use diesel traction on arid railroad lines, and approved the plan for dieselization of the Krasnovodsk - Chardzhou line, among other railroad sections (11). This decision was the beginning of the development of diesel traction and organization of diesel locomotive building industry in the USSR (12). The important step in this respect was made in 1931 when diesel locomotives from the Lyublino test base were transferred to the Ashkhabad enginehouse for regular operations (13). In fact this was the initiation of regular operations of diesel locomotives on USSR railroads (14).

In spite of difficulties, which were encountered in the initial stages of diesel locomotive operation on the Central-Asiatic railroads, including the Ashkhabad system, the effectiveness of diesel traction was noticeable (15). Already in 1932 - 1933 period, diesel locomotives of Ashkhabad enginehouse were covering 280 km in their daily runs, as compared with 170 km covered by steam locomotives (16).

By 1946 the main line of the Ashkhabad system was serviced by diesel locomotives (17). The basic dieselization of the system was to be completed in the Fifth Five-Year Plan period (18). In fact during the postwar years all freight and passenger traffic on the Krasnovodsk - Ziadin line was switched to diesel traction (19). Now it is used not only on the entire main line (20), but also on the new Chardzhou - Urgench line (21).

Suburban diesel passenger trains also operate, along with a bus line, on the Nebit-Dag - Vyshka branch line (22).

In 1956 the Kagan - Karshi line, 157 km long, was switched to diesel traction (23) and in the second part of June 1957, the 117 km Karshi - Samsonovo line (24).

Basically "Da", "TE-1" (25) and "TE-2" diesel locomotives are used for operations on the Ashkhabad system (26). From Krasnovodsk to Kagan stations, the profile of the route is relatively easy and density of freight traffic lighter than on the Tashkent system; "TE-2" diesels are used there for operations (27). Double-headed trains (using both "TE-1" and "TE-2" locomotives) were used as well, until the adoption of "TE-2" diesel locomotives (28).

Steam locomotives were used for shunting operations in most diesel locomotive enginehouses of the Ashkhabad system as late as 1955 (29). Evidently it was very inefficacious since it required retainment of coal yards, water supply system and other servicing facilities, otherwise not necessary for diesel traction (30). It was calculated that the replacement of steam locomotives by diesels only at one station could save 730,000 rubles annually (31). The use of diesel locomotives in shunting operations was also hampered by the condition of upper part of station tracks and on the sidings of various enterprises (32).

In June 1957, the efficiency of diesel locomotive operations on the Ashkhabad system permitted to release a certain number of diesel locomotives to replace steam locomotives in shunting operations at Krasnovodsk I, and Krasnovodsk II, at Mary and Kagan enginehouses (33). This statement was made by V.N. Ovsyannikov, chief of the Ashkhabad system (34).

B. Operations

Due to the fact that the Ashkhabad system was the first railroad in the USSR to operate on diesel traction, the diesel locomotive enginemen became the most experienced in the operations and their achievements in performance were rather successful (1). Thus, in 1954 diesel locomotive enginemen of the system hauled in heavy trains twice as much freight as in 1953 (2). The utilization of diesel locomotives was expedient. Some operating runs were lengthened in order to improve the diesel locomotive run indices. But a great many sections remained unchanged and entirely much too short for the operations of diesel locomotives (3).

By the end of the fifth five-year plan period freight traffic of the Ashkhabad system increased 67% as compared with 1950 level (4). V. Ovsyannikov, chief of the system, gave some detailed information on the 1955 accomplishments. He stated that the annual shipment plan was completed ahead of time (5). In 1955, the average daily freight origination plan was completed 101.9 per cent and the average daily unloading plan by 103.5 per cent (6). Freight car turnaround was accelerated 2.4 hours above the plan. The average turnaround was accelerated almost 11 per cent. The cost of hauling was reduced almost 13 per cent below the plan, resulting in nearly 45,000,000 rubles in above-plan profits. The plan for acceleration of labor productivity was surpassed by 20 per cent (7).

In 1955, over 25,000 above-norm-weight trains were operated on the system, hauling 4,137,000 tons of freight above the norm (8). Every other train on the system was a heavy-duty train (9). The number of heavy trains given by another source amounted only to 23,000 and 4,000,000 tons transported in excess of the norm (9a).

There were some inadequacies in the operational performance in 1955, such as neglect of safety rules of train movement, noncompliance with the rules for technical operational procedures and instructions (10). The plan for loading was not completed in regards to all kinds of freight. Train traffic schedules were frequently broken and cars remained too long at stations. Locomotives burned fuel in excess of established norms (11).

According to 1956 plans, the average daily loading was to increase 7.3 per cent, and the volume of passenger and freight hauling by more than 20 per cent over 1955 (12). Freight car turnaround was to be accelerated 6.3 per cent in 1956. The productivity of labor - 25 per cent and the cost of hauling was to drop 17 per cent (13).

In fact, in 1956 the average daily run of diesel locomotive increased on the entire system to 460 km, and at the end of February 1956 this figure was surpassed by 20 km (14). As reported on 1 March 1956, the average daily diesel locomotive run increased by 60 km, and the turnaround by 1.7 hours (15). In April 1956, the average daily locomotive run exceeded the norm by only 21 km (16). It was reported, that a "Da20-22" diesel locomotive made a monthly run of 8,636 km, covering an average of 278 km daily (17).

It was admitted that numerous improvements were necessary. The freight traffic alone should have been increased by 21 per cent, as compared with 1955, and the cost of shipments reduced by 17 per cent (18). In October 1956 the Ashkhabad system diesel locomotive enginemen raised the average daily locomotive run by 31 km (19). The turnaround operations were reduced 54 minutes below the norm. About 500 tons of fuel was saved (20).

In 1956 diesel locomotives carried 80 per cent of all freight traffic on the Ashkhabad system (20a). The 1956 loading plan was completed on 27 Dec 56. In the few remaining days of 1956, railroaders loaded 7,837 carloads above the plan (21). The plan for average daily loadings of freight was completed 101 per cent, construction materials - 98 per cent, cotton - 104 per cent, and grain 110 per cent (22). The above-norm-weight trains transported over 5,000,000 tons of freight above the annual plan of 1956 (23).

The unloading plan for 1956 was completed on 15 Dec 56. In the remaining days of 1956 the railroaders unloaded about 40,000 carloads above the plan (24). However, the assignments for the increase in freight car turnaround and the assignment for the speed-including-stops of freight trains were not fulfilled (25).

In 1956 all stations of the Ashkhabad system dispatched 13-times as much freight as in 1913, and received 14-times as much (26). During 1956 heavy trains transported 5,500,000 tons of freight over the norm (27).

The daily performance of diesel locomotives of the system increased to 530,900 ton/km gross in 1956, as compared to 334,600 ton/km in 1952 (28).

The acceleration of speed and average daily runs of diesel locomotives was followed by the increase of the average weight of trains. In 1956 the gross weight of a train increased to 1,370 tons, as compared with 935 tons in 1944 (29). The average daily diesel locomotive runs on the system increased to 475 km, as compared with 350 km in 1952 (30). See appendix.

B. Kurovskiy, chief of the Planning and Economic Department of the Ashkhabad system revealed some inadequacies in operations which occurred in 1956, and tried to explain the reasons. He said that the basic fault was lack of coordination at the time when the plans are made, namely, the shipment plan and the general plan for the production, supply and freight turnover (31). The result was that in spite of the fact that the monthly plans were exceeded considerably, the Ashkhabad system almost failed to fulfill the annual loading plans. In fact, the sum of monthly shipment plans is often not in agreement with the annual plan. The difference between the totals is as high as 30 per cent (32). Such discrepancies occur, Kurovskiy explained because the ministries and the shippers submit their declarations to the Ministry of Transportation for freight shipments not based on anything, neither facts, nor calculations (33). Moreover, shippers submitted excessively exaggerated declarations for annual shipments. Such was the case when the 1956 shipment plan was made for the Ashkahabad system. As result, the Ministry of Transportation had to change the annual freight plan in the middle of the year and lower the figure by 10 per cent (34).

Another example of poor organization in planning of shipments given by Kurovskiy occurred in 1956 when the Ministry of Petroleum Industry (and its main administrations) reduced the 1956 monthly plan for petroleum loadings by 40,000 carloads. Simultaneously, the Ministry of Light Industry of the Turkmen SSR reduced the plan by 1,500 carloads (35).

On the basis of these monthly plans the Ministry of Transportation makes allotments for necessary number of cars, flat cars, tank cars and so on. Since the monthly plans are often reduced, the shippers submit their declarations for shipments exceeding the plan. The railroad system, in an effort to complete the annual shipment plan, is therefore obliged to supply a certain number of cars over the plan (36). These unplanned and irrational shipments impair the general planned shipments. Kurovskiy suggested that the State Planning Committee of TSSR improve their entire planning system (37).

In 1957 the performance of Ashkhabad railroaders improved greatly. About half of all diesel locomotives on the system operated according to the "ring" system (38). The increase in the average daily locomotive runs was achieved by an improved planning of train movements, better diesel locomotive park, higher specialization of railroaders (39). There are some deficiencies to be overcome, like slow speeds due to the condition of tracks, or excessive standing time of locomotives waiting for trains (40). In April 1957, the average daily diesel locomotive run of the system reached 480 km (41) and in the first quarter of 1957 - 488 km (42).

At the end of May 1957, the summer time-table for traffic was introduced. Local passenger trains began to operate every other day on the Krasnovodsk - Chardzhou line (43).

It was reported in June 1957 that much effort and work was put in modernization of the diesel locomotive park of the system (44). The result was more heavy-duty trains. In 15 days of June 1957, the enginemen of the system ran more than 1,060 heavy trains and transported about 190,000 tons of freight in excess of the norm (45).

In June 1957 the total diesel locomotive turnaround time amounted to 14.3 hours, or by 4.6 hours less than in 1952 (46). The speed of trains was on the constant increase. In 1957 the speed-including-stops increased 12.5 km per hour, and speed-excluding stops by 12.9 km per hour as compared to 1956 (47).

In 6 months of 1957 diesel locomotive enginemen of the system ran more than 14,000 heavy trains and transported about 3,000,000 tons of freight above the norm (48). Over 60 percent of all freight trains on the Ashkhabad system are heavy-duty trains (49).

The 1957 semi-annual loading plan was completed 111 per cent. The assignment for unloading was exceeded considerably (50). In five months of 1957 the car turnaround plan was completed 101.5 per cent, and as compared to the same period of 1956 - it was accelerated by 2.4 hours. The cost of shipments was reduced (51).

Compared with 1956 the basic performance indices improved greatly during the first semi-annual period of 1957. The loadings increased 2.1 per cent, unloadings - 7.8 per cent, the speed-excluding-stops - 1.8 per cent, the speed-including-stops - 2 per cent, and the average diesel locomotive run - 5.9 per cent (52).

Train movement schedules were observed much better, the standing time of transit cars at stations and locomotive repair time were reduced (53). These improvements took place mainly due to efficiency of the Ashkhabad system railroaders (54).

Since diesel traction was introduced on the Ashkhabad system the speed-excluding-stops increased 25 per cent, speed-including-stops - 20.3 per cent (55). The mechanization of loading and unloading operations was constantly developed with electric and steam operated cranes used now in freight yards of the system (56). Better utilization of locomotives in 1957 resulted in an economy of 2,000,000 rubles, as reported in July 1957 (57).

C. Facilities:

1. General

The main route of the Ashkhabad system (from Krasnovodsk to Ziadin) has been divided into 10 locomotive operating runs with 6 diesel locomotive base enginehouses (1), located in Krasnovodsk (2), Kazandzhik (3), Ashkhabad (4), Mary (5), Chardzhou (6), and Kagan stations(7).

The servicing facilities of the enginehouses are located so as to assure simultaneous, or at least, conveyer-type operations (8).

In spite of the fact that the Ashkhabad system was the first railroad, where diesel traction was used in regular operations since 1931 (9), the reconstruction of enginehouses has not been completed until 1955 (10). The base enginehouse in Kazandzhik was built in the 19th century, facilities were outdated and inadequate (11). Many important points, such as Krasnovodsk, Chardzhou, or Kagan lacked facilities and machinery for the repair of diesel locomotives. The problem of reconstruction of turnaround enginehouses was even more acute. In 1955 the entire Ashkhabad system had only one new turnaround enginehouse building located in Dargan-Ata on the newly constructed Chardzhou - Urgench line (12). No other enginehouse was fit for servicing diesel locomotives. There was a lack of special tools and devices necessary for servicing. The reconstruction, if any, was proceeding

extremely slow (13). However, in 1955 the Main Administration of Locomotive Management allotted funds for reconstruction of the enginehouse building at Kazandzhik (14).

Complaints were made in 1956 that not a single enginehouse, which received diesel locomotives, was adequately prepared for repair work. Even the newly constructed dieselized line from Chardzhou - to Urgench was put in operation without diesel locomotive enginehouses and servicing facilities (15). In 1956 re-organization of the diesel locomotive repair at enginehouses was initiated in an effort to improve the situation. In the past years, on the Ashkhabad system (and on other systems as well), every enginehouse was carrying out all types of maintenance diesel locomotive repair, including light and heavy maintenance and running gear repairs (16). Each enginehouse had to be equipped with adequate machinery, have basic and secondary workshops, large administrative and workers personnel. But, due to relatively limited repair programs, the productivity of shops never reached the full possible capacity (17). Simultaneously, the dispersion of repair bases at numerous locations (i.e. enginehouses) complicated the delivery of spare parts, the creation of adequate revolving stock of spare parts at each of the involved enginehouses, particularly of such parts as cylinder liners, pistons and electric traction motors (18).

In the beginning of 1956 a decision was made to reorganize the repair system of the Ashkhabad system and to concentrate the repair of diesel locomotives in only a few enginehouses, specializing them in only certain types of repair and limiting the other enginehouses to regular operational activities (19).

The new system of repairs, concentration and specialization in repairs resulted in considerable reduction of diesel locomotive repair time. Thus, in 1957 running gear repair decreased to one third of the 1956 level; heavy maintenance - by 48 hours; light maintenance - almost halved. The number of stops for between - train repair decreased sharply (20).

At present (reported in July 1957) additional steps were being taken for further promotion of concentration and specialization in repairs, with the objective to shorten the standing time of diesel locomotives at the enginehouses, and consequently, improvement of locomotive performance (21).

2. Krasnovodzk and Dzhebel diesel locomotive enginehouses

Krasnovodsk is a station of major significance in the operations of the Ashkhabad system being the only port on the eastern coast of the Caspian Sea and serving as a transshipment point to and from the sea of freight consisting mainly of petroleum, grain and timber (1).

There is a base diesel locomotive enginehouse in Krasnovodsk (2) with a turnaround point at Dzhebel station (3), equipped with a turnaround enginehouse (4). Dzhebel station is located 134 km from Krasnovodsk (5) and the enginehouse was subordinated to the locomotive service of Krasnovodsk division, the performance was poor and the programs frequently failed (6). In 1954 the Dzhebel enginehouse was transferred to the jurisdiction of the Chief of Krasnovodsk base diesel locomotive enginehouse. Since then the condition of diesel locomotive park improved immensely (7), although, a complaint was made in May 1956 that much time was lost by the Krasnovodsk diesel locomotives at turnaround operations in Dzhebel(8). Moreover, the locomotive standing time within the Krasnovodsk division was found to be excessively long (9).

In 1956 the locomotive repair system of the Ashkhabad system was reorganized and the Krasnovodsk diesel locomotive enginehouse ceased to perform running gear and maintenance repairs, concentrating on the regular operations only. This change permitted to reduce the personnel of the enginehouse by seventy men (10).

Concerning the operations, and particularly shipment of grain, it was reported that cars with grain are systematically delayed at the stations of Ashkhabad system and particularly at the Krasnovodsk station. There were about 1,000 cars with grain standing at the station tracks, while not more than 130 cars were permitted daily by the port authorities on 27 October 1956 (11).

In three months of 1956 the locomotive enginemen of Krasnovodsk enginehouse ran 739 heavy-duty trains and transported about 115,000 tons of freight above the norm (12). In 1956 the average daily diesel locomotive run of Krasnovodsk enginehouse increased to 505 km, as compared with 356 km in 1952 (13). In 1956 diesel locomotive enginemen of Krasnovodsk increased the run of locomotives between light maintenance repairs to 25,000 km against the norm of 18,000 km. As a result, the 25,000 km run between light maintenance repairs was adopted in October 1956 as a norm for diesel locomotives. The norm for diesel locomotive runs between heavy maintenance repairs was also increased from 55,000 km to 75,000 km (14).

In the early part of 1957 the railroaders of Krasnovodsk enginehouse were commended for excellent performance (15). In March the crews ran 220 heavy-weight trains with high speed and transported 32,000 tons of freight above the established norm (16). In May 1957, the enginemen of Krasnovodsk division increased the number of trains which ran strictly on schedule by 19 per cent. This resulted in the acceleration of speed-excluding-stops by 4 km, and speed-including-stops by 5 km. The norm for the average daily diesel locomotive run was exceeded by 18 km (17).

3. Kazandzhik enginehouse

Kazandzhik is one of the largest railroad stations of the Ashkhabad system (1). It has a base diesel locomotive enginehouse (2). As reported in 1955 the enginehouse building was old, built in the last century, had outdated and inadequate facilities (3). In 1955 the Main Administration of Locomotive Management allotted funds for the reconstruction of the enginehouse (4). In fact, in late months of 1955 the construction was in full swing. A new diesel locomotive enginehouse was being built at Kazandzhik. The walls of the enginehouse were being erected and preparations were being made on the sites where station tracks were to be laid (5). Later on, the construction and the equipping of the diesel locomotive enginehouse was completed (6). It was stated that the enginehouse was splendidly equipped (7).

After reorganization of the diesel locomotive repair system on the Ashkhabad railroad in 1956, light and heavy maintenance repair of diesel locomotives was concentrated at the Kazandzhik enginehouse; running gear repair was discontinued (8). After re-organization the Kazandzhik enginehouse increased its activities and was carrying out light and heavy maintenance repair not only of its own registered diesel locomotives, but also those from Krasnovodsk and Ashkhabad enginehouses (9).

The enginemen of Kazandzhik enginehouse became known as inventors. They designed a sandblower for diesel locomotives. This device blows sand off rails after the locomotives have passed it. The Ashkhabad Locomotive Service made the decision to install these sandblowers on all its diesel locomotives (10). The enginemen of Kazandzhik enginehouse ran over 100 excess-weight trains in five and a half months of 1957, maintaining the consumption of diesel fuel below the norm (11).

4. Ashkhabad enginehouse

There is a base diesel locomotive enginehouse (1) and diesel locomotive repair shops in Ashkhabad (2). These latter shops are on the level of repair plants and not under the jurisdiction of the railroad system, therefore the subject beyond the purpose of this report.

The diesel locomotive enginehouse in Ashkhabad was destroyed by an earthquake in 1948 (3). Evidently, a new one was built. The locomotives of the Ashkhabad enginehouse operate on the 171 km Ashkhabad - Dushak run (4), which is in the direction to Mary station, and on another run in the direction to Kazadzhik. On the Ashkhabad - Dushak run diesel locomotives are coupled to trains at turnaround points without rest periods for locomotive crews in order to speed up the movement of trains (5).

As reported in January 1956, the maintenance and repair of diesel and steam locomotives at Ashkhabad enginehouse improved in 1955 (6). The performance of the enginehouse was satisfactory also in 1956 (7). The standing time of locomotives at stations, in servicing and at turnaround points was reduced. The average daily runs were lengthened by 44 km (8). In January 1956 the enginemen ran 257 heavy-duty trains and transported over 47,000 tons of freight above the norm, and saved 19.3 tons of fuel (9).

After 1956 re-organization of diesel locomotive enginehouse repair system, a statement was made that diesel locomotives of the Ashkhabad enginehouse undergo light and heavy maintenance repair at Kazandzhik enginehouse (10). The running gear, light and heavy maintenance repairs are still being carried out at Ashkhabad enginehouse. "Turkmenskaya Iskra" states in July 1957 that Ashkhabad diesel locomotive enginehouse organized special system for paying the labor for repair of diesel locomotives. The use of this system permitted to reduce the cost of diesel locomotive repair; also to shorten the time spent by locomotives in running gear, light and heavy maintenance repairs. The number of personnel engaged in repair was reduced by 7 persons (11).

In 1957 a new railroad station building was put in operation in Ashkhabad. The building has the capacity to accommodate 200 passengers. The cost of construction of the building was about 5,000,000 rubles (12).

In 8 days of January 1957 the enginemen of Ashkhabad enginehouse ran 150 trains, of them 75 trains were heavy-duty (13). There was a complaint simultaneously, that about one fourth of all cars are left daily unloaded at the Ashkhabad station. The number of unloaded cars doubles during the week-ends (14).

In 1955 the station was equipped with coal-unloading scaffolds which were supposed to be in operation 24-hours round the clock. The cost of construction of these devices was about 1,500,000 rubles and they had the capacity to unload about 50 cars in half an hour (15). However, when the scaffolds were put in operation the standing time of cars lengthened and the cars stayed unloaded for 10 and more hours (16).

It was disclosed that no cars were being unloaded during the night, because the place had no light (17). The freight operations on the most of the approach lines were organized inadequately. The cars were standing for a number of hours. Moreover, the enterprises preferred to pay fines rather than take up some steps to reduce the car standing time (18).

In June 1957 a complaint was made about the primitive way of fuel distribution at Ashkhabad enginehouse where fuel in locomotive tanks is measured by old-fashioned rods, with an error possibly up to 20 per cent (19).

In 15 days of June 1957, diesel locomotive enginemen of Ashkhabad enginehouse transported 25,000 tons of freight above the norm (20). In result of efficient utilization of diesel locomotives, the locomotive park of the Ashkhabad enginehouse was decreased (21). Diesel locomotive run between running gear repairs was increased from 160,000 km to 194,000 km for "TE-1" diesels, and up to 245,000 km for "TE-2" diesels (22).

During the semi-annual 1957 period the railroaders of Ashkhabad enginehouse ran 2,126 heavy-duty trains and transported 387,000 tons of freight above the norm. The norms for speed-excluding-stops and the average daily diesel locomotive run were exceeded and much fuel was economized (23). The repairmen of the enginehouse considerably reduced the standing time of diesel locomotives in repair, and especially in running gear and light maintenance repairs. The repairmen pledged to complete the annual repair plan by 15 December 1957, to reduce the time of running gear repair to six and a half days, and in light maintenance repair to 30 hours (24).

5. Mary enginehouse

There is a base diesel locomotive enginehouse at Mary station (1). Mary enginehouse was transferred to diesel traction in 1955 (2). However, as late as in 1955 steam locomotives were held in use on one of the runs, serviced by locomotives of the Mary enginehouse (3). Now, diesel locomotives operate on two runs: on the 109 km Mary - Uch-Adzhi run (4), and on the 173 km Mary - Dushak line (5). Diesels operating on the latter run are attached to trains at turnaround points without rest periods for the locomotive crews (6). Suggestions

were made to unite both runs. This action would eliminate unnecessary standing time of diesels at the turnaround enginehouse at Uch-Adzhi and would boost the average daily locomotive run (7). This suggestion was made in 1955, but no indication was found that it resulted in any action.

Mary enginehouse was performing running gear repair of diesel locomotives. In 1955 the average running gear repair time was 24.5 days while the norm was only 6 days. The heavy maintenance repair was 15 days, while the norm was 3 days (8). After the re-organization of the repair system in 1956 running gear repair of diesel locomotives from Mary, Krasnovodsk, Kazandzhik and Chardzhou enginehouses was concentrated at the Mary enginehouse (9). This step proved to be very economical and permitted to cut short the number of workers, engineers and technicians. The utilization of equipment has also improved (10). All shops of the enginehouse were adequately prepared (11). In result of the re-organization the standing time of diesel locomotives in repair was reduced (12). The kilometrage covered by diesel locomotives between repairs was boosted. An example of 305,000 km (and of 310,000 km (14)) between running gear repair was given - which is twice the norm (13).

New methods of operation were introduced on the Mary - Dushak run. It consisted in so-called "accelerated traffic" schedules, with diesel locomotives making long "ring" runs without stops at the base enginehouse at Mary station. The Mary - Uch-Adzhi and return trips were made by one crew shift (usually about 8 - 12 hours of working period) (15). However, the Mary - Dushak and return trip could not be covered in 12 hours. The locomotives had to stand while the crew rested (16). The new method, following the example of the Sverdlovsk system, provided the crew shifts at Dushak turnaround enginehouse. The crew which remained for the rest period at Dushak - was taking other diesel locomotive bound for Mary station after taking the rest (17).

As result of this improved organization of crew exchange - the standing time of locomotives at Dushak enginehouse was reduced by 3.2 hours and the turnaround of locomotives was accelerated by 3.8 hours. Average daily locomotive run increased 102 km over the norm (18). Changes introduced on the Mary - Dushak run affected the entire diesel locomotive park of the Mary enginehouse. The average daily locomotive run of all diesels increased by 56 km (19), or 60 km according to another source (20), permitting to reduce the locomotive park.

The railroaders of Mary enginehouse completed the 1957 semi-annual plan for freight origination 126.5 per cent, and for unloading - 103.4 per cent (21). In 6 months of 1957 the enginemen ran 3,000 heavy-duty trains and

[redacted]



[redacted] over 600,000 tons of freight over and above the norm. The shipment of this freight would require 400 additional regular trains and over 200 tons of fuel (22).

6. Chardzhou and Urgenech enginehouses

There is a base diesel locomotive enginehouse at Chardzhou station (1). Diesel locomotives of Chardzhou enginehouse operate on the 120 km run to Kagan (2) and on the 134 km Chardzhou - Uch-Adzhi run (3).

The specific conditions of operations on the Chardzhou - Kagan run were discussed and criticised by two engineers of the Ashkhabad system. They stated that the present organizational structure of the locomotive management is not efficient (4). Proper utilization of locomotives can not be secured when locomotive management is divided into small organizational units headed by the locomotive enginehouse and division chiefs (5). For example, diesel locomotives of the Chardzhou enginehouse operate on a section, which falls under jurisdiction of Kagan division, headed by the chief of that division. The chief of Kagan division and that of Chardzhou enginehouse did not coordinate operations. Thus, the chief of Chardzhou enginehouse, who is actually responsible for the performance of its diesel locomotives, has no way of influencing the utilization of Chardzhou diesels on the line, which is subordinated to the chief of another division (6). Suggestion was made to merge the administration in one hand (7).

Chardzhou enginehouse was praised for efficient operations, running locomotives for 4 years and 7 months without repairs, and saving 2,500 tons of fuel during that period (8). In January 1956, Chardzhou enginehouse ran the largest volume of heavy trains on the Ashkhabad system (9). In February 1956, the average daily diesel locomotive run increased from 450 km to 488 km (10).

In April 1957, daily locomotive run increased further to 500 - 590 km (11) and in May 1957 the enginemen of Chardzhou enginehouse constantly exceeded the norms for the basic performance indices (12).

In 15 days of June 1957 the Chardzhou enginehouse took the first place in heavy-duty train competition of the entire Ashkhabad system (13), moving about 180 trains with excess weight, some with 250 - 300 tons of excess freight (14).

Urgench is the largest classification station on the system; its significance is constantly increasing with the completion of the Chardzhou - Kungrad branch line (15). A diesel locomotive enginehouse has been built there (16). On the Urgench - Chardzhou line there is a diesel locomotive turnaround enginehouse at Dargan-Ata (17). It has a new enginehouse building, and actually the only new turnaround enginehouse building on the entire system (18). Diesel locomotive enginemen of Urgench station transported 40,000 tons of freight above the norm since the beginning of 1957 (19). In twenty days of May 1957, they ran 12 additional heavy-duty trains on Darganata - Urgench - Takhiya-Tash sections. The weight of each train exceeded the norm by 120 - 170 tons (20).

7. Kagan enginehouse

There is a diesel locomotive enginehouse at Kagan station (1). Diesel locomotives of Kagan enginehouse operate on two single-track lines: 116 km Kagan - Ziadin and 157 km Kagan - Karshi sections (2).

Prior to the introduction of diesel traction at Kagan enginehouse, the Kagan - Ziadin section was serviced by "SO" steam locomotives. In 1950 diesel traction was first introduced at the Kagan enginehouse. During the first two years only "TE-1" diesel locomotives were used for operations. In 1952 "TE-2" diesel locomotives arrived at the enginehouse and were put in service on the Kagan - Ziadin section (3). Diesel locomotives of Kagan enginehouse turnaround at Ziadin - the procedure which takes only 10 to 20 minutes (4).

In April 1956 "TE-2" diesel locomotives started operating on Kagan - Karshi section (5). The Karshi enginehouse had specialized in running gear repair in 1956. The shops and spare parts were adequately prepared, reducing thus the locomotive repair time (6).

The Kagan enginehouse uses "TE-1" diesel locomotives for shunting operations (7). Experience proved that these locomotives are very convenient for hump and pull-out tracks operations, or other station tracks (8). "TE-1" diesel locomotives proved to be capable to pull a 4,000 ton train on a hump. Actually one "TE-1" diesel locomotive can replace two steam locomotives in this operation (9). The cost of a diesel locomotive-hour in shunting operations at the Kagan enginehouse was 40 rubles, while a steam locomotive-hour (steam locomotives of "E" series) was 64 rubles (10).

a) Servicing of diesel locomotives at Kagan enginehouse

As a result of simultaneous servicing of diesel locomotives, the time spent for full servicing operations at Kagan enginehouse was limited to one hour and twenty minutes (11). This time includes all time spent by a diesel locomotive from the moment it arrives at Kagan station - until its departure for the next trip (12).

Since the operating runs of Kagan diesel locomotives are comparatively short, there is no need for diesel locomotives to be serviced at the turnaround points (13). Thus, the time spent by diesel locomotives at stations with turnaround enginehouses was shortened considerably (14). The most efficient diesel locomotive crews perform all servicing operations 7 - 15 minutes faster than norm (15). At Kagan station fueling of diesel locomotives is performed once a week (16).

The introduction of a special condensed schedule for diesel locomotive turnaround had its favorable effect on repair time of diesels. The time of diesel locomotives in heavy maintenance and running gear repairs had not reached the norm, but the time halved as compared to 1954 (17). All diesel and repair shops of Kagan enginehouse operate efficiently (18), and the railroaders were highly praised, suggestions were made that other enginehouses of the system follow the example of Kagan enginehouse (19).

b) Operations, indices

In the first quarter of 1954 the average daily diesel locomotive run of "TE-2" diesels at Kagan enginehouse was 320 km, and the daily productivity of a diesel locomotive never exceeded 400,000 ton/km (1). Such poor performance was the result of inadequate training of railroaders, lack of personnel in number, haphazard system of train arrivals from the Ursat'yevskaya division of the neighboring Tashkent system (2). However, by the end of 1954 the operational indices improved and the average daily run of diesel locomotives increased by 95 km, as compared

to the first quarter of 1954. The improvements in performance which took place in 1954 were as follows:

| Indices | I quarter 1954 | IV quarter 1954 |
|---|---|---|
| Entire diesel locomotive turnaround in hours | 17.8 | 13.2 |
| Average daily diesel locomotive run in km | 320 | 415 |
| Monthly diesel locomotive run in km | 9,200 | 12,850 |
| Average daily diesel locomotive productivity in t/km | 400,000 | 671,000 (3). |

In the fourth quarter of 1954 the efficiency (availability) of diesel locomotives amounted to 49 per cent of the entire operational time (4).

During the following year the maintenance and repair of locomotives at Kagan enginehouse improved (5). The achievements were recognized and rewarded by the administration of the Ashkhabad system (6). In 1955 a sum of 1,200,000 rubles were saved due to efficient operational performance of Kagan railroaders (7). However, in 1955 the average daily diesel locomotive run was only 496 km, which was below the norm (8). In September 1955 a special condensed schedule for diesel locomotive turnaround was introduced, in effort to improve locomotive indices. According to this schedule, the estimated average daily diesel locomotive run was 541 km (9). But in practice it reached 500 km (10).

The efficiency of Kagan enginehouse improved greatly in 1956 (11). The enginehouse was praised several times by the Ministry of Transportation (12). In February 1956 the average daily diesel locomotive run was 518 km, thus exceeding the norm established for the overall railroad network by 100 - 150 km* (13). In April 1956 the average daily diesel locomotive run reached and exceeded 580 km (14). The enginehouse was awarded for the efficient performance (15). Actually, only due to the performance and efficient utilization of diesel locomotives was it possible to switch the Kagan - Karshi section to diesel traction (16).

*Parshin, in his 1957 book stated that in May 1957 the norm for the average daily diesel locomotive run was 510 km (Parshin, 1957, Moskva, p. 16).

The average daily locomotive run rose to 587 km in May 1956; speed-excluding-stops norm was exceeded (17). The daily diesel locomotive performance efficiency reached 800,000 t/km. The use of diesel traction on the second run, i.e. Kagan - Karshi, improved the utilization of the diesel locomotives unused capacities (18), and by Jun the daily runs were accelerated to 600 km (19). This was almost 2-fold higher than in 1952 when the run was only 298 km (20). However, the daily locomotive run dropped to 542 km by October 1956 (21). A 1957 source stated that 500 - 600 km was the figure of the average daily diesel locomotive run in 1956. The daily productivity of a diesel locomotive was 784,400 and more ton/km (22). The performance of the entire Kagan division improved (23).

The target for 1957 average daily diesel locomotive run was 820 km (24). But it varied from 500 - 590 km in April 1957 and never over this figure (25). By July 1957 the minimum daily run was 580 km, and half of all Kagan diesel locomotives were running 600 and over km daily (26). By September 1957 the run amounted to 650 km - the figure considered as record-breaking run for a single-track line (26a).

The constantly rising efficiency of Kagan division railroaders brought results and with the limited number of diesel locomotives in the park, the railroaders completed the plans and the utilization of diesel locomotives was most effective (27). The diesel locomotive turnaround was shortened. While the total turnaround was 17 hours 48 minutes in 1954, it reduced to 11 hours and 25 minutes in 1956 (28).

The success in operations at Kagan enginehouse was definitely helped by the use of diesel locomotives in shunting operations. It permitted acceleration of speed and reduced the standing time of locomotives while being serviced (29).

The efficiency of Kagan classification yard operations is very important in the utilization of diesel locomotives, and therefore various steps were taken to that effect (30). A new schedule, calling for faster turnaround of locomotives on Kagan - Karshi run was put in force. This step was to yield over 2,000,000 rubles in savings and release three locomotives at Karshi enginehouse. The speed-including-stops rose by 8 km (31). With the gradual improvements it was possible to spare diesel locomotives of Kagan enginehouse to be used on other runs. Diesels spared on Kagan - Ziadin and Kagan - Karshi runs were used for operations on 117 km Karshi - Samsonovo run (32). According to the schedules of 8 diesels were required on the section for operating

9 trains in eastward and 8 trains in westward directions (33). The schedule for diesel locomotive turnaround on Kagan - Karshi run was changed and the turnaround was shortened to 9.6 hours from 22 hours as previously (34). This schedule permitted also to reduce the steam locomotive park (evidently both tractions, steam and diesel, were used there simultaneously) by six units without enlarging diesel locomotive park (35). All efforts were made to eliminate unproductive standing time of diesel locomotives (36).

The efficiency of Kagan enginehouse was acknowledged and noted. Their success was attributed to the efforts of the railroaders. The conditions under which they operated was not more favorable compared to other railroads, to the contrary, the existence of a turnaround point at a bordering station (Ziadin) only complicated the operations due to irregular exchange of trains between the Tashkent and Ashkhabad systems (37). The decisive factor in the improvements which took place on the railroad was strict adherence to the schedules and the fact that the railroaders proved themselves worthy of their responsibilities (38).

## CHAPTER II. THE ASHKHABAD SYSTEM

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## CHAPTER III- THE TASHKENT SYSTEM

### A. Dieselization of Lines

The Tashkent system is called "The trunk line of life". This system cuts through the arid steppe, mountain ranges and connects the Uzbek Republic with the industrial and cultural centers of the Soviet Union (1). Reaching the most distant parts of Uzbekistan, the railroad network helped to create new cities and industrial centers (2).

The Tashkent system borders with three other railroad systems: the Ashkhabad, the Turkestan-Siberian and the Orenburg systems (3). It stretches from Dzhusaly (Orenburg system) to Tyul'kubas (Turkestan-Siberian system) and Ziadin (Ashkhabad system) (4). The system services important industrial and agricultural regions of Uzbekistan, South-Kasakhstan and Kzyl-Orda oblast' of Kazakhstan, Northern Tadzhikistan and the southwestern part of Kirgizia. The Tashkent system connects the republics of Central Asia with the central parts of the USSR, the Urals, Siberia and the Far East (5). The system also includes the Ursat'yevskaya - Kokand branch and the entire Fergana Valley with its branches. Among these are the new railroad branch from Tashkent to Chirchik* (6) and from Tashkent to Angren (7).

The Tashkent system originated shipments of cotton, coal, cement and mineral construction materials (8); transports to all parts of the country agricultural machinery, ferrous and non-ferrous metals, ore, textile, compressors, movie equipment, mineral fertilizers, excavators, textile machinery (9), petroleum products (from Ashkhabad system), grain, timber and coal (10).

Diesel traction was initiated on the Tashkent system in 1949, on the section serviced by the Tashkent enginehouse, where "FD" steam locomotives were replaced by diesel locomotives (11). By 1950 the densest (12) and most arid sections of the system were converted to diesel traction (13). By 1956 diesel traction was carrying one third of all freight traffic within the system (14). Then the system had three runs which were serviced by diesel locomotives (15). These runs were double-tracked; the second tracks were built during recent years (16). The runs were probably as follows: Arys' - Chengel'dy, Chengel'dy - Tashkent, and Tashkent - Syr-Dar'inskaya. In 1956 diesel locomotives were used not only in freight, but also in passenger and partly switching operations (17). In fact the Tashkent system was the first system of the Soviet railroad network which initiated the use of diesel locomotives in switching operations (17 a).

As reported in April 1957, the Tashkent and Arys' divisions of the system have been transferred to diesel traction in their entirety (18). The Tashkent division services about 267 km of dieselized lines (19) and includes the following sections:

Tashkent - Angren dead-end branch, 119 km long (20);
Tashkent - Chengel'dy, 78 km long, extending in the direction of Arys' station (21);
Tashkent - Syr-Dar'inskaya, 70 km long section (22).

* Chirchik is the center of chemical equipment building industry.(6)

The Arys' division diesel locomotives operate now on the Arys' - Chengel'dy section (23) which is 77 km long (24); and also on Arys' - Turkestan, 108 km, section (25). This last section was switched to diesel traction in April 1957, as reported in "Gudok" newspaper. At that time some 24 steam locomotives were taken off and replaced by diesel locomotives, which were in turn taken from other sections of the system. The dieselization of this section was carried out mainly for the purpose of speeding up freight traffic and using a smaller locomotive park (26).

In June 1957 the Kzyl-Orda division was being transferred to diesel traction (27). However, prior to this diesel locomotives were used on the single-track Kzyl-Orda - Chiili section of Kzyl-Orda division and in January 1956 the daily diesel locomotive runs were 512 km (28).

The first group of "TE-3" diesel locomotives arrived at Kzyl-Orda enginehouse. From the beginning the operation of diesel locomotives was successful and the average daily runs were 600 - 650 km (29). The plans are that in the near future the Kzyl-Orda division will be dieselized in its entirety (30).

According to "Pravda Vostoka" direct passenger traffic on the Tashkent - Khodzheyli and Khodzheyli - Tashkent line was opened on 31 May 1957. The first train was pulled by a diesel locomotive (31).

B. General Information

1. Cost of Diesel Traction

In connection with the switch to diesel traction, the Tashkent Institute of Railroad Engineering carried out some technical and economic calculations. The comparative costs of each train-km when serviced by Su and Sum steam locomotives and "TE-1" and "TE-2" diesel locomotives (calculations made with equal train weight norms) are shown in the following table (32).

Cost of one train/km with diesel and steam traction

| Type of train traffic | Cost in rubles: Diesels | Cost in rubles: Steam locomotives |
|---|---|---|
| Express | 7 - 8 | 9 - 13 |
| Passenger, long-distance (serviced by TE-2) | 9 - 10 | 11 - 14 |
| Passenger, local (serviced by TE-1) | 5 - 7 | 9 - 11 |
| Suburban (serviced by TE-1) | 4 - 6 | 8 - 10 |

Calculations showed that on the Chiili - Ursat'yevskaya line the transfer of passenger traffic to diesel traction reduced annual operational expenditures of the Tashkent System by approximately 10,000 rubles. These savings will repay all capital investments put in equipment, (including the cost of diesel locomotives), in about two years (33). The dieselization of the entire main line of the Tashkent System would bring the savings in operational expenditures to 150 million rubles annually (34).

Diesel operations on the Tashkent system definitely proved their economic advantages (35). Thus in 1953 the Tashkent system was supplied mostly with coal from the Kuznetsk basin. The cost of each ton of coal (transported over 2,800 km) was then about 190 rubles, half of which went for transportation only (36). In 1955 freight shipments carried by the Tashkent division required 19,000 tons of diesel fuel; the same volume of shipments, if carried by "FD" series steam locomotives would have required 190,000 tons of coal (37). In 1955 on the Tashkent system the fuel consumption of "TE-1" and "TE-2" diesels amounted to 48 - 52 kg per $10^4$ t/km gross, while "FD" steam locomotives (on the same railroad section) used up to 270 - 300 kg, or 5.7 times as much (38). It was calculated that 100 diesel locomotives required about 33 - 35 trains of liquid fuel, while 100 steam locomotives needed 420 - 450 trains with coal (39).

Comparative costs of steam and diesel traction of the Tashkent system in 1954 - 1955 for freight traffic is given below in percentage (40).

| Services and Departments | The share of services in the total cost of freight traffic in per cent | |
|---|---|---|
| | In diesel traction | In steam traction |
| Traffic Service | 10.2 | 8.5 |
| Customers Service | 3.6 | 3.0 |
| Locomotive management | 32.5 | 47.6 |
| Railroad car management | 17.2 | 12.7 |
| Track and installations | 14.8 | 7.3 |
| Signals and communication | 1.8 | 1.5 |
| Buildings and structures | 0.5 | 0.5 |
| Reconstruction trains | 0.2 | 0.2 |
| Division of the system | 1.4 | 1.2 |
| Total expenditures of the system | 17.8 | 17.5 |
| Total | 100.0 | 100.0 |

During the 1951-1955 period the cost of freight shipments on the Tashkent system was reduced by 32.2 per cent, saving many millions of rubles (41).

2. Operations

During the Sixth Five-Year Plan period the Tashkent system was, and will continue to be supplied with modern facilities, including "TE-3" diesel locomotives (42). However, "TE-2" and "TE-1" type diesel locomotives are the basic series used on the system at present. The various railroad sections are serviced by diesel locomotives as follows: Chiili - Turkestan section is serviced by express passenger "TE-2" diesel locomotives, Turkestan - Arys' by "TE-2" passenger diesels, Arys' - Tashkent by express "TE-2" diesel locomotives, Tashkent - Syr-Dar'inskaya by local suburban "TE-1" diesels, as well as Tashkent - Ursat'yevskaya (43). In April 1956 the first "TE-3" diesel locomotive arrived at the Tashkent-freight enginehouse and hauled trains from Tashkent to Syr-Dar'inskaya and Ursat'yevskaya stations (44).

The two base diesel locomotive enginehouses of the Tashkent system (Arys' and Tashkent) use mainly "TE-1" and "TE-2" series diesels. The "TE-2" diesels carry about 80 per cent of all operations calculated in ton/km. They are used more on sections with heavier trains, while "TE-1" diesels haul those with lower weight. Double traction ("TE-1" plus "TE-2") diesels are used frequently in operations, in fact they carry two thirds of the total operations. In some instances double traction of "TE-2" plus "TE-2" is used (45).

Three coupled "TE-1" diesel locomotives are used as well, especially when "TE-2" diesel locomotives were not available. In such cases two "TE-1" diesels were coupled thus replacing one "TE-2" diesel; the third "TE-1" was used as auxiliary locomotive. The two "TE-1" diesels were operated by one engineman and two assistants, and the third "TE-1" by one engineman and one assistant (46).

The introduction of diesel traction on the Tashkent System was greatly assisted by the Tashkent Institute of Railroad Engineering. Their cooperation helped diesel locomotive enginemen of the system to discover new ways to increase train weight norms on the Tashkent - Syr-Dar'inskaya section (47).

Since the introduction of diesel traction on the Tashkent System the average weight of a train (gross) increased by 37 per cent (48). The use of diesels in double traction permitted considerably heavier trains and improved the through-put capacity of lines. When "TE-1" and "TE-2" diesels replaced "FD" series steam locomotives on the Tashkent System the weight of trains was boosted and the speed including stops was increased (49). Terekhov, chief of the Diesel Locomotive Administration of the Ministry of Transportation declared that the weight norms of freight train could be increased with the help of 3-section "TE-2" diesel locomotives which should be built. He said that these diesel locomotives would not only increase the weight norms, but would also result in a

25 per cent increase in the through-put capacity of Tashkent - Ursat'yevskaya section, and a 50 per cent increase on the Ursat'yevskaya - Ziadin section (50).

During the Sixth Five Year Plan the weight of freight trains on the main line of the Tashkent System was to be boosted to 3,200 tons in heavy traffic direction and to 2,800 tons in lighter traffic direction. The plan envisages the use of "TE-3" high-powered diesels in train traffic (51).

In 1956 the forwarding enginemen initiated the increase of weight norms of trains in a westward direction up to 4700 tons (52). In eleven months of 1956, some 2,800,000 tons of coal, grain, cotton and other freight were transported on the Tashkent system in heavy weight diesel trains (53).

With the replacement of "FD" steam locomotives by "TE-2" diesels on the Tashkent system, the speed-including-stops increased 7.7 km per hour (54), and speed-excluding-stops by 4.2 km, the weight of trains by 500 tons (55). The difference between actual and operational speeds was reduced 25 per cent (56). During the four-year period (probably 1953 - 57) of diesel locomotive operation the average weight of a freight train on the system increased 20.4 per cent, speed-excluding-stops by 16.7 per cent, and the volume of heavy duty trains increased almost 29-fold. These operational indices were accomplished by improvements in the method of operations (57).

The use of diesel traction bettered the productivity of diesel locomotives. While in 1955 the productivity of each diesel locomotive was 410,000 ~~kilometers gross~~ daily (of steam locomotives only 260,000 ton/km) (58), in 1956 diesel locomotive engineers competed to bring the efficiency of a diesel locomotive to 1,000,000 t/km gross daily (59).

Better results were achieved in diesel locomotive daily runs. In 1955 the average daily diesel locomotive run on the Tashkent system has been increased by 35 km in comparison with 1954 (60). In fact, in 1955, the average daily diesel locomotive run in freight movement on the system amounted to 360 km and was exceeding the steam locomotive run by 40 per cent. It was expected that in the next few years the diesel locomotive run can be brought up to 500 and more km daily (61).

In 1956 a large amount of diesel fuel was saved and average daily diesel locomotive run increased considerably. In December 1956, it increased up to 500 km and more, i.e. to the level which was planned for 1960 (62). Later on, in May 1957, after the introduction of new time schedules and as a result of this step, the average daily diesel locomotive run on the Tashkent system increased by 46 km (63). By June 1957, the assignment of the Sixth Five-Year Plan for the average daily diesel locomotive run has been exceeded ahead of time (64).

On the Tashkent system, the standing time of each diesel locomotive at the base enginehouse (depending on the individual case) varied from 15 - 25 per cent of the total locomotive turnaround

time (65). In five months of 1957 the railroaders of the system transported as much freight above the norm as was transported above the norm in seven months of 1956 (66). In August 1957, the volume of heavy trains pulled on dieselized sections of the Tashkent system amounted to 45 - 58 per cent (67).

However, the advantages of diesels are not yet fully used. The standing time in servicing remained long, although this operation should have been conducted in a much faster manner than with steam locomotives (68). The standing time of diesel locomotives at intermediate stations was excessively long. The actual movement of trains hauled by diesels from the Tashkent and Arys' enginehouses varies from 40 to 45 per cent of the total locomotive turnaround time. The coefficient of the stop-including-speed on the Tashkent division is still only 0.74 (69).

There are no definite schedules for diesel locomotive turnaround on the Tashkent system. Locomotives are distributed according to daily plans which are made up as a rule, for accelerated traffic, not answering to actual facts. This brings up the excess number of locomotives in the operating park and consequently results in excessive standing of locomotives (70).

A large number of steam locomotives is still used for intra-junctional, inter-sectional and intersectional-outbound traffic with the purpose to secure the movement of freight at the stations of Tashkent system (71). In fact, in switching operations, diesel locomotives are used only partly (72). An article in the "Collected Works of the Tashkent Institute" stated that in general the economics of diesel locomotive passenger and switching operations have been studied so far inadequately in the USSR, and published information is very scant (73).

G. Khodzhayev, Chief of the Central Asiatic Territorial Trust of Construction Material Enterprises of the Ministry of Transport Construction, stated, that according to his opinion, now was the time to unite the Tashkent and Ashkhabad systems, under one administration in Tashkent. He added that this would be possible to carry out because both railroads were technically well equipped and had trained railroaders (74).

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C. Tashkent Enginehouse

1. Operations on Chengel'dy - Tashkent - Syr-Dar'inskaya sections

There were two base diesel locomotive enginehouses on the Tashkent system in 1951. One of them was located at the Tashkent-freight station (1) and the other at Arys' station (2). In 1956 it was planned to switch a number of other enginehouses of the Tashkent system to diesel traction (3). The Tashkent-enginehouse* (4) was transferred to diesel traction in 1949 (5).

Diesel locomotives of the Tashkent enginehouse are engaged on sections with the heaviest freight traffic of the Tashkent system (6). This enginehouse services three operating runs with a total length of about 270 km (7).

Most diesel locomotives registered with the Tashkent-freight enginehouse are engaged in transit shipments on two operating runs: Tashkent - Chengel'dy and Tashkent - Syr-Dar'inskaya, both located on the main route of the system, and on the branch line from Tashkent to Angren (8). Freight trains are hauled by diesel locomotives from the Tashkent enginehouse to Syr-Dar'inskaya station. At Syr-Dar'inskaya trains are taken over by steam locomotives of Ursat'yevskaya enginehouse, further on by steam locomotives of the Kokand and Samarkand enginehouses (9). Suburban passenger diesel locomotive traffic is used to Ursat'yevskaya station (10).

Diesel locomotives of the Tashkent enginehouse make the turnaround at Chengel'dy and Syr-Dar'inskaya stations (11). Chengel'dy station is the connecting point of the two neighboring Arys' and Tashkent divisions (12).

In spite of the investments and efforts to improve and develop turnaround facilities at Chengel'dy and Syr-Dar'inskaya, the standing time of diesel locomotives at these points is excessive due to a lack of coordination in locomotive readiness for operation and the arrival of trains. At the same time the existing operating runs require that locomotive crews work at turnaround points without rest periods and minimum time loss for the preparation of locomotives for the return trip (13). Thus, in 1955 on the Tashkent division which handles 78 km of the Tashkent - Chengel'dy and 80 km of the Tashkent - Syr-Dar'inskaya sections, there were 3,293 delayed runs with a total of 11,700 hours of idle standing time of diesel locomotives due to rest periods taken by the locomotive crews. Moreover, the rest periods were taken by crews after trips of only 1 hour 56 minutes on one run, and 2 hours 15 minutes on the other. Thus the Tashkent enginehouse was keeping three superfluous diesel locomotives in the operating park daily (14).

One of the basic elements of effective utilization of locomotive park is the use of a "ring" system of operation, which speeds up the turnaround. When steam traction was used on the system only

* See appendix

41 percent of runs were made by this method (15). Since the introduction of "TE-2" diesels at the Tashkent enginehouse the number of "ring" system runs increased to 80 per cent. The increase of use of "ring" system operations was made possible because diesel locomotives are serviced only every 700 -1,000 km and fueled, watered and lubricated at receiving and departure yards of main enginehouses without uncoupling from the train (16). "TE-2" diesel locomotives operated on the "ring" system of runs on two sections located on the main route (Tashkent - Chengel'dy and Tashkent - Syr-Dar'inskaya). The most difficult section for operation is the Tashkent - Chengel'dy section which uses double headed traction of "TE-2" and "TE-1" locomotives (17).

Although the Tashkent system uses the "ring" system of diesel locomotive runs, all advantages are nullified because of constant delays at turnaround points (18).

When switching from steam to diesel traction on the Tashkent system, no changes were made in the lay-out of operational runs. Thus, it developed that two locomotive enginehouses (Tashkent and Arys') were located too close to each other; the same was true of two steam locomotive enginehouses, one at Chimkent and the other at Ursat'yevskaya. As a result, diesel locomotives operated on short runs and their capacities were not fully utilized (19).

Calculations show that the turnaround enginehouses at Chengel'dy and Syr-Dar'inskaya stations could be completely eliminated and that Tashkent locomotives could be operated without rest periods of crews at turnaround points on the entire stretch from Arys' to Ursat'yevskaya. Moreover, the Tashkent enginehouse could also handle movement of trains on Shagir - Badam line, which is the farther by-pass of the Arys' junction (20).

These calculations and suggestions were made by the most capable dispatchers and enginemen of the Tashkent division. In fact, they proved in practice that diesel locomotives can operate successfully on 155-km operating runs and turn around at twelve-hour intervals (sometimes in ten hours) without rest periods of crews at the Ursat'yevskaya and Arys' terminals (21). However, this system of long runs was not approved by the administration of the Tashkent system, despite the fact that diesel locomotives covered the 80 km Tashkent - Chengel'dy stretch in two hours and then waited for trains from the opposite direction for two and a half hours and more (22). The administrators agreed that the long runs would make the classification station at Arys' dependent on the three neighboring enginehouses - Chimkent, Turkestan, Tashkent, with Arys' classification station serving as turnaround point for the locomotives of all the directions (23)

An article which appeared in a publication of the USSR Academy of Science stated that the lengthening of short diesel locomotive operating runs (78 and 80 km) serviced by the locomotives of the base Tashkent-freight enginehouse, was a complicated matter, because the reconstruction of the classification yards and trackage at Arys' and Ursat'yevskaya stations in 1952 - 1955 was carried out

without taking into consideration the possibility that these junctions might be used as turnaround points for diesel locomotives of the Tashkent enginehouse (24). Moreover, considerable work was done to develop the facilities of the turnaround points at Chengel'dy and Syr-Dar'inskaya stations. Such were the reasons why the existing short runs were retained. These runs are in effect too short for operation of the powerful "TE-3" diesel locomotives (25), delivered recently to the Tashkent enginehouse to replace "TE-2" and "TE-1" locomotives, used at present in double-headed traction because of the difficult profile on the route (26). To obtain maximum efficiency of "TE-3" diesel locomotives it would be necessary to lengthen the locomotive runs. The Tashkent - Arys' and Tashkent - Ursat'yevskaya runs are proposed (27).

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2. Operations on Tashkent - Angren branch line

The operations of the Tashkent division (and Tashkent enginehouse) extend also to a waterless, coal-shipping branch line from Kzyl-Tukumachi to Angren and services a number of large enterprises and kombinats built in the area after the war (28).

As result of the increased freight traffic, the "TE-1" diesels were forwarded for operations on the Angren branch (29). The lengthening of lines on several stations of the section was made, in order to organize non-stop crisscrossing of trains at two or three points. On the Angren line the weight norm of a train pulled by "TE-1" diesel locomotive was established at 2,000 tons for freight moving in westward direction, and at 600 tons moving eastward. Prior to 1955 the weight norm of trains in freight traffic on this branch line differed from the weight norm of the main line by 300 tons; and in the beginning of 1955 - by 500 tons. This difference in weight resulted in the idle standing of coal trains at the Tashkent station - awaiting additional loading to equal the weight norms. The hauling of trains with a weight of more than 2,000 tons was limited, because of the 40 km long ascent grades on the Kuchluk - Tashkent section (30).

On the Tashkent - Angren section diesel locomotives often had daily runs of 400 - 450 km, exceeding the norm by more than 100 km (31). As a result of various measures taken on the Angren branch line, and the increase of train weight norms, the average daily diesel locomotive run increased to 330 km and the norm was exceeded. In September 1955 the average daily diesel locomotive run was 421 km, which prompted an increase of the norm to 433 km. This permitted to reduce the locomotive park by three to four units (32).

3. Servicing of diesel locomotives, training of personnel.

In connection with the transfer of the Tashkent enginehouse to diesel traction the re-construction of the facilities cost 3,300,000 rubles plus 1,000,000 rubles for the development of the turnaround enginehouse (33). An additional 2,000,000 rubles were spent for the training of personnel. However, these expenditures were to be amortized by a reduction in the number of locomotive crews and the improved turnaround of diesel locomotives. The number of personnel at fueling stations, water stations and servicing facilities was also to be reduced (34).

The servicing of diesel locomotives operating on the Tashkent division used to take four to six hours. Since a servicing point was opened at Tashkent-passenger station this time was greatly reduced (35).

Since March 1955 fueling and lubrication of diesel locomotives was performed on station trackage of the Tashkent-passenger station during the scheduled standing of trains. This measure permitted all diesel locomotives in transit traffic to operate by the "ring" system (36). A pipe line was laid (For fueling of diesel locomotives ) to the inspection pits of the Tashkent-freight station and the fueling, watering and lubricating operations were organized

simultaneously with the inspection of locomotives. The technical check-up of diesel locomotives was organized to take place during the standing time of the train (during classification) at the Tashkent-freight station (37). However, in August 1956 the Tashkent station was still lacking some necessary equipment to service diesel locomotives (38).

Training of personnel takes place in the Institute of Railroad Engineering in Tashkent, three Railroad Technical Schools, and a number of other special and general schools in this area (39). At present (1957) the transportation system employs about 3,500 specialists, mostly local inhabitants, with higher and lower specialized education (40).

4. Repair of diesel locomotives at Tashkent enginehouse*

The Tashkent diesel locomotive enginehouse (41) carries out repair of diesel locomotives (42). It has various shops necessary for the taks, like a procurement shop (43), the running gear repair shop (44), or periodical repair shop. The latter shop was never completed. Its construction started in 1953. Walls were erected and then work stopped. The Ministry decided that the Tashkent enginehouse can do without this workshop. Nothing has been done since. A photo shows the roofless ruins of the shop. See appendix (45).

The Ministry of Transportation was criticized in 1955 for compelling the Tashkent diesel locomotive enginehouse to have its diesel locomotives repaired at the Ashkhabad diesel locomotive enginehouse repair shop, despite the fact that the Tashkent repair shop had ample facilities and personnel to do the job. This procedure added unnecessarily to the costs of repair, since the shop in Ashkhabad charged several thousand more than that in Tashkent (46).

In September 1956 the running gear repair shop at Tashkent enginehouse was equipped with a ten-ton bridge crane. Two stalls of the shop had electrically-operated hoisting jacks for lifting "TE-2"

*There is a large locomotive repair plant in Tashkent; the "L. M. Kaganovich" (this name is probably changed since) Steam Locomotive and Car Repair Plant, which will be turned into the largest diesel locomotive repair base of the Central Asia during the Sixth Five-Year Plan period (41).
See appendix.

In fact the Ministry of Transport Construction started the reconstruction of the plant in 1956. The plans for some new shops at the plant are given in Railroad Transport magazine, No. 5, 1956, page 17.

This type of major repair installation is not within the scope of this report, since it does not belong to the network of the railroads.

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and "TE-3" diesels, and one hoisting jack for lifting "TE-1" diesels, one of the stalls had a wheelpair hoist and motor-generator to supply current for the checking of engines (47).

Repair of diesel locomotives is done simultaneously by two repair crews. Each crew consisting of 18 members is divided into specialized sections, organized according to the type of repair (48).

The actual average time for the lifting repair of a "TE-1" is about five days instead of six days as prescribed by the norm; and of a "TE-2" diesel locomotive, seven days instead of eight days. The average (actual) time of major periodical repairs of the "TE-1" diesel locomotive is 0.3 days below the norm and of a "TE-2" diesel locomotive - 1.3 days below the norm. Minor repairs of a "TE-1" diesel locomotive last 14.3 hours instead of 24 hours and of a "TE-2" diesel locomotive - 15.1 hours instead of 36 hours (49). On May 1, 1956, it was decided to repair one extra "TE-2" diesel locomotive above the norm and it was accomplished (50).

The enginehouse is well equipped with parts which are kept in perfect order (51).

The railroaders of Tashkent diesel locomotive enginehouse pledged to complete the 1957 plan for the repair of diesels by December 20, 1957 (52).

5. Performance indices of Tashkent diesel locomotives

a. Daily run

In 1955, the Tashkent diesel locomotive enginehouse, had an average daily diesel locomotive run of only 365 km. During the last few years the Tashkent system was falling below the norms for the average daily diesel locomotive run (53). In September 1955 the run of the Tashkent-freight enginehouse exceeded the level of the third quarter of 1955 by 70 kilometers. The daily performance of each diesel locomotive amounted to 850,000 - 950,000 ton-kilometers (54). The Tashkent diesel locomotive enginehouse pledged to bring the average daily diesel locomotive run to 500 km in 1955 (55) and repeated this pledge in 1956 (56).

But there was a lack of coordination between the railroaders of the Tashkent enginehouse and the administrators. Simultaneously with the 500 km locomotive run pledge of the engineers, the chief of the division gave orders to increase the daily runs by only 10 kilometers above the plan, equivalent to only 392 kilometers. This lack of coordination was criticized by the enginemen, who declared that given the assistance of the administration they could boost the daily average runs to 600 kilometers (57).

In January 1956 diesel locomotives which service the Tashkent - Chengel'dy and Tashkent - Syr-Dar'inskaya sections ran daily 500 and more kilometers and exceeded the winter norm by 40 kilometers, The daily productivity of "TE-2" diesels amounted to a million ton-kilometers (58). In February and March the Tashkent division

increased the daily runs of diesel locomotives up to 503 kilometers, thus exceeding the established norm by 70 kilometers. Some diesel locomotives reached even 532 kilometers. In such a way Tashkent diesel locomotive enginemen fulfilled their pledge to increase the daily runs up to 500 kilometers and raise the diesel locomotive performance efficiency to 1,000,000 ton/kilometers (59).

The first "TE-3" diesel locomotive arrived at the Tashkent-freight enginehouse in April 1956. Following this some locomotive crews obtained 600 kilometers in the average daily runs of "TE-3" diesel locomotives with a total of 1,500,000 ton/kilometers (60).

The "Railroad Transport" magazine stated that in spite of the fact that the average daily locomotive run has been increasing from year to year, the runs of locomotives from the Tashkent enginehouse did not reach the norm in May 1956. Evidently the administrators of the Tashkent division did not fully use the capacities of diesel locomotive park (61). In 1957, the newspaper "Gudok" reported that locomotive crews of the Tashkent enginehouse increased their daily average runs up to 500 kilometers and during May 1957 to 511 km and sometimes even 650 kilometers (62).

b. Weight of trains

On sections serviced by Tashkent enginehouse the weight norm of trains pulled by "FD" steam locomotives was 1,600 tons (63). In the beginning of diesel operations the weight of trains for the Tashkent - Arys' section was established at 2,300 tons in an eastward and 1,800 tons in westward direction (64).

The use of diesel traction usually provides easier handling of weight norms due to double traction system. For example: the Syr-Dar'inskaya - Tashkent - Chengel'dy section has two runs, one with a difficult profile of the route and another with easier. "TE-2" diesel locomotives are used in the second case and the double headed haulage of "TE-1" and "TE-2" diesels on the more difficult section with the same weight norms (65). The double-headed traction of "TE-2" and "TE-1" diesel locomotives was used in regular traffic as means to increase the weight norms for freight trains in February 1956 (66). In February 1956 the most capable enginemen of the Tashkent enginehouse occasionally hauled trains with weight coming close to the norms established for the last year of the Sixth Five-Year plan period (67). When in April 1956, the Tashkent-freight enginehouse got its first new "TE-3" diesel locomotive, it ran over-weight-norm trains (about 1,000 tons over-weight) on the Tashkent - Syr-Dar'inskaya and Tashkent - Chengel'dy runs. The double run from Tashkent to Ursat'yevskaya showed a possibility of extended runs to be introduced (Tashkent - Arys', Tashkent - Ursat'yevskaya) and a 2,789 ton train (789 tons in excess of norm for "TE-2" series diesel locomotives) was pulled from Ursat'yevskaya to Tashkent (68).

In May 1956, in connection with the completion of the second tracks there was an increase of train weight and the speed-including-stops (the latter by 7.6 km). In 1956 a freight train of 2,500 - 2,700 tons proceeded from Chengel'dy to Tashkent without stops with a speed equaling that of a passenger train (69).

c. Haulage of heavy trains

The haulage of over-weight-norm trains is practiced by Tashkent enginemen, but the majority of the locomotive crews rarely run heavy trains (70). Some figures for 1952, 1953, 1954, 1955, 1956 and 1957 are given to illustrate the point. In 1952 the Tashkent diesel locomotive enginehouse ran 1,971 heavy trains; the standard weight was exceeded by an average of 220 tons (71). In 1952 the Tashkent division saved approximately one million rubles by reducing the number of trains (72). The diesel locomotive enginehouse in January 1953 dispatched 563 heavy trains with 117,450 tons of extra freight, in February 641 heavy trains with 140,000 tons of extra freight. It was planned to load all freight trains 200 to 300 tons overweight (73). In March 1953 the Tashkent division had to increase the number of diesel locomotives to take care of the greater number of point-to-point trains to the Uzbekistan capital and other cities in Central Asia (74). In three months of 1953, the Tashkent diesel locomotive enginehouse ran 1,700 heavy trains with 560,000 tons of extra freight (75). In five months of 1953, the locomotive engineers ran 3,000 heavy trains with an average of 226 tons of excess freight. The train weight norm was increased 200 tons (76).

As reported in April 1954, the enginemen of the Tashkent diesel locomotive enginehouse ran 900 heavy trains and transported about 140,000 tons of excess coal, petroleum, cotton and other freight from January to March 1954 (77).

They ran more than 2,500 trains in six months of 1954 and by reducing the number of trains saved almost 700,000 rubles during that time (78).

In connection with the increased flow of freight from Siberia, the Tashkent railroad received increasingly more coal-loaded trains through the border station of Tylu'kubas. In September 1954, the diesel locomotive enginemen of Tashkent enginehouse transported more than 2,000,000 tons of additional freight (79).

The diesel locomotive enginehouse in Tashkent operated very efficiently in 1955. During January through July 1955, a total of 4,800 excess weight trains were run with 1,325,000 tons of additional freight (80). In ten months of 1955 the diesel locomotive enginemen ran 7,600 heavy trains and transported 1,727,000 tons of freight above the norm (81). In 1955 the enginemen of Tashkent (and Arys') enginehouse ran monthly from 1,200 to 1,400 heavy point-to-point trains. However, not many locomotive crews run heavy trains (82). In 1955 the diesel locomotive enginemen of Tashkent and Arys' enginehouses transported over 3,200,000 tons of freight over the norm (83).

Following the arrival of "TE-3" diesel locomotives, a heavy train was successfully hauled from Tashkent to Ursat'yevskaya station and a 2,789 ton train (i.e. 789 tons heavier than the norm for the "TE-2" diesel, or for two "SO" steam locomotives) from Ursat'yevskaya to Tashkent. Another train pulled by a "TE-3" diesel locomotive, had an excess weight of 943 tons above the norm established for coupled "TE-2" and "TE-1" diesel locomotives (84).

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In September 1956 the Tashkent-Freight diesel locomotive engine-house hauled over 1,000 over-weight trains, of which almost 50 per cent carried grain, and carried 340,000 tons of freight above the norm (85).

The railroaders of the Tashkent diesel locomotive enginehouse pledged to complete the 1957 shipment plan (in ton/km) by December 20, 1957, to transport in heavy-duty trains 3,000,000 tons of freight over the norm and to save 700 tons of fuel in 1957 (86).

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D. Arys' Enginehouse

Diesel traction was introduced at the Arys' enginehouse in 1951-1952 (1).

There are two base enginehouses at Arys'; one diesel locomotive enginehouse (2) and one steam locomotive enginehouse, which was still in operation in October 1956 (3).

In 1951 the Arys' terminal was developed. However, its planning was very poor. It happened that on a small section of the system there were three base enginehouses closely located to each other: The Tashkent, Arys' and Chimkent enginehouses (4). As late as 1956 train operations between the three points were not properly organized. There was a surplus of base and turnaround terminals on the sections between Arys' and Iletsk also, thus making the locomotive operating runs too short (5).

Diesel locomotives of the Arys' enginehouse operate mainly on the Arys' - Chengel'dy section, which is 77 km long (6) with a turnaround point at Chengel'dy (7). Chengel'dy station is the joint station of the Tashkent and Arys' divisions* (9). In April 1957, another section of the Arys' division was dieselized. This section is 108 kilometers long and runs from Arys' to Turkestan (10). Diesel locomotives of the Arys' enginehouse (and of Tashkent enginehouse) operate on the very heavy traffic section of the Tashkent system main line (11). It was planned to use double-unit "TE-2" diesel locomotives on the entire Arys' - Kagan (Ashkhabad system) line (12). However, no "TE-3" diesel locomotives were reported at the Arys' enginehouse so far (as was the case with the Tashkent enginehouse).

Very few transit trains pass through the Arys' station (13). The station handles mostly trains which arrive from the direction of the Turkestan-Siberian system. It is carried out in the following manner: locomotives from the Chimkent steam locomotive enginehouse haul trains from the Tyul'kubas transfer point (Turkestan-Siberian system) to Arys' station, where the trains are taken over by diesel locomotives of Arys' terminal. Further on diesels haul these trains to Tashkent and Syr-Dar'inskaya station (14).

Since the introduction of diesel traction on the main line from Arys' to Syr-Dar'inskaya there was a considerable growth of weight norms of trains (15). The train weight norms were 1,500 tons (16) and in 1956 and 1957 the "TE-2" diesels were hauling trains of 3,000 - 4,000 tons (17). Trains with weights above the norm were hauled almost regularly (18).

*Complaint was made about excessively long turnaround time of Arys' diesel locomotives at Chengel'dy. It takes an hour and more to complete this operation, in spite of the fact that there is no servicing of locomotives or crew rest period there (8).

During 1956 diesel locomotives of the Arys' enginehouse ran 9,719 heavy trains and transported over 4,000,000 tons of freight above the norm (19). Other operational indices improved as well. The speed-including-stops of trains pulled by diesel locomotives of the Arys' enginehouse exceeded the speed of trains pulled by steam locomotives by 6 per cent (20). In 1956 the average daily diesel locomotive run was accelerated to 405 km, which is 74 km over the norm (21).

1. Diesel locomotives in shunting operations

Prior to 1950 the Arys' station delayed the passage of trains systematically (22). In 1952 the terminal started using diesel locomotives of "TE-1" series (23) for shunting operations on the humps (24). The introduction of this new technique and the improved methods of classification work at Arys' junction improved the operational conditions of the entire system (25), and diesel locomotives proved their advantage over steam switchers (26). By 1955 diesel locomotives (switchers) were used also on the pull-out tracks of the terminal. Consequently, the handling capacity of the hump rose by 30 per cent (27). Use of diesel switchers gave the following results: the entire cycle of switching operations per train on the hump was reduced an average of 20 - 25 per cent, the availability of a locomotive increased an average of 1.5 - 2 hours daily, the standing time of transit cars with classification was reduced by 25 - 30 per cent, as compared with steam, the conditions of work and rest of railroaders working on the hump improved (28). In 1956 the locomotive standing time at Arys; enginehouse was 2.35 hours, or 25.6 per cent of the total locomotive turnaround (29). The norms for the standing time of cars were fulfilled (30). The volume of cars handled on the hump increased from 2,200 (handled by steam switchers) to 3,300 cars now handled by diesel switchers (31).

Compared with steam the cost of switching operations was halved (32). Since the car standing time was reduced by 15 per cent (33), there was a simultaneous reduction of the car-handling cost by 28 - 30 per cent (34).

The classification capacity of the Arys' mechanized hump increased 17 per cent and the standing time of transit cars was reduced by 36 minutes below the norm (35). The productivity of the Arys' terminal railroaders on the classification hump (in 1956 as compared with 1952) increased 52 per cent (36). During the same period the cost of classification of one freight car was reduced 22.5 per cent (37).

The servicing of diesel switchers at Arys' is much simpler and speedier than that of steam switchers. During a 24-hour period a steam switcher had to have small servicings each lasting about 30 minutes and one full servicing lasting two full hours (38).

The servicing of a diesel switcher is carried out only once in ten days, thus saving over 40 days of additional operations. Moreover, trains with 2,500 - 3,000 tons in weight are pulled out

on hump without pushers, the train is not broken up into separate units, as it was practiced before (39). Thus, the total time in shunting operations was reduced (40).

The full servicing of diesel locomotives of Arys' enginehouse takes place after the locomotive covers 800 - 1,000 km. The inspection of diesel locomotives is performed at the same time at the inspection pit (41). Daily check-ups of engines is performed when the locomotive is at the station yard of the main enginehouse or when it stands on the trackage of the intermediate station (42).

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CHAPTER IV. ORENBURG SYSTEM

A. General Information.

B. Orsk Division.

1. Dieselization and General Information.

2. Orsk - Nikel'-Tau Section.

3. Orsk - Aydyrlya Section.

4. Orsk - Kuvandyk - Saraktash - Orenburg - Kinel' Line.

5. Haulage of Heavy Trains.

C. Ural'sk Division.

1. Ozinki - Ural'sk; Ural'sk - Kazakhstan - Iletsk Sections.

D. Gur'yev Division.

1. Kandagach - Shubar-Kuduk - Sagiz - Makat Line.

E. Kandagach - Dzhusaly Line.

1. General Information on Dieselization, on Runs, Enginehouses.

2. Nikel'-Tau - Kandagach - Emba - Kotr-Tas, Sections.

3. Emba Diesel Locomotive Enginehouses

4. Chelkar Division.

a. Chelkar Enginehouse.

b. Operations.

5. Kazalinsk Division.

a. Kazalinsk Enginehouse.

b. Operations of Kazalinsk Enginehouse.

c. Dzhusaly Enginehouse.

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# CHAPTER IV

## THE ORENBURG SYSTEM

### A. General Information.

The main line of the Orenburg system runs over about 1,500 km, and is called "the gate" to Central Asia (1). This system consists of three main lines: 1) Novo-Sergiyevskaya - Orenburg - Dzhusaly line, connecting the districts of European USSR with Central Asia; 2) Orenburg - Orsk - Aydyrlya line connecting the South Urals with Siberia (2); and 3) Orsk - Kandagach - Gur'yev line which provides the shortest route from the Emba petroleum districts to the industrial centers of the South Urals (3).

The Orenburg system is now not only a transit type railroad, but also a considerable freight originating system (4). The basic outgoing freight of the system are ore, petroleum products, coke, fluxes, mineral-construction materials, grain and salt; the transit freight consists of cotton, rice, equipment and industrial goods; coal, lumber and industrial goods are imported freight (5).

In the length of lines operated by diesel traction the Orenburg system takes second place after the Ashkhabad system (6).

The first diesel locomotives appeared on the Orenburg system in 1949 (7). During the 1950 - 1953 period, the 791 km Kandagach - Dzhusaly line was converted to diesel traction (8). In the beginning both steam and diesel traction were used on some of the Kandagach - Dzhusaly line sections; since 1955 all sections were entirely transferred to diesel traction (9).

The Gur'yev division of the Orenburg system which first introduced diesels in 1954, was switched to diesel traction in 1956 (10). It includes all stretches from Kandagach to Gur'yev, a distance of 517 km (11).

The Ural'sk division was switched to diesel traction about 1953 (12). Diesel locomotives operated on Ozinki - Ural'sk - Kazakhstan - Iletsk sections in 1956 (13). The length of the stretch from Ozinki to Iletsk is 393 km (14).

Diesel locomotives of "TE-2" series were received on the Orsk - Aydyrlya and Orsk - Kuvandyk sections of Orsk division in 1954 (15). In 1956 the Orsk - Kuvandyk line was entirely switched to diesel traction (16). The Shil'da - Adamovskoye narrow gauge line of Orenburg system used diesel traction in 1957 (17).

In 1955, diesel locomotives carried 55 per cent of the total volume of traffic, stated G. Chirikov, Chief Economic-Planning Department of the Orenburg system (18). According to "Gudok" of 7 June 1955 two-thirds of the entire volume of traffic was hauled by diesel locomotives in 1955 (19). In 1956 about 70 per cent of all traffic of the system was using diesel traction (20).

An April 1957 issue of "Gudok" stated that over 50 per cent of freight operations of Orenburg system are performed by diesel locomotives (21) and by April 1957 about 72 per cent of rail lines of the system have been dieselized (22).

The discrepancies in the percentage of diesel locomotive participation in traffic may be explained by the fact that the USSR railroads often use diesel locomotives on sections which still employ steam traction. The practice of sending diesel locomotives to assist the steam traffic was common on the Orenburg system, including Orsk - Kuvandyk section where steam locomotives were still operating in 1956 (23), or on the Kandagach - Nikel'-Tau section (24).

The "TE-2" series diesel locomotives are the basic locomotives in use on the system and the "TE-3" diesels are being introduced recently (26).

According to G. Chirikov, the five-year experience of diesel locomotive operation on the system proved its effectiveness and advantages as compared with steam in 1955 (27).

The advantages were especially evident when comparing the operations of two divisions of the system. The cost of shipments on the Orenburg division, which operated in 1955 on steam traction was reduced only 32.2 per cent during the past five years, while on the Chelkar division, which switched to diesel traction, it was reduced by 56.3 per cent during the same period of time (28).

The comparative data on the profitability of diesel traction and reduction in operational expenditures per 10,000 t/km is given below:

| Expenditures in Rubles | On Sections with Diesel Traction | On Sections with Steam Traction |
|---|---|---|
| Fueling | 13.6 | 48.7 |
| Current repair of locomotives | 4 | 9.2 |

In 1954 the expenditures for fueling, watering and repair of diesel locomotives per 10,000 t/km gross amounted to 19.4 rubles, and on sections with steam traction - to 59.75 rubles (29). On sections with diesel traction the average expenditure of fuel per 10,000 t/km is 51,5 kg, while on sections with steam traction it is 202 kg. Moreover, the cost of transporting diesel fuel is lower due to the fact that petroleum refineries are located within the limits of the Orenburg System. On the other hand the coal basins are located at a distance of 1,600 - 1,800 km from this system (30).

The replacement of steam locomotives by diesels resulted in the increase in the speed-including-stops by 6.9 km per hour (31) and speed-excluding-stops by 7.4 km per hour. The weight of trains increased by 400 tons (32). In April 1955 the diesel locomotive turnaround was reduced by eleven hours and the average weight of trains increased by 600 tons (33).

G. Chirikov is of the opinion that the economical effectiveness of diesel traction on the Orenburg System could have been boosted even more, if the introduction of this traction had been conducted in a more efficient and planned manner. Serious inadequacies in the operation of diesel locomotives could have been also eliminated (34).

There was no planning in the transfer of railroad sections from steam to diesel traction. There was also irrational distribution of diesel locomotives to the enginehouses which were to service simultaneously both steam and diesel locomotives for quite a long time (35). Quite often these enginehouses lacked the simplest facilities necessary for the servicing or repair of diesels (36).

In fact, when the transfer of traction occurred - none of the enginehouses were fit for repair of diesels (37). The unpreparedness of the enginehouses for repair resulted in extremely long and inadequate repair of locomotives (38). Thus, in 1954 diesel locomotives remained in repair 65 to 70 per cent longer than prescribed by the norm, which was equivalent to taking seventeen diesel locomotives out of the operational locomotive park (39).

Very poor planning was evident when the running gear repair was organized on the system at three enginehouses: Chelkar, Emba and Ural'sk. The repair assignments were rather small and in many instances repairmen remained idle. In addition to the above three shops, the construction of two more running gear repair shops was started at Kazalinsk and Orsk. Suggestions were made to concentrate specialized repair of diesel locomotives in enginehouses and eliminate the dispersion of identical types of repair among a great number of enginehouses (40).

Complaint was made that inadequate performance of the diesel locomotive repair shops hampers operations of locomotives of the system (41). Irrational distribution of funds was made when substantial sums were used in the development of water facilities (for steam locomotives) on the Orsk - Aydyrlya section, which was eventually switched to diesel traction (42). The Kazalinsk division of the Orenburg system was entirely transferred to diesel traction in 1955, but used only an automatic block system. Simultaneously the Kzyl-Orda division of the Tashkent system, uses an automatic block system with centralized traffic control, but has still steam traction (43).

There were also inadequacies in the training of personnel for diesel traction. All diesel locomotive enginemen of the Orenburg system received their training at the Kazalinsk and Chkalov technical schools. The Kazalinsk School has an inadequate teaching staff and lack of facilities necessary for practical exercises (44).

In 1955 the Orenburg system was 22 km short of the norm for the average daily diesel locomotive run (45), but still this average daily run amounted to 255 km as compared with 191 km for the steam locomotives (46). The average daily performance of a diesel locomotive was 397,000 ton/km, as compared with 247,000 ton/km for steam (47). The speed-excluding-stops was higher by 2.1 km/hour, and the speed-including-stops by 5 km/hour (48).

Suggestions were made that better results could be obtained with diesel locomotive operation if proper lengths of operating runs were established (49). The locomotive operating runs of some sections switched to diesel traction were shortened. In connection with this, four new turnaround enginehouses were to be organized on the system and two turnaround enginehouses were changed into base enginehouses (50). In 1955 the length of diesel locomotive operating runs of the Orenburg system ranged from 70 to 85 km (51).

All through 1956 statements were made concerning inadequate utilization of diesel locomotives. Among others the blame was placed on excessively slow reconstruction of the STsB (Centralized Traffic Control and Block System) devices. In 1956, for instance, there was an automatic control system on the Dzhusaly - Kandagach section of the system, but staff system was used on the Ozinki - Iletsk and Orsk - Kandagach sections. A semi-automatic block system was put in operations on the Orsk - Aydyrlya section, but the Iletsk - Emba and Aral-Kum - Dzhusaly sections have hand-operated switch control system, while the Emba - Aral-Kum section used mechanically controlled centralization system (52). The Kandagach station is the only station of the Orenburg system equipped with an electrically controlled switch system (53).

Gudok of 20 April 1957 revealed that in 1956, due to a lack of centralized dispatching control, the difference between speed-excluding-stops and speed-including-stops was 15.6 km per hour (54); the average daily locomotive run was 300 km (55). In July 1956, the utilization of diesel locomotives on the Orenburg system was very inadequate; diesels were in operation only 25 per cent of their time (56). The explanation was that diesel locomotives could not be fully utilized because tracks were in poor condition. Speed limitations were in effect on almost one-third of the railroad lines of the system (57).

The construction organizations were critisized for slow progress of the reconstruction of lines for the new type of traction and for inadequate repair base expensions (58).

Some of the construction organizations consider these problems of secondary importance. For example, the chief of "Orenburgtrans-story" Trust re-assigned the workers engaged in the construction of diesel locomotive facilities on the system to some other projects with the consent of the Main Construction Administration for the Volga area and Central Asia (59). The reconstruction of the enginehouse for the servicing of diesel locomotives was stopped. The re-equipping of a number of enginehouses was long delayed (60).

Simultaneously diesel locomotive enginemen of numerous enginehouses (Orsk, Chelkar, Emba, Kazalinsk, Dzhusaly) tried to prove with their own efforts that diesel locomotive performance may be stepped up to 1,000,000 ton/km daily (61).

In 1957 the construction plan for the development and reconstruction of locomotive management was revised and 6,000,000 rubles were appropriated for the finishing work in steam and diesel locomotive enginehouses. Special attention was paid to the reconstruction of sections which were to use diesel traction and a special order was issued to complete the task in 1957 (62).

An article in Gudok, July 1957, disclosed that it was evident that the Main Administration of Locomotive Management does not know the order in which the changeover to new traction should [redacted] (63), and to date no detailed plan had been made for the conversion of enginehouses to diesel traction. Consequently the distribution of repair bases could not be made either. Each enginehouse, upon the arrival of diesel locomotives, created its own repair base. Thus, there are now three enginehouses with running gear repair shops. Meanwhile, the Main Administration of Locomotive Management ordered the construction of running gear repair shop in the fourth enginehouse, i.e. in Orenburg. Thus, there will be as many running gear repair shops within the railroad system, as in 1949 when steam traction was used. Calculations showed, however, that even if the entire system were transferred to diesel traction - two, or at most three, running gear repair shops would be sufficient (64).

V.M. Terekhov, First Deputy Chief of the Main Administration of Locomotive Management declared that the number of defective diesel locomotives on the Orenburg system increased sharply during the winter of 1956/57 and resulted in seriously hampering operations. He stressed that operational efficiency of the Chalkar enginehouse was not followed by other enginehouses. Definite and urgent steps should be taken for the improvement of the system (65).

Although this statement was published in February 1957, the situation had not improved by September 1957. The entire locomotive management of the Orenburg system was poorly prepared for 1957 winter operations. Only one half of the funds allocated for the repair of locomotive management facilities were used. For example, only one out of the planned nine enginehouses had the roof repaired and only four out of eighteen inspection pits were prepared for winter. The lubricating and other servicing facilities were in disrepair in September 1957; only thirty to forty per cent of the appropriated funds were used (66).

The maximum speed limit for newest "TE-3" diesel locomotive on some sections of the Orenburg system is only 25 km/hour (67).

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B. Orsk Division

1. Dieselization and General Information.

Orsk is one of the major railroad junctions of the Orenburg system. In connection with the rapid growth of industry at Orsk and Novo-Troitsk (the latter city was created during World War II), the railroad junction has grown significantly and includes a number of large stations, the largest of them Gudron and Nikel' (1). Gudron station is called "the factory of point-to-point trains", because of enormous freight flow, which comes from the Urals and is distributed by this station in all directions of the system (2). Orsk station and enginehouse service important lines. The Orsk division originates and receives much more freight than all other divisions of the system combined (3).

The importance and the volume of traffic of the Orenburg - Orsk - Aydyrlya (toward Chelyabinsk) line was and is constantly increasing (4).

The Orsk - Nikel'Tau - Kandagach route is also of great significance. This line secures the supply of ore to the industrial enterprises of Orsk and Novo-Troitsk and shortens the route of Ural timber and Kuznetsk coal by 400 km in the direction of western regions of Kazakhstan and Central Asia (5). The Kimper-Sai station on the Orsk - Nikel'Tau - Kandagach line was created due to the richest nickel ore deposits of this area. The ore is shipped from here in a continuous flow to Orsk Nickel Kombinat (6).

Prior to 1954 the Orsk Railroad junction used only steam locomotives. In 1954 the Main Administration of Locomotive Management supplied "TE-2" diesel locomotives to Orsk division to operate on the Aydyrlya - Orsk and Orsk - Kuvandyk sections (7), and the Orsk base enginehouse was transferred to diesel traction (8). The railroaders of the Orsk enginehouse studied and followed the methods of diesel operations of the Chelkar diesel locomotive enginehouse and were very successful in this task (9). So that in the third quarter of 1955 diesel locomotive enginemen of the Orsk enginehouse boosted the daily performance of diesel locomotives from 500,000 - 600,000 ton/km to 700,000 - 800,000 ton/km (10).

As mentioned previously the "TE-2" diesel locomotives were used for regular train operation (11) and "TE-1" diesel switchers for shunting and classification operations (12). In April 1956 new high-powered "TE-3" diesel locomotives were sent to the Orsk enginehouse (13). In fact, as reported in September 1957, the Orsk enginehouse was the only one on the entire Orenburg system which had and used "TE-3" diesel locomotives (14). Numerous complaints were made about inadequacies in construction of "TE-3" diesel locomotives. Thus, there were 22 "between-train" repairs on the nine "TE-3" diesel locomotives, which were in operations at the Orsk enginehouse during three months of

April - July 1956 alone (15).

When a new three-unit 6,000 hp diesel locomotive was sent in 1956 to the Orsk enginehouse the railroaders uncoupled one unit and let the locomotive operate as an ordinary "TE-3" diesel locomotive (16). The "Dneprogiprotrans" Trust was assigned the study concerning the expansion of servicing facilities and development of the Orsk railroad junction in 1952 (17). The reconstruction of locomotive servicing facilities was started in 1953 (18). But, as reported in August 1956, the re-equipping of the Orsk enginehouse for servicing of diesel locomotives was delayed (19) and the reports from March 1957 show that the enginehouse was not yet reconstructed. Sand was refilled manually by buckets and the equipment for servicing facilities remained idle on the ground (20).

When "TE-2" diesel locomotives arrived at the Orsk enginehouse, the inspection pits were reconstructed according to their length. Two years later, when the "TE-2" diesels were replaced by "TE-3" diesel locomotives, inspection pits remained 30 meters long, even though new locomotives were 33.4 meters long. As result the workers and instruments are lowered into pits from the side (21).

Repeated complaints were made that the railroaders of the Orsk enginehouse made no preparations for 1956 - 1957 winter operations. Moreover, they failed to maintain cleanliness and order at the enginehouse. As a result, such conditions affected the operations of diesel locomotives and the mechanical condition of diesels (22). As late as July 1957, the construction of locomotive servicing facilities was still in progress (23). Also the running gear repair shop, adjusted for two-unit "TE-2" diesel locomotives had to handle repairs of "TE-3" diesel locomotives. For this purpose two units of "TE-3" diesel locomotives had to be uncoupled and placed on different tracks, crowding the shop and complicating the procedure (24).

There were no special stands for "TE-3" diesel locomotives, no measuring instruments, or any other equipment to handle their repair. In July 1957, sixty different instruments necessary for locomotive repair were still lacking. This was one of the reasons, why the quality of locomotive repair at the enginehouse was low and repair was done with interruptions (25).

The fuel pumping station was not yet completed and, as result, it took hours to pump fuel out of the locomotive tanks, instead of twenty minutes as prescribed by the norm (26).

In July 1957 reconstruction of repair shops of the Orsk enginehouse was contemplated at a cost of 600,000 to 700,000 rubles, but doubt was expressed for its completion in due time and it was predicted that the construction might last for years (27).

As reported in September 1957, the reconstruction of these shops was in progress, but was carried out taking into consideration the use of "TE-2" diesel locomotives. Consequently additional funds were needed in September 1957 for the alteration of already reconstructed shops. In the meantime, the repair of "TE-3" diesel locomotives had to be carried out in unfit and inadequate shops. Moreover, many shops of the Orsk enginehouse were still in disrepair and incapacitated for the repair of diesel locomotives of even smaller capacity than the "TE-3" type diesel locomotives (28).

2. Orsk - Nikel'-Tau - Kandagach section.

Evidently both diesel and steam locomotives were used on the Orsk - Kandagach line in 1956. Diesel locomotives of the Orsk base enginehouse haul trains to Nikel'-Tau station where they are taken over by diesel locomotives from Kandagach enginehouse (29). Assistance to the steam locomotive Kandagach - Aktyubinsk run by diesel locomotives of the Kandagach enginehouse is constantly being extended (30).

The entire Orsk - Nikel'-Tau section is 109 km long (31). Diesel locomotives turnaround at Nikel'-Tau station (32). The enginemen use the "ring" system of operations without stops at the Orsk base enginehouse. Diesel locomotives stand at Nikel'-Tau turnaround enginehouse 2.5 hours, while the norm for standing time of steam locomotives was 7.1 hours (33).

3. Orsk - Aydyrlya section.

Diesel locomotives of the Orsk base enginehouse turnaround at the Aydyrlya turnaround enginehouse (34).

The operations on the Aydyrlya - Orsk section (133 km) are carried out in the following manner: steam locomotives of the Kartaly enginehouse of the South Urals system pull double weight trains to Aydyrlya station, where they are taken over by diesel locomotives ("TE-3" type) from Orsk and pulled further to Orsk and in the direction to Nikel'-Tau station (35). At Nikel'-Tau station "TE-2" diesel locomotives from Kandagach take over, and even though these locomotives are not as powerful as "TE-3" diesel locomotives, the enginemen never refuse to haul double trains. About fifty per cent of all trains are double-weight trains on this entire route (36).

A number of diesel locomotive enginemen use the "ring" system of operations on the Orsk - Aydyrlya section without stops at the base enginehouse. In the turnaround enginehouse at Aydyrlya diesel locomotives stand 1.5 hours, while the norm of the steam locomotive standing time was 6.8 hours (37).

In 1955 the Orsk - Aydyrlya section was not yet completely switched to diesel traction and the advantages of diesel locomotives could not be fully utilized. But, even with the low utilization of diesel locomotives on the railroad, the savings in 1955 were to exceed 12,000,000 rubles annually, according to the following table:

| Expenditures in Thousand Rubles | Diesels | Steam Locomotives | Savings |
|---|---|---|---|
| Wages | 8,613 | 11,350 | 2,737 |
| Fuel | 8,400 | 17,400 | 9,000 |
| Repair of locomotives | 926 | 1,353 | 427 |
| Miscellaneous | 103 | 196 | 93 |
| Totals | 18,042 | 30,299 | 12,257 |

In June 1955, suggestions were made that the Main Administration of Locomotive Service of the Ministry of Transportation should switch the Orsk - Aydyrlya section to diesel traction in its entirety. The Orenburg system was able to secure diesel locomotives from its own reserves to operate on this section (38). As reported in November 1955 the administrators of the Orenburg system thought it possible to change over completely to diesel traction on the Orsk - Aydyrlya section without additions to the existing diesel locomotive park of the system (39). Simultaneously, irrational expenditures for servicing facilities were made when watering facilities were provided for the Orsk - Aydyrlya section, which was later switched to diesel traction (40).

Second tracks were laid on the Orsk - Aydyrlya stretch in February 1955 (41), to increase the through-put capacity of this dense traffic line. New traffic schedules were made to utilize fully its capacities (42).

The Use of "TE-3" diesel locomotives on the section permitted to raise weight norm of freight trains to 4,000 tons, instead of 2,700 tons for "TE-2" diesel locomotive operations (43). In 1956 some "TE-3" diesel locomotives pulled even 5,000 ton trains (44).

4. Orsk - Kuvandyk - Saraktash - Orenburg - Kinel' Line

As mentioned before, the 233 km long Orsk - Kuvandyk section of Orenburg system used diesel locomotives since 1954 (45). But apparently steam locomotives were still in use as late as January 1956. Gudok revealed that four diesel locomotives were sent from the Orsk enginehouse to assist winter operations of steam locomotives on the Orsk - Kuvandyk station (46). These locomotives were spared from other sections through efficient operations and shorter time spent for servicing (47).

In 1956 the stretch was entirely switched to diesel traction (48). The "TE-3" diesel locomotives, which were to operate on the Orsk - Kuvandyk section were capable of pulling 3,500 ton trains; prior to this two steam locomotives were needed on this difficult gradient section to pull a 2,200 ton train (49). Quite frequently, one diesel locomotive replaced three to four steam locomotives on this section (50). Nevertheless, a complaint was made that during the entire year 1956, diesel locomotives operating on the Orsk - Kuvandyk section remained idle 41 per cent of their time (51).

The Orenburg enginehouse was the other enginehouse of this section to receive diesel locomotives, as reported in Gudok, 10 May 1956 (52). This information was not confirmed in later editions of the newspaper.

The operational handicaps on the main line of the Orenburg system seem to have been caused by delays in reconstruction of the roadway and station facilities. The Orsk - Orenburg - Novo-Sergiyevskaya line was undergoing repair and expansion of trackage as reported in August 1956. It was planned to lengthen the station trackage at eight points on the Orsk - Orenburg section during June - August 1956 period. However, by the end of August 1956 the work was completed at only one turn-out point. As a result new high-powered "TE-3" diesel locomotives could not be used to their full capacity (53).

New tracks on the Orenburg - Saraktash section (105 km) were built in 1956 and during the grain harvesting time in August 1956 traffic was switched from the old line. But since the construction work was not fully completed, the trains moved only 15 km/hour (54).

Track repair and construction works carried out on the Orsk - Saraktash sector caused serious delays and disruptions of regular handling of trains at the Aydyrlya and Gudron railroad stations in September 1956 (55). The station tracks of the Kuvandyk station were being expanded, as reported in December 1956. Several tracks have been laid to increase the through-put capacity of the station (56).

As reported in Gudok, 12 July 1957, the funds rendered for the reconstruction of the Orenburg system were ample enough to secure the necessary through-put capacity of lines. But actual investments were irrationally distributed to different branches of railroad managements and consequently shortcomings occurred on some sections. The reconstruction of tracks on the Aydyrlya - Orsk - Orenburg stretch continued for seven years, and was still in process in July 1957. Several stations of this stretch still have short station tracks and a number of runs have low-capacity rails. The condition of the roadway was not fit for the new traffic conditions and for operation of the new three-unit "TE-3" diesel locomotives. In fact even the regular "TE-3" diesel locomotives cannot be utilized effectively on the Orsk division (57).

The entire Aydyrlya - Orsk - Kuvandyk stretch continues to delay freight traffic from the South-Urals to the central parts of the country and in the opposite direction. The Main Administrations of the Ministry were blamed for the situation (58).

Reconstruction of the Gudron - Profintern line still continued even though all datelines had passed. Lengthening of trackage at the Profintern station has not been completed, meanwhile several tracks at the Gudron classification station were blocked by Profintern-bound trains which interfere with transit traffic. At the end of August, there were complaints that grain-loaded trains hauled by diesel locomotives were held up on the Nikel' - Saraktsh - Orenburg line, by trains with ballast bound for construction sites (59).

According to the Sixth Five-Year Plan second tracks were to be built on the entire Aydyrlya - Orsk - Kuvandyk - Saraktash - Novo-Sergiyevskaya - Kinel' (Kuybyshev system) line (60). As reported in 1955 and 1956, second tracks were being constructed on the Orsk - Orenburg section (61).

By November 1956 about 160 km of second tracks have been laid on the Orsk - Orenburg - Novo-Sergiyevskaya and on Orenburg - Iletsk rail sections (62). Approximately 120 km of second tracks have been opened to traffic from the Orenburg station to siding No. 205, in December 1956 (63).

The construction of second tracks on the Orsk - Orenburg line which was assigned to the "Orenburgtransstroy" Trust, was still in progress in July 1957. Doubts were expressed that the line would be ready for traffic by the time grain shipment began. The trackage at Rusayevo station was not completed, although the lengthening of lines was planned for 1956. A similar situation existed on Orenburg - Novo-Sergiyevskaya stretch. Here again station tracks were not lengthened; at Perevolotskaya station this work was not even started (64).

5. Haulage of Heavy Trains.

The introduction of diesel traction on the main route of the Orenburg System and on the Orsk Division and the replacement of "SO$^{K}$" steam locomotives by "TE-2" permitted an increase in speeds and in weight of trains. The weight increase amounted to about 400 tons (65). In 1955 Orsk enginemen ran about 10,000 heavy-duty trains and transported 6,000,000 tons of freight over and above the norm. This figure doubled the 1954 record (66).

In 1956, train weight loading norms were increased after the delivery of high powered "TE-3" diesel locomotives (67). In one month (July 1956) diesel locomotive enginemen of the Orsk Division shipped about 1,500,000 tons of freight in excess of norms (68).

In August 1956 diesel locomotives of the Orsk diesel locomotive enginehouse hauled 375 heavy trains, and in September 1956 - 609 trains. A particularly large number of heavy-weight trains was hauled from Aydyrlya Railroad Station via Gudron, Orsk to Kuvandyk.

A "TE-3" diesel locomotive hauled a 5,300 ton train from Aydyrlya exceeding the speed norm by 3.5 km. It also completed two runs in one day without stops at the Aydyrlya turnaround enginehouse, making 954,000 ton/km. This example was followed by other diesel locomotive enginemen, who hauled trains with over 5,000 tons in weight. In October 1956 a number of enginemen from Orsk were hauling not only double-weight trains, but also with an additional 1,000 or more tons of freight (69).

In spite of very difficult winter conditions on the Orsk - Aydyrlya section, diesel and steam locomotive enginemen of Orsk enginehouse transported about 400,000 tons of freight above the norm in heavy trains in a month (70).

a. [redacted]

1. [redacted]

1. Gudok, 1 Feb 55, p. 2
2. Ibid.
3. Ibid.
4. Ibid.
5. Ibid.
6. Ibid.
7. Ibid., 6 Nov 56, p. 3
   Ibid., 12 Jul 57, p. 3
8. Ibid., 1 May 56, p. 3
9. Ibid., 28 Oct 55, p. 1
10. Ibid.
11. Ibid., 19 May 56, p. 3
12. Ibid., 6 Nov 56, p. 3
13. Ibid., 1 May 56, p. 3
    Ibid., 19 May 56, p. 3
    Ibid., 1 Sep 56, p. 1
    Ibid., 15 Sep 56, p. 1
    Ibid., 6 Nov 56, p. 3
14. Ibid., 10 Sep 57, p. 3
15. Promyshlennaya Ekonomicheskaya Gazeta, 17 Jun 56, p. 1
16. Gudok, 12 Jul 57, p. 3
17. Railroad Transport, No. 9, 1956, p. 16
18. Gudok, 12 Jul 57, p. 2
19. Ibid., 21 Aug 56, p. 3

20. Gudok, 21 Mar 57, p. 3

21. Ibid., 12 Jul 57, p. 3

22. Electric and Diesel Traction, No. 2, 1957, p. 2

23. Gudok, 12 Jul 57, p. 3

24. Ibid.

25. Ibid.

26. Ibid.

27. Ibid.

28. Ibid., 10 Sep 57, p. 3

2. Orsk - Nikel'-Tau Section

29. Ibid., 10 Jan 56, p. 3

30. Ibid.

31. Tariff Guide, 1954, p. 362

32. Railroad Transport, No. 6, 1955, p. 21

33. Ibid.

3. Orsk - Aydyrlya Section

34. Ibid.

Gudok, 28 Oct 55, p. 1

35. Ibid., 24 Oct 56, p. 1

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37. Railroad Transport, No. 6, 1955, p. 21

38. Ibid

39. Gudok, 18 Nov 55, p. 3

40. Ibid., 25 Nov 55, p. 3

41. Ibid., 1 Feb 55, p. 2

42. Railroad Transport, No. 5, 1955, p. 21

43. Rail. Transport, No. 7, 1956, p. 10

44. Gudok, 6 Nov 56, p. 3

4. Orsk - Kinel' Line

45. Ibid., 12 Jul 57, p. 3
46. Ibid., 10 Jan 56, p. 3
47. Ibid.
48. Ibid., 1 Jan 57, p. 2
49. Ibid., 1 May 56, p. 3
50. Ibid.
51. Ibid., 10 Apr 57, p. 3
52. Ibid., 10 May 56, p. 2
53. Ibid., 31 Aug 56, p. 3
54. Ibid.
55. Ibid., 20 Sep 56, p. 1
56. Gudok, 1 Dec 56, p. 1
57. Gudok, 12 Jul 57, p. 3
58. Ibid.
59. Ibid., 31 Aug 56, p. 3
60. Ibid., 1 Dec 56, p. 1
61. Ibid., 1 May 56, p. 3; Vechernyaya Moskva, 30 Jul 55, p. 1
62. Leningradskaya Pravda, 11 Nov 56
63. Ibid.
64. Ibid., 18 Jul 57, p. 3

5. Haulage of Heavy Trains

65. Gudok, 11 Jan 56, p. 3
66. Ibid., 10 Jan 56, p. 3
67. Ibid., 6 Nov 56, p. 3
68. Ibid., 11 Aug 56, p. 1
69. Ibid., 5 Oct 56, p. 1
70. Ibid., 12 Jan 56, p. 1

C. Ural'sk Division

1. Ozinki - Ural'sk; Ural'sk - Kazakhstan - Iletsk sections.

On the Ural'sk Division diesel traction was introduced with the delivery of diesels to the Ural'sk enginehouse in 1953 (1). By July 1955 diesel locomotives had completely replaced steam on the division and the Ural'sk enginehouse was re-constructed for the repair of diesel locomotives (2).

The Ural'sk base diesel locomotive enginehouse had turn-around points in Ozinki, which is the bordering station with the Volga Railroad (3), and in the enginehouse of Kazakhstan station (4), which received diesel locomotives in 1954 (5) and evidently is another base enginehouse (6). The Ural'sk - Ozinki stretch is 130 km long, the Ural'sk - Kazakhstan - 118 km (7).

Another base diesel locomotive enginehouse was organized at Iletsk station in 1954*. Extensive work was started in the development of roadway and trackage of this ever growing railroad junction, which passes freight trains from Volga and Kuybyshev systems to Tashkent Railroad (9).

The introduction of diesel traction on the Ural'sk division boosted the weight norms of trains by 300 tons. In 1954 diesel locomotive enginemen transported additionally over 2,000,000 tons of freight or about 12 times as much as in 1950, when steam locomotives operated on the division (10). But the utilization of diesel locomotives on the Ural'sk division was poor during 1954 and improvements were made only in 1955. Thus, in 1954 diesel locomotives of the Ural'sk enginehouse met their trip quota only 89.5 per cent and their quota for average daily runs by 86.8 per cent, mainly because of excessively long standing time at the turnaround points (11). In 1954 the standing time of diesel locomotives in running gear repair at the Ural'sk enginehouse was exceedingly above the norm (12).

In 1955 the performance of locomotives was much better. The standing time in repair did not exceed the norms, and the cost of repair was reduced (13). The Ural'sk enginehouse was equipped with instruments, machinery and spare parts (14). Personnel was well trained and the organization of labor was very efficient. The repair of diesel locomotives was of high quality (15), and the repair plan was being surpassed (16).

*No preparations were made for the organization of a repair base there (8).

In 1955 diesel locomotives of the Ural'sk enginehouse operated according to the "ring" method on the Ural'sk - Kazakhstan - Ural'sk - Ozinki - Ural'sk operating runs, covering 496 km without stops for locomotive servicing. The entire run was made sometimes by one crew without servicing at Kazakhstan or Ozinki turnaround enginehouses. About seventy per cent of locomotives were serviced without entering shops of the turnaround enginehouses (17). Use of the "ring" method of operation permitted to speed up diesel locomotive turnaround by 4.5 hours, and the average daily run was boosted by 108 km; simultaneously the locomotive operational park was reduced twenty per cent and a considerable amount of fuel was saved (18).

In January 1955 the average daily run norm of diesel locomotives was exceeded by 6.5 km per hour. In February 1955 diesel locomotives made the Ural'sk - Kazakhstan run in four hours less than previously and increased their average daily run by 94 km, releasing more than one fourth of the locomotives ordinarily making this run (19). In 1955 the average diesel locomotive daily run at the Ural'sk enginehouse was 362 km (20).

In the first ten days of December 1955 about 158 heavy duty trains passed through the Ural'sk division of the Orenburg system carrying 35,000 tons of freight. In the next ten days the division passed 199 heavy trains and the average weight of trains increased by fifty tons. In addition to the norm the enginemen transported 52,000 tons of freight in the last ten days of December 1955(21).

In 1956 the performance of the Ural'sk division deteriorated. In the first quarter of 1956 the average daily diesel locomotive run of Ural'sk enginehouse was only 290 kilometers (22), or about 260 km less than the average daily run of diesel locomotives from Kagan enginehouse(23).

Complaints were made in August 1956 that delays occurred in the re-equipping of the Iletsk enginehouse for servicing diesel locomotives (24).

A new system of "non-personalized" handling of diesel locomotives was introduced on the Ural'sk division in July 1956 (25). The new method was based on the principle that locomotive crews were not registered, or attached to a diesel locomotive (26).

In 1955 the Kazalinsk - Iletsk section was an independent operational run, which could not use a "ring" system of operation. Nevertheless the locomotive turnaround on that section was speeded up by 1.4 hour, and the average daily run increased by 28 km (27). As a result, the locomotives were used more productively and fewer locomotives were used to handle the same amount of traffic (28).

Chirikov, Chief of the Economic-Planning Department of the Orenburg System, suggested some changes in diesel locomotive operation on this section. He criticized the existence of two base enginehouses, one at Iletsk and another at Kazakhstan (as mentioned before), each of them servicing only one run, which increases daily operational expenditures by 1,500,000 rubles. He suggested to speed up the construction and completion of the enginehouse building at Iletsk instead of additional expenditures for repairs and equipping of facilities at the Kazakhstan enginehouse. These expenditures amounted to 2,000,000 rubles in 1955 (29).

The changes were made in 1956. The base enginehouse at Kazakhstan transferred its diesel locomotives to the Ural'sk enginehouse and the operational runs were changed. The locomotives of the Ural'sk enginehouse started operating on two runs: Ural'sk - Kazakhstan - Iletsk, a distance of 253 km, and Ural'sk - Ozinki (Volga System), a distance of 130 kilometers. Six diesel locomotive crews were necessary to make a full 800-kilometer operating "ring" system run (30).

The new system permitted to reduce the combined operating park of locomotives of the Ural'sk and Kazalinsk enginehouses by fifteen locomotives and to save 15,000,000 rubles. Since maintenance of all diesel locomotives was transferred to the Ural'sk enginehouse, the utilization and repair of locomotives has improved (31).

At first the new method of operation did not bring expected results. The average daily diesel locomotive run was 338 km in July 1956, rose to only 344 in August 1956 (32), and in September remained approximately the same. This happened because the introduced changes in operation were not followed by simultaneous changes in train schedules and locomotive turnaround time. As a rule the standing time exceeded the daily norm by 75 - 85 hours, which means that three to four additional locomotives had to be put in operation daily. Organization of locomotive crews work also was not improved. Special crews organized in connection with the new system were incomplete and had an insufficient number of mechanics, etc. Some of the maintenance duties were again assigned to locomotive crews which had neither time nor interest to take proper care of locomotives. Since the new system was introduced, the maintenance of diesel locomotives deteriorated and the between-train repairs increased six times. Fuel consumption per ton/kilometer increased four per cent (33).

In 1957, the new system of servicing diesels with shift crews improved operational indices; the average daily diesel locomotive run was increased by 40 - 50 km, the number of heavy trains doubled, and the average weight of a train increased by fourteen per cent (34). However, the performance of the Ural'sk enginehouse in the repair of diesel locomotives was rather poor. Thus, in January 1957, the norms for the standing time of diesels in running gear repair were exceeded by six days and the number of defective locomotives rose considerably (35).

As reported in June 1957, it was decided to retain a base enginehouse at the Iletsk station (36). The construction of diesel fuel tanks at the Kazakhstan station was canceled after the revision of the plan for the reconstruction of locomotive management facilities (37).

The railroaders of the Ural'sk enginehouse stated that they could handle about half of the running gear repair program of the entire Orenburg system, if one stall were lengthened, and a five-ton bridge crane, two rheostats and two-three machines were installed (38). But in September 1957, complaint was made that the Ural'sk diesel locomotive enginehouse was not prepared for 1957 winter operations. Moreover, no one was concerned about this fact, and the irresponsibility of the Chief of the enginehouse and other personnel was blamed. This enginehouse has a boiler shop, the reconstruction of which was lagging in September 1957. The repair of the inspection pit was not started at that time either. The roofing of the running gear repair shop was not completed (39).

Servicing facilities for diesel locomotives at Ozinki turnaround point were not adequate either; the stalls at the enginehouse were not fit for operations in winter conditions; electric lighting was poor (40).

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C. Ural'sk Division


1. Gudok, 8 Oct 55, p. 3
2. Kazakhstanskaya Pravda, 31 Jul 55, p. 1
3. Gudok, 24 Nov 54, p. 1
4. Ibid., 9 Apr 55, p. 3
5. Ibid., 8 May 55, p. 3
6. [redacted]nsport, No. 6, 1955, p. 21
7. Tariff Guide, 1954, pp. 300 - 303
8. Gudok, 8 May 55, p. 3
9. Ibid., 1 Feb 55, p. 2
10. Ibid., 9 Apr 55, p. 3
11. Kazakhstanskaya Pravda, 3 Mar 55, p. 1
12. Gudok, 8 Oct 55, p. 3
13. Ibid.
14. Ibid.
15. Ibid.
16. Ibid., 18 Nov 55, p. 3
17. Gudok, 9 Apr 55, p. 3
    Ibid., 3 Aug 55, p. 1
18. Belen'kiy, 1956, p. 48
19. Kazakhstanskaya Pravda, 3 Mar 55, p. 1
20. "Methods", by Academy, 1957, p. 67
21. Gudok, 24 Dec 55, p. 1
22. "Methods", by Academy, 1957, p. 67
23. Railroad Transport, No. 7, 1956, p. 4
24. Gudok, 21 Aug 56, p. 3
25. Ibid., 10 Oct 56, p. 3
26. Kazakhstanskaya Pravda, 12 Feb 57, p. 2
27. Gudok, 3 Aug 55, p. 1

28. Gudok, 18 Nov 55, p. 3
29. Railroad Transport, No. 6, 1955, p. 21
30. Gudok, 10 Oct 56, p. 3
31. Kazakhstanskaya Pravda, 12 Feb 57, p. 2
32. Gudok, 10 Oct 56, p. 3
33. Ibid.
34. Kazakhstanskaya Pravda, 12 Feb 57, p. 2
35. Electric and Diesel Traction, No. 2, 1957, p. 3
36. Gudok, 21 Jun 57, p. 3
37. Ibid.
38. Ibid., 12 Jul 57, p. 3
39. Ibid., 10 Sep 57, p. 3
40. Ibid., 14 Aug 57, p. 3

D. Gur'yev Division

1. Kandagach - Shubar-Kuduk - Sagiz - Makat Line

Diesel locomotives were first introduced on Gur'yev division in 1954 when they were sent to the Shubar-Kuduk enginehouse (1). By February 1956 the entire Kandagach - Makat stretch (393 km) was using diesel locomotives (2).

The Kandagach - Makat line is made of three operating runs: Kandagach - Shubar-Kuduk (86 km), Shubar-Kuduk - Sagiz (169 km), and Sagiz - Makat (138 km) (3). The dieselization of the Sagiz - Makat section alone resulted in savings of 7,500,000 rubles and released steam locomotives of the Makat enginehouse (4).

When diesel locomotives appeared at the Shubar-Kuduk in 1954, the enginehouse was not prepared for their maintenance and repair (5). The situation did not improve by 1956. During the 1956 winter season the Shubar-Kuduk diesel locomotive enginehouse was roofless and the repair of diesel locomotives was performed outside (6).

In consequence of existing conditions diesel locomotives of the Shubar-Kuduk enginehouse had an excessively long repair time exceeding norms about four times (7). A certain number of diesel locomotives had to be sent for repair to other enginehouses of the Orenburg system (8). Diesel locomotives of Shubar-Kuduk enginehouse for instance, were sent to the Chelkar diesel locomotive enginehouse for repairs (9).

In 1957 (reported in September 1957) a considerable number of enginehouse premises still lacked roofs, doors and windows. Diesel locomotives were repaired amidst junk and trash accumulated in the enginehouse yards. There was a complaint that the chief of the enginehouse does not feel responsible for the fact that only one out of three repair shops of the Shubar-Kuduk enginehouse was fit to carry out the repair of diesel locomotives during the coming winter season (10).

Diesel locomotive enginemen of the Shubar-Kuduk enginehouse operate diesel locomotives to Kandagach station in one direction and to Makat station in another direction (11). Makat and Kandagach enginehouses served as turnaround points for Shubar-Kuduk diesel locomotives (12).

The organization of diesel locomotive operations on the Shubar-Kuduk - Makat line, which is a single track line, was compared as identical to the system used on Gudermes - Prokhladnaya line of Ordzhonikidze system. The latter has been described in detail in a separate chapter dealing with the Ordzhonikidze system (13).

In spite of a lack of an automatic block system and centralized switch control on the Gur'yev division it became possible to lengthen the operating runs of locomotives. When the Shubar-Kukuk enginehouse was switched to diesel traction, the turnaround enginehouse was organized on the Shubar-Kuduk - Makat stretch with the crew shifts on Sagiz - Makat sections (14).

These operations are performed in the following manner: each diesel locomotive is handled by three crews, the first one drives it from Shubar-Kuduk to Sagiz station, from where the second crew (living permanently at Sagiz) runs it to Makat, where it picks up the opposite direction train and proceeds without rest back to Sagiz. In Sagiz, the second crew (already rested) takes over and proceeds to Shubar-Kuduk. In Shubar-Kuduk the diesel locomotive and the train are taken over by the third crew, which proceeds to Kandagach, and then returns to Shubar-Kuduk for servicing (15).

Thus, at the main enginehouse stops were made only for technical inspection and scheduled repairs. The total length of the operating run was 788 km (16). This system has greatly improved the utilization of diesel locomotives (17). It increased the average daily diesel locomotive run from 286 km (18) to 500 km (19). Diesel locomotives of the Shubar-Kuduk enginehouse were 85 per cent of their operating time in movement, which was an excellent performance for a single-track line (20).

The best enginemen proved that diesel locomotives could make 800 to 1,000 km daily. The average daily productivity was 1,000,000 ton/km per each locomotive of Shubar-Kuduk enginehouse (21).

The railroaders of the Gur'yev division pledged to fulfill the 1956 plan ahead of time. The daily performance was to be raised by 230,000 ton/km in excess of the norm, and at least 1,000,000 tons of excess freight had to be shipped in heavy trains (22). The weight of freight trains was increased by 200 to 300 tons over the norm in 1957 (23). However, speed restrictions were enforced on stretches with a total length of over 60 km out of the 168 km long Shubar-Kukuk - Sagiz section alone. As a result, the average speed dropped from 39 km to 37 km per hour (24).

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D. Gur'yev Division

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   Kazakhstanskaya Pravda, 31 Jul 55, p. 2
2. Gudok, 4 Feb 56, p. 3
   Railroad Transport, No. 8, 1956, p. 16
   Ibid., No. 5, 1956, p. 22
3. Tariff Guide, 1954, pp. 360 - 364
4. Railroad Transport, No. 8, 1956, p. 16
5. Gudok, 8 May 55, p. 3
6. Ibid., 10 Sep 57, p. 3
7. Railroad Transport, No. 8, 1956, p. 17
8. Gudok, 10 Sep 57, p. 3
9. Ibid., 26 May 56, p. 3
10. Ibid., 10 Sep 57, p. 3
11. Ibid., 25 May 56, p. 1
12. Ibid.
13. Promyshlennaya Ekonomicheskaya Gazeta, 9 Sep 56, p. 2
14. Railroad Transport, No. 9, 1956, p. 14
15. Ibid., No. 8, 1956, p. 16
    Railroad Transport, No. 5, 1956, p. 22
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16. Gudok, 25 Mar 56, p. 1
17. Ibid., 4 Feb 56, p. 3
18. Gudok, 25 Mar 56, p. 1
19. Railroad Transport, No. 9, 1956, p. 14
20. Railroad Transport, No. 9, 1956, p. 14
21. Gudok, 25 Mar 56, p. 1
22. Ibid.
23. Kazakhstanskaya Pravda, 26 May 57, p. 1
24. Gudok, 4 Oct 56, p. 4

E. Kandagach - Dzhusaly Line

1. General Information on dieselization, runs and enginehouses

During the 1950 - 1953 period the 791 km Kandagach - Dzhusaly line was switched to diesel traction (1). In the beginning both steam and diesel traction were used on some sections of this main route of the Orenburg system, but since 1955 they were entirely transferred to diesel traction (2) and the line is now operated by powerful diesel locomotives (3). After the transfer to diesel traction the line was divided into nine runs, with three base and six turnaround enginehouses (4).

The runs are as follows:

| | |
|---|---|
| Kandagach - Emba | 98 km |
| Emba - Kotr-Tas | 87 km |
| Kotr-Tas - Chelkar | 88 km |
| Chelkar - Tuguz | 85 km |
| Tuguz - Saksaul'skaya | 80 km |
| Saksaul'skaya - Aral-Kum | 91 km |
| Aral-Kum - Kazalinsk | 89 km |
| Kazalinsk - Tyura-Tam | 95 km |
| Tyura-Tam - Dzhusaly | 78 km (5). |

The base enginehouses were located at Emba (6), Chelkar (7), and Kazalinsk stations (8).

The following stations served as turnaround points: Kandagach, Kotr-Tas, Tuguz, Saksaul'skaya, Aral-Kum and Tyura-Tam. All these short operating runs of the Kandagach - Dzhusaly route were equipped with an automatic block system already in 1955. Radio train control system is used on the Kandagach - Tuguz section (9).

In 1956 the Institute of Complex Transportation Problems carried out calculations to determine the necessary length for diesel locomotive operating runs on the Kandagach - Dzhusaly route of the Orenburg system. The existing runs ranged from 80 to 97 km. The consolidation of these two runs into one, and creation of points for shifting locomotive crews regarded as disadvantageous, because it would have resulted in idle standing of diesel locomotives at the turnaround points during rest periods of their crews. The latter would cause a decrease in the average daily locomotive run by at least 30 km and an increase in the operating locomotive park (10).

In 1955 about 30 per cent of diesel locomotives (operated by the best enginemen on the route) used the "ring" method of operations without stops at the main enginehouse.

After the introduction of diesel traction the standing time at the turnaround enginehouses was reduced by one hour. In 1955, the average daily diesel locomotive runs, which previously never exceeded 240 km, reached 350 km. A great number of enginemen were making up to 500 km daily (11).

2. Nikel'-Tau - Kandagach - Emba - Kotr-Tas sections

Diesel locomotives from the Kandagach enginehouse haul trains from Nikel'-Tau station, taking the train compositions driven to that point by diesel locomotives of the Orsk enginehouse, to Kandagach. Double-weight trains are used on the section (12). The Kandagach - Emba and Emba - Kotr-Tas have many difficult gradients, which result in very intensive operations (13).

The Kandagach enginehouse was to be reconstructed for servicing of diesel locomotives, but the work was interrupted by the Chief of the "Orenburgtransstroy" Trust who reassigned the construction workers to some other projects (14). In similar instance the re-equipping for diesel traction of Emba enginehouse had been delayed in 1956 (15).

3. Emba Diesel Locomotive Enginehouse

Diesel locomotives of the Emba enginehouse operate over the Mugodzharskiy Pass (Mugodzharskiy pereval) (16). The pass is located between [redacted] and Alabaz stations (17). The Emba diesel locomotive enginehouse uses "TE-2" type diesel locomotives (18). All locomotives are equipped with radio communication system (19). Since the route has a very difficult profile the tear-and-wear of diesel locomotives is high and the locomotives break down frequently (20). Nevertheless, the replacement of "SO$^{K}$" steam locomotives (with a pusher) by diesels permitted to boost the speed-excluding-stops by 4 km/hour, and the train weight by 200 tons (21), in spite of very difficult operating conditions on this section due to the topography of the roadway (22). There are plans to use the most powerful diesel locomotives on that section. However, "TE-1" pushers were used on the Kirgizskaya - Alabaz section in 1955 since "TE-3" locomotives were not yet available (23). The use of diesel pushers permitted an increase in weight norms by at least 250 to 300 tons, on the entire Kandagach - Dzhusaly route (24).

The use of diesel locomotives especially improved the operations in winter time (25). In some instances the quota of locomotive daily performance was exceeded by 100,000 to 200,000 ton/km (26).

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E. Kandagach - Dzhusaly Line

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   Railroad Transport, No. 5, 1956, p. 26
   Gudok, 4 Jan 56, p. 3
7. Ibid., 21 Aug 56, p. 3
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9. Railroad Transport, No. 6, 1955, p. 21
10. Metody, by Academy, Moskva, 1957, p. 71
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12. Gudok, 10 Jan 56, p. 3
13. Ibid., 8 May 55, p. 3
14. Ibid., 21 Aug 56, p. 3

15. Gudok, 21 Aug 56, p. 3
16. Ibid., 4 Jan 56, p. 3
17. Railroad Transport, No. 6, 1955, p. 21
18. Metody, by Academy, 1957, p. 73
19. Gudok, 5 Jun 55, p. 3
20. Metody, by Academy, 1957, p. 73
21. Railroad Transport, No. 5, 1956, p. 26
22. Ibid., No. 6, 1955, p. 21
23. Ibid.
24. Ibid.
25. Gudok, 4 Jan 56, p. 3
26. Ibid.

4. Chelkar division

The first diesel locomotives arrived at the Chelkar division in 1951 (1) and were assigned to the Chelkar enginehouse (2) where they replaced "SO^KH" steam locomotives (3). The locomotives of the Chelkar diesel locomotive enginehouse operate on the 344 km Kotr-Tas - Chelkar - Tuguz -- Saksaul'skaya - Aral-Kum line (4).

The most difficult section of the line serviced by the Chelkar base enginehouse extends from Tuguz to Chelkar. It has many curves and grades (5), creating very difficult operational conditions (6).

a. Chelkar enginehouse

When diesel locomotives were delivered to the Chelkar enginehouse, it was not prepared for their maintenance (7). The enginehouse lacked the most necessary instruments and spare parts. The time for repair of diesel locomotives was three to four times longer than the established norm and the quality of repair was low (8). The repair facilities had to be reconstructed* without interruptions in operations. The personnel was sent partly to Khar'kov plant and partly to other diesel locomotive enginehouses to acquire the necessary experience (10).

By 1955 the Chelkar diesel locomotive enginehouse mastered the skill of adequate repair of diesel locomotives and higher programs were taken over; the running gear repair of a diesel locomotive was completed in six days, instead of twelve days, as established by the norm in September 1955 (11). In spite of the fact that the enginehouse was well equipped by 1955 for the repair of diesel locomotives and was even rewarded for performance in the second and third quarters of 1955, there were many inadequacies (12). For example, diesel locomotives were sent for periodical repair to the Kandagach enginehouse, the facilities of which are inferior to Chelkar enginehouse. In one case, a diesel locomotive was in repair thirteen days, instead of four. Such cases were numerous (13).

The running gear repair shop at the Chelkar enginehouse has a high ceiling, is spacious and well lighted (14); the shops had two specialized groups of mechanics engaged in repair (15). About seven to eight persons were on the staff in the machine workshop alone (16).

*In 1956 the construction of diesel locomotive enginehouse at Chelkar was still in process and slowed down (9).

In 1956 the lack of spare parts, frequently hampered the performance of the repairmen. At one time the Chelkar enginehouse was short of traction motors, after repairing and replacing three motors on diesel locomotives from Shubar-Kuduk enginehouse. The stock was depleted and there was no hope to fill it with a new supply promptly (17). The Chelkar enginehouse was sending traction motors to Astrakhan' and other plants for general overhaul (18).

The organization of servicing facilities at the Chelkar enginehouse was such that diesel locomotives had to cover a mile to get a supply of sand; they proceed from the place of the basic servicing facilities to the coal yard where the sanding facilities are located (19).

b. Operations

The use of diesel traction had an advantageous effect on the operations of the Chelkar division, in spite of the fact that its diesel locomotives operated on short runs: Chelkar - Kotr-Tas, Chelkar - Tuguz (20)*. During the 1950 - 1955 period the cost of shipments on Chelkar division fell 56.3 per cent due to the use of diesel traction (21).

The replacement of "SO$^{k}$" steam locomotives by diesels on the runs serviced by the Chelkar enginehouse permitted to increase the speed-excluding-stops by 10.4 km/hour and simultaneously the increase of train weight by 400 tons (22). The average daily run of diesel locomotives was increasing from year to year since 1951. In 1952, the average daily run of Chelkar diesel locomotives was 260 km and by the end of 1955 it reached 388 km per day (23).

In 1955 the operations of diesel locomotives improved - which was partly due to a well organized repair base. All diesel locomotives of the Chelkar enginehouse were equipped with radio communication (25). In 1955 diesel locomotive enginemen of the Chelkar enginehouse shipped over 2,000,000 tons of excess freight in heavy trains (26).

During the Fifty Five-Year Plan period the daily performance of diesel locomotives of the Chelkar enginehouse was boosted three-fold (27). In 1955 the average performance was 1,000,000 ton/km daily (28). This figure was named as a goal for 1956 (29).

In March 1956 the average daily diesel locomotive performance was 500,000 ton/km, or three times better than the results achieved with steam traction (30). The railroaders of the Chelkar enginehouse pledged to complete the annual plan (1956) ahead of time and repeated again the pledge to

*Analyst's note: Evidently the Tuguz - Saksaul'skaya and Saksaul'skaya - Aral-Kum sections were operated by Saksaul'skaya enginehouse in 1955.

bring the diesel locomotives performance to 1,000,000 ton/km daily. They also decided to use the "ring" method of operations without stops at the main enginehouse, and to shorten the time spent at stops at turnaround points; to haul monthly 140,000 tons of freight in excess of the monthly quota and to carry out all their pledges with a smaller diesel locomotive park (31). They pledged to exceed the 1956 shipment plan by at least four per cent and to save 500,000 rubles (32). The runs of diesel locomotives between running gear repairs was to increase to 200,000 kilometers, and the consumption of fuel was to reduce by one per cent. The time spent for running gear repair was to be speeded up by one day below the norm(33).

During the first ten days of April 1956 the average daily run of diesel locomotives was 394 km, and by the end of April it frequently reached 500 km (34). At that time from 80 - 100 per cent of diesel locomotives were operating on the "ring" method, without stops at turnaround enginehouses (35).

By June 1956, some diesel locomotive enginemen of the Chelkar enginehouse brought the daily performance of each diesel locomotive to 560,000 - 700,000 ton/km (36). In 1956 the Chelkar enginemen ran 279 heavy duty trains and transported 52,000 tons of freight over the norm (37), as well as economized 47 tons of diesel fuel (38). During this year the run of diesel locomotives (at Chelkar enginehouse) between running gear repairs was 200,000 kilometers. The norm was 160,000 km (39).

But the lack of spare parts continued in 1956. This happened because with the use of diesel traction, the funds allotted for spare parts in 1956, were cut down to 225,000 rubles and for construction materials to 19,000 rubles. When steam traction was used by Chelkar enginehouse in 1949, the funds allotted for spare parts were 352,000 rubles, and for materials - 49,000 rubles (40), which exceeded the sums given in 1956. This reduction in funds was quite unreasonable, because spare parts for diesels are much more expensive than steam and there was, and is a considerable shortage of them within the entire Orenburg system (41).

In September 1956 a reorganization of the train operation took place. This was done in connection with the dieselization of the main line of the system (42).

This reorganization came into effect on 20 September 1956. It consisted of lengthening of operational sections and organization of crew-shift points. The entire diesel locomotive park of Saksaul'skaya enginehouse was transferred to the Chelkar enginehouse, which became the base enginehouse for the entire stretch. Now the Chelkar enginehouse services a long run from Chelkar to Saksaul'skaya and two short runs: Chelkar - Kotr-Tas and Saksaul'skaya - Aral-Kum (43).

Diagram No. 1 shows the system of operations prior to changes of 20 September 1956. It shows that diesel locomotives of the Chelkar enginehouse serviced freight traffic on short runs: Chelkar - Kotr-Tas (88 km) and Chelkar - Tuguz (82 km long). Diesel locomotives of the Chelkar station were completing two to three "rings" before returning to the Chelkar enginehouse for servicing. Diesel locomotives of the Saksaul'skaya enginehouse operated in the same way (44).

Diagram No. 2 shows the turnaround of diesel locomotives, which was introduced in September 1956: a diesel locomotive is leaving the base enginehouse at Chelkar with a train routed eastward to Aral-Kum. In Aral-Kum diesel locomotives are coupled to trains going westward to Kotr-Tas. At Kotr-Tas diesel locomotives are coupled to trains going eastward to Chelkar, where they proceed to the enginehouse for fueling, lubricating, sanding and technical inspection. Thus, the "ring" run is completed. By-passing intermediate enginehouses the entire run of the diesel locomotive amounts to 700 kilometers. The convenient location of the Chelkar enginehouse permits fast servicing of diesel locomotives without additional trips to receiving-departure yards of the station (45). Both diagrams are attached in the appendix.

Evidently the change in the traffic movement brought expected results. V.M. Terekhov, First Deputy Chief of the Main Administration of Locomotive Management noted the efficient performance of the Chelkar diesel locomotive enginehouse and pointed it out as an example to be recommended and followed (46).

E. Kandagach - Dzhusaly Line

4. Chelkar Division


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2. Ibid., 16 Nov 52, p. 1
   Ibid., 24 Aug 55, p. 3
   Ibid., 26 May 56, p. 3
   Kazakhstanskaya Pravda, 31 Jul 55, p. 2
3. Railroad Transport, No. 5, 56, p. 26
   Gudok, 26 May 56, p. 3
4. Electric and Diesel Traction, No. 2, 1957, p. 17
5. Gudok, 14 Mar 57, p. 3
6. Ibid., 8 May 55, p. 3
7. Ibid., 26 May 56, p. 3
8. Ibid.
9. Ibid., 21 Aug 56, p. 3
10. Ibid., 26 May 56, p. 3
11. Ibid.
12. Ibid., 18 May 55, p. 3
13. Ibid., 18 Nov 55, p. 3
14. Ibid., 26 May 56, p. 3
15. Ibid.
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17. Ibid.
18. Ibid.
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20. Electric and Diesel Traction, No. 2, 1957, p. 17
21. Railroad Transport, No. 6, 1955, p. 20
22. Ibid., No. 5, 1956, p. 26

23. Gudok, 13 May 56, p. 1
24. Ibid., 5 Jun 55, p. 3 (photo)
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28. Ibid.
29. Ibid., 27 Mar 56, p. 1
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30. Ibid., 27 Mar 56, p. 1
31. Ibid.
32. Ibid.
33. Ibid.
34. Ibid., 13 May 56, p. 1
35. Ibid.
36. Railroad Transport, No. 6, 1956, p. 15
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39. Ibid.
40. Ibid., 12 July 57, p. 3
41. Ibid.
42. Electric and Diesel Traction, No. 2, 1957, p. 17
43. Ibid.
44. Ibid.
45. Ibid.
46. Ibid., p. 3

5. Kazalinsk Division

Diesel locomotives were first introduced on the Kazalinsk division in 1953 (1), when mixed steam and diesel traction was used (2). Only in the beginning of 1955 the division was transferred entirely to diesel traction (3). There is a base diesel locomotive enginehouse in Kazalinsk (4).

a. Kazalinsk enginehouse

The construction of a diesel locomotive enginehouse at Kazalinsk was started in 1952, but in 1956 was not yet completed (5), and the work continued in 1957. The Kazalinsk diesel locomotive enginehouse performs running gear repair of "TE-2" diesel locomotives for a number of enginehouses on the Orenburg system (6).

In 1957 the administrators of the Orenburg system planned to organize an additional repair center for diesel locomotives at Kazalinsk with the purpose to ease up the repair operations of the Orsk enginehouse and to expand repair facilities for "TE-3" diesel locomotives. The running gear repair shop in Kazalinsk was due to be put in operation by 1 September 1957, but the construction work has not been completed (7). Moreover, the shop was far from ready. It lacked a floor and window glass and the construction of tire lathe foundations was started only in September 1957. The reconstruction of auxiliary units of the shop advanced very slowly. The assembly work was also lagging, due to lack of some parts (8). The administrators of the enginehouse complained about the shortage of construction materials. Some materials were shipped by mistake to other places (for example tiles were left piled at the Chelkar station), where they were destroyed or damaged. Administrators of various departments of the railroad were blamed for inability and mismanagement (9).

b. Operations of Kazalinsk enginehouse

The Kazalinsk enginehouse used "TE-2" diesel locomotives for operations in 1956 (10). In 1955 it operated two short runs: Kazalinsk - Aral-Kum (89 km) and Kazalinsk - Tyura-Tam (95 km) (11). Diesel locomotives of Dzhusaly enginehouse operated only on one 78 km run from Tyura-Tam to Dzhusaly (12). The adjoining section, from Dzhusaly to Kzyl-Orda, which belongs to the Tashkent system, was operated by steam traction in 1955 (13).

The introduction of diesel traction on the Kazalinsk division proved to be economical (14). Following table gives a comparison of operational indices for the Kazalinsk - Dzhusaly and Kazalinsk - Saksaul'skaya sections in 1956 and 1952, when steam locomotives were used (15).

| Operational Indices | 1952 | 6 months of 1956 | in per cent to 1952 |
|---|---|---|---|
| Average weight of a freight train in tons | 1,473 | 1,735 | 118 |
| Speed-excluding-stops, in per cent | 100.0 | 125.5 | 125.5 |
| Total turnaround in hours | 23.4 | 9.1 | 34.6 |
| Average daily run in km | 260.8 | 407 | 156.5 |
| Number of heavy trains | 1,390 | 8,702 | by 6.3 times |
| Average increase in weight of a heavy-duty train compared to a regular train, in tons | 150 | 278 | 185.3 |
| Number of locomotives in operation, in per cent | 100 | 56 | 56 |

(16)

Although diesels were in operation since 1953, the schedules of locomotive operations made up for steam traction, remained unchanged for a considerable time (17). The schedules for turnaround time of locomotives amounted to four or five hours, and exceeded the turnaround norms (18). In 1954 the average turnaround time of diesels was 3.5 hours (19), and the haulage of heavy-duty trains doubled. During 1954 diesel locomotive enginemen ran 2,592 heavy trains and transported 677,000 tons of freight above the plan (20).

In 1955 the average turnaround time in enginehouses was further reduced and amounted to 2.5 hours (21). The schedules for train departures, however, were fulfilled only 80 - 85 per cent, the passing of trains - 85 and 90 per cent (22). It has been calculated that the increase in standing time of diesels at stations interrupted traffic schedules in amount equal to five or six diesel locomotives off the operational park (23).

In January 1956 diesel locomotive enginemen of the Kazalinsk division speeded up the locomotive turnaround by 1.4 hour over the norm, and accelerated the average daily diesel locomotive run by 41 km over the norm (24). A pledge was made to increase the locomotive run between running gear repair by 5,000 km for freight and by 30,000 km for passenger locomotives (25). The norm for locomotive runs between two running gear repairs was 200,000 km, and some enginemen intended to increase to 300,000 km (26).

In the first semi-annual period of 1956 the average turnaround time of diesel locomotives was 1.9 hours (27). In September 1956 the average turnaround time at Aral-Kum and Tyura-Tam stations was two hours, while the time spent for the trip from Kazalinsk to Aral-Kum and from Kazalinsk to Tyura-Tam was not exceeding 2.5 to three hours (28).

Suggestions were made to change the method of operations. It was stressed that from the point of view of economy it would be expedient to eliminate the turnaround engine-house at Tyura-Tam and organize the operations of the Kazalinsk diesel locomotives on the entire 173 km Kazalinsk - Dzhusaly line (29). This suggestion was made in 1955. And in 1956 it was repeated, and even some action was taken to the effect. Plans were made to introduce centralized traffic control on the entire Kazalinsk - Dzhusaly line, also to lay third tracks at the turn-out sidings which had only two tracks (30). Calculations showed that the traffic speed would reach 80 km/hour. According to the plan the Tyura-Tam engine-house was to be closed. The crew operating on the Dzhusaly - Kazalinsk line would not rest at the turn-around enginehouse at Dzhusaly. In 1956 some operational test runs were carried out by shifting the crews on the short Kazalinsk - Aral-Kum operating run (31).

In fact, as revealed in 1957 sources, changes in the system of crew shifting were made (32). The so-called system of running diesel locomotives "without personal responsibility" was used on the entire Kazalinsk division (33). Although lack of personal responsibility for locomotives resulted in numerous damages to locomotives - the daily locomotive runs were boosted 20 per cent (34). After the changes took place the average daily diesel locomotive run was 476 km, as compared with 394 and 408 km achieved prior to the change (35). The performance efficiency rose, but the number of defective diesel locomotives increased sharply (36). The enginemen of Kazalinsk diesel locomotive enginehouse pledged to complete the annual shipment plan by November 7, 1957 and to economize five per cent of fuel (37).

c. Dzhusaly enginehouse

As mentioned before, the Dzhusaly enginehouse operated only one short 78 km run on the Tyura-Tam - Dzhusaly section (38), with adjoining section of the Tashkent system operated by steam traction (39).

The reconstruction of Dzhusaly enginehouse was started in 1953. In the first quarter of 1955 the building of workshop premises, of boiler shop, servicing facilities and electric power stations were basically completed. But the assembly was delayed and by the end of 1955, the installation of a transmission line to the enginehouse was not finished, the servicing facilities, like sanding and other, were not installed. Due to the lack of a bridge crane in the shops, diesel locomotives of Dzhusaly enginehouse had to be sent to other enginehouses for heavier repair (40). Suggestions were made at that time that diesel locomotives operating on the line, by-pass the main enginehouse during the entire period from one periodic repair to another, and be serviced only at the turnaround enginehouses. It has been also suggested that the servicing facilities at the turnaround enginehouses be better developed (41). Another suggestion was made concerning the operations of Dzhusaly enginehouse: that the Dzhusaly enginehouse be left as a base enginehouse, its operations organized on two runs, including the run which falls within the Tashkent system, i.e. the Dzhusaly - Kzyl-Orda stretch (42) or that the border between the Orenburg and Tashkent systems be transferred from Dzhusaly to Tyura-Tam station (43).

E. Kandagach - Dzhusaly Line

5. Kazalinsk Division

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5. Ibid., 21 Aug 56, p. 3
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10. Ibid., 5 Jul 56, p. 1
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12. Ibid., No. 6, 1955, p. 21
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## CHAPTER V. THE TURKESTAN - SIBERIAN SYSTEM

A. Mointy - Chu Line.

B. Chu and Sary-Shagan base diesel locomotive enginehouses.

## Chapter V

## Turkestan - Siberian System

The "Turksib" or Turkestan-Siberian system was included in the operating railroad network of the Soviet Union on 1 January 1931 (1). The Turksib system serves many industrial enterprises, such as the industrial complex of Alma Ata, chemical plant in Dzhambul, cement plant in Semipalatinsk, Bukhtarminsk and Kochagaysk hydroelectric power plants, and others (2).

The Turkestan-Siberian trunk line connects Siberia with Central Asia, passes through the territory of the Kazakh SSR, Kirgiz SSR, and the Altay Kray of the RSFSR (3).

The entire length of the system is 3,514 km (4). Diesel locomotives were used on the 438 km Mointy - Chu and 271 km Otar - Lugovaya lines in 1956 (5). It is planned to introduce diesel traction on the entire Turkestan - Siberian system (6). However, steam locomotives are still used on most lines of the system. In most cases they pull trains in double-headed traffic resulting in high cost of operation ranging from 20 to 22 rubles per train-km (7). The use of diesel locomotives would reduce the cost to 10 to 12 rubles per train-km (8).

### A. Mointy - Chu Line.

The newly constructed Mointy - Chu line (9) stretches across the arid Bet-Pak-Dala desert, Ala-Tau mountain ranges and the steppe of Pribalkhash (10). Thus the route from the capital of the Soviet Kazakh Republic in Alma Ata to the various industrial centers of the Republic (Karaganda, Balkhash, Dzhezkazgan) has been cut short by 1,500 km (11). It is the shortest route between the Karaganda coal mines, Siberia and Urals in the north and Central Asia in the south (12). The Mointy - Chu line was put in permanent operation on 25 October 1953 (13).

The diagram shows the location of the following stations (north to south): Mointy, Kara-Zhingil, Kovaly, Sary-Shagan, Kashen, Teniz, Myn-Aral, Chiganak, Kiyakhty, Khan-Tau, Zhideli, Berlak and Chu (14).

At the time of its competition the line included 14 passenger stations and two diesel locomotive enginehouses (15). The line was opened for traffic in October 1953 in a ceremony at Chiganak station (16), which was to become the major junction (17).

Photos of the Chiganak railroad station building (18), a diesel train on a line along the Balkhash Lake (19), a locomotive enginehouse on the Mointy - Chu line, and of the Sary - Shagan railroad station building are included in the appendix (20).

In 1956 a complaint was expressed that the newly constructed Mointy - Chu line was put in operation lacking proper diesel locomotive servicing facilities (21) [illegible] that "TE-1" and "TE-2" diesels operate on it (22).

Diesel traction was planned for the Mointy - Chu line from the very beginning. The construction of the line was carried out with the same objective. Diesel traction was used on the line when it was still under construction and when it was in temporary operation. Nevertheless, a considerable volume of construction-assembling work on locomotive management facilities was not completed when it was put in operation (23).

B. Chu and Sary-Shagan enginehouses.

There are two base diesel locomotive enginehouses on the Mointy - Chu line, one in Sary-Shagan, which was put in operation in the spring of 1954 (24) and the second at Chu station (25). Diesel locomotives of Chu enginehouse turnaround at Chiganak station (26).

When the line was put in operation in 1953, only the frame of the enginehouse building was completed at Chu. Servicing and repair of diesel locomotives had to be organized in a roofless building (27).

The Ministry of Transportation set 1 January 1956 as the new date for completion of this enginehouse. This was not accomplished and the construction has almost stopped in 1954 (28). Finally, in January 1955 the Chu diesel locomotive enginehouse was put in operation, but the official documentation listed about 100 incompleted details (29).

The enginehouse facilities for servicing of diesel locomotives at Chu and Sary-Shagan stations were still not completed by March 1955. Both enginehouses lacked many devices and were short in qualified repairmen (30).

Light and heavy maintenance repair of diesel locomotives was carried out at Chu enginehouse and only one stall was in operation. The working conditions were very poor and primitive (31). Due to a lack of sufficient number of stalls at the enginehouse, diesel were waiting for their turn for quite some time, thus increasing the unproductive time by 30 - 40 percent (32). In May 1956 the two enginehouses (one steam and one diesel) at Chu station were combined into one, because only very few steam locomotives remained in use (33).

It was reported in September 1957 that railroaders of Chu enginehouse invented a new automatic cooling system for diesel locomotives, which will improve their operations, reduce operational cost, and contribute to the safety of train traffic (34).

Diesel locomotives of the Sary-Shagan base enginehouse operate on the Sary-Shagan - Chiganak section, which has three up-grades (35). The construction of the enginehouse building at Sary-Shagan was basically completed when the Mointy-Chu line was put in operation in October 1953 (36). However, the shops had no stalls, no instruments or any other equipping devices, and no electricity. The enginehouse could not operate properly even when it got some equipment from the Chu steam locomotive enginehouse (37). Some time later, an electric mobile power plant was

sent to Sary-Shagan station, but its capacity was low and could not satisfy the necessities of the enginehouse (38).

In June 1955 the Sary-Shagan enginehouse was still not operating at full capacity (39). Locomotive servicing was inadequate due to defects in the structure of the enginehouse and shortage of tools, machine tools, spare parts and other equipment for the repair of diesel enginehouse (40). In 1955, the running gear repair was concentrated at Chu terminal while Sary-Shagan was to conduct only technical inspections (41).

In 1956 the construction of the Sary-Shagan enginehouse continued to lag because of lack of equipment (42). In late 1955 and 1956 the Turkestan-Siberian system gradually received improved technical facilities and a station radio communication and yard address system at three terminals (43).

In the first half of 1955, the hauling plan was surpassed on the system by 17.5 percent and the cost of hauling was reduced 8 percent (44). In 1955 two engineers of the Sary-Shagan division conducted technical and economic calculations and suggested a lengthening of operating runs (45). The construction of the Mointy-Chu line provided a servicing of diesel locomotives at two terminals: Chu and Sary-Shagan. The entire stretch was divided into three locomotive operating runs (46). However, diesel locomotives can make runs of 1,000 km without being serviced. The existing organization of traffic causes unproductive layovers of 14 hours per day in the Chu, Sary-Shagan, and Chiginak terminals, with daily locomotive runs not exceeding 350 km (47). It was suggested to abolish the Chiganak turnaround terminal, located between Chu and Sary-Shagan, and to operate locomotives directly from Chu to Mointy with a crew shift at Sary-Shagan. Such an organization of train movement would almost double the average daily run of locomotives and reduce the locomotive park (48).

This system of operation was subsequently introduced, but lasted only until the middle of September 1956, when the operating run on the Sary-Shagan - Chu section was divided again and the turnaround point at Chiganak station re-established. Diesel locomotives of the Sary-Shagan enginehouse service the section from Chiganak to Mointy (49), and the locomotives from Chu enginehouse service the Chu - Chiganak section (50).

There were several complaints about the poor training of diesel locomotive maintenance personnel in 1956 (51). In 1957 a technical school at Chu station undertook the training of personnel. Over 400 diesel locomotive enginemen and assistants were taking courses (52). Another school at Alma-Ata was also engaged in training railroaders in diesel locomotive maintenance and operation procedures (53).

TURKESTAN - SIBERIAN SYSTEM

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## CHAPTER VI

## AKTOGAY - GOSGRANITSA "DRUZHBA" LINE

A new railroad line connecting the USSR and the Chinese People's Republic is under construction (1). The railroad begins at Aktogay station of the Turkestan - Siberian system and extends to the future station named Erkhorlili (in Russian "Druzhba" which means friendship) in China (2). The entire line is often referred to as "Druzhba"(Friendship) Line (3).

The new trunk line will be 312 km long, or 308 km, according to another source (4).

This railroad will use diesel traction and it is expected that the newest types of diesel locomotives will operate there (5).

Topographically the line may be divided into three section (6). The first 126 km section will extend from Aktogay station to Tentek river, the rough sandy and uninhabited deserts; the second section will stretch from the Tentek river toward the south-eastern extremity of Alakul' Lake and through the foothills of Dzhungar Ala-Tau, rich and densely inhabited regions. The third 100 km section extends to the Dzhungarskiye Gate (Dzhungarskiye Vorota), where the Chinese part of the railroad begins. On the Chinese side, the railroad is being laid from Lan-chou to Urumchi (Tikhua) and Erkhorlili on the border. It is considered that the border. It is considered that the most favorable passage for the railroad at the Dzhungarskiye Gate is located between the Barly and Ala-Tau Mountain Ranges, where the narrowest place is 18-20 kilometers wide (7).

Over 100 roadway structures will be built on the new railroad. Three large bridges will be built over the Tentek, Dzhamanty and Dzhama-Utkul' Rivers. Seven new railroad stations with schools, dwelling houses and clubs will be erected (8). The names of some new stations were mentioned as Alakul', Koktuma, Dzhalanshkul' and Druzhba (9).

Aktogay station will be completely reconstructed. A diesel and steam locomotive enginehouses will be built at Aktogay, as well as many other facilities necessary for regular operation (10).

The new railroad will be equipped with centralized traffic control. Heavy-duty "R-50" type rails will be laid on ballast (11). The expectations are that speed-including-stops will exceed by 1-1 1/2 times the speed of the overall railroad network. Train traffic will be organized on operating runs of 300 km in length and an eight-hour continuous operation of crews (12).

Construction work has already been started by the "Turksibtrans-stroy" Trust (13). In September 1956 the earth bedswere prepared for three new tracks at Aktogay Station and on the main track of Aktogay-Vostochnyy (Aktogay-Eastern) station. The laying of rails has been started near Aktogay (14). Twenty-six dwelling houses for workers were built (15).

By 10 December 1956 earth work on 45 km of roadbed on the main line was completed (16). And the first shipment of heavy rails (to cover 50 km) has arrived from Nizhniy Tagil and Kuznetsk. These rails were calculated for the use of diesel traction (17).

Although the first 15 km on the main route were to be laid by New Year's day (18), a 10 km stretch was completed by 26 January 1957 (19). The laying of the main trunk line near Aktogay station was in full swing at that time (20).

A total of 2,000 workers were engaged in the construction of the new railroad line (21).

In December 1956 an 11 km branch line leading to a stone quarry was completed and was to be put into operation shortly (22). This stone quarry is located at the 16th km off the main trunk line (23).

The plans for 1957 included completion of the roadbed on the entire trunk line and the laying of rails on 150 km (24).

In 1957 the "Turksibtransstroy" Trust intended to complete 3,200,000 cubic meters of earth, prepare 206 km of earth-bed and lay 135 km of main line. A total of 9,000 cubic meters of concrete was to be used for road-way structures (25). In 1957 a concrete casting yard and a plant were built at the Aktogay industrial base for the productions of concrete structures (26). The bridge construction unit No. 5 was engaged in building bridges, culverts and other road-way structures along the Aktogay - Gosgranitsa line. In 1957 the unit was to erect 76 structures, including a large bridge (27). The most difficult part for the line construction is located between the 25th and 80th km of the route-way, abundant with moving sands, impassable in summer. In February 1957 the constructors were urged to complete earth work on that part in winter, the only time when such work may be accomplished (28).

In 1958 the construction of all roadway structures and the laying of rails must be completed and the operation of trains should be initiated* (29).

By 29 May 1957 the work on the earth-bed reached the 70th kilometer. Rails were laid on 55 km of the line and trains began operating on that section transporting construction workers, materials such as ballast, rail links and others (31). Steam locomotives were used during the construction (32). On the 54th kilometer of the line the construction of Sary-Kum turn-out point was in progress, as well as some dwelling houses (33).

At the end of May 1957 the first diesel locomotive arrived at the new railroad (34). The first diesel locomotive arrived at the completed rail section of "Druzhba" Line and was put in operation

*Note: As soon as the Aktogay - Gosgranitsa line is completed, the construction of Aktogay - Karaganda line will be initiated. Thus, the route from Moskva to Pekin will be shortened considerably (30).

for transportation of ballast and other construction materials on 15 June 1957 (35).

Two more diesel locomotives were reported to be on the way to Aktogay station (36). In June 1957 six diesel locomotives taken from the Kuybyshev, Karaganda and Tashkent systems, were sent to Aktogay - Druzhba line. Hope was expressed that the use of diesels will speed up the construction of the "Druzhba" railroad (37).

"Kazakhstanskaya Pravda", 26 June 1957, reported that work on the construction of "Druzhba" railroad was in full swing. The laying of the road-bed was carried out by the construction-assembling train No. 137. According to the 1957 plan, this train was to fill in 30,000 cubic meters of ballast and to lay 33 km of the line. This assignment was completed ahead of time and constructors pledged to lay rails and ties on 33 additional kilometers of the road-way by 7 Nov 57. Workers of train No. 137 were commended by the Ministry of Transport Construction for their successful achievements (38).

In June 1957, M. Kazybekov, chief of "Turksibtransstroy" Trust, reported that the construction of the Aktogay - Gosgranitsa line was in good progress (39).

The Aktogay - Gosgranitsa Line is the western section of the 2,781 km Lan-chou - Urumchi - Alma-Ata trunk line, which will be of great significance in the industrial and agricultural development of Sintsian and Gan'su provinces of China (40).

On the Soviet territory the Aktogay - Gosgranitsa railroad will be extended farther from Aktogay to Karaganda Railroad system (41).

The total length of this new line in China from Lan-chou to Gosgranitsa is 2,470 km, and in the USSR from Aktogay to Gosgranitsa is 311 km (42).

In June 1957 work on the construction of the line was in full swing. The earth road-bed was being laid on the desert sands and tracks laid on the 54th km. Earth digging machinery (19 excavators, bulldozers, tractors) have arrived at the railroad construction site (43). Mechanized operations were used for ballasting and laying tracks. A track unit assembly center ("zvonosborochnaya baza") was built with a capacity of assembling 3 km of trackage daily (44).

Construction of the railroad could be even more efficient if there were no lag in the supply of materials, which hampers the operations. There was lack of automobiles, electric power stations, cranes, and other equipment. The plants were short on delivery of construction material and equipment (45).

M. Kazybekov complained that the construction of the railroad was subordinated to four different main administrations located in Moskva, and Odessa, too far from the construction sites. He suggested that it would be much more efficient to move the Main Administration for Central Asia and Kazakhstan (Mintransstroy) to Alma-Ata (46). He also stated that it has become necessary to subordinate all railroad construction organizations to the administration of "Turksibtransstroy" Trust. Such a measure would raise efficiency and eliminate red tape which slows down the pace of construction. Other inadequacies hampering the construction were poor utilization of construction materials and equipment, and poor control over the quality of completed work (47).

In 1956 builders were to lay 135 km of trackage, reach Gosgranitsa in 1958 and open the servicing of trains on the entire railroad (48).

By the end of 1956 construction of the 1,000 km Lan-chou - Yumyn line, located on the Chinese territory, was completed. In June 1957 construction was in progress on the Yumyn - Urumchi (Tikhua) section. After opening of servicing traffic on the Aktogay - Gosgranitsa line, Soviet constructors will assist the Chinese to lay trackage up to Urumchi (Tikhua) city in China (49).

The volume of construction work has been accelerated constantly. However, there was a lack of experienced engineers (50).

In September 1957 construction of the Aktogay - Gosgranitsa line was going through the most difficult stage. It consisted of laying tracks through the Kara-Kum and Sary-Kum sandy areas located between Sasyk-Kul' lake and Ala-Tau mountain. Construction of the road-bed reached the 150th km, and 100 km of trackage have been already laid. Part of the completed line was recently placed in operation, thus permitting the delivery of construction materials to the construction sites (51).

Between September 1956 and September 1957, Aktogay station, formerly a small station, had become a large railroad junction (52).

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AKTOGAY - GOSGRANITSA "DRUZHBA" LINE

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2. Ibid., 30 Sep 56, p. 2.
3. Kazakhstanskaya Pravda, 29 May 57, p. 3. Hereafter cited as Kazakhst. Prav.
4. Gudok, 13 Dec 56, p. 2.
5. Ibid.
6. Ibid., 30 Sep 56, p. 2.
7. Ibid.
8. Ibid.
9. Kazakhst. Prav., 26 Jan 57, p. 2.
10. Ibid.
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12. Ibid.
13. Ibid.
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19. Kazakhst. Prav., 26 Jan 57, p. 2.
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26. Ibid.

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27. Str. Gaz., 5 May 57, p.3.

28. Kazakhst. Prav., 14 Feb 57, p. 3.

29. Gudok, 13 Dec 56, p. 2. Str. Gaz., 5 Jun 57, p. 1.

30. Kazakhst. Prav., 26 Jan 57, p. 2.

31. Ibid., 29 May 57, p. 3.

32. Str. Gaz., 5 Jun 57, p. 1.

33. Ibid.

34. Kazakhst. Prav., 29 May 57, p. 3.

35. Ibid., 15 Jun 57, p. 2.

36. Ibid., 29 May 57, p. 3.

37. Ibid.

38. Ibid., 26 Jun 57, p. 1.

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40. Ibid.

41. Ibid.

42. Ibid.

43. Kazakhst. Prav., 13 Jun 57, p. 3.

44. Ibid.

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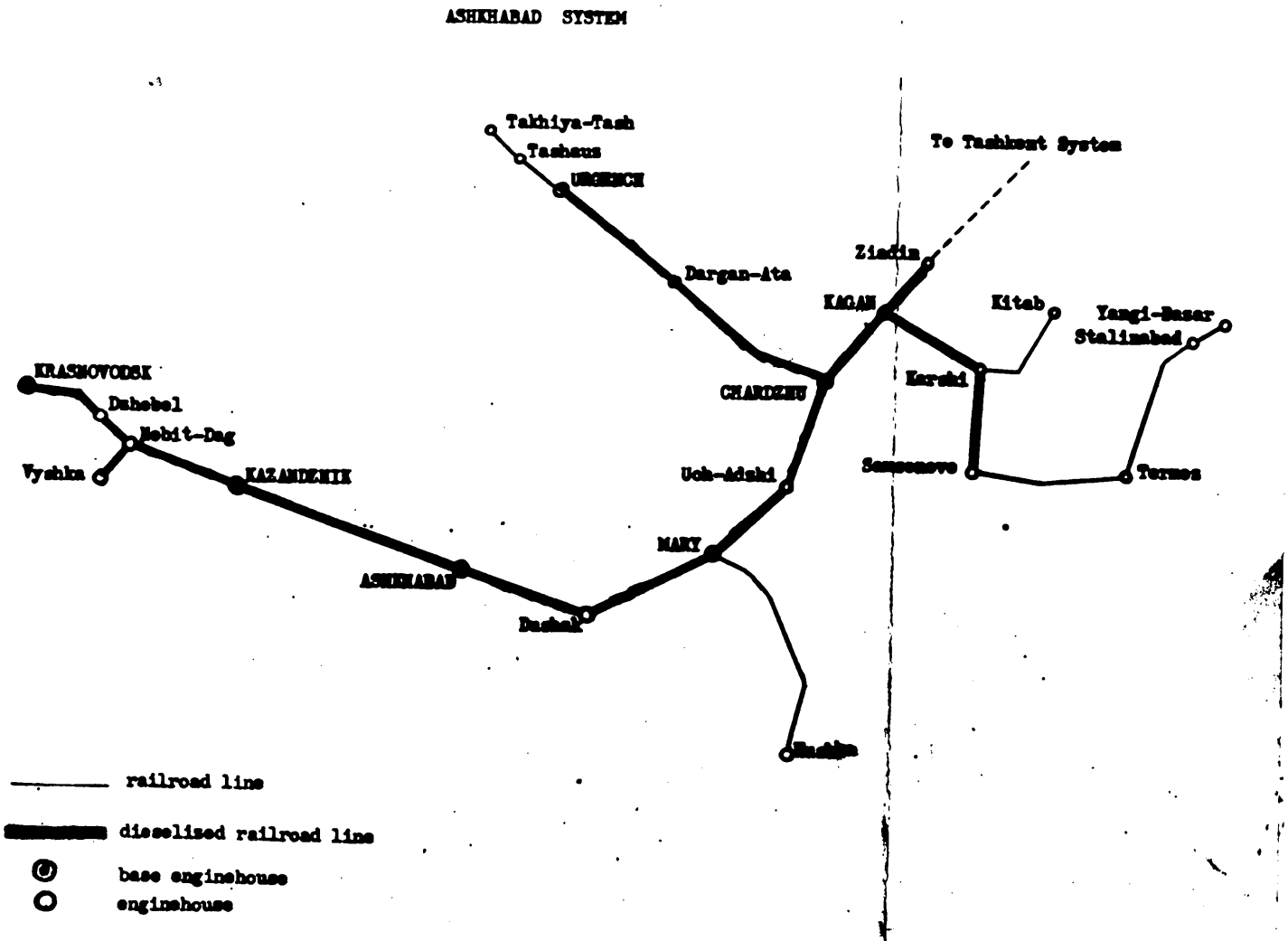


Fig. 1 - Map of Ashkhabad System

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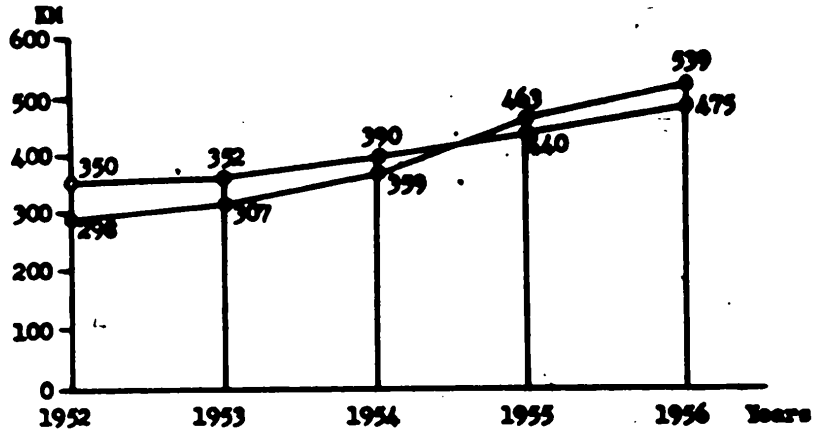


Fig. 2 - The diagram shows the average daily diesel locomotive runs on Ashkhabad system during 1952 - 1956 period, calculated in kilometers (Railroad Transport, No. 6, 1957, p. 66).

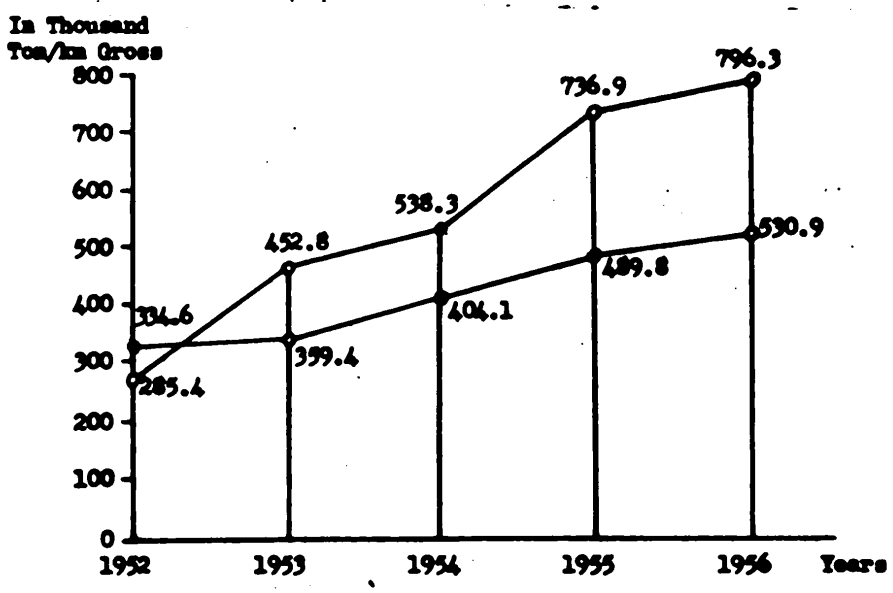


Fig. 3 - The diagram shows the productivity of one diesel locomotive of Kagan enginehouse of Ashkhabad system during 1952 - 1956 period, calculated in thousand ton/kilometers (Railroad Transport, No. 6, 1957, p. 68).

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Fig. 4 - Near Kagan locomotive enginehouse of Ashkhabad System.

Source: Gudok, 21 Aug 56, p. 3.

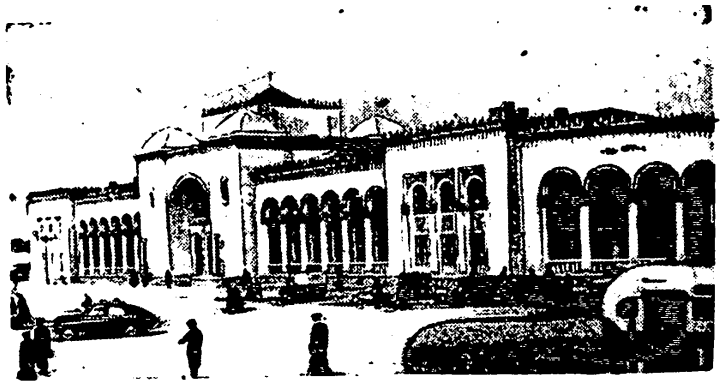

Fig. 5 - The view of the newly built railroad station building in Ashkhabad, its construction cost about 5,000,000 rubles.

Source: Turkmenskaya Iskra, 27 Jan 57, p. 3.

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Fig. 6 - At the assembling shop of the Ashkhabad diesel locomotive repair work shops.

Source: Turkmenskaya Iskra, 11 Jan [illegible], p. 1.

Fig. 7 - Near Krasnovodsk enginehouse.

Source: Turkmenskaya Iskra, 14 Mar [illegible], p. 1.

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TASHKENT SYSTEM

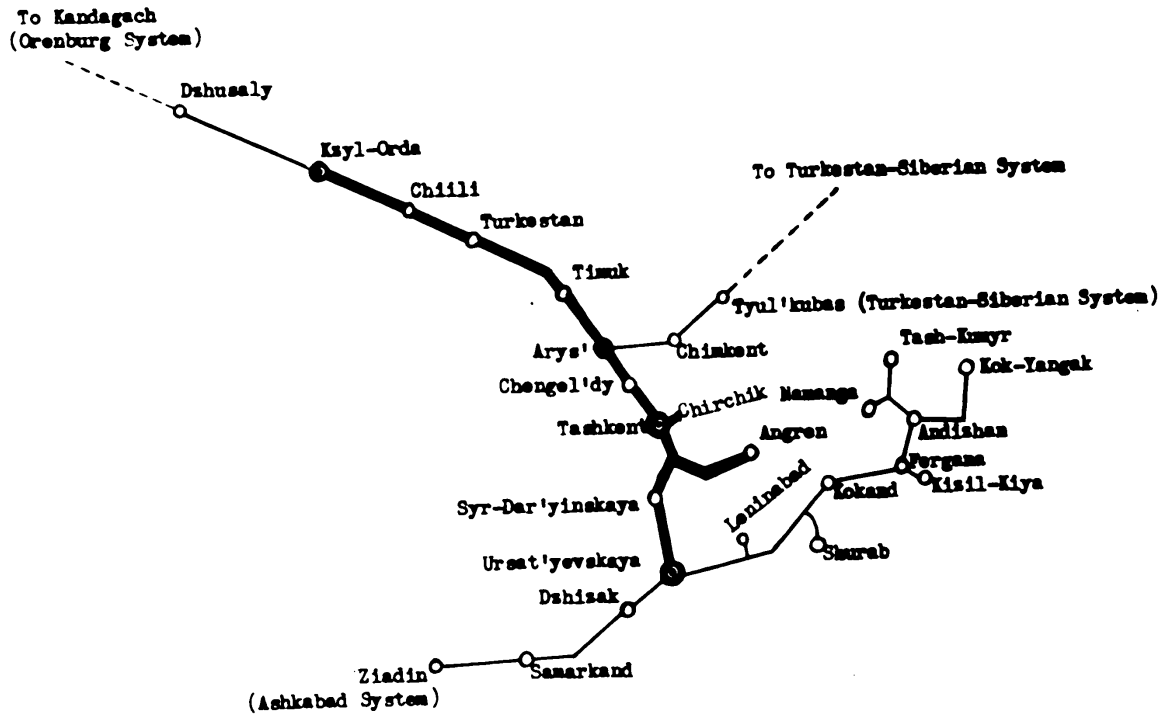


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Fig. 5 - Map of Tashkent System

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Fig. 9 - Tashkent Steam Locomotive and Car Repair Plant, which will be turned into the largest diesel locomotive repair base of the Central Asia during the Sixth Five-Year Plan period.

Source: Gudok, 15 August 1957, p. 1.

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Fig. 10 - At Tashkent-freight diesel locomotive enginehouse.

Source: Gudok, 20 Sep 80, p. 3.

Fig. 11 - Ruins of the Tashkent System maintenance periodic shop (periodicheskiy tsekh) of Arys' diesel locomotive enginehouse. Its construction was started in 1) and then stopped.

Source: Gudok, 1 Apr 81, p. 4.

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Fig. 12 - At preliminary-processing shop of Tashkent-Freight diesel locomotive enginehouse.

Source: Gudok, 23 Aug 58, p. 3.

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Fig. 1 - [illegible]

[illegible]

Fig. 1 - First two-unit "TE-3" series diesel locomotives at Tashkent-freight enginehouse.

Source: Gudok, 17 May [illegible], p. 1.

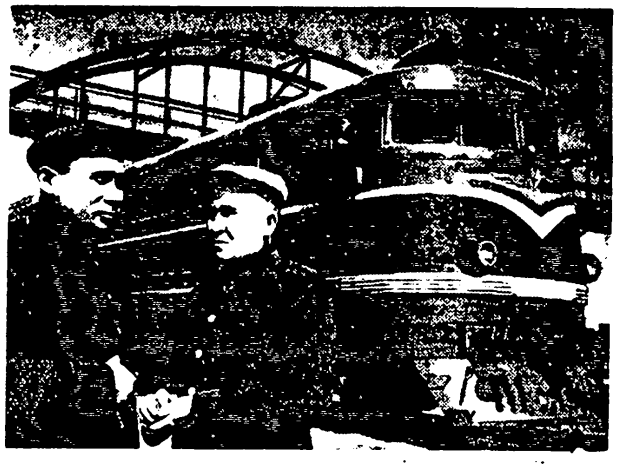

Fig. 2 - A diesel locomotive on the tracks of Mayl-Grad enginehouse of Tashkent System.

Source: Gudok, 20 Jun [illegible], p. 1.

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ORENBURG SYSTEM

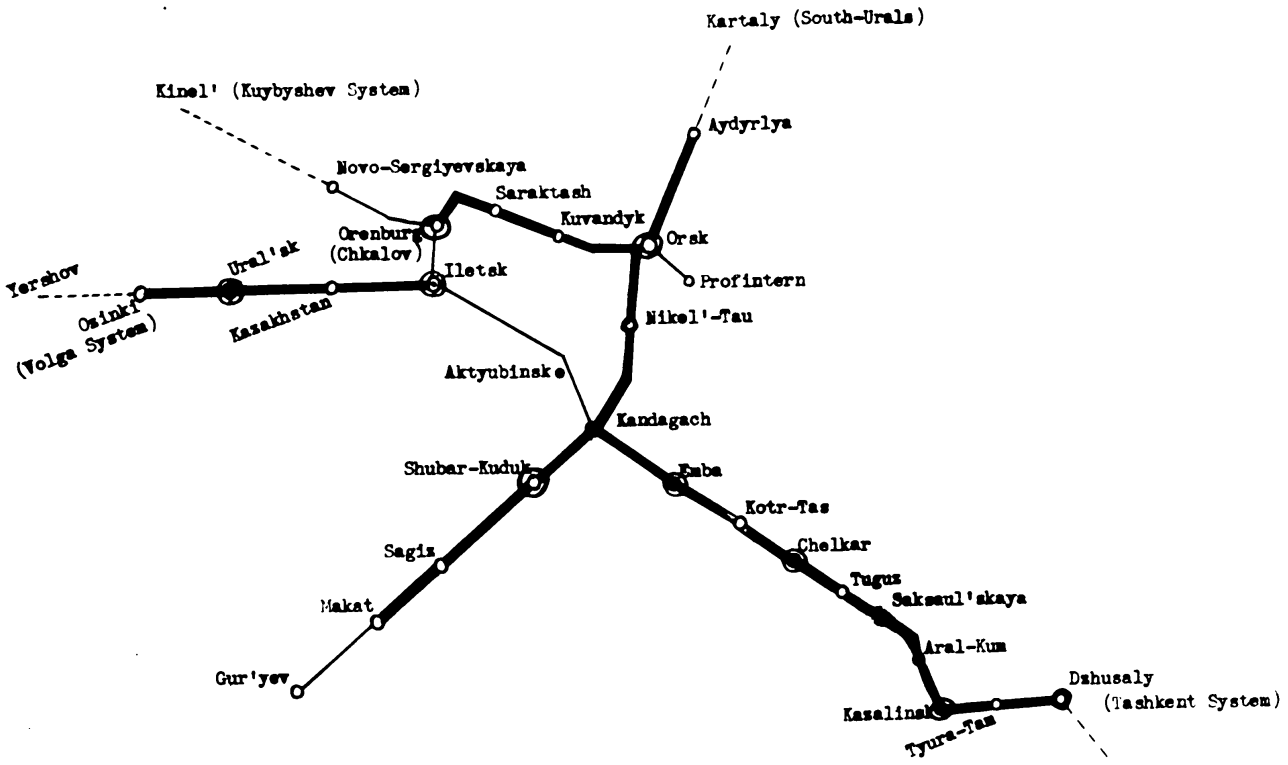


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Fig. 1c - Orenburg System

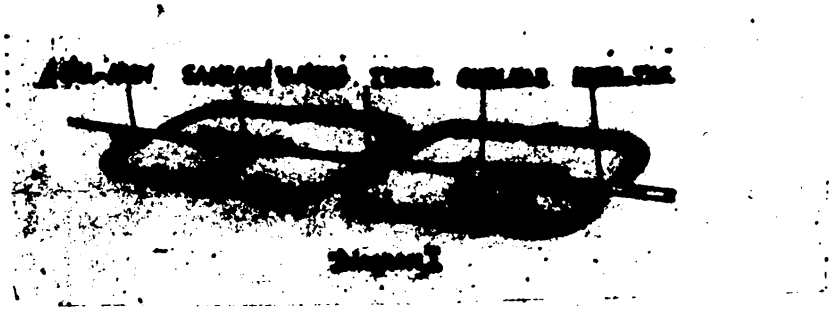

Fig. 17 - Diagram No. 1 shows the operations of Chelkar diesel locomotives of Orenburg system prior to September 1956.

Source: Electric and Diesel Traction, No. 2, 1957, p. 17

Fig. 18 - Diagram No. 2 shows the operations of Chelkar diesel locomotives of Orenburg system on long runs introduced in September 1956.

Source: Electric and Diesel Traction, No. 2, 1957, p. 17

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Fig. 19 - Diesel locomotives on tracks near Chelkar enginehouse of Orenburg System.

Source: Gudok, 31 May 55, p. 1.

Fig. 20 - Radio train communication has been installed on diesel locomotives of Chelkar and Emba enginehouse of Orenburg System. The picture shows an engineman in conversation by radio with a dispatcher.

Source: Gudok, 5 Jun 55, p. 3.

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Fig. 1 - Running gear repair shop of Chelkar enginehouse of Orenburg System.

Source: Gudok, 26 May 56, p. 3.

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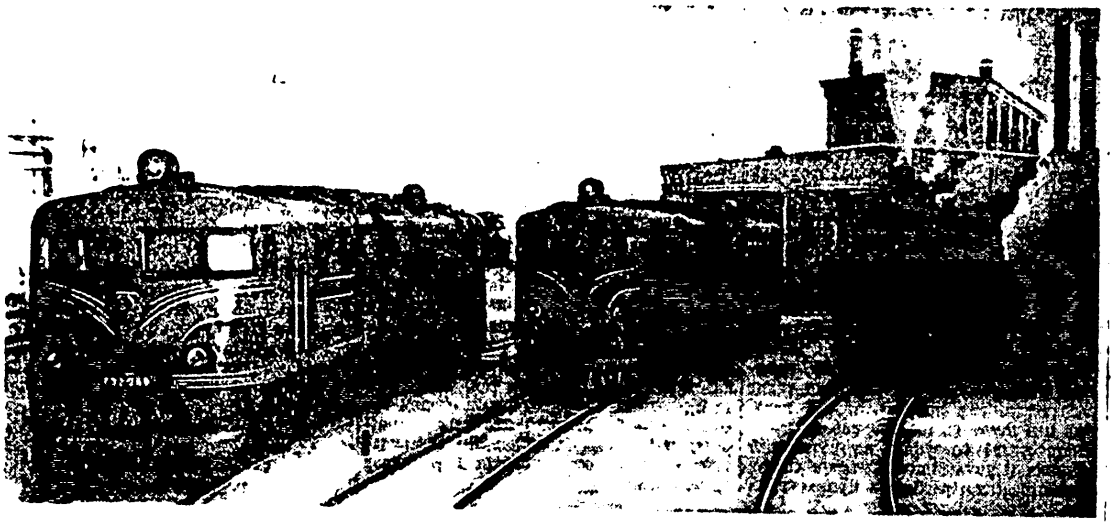

Fig. 22 - At Orsk enginehouse of Orenburg System.

Source: Gudok, 1 Feb 55, p. 2.

Fig. 23 - New device introduced at Chelkar diesel locomotive enginehouse of Orenburg System.

Source: Gudok, 26 May 56, p. 3.

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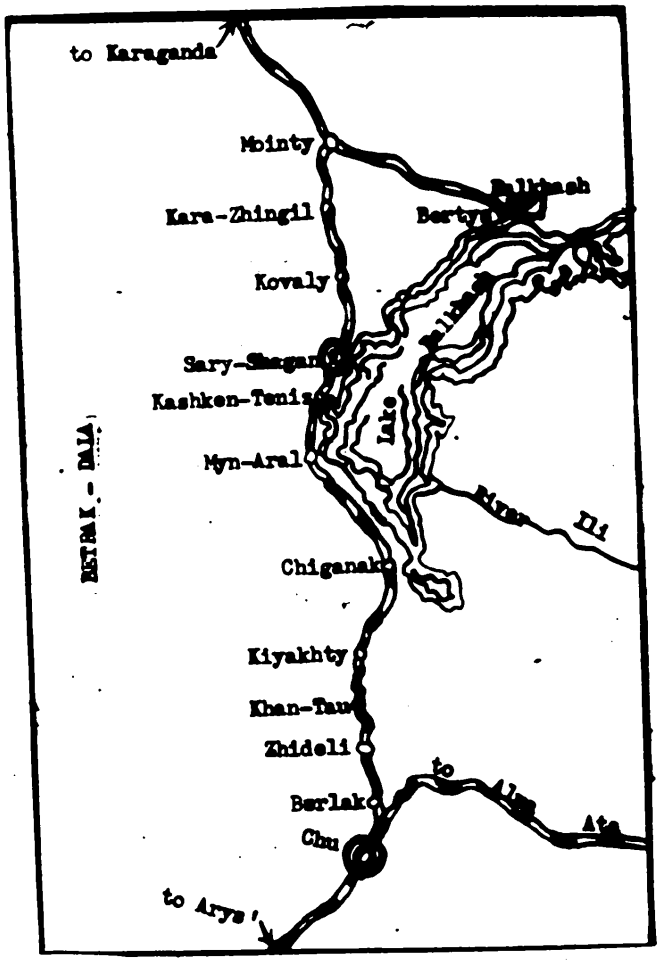


Fig. 24 - A map showing the course of the Mointy-Chu Railroad Through the Golodnaya Step'.

Source: Kazakhstanskaya Pravda, 27 October 1953, p. 1.

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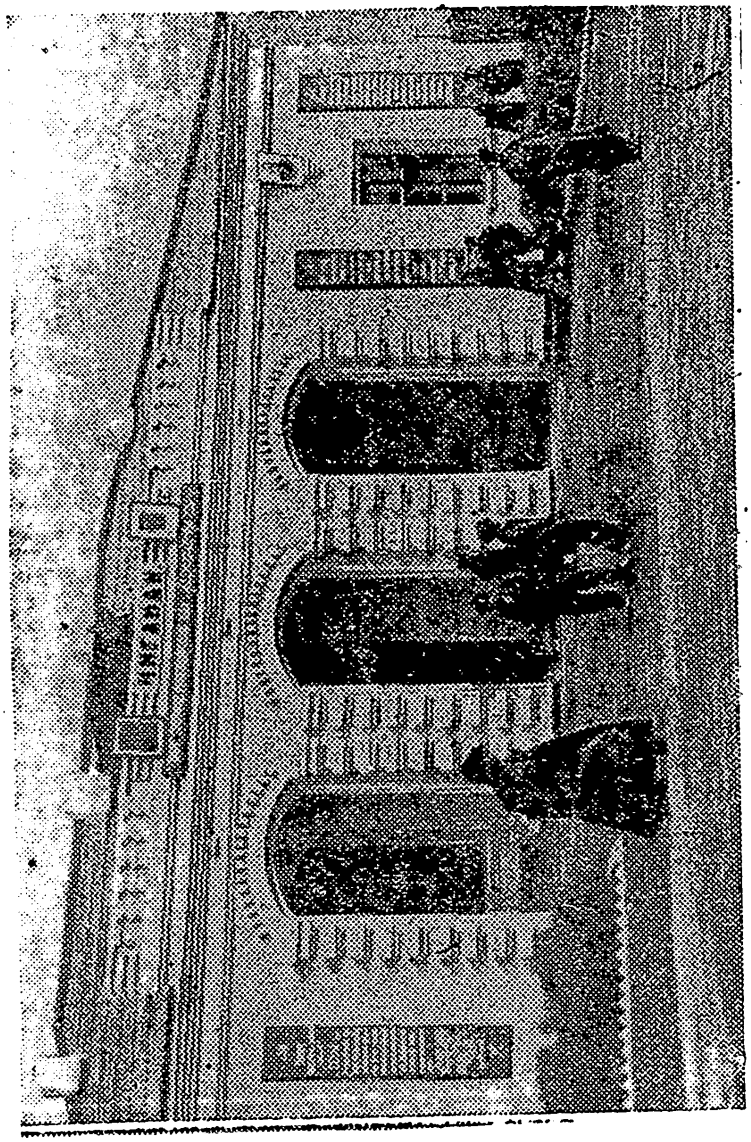

Fig. 25 - A view of the Chiganak Railway Station on Mointy-Chu Railway.

Source: Kazakstanskaya Pravda, No. 254, 28 Oct 53, p. 1.

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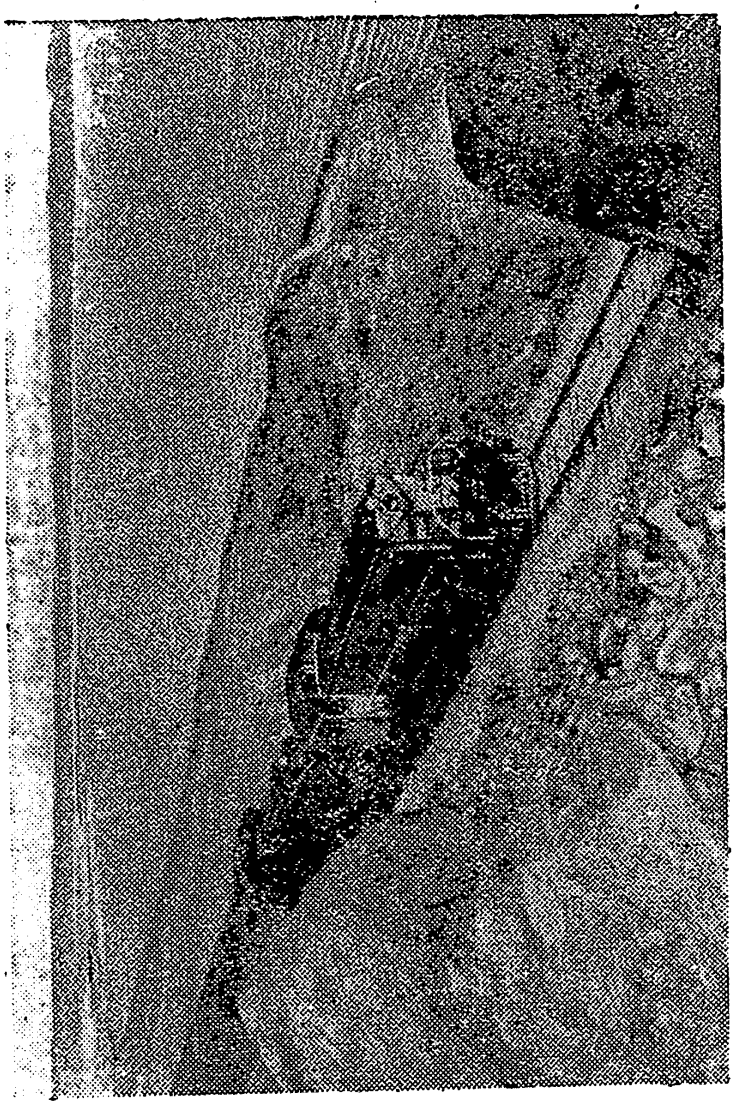

Fig. 26 - A train of coal near the Chiganak Station on the Mointy-Chu Railway.

Source: Kazakstanskaya Pravda, No. 254, 28 Oct 53, p.1.

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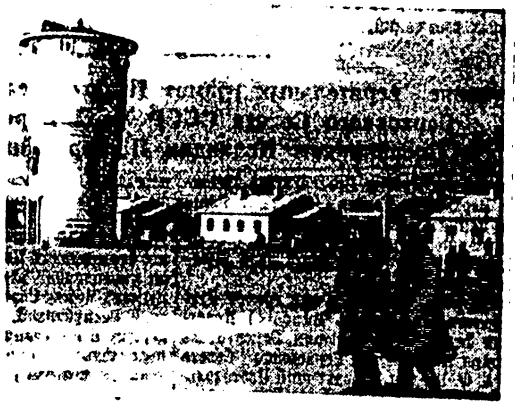

Fig. 27 - A settlement built near Myn-Aral station on the Mointy - Chu Line.

Source: Gudok, 4 Nov 53, p. 3.

Fig. 28 - Somewhere on Mointy - Chu Railroad Line, across the Bek-Pak-Dala Desert.

Source: Gudok, 4 Nov 53, p. 3.

Fig. 29 - View of the tracks at Krasnovodsk-2 station of Ashkhabad System.

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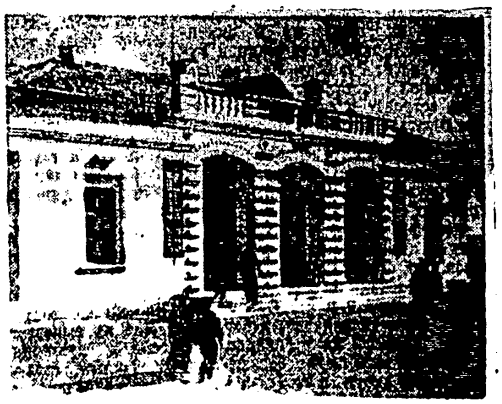

Fig. 30 - One of the fourteen railroad station buildings on the Mointy - Chu Railroad Line.

Source: Gudok, 4 Nov 53, p. 3.

Fig. 31 - One of the diesel locomotive enginehouses, on Mointy - Chu line, equipped with all necessary facilities for the repair of diesel locomotives.

Source: Gudok, 4 Nov 53, p. 3.

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Fig. 32 - A coal train moving along the Balkhash Lake, on the Mointy - Chu Line.

Source: Gudok, 4 Nov 53, p. 3.

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