MEMORIES OF A FORMER STEAM LOCOMOTIVE FIREMAN

Kurbatsky, Evgeny N., *Russian University of Transport (MIIT), Moscow, Russia.*

ABSTRACT

The author of the article has been dealing with transport underground facilities for a long time; in particular, he studies the «behavior» of tunnels in zones of seismic activity. But professor Kurbatsky began his work as an ordinary fireman at a locomotive furnace. Today, very few people know about the intricacies of this profession, without which no railway train, headed by a locomotive, could do. The work of a fireman required very good physical training and skill. In addition to the constant casting of coal into the furnace, the fireman had to take a staff at each station. This procedure ensured the presence of only one train at a station. Sometimes this was done at full speed. At all stops at any time of the day a fireman was obliged to lubricate axle boxes with fuel oil, to fill a locomotive with water. About this first and distant stage of his railway life, the current doctor of science recalls with particular warmth, as it should be for a hereditary transport worker.

Keywords: history, railway, steam locomotive, staff, axle box, fireman, memories.

When reading the title and author's presentation, a reader may have a question: what is the relationship between the department of Bridges and Tunnels and the memories of the fireman of a locomotive? Answer. As follows from the first entry in my work records book dated 13/04/1959, I was accepted as a fireman of the locomotive depot of the station of Alma-Ata. Two months before that, I had graduated from the diesel locomotive department of the railway technical school. The Alma-Ata depot was due in the near future to receive diesel locomotives, but all transportation was carried out still by steam locomotives. At that time, steam locomotives of SO series were used for freight trains, and for shunting works – steam locomotives OV. For passenger transportation, locomotives of SU series were used, one of the best at that time, although it was designed in 1925.

I was offered a position of a fireman of a passenger steam locomotive SU. When I first climbed into its cabin, the driver asked: «Where did you study, what is your education?» (the driver and the driver's assistant graduated from two-year railway schools). When I answered that I had graduated from a technical school, the engineer cursed and said: «Well, here they sent the scientist! Have you ever held a shovel in your hands?». I replied that I had many times to dig a vegetable garden. The engineer grinned and, having calmed down a bit, gave me a shovel of a fireman. Of course, it surprised me, because its dimensions were twice the size of ordinary shovels.

The crew that runs the locomotive consists of three people: a driver, a driver's assistant and a fireman [1]. In a wonderful Russian folk song about a fireman there are the following words:

Comrade, I cannot keep watch, –
Said one fireman to another, –
The lights in my furnaces do not burn at all,
I cannot keep steam in a boiler.

This song is about a fireman of a steamer. On locomotives firemen do not throw coal into a furnace. The locomotive furnace is stoked by a driver's assistant, as this is a very complicated task and it can be performed only by an experienced worker who knows the road's terrain. In a boiler it is necessary to maintain steam pressure up to 12 atmospheres. And this maximum pressure must be created before lifts to increase traction force, with descents in such pressure there is no need. And if in the boiler because of intense heat in the furnace increased pressure is created, the emergency valve is triggered and discharges the steam into the atmosphere, reducing the pressure to a safe. The traction force depends on the magnitude of pressure. It is a great art to maintain proper pressure with a different traction force.

The doors of the furnace are usually in a closed state and are automatically pushed apart by a driver's assistant with the help of a pedal, which he presses when he brings the shovel with coal to the furnace [2].

What duties did a fireman perform?

The first and the main duty. *The fireman throws coal from the tender into a tray, a special box in front of the furnace, and wets it with water in a certain proportion. The tray was located in front of the furnace at a distance convenient for a driver's assistant so that he could pick up a full shovel of coal in one motion and throw it into the furnace. The furnaces were large, and coal had to be spread evenly. At the beginning of a trip, when the tender is full of coal, a fireman had*

Pic. 1. Steam locomotives SO and OV. Museum exhibits.

Pic. 2. Steam locomotive SU.

only to rake it up to a tray. By the end of a trip, after almost 10 tons of coal had been consumed, it was necessary to throw fuel from the middle of the tender.

The second duty. *When a station or a crossing point was passed without stopping, it was necessary to exchange staffs with a station duty officer on the move. At that time, the section of the Kazakh railway (the former Turksib) on which I worked was single-track and not equipped with dispatching centralization. The safety of traffic in the absence of traffic lights was provided by the electric staff system. The staff was a metal «document», allowing the driver to occupy the haul.*

The driver of the locomotive received a staff from the duty officer at the departure station and was obliged to pass the staff to the duty officer at the arrival station. The driver is obliged to make sure that the staff belongs to the haul at which the train departs. The duty officer at the arrival station, having received a staff, turns an electric current in the apparatus of the departure station by rotating the handle of the staff, giving permission for occupation of the haul by the next train.

From the staff apparatus it was possible to take out only one staff, which ensured the presence of only one train on the haul. The staff is a metal cylinder with protrusions in the form of rings, preventing removal from the apparatus. For each haul, the shape of the rings is different, which precludes the possibility of using staffs from another haul.

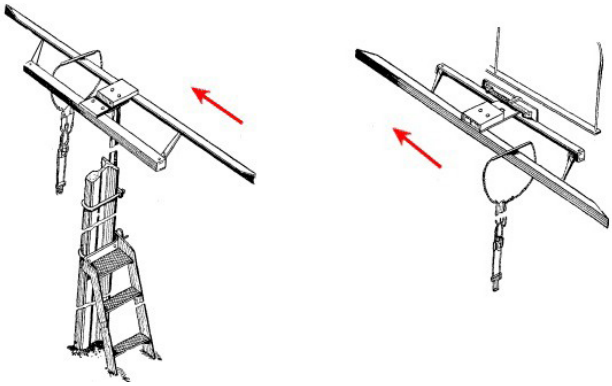
Pic. 4 presents photographs of a typical staff apparatus, the moment of installation of the staff by a station duty officer in a staff holder and a staff holder with a staff fixed in it. To exchange staffs without staff holders, it is necessary to stop, which significantly slows down the movement. Therefore, for this operation staff feeders were used on the move.

Staff feeders, which were wire rings with a diameter of 30–50 centimeters on a long handle with a spring holder, made it possible to organize a non-stop through movement of trains at the station. The fireman on the move suspended his staff feeder with a staff from the previous haul to a special post, standing on the cross-road and then picked up the staff feeder with a staff for the next haul from the station duty officer. For a transfer to a moving locomotive, the station duty officer fixed the staff in the staff feeder beforehand, and, standing next to the tracks, reached it out to the fireman of the steam locomotive on his outstretched hand.

The staff was handed over to the driver. The driver read the name of the haul that had been knocked out on it, and if the staff corresponded with the next haul, continued movement.

There was a simple rule of safety when catching staff holders: the thumb of the hand had to be clamped in the fist so as not to knock it out with a metal ring. In addition, it was recommended to stand on the bottom step of the footboard, firmly holding the handrail with one hand and not deviating strongly from the steam locomotive. When picking up staff holders at high speed, bruises appeared on the shoulders, so it was suggested to wear a quilted jacket before handing the staff, but usually nobody did it because of the heat.

Pic. 3. Furnace of a steam locomotive in open and opening state.



Pic. 4. Staff apparatus and staff holders with a staff.

Exchange of staffs requires a certain skill. If it is impossible to exchange on the move, the driver turns on an emergency braking, stops the train, the fireman jumps off the running board and runs back to the duty officer, and the duty officer runs after the train. I had only one such case. The duty officer stood at a great distance from the passing train, and I could not reach the staff holder. I had to jump off the running board and run to the duty officer. When I gave away the staff received from the duty officer, the driver scolded me, but not because I could not pick up the staff (the driver saw that it was not my fault), but for jumping off the train at high speed.

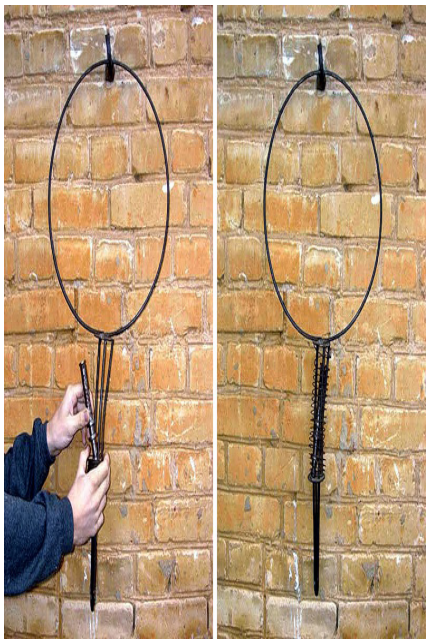
In the last years for the old practice, before replacement of the electric staff system by dispatching centralization, several types of mechanical staff exchangers were invented on the domestic railways, simplifying the process on the move of the train.

Pic. 5 shows a schematic representations of such devices. One staff exchanger was fixed to a post in the inter-track space, the other under the driver's cab window. However, these devices have not received wide distribution. Therefore, on locomotives, staffs were dropped and caught by firemen, and on steam locomotives and electric locomotives, the driver's assistants.

Usually a fireman was preparing to transfer the staff when the train passed the input semaphores. At that time, in front of the entrance to the stations and crossing points there were semaphores, and at the entrance there were switch turnouts, which were switched by hand by the switchmen, who were on duty in special booths.

With the horizontal position of the semaphore's wing (closed semaphore), it was necessary to stop before it, which corresponded to a red signal. When two wings were open, the speed should be slowed down, since the train was taken to a side track, with one wing open, on a straight track.

The third duty of a fireman. *Almost at each stop it was necessary to lubricate axle boxes with fuel oil. At that time, in axle boxes of locomotives and cars, sliding bearings were used, which needed it. For this purpose, special oilers with an elongated spout, a wire hook for opening the covers of axle boxes and at night a torch were used. The torch consisted of a piece of a wire 40–50 cm in length, at the end of which a piece of tow was wetted, soaked in black oil. Without it, it was indispensable for the fact that usually there was no lighting at the crossing points and stations far from platforms.*



Pic. 5. Scheme of mechanical staff exchangers [3].

Pic. 6. Turnout switch.

It was most uncomfortable to lubricate the driving wheels (the largest ones in Pic. 2), their axle boxes were inside the wheels to ensure movement of the connecting rod, and the nozzle of the oiler had to be pushed between the spokes. The drive connecting rod transmits the force from the piston to the crank pin of the driving wheel and imparts a rotational motion to it. From the driving wheel, this force is distributed over the remaining driving wheels through the connecting rod. Since the connecting rod is located on the outer sides of the wheels, the axle boxes are located inside them [4].

Other duties of a fireman. *The steam locomotive consumes a lot of water, therefore at intermediate stations 50–70 km in the inter track space there were powerful hydraulic columns with a capacity of 5–8 m^3 per minute [5]. The stoker, being at the tender, turned the trunk of the column until it coincided with the hatch of the tender tank. Usually, the refueling lasted 10–15 minutes, which was taken into account when scheduling the trains.*

Upon arrival at the transfer depot, the fireman helped the driver's assistant to clean the furnace and remove the ashes into the pits at the inter track space in specially designated areas.

In the transfer depot, the crew rested for several hours (usually 3–5). Then it set off on the return journey on the own locomotive.There was no replacement crew for return to the main depot. While the crew was resting, the steam locomotive was still heated by the firemen on duty. In these cases, the furnaces have never been extinguished, since at least 4–5 hours are needed to warm up the steam locomotive.

I worked as a fireman for a short time – less than six months. During this time I made trips from the station of Alma-Ata to the Otar station – about 160 km and to the station of Sary Ozek – about 220 km. The driver of our crew worked the last year before retiring and had the first class qualification, so we were allowed to drive any trains: speed, passenger and postal. Then speed trains to Moscow, Tashkent and Novosibirsk departed from the station of Alma-Ata, passenger and postal ones to Stalinabad (present Dushanbe), Frunze (present Bishkek) and Novosibirsk.

From Alma-Ata to Otar (in the direction of Moscow) the road passed along a flat terrain at some distance from the foothills of the Tien Shan. During the route it was necessary to prepare for the driver's assistant, i.e. from the tender to the tray, about six tons of coal. When driving trains in the direction of Novosibirsk, the first sixty kilometers to Ili station, located on the bank of the river of the same name, it was enough to prepare just one tray,

Pic. 7. Input semaphores: closed and open to move on a side track.

Pic. 8. Typical oiler for lubrication of axle boxes of a steam locomotive and a tender.

Pic. 9. Column position in non-working condition.

because the route came with a slight slope, and fuel consumption was low. But after Ili River, a steep climb began, which lasted almost a hundred kilometers, and you could rest only with snatches. It should be noted that the fireman's seat on those locomotives was fixed to the cabin, and the back to the tender, so it was practically impossible to lean on the back with the moving locomotive. Another inconvenience that designers did not take into account is the lack of a toilet. To such trifles, few people then paid attention.

Despite the rather heavy and intensive work, on night trips, very good memories of this time have remained. I became good friends with the driver and the driver's assistant. They taught me a lot.

And one moment. My first trip was called on my birthday, when I turned 20, May 1, 1959. When I put on fireman's, used oily clothes, the other at the time was not suuplied, and left the house, heading to the depot, my mother cried. And my father, who at that time was deputy chief of the track service of the Kazakh Railway, shook his head approvingly. The son continued the family tradition, began now his biography of a railwayman.

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And in conclusion I want to say that the steam locomotive is one of the unique technical creations of mankind. For almost 150 years, all rail transportation was carried out by steam locomotives. In view of their low efficiency and low profitability in comparison with new technology, the production of steam locomotives in our country stopped in 1956, but their operation continued for some time.

The production of steam locomotives in Russia began approximately 50 years before the foundation of MIIT. By 20th century, domestic railways have completely freed themselves from foreign dependence in the field of locomotive building, so we can assume that the first institute' graduates-steam locomotive workers worked already on their own locomotives [6].

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Information about the author:
Kurbatsky, Evgeny N. – D.Sc. (Eng), professor of the department of Bridges and Tunnels of Russian University of Transport (MIIT), Moscow, Russia, usd.miit@gmail.com.

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