One of the main problems that impairs the operation of the well is the deposition of paraffins on the walls of pipes. There are various ways to deal with these deposits:

1) melting paraffin by heating;
2) dissolving paraffin with different solvents;
3) mechanical removal of paraffin from the pipe walls using scrapers.

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HYBRID TRANSPORT SYSTEMS

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The hybrid transport facility can be defined as a transport mean which combines several key engineering solutions; they can be applied independently or interchangeably for various transport facilities. The concept of hybrid transport implies a complex combination of independent operational principles, aimed at the optimal efficiency values, universality and maintainability.

One of the hybrid transportation facilities is those combining several power supply sources. Their basic power schemes are:

- an internal combustion engine and an electrical engine supplied by an accumulator;
- power supply from a contact network and an internal combustion engine;
- power supply from both a contact network and an accumulator.

Any of the schemes takes the main (basic) source, and the additional (auxiliary) source. In the above-mentioned power supply schemes, the main power source is indicated first.

The basic idea behind the hybrid power energy scheme is a need to achieve various capacity values on different sections along the route, which depends on the effective work required. Therefore, all sections can be divided into ‘heavy’ ones, which require more energy, and ‘light’ ones, for which the same amount of energy can be redundant. For example, the capacity needed to start up a train or to overcome a guided slope along the route, is considerably higher, than that needed

for movement along a low-grade section (for a freight speed). The power supply from a contact network raises the problem to maintain comparatively low-traffic sections, such as approach tracks of the enterprises the wagon flow of which is moderate. Besides, it may happen that both electrification of such a section and maintenance (rent) of a locomotive are unprofitable.

Therefore, implication of hybrid transport facilities can solve similar problems. Thus, when a hybrid locomotive is fed from a hybrid power unit combining a motor-generator set, an accumulator and an electric drive, the following operating processes along a railway haul can be distinguished:

- for low energy consumption (at a constant speed along a low-grade section), a motor-generator directly feeds the tractive engines and, if needed, charges the accumulator;
- for movement from a high-grade slope the motor-generator switches to a blank run mode, and excess kinetic energy transforms into electric by tractive engines, operating in a generator mode, and may be used for battery charging. Besides, it increases the speed regulation efficiency; and
- for obtaining a total capacity, the tractive engines are simultaneously fed from both the motor-generator and the accumulator battery.

Here, we can witness a uniform distribution of power generated by the internal combustion engine. It helps effectively use resources, as there is a possibility for the engine to work at the most effective operational modes. Moreover, a considerable ecological effect can be gained due to low harmful emission into the environment.

An example of such locomotives is a shunting locomotive developed by Toshiba for Japan Freight Railway Company. The Sinara Transport Machines holding developed and manufactured a testing model of the TEM9H shunting locomotive with a hybrid power unit; its fuel consumption and environmental emission were decreased by 30% and 55%, respectively, than similar values of the locomotive line with conventional power unit.

If a locomotive with an electric power unit can be fed from the contact line and the accumulator, it can be used for electrified and non-electrified sections. Moreover, there is no need to change the locomotive at destination stations so that to provide routing wagons to a consignee's arriving track. Therefore the scheme realizes, first of all, a door-to-door approach, i.e. consignees do not have to obtain their freight at the station by a standard procedure, thus, saving their money and clearing tracks at an adjacent station. Therefore, use of hybrid transport facilities allows increasing rail competitiveness in the transportation market for small and average deliveries.

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