



doc. Ing. Milan Hobza, CSc.

Možnosti uplatnění logistiky v železniční dopravě
The possibility of applying logistics in railway transport

The thorough application of logistics in principle may contribute to a significant improvement in railway transport services, increased interest in freight transport, and improved business returns. In recent years, Czech Railways has implemented a number of changes in this direction. The quality of services being offered has increased, especially for IC and EC trains, travellers are better informed before the departure of trains in comparison with the past, work is going on to raise the top speeds for certain sections of track, ČD is actively participating in the creation of integrated transport systems, and the railway policy has changed. Certain shortcomings are evident however, in that these changes are being introduced slowly, all opportunities for additional improvements are not being utilized, and there are great reserves still untapped for the promotion of the services being offered.

doc. Ing. Vlastislav Mojžíš, CSc.

Změny v technologii nákladní dopravy
Changes in freight transport technologies

The article deals with the basic innovations in freight transport technology, with the goal of increasing the competitiveness of railway transport on the transport market in the single car shipment system. Changes in technology lie in applying time plan regimes, concentrating train make-up, minimalizing car re-arrangement, introducing time discrete technology in re-arranging cars, and re-organizing the activities of marshalling yards. The changes in technology have resulted in increased transport speed and reliability, partial time separation between passenger and freight transport, and higher work efficiency.

Ing. Ferdinand Gottmann

Vozidlový park ČD - přítomnost a budoucnost
Rolling Stock at Czech Railways - Present and Future

The introduction contains a brief overview of the rolling stock of Czech Railways and trends in inventories between 1980 and 1995. On this basis are formulated principles for modernisation of cars. The necessity for balance between purchase of new rolling stock and modernisation and renovation of older rolling stock is stressed. A table of requirements for the altered structure of particular types of rolling stock is given.



Ing. Pavel Pavloušek, CSc. – Ing. Michal Karel
– Ing. Vladimír Klomínek – Ing. Jan Lutrýn

**Motorové vozy pro regionální dopravu
Railcars for Regional Transport**

The article describes the European development trends in the field of railcars for regional transport and analyses the development concept for new vehicles. Modern vehicles for regional transport, developed by famous European manufacturers, are introduced. Analysis of requirements of a design project for a regional transport vehicle is carried out.

prof. Ing. Jaroslav Čáp, DrSc.

**Další možnosti zvyšování adhezních schopností kolejových vozidel
Other possibilities for increasing the adhesive properties of cars**

This contribution deals with the interrelation between adhesion and friction in the contact of the wheel and the track as a hypothesis of a unitary interpretation of an absolute adhesive characteristic. On the basis of this theoretic model areas for improvement and potential for further increase of the adhesive properties of cars are indicated.

Ing. Jaromír Zelenka, CSc. – doc. Ing. Jiří Izer, CSc.

**Specializované pracoviště pro měření a vyhodnocování kontaktní geometrie
Laboratory for measurement and assessment of contact geometry**

This article acquaints the professional public with the work of the laboratory for the measurement and assessment of wheel-set/rail contact geometry. The laboratory's core activities involve servicing work for Czech Railways and other organisations. The article describes the central activity of the laboratory in measuring the gauge of wheel-sets and rail sections in operational conditions of travel and railway-car repair and maintenance and also its work in assessment and presentation of the results of measurement. The contribution describes KONTAKT 3 software for assessment and official recording of wheel-set/rail contact geometry calculated. In addition to this core activity, the laboratory carries out simulations of railway car journeys using an in-house software system.



Ing. Karel Hlava, CSc. – Ing. Václav Boček

Aktivity ČD v oblasti snižování nákladů na energii pro elektrickou trakci ČD activities in the area of reducing energy costs for electric traction

Electric traction, aside from indisputable technical, economic, and ecological advantages also has a significant reverse impact on its surroundings including the electric system which feeds it. In the case of the 3 kV DC system, this impact is primarily stray currents causing corrosion in systems placed nearby, while the converters are essentially suitable from a perspective of affecting the energy feed system.

In the case of the single-phase 25 kV, 50 Hz system however, in recent years it has been necessary to equip the original simple traction substations with expensive supplementary systems. These systems are intended to reduce unfavorable feedback, especially from electric locomotives on the 110 kV power grid. The energy drawn by them makes up a considerable share of the reactive power demand worsening the power factor of energy drawn, furthermore the curve of the current drawn by these cars is distorted by higher harmonics.

Suppliers of electric energy, the power plants, are currently gradually raising the criteria of quality for electric energy, based upon the provisions of law no. 266/1994 Coll. effective since 1.1.1995 and its accompanying public notices from the MPO ČR including internal power company standards.

The article summarizes the long-term approach of ČSD and ČD in their attempts to sufficiently meet these requirements technically and economically. These efforts have as of today led to the equipment of the majority of power substations of single-phase systems with regulated filter compensation systems, even though this did not solve the actual cause of the problem, lying in the now unsuitable design of the traction circuits of the locomotives.

Ing. Zdeněk Beneš, CSc. – Ing. Václav Boček

Napájení rozvodu 6 kV, 75 Hz pomocí statických měničů frekvence 50/75 Hz 6 kV, 75 Hz power feeds using static frequency converters

Track safety systems on a 25 kV, 50 Hz single-phase system, are fed with a 6 kV, 75 Hz track cable line. The change in frequency was originally carried out by rotating converters fed from the 50 Hz network. The development of semi-conductors allowed for energy to be acquired at 75 Hz using static frequency converters.

The electric qualities of the cable line fed from these converters (especially the capacity) fundamentally affected the design and the safeguards for the static converters, which were originally intended for feeding from rotary machines. Along



with this, the user placed great emphasis on the high reliability of the entire system so that it met the standards of ČD safety equipment.

After the initial difficulties, it was possible in cooperation with the manufacturer to develop and operationally test the set of 50 kVA and 90 kVA static converters, offering not only high energy efficiency but also other operational advantages (such as resistance to short circuits, synchronization with neighbouring converters, limiting failures in the cable leads), which rotary converters could not provide.

Ing. Zdeněk Beneš, CSc. - Josef Černý

Záskokový zdroj ZZ1-3 pro napájení zabezpečovacího zařízení v železniční stanici

The ZZ1-3 Back-up source for feeding safety systems

Railway stations have back-up power sources using diesel motors to supply necessary systems (safety systems, emergency lighting) in case of local network failure. This design has certain problems both operationally (maintenance of the diesel motor, start-up delays) as well as ecologically (fossil fuels, exhaust, noise during operation).

With the use of high performance semi-conductors, it became possible to develop and test back-up sources using static converter fed from the traction catenary of a single phase 25 kV, 50 Hz system and offering three phase voltage of 3x380 V, 50 Hz.

Aside from eliminating the problems of the diesel motors listed above, this design has additional significant advantages (stabilization of output voltage, quick renewal of voltage during blackouts, high energy efficiency).

Further developments are expected through the power feed of this back-up source from the traction line of a 3 kV DC catenary system using a converter for heating points.

Ing. Jiří Krupica

Kvantitativní a kvalitativní parametry napájecího rozvodu 6 KV ČD

Quantitative and qualitative parameters of the ČD 6 kV power feed network

A reliable and continuous power feed for safety systems is a necessary pre-condition for safe operations on ČD (Czech Railways). The power distribution network uses a voltage of 6 kV and frequencies of 50 and 75 Hz. Power feeds are provided using v_{hv}, hv, or lv voltages. The power feeds are provided directly at ČD feed stations, or from independent transformer stations, and in some cases from the lv distribution network.



Meeting the requirements of the law, public notices, and the conditions established in MF ČR price guidelines affects the final price of the electric energy. Provided that all regulations and conditions are met, the consumer pays only the basic price given by the price guidelines. When these conditions are not met, there are various price surcharges. The article shows how a single indicator, the "demand purity" power factor is determined. The text also explains cases where the value for this power factor is not met and a price surcharge is added to the base price of the electric energy.

In addition, the article mentions the content of the higher harmonics in the current which is drawn to feed safety systems. For the time being, there are no direct financial sanctions (aside from the greater authority of the State Energy Inspection Agency), but the energy supplier may limit or discontinue the supply of electricity. Even in this case, necessary measures must be taken to eliminate the cause.

Ing. Petr Brouček

Zásobování moderních osobních vozů elektrickou energií
Supplying modern passenger cars with electric power

There is a comprehensive description of the options for the technical design of central power sources including the use of IGBT and its comparison with the use of GTO thyristors. The article is supported with a number of graphs.

There is also a table of requirements for the electrical equipment of a railway passenger car as laid down by the amendment to decree UIC 550.