THE ECONOMICS OF WOODTRANSPORT DISTANCE TEST

Katalin SZAKÁLOS – MÁTYÁS
assistant professor
Institute of Forest- and Environmental Techniques
University of West Hungary, Faculty of Forestry
mkata@emk.nyme.hu

Abstract

The tree transportation of bulk goods are sometimes long-distance transmission.

The transport costs to the economy are very important and very complex variety of environmental conditions in terms of delivery.

The timber handling during the production process of operating, adequate capacity and axle truck application, it is important to seek to examine the ways in which transport and vehicle group which from an economic timber supply.

Environmentally significant impact on road freight transport (pollution, noise), the depreciation of roads and high specific energy and labor need to compensate for the short term, the direct delivery option, the smaller number of loading and disposal work, the flexibility to meet customers' needs are of the rail transport has not be indicated.

On the other hand, a great quantity of goods to be forwarded by rail, regardless of the general external environmental influences. These are the parameters by comparing the different freight transport systems can be investigated and the expected unit cost for shipping distance.

The calculations show the importance of the following ratios:

– the wood hauling cost of the total- cost represents about 75-85%;
– the fuel consumption of the-total fuel consumptions 80-90% of the total;
– the energy of the whole process 90-95% of the total.

The unit cost of today tree utilization in Hungary 4-5.000 Ft/m^3. The figure of the above percentages are therefore show the magnitude of savings achieved by streamlining materials handling, annual production of 5-6 million m^3 of forest assortment case.

Objective

Wood hauling processes in the forest are of outstanding importance as they fundamentally determine the total cost of shipping. Optimisation of these tasks have always been among the current issues of forestry.

One of the typical characteristics of timber transportation is the initial concentration of timber being distributed over the cutting area (0,005 – 0,05 m^3/m^2). The aim of the collection of timber is to pile up timber volume of several hundred or several thousand m^3, which can be transported to stabilized roads, and from which transportation can be characterized as distribution.

The Hungarian economy, as well as the international trade in the freight task in many successful solutions attempted to benefit from the enforcement division of labor, reducing the extra cost of transport.

The freight divisions of labor (modal split) rates over the past decades show a significant change, particularly in the road freight sector. Both rail and water transport in the major markets lost road transport (Figure 1).

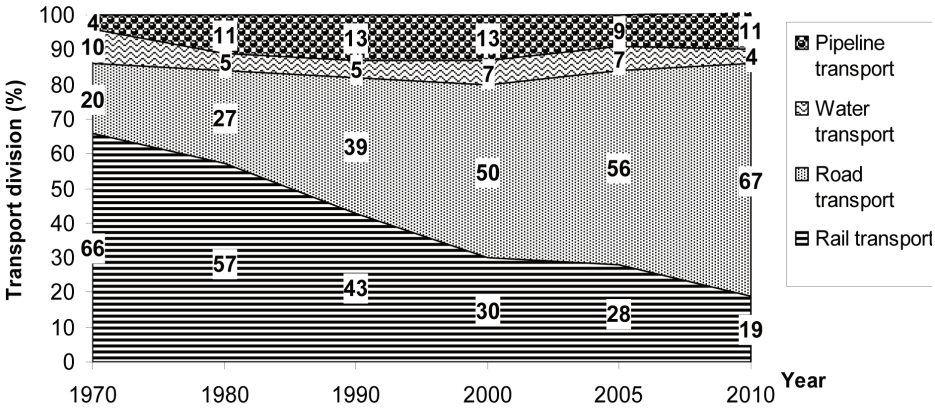

Figure 1. The Hungarian freight transport modal split (Self-assembly of the Economic and Transport Ministry and the Ministry of Environment on the basis of transmission)

Road freight transport plays the most important role in timber transport in Hungary, where wheeled machines are apllied. These include: chassis-mounted loader with the tractor-trailer carrying load compartment fittings, road trucks, off-road forestry trucks, special trucks. Forest holdings used to operate their own trucks, but the employment of contractors has recently became the most common, and they only keep a limited number of strategic machinery.

The selection of the transport vehicle to be taken into account that the trucks directly to shippers premises are usually able to provide, there is no need for transshipment, achieved the "door-to-door transport" in a relatively short time the goods arrive, but the higher specific energy and labor intensity, and significant impact on the environmental risks, for example. compared to rail transport. The great advantage of road transport of goods that can flexibly adapt to customer needs or changed conditions, but the external conditions, sudden impacts (congestion, adverse weather) and the restrictions, prohibitions (e.g. „truck stop") are often difficult goods access

The impact on the cost of rail freight is that the last major transformation took place during the MÁV. It has been the accounting and organizational separation of railway. Five businesses evolved from passenger, cargo, engineering, railway infrastructure and real estate. European Union Directive on the basis of the free truck usage mastered the infrastructure through increased activity and train using separation of the private railway companies (e. g. GYSEV) case, however, appeared in several countries over the transmission need to train. These are the usual patterns MÁV previously re-claimed.

Considering all the factors described above – if you want to plan objectively – the recommended mode of transport in particular must be assumed in determining the specific

calculations, the circumstances under which economic timber transportation by truck, rail and when the economical use of multi-movement plan!

Methods and materials

The transport system and the selection of the means of transport must be assumed that the higher unit cost of road transport – a transport distance – offset by the benefit that is less than the total cost of loading, and usually shorter than the route, such as rail. Longer-distance transport, however, these benefits outweigh the rail unit is significantly lower (Ft / tkm) costs. It should therefore be specified by the transport-distance, as long as economically transported by road and by rail from which it is better to use transit.

The road or rail transport unit cost (K; Ft/t), the transport distance (s; km) depending on the freight costs which occur during constant (α; Ft/t) and freight (β; Ft/tkm) taking into account the following linear correlation can be described.

$$K= \alpha+\beta*s$$

The rail timber unit costs (K_V) – the average domestic conditions – 2010 came into force on January 1 rail fare tables for data derived from the following:

K_V=1870+18,8*(s_v-60), which is the formula plus loading(r_V) 350 F/t permanent cost to the final K_V=1870+350*r_V+18,8*(s_v-60) cost equation developed.

The cost of timber by road equation (K_k) of the timber carriers employed business fee determined based on (8 averaged information provided by Forest Co.)

K_k=350*r_k+50*s_k, where the loading (r_k), a take-off and a take-down 700 Ft, rate represents the total cost of the fixed costs, such as K_k=700+50*s_k.

The transport distance limit (sh), when determining to believe that the rail and road transport distance is different. The most common relationship $s_v > s_k$, but it may $s_v < s_k$ or $s_v = s_k$ as well.

The calculation must take into account the fact that rail transport, in the complex case, a road transport there (K_{kz1}) and a road transport in (K_{kz2}) are required.

The transport distance limit, which is equal to the costs resulting:

$$K_k= K_V + K_{kz1} + K_{kz2}$$

$$700+50*s_k=1870+350*r_V+18,8*(s_v-60)+350* r_{kz}+50*(z_1+z_2)$$

The previous equation in terms of distance road transport of timber at the same time to obtain the economics transport distance limit (sh; km) in connection with:

$$s_h=s_k=0,376*(s_v-60)+7*(r_V+r_{kz})+(z_1+z_2)+23,4$$

Result and discussion

The graphical representation of the transport distance limits calculated to determine the function shows to what distance of direct delivery by car (with 2 loadings) is economical, and over what distance rail transport should be applied (with 4 loadings).

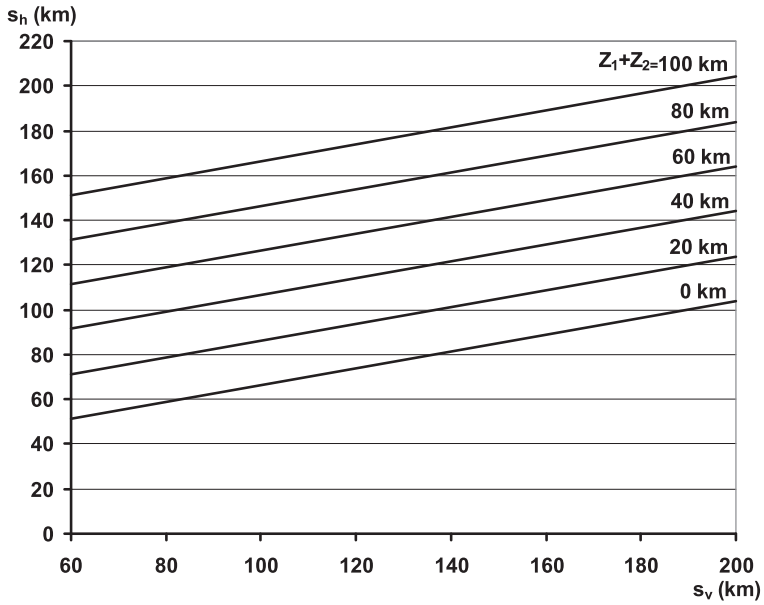

Figure 2. The nomogram of the transport distance limits (15 tons truck and 20 tons open rail wagons)

The calculations as well as the graph show that over approx. 50-60 km rail transport makes more sense because of the high fixed costs (scheduled track, locomotive and rail car, etc.).

The figure is constructed for the most typical case when 4 loading (2 r_v +2 r_{kz}) is applied. The linear functions show from what distance road transport and rail transport are worth combining.

The graph shows changes in the transport distance limit may be reduced or discounted rail contracts, instead of loading the plus or the failover application. In this case, if the commonly used 4 loading is reduced by 1 that results in 7 km shorter minimum transport-distance. The number of loadings and the economical transport-distance are in direct proportionality.

The costs and thus the transport distance limit also change, if transport commissions are also taken into account, which is to be paid by the forest holdings, if transport is organized through contractors.

Conclusions

The nomogram presented in the present study, can only be used as an explanatory tool. The results are based on a series of strategic calculations, which should not be applied in actual cases directly. However the method can be adapted to concrete circumstances on a 'mutandus mutandis' basis. The z_1 distance road transport of forest subcompartment you'd like to determine the level and the

local conditions in accordance with the established formula and a computer program to quickly sh exactly calculable.

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