

DEVELOPMENT OF ROAD FREIGHT TARIFF

TVORBA TARIFY CESTNEJ NÁKLADNEJ DOPRAVY

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Summary: The paper deals with the issue of tariff-making of national road freight transport in the SR. It describes the possibility of using the indicative rates up of association ČESMAD Slovakia through its conversion. The contribution shows the possibility to apply to use their own average speed of the carrier in the preparation of tariffs. The paper elaborated a model example of conversion rates.

Key words: tariff, road, transport, valuation

Anotácia: Príspevok rozoberá problematiku tvorby tarify vo vnútroštátnej cestnej nákladnej doprave v SR. Popisuje možnosť použitia Orientačnej tarify zostavenej združením ČESMAD Slovakia prostredníctvom jej prepočítania. Taktiež v príspevku je poukázaná možnosť aplikovať použitie vlastných priemerných rýchlostí dopravcu pri zostavení tarify. V príspevku je spracovaný modelový príklad prepočítania tarify.

Kľúčové slová: tarifa, cestná, doprava, oceňovanie

1. INTRODUCTION

In Slovakia the national road freight transport are not available since 1993 no reference tariffs. Orientation tariff, prepared by an association ČESMAD Slovakia, was developed in 1993 based on the cost level of that period. The rate of Orientation tariff does not cover the cost of haulers. Goal of this paper is to describe the process by which the carrier can find cover of costs. Also goal of the paper is to describe the process of converting the tariff rates to meet the costs of the carrier.

2. CALCULATION OF THE LAST RECOMMENDED TARIFF IN SLOVAKIA FOR DOMESTIC TRANSPORTATION – ORIENTATION TARIFF

In 1993 was issuance Orientation tariff for performance rating in domestic freight road transport. As result from title this tariff has only orientation nature

The price list and carriage fees must be calculated in consideration of concrete operation conditions of carrier. Considering that the tariff go out from ways for creation of price list

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which is suitable for wood transportation was the tariff use by salutationists as one of possible solution.

It is necessary consider in carriage fees:

- type of vehicle (flat car, stakes vehicle, etc),
- vehicle equipment (vehicle hoist, hydraulic arm, capstan etc.),
- nature of transportation performance,
- execution of qualitative and quantitative conditions of contract ,
- delivery speed of shipment,
- backward payload of vehicle by one customer,
- ride in terrain, urban driving etc.

In regard to above rules and changes which occur in some costs input it is necessary modify price list 1 (table 1) and 3 (table 2) to conditions of concrete road carrier.

Tab. 1 - Price list 1

Item	Tariff zone with cargo in km	Rate (Sk/1 km) in related tariff zone at shipment weight by tonnes/m ³ (tariff level)					
		4/16	6/24	11/44	16/64	25/100	over 25/100
	(km)						
11	1	16,60	21,00	25,40	30,10	31,50	32,40
	5	14,80	19,40	23,70	27,90	29,10	30,00
	10	14,30	18,90	23,10	27,10	28,40	29,40
	20	13,30	18,10	22,20	26,00	27,20	27,90
	50	12,20	16,90	20,70	24,40	25,70	26,20
	100	11,70	16,40	20,20	23,90	25,20	25,60
	for 1km over 100	11,50	16,20	19,90	23,30	24,80	25,30
12	Rate for 15 minutes of vehicle downtime	21,40	28,00	28,40	32,50	35,90	36,00

Source: [1]

Tab. 2 - Price list 3

Item.	activity	Rate (Sk) for vehicle using (capacity weight/loading space in tonnes/m ³)					
		4/16	6/24	11/44	16/64	25/100	over 25/100
	(15 min)						
31	15 min. of total using time of vehicle	33,50	55,20	58,70	63,30	70,60	74,80

Source: [1]

At modification is necessary go out from price list of orientation tariff. These price list are presented in tables 1 and 2. In price list 1 are the rates specified for 1 km of drive with

cargo (moved transportation distance in km) and for 15 minutes of vehicle downtime. In price list 3 are the rates specified for 15 minutes of vehicle using (total time start when vehicle leave form its location and end when vehicle go back).

Economic and structural pattern of price lists 1 and 3 (in case of transportation for same customer) disallow their mutual combination. The rates in price lists are round to whole 15 minutes include initiated (for time rates) or to whole Sk (for carriage fees).

When was creating this tariff we considered following facts:

- composition of fleet,
- rates digression in tariff zones depending of vehicle average speed in usual traffic,
- annual operating time 2000 hours which including period related with transport output (that mean ride time and handling time including downtime cause by customer),
- drive utilization of vehicle abreast of 50 %.

It is necessary to notice that in rates which are presented in original price lists are average operational, technical and organizational cost (include labour costs and mission allowance costs) to one driver and this rates was calculated on 1.1.1993).

So if we want use this price lists it is necessary update their. Update depending on changes in costs inputs and others economic conditions and of course of total costs of concrete hauler.

2.1 Verification of Orientation tariff's usability for needs of hauler

The basic information important for deduction of costs level calculated into tariff rate is the method of determination of rate schedule no. 3 of Orientation tariff. These rates create in individual tariff levels the sum of items no. 12 of rate schedule no. 1 and costs for passing 4km in 15 minutes of operation. It means, that $\frac{1}{4}$ from the difference between time-dependent rate (rate schedule no. 3) and item no. 12 of rate schedule no. 1 corresponds to considered costs for 1 km of journey (fuel, lubricants, maintenance and repair works and other material costs related to journey). For example for the vehicle of tariff level "25 tonnes" is valid following:

$$S_{\text{km}} = \frac{70,60 - 35,90}{4} = 8,675 \text{ Sk / 1km}$$
$$S_{\text{EUR}} = \frac{S_{\text{km}}}{\text{konver} \cdot \text{kurz}} = \frac{8,675 \text{ Sk / km}}{30,126} = 0,2880 \text{ eur/ km}$$

The essential part of vehicle's product price in 1993 (tariff level "25 t") is 0,2880 eur/1 km (variable costs) and 35,90 Sk/15 min. of product duration time (fixed costs), this is 1,19 eur/15 min.

Tab. 3 - Decomposition of input costs into costs items

No.	Cost item	1 km	1 hour of operation
		column no. 1	column no. 2
1.	Fuel and lubricants		
2.	Tires		
3.	Repairs and maintenance		
4.	Driver's wage and taxes		
5.	Depreciation of vehicle		
6.	Journey-money		
7.	Other direct costs		
8.	Indirect costs		
9.	Total costs	0,2880	
10.	Profit		4,5 % from purchase costs
11.	Price of product	0,2880	1,19 x 4 = 4,76 eur

Source: the author's own processing

Detailed decomposition of these input rates into costs items is shown in table 3. The division of costs (costs items) and calculation items are there in principle the same as in calculation of product price. However the decomposition of rates into individual price items doesn't come out from annual costs summary, but is adapted to unit formulation of these rates.

From the table we can see, that if we fill in own costs into 1st and 2nd row in 1st column, i.e. operation costs of vehicle calculated per 1 km, then the difference between sum of both of these items and the tariff in row 9 respectively 11 should be sufficient for covering costs of repair and maintenance (row 3) and other direct costs related with operation of the vehicle.

On the basis of input items of vehicle for transporting wood, there are calculated cost tariff rates increased by profit for wood transport - in table 4 for vehicles with hydraulic hand. When comparing calculated costs increased by 10%-profit, we can state that rates of Orientation tariff neither cover operator's price when assuming distance-dependent cost (operator's costs – 0,890 eur/km are higher than Orientation tariff's costs 0,288 eur/km) nor time-dependent costs (operator's costs – 28,96 eur/h are higher then Orientation tariff's costs 4,76 eur/h). From that reason it is necessary to recalculate the tariff when assuming its utilization.

Tab. 4 - Calculation of costs for driving unit with hydraulic hand according to current level with reference to Orientation tariff

Cost item	Per 1 km	Per 1 hour of operation
Fuel	0,558	x
Motor oil	0,018	x
Gear oil	0,001	x
Tires (tractor)	0,048	x
Tires (trailer)	0,035	x
Repair service	0,040	x
Maintenance	0,010	x
Toll	0,100	x
Driver`s labour costs and taxes	x	10,23
Depreciation (tractor)	x	8,48
Depreciation (trailer)	x	1,97
Journey-money	x	0,60
Mandatory insurance	x	0,37
Accident and other insurance	x	1,59
Vehicle`s operation tax	x	0,95
Parking costs	x	0,37
Overheads	x	1,77
Total own costs	0,809	26,33
Profit of hauler	0,081	2,633
Price	0,890	28,964

Comparison with Orientation tariff	0,288	4,76
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Source: the author's own processing

2.2 Recalculation of Orientation tariff to actual cost level

Since the rates of Orientation tariff not cover the costs of carrier it is necessary these rates recalculated according actual carrier`s costs:

- 0,890 eur/km in case of costs which depending on moved distance,
- 4,76 eur/h in case of costs depending on working time of vehicle.

For establishment of new rates according to transporters costs is needed to calculate the speed of semi-trailer unit from native rates according to correlation:

$$v_t = \frac{(\text{item 12 rate} \cdot 1) \cdot 4}{\frac{\text{item 11 rate} \cdot 1}{2} - s_{km}} \text{ (km / h)}$$

Tab. 5 - Average speeds of semi-trailer unit establish on basis of rates of Directory tariff

Item.	Tariff zone in km with load to	Rate in Sk/1km in proper tariff zone with weight of consignment max. ton/ m ³ (tariff degree)			
		(km)		25/100	V _t (km/h)
11	1			31,50	20,297
	5			29,10	24,443
	10			28,40	25,991
	20			27,20	29,157
	50			25,70	34,395
	100			25,20	36,586
	per 1km over 100			24,80	38,550
12	Rate for 15 min. of service vehicle stoppage			35,90	

Source: the author's own processing

Tab. 6 - Estimative speed for tariff rates processing in km/h

Low-water mark of tariff zone	Upper limit of tariff zone	Average speed January 2008	Average speed February 2008	Average speed March 2008	Average speed 1.-3. 2008	Estimative average speed
1	10	24,5	19,5	-	22,00	22,00
11	20	46,3	25,1	56,5	42,63	33,57
21	30	32,8	22,7	57,7	37,73	36,47
31	40	38	34,1	42,6	38,23	38,53
41	50	49,6	44,3	45,5	46,47	40,13
51	60	28,9	36,2	35,7	33,60	41,43
61	70	33,6	41,3	47,9	40,93	42,54
71	80	46,2	49,5	46,8	47,50	43,49
81	90	42,5	46,8	46,5	45,27	44,34
91	100	45,9	47,8	50,4	48,03	45,09
101	110	46,4	46,7	51,6	48,23	45,77
111	120	43,4	47,6	51,4	47,47	46,40
121	130	43,2	46,6	46,6	45,47	46,97
131	140	46,6	49,5	52,6	49,57	47,50
141	150	45,1	49,5	48,4	47,67	47,99
151	160	49,8	52	51,5	51,10	48,46
161	170	49,1	49,9	49,1	49,37	48,89
171	180	46,6	47,4	52,3	48,77	49,30
181	190	49,8	50,2	52,4	50,80	49,69
191	200	53,7	53,1	55,5	54,10	50,05
201	210	48,9	50,4	49,8	49,70	50,40

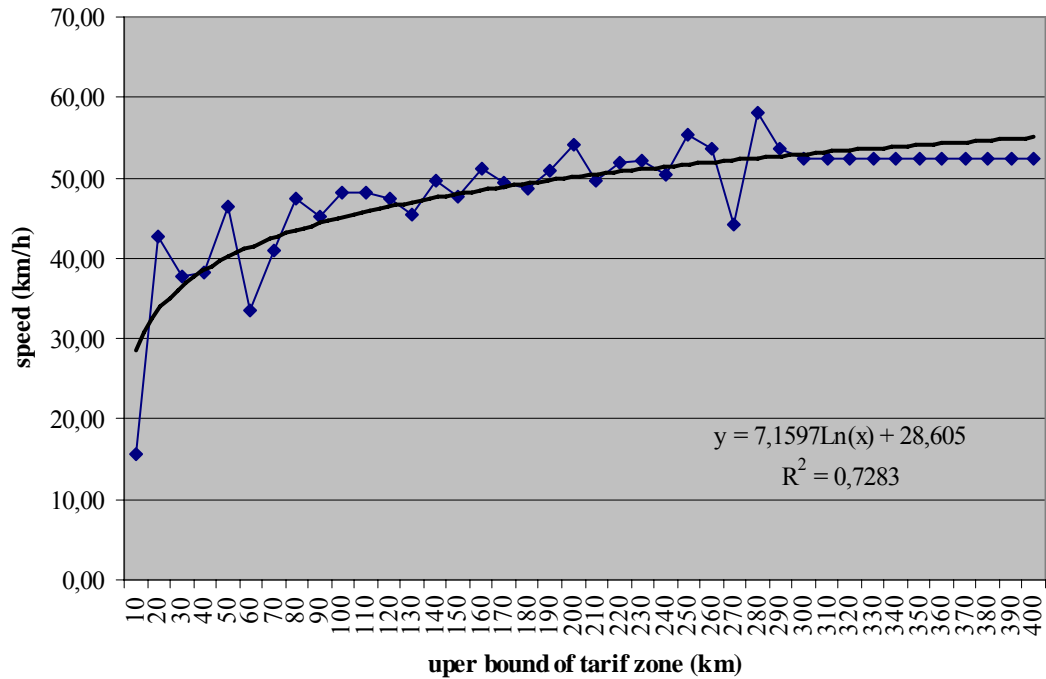
Low-water mark of tariff zone	Upper limit of tariff zone	Average speed January 2008	Average speed February 2008	Average speed March 2008	Average speed 1.-3. 2008	Estimative average speed
211	220	48,9	52,6	53,9	51,80	50,74
221	230	52,3	53,2	50,6	52,03	51,05
231	240	50,8	51,4	48,6	50,27	51,36
241	250	52,9	56,5	56,6	55,33	51,65
251	260	51,8	54,4	54,5	53,57	51,93
261	270	31,7	47,4	53,2	44,10	52,20
271	280	56,4	58,5	59,1	58,00	52,46
281	290	52	52,8	55,8	53,53	52,71
291	300	47	54,6	55,8	52,47	52,96
301	310	47	54,6	55,8	52,47	53,19
311	320	47	54,6	55,8	52,47	53,42
321	330	47	54,6	55,8	52,47	53,64
331	340	47	54,6	55,8	52,47	53,85
341	350	47	54,6	55,8	52,47	54,06
351	360	47	54,6	55,8	52,47	54,26
361	370	47	54,6	55,8	52,47	54,46
371	380	47	54,6	55,8	52,47	54,65
381	390	47	54,6	55,8	52,47	54,84
391	400	47	54,6	55,8	52,47	55,02

Source: the author's own processing of documents [4]

In table 5 are calculated speeds. Suppose that the carrier requires tariff rates after 10 km to 400 km distance by the prepared of adjusted rates of Orientation tariff, we will appear from true speeds of semi-trailer units, which are achieve by the wood transport. In table 6 are typified average speeds of transports of specific carrier from January to March 2008, which are marshalled by tariff zones. Tariff zones over the 300 km are consider in one group in term of speeds (the same speed), because we didn't keep at disposition the sufficient in numbers of transports.

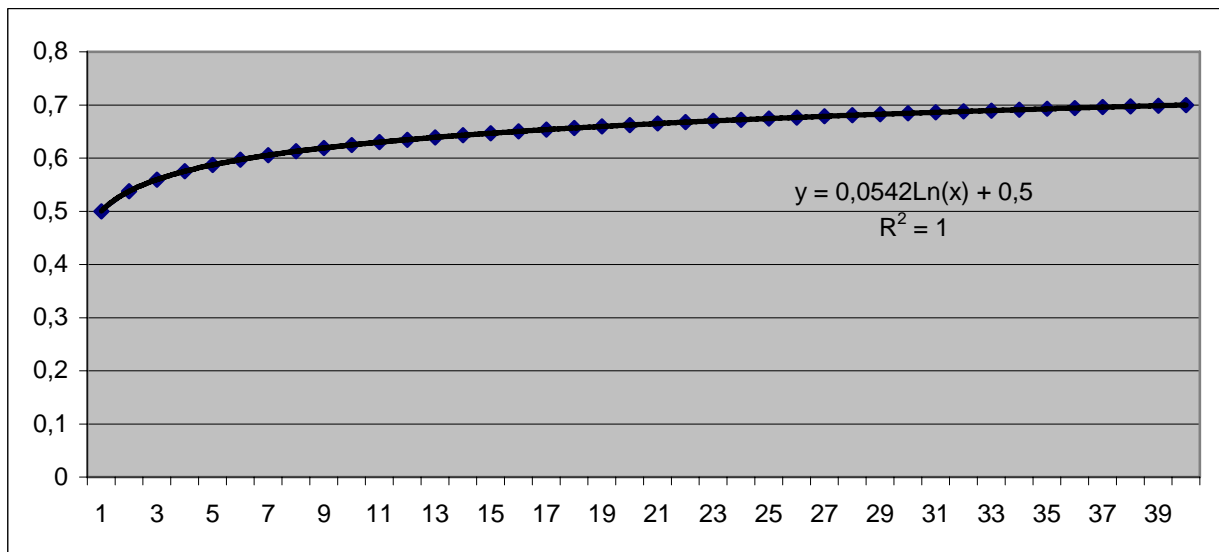
By development comparison of achieve speeds is possible to state, that the speed is expressively varied and with distance progressive it doesn't have only non-decreasing character. From this reason is in figure 1 progress of speed depending up tariff zone, which is reversed by smooth line following which are estimated average speeds in km/h for each tariff zone (Table 6). Exception introduces first tariff zone, by which the assessment didn't have adequate predicative ability and from this reason being applied average speed 22 km/h by this assessment.

Accordingly with distance progressive is requirement of driving utilization coefficient growing. Here is needed to emphasize that by the stake truck is backward utilization expressively delimited. From this reason is maximum possible driving utilization of vehicles by distance max. 400km consider with coefficient 0,7. In figure 2 is typified the severance of coefficient amounts depending up tariff distance.



Source: the author's own processing

Fig. 1- Estimated speeds on the basis of evidence from the operation of vehicles



Source: the author's own processing of documents [4]

Fig. 2 - Severance of driving utilization coefficient depending on tariff zones

Then for each tariff zone is possible to establish the tariff rate in dependence on costs, which are dependent form passed distance, estimative speed and establishment of driving utilization coefficient, according to next correlation:

$$S_x = \frac{S_{km} + \frac{Sh}{v_t}}{\beta}$$

Final rates included 10 % transporters profit per 1 passed kilometre by loading vehicle are typified in table 7 for semi-trailer unit with.

Tab. 7 - Adjusted rates of Orientation tariff for the semi-trailer unit with the hydraulic arm

Tariff zone (km)		Rate in eur per 1 km (20 t)	Rate in eur per 1 ton
1	10	4,23	2,11
11	20	3,08	3,08
21	30	2,83	4,25
31	40	2,68	5,36
41	50	2,57	6,43
51	60	2,49	7,48
61	70	2,43	8,50
71	80	2,37	9,50
81	90	2,33	10,48
91	100	2,29	11,45
101	110	2,26	12,41
111	120	2,23	13,35
121	130	2,20	14,29
131	140	2,17	15,22
141	150	2,15	16,13
151	160	2,13	17,05
161	170	2,11	17,95
171	180	2,09	18,85
181	190	2,08	19,74
191	200	2,06	20,63
201	210	2,05	21,51
211	220	2,03	22,38
221	230	2,02	23,25
231	240	2,01	24,12
241	250	2,00	24,98
251	260	1,99	25,84
261	270	1,98	26,70
271	280	1,97	27,55
281	290	1,96	28,40
291	300	1,95	29,24
301	310	1,94	30,08
311	320	1,93	30,92
321	330	1,92	31,76
331	340	1,92	32,59

Tariff zone (km)		Rate in eur per 1 km (20 t)	Rate in eur per 1 ton
341	350	1,91	33,42
351	360	1,90	34,24
361	370	1,90	35,07
371	380	1,89	35,89
381	390	1,88	36,71
391	400	1,88	37,53

Source: the author's own processing

3. CONCLUSION

In the national road transport of cargo exist transports that can be assessed only on tariffs. In particular, shipments to several customers. In these cases it is not possible making price based on existing tariff in Slovakia, or to convert to euro conversion rate only. Tariffs need to be established on the basis of production cost carrier's own average speed and the use of the vehicle fleet. The procedure in this paper provides guidelines by which it is possible to Orientation tariffs converted to actual conditions of the carrier.

LITERATURE

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