### Annex 7
### Methodology of determining categories of individual line sections

For determining charges of running of trains, three line categories must be established because of differences in quality of certain sectors of the infrastructure (quality criteria of the infrastructure):

- lines of category I

- lines of category II

- lines of category III

Categorisation of certain open line infrastructure sections is based on categorisation parameters showed by the table. Parameters must be taken into consideration with weighting values as follows:

| | Categorisation parameters | Weight value (%, $\alpha_i$) | Factors defining service quality |
|---|---|---|---|
| Track parameters | Track speed (km/h) ($\alpha_1$) | 15 | Reduced speed applicable on the section because of permanent signal warning to slow down |
| | Axle load (ton) ($\alpha_2$) | 15 | Axle load permitted on the track section |
| | Number of tracks ($\alpha_3$) | 15 | One / two / more |
| | Electrification ($\alpha_4$) | 10 | yes / no |
| Parameters of signalling and communication | Station signalling and safety installation($\alpha_5$) | 5 | Type of station signalling and safety installation used on the track section |
| | Line signalling and safety installation ($\alpha_6$) | 5 | Type of line signalling and safety installation used on the track section |
| | Ground-train radio ($\alpha_7$) | 5 | GSM-R/ yes/ no |
| | Train protection ($\alpha_8$) | 5 | Train protection system used on the track section |
| Traffic parameters | Number of blocks ($\alpha_9$) | 5 | Number of blocks on the track section |
| | Type of traffic control ($\alpha_{10}$) | 10 | Type of traffic control on the track section |
| Economical parameters | Capacity utilisation ($\alpha_{11}$) | 10 | Shows marketability, exploitation of the track section (number of allocated train paths) |

## *Criteria defining the service quality of railway lines*

After determining categorisation parameters characterizing the quality of the track section, the sections have to be ranked as a line of category I, or II or III as follows. Scales and quality multiplier values ($\beta_j$) belonging to certain categorisation parameters can be seen below under the same title.

Quality value of the track section (open line index):

$$Sz = \sum_{i,j=1}^{12} (\alpha_i x \beta_j)$$

- If $Sz \geq 0{,}7$, the line section belongs to category I.

- If $0{,}7 > Sz \geq 0{,}4$, the line section belongs to category II

- If $Sz < 0{,}4$, the line section belongs to category III.

### *Quality multiplier values ($\beta_j$) belonging to categorisation parameters characteristic of the individual track section*

    *1.*    <u>Track speed</u> *($\beta_1$)*

| *Maximum speed applicable on the track section* | $\beta_S$ |
|---|---|
| s < 20 km/h | 0 % |
| 20 km/h =< s < 40 km/h | 20 % |
| 40 km/h =< s < 60 km/h | 40 % |
| 60 km/h =< s < 80 km/h | 60 % |
| 80 km/h =< s < 100 km/h | 70 % |
| 100 km/h =< s < 120 km/h | 80 % |
| 120 km/h =< s | 100 % |

    *2.*  *<u>Axle load</u> ($\beta_2$)*

$\beta_2$ = maximum axle load applicable on the track section / *22,5 (ton)* × 100%

    *3.*    *<u>State of electrification</u> ($\beta_3$)*

$\beta_3$ = 100%, if the section is electrified, in other cases $\beta_3$ = 0%

4. _Number of tracks ($\beta_4$)_

$\beta_4$ = 100%, if the section is a double track or multiple-track section, in any other case
$\beta_4$ = 0%

5. Type of line signalling and safety installation _($\beta_5$)_
*The following quality multiplier can be applied depending on the type of line signalling and safety installation used on the given line section:*

| Type of line signalling and safety installation | $\beta_5$ |
|---|---|
| No, V reporting | 0 |
| SH | 40 |
| EB, SH ell., RPB, Sz ell., SIEMBA | 90 |
| AUTV, ZG 62 | 100 |

Abbreviations of the above tables stand for:

| V reporting | train reporting safety equipment |
|---|---|
| SH | Siemens & Halske type block system |
| EB | Contra flow-run safety equipment |
| SH ell. | Siemens & Halske type block system with contra-flow-run support |
| RPB | Slovak contra-flow-run safety equipment |
| Sz ell. | Soviet contra-flow-run safety equipment |
| SIEMBA | Siemens electronic contra-flow-run safety equipment |
| AUTV | automatic block with train protection |
| ZG 62 | Alcatel contra-flow-run safety equipment |

6. Type of station signalling and safety installation _($\beta_6$)_
*The following quality multiplier can be applied depending on the type of station signalling and safety installation used on the given line section:*

| Type of station signalling and safety installation | $\beta_6$ |
|---|---|
| No installation or EÁ | 0 |
| NBJF | 15 |
| KA, KAE | 25 |
| KR | 35 |

| ER, SH, FM, VES, INT-VES | 80 |
|---|---|
| FOND, INT, D55, KA69, SZKA, WSSB, D70V, ESTW-ELEKTRA-D55, KSW-90 | 90 |
| D67, D70, SZT, ELEKTRA, SIMIS | 100 |

Abbreviations of the above tables stand for:

| | |
|---|---|
| EÁ | Other station and branching-off equipment |
| NBJF | Not interlocked protective signal equipment |
| KA | Point lock key-identifier equipment |
| KAE | Single-centre point lock key-identifier equipment |
| KR | Point lock key-fastening equipment |
| ER | Control-locking safety equipment |
| SH | Siemens-Halske route protection equipment |
| FM | Light-signal mechanical equipment |
| VES | Electro-dynamic safety equipment |
| INT-VES | Integra and electro-dynamic safety equipment |
| FOND | Dinamo-55-type relay-dependent safety equipment without sensation of track occupation |
| INT | Integra single-centre relay-dependent safety equipment |
| D55 | Dominó 55 type relay-dependent safety equipment |
| KA69 | KA69 small station relay-dependent safety equipment |
| SZKA | Soviet small station safety equipment |
| WSSB | NDK small station relay-dependent safety equipment |
| D70V | Dominó 70 type, train-route relay-dependent safety equipment (no shunting route) |
| ESTW-ELEKTRA-D55 | Alcatel type electronic and Dominó 55 type safety equipment |
| KSW-90 | Alcatel type small station relay-dependent equipment |
| D67 | Dominó 67 type shunting route relay-dependent equipment |
| D70 | Dominó 70 type, shunting route relay-dependent equipment |
| SZT | Soviet type safety equipment |
| ELEKTRA | Alcatel electronic safety equipment |

| SIMIS | Siemens electronic safety equipment |
|---|---|

### 7. Ground train radio($\beta_7$)

$\beta_7$= 100%, if GSM-R system is in operation on the track section. If ground train radio is in operation, $\beta_7$= 60%, in any other case $\beta_7$= 0%.

### 8. Train protection ($\beta_8$)

*The following quality multipliers can be applied depending on the type of train protection system used on the given track section:*

| *Type of train protection system working on the track section* | $\beta_8$ |
|---|---|
| No protection system | 0 % |
| Indusi, EVM | 60 % |
| automatic block system (AUTV) | 80 % |
| ETCS | 100 % |

### 9. Number of blocks ($\beta_9$)

Track section can be modelled by the number of blocks on a 1,5 km long section. (Standard length of a block is 1,5 km)

Method of calculation of the parameter value: Number of blocks on the track section / (length of the track section (km) / 1,5) * 100. If the value is higher than 100%, the maximum value shall be used concerning the parameter.

### 10. Types of line traffic control ($\beta_{10}$)

| *Type of line traffic control* | $\beta_{10}$ |
|---|---|
| Operation controlled | 30 % |
| MEFI, MERÁFI | 50 % |
| KÖFE | 70 % |
| Remote controlled, KÖFI | 100 % |

## 11. Capacity utilisation ($\beta_{11}$)

Value of capacity-utilisation shall be defined on the basis of the daily average number of allocated train paths resulting from data issued two years in advance of the entry into force of the Networks Statement for the given timetable year.

| Daily Average number of allocated train paths | $\beta_{11}$ |
|---|---|
| 0-10 | 30 % |
| 11-20 | 50 % |
| 21-30 | 70 % |
| 31-50 | 80 % |
| 51- | 100 % |