# UIC CODE 714

4th edition, February 2009

*Original*

**R**

## Classification of lines for the purpose of track maintenance

*Classification des voies des lignes au point de vue de la maintenance de la voie*
*Klasseneinteilung der Streckengleise vom Gesichtspunkt der Gleiserhaltung*

UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBAHNVERBAND
INTERNATIONAL UNION OF RAILWAYS

## Leaflet to be classified in Volume:

VII - Way and Works

## Application:

With effect from 1st February 2009
All members of the International Union of Railways

## Record of updates

| | |
|---|---|
| **1st edition, January 1963** | First issue entitled "Classification and coding of lines for the purpose of track maintenance". |
| **2nd edition, January 1972** | Entitled: "Classification of lines for the purpose of track maintenance" |
| **3rd edition, January 1989** | |
| **4th edition, February 2009** | Computerisation of existing UIC Leaflet (3rd edition, January 1989).<br><br>Important:<br>The contents of the edition of January 1989 have not been changed. |

*The person responsible for this leaflet is named in the UIC Code*

# Contents

# Summary

Traffic loads are one of the key factors that have a direct bearing on track maintenance.

In order to facilitate economic studies and comparisons between the different infrastructure managers (IM), lines are classified into several groups depending on the type of traffic and on the loads they carry.

For this purpose, a notional traffic value shall be used, allowing for the speed factor and the relative wear effect of axle-loads. The method used for calculating the notional traffic value for tracks over a particular line section and the classification adopted are specified below.

# 1 - Theoretical traffic

Line classification shall be determined on the basis of a theoretical traffic load Tf expressed by the following formula:

$$Tf = Sv \cdot (Tv + Kt \cdot Ttv) + Sm(Km \cdot Tm + Kt \cdot Ttm)$$

Where:

| | |
|---|---|
| Tv | the mean daily passenger tonnage in gross tonnes hauled |
| Tm | the daily freight tonnage in gross tonnes hauled |
| Ttv | the mean daily tonnage of tractive units used in passenger traffic, in tonnes |
| Ttm | the mean daily tonnage of tractive units used in freight traffic, in tonnes |
| Km | a coefficient allowing both for the influence of the load and wear effect of freight bogies, and which normally corresponds to the following value:<br>Km = 1,15<br>and, for tracks handling heavy loads:<br>Km = 1,30 for traffic based primarily on 20 t axle-loads (> 50 % of traffic) or for a significant proportion of traffic with 22,5 t axle-loads (> 25 % of traffic)<br>or<br>Km = 1,45 for traffic based primarily on 22,5 t axle-loads (> 50 % of traffic) or for traffic largely consisting of 20 t or heavier axle-loads (> 75 % of traffic) |
| Kt | a coefficient that allows for the traction-motor axle wear factor, and is equal to 1,40. |

Sv and Sm are coefficients that allow for train running speeds.

Sv relates to the speed of the fastest passenger trains.

Sm relates to the speed of ordinary freight trains.

These coefficients shall be assigned the following values:

| | | | | |
|---|---|---|---|---|
| Sv (Sm) = | 1,00 when | | V ≤ | 60 km/h |
| Sv (Sm) = | 1,05 when | 60 km/h < | V ≤ | 80 km/h |
| Sv (Sm) = | 1,15 when | 80 km/h < | V ≤ | 100 km/h |
| Sv (Sm) = | 1,25 when | 100 km/h < | V ≤ | 130 km/h |
| Sv = | 1,35 when | 130 km/h < | V ≤ | 160 km/h |
| Sv = | 1,40 when | 160 km/h < | V ≤ | 200 km/h |
| Sv = | 1,45 when | 200 km/h < | V ≤ | 250 km/h |
| Sv = | 1,50 when | 250 km/h < | V | |

# 2 - Track classification

The lines shall be classified into 6 groups, according to the value of their notional traffic, as indicated below:

| | | | |
|---|---|---|---|
| Group 1 .... | 130 000 t/j | < Tf | |
| Group 2.... | 80 000 t/j | < Tf ≤ | 130 000 t/j |
| Group 3.... | 40 000 t/j | < Tf ≤ | 80 000 t/j |
| Group 4.... | 20 000 t/j | < Tf ≤ | 40 000 t/j |
| Group 5.... | 5 000 t/j | < Tf ≤ | 20 000 t/j |
| Group 6.... | | Tf ≤ | 5 000 t/j |

# 3 - Line classification

1. Lines shall be classified track by track, but, should managers consider it advisable, they may include the two tracks (or more if necessary) on the same line or line section under the same category.

2. Notional traffic shall be calculated by line sections, demarcation of the sections being left to each IM's own judgment: for example, a section may be bounded by two junctions, or by one junction and one traffic centre.

3. The coefficient Sv (or Sm) may have the same value between the two extremities of the same line section even if, on this section, there are one or more portions where trains run slower than on the remaining part of the section, for different reasons (particularly alignment).
   The coefficients may even have the same values for all sections of the same line and correspond to the maximum speed allowed on these sections.

4. Each IM shall determine the value of tonnages Ttv and Ttm of tractive units by the most suitable method (use of statistics, special counts, approximate evaluation by means of a percentage or formula, in relation to the tonnage hauled).

In principle, passenger multiple units with axle-loads of more than 17 tonnes may be included in the tonnage of tractive units Ttv, the others being included in the passenger tonnage Tv.

Those IMs which only keep statistics on aggregate tonnages (tractive units + trailing stock) T'v and T'm defined below, and are unable to calculate Ttv and Ttm separately, may use the following formula:

$$Tf = \lambda v \cdot (Sv \cdot T'v) + \lambda m \cdot (Sm \cdot Km \cdot T'm)$$

where:

| | |
|---|---|
| T'v | the daily mean passenger tonnage (tractive units + trailing stock) expressed in tonnes |
| T'm | the daily mean freight tonnage (tractive units + trailing stock), expressed in tonnes. |

Sv and Sm have the values shown in point 1 - page 2.

$\lambda v$ and $\lambda m$ are coefficients that allow for the wear effect of tractive-unit axles and of the percentage they represent in overall freight and passenger tonnages.

These coefficients shall have the following values:

$\lambda v$ = 1,08 when the bulk of traffic is moved in hauled trains, with tractive units accounting for about 20 % of the overall tonnage of passenger trains;

or

$\lambda v$ = 1,05 when a significant proportion of passenger traffic is moved by motor trainsets, with the tonnage of tractive units accounting for about 12 % of the overall tonnage of passenger trains

$\lambda m$ = 1,02 when Km = 1,15

or

$\lambda m$ = 1,00 when Km = 1,30 or Km = 1,45,
with the tonnage of tractive units accounting in all these cases for about 10 % of the aggregate tonnage of freight trains.

## Warning



Printed by the International Union of Railways (UIC)
16, rue Jean Rey 75015 Paris - France, February 2009
Dépôt Légal February 2009

ISBN 978-2-7461-1160-8 (French version)
ISBN 978-2-7461-1161-6 (German version)
ISBN 978-2-7461-1162-4 (English version)