GUIDELINES FOR THE APPROVAL OF HIGH SPEED LINES

by ir Hugo Goossens

Purpose of these guidelines

- Assisting in the understanding and application of the general procedure
- Providing pointers for the implementation of the different approval stages, and particularly the dynamic tests
- Presenting measures and common principles to be followed in the approval procedure

Approval of a High Speed Transport System

- New rolling stock on an existing, approved line
- New (upgraded) line with rolling stock already approved on a (similar) HS Line

- New line and new rolling stock

The approval process

(quasi) STATIC TESTS

√ MAX + 160 km/h

- Design review
- Acceptance materials
- Check during manufacturing
- Static-tests/subsystem
- Static-integration tests

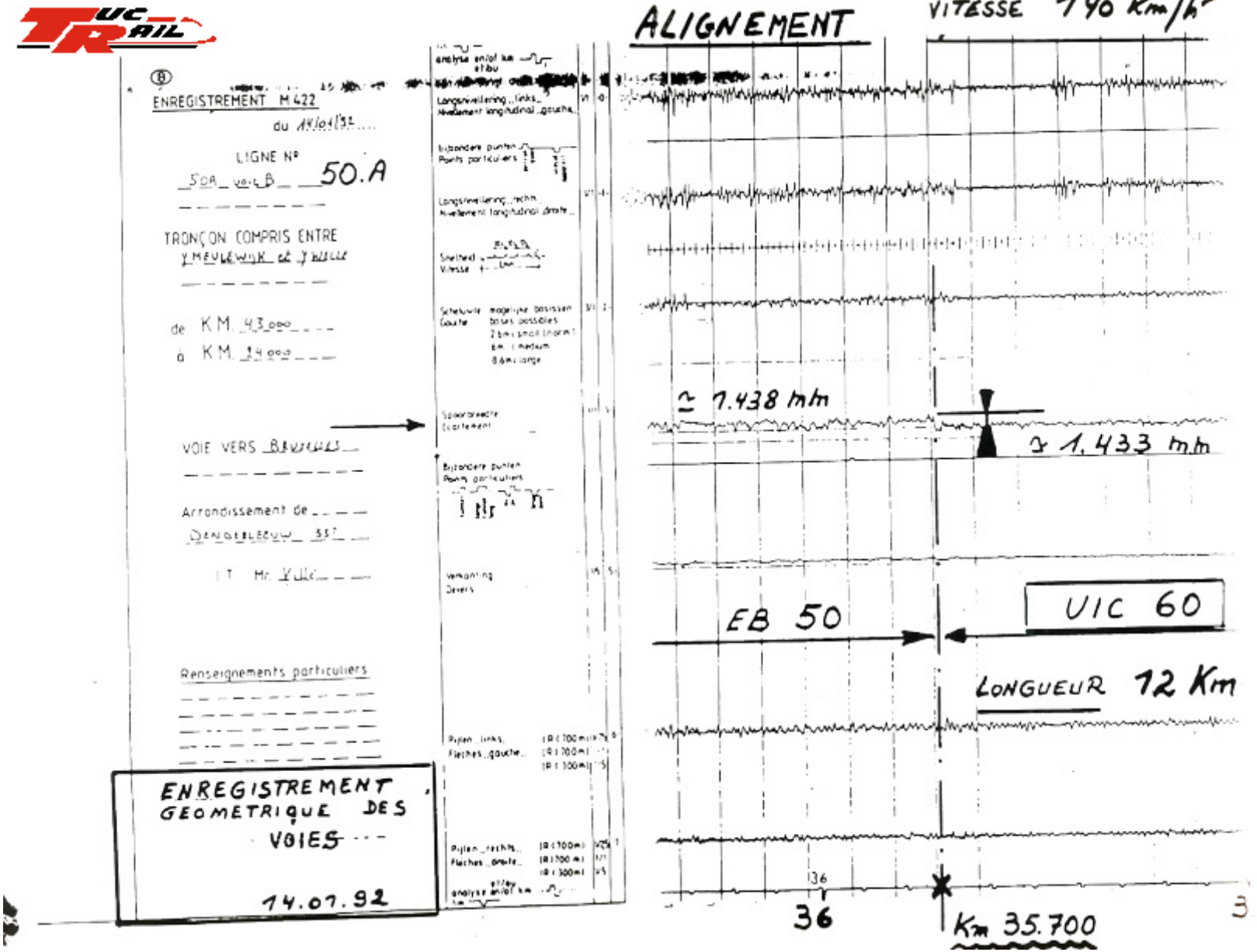
DYNAMIC TESTS

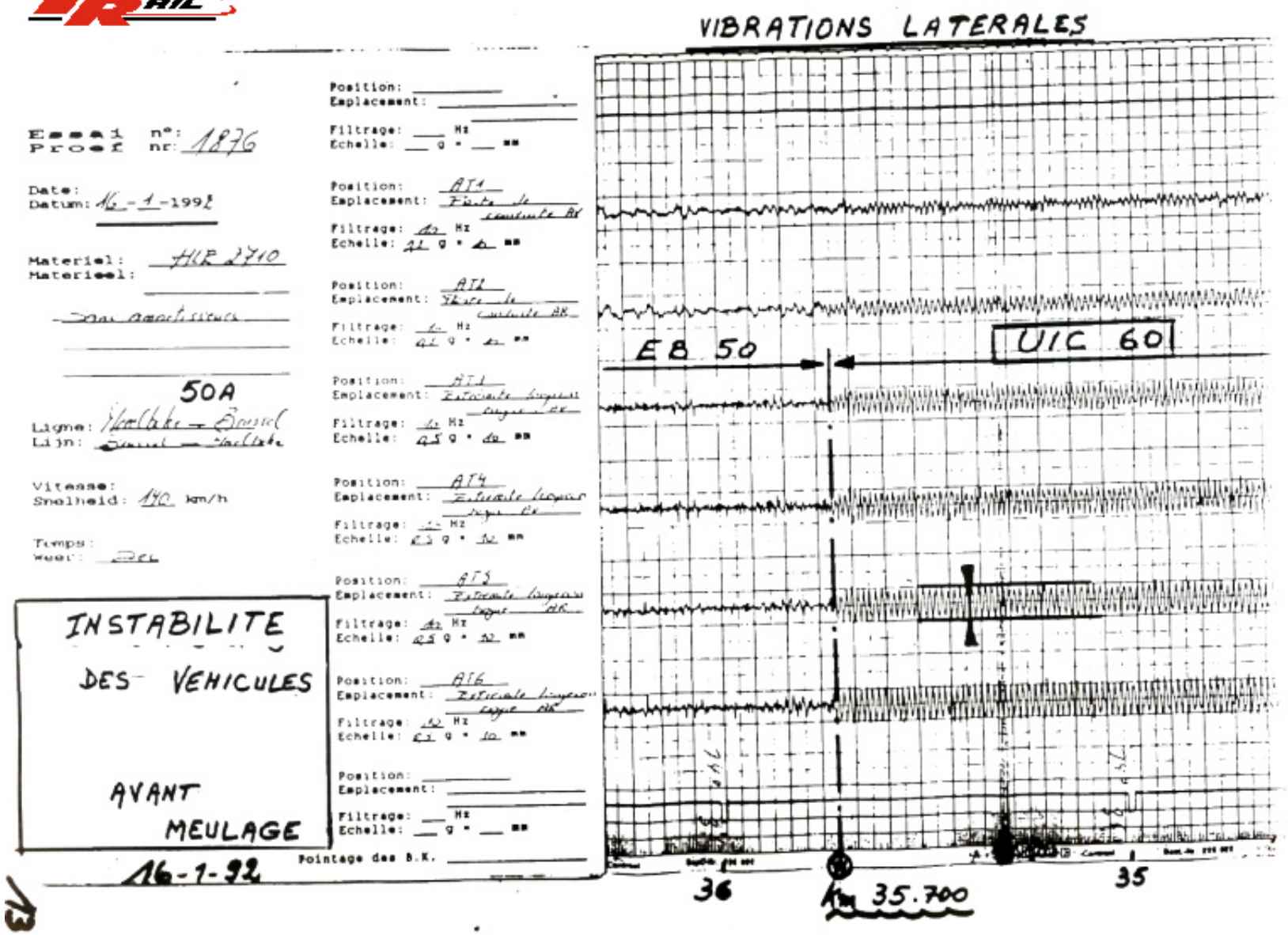
MAX + √ DESIGN + 10%

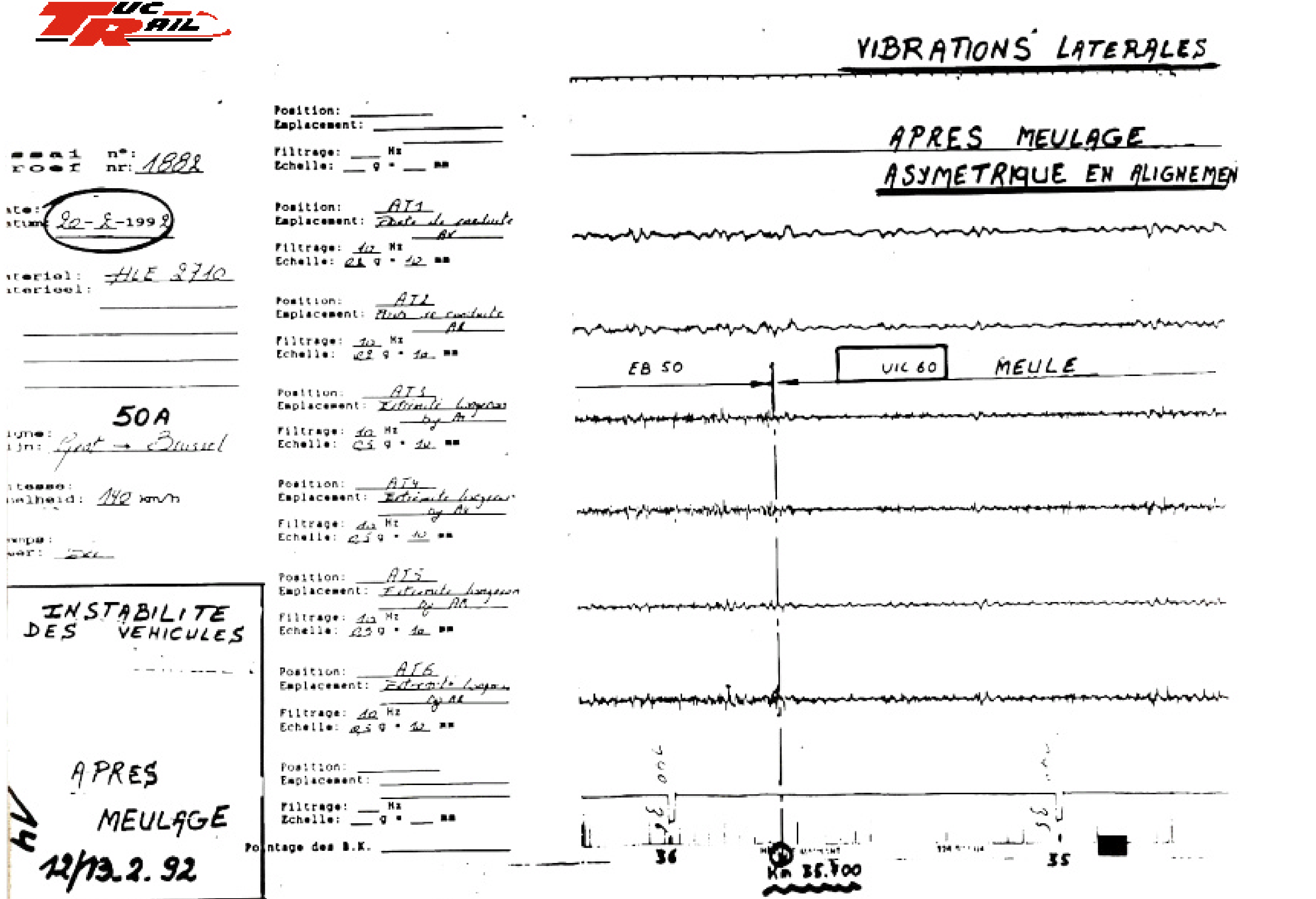
Why ?

STATIC TESTS ⟺ DYNAMIC TESTS

Track control geometry with measuring car ⟺ **Dynamic response Rolling stock**


ALIGNEMENT
VITESSE 140 Km/h
ENREGISTREMENT M 422
du 14/04/92
LIGNE N°
50A voie B 50.A
TRONÇON COMPRIS ENTRE
Y MEULEWIJK et Y HALLE
de KM 43.000
à KM 14.000
VOIE VERS BRUXELLES
Arrondissement de
DENDERLEEUW 557
Mr. Vdc
Renseignements particuliers
ENREGISTREMENT GEOMETRIQUE DES VOIES
14.07.92
≃ 1.438 m/m
≃ 1.433 m/m
EB 50
VIC 60
LONGUEUR 12 Km
36
Km 35.700


VIBRATIONS LATERALES
Essai n°: 1876
Proef nr:
Date: 16-1-1992
Datum:
Materiel: HLP 2710
Materieel:
50A
Ligne: Vierzon - Bourges
Lijn: Bourges - Vierzon
Vitesse: 140 km/h
Snelheid:
Temps:
Weer:
INSTABILITE
DES VEHICULES
AVANT
MEULAGE
16-1-92
Position:
Emplacement:
Filtrage: Hz
Echelle: g = mm
Position: AT1
Emplacement: Face de roulement AV
Filtrage: 10 Hz
Echelle: 2 g = 4 mm
Position: AT2
Emplacement: Face de roulement AR
Filtrage: 10 Hz
Echelle: 2 g = 4 mm
Position: AT3
Emplacement: Extrémité longerons coque AV
Filtrage: 10 Hz
Echelle: 0,5 g = 10 mm
Position: AT4
Emplacement: Extrémité longerons coque AV
Filtrage: 10 Hz
Echelle: 0,5 g = 10 mm
Position: AT5
Emplacement: Extrémité longerons coque AR
Filtrage: 10 Hz
Echelle: 0,5 g = 10 mm
Position: AT6
Emplacement: Extrémité longerons coque AR
Filtrage: 10 Hz
Echelle: 0,5 g = 10 mm
Position:
Emplacement:
Filtrage: Hz
Echelle: g = mm
Pointage des B.K.
EB 50
UIC 60
36
35.700
35



TUC RAIL
VIBRATIONS LATERALES
APRES MEULAGE
ASYMETRIQUE EN ALIGNEMEN
nr: 1882
20-2-1992
HLE 2710
50A
Gent → Brussel
140 km/h
INSTABILITE DES VEHICULES
APRES MEULAGE
12/13.2.92
Position:
Emplacement:
Filtrage: Hz
Echelle: g = mm
Position: AT1
Position: AT2
Position: AT3
Position: AT4
Position: AT5
Position: AT6
Pointage des B.K.
EB 50
UIC 60
MEULE
36
35
Km 35.700

Dynamic integration AND approval tests

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Demonstrate that the infrastructure and its interfaces
work properly remain safe
with a high degree of comfort

Tests can be carried out

- In single-unit and multiple unit composition
- With push and pull train sets
- With train sets with different types of pantographs or different positions of the pantographs
- With wheel sets on the maximum level of wear

Minimum tests

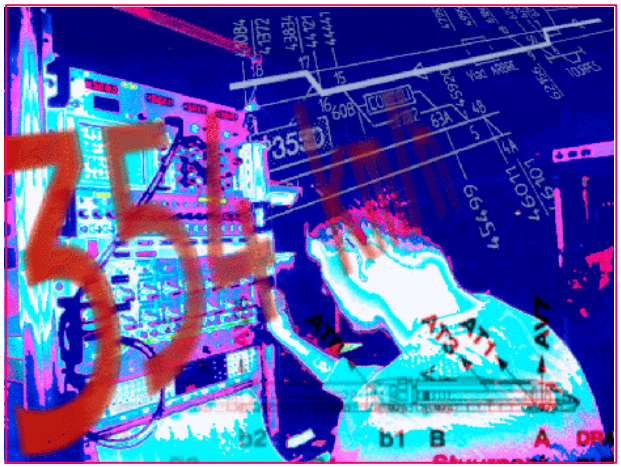
- Recording of vertical and horizontal measurements
  - of accelerations in the driver's cab,
  - in a coach and on bogies
- Video recording of the contact between pantograph and the overhead wire
- Recording of the contact force between pantograph and overhead wire
- Observation of the behaviour of the overhead line from the rear cab
- Registration of the running speed
- Control of the signalling and telecommunication systems

Optional measurements

- Measuring of the uplift of the overhead line
- Counting of the number of arcs and their duration
- Measure of the tympanic pressure in a coach (tunnels)
- Measure of the running noise (wheel-rail contact)
- Measuring of noise and vibrations at various distances of the rail (bridges)
- Measuring of the slipstream effect of the train
- Measuring on sleepers, fastenings, pads, ...
- etc

Evolution of the dynamic tests

- Tests start from a limited speed (e.g. 160km/h) up to the design speed+10%
- Each possible route is in both directions



Other tests before opening the line

- Endurance tests
- Downgraded situations
- Disaster simulations

Method « 1+? »

- Number and the extend of the tests can be reduced for proven sub-systems insofar :
  - The test do not fall within the regulatory field (TSI or national regulations)
  - The agreement of the NOBO and the ministry is obtained

The technical approval file

- the technical approval file that accompanies the « EC » declaration must comprise :
  - **List of plans (civil works)**
  - **Acceptance documents**
  - **Test and control reports, … electrical and hydraulic diagrams**
  - **Description of the systems**
  - **References of the «**  **»**
  - **« EC » conformity declarations**
  - **Maintenance instructions**
  - **Limits of use**
  - **Derogations on the TSI**

Conclusions

- Validation and verification of the sub-systems of a high speed line according the TSI is a legal matter
- Approval of a new line with new rolling stock should be avoided
- To harmonise the approaches and process of approval of new lines UIC is drawing up a guide for the approval of new lines
- The process starts in the design phase and is completed with the dynamic tests at the design speed + 10%
- The state delivers the « CE » certificate