

# **CIRCULATION OF TRAMS-TRAINS**

## **ON THE FRENCH NATIONAL RAILWAY NETWORK**

*My presentation will concern the conditions of opening to traffic of the trams-trains services on the French national railway network.*

*It will be divided into 4 parts: a recall of the concept of tram-train, a typology of the various configurations and the description of 2 types of trams-trains in operation or in project.*

*In first place I will return on the concept of tram-train.*

### **Recall on the concept of tram-train**

- The tram-train is a system including a railway infrastructure adapted or not and a specific light rolling stock. An adaptation of the railway infrastructure can be necessary taking into account the least impact resistance of the tram compared to the railway rolling stock
- According to the performances of the rolling stock, it makes it possible to organize dense services by increasing the number of stops without damaging the time of total course

*After this return on the concept of tram-train, it is important to classify the trams-trains in various categories according to their type of operation.*

### **Typology of the various cases of application in France or border area**

- The tram-train can run on a dedicated line where no conventional train operates (example of the T2 tram in Ile de France La Defense / Issy Val de Seine and tram-train T4 Bondy / Aulnay which will run as from October 2006)
- Operation can be alternated with sequences "train" and sequences "tram-train" or "tram". It is the scheme carried on the T2 line of the tram of Montpellier which will come into service at the end of 2006.
- Operation can be completely mixed (example of the Sarrebrück / Sarreguemines line and the Genevese RER Bellegarde/Genève)
- Operation can be extended by an urban run (example of Mulhouse which is under construction but where the urban section is already in operation)

*I now will present you more in details two types of trams-trains : Bondy / Aulnay in Ile de France and that of Mulhouse under construction.*

### **1st example of application: T4 Bondy Tram-train/Aulnay (opening October 10, 2006)**

- The commercial operation is set up on 8 km between Bondy and Aulnay. The line is used by trains only as tram-train (AVENTO of SIEMENS)
- The line was refitted for the tram-train running with control at sight and urban road crossings instead of level crossings. Signals are set up only to protect points
- The electrification is maintained in 25 Kv 50 Hz
- The trams-trains use the conventional network to join the site of maintenance of Noisy le Sec (run without travellers). For that, they are fitted with the trains safety systems (cab signalling and speed control).

### **2nd example of application: Mulhouse tram-train/Vallée de la Thur (under construction)**

- The 30 km long line of tram-train will be divided into 3 technical sections : urban, dedicated and mixed
- Faced with single track sections we had to take into account the risk of nose-to-nose between trams-trains and trains (freight and passenger trains)
- Several innovations were improved for the project : selection prohibiting the access of running train other than trams-trains to the dedicated sections, identification of the trams-trains to delay the closing of the level crossings close to the stop point, creation of a new trade of "tram-train driver" in SNCF.

*To summarize, I will conclude on the advantages of the tram-train as regional railway transport system*

**Conclusion**

- The regional railway lines operation with light rolling stock makes it possible to collect new segments of customers, in particular in peri-urban areas.
- Safety must be guaranteed. Thus, the railway reference to retain for the tram-train in term of safety is, according to the operation mode (dedicated or mixed) the tram or the regional train
- The question of frontier zone must be particularly studied in the projects, as the interfaces between the railway and the urban fields managed by 2 different operators.

*Thank you for your attention !*

Jean-Paul Balensi



August 28<sup>th</sup>, 2006