

# "HIGH SPEED LINES IN FRONT OF CONVENTIONAL LINES. ADAPTATION OF CONVENTIONAL LINES TO HIGH SPEED"

Author: Arantzazu Ruano  
Tutor: Andrés López

## ABSTRACT

With the appearance of high speed railway a classification for rail Spanish lines has been traditionally realized, conditioned by the existent different track width: conventional lines and high speed lines. The different temporary context among both lines and the demands that each one requires supposes differences among them, so much from the point of view of the infrastructure as the construction and exploitation.

High speed, about 350 kph, that supposes less track deterioration and, therefore, less maintenance necessities can be reached if the quality and characteristics of the materials that compose it are adapted. It is hence that in high-speed lines the tolerances demanded as for geometric track quality are much smaller that in conventional lines. From the layout point of view, the increase of speed requires more demanding geometric parameters, so much in its plan as in its elevation. New technologies as desviations with mobile heart and slab-track improve the conservation of the quality demanded in high speed. Slab-track is an alternative method to the traditional track with ballast that offers qualitative and economic advantages in high speed lines.

The rigidity of high speed infrastructures forces to build a great number of factory works, bridges and tunnels in comparison with the existent ones in conventional lines. The technology applied to the constructive procedures has advanced with the step of the time rebounding in an improvement of the platform, important of face to minimize the drops of the infrastructure, and getting an assembly of track more effective and specify that in the past.

The named high speed trains differ of the conventional trains to be trains of indeformable composition with aerodynamic design. But maybe the most important thing with regard to the reduction of efforts on the track is the difference of weight that exists between both types of trains, being smaller in the high speed one. On the other hand, the demanded energy and the demanded benefits require a system of energy feeding to 25.000 V A.C. in front of the one demanded in conventional lines at 3.000 V D.C. As for facilities of security and telecommunications, the fundamental difference is the ERTMS, a global system of train control created especially for the high speed lines.

As a consequence of these, high speed lines cause a greater environmental impact in front of the conventional lines, mainly to the so called barrier effect. The acoustic impact and the vibrations caused by these trains can end up being more important in urban areas if they circulate at higher speeds than those characteristics of conventional trains.

The adaptation of conventional lines to the so named *Speed High* can be an alternative to the construction of new high speed infrastructures. This possibility essentially requires the correction of the current layout and the adaptation of the track and catenary to speeds of 200-220 kph. Polivalent sleepers that easily allows to change the rail wide play a very important role in this aspect. Wide changers, meanwhile, are the current systems that allow to connect the adapted lines to high speed with the high speed one. The difficulty of carrying out these performances supporting the rail service and an excessively inadequate layout determine the decision of carrying out this adaptation.