



**renfe** | **Development of the High Speed  
Double Gauge Services**

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**renfe** |

**High Speed - Double Gauge  
Services**

## LINES

**NEW HIGH SPEED LINES**  
GAUGE: 1,435 mm.

**CONVENTIONAL NETWORK**  
GAUGE: 1,668 mm.



**IN 2010: 2,230 km.**



**AT PRESENT: 11,715.4 km.**

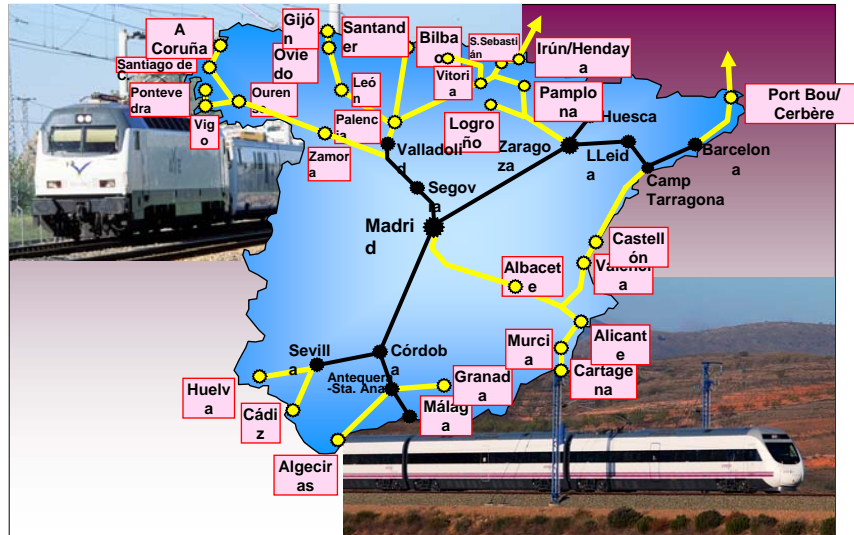
## HIGH SPEED LINES + CONVENTIONAL NETWORK

	ADVANTAGES	SPEED	GAUGE
NEW HIGH SPEED LINES	Travel time	300/350 km	1,435 mm
PRESENT CONVENTIONAL NETWORK	Geographical extension	160 km	1,668 mm

**ADVANTAGES OF COMBINING BOTH NETWORKS :  
BETTER TRAVEL TIME + GEOGRAPHICAL EXTENSION**

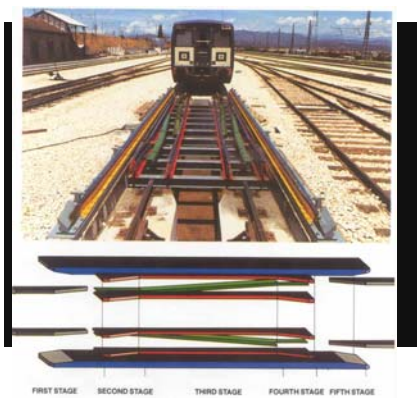
**HIGH SPEED DOUBLE GAUGE FLEET**

## NEW SCENE OF DOUBLE GAUGE SERVICES IN 2008



### Technical results: interoperability + high performance lines

**Talgo Interoperable Trains**  
Coaches  
Locomotives



**CAF Interoperable Trains**  
Regional Services  
HS Services 250 km-h

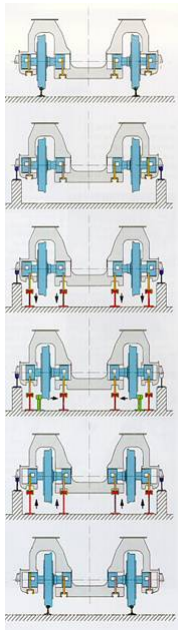


*Technical results: interoperability + high performance lines*

### **Gauge Changing Facility**

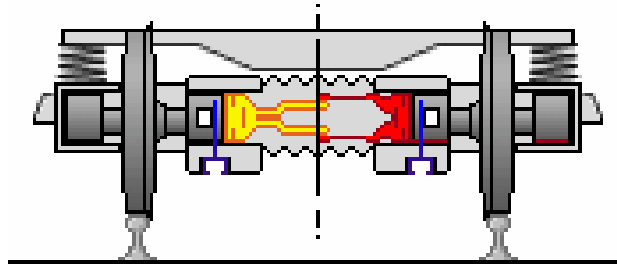


## **TALGO VARIABLE GAUGE SYSTEM HOW IT WORKS**



- **FIRST PHASE:** The sliding pads enter into contact with the lateral rails and advance on them. The wheels are totally discharged.
- **SECOND PHASE:** The lateral wheel blockings are opened.
- **THIRD PHASE:** By passing along between two rails, the wheel is pushed into its new position.
- **FOURTH PHASE:** The wheels are blocked again in their new position.
- **FIFTH PHASE:** The wheels roll in the new gauge width.

## Variable Gauge System for conventional trains: How it works



## The Variable Gauge Installation





**NEW VARIABLE GAUGE PROJECTS**  
**TRAV-CA Electric Loco with variable gauge (I)**



**NEW VARIABLE GAUGE PROJECTS**  
**TRAV-CA Electric Loco with variable gauge (III)**



**NEW VARIABLE GAUGE PROJECTS**  
**TRACTION BOGIE FOR 1435MM<>1668MM**  
**AND 1435MM<>1520MM**

