RAILWAY TESTING CENTRE IN VALENCIENNES

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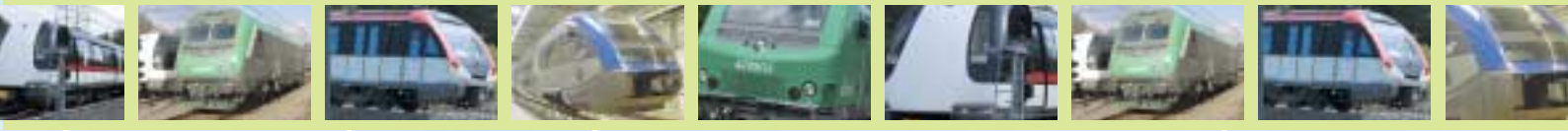
A high-tech tool



A MAJOR ASSET FOR EVERY RAILWAY PROJECT LEADER

The purpose of the Centre is to contribute to the preparation and to the development of the certification process of railway rolling stock and their associated railway systems. To this effect, the Rail Testing Centre in Valenciennes offers railway project leaders an outstanding experimental platform in order to help them test technological breakthroughs, to enhance the performances of the equipment and to implement systems with proven reliability and flawless safety.

A unique range of services

An infrastructure dedicated to the engineering and validation of:

• the rolling stock ;
• the signalling components and/or architecture;
• the system architecture of automatic or semi-automatic pilot within a controlled electrical and mechanical referential system.

A Solution for testing the stress-strain behaviour of:

• any mechanical components from the track or from the signalling system;
• any types of railway vehicles, special or not.

The reception of operating/maintenance staffs from companies networks

• so that they get used with and trained in the new products integrated into the rail architecture.

The guaranteed adaptability of the infrastructure

• feasibility study of the specific testing platform or test bench to be implemented according to the target defined.

A great variety of rolling stocks

• Gauge : UIC up to 22.5 tons per axle ;
• diesel, electric or bi-mode ;
• single composition or multiple unit.

- Locomotive up to 5000 KvA.
- Single- or double-deck railcar.
- Self-propelled locomotive.
- Metro.
- Tramway.
- Tram-train.
- Rail-born car for inspection, works, measures with on-board data-acquisition system.
- Freight car.
- Demonstrator.
- Track motor car.

Whatever test is carried out, for prototypes or series, each type of test will determine which of the three Testing Centre's circuits the equipment will be assigned to. These circuits are connected to a management unit which controls and records the experiments.

FEATURES OF CIRCUITS AND ASSOCIATED EQUIPMENT

Performance Test Track of VEV

• Total length	2 750 m
• Maximum speed	100 km/h
• maximum cant	6 to a thousand
• radius of the curve	325 m
• length of the straight line	1 400 m including the reference LRS zone for measurement
• electric supply	CC and CA per catenary - all-voltage - voltage jump and fall
• access junction points	hand operated wih control by the Vcc
• 3rd rail for collection of the traction energy	750 Vcc - universal type on total length (2 750 m) - adapted to the exact gauge and features of the customer's network over 400 m

Endurance Ring Test Track VAE

• Total length	1 840 m - closed loop
• Maximum speed	72 km/h to 90 km/h according to section
• maximum cant	4 to a thousand
• radius of the curve	190 and 325 m
• electric supply	CC and CA per catenary - all-voltage
• access junction points	hand operated wih control by the Vcc

Test track for automatic piloting PASC

• total length	1 810 m in closed loop, except for internal return loop
• maximum speed	50 to 80 km/h according to section
• maximum cant	4 to a thousand
• radius of curves	185 and 305 m
• "S"-shaped return loop	1 140 m
• parking platform	with automatic front door and opening/closing sequential
• power supply	CC per catenary
• ground to train transmission	bidirectional, through wave guide or radiating cable
• track circuits	no joints
• equipment	beacons for initialisation, (re)positioning, accurate stop in station
• 2 track sections	interfaced communication

FEATURES OF CIRCUITS AND ASSOCIATED EQUIPMENT

Common features

• ballastic tracks according to standard UIC with referential to the 3 dimensions	independent, linked by un-energised track sections
• weight on the axle	22,5 T maxi
• standard distance gauge	1 435 mm
• rail	50 kg/ml – laid at 1/20e
• automatic lubricators of rail adjustable according to the travelling frequency and to the number of axles	
• communication switches between circuits - hand operated * with a key locking device, type VCC * with a switch diamond for tram train type vehicle - engine operated	 tracks VEV - VAE track PASC

Power supply

• power	3 independent production units of 5MVA
• single-phased voltages	25kV-50 Hz and 60Hz • 15kV-16Hz 2/3
• direct -current voltages	750 V, 1500 V, 3000 V
• voltage regulations	according to UIC ranges regarding these voltages
• cancelling simulation of distributing substation	equivalent distance up to 7 km
• reversing units	- rheostatic or regenerative braking - contribution to combined braking

ADDITIONAL FACILITIES AND EQUIPMENT

Building, workshops and offices

• **Storage track:** *180 m*

• **Workshop:**
- area: 1 210 m²
- dimensions: 110 m x 11 m
- service line with a pit: 110 m
- energy: supply from an all-voltage 30-metre-span catenary for auxiliaries standing test

• **Offices:** *independent and cabled modules for customers*

• **Control centre:**
- energy management ;
- test recordings ;
- management of traffic and security.

• **Management centre of the command control system of the automatic pilot**

Additional Means

• Ballast loads: up to 150 tons to simulate loads inside the vehicle.
• Command control voltage generator: 7.5 KVA (12 to 110 Vcc).
• Filling station : 200 litres/min.
• Elevating cradle for technical intervention on the roof of the rolling stock.
• Anti-fire water-tank car.

TESTING VEHICLE

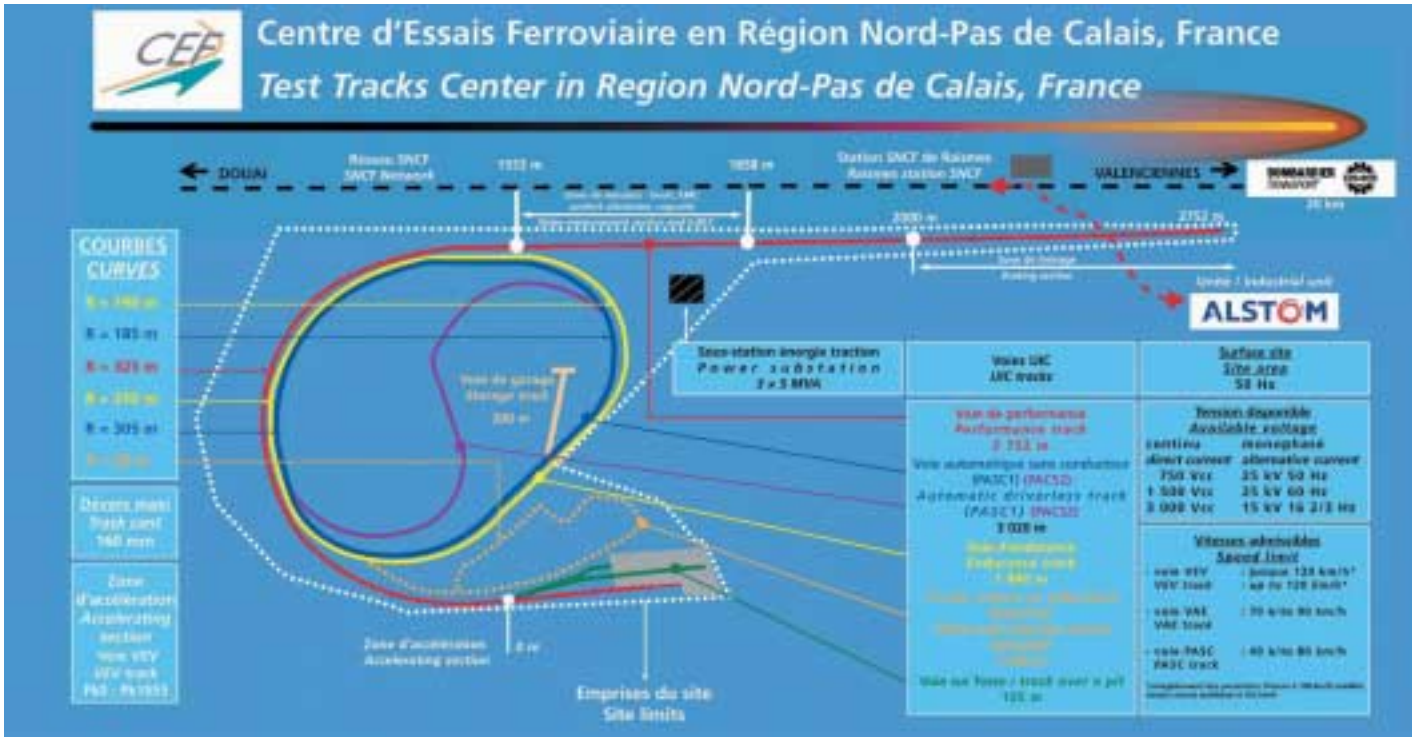
A mobile test bench can be fitted and adapted to record all types of mechanical or electrical tests.

Features

• Coupling single vehicle : 20 tons with bogie UIC, pull chain 1500 Vcc.
• Hand-operated or automatic, bi-directional drive.
• Power supply from pantograph.
• 2 doors with pneumatically controlled sides.
• On-board sensors for ground-to-train communication.

Tests that can be run

• Tests on the features and on the operation :
- of automatic and semi-automatic piloting systems,
- of ground- or lateral-signalling interface.
• Tests on sub-systems or components (traction, braking, etc.).
• Tests on comfort and safety.



TESTS RUN ON ROLLING STOCK

Type of test	Infrastructure and CEF means
Clearance/car-bodies	test is possible
Suspension	test is possible
Bogie mechanical stresses	VEV,VAE
Wheel-to-rail contact	VEV, VAE
Taking of curves / maximum cant	VEV
Auxiliaries balance	Technical hall with fixed stand
Lubricators operation	VEV,VAE
Pneumatic balance	Technical hall with fixed stand
Power consumption	Counting energy/station
Inside noise measurement	Fitted out section/VEV
Outside noise measurement	Fitted out section/VEV
Sound level of horns	VEV
Measure for the disposal of dust emissions	VEV,VAE
Braking test	VEV
Stopping distances	Right section VEV
Starting performances	VEV
Anti-skid testing	VEV, VAE
Anti-jamming testing	VEV
Energy collection	VEV, VAE
Voltage jumps/falls	VEV, testing tools substation
Passing the commutation sections	VEV
Rheostatic electric braking	VEV,VAE
Regenerative electric braking	VEV,VAE, PASC
Combined braking	VEV, VAE, PASC
Braking on track in CC	VEV
Signal capturing	PASC
Electromagnetic compatibility	VEV
Harmonic current	VEV,VAE
Current connection / pantograph lifting off	VEV,VAE
Endurance behaviour tests	VAE
Parameters recording	VEV,VAE
Automatic operation	PASC
Low speed approach	VEV
Coupling tests between trains	VEV,VAE

TESTS RUN ON TRACK AND/OR ON SIGNALLING EQUIPMENT

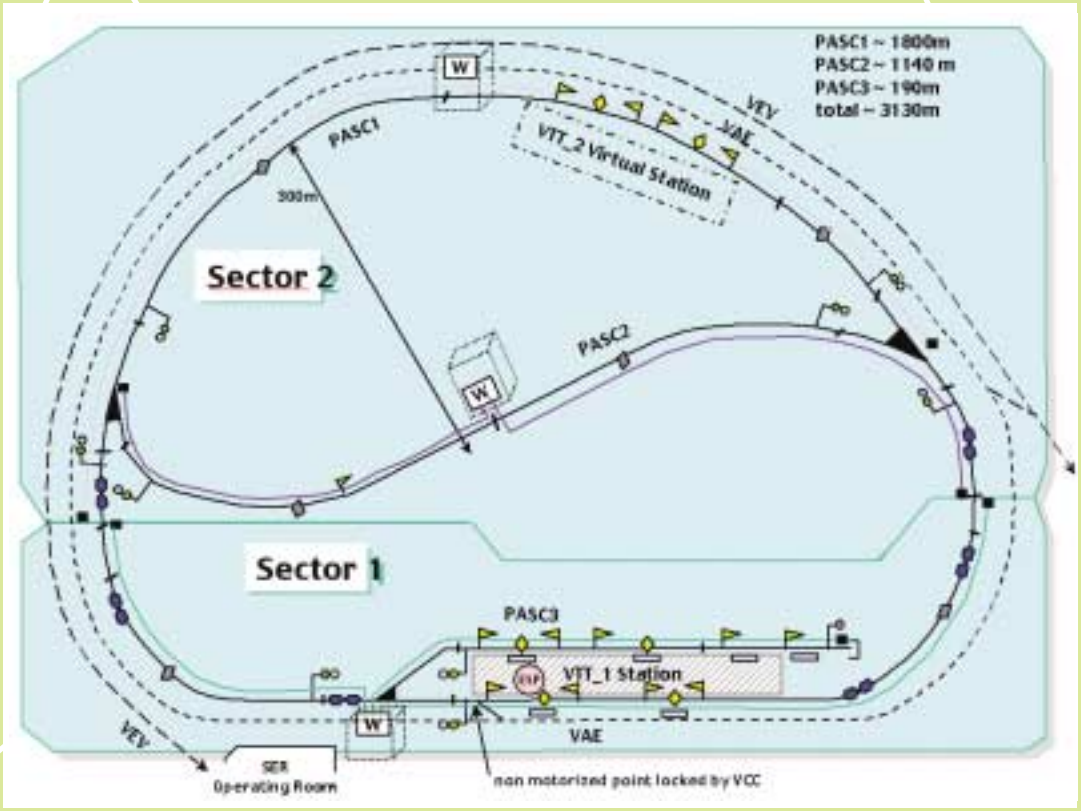
Type of test	Infrastructure and CEF means
Reaction from the track	VEV
Measure of the vibratory comfort	VEV
Roughness influence	VEV
Distance between 2 trains	PASC
Ground-to-train transmission	PASC
Testing of functional integration and/or safety interface	VAE/PASC
Management of the distance between 2 trains	PASC
Route selection	PASC

RAILWAY TESTING CENTRE

A high-tech tool

Thanks to the Rail Testing Centre, railway project leaders do benefit from a unique range of services on a very high variety of rolling stocks. Thus, they hold all the assets for controlling the process of improvement and integration of functions and for validating design.

TEST TRACK FOR AUTOMATIC PILOTING PASC



- Stationary Train Initialisation Beacon
- Docking Detector
- Precise Stop announcement Beacon
- Moving Train Initialisation Beacon
- Reloc. Beacon
- Motorized Point
- signal 2 aspects
- signal 1 aspect
- IAGO base station
- terminaison guide
- Emergency Stop Plunger

Functionalities available

- *Centralised control.*
- *Operation signalling.*
- *Driving automatic controls.*
- *Train-ground /ground-train transmission.*
- *Management of distance between 2 trains.*
- *Accurate stops in station.*
- *Passenger exchange.*
- *Voice and data communication.*
- *Simulation of operation in standard and downgraded modes.*

Components

- *Route command and control.*
- *Route locking information system (2 ASCV).*
- *Track circuits, light indicators, point motors.*
- *Automatic piloting system (2 SACEM areas) and position beacons (spot transmission).*
- *Wave guide bi-directional transmission (IAGO), (evolutionary transmission support)*
- *Transmission through radiating cable.*
- *Front door.*

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