


# Two tunnels for the Madrid – Levante high-speed rail network

## Project overview ›

The Madrid–Levante high-speed network connects Madrid with the Mediterranean coast of the Levante region. ArcelorMittal Fibres has supplied reinforced concrete solutions to several tunnelling projects within the high-speed network including Villagordo del Gabriel – Venta del Moro and Horcajada – Naharros.

Name: Tunnel of Villagordo del Gabriel
Tunnel length: 3,108m
Duration: 18 months (2006 – 2007)
ArcelorMittal Fibres used: HE 55/35
Dosage: 25kg/$m^3$

Name: Tunnel of Horcajada
Tunnel length: 3,957m
Duration: 18 months (2007 – 2008)
ArcelorMittal Fibres used: HE 55/35
Dosage: 25kg/$m^3$

Contractor: Acciona Infraestructuras S.A.
Total volume of fibres used for both tunnels: 2,300 tonnes

"Our customers continue to benefit from the wide range of high performing steel fibres and on-site support provided by our technical experts. We advise on a comprehensive range of matters including the supervision of tests, the most appropriate fibre type for optimum performance, concrete mix design optimisation and dosage rates and equipment."

Aitor Osa
Head of Fibre Business Iberia

## The challenge ›

The key challenge for ArcelorMittal Fibres was to provide a steel fibre reinforced concrete solution which enabled contractors to meet the specified safety and quality standards and the construction schedule.

The tunnels of Villagordo del Cabriel and Horcajada are part of the new high-speed line Madrid-Castilla/La Mancha-Comunidad Valenciana-Región de Murcia.

The tunnels run through diverse geological conditions including keuper, sandstone, limestone, shale and clay. Further, more complex circumstances were prevalent including karstic cavities in the keuper, water springs and unstable limestone.

## The solution ›

Due to our on-site support, ArcelorMittal Fibres was able to deliver a high performing and efficient solution, achieving considerable time and cost savings for the contractor. By using the HE 55/35 fibre, 750 joules was achieved with 25kg/m$^3$. This achievement represented a significant cost saving when compared to the 40kg/m$^3$ that was defined in the project. Overall, 35% fewer fibres were required and fibre workability was made much easier by using fibre dosing methodologies and equipment that were specified by ArcelorMittal Fibres.


## The result ›

When fully operational the Madrid–Levante network will total 940 km of high-speed rail, capable of top speeds of 350 km/h in the majority of its segments.

By 2020 Spain will have Europe's largest high-speed network with 6,000 miles of track. By then, 90% of the population will be within 30 miles of a railway station and new rail links will eventually connect France and Portugal.

The high speed railway network will allow Spain to cut down carbon emissions generated by transport of passengers.

"Our involvement in the tunnelling projects across the Spanish high speed railway network is a clear and tangible example of ArcelorMittal Fibres' business purpose: to transform reinforced concrete in pursuit of a better built world. This is something that we are all very proud to be doing at ArcelorMittal Fibres."

José Ramón González
Steel Fibre Business Line Manager

# The world is building on our expertise.

Contact: tunnels@arcelormittal.com
Visit: www.arcelormittal.com/steelfibres