



## **Salerno-Reggio Calabria Railway Adds Vital Connections in Southern Italy**

### *Integrated Digital Models Enable Railway Expansion over Complicated Terrain*

Rising from the economic challenges brought by the pandemic, Italy has embarked on an EUR 191.5 billion National Recovery and Resilience Plan to invest in the country's next era of development. Called Italia Domani, or Italy Tomorrow, the plan focuses on boosting digital innovation, improving sustainability and resilience of Italy's economic system to ensure a fair and inclusive environmental transition, including within the development of modern, sustainable transport infrastructure that extends to all areas of the country.

EUR 25.4 billion of this plan is dedicated to a range of strategic projects that improve Italy's transport network, with particular attention to boosting high-speed, high-capacity rail in southern Italy, which has lagged behind the rest of the country. To this end, the engineering company Italferr from the National Railway Company "Ferrovie dello Stato" Group is assigned with the design of an expansion to the high-speed railway that connects Reggio Calabria, a city located at the tip of the Italian peninsula, to Salerno, near Naples. This railway also provides a key connection between Sicily and the Italian mainland.

"The lack of high speed lines in the Southern Italy and the actual availability of European funds offered a great opportunity to improve infrastructure system," said Giulia Giustino, a civil engineering team coordinator at Italferr. "With this line, it will be possible to quickly get [from Reggio Calabria] to Napoli, which is well-connected with the center and north part of the country."

### **Finding Synchronicity**

Italferr's first objective was designing a 35-kilometer leg of the new high-speed railway from Battipaglia to Romagnano at speeds of up to 300 kilometers per hour. This line will also join with an existing leg from Battipaglia to Potenza and Metaponto.

To meet the ambitious national goal of building out the new line by 2026, Italferr's team had to complete the project's digital design in just four months. Italferr's design had to incorporate roadways, underpasses, buildings, electrical substations, viaducts, and tunnels.

"Due to the topography of the territory, technically it was a challenging project," Giustino said. "We had about 19 kilometers of tunnels and [about] 6 kilometers of bridges."

Pasquale Ferrante, Italferr's building information modeling coordinator for the project, was tasked with creating a digital model that incorporated all these features. To achieve this goal, Ferrante and his colleagues made 504 individual BIM models of everything from railway trenches to roadway support works. This process required the use of several Bentley applications, including OpenBridge and OpenRail. Then, Ferrante synchronized these various elements into a single, integrated model using Bentley's iTwin Platform and ProjectWise.

With many stakeholders involved in the project due to the line passing through multiple municipalities, its digital twin approach provided easy access to data and ensured clear lines of communication with the Italferr team.

"This approach and digital twin technology we use is crucial because it enables the many different specialists and managers—both from Italferr and external to our group—to observe the modeling process and contribute to design decisions," Ferrante said. "In the past, it was harder to get people involved."

In addition to these collaborative benefits, digital applications streamlined the design process by making files and documents more accessible and organized. Italferr estimates this resulted in a 10% time-efficiency gain. Virtualizing the project with a digital twin also cut the number of site visits and in-person meetings required by around 50%. Overall, the engineering team saved approximately 675 hours of work, thus preserving their most essential resource on this complex project—time.

"Digitization facilitated our ability to complete this very complex line in just a few months," Ferrante said.

### **Scaling Digital Solutions**

While BIM methods have been standard practice at Italferr for several years, the Battipaglia-Romagnano line represents a milestone digital achievement for Ferrante: it is the longest project for which he has integrated multiple models into a single digital twin.

"In addition to all the technical issues due to the topography of the area, this railway project is unique, because it's the first total design with BIM on this scale," he said. "We are talking about developing the digital design for 35 kilometers of rail in only four months. That's very challenging."

The challenge has also been a model for what is to come. The next extension to the Salerno-Reggio Calabria Railway, as part of the Italy Domani plan, will be a doubling of the Santomarco rail tunnel that runs between Cosenza-Paola and San Lucido, set to complete construction by

2029. Also planned are lines between Romagnano and Praja, as well as Praja and Paola. Once complete, these sections should cut travel time between Reggio Calabria and Rome by two hours.

“This will be a crucial project for connecting the southern part of the country with the north and central parts, through the backbone corridor,” Giustino said.

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### **Spotlight on Pasquale Ferrante**

*BIM Coordinator Harnesses Digital Modeling Tools to Advance Italian Rail Infrastructure*

Pasquale Ferrante began his career as a geotechnical engineer. However, he was quickly drawn to the innovations that he noticed in the field of civil engineering. He saw that BIM was propelling the engineering industry’s digital transformation, and wanted to be a part of it.

“First, I got interested in 3D modeling, so I started with that and then experimented with all the opportunities that BIM methodologies can offer,” Ferrante said.

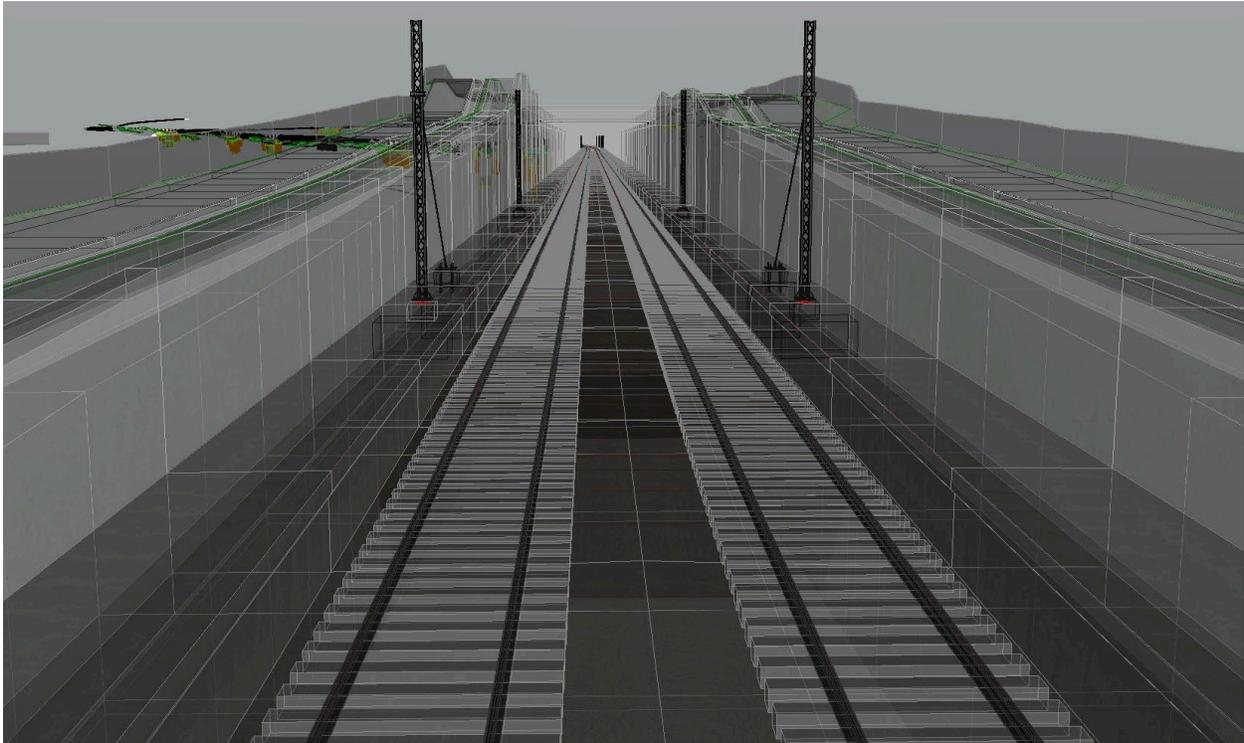
Now, Ferrante serves as a BIM coordinator for Italferr and is passionate about making the company’s adoption of BIM methods as comprehensive as possible. In his role at Italferr’s Rome office, he creates 3D models and integrates them into shared digital platforms. He also moderates common data platforms used by project managers, engineers, and external stakeholders.

Although still relatively early in his career, Ferrante has already had the opportunity to play a key role in projects that are integral to the advancement of Italian transportation infrastructure, from designing new rail lines to enhancing existing ones. For instance, he was involved in Italferr’s Naples-Bari project, which upgraded and accelerated the rail line between the two major cities in southern Italy. He has also used digital applications to tackle more experimental projects, such as a recent effort to create a 3D representation of an existing viaduct and apply a digital monitoring system to the model.

“I think the most exciting thing for the future of the rail industry are the possibilities that we have in terms of saving time,” he said. “I think using all these applications in an integrated way can help us save time, and of course, this leads to saving money.”

As BIM technology continues to develop, Ferrante believes its potential to facilitate collaboration and communication among project leaders and other stakeholders for the lifecycle of complex projects will only continue to grow.

“I’m excited to use digital twins for other opportunities, like asset monitoring and maintenance,” he said.



[Image link](#)

**Image caption/courtesy:** Virtualizing the project with a digital twin cut the number of site visits and in-person meetings required by around 50%, saving Italferr approximately 675 hours of work. *Image courtesy of Italferr S.p.A.*

**Author:** Steve Cockerell is the industry marketing director for transportation at Bentley Systems. He joined Bentley in 2002 through the company’s acquisition of Infracore and has worked to deliver knowledge and expertise to users in the transportation industry. Cockerell has more than 20 years of industry experience, which he began by studying civil engineering and working as a highway designer for local government in the U.K. He can be reached at [steve.cockerell@bentley.com](mailto:steve.cockerell@bentley.com).

2023 *Going Digital* Awards Finalist

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