



## A NEW BRIDGE FOR GENOA

### PERGENOVA AT WORK TO RELAUNCH THE TERRITORY AND THE COUNTRY

The new Genoa bridge was designed and will be built by PERGENOVA, a joint venture between Salini Impregilo and Fincantieri Infrastructure, following a design by Renzo Piano.

The construction of the work will take place according to a 12-month time schedule defined with the with the Extraordinary Commissioner for Reconstruction. An infrastructure of this complexity has never been built in Italy in such a very short time. The objective shared by all those involved is to create a work of simple design with the highest standards of monitoring and security.

Currently, PERGENOVA is working to return to the country and to the territory a neuralgic link for Liguria and its ports, which can reconnect Genoa to the main European transport corridors.

The new bridge is to become the symbol of the renaissance of the city of Genoa as well as a model for a new phase of development of the Country, showing how even in Italy it is possible to create great works, experimenting with models of virtuous collaboration between public and private sectors and among large leading companies in the sector.

### THE AWARD TO PERGENOVA

On 18 December 2018, the Extraordinary Commissioner Marco Bucci, after having analyzed several proposals in the negotiated procedure, assigned to PERGENOVA the design and construction of the new viaduct on the Polcevera stream.

With PERGENOVA, two leading companies in their respective sectors, Salini Impregilo in large complex infrastructures, Fincantieri Infrastructure in the design and construction of large steel structures, offer their work for the relaunch of Genoa and the Country.

### STRENGTHS OF THE PROJECTS

Two of the reasons that led the Commissioner to choose the project submitted by PERGENOVA, are the **competence and reliability** of the companies involved in the joint venture, both global leaders in their respective sectors, committed to realize complex projects all over the world.

The strengths of the project proposal include:

- **AESTHETIC.** The line of the new bridge will recall the hull of a ship, to recall the story of a seaside town like Genoa.
- **SOLIDITY.** A harmonious design in the lines, with high safety standards: piles differentiate this project from the previous viaduct, while the high quality of the mixed structure in steel and reinforced concrete guarantees the durability of the infrastructure.
- **EXECUTION PROCEDURES.** Thanks to the high construction standards, strength, safety and speed of execution can be combined with valuable architectural features.
- **THE ECONOMIC DIMENSION AND REALIZATION SCHEDULE.** Given the importance of the work, and the need to recover the competitiveness of the local and national economic system, a project proposal that balanced the economic dimension with the temporal one, for the delivery of a complex and quality work in the shortest possible time, has been favored.

### THE BRIDGE

## A SMART BRIDGE

The bridge will be a state-of-the-art infrastructure, a benchmark for similar works, and will be completely “**smart**”. It will in fact be equipped with a series of **innovative monitoring, supervision and control systems**, including **robotic automation systems** for infrastructural control; moreover, all plants will be centrally controlled.

**The most innovative technologies will be implemented at the service of safety.** The **sensors system** installed in the infrastructure will allow to monitor the physiological phenomena of wear and any impacts of extraordinary events, so as to be able to schedule maintenance. The bridge, in fact, wants to be an “intelligent tool”, able to autonomously provide data on the behavior of all its parts, as well as information on its operating status, through a complex system of internal sensors consisting of accelerometers, strain gauges, velocimeters, inclinometers and detectors of the expansion of joints and differential displacements.

The use of this system will allow the creation of a database that can be studied and constantly monitored, becoming also a basis for the future design of infrastructures of the same type.

**The special dehumidification system** will prevent the formation of salt condensation, limiting corrosion damage.

The maintenance and cleaning of the glass barrier and of the photovoltaic system will be entrusted to robots, able to walk along the edge of the bridge through tracks and drive wheels. The robots will also monitor the deck externally, integrating the information from the internal sensor system, by means of a retractable arm on which high-resolution cameras and sensors, measuring the conditions and deformations of the surfaces, as well as the thicknesses of the paints and the state of the welds, will be installed.

## A SUSTAINABLE PROJECT

The new bridge will be built with a **strong focus on sustainability**. Its environmental impact will be contained by the **presence of photovoltaic panels which will significantly reduce its energy consumption**.

The collection of sunlight through the panels, in fact, will allow the structure to produce the energy required for the night and day operation of all its systems, such as lighting, sensors and plants. The new viaduct, due to its position - in the middle of a highly man-made area, such as that of Val Polcevera - therefore takes on the character of an “urban bridge”. This condition has characterized the design, making it attentive not only to the infrastructure itself, but also to the strong relationship with the surrounding context. The new bridge, in fact, will rest on the ground through slender reinforced concrete piers, and the geometry of the ellipse, thanks to the absence of sharp angles, will allow the light to “slip” on the surface, thus mitigating the visual impact and the presence of the infrastructure in the urban context. The deck, which recalls the hull of a ship, has been designed so that the gradual reduction of the section towards the ends of the bridge attenuates the visual impact of the new infrastructure. In addition, the use of a light colour for painting the steel elements will make the bridge bright, harmonising its presence within the landscape. Along both sides of the bridge there will be a 2.50-metre high fall and wind barrier designed to further mitigate the visual impact of the new infrastructure within the urban context. The transparency of the glass and, consequently, the extreme visual permeability that will result, will allow to look at the surrounding landscape along the new bridge, as well as lighten its presence in the valley for those who will live it from the city. From a structural and seismic point of view, the deck is “isolated” from the piers through the use of support devices that allow the bridge to “breathe” without any influence on its stability and strength. This strategy has allowed the optimization of structures, substructures and especially foundations, limiting the size of the same in a highly-urbanized context.

## THE STRUCTURE

The main deck of the bridge will consist of a **1067-meter long** girder, made up of a total of **19 steel and concrete spans**, of which 14 are 50-meter long, 3 are 100-meter long, 1 is 40-meter long and 1 is 26-meter long. A **110-meter long** steel-concrete **ramp** with **3 spans** will be structurally

connected to the bridge deck. The distance between two successive supports will be 34 meters, 43 meters and 32 meters respectively. The bridge street level will be 45 meters high.

The bridge is supported by 18 piers with a constant 50-meter pitch, except for the three central bays that, crossing the Polcevera stream and the railway areas, have a 100-meter pitch. The external dimensions of the stacks for the 50 and 100 metre spans are 9.5 by 4 metres.

There are **281 poles** supporting the piles and parapets.

The steel part of the deck will be made up of three transverse segments, made from sheets of different thicknesses for a total width of 26 meters, able to make the construction and assembly of several spans in sequence simple and fast. The internal structure, composed of steel diaphragms, has allowed a high degree of optimization of the materials' performance in relation to the speed of realization and assembly of each part. The deck will be completed by the slab, made with precast elements in reinforced concrete and subsequent casting.

## FACTS AND FIGURES

**80,000 cubic meters** excavation volumes

**67,000 cubic meters** the quantity of concrete to be used

**9,000 tonnes** the steel to be used in the structure

**15,000 tonnes** the steel for metal framing

**202 million euros** the total cost for the design and realization of the viaduct

**12 months** expected time schedule for the realization of the viaduct since the delivery of the areas

Over **1,000 persons** to be **involved** in the direct and indirect activities concerning design and building.

## THE WORKSITE THAT NEVER STOPS

The worksite of the new bridge never stops: to guarantee continuity of the complex operations required to build the infrastructure, the workmen, engineers and technicians work 24/7 parallel shifts underground, above ground, in elevation, at height, inside the caisson, on the slab.

A never-ending and unprecedented feat in Italy, to be carried out perfectly, safely and quickly, according to extremely tight deadlines: a new frontier, in terms of engineering and management.

A unique feature of the new bridge is its total control on every activity, in terms of quality and aesthetic beauty. The project management's organizational complexity, and the extreme attention to detail, make this project safe, efficient and extremely attractive.

The New Genoa Bridge worksite is transparent: for the very first time in Italy and in the history of infrastructure, a new way of "communicating infrastructure" has been purposely created. All activities are, in fact, visible to the public, 24/7, through a streaming service with 8 live webcams, on the [pergenova.com](http://pergenova.com) website. And the direct link to the worksite continues, in a specially created interactive venue named Spazio Ponte, situated in Genoa's Old Port area, where people can meet and gain an in-depth understanding of the project.

## THE PROJECT MILESTONES

**18 December 2018** – Fincantieri, through its subsidiary Fincantieri Infrastructure, and Salini Impregilo constitute the joint venture PERGENOVA, which is entrusted by the Special Commissioner for the Reconstruction, Marco Bucci, with the construction of the new bridge.

**21 January 2019** – Signature of the single contract, with separate responsibilities, for the demolition and construction, by the Commissioner, ATI Demolitori and PERGENOVA.

**22 March 2019** – PERGENOVA starts the preparatory activities to make the construction site area at the foot of the Polcevera viaduct accessible, in view of the start of the construction work.

**15 April 2019** – The execution of the first pole for the pile number 6 marks the beginning of the construction of the new bridge.

**May 2019** – The foundation piles of the 5, 9 and 11 piles have been made

**25 June 2019** – First cast of concrete for the foundation of the first Pier (9) to be built

**June 2019** - The foundation piles of Piers 2, 3, 4 and the plinths of Piers 5 and 9 have been made

**July 2019** - The foundation piles of Pier 7 and the plinths of Piers 4, 6 and 11 have been built.

**1 July 2019** - Arrival of the first deck elements

**August 2019** - The foundation piles of Piers 8, 10 and 18 and the plinths of Piers 7 and 8 have been made. Work is done on the bulkhead of Abutment B. The lifting of Piers 5 and 6 have begun

**September 2019** - The foundation piles of Piers 12 and 15, and the plinths of Piers 3 and 10, are made. The lifting of pile 4 has been started. The steel segments continue to arrive on the site.

**1 October 2019** - Lifting of the first span (P. 5 and P. 6)

**November 2019** - The foundation piles of Pier 1 have been built. The elevation of Piers 3 and 18 has been complete. The foundation piles of the abutment of the intake ramp to the East has been realised.

**7 November 2019** - Raising of the second span (P4-P5).

**18 November 2019** - Raising of the of the third span (P6-P7).

**December 2019** - The foundation plinths of the West abutment A, and Piers 1, 10, 11 and 17 have been completed. The raising of Piers 2, 14, 15 have been completed.

**15 December 2019** - Raising of the fourth span (P14-P15).

**28 December 2019** - Raising of the fifth span (P7-P8).

**8 January 2020** - Raising of the sixth span (P3-P4).

**22 January 2020** - Raising of the seventh span (P15-P16).

**7 February 2020** - Raising of the eighth span (P13-P14).

**13 February 2020** - Raising of the ninth span (P18-P19). This is the first 100-metre span.

**18 February 2020** - Completion of the Piers

## PERGENOVA

**PERGENOVA S.C.p.A.** is the joint-stock consortium company set up by Fincantieri Infrastructure and Salini Impregilo for the design and construction of the new Polcevera viaduct of the A10 motorway.

The joint venture represents a model of collaboration between large companies, one complementary to each other, with the aim of making a unique know-how on components and construction techniques developed over decades of experience all over the world available to the city and the country.

### Fincantieri Infrastructure

Specialized in the design, construction and assembly of steel structures on large-scale projects such as bridges, stadiums, ports as well as industrial, commercial and institutional projects. It operates as an EPC contractor with uncommon project management, engineering and construction skills, gained in a complex sector such as shipbuilding, in which Fincantieri is the world leader.

### Salini Impregilo

Salini Impregilo is one of the largest global players in the sector of large complex works. For five years it has been a world leader in the water sector (dams and water management systems) and a leading player in the field of sustainable mobility, with underground transit systems and high-speed railways. From bridges to motorways, from civil buildings to dams, from subways to railways: Salini

Fincantieri has a consolidated and significant presence in the territory of the Liguria Region, employing approximately 3,000 direct workers, also considering the subsidiaries, of which just over 70% in the military area and the others in the civil area, such as in the construction of cruise ships at the Sestri Ponente site. Within a predominantly Italian supply chain, Fincantieri has made purchases in Liguria in the 2016-2018 two-year period for around 1.6 billion euros, corresponding to 14% of its purchases, distributing them among around 600 companies, mainly SMEs.

*“From the very beginning, Fincantieri has made itself available, we owed it to Genoa and Liguria,”* commented the Chief Executive Officer of Fincantieri, **Giuseppe Bono**, on the day of the assignment. *“Our competence in the management of complex processes and products enables us to do the best possible job to give the city a beautiful, functional and long-lasting work in good time. I am convinced that the new infrastructure will be the best example of an Italy that, when it combines its excellence, can create a system and perform great works in the service of the country.”*

Impregilo has developed some of the most iconic infrastructure projects in the world, such as the Panama Canal.

*“Twelve months to relaunch Genoa. This is the dream we are about to deliver to the people of Genoa, remembering the victims of this terrible tragedy, to get the city moving quickly again, giving a strong signal to the whole Country, because economic recovery and employment can start again from the great works. We are in Genoa for a spirit of service”* said Pietro Salini, Chief Executive Officer of Salini Impregilo, welcoming the news of the assignment of the reconstruction of the bridge to PERGENOVA.

## THE PERGENOVA MANAGEMENT

President of PERGENOVA **Alberto Maestrini** (Director General of Fincantieri).  
 CEO of PERGENOVA **Nicola Maestro** (Director General of COCIV, Salini Impregilo).  
 Project Manager Director of PERGENOVA **Francesco Poma** (Salini Impregilo).  
 Deputy Project Director of PERGENOVA **Riccardo Zen** (Fincantieri Infrastructure).

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### **ALBERTO MAESTRINI** – President of PERGENOVA

Since September 2016, General Manager of FINCANTIERI S.p.A.; previously, Deputy General Manager of the same company. Since 2004, Director of Military Ships. He is a member of the Board of Directors of Marinette Marine Corporation. International career in the IT and telecommunications sector, with top research and development and sales and marketing roles. He was Chief Executive Officer of Marconi S.p.A. and of Telindus S.p.A. From Genoa, married with two daughters, a degree in Electronic Engineering from the University of Genoa.

### **NICOLA MEISTRO** – CEO of PERGENOVA

Since October 2016, Director General of the COCIV Consortium, General Contractor entrusted with the design and construction of the Milan-Genoa Giovi Third Tunnel Track High Speed railway line. Since September 2014, Chairman of Isarco S.C.a.R.L., a company that participates in the construction of the Brenner Base Tunnel. From 2012 to 2014, Project Manager of Passante Dorico

and CEO – President of Pedelombarda S.C.p.A. (General Contractor for the construction of the Pedemontana Lombarda motorway), after having been its Construction Site Manager from 2010 to 2012, a position already had at the CAVTOMI Consortium (2003-2010, Turin-Milan high-speed railway line) and CAVET Consortium (1999-2003, Bologna-Florence high-speed railway line). Born in the province of Savona, he graduated in Building Engineering from the Polytechnic of Milan.

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[www.pergenova.com](http://www.pergenova.com)

[facebook.com/PerGenova.SCpA](https://facebook.com/PerGenova.SCpA)

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