INNOVATIVE MATERIALS FOR THE 5th BRIDGE IN SAN SEBASTIAN, SPAIN

Ana Lorea*, Sergio Saiz**
*Structural Engineer Project Manager, **Technical Director
IngZero Co.Ltd.
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN

Urban development right side of the Urumea river

New urban traffic design

5thB connection Amara - Aldunaene areas
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
Innovative Infrastructures - Toward Human Urbanism

Geometric · no intermediate support → span 80m
· 500-year-flood → max. depth 1.10m

Aesthetic: total integration on the environment
Span → 80m = 62m + 18m
h. below deck → 4.20m  h. above deck → 3.35m
span-to-raise ratio → 24:1
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN

Width ➔ 27.5m
- 4 lanes 3.25
- 2 sidewalks 4.5
- bike lane 2.65

inner width ➔ 22.4m

sidewalks materials
- wood composite
- artistic tiled ceramic
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
the abutment

- deep foundation
- pile caps 32x17m → 14 piles diameter 1.50m
- 4 post-tensioned counterforts
Innovative Infrastructures - Toward Human Urbanism

18th IABSE Congress, Seoul, 2012

WRITE HERE TITLE OF YOUR PRESENTATION

INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN

the composite arches

Carbon Steel S-355

Stainless Steel 1.4462

Inner core HPC-90 MPa
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
26 transversal beams → 21.50m
3 long. beams → 80m
50 cantilevers → 4.75m
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
Innovative Infrastructures - Toward Human Urbanism

**18th IABSE Congress, Seoul, 2012**

**the inner concrete HPC-100**

- high performance concrete
- self-compacting
- set retarders
  - 2 hour-mixed concrete slump flow test → Φ 800mm
  - no segregation
    → workability
- avoid working joints
- compressive strength
  - 28 days → 90 MPa
  - 90 days → 100 MPa

**WRITE HERE TITLE OF YOUR PRESENTATION**

INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
filling the arches

Part 1 – The springings
INNOVATIVE MATERIALS FOR THE FIFTH BRIDGE IN SAN SEBASTIÁN, SPAIN
curing the HPC-50 concrete slab

AIM: low shrinkage and high resistance (early post-tensioning)

Curing with water just after vibrating.

Irrigated during 72 hours (sprinklers).

→ Reduce early age shrinkage.
sealing the slab

AIM: reduce the hydraulic shrinkage.

Cationic emulsion ECR-1 on wet concrete.

Bitumen membrane retains water.