

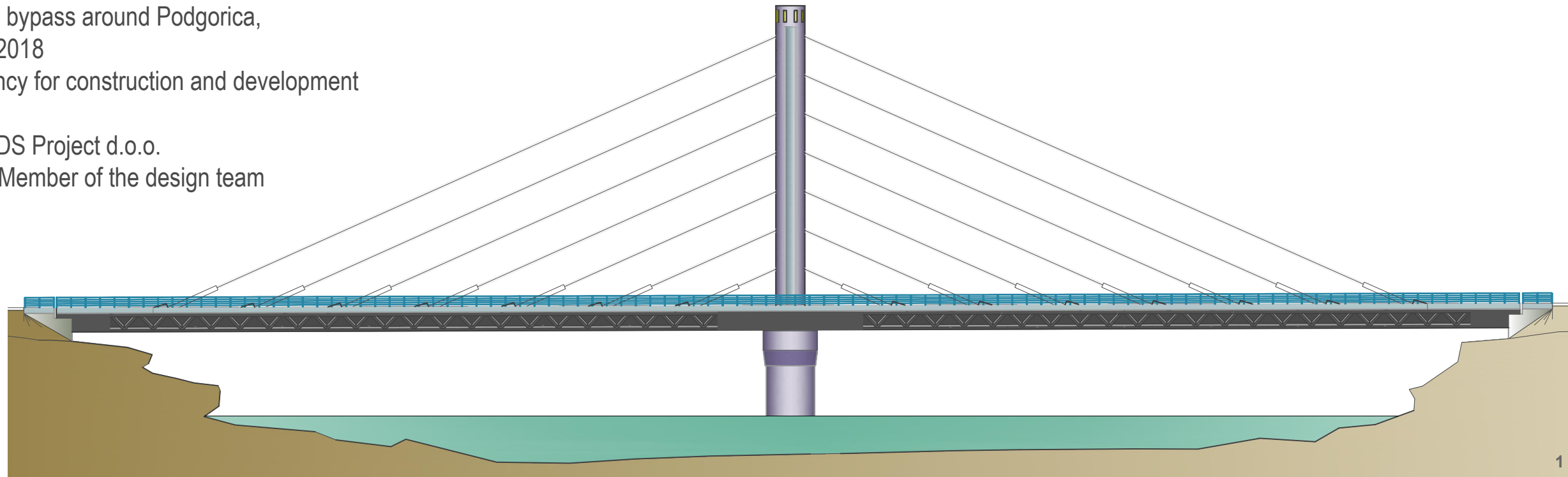
Cable - stayed bridge

Southwestern bypass around Podgorica,
Montenegro, 2018

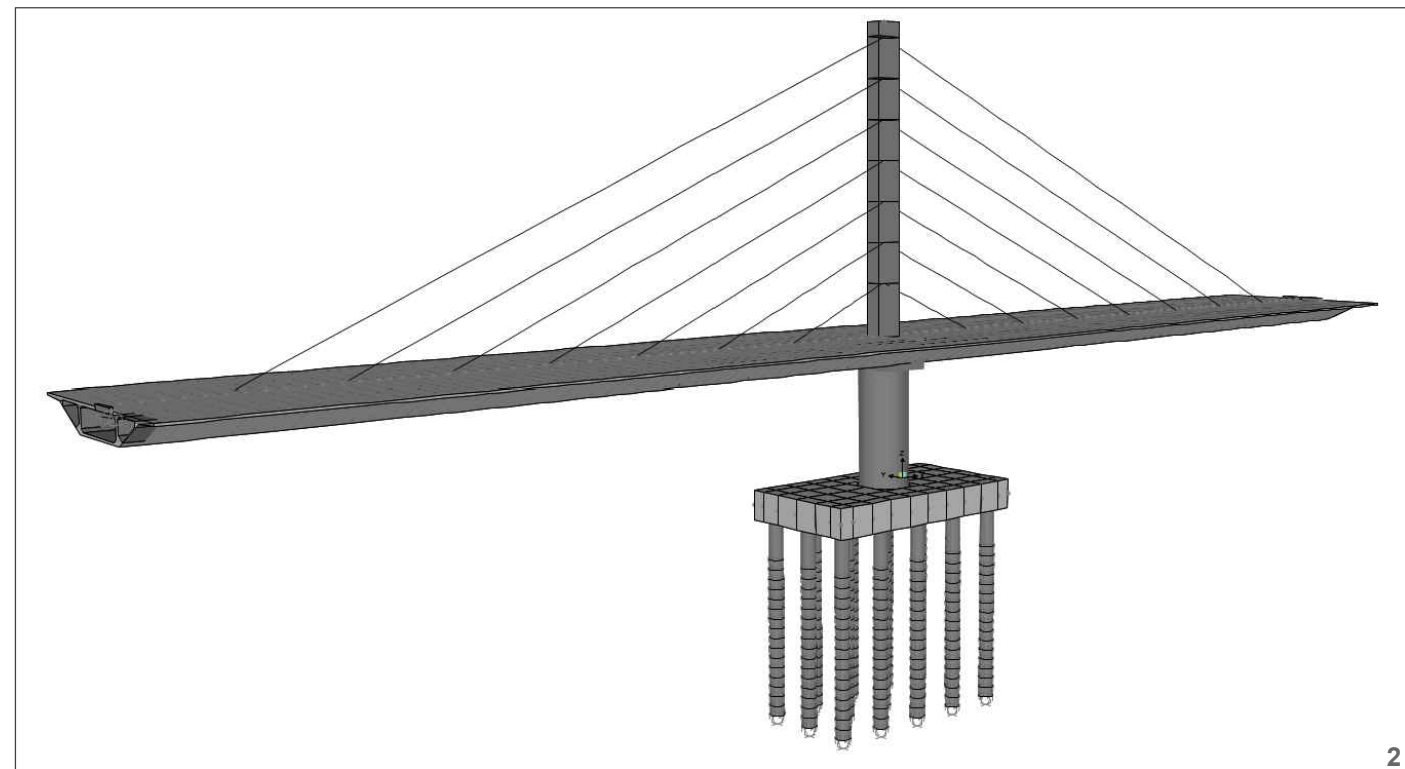
Investor: Agency for construction and development
of Podgorica

Contractor: CDS Project d.o.o.

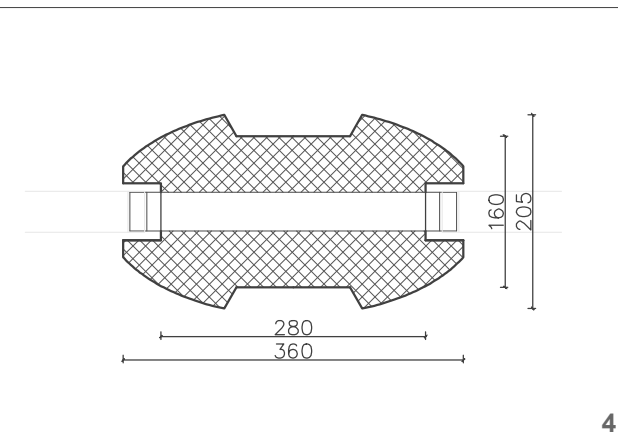
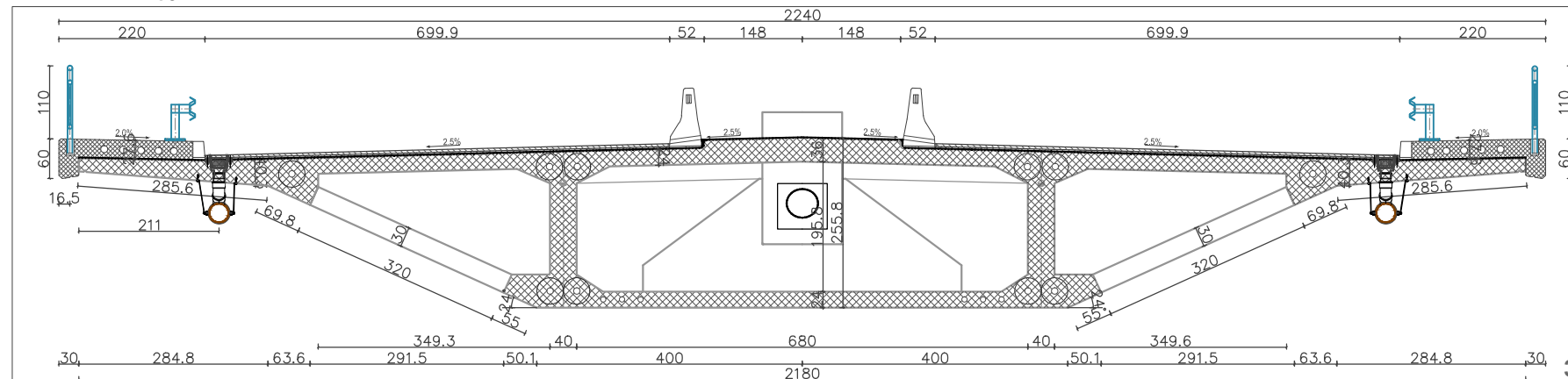
Participation: Member of the design team



The bridge is located on the southwestern bypass around Podgorica. It is positioned above the river bed at the length of 150 m. The maximum depth of the river valley is about 14 m. Adopted technical solution is cable - stayed bridge with one pylon, 31 m tall above deck, at the middle of the bridge. The pylon above the deck has the cross-section as shown in figure 4, while beneath the deck changes into the circular column of diameter 5,0 m. Seven cables are supporting the deck, 75 m long from pylon to the abutment. The cables are arranged symmetrically in one plane along the middle of the bridge. They are at relatively small distances (9m), which gives the possibility of a thinner span construction. The width of bridge is 22.40 m, with the box-shaped cross-section of the deck structure, with an average height of 2.40m. The deck structure is in straight line in the vertical and horizontal layout.



1. Side view of the bridge
2. 3D model of the bridge
3. Characteristic deck cross section
4. Characteristic pylon cross section



Highway bridges

Podgorica - Mataševo, Montenegro, 2016

Investor: Government of Montenegro

Contractor: CRBC Subcontractor: Čelebić/FRAME Project

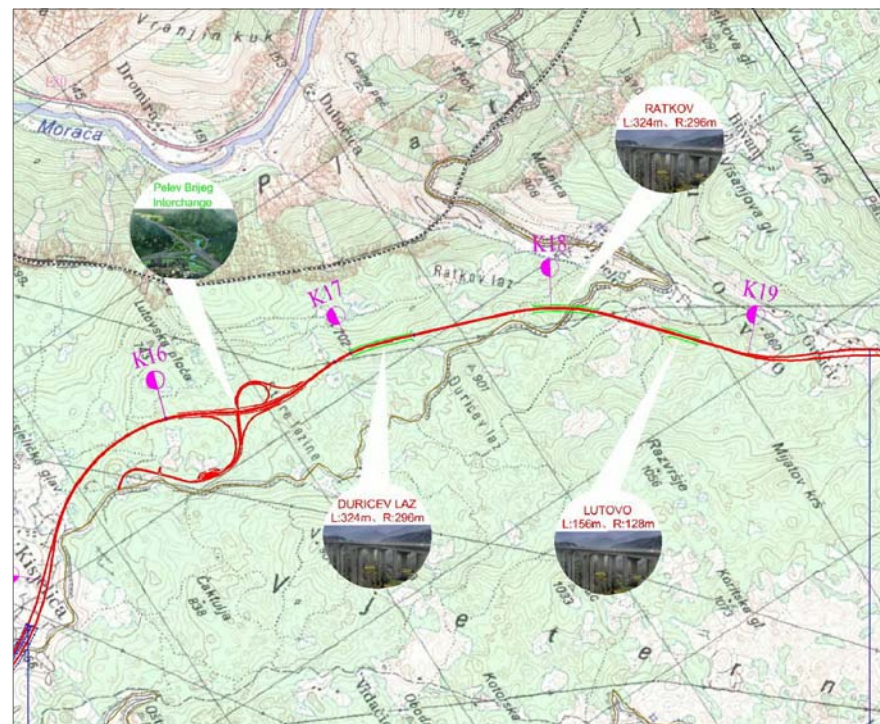
Participation: Designer

Viaducts: Djuricev laz, Ratkov laz, Lutovo; Interchange - Pelev brijeg; Overpass -Kisjelica

Viaduct - Djuricev Laz

The viaduct is located on the highway Podgorica - Mataševo, section Smokovac - Uvac on the location Djuricev laz. The viaduct is positioned in valley, which is about 352m long and about 28m deep. The total length of the viaduct in left lane is 352m and 324m in right lane. Width of viaduct per lane is 13.40m. Structure is mainly in straight line, partly in transition curve and partly in circular curve of radius $R = 752$ m. Adopted technical solution is continuous frame with span composition of $22+nx28+22$ m. Superstructure is rigidly connected to the middle piers. Pot bearings movable in longitudinal direction were used on the first pier from abutments. Superstructure is designed as prestressed solid slab of constant height $d = 1.2$ m, while piers are designed as reinforced concrete. Piers were founded on shallow foundations, on limestone bedrock, with height of 1.6m.

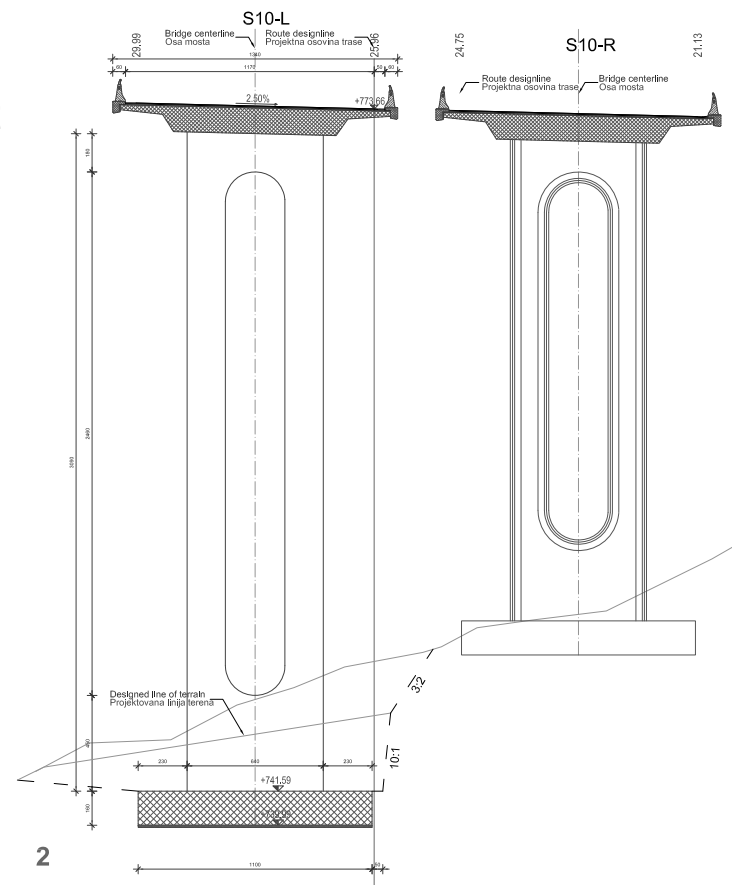
Cast-in-situ span-by-span construction method is applied for the superstructure.



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- 1. Disposition of objects on the route
- 2. Characteristic cross section
- 3. and 6. Viaduct Djuricev Laz under construction
- 4. Longitudinal layout
- 5. Disposition of tendons in slab

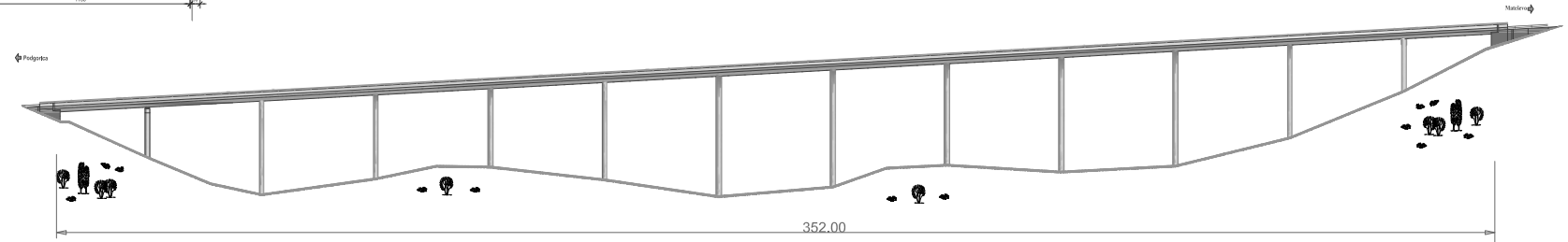
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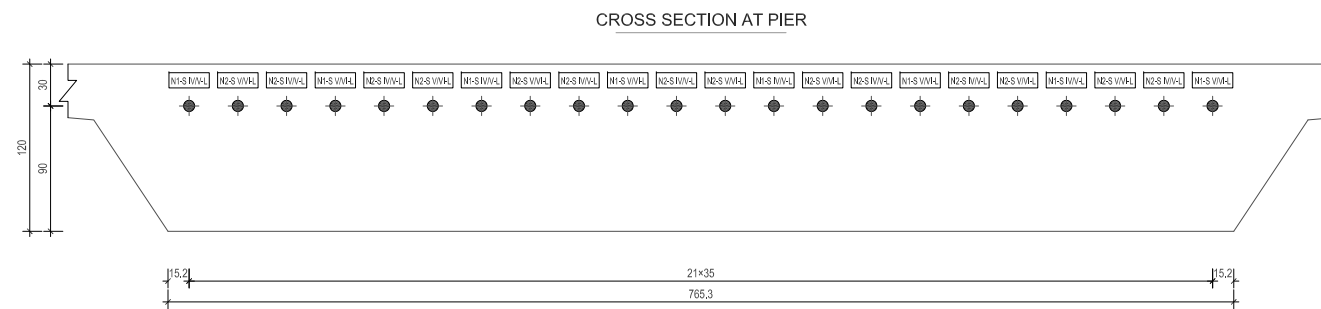
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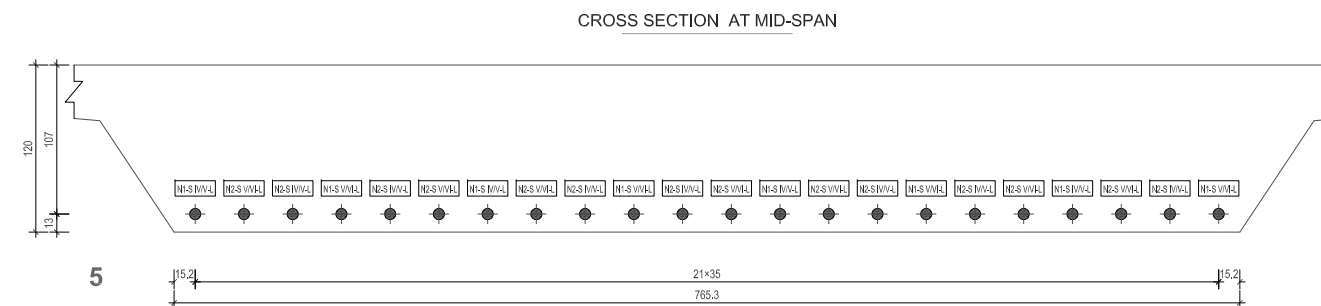
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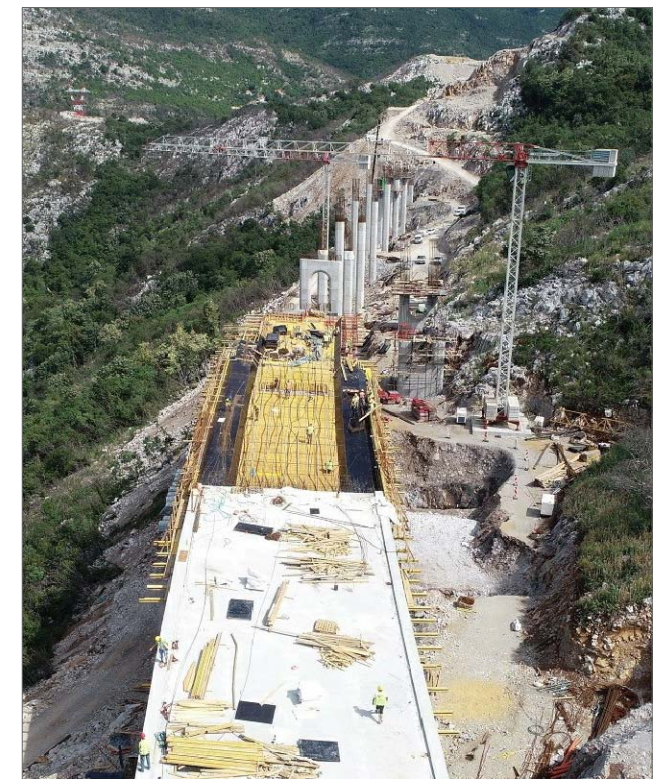


CROSS SECTION AT PIER



CROSS SECTION AT MID-SPAN

5



6

Highway bridges

Podgorica - Mataševo, Montenegro, 2016

Investor: Government of Montenegro Contractor: CRBC

Subcontractor: Čelebić/FRAME Project

Participation: Designer

Viaducts: Djuricev laz, Ratkov laz, Lutovo;

Interchange - Pelev brijeg; Overpass -Kisjelica

Viaduct - Lutovo

The viaduct is located on the highway Podgorica - Matasevo, section Smokovac - Uvac on the location Lutovo. The viaduct is positioned in valley, which is about 212m long and about 34m deep. The total length of the viaduct in left lane is 212m and 128m in right lane. Width of viaduct per lane is 13.40m. Structure is in straight line. Adopted technical solution is continuous frame with span composition of $22+nx28+22$ m. Superstructure is rigidly connected to the middle piers. On the first pier from abutments pot bearings movable in longitudinal direction were used. Superstructure is designed as prestressed solid slab of constant height $d=1.2$ m, while piers are designed as reinforced concrete. Piers were founded on shallow foundations, on limestone bedrock, with height of 1.6m.

Cast-in-situ span-by-span construction method is applied for the superstructure.



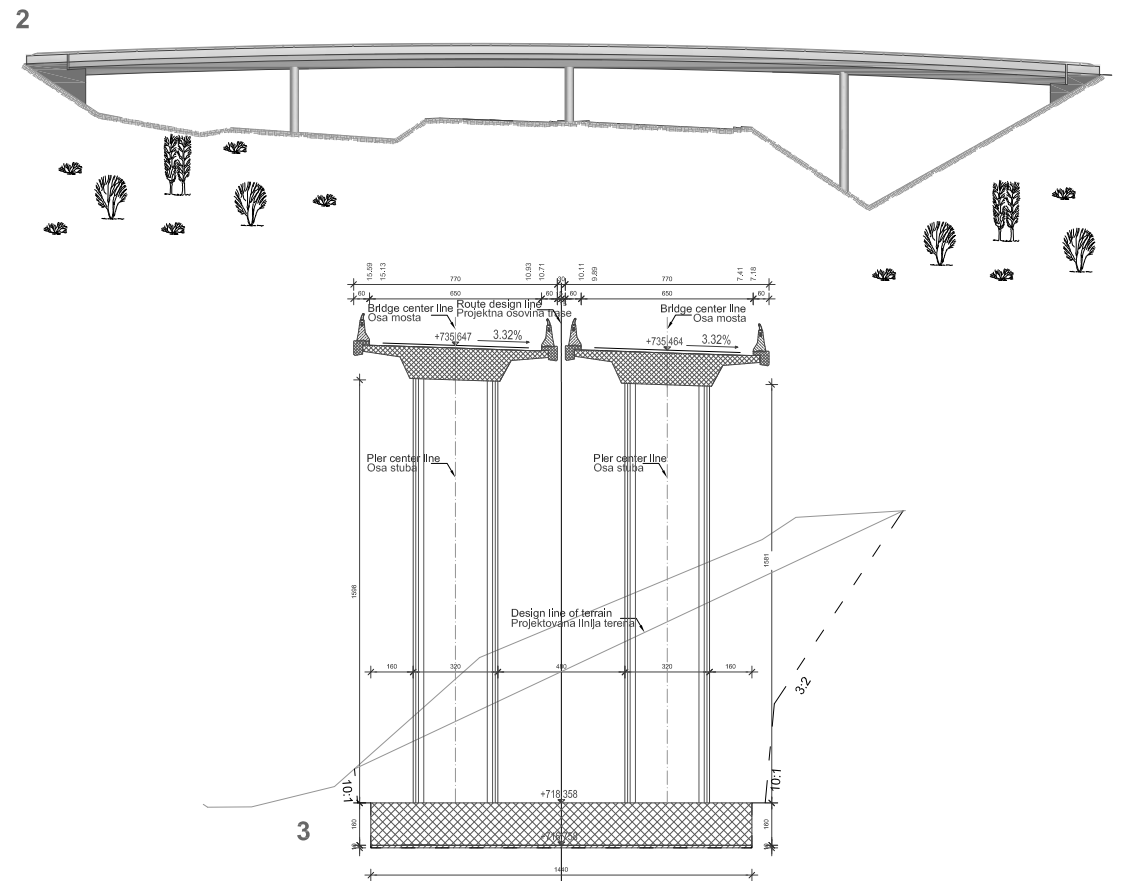
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1. Viaduct Lutovo under construction
2. Interchange Pelev brijeg - side view
3. Interchange Pelev brijeg - cross section
4. Interchange Pelev brijeg - under construction
5. Overpass Kisjelica - side view
6. Overpass Kisjelica - cross section
7. Overpass Kisjelica - under construction

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Interchange - Pelev brijeg

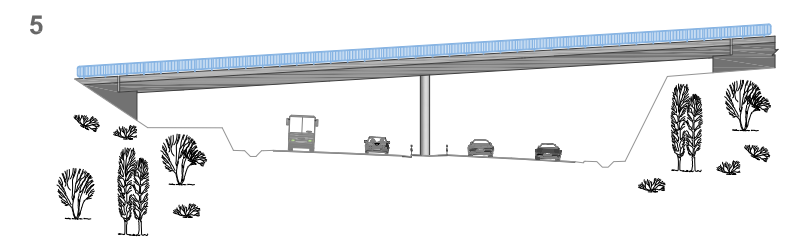
The interchange is located on the highway Podgorica - Matecevo, section Smokovac - Uvac on the location Pelev brijeg. The bridge is over the highway at the length of 100 m and maximal depth about 6 m. The width of the bridge is 7.70 m per lane. The bridge makes the free clearance above the highway of 5.2 m. Structure is mainly in straight line and partly in transition curve. The bridge is in the vertical convex curve. Adopted technical solution is continuous frame that has two spans $22+2x28+22=100$ m. Superstructure is rigidly connected to the middle piers. Superstructure is designed as prestressed solid slab of constant height $d=1.2$ m



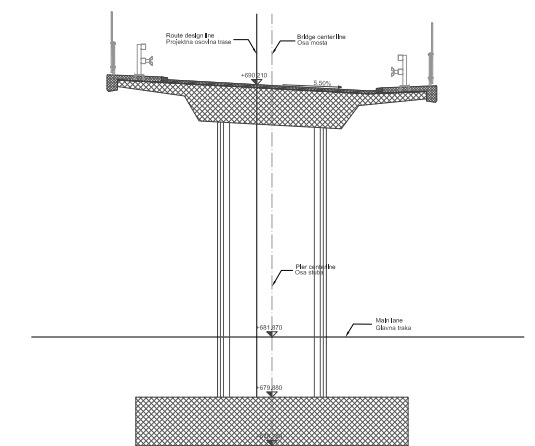
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Overpass - Kisjelica

The overpass is located on the highway Podgorica - Mateševo, section Smokovac - Uvac on the location Kisjelica. The bridge is over the highway in the length of about 52 m and maximal depth about 8 m. The overpass makes the free clearance above the highway of 6.0m. The total length of the bridge is 52 m. Width of overpass is 10.90m. Structure is in circular curve of radius $R=60$ m. Adopted technical solution is continuous frame that has two spans $26+26=52$ m. Superstructure is rigidly connected to the middle pier S1. Superstructure is designed as prestressed solid slab of constant height $d=1.2$ m



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Highway bridges

Podgorica - Mataševo, Montenegro, 2016

Investor: Government of Montenegro Contractor: CRBC

Subcontractor: Čelebić/FRAME Project

Participation: Designer

Viaducts: Djuricev laz, Ratkov laz, Lutovo; Interchange - Pelev brijeg; Overpass -Kisjelica

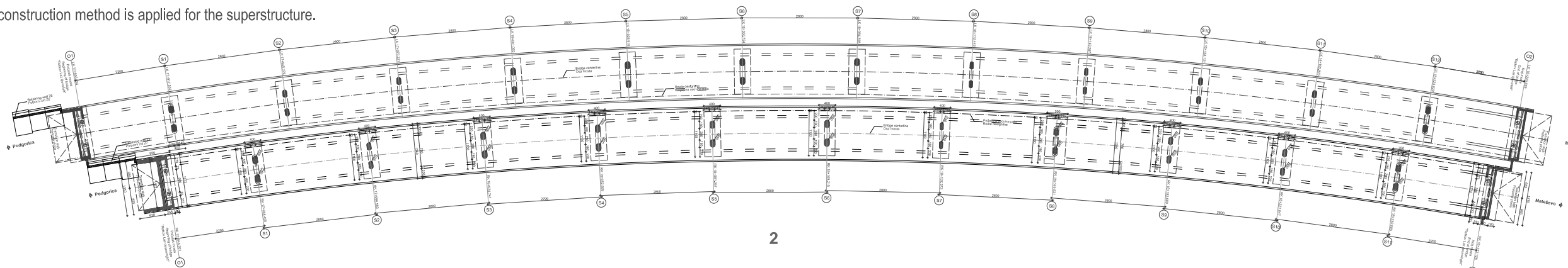
Viaduct - Ratkov Laz

The viaduct is located on the highway Podgorica - Matasevo, section Smokovac - Uvac on the location Ratkov laz. The viaduct is positioned in valley, which is about 352m long and about 35m deep. The total length of the viaduct in left lane is 352m and 324m in right lane. Width of viaduct per lane is 13.40m. Structure is mainly in circular curve of radius $R = 998$ m line, and partly in transition curve. Adopted technical solution is continuous frame with span composition of $22+nx28+22$ m. Superstructure is rigidly connected to the middle piers. Pot bearings movable in longitudinal direction were used on the first pier from abutments. Superstructure is designed as prestressed solid slab of constant height $d = 1.2$ m, while piers are designed as reinforced concrete. Piers were founded on shallow foundations, on limestone bedrock, with height of 1.6m.

Cast-in-situ span-by-span construction method is applied for the superstructure.



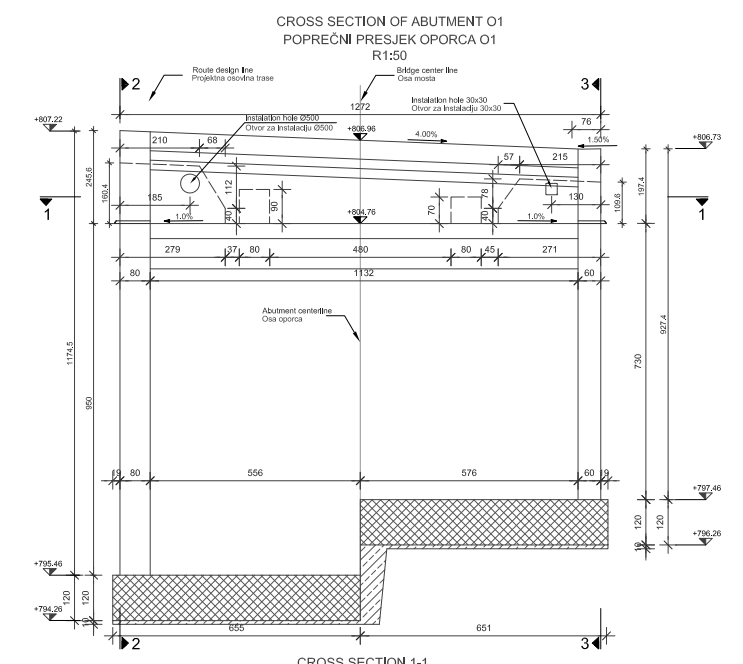
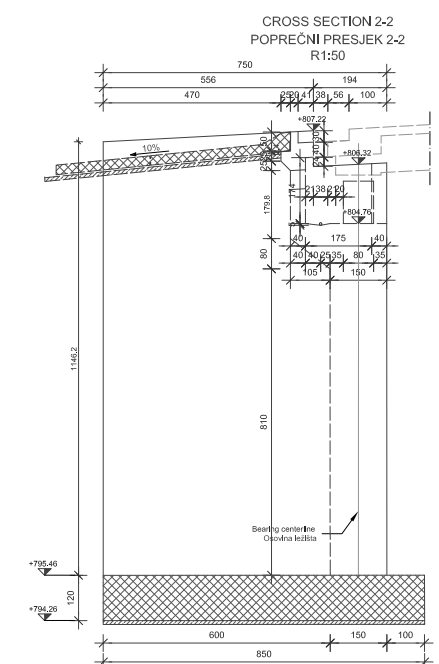
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1. and 3. Viaduct under construction
 2. Structure layout
 4. Characteristic abutment
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Tourist resort Dobrota Palazzi

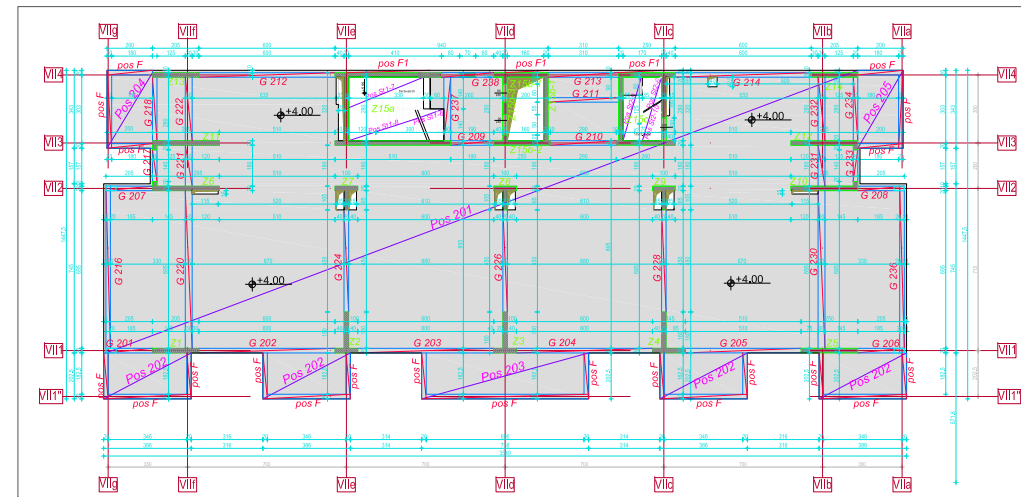
Dobrota, Montenegro, 2015

Investor: Serzman Incorporated d.o.o.

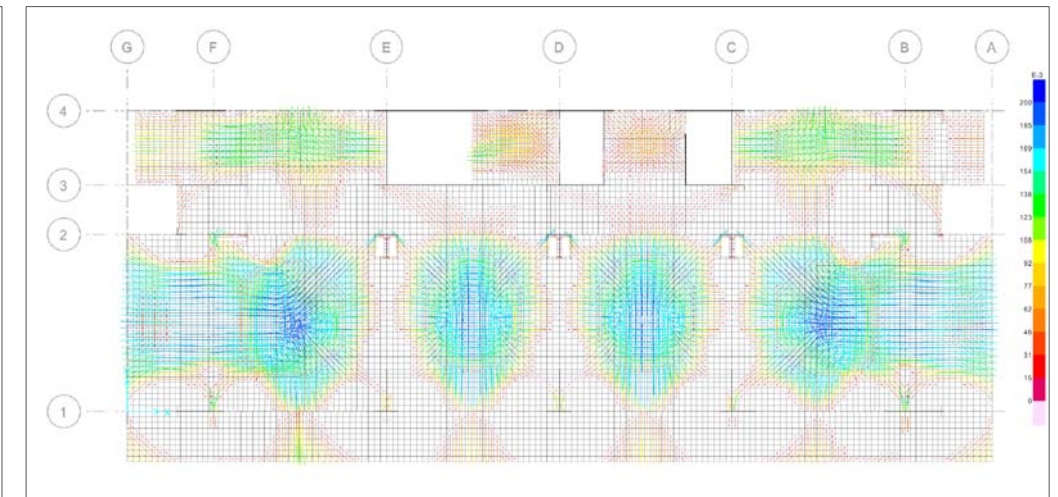
Contractor: FRAME Project d.o.o

Participation: Designer

The resort is located in Dobrota, Montenegro, on the shore of Boka Kotorska Bay, which is in the Mediterranean sea. Seven objects: hotel, residential objects, villas and underground garage were designed. The structural system for all objects consists of ductile reinforced concrete walls and cores connected with beams and solid flat slab. Foundation, due to very weak soil characteristics, is thick slab dilated on the objects edges. Full structural engineering service from conceptual design to the main project was provided. Finite element model in ETABS was used for structural analysis and design.



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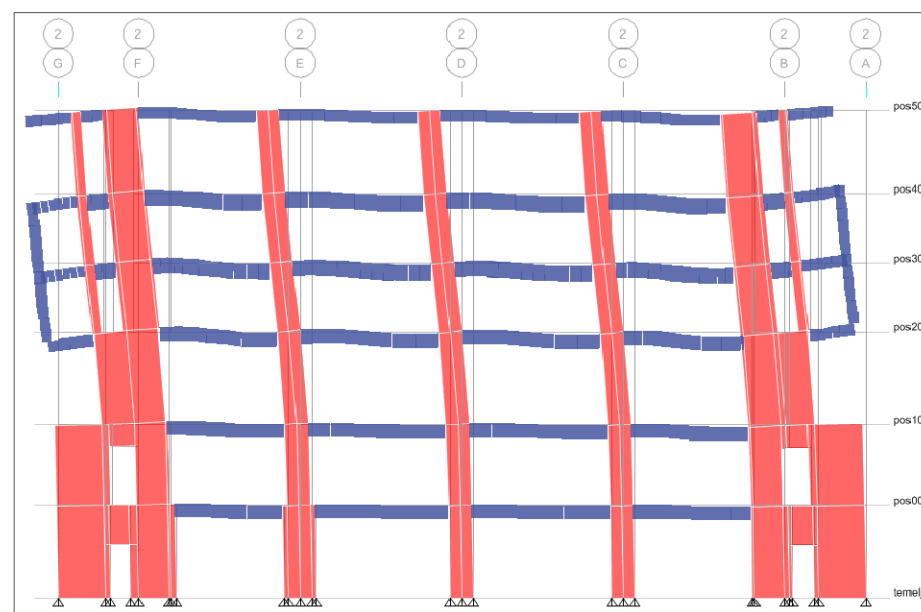
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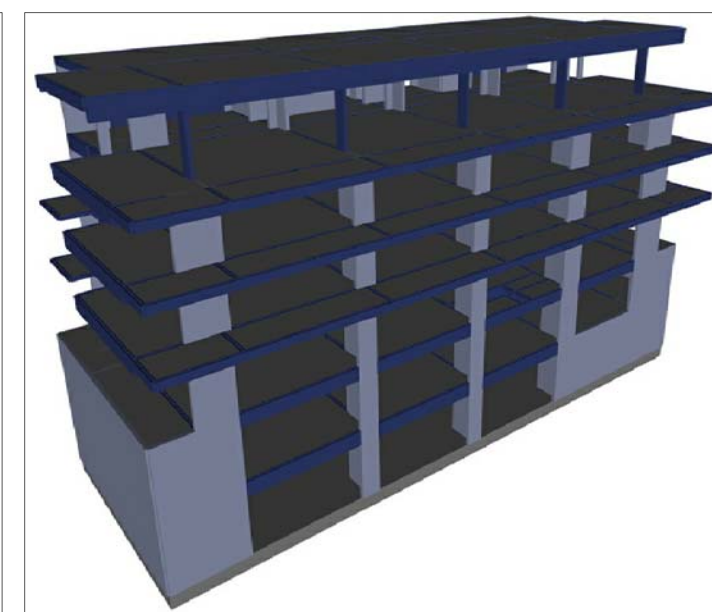
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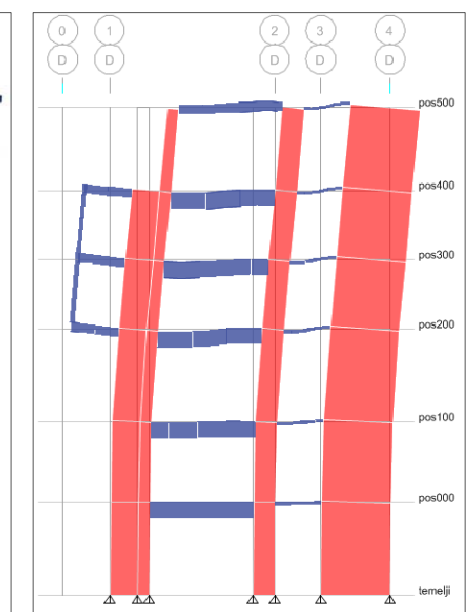
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1. Visualization of resort
2. Resort under construction
3. Typical floor layout
4. Disposition of cracks in typical slab
6. 3D model
5. 7. First modes of deformation in two orthogonal directions

Tourist resort Lustica Bay - villas F

Lustica, Montenegro, 2014

Investor: Lustica Development A.D.

Contractor: FRAME Project d.o.o

Participation: Designer

The resort is located in Lustica, Montenegro, on the shore of the Mediterranean sea. Eight residential objects - villas and underground garage under objects F5, F6 and F7 were designed. Villas provide high level of comfort in tourist habitation, with great attention on insolation and open vistas toward sea.

The structural system for all objects consists of ductile reinforced concrete walls and cores connected with beams and flat solid slab. Foundation of objects was performed on limestone, on foundation strips. Full structural engineering service from conceptual design to the main project were provided according to the Eurocode.



1



2



3

1. View on the resort
2. Villas F7, F6, F5
3. Villas F under construction
4. Disposition of objects on the foundation level



4