CABLE STAYED BRIDGES
OUR EXPERTISE

- DESIGN
  - HIGHWAY BRIDGES
  - RAILWAY BRIDGES
  - COMBINED BRIDGES
  - HIGHWAYS
  - STREETS AND ROAD INTERCHANGES
  - VIADUCTS & FLYOVERS
  - TRANSPORT TUNNELS
  - UNDERGROUND STRUCTURES
  - EMBANKMENTS AND MOORING BERTHS
  - RETAINING WALLS
  - REINFORCED MOUNDS
  - BUILDINGS AND STRUCTURES OF DIFFERENT HEIGHTS
  - SOPHISTICATED FLOORS OF BUILDINGS AND STRUCTURES
  - FOUNDATIONS IN COMPLEX ENVIRONMENT

- GENERAL DESIGN

- DEVELOPMENT OF CONSTRUCTION TECHNOLOGY OF BRIDGE AND TRANSPORT STRUCTURES

- DEVELOPMENT OF PROJECTS FOR SPECIAL AUXILIARY STRUCTURES AND DEVICES (SAS&D)

- DEVELOPMENT OF METHOD STATEMENTS (MS)

- DEVELOPMENT OF CONSTRUCTION METHOD STATEMENTS (CMS)

- DEVELOPMENT OF PROJECTS FOR RENOVATION AND REPAIR OF BRIDGE AND TRANSPORT STRUCTURES

- DESIGN OF MONITORING SYSTEMS FOR COMPLEX ENGINEERING STRUCTURES

- SOPHISTICATED ENGINEERING ANALYSIS

- AERODYNAMIC ANALYSIS

- DEVELOPMENT OF TECHNICAL AND ECONOMIC FEASIBILITY STUDY

- FINANCIAL ESTIMATES

- PREPARATION OF TENDER DOCUMENTATION

- ENGINEERING SUPERVISION

- PROTECTION OF INTELLECTUAL PROPERTY ARTICLES

- CONSTRUCTION

- DESIGN OF TECHNOLOGICAL SOLUTIONS FOR OBJECTS OF NUCLEAR POWER ENGINEERING AND INDUSTRY AND ITS COMPLEXES

- DEVELOPMENT OF JUSTIFICATION OF RADIATION AND NUCLEAR PROTECTION
OKTYABRSKIY CABLE-STAYED BRIDGE OVER THE SHEKSNA RIVER, CHEREPOVETS

DESCRIPTION
City Bridge is being connected Industrial and Zasherninsky districts of Cherepovets city. It is the first ever built cable-stayed Bridge in Russian Federation. Bridge deck structure presented by steel girder structure with cable-stayed system, with five fan type RC approaches. Single A-shaped steel pylon with six pairs of stay cables, located on Pier 2 between spans of 194.2 m and 136.5 m.

- Bridge diagram: 53.0 + 194.25 + 136.5 + 68.65 + 4 x 68.25 + 52.5 m
- total length of bridge structure – 709.25 m
- A-shaped pylon
- pylon height – 83.5 m
- weight of stay cables – 510 t
- length of stay cables – 16 km
- clearance – 28.4 m

SCOPE OF WORKS
- design of SAS&D
- design of work technology
- development of Method Statements (MS)
- field supervision

CLIENT
Cherepovetskiy Metallurgical Plant

GENERAL CONTRACTOR
‘Mostootryad 61’; JSC ‘Mostostroy 6’

DESIGN PERIOD
1972 – 1976

CONSTRUCTION PERIOD
1976 – 1979
CABLE-STAYED BRIDGES
BOLSHOY OBUHOVSKIY CABLE-STAYED BRIDGE
OVER THE NEVA RIVER, SAINT-PETERSBURG

DESCRIPTION
Twin bridge crossing the Neva River on ring road around Saint-Petersburg, on site between Priozerskoe motorway and up to Highway ‘Russia’.

Bolshoy Obuhovskiy Cable –Stayed Bridge is the only one not fixed bridges over the Neva River, connecting Prospect Obuhovskoy Oborony with Oktyabrskaya Embankment.

First bridge crossing was inaugurated on December 15th 2004 and the second one on October 19th 2007

- Bridge diagram: 2 x 66+174+382+174+2x66 m
- deck width is 25 m with a height of 2.5m, deck structure composed of two longitudinal boxed girders with bracing
- deck clearance is 30 m

Four lanes of carriageway conceived as one way crossing with two technological passages for maintenance purposes (pedestrian crossing was not considered). Distance within main bridge axis is 36.4 m

Spans connected with steel pylons by height 120.5 m via stay cables. Pylon Foundation presented by bored piles with a length from 30 up to 40 m long. Total length of strands is 900 km long.

Stay cables from parallel strand manufactured on monostrand technology. Each stay cable is formed from series straining strand immediately during construction.

SCOPE OF WORKS
- definition of bridge crossing conception
- structural design
- technology of construction
- design of SAS&D plus DDPE
- structural monitoring of construction and service periods
- field supervision

CLIENT
Road Administration of Saint-Petersburg Institute Stroyproekt

GENERAL CONTRACTOR
‘Mostootriad– 19’

DESIGN PERIOD
2000 – 2007

CONSTRUCTION PERIOD
2002 – 2007
VIADUCT ALEXANDROVSKAYA FERMA, SAINT-PETERSBURG

DESCRIPTION
Overpass over RR stations SPb –Sortirovochniy – Moskovskiy Prospekt along Alexandrovskaya Ferma.
Structure of overpass fulfilled as a continuous steel span of box section with orthotropic slab, steel structure of middle span and back spans out of reinforced concrete. Viaduct has curved form with radius of 400 m. Cable-stayed trusses are within plane along overpass axis.
- diagram of cable-stayed span:
  51.2+70.0+182.3+70.0+51.2 m
- total length – 713.24 m
- length of Cable-stayed spans – 424.7 m
- width of carriageway – 23.7 m
- A-shaped RC pylons
- height of pylons – 65 m

SCOPE OF WORKS
- bridge crossing conception
- design of main structures of overpass
- technology of construction
- design of SAS&D
- development of Method Statements (MS)
- structural monitoring during construction stage and service period
- field supervision

CLIENT
Road Administration of Saint-Petersburg

GENERAL CONTRACTOR
JSC ‘Lengiprotrans’

DESIGN PERIOD
2006 – 2008

CONSTRUCTION PERIOD
2008
GOLDEN HORN CABLE-STAYED BRIDGE, VLADIVOSTOK
DESCRIPTION

Cable-Stayed Bridge Crossing on federal highway M60 ‘Ussuri’ Khabarovsk – Vladivostok toward Russkiy Island.

Bridge structure located in the central part of Vladivostok nearby Gogolya and Nekrasovskaya streets on Northern side as well as Kalinina, Fastovskaya and Nadibaide streets on Southern side. Total length of bridge crossing is 2.1 km.

- Bridge diagram:
  45+100+2 x 90+737+2 x 90+100+45 m
- center span – steel structure of 737 m
- back span – prestressed RC
- bridge length – 1,387 m
- pylon height – 225 m
- clearance – 60 m
- width of main girder – 29.4 m
- height of main girder – 3.5 m
- weight of stay cables – 1,845 t
- total area – 43,030 m²

SCOPE OF WORKS

- definition of bridge crossing conception
- structural design
- technology of assembling design
- design of SAS&D
- structural monitoring during stage of construction and service period
- field supervision

CLIENT

Road Administration of Primorskiy Kray

GENERAL CONTRACTOR

TMK Ltd

DESIGN PERIOD

2006 – 2008

CONSTRUCTION PERIOD

2008 – 2012
CABLE-STAYED BRIDGE RUSSKIY, VLADIVOSTOK
DESCRIPTION
Cable-stayed bridge on Russkiy island, Vladivostok. One of the world biggest cable-stayed crossing of 1,104 m with the highest pylons and longest stay cables ever build currently.

- bridge diagram: 60+72+3x84+1104+3x84+72+60 m
- total bridge length — 1,885.53 m
- total length with approaches — 3,100 m
- main span — 1,104 m
- deck width — 29.5 m
- carriageway width — 23.8 m
- number of lanes — 4 (2 per one way)
- clearance — 70 m
- number of pylons — 2
- pylon’s height — 320.9 m
- number of stays — 168 pcs
- longest stay cable — 578.08 m
- shortest stay cable — 181.32 m

SCOPE OF WORKS
- design of project stage
- design of SAS&D, main structures
- aerodynamic tests
- control of technical decisious
- verification analysis

CLIENT
Road Administration of Primorskiy Kray
Rosavtodor, ‘Mostovik’

GENERAL CONTRACTOR
JSC ‘USK Most’

DESIGN PERIOD
2008 – 2012

CONSTRUCTION PERIOD
2009 – 2012
DESCRIPTION

Bridge Crossing the Moscow River in Serebrianiy Bor nearby Krasnopresnyanskiy Prospekt from MKAD up to Prospekt Marshal Jukov.

The task of picturesque bridge design was to insure comfortable and steady vehicles movement along highway with a speed of 100 km per hour.

Pylon was conceived as a huge arch structure with fan type crown of stay cables placed via sharp angle on both banks of Moscow River.

The upper part of the arch has cozy ellipse shaped restaurant with amazing view:

- bridge diagram:
  - 15x25+2x105+409.5+2x105+84+82+42 m
- total bridge length – 1,460 m
- clearance – 37 m
- cable-stayed bridge with arch pylon
- boxed steel girder
- height of the arch – 105 m

- weight of stay cables – 400 t
- weight of arched pylon – 4,000 t
- weight of main girder – 12,000 t

SCOPE OF WORKS

- initial aerodynamic analytical assessment.
- analytical assessment and recommendations subsequent to test in aerodynamic tube
- dynamic calculation

CLIENT

‘Organizator Ltd’

GENERAL CONTRACTOR

JSC ‘Metrogiprotrans’; JSC ‘Giprotransmost’

DESIGN PERIOD

2004 – 2007

CONSTRUCTION PERIOD

2004 – 2007
CABLE-STAYED BRIDGE
OVER THE SHEKSNA RIVER, CHEREPOVETS

DESCRIPTION
Two H-type pylon Cable–Stayed Bridge Crossing is being connected Zarechenskiy and Zashekninskiy districts on Arkhangelskaya street in Cherepovets City.

- Bridge diagram: 4x63+63+64+98+220+98+64+63+3x63+42 m
- Design length – 2,000 m
- Total bridge length – 1,166.85 m
- Pylon height from the carriageway – 91 m
- RC pylons
- Length of Stay Cables – 5,428 m
- Weight of stays – 325 t
- Clearance of navigable span – 180 m
- RC deck
- Number of lanes – 6
- Clearance – 17 m
- Pavement – 2x3.0 m

SCOPE OF WORKS
- General Design
- Design of main structures (bridge and flyover)
- Complex design
- Architectural decisions
- Design of SAS&D, construction method statement
- Design of illumination
- Design of navigation bridge warning
- Design of aeronautical bridge warning
- Improvement design
- Field supervision

CLIENT
Road Administration of Cherepovets

DESIGN PERIOD
2010 – 2011
CABLE-STAYED BRIDGE ON HIGHWAY
ADLER-MOUNTAIN RESORT ‘ALPICA-SERVICE’

DESCRIPTION
Composite road (highway together with RR) Adler – mountain resort ‘Alpica – Service.’
Two pylons Cable–Stayed Bridge Crossing nearby Northern part of Tunnel Complex N3.

- bridge diagram: 126+300+126 m
- total length – 552 m
- main span – 300 m
- number of lanes – 2
- total weight of steel – 4,900 t
- total weight of RC – 8,900 t
- weight of cable stays – 150 t
- pylon height from the carriageway – 68 m
- pylon height from the foundation – 86 m

SCOPE OF WORKS
‘Project’ stage:
- basic calculations
- analytical assessments for wind tunnel tests
- wind tunnel tests analysis
- dynamic analysis

CLIENT
Road Administration of Sochi;
Institute Giprostroymost, Moscow

DESIGN PERIOD
2010

KRAKNOODAR TERRITORY
TECHNOLOGICAL CABLE-STAYED VIADUCT
OVER THE DUDERGOFSKIY CANAL IN SAINT-PETERSBURG

DESCRIPTION
Cable-Stayed Technological Viaduct with main span of 130 m is being crossing Dudergofskiy Channel with sibling heating tubes of $\varnothing$ 1,020 mm above with single inclined pylon. The structure of cable-stayed bridge supporting heating main has no analogues in Russia. Pylon by height 58 m is inclined to the ground.

Bridge Crossing presented as follows:
- height of pylon – 58 m
- length of span – 130 m
- technological load – Two heating tubes $\varnothing$ 1.2 m

SCOPE OF WORKS
- design of pylon construction technology
- design of SAS&D
- Method Statement of pylon construction

CLIENT
Petrokom Ltd, Saint-Petersburg

CONSTRUCTION PERIOD
2011
CABLE STAYED BRIDGE OVER THE PETROVSKY CHANNEL, SAINT-PETERSBURG, RUSSIA

DESCRIPTION
The Bridge Crossing was conceived as a part of the important city Motorway Western High Speed Diameter. The structure is located on convex curve of 10,000 m. Projection of upstream clearance is 166x25 m and downstream clearance is 80x25 m. Foundations of piers were fulfilled as bored piles diameter 1,500 mm. Deck cross-section is presented as a structure of four main girders of 1.76 m height within stay cable system. Bridge girders were connected via beams on distance of 65 m. (3 m per edge piers). Composite monolithic carriageway slab thickness is 220 mm. SSi2000 was an option of stay cable system with galvanized strands individually greased and coated with a high-density polyethylene sheath. The strands are used in accordance with the EN10138 standard. Total strands are seven wire 15.7 mm diameter. Designated distance within stays is 13 m.

TECHNICAL FEATURES
- Bridge schema: 60+110+240+110+60 m
- Total length — 580 m
- Carriageway clearance 2 x (Г – 17.5)
- RC pylons

**Pylon heights — 124 m**

**SCOPES OF WORKS**
- Architectural conception design
- Main structures design
- Working Documentation per Cable Stayed Bridge
- SASS&D per the bridge structure
- MS development and issue
- Technical Supervision

**CLIENT & GENERAL CONTRACTOR**
JSC WHSD

**CONTRACTOR**
ICA Astaldi Ictas

**OWNER**
Northern Capital Highways, Ltd

**DESIGN PERIOD**
2013 – 2014

**CONSTRUCTION PERIOD**
2016

**SAINT-PETERSBURG**
CABLE-STAYED BRIDGE OVER THE VOLGA RIVER, NIZHNIY NOVGOROD

DESCRIPTION
Design decision relating reconstruction bridge over the Volga River on the highway P-159 Nizhniy Novgorod–Shahuniya – Kirov with carriageway widening. Combined Bridge upper deck presented as RR way and lower deck as a highway. Existed bridge was built in 1965.

- total bridge length (motorway) – 1,608.8 m
- Bridge design conception presented as follows:
  - 12x18 + 55 + 2x159 + 55 + 53 +13x18 m
  including:
  - 12x18 – right bank approaches for highway
  - 55 + 2x159 +55 – middle span for combined way

SCOPE OF WORKS
- predesign of bridge reconstruction by carriageway widening which uses one pylon cable-stayed system

CLIENT
Road Administration of Nizhniy Novgorod, JCS ‘Avtomost’

DESIGN PERIOD
2007
CABLE-STAYED BRIDGE CROSSING IN ULYANOVSK
DESIGN PROPOSAL

DESCRIPTION
- Bridge diagram: 221 + (205 + 610 + 221) + 221 m

SCOPE OF WORKS
- technical proposal on concept of object

CLIENT
JSC ‘Baltic Construction Company—SPb’
CABLE-STAYED OVERPASS ON CHERNYAHOVSKOGO STREET IN SAINT-PETERSBURG

DESCRIPTION
City highway cable-stayed overpass on Chernyahovskogo Street and Kremenchugskaya Street in SPb.
Cable-Stayed part should cross RR toward Moscow direction.

Basic features:
- continuous irregular span by length – 252 m
- cable-stayed span – 252 m

SCOPE OF WORKS
- project design
- investment justification

CLIENT
Saint-Petersburg Road Administration
Direction of transport construction
Lengiproinzproekt, SPb

DESIGN PERIOD
2006
CABLE-STAYED BRIDGE CROSSING OVER THE KAMA RIVER IN PERM

DESIGN PROPOSAL

DESCRIPTION

Two pylons cable-stayed Bridge Crossing over the Kama River connecting Northern and Eastern parts of the city of Perm.

- Bridge crossing presented as follows: 250+520+250 m
- Pylons – A-shaped
- Main span – 520 m
- Locations of cable stays – fan type in two planes
- Heights of pylons – 160 m

- Total length of bridge – 1,256 m

SCOPE OF WORKS

- General design
- Predesign

CLIENT

Road Administration of Perm City
Perm Improvement

DESIGN PERIOD

2008
bridges  tunnels  sport  structures  civil engineering  design  footbridges  embankments & berths

general  design  design of constructions  sophisticated engineering  analysis  field  supervision  monitoring of structures  construction technology

SC INSTITUTE GIPROSTROYMOST - SAINT-PETERSBURG

Yablochkova str. 7, Saint-Petersburg, Russia, 197198; e-mail: office@gpsm.ru; www.gpsm.ru