Creating Valuable Space for Humans and the Environment

PEC is materializing “Customer Satisfaction” through its excellent human resources, most advanced technology and cutting-edge systems in the field of construction engineering focusing on structural technology. PEC is also aiming to deliver consistent technological development and management innovation to create prosperous future space where humans and the environment coexist in harmony.

In addition, more than 900 engineers and executives of PEC are focusing to achieve the company vision, “Global Engineering Company”, by the year 2015 with their efforts and commitments to the full extent.

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Commitment to Achieve/Pursue Clients' Dreams and Visions

PEC is putting its utmost efforts to pursue the dreams and visions of its clients demanding more efficient infrastructures. Our group of professional engineers with advanced expertise plays a leading role in creating an environment to enrich the human life.

A World-Leading Technology of Cable-Supported Bridge Design

Chairman's Message

Founded in 1995, PEC has been carrying out its responsibility for the infrastructure invested by government and private sectors to create a abundant space for human beings through full spectrum of its engineering business solutions - planning, design, construction of development and maintenance services in the field of civil engineering.

As a result of continuous efforts in developing numerous construction markets based on our accumulated expertise and rich experiences, PEC has become a world-leader in the field of cable-supported bridge design and construction technology as well as various civil engineering projects. Our Group is now leading the global construction market especially in designing and constructing cable-supported bridges based on our accumulated expertise and rich experiences which have been proven by the successful accomplishment of the competition in Taiwan bridge design contest.

PEC is here to lead the global construction market especially in designing and constructing cable-supported bridges based on our accumulated expertise and rich experiences which have been proven by the successful accomplishment of the competition in Taiwan bridge design contest and alternative design for the cable-supported bridges in the field of bridge construction engineering. Our Group has the “essence” of cable-supported bridge design and construction technology through our Department professionals who have broad experiences in the field of bridge engineering for long span and special bridges.

It is my pleasure to proudly present our Structural Engineering Department professionals who have broad experiences in the field of bridge engineering for long-span and special bridges.

With gratitude for the trust and support that you have shown towards PEC so far, we will devote ourselves to make PEC a successful global construction engineering enterprise, which contributes fully to the society and continue to stay competitive internationally through a variety of services in the construction engineering field.

PEC Chairman
Jae-Won Kwon

Foreword

Bridge means more than a civil structure. It often plays a role as a symbol or a landmark symbolizing a city or a country such as the Golden Gate Bridge in San Francisco, the Sydney Harbour Bridge in Sydney, Australia, or the Tower Bridge in London, UK.

In particular, due to the geographical environment, South Korea is ranked as a top fourth country possessing large number of islands, following Indonesia, Philippines and Japan. Along with this fact and the advent of new-oceanic era, we have brought about remarkable advances of technology in bridge engineering, with numerous long-span bridges in the process of planning, design, construction and operation. These advances have been accomplished by the change of perception towards islands being part of the mainland. However, limiting our business activities within South Korea would not provide us with competitive advantages as well as a retrogression of competitiveness as well as a loss of expertise in national and international industries.

Therefore, PEC is here to take the lead in making advances in the overseas market being fully geared with South Korea’s best engineering professionals and our state-of-the-art technology. As part of the process, a brochure presenting PEC Structural Engineering Department has been prepared in both Korean and English.

It is our vision to become a global leader in the field of cable-supported bridges and long span bridges. As part of this, we are preparing and planning to publish a brochure presenting PEC Structural Engineering Department and make us to stand out and be known in the world as a leading company in the field of bridge engineering.

PEC Structural Engineering Department Vice-President
Chung-Young Cho
Chung-Young Cho

Civil Structure Professional Engineer

Specialization:
- Structural Analysis, Design, and Construction

Awards:
- Merit Award: Korean Concrete Society, 2007
- Korea Institute of Structural Engineers, Young Engineers Development Award, 2003

Main Careers

Domestic Projects

Cable-Stayed Bridge

Overseas Projects

Railway Bridge

Chung-Young Cho

Senior Managing Director

Civil Structure Professional Engineer

Specialization:
- Healthcare Engineering, Design, and Construction

Key Projects:
- Research: "Structural Analysis and Design of Cable-Stayed Bridges", 2009

Awards:
- Seoul Metropolitan Government: "Outstanding Young Engineer", 2009
- Others: "Outstanding Young Engineer", 2008

Main Careers

Domestic Projects

Cable-Stayed Bridge

Overseas Projects

Railway Bridge

Cable-Stayed Bridge

Overseas Projects

Railway Bridge

Hee-Chul Kang

Senior Managing Director

Civil Structure Professional Engineer

Specialization:
- Civil Engineering, Design, and Construction

Key Projects:

Awards:
- Seoul Metropolitan Government: "Outstanding Young Engineer", 2009
- Others: "Outstanding Young Engineer", 2008

Main Careers

Domestic Projects

Cable-Stayed Bridge

Overseas Projects

Railway Bridge

Hee-Chul Kang

Senior Managing Director

Civil Structure Professional Engineer

Specialization:
- Healthcare Engineering, Design, and Construction

Key Projects:
- Research: "Structural Analysis and Design of Cable-Stayed Bridges", 2009

Awards:
- Seoul Metropolitan Government: "Outstanding Young Engineer", 2009
- Others: "Outstanding Young Engineer", 2008

Main Careers

Domestic Projects

Cable-Stayed Bridge

Overseas Projects

Railway Bridge

Soyoung Park

Senior Managing Director

Civil Structure Professional Engineer, P.Eng. in Civil Engineering

Specialization:
- Civil Engineering, Design, and Construction

Key Projects:

Awards:
- Seoul Metropolitan Government: "Outstanding Young Engineer", 2009
- Others: "Outstanding Young Engineer", 2008

Main Careers

Domestic Projects

Cable-Stayed Bridge

Overseas Projects

Railway Bridge
Main Careers
Overseas Projects
- KPIC Project [Japan, 1989~1990]
- Basic and Detailed Designs for Construction Project of Worldcup Grand Bridge [2001]
- Basic Design for Access Road Construction for YEOSU National Industrial Complex Development Project [1999]
- Basic and Detailed Designs for Construction Project of 2nd Jindo Grand Bridge (Steel Cable-Stayed Bridge) [2000]
- Feasibility Study for Gyeongnam Innovation City Connection Bridge Construction [2008]
- Alternative Design and Detailed Design for Connection Road (5th Section) Construction of Incheon Expressway [2005]
- Alternative Competitive Design and Detailed Design for 2nd Part of Busan-Ulsan Expressway (Section 2) [2005]
- Alternative Competitive Design for 3rd Part Construction of 88 Olympic Expressway (Yaro Grand Bridge) [2008]
- Alternative & Detailed Designs for the 2nd Chumdan Industrial Complex Access Road Construction (1 Area) [2005]
- Detailed Design for Construction Project of Tangeum Grand Bridge [2000]
- Detailed Design for Construction Project of 2nd Jindo Grand Bridge [1990]
- Detailed Design for Construction Project of Chungui Grand Bridge [1994]
- Detailed Design for Construction Project of Gangdong Grand Bridge [1990]
- Detailed Design for Construction Project of Geogumdo Bridge (Special Architectural Bridge) [2009]
- Detailed Design and Supervision of Siem Reap Bypass Project Phase II [Cambodia, 2005~2006]
- Turn-Key Bid & Detailed Designs for Bridge Construction Project between Jeokgeum and Youngnam [2004]
- Basic and Detailed Designs for Construction Project of Worldcup Grand Bridge [2001]
- Detailed Design for Construction Project of Siem Reap Bypass Phase II [Cambodia, 2005~2006]
- Detailed Design for Construction Project of 5th Section of Worldcup Grand Bridge [2002]
- Detailed Design for Construction Project of Toegyehwa Bridge [2000]
- Basic Planning for Yeosu-Goheung Link Bridges Project [2003]
- Ⅱ
- Basic Design for Access Road Construction for YEOSU National Industrial Complex Development Project [1999]
- Basic and Detailed Designs for Construction Project of Worldcup Grand Bridge [2001]
- Basic and Detailed Designs for Construction Project of 2nd Jindo Grand Bridge (Steel Cable-Stayed Bridge) [2000]
- Feasibility Study for Gyeongnam Innovation City Connection Bridge Construction [2008]
Main Careers

Overseas Projects

- Turn-Key Bid Design for Restoration in Covering Section of Suwon River [2009]
- Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
- Alternative Design for the Kyori-Susang Detour Road Construction [2006]
- Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
- Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
- Alternative Design for National Road Construction of Gohyeon-Hadong IC(2) [2009]
- Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
- Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
- Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
- Project Director of Incheon Song-do Coastal Road Expansion Project [2007]

Domestic Projects

- Extradosed Bridge
  - Turn-Key Bid Design for Construction of Gonyang~Sanin Nam-hae Expressway Project (Section 6) [2005]
- Detailed Design for the Construction Work of Straight Gyeongin Expressway (2nd Section) [2006]
- Detailed Design for Construction of Yangji 1st Bridge and Other Bridge Project [2007]
- Basic and Detailed Designs for Namcheon Bridge and Special Structure Project [2007]
- Detailed Design for Construction of Chungju~Jecheon Expressway Project [2008]
- Executive Director
  - Specialization: Civil Structure Engineer

Bi-Sook Park

Civil Structure Professional Engineer

Specialization
- Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River [2009]
- Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
- Alternative Design for the Kyori-Susang Detour Road Construction [2006]
- Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
- Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
- Alternative Design for National Road Construction of Gohhyon-Hadong IC(2) [2009]
- Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
- Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
- Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
- Project Director of Incheon Song-do Coastal Road Expansion Project [2007]

Seon-Jun Kwon

Executive Director

USA Korea Technology Engineering Major Professional Engineer in USA

Specialization
- Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River [2009]
- Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
- Alternative Design for the Kyori-Susang Detour Road Construction [2006]
- Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
- Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
- Alternative Design for National Road Construction of Gohhyon-Hadong IC(2) [2009]
- Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
- Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
- Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
- Project Director of Incheon Song-do Coastal Road Expansion Project [2007]

Gyung-Min Jeon

Vice President

Specialization
- Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River [2009]
- Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
- Alternative Design for the Kyori-Susang Detour Road Construction [2006]
- Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
- Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
- Alternative Design for National Road Construction of Gohhyon-Hadong IC(2) [2009]
- Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
- Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
- Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
- Project Director of Incheon Song-do Coastal Road Expansion Project [2007]

DB Construction Group

Domestic Projects

- Girder Bridge
  - Extradosed Bridge
  - Cable-Stayed Bridge
  - Suspension Bridge
  - Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River [2009]
  - Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
  - Alternative Design for the Kyori-Susang Detour Road Construction [2006]
  - Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
  - Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
  - Alternative Design for National Road Construction of Gohhyon-Hadong IC(2) [2009]
  - Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
  - Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
  - Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
  - Project Director of Incheon Song-do Coastal Road Expansion Project [2007]

Bi-Sook Park

Civil Structure Professional Engineer

Specialization
- Girder Bridge
  - Extradosed Bridge
  - Cable-Stayed Bridge
  - Suspension Bridge
  - Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River [2009]
  - Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
  - Alternative Design for the Kyori-Susang Detour Road Construction [2006]
  - Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
  - Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
  - Alternative Design for National Road Construction of Gohhyon-Hadong IC(2) [2009]
  - Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
  - Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
  - Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
  - Project Director of Incheon Song-do Coastal Road Expansion Project [2007]

Jung-Hyun Kim

Executive Director

Specialization
- Girder Bridge
  - Extradosed Bridge
  - Cable-Stayed Bridge
  - Suspension Bridge
  - Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River [2009]
  - Alternative Design for Construction Works between Gye-gok and Sindeok of the Regional Road [2006]
  - Alternative Design for the Kyori-Susang Detour Road Construction [2006]
  - Alternative & Detailed Designs for the Construction Work of Incheon Free Economic Zone Cheoungna Area (4th Section) [2007]
  - Alternative & Detailed Designs for Asan Yeongin~Pyeongtaek Chungbuk(2) Road Construction [2009]
  - Alternative Design for National Road Construction of Gohhyon-Hadong IC(2) [2009]
  - Project Manager for Road Improvements Project of Honam Expressway (Mangyeong Steel-girder Bridge) [1988~2000]
  - Project Manager for Road Improvements Project of Donggwangyang I/C [1987~1988]
  - Project Manager for Construction Project of Yulchon Industrial Complex [2003~2006]
  - Project Director of Incheon Song-do Coastal Road Expansion Project [2007]
Suspension Bridge

Cable-Stayed Bridge

Extradosed Bridge

Arch Bridge

Pedestrian Cable-Stayed Bridge

1. Dan-deung Grand Bridge
2. 2nd Nam-hae Grand Bridge

1. 1004 Diamond Bridge
2. Pyeong-sik Grand Bridge
3. 2nd Pyeong-sik Grand Bridge
4. 1st Gang-chon Bridge
5. So-yong Grand Bridge

1. Oun-am Grand Bridge
2. 2nd Oun-am Bridge
3. Cho-tek Bridge
4. Na-dong River Bridge

1. 2nd Cheom-dan Bridge
2. Yeo-cheon Pedestrian Bridge
3. 2nd Cheom-dan Bridge
4. Yeo-cheon Pedestrian Bridge
5. Yeou-ri Overpass
6. Su-won Bridge
7. Rainbow Bridge
Suspension Bridge
Dan-deung Grand Bridge

The world's longest, as well as the first single tower suspension bridge in South Korea representing great harmony with the beautiful scenery of Gogunsan Islands.

Environment-friendly suspension bridge construction
Dan-deung Grand Bridge
A stiffening girder was designed with streamlined edge box shape considering the aesthetic visual quality, minimization of steel weight, and efficiency of wind resistance and constructability.

The world's longest single-tower suspension bridge offers an opportunity to tourists to enjoy the view from a double-layer Observation platform inside three legs of the pylon and the Art park of Mu-nyeo island and Dream park.

Environment-friendly suspension bridge construction

By taking into account the importance of preserving marine environment and the rapid flow of the deep water, the design with the suspended single span deck was used. An earth-anchored suspension bridge and D-shaped main tower reduced the compressive force on the stiffening girder, and this design also minimized both the deflection of the girder and the cross section of the main girder.

Inclined cable was planned to ease the construction by way of preventing the geometry difference/variation of the cable between during and after the construction.

Main girder stiffened with edge box for wind stability

Inclined main cable design for outstanding constructability of suspension bridge

"D-shape pylon" of excellent structural efficiency

"D-shape pylon" represents 'canvas' of a sailboat navigating honorably towards a powerful future which pronounces world's artistic merit. This pylon has optimized the structural efficiency of the stiffening girder by increasing the lateral stiffness.

Main tower foundation and anchor blocks constructed on the ground were planned to provide safe passage way for vessels on the water and to conserve the marine environment.

Inclined cable was planned to ease the construction by way of preventing the geometry difference/variation of the cable between during and after the construction.

Characteristics of Bridge

- Pylon Construction : Auto-climbing Form
- Girder Construction : Large Block Erection by Large Floating Crane
- Cables Sag Ratio : 1/9 (Hangers Space 16m)
- Main Cables Tensile Strength : 1960MPa (High-strength Cable)
- Stiffening Girder : Streamlined Twin Box Steel Girder (B=20.0m)
- Spans Arrangement : 400m (Single-span Suspension Bridge with One-pylon)
The 2nd Nam-hae Grand Bridge

Majestic single span suspension bridge at the center of South Korea’s new-southern coast era

PEC proposed the design of the 2nd Nam-hae Grand Bridge considering the historic meaning of the site, which the final victory took place after the “Japanese Invasion of Korea in 1592”.

For the purpose of eliminating the main tower in the region of the famous paradisiacal place called “Hanryeo Oceanic National Park” preserving the surrounding environment and tourism attraction, 815m single span suspension bridge structure was adopted in the design. By increasing the main cable’s sag ratio, visual aesthetic of the bridge could be improved while reducing the anchorage size. Comparing to the existing Nam-hae Grand Bridge, it will become the symbol of advanced technology among modern suspension bridges.

The bridge design satisfied the conditions of the project by connecting the Noryang IC, and having the foundation of the main tower constructed on the coastal ground which achieved rational type design considering the landscape and environment. Suspension bridge’s main span of 815m has symmetric shape which could provide harmony with its surrounding landscape.

Project : Alternative Design for National Road Construction of Gohyeon-Hadong IC(2)
Services : Alternative Design

Characteristics of Bridge
Spans Arrangement : 815m (Single-span Suspension Bridge)
Stiffening Girder : Streamlined Twin Box Steel Girder (B=21.3~24.5m)
Main Cables Tensile Strength : 1,960MPa (High-strength Cable)
Cables Sag Ratio : 1/9 (Hangers Space 18m)
Pylons : Portal Type Concrete Pylon (H=132.0m)
Girder Construction : Large Block Erection by Large Floating Crane
Cable Construction : AS(Air-spinning) System
Pylon Construction : Auto-climbing Form

Sag ratio and tensile strength improvement of the main cable
In PEC design, we reduced the cable diameter and the anchorage size by improving sag ratio(1/9) and tensile strength(1,960 MPa) of the cable to harmonize with existing Nam-hae Grand Bridge, and to improve serviceability, structural efficiency and wind stability based on our advanced design technology of suspension bridge.

Implementation of environment-friendly suspension bridge
By constructing the pylons on the coastal ground with 815m main span, the abundant marine ecosystem of Hanryeo Oceanic National Park can be preserved while securing the safety of the ship from collision.

In 1973, the largest suspension bridge in Asia called Nam-hae Grand Bridge had been constructed based on Japanese engineering. Until the 35th anniversary of its birth, due to a significant increase in traffic volume, safety issues to the users had risen among the public. Therefore, to fulfill the long-awaited wish of Nam-hae citizens, the 3.1km long, 2nd Nam-hae Grand Bridge was planned to be constructed. It will be located at Gohyun & Hadong Interchange no. 2 on National Expressway development area, connecting “Kyeongsangnam-do Namhae-goon Seolcheon-myeon Deoksin-ri” and “Hadong-goon Geumnam-myeon Noryang-ri.”

Spans Arrangement : 815m (Single-span Suspension Bridge)
Stiffening Girder : Streamlined Twin Box Steel Girder (B=21.3~24.5m)
Main Cables Tensile Strength : 1,960MPa (High-strength Cable)
Cables Sag Ratio : 1/9 (Hangers Space 18m)
Pylons : Portal Type Concrete Pylon (H=132.0m)
Girder Construction : Large Block Erection by Large Floating Crane
Cable Construction : AS(Air-spinning) System
Pylon Construction : Auto-climbing Form
Cable-Stayed Bridge

New Millennium Grand Bridge (1004 Diamond Bridge)

World best bridge with main spans of 1,004m at Diamond archipelago composed of a world unique group of 1,004 islands in a diamond shape in Shin-an District.

Characteristics of Bridge

1. World Best Height - Pylon Height (310m) - Diamond Bridge - Gate Mark
2. World 2nd Longest - Total Length (2,000m) - Millennium Bridge - Symbol Mark
3. World 3rd Longest - Main Span Length (1,004m) - 1004 Bridge - Land Mark

Spans Arrangement: 78+96+324+1,004+324+96+78 = 2,000m

Stiffening Girder: Streamlined Twin Box Steel Girder (B=25.7m)

Cables Tensile Strength: PWS - 1960MPa (High-strength Cable)

Pylons: 3 Dimensional Diamond Shape Concrete Pylon

Girder Construction: Side Span - FCM & Large Block Erection by F/Crane, Main Span - F.C.M

Pylon Construction: Auto-climbing Form

Durability design for ultimate load

New concept for aerodynamic stability of super long-span bridge

Girder width was designed to be 25.7m to meet width to span ratio limit of 40 and an innovative streamlined shaped twin-box girder structure was designed to enhance the wind stability.

Innovative streamlined twin-box stiffening girder section design and complex floating system were applied to enhance wind stability and vibration control respectively.

Overcoming the risk of ship collision to the super long-span bridge

To meet the safety requirement for the navigation width (957m) of a 320,000 DWT-class vessel, main span of 1,004m was designed.

Risk analysis based on AASHTO was carried out with a result of 0(zero) probability of collapse proving the bridge to be safe.

Overcoming construction risks of super long-span bridge

To safely construct the world’s tallest pylon, first main girder segment of pier-table is to be constructed after the cross beam construction of the pylon and auto climbing form was applied in our design.

Also, by analyzing the construction stages, 6 layers of temporary struts are to be installed in stages, and as for the independent pylon construction, a construction method of large block construction without bent system was applied to allow fast pre-closing of side span considering wind stability, and maximizing the construction safety of cable-stayed bridge while securing wind stability of stiffening girders in our design.

Overcoming flexibility problem of super long-span bridge

To meet the stiffness requirement, world’s first prismatic diamond shaped pylon with 4 legs was designed to limit the lateral displacement of the pylon top and stiffening girders.

A bridge is a symbol representing the local city and country. Bridge history represents the history of constant challenges to improve and to achieve cutting-edge design technology.

1004 Diamond Bridge is a symbolic bridge which was specially designed for Sin-ahn District, South Korea to re-illuminate local people’s dearest wish as it was selected the world’s best bridge design which signified world leading bridge design technology in South Korea.

With the belief that the most “for-local” bridge being the world’s best bridge, PEC pioneered to develop new bridge design techniques with honor and spirit.

The New Millennium Bridge (1004 Diamond Bridge) was designed to be located at the entrance of the region. It connects Nongong-ri and Sineseo-ri.

The requirements for bridge design were as follows:

1. Symbolic bridge as an entrance to a diamond shaped group of 1,004 islands and reflecting local people’s dearest wish
2. Two-lane bridge incorporating another two lane widening possibility in the future
3. 320,000 DWT-class vessel’s safe navigation

Therefore, New Millennium Bridge was designed with the following characteristics to fulfill all of the major seminar listed above:

1. World’s tallest pylon height: 310m
2. World’s second longest cable-stayed bridge: 2,000m
3. World’s third longest main span: 1,004m

The New Millennium Bridge is Korea’s first super long-span bridge to incorporate innovative technology and risk-based core design concepts to achieve flexibility, wind stability and prevention of possible ship collision to the bridge with the analysis in an extreme environment.

Project: Turn-Key Bridge for Road Construction Project between Aphae and Amtae (Construction Section 2)

Services: Basic Design

PYUNGHWA ENGINEERING CONSULTANTS

20     21

20     21
PEC established a design for a cable-stayed bridge with low pylons to consider bird migration altitude while having long-spanned bridge to preserve the water quality environment.

Cable anchorage and arrangement
Saddle type cable anchorage method at the pylon was adopted in the design by reducing the fatigue stress of the cable and to simplify the pylon structure. Fan type arrangement of cable system was applied to increase the efficiency of the structure.

Pyeong-taek Grand Bridge
Cable-stayed bridge with low pylons to preserve bird habitats
Pyeong-taek Grand Bridge is a multi-span cable-stayed bridge designed by the company. It is expected to be completed in the near future. The bridge is designed to be environmentally friendly by minimizing the impact on the surrounding environment. It also features low pylons to reduce the disturbance to bird migration.

Pyeong-taek Grand Bridge is designed to fulfill the four requirements:
1. Region-Friendly
2. Landscape-Friendly
3. Environment-Friendly
4. River-Friendly

Pyeong-taek Grand Bridge is planned to be constructed in the first section of Yeongin-Chungbuk road construction with continuous connection of seven low pylons. The bridge connects “Paengsung-eup Dodu-ri” with “Anjoong-eup Samjeong-ri” of Pyeongtaek City in Gyeonggi Province.

Pyeong-taek Grand Bridge is designed to fulfill the four requirements:
1. Region-Friendly
2. Landscape-Friendly
3. Environment-Friendly
4. River-Friendly

The requirements appeal its significance as a gateway which symbolizes prosperity of Pyeongtaek City, harmonious landscape rendering beautiful ambiance, minimizing negative environment issues and having easy access to its river basin.

20m pylons were selected to minimize the disturbance of bird migration considering 23m as a typical bird migration altitude which data was provided by a bird professional. Continuously connected multi-spanned cable-stayed bridge with low pylons was designed considering ‘national water resources protection area’ and first class water quality environment of ‘natural environmental conservation region of ecological wetland’.

For a cable-stayed bridge having low pylons, average height range of 17.5m (L/9) for anchoring cables was designed to maximize the efficiency of the cables. For a cable-stayed bridge with continuously connected seven pylons, special structural plan was established to control the distribution of vertical reaction force and girder's deflection by supports in two rows on the piers.

20m pylons were selected to minimize the disturbance of bird migration considering 23m as a typical bird migration altitude which data was provided by a bird professional. Continuously connected multi-spanned cable-stayed bridge with low pylons was designed considering ‘national water resources protection area’ and first class water quality environment of ‘natural environmental conservation region of ecological wetland’.

For a cable-stayed bridge having low pylons, average height range of 17.5m (L/9) for anchoring cables was designed to maximize the efficiency of the cables. For a cable-stayed bridge with continuously connected seven pylons, special structural plan was established to control the distribution of vertical reaction force and girder's deflection by supports in two rows on the piers.

Pyeong-taek Grand Bridge
Cable-stayed bridge with low pylons to preserve bird habitats

Characteristics of Bridge
Cable Stayed Bridge
Spans Arrangement: 110+6@160+90+50=1210m (Multi-span Cable-Stayed Bridges with 7-Pylons)
Stiffening Girder: Three-cell Concrete Box Girder (B=29.9~34.4m, 6-Lanes)
Cables Tensile Strength: PSS (Semi-prefabricated)-1860MPa
Pylons: Longitudinally A-shaped Concrete Pylon
Girder Construction: F.C.M
Pylon Construction: Steel-form System by Tower Crane

Bridge consisting with quality environment and bird habitats
PEC established a design for a cable-stayed bridge with low pylons to consider bird migration altitude while having long-spanned cable-stayed bridge to preserve the water quality environment.

Cable anchorage and arrangement
Saddle type cable anchorage method at the pylon was adopted in the design by reducing the fatigue stress of the cable and to simplify the pylon structure. Fan type arrangement of cable system was applied to increase the efficiency of the structure.

Bridge consisting with quality environment and bird habitats
PEC established a design for a cable-stayed bridge with low pylons to consider bird migration altitude while having long-spanned cable-stayed bridge to preserve the water quality environment.
The earth anchored and single spanned concrete cable-stayed bridge having two pylons harmonizing with the magnificent view of Red Cliff ("Jeokbyeok" in Korean).

**Characteristics of Bridge**

**Se-pung Grand Bridge**

- **Spans Arrangement**: 385m (Korea’s Longest Concrete Cable-Stayed Bridge)
- **Stiffening Girder**: Single-cell Concrete Box Girder (B=22.5m, 4-Lane)
- **Cables Tensile Strength**: PWS - 1860MPa
- **Pylons**: Inverted Y-shaped Concrete Pylon
- **Girder Construction**: Full Staging Method
- **Pylon Construction**: Auto-climbing Form

**Jiok-byeok Grand Bridge**

- **Spans Arrangement**: 57.5+85+2@220+85+57.5 = 725m
- **Stiffening Girder**: PSC Box Girder (B=23.9m, 4-Lane)
- **Pylons**: A Free Standing I-shape Concrete Pylon (H=101m)
- **Cables Tensile Strength**: PSS - 1860MPa
- **Girder Construction**: Full Staging Method
- **Pylon Construction**: Auto-climbing Form

**1st Gong-chon Bridge**

- **Spans Arrangement**: 82.7+170+36.8 (Total 320m)
- **Stiffening Girder**: Steel Composite Box Girder (B=34.6~44.2m, 4-Lane)
- **Pylon**: Inclined Concrete Pylon
- **Cables Tensile Strength**: PSS - 1860MPa
- **Girder Construction**: Full Staging Method
- **Pylon Construction**: Auto-climbing Form

**Se-pung Grand Bridge**

- **Spans Arrangement**: 45.5+170+85 = 300.5m
- **Stiffening Girder**: Steel Composite Box Girder (B=34.6~44.2m, 4-Lane)
- **Pylon**: Inclined Concrete Pylon
- **Cables Tensile Strength**: PSS - 1860MPa
- **Girder Construction**: Full Staging Method
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- **Spans Arrangement**: 82.7+170+36.8 (Total 320m)
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- **Girder Construction**: Full Staging Method
- **Pylon Construction**: Auto-climbing Form

**Project**

- **Alternative Design for Juk-seong~Jeon-gok Road Construction (Part 2)**
- **Services**: Alternative Design

**Characteristics of Bridge**

**Se-pung Grand Bridge**

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- **Pylon Construction**: Auto-climbing Form
Extradosed Bridge

Dan-am Grand Bridge

Multi-spanned extradosed bridge with single central cable plane and twin pylons

Project: Alternative Design for the Kyori - Susang Detour Road Construction
Location: Jeonbuk Wanju-gun Gui-myeon Gaegok-ri ~ Imsil-gun Sindeok-myeon Sinheung-ri
Services: Alternative Design

Spans Arrangement: 65+120+160+120+65 = 530m
Stiffening Girder: Single-cell Concrete Box Girder (B=15.4~17.4m, 2-Lane)
Pylons: Concrete Pylons Comprising Two Free-standing Columns (H=22.1m)
Cables Tensile Strength: PSS - 1860MPa (Mono-tube Type Saddle)
Pylon Construction: Steel-form System by Tower Crane

Cho-rak Bridge

Multi-spanned Extradosed Bridge with Pylons Comprising Twin Free-standing Columns
Project: Alternative Design for Chorak Bridge Building Work
Location: Chungnam Dangjin-gun Godae-myeon

Spans Arrangement: 60+4@115+60+50 = 630m
Stiffening Girder: Single-cell Concrete Box Girder (B=15.4m, 2-Lane)
Pylons: Concrete Pylons Comprising Two Free-standing Columns (H=28m)
Cables Tensile Strength: PSS - 1860MPa (Multi-tube Type Saddle)
Pylon Construction: Steel-form System by Tower Crane

Nak-dong River Bridge

Multi-spanned Extradosed Bridge with Low-eccentric Cables
Project: Alternative Design for the Kyori - Susang Detour Road Construction
Location: Jeonbuk Wanju-gun Gui-myeon Gaegok-ri ~ Imsil-gun Sindeok-myeon Sinheung-ri
Services: Alternative Design

Spans Arrangement: 51.6+5@60+135+2@150+121.35 = 907.95m
Stiffening Girder: Twin-cell Concrete Box Girder (B=23.2m, 4-Lane)
Pylons: Concrete Pylons Comprising Two Free-standing Columns (H=28m)
Cables Tensile Strength: PSS - 1860MPa
Pylon Construction: Steel-form System by Tower Crane

Motivations for this bridge design were the beautiful scenery of surrounding mountains and Imsil-gun's symbolic bird: heron. To be harmonized with its beautiful environment, this bridge was formatively designed to symbolize heron; meaning warm welcome, and its nest; meaning origin of life. Golden section theory was incorporated in the design between the main and side span lengths and dynamic symmetry ratio was incorporated in the design of the approach bridge. In addition, by the multi-fixed continuous extradosed bridge, certain structure was adopted in the design to protect the environment and the safety of the bridge by using space concrete girder with large branches. In the approach bridge, concrete girder was adopted, and in the main span Epoxy Coated Strands 1860MPa (Mono-tube Type Saddle) were adopted in view of the economic structure and maintenance of the bridge. Pylons were designed to facilitate the maintenance work on the approach bridge.On the Kyori-Susang Detour Road, the side span length was determined by the economic structure and maintenance of the bridge. Further design work was done on the waterfront side to test the environmental impact on the river. In the approach bridge, the piling type was changed from a reinforced concrete pile to a driven round pile. 28m height of pylons was designed on the waterfront side. Pylons were designed to secure the pedestrian safety; the front of the pylon was designed to be thin and strong enough and the back was designed to be thick and strong enough, to prevent sudden collapse of the bridge. Front to back ratio of the pylon was designed to be 0.64 for its aesthetic proportions. Further design work was done on the waterfront side to test the environmental impact on the river. The pier design was modified to secure the pedestrian safety; the front was designed to be thin and strong enough and the back was designed to be thick and strong enough, to prevent sudden collapse of the bridge. Front to back ratio of the pier was designed to be 0.64 for its aesthetic proportions. Further design work was done on the waterfront side to test the environmental impact on the river. Project: Alternative Design for Construction of the Sunchang-Ounam (4th Section) Expansion Project.Compared to traditional expansion joints in the bridge section, could be eliminated to induce great improvement of trafficability, constructability, maintenance efficiency. To optimize pier stiffness, split pier type pylon was designed which separates the center of the pier to secure flexibility and between the side span and approach bridge span lengths to give out aesthetical proportions. Aesthetics was considered for this bridge to be harmonized with the beautiful environment. This bridge is designed to represent the heron, symbolizing the warm welcome for visitors and the origin of life, which is the symbolic bird of Imsil-gun.
2nd Chum-dan Bridge

Fast light energy towards high technology - Korea's first arch bridge with PSC box girders

2nd Chum-dan Bridge will be constructed at the entrance of Chum-dan Industrial Complex with a total length of 1.42km. It will be connecting Jiya-dong with Yongjeon-dong in Buk-ku, Gwangju City in South Jeolla Province.

For the first time in Korea, PSC box girders were adopted in the arch bridge design to the upper girders of 120m main span, and the rise ratio 1:4.8 was applied to the steel arch ribs. Optimal triangle section is achieved by main arch and two side arches. Side arch ribs are leaning outwards and located on the sidewalks at both sides of the bridge. Side arch was designed to have an effective structural system by controlling stresses generated in the cantilever.

For the project, Alternative & Detailed Designs for the 2nd Chumdan Industrial Complex Access Road (Construction/Equipment) Area
Services: Alternative Design, Detailed Design

 Characteristics of Bridge

Spacing Arrangement: 10.5m (1.5m x 7)
Arch Type: Mono-plane Steel Arch
Girder Construction: Full Staging Method
Arch Construction: Large Block Erection Method by Hydraulic Crane

Spans Arrangement : 53.4+60+65+120+65+53.4=416.8m
Stiffening Girder: Four-cell Concrete Box Girder (B=33.0~41.0m, 6-Lane)
Archs: Rise-span Ratio 4.8, Mono-plane Steel Arch (H=25m)
Cables: PSS - 1860MPa (Pin Type & Jaws Type Cable Anchorage)
Girder Construction: Full Staging Method
Arch Construction: Large Block Construction by Hydraulic Crane

Su-won Bridge

Hybrid Arch Bridge
Project: Turn-Key Bid Design for Construction for Restoration in Covering Section of Suwon River
Location: Gyeonggi-do Suwon-City Paldal-gu Maegyo-dong ~ Ji-dong Area
Services: Turn-Key Bid Design

Characteristics of Bridge

Spans Arrangement : 30.7m (Single-span)
Deck Width : 31.9m (5-Lane & Sidewalk)
Girder Construction : Full Staging Method
Arch Construction : Large Block Erection Method by Hydraulic Crane

Rainbow Bridge

Asymmetric-Arc Bridge
Location: Downtown of Seoul, Non-Highway Erosion and Erosion, Cheonggye Stream, and Gwanggye Stream
Services: Alternative Design, Detailed Design

Characteristics of Bridge

Spacing Arrangement: 90m (Single-span)
Deck Width : 19.7m (4-Lane)
Girder Construction : Full Staging Method
Arch Construction : Large Block Construction by Hydraulic Crane

2nd Chum-dan Bridge will be constructed at the entrance of Chum-dan Industrial Complex with a total length of 1.42km. It will be connecting Jiya-dong with Yongjeon-dong in Buk-ku, Gwangju City, South Korea.

For the first time in Korea, PSC box girders were adopted in the arch bridge design to the upper girders of 120m main span, and the rise ratio 1:4.8 was applied to the steel arch ribs. Optimized triangle section is achieved by main arch and two side arches. Side arch ribs are leaning outwards and located on the sidewalks at both sides of the bridge. Side arch was designed to have an effective structural system by controlling stresses generated in the cantilever.

2nd Chum-dan Bridge was designed to be a gateway to New Gwang-ju City. It is treated with two colors which represents high-tech and tradition, and as an arch bridge, beautiful arch design reflects spiritual power of Mt. Moodeung.
Yeoui-do Saet-river Pedestrian Bridge
Composite Cable-Stayed Bridge with Two-span and Twisted cables
Characteristics of Bridge
Spans Arrangement: 49+52+49+95+80 = 325m
Deck Width: 4.5m x 2
Stiffening Girder: Space Truss Girder
Pylon: V-shaped Steel Pylon with Inclined Legs
Cables: PSS - 1860MPa (Pin Type Cable Anchorage)
Girder Construction: Full Staging Method
Pylon Construction: Large Block Erection Method by Hydraulic Crane

Yang-san River Bridge
Symmetric Type Pedestrian Overpass with Inclined Steel Pylons Supporting Under-tensioning Cable
Characteristics of Bridge
Spans Arrangement: 53+37+80+37+50 = 257m
Deck Width: 2.4~7.4m
Stiffening Girder: Steel Box Girder & H-shape Steel Girder
Pylons: Symmetric Inclined A-shaped Steel Pylon
Cables: PSS - 1860MPa (Pin Type Cable Anchorage)
Girder Construction: Full Staging Method
Pylon Construction: Large Block Erection Method by Hydraulic Crane

Construction of ecological waterways and various special structures will be carried out in Gwang-gyo New-town across Yeongtong-gu and Paldal-gu, Su-won City and Suji-gu, Yong-in City in Gyeonggi Province. As a landmark bridge among 46 special structures in the New-town, Yeo-cheon Footbridge was designed to be constructed at the junction of Yeo River and Woncheonri River in the vicinity of Woncheon amusement park.

Design theme for special structural bridges was considered in producing innovative design for the bridges with the light and water of Gwang-gyo. Special emphasis was given for the bridge to express light diffusion to the inclined pylon and cables of the bridge. Asymmetric pedestrian Cable-Stayed bridge with two-span and twisted cables was designed to reflect both the functional and aesthetic needs.

To prioritize right of view and safety for pedestrians, pedestrian bridge and roadway bridge are completely separated, and the pedestrian bridge level was designed to be at a higher elevation than the roadway. Observatory platform will be constructed around the pylon to provide space for pedestrians to enjoy the beautiful view around the ecological waterways, Woncheonri River, and Gwang-gyo New-town.

Considering ecological waterways, asymmetric configuration of the spans was designed and steel pipe stiffening girder was applied in the design to ensure sufficient stiffness for pedestrian safety from vibration.

Services: Alternative Design, Detailed Design

Characteristics of Bridge

Pylon: Inclined Steel Composite I-shaped Pylon
Girder Construction: Full Staging Method
Pylon Construction: Large Block Erection Method by Hydraulic Crane

Construction of ecological waterways and various special structures will be carried out in Gwang-gyo New-town across Yeongtong-gu and Paldal-gu, Su-won City and Suji-gu, Yong-in City in Gyeonggi Province. As a landmark bridge among 46 special structures in the New-town, Yeo-cheon Footbridge was designed to be constructed at the junction of Yeo River and Woncheonri River in the vicinity of Woncheon amusement park.

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Pylon Construction: Large Block Erection Method by Hydraulic Crane
Super Long-Span Bridge Team

Super Long-Span Bridge Team is in charge of the design for special types of long-span bridge such as suspension bridges, cable-stayed bridges, extradosed bridges and arch bridges. It has also taken a principal role in the advancement of various specialized techniques and know-how of the best technology in South Korea and various experiences from numerous worldwide bridge projects. In addition, it is renowned worldwide for its bridge span length. The Team has participated in “the National Super Long Bridge NO Center” together with PEC R&D Team, in order to enable PEC to play a role as a pioneer in the global market by localization of super long-span bridge design technology through constant development of its core technologies.

This team has performed a variety of special type bridge designs by actively participating in the competitions of turn-key and alternative design tenders, private investment projects, and international design competitions. Super Long-Span Bridge Team is in charge of the design for the longest single span suspension bridge, 1004 Diamond Bridge with main span of 1,004m, the longest cable-stayed bridge in Korea and the 3rd in the world. Designing such special bridges by PEC was a good opportunity to develop the technology of long-span bridge design in Korea. The expertise and capability of PEC’s professionals is proved in the field of bridge engineering from variety of special bridge designs such as Oun-am Grand Bridge which is a multi-fixed extradosed bridge with single central cable plane and 2 pylons, 2nd Chum-dan Bridge which is the Korea’s first arch bridge with full prestressed concrete box girder, and Dan-deung Grand Bridge with main span of 400m is Korea’s first and world’s longest single pylon suspension bridge, and 1004 Diamond Bridge with main span of 1,004m is the longest cable-stayed bridge in Korea and the 3rd in the world. Designing such special bridges by PEC was a good opportunity to develop the technology of long-span bridge design in Korea.

In the future, this team will be performing design supervision of the 2nd Nam-hae Grand Bridge and Ul-san Grand Bridge (both Suspension Bridges) and construction supervision of Kum-ho Bridge and Chil-san Grand Bridge (both Cable-Stayed Bridges).
Overseas Bridge Team

Overseas Bridge Team has been participating in various forms of business such as T/K (Turn-Key Tender Competition), CM (Construction Management), Private Investment Business for SOC (Social Overhead Capital) projects related with bridge engineering.

We have made a great effort to the overseas bridge contracts business based on accumulated bridge engineering technologies and experience from the domestic market, and as a result a lot of international projects have been completed and are now underway in Indonesia, Philippines, Vietnam, etc. in South-East Asia, Azerbaijan in South-West Asia, and Algeria in Africa.

We have collaborated with top international consultants to jointly develop the advanced technology, and we are now taking an active role to provide total solutions to both contractors (BOT and Design-build Projects) and clients in bridge engineering field by actively participating in overseas projects financed by the owners as well as funded by ODA such as KOICA (Korea International Cooperation Agency), EDCF (Economic Development Cooperation Fund), ADB (Asian Development Bank), WB (World Bank), and so on.

2. Project Synopsis

Project Name: Detailed Design and Supervision Consultant Service for Construction of Rach Gia Bypass Project
Location: Rach Gia City, Kien Giang Province, Vietnam
Services: Detailed Design, Construction Supervision
Client: Ministry of Transport, My Thuan Projects Management Unit (PMU-MT)

It is a bridge and road project to alleviate the increasing traffic congestion and logistics flow due to the widening of the connection roads of GMS southern coast in accordance with the Mekong River Basin Development Plan of Vietnam Government.

Major Bridges List

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<th>Bridge No.</th>
<th>Name</th>
<th>Length (m)</th>
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<tr>
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<td>He Thu 1</td>
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<td>Ong Hien (F)</td>
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1. Bridge No. | Name                  | Length (m)  |
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</table>
Railway Bridge Team

PEC Railway Bridge Team has been involved in various projects for T/K and alternative design competitions, ETL projects, related to railway bridge construction such as urban railway high-speed railway lines and KTX (Korea Train Express), in the preliminary to the final design stage as well as for the whole construction period until its completion. With accumulated high-end techniques, experience and future oriented creativeness, PEC is performing its best to create a better environmentally geared society.

Following are some of the major projects carried out by PEC: Honam High-Speed Railway, KTX, Common Railway, Incheon International Airport – Seoul direct railway, Seoul and Pusan subways (MRT), and Gyeonggi Province light rail (LRT).

In addition, we shall not stop from inspiring to achieve a greater customer satisfaction. Our motive is “the coexistence of human beings and nature in excellent harmony”, and this is to be continuously enhanced by the accumulated technology deeply implanted in our superior personnel, and future-oriented creativeness fully committed to the development of railway transportation.

Hydraulic Structure Team

PEC Hydraulic Structure Team is planning and designing hydraulic structures such as multi-purpose dams, lock gates, weirs across river while taking account of preserving the environment and successfully managing floods and natural conditions. As a result, we improve the quality of human life, environment and municipal projects to control the water supply and sewage from urban pedestrian flow.

PEC Subsurface Structure Team provides a wide range of services including project planning, feasibility study, design and construction in the fields of subway, underpass and underground complex spatial structures. Based on the most advanced design techniques and software with comprehensive consideration of the overall plan of the subsurface structure, we have successfully participated in the projects for tunnels, subway, and underground mixed-use structure to provide flourish living spaces for users. Furthermore, to meet the users’ demands on safety, we continuously provide the systematic skills training to our employees to create better, safer and economical structural design.

R&D Team

PEC R&D team is contributing to the advancement and globalization of domestic construction engineering technology by researching and developing new technologies for the future generations with high professionalism, and full consideration of the overall plan of the subsurface structure, we have successfully participated in the projects for tunnels, subway, and underground mixed-use structure to provide flourish living spaces for users. Furthermore, to meet the users’ demands on safety, we continuously provide the systematic skills training to our employees to create better, safer and economical structural design.

PEC R&D team is performing various national R&D studies such as development of the construction cost estimation models and standards for road structures, standard drawings for bridge scaffolding system, and standardization of shop drawings. In particular, we are leading super long-span bridges design technology with research of design techniques for the optimization of structural efficiency and environmental R&D. In addition, we are in the process of research on vegetation, vegetation and fauna growth on bridge piers and through various R&D projects, conducting various research and development activities related to environment, vegetation, and fauna growth on bridge piers and through various R&D projects.

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# PEC Global Activities & Overseas Projects List

## PEC Global Activities

### Korea
- **Super Long-Span & Special Bridges**
  - **Location:** Dongan-ku, Anyang, Gyeonggi-do, South Korea
  - **Address:** PYUNGHWA Bldg, 1474-21, Gwanyang 2 dong,
  - **Services:** Detailed Design
  - **Period:** 2007~2008
  - **Client:** Algeria

### Algeria
- **Consulting Services for High Plateaus Bypass Project in Algeria**
  - **Services:** Turn-Key Design
  - **Period:** 2007~2008
  - **Client:** Azerroadservice OJSC, Ministry of Transport, Azerbaijan

### Azerbaijan
- **Ganja Road Section Widening to 4-Lane**
  - **Project Name:** Design Build & Completion of Azerbaijan, Yevlakh to (Shamakhi~ Guba) Highway Project
  - **Services:** Feasibility Study & Basic Design
  - **Period:** 2007~2008
  - **Client:** Azerbaijan Republic Ministry of Transport

### Cambodia
- **Detailed Design and Construction of Siem Reap Bypass Project Phase Ⅰ**
  - **Project Name:** Detailed Design and Construction of Siem Reap Bypass Project Phase Ⅰ
  - **Services:** Turn-Key Design
  - **Period:** 2002~2005
  - **Client:** Ministry of Settlement & Regional Infrastructures, Government of Indonesia

### Laos
- **Turn-Key Design for Construction & Rehabilitation of Mahanama Bridge Project**
  - **Project Name:** Turn-Key Design for Construction & Rehabilitation of Mahanama Bridge Project
  - **Services:** Turn-Key Design
  - **Period:** 2004~2005
  - **Client:** Road Development Authority, Ministry of Highways, Democratic Socialist Republic of Sri Lanka

### Nepal
- **Turn-Key Design**
  - **Project Name:** Turn-Key Design for Construction & Rehabilitation of Mahanama Bridge Project
  - **Services:** Turn-Key Design
  - **Period:** 2004~2005
  - **Client:** Department of Roads, Ministry of Physical Planning and Works, Nepal

### Philippines
- **Turn-Key Design of Access Roads Construction Project for Five Villages in Vientiane Province**
  - **Project Name:** Turn-Key Design of Access Roads Construction Project for Five Villages in Vientiane Province
  - **Services:** Turn-Key Design
  - **Period:** 2007~2008
  - **Client:** Department of Planning and Investment, Vientiane Province, Lao PDR

### Sri Lanka
- **Detailed Design Review and Construction Supervision**
  - **Project Name:** Detailed Design Review and Construction Supervision
  - **Services:** Turn-Key Design
  - **Period:** 2004~2005
  - **Client:** Ministry of Public Works, Government of Indonesia

### Vietnam
- **Detailed Design Review and Construction Supervision**
  - **Project Name:** Detailed Design Review and Construction Supervision
  - **Services:** Turn-Key Design
  - **Period:** 2004~2005
  - **Client:** Ministry of Public Works, Government of Indonesia

### Mongolia
- **Preliminary Masterplan for Yenikhand New City Development Project**
  - **Project Name:** Preliminary Masterplan for Yenikhand New City Development Project
  - **Services:** Basic Design
  - **Period:** 2007~2009
  - **Client:** Ministry of National Development & Ecology

### Indonesia
- **Technical Proposal, Detailed Design for Construction of Rach Gia Bypass Project**
  - **Project Name:** Technical Proposal, Detailed Design for Construction of Rach Gia Bypass Project
  - **Services:** Detailed Design
  - **Period:** 2007~2008
  - **Client:** Department of Roads, Ministry of Physical Planning and Works, Nepal

### Vietnam
- **Establishment of the Detailed Master Plan of Hai Phong New Town Development Project**
  - **Project Name:** Establishment of the Detailed Master Plan of Hai Phong New Town Development Project
  - **Services:** Detailed Design & Construction Supervision Consultant Services
  - **Period:** 2007~2008
  - **Client:** Ministry of Roads, Transportation & Tourism, Mongolia

### Mongolia
- **Detailed Design for Construction of Hanoi-Haiphong Expressway Project**
  - **Project Name:** Detailed Design for Construction of Hanoi-Haiphong Expressway Project
  - **Services:** Turn-Key Design
  - **Period:** 2008~2009
  - **Client:** Vietnam Infrastructure Development and Finance Investment JSC of Vietnam

### Philippines
- **Detailed Design for Construction of Hanoi-Haiphong Expressway Project**
  - **Project Name:** Detailed Design for Construction of Hanoi-Haiphong Expressway Project
  - **Services:** Turn-Key Design
  - **Period:** 2008~2009
  - **Client:** Department of Public Works and Highways

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  - **Project Name:** Detailed Design for Construction of Rach Gia Bypass Project
  - **Services:** Turn-Key Design
  - **Period:** 2007~2008
  - **Client:** Department of Roads, Ministry of Physical Planning and Works, Nepal

### Nepal
- **Technical Proposal, Detailed Design for Construction of Rach Gia Bypass Project**
  - **Project Name:** Technical Proposal, Detailed Design for Construction of Rach Gia Bypass Project
  - **Services:** Detailed Design
  - **Period:** 2007~2008
  - **Client:** Department of Roads, Ministry of Physical Planning and Works, Nepal

### Vietnam
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  - **Client:** Ministry of Roads, Transportation & Tourism, Mongolia
## PEC Overseas Projects List

### Highway/Bridge/Tunnel

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<tr>
<th>Scope</th>
<th>Project</th>
<th>Client</th>
<th>Location</th>
<th>Capacity</th>
<th>Year</th>
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<tbody>
<tr>
<td>Feasibility Study &amp; Basic Design</td>
<td>Feasibility Study for Rehabilitation of Freeways - Timor Leste Road Project</td>
<td>Ministry of Transportation, Government of Indonesia</td>
<td>Taisili, Dili, Timor Leste</td>
<td>Q=10,000m³/day</td>
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<td>Feasibility Study &amp; Construction</td>
<td>Feasibility Study for Construction &amp; Improvement of Selected National Roads</td>
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<td>Feasibility Study for Development of the Western Urban Road Network</td>
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<td>Design Build &amp; Completion</td>
<td>Design &amp; Build of a 3-Way Bypass in Jakarta</td>
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<td>Feasibility Study for the Construction of Water Supply System</td>
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### Detailed Design 

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### Traffic System Management

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1. International Scientific Journals

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<td>2005</td>
<td>Planning and Design of Marine Suspension Bridge</td>
<td>Soo-Young Park, Chung-Young Cho</td>
<td>Journal Article of Computational Structural Engineering Institute of Korea</td>
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<td>2005</td>
<td>The  Innovation of Bridge Structural Systems to Realize a Super Long-span Bridge  (Gwangyang Bridge)</td>
<td>Soo-Young Park, Chung-Young Cho</td>
<td>Journal Article of the Wind Engineering Institute of Korea</td>
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<td>2005</td>
<td>Development of T-type Pier Construction Method Using the Rotators</td>
<td>Soo-Young Park, Chung-Young Cho</td>
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<td>Study of Crack Appearance of Road Structure</td>
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2. Domestic Scientific Journals

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<tr>
<td>2000</td>
<td>The Planning and Design of High Speed Suspension Bridge</td>
<td>Soo-Young Park, Chung-Young Cho</td>
<td>Journal Article of Korean Society of Civil Engineers</td>
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<td>2001</td>
<td>The Planning and Design of Marine Suspension Bridge</td>
<td>Soo-Young Park, Chung-Young Cho</td>
<td>Journal Article of Korean Society of Civil Engineers</td>
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<td>2002</td>
<td>Wind Tunnel Test of Self-anchored Suspension Bridge with 1-Plane Monocable</td>
<td>Soo-Young Park</td>
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*PEC Principal Research Results List*
PEC Principal Research Results List

3. Technical Books

<table>
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<tr>
<th>Year</th>
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<tbody>
<tr>
<td>2001</td>
<td>Developing Standard Drawings of Temporary Scaffolding of Bridge and Standardizing Shop Drawings</td>
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<tr>
<td>2002</td>
<td>Developing Technology of the Road Design for Prevention of Damage by the Severe Rain Storm</td>
</tr>
<tr>
<td>2003</td>
<td>Development of the Construction Cost Model and Criteria of Road Structures (Bridges, Tunnels)</td>
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<tr>
<td>2004</td>
<td>Prototype Design of 4 Core Test Beds Projects for the Super Long-span Bridge (On Going)</td>
</tr>
<tr>
<td>2005</td>
<td>Study on Internationalization Plan of Design Documents for Global Competitiveness</td>
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4. Other Research Results

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PEC Patents & Licensed New Technologies List

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PEC Major Computer Software Programmes Registration List

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