





Message from the Chairman



Kern Nyol Chon, P.E. Chairman

YOOSHIN ENGINEERING CORPORATION(Yooshin), established in January 1966 when infrastructure facilities began to be actively expanded across the nation, has consistently grown into one of the leading engineering consulting firms in Korea.

I, chairman and founder of Yooshin, have walked a 'Railway Life' since 1947, devoting my entire career to the development of national traffic infrastructure development and expansion. As a civil engineer and registered professional engineer in railway, I myself have accumulated immeasurable understanding and field experiences in the railway sector at home and abroad.

Yooshin has accumulated various consulting experiences in all areas: design and supervision consulting services of the Gyengbu(Seoul-Busan) Expressway(1967): design and construction supervision of the Gyeongbu High-speed Railroad(late 1980s) design and construction supervision of Incheon International Airport(early 1990s). It plays a leading role for the expansion of the airport by participating in each phase of the Incheon International Airport Expansion Projects.

Befitting its image as an internationally competitive engineering firm, Yooshin has expanded its overseas market share by actively advancing into Southeast Asia, Africa, and the Middle East based on its 48-year experiences of engineering consulting services in roads, airports, railroads, ports, traffic fadilities, urban planning, leisure & landscape and environmental areas. More recently, Yooshin has participated in the Lamu Port Construction Project in Kenya.

It has also successfully completed the test operation of the magnetic levitation urban train facilities and provided technical consulting service on the three-dimensional(3D) cable installation for the Oakland Bay Bridge Project in the USA.

Meanwhile, Yooshin is the nation's only one engineering consulting firm listed on the KOSDAQ market(January 2002). Now, in pursuit of the Low Carbon Green Growth approach, Yooshin has participated in diverse environment-friendly projects including the Four Major National River Restoration Project and other waterway projects. We will put our utmost efforts to contribute to the achievement of Environmentally Sustainable Development and co-existence between human and nature.

Thank you.

Ken Nyol Chon

Service

Types of Services

PLANNING, FEASIBILITY STUDY

- Masterplan and feasibility study for major infrastructure development projects
- Traffic assessment, financial and economic analysis
- Life-cycle costing, value engineering

DESIGN

- Preliminary and detailed design for the whole range of civil works
- Turn-key and design-build project

CONSTRUCTION SUPERVISION

- Cost management
- Design review & construction supervision
- Quality control and quality assurance
- Construction management

OPERATION AND MAINTENANCE

- Q&M for large scale infrastructures, facilities
- Bridge Management System for long-span bridges

Program Management

- Master plan & feasibility study including financial & economy analysis
- Front End Engineering Design (FEED)
- Tender stage for Engineering/Design
- Tender stage for Construction
- Project Management Services during construction including defects liability and O&M period

• Professional Engineers



Fields of Specialization

ROAD & HIGHWAY

- Pavement design, rehabilitation and reconstruction of highway
- Widening and improvement of rural and urban highways
- Development and design of highway network

RAILWAY

- High-speed railway, subways, light railway and mass rapid transit system
- Development and improvement of railway and railway network
- Four-line track, double-track, and depot design

AIRPORT

- International airports, local airports and military airbase
- Development and expansion of airports and airport network

HARBOR

- Development, modernization, and expansion of ports
- Wharf, dredging, reclamation, and ship collision

STRUCTURE / TUNNEL

- Suspension bridges, cable-stayed bridges
- Extradosed bridges, PSC box girder bridges, Orthotropic steel plate deck bridges
- Wind tunnel test and fluid dynamic analysis
- Shield tunnel, New Austrian Tunneling Method, TBM
- Large-sectioned and long tunnel (under-river and seabed)
- Tunnel ventilation and safety

DAM AND WATER RESOURCE

- Earthfill, rockfill and multi-purpose dams
- River basin studies

WATER SUPPLY AND SEWERAGE

- Development of ground water, water treatment plant
- Water supply system for nuclear power plant

URBAN AND REGIONAL PLANNING

- Site use planning, urban design and rehabilitation
- Parks, recreation and landscape planning

ENVIRONMENT

- Environmental impact assessments
- Automatic garbage gathering facility design

TRANSPORT PLANNING

- Traffic management planning
- Intelligent Transport Systems(ITS)
- Transport economics and planning
- CONSTRUCTION MANAGEMENT & SUPERVISION

Since its foundation in 1966, Yooshin has successfully participated in major domestic road and highway projects including the Gyeongbu(Seoul-Busan) Expressway Project in 1968 and several other road planning and design projects funded by the International Bank for Reconstruction and Development(IBRD) or the Asian Development Bank(ADB) in the 1970s. As one of nation's top engineering service providers, it offers diverse engineering consulting services like mater planning, feasibility study, preliminary and detailed designs for expressways and national/regional roads. Recently, Yooshin has participated in various overseas projects such as preliminary studies of the ASEAN Highway Network Development Project, master plan of the arterial road network in Myanmar, and feasibility study of the NR 48 in Cambodia, detailed design for the road construction projects in Afghanistan, and the Hanoi-Haiphong Expressway Project in Vietnam.

Main Work Areas

Expressway

- National and local roads
- Survey, planning and design for overseas road projects
- •Turn-key, alternative design and privately financed projects



Sansung Tunnel Approach Road

Detailed Design of the Hamyang~Ulsan Expressway(15th,16th Section)

- Project period : Sep.2010~Dep.2014
- •L=9.94km (B=23.4. 4 lanes)
- Bridge: 24 locations/3,482m
- Tunnel: 4 locations/1,164m
- Intersection : IC 1EA, JC 1EA
- Service Area : 1EA



Seoul Ring Road Hak-ui JCT

Preliminary Design of the Seamanguem~Jeonju Expressway (5th Section)

- Project Period : Mar.2013~Nov.2014
- L=7.1km (B=23.4. 4 lanes)
- Bridges: 6 locations/1,140m
- Tunnel: 1 location/842m
- Service Area : 1EA

■ Feasibility Study of the Pyeongtaek ~ Asan Expressway

- Project Period : Dec. 2010 ~ Nov. 2012
- L = 19.88km (B=30.6m, 6 lanes)
- Bridges : 24 locations/7,230m
- Tunnel: 1 location/230m
- Interchanges : 3 locations, Junctions : 2 locations

Detailed Design of the Changwon Dongeup ~ Gimhae Hallim National Highway

- Project Period : Nov. 2007 ~ Nov. 2012
- L = 7.29km (B=20.0m, 4 lanes)
- Bridges : 14 locations/1,827.9m
- Tunnels: 2 locations/542.5m
- Interchanges: 4 locations



Seoul Ring Road Sanbon IC



Detailed Design of the Hanoi-Haiphong Expressway in Vietnam

- · Connecting Hanoi (capital city) to Haiphong (largest western harbor city)
- •L = 105.5km (Two-way, 6 lanes)
- Design speed : 120km/hr
- Bridges: 60 locations/13,444.4m
- Interchange: 8 locations

Feasibility Study of the Improvement of National Road No.48 in Cambodia

- Rehabilitating the Asean Highway Route No.123 between Kao Kong and Sre Ambel
- L = 150.0km (B = 11.0m, 2 lanes)
- Bridges: 19 locations/311.0m
- Interchanges: 4 locations



Overseas Projects

- Detailed design of the Tobruk~Jagbub Highway in Libya
- · Feasibility study and detailed design of the Bukittinggi Highway in Indonesia
- · Feasibility study and detailed design of the Padang Highway in Indonesia
- Design-Build contract for the rehabilitation of the Pul-e-Khumri to Balkh Roads with link roads from Naibabad to Hairatan in Afghanistan
- Design-Build contract for the rehabilitation of the road from Almar to Andkhoy in Afghanistan
- · Detailed design of the Padeniya-Anuradhapura Highway in SriLanka
- Consulting service for the N. R. No.3 rehabilitation project phase II in Cambodia
- · Detailed design consulting service of the Hanoi~Haiphong Expressway in Vietnam
- · Malagarsi bridge & associated roads design-build in Tanzania
- Ho chi Minh Long Thanh-Dau Giay Expressway in Vietnam
- Detailed design of the Siem Reap Bypass Road(Korea ring road) expansion and construction project (phase 2)
- · Feasibility study of the Improvement of National Road No.48 in Cambodia
- Second Northern Greater Mekong Sub-Region Transport Network Improvement Project (Highway 217 Improvement, Phase 1)
- Road Safety Improvement Project of the Cambodia NR No.3 and NR No.48
- Master Plan of the Arterial Road Network Development in Myanmar
- Feasibility Study for the Urban Expressway Development in the Greater Yangon (the North~South corridor)
- Consultancy services for feasibility study, preliminary design of the Muzaffarabad-Mirpur-Mangla (N-5) Expressway
- Malakand Tunnel Construction Project in Pakistan

Padeniya-Anuradhapura Highway in Srilanka



Cheongwon~Sangju Expressway





Yooshin Engineering Corporation 07





Railway

Yooshin has participated in numerous railway projects: Double-track improvement projects (Gyeongbu Railway Line and Honam Railway Line), subway construction projects in 6 large cities, railway construction projects (Donghae Line, Seongnam-Yeoju Line, Wonju-Gangreung Line, and Trans-Korea Railway Projects (linking Gyeongui Railway Line to Donghae Railway Line), and LRT construction projects (Gimhae Line and Yongin Line).

In particular, it carried out every kind of consulting services including technical survey, planning, preliminary and detailed design, and construction supervision for the Gyeongbu High-speed Railway Project (opened in 2004). Currently, it has provided preliminary/detailed design and construction supervision services for the Honam High-speed Railway Project. Yooshin also tries to modernize the domestic railway system by providing environment-friendly transport services, improving the national railway network fit for the 21st century and developing new lines such as the Donghae Railway Line and New Ansan Railway Line.

Specialized Fields

- System integration
- High-speed railway, common railway (newly-built and improvement), minning railway, urban railway (subway and light rapid transit)
- · Depot design
- · Track layout rearrangment of major stations

Honam High-speed Railway Project

- Basic planning: 1994~1997
- Basic design for Lot No.1: 2006~2008
- Detal design for Lot No.1 : 2008~2009
- Construction supervision for Lot No.1 : 2010 \sim

Wonju-Gangreung Railway Project

- Feasibility study : 1995~1996
- Basic design in Jinbu-Gujeong: 2004~2006
- Detailed design for Lot No.7, 8, 10, 11 : 2010~2014

Masterplan for the New Ansan Railway Line

- -L = 44.4km
- Stations : 16nos
- Car depot : 1no
- Route selection
- Summary of project

Commuter line for the southwestern of Seoul and (transfer line) Seoul~Busan HSR, Seoul subway lines





Cycongjeon Railway (Nakdong-river bridge)



Bundang Railway Line (Under river tunnel)

Railway

■ Seoul~Busan High-speed Railway Project

- ▶ Feasibility study : 1980~1982
- ▶ Technical survey : 1989~1991
- Total length : 418.7km
- Design speed : 350km/h
- ▶ Detailed design for Lot No.14 : 1991~1998
- Lot property : Busan area, length : 30.0km
- Station : 1 location(Busan station)
- Bridges : 8 locations(3.7km)
- Tunnels : 20.6km
- Detailed design of civil works for Double-tracking at Gaya~Sasang station
- Length : 7.1km and access line to depot 5.1km
- Track design for Lot No.6 : 1997~2001
- Track length : 43.5km, ballasted and concrete(Rheda) track
- Construction Supervision
- Lot No. 9: 1997~2003
- Lot No.13 : 2003~2009
- Lot No.14 : 2002~2010



Basic and Detailed Design for Access Railway to Incheon International Airport

- Route : Seoul~Incheon International Airport
- Length : 61.5km (1 depot and 10 stations)
- Highlight : Youngjong Bridge L=3.5km, the world's largest self-anchored double-deck suspension bridge (upper deck of 6-lane, and lower deck of double track railway and 4-lane road)





Airport

Based on its various domestic project performances such as preliminary design for Jeju International Airport in 1967, Yooshin has remarkably marched into the overseas markets since its first successful detailed design service for Auzou Airport in Libya in 1979. Joined with advanced foreign design firms in the form of consortium or Joint Venture, Yooshin has accumulated enormous airport design technologies by participating in most of domestic and some of overseas airport projects mainly in the Philippines, Cambodia, and other African countries. In particular, Yooshin won the Presidential Prize for its leading role in the Incheon International Airport Project by providing all kinds of services including feasibility study, preliminary and detailed design, and construction supervision. In 2008, Yooshin established an MOU with the Incheon International Airport Corporation for the creation of overseas airport project opportunities.

• Main Work Areas

- · Airport Strategic Planning
- Definition of airport goals and objectives
- Aviation traffic forecast
- Short and long-term airport development strategy
- Preliminary/Detailed design
- Airside and landside design
- Navaids design
- Airspace & air traffic control analysis
- Utility & support system design
- Telecommunication and IT infrastructure
- Project Management
- Construction management
- Construction supervision
- Value engineering

Incheon International Airport

Detailed Design and Construction Supervision of Airport Facilities (Phase 1), 1992 ~ 1998

- Site preparation: 44,000,000m²
- Pavement designs for 2 runways(3,750m×60m each),
 4 parallel taxiways(10 rapid exit and 20 bypass),
 which add up to the total of 1,700,000m² in area.
- Pavement designs for apron stands totalling
- 1,950,000m² in area.

Detailed Design and Construction Supervision for Airport Facilities (Phase II), 2002~2008

- Site preparation : 8,250,000m²
- Pavement designs for runway III(4,000m $\times60m)$ and 2 parallel taxiways in area of 1,484,000m^2
- Pavement designs for apron stands totalling 1,550,000m²
- Parking area designs : 279,000m²
- Navaids : CAT-IIIb
- Power supply systems





Preliminary Design of Incheon International Airport (Phase III), 2010 ~ 2012

- Site Area : 1,105,000m²
- Apron for 2nd Passenger Terminal : 753,000m²
- Cargo Apron : 455,000m²
- Rapid Exit Taxiway of 2nd R/W : 52,000m²
- Run-up : 41,000m²
- •T1-T2 Connection Road : 10.8km, 4lane
- •T1-T2 Connection Rail: 11.2km
- IAT/BHS Tunnel : 618m
- Parking Area: 342,000m²
- Aircraft Fueling System
- Power Supply System
- AGL System
- NAVAIDS CAT-IIIb
- Utility System

Airport





■ Jomo Kenyatta International Airport in Kenya

- Client : Kenya Airports Authority
- Project Period : Aug. 2012 ~ Feb. 2013
- Scope of Work
- Consulting services of review of master plan and preliminary design
- New Runway : 5,500m X 60m
- Parallel Taxiway : 5,500m X 30m X 2ea
- Connective Taxiway : 2,000m X 30mm X 2ea
- Airfield Lighting System and NAVAIDs System : CAT-II





Gautam Buddha Upgrading Component Project in Nepal

- · Client : Civil Aviation Authority of Nepal (CAAN)
- Asia Developement Bank (ADB) Project

Overseas Projects

Airport in Cambodia

in Nepal

· Detailed design for AUZOU Airport in Libya

Masterplan study for Maputo International Airport in Mozambique
Masterplan study for Jimma International Airport in Ethiopia

Preliminary and detailed design for AGIP WLGP Airport in Libya
New Laguindingan Airport Deverlopment Project in the Philippines
MP, F/S & detailed design for New Siem Reap International

· Mater planning & feasibility study on 2nd International Airport

- Project Period : Aug. 2011 ~ Aug. 2012
- Scope of Work
- · Consulting Services of the Master Plan and Detailed Design Review
- New Runway : 3,000m X 45m
- Parallel Taxiway : 1,900m X 45m
- New Apron : 57,000m²
- Airfield Lighting System and NAVAIDs System : CAT-I

Cox's Bazar Airport Development Project in Bangladesh

- Client : Civil Aviation Authority of Bangladesh (CAAB)
- Project Period : Oct. 2010 \sim Feb. 2011
- Scope of Work
- Consulting Services of Airport Feasibility Study, Master Plan, Preliminary and Detailed Design
- Runway Extension, Strengthen and Widening
- : 2,065m X 39m \rightarrow 2,743m X 45m
- New Apron : 43,680m²
- Airfield Lighting System and NAVAIDs System : CAT-I



Yooshin has provided plenty of consulting experiences for most of domestic long-span marine bridges including the Youngjong Bridge (world' s 2nd long self-anchored suspension bridge), Gwangan Bridge, Lee Sun-shin Bridge(center span of 1,545m long), Jeokgeum Bridge(850m long single-span suspension bridge), and Incheon bridge (completed in October 2009). Furthermore, it has won the bridge design competition for the Songdo 3rd Bridge in the Incheon Free Economic Zone, World Cup Bridge, and Yeosu~GoheungMarine Bridge. Its sound bridge design technologies have been widely recognized at home and abroad through its successful design for the Ulsan Harbor Bridge (world' s 3rd longest 1,150m long single-span suspension bridge), and technical consulting services on the construction of the Oakland Bay Bridge in the USA.



Suspension Bridges

■ Yi Sun-shin Bridge

- Three-span twin steel deck suspenssion bridge
- L = 2,260m (357.5+1,545+357.5)



- Yeongjong Bridge
 Self-anchored suspension bridge
 - L = 550m (125+300+125)



Sorok Bridge • Mono plane cable, self-anchored suspension bridge • L = 470m (110+250+110)



Jeokgeum Bridge ·Single-span steel deck suspension bridge





- Gwangan Bridge
- Three-span double deck suspension bridge
- L = 900m (200+500+200



- Ulsan Harbor Bridge
- Single-span suspension bridge L = 1,150m (300+1,150+350)

Arch Bridges





- Borom(1st Mihocheon) Bridge
- 3-span arch bridge L = 320m(70+180+70)



Sunmoo Bridge · Single-span arch

• Rohse arch bridge • L = 600m (6@100)

• L = 90m



- Aphae Bridge Nilsen arch bridge
- L = 355m(95+165+95)



Gajo bridge Nilsen arch bridge • L = 330m (90+150+90)



Choyang bridge • Half through steel arch bridge • L = 330m(90+150+90)

Cable-stayed Bridges



- Incheon Bridge
 5-span Steel Deck (Nation's 1st, World's 6th long)
 L = 1,480m (80+260+800+260+80)



2nd Jindo Bridge • Twin 3-span Steel Deck • L = 484m (70+344+70)



- Yeongheung Bridge
- 3-span Steel Deck
- L = 460m (110+240+110)



- Songdo 3rd Bridge
- PSC edge girder bridge L = 250m(45+100+40+35+30)



Bukhang Bridge • 5-span Composite Deck (Nation's 1st long) • L = 1,114m (60+227+540+227+60)



- Cao Lanh Bridge
 - Concrete Edge Girder • L = 650m (150+350+150)



Handol Bridge

Yeosu Bridge



Hwayang Bridge Concrete Box Girder (Nation's 1st, World's 2nd long) • L = 854m (177+500+177)



Jobal Bridge • Curved 1-pylon Concrete Girder • L = 990m (95+2@150+200+170+140+85)



- World Cup Bridge Asymmetric Hybrid Girder
- L=540m(100+225+120+95)



- 2nd Dolsan Bridge
- Concrete Edge Girder
- L=744m(35+82+230+85+32)



- Chilsan Bridge Concrete Box Girder
- L = 590m (135+320+135)



- Anjwa Jara Bridge
- Concrete Box Girder
- L = 670m (80+2@255+80)



- Miho Bridge
- · 6-span Concrete Box Girder
- L = 800m (70+4@165+70)
- - Unnam Bridge • 4-span Concrete Box Girder
 - L = 445m (70+2@152.5+70)



- Namchang Bridge
- · Asymmetric span, inclined pylon

Cheonghae Bridge

• Composite I-type girder

 $\cdot L = 400m (90+220+90)$

• L = 172.5m (30+112.5+30)

- 2nd Geumgang Bridge
- · Asymmetric span, curbed pylon
- L = 880m (5@78+200+140+2@75)



Samcheonpo Bridge • Composite I-type girder • L = 436m (103+230+103)





- 1st Dong-i Bridge • Composite I-type girder • L = 400m (1 span)



Extradosed Bridges





- Munhwa Bridge
- 1-pyion 3-span extradosed bridge • L = 270m (55+115+100)



Kim Dae Jung Bridge
 3-span extradosed bridges
 L = 325m (85+155+85)

Muyeong Bridge
 Multi-span estradosed bridge
 A = 260m (10014@11651100)





- Chorak Bridge
 5-span extradosed bridge
 L = 530m (70+3@130+70)
- 1st Geumgang Bridge
- Multi-span extradosed bridge
- L = 740m (100+3@180+100)



Girder Bridges



Ilseon Bridge

Pedestrian Suspension Bridges



Eunpa Suspension Footbridge



Eumji Bridge

Summok – Gwaneumdo Suspension Bridge



- Sachun Bridge
- Bascule Bridge



Yeongdo Bridge

Tunnel

Yooshin offers all kinds of consulting services including planning, design and supervision for long, largesectioned, soft-ground, and under-river(subsea) tunnels based on its various tunneling technologies such as the shield TBM method. Through its consistent R&D activities, Yooshin also leads the development of the national tunneling technologies by offering technical supports for tunnel supervision works and analyzing construction performances. Since the 1980s, Yooshin has successfully provided diverse domestic shield tunnel design works; Gyeongbu High-speed Railway Tunnels, Shield Tunnel under the Han River (Bundang Railway Line Wangsipri~Cheongdam Section), and Three-Arch Tunnel (nation's largest sectioned one (W=28m) and passing under the Daejeon Subway Station Line No. 1). More recently, it is participating in overseas projects such as the Xe Pian-Xe Namnoy Hydroelectric Power Project in Laos.

Main Work Areas

- New Austrian Tunnelling Method (NATM)
- TBM and mechanized tunnelling
- Cut and cover tunnelling
- Large-sectioned tunnelling
- Soft-ground tunnelling
- Shaft design
- Blasting and seismic design
- Tunnel ventilation and safety design



Boryeong Tunnel

- Length : 6,900m X 2 (2-Lane, 2-tube)
- Longest subsea tunnel in Korea

Ke Namnov

Baehuryeong Tunnel

- Length : 5,057m (bi-directional 2-lane)
- Service tunnel : 5,137m (Ø5.0m TBM)
- Transverse ventilation
- Longest roadway tunnel in country
- First tunnel with service tunnel
- Phased construction (uni-directional 2-lane twin tunnel in future)

■ 3-Arch Tunnel of the Daejeon Subway Line-1

- The longest 3-Arch tunnel in Korea with a width of 28m
- Underpassing railway tracks and buildings

Bundang Line under the Han River Tunnel

- Length : 846m X 2 (double bore, single track)
- Shield tunnel : Ø8.02m EPB shield
- Riverbed tunnel

Xe Pian-Xe Namnoy Hydroelectric Power Project in Laos

- Low Pressure Headrace Tunnel : 13.6km (Double Shield TBM : 11.5km + Drill & Blast : 2.1km)
- Surge shaft : 217m
- Pressure shaft : 485m
- High Pressure Headrace Tunnel : 1,565m
- River diversion tunnel : 617m
- Waterway tunnel



Baehuryeong Tunnel

Bundang Line under the Han River Tunn

Water Resources

Yooshin has participated in most of domestic multi-purpose dam projects such as the Yongdam, Jangjeung, and Buhang Dams and conducted basic studies for the nation's Four Major River Restoration Project. Recently, it is enhancing its position as a globally competitive company by participating in 21 overseas projects in 15 countries: Design service for the sustainable water resources management and flood prevention in Thailand and the Xe Pian-Xe Namnoy Hydroelectric Power Project in Laos.

4 Major Rivers Restoration Project (Korea)

• Han River

- Dredging : $0.5 \times 10^8 \text{m}^3$, Barrage : 3EA
- Ecological restoration : 127km
- Enforcement levee : 131km
- Nakdong River
- Dredging : $4.4 \times 10^8 \text{m}^3$, Barrage : 8EA
- Ecological restoration : 213km
- Enforcement levee : 335km
- Construction of dam : 3EA

- Keum River
- Dredging : $0.5 \times 10^8 \text{m}^3$, Barrage : 3EA
- Ecological restoration : 124km
- Enforcement levee : 117km
- Yeongsan River
- Dredging : 0.3×10⁸m³, Barrage : 2EA
- Ecological restoration : 73km
- Enforcement levee : 17km
- Retention reservoir : 2EA









Planning and Designing of Buhang Multipurpose Dam (Korea)

- Reservoir
- Total storage : 54.3 \times 10⁶m³
- Effective storage : 42.6 $\times 10^{6} \text{m}^{3}$
- Dam : Concrete Faced Rockfill Dam
 - (H:64.0m, L:472.0m)
- Spillway : B7.6m × H9.87m × 3gates (Design Discharge : 1,337 m³/s)
- Intake tower : Surface and selected intake
- Small hydropower: 450 kW



Spillway Expansion of Yedang Dam (Korea)

- Reservoir
- Total storage : $46.3 \times 106 \text{m}^3$
- Effective storage : 45.9 \times 106m³
- Dam : Concrete Gravity Dam (H : 19.1m, L : 247.5m)
- Spillway : B15.0m × H6.7m × 11gates (Design Discharge : 5,111m³/sec)
- Downstream expansion : W269.0m × L320.0m
- Small hydropower : 480 kW

Water Resources







Flood and Drought Management Project (Cambodia & Indonesia)

· Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project in Cambodia

- ADB: Loan No.2970 CAM and Grant No.0330 CAM
- Project Implementation Consultants (PIC)
- → Establishment of national flood and drought forecasting and early warning center
- → Irrigation system rehabilitation and extension project in Pursat and Battambang Province
- · Development of the Flood Forecasting and Warning System in the Citarum River Basin, Indonesia
- ODA Project through KOICA
- Supporting and supplying system equipment
- Basic Plan : Citarum basin (A=6,614km²)
- Basic Design : Citarum upstream basin (A=1,827km²)

Xe-Pian Xe-Namnoy Hydroelectric Power Project (Laos)

- Xe-Pian Dam (H=48.0m, L=1307.0m)
- Type : Concrete Gravity Dam + Earth Core Rock-fill Dam
- Storage at FSL: 28.72×10⁶m³
- Xe-Pian Xe-Namnoy Water Transfer Conduit : L=7.9km
- Xe-Namnoy Dam (H=73.0m, L=1600.0m)
- Type : Center Core Rock-fill Dam
- Storage at FSL : 1,043.3×106m3
- Power Waterway
- Low Pressure Tunnel(13.6km), High Pressure Tunnel(1.6km)
- Surge Tank : Restricted orifice surge tank(concrete lined)
- Hydro power



Xe N

Water Tran



Harbor

Yooshin has participated in diverse harbor projects at home and aboard: development of new ports and coastal areas, rehabilitation of the existing port facilities, and construction of offshore airports. Yooshin has successfully provided its state-of-the-art consulting services like survey, planning, design, and construction supervision for the Incheon New Port Development Project, Gwangyang Container Port Development Project, Busan North Port Redevelopment Project and more recently, Lamu Port Construction Project in Kenya.

Main Work Areas

- Development of new ports
- · Expansion and modernization of existing ports
- · Development of fishing ports
- · Site creation (reclamation and landfill of public water surface)
- · Shipyard business (dock, outfitting basin)
- Coastal management

Detailed Design for the Inlet/Outlet of BNPP #1, #2

- Client : Korea Electric Power Corporation
- Location : Barakha, UAE
- Project Description
- Breakwater (Intake : 10,276m, Discharge : 4,642m)
- Dredging : 8,500,000m³
- Wharf : 300m
- Intake & discharge structure facility : 1 L/S

Basic and Detailed Design for the Incheon New Port Container Terminal Substructure Work (#1)

- Client : Incheon Port Authority
- Location : Incheon, Korea
- Project Description
- Quay: 850m (100,000 DWT = 8,000 TEU)
- Revetment : 476m
- Dredging and reclamation : 1 L/S
- Soil Improvement : 1 L/S
- Superstructure facilities : 1 L/S



- Detailed Design, Review and Supervision for the First Three Berths and Associated Infrastructure of the Proposed Lamu Port at Manda Bay, Lamu
 - Client: Kenya Ports Authority
 - Location : Lamu, Kenya
 - Quay: 1,130m (200,000DWT, 18,000TEU)
- Dredging : 12,000,000m³
- Reclamations : 121ha
- Buildings and other facilities : 1 L/S
- Navigation Aids System : 1 L/S
- Cause way(Width 50m, Length 944m)
- Railway freight terminal :1 L/S

Harbor

Masterplan of the Wider Gwangyang Port Area

- Quays
- Container pier : 9,300m (wharf for 50,000 tons : 24 berths, wharf for 20,000 tons : 4 berths)
- General pier : 2,520m (wharf for 20,000 tons : 12 berths)
- Administrative pier : 1,700m
- Gantry Crane : C/C 52 gears
- Filling and Development of Sites
- Revetments : 65,169m
- Land reclamation : 15,005,000m³ (dredging : 144,246m³)
- Soil improvement : 144,551 a (quay wall, CY, rear site)
- Harbor Facilities
- Seaway width/water depth : 600m, DL(-) 15.00m
- Turning basin : 4 places
- Anchoring basin : 7 places
- Lighted buoy : 25 facilities





Detailed Design for the Busan North Port (Stage 1–1) Redevelopment (Gov. BPA)

- Break water : 150m
- Outer revetments : 192m
- Marina revetments : 376m
- Landscape channel revetments: 1,846m
- Seaside revetments : 612m
- Channel view revetments : 117m
- Land reclamation : 635,451m³
- Other appurtenat works







Water Supply & Sewerage

Yooshin, which boasts a large number of professional engineers with rich experiences and broad-based technical know-how, can provide all kinds of consulting services including planning, feasibility studies, and basic and detailed design for the water supply, sewage treatment, and urban waterwork maintenance areas by developing and introducing advanced technologies. Our major project experiences include alternative design for the Nakdong River Filtrate Intake Facility Construction Project and basic and detailed design for the Jigeum Sewage Treatment Plant in Namyangju.

Alternative Design for the Nakdong-river Filtrate Intake Facility Construction Project

- Purpose of project : Supplying clean water to Busan and
- Gyeongnam Provinces
- Horizontal collector well
- Q=351,000m³/day
- D=6.0m×10EA, H=32.6~48.0m
- Pipeline: D700~D1,800mm, L=2,362m





Basic and Detailed Design for Sewage Treatment Plant of Jigeum in Namyangju City

- Water Treatment Process : A2O-MBR, Speed Coagulating Sedimentation
- Capacity : Q = 28,000m³/day
- Flowing Sewage Pipe : L=5.31km(D600~800)
- Sludge Treatment Process : Dewatering, Pneumatic Conveying Drying of Low Temperature

Major Project Experiences

- Construction of the Siem Reap Sewerage System & Improvement of the Siem Reap River
- Basic & Detailed Design of main infrastructure system of THU THIEM New urbanized area, HO CHI MINH CITY, VIETNAM
- Establishment of Water Supply and Sanitation System in Kurdakhani Settlement in the Absheron Peninsula.
- ·Hlaing Thar Yar Township & Western District Water Supply Project in Yangon City, Myanmar
- Basic & Detailed Design of Optimal Management System of Water Supply Distribution Network(PyeongChang County)
- Basic & Detailed Design of Jeok-Sung Sewage Treatment Plant Expansion Project in Paju City
- · Establishment of Environmental Improvement Master Plan for Yangon, Myanmar
- Feasibility Study and Basic Engineering Design of Water Conveyance and Integrated Dam Operating System for
 Bandung, Indonesia
- ·Basic & Detailed Design of the City Sewer Maintenance and Flood Prevention
- Basic & Detailed Design of Sludge reduction Plant in Jeju Sewage Treatment Plant
- Basic & Detailed Design of water pipeline refurbish construction for the Geum River
- Detailed Design of Sadang drainage zone general maintenance projects
- · Efficiency planning of the Yarmag water resources and supply in Ulaanbaatar, Mongolia
- ·Basic & Detailed Design of Advanced Sewage Treatment Plant in Yangsan
- ·Basic & Detailed Design of Advanced Water Treatment Process of the Gangbuk Water Treatment Plant

Leisure, Recreation & Landscape

Yooshin performed the basic and detailed design services for the 88 Golf Club ordered by the Ministry of Patriots' and Veterans' Affairs in the mid-1980s. In the field of Leisure, Recreation, and Landscape, it boasts diverse work experiences: detailed design of the Busan Citizens' Park, basic and detailed design of the Bogwang Phoenix Park, detailed design of the World Cup Park, and the Gangwon Land Ski Report. Furthermore, Yooshin has won the International Design Competition of the Chuncheon G-5 Project, Design Competition of the Lee Sun-shin Square and the 2018 Pyeongchang Winter Olympic Sliding Centers (bobsleigh, skeleton, and luge facilities).

Services

- · Planning and design of ski, golf, and other tourism facilities
- Landscape planning and design of parks, building sites, complex and SOCs
- · Planning and design of districts and urban landscape

Major Projects

- Tourist Resort Plan and Design
- High 1 Switchback Resort (Design development)
- Unbuk Complex Leisure Town (Design development and construction document)
- National Forest Therapy Complex (Schematic design)

Ski and Golf Courses Plan and Design

- Phoenixpark Ski Course
- (Design development and construction document)
- · Gangwonland Ski Course (Construction document)
- West of Daejeon Public Golf Course
- (Design development and construction document)
- Black Valley Golf Course
 (Design development and construction document)

Landscape Planning and Design

- Busan Citizen Park (Design development and construction document)
- Han River Park(Teuk-seom)
- (Design development and construction document)
- New Songdo Central Park
- (Design development and construction document)
- Yeongju Eco & Environmental Experience Complex
- (Design development and construction document)
- Saemaul Undong Theme Park (Design development)
- World Cup Park(Sky-Park)
- (Design development and construction document)
- T/K Project (1st prize)
- Gangwonland Ski Resort (T/K design)
- General Lee Sun Shin Square (T/K design)
- Yeonin Mountain Provincial Park (T/K design)
- Sliding Center for Bobsleigh, Skeleton and Luge (T/K design)



 Kangwonland Ski Course



Urban Planning & Site Development

Yooshin aims to ensure the most optimal urban planning services by providing safe and economically efficient site design performances customized to each local characteristics. By applying every possible technology in a flexible manner, it tries to create an attractive and sustainable urban environment where all people can enjoy a worthy and pleasant life. Yooshin has successfully participated in large-sized urban planning and site design projects at home and abroad: Songdo New Town in Incheon, Centum City and Eco-Delta City in Busan, and Yachay City in Ecuador.

Main Work Areas

- Urban planning : Establishment of city plans including long-term city masterplan, city development, management plan, official topographical mapping, and zone-scale urban design
- · Site design : Planning and design for public or private development projects according to relevant rules and regulations









Development plan for the Songdo New Town

- Area : 44.8km²

- · Impact assessment studies : Enviroment, traffic and population
- Energy use plan

Urban Planning & Site Development



Impact Assessment Studies and Detailed Design for the Centum City of Busan

- Area : 1,172km²
- Impact assessment studies : Environment and traffic
- Investigations : Topographical soil survey
- investigation and analysis
- Detailed design : Review of the masterplan, grading design, roads and pavement design, water supply system design, sewerage design, structures design, soft-ground improvement design, landscape design, power supply system design

Busan Eco-Delta City Development Plan

- Area : 11.9km²
- · Feasibility study & basic plan
- Survey : Soil investigation and analysis
 Compensation Survey
- Impact Assessment Studies
- : Environment, disaster and metropolitan traffic control
- Topographical survey





Master plan for the City of Knowledge, YACHAY, Ecuador

- Area : 44.9km²
 - (Master plan 6.6km²
 - / Metropolitan development plan 44.9km²)
- Survey : Topographical survey, soil investigation
 cultural properties ground survey
- · Master plan & metropolitan development plan
- · Metropolitan transportation improvement measure
- Marketing & investment attraction strategy
- Feasibility study

Environment

Befitting its reputation as one of the nation's renowned environmental engineering service providers. Yooshin has successfully performed a variety of environmental consulting services including the Environment Impact Assessment (EIA), Post-investigation of Environmental Impact (PIE), Strategic Environmental Assessment (SEA), and many kinds of environment management and research activities. It boasts a lot of environmental management experiences, advanced engineering know-how and skills and a large pool of highly qualified professional engineers.

Environment Impact Assessment(EIA)

- EIA on Hadong 3rd Port Construction and Dredge, Jul.2014~Jan.2016, KOREA SOUTHERN POWER CO.,LTD
- EIA on Singori Nuclear Power Plant No.5, 6 Construction, Apr.2009~Apr.2014, Korea Hydro & Nuclear Power CO.LTD
- EIA on 2nd Capital Outer Circular Expressway Construction(Yangpyeong-Ichon), Sep.2013~Nov.2014, Korea Expressway Corporation
- EIA on Yeungheung Power Plant No. 7,8 Construction, Apr.2011~, Korea South-East Power CO. LTD



Post-Investigation of Environmental Impact(PIE)

- PIE on Incheon Bridge, Oct.2005~Jan.2013, Incheon Bridge Corporation
- PIE on Sejong Steam Supply and Power Plant Construction, Jul.2011~Jan.2019, Korea midland power CO.,LTD
- PIE on Wonju-Kangrung Railway Construction, Nov.2013~Dec.2020, Korea Rail Network Authority



Strategic Environment Assessment(SEA)

- SEA on Heuksan Airport Construction, Jul.2014~May.2015, Ministry of Land, Infrastructure and Transport
- SEA on Environment Industry Development Complex, Mar.2013~Jan.2014, Ministry of Environment

Environment Management and Research

- Case study on Environment Assessment Technique considering complex features of soil, Ari.2014~May.2015, Korea Environment Institute
- Research for Rail Road Noise/Vibration Reduction, Aug.2011~Nov.2013, Korea Rail Network Authority
- Research for Rail Road Noise Reduction Technology Dec.2013~Dec.2018, Korea Railroad Research Institute



Frame Material



Development of Noise Prediction



Measurement of Noise & Vibration

Environment Plant

Recently, the environment plant area has become more specialized through the recycling resource development and environmental policy stringency, requiring more systematic engineering capabilities and technical skills. Our highly qualified experts with various field experiences have performed diverse mechanical design works of each plant type. Now, we are marching into new business areas such as water pipeline refurbish construction and mechanical design of water supply, waste water treatment, dam steel equipment and tunnel ventilation.

Basic & Detailed Design of Pneumatic Refuse Collection System in Gimpo~Masong

- Business area : 989,738m²
- Amount of rufuse : Total 9.966 ton/day
- Inlet facility : Refuse inlet door 194ea
- Pipeline facility : D 500mm, L 11.516km
- Collection facility : 1 station
- Design part : Mechanical, electrical, measuring control, architecture, civil, landscape architecture



Basic & Detailed Design of Pipeline Rehabilitation in Geum River Water Pipelines

- Total length : L = 68.8km
- Pipe diameter : D1,100mm ~ D1,500mm
- Valve room/Valves : Replacement 414EA/177EA





Other Major projects

- T/K basic & detailed design of the second section in Gyeongin Canal
- Basic & detailed design of sewage treatment facility in Namyangju
- Basic & detailed design of emergency spillway water gate in Unmun Dam
- Basic design of mechanical facility for the 3rd phase construction for Incheon International Airport
- New & renewable energy feasibility study for Incheon International Airport
- Basic & detailed design of Steel Liner Design in Pakistan
- Detailed design & site engineering of the XePian-XeNamnoy Hydroelectric Power Project
- Feasibility study & basic plan of Biomass power plant in Marshall
- Feasibility study of Kabd Municipal solid waste treatment plant in Kuwait
- Basic & Detailed Design of River Barrage in the Nakdong River

Transportation Planning

Yooshin provides diverse consulting services such as feasibility study, master plan, and preliminary/detailed engineering design for transport infrastructure development projects at home and abroad. More detailed service areas are as follows: Traffic demand forecast, traffic impact analysis, traffic safety improvement plans, comprehensive transport plans, public transport planning and operation, pedestrian priority zones, and other Intelligent transportation systems (ITS).

Main Work Areas

- Feasibility study, master plan and preliminary design for the improvement & new development of transport infrastructures such as roads, railways, ports, airports, and waterways
- Traffic impact analysis in relation to large-scale development projects and countermeasure analysis to ease the induced problems
- · Traffic safety diagnosis on roads and safety improvement plans
- · Comprehensive transport plan for large cities
- Public transport planning & operation including LRT and BRT
- Planning & Design for pedestrian priority zone & road network for vulnerable road users
- Masterplan, preliminary and detailed design, and construction supervision for Intelligent Transport Systems (ITS)
- Overseas project development : Feasibility study and master plan for transport infrastructure, comprehensive transport plan for large cities, and ITS masterplan





Preliminary Study of the Asean Highway Network Development

- Client : KOTI
- Project period : Mar. 28, 2003 ~ Feb. 26, 2005
- Project description
- Selected the work priority over the roads under level 3 and unlinked sections from the ASEAN road network (L = 3,192km) and implemented feasibility study (Myanmar section : 64km)
- Design speed : 80km/h~100km/h (two-way, 2-lane)

Master Plan for the Arterial Road Network Development in Sumatra Island

- Client : KOICA(Korea International Cooperation Agency)
- Project Period : July 7, 2008 ~ October 30, 2010
- Project Description
- Envisioning the future optimal transport system which supports the vitalization of regional economy and establishing mid-and long-term arterial road network plans based the future transport system
- Total length: 10,589km (Eastern corridor: 2,807km, Western corridor: 2,275km, Central corridor: 2,302km, East-West corridor: 3,205km)



Geotech

Yooshin is capable of providing a comprehensive engineering consulting service including ground survey. analysis, planning and design for water resources work, soft ground/slope/embankment/dam and foundation treatment. It also performs groundwater assessment, development, and management works. Yooshin has accumulated lots of technologies related to soft ground improvement and bridge foundation designs by participating in lots of domestic projects including the Incheon International Airport Project, Anchorage Design Project for the Lee Sun-shin Bridge and the Ulsan Harbor Bridge Project. Recently, it is activity offering geotechnical engineering services for overseas projects such as the Cao-lanh Bridge Project in Vietnam and the Xe Pian-Xe Namnoy Hydroelectric Power Project in Laos.

Main Work Areas

- · Diverse site survey and analysis
- · Site investigation for civil engineering works
- · Groundwater reconnaissance survey and database
- · Foundation planning and design
- · Anchorage foundation design for suspension bridges
- · Embankment dam planning and design
- · Slope safety review and reinforcement design



Stepwise Deformation Analysys of Dam



3D Rock Mass Rating Diagram



Discrete Analysis of Tunnel Anchorage

Design of Soft-ground Improvement of Incheon International Airport(IIA)

- Description : The site of IIA, located between Yeongjong and Yongyu islands, was reclaimed with nearby marine sand and converted to an airport area.
- Improvement of the soft and the reclaimed land
- Design of the building and box foundations

National Groundwater Reconnaissance Survey (Gongju, Sangju, Gwangju-Hanam, etc.)

- Water balance analysis, numerical modeling, estimation of recharge and sustainable yield and production of hydrogeological map

Foundation Design of the Cao-lanh Cable-Stayed Bridge in Vietnam

- Large and deep drilled shafts design in line with LRFD design specification
- Construction planning methods

Design of Embankment Dam in the Xe Pian-Xe Namnoy Hydroelectric Power Project

- Performing stress-deformation analysis by FEM to evaluate the stability and performance of dam and its foundation during embankment construction & reservoir impounding

Pile Foundation

Overseas

Since its first overseas project participation in Libya and Indonesia in the 1970s, Yooshin has consistently advanced into overseas markets. In order to enhance its global competitiveness, it has set up the Overseas Division which provides all kinds of necessary assistances to its other technical divisions. Yooshin has successfully offered all kinds of consulting services for numerous overseas projects financed by the Export-Import Bank of Korea (Korea Exim Bank) and Korea International Cooperation Agency(KOICA), which are nation's Official Development Assistance(ODA) providers, and by other Multilateral Development Banks(MDB) such as the Asian Development Bank(ADB), the World Bank (WB), and the African Development Bank(AfDB).

Yooshin, which is growing into a globally renowned engineering consulting firm, will do its utmost efforts in ensuring the best consulting services.

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Vinh Thinh Bridge, Vietnam ① South Manila Commuter Rail, Phillppines ② Infrastructure of Yachay Knowledge City, Ecuador ③ Hanoi~Hai Phong Expressway, Vietnam ④ Gautam Buddha International Airport, Nepal (5)







Major Overseas Projects

- Cao Lanh Cable-Stayed Bridge, Vietnam(ADB) : Design and Supervision, L=2km, 350m span / Road Design Speed : 80km/hr
- Vinh Thinh Bridge, Vietnam(EDCF) : Feasivility Study, Design and Supervision, Total Length : 5,5km, Bridge : 4,4km
 South Manila Commuter Rail, Philippines(EDCF) : Design and Supervision, Total Length : 30km Double Track
 Cox's Bazar Airport, Bangladesh(Gov) : Design and Supervision, Runway, Mechanical, Navaid Equipment included
- National Highway No. 217, Vietnam(ADB): Design and Supervision, 3 Sections, Total Length : 196,1km
 Jomo Kenyatta International Airport, Kenya(Gov): Feasibility Study and Basic Design, Runway and Associated Taxiway, ILS Equipment
 Infrastructure fo Yachay Knowledge City, Ecuador(Gov): Master Plan, Area : 660ha
- UVA Provincial Road, Sri Lanka(WB) : Supervision, Phase 1 (Total Length : 109,93km), Phase 2 (Total Length : 117,82km)

Overseas

■ MAJOR OVERSEAS PROJECTS

PROJECTS	PHASE	COUNTRY	PERIOD(MM/YY)	CLIENTS
Balkh to Andkhoy Road Project(ADB)	DD	Afghanistan	04/04~09/05	Ministry of Public Works
AndKhoy~Qaisar Ring Road Project	DD	Afghanistan	05/06~05/08	Ministry of Public Works
Agriculture Modernization Project(Phase2)	FS,DD	Angola	08/09~01/11	Ministry of Agriculture and Rural Develoment
Batei Irrigation System Construction Project(Phase2)	DD,CS	Cambodia	04/09~09/10	Korea International Cooperation Agency
New Town of Phnom Penh City	BD,DD,CS	Cambodia	11/05~12/08	World City Co., Ltd
National Road No. 3 Rehabilitation Project(Phase2)	DD	Cambodia	10/07~05/08	Ministry of Public Works and Transport
New Siem Reap International Airport	FS,DD	Cambodia	10/06~03/08	Government of Cambodia
Banjul Port Development Project(AfDB)	FS,DD	Gambia	02/08~10/09	Africa Development Bank
Arterial Road Network Development in Sumatra Island	MP	Indonesia	07/07~07/10	Korea International Cooperation Agency
Singapore~Kunming Railway Link Project	BD,DD	Myanmar, ailand	02/05~04/07	Korea International Cooperation Agency
Nepal New International Airport	MP,FS	Nepal	04/10~01/11	LandMark Worldwide Co.,Ltd.
Bacolod~Silay Airport Access Road	FS	Philippines	06/07~09/07	Korea Eximbank
Development of Cox's Bazar Airport(phase2)	DD,CS	Philippines	10/10~04/13	Civil Aviation Authority
Northwest Provincial Road Improvement Project	DD,CS	Cambodia	12/10~03/14	Ministry of Public Works and Transport
Ecuador Yachay Knowledge City	MP	Ecuador	05/12~05/13	Yachay New Town Development
Kenya Jomokenyatta International Airport	BD	Kenya	08/12~05/13	Kenya Aviation Authority(KAA)
Laquindingan Airport Development Project	FS,DD,CS	Philippines	07/00~06/13	Dept, of Transportation and Communications
South Manila Commuter Rail Project(Phase 1)	DD,CS	Philippines	05/06~11/07	Philippine National Railways
Malagarasi Bridge and Associated Roads Project	DD	Tanzania	12/10~12/13	Tanzania National Roads Agency
Padeniya~Anuradhapura Highway	BD,DD	Sri Lanka	09/05~09/06	Road Development Authority
Main Infrastructures of Thu Thiem Urbanized Area	BD	Vietnam	08/11~03/12	Vietnam Infrastructure Development and Finance
				Investment.,JSC
Hanoi-Hai Phong Expressway Project	DD	Vietnam	01/08~09/09	Vietnam Infrastructure Development and Finance Investment, JSC
Vinh Thinh Bridge	FS	Vietnam	04/08~06/14	PMU THANG LONG
Xe Pian-Xe Namnoy Hydroelectric Power Plant & Damt	DD	Laos	10/12~03/14	Xe Pian-Xe Namnoy Power Co., Ltd.
Uva Provincial Road Project(WB)	CS	Sri Lanka	09/10~09/14	Ministry of Local Government and Provincial Councils
Tanzania Eleven(11) National Airport(IDA)	FS,DD	Tanzania	05/14~05/15	Tanzania Airports Authority

ONGOING OVERSEAS PROJECTS

PROJECTS	PHASE	COUNTRY	PERIOD(MM/YY)	CLIENTS
Firt Three Berths and Associated Infrastructure for Lamu Port	DD,CS	Kenya	05/13~05/17	Kenya Ports Authority
Gebze~Orhangai~Izmir Motorway	CS	Turkey	05/13~08/16	General Directorate of Highways, Turkey
Gautam Buddha International Airport(ADB)	DD,CS	Nepal	08/11~12/17	Civil Aviation Authority(CAA)
BNPP Unit 1-2 Intake & Discharge Channel	DD	UAE	07/10~02/16	Emirates Nuclear Energy Corporation
Central Mekong Delta Region Connectivity Project(ADB)	DD,CS	Vietnam	11/11~04/17	Cuu Long CIPM
Hanoi Ring Road No.2 Projects(WB)	CS	Vietnam	05/12~06/15	HUTDPMU
Mwatate Taveta (A23) Road Section Project(AFDB)	DD,CS	Kenya	03/14~03/18	Kenya Highway Authority (KeNHA)
Hazrat shahjalal international Airport(HSIA), Kurmitola, Dhaka	DD	Bangladesh	05/14~06/15	Civil Aviation Authority of Bangladesh(CAAB)

Note MP: Master Plan FS: Feasibility Study BD: Basic Design DD: Detailed Design CS: Construction Supervision PMC: Project Management Consultancy

Construction Management & Supervision

Since the introduction of the responsible construction supervision system, Yooshin has become the nation's No. 1 construction supervision service provider, boasting unrivaled project experiences. Yooshin has offered diverse kinds of control work in the quality, work process, safety and management areas at about 120 construction sites across the nation based on its customer-oriented construction supervision services.

The recent major works are as follows: Responsible construction supervision of the Busan-Geoje Linking Road(Geoga Bridge and immersed Tunnel); Responsible construction supervision of the Cable-stayed Bridge in the Incheon Grand Bridge Project: Comprehensive project management of the US military base relocation project; Responsible supervision of the subway construction in major urban areas; and Responsible construction supervision of the Gyeongbu High-speed Railway.



Bridges

- Construction supervision of the Yeoungjong Bridge on Incheon International Airport(IIA) Expressway and railway section
- · Construction supervision of the Gwangan bridge in Busan
- Construction supervision of the bridges between Changseon and Samcheonpo.
- Construction supervision of the Sacheon Grand bridge between Seopo and Yonghyun
- Construction supervision of the Yeongheung bridge
- Construction supervision of the Namhae Bridge
- Construction supervision of the Incheon Bridge
- · Construction supervision of the Busan-Geoje Fixed Link



Airports

- Construction supervision of site preparation and civil facilities of Incheon International Airport (IIA)
- Construction supervision of Yangyang International Airport
- Construction supervision of Muan International Airport
- Supervision of the Yeosu Airport Facility Expansion
- Supervision of Jeju Airport Landing Facility Expansion



Road/Highways

- Construction supervision of pavement and road expansion between Yeondang and Yeongwol
- Construction supervision of pavement and road expansion between Sangrim and Haepyung
- Construction supervision of pavement and road expansion between Gyoha and Jori
- Construction supervision of the Seoul Belt Expressway between Ilsan and Toeguewon
- Technical assistance to construction of the Jungang Expressway (Andong~Jecheon~Hongcheon)

Construction Management & Supervision

Railways/High-speed Rails

- $\,$ $\,$ Construction supervision of 1st stage civil work (Gimpo airport \sim carriage base) of Incheon International Airport Railway
- Supervision of subtrackbed construction of the Seoul~Busan double track railways between Suwon and Chunan
- Supervision of subtrackbed construction of the Seoul~Wonsan double track railways between Uijeongbu and Dongducheon
- Supervision of subtrackbed construction of the Seoul~Chuncheon double track railways (section 7, 8)
- Supervision of subtrackbed construction of the Seoul~Busan High-speed railways (section 9).

Water Supply & Sewerage, Water Resources, Ports & Harbors

- Supervision of 1st and 2nd stage construction of wide area water supply in Jeju Island
- Construction supervision of Wonju wastewater treatment facility
- Construction supervision of flood damage rehabilitation in Ichon City
- Construction supervision of 3rd stage container terminal of Gwangyang harbor





Overseas Project

- · Laguindingan Airport Development Project in the Philippines
- Design and Construction Supervision for the South Manila Commuter Rail Project (Phase 1) in the Philippines
- Design, Project Management & Construction Supervision of River Bank Protection and other Works along the Mekong River in Vientiane
- Hanoi~Hai Phong Expressway Project in Vietnam, Laos
- Consulting services for the National Road No. 3 Rehabilitation Project (Phase II)
 in Cambodia



[Road & Highway]

- Prefeasibility study of the Mokpo~Gwangyang Expressway (104.9km, 4-lane)
- Feasibility study of the Jeonju~Gwangyang Expressway (59.0km, 4-lane)
- Detailed design of the Incheon International Airport Access Expressway (6.49km, 4-lane)
- Detailed design of the Gimcheon~Gumi Expressway Expansion (9.90km, 4-lane)
- Detailed design of the Gikye~Shinhangman Expressway (4.14km, 4-lane)
- Detailed design of the Cheongju~Sangju Expressway (10.99km, 4-lane)
- Detailed design of the Gochang~Jangseong Expressway (4.0km, 4-lane)
- Detailed design of the Muan~Gwangju Expressway (10.34km, 4-lane)
- Preliminary design of the Ulsan~Pohang Expressway (11.5km, 4-lane)
- Prefeasibility study of the Jangan~Onsan Road (15.53km, 4-lane)
- Detailed design of the Gijang~Jangan Road (10.25km, 4-lane)
- Detailed design of the Tongil Bridge ~Jangdan Station Road along the DMZ (5.10km, 4-lane)
- Detailed design of the Chungyang~Hongseong Road (10.8km, 4-lane)
- Detailed design of the Imdang~Dumil Road (10.8km, 4-lane)

[Railway]

- · Feasibility study and technical survey for the Seoul~Busan High-speed Railway
- · Feasibility study and basic planning of the Seoul~Mokpo High-speed Railway
- · Basic planning for the East-west High-speed Railway
- Feasibility study for the Misan~Dangbi Railway Project in Heung Riong Gang, China
- · Double-tracking and electrification design for the Gyeongju, Joongang, and Honam Lines
- Double-tracking design for the Jeongra, Janghang, Wonju~Gangreung Railway Lines
- · Railway reconnection design for the Gyeongui Line (Munsan~Jangdan)
- Basic and detailed design for the Donghae Line (Jeongin~Military distribution line)
- · Study for the Seoul mass rapid transit system improvement
- · Preliminary feasibility study for the New Bundang Line Extension
- · Basic and detailed design of the Busan Metropolitan Subway Line No. 3
- Master planning, basic design, and technical proposal for the Busan~Gimhae Light Rail Transit (BOT)
- Technical proposal for the Gangnam New Transportation System (BOT)
- · Master planning of the Busan Metropolitan Light Rail Transit Network (technical part)

[Airport]

- · Detailed design of the Laguindingan Airport Project in the Philippines
- · Master plan, detailed design and construction supervision of the Incheon International Airport Project
- · Master plan, detailed design and construction supervision of the Gimpo International Airport Project
- · Master plan, detailed design and construction supervision of the New Cheongju Airport Project
- Master plan, detailed design and construction supervision of the Jeju International Airport Expansion Project
- · Master plan, detailed design and construction supervision of the New Muan International Airport Expansion Project
- ·Master plan, detailed design and construction supervision of the Yeosu Airport Expansion Project
- Detailed design and construction supervision of the Gimhae International Airport Expansion Project
- Detailed design and construction supervision of the Daegu International Airport Expansion Project
- Detailed design and construction supervision of the Yangyang International Airport Expansion Project
- Detailed design and construction supervision of the Mokpo Airport Expansion Project
- Detailed design and construction supervision of the New Cheongju Airbase Project
- Detailed design and construction supervision of the New Heongseong Airbase Project
- Master plan for the Korea Airport Network Development Project (Phase I & II)

[Structure]

- · Lee Sun-shin Bridge: Nation's longest suspension bridge and 4th in the world
- Ulsan Harbor Bridge: Nation's longest single span suspension bridge and 3rd in the world
- · Jeokgeum Bridge: Nation's 1st single span suspension bridge
- · Yeongjong Bridge: Nation's longest self-anchored suspension bridge and 2nd in the world
- · Sorok Bridge: Nation's first mono cable self-anchored suspension bridge
- · Incheon Bridge: Nation's largest cable-stayed bridge and 6th in the world
- Bukhang Bridge: Nation's largest steel composite cable-stayed bridge
- World Cup Bridge: Nation's largest bridge in the Han River zone with inclined pylon and nation's first hybrid cable-stayed bridge
- · Hwayang Bridge: Nation's longest concrete girder cable-stayed bridge and 2nd in the world
- · Cao Lanh Bridge: Nation's first overseas design consulting work for cable-stayed bridges

[Tunnel]

- Relocation of the Yongdong, Gyeongcheon, Jinbu~Gangreung, Chungang Railway Lines
- · Gyeongjeon and Wonju~Bongyang Railway Lines (nation's longest tunnel)
- Gyeongbu High-speed Railway (including 11 tunnels)
- Seoul Subway (Line No. 6, 8, 9), Busan Subway (Line No. 2), Daejeon Subway (Line No. 1), Daegu Subway, Gwangju Subway (Line No. 1), and Bundang Subway (Line No. 1, 2)
- Shinbuk~Buksan Highway, Daejeon~Dangjin Highway, Sanseong Tunnel, Jeonju~Gwangyang Highway, Bopyeong~Naemyeon Highway, Daejeong~Jinju Expressway
- ·Weolseong Nuclear Power Plant and Multi-purpose Dams in Yongdam, Seomjingang, and Buhang
- · Bundang Subway under the Han River

[Water Resources]

- · Detailed design of the Yongdam and Tamjin Multi-purpose Dams
- Preliminary planning of the Gamcheon Dam
- · Feasibility study of the Dalcheon Dam and New Sinpung Dam
- · Preliminary design of flood control enhancement for the Seomjingang Dam
- Preliminary planning and detailed design of the Farin Ruwa Dam in Nigeria
- · Detailed design of the Angye Dam Reinforcement Works
- ·Water resources planning for the capital area, Jeju Island, and South Gyeongsang Province
- River basin studies for the nation's 4 major rivers
- · Facility work planning of the Hantangang Dam
- · Preliminary design of emergency spillway for the Imha Dam
- · Planning and design of the Buhang Multi-purpose Dam
- · Preliminary design of the emergency spillway for the Andong Dam
- · Comprehensive flood control planning for the Tamjin River Basin
- · Master planning of the nation's 4 major rivers

[Harbor]

- Detailed design of the Gwangyang Port Container Wharf Development (Phase 1)
- Preliminary and detailed design of quay and connection dike for the Sadong Port
- Detailed design of the Gunsan Port International Passenger Pier Construction Project
- Detailed design of the New Boryeong Port Construction Project
- Master planning of the Gwangyang Port Expansion Project
- · Feasibility study and preliminary design of the Busan Port Water Depth Increase
- · Detailed design of the Gonghyeongjin Port Construction Project
- · Detailed design of the Ulsan Port Craft Pier Construction Project
- · Detailed design of the Northern Incheon Port Vessel Pier Construction Project
- · Detailed design of the Gunsan Port Craft Pier Construction Project
- · Basic design of the Jeju Outer Port Construction Project (Phase II)
- · Detailed design of the Northern Busan Port Redevelopment Project

[Water Supply / Sewerage]

- Preliminary and detailed design of sewerage treatment plants in Wonju, Gyeongcheon, and Onyang
- Detailed design of industrial water supply system for the Weolsong Nuclear Power Plant
- · Detailed design of the Gongneung Water Distribution Reservoir
- · Preliminary and detailed design of the Gangjin Sewerage treatment plant
- Preliminary and detailed design of water supply system in Seoul and Jeju
- · Detailed design of the Hwanggil water treatment plant
- · Detailed design of the Jangan rainfall drainage pumping station
- · Detailed design of the Sapyeongro rainfall drainage pumping station
- · Detailed design of the Muan drainage system improvement
- Preliminary and detailed design of the Palhyeon rainfall drainage pumping station
- Preliminary and detailed design of the Gwangjang rainfall drainage pumping station
- · Basic planning of the Bonghwa water supply system

[Leisure, Recreation & Landscape]

Resort Planning and Design

- · Planning of the Songju Lake Creation
- · Planning of the Jeongseon Ahuraji Tourist Area
- · Master planning of the World Seafood Tourist Village
- · Master planning of the Saekdal Spa Creation
- · Planning and design of the Suwon Film Tech Park Creation

Park Planning and Design

- · Planning and design of the Naejang Mountain National Sculpture Park Creation
- · Planning and design of the Jinhae Ocean Park Creation
- Construction design of the World Cup Sky Park Creation
- Design of the Godeok Ecological Park Creation
- · Design of the Ilsan Music Fountain Creation

Ski & Gold Course Planning and Design

- Master planning of the Hongcheon Leisure Town (Vivaldi Park Ski World)
- · Master planning of the Gangwon Land Ski Resort
- · Master planning and design of the Phoenix Park Ski Resort
- Golf course planning (88 CC, Cheongju CC, Giheung CC, Muju CC, Jungang CC, Chuncheon CC, IMG National CC, Black Valley Golf Courses, Peace Valley Resort)

Housing Development

· Design of the Songdo New Town and Industrial Complex in Incheon

SOC Landscape Design

- · Landscape design of Daegu Airport
- · Landscape design of the Centum City in Busan
- Landscape design of Incheon International Airport

[Urban Planning & Site Creation]

- · Design of the Yangjae urban district
- Preliminary and detailed design of the Incheon Industrial Site (Step 1)
- · Land readjustment for the Bulhyeon District
- Preliminary planning for the CIQ (Gyeongui and Donghae Lines)
- · Design of the Songdo Media Valley
- · Readjustment planning of the Asan urban district
- Preliminary and detailed design of the World Cup Football Stadium in Daejeon
- Preliminary and detailed design of the Suji 2nd Housing Development Project in Yongin
- · Urban development master planning for Anyang, Uiwang, Anseong, Icheon, and Asan
- · Preliminary and detailed design of the Sinweol Lot Readjustment Project
- Urban design of the Noweon Ward (Mokdong, Sanggye, Weolgye areas)
- · Urban readjustment planning for the Busan area
- Preliminary and detailed design of the Housing Development Project in west Gyeongsan
- Detailed district planning for the Gyeongbokgung, Dongdaemun, Hoehi, and Chungjeong Districts
- · Readjustment planning of the Busan Urban Redevelopment Project
- · Detailed design for the Visual Theme Park Development Project in Suwon

[Environment]

- · Master planning of the Nakdong River Environment Management
- · Assessment of aircraft noise in Gimpo, Jeju, Daegu, Gwangju, Ulsan, Yeosu Airports
- Master planning of air quality development in Hadong, Gimhae
- EIA study for the Cheongju~Sangju Highway (6th)
- · EIA study for the Tongil Bridge~Jangdan Road Construction
- Detailed design of river purification treatment (Yanghwa, Deokso, Ockcheon, Nakdong River)
- · Detailed design of river purification treatment (Gisa Stream)
- · Post environmental monitoring for the Yeosu and Seosan harbor areas
- · EIA study for the Osong Science Complex

[Transportation Planning]

- Traffic impact assessment of the Asan~Cheonan Road
- Traffic impact assessment of the Pohang~Samcheok Railway Line
- \bullet Preliminary feasibility study of the Ganghwa \sim Gyodong Link Bridge
- Master planning of Daegu and Daejeon transportation
- •ITS master planning for Busan and Changwon
- Traffic management software development for the Gwangan Road
- · Establishment of national transportation database management system
- · ITS establishment for the detour road paralleling freeways
- Preparation studies for the ASEAN Highway

[Geotechnical Engineering]

- ·Soft ground improvement for the Busan New Harbor and Gwangyang Container Wharf
- · Reclamation design of the Songdo New Town
- Karst hazard mitigation of the Miro~Samcheok Road
- · Geological investigation of the Jaecheon~Dodam Railway
- Hydrogeological study for Pohang City