

PART 1 | PART 2 | PART 3

HISTORY OF INCHEON BRIDGE

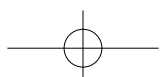
경이로운 건설과정, 1650일의 기록

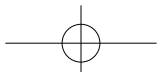
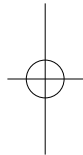
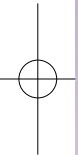
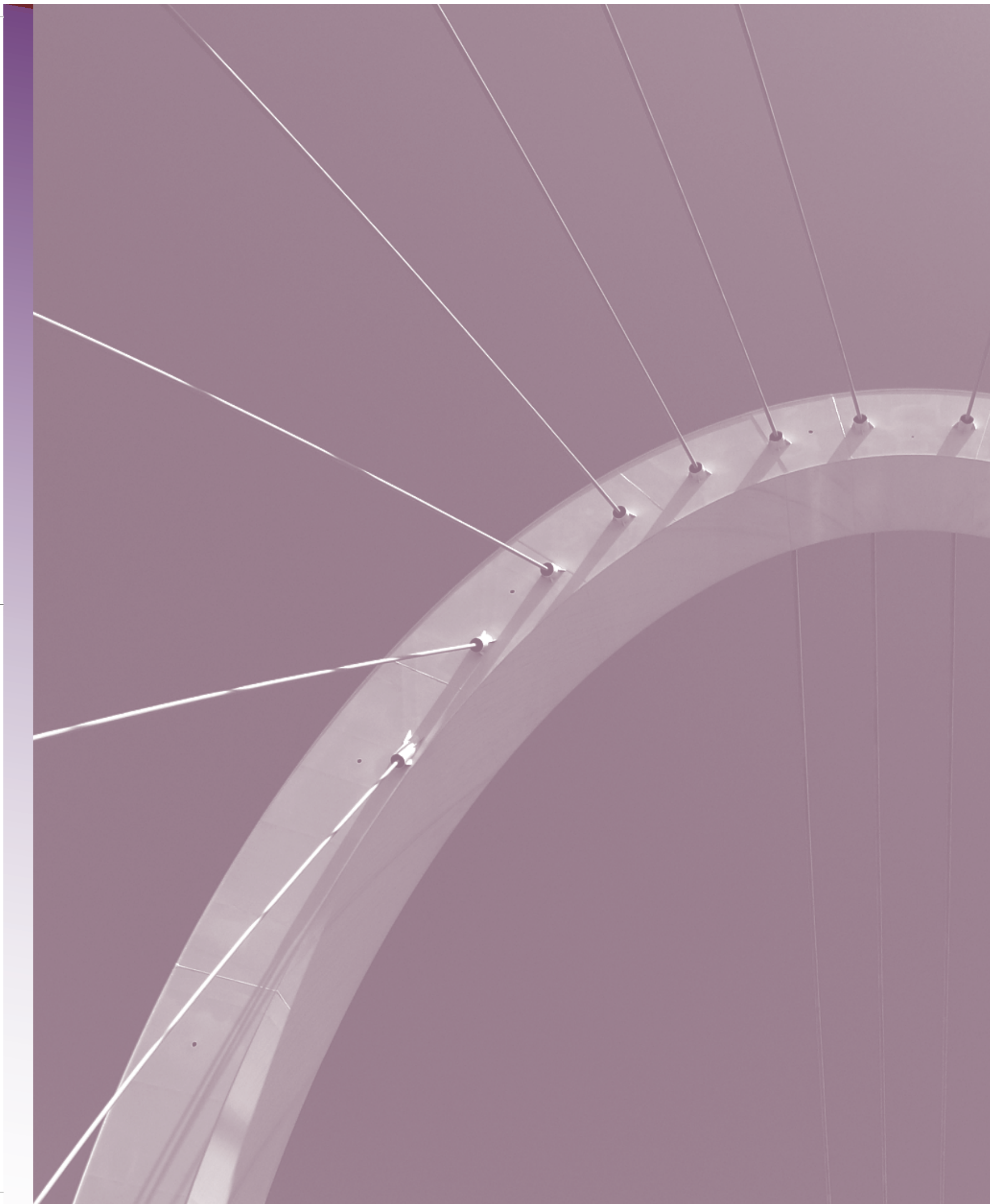
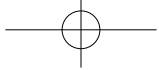
인천대교는 고난과 역경의 산물입니다.

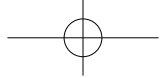
그리고 엔지니어들이 품었던 교량에 대한 모든 상상을 현실화한 작품입니다.

갯벌과 바다 위에 놓인 21.38km의 육중한 교각에는

수많은 사람들의 희망과 꿈과 감동이 새겨져있습니다.





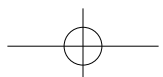


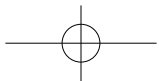
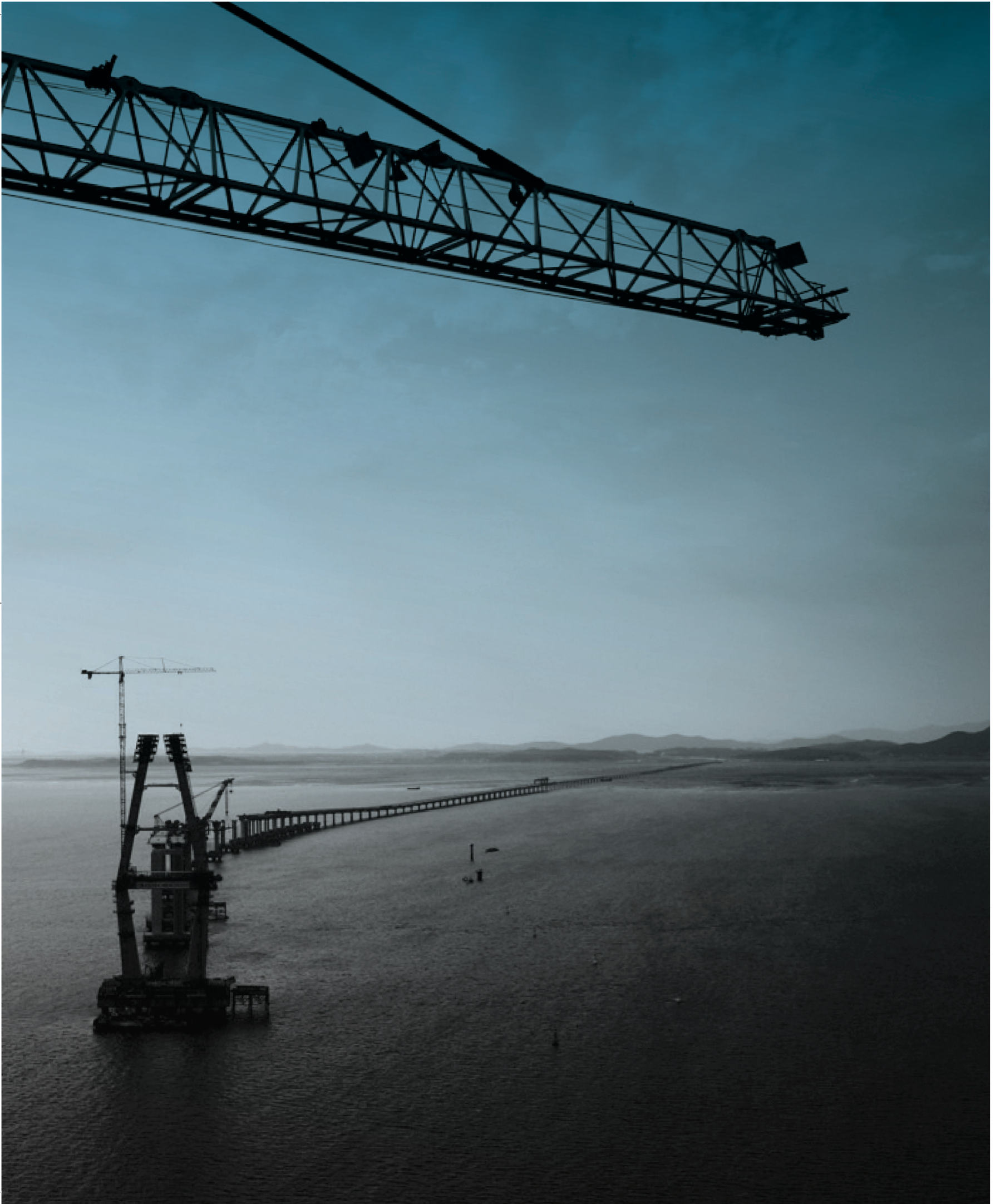
PART 1 | PART 2 | PART 3

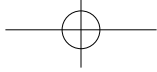
Section 1.

RESEARCH+PLANNING

... 조사 및 계획



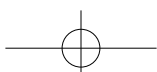


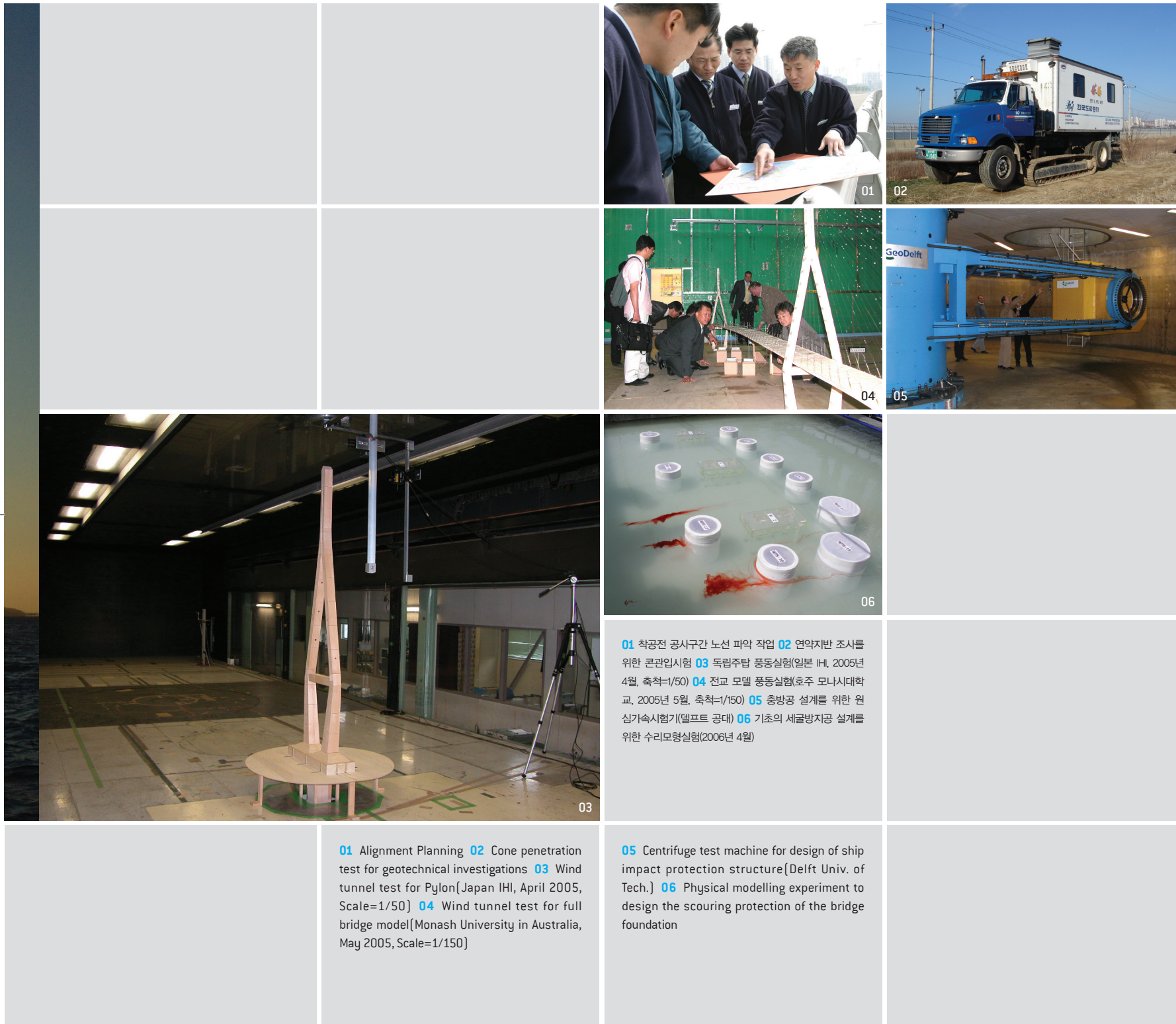
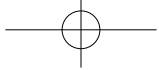


Preliminary Investigations, Tests, and Experiments ... 사전조사 및 실험

인천대교는 본격적인 시공에 앞서 철저한 사전조사와 실험을 실시하여 설계와 시공의 품질을 극대화하였다.

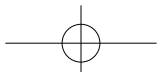
Thorough Investigation, Test and Experiments before beginning could make maximum quality in design and construction work.

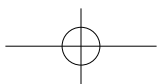
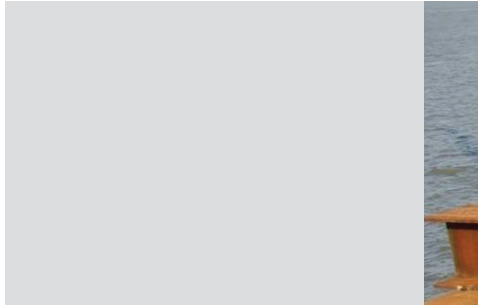
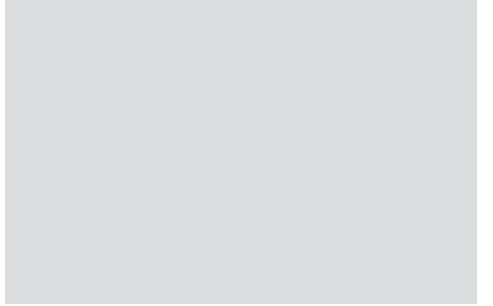
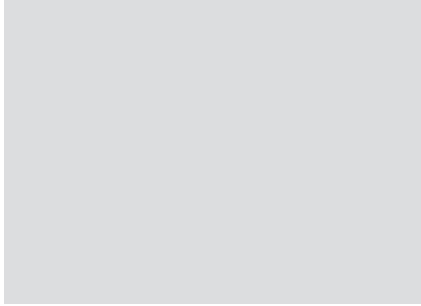
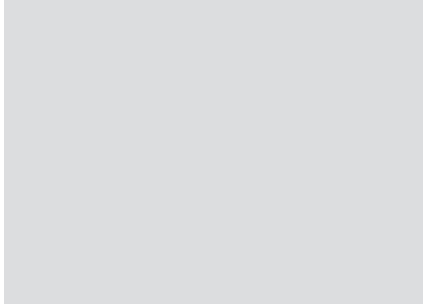


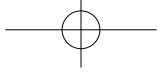


01 Alignment Planning 02 Cone penetration test for geotechnical investigations 03 Wind tunnel test for Pylon[Japan IHI, April 2005, Scale=1/50] 04 Wind tunnel test for full bridge model[Monash University in Australia, May 2005, Scale=1/150]

05 Centrifuge test machine for design of ship impact protection structure[Delft Univ. of Tech.] 06 Physical modelling experiment to design the scouring protection of the bridge foundation

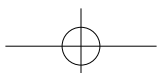


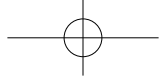




01, 02, 03, 04 해상지반조사
05, 06, 07, 08 교량기초 성능평가를 위한 재하시험

01, 02, 03, 04 offshore geotechnical investigations
05, 06, 07, 08 Pile load tests to evaluate the bearing capacity of the foundation



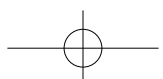


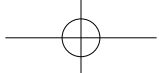
PART 1 | PART 2 | PART 3

Section 2.

SEA-CROSSING

... 해상교량





-
- **Project** : Incheon Bridge Private Investment Project
 - **Project Management** : Korea Expressway Corporation (KEC)
 - **Concessionaire** : Incheon Bridge Corporation (UK Company, AMEC + Government of Incheon City)
 - **Construction Supervisor (CS)** : Yooshin Corporation, Kunhwa Engineering, KCI
 - **Contractor** : Samsung JV (Samsung, Daelim, Daewoo, GS, Hanjin, Hanwha, Kumho)
 - **Contract Type** : Design-Build Project
 - **Total Project Cost** : 1520.1 Billion Korean Won (Private Portion : 786.6 Billion + Government Subsidy : 733.5 Billion)
 - **Formation** : Total Length of Private Invested Section-12.343km
Bridge Section 11.658m (Cable-Stayed Bridge : 1,480m, Approach Bridge : 1,778m, Viaduct 8,400m)
Earth Work Section (Toll Plaza) : 685m
Construction Work Period : July 2005 to October 2009 (52 months)
 - **Project System** : BTO (Build-Transfer-Operate) - A private investor constructs the structure, the ownership of the structure is transferred to the Government, and the private investor operates for a certain period (30 years for Incheon Bridge Project).
 - **Fast Track Method** : Construction work and Design work are carried out simultaneously in stages.
-

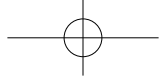
- 공사명 : 인천대교 건설공사(민간투자사업)
- 사업관리 : 한국도로공사
- 사업시행자 : 인천대교(주) (영국AMEC, 인천광역시 합작법인)
- 책임감리자 : (주)유신코퍼레이션, (주)건화, (주)한국해외기술공사
- 시공자 : 삼성 JV (삼성건설, 대림산업, 대우건설, GS건설, 한진중공업, 한화건설, 금호산업)
- 발주방식 : 설계, 시공 일괄입찰 방식(턴키)
- 사업비 : 1조 5,201억원(민간자본 7,866억원 /정부지원금 7,335억원)
- 구간구성 : 민자구간 총연장 12,343m
교량 11,658m(사장교 1,480m / 접속교 1,778m / 고가교 8,400m)
토공 도로(요금소 광장) 685m
- 공사기간 : 2005. 7. ~ 2009. 10. (52개월)
- 추진방식 : 사업 - BTO(Build-Transfer-Operate)
민간 사업시행자가 건설하여 준공 후 소유권은 국가에 이전하고, 일정 기간(인천대교 민자사업은 30년간) 동안 운영하는 체제임
- 시공 : 단계별 설계, 시공 병행 방식(Fast Track)



Bridge Foundation Constructions ... 교량 기초 건설

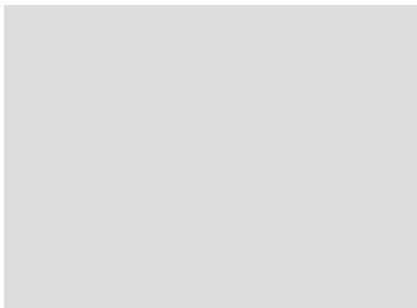
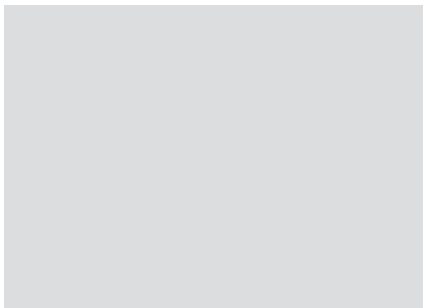
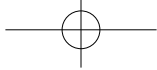
웅장한 인천대교의 상판을 떠받치는 기초는 다리의 구조적 안정성을 확보하는 토대이다.

A state-of-the-art of the geotechnologies which were applied to foundation construction work to support the colossal superstructures.



01 현장타설 말뚝 기초의 철근망 자동 조립 02, 04 케이싱 강관 제작 03 철근망 제작이 한창인 제작장 전경 05 케이싱 강관의 선단부 보강

01 Automated fabrications of the re-bar cage for drilled shaft foundation 02, 04 Casing steel pipe bending 03 re-bar cage fabrications on the casting yard 05 Reinforcement of the casing pipe tip



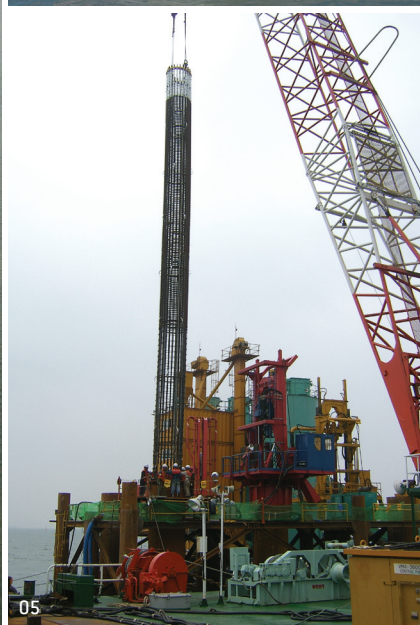
02



01



03

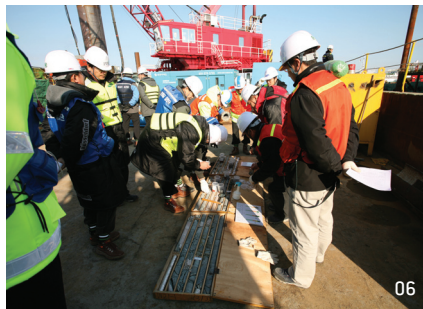


05

01 인천대교 기초시공 전경(2006년 4월) 02 해상 작업대 지그재킷 운반 03 파일캡 시공을 위한 PC하우스 설치 04 RCD 공법을 이용한 현장타설 말뚝 굴착 05 말뚝 철근망 설치 06 굴착기초지반의 암판정 07 사창교 동측 주탑 터 기초 시공 전경



01 Foundation Constructions for the Incheon Bridge, April 2006) 02 Transportation of the jig-jacket platform 03 PC House Installations for the pile-cap construction 04 Drilled shaft excavations using RCD machine 05 re-bar cage installations for the drilled shaft 06 Rock quality inspections for the foundation 07 Pylon foundation constructions for cable-stayed span



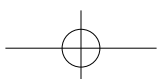
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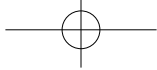


07



04





01

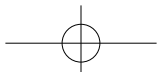
01 사장교 주탑기초 PC House용 철근조립 장면 02 말
뚝의 간전도 시험 장면 03 PC House 거치부 말뚝과 연
결 작업 04 사장교 PC House 거치 작업 05 FCM교 PC
House 거치 작업 06 사장교 주탑기초 PC House 거치 후
철근 조립 07 FCM교 PC House 거치를 위한 이동



02

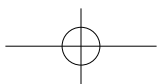
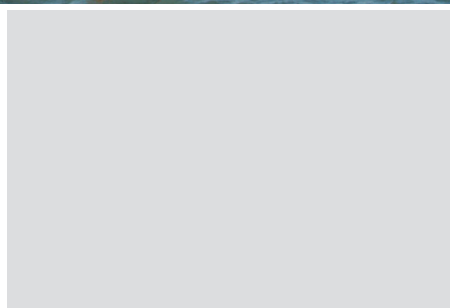
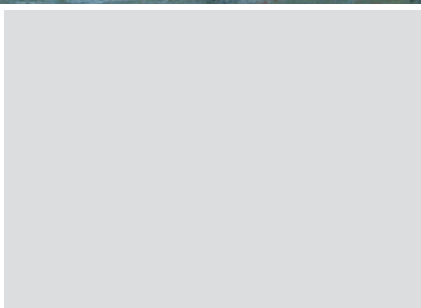
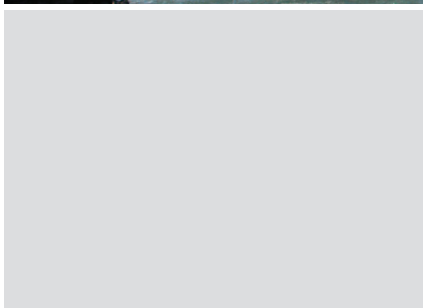
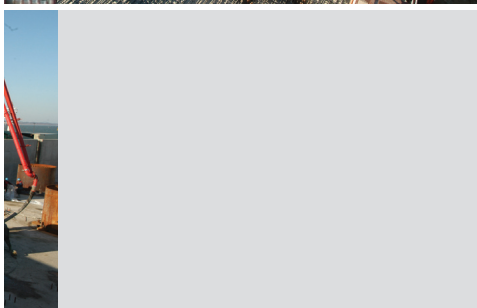
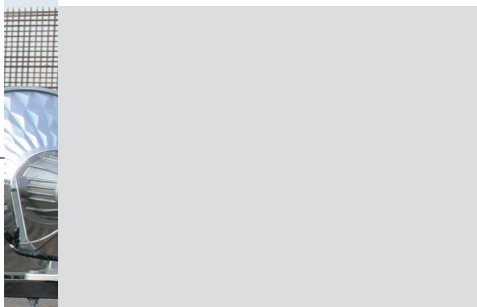


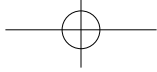
03





01 Rebar assembling works of PC house for the foundation of cable-stayed bridge 02 Sound test of drilled shaft pile 03 Connection works between PC house and piles 04 Laying PC house down on the piles of cable-stayed bridge 05 Laying PC house down on the piles of PFCM bridge 06 Rebar assembling of PC house for cable-stayed bridge 07 Moving PC house for laying down

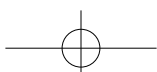


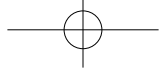


Cable-Stayed Bridge ... 사장교

인천대교는 고난과 역경의 산물이다. 그리고 엔지니어들이 품었던 교량에 대한 모든 상상을 현실화한 작품이다.

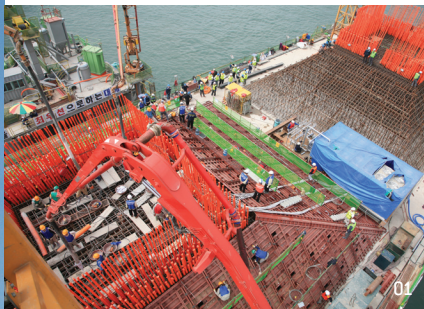
Incheon Bridge is a great masterpiece made through the hardship and the adversity. Engineers could come true their every imagination about the Bridge.



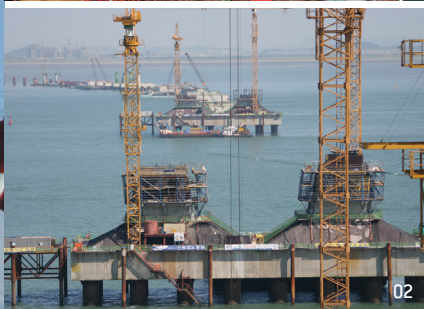


01 사장교 주탑 기초 페데스탈 콘크리트 타설 02 사장교 주탑 기초부 콘크리트 타설 03 중간교각과 단부교각 시공 전경 04 ACS폼을 이용한 주탑 하부 시공전경 05 완성된 중간교각과 단부교각 06 3,000톤 크레인에 의한 가로보 시공 전경(2007년 2월 12일) 07 주탑시공완료(2008년 1월 27일, 높이 238.5m)

01 Pedestal Concrete placing for foundation of pylon 02 Concrete placing for lower part of pylon 03 Erection of supplementary pier and end pier 04 Erection of pylon lower part using ACS form 05 Completed supplementary pier and end pier 06 Placing precast cross beam by 3,000tonf floating crane[12th Feb., 2007] 07 Completion of pylon[27th Jan., 2008, Height=238.5m]



01



02



03



04



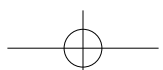
05

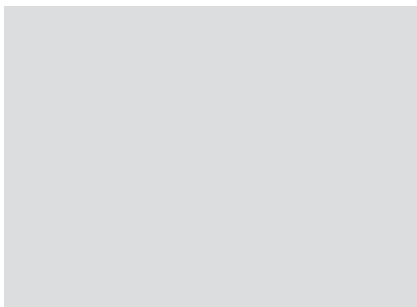
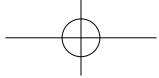


06

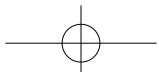
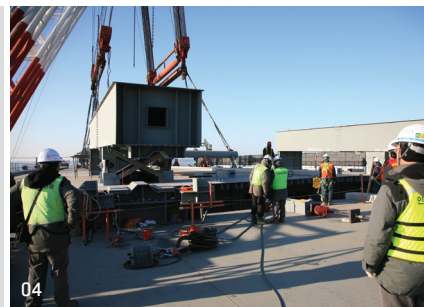


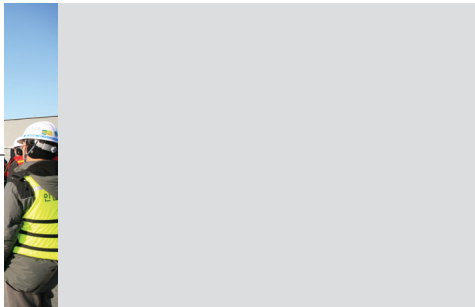
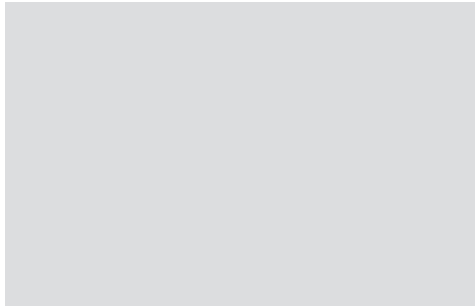
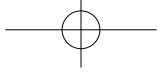
07



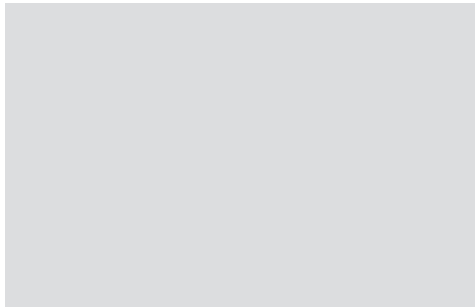


01 3,000톤 해상크레인을 이용한 대블럭 가설모습 02 대 블럭 가설을 위한 가벤트 시공 03 두번째 대블럭 작업 전 경 04 두번째 대블럭 안착 작업중(거대한 세팅빔을 볼 수 있다) 05 소블럭 인양을 위한 데릭 크레인 체결 모습 06 사장교 최초 소블럭 가설(2008년 5월 6일) 07 소블럭 가 설용 데릭 크레인의 유압조절 설비 08 소블럭 가설을 위 한 데릭 크레인 세팅 09 상부구조 작업이 한창 진행 중인 인천대교 해상구간



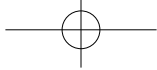


01 Erection of large block using 3,000tonf floating crane 02 Installation of bent for large block method 03 Erection of the second large block 04 Setting the second large block (view of large setting beam) 05 Lifting the small block of center span 06 Erection of the first small block(6th May, 2008) 07 Hydraulic facilities of derrick crane for small block erection



08 Setting of derrick crane for small block erection 09 View of sea-crossing section of Incheon Bridge





01

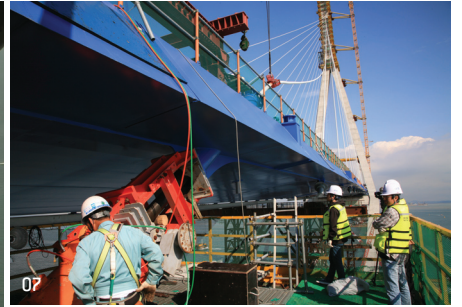
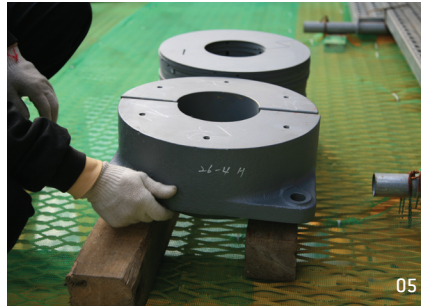
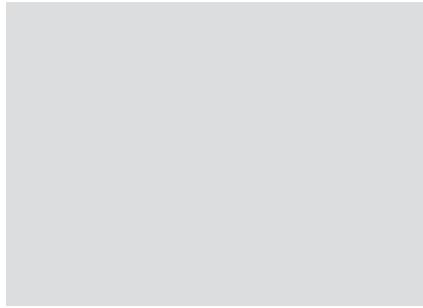
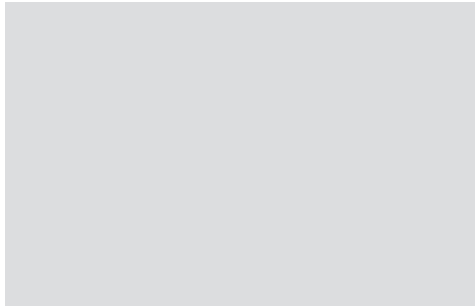
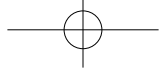
01 상부구조 작업이 한창 진행 중인 인천대교 해상구간과 인천항 모습 02 단부교각 타이다운 케이블 가설 03 사장교 최초 케이블 가설(2008년 4월 24일) 04 주탑에서 바라본 사장교 동측 구간 05 케이블 고정을 위한 베어링 플레이트와 심플라이트 모습 06 케이블 가설을 위한 전개 작업 07 800톤 인장력을 이용한 거더측 케이블 작업 08 풍우진동을 방지하기 위해 처리된 케이블 표면 09 케이블의 진동을 막기 위한 마찰댐퍼



02

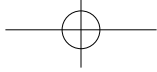


03



01 Scenery of sea-crossing section and Incheon Port
02 Installation of tie-down cable at end pier 03 The first installation of stay cable[24th Apr., 2008] 04 East part of cable-stayed bridge viewing from pylon
05 Bearing plate and shim plate for fixing stay cable
06 Unreeling works for installation of stay cable 07 Fixing girder side stay cable using 800tonf center hole jack

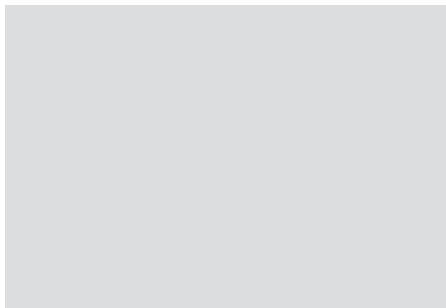
08 Cable surface treatment(dimple) for preventing rain-wind vibration 09 Friction damper for vibration mitigation of stay cable



01 키세그먼트 가설을 위한 인양 작업 02 인천대교 사장교와 일몰 03 중앙경간 세그먼트 작업이 한창인 인천대교 사장교 04 폐합을 앞둔 사장교와 소블럭 가설용 데릭크레인 05 키세그먼트 가설로 동서가 연결되는 역사적 순간 (2008년 12월 16일) 06 키세그먼트의 마지막 용접 작업을 위한 세팅 07 국내 최대 크기의 신축이음장치(신축량 2m) 08 사장교 경관조명 점검 09 포장작업중인 인천대교 사장교(구스아스팔트포장, 구스(35mm)+SMA(40mm))



01



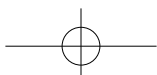
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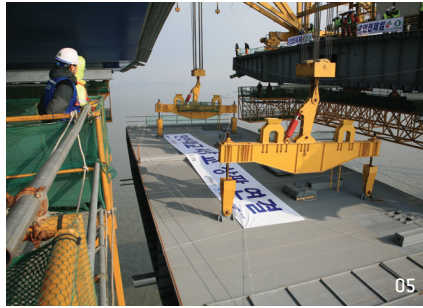
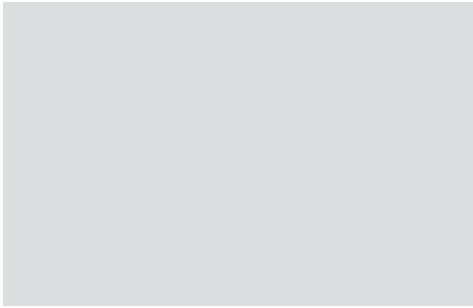
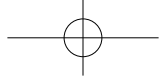


03



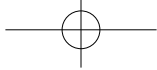
04





01 Lifting key segment 02 Sunset over cable-stayed bridge 03 Installation of small block in center span of cable-stayed bridge 04 Derrick cranes and opposite side girder before closing 05 Historic scene connecting east and west part of bridge by key segment(16th Dec., 2008) 06 Welding of key segment 07 The largest expansion joint in Korea(2m capacity)

08 Inspection of aesthetic lighting 09 Guss asphalt pavement(Guss(35mm)+SMA(40mm))

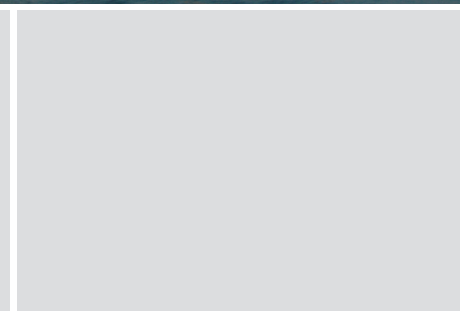
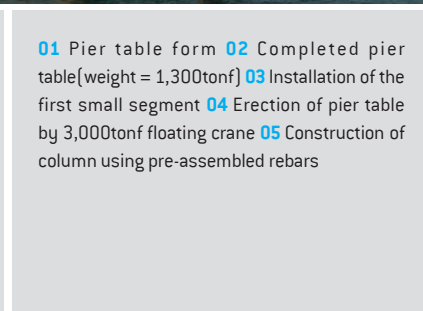
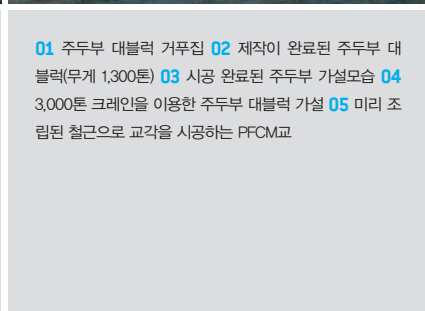
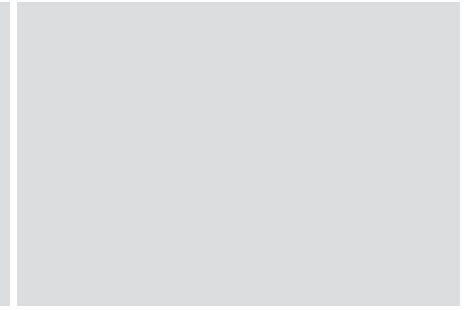
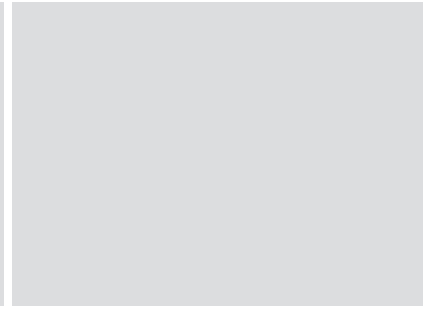
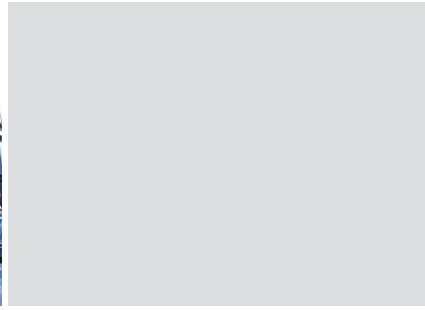
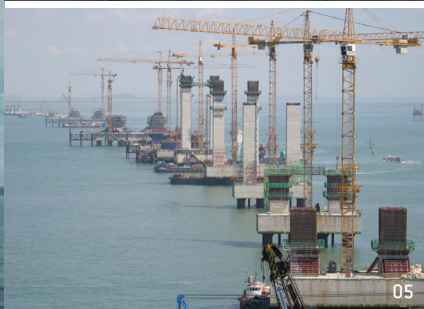
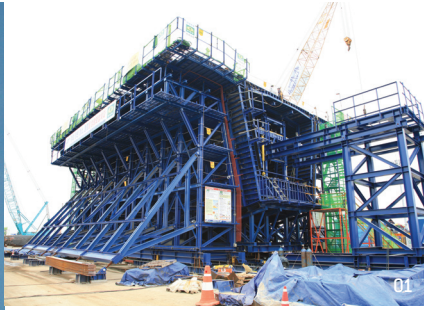
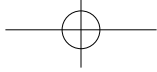


Precast Free Cantilever Method Bridge

... PFCM교

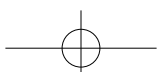
인천대교는 최초, 최대라는 수식어에 걸맞게 모든 것을 다시 생각하여야 했다.

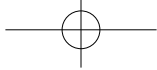
Everything was reconsidered to satisfy the best one such as the first, the largest.



01 주두부 대블럭 거푸집 02 제작이 완료된 주두부 대블럭(무게 1,300톤) 03 시공 완료된 주두부 가설모습 04 3,000톤 크레인을 이용한 주두부 대블럭 가설 05 미리 조립된 철근으로 교각을 시공하는 PFCM교

01 Pier table form 02 Completed pier table[weight = 1,300tonf] 03 Installation of the first small segment 04 Erection of pier table by 3,000tonf floating crane 05 Construction of column using pre-assembled rebars



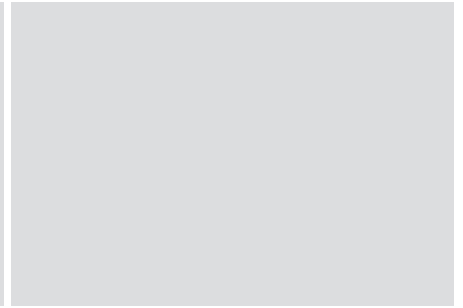


01 데릭크레인에 의한 캔틸레버 가설 모습 02 매치캐스팅으로 제작되는 소블럭 세그먼트 03 소블럭 세그먼트 인양 04 소블럭 운반모습 05 엔드 세그먼트 가설 직전의 PFCM교 06 3,000톤 해상크레인에 의한 엔드 세그먼트 가설 전경 07 키세그먼트 인양 장비 및 시공 모습 08 제작된 소블럭 세그먼트 09 PFCM교의 배수관



05

01 Cantilever method by derrick crane 02 Small segment made by match casting method 03 Lifting the small segment block 04 Transportation of small segments by barge 05 PFCM bridge just before installation of end segment 06 Installation of end segment using 3,000tonf floating crane 07 Key segment installation using specifically designed lifting device 08 Small segments in casting yard 09 Drainage pipes of PFCM bridge



07



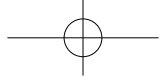
06



08



09



PART 2 | PART 3

PART 1

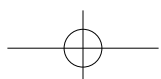


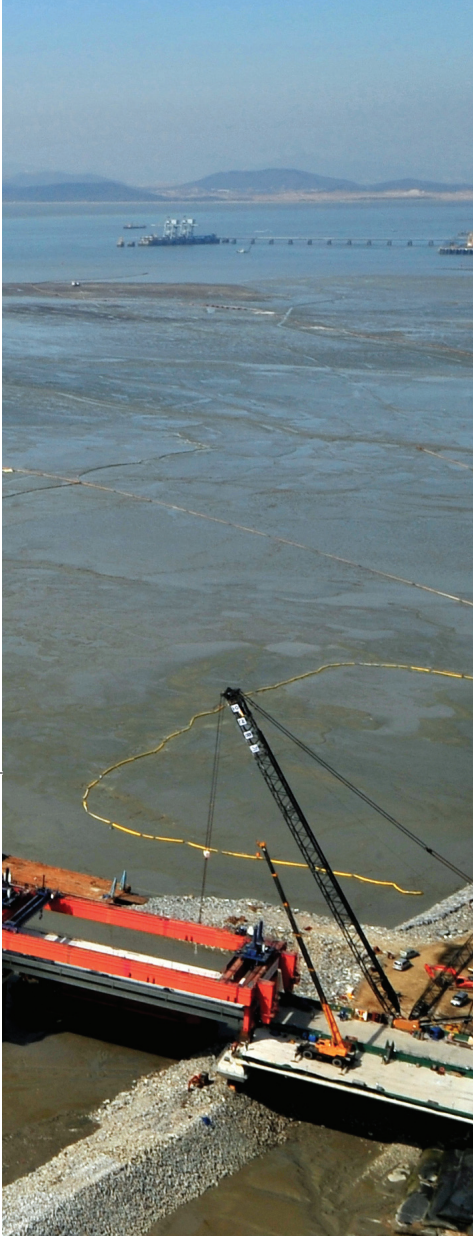
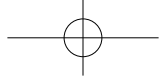
Full span Launching Method Bridge ... FSLM교

인천대교 FSLM교는 거대한 구조물과 인간과의 끝없는 시간 싸움이었다.

FSLM bridge, it was a continuous race against time between huge structure and human.

1 6 HISTORY OF INCHEON BRIDGE

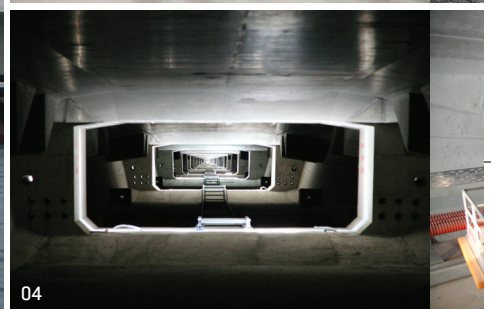
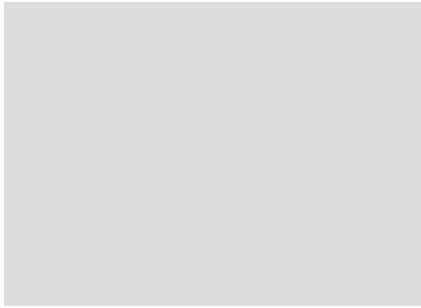
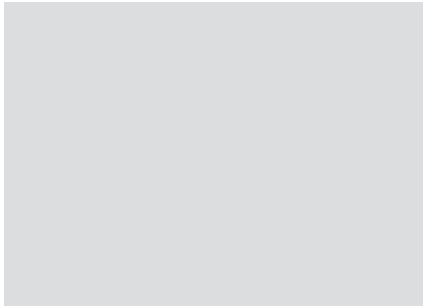
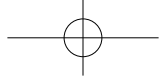




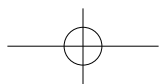
01 박스거더 바닥판 횡방향 프리텐션 장치 02 FSLM교 제작공장에서 철근 조립하는 모습 03 박스거더 종방향 프리텐션 장치 04 박스거더의 미리 조립된 다이아프램부 철근망 05 현장 반출대기 중인 완성된 박스거더(길이 50m, 무게 1,360톤)

01 Lateral pretension devices of girder slab
02 Rebar assembly in girder casting factory of FSLM bridge
03 Longitudinal pretension devices of box girder
04 Prefabricated diaphragm rebar cage of box girder
05 Finished box girder just before moving(length = 50m, weight = 1,360tonf)





01 해상 현장에서 운반되고 있는 박스 거더 02 교각과 코
핑 시공중인 FSLM교 03 캐리어에 실려 가설을 위해 갠트
리 크레인으로 진입하는 거더 모습(2007년 1월 5일 최초
가설) 04 FSLM교 박스거더 내부 모습 05 FSLM교 마지
막 거더를 거처하는 장면(2009년 2월 27일) 06 교면 포장
작업 모습(두께 50mm, LMC포장) 07 FSLM교 박스 내부
전동식 점검차 08 FSLM교 거더 상량식(2006년 6월 16일)
09 캐리어에 박스거더를 싣기 위해 접근하는 해상 크레인

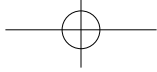




01 Box girder moved to sea crossing section
02 Fabrication of column and coping 03 Carrier with box girder moving into the gantry crane(first erection was 5th Jan., 2007) 04 Inside of FSLM bridge 05 Last girder installation of FSLM bridge(27th Feb., 2009) 06 LMC pavement(depth = 50mm) 07 Motor car for inside maintenance and inspection of FSLM bridge

08 Girder lifting ceremony of FSLM bridge(16th Jun, 2006) 09 Floating crane loads the box girder on the carrier

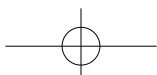


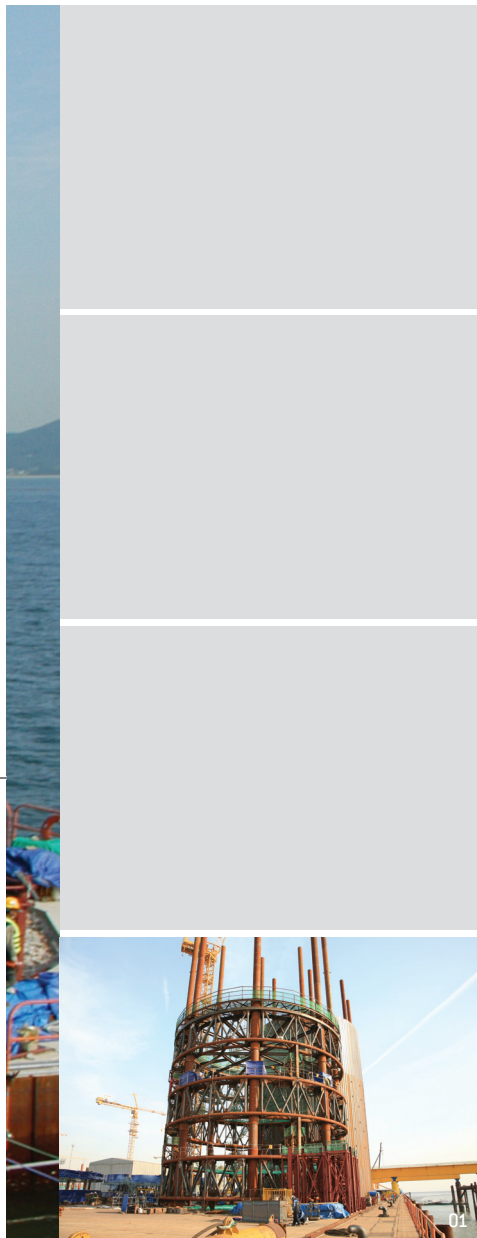


Ship Impact Protection System ... 충돌방지공

살아움직이는 거친 구조물을 길들이기는 쉽지 않았다.

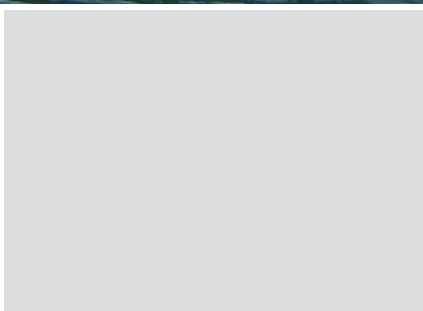
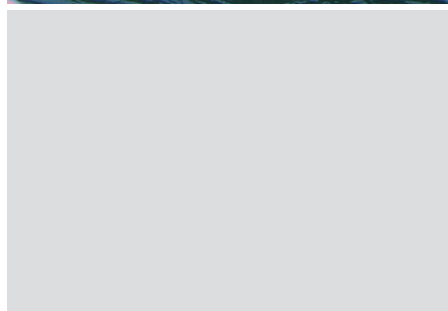
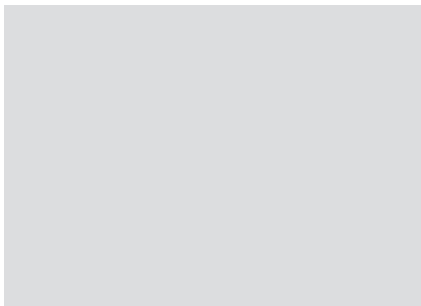
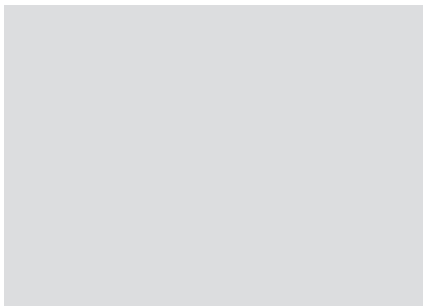
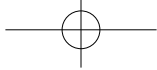
It was not easy to domesticate the tough structures which come to life.



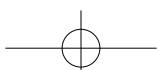
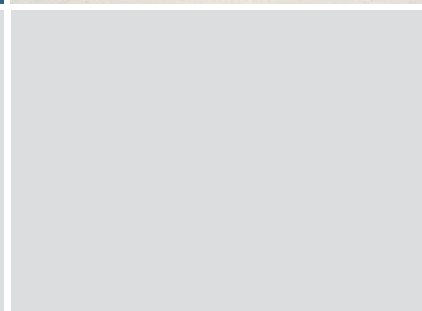


01 슈트파일 조립을 위한 내부 템플레이트 02 총방공 본체 슈트파일 조립작업 03 총방공 본체 해상현장 안착 04 슈트파일 본체의 해상 현장 이동 모습 05 슈트파일조립을 위한 외부 템플레이트 06 바이브로 해머를 이용한 슈트파일 향타

01 Inner template for assembling of sheet piles 02 Assembly of sheet pile for SIP[Ship Impact Protection] structure 03 Setting the sheet pile structure on sea bed 04 Moving the sheet pile structure by floating crane 05 Outer template for assembling of sheet piles 06 Sheet pile driving using vibro hammer



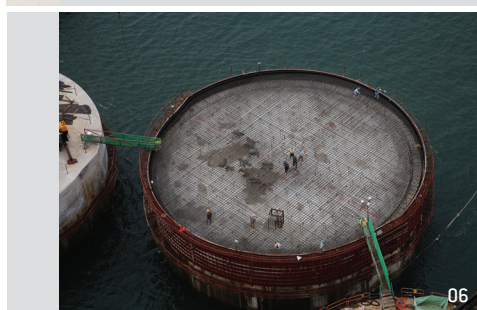
01 벽체콘크리트 타설을 위한 철근조립 작업 02 총방공 내부 채석투하작업 및 완료된 총방공 03 벽체 프리캐스트 판넬 시공 완료 04 해상 배치플랜트를 이용한 캡 콘크리트 타설 05 슈트파일 부식방지용 아노드(목표수명 75년) 06 탑 슬래브 콘크리트 타설을 위한 철근 조립 07 해상에 서 한창 진행 중인 총방공 작업 08 작업 순서대로 진행되고 있는 사장교 주탑 총방공 모습 09 사장교 중간과 단부 교각 주변의 완성된 총방공 10 소형 어선의 충격 완화를 위해 설치된 팬더

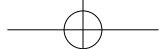




01 Rebar assembling works for casting the wall concrete 02 Pouring the crushed rocks into SIP structure 03 Finished precast wall panels 04 Casting the cap concrete by floating batch plant 05 Anode for corrosion protection of sheet piles (design life = 75yrs) 06 Rebar assembly for cap concrete 07 SIP structures works on sea 08 We can see the erection procedures of SIP structures around the pylon

09 Finished SIP structures around the supplementary and end piers 10 Fender for impact protection of small ships



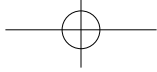


PART 1 | PART 2 | PART 3

Section 3.

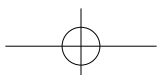
CONNECTING ROADS

... 연결도로



- **Project** : Incheon Bridge Government Financed Project
- **Project Cost** : 860.5 Billion
- **Formation** : 9.04km
- **Construction Work Period** : Dec., 2005 to Oct., 2009 (46months)
- **Owner** : Korea Expressway Corporation (KEC)
- **Contractor** : Kolon, Daelim, Hyundai, SK, Doosan
- **Contract Type** : Design-Build Project
- **Construction Supervisor(CS)** : Korea Expressway Corporation
- **Main Project** : PCT Girder, Arch bridge, PSC Box girder Bridge using Strut, V-Shape Pylon Cable Stayed Bridge, Extradosed Bridge

- 공사구간 : 인천대교 (국고구간)
- 사업비 : 8,605억원
- 사업연장 : 9.04km(본선기준)
- 공사기간 : 2005. 12. ~ 2009. 10. (46개월)
- 발주처 : 한국도로공사
- 시공자(대표사) : 코오롱건설, 대림산업, 현대건설, SK건설, 두산건설
- 발주방식 : 설계시공일괄이행방식(턴키방식)
- 추진방식 : 발주처 직접감독
- 주요교량 : PCT교, 아치교, 스트럿부착박스거더교, 강사장교, 엑스트라도즈교



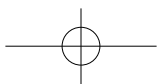


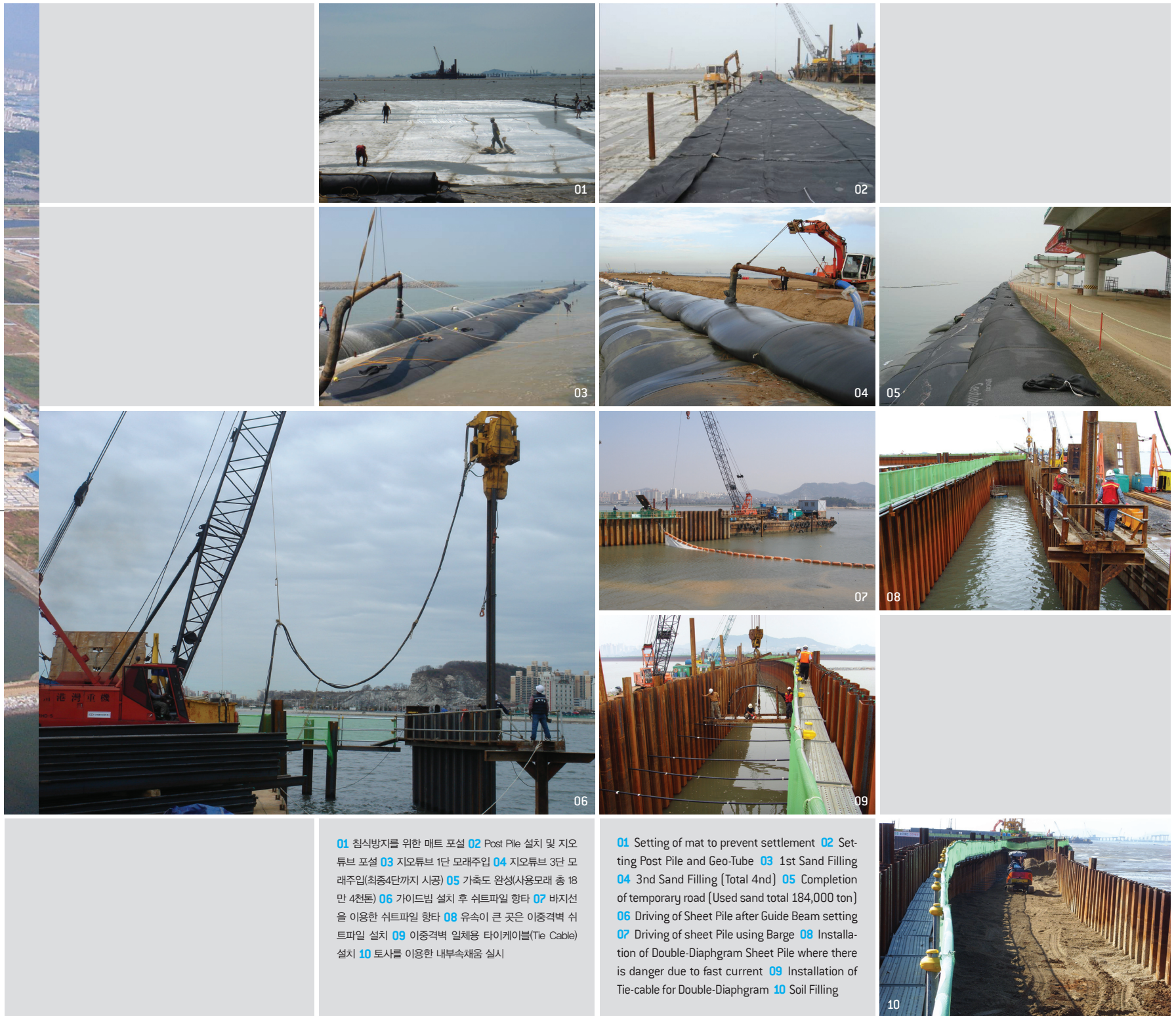
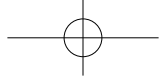
Coffer Dam ... 가물막이

가물막이는 물의 유입을 방지하는 시설로 조수간만의 차가 큰 서해안지역의 특성을 감안하여 강재쉬트파일과 지오투브를 이용하여 가물막이를 설치하였다.

The Function of Coffer Dam is to prevent water flow.

Construction Work of Coffer Dam were taken sea level change into consideration using steel Sheet-Pile and Geo-Tube.





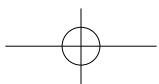
01 침식방지를 위한 매트 포설 02 Post Pile 설치 및 지오투브 포설 03 지오투브 1단 모래주입 04 지오투브 3단 모래주입(최종4단까지 시공) 05 가축도 완성(사용모래 총 18만 4천톤) 06 가이드빔 설치 후 쉬트파일 항타 07 바지선을 이용한 쉬트파일 항타 08 유속이 큰 곳은 이중격벽 쉬트파일 설치 09 이중격벽 일체용 타이케이블(Tie Cable) 설치 10 토사를 이용한 내부속채움 실시

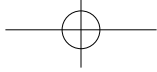
01 Setting of mat to prevent settlement 02 Setting Post Pile and Geo-Tube 03 1st Sand Filling 04 3rd Sand Filling (Total 4nd) 05 Completion of temporary road (Used sand total 184,000 ton) 06 Driving of Sheet Pile after Guide Beam setting 07 Driving of sheet Pile using Barge 08 Installation of Double-Diaphragm Sheet Pile where there is danger due to fast current 09 Installation of Tie-cable for Double-Diaphragm 10 Soil Filling



Pile Shift Drilled Method ... 현장타설말뚝

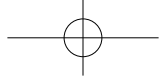
말뚝에서 사용하는 철근망을 제작장에서 제작하여 사용하였으며, 가물막이에 의해 육상화된 곳에서 현장타설말뚝을 시공하였다.
The Reinforcement cage were fabricated in Factory. The pile was constructed in Dry condition by Cofferdam.





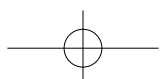
01 케이싱(희생강관)타입 02 햄머그라브를 이용한 케이싱 내부 굴착 03 RCD(reverse Circulation Drilling Method) 이용 암반굴착 04 철근망 근입 05 트래미관을 이용한 콘크리트 타설 06 브레이커를 이용한 말뚝 두부정리

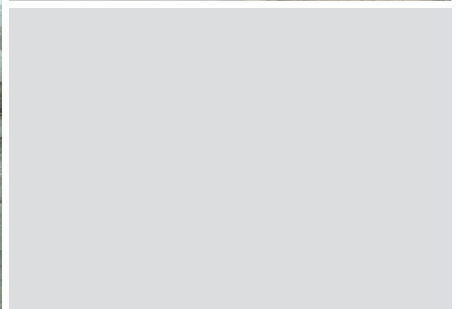
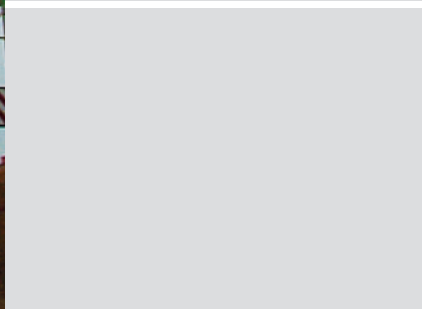
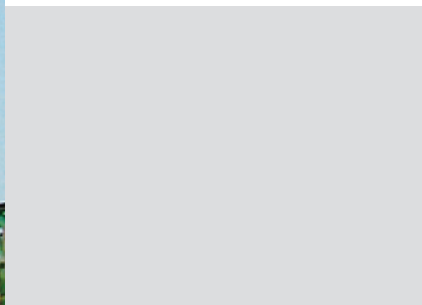
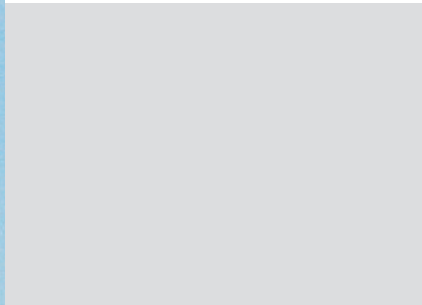
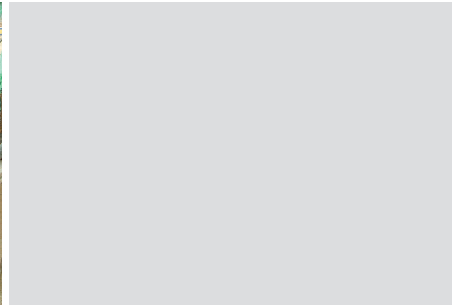
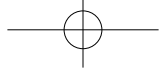
01 Driving of Casing[Steel Tube] 02 Excavation of Inner casing using Hammer Grave 03 Excavation of Rock mass using RCD 04 Placement of reinforcement cage 05 Casting of Concrete using Tremmi 06 Chipping of the pile head using Braker



Prestressed Composite Truss Girder ... PCT교

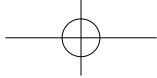
강재트러스를 이용하여 거더의 자중을 경감시켜 장지간의 교량을 건설할 수 있는 형식의 교량으로 초록색의 트러스가 교량의 미관을 개선시킬 수 있다.(교량연장 45m, 거더높이 2.3m)
PCT Girder Bridge could reduce self-load by Truss system. The Green color could make improved appearance.(length 45m, height 2.3m)





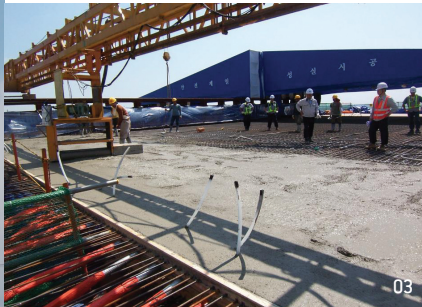
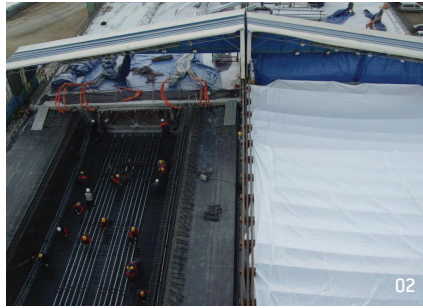
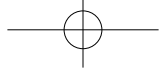
01 PCT교 강재부 공장제작 02 PCT 강재부와 하현재(콘크리트부) 조립 03 하현재(콘크리트부) 철근조립 04 하현재 콘크리트 타설 05 강선을 이용하여 압축력 도입 06 슬래브 철근조립 07 슬래브 콘크리트 타설 08 PCT교 완성

01 Steel Part of PCT girder fabrication in Factory 02 Steel Part and Lower Chord 03 Assembly of Reinforcement 04 Casting of lower chord Concrete 05 Stressing of Strand for compression 06 Assembly of Reinforcement 07 Casting of Concrete 08 Completion of PCT Girder



Incremental Launching Method ... ILM공법

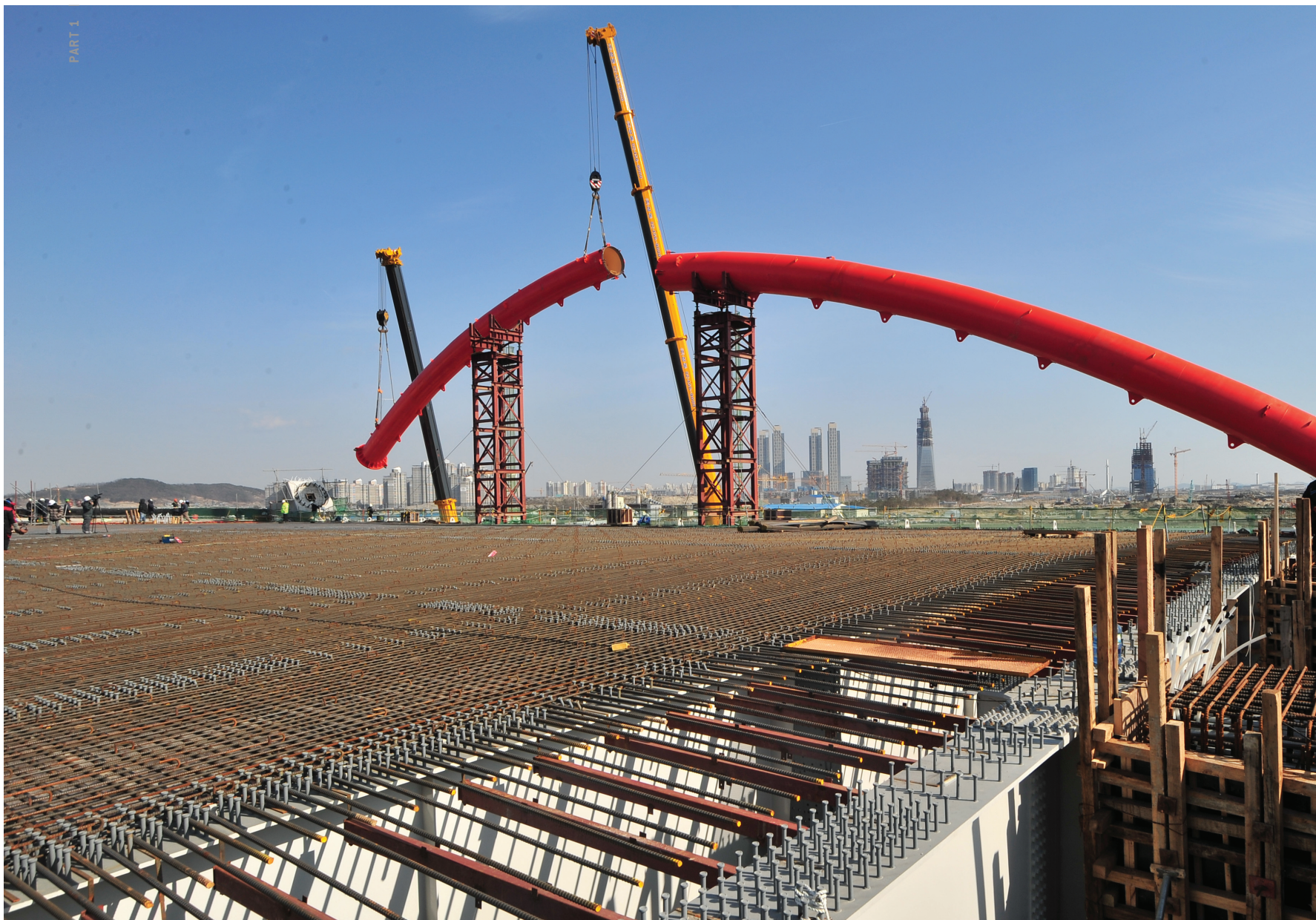
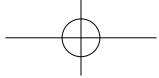
교량의 상부구조물을 제작장에서 제작하여 압출잭으로 제작된 구조물을 조금씩 밀어내면서 교량을 가설하는 공법으로 중로 아치교는 교각사이에 제작장을 설치하여 시공하였다.
ILM(Incremental Launching method) use Launching Jack to set girder gradually. Incheon Bridge set Segment Casting Yard between pier and pier.



01 교각 중간에 제작장과 가교각을 설치하여 ILM시공 02 제작장을 병렬로 설치하여 사용면적 최소화 03 콘크리트 타설 및 면정리 04 조기강도 발현을 위한 증기양생 05 압축력도입을 위한 종방향 강선긴장 06 인상잭(800ton*2개), 압출잭(200ton*4개)를 이용하여 최대 25cm압출 07 교량압출 전경

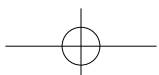


01 Setting of Segment Casting Yard and Temporary Pier 02 Placement of Segment Casting Yard in parallel could take minimum area 03 Concrete casting and Chipping 04 Atmospheric Steam Curing for early Strength 05 Tensioning of Strand for compression 06 The Girder was launched max.25cm at a time using Lifting Jack(800ton*2) and Launching Jack(200ton*4) 07 View of Launching Girder



Arch Bridge ... 아치교

하이브리드(Hybrid)개념을 도입하여 중앙부는 강재로, 측경간은 콘크리트로 시공한 복합구조로 경제성을 확보하였고, 교량미관이 뛰어난 형식의 교량이다.(교량연장 213m)
Hybrid concept could have economic and improved appearance to arch bridge.(length 213m)





01 아치교 하중 지지를 위한 확대기초 시공 02 수화열 억제
제를 위해 파이프 쿨링 시스템 03 아치교의 사교각 동바리
04 중공의 사교각 시공을 위해 EPS 블록 설치 05 사교각
콘크리트 타설 06 가설벤트를 이용하여 엣지 거더 설치

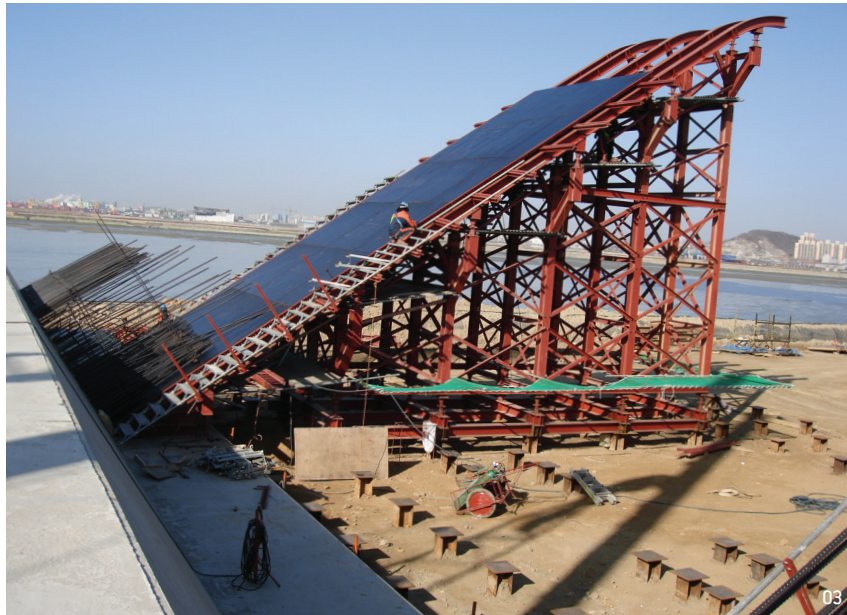
01 Installation of Expansive Foundation to support Arch load 02 Pipe Cooling System to control heat of Hydration 03 Temporary Form for Skew Pier 04 Placement of EPS Block for Skew Pier 05 Casting of Concrete 06 Installation of Edge girder using temporary Bent



01



02



03



04



05



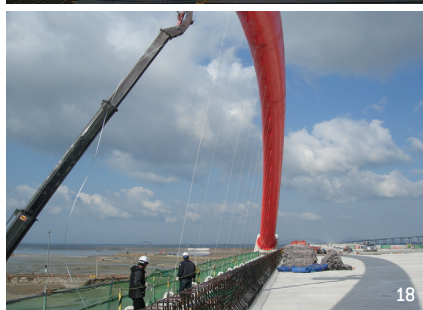
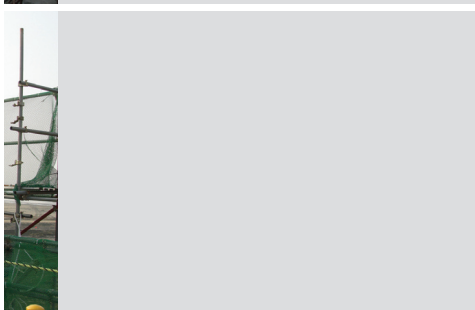
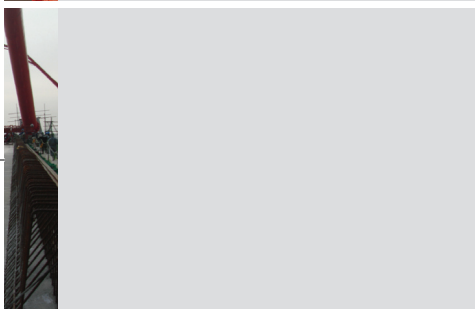
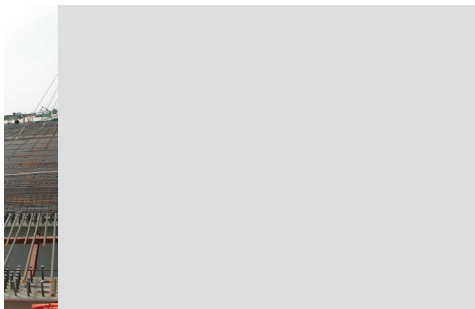
06





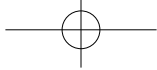
07 Installation of Beam for Arch Section 08 Assembly of Reinforcement after Installing of Bottom Form 09 Casting of Concrete 10 Casting of Concrete 11 Arch tube Fabrication in Factory 12 Arch tube Bending by high frequency 13 Installation of Arch tube 14, 15 Lifting of Arch tube 16 Installation of Arch tube at top 17 Connection of the arch tube to the Skew Pier 18 Cable length check

19 Cable Installing and Stressing 20 Modification of Final Tension 21 Completion of Arch(Removing of Temporary Bent)



07 아치 강교부 가로보 설치 08 바닥거푸집 설치 후 철근 조립 09 슬래브 콘크리트 타설 10 콘크리트 교각과 아치부 결합을 위한 앵커부 시공 11 아치교 아치튜브 공장 제작 12 고주파를 이용한 아치튜브 밴딩 13 아치튜브 현장설치 14, 15 정점부 아치튜브 인상 16 아치튜브 정점부 설치 17 아치튜브와 사교각 연결(강봉긴장) 18 설치될 케이블 길이 측정 19 케이블 설치 및 긴장 20 케이블 최종 장력 조정 21 아치교 시공 완료(가설벤트 제거)



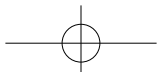


PSC Box Girder Bridge using Strut

... 스트럿부착 PSC 박스거더교

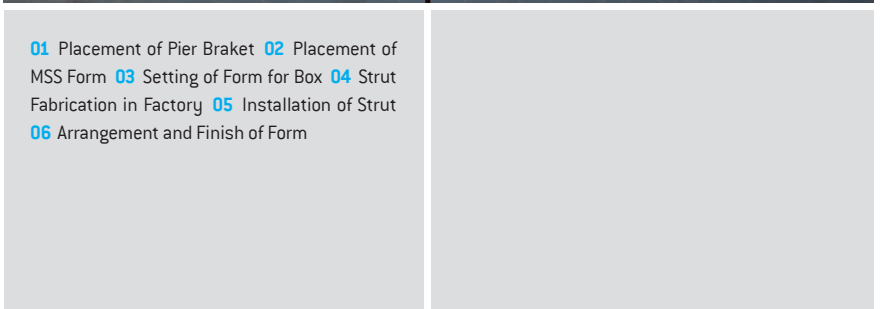
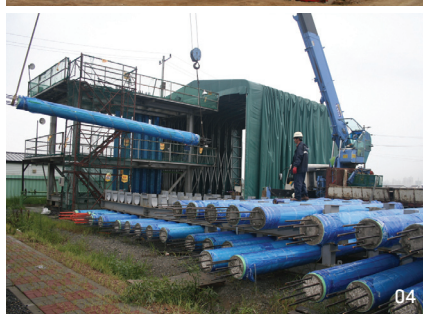
스트럿을 이용하여 박스거더의 자중을 줄이고, 미관을 개선하였다. 연약지반 높은곳에 시공되는 박스거더 시공을 위해 MSS(Movable Scaffolding System)를 이용하여 시공하였다.

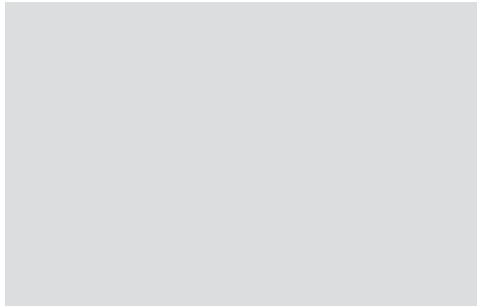
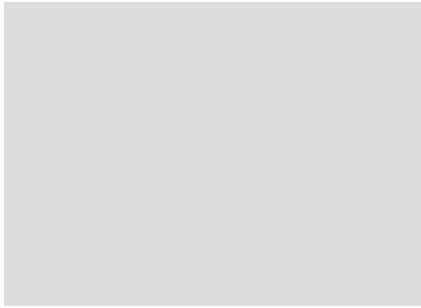
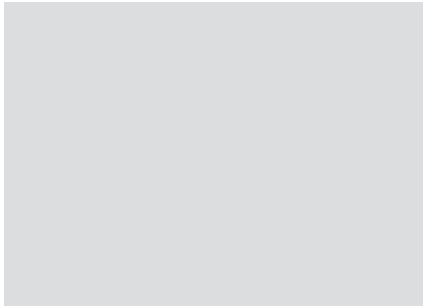
PSC Box Girder Bridge could reduce self-load and improve appearance using Strut. MSS(Movable Scaffolding System) is used for installation of Box Girder where there is a high place.



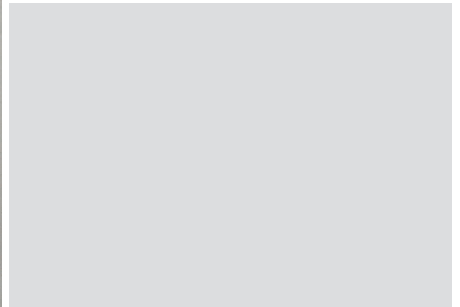
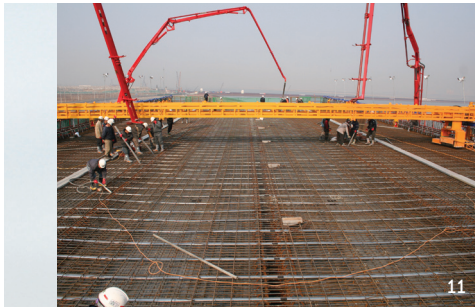
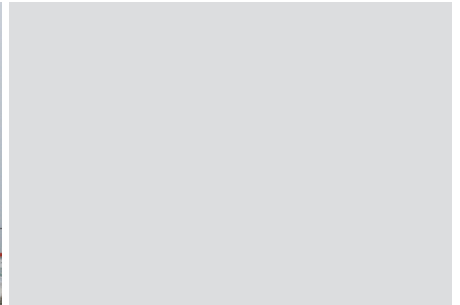
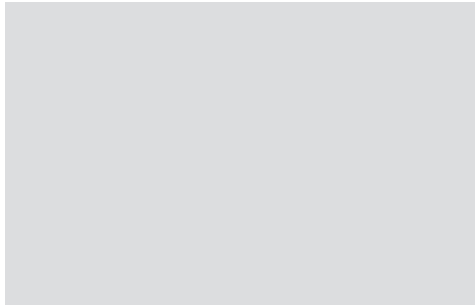
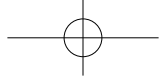


01 피어브라켓(Pier Bracket) 설치 02 MSS폼 설치 03 박스시공을 위한 거푸집 설치 04 스트럿 공장 제작 05 스트럿 설치 06 거푸집 정렬 및 마감

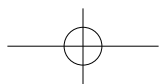
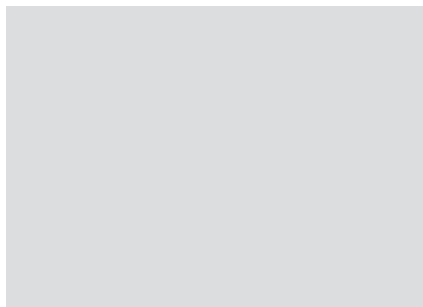
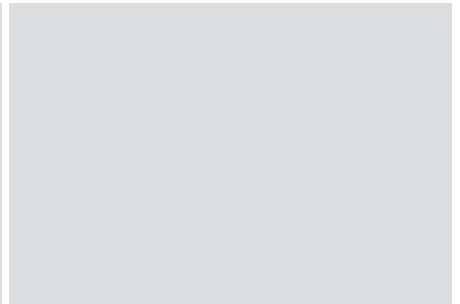
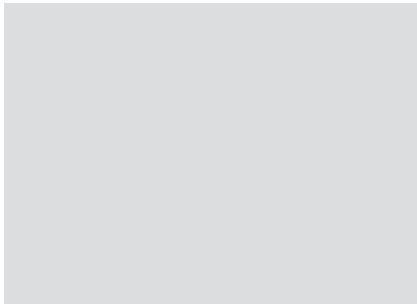


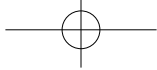


07 철근조립 및 쉬스관 배관 08 내부거푸집 설치 09 상
부철근 조립 및 쉬스관 배관 10 콘크리트 타설(전경) 11
콘크리트 타설 12 데크피니셔를 이용한 콘크리트 면정리
13 작업대를 이용한 피막양생제 도입 14 강선 삽입 15
프리스트레스 도입을 위한 텐던긴장 16 PCS 박스거더와
거푸집 분리 17 MSS 런칭 완료



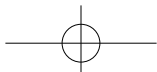
07 Assembly of reinforcement and placement of sheath 08 Setting of inner form 09 Assembly of reinforcement and placement of sheath 10 View of Concrete casting 11 Casting of Concrete 12 Surface Finishing Using Deck-Finisher 13 Material for Membrane Curing 14 Insertion of Tendons 15 Stressing of Tendons for Pre-Stress 16 Separation Form From PSC Box Girder 17 Completion of MSS Launching

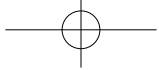




V-Shape Pylon Cable Stayed Bridge ... 강사장교

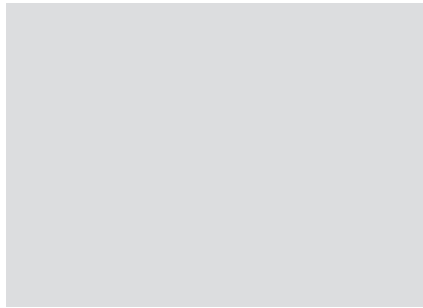
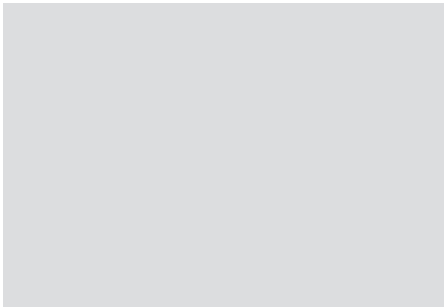
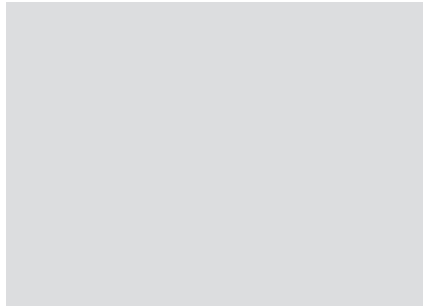
강재주탑과 바닥판을 케이블로 연결하여 시공하는 형식으로 타원형의 나비모양 주탑을 가지는 독창적인 이미지와 케이블 배치로 인천대교의 관문 역할과 호수공원과의 조화를 이루게 하였다.
V-shape Pylon is the figuration of Butterfly. The V-Shape Pylon Cable Stayed Bridge were installed as The First Entrance of Incheon Bridge and Harmony with Lake Park.



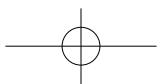
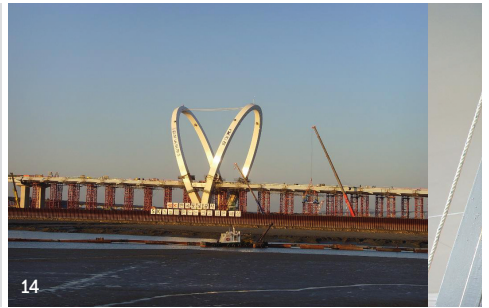


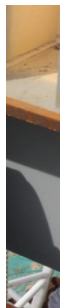
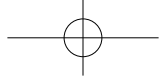
01 사장교 주탑 탐기부 설치 02 강재 주탑 1단 설치 03 강재 주탑 설치 04 강상판 현장조립 05 가벤트 설치 후 강상판 거치 06 가벤트 설치 후 강상판 거치 중 07 벤트 설치 및 강상판 거치(전경) 08 강상판 위 주탑(상부)조립

01 Installing Base of Pylon 02 Installing Base of Pylon 03 Installation of Pylon 04 Assembly of Steel Plate Floor 05 Installation of Steel Plate Floor after Temporary Bent Setting 06 Installation of Steel Plate Floor 07 Installation of Bent and Steel Plate Floor(The Scene) 08 Assembly of Pylon Part on Steel Plate Floor



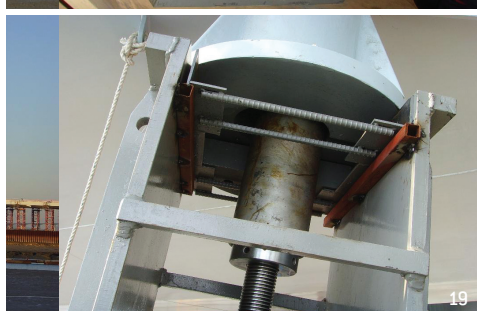
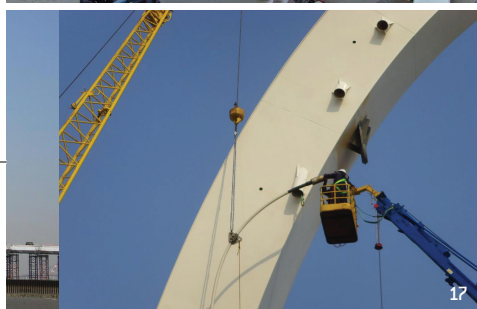
09 가설벤트를 이용한 주탑조립 10 주탑 Roll Up을 위한
한지 11 탑 조립 완료 12 크레인과 원치를 이용한 Roll-
Up(주탑1번) 13 Roll-up(주탑 2번) 및 임시케이블 설치 14
수평케이블 설치 및 임시케이블 제거 15 경사 케이블 설
치를 위한 케이블 포설 16 크레인을 이용한 경사 케이블
설치 17 경사케이블을 주탑에 인입 18 주탑내부 케이블
정착부 19 강상판 측에서 케이블 긴장 후 정착 20 강상판
측 정착구 21 케이블 설치 완료





09 Assembly of Pylon Using Temporary Bent
10 Hinge for Roll Up 11 Completion of Pylon
Foundation 12 Roll-Up(Pylon No.1) using
Crane and Winch 13 Setting Temporary Cable
and Roll-up(Pylon No.2) 14 Removing tempo-
rary cable and install horizontal cable 15 Set-
ting Cable for Sloping Cable 16 Installation of
Sloping Cable Using Crane 17 Connect Sloping
Cable to the Pylon

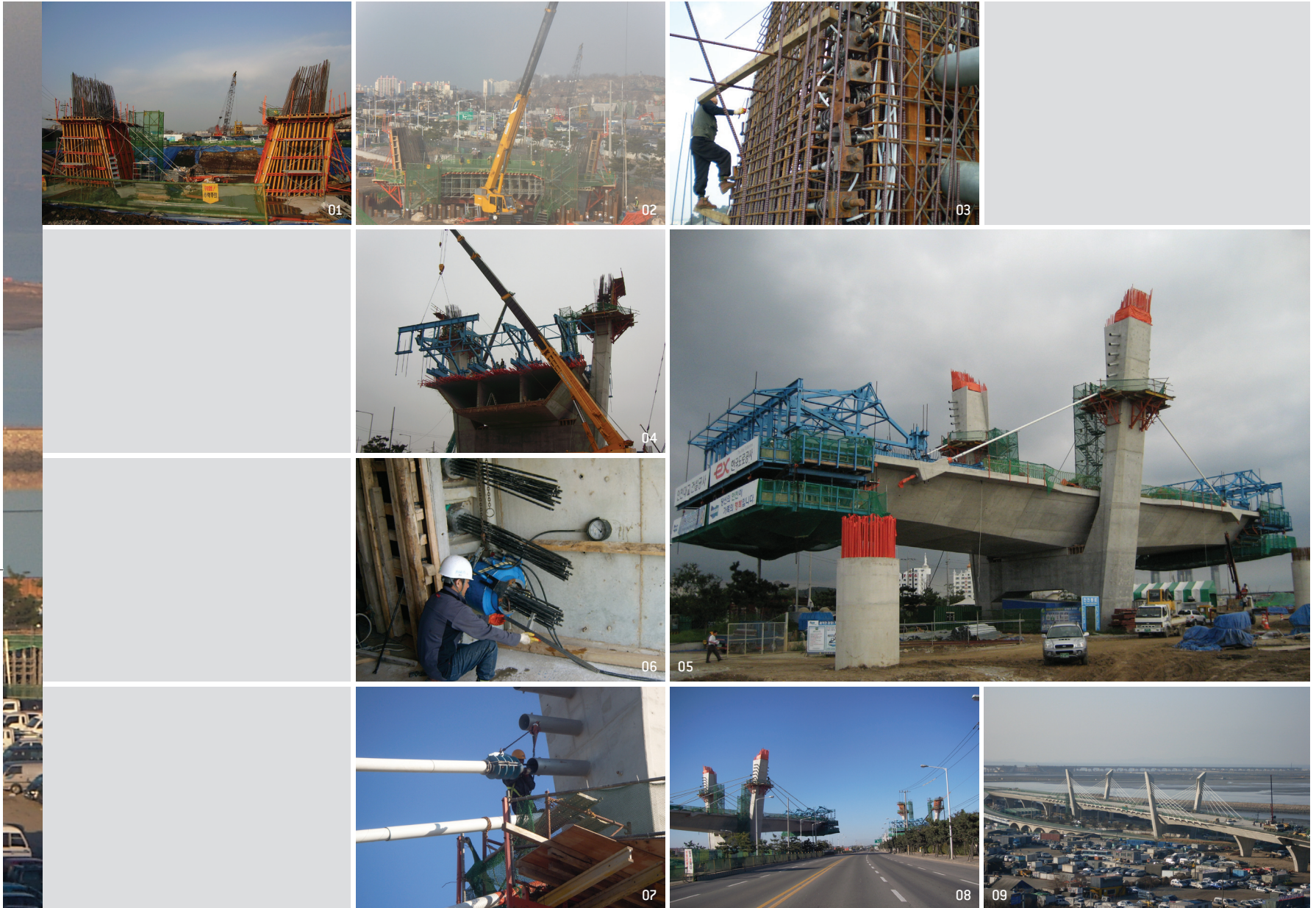
18 Cable Anchorage at Pylon inside 19 Anchor-
ing after Stressing at Steel Plate Floor 20 Cable
Anchorage at Steel Plate Floor 21 Completion
of Cable setting





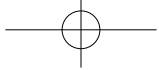
Extradosed Bridge ... 엑스트라도즈드교

콘크리트박스교로 낮은 주탑과 케이블을 이용하여 비교적 긴 지간의 교량을 건설할 수 있으며, 미관이 우수한 교량이다.
The Feature of Extradosed Bridge are Lower Pylon and outside Cable. Extradosed Bridge could take advantage of cable ability and improve appearance.



01 주탑 및 가로보 시공 02 철제 프레임을 이용한 주탑
부 정착구 설치 03 주두부 시공 04 FCM 시공을 위한 폼
트래블러 설치 05 폼트래블러를 이용한 PSC 박스 시공과
케이블시공 06 박스거더 내부 강선간장 07 주탑 케이블
설치 08 상부거더 및 케이블 시공 중 09 시공 완료

01 Installing Pylon and Cross Beam 02 Instal-
lation of Anchorage at Pylon using Steel Frame
03 Installation of Pier 04 Setting Form-Traveler
for FCM 05 Assembly of reinforcement and in-
stallation of sheath 06 Installation of PSC BOX
and Cable using Form-Traveler 07 Installation
of Cable Duct 08 Insertion of cable 09 Comple-
tion of Cable Setting

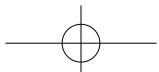


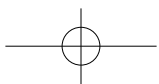
PART 1 | PART 2 | PART 3

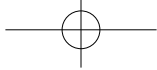
Section 4.

ANCILLARY WORKS

... 부대공사



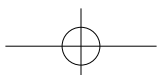


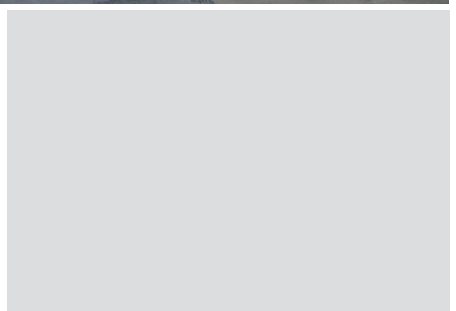
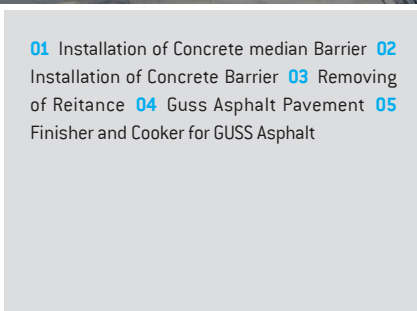
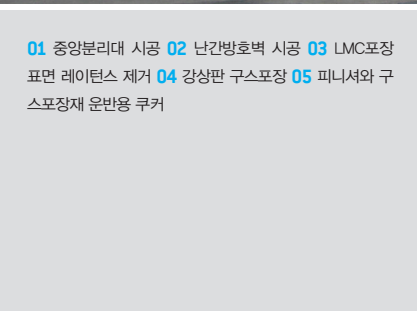
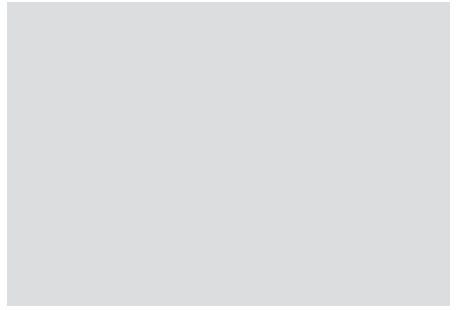
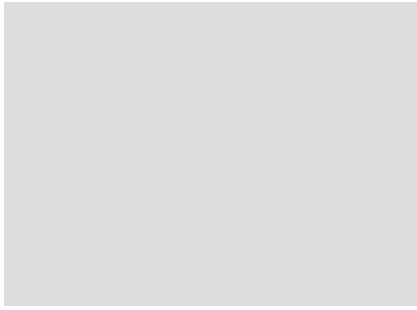
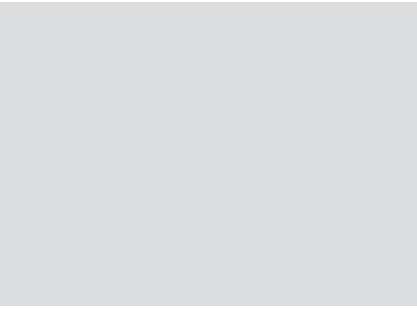


Ancillary Works ... 부대공사

포장, 교통안전시설, 재난방지시설 등 주행성, 안정성, 미관등을 고려하여 각종 부대공사를 실시하였다.

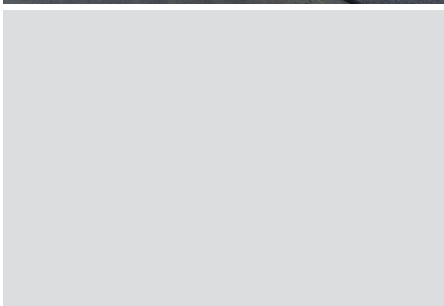
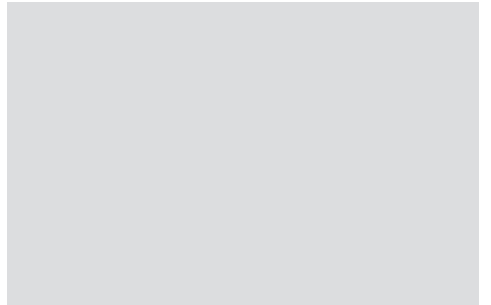
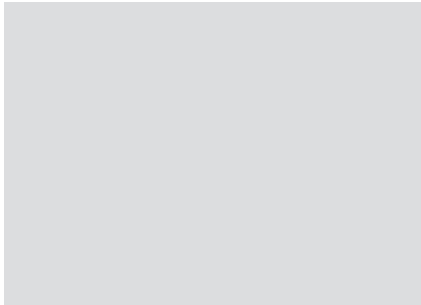
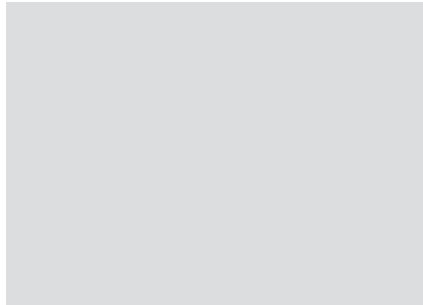
Installation of Pavement, Transportation Safety Facilities and Disaster management facilities were taken Evenness, Safety and Appearance into consideration.



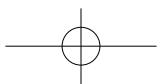
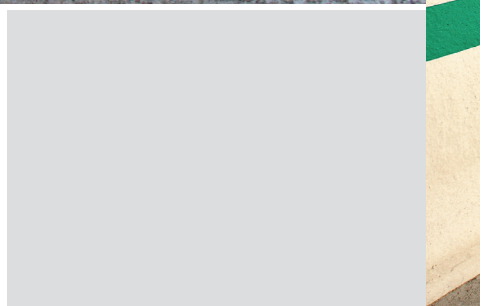


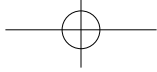
01 중앙분리대 시공 02 난간방호벽 시공 03 LMC포장
표면 레이턴스 제거 04 강상판 구스포장 05 파니셔와 구
스포장재 운반용 쿠커

01 Installation of Concrete median Barrier 02
Installation of Concrete Barrier 03 Removing
of Reitanse 04 Guss Asphalt Pavement 05
Finisher and Cooker for GUSS Asphalt



06 일반구간 LMC포장 07 적절한 두께로 콘크리트 분배
08 타이닝과 표면 양생제 살포 09 아스콘(PSMA) 교면포
장 10 신축이음장치 설치 11 가변정보(차로) 표지판 12 돌
출형 차선 설치 및 중분대 시선유도도장 13 비상 방송시설
14 안개표시등 15 도로기상정보 수집장치 16 노면결빙방
지 자동 염수분사장치





06 LMC Pavement 07 Concrete Placing 08 Tinting and Spray Curing agent 09 Asphalt(PSMA) Pavement 10 Installation of Expansion Joint



13

11 Variable message system (VMS) 12 Protruding type lane Paint and Sight line induction painting 13 Emergency Broadcasting Equipment 14 Fog Sign light 15 Road Weather Information System(RWIS) 16 Salt water Spraying equipment



11



14



15



12



16