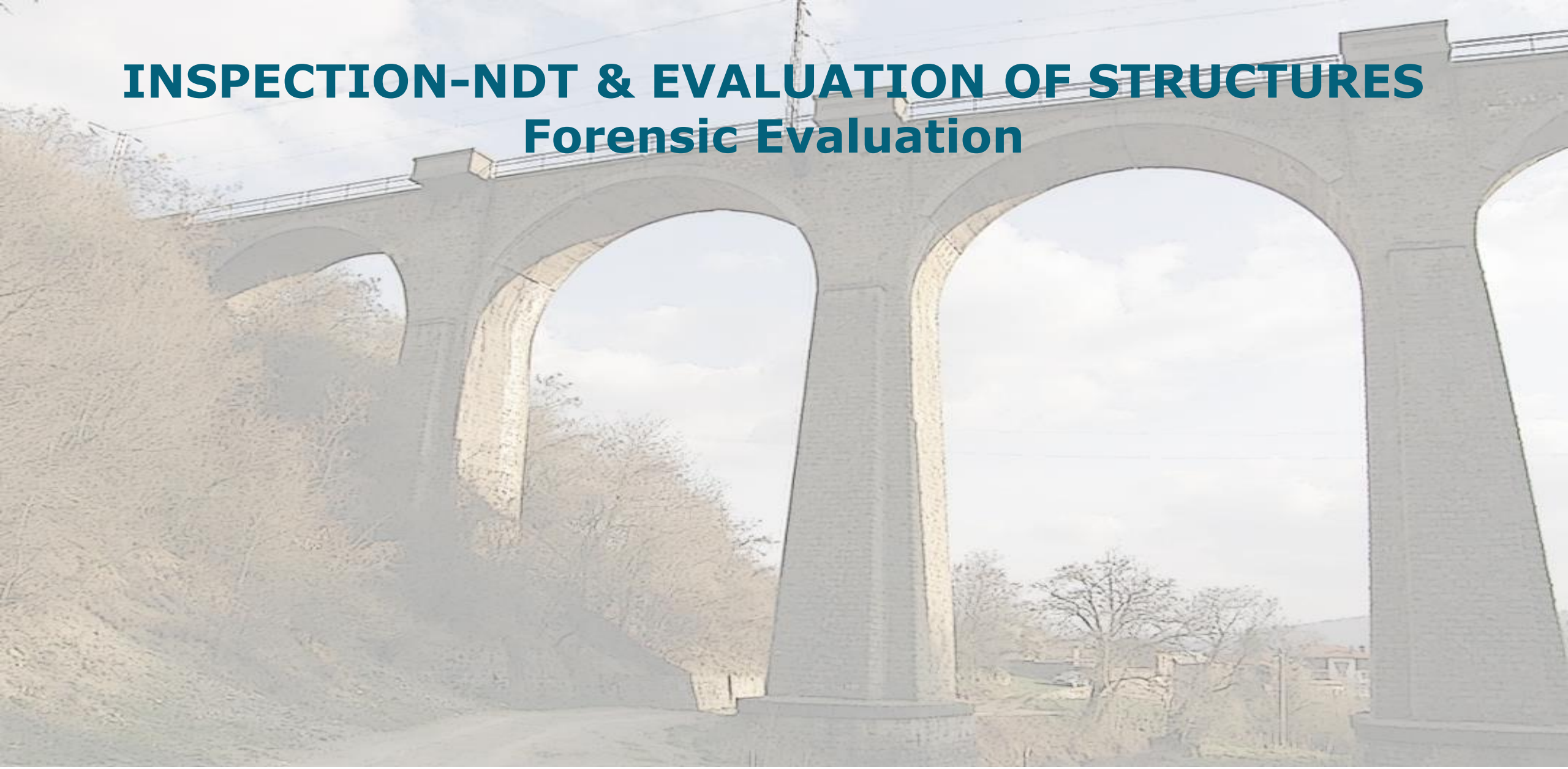
INSPECTION-NDT & EVALUATION OF STRUCTURES
Forensic Evaluation



HiSCS
engineering experts

COMPANY OVERVIEW & ACTIVITIES

HiSCS
engineering experts

- +30 years of experience in Construction Works
- Multi-disciplined team of Engineers & Technicians
- Installation/Supervision of Construction/Civil Engineering materials
- Specialized Engineering:

  -Inspection
  -NDT & Evaluation
  -Maintenance & Retrofitting,
  -Monitoring of structures

- Technical and Design support - Technical Department
- Full range of specialized equipment/machinery

HQ in GREECE

Regional Offices

KSA - KUWAIT – UAE - CYPRUS - MALAYSIA

LMK Post Tensioning system

All types of anchorages for Bridges & Buildings



LMK
Post Tensioning System

Application of advanced products for bridge and road construction industry, including the design, and supervision

Bearings, Expansion Joints, Road Safety Items, PT




Inspection and Maintenance of structures requiring sophisticated know-how, as well as special Engineering and monitoring

Jacking & Lifting of bridges & buildings

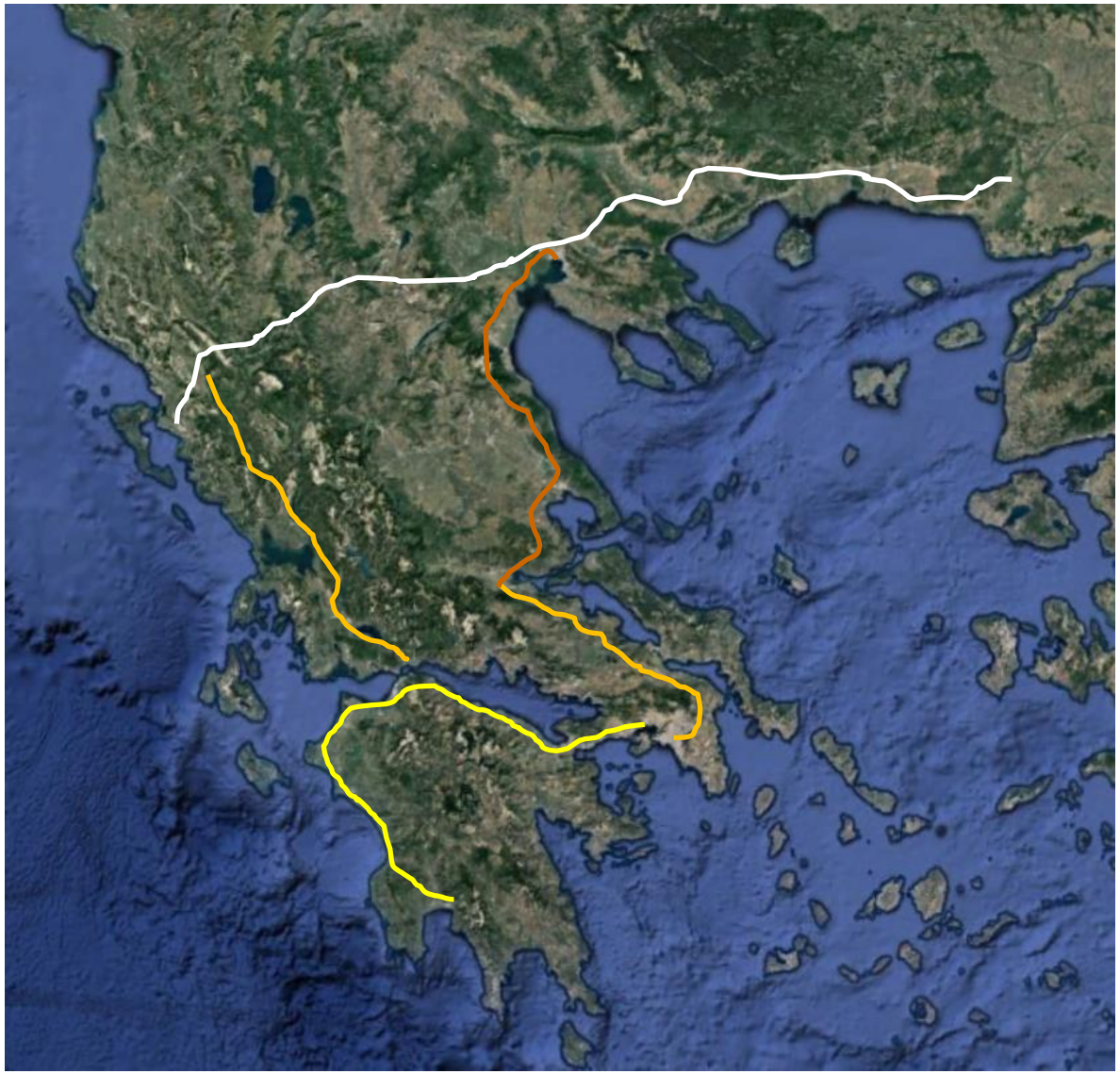




OUR PRESENCE IN THE FIELD

PROVISION OF SPECIALIZED SERVICES OF INSPECTION & EVALUATION

HiSCS engineering experts



EGNATIA Highway

670 Km, 63 Intersections, 177 Long Span Bridges,
350 Over-Underpasses, 73 Tunnels

AEGEAN Highway

230 Km, 20 Long Span Bridges, 6 Tunnels

PATHE – IONIA Highway

368 Km, 30 Intersections, 160 Overpasses,
24 Underpasses, 32 Long Span Bridges, 4 Tunnels

EKPPT Highway

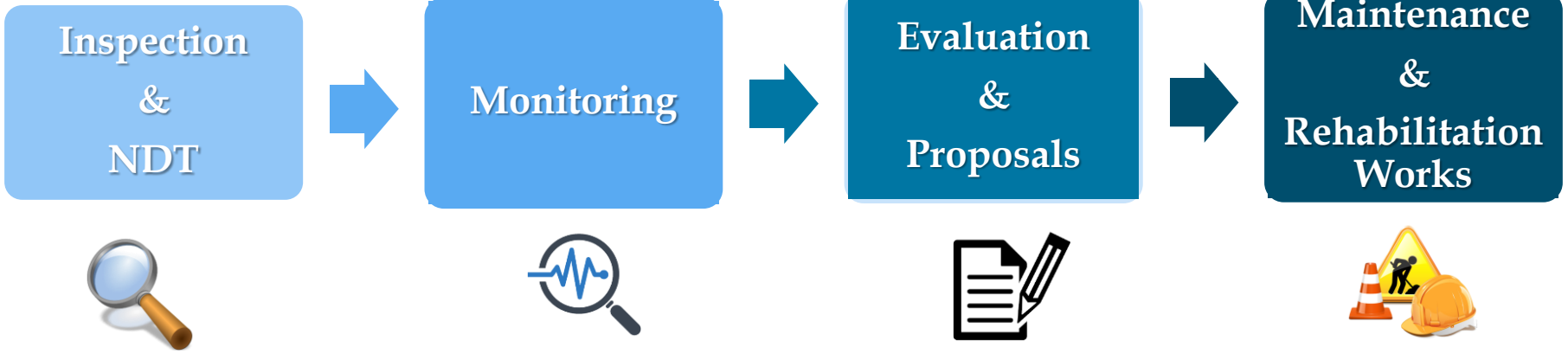
365 Km, 29 Intersections, 38 Overpasses,
204 Underpasses, 80 Long Span Bridges, 29 Tunnels

SPECIALIZED SERVICES OF INSPECTION & EVALUATION

HiSCS
engineering experts

ABOUT US

HiSCS has the necessary experience to undertake all kinds of:



Highly specialised services requiring a unique approach for each individual construction and type of repair.

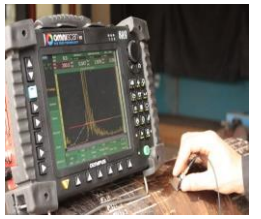
TYPES OF INSPECTIONS

HiSCS engineering experts

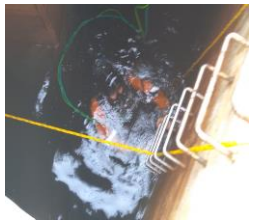
Initial. Performed on new bridges or when bridge is first recorded.

Routine. Those regularly scheduled, usually every 2 years for most normal bridges.

Damage. Those performed as a result of collision, fire, flood, significant environmental changes, loss of support, seismic activity etc. These inspections are also called EMERGENCY INSPECTIONS and are performed on an as-needed basis.



In-Depth. Performed usually as a follow-up inspections to better identify deficiencies found in any of the above three types of inspection. Detailed Underwater & Fracture-critical Inspections are considered In-Depth Inspection.



Special. Performed to monitor a particular deficiency or changing condition. Unusual bridge designs or features such as external, grouted, post-tensioned tendons, may require a special Inspection.

PURPOSE OF OUR SERVICES

HiSCS engineering experts

PROTECT PUBLIC INVESTMENT and allow efficient allocation of resources

ENSURE PUBLIC SAFETY and confidence in bridge structural capacity

effectively **SCHEDULE MAINTENANCE and REHABILITATION** operations

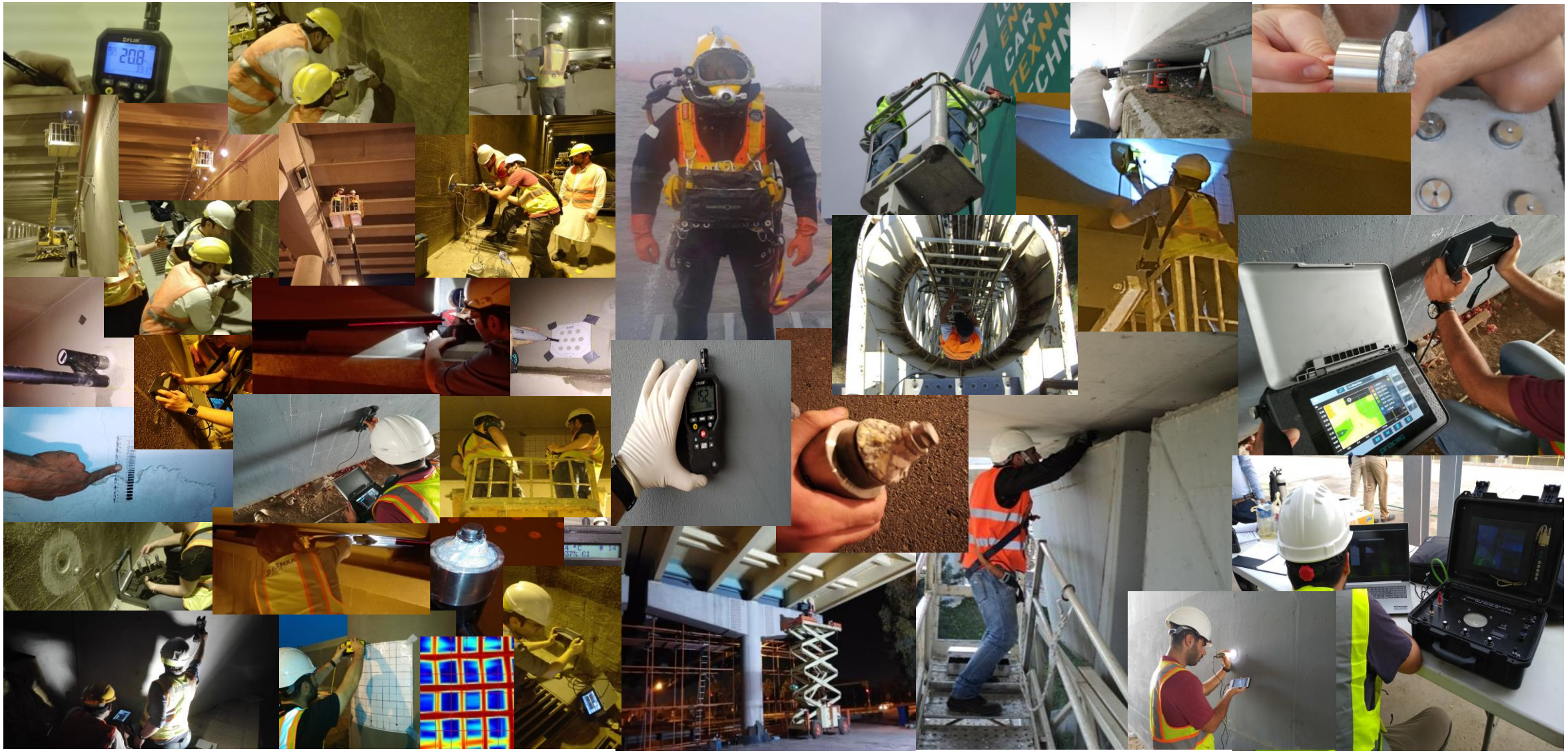
ensure that State **FUNDING will remain AVAILABLE** for bridge rehabilitation and replacement

provide a basis for **REPAIR, REPLACEMENT** or other **IMPROVEMENTS**

Safe for **U**se & **FI**t for **P**urpose=**SUFIP**

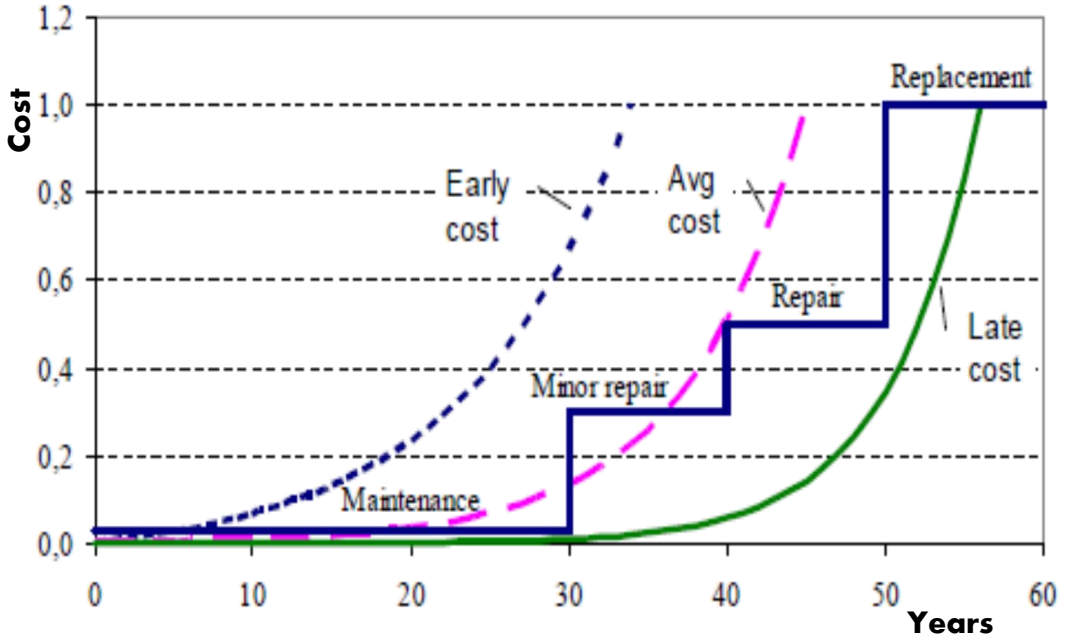
INSPECTION & NDT

HiSCS
engineering experts



WHY TO PERFORM NDT

Statistically investigation of the deficiencies and their augmentative rate in the structure, by determining (using the correlation method among several NDT) the **actual mechanical & physical properties of the material (compressive strength, modulus of elasticity etc.)**, so as to predict the needed remedial works in order to prolong the service life, by estimating to the Owner the ratio:



$$\frac{\textbf{Money to spend}}{\textbf{Remaining Service Years}} < 1$$

meaning the pay – off of the investment

BSi

Bridge Scene Investigation

INSPECTION ELEMENTS

ALL TYPES OF STRUCTURES VEHICLES-AIRCRAFTS-RAILWAYS-PEDESTRIANS

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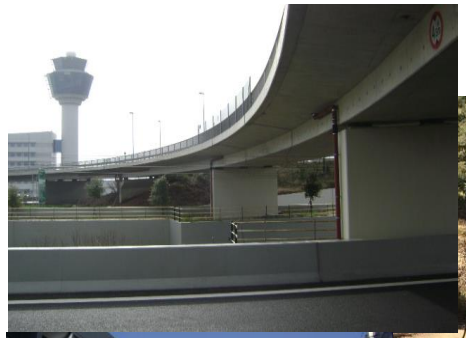
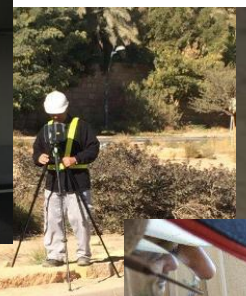
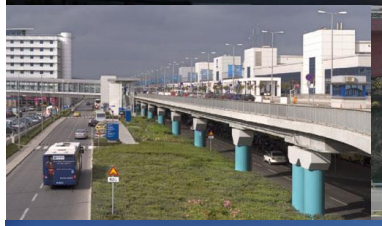
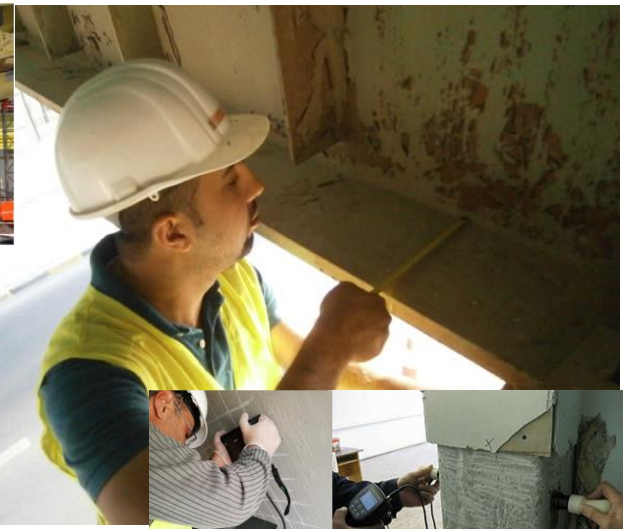







INSPECTION OF BEARINGS, EX. JOINTS, GUARDRAILS, BARRIERS, MASTS, TRAFFIC SIGNALLING, PAVEMENT, PIERS, ABUTMENTS, DECKS, RETAINING WALLS, FOUNDATIONS, GANTRIES, SCOUR, BOREHOLES, UNDERWATER, PT CABLES, STEEL, CONCRETE, TIMBER, MASONRY…..

AND MANY MORE

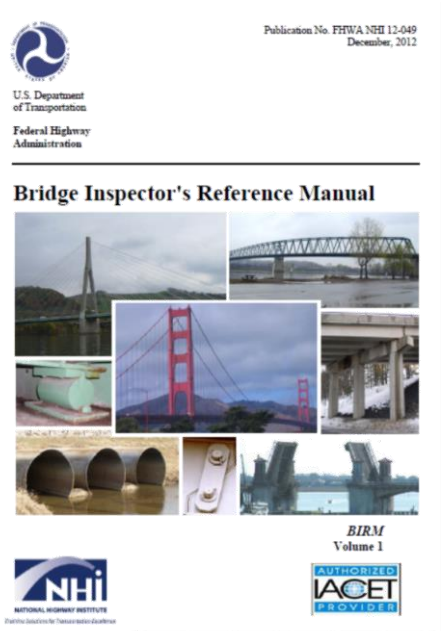
RANGE OF APPLICATION

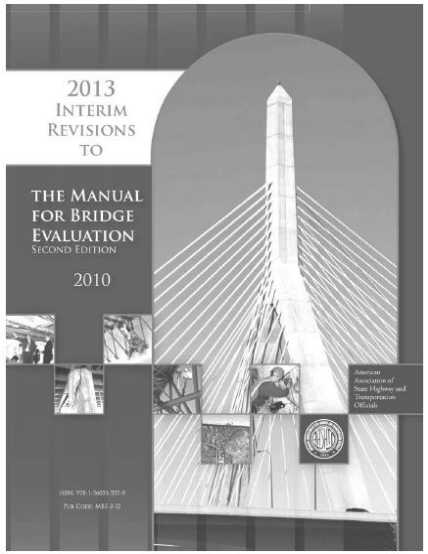
HiSCS
engineering experts

Road & Railway Bridges, Airport Bridges
Stay-Cable & Pedestrian Bridges
Tunnels & Underpasses
Jetties
Railway Stations

Airports and other special Structures
Historical & Industrial Buildings
Roofs, Fences, Barriers
Tanks and Water Basins
Parking Stations etc.

SPECIFICATIONS





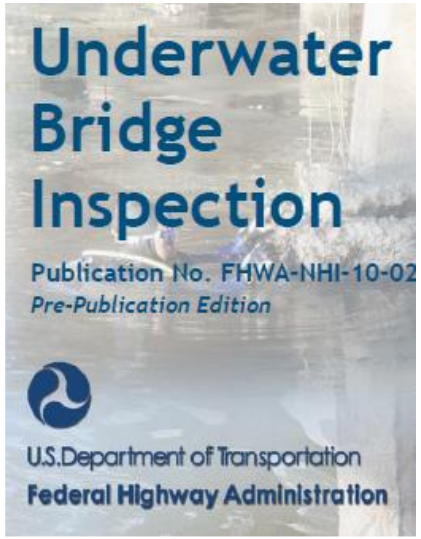
-AASHTO Inspection & Maintenance Manual

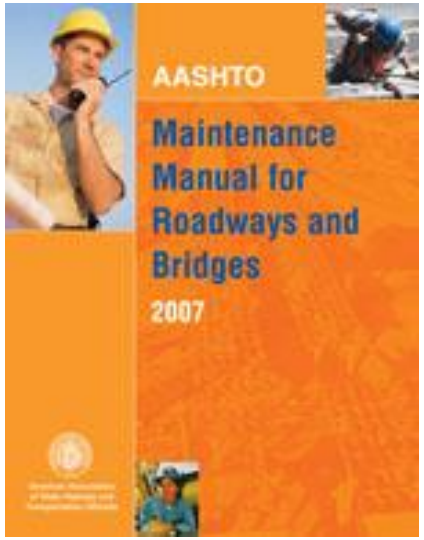
-FHWA National Bridge Inspection Standards

-AASHTO Manual - Condition Evaluation of Bridges

-EN, ASTM & ACI CODES

FHWA





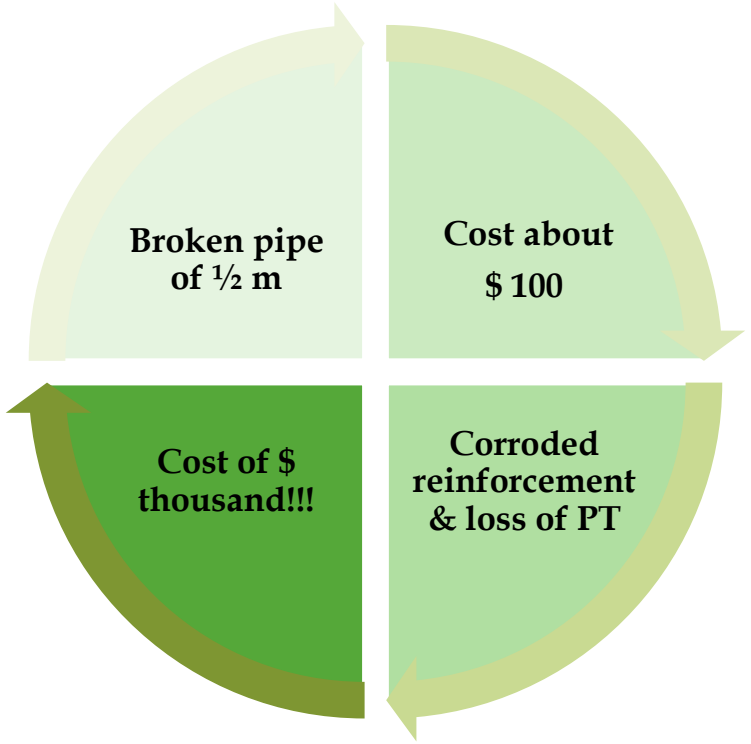
AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AASHTO
1914

ASTM INTERNATIONAL

AASHTO Guide Manual for Bridge Element Inspection

FINDINGS

HiSCS
engineering experts



HOW OFTEN

For new or reconstructed bridges it is recommended to carry out the first principal inspection (**BIRTH CERTIFICATE**) within **60 days** up to **1 year** (depending on the State regulations) of the structure being put into service.

Bridges are inspected every **2 years**, but the frequency may be increased depending on the condition of the bridge and its strategic importance.

EN-1990

Table 2.1 - Indicative design working life

Design working life category	Indicative design working life (years)	Examples
1	10	Temporary structures (1)
2	10 to 25	Replaceable structural parts, e.g. gantry girders, bearings
3	15 to 30	Agricultural and similar structures
4	50	Building structures and other common structures
5	100	Monumental building structures, bridges, and other civil engineering structures

(1) Structures or parts of structures that can be dismantled with a view to being re-used should not be considered as temporary.

Structural elements such as bearings should be inspected after an accidental collision with the bridge such as an over high vehicle colliding with the deck or after an exceptional event such as abnormal behavior of expansion joints, fire, chemical attack, flood, severe weather conditions (heavy sand storms-winds), earthquake or in general any sign of tension/strain in structure.

ON THE SPOT STAFF

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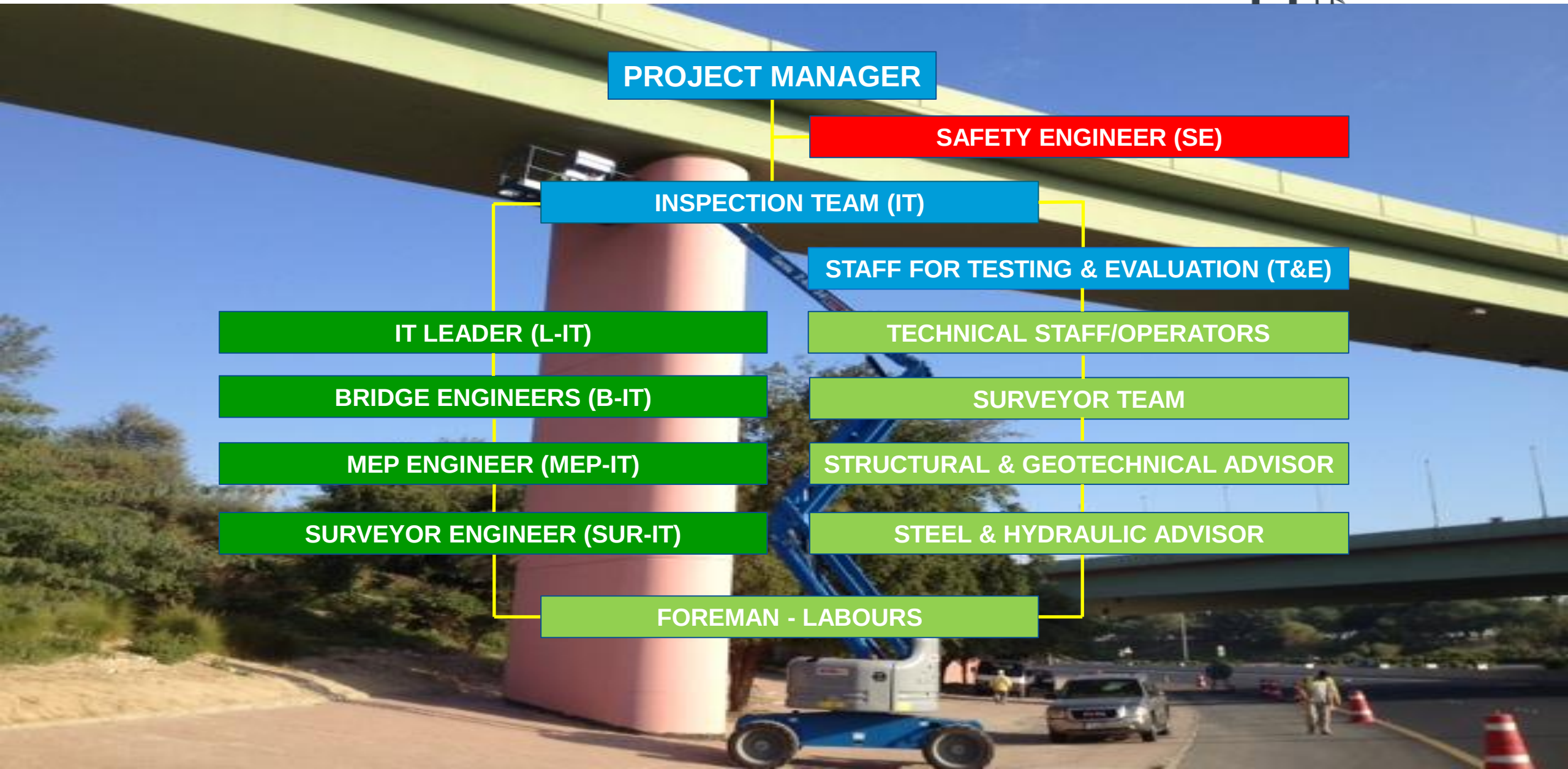
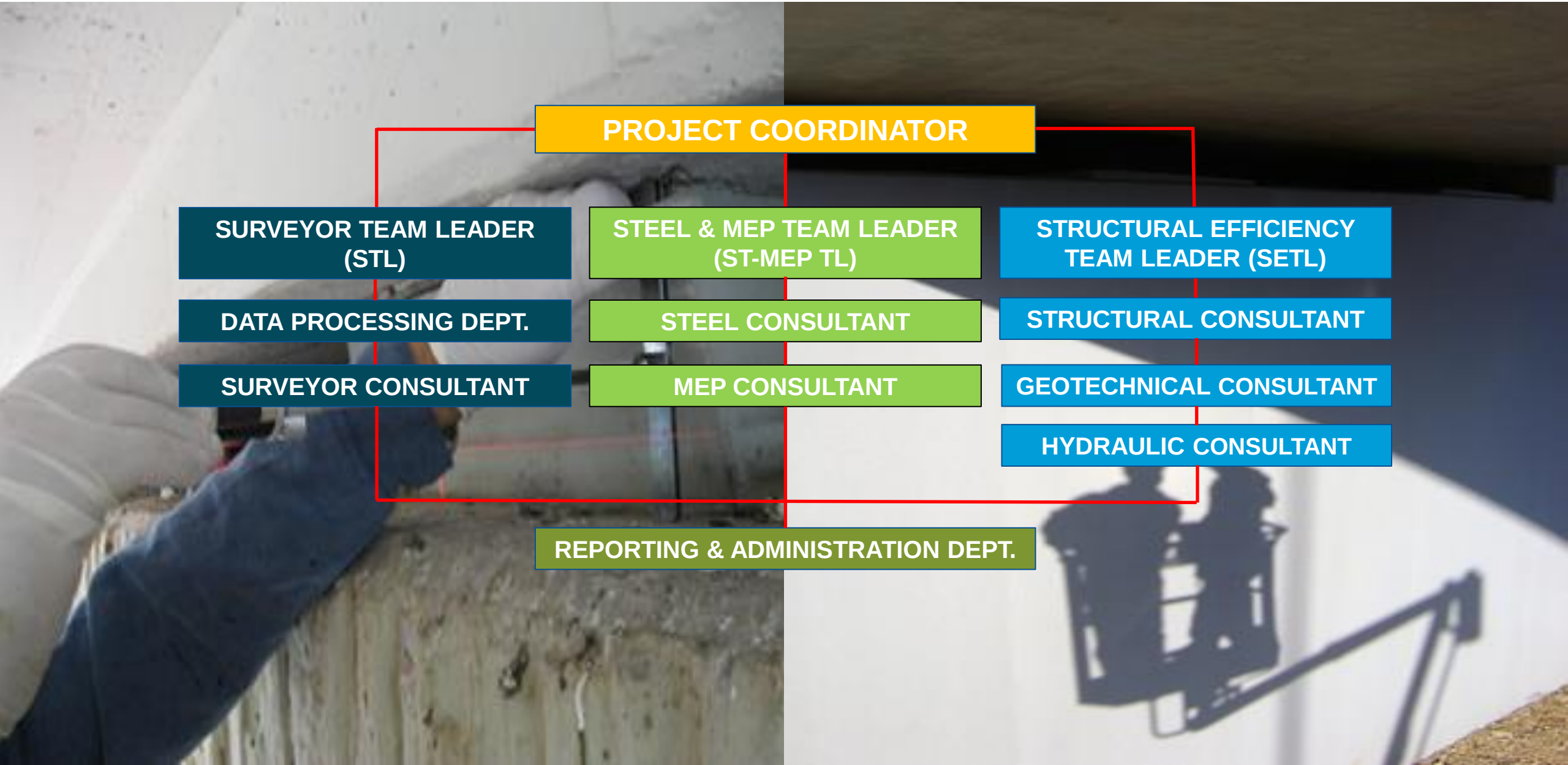
engineering experts



SUPPORTIVE STAFF

HiSCS
engineering experts



PROJECT COORDINATOR

- SURVEYOR TEAM LEADER (STL)
  - DATA PROCESSING DEPT.
  - SURVEYOR CONSULTANT
- STEEL & MEP TEAM LEADER (ST-MEP TL)
  - STEEL CONSULTANT
  - MEP CONSULTANT
- STRUCTURAL EFFICIENCY TEAM LEADER (SETL)
  - STRUCTURAL CONSULTANT
  - GEOTECHNICAL CONSULTANT
  - HYDRAULIC CONSULTANT

REPORTING & ADMINISTRATION DEPT.

PHASES OF INSPECTION

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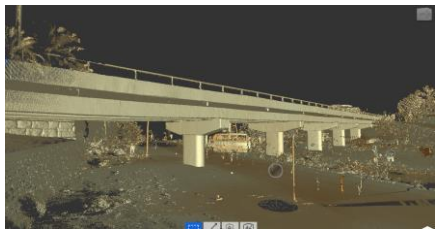
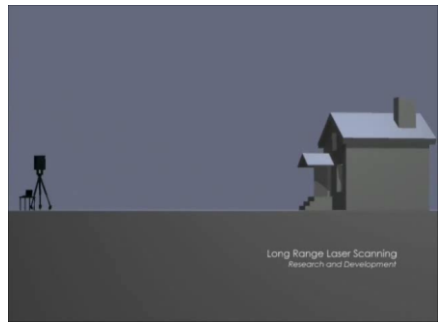
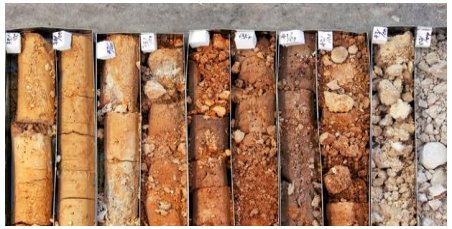
Land & Structural Survey & Drawings



3D Terrestrial Laser Scanning - issuance of reliable & accurate drawings (side & plan views, cross sections, point cloud & 360° images) with ranging error of ± 1mm



Geo, Hydraulic, Drainage, Scour Evaluation



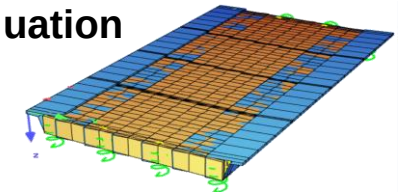
Ground stability, geo & hydraulic and drainage survey, boreholes & piezometers, scour condition

Site Inspection & NDT – MEP

Record the actual condition of structures & elements (steel-concrete-masonry-timber) including the performance of NDT and survey in lighting systems, pumps, electrical, CCTV, safety, fire, communications, control systems & networks

Load Rating & Structural Modelling

Determination of the live load carrying capacity and simulation of structure for final evaluation

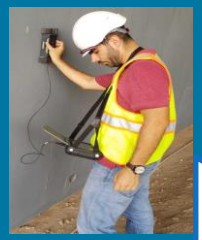


CONCRETE NDT

HiSCS engineering experts

Profometer

Localization of bars, determination of cover and estimation of dia



Schmidt Hammer

Determination of compressive strength of concrete

Carbonation & PH

Indication of the location of de-passivation concrete cover

Chlorides / Galva pulse

Determination of concrete chemical attack & corrosion risk in reinf/ent

Cracks Microscope

Determination of width and depth of cracks

CAPO & Pull-Off

Estimation of compressive, bonding, tensile strength of concrete

FLIR (Infra Red)

Detection of humidity, voids and other anomalies

GPR (Ground Penetration Radar)

Detection of anomalies, voids, cracks, sub-surface objects

Pundit - Ultra Pulse Velocity

Detection of anomalies, voids, cracks, delaminations

Borescope Camera

Visual inspection of non-accessible areas

STEEL NDT

HiSCS
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Magnetic Particle

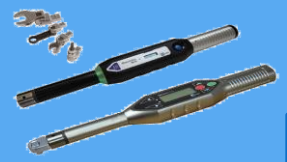
Determination of subsurface discontinuities and welding adequacy

Ultrasonic

Localization of flaws and other irregularities

Torque

Determination of bolts torque tightening

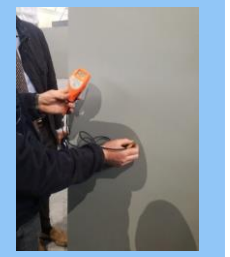


Dye Penetrant

Determination of surface defects in welding areas

Paint thickness

Determination of paint thickness



MASONRY NDT

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engineering experts

Compressive Strength

Strength of masonry depends on the mortar, brick or stone

Pull-Out

Indication of the compressive strength of the mortar

Flat-jack

Determination of in-situ compressive strength

Flexural Bond Strength

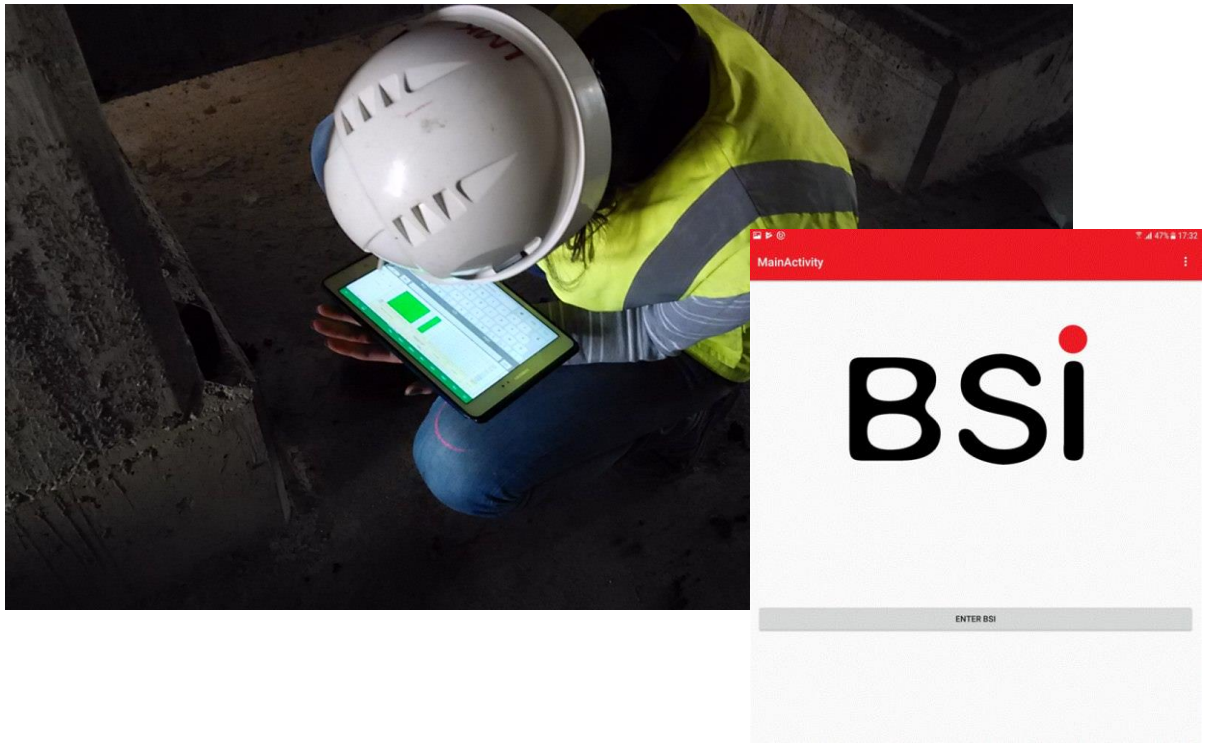
A bond wrench determines the bond of masonry units to mortar

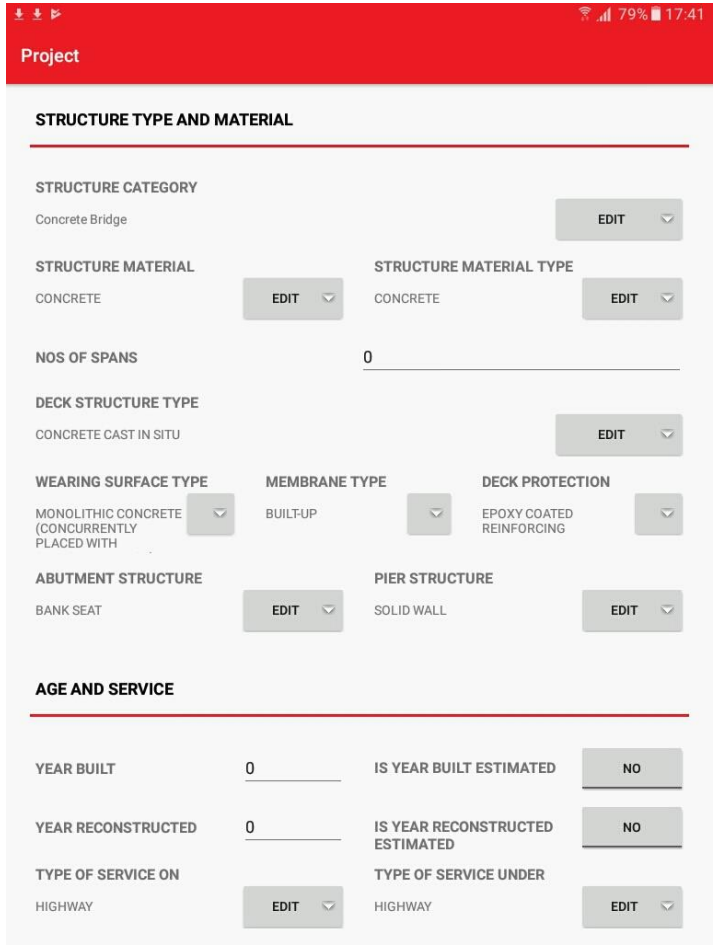
Shove (in-situ shear)

Determination of masonry shear resistance

INSPECTION SOFTWARE

All inspections will take place using a special software which will speed up the calculation and analysis from investigation and field data collection





DELIVERABLES

HiSCS engineering experts

Inception / Inspection Reports

Visual survey to evaluate the overall condition of the structure
(H = High / L = Low severely damaged)

Periodic / Interim Report

Demonstration of the **current overall progress** of inspection serving also as a pilot for the Evaluation Report, including the up to date results and recommendations for repair & rehabilitation

Field & Testing / Factual Report / Load Rating etc…

Performed tests and results in order to evaluate current state of the structure

Data / Inventory Report

The Inventory & Appraisal Report (IAR) **is a tabulation of information** that is submitted for the structure summarizing the structure's data required by the Owner enabling the effective monitoring and management of the structure

Evaluation Report

The final evaluation including all investigations, testing, results and **recommendations for repair & rehabilitation including estimated budget**

DELIVERABLES

INCEPTION REPORT

VISIBLE DEFECTS & DEFICIENCIES			
ITEM	**ON TRAFFIC**		
D_1	DECK	SATISFACTORY	2
D_2	KERBS/SIDEWALKS	SERIOUS	4
D_3	PAVEMENT	GOOD	1
D_4	BARRIER (RAILS, NEW JERSEY, FENCES ETC.)	CRITICAL/DANGEROUS	5
D_5	EXPANSION JOINTS	SERIOUS	4
D_6	DRAINAGE/SCUPPERS/COLLECTORS	ACCEPTABLE	3
D_7	TRAFFIC SAFETY/SIGNALING	ACCEPTABLE	3
D_8	MASTS/GANTRIES	GOOD	1
D_9	PT CABLES	CRITICAL/DANGEROUS	5

VISIBLE DEFECTS & DEFICIENCIES			
ITEM	**UNDER TRAFFIC**		
D_{10}	ABUTMENT	SATISFACTORY	2
D_{11}	PIER	SERIOUS	4
D_{12}	RETAING WALLS	ACCEPTABLE	3
D_{13}	EMBANKMENT	GOOD	1
D_{14}	BEARINGS	CRITICAL/DANGEROUS	5
D_{15}	RIP RAP	ACCEPTABLE	3
D_{16}	FOUNDATION/SCOUR/SETTLEMENTS/INCLINATIONS	NON APPLICABLE	0
D_{17}	CLEARANCES	GOOD	1
D_{18}	DISCHARGE & DRAINAGE SYSTEMS	CRITICAL/DANGEROUS	5
D_{19}	STEEL CONDITION (CONNECTIONS-WELDING)	CRITICAL/DANGEROUS	5
D_{20}	CONCRETE CONDITION (CRACKS, CHEMICAL ATTACK ETC.)	CRITICAL/DANGEROUS	5

HiSCS engineering experts

BRIDGE C 3

MUNICIPALITY OF RIYADH
KINGDOM OF SAUDI ARABIA

STATUS:	OPEN
REV:	0
DATE:	15/04/2015

INCEPTION SHEET

ITEM	IDENTIFICATION						
1	COUNTRY	KINGDOM OF SAUDI ARABIA-KSA					
2	DISTRICT	AD DIRIYAH					
3	PROVINCE	CENTER					
4	PLACE	RIYADH					
5	ROUTE/HIGHWAY/ROAD/STREET (ON/UNDER)	KING KHALOD ROAD					ON
6	ORIENTATION	NW-SE					8-4
7	LOCATION/LANDMARK	VILLA ROSAS AL-WADI COMPOUND					
7	STRUCTURE No.	C		3			
8	KM POINT (STA)	23+339					
9	LATITUDE (N/S)	N24	deg	43	min	36,56	sec
10	LONGITUDE (E/W)	E46	deg	34	min	33,04	sec
	STRUCTURE ID NUMBER (SIN)	234566					
		234567					

ITEM	CLASSIFICATION		
100	STRATEGIC/DEFENSE STRUCTURE	0	
103	TEMPORARY STRUCTURE	0	
105	OTHER KSA AUTHORITY	N	
20	TOLL	FREE	0
21	MAINTENANCE RESPONCIBILITY	RIYADH MUNICIPALITY	
22	OWNER	RIYADH MUNICIPALITY	
37	HISTORICAL SIGNIFICANCE	0	

VISIBLE DEFECTS & DEFICIENCIES			
ITEM	ON TRAFFIC		
D_1	DECK	SATISFACTORY	2
D_2	KERBS/SIDEWALKS	SERIOUS	4
D_3	PAVEMENT	GOOD	1
D_4	BARRIER (RAILS, NEW JERSEY, FENCES ETC.)	CRITICAL/DANGEROUS	5
D_5	EXPANSION JOINTS	SERIOUS	4
D_6	DRAINAGE/SCUPPERS/COLLECTORS	ACCEPTABLE	3
D_7	TRAFFIC SAFETY/SIGNALING	ACCEPTABLE	3
D_8	MASTS/GANTRIES	GOOD	1
D_9	PT CABLES	CRITICAL/DANGEROUS	5

ITEM	STRUCTURE TYPE AND MATERIAL				
S_1	STRUCTURE BASIC CATEGORY (B-UP-PD-ST)	BRIDGE			
43	STRUCTURE MATERIAL/TYPE	CONCRETE	1	GIRDER	2
45	Nos. OF SPANS	6			
107	DECK STRUCTURE TYPE	CONCRETE CAST-IN-SITU			1
108A	WEARING SURFACE TYPE	6			
108B	TYPE OF MEMBRANE	8			
108C	TYPE OF DECK PROTECTION	0			
S_2	ABUTMENT/WALL STRUCTURE TYPE	3		6	
S_3	PIER STRUCTURE TYPE	HAMMER HEAD			

VISIBLE DEFECTS & DEFICIENCIES			
ITEM	UNDER TRAFFIC		
D_{10}	ABUTMENT	SATISFACTORY	2
D_{11}	PIER	SERIOUS	4
D_{12}	RETAING WALLS	ACCEPTABLE	3
D_{13}	EMBANKMENT	GOOD	1
D_{14}	BEARINGS	CRITICAL/DANGEROUS	5
D_{15}	RIP RAP	ACCEPTABLE	3
D_{16}	FOUNDATION/SCOUR/SETTLEMENTS/INCLINATIONS	NON APPLICABLE	0
D_{17}	CLEARANCES	GOOD	1
D_{18}	DISCHARGE & DRAINAGE SYSTEMS	CRITICAL/DANGEROUS	5
D_{19}	STEEL CONDITION (CONNECTIONS-WELDING)	CRITICAL/DANGEROUS	5
D_{20}	CONCRETE CONDITION (CRACKS, CHEMICAL ATTACK ETC.)	CRITICAL/DANGEROUS	5

ITEM	AGE AND SERVICE		
27	YEAR BUILT (E=ESTIMATED)	1980	E
106	YEAR RECONSTRUCTED	0	
42A	TYPE OF SERVICE ON	4	
42B	TYPE OF SERVICE UNDER	4	
28A	Nos. OF LANES ON	2	
28B	Nos. OF LANES UNDER	2	
29	AVER. DAILY TRAFFIC (ADT)-Nos.	(100-400-1000-2000-5000)	400
30	YEAR OF ADT	2015	
109	AVER. TRUCK DAILY TRAFFIC (TDT) (%)	5,00	
19	BYPASS, DETOUR LENGTH (Km)	1	

VISIBLE DEFECTS & DEFICIENCIES			
ITEM	ELECTROMECHANICAL & COMMUNICATION		
D_{21}	PUMPS/PUMPING ROOMS	SATISFACTORY	2
D_{22}	LIGHTING & ELECTRICAL	SERIOUS	3
D_{23}	COMMUNICATION SYSTEMS	ACCEPTABLE	3
D_{24}	SAFETY/ SECURITY SYSTEMS (CAMERAS, ALARMS ETC.)	GOOD	1

ITEM	GEOMETRIC DATA						
48	LENGTH OF MAX SPAN (m)	30					
49	STRUCTURE LENGTH (m)	82					
50	KERB/SIDEWALK WIDTH (m)	1	L	0	M	1	R
51	CARRIAGE WIDTH (KERB-KERB) (m)	9					
52	TOTAL DECK WIDTH (m)	12					
32	APPROACH ROADWAY WIDTH (m)	9					
34	SKEW ANGLE (DEG)	90					
53	MIN VERT. CLEARANCE ON (m)	0					
54	MIN VERT. CLEARANCE UNDER (m)	5,5					H
47A	MAX HORIZ. CLEARANCE ON (m)	9					
47B	MAX HORIZ. CLEARANCE UNDER (m)	12					
33	MEDIAN	0					

ITEM	EVALUATION - PROPOSALS		
E_1	HYDRAULIC EFFICIENCY	SATISFACTORY	2
E_2	OPERATIONAL EFFICIENCY	CRITICAL/DANGEROUS	5
E_3	ENVIRONMENTAL EFFICIENCY	SERIOUS	3
E_4	AESTHETIC ISSUES	GOOD	1
E_5	TRAFFIC EFFICIENCY	SATISFACTORY	2
E_6	SERVICE BEHAVIOR	ACCEPTABLE	5
E_7	QUALITATIVE DETERIORATION	SATISFACTORY	2
N_9	NEEDED TESTING		
N_{10}	NEEDED INSPECTION FOCUSED ON		
N_{11}	NEEDED REPAIR/REPLACEMENT WORKS		
N_{12}	OTHER		

ITEM	NAVIGATION DATA	
38	NAVIGATION CONTROL	N
111	PIER PROTECTION	N
39	NAVIGATION VERT. CLEARANCE (m)	N
40	NAVIGATION HORIZ. CLEARANCE (m)	N

ITEM	INSPECTIONS	
90	INSPECTION DATE	15/08/2015

OVERALL PRIORITY HIGH (H=1)/LOW (L=2)	L	2
OVERALL ASSESMENT	SATISFACTORY	2

GENERAL COMMENTS

Rev:	Description	Issuance	Check	Date

DELIVERABLES

INSPECTION REPORT

Our aim is the inspector on the spot to collect information depicting the actual condition of the structure by filling inspection sheets, classifying extension and intensity of the deficiencies and specifying their exact location on an actual photo of defective area with comments.

HiSCS engineering experts

STRUCTURE ID: XXXXXX	STATUS:	OPEN
STRUCTURE NAME: XXXXXX	REV:	0
	DATE:	17-Dec-20
	P/Nr-F/Nr:	

INSPECTION SHEET

STRUCTURE TYPE:	UNDERPASSES	LOCATION:	SUPERSTRUCTURE (ABOVE TRAFFIC)	ELEMENT:	IMPACT ATTENUATOR
MATERIAL:	COMPOSITE		SUBSTRUCTURE (BELOW TRAFFIC)	ELEMENT:	EMBANKMENT

PHOTOS/SKETCH OF THE ELEMENT

DEFECT TYPE-CONCRETE

C.1	PASSIVE MOISTURE SPOTS	C.11	EFFLORESCENCE	C.21	FIRE DAMAGE
C.2	ACTIVE MOISTURE SPOTS	C.12	LEACHING/STAINING	C.22	IMPACT DAMAGE
C.3	DETERIORATED AREA	C.13	HONEYCOMBING	C.23	COATING/PAINT DEFECTS (PEELING, BLOW HOLES)
C.4	DETACHED AREAS	C.14	ALKALI SILICA REACTION	C.24	LOSS OF REINFORCEMET SECTION
C.5	DIAGONAL SHEAR/TORSION CRACKS	C.15	CHEMICAL/SULFATE ATTACK	C.25	UNSEALED/CRACKED PT ANCHOR HEADS AREA
C.6	VERTICAL/FLEXURAL CRACKS	C.16	LOSS OF COVER	C.26	VISIBLE PT DUCT
C.7	SHRINKAGE CRACKS	C.17	INADEQUATE COVER THICKNESS	C.27	CORRODED PT DUCT
C.8	SPALLING/DELAMINATION	C.18	OXIDIZED REINFORCEMENT	C.28	SCOUR
C.9	SCALING	C.19	EXPOSED REINFORCEMENT	C.29	WASHOUT OF THE APPROACH SUBSTRUCTURE
C.10	CRAZING	C.20	STAINING SPOTS/AREAS	C.30	INSIDE HUMIDITY

NOTES:

Defect No.	Q/ty	EXTENSION			INTENSITY			Photo No.
		25%	50%	100%	25%	50%	100%	
C.6	1	1			1	0		1
C.7	1		1		0	1		2
C.8	1	1			0		1	25
C.9	1			1	1			36
C.10	1	1					1	47
C.11	1			1		1		58
C.12	1		1			0	1	69
C.13	1	1			1			80
C.14	1	1		1	1			91
C.15	1		1			1		102
C.16	1		1				1	113
C.17	1	1					1	124

Defect No.	Q/ty	EXTENSION			INTENSITY			Photo No.
		25%	50%	100%	25%	50%	100%	
C.6	1	1			1			1
C.7	1		1		1			2
C.8	1		1		1			25
C.9	1	1			1			36
C.10	1		1		1			47
C.11	1		1		1			58
C.12	1		1			1		69
C.13	1	1				1		80
C.14	1	1				1		91
C.15	1			1			1	102
C.16	1		1				1	113
C.17	1	1				1		124

STRUCTURAL ELEMENTS RATING (EXT)	49%
STRUCTURAL ELEMENTS RATING (INT)	54%

CONDITION RATING: POOR

Rev:	Description	Check	Approved	Date
0	initial	SR	SR	17-Dec-20

DELIVERABLES

FACTUAL REPORT

HiSCS engineering experts

SCHMIDT HAMMER TEST FORM

Report No: AM/001 | Page: 1/1 | Rev: 02 | Date: 16/08/2015

Contract No:	Project:	Study, Investigation and Evaluation for Bridges, Retaining Walls and Underpasses in Riyadh City
AM/Q305	Client:	Municipality of Riyadh - Kingdom of Saudi Arabia

General Information

Time:	13:00	Relative Humidity:	67%	Air temperature:	35°C
Hammer Type:	LDG/2000	Serial Number:	12445/67	Orientation of hammer:	+90°

Test Area

Location on structure:	PIER - 1
Type of member:	HAMMER HEAD

Structure Data

Year of construction (estimated):	1985

Concrete Characteristics

Design strength of concrete (MPa):	40

Readings

	First Set (Kg/cm²)	CHECK		Second Set (Kg/cm²)	CHECK		Third Set (Kg/cm²)	CHECK
No 1	58	OK	No 1	59	OK	No 1	50	OK
No 2	59	OK	No 2	56	OK	No 2	56	OK
No 3	58	OK	No 3	58	OK	No 3	56	OK
No 4	58	OK	No 4	56	OK	No 4	55	OK
No 5	57	OK	No 5	58	OK	No 5	56	OK
No 6	58	OK	No 6	44	STOP	No 6	56	OK
No 7	56	OK	No 7	56	OK	No 7	62	STOP
No 8	60	OK	No 8	55	OK	No 8	56	OK
No 9	58	OK	No 9	53	OK	No 9	57	OK
No 10	59	OK	No 10	56	OK	No 10	40	STOP
Average	58		Average	56		Average	55	

First Set Results			Second Set Results			Third Set Results		
Corrections due to Inclination:	R-ReCorrection value	56	Corrections due to Inclination:	R-ReCorrection value	54	Corrections due to Inclination:	R-ReCorrection value	53
Corrections due to age:	R-R-T3	33	Corrections due to age:	R-R-T3	32	Corrections due to age:	R-R-T3	32
CONCRETE CLASSIFICATION:	MEDIUM		CONCRETE CLASSIFICATION:	MEDIUM		CONCRETE CLASSIFICATION:	MEDIUM	

Remarks:

In case the n2 measurements differs more than the average of 6 units, test is performed again

	INSPECTOR	SUPERVISOR/CLIENT
Date:		
Name/ Signature:		

Rev:	Description	Issuance	Check	Date
2	Format Revision	SR	NA	08/10/2015
1	Format Revision	NA	NA	01/10/2015

SAMPLE

PEDESTRIAN BRIDGES CORROSION IDENTIFICATION TEST FORM

Report No: AM/002 | Page: 1/1 | Rev: 02 | Date: 16/08/2015

Contract No:	Project:	Study, Investigation and Evaluation for Bridges, Retaining Walls and Underpasses in Riyadh City
AM/Q305	Client:	Municipality of Riyadh - Kingdom of Saudi Arabia

General Information

Time:	15:00	Relative Humidity:	67%	Air temperature:	35°C

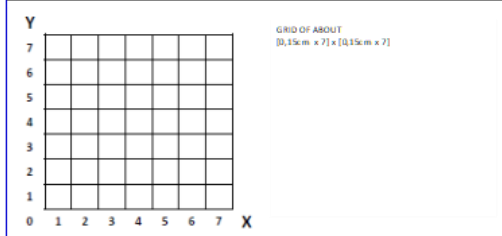
General Test information

Investigated element:	PIER-1
Previewing:	YES
Method of investigation:	DIRECTLY TO REINFORCING STEEL
Assessment of element:	NO RISK OF CORROSION OR ATTACK
Remarks:	

Readings

Y								
7	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
6	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
5	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
4	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
3	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
2	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
1	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
0	-0,18	-0,25	-0,15	-0,30	-0,25	-0,35	-0,50	-0,13
X	0	1	2	3	4	5	6	7

Corrosion Map:



Total Half Cell potentials %	More negative than -0,33V	12,50	>90% probability for corrosion
	less negative than -0,33V & more negative than -0,20V	50,00	uncertain probability for corrosion
	less negative than -0,20V	37,50	<90% probability for corrosion

	INSPECTOR	SUPERVISOR/CLIENT
Date:		
Name/ Signature:		

Rev:	Description	Issuance	Check	Date
2	Format Revision	SR	NA	08/10/2015
1	Format Revision	NA	NA	01/10/2015

SAMPLE

STEEL BRIDGES ULTRASONIC (UT) INSPECTION TEST FORM

Report No: AM/001 | Page: 1/1 | Rev: 02 | Date: 16/08/2015

Contract No:	Project:	Study, Investigation and Evaluation for Bridges, Retaining Walls and Underpasses in Riyadh City
AM/Q304	Client:	Municipality of Riyadh - Kingdom of Saudi Arabia

Identification

Drawing:		Item / Item No.	
Material:		Welding process:	

Technical Data

Inspection before heat treatment:		Inspection after heat treatment:	
Surface condition:		Test temperature:	
Applicable standard:		Evaluation According:	

Type and Method of Ultrasonic Test

Equipement:		Correction for K1 & K2 respectively:	
Probes:		Transfer correction:	
Sensitivity Settings:		Check of scanning position:	
Recorded Threshold:		Coupling mean:	
		Percentage to be tested:	

Weld No.	Type of Indications (#1)	Welder No.	Distance of Indications from reference point	Depth of Indications	Length of Indications	Indications L or CL (#3)	A or R (#4)	Remarks

*1 Indications designation (EN ISO 17637:2011)

100 | cracks		
104 | crater crack	401 | lack of fusion	S11 | incomplete filled groove
2011 | gas pore	402 | lack of penetration	S12 | excessive assymetry of fillet weld
2014 | linear porosity	S011 | undercut	S15 | root concavity
2013 | localised-clustered porosity	S02 | excess weld metal	S013 | shrinkage groove
2015 | elongated cavity	S03 | excessive convexity	S06 | overlap
2016 | worm hole	S04 | excessive penetration	601 | stray flash or arc strike
300 | solid inclusions	S07 | linear misalignment	602 | spatter

*2 Reference point marking.

*3 L, longitudinal / CL transverse

*4 A, Accepted / R, rejected

	INSPECTOR	SUPERVISOR/CLIENT
Date:		
Name/Signature:		

Rev:	Description	Issuance	Check	Date
2	Format Revision	SR	NA	08/10/2015
1	Format Revision	NA	NA	01/10/2015

SAMPLE

DELIVERABLES

INVENTORY & APPRAISAL REPORT

ITEM	CLASSIFICATION		
100	STRATEGIC/DEFENSE STRUCTURE	Not a STRATEGIC/DEFENSE	0
103	TEMPORARY STRUCTURE	NOT A TEMPORARY STRUCTURE	0
105	OTHER KSA AUTHORITY	N	
20	TOLL	TOLL-FREE	0
21	MAINTENANCE RESPONCIBILITY	RIYADH MUNICIPALITY	
22	OWNER	RIYADH MUNICIPALITY	
37	HISTORICAL SIGNIFICANCE	NO HISTORICAL SIGNIFICANCE	0

ITEM	CONDITION RATING		
58	DECK	SATISFACTORY CONDITION	6
59	SUPERSTRUCTURE	FAIR CONDITION	5
60	SUBSTRUCTURE	FAIR CONDITION	5
61	CHANNEL & CHANNEL PROTECTION	NOT APPLICABLE	N
62	CULVERTS	NOT APPLICABLE	N

ITEM	LOAD RATING & POSTING			
31	DESIGN LOAD (DESIGNED LIVE LOAD)	M9	H10	1
63	OERATING RATING METHOD	LOAD TESTING		4
64	OPERATING RATING (TONS)	10		
65	INVENTORY RATING METHOD	LOAD TESTING		4
66	INVENTORY RATING (TONS)	10		
70	BRIDGE POSTING	4		
41	STRUCTURE OPEN, POSTED OR CLOSED	POSTED FOR LOAD (MAY INCLUDE OTHER RESTRICTIONS SUCH AS TEMPORARY STRUCTURES WHICH ARE LOAD POSTED)		P

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BRIDGE C3

MUNICIPALITY OF RIYADH
KINGDOM OF SAUDI ARABIA

STATUS:	OPEN
REV:	0
DATE	15/04/2015

INVENTORY & APPRAISAL SHEET

ITEM	IDENTIFICATION						
1	COUNTRY	KINGDOM OF SAUDI ARABIA-KSA					
2	DISTRICT	AD DIRIYAH					
3	PROVINCE	CENTER					
4	PLACE	RIYADH					
5	ROUTE/HIGHWAY/ROAD/STREET (ON/UNDER	KING KHALID ROAD				On	
6	ORIENTATION	NORTH-WEST	/	SOUTH-EAST		S-E	
7	LOCATION/LANDMARK	VILLA ROSAS AL-WADI COMPOUND					
8	STRUCTURE No.	C		3			
9	KM POINT (STA)	23+340					
10	LATITUDE (N/S)	N24	deg	43	min	36.56	sec
	LONGITUDE (E/W)	E46	deg	34	min	33.04	sec
11	STRUCTURE ID NUMBER (SIN)	234567					

ITEM	CLASSIFICATION		
100	STRATEGIC/DEFENSE STRUCTURE	Not a STRATEGIC/DEFENSE	0
103	TEMPORARY STRUCTURE	NOT A TEMPORARY STRUCTURE	0
105	OTHER KSA AUTHORITY	N	
20	TOLL	TOLL-FREE	0
21	MAINTENANCE RESPONCIBILITY	RIYADH MUNICIPALITY	
22	OWNER	RIYADH MUNICIPALITY	
37	HISTORICAL SIGNIFICANCE	NO HISTORICAL SIGNIFICANCE	0

ITEM	CONDITION RATING		
58	DECK	SATISFACTORY CONDITION	6
59	SUPERSTRUCTURE	FAIR CONDITION	5
60	SUBSTRUCTURE	FAIR CONDITION	5
61	CHANNEL & CHANNEL PROTECTION	NOT APPLICABLE	N
62	CULVERTS	NOT APPLICABLE	N

ITEM	STRUCTURE TYPE AND MATERIAL						
51	STRUCTURE BASIC CATEGORY (B-UP-PD-ST)	BRIDGE					
43	STRUCTURE MATERIAL/TYPE	STEEL	2	43A	STRINGER/M	2	43B
45	Nos. OF SPANS	6					
107	DECK STRUCTURE TYPE	CONCRETE CAST IN SITU					1
108A	WEARING SURFACE TYPE	BITUMINOUS					6
108B	TYPE OF MEMBRANE	UNKNOWN					8
108C	TYPE OF DECK PROTECTION	NONE					0
52	ABUTMENT STRUCTURE TYPE	MSE					
53	PIER STRUCTURE TYPE	HAMMER HEAD					

ITEM	LOAD RATING & POSTING			
31	DESIGN LOAD (DESIGNED LIVE LOAD)	M9	H10	1
63	OERATING RATING METHOD	LOAD TESTING		4
64	OPERATING RATING (TONS)	10		
65	INVENTORY RATING METHOD	LOAD TESTING		4
66	INVENTORY RATING (TONS)	10		
70	BRIDGE POSTING	4		
41	STRUCTURE OPEN, POSTED OR CLOSED	POSTED FOR LOAD (MAY INCLUDE OTHER RESTRICTIONS SUCH AS TEMPORARY STRUCTURES WHICH ARE LOAD POSTED)		P

ITEM	AGE AND SERVICE		
27	YEAR BUILT (E=ESTIMATED)	1980	E
106	YEAR RECONSTRUCTED	0	
42A	TYPE OF SERVICE ON	OVERPASS/UNDERPASS/ROAD	4
42B	TYPE OF SERVICE UNDER	OVERPASS/UNDERPASS/ROAD	4
28A	Nos. OF LANES ON	2	
28B	Nos. OF LANES UNDER	2	
29	AVER. DAILY TRAFFIC (ADT)-Nos.	400	
30	YEAR OF ADT	2015	
109	AVER. TRUCK DAILY TRAFFIC (TDT) (%)	5.00	
19	BYPASS, DETOUR LENGTH (km)	1	

ITEM	APPRAISAL RAITINGS		
67	STRUCTURAL EVALUATION	4	
68	DECK GEOMETRY	6	
69	UNDERCLEARANCES, VERT. & HORIZ.	7	
71	WATERWAY ADEQUACY	N	
72	APPROACH ROADWAY ALIGNMENT	6	
36	TRAFFIC SAFETY FEATURES	RAILINGS	1
		TRANSITIONS	1
		APPROACH GUARDRAIL (S/R)	N
		ARRPROACH G/R ENDS	N
113	SCOUR CRITICAL STRUCTURES	N	

ITEM	GEOMETRIC DATA							
45	LENGTH OF MAX SPAN (m)	30						
49	STRUCTURE LENGTH (m)	82						
50	KERB/SIDEWALK WIDTH (m)	1	L	0	M	1	R	
51	CARRIAGE WIDTH (KERB-KERB) (m)	9						
52	TOTAL DECK WIDTH (m)	12						
32	APPROACH ROADWAY WIDTH (m)	9						
34	SKEW ANGLE (DEG)	90						
35	MIN VERT. CLEARANCE ON (m)	0						
54	MIN VERT. CLEARANCE UNDER (m)	5.5						H
47A	MAX HORIZ. CLEARANCE ON (m)	9						
47B	MAX HORIZ. CLEARANCE UNDER (m)	12						
33	MEDIAN	0						

ITEM	PROPOSED IMPROVEMENTS	
75	TYPE OF WORK (SR≤ 80%)	OTH
76	LENGTH OF STRUCTURE IMPROVEMENT (m)	82
94	(a)STRUCTURE IMPROVEMENT COST (SAR)	1,000,000
97	YEAR OF IMPROVEMENT COT ESTIMATE	2017
114	FUTURE ADT	800
115	YEAR OF FUTURE ADT	2027

(a) ESTIMATED

ITEM	NAVIGATION DATA		
38	NAVIGATION CONTROL	NOT APPICABLE, NO WATERWAY	N
111	PIER PROTECTION	NOT APPLICABLE-ITEM CAN BE OMITTED	N
39	NAVIGATION VERT. CLEARANCE (m)	N	
40	NAVIGATION HORIZ. CLEARANCE (m)	N	

ITEM	INSPECTIONS	
90	INSPECTION DATE	15/08/2015
91	INSPECTION FREQUENCY (months)	24
92	CRITICAL FUTURE INSPECTION (months)	60

SUFFICIENCY RATING	43.45%

GENERAL COMMENTS

DELIVERABLES

PERIODIC/EVALUATION REPORT

ITEM	ABUTMENTS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	ASPHALT	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	CRITICAL/DANGEROUS	5	REMOVAL OF OLD AND REPLACEMENT WITH NEW ASPHALT	REPL	1
2					
4					

ITEM	BARRIERS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	CONNECTION POINTS	REPA	3
2	ACCEPTABLE	3	COLD GALVANIZATION	REPA	3
4	ACCEPTABLE	3	CUTTING OF REINFORCEMENT	REPA	3

ITEM	BEARINGS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	CRITICAL/DANGEROUS	5	JACKING	REPL	1
2	ACCEPTABLE	3	REMOVAL OF SUPPORT (PIER No. 2)	REPA	3
4	ACCEPTABLE	3	REPAIR OF CONTACT AREAS	REPA	3

ITEM	CONCRETE	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	REPAIR OF CRACKS AT BEARING LOCATIONS	REPA	3
2	ACCEPTABLE	3	REPAIR OF VOID (ABUT A2, BEAM 4)	REPA	3
4	SATISFACTORY	2	PAINTING	PAIN	4

ITEM	EXPANSION JOINTS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	SERIOUS	4	REMOVAL OF APJ AND REPLACEMENT	REPL	2
2					
4					

ITEM	ELECTROMECHANICAL	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	REPLACEMENT OF SPLITTER (PIER 2)	REPA	3
2					
4					

HiSCS engineering experts

STRUCTURE C3

MUNICIPALITY OF RIYADH
KINGDOM OF SAUDI ARABIA

STATUS: OPEN
REV: 0
DATE: 15/04/2015

INTERIM REPORT SHEET

ITEM	ABUTMENTS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	ASPHALT	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	CRITICAL/DANGEROUS	5	REMOVAL OF OLD AND REPLACEMENT WITH NEW ASPHALT	REPL	1
2					
4					

ITEM	BARRIERS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	CONNECTION POINTS	REPA	3
2	ACCEPTABLE	3	COLD GALVANIZATION	REPA	3
4	ACCEPTABLE	3	CUTTING OF REINFORCEMENT	REPA	3

ITEM	BEARINGS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	CRITICAL/DANGEROUS	5	JACKING	REPL	1
2	ACCEPTABLE	3	REMOVAL OF SUPPORT (PIER No. 2)	REPA	3
4	ACCEPTABLE	3	REPAIR OF CONTACT AREAS	REPA	3

ITEM	CONCRETE	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	REPAIR OF CRACKS AT BEARING LOCATIONS	REPA	3
2	ACCEPTABLE	3	REPAIR OF VOID (ABUT A2, BEAM 4)	REPA	3
4	SATISFACTORY	2	PAINTING	PAIN	4

ITEM	EXPANSION JOINTS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	SERIOUS	4	REMOVAL OF APJ AND REPLACEMENT	REPL	2
2					
4					

ITEM	ELECTROMECHANICAL	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	REPLACEMENT OF SPLITTER (PIER 2)	REPA	3
2					
4					

ITEM	MASTS & POSTS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	PIERS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	RETAINING WALLS	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	STEEL	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	UTILITIES	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	N/A	0	NONE	NONE	0
2					
4					

ITEM	TRAFFIC	SEVERITY	ACTIONS/LOCATION		PRIORITY
1	ACCEPTABLE	3	COLD GALVANIZATION OF POST	REPA	3
2	SERIOUS	4	REPLACEMENT OF SIGN (ABUT 2)	REPL	2
4					

STRUCTURE CLASSIFICATION:	SERIOUS	4

Rev:	Description	Issuance	Check	Date

ANALYSIS OF FINDINGS

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S/N	ITEM	SEVERITY	PRIORITY	ACTION	REMARKS
1	ABUT/RW under superstructure	4	2	**REPA**	Installation of drainage system to discharge humidity
2	ASPH	4	2	**REPA**	Repair of cracks-differential settlements, rutting phenomena especially in heavy traffic right lane
3	BARR	4	2	**REPA**	Repair of cracks at areas close to retaining walls, repair works are necessary at areas with broken tiles that exhibit soil settlement
4	BEAR	4	2	**REPA**	Jacking & lifting of superstructure in all locations to repair the bearings seating on superstructure and bearing plinth
5	CONC	3	4	**REPA**	Repair of vehicle impact areas & removal of mass concrete preventing proper transmittion of loads
6	STEEL	0	0	**NONE**	Not applicable
7	EXJO	4	2	**REPL**	Replacement of expansion joints, transition strips and waterproofing of expansion gaps in all locations, repair of steel cover plates and their fixing
8	MAST	3	3	**REPA**	Nut replacement & repair of anchoring systems
9	PIER	3	4	**PAIN**	Painting to cover the water leakage stains
10	RW	4	2	**REPA**	Repair of cracks at construction joints
11	TRAF	5	1	**REPL**	Replacement of impact attenuators & cat eyes
12	MEP	4	2	**REPA**	Covering of exposed/loose cabling

STRUCTURE CONDITION RATINGS

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SEVERITY	CLASSIFICATION	DESCRIPTION
N	NOT APPLICABLE	Inability to perform inspection
0	FAILED CONDITION	Out of service; beyond corrective action
1	"IMMINENT" FAILURE CONDITION	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Structure is closed to traffic, but corrective action may put structure back in light service
2	CRITICAL CONDITION	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the structure until corrective action is taken
3	SERIOUS CONDITION	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present
4	POOR CONDITION	Advanced section loss, deterioration, spalling or scour
5	FAIR CONDITION	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour
6	SATISFACTORY CONDITION	Structural elements show some minor deterioration
7	GOOD CONDITION	Some minor problems observed
8	VERY GOOD CONDITION	No problems noted
9	EXCELLENT CONDITION	No action is required

SEVERITY / PRIORITIES

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RATING	CLASSIFICATION	PRIORITY	ACTIONS
N	NOT APPLICABLE	N/A	NONE
0	FAILED CONDITION	N/A	OUT OF SERVICE
1	"IMMINENT" FAILURE CONDITION	1	URGENT
2	CRITICAL CONDITION	1	URGENT
3	SERIOUS CONDITION	1	URGENT
4	POOR CONDITION	2	SHORT TERM
5	FAIR CONDITION	2	SHORT TERM
6	SATISFACTORY CONDITION	3	LONG TERM
7	GOOD CONDITION	3	LONG TERM
8	VERY GOOD CONDITION	3	LONG TERM
9	EXCELLENT CONDITION	3	LONG TERM

STRUCTURE CLASSIFICATION

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CLASSIFICATION	DESCRIPTION
GOOD = 1	None action is required / No deteriorations.
SATISFACTORY = 2	None action is required / Optional inspection according to routine inspection schedule.
ACCEPTABLE = 3	Minor repairs are required / Mandatory inspection according to an inspection schedule Minor deteriorations but functioning as originally designed.
SERIOUS = 4	Immediate repair works / Serious deteriorations not functioning as originally designed.
CRITICAL/DANGEROUS = 5	Urgent repair works / Totally deteriorated or failed.
NOT APPLICABLE = 0	Condition and/or existence unknown / Not applicable-feasible any inspection.

Classification of Colors:

RED = Urgent Actions, YELLOW= Short Term Actions, GREEN= Long Term Actions

Classification of Severity:

0 = NON APPLICABLE

1 = AS NEW CONDITION OR DEFECT HAS NO SIGNIFICANT EFFECT ON THE ELEMENT (VISUALLY OR FUNCTIONALLY)

2 = EARLY SIGNS OF DETERIORATION, MINOR DEFECTS/DAMAGES, NO REDUCTION IN FUNCTIONALITY OF ELEMENT

3 = MODERATE DEFECT/DAMAGE, SOME LOSS OF FUNCTIONALITY COULD BE EXPECTED

4 = SEVERE DEFECT/DAMAGE, SIGNIFICANT LOSS OF FUNCTIONALITY AND/OR ELEMENT IS CLOSE TO FAILURE/COLLAPSE

5 = THE ELEMENT IS NON-FUNCTIONAL/FAILED

STRUCTURE HEALTH INDEX-CONDITION RATINGS

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INSPECTION SHEET - CONDITION RATINGS - STRUCTURE HEALTH INDEX

ITEM	IDENTIFICATION						
1	COUNTRY	UNITER ARAB EMIRATES					
2	DISTRICT	ABU DHABI MUNICIPALITY					
3	PROVINCE	ABU DHABI					
4	PLACE	XXXXXX					
5	ROUTE (ON/UNDER)	N/A		ON			
6	ORIENTATION	N/A					
7	LOCATION/LANDMARK	N/W-S/E					
8	STRUCTURE No.	XXXXXX					
9	KM POINT (STA)	N/A					

ITEM	IDENTIFICATION						
1	STRUCTURE ID NUMBER (SIN)	N/A					
2	LATITUDE (N/S)	27	deg	33	min	26	sec
3	LONGITUDE (E/W)	35	deg	32	min	21	sec
4							
5							
6							
7							
8							
9							
10							
11							
12							

ITEM	STRUCTURE TYPE AND MATERIAL		
1	STRUCTURE BASIC CATEGORY	Underpass	
2	STRUCTURE MATERIAL/TYPE	CONCRETE	MULTI BEAM
3	Nos. OF SPANS	2	
4	DECK STRUCTURE TYPE	CONCRETE CAST IN SITU	
5	WEARING SURFACE TYPE	BITUMINOUS	
6	TYPE OF MEMBRANE	UNKNOWN	
7	TYPE OF DECK PROTECTION	UNKNOWN	
8	ABUTMENT/WALL STRUCTURE TYPE	CANTILEVER	
9	PIER STRUCTURE TYPE	PIER CAP BEAM	
10			
11			
12			
13			
14			

VISIBLE DEFECTS & DEFICIENCIES

ITEM	ON TRAFFIC	DESCRIPTION	RATING	25%	50%	100%	WEIGHT FACTOR	ELEMENT HEALTH INDEX
1	SUPERSTRUCTURE	FAIR	5	1			50	12.5
2	DECK/SOFFIT	FAIR	5			1	50	50
3	PARAPETS	VERY GOOD	8			1	80	80
4	EXPANSION JOINTS	FAIR	5			1	50	50
5	DRAINAGE/SCUPPERS/COLLECTORS	EXCELLENT	9			1	90	90
6	STAY/SUSPENDED CABLES	POOR	4		1		40	20
7	STEEL CONDITION (CONNECTIONS-WELDING)	IMMINENT FAILURE	1			1	10	10
8	CONCRETE CONDITION (CRACKS, CHEMICAL ATTACK ETC	FAIR	5			1	50	50
9	HUMIDITY/LEAKAGES	FAILED	0			1	0	0

VISIBLE DEFECTS & DEFICIENCIES

ITEM	ON TRAFIC	DESCRIPTION	RATING	25%	50%	100%	WEIGHT FACTOR	ELEMENT HEALTH INDEX
1	PAVEMENT	SATISFACTORY	6			1	60	60
2	KERBS & SIDE WALKS	SERIOUS	3	1			30	7.5
3	BARRIERS	SATISFACTORY	6			1	60	60
4	RAILINGS	SERIOUS	3			1	30	30
5	FENCES	EXCELLENT	9			1	90	90
6	TRAFFIC SIGNALING	SERIOUS	3		1		30	15
7	OVERHEAD GANTRIES	SERIOUS	3			1	30	30
8	MASTS/POSTS	GOOD	7			1	70	70
9	APROACH SLABS	SERIOUS	3			1	30	30
10	CORROSION/EXPOSED REINFORCEMENT	SERIOUS	3	1			30	7.5
11	SETTLEMENTS/INCLINATIONS	NOT APPLICABLE	0			1	0	0
12	VEHICLE ATTENUATORS	SERIOUS	3			1	30	30

VISIBLE DEFECTS & DEFICIENCIES

ITEM	UNDER TRAFFIC	DESCRIPTION	RATING	25%	50%	100%	WEIGHT FACTOR	ELEMENT HEALTH INDEX
1	ABUTMENT	POOR	4			1	40	40
2	PIER	SATISFACTORY	6			1	60	60
3	RETAING WALLS	GOOD	7			1	70	70
4	EMBANKMENT	POOR	4		1		40	20
5	BEARINGS	FAIR	5			1	50	50
6	RIP RAP	POOR	4	1			40	10
7	FOUNDATION	CRITICAL	2			1	20	20
8	CLEARANCES	CRITICAL	2			1	20	20
9	DISCHARGE & DRAINAGE SYSTEMS	POOR	4		1		40	20
10	STEEL CONDITION (CONNECTIONS-WELDING)	EXCELLENT	9			1	90	90
11	CONCRETE CONDITION (CRACKS, CHEMICAL ATTACK ETC	EXCELLENT	9			1	90	90
12	SCOUR	EXCELLENT	9			1	90	90
13	SETTLEMENTS/INCLINATIONS	POOR	4	1			40	10
14	HUMIDITY/LEAKAGES	POOR	4			1	40	40

ITEM	AGE AND SERVICE		
1	YEAR BUILT (E=ESTIMATED)	2014	E
2	YEAR RECONSTRUCTED	2015	
3	TYPE OF SERVICE ON	ROAD	
4	TYPE OF SERVICE UNDER	UNDERPASS/ROAD	
5	Nos. OF LANES ON	4	
6	Nos. OF LANES UNDER	6	
7	AVER. DAILY TRAFFIC (ADT)-Nos.	40,000	
8	YEAR OF ADT	2018	
9	AVER. TRUCK DAILY TRAFFIC (TDT) (%)	8000	
10	BYPASS, DETOUR LENGTH (Km)	0	

ITEM	CLASSIFICATION	
1	STRATEGIC/DEFENSE STRUCTURE	Not a STRATEGIC/DEFENSE
2	TEMPORARY STRUCTURE	NOT A TEMPORARY STRUCTURE
3	OTHER KSA AUTHORITY	N/A
4	TOLL	N/A
5	MAINTENANCE RESPONSIBILITY	ABU DHABI MUNICIPALITY
6	OWNER	ABU DHABI MUNICIPALITY
7	HISTORICAL SIGNIFICANCE	NO HISTORICAL SIGNIFICANCE

ITEM	GEOMETRIC DATA						
1	LENGTH OF MAX SPAN (m)	15.5					
2	STRUCTURE LENGTH (m)	1475					
3	KERB/SIDEWALK WIDTH (m)	1	L	1.5	M	1	R
4	CARRIAGE WIDTH (KERB-KERB) (m)	13.4					
5	TOTAL DECK WIDTH (m)	31					
6	APPROACH ROADWAY WIDTH (m)	31					
7	SKEW ANGLE (DEG)	90					
8	MIN VERT. CLEARANCE ON (m)	N/A					
9	MIN VERT. CLEARANCE UNDER (m)	6.17	H				
10	MAX HORIZ. CLEARANCE ON (m)	8					
11	MAX HORIZ. CLEARANCE UNDER (m)	8					
12	MEDIAN	OPEN MEDIAN					

ITEM	NAVIGATION DATA	
1	NAVIGATION CONTROL	NOT APPLICABLE, NO WATERWAY
2	PIER PROTECTION	NOT APPLICABLE
3	NAVIGATION VERT. CLEARANCE (m)	N/A
4	NAVIGATION HORIZ. CLEARANCE (m)	N/A

VISIBLE DEFECTS & DEFICIENCIES

ITEM	UNDER TRAFFIC	DESCRIPTION	RATING	25%	50%	100%	WEIGHT FACTOR	ELEMENT HEALTH INDEX
1	CORROSION/EXPOSED REINFORCEMENT	POOR	4			1	40	40
2		NOT APPLICABLE	0				0	0
3		NOT APPLICABLE	0				0	0
4		NOT APPLICABLE	0				0	0
5		NOT APPLICABLE	0				0	0
6		NOT APPLICABLE	0				0	0
7		NOT APPLICABLE	0				0	0
8		NOT APPLICABLE	0				0	0
9		NOT APPLICABLE	0				0	0
10		NOT APPLICABLE	0				0	0

VISIBLE DEFECTS & DEFICIENCIES

ITEM	OTHER	DESCRIPTION	RATING	25%	50%	100%	WEIGHT FACTOR	ELEMENT HEALTH INDEX
1	PUMPS-PUMPS STATION	SERIOUS	3	1			30	7.5
2	ELECTRICAL, LIGHTING	SERIOUS	3		1		30	15
3	NETWORKS	SERIOUS	3	1			30	7.5
4	COMMUNICATIONS	SERIOUS	3			1	30	30
5	CCTV & SAFETY	SERIOUS	3	1			30	7.5
6		NOT APPLICABLE	0				0	0
7		NOT APPLICABLE	0				0	0
8		NOT APPLICABLE	0				0	0

ITEM	EVALUATION - PROPOSALS			
1	HYDRAULIC EFFICIENCY	POOR	NEEDED TESTING	YES
2	OPERATIONAL EFFICIENCY	VERY GOOD	NEEDED INSPECTION FOCUSED ON	NO
3	ENVIRONMENTAL EFFICIENCY	VERY GOOD	NEEDED REPAIR REPLACEMENT WORKS	YES
4	AESTHETIC ISSUES	VERY GOOD		
5	TRAFFIC EFFICIENCY	VERY GOOD		
6	SERVICE BEHAVIOR	VERY GOOD		
7	QUALITATIVE DETERIORATION	VERY GOOD		
8		NOT APPLICABLE		
9		NOT APPLICABLE		
10		NOT APPLICABLE		
11		NOT APPLICABLE		
12		NOT APPLICABLE		
13		NOT APPLICABLE		

ITEM	INSPECTIONS & OTHER NOTES	
1	NEXT INSPECTION DATE	SEE REPORT
2		
3		
4		

OVERALL PRIORITY AND CLASSIFICATIONS OF ACTIONS	HIGH-1
STRUCTURE HEALTH INDEX	37

GENERAL COMMENTS

SEE REPORT

Rev:	Description	Issuance	Check	Date
0	initial	SR	SR	15-Jan-21

STRUCTURE CERTIFICATE

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Inspection Certificate

FOR OFFICE USE ONLY

Page 1 of 6 | Rev.00

Structure: xxxxx

INSTRUCTIONS: *Fill in ALL applicable data.* A copy of this completed form shall be kept by ADM viewing by the authorized Inspection Agency upon request.

IDENTIFICATION:

OWNER NAME	CUSTOMER ID#			DEPARTMENT NAME: MUNICIPALITIES AND TRANSPORT	
STREET ADDRESS: SHEIKH ZAYED BIN SULTAN ST – ZONE 1E11		☒ CITY ☐ VILLAGE ☐ TOWN: ABU DHABI		COUNTRY: U.A.E	ZIP: N/A
E-MAIL: N/A		PHONE: (+971) 26788888		CELL: (+XXX) XXXXX	
INSPECTED STRUCTURE TYPE: CULVERT	STRUCTURE ID/NAME: XXXXXXX	STRUCTURE MATERIAL: CONCRETE	GPS COORDINATES: XX°XX'XX"N, XX°XX'XX"E	YEAR BUILT (YYYY, E=ESTIMATED): XXXX	
STRUCTURE LOCATION ☒STR./ROAD ☐AREA ☐LANDMARK: 1 km SOUTH OF PORT			ORIENTATION: NE-SW	MUNICIPALITY DISTRICT: ABU DHABI	
INSPECTOR NAME: XXXXXXXX	COMPANY N				
STREET ADDRESS		☒ CITY ☐ VILLAGE ☐ TOWN: ATHENS		COUNTRY: GREECE	ZIP: 15125
E-MAIL		PHONE: (+30)		CELL: (+XXX) XXXXX	

GENERAL INSPECTION INFORMATION:

INSPECTION DATE (MM/YYYY):	PRIOR INSPECTION DATE (MM/YYYY or N/A):	INSPECTION PURP	STRUCTURE DESIGN RECORDS/AS BUILT:
05/2021	05/2021	FRACTURE-CRITICAL MEMBER INSPECTION	YES

NDT TYPE: ☒Sound Delamination ☒Schmidt ☒Crack Mapping ☒Corrosion Potential ID ☒UT ☒Ground Penetration Radar (GPR)

☒Concrete Cover ☒Concrete Core ☒Carbonation ☒Sulphate ☒Chlorides ☐Other Chemical Analysis

☒Steel VT ☒Steel PT ☐Steel MP ☐Steel UT ☐Steel Coating/Painting ☐Chemical Analysis ☒Bolt Torque Testing ☐Steel Testing

☒Pump station ☐MEP ☒Security/Networks/Communications ☒Load Testing ☐Rip/Rap ☒U/W ☒Scour ☐Boreholes ☐Piezometers

STRUCTURE SPECIFICATIONS:

SUPERSTRUCTURE TYPE:	SIMPLY SUPPORTED BEAM	SPAN Nos.:	MULTI	DECK Nos.:	DOUBLE	Length (m):	50	Deck Width (m):	15
TRAFFIC:	SINGLE	ABOVE:	STREET/ROAD/HIGHWAY	BELOW:	STRUCTURE	SIDEWALKS:	☐Yes ☒ No	MEDIAN BARRIER:	☐Yes ☒ No
PREVIOUS REPAIRS:	☐Yes ☒ No	MONITORING SYSTEM:	☐Yes ☒ No	PRIORITY OF ACTIONS:	☐High ☒ Low	RATING POSTED:	☐Yes ☒ No		

PERFORMED INVESTIGATIONS, ANALYSES AND STUDIES:

☒ Abutments ☒ Piers ☒ Bearings ☒ Expansion Joints ☐ Sidewalks/Barriers ☒ Scuppers/Gullies/Drainage system ☒ Posts/Masts ☒ Pavement ☒ PT Cables

☐ Traffic Signaling ☒ Overhead Gantries ☒ Lighting ☒ Paint ☒ Utilities ☒ Foundation ☒ Approach Slab ☒ Retaining Walls ☒ Embankment

☒ Structural ☐ Hydraulic ☒ Drainage ☒ Scour ☒ Settlement/Stability ☐ Geotechnical ☐ Topographic Survey ☒ Issuance ACAD ☒ Issuance BIM/(LOD 350)

Reporting: ☐ Inception ☒ Interim/Periodic ☒ Final/Evaluation ☒ Inventory/Appraisal ☐ Other

STRUCTURE CLASSIFICATION AND HEALTH INDEX:

CONDITION RATING (Code - Description):	2 - CRITICAL	ANALYSIS:	2 - ADVANCED DETERIORATION OF PRIMARY STRUCTURAL ELEMENTS. FATIGUE CRACKS IN STEEL OR SHEAR CRACKS IN CONCRETE MAY BE PRESENT OR SCOUR MAY HAVE REMOVED SUBSTRUCTURE SUPPORT. UNLESS CLOSELY MONITORED IT MAY BE CLOSED TO TRAFFIC UNTIL CORRECTIVE ACTION
STRUCTURE HEALTH INDEX:		2 - FAIR	

TRAFFIC SAFETY FEATURES INDEX:

CONDITION RATING (Code - Description):	0 - DOES NOT MEET/NOT PROVIDED	ANALYSIS:	0 - FEATURE DOES NOT MEET ACCEPTABLE STANDARDS OR SAFETY FEATURES OR A SAFETY FEATURE IS REQUIRED AND NON IS PROVIDED

KEY PERFORMANCE INDICATORS

ELEMENTS-SAFETY-RELIABILITY-SECURITY-AVAILABILITY-MAINTAINABILITY-ECONOMY-ENVIRONMENTAL-HISTORY-IMPORTANT-SPIDER DIAGRAMS

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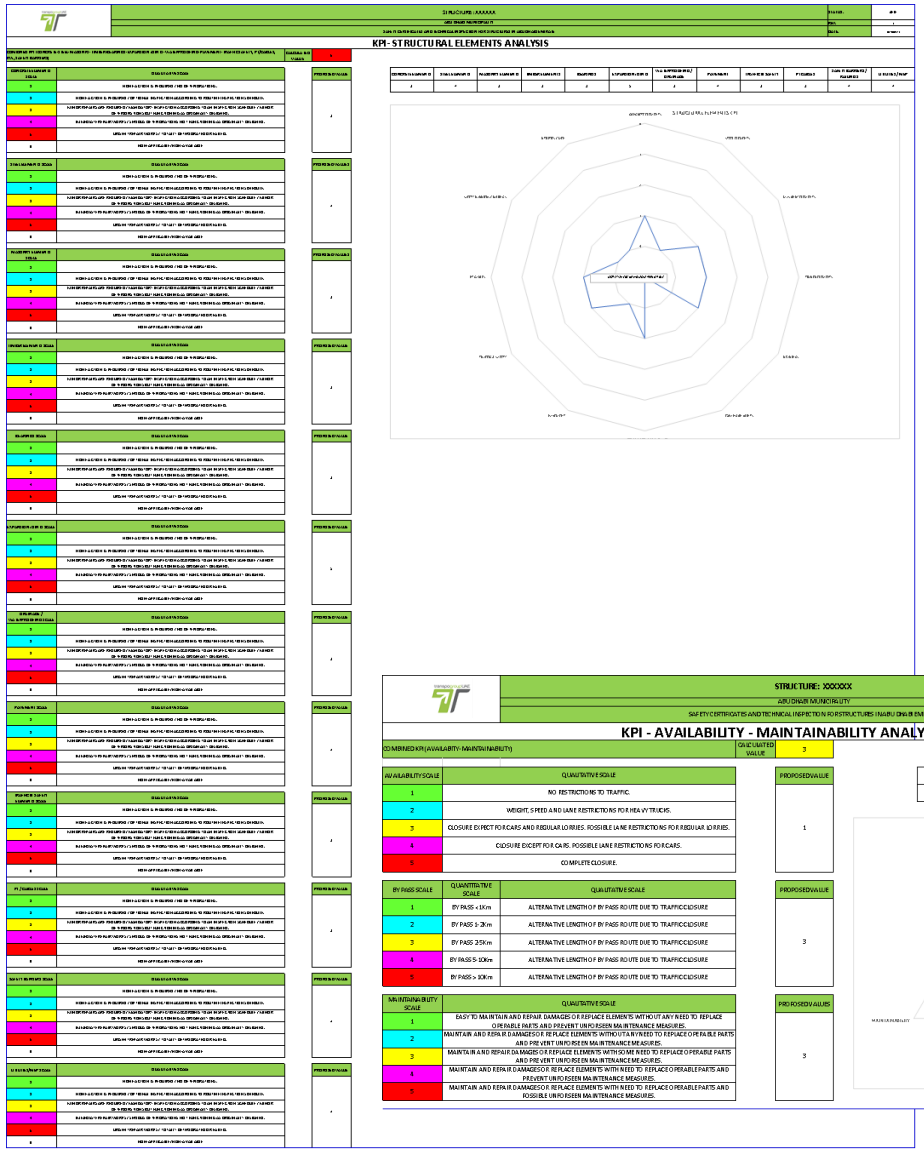

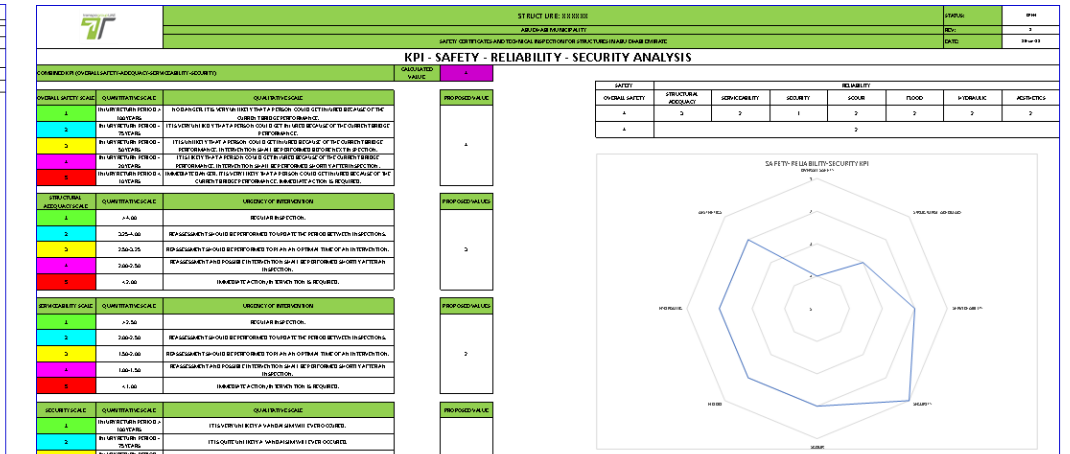

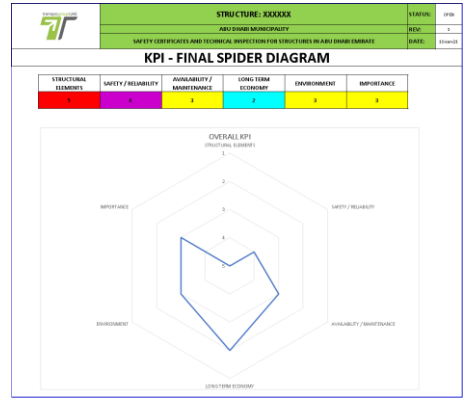

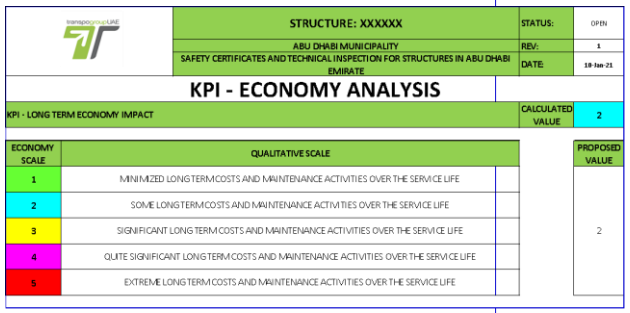

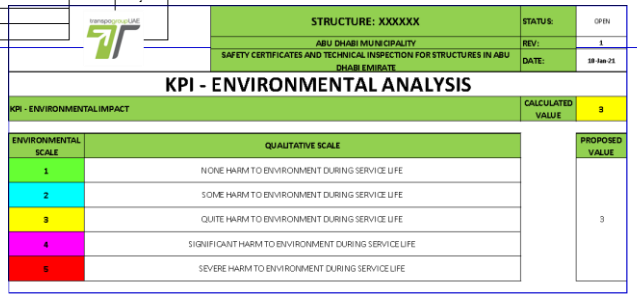

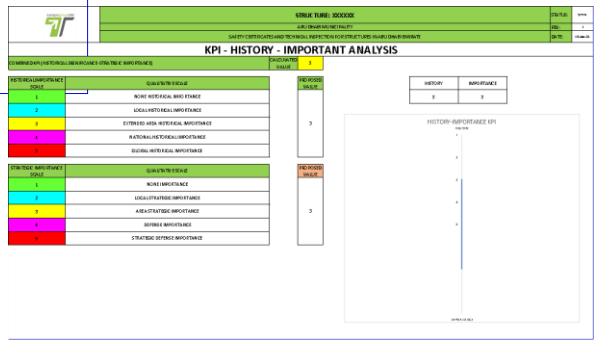

REAL TIME STRUCTURAL MONITORING (RTSM)

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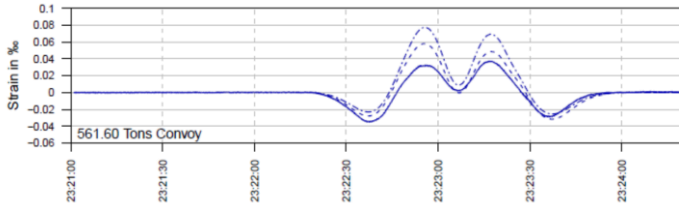
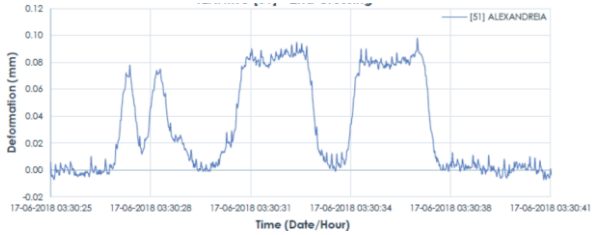
USING THE TECHNOLOGY OF FIBRE OPTICS VERIFICATION OF THE APPLIED STRESSES IN THE STRUCTURE BY MEASURING:

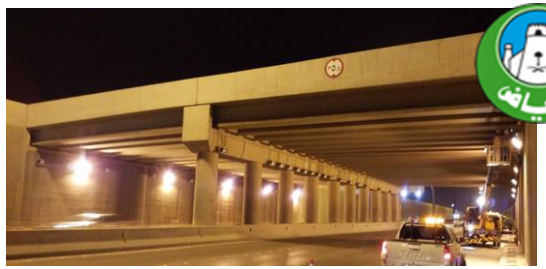
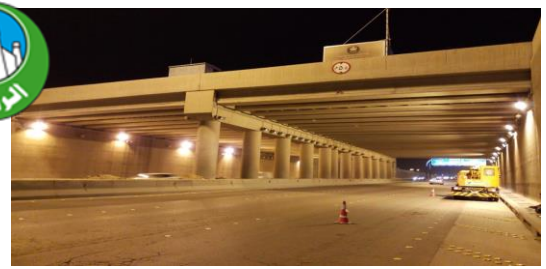


-LOADS
-DISPLACEMENTS, ROTATIONS & INCLINATIONS
-ACCELERATIONS
-STRAINS
-TEMPERATURE OF STRUCTURE & AMBIENT TEMPERATURE
-ENVIRONMENTAL CONDITIONS (HUMIDITY & WINDS)
-STRUCTURE BEHAVIOUR UNDER SERVICE (TRAFFIC) or SEISMIC ACTIONS



BROADCASTING OF AUTOMATIC MESSAGES / REPORTS (SMART MONITORING) FOR SPECIFIC BEYOND PREDETERMINED LIMITS IN ORDER TO ENSURE THE PUBLIC SAFETY AND TRAFFIC

PRESENCE IN GULF


STRUCTURES U-6A – 14 – 15 - 16
Intersection of Dhahran road with Omar Ibn Al Khattab road & Ali Ibn Ali Talib road & Dirab Road Tunnels &


KING KHALID INT'L AIRPORT
East Taxiway Aircraft Bridge 1 (T) - Car Park building Terminals 1 & 2


AL SHUQAIQ SALINE WATER CONVERSION DESALINATION
Under Water Inspection

- **Inspection & NDT**
- **Evaluation - Proposals & Recommendations**


SAUDI RAILWAYS ORGANIZATION
Hofuf-Riyadh Culverts

PRESENCE IN GULF

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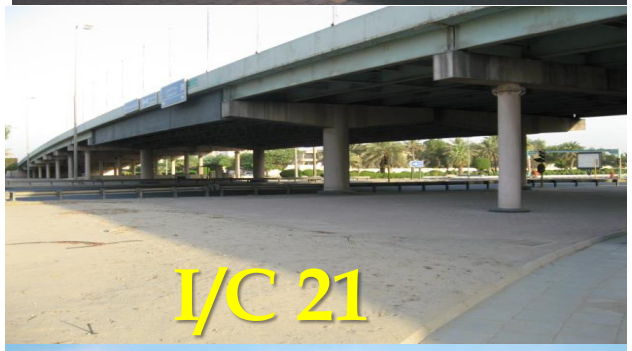

SPECIALIZED APPLICATIONS IN MAINTENANCE & REPAIR

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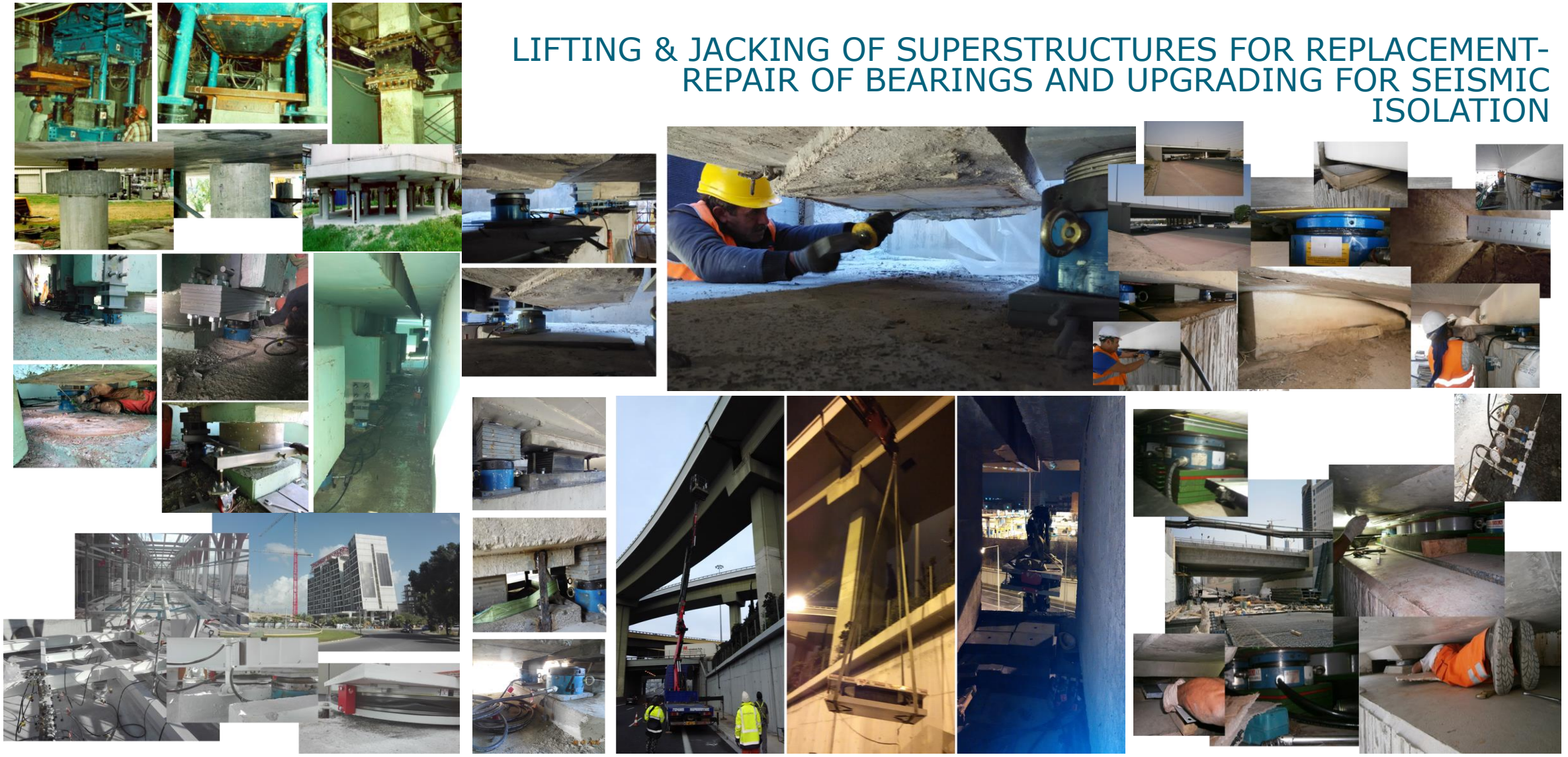
LIFTING & JACKING OF SUPERSTRUCTURES FOR REPLACEMENT-REPAIR OF BEARINGS AND UPGRADING FOR SEISMIC ISOLATION



SPECIALIZED MAINTENANCE & REPAIR

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EXTERNAL PT, FRP, RELOCATION, STRENGTHENING, CRACK REPAIRS, BRIDGE UPGRADING, STEEL ITEMS & CONNECTIONS, PAINTING, WATERPROOFING

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