Current State and Issues of Infrastructure Maintenance in Korea

(ACECC TC-28 Meeting in Mar 2022)

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For a Better Quality of Life

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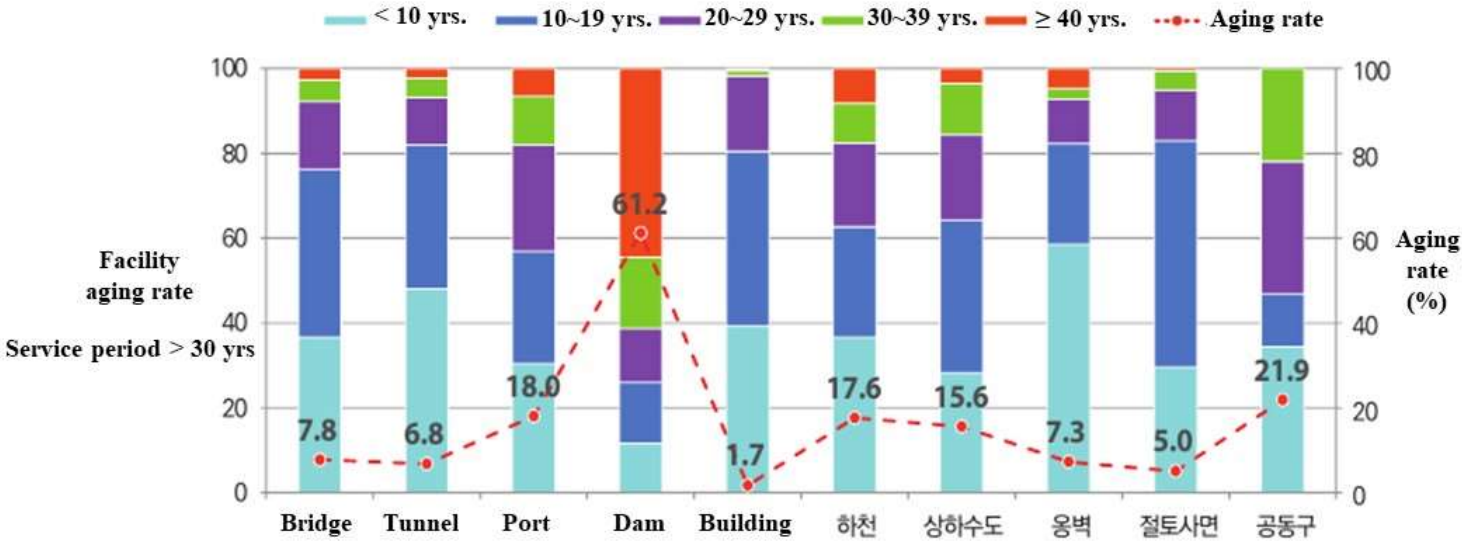
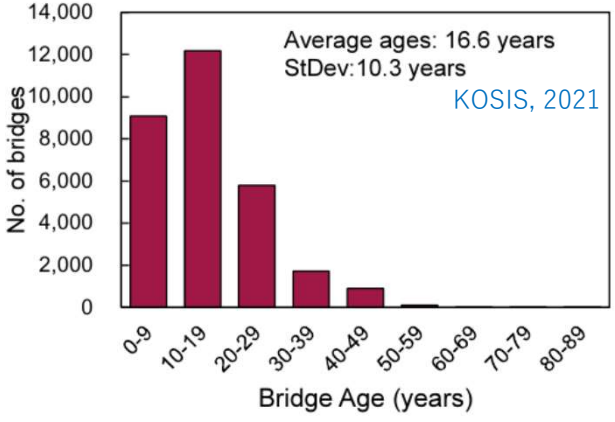
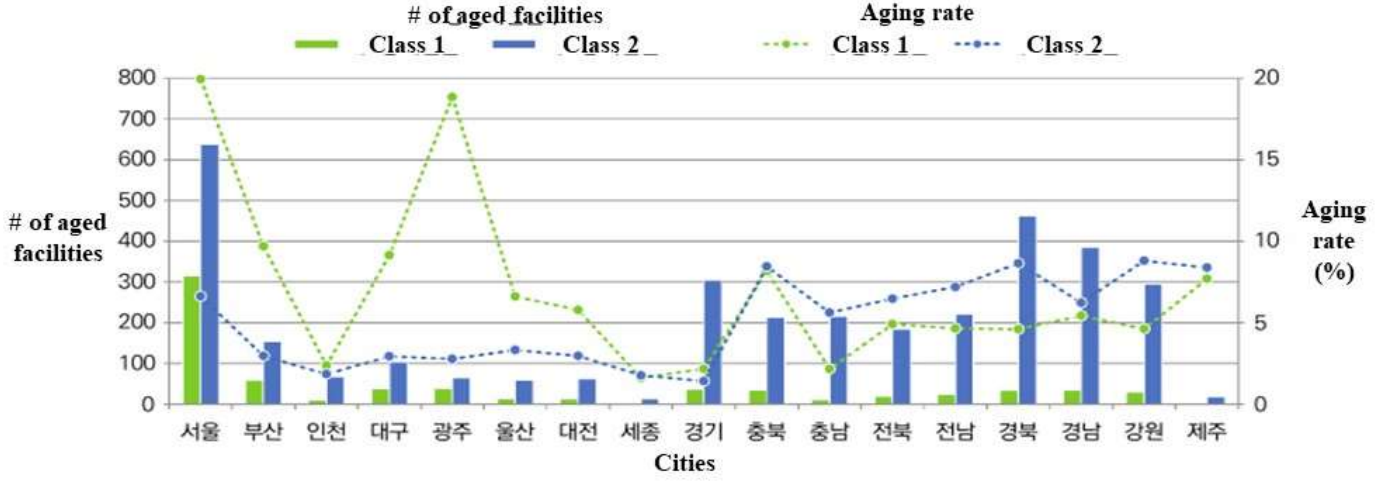
Outline

1. Deterioration of Infrastructures in Korea
2. Member-based Data for Bridges
3. Digitalization of Maintenance task
4. Issues of Bridge Maintenance in Korea

Deterioration of Infrastructures in Korea



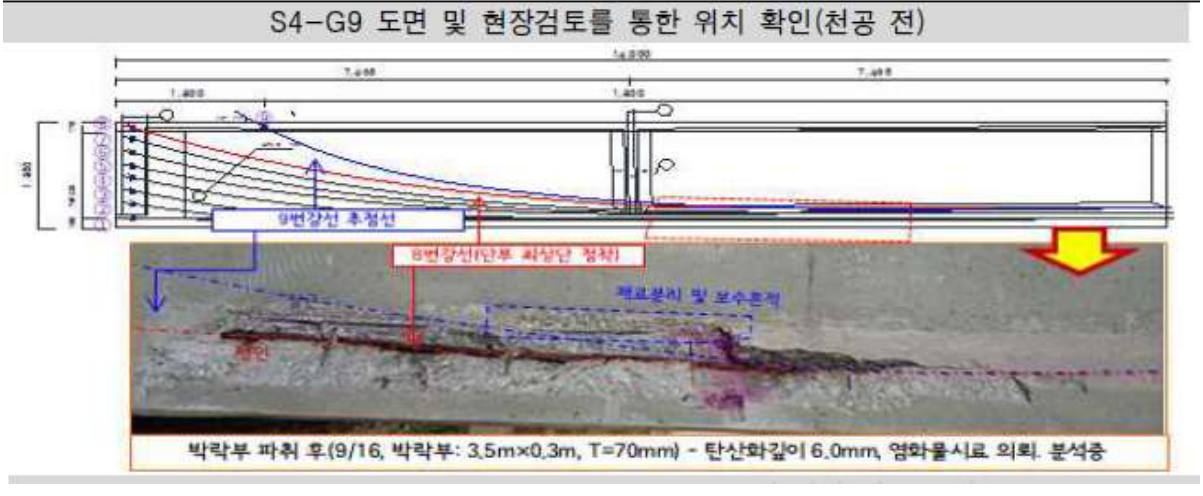




Deterioration of Infrastructures in Korea

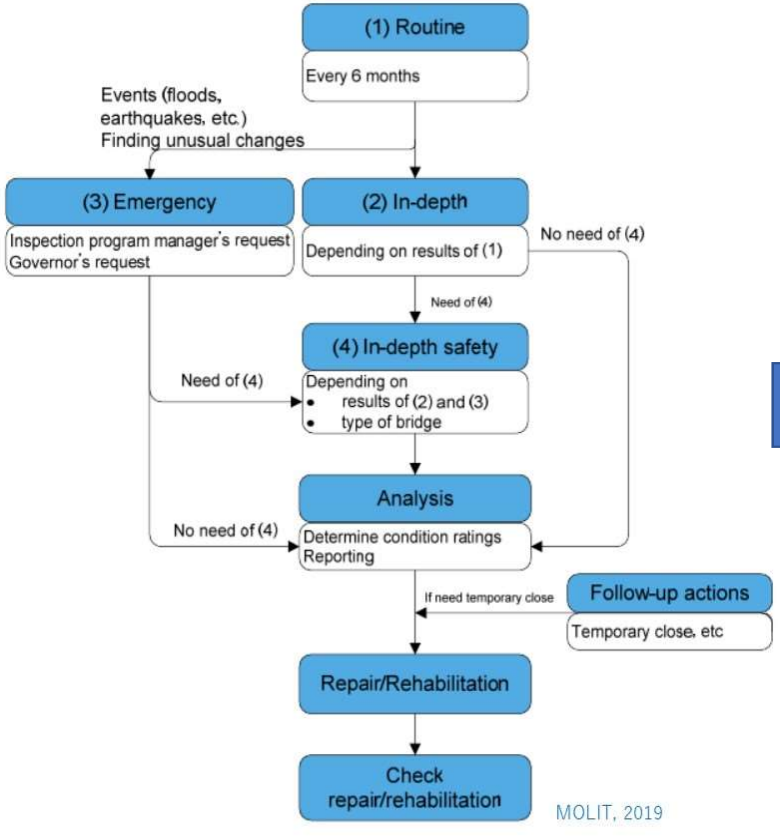
- Safety Issue due to Hidden Damages of Bridges

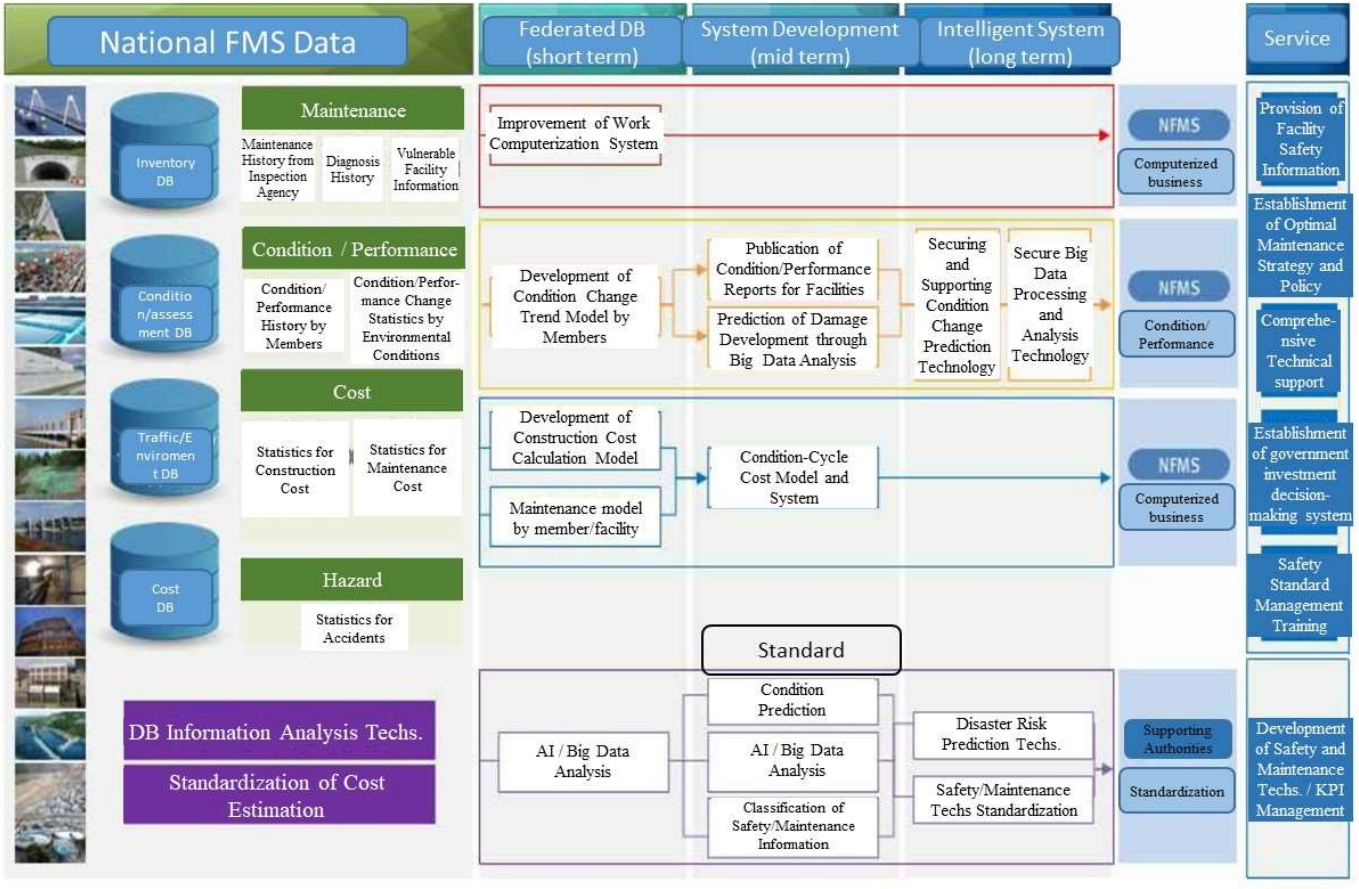
- New Process and Technologies are needed.



Member-based Data for Bridges

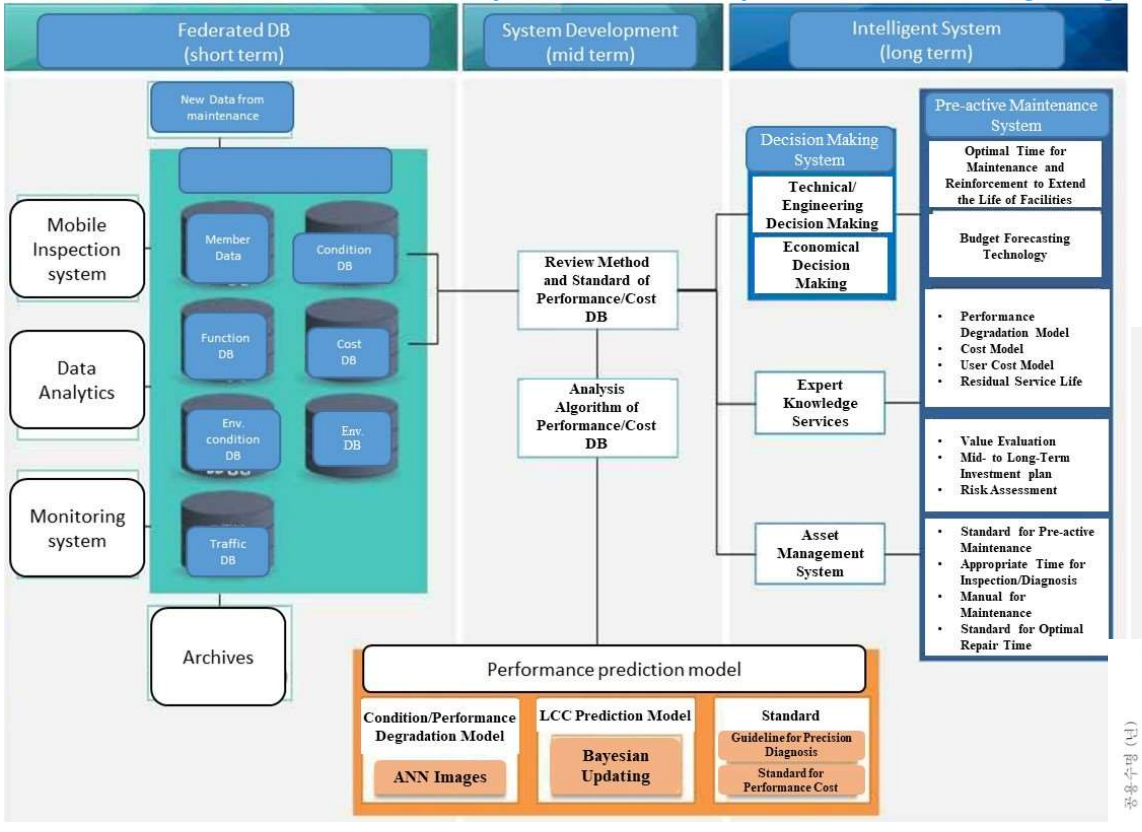
- Visual inspection data : FMS starts to accumulate member-based data

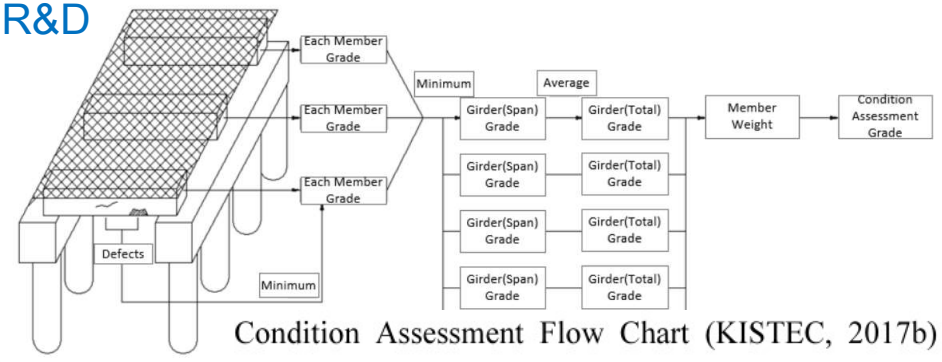




Member-based Data for Bridges

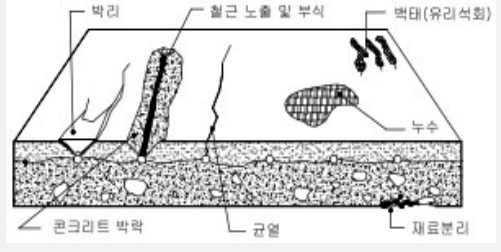
- Data collection and performance prediction : on-going R&D

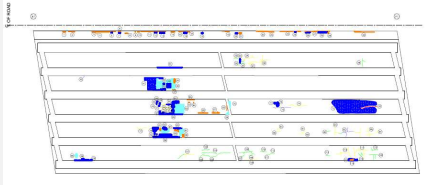


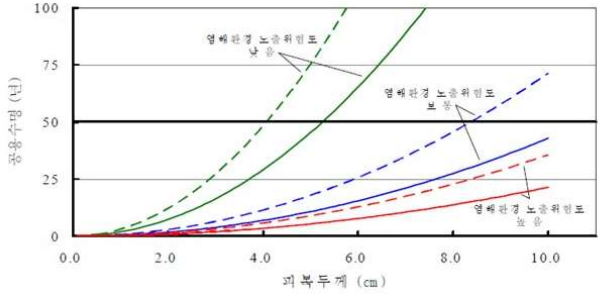


Condition Assessment Flow Chart (KISTEC, 2017b)

- Bridge Slab



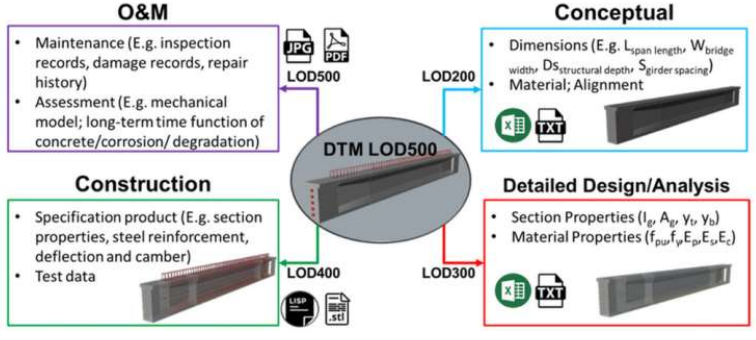




Deterioration model For prediction

Digitalization of Maintenance task

- Digitalization of existing maintenance data & bridges



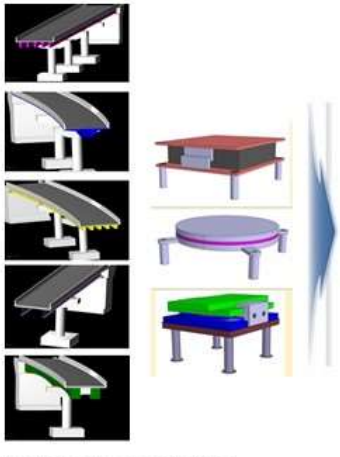
Data labeling Unique ID

Section①	Section②		Section③				Section④
1	2	3	4	5	6	7	8	9
940	-	SG04	ITUR	-	E02	D01	SD01	AS05	-	161228

Division	Item		Notation
Section ①	Bridge Identification		
Class 1.	*Bridge Identification*	940	Corresponding Bridge
Section ②	Inspection Elements		
Class 2.	*Structural Member (Part)*	SG04	Stiffening Girder #04
Class 3.	*Structural Member (Position)*	IT	In-Top
Class 4.	*Inspection Member*	UR	U-shape Rib Member
Section ③	Damage Types		
Class 5.	*Member Detail*	E02	Element Detail(E02) - Steel Girder
Class 6.	*Damage Type*	D01	Damage Detail(D01) - Basic Material and Joint Damage
Class 7.	*Specific Damage*	SD01	Specific Damage(SD01) - Part Cracking
Class 8.	*Assessment Standard*	AS05	Assessment Standard(AS05) - Overall Cracking in Element
Section ④	Inspection Data		Year. Month. Day
Class 9.	*Inspection Date*	161228	Inspection Data 16-12-28

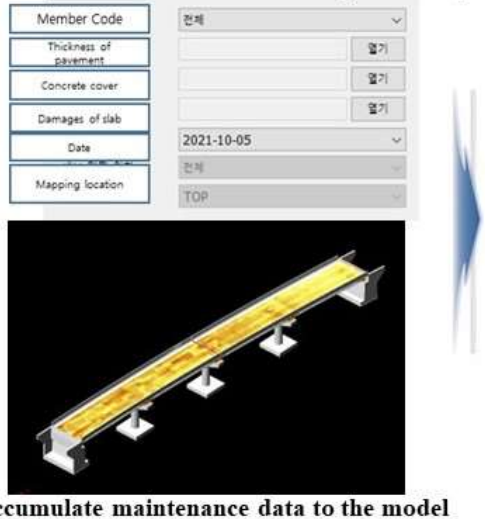
Algorithm-based model generation

Data template for BMS model authoring

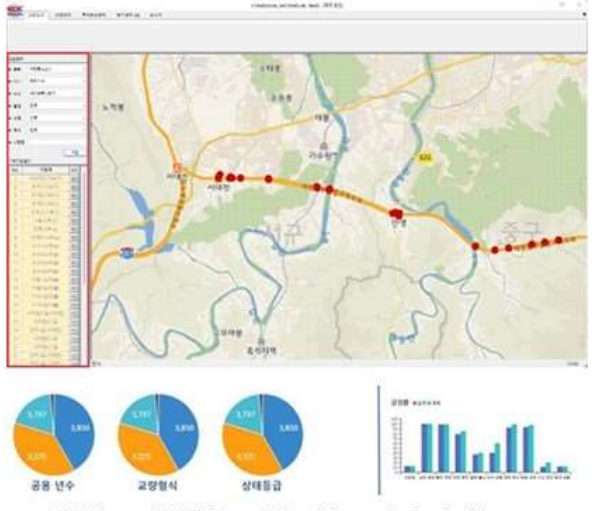


Automatic generation of digital models by data

Inspection, NDE, condition, repair history



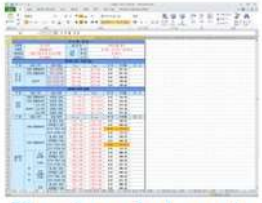
Accumulate maintenance data to the model



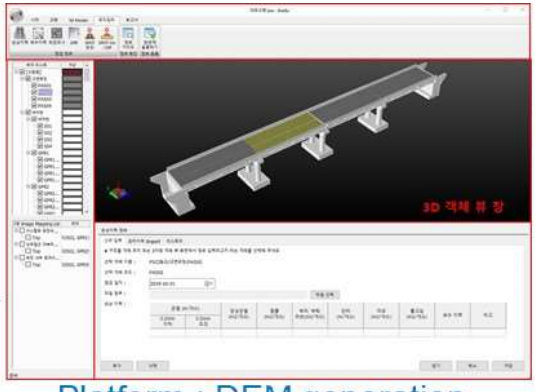
GIS based BMS and Dashboard for bridge owners

Digitalization of Maintenance task

- New BMS for Korea Expressway Corporation

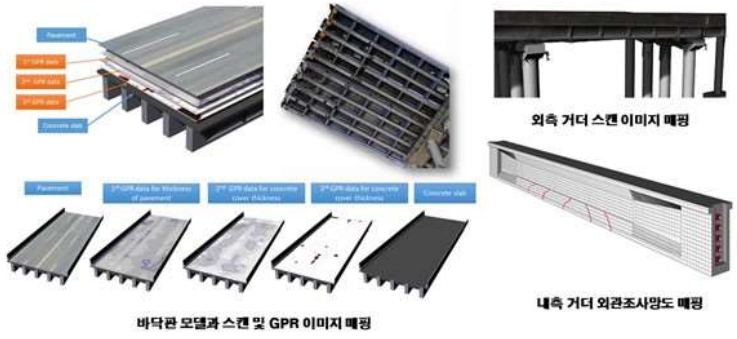


Design dataset

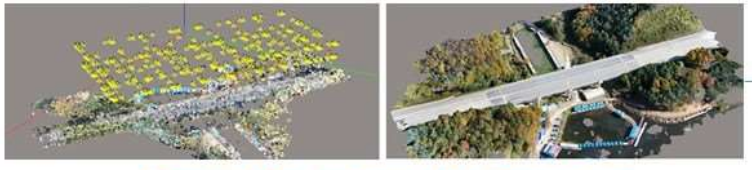


Platform : DEM generation

Data collection
& analytics for future
performance prediction

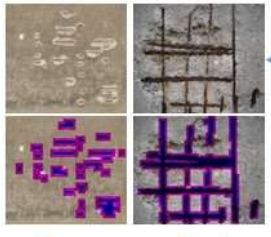


Digital Models for Maintenance

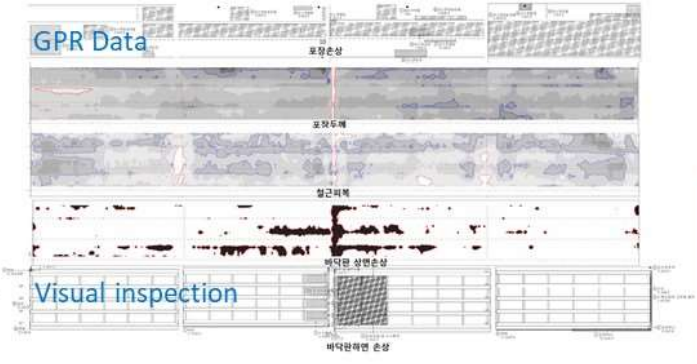


Reality Model by UAV Scanning

Scanned Image DB



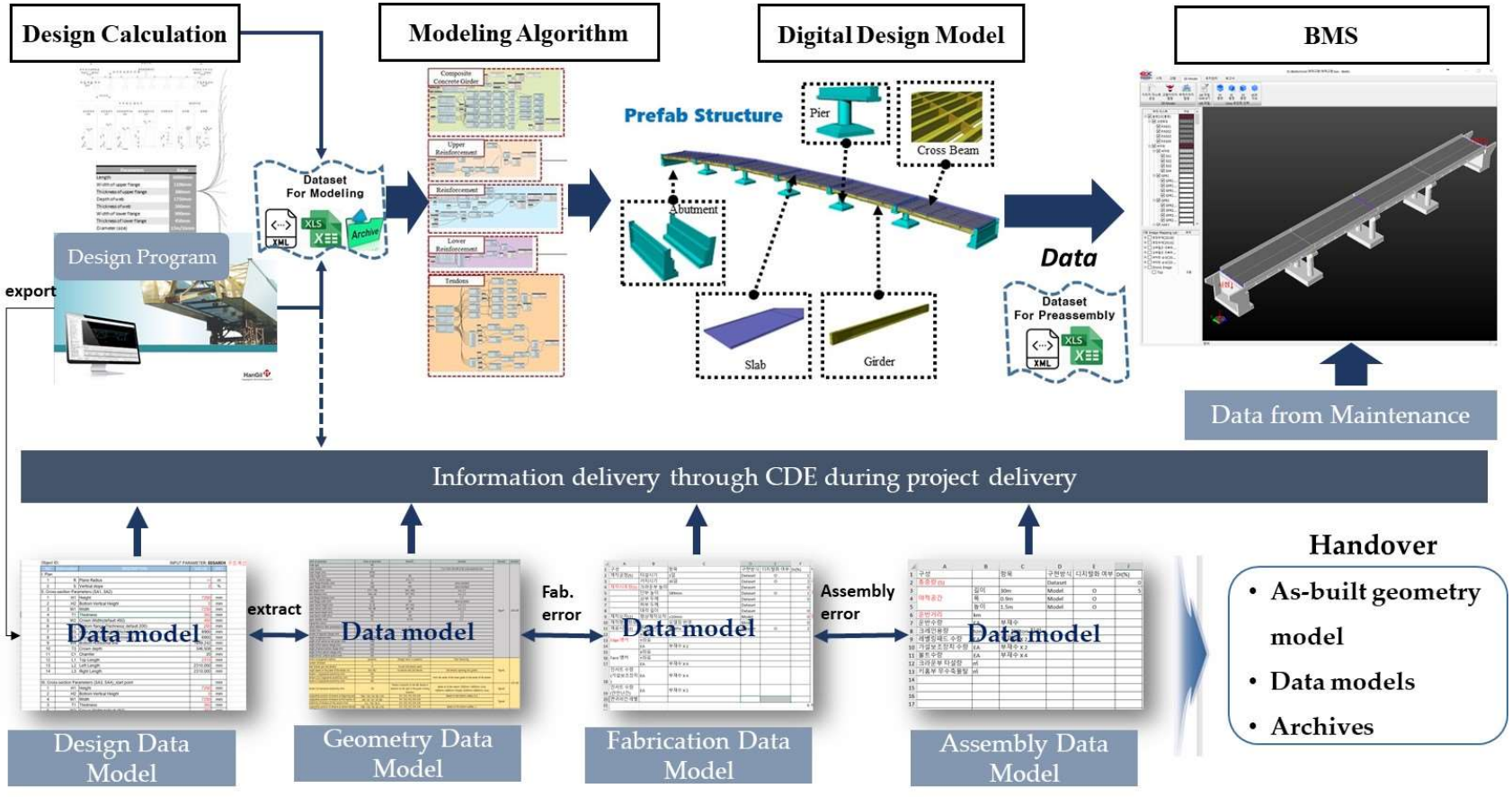
Damage Data



Concrete Slab Twin Model

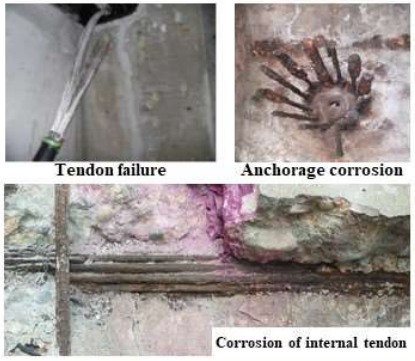
Digitalization of Maintenance task

- As-built BIM deliverables for Maintenance : on-going national R&D

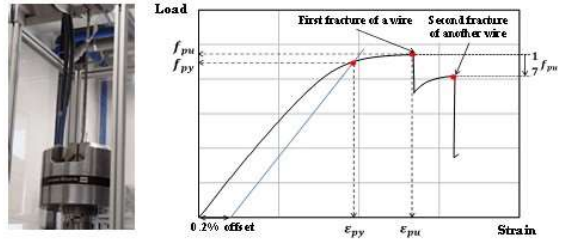


Issues of Bridge Maintenance in Korea

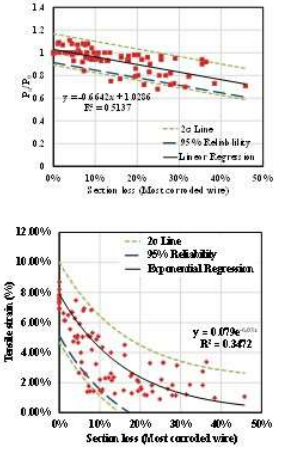
- Invisible deterioration of bridges (new inspection methodology & future prediction data ?)



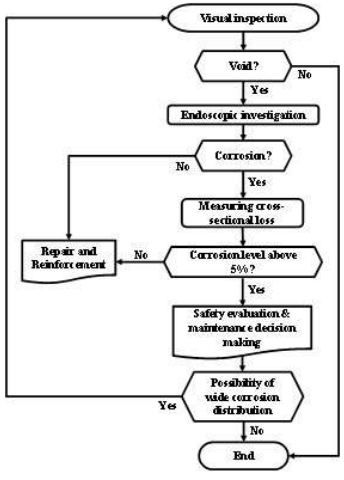
Corrosion cases in Korea



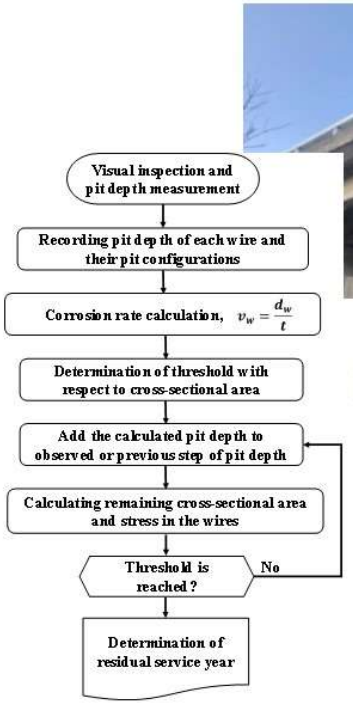
Tensile test of corroded strands



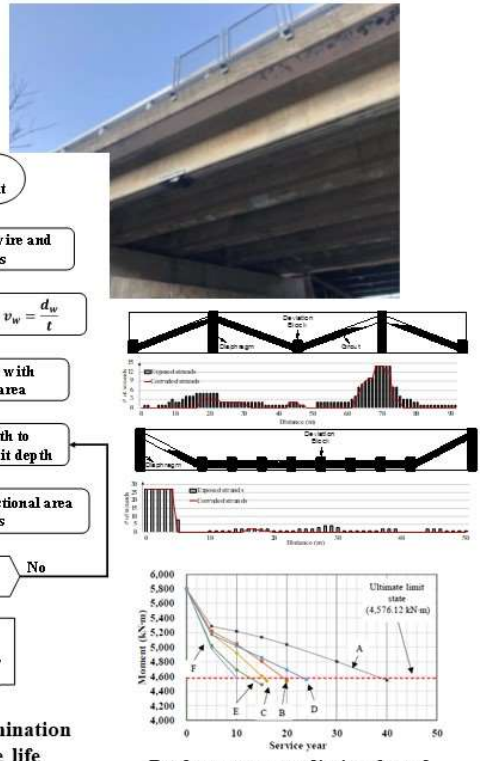
Tensile strength and strain



Corrosion inspection flowchart

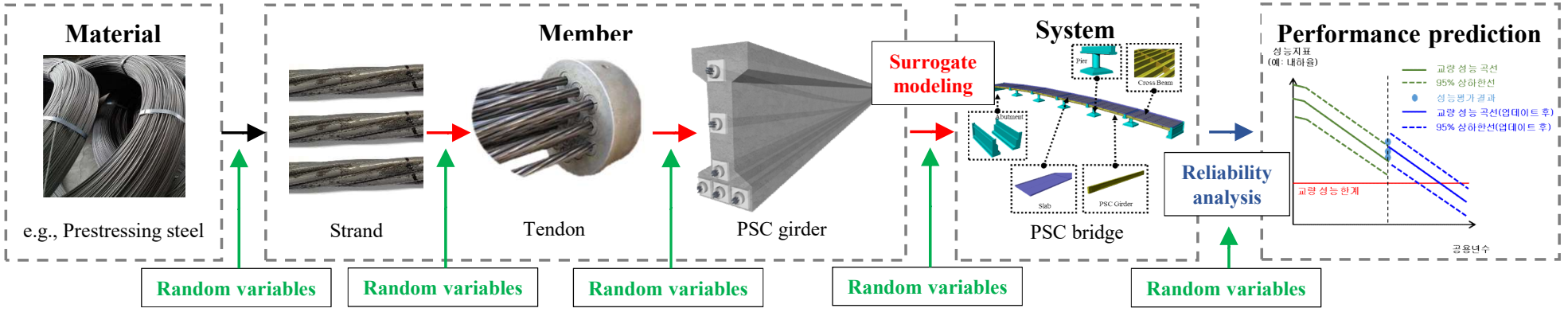


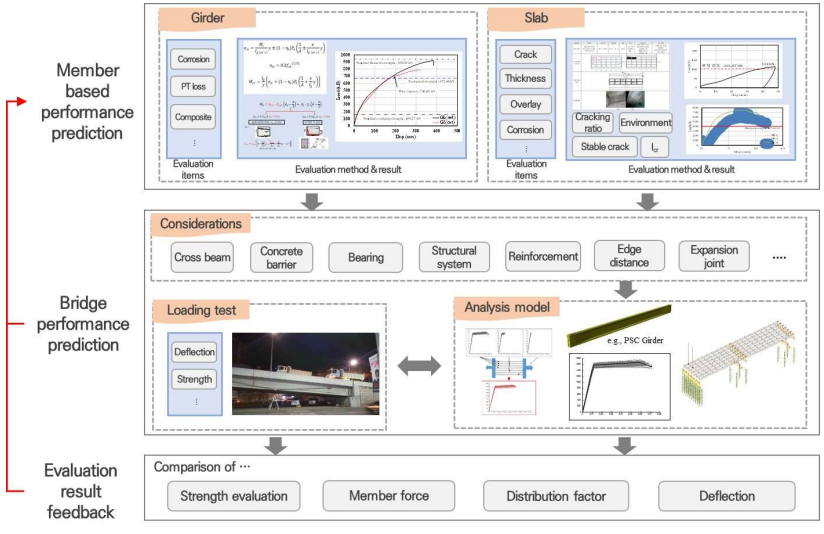
Flowchart for determination of residual service life



Performance prediction based on corrosion scenarios

Issues of Bridge Maintenance in Korea



- **Collaborative Effort**

- Bridge owners : allow detail inspection for replaced bridges
- Public agencies for maintenance: digitalization of data and open-data
- Academics: AI-based prediction
- International : IABSE TG 5.6 “BIM for existing structures”