Infrastructure Safety Management & Maintenance in Korea

September 2013

KISTEC
(Korea Infrastructure Safety & Technology Corporation)

Contents

I Infrastructure Status in Korea

1. Infrastructure in Korea

Unit : no. of facility

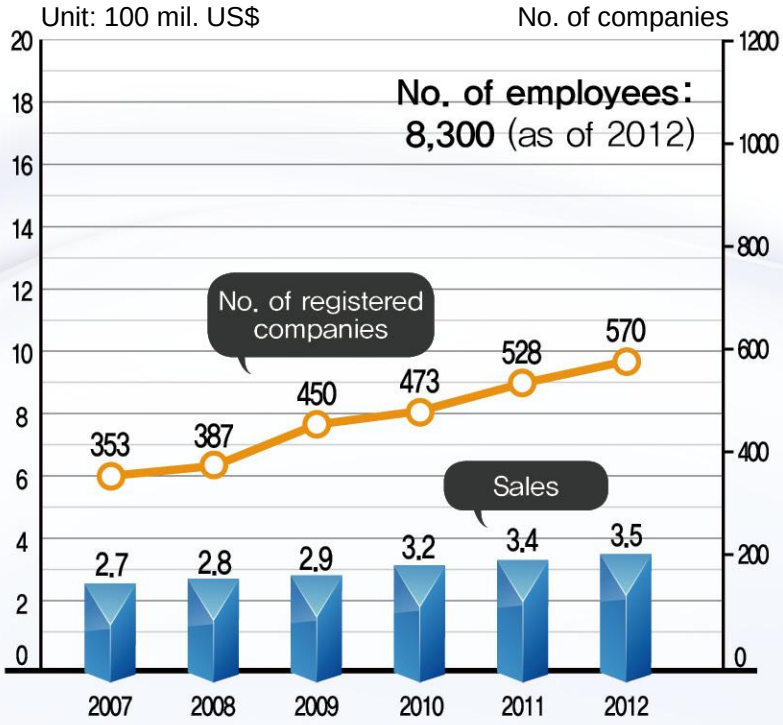
Classification		Total Facility	Vulnerable facility (Grade D&E)
National major facility[1)]	Public facility	24,800	50
	Building	38,100	1
	Sub-total	62,900	51
Small scale facility[2)]	Public facility	19,700	268
	Building	177,900	1,196
	Sub-total	197,600	1,464
Other facility[3)] (e.g. houses, reservoirs, etc.)	Public facility	71,700	N/A
	Building	6,580,200	N/A
	Sub-total	6,651,900	N/A
Total	Public facility	116,200	318
	Building	6,796,200	1,197
	Sub-total	6,912,400	1,515

Note: 1)~3) Subjected by SASMI, GADSM and specific Acts, respectively
(SASMI - Special Act on the Safety Management of Infrastructure; GADSM - General Act on Disaster & Safety Management)
Source : FMS (Facility Management System, Jul. 2013), NEMA (National Emergency Management Agency, 2013), MOLIT (Ministry of Land Infrastructure & Transport) Statistics (2012), KRCC (Korea Rural Community Corporation, 2013)

I Infrastructure Status in Korea

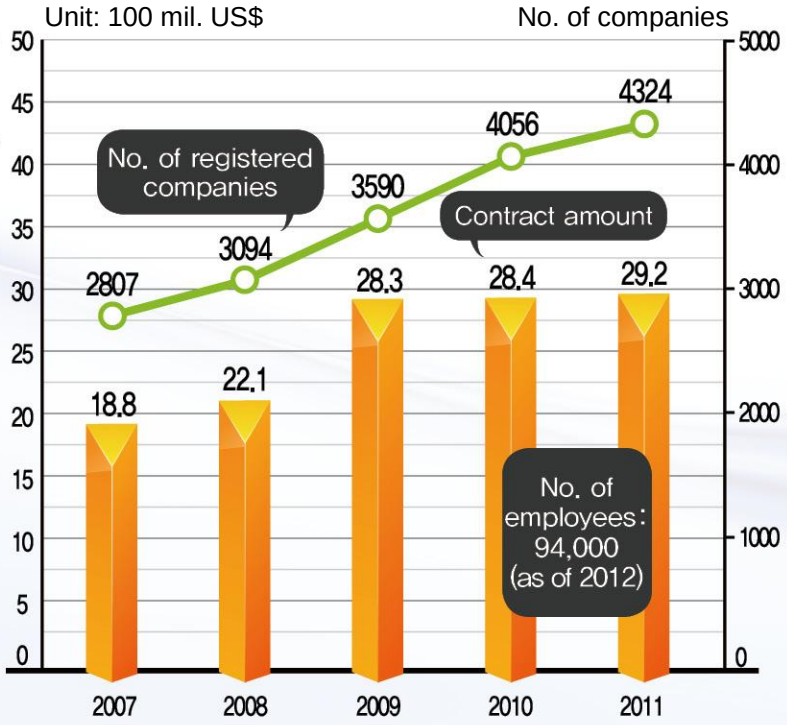
2. Safety Inspection & Maintenance Markets

Safety inspection Services



Source: FMS, etc

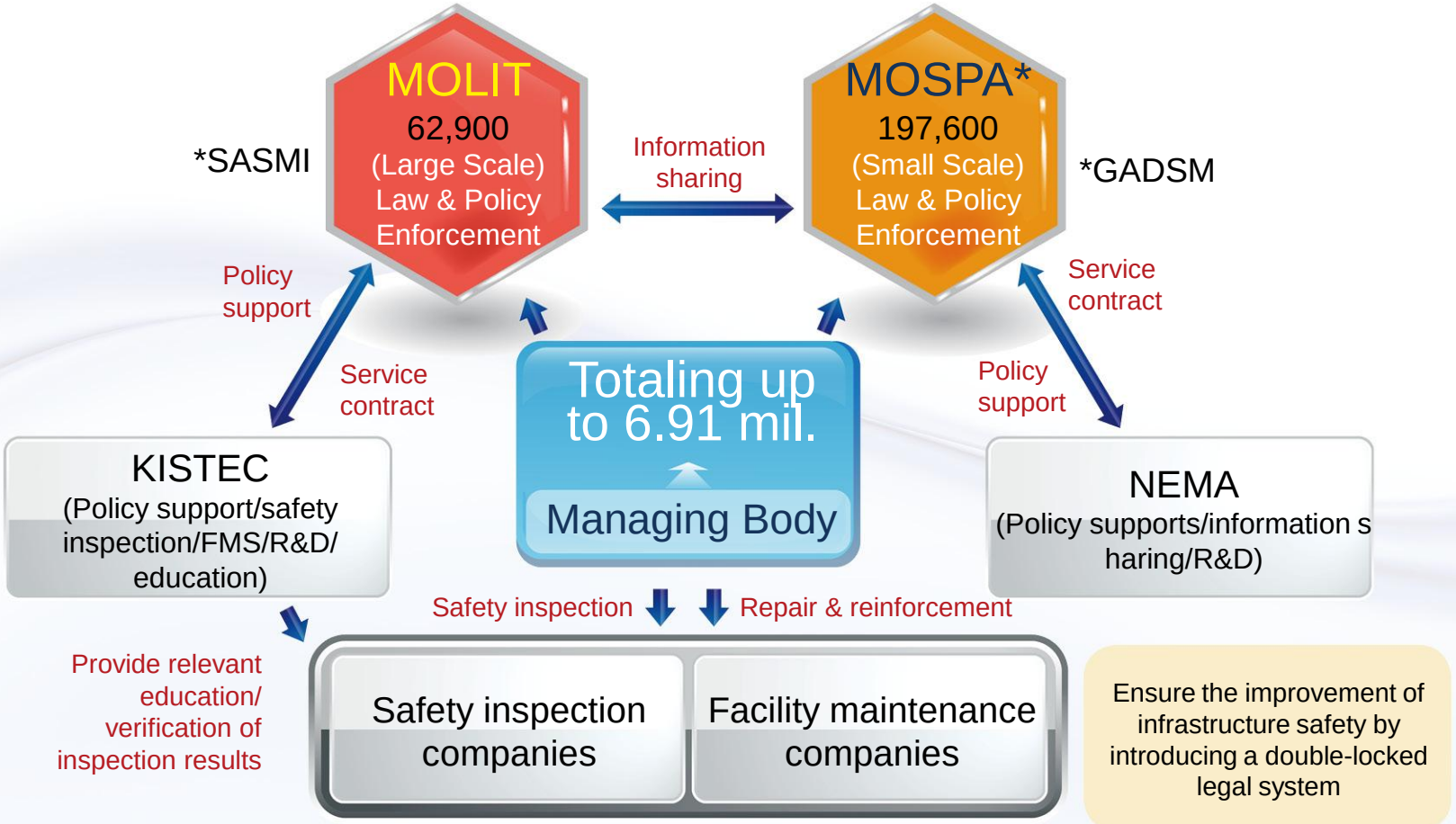
Maintenance Services



Source: Statistical Annual Report issued by FMA

Ⅱ Maintenance Polices on Infrastructure

1. National Safety & Maintenance System



Note : MOSPA - Ministry of Security & Public Administration

Maintenance Polices on Infrastructure

2. Safety & Maintenance Strategy

Utilize ICT applications

To improve the safety management of Infrastructure within SASMI

- ⊙ Ensuring the precise safety inspection & maintenance practices:
  Development & provision of safety inspection & maintenance guidelines, etc.
- ⊙ Introducing FMS-based smart & intelligent management
  - Implementing mobile safety inspection system
- ⊙ Pursuing real-time safety monitoring for long span bridges

To build safety management for small-scale vulnerable facilities

- ⊙ Building up a safety inspection & management system of living based urban facility vulnerable to abnormal climate and aging
- ⊙ Operating the Real-time Disaster Management System (#4949)
- ⊙ Emergency Support System on duty (Safety Inspection Task-Force Team)

Maintenance Polices on Infrastructure

3. Outcomes from the System

⊙ Well-organized safety management regulations & systems, facility management DB (i.e. FMS) and safety education since the SASMI having been enacted

- enabled safety accidents free and safety grades A & B for 95% of 1st & 2nd class facilities

⊙ Currently, strong demands for intensification of safety management on small-scale vulnerable facilities

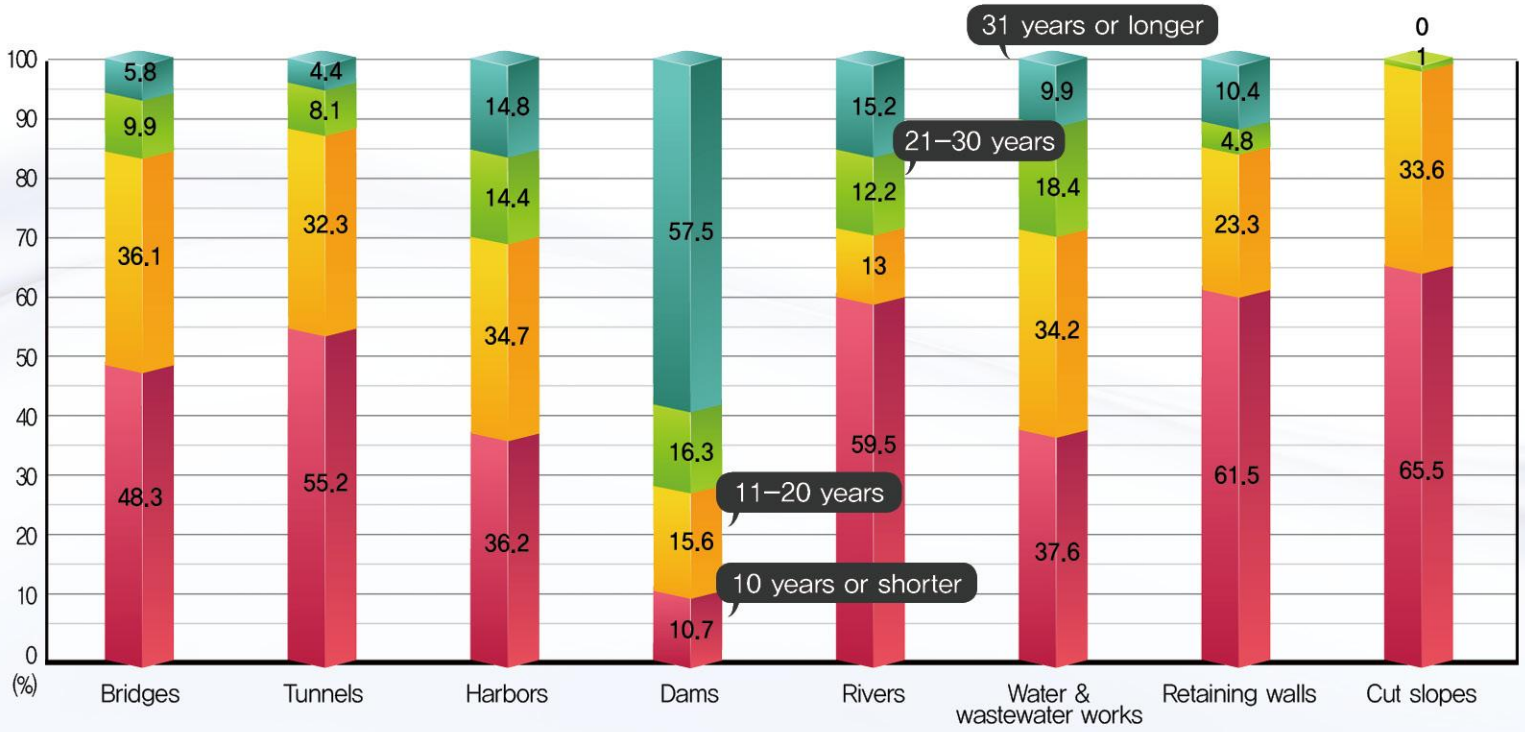
⊙ Convenient & efficient infrastructure maintenance Integrating ICT

⊙ Pursuing maintenance enabling the prolonged durability

Maintenance Polices on Infrastructure

4. Environment Changes in Korea (1)

Distribution of service age by type of facility



Present rate of agedness: 9% ; expected rate of agedness in 10 years: 20%

* Facilities are deemed as “aged” when at least 30 years have passed since their construction.

Source: FMS(2012), etc.

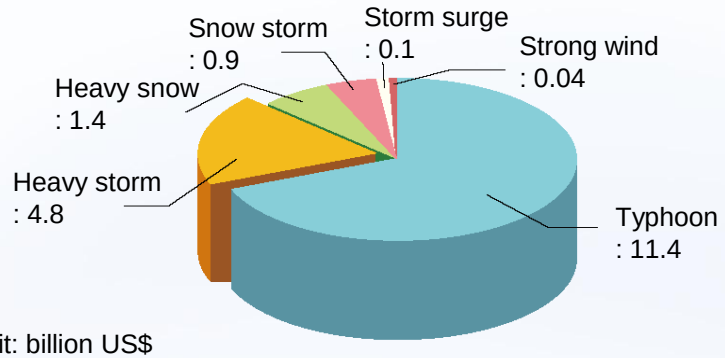
Maintenance Polices on Infrastructure

4. Environment Changes in Korea (2)

⊙ The rising occurrence of extreme weather events by climate change

- A severe threat to the safety of infrastructure, especially living based urban facilities

Damages by natural disasters for the past 10 years



Unit: billion US$

Trends in the rising intensity of typhoons & rainfalls

· Six of the top 10 typhoons for the past 100 years occurred within the recent 10 years.

· For the recent 10 years, the frequency of heavy storms has increased 2 times as many as that of heavy storms in the 1970's.

Source : Adapted from data as provided by KMA (Korea Meteorological Administration)

Maintenance Polices on Infrastructure

5. Direction of Policies (2013~2017)

National Vision & Goals

To realize a "happy society" filled with a safe infrastructure

To sustainably enable to be free from any safety accidents

To raise people's satisfaction about infrastructure safety

To maintain the current share of Safety Grade A & B (i.e. 95%)

Maintenance Polices on Infrastructure

5. Direction of Policies (2013~2017)

Objective & Strategy

⊙ To establish an advanced safety management system

⊙ To realize safety management practices together with people

⊙ To shift safety management into pro-active response to an environmental change:
- Building an integrated emergency response system against natural disasters
- Building a managing body-friendly maintenance system

⊙ To pursuing smart & intelligent management and improve their efficiency:
- Developing safety inspection & maintenance technologies based on ICT convergence
- Building up the sophistication & utilization of facility information system

Special Act on Safety Management of Infrastructure(SASMI)

* KISTEC: Korea Infrastructure Safety & Technology Corporation

Special Act on Safety Management of Infrastructure(SASMI)

1. Overview

< Facility Classification >

- The 1st and 2nd class:
  with importance and scale of facilities
- Facility group:
  bridge, tunnel, port, dam, building, river/water works,
  wall & cutting slope
- All managing bodies know how to classify their facilities.

Special Act on Safety Management of Infrastructure(SASMI)

2. Inspections - levels of execution

- Managing body
- Special inspection company
- Facility maintenance company

- KISTEC
- Special inspection company
- More than once/4-6yrs

Ensuring function & safety of facility
Following official and detailed guideline
Three levels of safety inspection &
A level of in-depth safety inspection

Must Be Legally Executed

Special Act on Safety Management of Infrastructure(SASMI)

3. Safety Measure and Enforcement of Inspection Results

- Begin within 2yrs after reporting
- Complete within 3yrs after beginning

KISTEC : Functions & Roles

Organizational Status

⊙ No. of workforce: 450 in total
- Out of which 80% are doctoral engineers, specialists or experts

⊙ Components of organization: 3 offices, 17 departments, 1 secretariat, 1 research institute, 2 centers

⊙ Annual budget: 35 mil. US$
- Government subsidy: 25% / Self-finance: 75%

⊙ Inspection equipment: 508 units(185 kinds) & 58 inspection vehicles

KISTEC : Functions & Roles

Key Functions & Roles (1)

1. To secure the safety of national major infrastructure

⊙ Performing in-depth safety inspection of national major infrastructure
- Prolonging service life through improving safety practices
  ※ Developing & providing relevant guidelines, manuals and the best practices, etc.

⊙ Building smart DB & converting into intelligent FMS to ensure scientific & preventive facility maintenance & safety management
  ※ Operation of FMS: 1st class 7,000 / 2nd class 53,000

⊙ Integrated maintenance of long span bridges : Real-time monitoring & standardized integrated maintenance
  ※ Currently 17 bridges → gradually be expanded (25 in 2015)

⊙ Evaluating the inspection results
- Preventing poor inspection in market (3,300cases/yr)

⊙ Providing education for inspection & relevant engineers (1,300 person/yr)

KISTEC : Functions & Roles

Key Functions & Roles (2)

2. To improve the safety management of small scale vulnerable facility

⊙ Expanding safety inspection to living based urban facility
- Social welfare facilities, small-scale bridges & reservoirs, retaining walls and traditional markets, etc.

⊙ Providing safety management services for aged flat & school

⊙ Operating a year round Safety Inspection Task-force Team (100cases/yr)
- Securing infrastructure safety and improving people's awareness

⊙ Operating the Real-time Disaster Management System (smart phone app. #4949)

KISTEC : Functions & Roles

Key Functions & Roles (3)

3. To shift safety into serviceability with performance

⊙ Green Remodeling of Existing Buildings
→ Project planning, design consulting, structural safety evaluation, energy performance evaluation

⊙ Energy Performance and Green Building Certification
→ Building energy efficiency rating system & G-SEED
※ G-SEED: Green-Standard for Energy & Environmental Design

⊙ Greenhouse Gas & Energy Target Management System for construction industry & existing building, etc.

⊙ Mediation work for apartment defect disputes between contractor and residents

V Concluding Remarks

⊙ Build & operate well-organized infrastructure safety & maintenance institutions & systems
- SASMI, CTMA(Construction Technology Management Act), BADSM, etc.

⊙ Develop & operate advanced systems through ICT convergence
- FMS, mobile inspection system, #4949, etc.

⊙ Reform safety & maintenance strategies in response to the environmental and climate change:
- The rising of rainfall and typhoon intensity in densely populated area
- Entrance into an era of aged (present rate: 9%; expected rate: 20% in 10 years)

⊙ Vulnerable awareness and basis of facility maintenance:
- Lack of budgets for maintenance & repair (M&R), poor work environment
- Shortage of skillful M&R engineers due to frequent job change & rotation, low salary, etc.
- Incapacity of a high level of technologies as required for data analysis, etc.

⊙ Improve the safety management of small-scale vulnerable social infrastructure

⊙ Securing safety → Securing safety + [performance + serviceability]
- Prolonging the service life & energy saving of infrastructure

Thank You !