Infrastructure Safety Management & Maintenance in Korea
September 2013

KISTEC
(Korea Infrastructure Safety & Technology Corporation)
Contents

I . Infrastructure Status in Korea

II . Maintenance Policies on Infrastructure

III. Special Act on Safety Management of Infrastructure (SASMI)

IV. KISTEC : Functions & Roles

V . Concluding Remarks
## Infrastructure in Korea

<table>
<thead>
<tr>
<th>Classification</th>
<th>Total Facility</th>
<th>Vulnerable facility (Grade D&amp;E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>**National major facility¹)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public facility</td>
<td>24,800</td>
<td>50</td>
</tr>
<tr>
<td>Building</td>
<td>38,100</td>
<td>1</td>
</tr>
<tr>
<td>Sub-total</td>
<td>62,900</td>
<td>51</td>
</tr>
<tr>
<td>**Small scale facility²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public facility</td>
<td>19,700</td>
<td>268</td>
</tr>
<tr>
<td>Building</td>
<td>177,900</td>
<td>1,196</td>
</tr>
<tr>
<td>Sub-total</td>
<td>197,600</td>
<td>1,464</td>
</tr>
<tr>
<td>**Other facility³)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e.g. houses, reservoirs, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public facility</td>
<td>71,700</td>
<td>N/A</td>
</tr>
<tr>
<td>Building</td>
<td>6,580,200</td>
<td>N/A</td>
</tr>
<tr>
<td>Sub-total</td>
<td>6,651,900</td>
<td>N/A</td>
</tr>
<tr>
<td>**Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public facility</td>
<td>116,200</td>
<td>318</td>
</tr>
<tr>
<td>Building</td>
<td>6,796,200</td>
<td>1,197</td>
</tr>
<tr>
<td>Sub-total</td>
<td>6,912,400</td>
<td>1,515</td>
</tr>
</tbody>
</table>

**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)  
2. Safety Inspection & Maintenance Markets

**Safety inspection Services**

- No. of employees: 8,300 (as of 2012)
- No. of registered companies: 353, 387, 450, 473, 528, 570
- Sales: 2.7, 2.8, 2.9, 3.2, 3.4, 3.5

**Maintenance Services**

- No. of registered companies: 2807, 3094, 3590, 4056, 4324
- Contract amount: 18.8, 22.1, 28.3, 28.4, 29.2
- No. of employees: 94,000 (as of 2012)

Source: FMS, etc

Source: Statistical Annual Report issued by FMA
1. National Safety & Maintenance System

- **MOLIT**
  - 62,900 (Large Scale)
  - Law & Policy Enforcement

- **MOSPA**
  - 197,600 (Small Scale)
  - Law & Policy Enforcement

- **KISTEC**
  - (Policy support/safety inspection/FMS/R&D/education)
  - Policy support

- **NEMA**
  - (Policy supports/information sharing/R&D)

- **Totaling up to 6.91 mil.**

- **Managing Body**

- **Safety inspection companies**

- **Facility maintenance companies**

- **Information sharing**

- **Service contract**

- Provide relevant education/verification of inspection results

- Ensure the improvement of infrastructure safety by introducing a double-locked legal system

Note: MOSPA - Ministry of Security & Public Administration
2. Safety & Maintenance Strategy

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)
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
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.
The rising occurrence of extreme weather events by climate change - A severe threat to the safety of infrastructure, especially living based urban facilities

- 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.
National Vision & Goals

To sustainably enable to be free from any safety accidents

To realize a “happy society” filled with a safe infrastructure

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

To raise people’s satisfaction about infrastructure safety

Safe infrastructure

Smart infrastructure

Sustainable infrastructure In harmony with nature
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)

Special Act (SASMI)

Safety Inspection

Infrastructure Maintenance

KISTEC*, Inspection Company

* KISTEC: Korea Infrastructure Safety & Technology Corporation
1. Overview

< Facility Classification >

- The 1\textsuperscript{st} and 2\textsuperscript{nd} 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
3. Safety Measure and Enforcement of Inspection Results

**Inspection results**

**Managing body**

- **Restriction & prohibition of use or removal**
- **Repair & reinforcement**

- **Notification of maintenance results to admin. organ**
  - Begin within 2yrs after reporting
  - Complete within 3yrs after beginning
○ **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
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: 1\textsuperscript{st} class 7,000 / 2\textsuperscript{nd} 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 (3,300 cases/yr)

- Providing education for inspection & relevant engineers (1,300 person/yr)
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 (100 cases/yr)
  - Securing infrastructure safety and improving people's awareness

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