Quality Infrastructure Development
- Why, What and How -

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Japan’s Experience (the Great Hanshin-Awaji Earthquake)

- The large earthquake which occurred in 1995 caused devastating damage to the infrastructures.
- The sloppy construction management resulted in the collapse of a wide range of the highway.
Japan’s Experience (High economic growth period)

- Around 80,000 people were officially acknowledged by the government as patients of air pollution in 1980. (e.g. bronchitis, asthma, emphysema).
- Regulation on total volume of SOx emissions was introduced in 1974, and NOx in 1981, respectively.
- Through the efforts of Japanese industry, emissions of those pollutants were suppressed, and the air environment was substantially improved.
The quality problems for infrastructure development would eventually affect the long-term development of emerging economies.

The major challenges are ...

- Damage and accident
- Life-cycle cost escalation
- Delay of completion
- Destruction of environment and local community
- Lack of skillful human resource

etc.
Examples of Infrastructure Project with Quality Problems

Quality problems in the case of urban rail

- Due to the poorly planned project management, the completion of the construction has been delayed.
  (2 years delay of completion: 2014 ⇒ 2016)
- The delay caused the unexpected increase of the construction cost.
  ($552 million ⇒ $868 million)
- During the construction, three major accidents happened.
  (1 person died, 17 people injured)
Examples of Infrastructure Project with Quality Problems

Quality problems in the case of thermal power plant

✓ The poorly qualified turbine has resulted in less than half of the expected generation capacity. \((6 \text{ MW} \Rightarrow 2.5 \text{ MW})\)
✓ The turbine equipped in the expansion construction broke down in the trial operation.
✓ The area around the power plant has suffered continuous electricity shortage.

Start of operation: 2000
Examples of Infrastructure Project with Quality Problems

Quality problems in the case of waterworks

- From the start of operation, the aqueduct has broken 17 times.
- The local people have suffered continuous suspension of water supply.
- As a consequence, the local government additionally bore the repair cost. (Repair cost: more than $50 million)

Start of operation: 2009
Ise-Shima Principles for Promoting Quality Infrastructure Investment
(Agreed by the G7 leaders at the G7 Summit in May 2016)

◆ Principle 1: economic efficiency (life-cycle cost), safety and resilience against natural disaster, terrorism and cyber-attack risks

◆ Principle 2: capacity building, transfer of expertise and know-how for local communities

◆ Principle 3: addressing social and environmental impacts

◆ Principle 4: alignment with the aspect of climate change and environment at the national/regional levels

◆ Principle 5: Enhancing effective resource mobilization including through PPP
Examples of Quality Infrastructure by Japan

Project: High Speed Rail (Taiwan)

● Characteristics as “Quality Infrastructure”

  <Safety, Resilience>
  ✔ No accidents resulting in fatalities or injuries during 8 years of operation
     (※ no passengers died or injured despite earthquake (of magnitude 6.4) in 2010)

  <Reliable Operation>
  ✔ Average delay: 14.4 seconds
  ✔ Ratio of trains arriving within 5 minutes before or after the schedule: 99.4%
Examples of Quality Infrastructure by Japan

Project: Neak Loeung Bridge (Cambodia)

Characteristics as “Quality Infrastructure”

< Economic efficiency (Life cycle cost)>
✓ Reduction of maintenance cost through Japanese technology
  (※Prestressed concrete cable-stayed bridge)

< Social and environmental impact >
✓ Selection of a route that avoids transfer of residents as much as possible

< Transfer of expertise and know-how for local communities >
✓ Local job creation of about 1,000 people per day during the construction
✓ Transfer of construction skills to local engineers

*Neak Loeung Bridge (Cambodia)

*Matadi Bridge (maintained by the local staff in Congo)
Examples of Quality Infrastructure by Japan

Technology: GTCC (Gas Turbine Combined Cycle)

● Characteristics as “Quality Infrastructure”
  <High performance, eco-friendliness>
  ✓ Generation efficiency
    GTCC (60%*) > gas turbine (39%*)
    (*Source: World Energy Outlook, IEA)

Technology: USC (Ultra Super Critical)

● Characteristics as “Quality Infrastructure”
  <High performance, eco-friendliness>
  ✓ Generation efficiency
    USC (46%*) > Super Critical (43%*) > Sub-Critical (39%*)
    (*Source: World Energy Outlook, IEA)

<Continuous High performance, eco-friendliness>

◆ Japan’s higher generation efficiency can be maintained over times rather than others.

(Source: The Federation of Electric Power Companies, Japan)
How is quality of infrastructure ensured?

Suggestions for quality infrastructure development

1. Promotion of infrastructure development, based on...
   - Ise-Shima Principles for Promoting Quality Infrastructure Investment
   - G20 Leader’s Communique at Hangzhou summit

2. Change of procurement method
   - Introducing the criterion of life-cycle cost in procurement assessment
   - Promoting the understanding of Quality and Money for Value

3. Introduction of financial incentives for quality infrastructure through the Loans with lower interest rate

Developing Countries

MDBs

Developed Countries