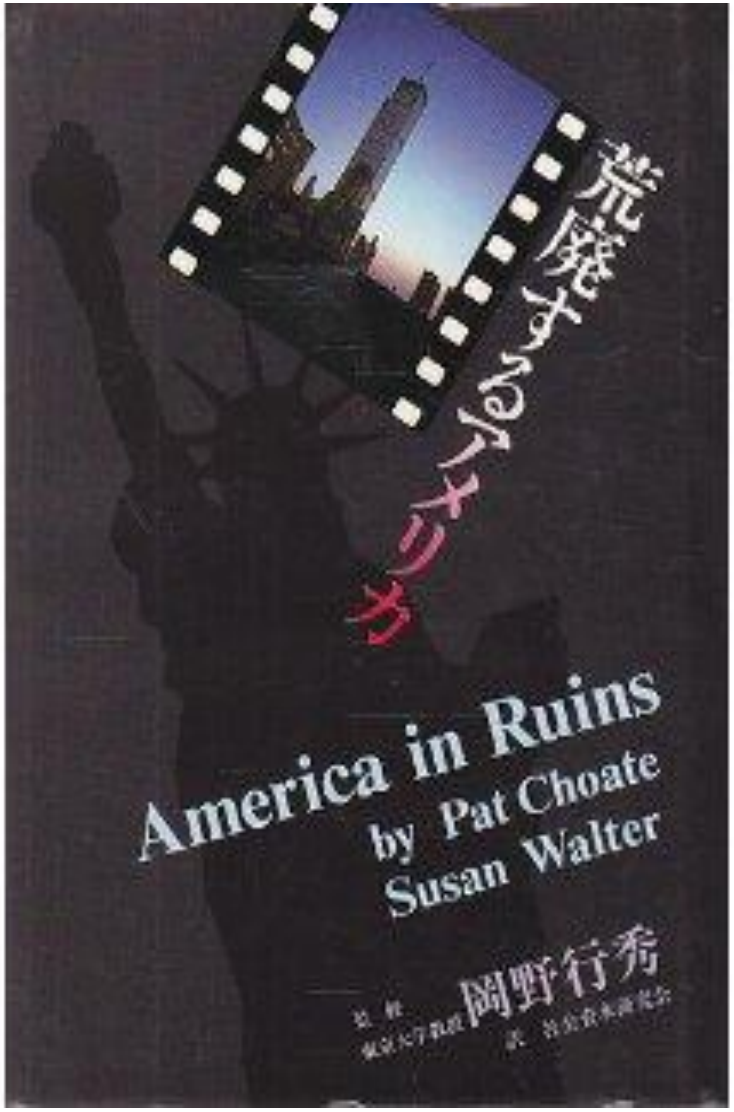
2013 JSCE Annual Meeting
International Panel Discussion

Infrastructure Maintenance and Renewal for Achieving Sustainable Society

September 4, 2013



America in Ruins: the Decaying Infrastructure

by Pat Choate & Susan Walter

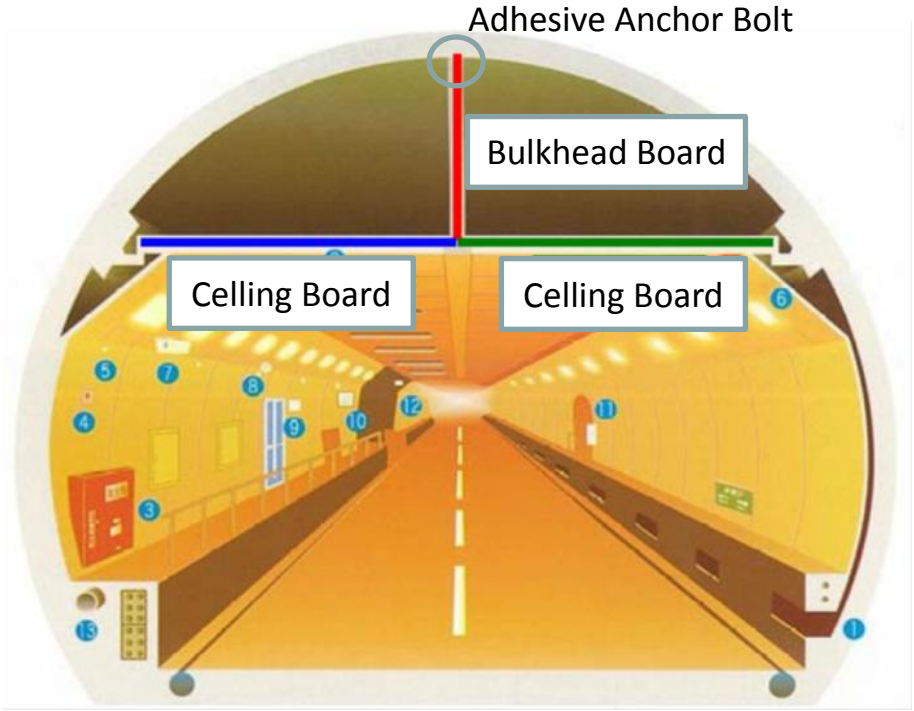
「荒廃するアメリカ」

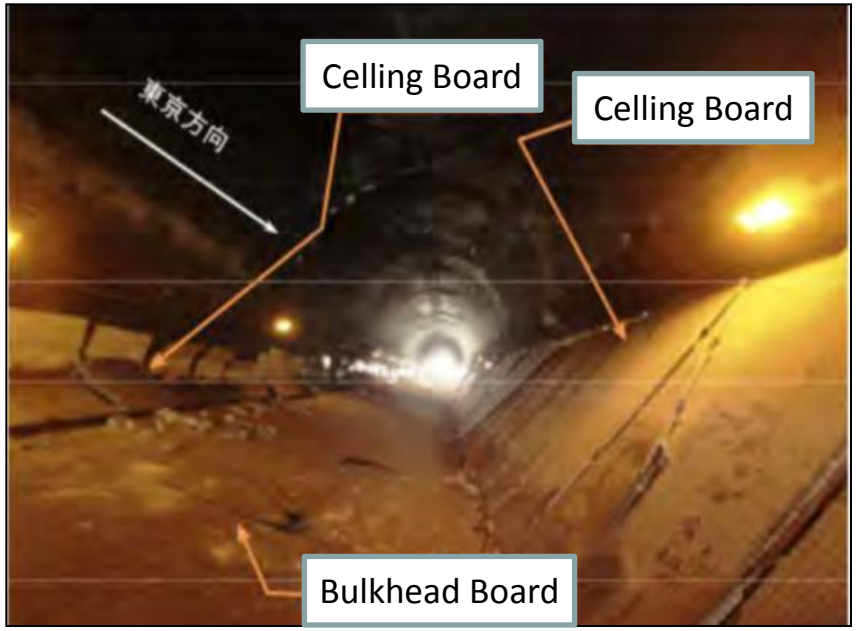
岡野行秀 監訳（1982）
（**Yukihide Okano**）

Concentrated constructions of infrastructure in 1930s → rapidly increasing "**Aging**" in US.

Insufficient budgeting for maintenance and renewal → accidents and troubles in infrastructure in US. A **warning** to Japan's infrastructure Now after 30 years, Japan faces the same situation.

Sasago-Tunnel Accident in Chuo-Expressway on Dec. 2, 2012





Tunnel Length : 4,417m,
Cross-Sec. Traffic: 40 thou. Veh./day

- **Ceiling board suddenly fell down around 100 m** on running vehicles, and **9 dead**, **2 insured**.
- Nation-wide **urgent inspection** of tunnels implemented
- Required around **two months to re-open**
- Under investigation, however, the suitability of **inspection** of the anchor bolts as well as of its **structural design** perhaps suspected

Introduction: **What are issues and problems?**

- Rapid increase in "**Aging Infrastructure**" and increasing importance of maintenance and renewal
- **Budgetary capacity** for infrastructure in "downsizing Japan" in population
- Usually **poor concern** of general public, politicians, and even engineers! except just when shocking accidents occur
- Even when well-understood, often regarded as just a **problem of "money"**

Coordinator: **Hitoshi Ieda**

Professor, Dr. Eng., P.E.
Dept. of Civil Engineering, The University of Tokyo

- Former Vice-President of JSCE (2011-2013)
- Member, Infrastructure Development Council, Transport Policy Council, and National Land Development Council, MLIT, Japan

- Chairman, Committee on Infrastructure Maintenance Strategies, MLIT, Japan (2012-)

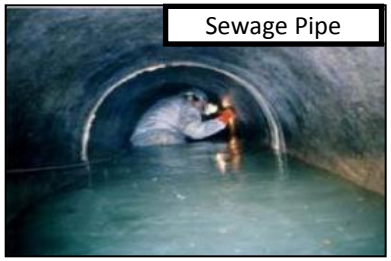
- Member of JSCE's Special Committee of Infrastructure Maintenance (2012-)

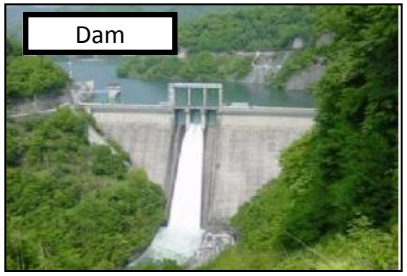
Variety of Infrastructure

More Natural

For Daily Use

For Emergency





More Artificial

Establishing Systematic and Sophisticated Maintenance Systems

Tokaido Shinkansen (since 1964)

Number of Operation : 333 trains / day
Number of Passengers : 391 thou. pax. / day
Operating Speed : 270 km/h
Average Delay : 0.6 min. / train
No passenger fatalities or injuries till now
Most strict noise/ vibration codes

Track Maintenance:

- Traditional ballast track
- World severest train load
- Computer assisted 10 day cycle maintenance system
- Automated measurement of track irregularity
- Mechanized maintenance work

Severely Used Motorway: **Tokyo Metropolitan Expressway**

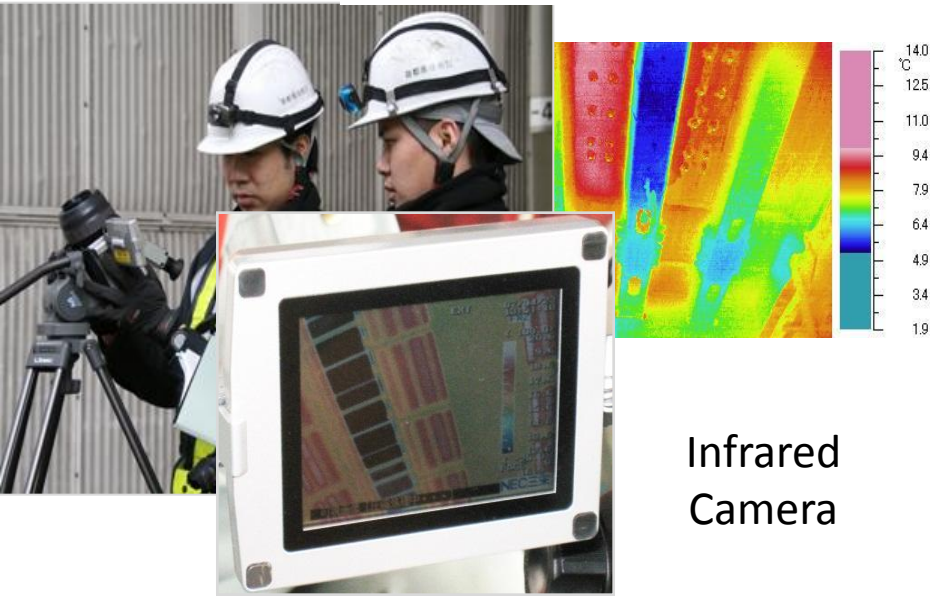
The Network

- Constructed since 1962
- Present Route Length: 301 kms (**mostly 4 lanes**)
- Structure: bridges (80%), tunnels (10%)
- Traffic Volume: 1.1 mil. veh./day
- Cross Sec. Traffic: **86 thou. veh./day** (Central Tokyo)
- Illegally **Over-loaded Large Vehicles**: often observed but not yet suitably controlled and eliminated
- **Repair-required damages**: quite often found

Technological Potential for Better Maintenance and Renewal

Tunnel Lining Scan Vehicle

Inspection Robot used in
Tokyo Metropolitan. Expressway



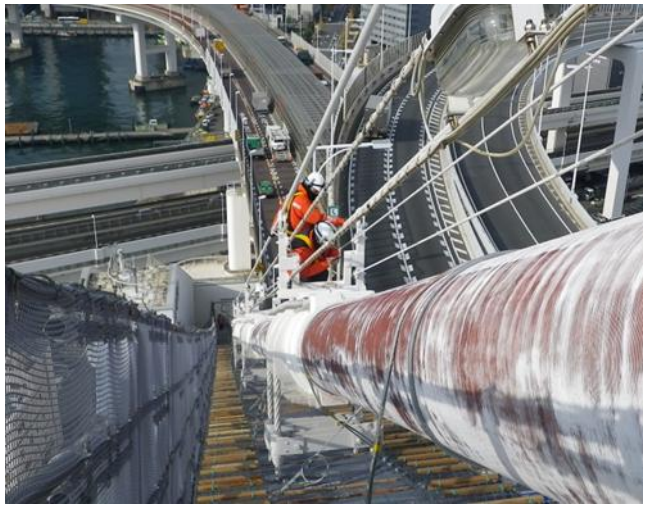
Infrared
Camera

Track Inspection Train-Set in Shinkansen

Human Resources for Maintenance and Renewal

Daily Inspection

Periodical Deep-Inspection



Cable Inspection of Suspension Bridge

Re-pavement

Track Maintenance

Points of Proposals by JSCE

1) To **systematically re-organize** theories, knowledge, technologies, and experiences on maintenance and renewal in individual fields of infrastructure, and to establish "**Infrastructure Maintenance Engineering**" in the near future

2) To enrich **human resources** on infrastructure maintenance engineering in quality and in quantity, and to reinforce related institutional systems

3) To establish **stable institutional systems** for infrastructure maintenance and renewal in **legislative** and **financial** aspects

4) To create **realistic and suitable contract systems** for infrastructure maintenance

5) To enhance the **understanding and support of people** for infrastructure maintenance

Panel Discussion

RESOURCE SPEAKERS:

S1) Mr. **Gregory Diloreto**, President, ASCE

S2) Prof. **Kyoung-Soo Kim**, CEO, Korea Infrastructure Safety & Technology Corporation

S3) Prof. **Yin-Wen Chan**, President, Taiwan Construction Research Institute

S4) Mr. **Rahul Gupta**, Superintending Engineer, Ministry of Road Transport & Highways

S5) Ms. **Christine Andersen**, Director of Public Works, The City of Santa Barbara

COMMENTATORS:

C1) Prof. **Benito Pacheco**, Vice Chancellor, The University of the Philippines

C2) Prof. **Iswandi Imran**, Professor, Bandung Institute of Technology

Points of Discussion:

3 Elements:
- **Human-Resources and People** （人）
- **Technology**（技術開発）
- **Money** （カネ）

1) Roles of national/ local gov., private sectors, and other institutions in various aspects

2) Potential contribution of technologies

3) Appropriate contract and procurement systems

4) Enhancing citizens' understanding and co-operation

Time Table:

-14:40

Presentations by the Five Resource Speakers

(**BREAK**)

14:50-15:10

Comments by the Two Commentators

15:10-15:50

Overall Discussion together with the Floor