

59 Development of Life-Cycle Management System for Port and Harbour Facilities - Integrated Framework from Inspection to Assessment



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R&D Objectives and Subjects

Objectives

Implementation of maintenance and management support tools for port facilities based on a life-cycle management system

- Development of inspection and monitoring technologies for port concrete/steel structures
- Proposal of appropriate maintenance and management techniques for individual port facility management bodies
- Improvement of formulation methods of maintenance and management plans for the optimization of life cycle costs

The proposed tools contribute to simplifying maintenance work and reducing maintenance cost, aiming to enhance the international competitiveness of Japanese ports and improve disaster prevention functions of port facilities.

Subjects

Development of inspection and monitoring technologies for piled piers

- Development of 4 types of inspection devices; 1. ROV equipped with a camera system for visual inspection of concrete superstructures, 2. Non-contact ultrasonic thickness gauging system, 3. Sensor for anti-corrosive coatings, and 4. Sensor-aided maintenance system with IT
- Proposal of an inspection scheme according to requirements of maintenance and management

Improvement of evaluation and prediction of performance for piled piers

- Development of performance evaluation methods for anti-corrosive coatings of steel piles
- Development of performance evaluation methods for concrete superstructures

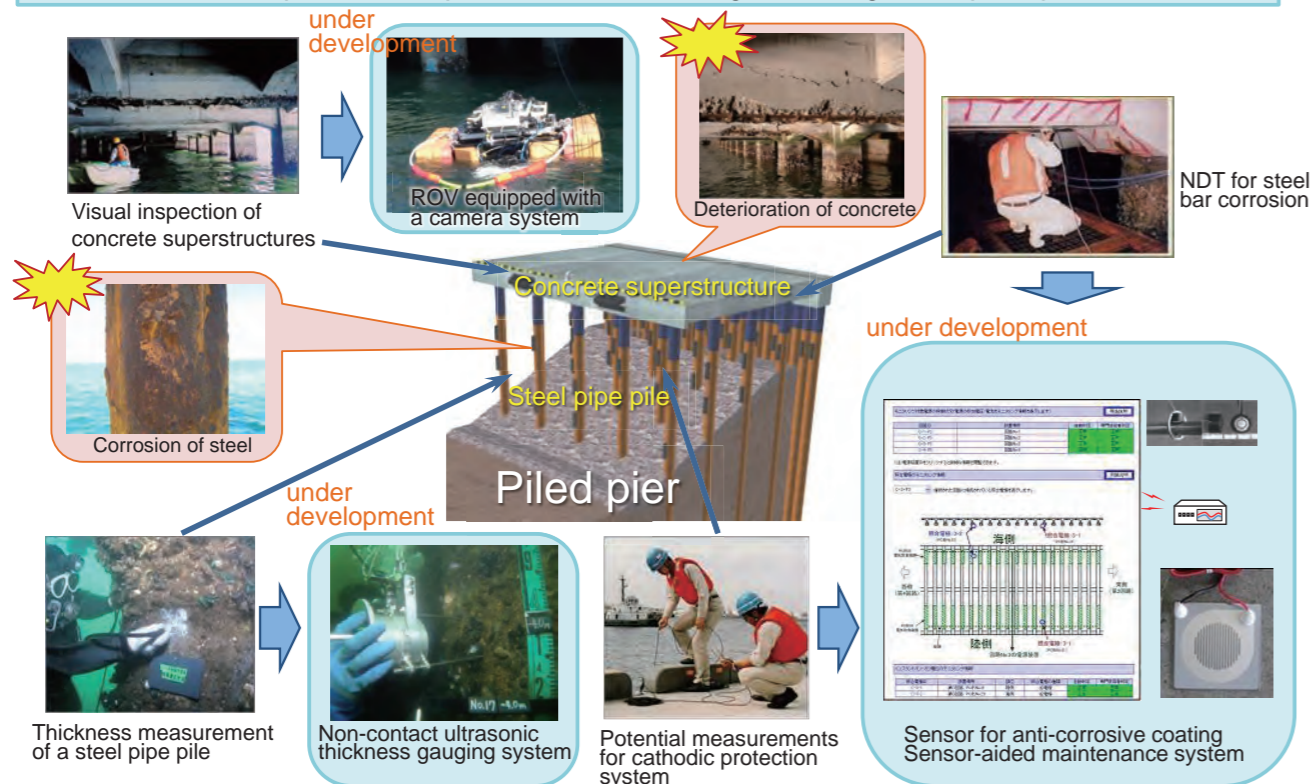
Improvement of the Life-Cycle Management system for open-type wharves

- Methodology establishment of maintenance and management plans for optimization of life cycle costs

Current Accomplishments (1/2)

- Problem**
- Limited working hours due to tidal actions
 - Hazardous underwater work
 - Possible accidents during inspection work
 - Operation restrictions due to inspection work

Development of inspection and monitoring technologies for piled piers

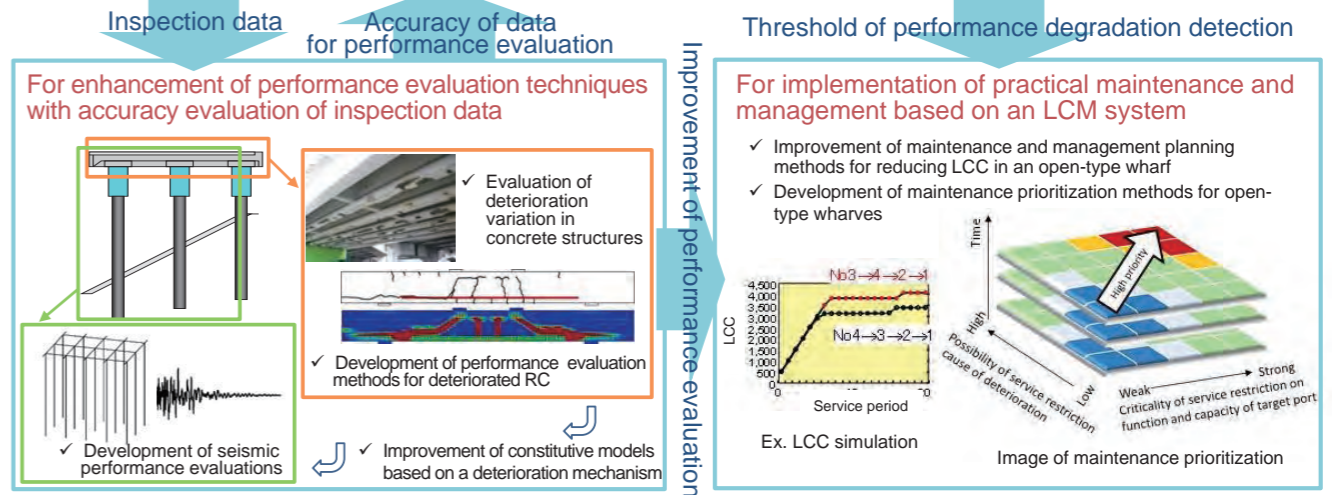


Current Accomplishments (2/2)

For implementation of efficient inspection and diagnosis of piled piers

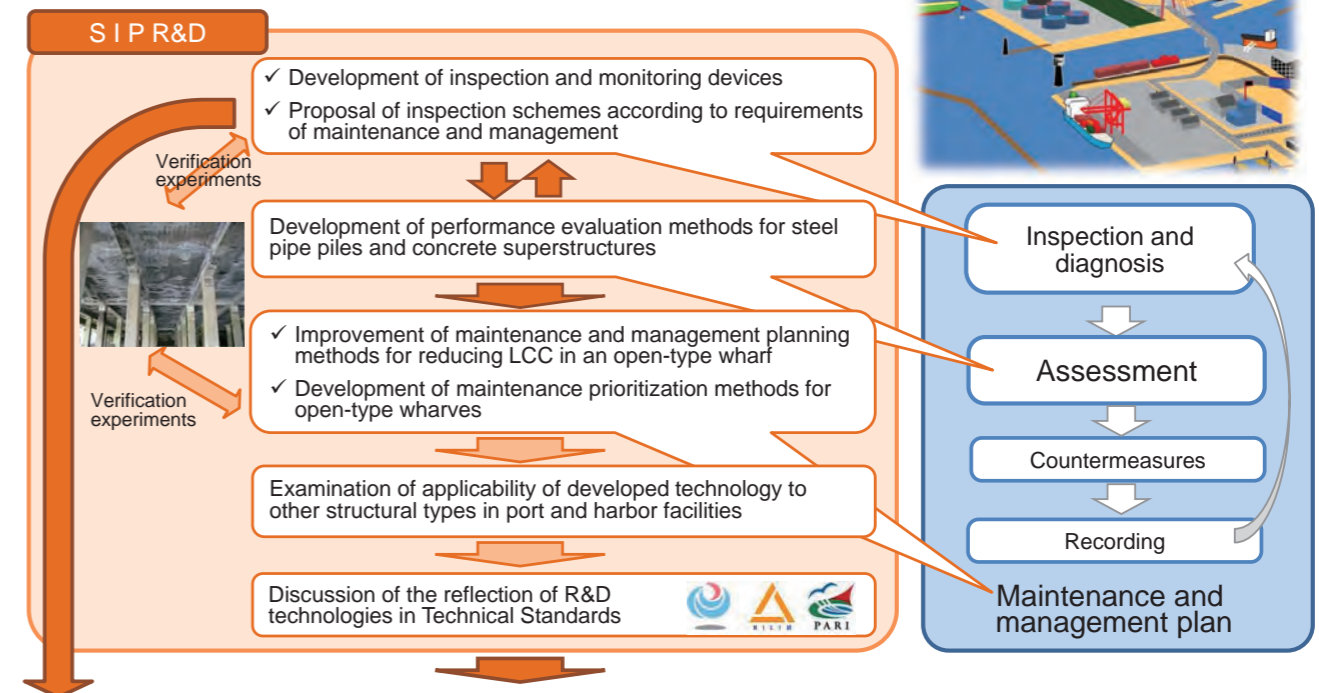
- ROV equipped with a camera system for visual inspection
 - Improvement of location identification and operation-supporting systems
 - Promotion of demonstration tests
 - Non-contact ultrasonic thickness gauging system
 - Enhancement of precision by improving detection of multiple reflection waves
 - Sensor for performance evaluation of anti-corrosive coating
 - Examination of the threshold value of sensors for corrosion
 - Promotion of demonstration tests
 - Sensor aided maintenance system with information technology
 - Development of monitoring systems for protection against corrosion of steel piles and superstructures
- Investigation for inspection schemes according to requirements of maintenance and management

- Conventional inspection technology for marine structures
- Cooperation with the Society of Maintenance Engineers for Maritime, Port and Harbor Infrastructure
- Conventional inspection technology for land structures
- Inspection, Monitoring and Diagnostics Technologies developed by SIP



Goals

Enhancement of practical maintenance and management technologies



Reflection in Technical Standards for maintenance and management of Port and Harbour facilities

- Technical Standards and Commentaries for Port and Harbour Facilities in Japan
- Manual on Maintenance and Rehabilitation of Port and Harbour Facilities
- Guidelines on Strategic Maintenance for Port Structures