

# Strategic Life-Cycle Management for Civil Infrastructure Systems with the Latest Information Technologies

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## 【 Outline of survey 】

In our country, because there are a huge number of civil infrastructure systems such as bridges, dams, tunnels, etc, it will be becoming a major social concern to develop an integrated lifetime management system for such infrastructures in the near future. Then we need to develop an integrated lifetime management system for civil infrastructure systems combined with the latest information processing technologies and intelligent health monitoring techniques, and also to establish the Doctor Degree for Civil Infrastructure Systems (INFRADOCTOR).

For example, in advanced countries in Europe and the United States, life-cycle management of social capital stock including civil infrastructures has recently been gathering attention. An example is LIFETIME Thematic Network, an organization based in Finland that is now being launched by the European Union as an area-wide project. Another group led by the United States has also been accumulating expertise and know-how of its own. The First International Conference on Bridge Maintenance, Safety and Management was held in Spain in July 2002. Thus, there has been a move, mainly among the countries with well-developed social capital, to establish a common global goal.

This research project aims to make a concept of strategic capital stock management (integrated life-cycle management system). The life-cycle management system incorporates life-cycle cost (LCC) and the concepts and analysis methods for management into the field of maintenance that used to be considered somewhat low-key as compared with the construction of structures. The system is an organic integration of studies in a wide range of academic fields including systems, electrical and mechanical engineering fields beyond the scope of civil engineering field. It is an environmentally friendly system aided by the latest information technologies such as network-based databases systems, multimedia virtual reality, intelligent monitoring, artificial life and artificial intelligence.

The final goal of this research is to provide a forum to exchange and share experiences related to integrated lifetime management system for civil infrastructure systems combined with the latest information processing technologies and intelligent health monitoring techniques for the 21st Century.

## 【 Expected results 】

It is important for not only Japan but also advanced countries in the world to develop an integrated lifetime management system for infrastructure systems combined with the latest information processing technologies and intelligent health monitoring techniques, and also to establish the doctor degree/professional engineer for structure diagnosis with clinical and pathological senses.

After establishment of an advanced management system through this research project in the relevant field ahead of the rest of the world in close coordination with the recent move and create a base for research that will enable Japan to lead the world. Then the efficiency of maintenance of civil infrastructures will be increased and the field of maintenance will become technically more challenging.

Then, in the future, it is expected to be important to attract young excellent engineers to the field of protection of aged structures, which is analogous to the care of elderly people, and to make the field more dynamic. The author would hope that this paper would be of some help in the future.

## 【 References by the principal researcher 】

- 1)A. Miyamoto & H. Nakamura(Ed.): Proceedings of High Technology Symposium in Yamaguchi 2003(High-Tech Sympo 03)-Life-Cycle Management in Infrastructure Systems for the 21st Century-, Yamaguchi University, 2003.
- 2)A. Miyamoto & D. M. Frangopol(Ed.): Maintaining the Safety of Deteriorating Civil Infrastructures, Practical Maintenance Engineering Institute of Yamaguchi University, 2002.

【 Term of project 】 FY 2004 - 2008

【 Budget allocation 】 80,500,000 yen

【 Homepage address 】 <http://gateway2.design.csse.yamaguchi-u.ac.jp/lab/index.html>