

Toward environmentally sustainable infrastructure development using an LCA tool

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1. Introduction

We developed an LCA method for infrastructure (Infra-LCA). This paper introduces efforts now being made to put this calculation method into practical use.

2. Publication of the LCA manual and the database of environmental loads coefficients table

The Infra-LCA manual and the database of environmental loads coefficient tables are available from “<http://www.nilim.go.jp/lab/dcg/index.htm>”. The following are special features of the infra-LCA method.

- The environmental loads coefficients tables are classified into three groups. Each group is used at a different level of decision making. The first group is used to compare environmental loads according to structure types at the planning level, the second group is used to compare environmental loads according to work type at the design level, and the last group is used to compare environmental loads according to material and construction machine types at the construction level (see Fig 1).
- Categories of the coefficients correspond to the element of cost estimation.

- The environmental loads of new technologies can be calculated under the completely same conditions as the ordinary environmental loads.

The environmental loads coefficients cover carbon dioxide emissions, final disposal of wastes, and consumption of natural resources.

3. Confirming the usefulness of the calculation method for infra-LCA

Validation of infra-LCA is being conducted by a working group established by the Japan Society of Civil Engineers. The working group consists of scholars specialized in LCA and members of construction consultant companies and construction companies. The working group pointed out that the environment loads of miscellaneous expenses, which are estimated by multiplying a certain ratio to cost of labor, material or something, should not be ignored although it is difficult to determine this using the present calculation method. We will closely examine the miscellaneous expenses, and set a method of calculating the environmental loads if necessary.

4. Finding low-environmental loads technologies

The working group has been conducting many case studies to find how we can reduce the environmental loads in design and construction technologies and how much cost will be needed to achieve the reduction targets. Past studies show that the construction field has many more technologies to reduce cost as well as environmental loads than other fields.

5. Introduction of infra-LCA into practical use

Introduction of infra-LCA is undertaken in some specific usages. One usage is the standard to designate proposal items as environmentally recommended items under the Act on Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities. Besides this, the application of carbon dioxide emissions coefficients in a technical guideline of pavement published by Japan Road Association is planned.

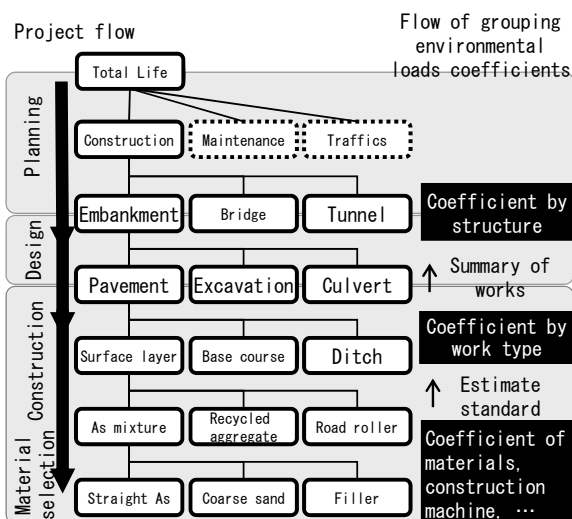


Figure 1. Group of environmental loads coefficients