Approaches for assessment of CO_2-reduction effect by using low-carbon technology

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1. Introduction

By “Infrastructure LCA”, we came to be able to calculate of CO_2 emissions in the construction field including infrastructure improvement. Low carbonization of the construction field is needed for practical realization of Infrastructure LCA. General versatility that can assess various technologies is desired. But long-life technologies can’t be evaluated by Infrastructure LCA.

In this study, NILIM examined how to evaluate long-life technologies. Additionally we evaluated other technologies, and examined prospects for low-carbon future by evaluation results.

2. Consideration of assessment method of long-life technology

Long-life technology emits a large quantity of CO_2 during construction and reinforcing / repairing. But CO_2 emissions of entire in−service period are small. For instance, if the period is set by durable years of structure, long-life effect is assessed. On the other hand, if it is actually taken down before the durable year, it is possible to be overrated. If the period is set short, considering uncertainty of future, the long-life effect will not be assessed.

Fig-1 shows a calculation result for concrete modifier that is expected to prevent cracks by applying to concrete structures. This technology is expected to decay 20% of the rate of deterioration of bridge, and to extend the durable yeas from 50 years to 60 years. If the period is set by durable year, the long-life technology is advantageous. But if the bridge is replaced at 40 years and 20 years before the durable years, the result is changed.

After this, we plan to set installation strategy of the period by condition, to be able to assess the long-life technology, and to improve general versatility of Infrastructure LCA.

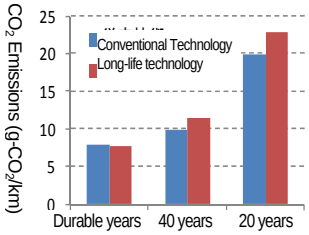

Fig-1 The calculation result, concrete modifier

3. Assessment of CO_2 reduction effect by low carbon technology

It is possible to assess most of the technologies, except the long-life technology, in Infrastructure LCA. Fig-2 shows the results of estimate CO_2 emissions and costs for 27 low-carbon technologies.

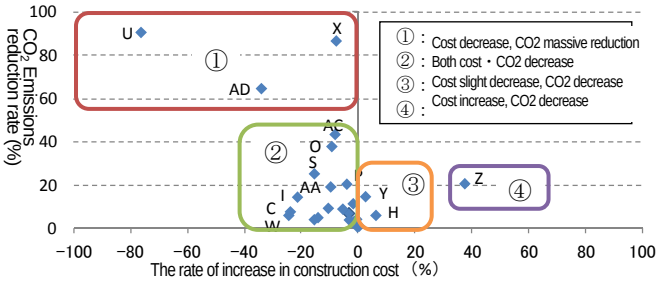

Fig-2 The relationship between the rate of CO_2 emission reduction and cost increase / decrease

According to Fig-2, most of low-carbon technologies belong to ②. Therefore, we concluded that the development of the technology which reduces both CO_2 emissions and costs has proceeded.

Also, by assuming the number of the adoption of 27 technologies, and by multiplying CO_2 reduction to the number of the adoption, CO_2 reduction effect of using low-carbon technologies was assumed about 400,000 t-CO_2.

4. Conclusion

In order to achieve low-carbon society, it is effective to adopt the Infrastructure LCA into the social system. “Index Integration Committee” and “LCI Calculation WG” gave support to this study, and we wish to acknowledge valuable discussions with them.

http://www.nilim.go.jp/lab/bcg/siryou/kpr/prn0036.htm