博士学位論文 審査結果の要旨

Abstract of review result

芝浦工業大学大学院 理工学研究科 博士（後期）課程

Doctoral thesis defense committee

博士学位論文審査委員会

Main examiner 主査	HENRY Michael
Examiner 審査委員	IYODA Takeshi
Examiner 審査委員	KATSUKI Futoshi
Examiner 審査委員	ANAMI Kengo
Examiner 審査委員	NISHIKAWA Takafumi
Examiner 審査委員	

氏　　名 Applicant's Name	Hatthaphone SILIMANOTHAM
論文題目 Thesis title	Quantification and treatment of uncertainties in repair prioritization for the maintenance management of road bridges

〔論文審査の要旨〕

Abstract of review

The final examination was held on Wednesday, January 29, with all five committee members present in person. Approximately ten SIT students and staff also joined on-site.

The final defense began with a 60-minute presentation by the candidate on the outcomes of his doctoral study. He reviewed the background of bridge maintenance and explained the importance of understanding and managing uncertainties in the management of bridges. The candidate then explained the current approach to bridge prioritization recently developed in Lao PDR, which served as the baseline for the study, and also introduced the datasets that were used for analysis. The first objective of his study was to develop a method for quantifying the uncertainty in bridge inspection results, which was achieved by using a boot-strapping method to generate simulated bridge health indices from a limited set of inspection trainees. These results were then compared against an expert judgment to evaluate the probability and degree of overestimating the bridge health. For the next objective, the candidate introduced a method for evaluating the effects of methodological uncertainty on the prioritization of bridges using uncertainty analysis and probabilistic evaluation of the bridge priority ranks. Variance decomposition was also used to quantify the effects of the different methodological sources of uncertainty on the prioritization results. Finally, for the final objective, the two methods were integrated and applied to current national road bridges to develop an improved set of prioritization rankings, which were then compared against the conventional approach to examine how the consideration of uncertainties may affect decision making related to bridge maintenance management.

In the Q&A, the examiners asked about how to consider additional factors in the prioritization, such as the cost of repairs, and how these could be based on prediction of future deterioration. They also asked about how training should be improved using the results of this study to increase the reliability of the bridge inspection, and how to develop the experts in Lao PDR so that the future human resource development can become self-sustaining.

In conclusion, the examiners noted the candidate's great improvement from the preliminary examination, and unanimously agreed that the candidate passed the final examination of the doctoral thesis.