Surattachon Chauytook 2009: Optimization of Bridge Management and Maintenance Plan. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Assistant Professor Piya Chotickai, Ph.D. 136 pages.

Life-cycle cost analysis has become an important consideration in a maintenance and rehabilitation plan for highway bridge structures during the past decades to achieve an efficient means for allocating limited capital and funds on the preventive and maintenance program. Consequently, certain safety and performance levels of bridge structures can be obtained. Based on the structural reliability concept, a stochastic model for evaluating the level of safety and service life of bridge superstructure and substructure, which has deteriorated due to chloride-induced corrosion, is presented in this research study. The inherent uncertainties in material properties and environmental effects were incorporated in the model to determine the reduction in capacity due to loss in cross-sectional areas of reinforcing steels. The load and resistance parameters were treated as random variables with statistical parameters obtained from available literatures. The Monte Carlo simulation was utilized during the calculation process to obtain the probability of survival over the lifetime of the structures. Additionally, by employing the Fault Tree Decision process, the optimum maintenance strategy for an example of the deteriorated reinforced concrete bridges in the southern part of Thailand was determined. The flexural and compression capacities were used in the calculation to determine the life-cycle cost for the slab and pier, respectively. Analysis procedure developed in this study may be use to obtain efficient maintenance strategy of bridge structures deteriorated due to chloride induced corrosion.

Student's signature Thesis Advisor's signature ___ / ___ / ___