

Development of Road Slope Risk Management System Focusing on an Evaluation of Optimum Maintenance and Repair Plan

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ABSTRACT

The issue of the maintenance/repair/renewal of road slopes has conventionally been addressed in the context of disaster prevention. While such an approach is undoubtedly essential, it is also necessary to introduce the infrastructure asset management concept, which is proposed by institutional lenders, in order to deal with the issue of optimizing the maintenance/repair/renewal of structures. Generally, infrastructure asset management is not concerned with the execution of repair work as the primary countermeasure. Instead, it requires comprehensive judgment of structural stability and return on repair investment for deciding which location should be repaired first, and thus it involves uncertainties. Recently, a number of infrastructure management systems, designed for specific asset classes, have existed for several decades, such as the development of pavement management systems and bridge management system. However, in consideration of road slopes, current infrastructure asset management systems are quite limited. Furthermore, considering long-term performance of the road slope, it is supposed to be affected by the performance deterioration of remedial works such as ground anchor system. Using expected life cycle cost, LCC, as the judging criterion and taking into account the performance deterioration process, this study aims to propose a new evaluation methodology associated with the development of optimum maintenance/repair plans for road slope based on road infrastructure asset management concept assuming rainfall as the natural hazard event. Finally, by applying the proposed method for a given slope adjacent to a highway, results show that the proposed method is very effective to comprehensively determine the optimum interval for cleaning the groundwater drainage system based on the evaluated LCC to restore its performance.

Key Words: road slope, risk, natural hazard, countermeasures, performance-deterioration, life cycle cost, risk

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