**Probabilistic analysis of bridge failure and corresponding risk assessment under an influence of predictive climate models**

**Influence of different climate models on probabilistic analysis of of bridge failure and corresponding risk assessment – A probabilistic approach**

Successful management of controlling deterioration of bridges requires the reliable prediction of damage due to scour. The reliability of the scour prediction process can be significantly improved by integrating past information with information generated from prediction models of future climate and its corresponding river flow. Among the vast range of available climate models and their different downscaling methods and climate scenarios, most relevant selection was made to derive future daily and annual change in climate and precipitation and corresponding change in intensity of streamflow in river. This integration of predicted future data leads to a more accurate prediction of the time-dependent damage level ~~caused by scour~~ and, eventually, to a better supported ~~decision-making~~ process to ~~perform mitigation process to prevent failure~~ evaluate corresponding failure risk. In this paper, a probabilistic approach is provided to find ~~an optimum management plan~~ risk of failure for a bridge ~~with scour-sensitive pier~~ by integrating the available information from prediction of future climate data. ~~The proposed approach utilizes a probabilistic time-dependent scour failure criterion, rebuild, running and time cost associated with failure to find optimum maintenance time under uncertainty.~~ ~~New information of future climate prediction resulting from climate models performed for span of 2016 AD – 2099 AD, is used to update the scour depth and parameters of uncertainty as well as optimization and mitigation procedure.~~ This process results in ~~an enhanced mitigation strategy~~ risk profile which can provide managers the ability to make real –time decisions based on probabilistic results of failure. The integration of this future climate information and its impact on the life-time ~~maintenance process~~ stability of the bridge ~~foundation~~ are thoroughly investigated. In addition, an existing bridge is used to illustrate the proposed probabilistic approach.