



**Project: Risk Analysis and Reliability Models Development for USACE Civil Works Projects**

**Client: US Army Corps of Engineers Risk Management Center - Institute of Water Resources (IWR)**

**Client Contact: Robert Patev**

**MSMM Services:** Project Management; Development of Risk Management Plan

**DESCRIPTION**

The Risk Management Center of the US Army Corps of Engineers (USACE) Institute of Water Resources (IWR) required the development of a **fragility primer and tolerable risk guidelines** for use throughout USACE. The USACE is updating reliability modeling methodologies for managing civil works assets which requires the development of baseline information, technical support, and guidance materials related to the use of fragility curve concepts in risk analysis. The work includes the **Development of guidance on fragility models and Investigation of tolerable risk criteria and guidelines.**

The project included a literature survey of the development and use of fragility curve concepts in risk analyses as applied to USACE civil works projects, and development of a tutorial document of findings. This survey reviewed the development of structural, geotechnical, and hydraulic engineering uses of fragility (i.e., the conditional probability of adverse performance under stated hazard loading). Also, the work included a literature survey of the use of **“acceptable” and “Development of guidance on fragility models and Investigation of tolerable risk criteria and guidelines.** The survey followed the history of the development of such criteria from the 1960s in the UK and Netherlands through present, and focused on civil infrastructure systems. A report was developed to summarize the findings of the literature survey of “acceptable” and “tolerable” risk criteria as applicable to USACE projects.