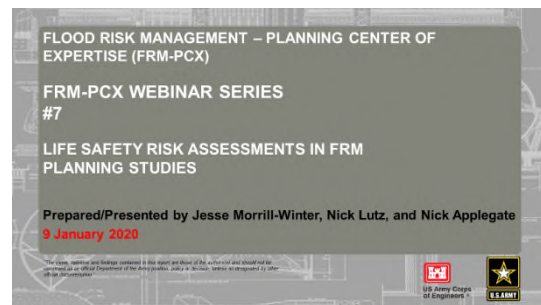


FRM-PCX Webinar #7 – Life Safety in FRM Planning Studies

January 9, 2020

Q&A Session

This webinar discussed best practices for incorporating life safety considerations in flood risk management (FRM) planning studies, with a focus on life safety risk assessments. The webinar was presented by Nicholas Applegate (National Technical Specialist, FRM Planning Center of Expertise), Jesse Morrill-Winter (Sacramento District Regional Technical Specialist for Dam and Levee Safety Economics), and Nick Lutz (Louisville District Regional Technical Specialist for Dam and Levee Safety Economics).



The webinar addressed the following questions:

- *Why are the USACE Tolerable Risk Guidelines important?*
- *How does a life safety focused risk analysis differ from an economics analysis?*
- *When/how should teams incorporate life safety risk assessments into the planning process?*
- *Who needs to be involved in a life safety risk assessment during a planning study?*
- *What is the appropriate level of analysis/assessment and what are my team's options?*
- *Where can you find assistance in conducting life safety studies?*

This is the seventh in a series of webinars from the FRM Planning Center of Expertise (FRM-PCX) focused on helping PDTs with current and relevant challenges on their FRM Planning studies through tips, tools, and lessons learned. These webinars are available on the [Planning Community Toolbox](#), including videos of past webinars.

This summary of the Question / Answer session of the webinar is not a transcription; questions and responses have been edited and reordered for clarity.

Application of Life Safety Concepts and Policies

Does the new [Engineering and Construction Bulletin \(ECB\) 2019-15: Interim Approach for Risk-Informed Designs for Dam and Levee Projects](#) also apply to Continuing Authorities Program and/or Tribal Partnership Program FRM projects?

Yes, the ECB applies to all project types, including Supplemental projects. Reference Section 5 of the ECB: “Applicability. This ECB is applicable to all Headquarters USACE (HQUSACE) elements, Divisions, Districts, laboratories and field operating activities related to Civil Works projects. The actions and policies in this ECB will also be applied in the execution of all design projects, including those funded by the 2018 Disaster Relief Supplemental Appropriations (P.L. 115-123).”

To what extent do ECB 2019-15 and [Planning Bulletin \(PB\) 2019-04: Incorporating Life Safety into Flood and Coastal Storm Risk Management Studies](#) apply to coastal storm risk management (CSRM) projects that consist of sandy beaches designed for reducing coastal erosion or coastal back bay areas?

PB 2019-04 requires evaluation of life risk in planning studies and applies to all CSRM studies. ECB 2019-15 applies to any civil works project, but a life safety risk assessment may not be necessary for the referenced situations (i.e., sandy beaches, coastal back bay areas). PDTs should coordinate early in the

study with the CSRM PCX regarding incorporation of life safety analyses in CSRM projects per Planning Bulletin 2019-04.

Is there a life safety webinar or other resources targeted specifically to CSRM? It seems like all the existing life safety resources are geared toward inland flooding.

The life safety analysis framework described in this webinar is used by the FRM-PCX and the USACE Dam and Levee Safety programs, and applies to CSRM projects with many of the key elements remaining the same regardless of the project type. At this time, the presenters are not aware of resources or webinars targeted specifically to CSRM studies.

Are there any cases in which the Assistant Secretary of the Army for Civil Works (ASA(CW)) has approved an exception to the National Economic Development (NED) recommendation based on life safety?

The presenters are not aware of any examples of the ASA(CW) approving a policy exception to recommending the NED plan in favor of a life safety plan. However, there are multiple FY2018 Emergency Supplemental studies that are requesting this policy exemption and recommending non-NED plans based on life safety considerations. Several exemption requests are making their way up the vertical team chain. As successful examples arise, the FRM-PCX and Planning Community will be able to learn from them.

Life Safety Modeling

To what extent should study teams consider using the G2CRM model (a coastal Monte Carlo life cycle simulation model) to estimate life safety risk for a project?

While G2CRM incorporates some of the same curves used in [HEC-LifeSim 1.01](#), teams should be cautioned that it can be difficult to use this model specifically to estimate life safety risk. This doesn't mean that the model can't be used, but that teams should ensure they are comfortable with using the model outputs.

Note: the FRM-PCX is working with the Risk Management Center (RMC) to certify LifeSim version 2.0, which may be more applicable and easier to use for CSRM studies. LifeSim 1.01 is currently certified for life loss estimates only.

Are water or air temperatures factored into life risk modeling? Many of the high flood seasons around the country coincide with cold weather seasons, which means that flooding events can pose a hypothermia risk.

Yes, water and air temperatures are factored into LifeSim outputs by way of the empirical data that is used to develop the fatality rate curves. The empirical data include events where life loss occurred due to cold weather flooding. Water and air temperatures are not implicit inputs into the model; rather, the model specifically evaluates the impact of hydraulic force on the exposed population at risk (PAR). However, water and air temperature are factors that can be considered qualitatively in the risk assessment category, and which may result in adjusting the risk category of a project if such factored are deemed to be significant risk drivers.

Is work related to life safety analysis (e.g., conducting a Semi Quantitative Risk Analysis) funded out of the total \$3M feasibility study allotment?

Life safety risk assessment efforts should be included in the \$3M budget, but study teams can minimize the amount of funding needed by leveraging data and results from other modeling, data collection, and analytic efforts that have already been done, and by strategically establishing the scope and scale of the risk assessment that best fits the decision-making needs of the study. The PED phase should also be considered and utilized for more robust assessments prior to construction, if necessary for the particular study or project.

Does LifeSim incorporate “real” human responses in evacuation scenarios (i.e., group think)?

LifeSim explicitly incorporates human responses to evacuation situations based on empirical data collected by two sociologists hired by USACE (Dr. John Sorensen and Dr. Dennis Miletic) to evaluate the factors that contribute to the effectiveness of evacuation warning and messaging systems and the resulting human response. The results of their research were also incorporated into a 2019 Engineering Pamphlet, [A Guide to Public Alerts and Warnings for Dam and Levee Emergencies](#).

Does LifeSim account for traffic already on the roads at the time of an evacuation?

There are ways to account for traffic already on the roads at the time of an evacuation by loading the structure inventory in different ways, but typical studies do not do this due to the large level of analysis and higher level modeling required, as well as the potential to double count portions of the PAR. By default, LifeSim assumes that people are either at work or at home when the evacuation (simulation) begins.

Semi-Quantitative Risk Assessments

Is the life risk to PAR plot data shown in the SQRA example in the presentation USACE data (slides 46-52 of the presentation)?

Yes, the data shown in the SQRA example came from data outputs from the Levee Screening Tool. Talk to your local LSPM to gain access to the LST or to obtain documents explaining its methodology.

How does the SQRA process control for the disconnect between probability of poor performance (i.e., fragility curves) and observed performance?

Ideally, observed performance data is used to help create probability of performance data. For example, when conducting an SQRA, teams generally use the pool of record and other information sources when estimating the probability of failure for a future, larger flood. Ultimately, the SQRA framework is intended to move away from using “black boxes” to generate probability estimates, and towards considering all available data sources.

Is there a template or tool available for making f-n charts?

Yes, there are SQRA “toolboxes” that are often used by risk cadres. Study teams interested in using these toolboxes should contact Nick Lutz.