Inherent Safety of Dikes Against Catastrophic Failure of Storage Tanks

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ABSTRACT

It is industry practice to provide passive containment (dikes) of storage tank equivalent to 110% of the capacity of the tank. This standard is sufficient for containment of small to moderate leaks. However, it is generally inadequate to contain a catastrophic failure, which can form a wave that simply washes over the side of (or through) a dike wall. The 110% standard has generally served industry well, since the likelihood of a catastrophic tank failure is very low historically. However, concerns over terrorist attacks, and adoption of principles such as “inherent safety”, have brought the catastrophic tank failure case back onto the “radar screen” of chemical risk management.

It is possible to analyze the potential for tank dike spillover using both “classic” correlations and more modern techniques such as computational fluid dynamics (CFD). In recent work, the two methods have been shown to provide similar results, with the classic approach providing some insights not immediately apparent from CFD outputs alone. Spillover correlations and mitigation strategies are described.