Abstract

Since September 11, 2001, security of urban infrastructure against car or truck bombings has emerged as a major concern in New York City and other urban centers. Increasing the "stand-off" distance between the potential explosive charge and the target structure significantly lessens the blast pressures since the pressure is inversely proportional to roughly the cube of the distance between the charge and the target. In other words, excluding vehicles from entering the proximity of important buildings which are more likely to be the target of explosive threat is an important security measure. This may be accomplished by using barriers or bollards which are designed to stop an incoming car or truck traveling at various design speeds.

This thesis presents a rational method for the design of perimeter bollards using the relevant federal and NYC design criteria. The thesis presents a holistic approach, placing special emphasis on the permitting and approval process in the context of New York City. The design approach is illustrated for a shallow foundation composite structure bollard to absorb the impact of a 15,000 lb vehicle traveling at 30 mph.