ON THE BURSTER SLAB DESIGN OF HARDENED AIRCRAFT SHELTERS

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Abstract:

High value strategic defense installations are the primary target of preemptive attacks in case of an armed conflict. Hardened shelters have traditionally been used to protect critical infrastructure and equipment against enemy attacks. These structures are heavily reinforced concrete (RC) structures designed to sustain the impact of precision guided munitions (PGMs). The burster slab is the outermost layer of a hardened shelter to arrest and detonate a missile before it can reach the inner layers of the target structure. The optimized and practical design of RC burster slab is critical to the safety and performance of the hardened shelters. The development of advanced penetrators requires design of burster slabs of high resistance within practical dimensions and thickness. This demands ultra high performance concrete with specialized detailing and composite construction.

The work here presents the research done on the design and detailing of burster slab against large missile impact. The role of slab design parameters (e.g., concrete strength, rebar percentage, detailing configuration) is discussed to allow an effective design strategy. The uncertainty associated with numerical predictions is discussed. The analytical or simplified numerical models to study the localized impact loading on a RC slab often fail to capture the complexity of the event. The accuracy of numerical prediction with respect to slab dimensions, boundary conditions and location of impact are discussed. The considerations for rail track sled facility trials to simulate the actual event through field scale testing are also discussed through the conclusions of the experimental and numerical conclusions of this study.