

A series of practical experiments was conducted in order to judge the effectiveness of ferro cement panels for use in building revetments, bunkers and "concrete sky" aircraft cover and fenders around brigade piers to protect them from demolition by underwater blast charges. Ferro cement consists of closely packed steel mesh reinforcing with its interstices filled with sand-cement mortar.

Two panel designs were selected by exposing panels of differing thicknesses, mortar mixes and types and amounts of reinforcing to Caliber. 30-06 rifle and caliber .45 of pistol fire. Portland Type III and Fast Fix I cements were triad. A 1:2.5 cement to sand mortar mix was selected and ordinary expanded metal lath was chosen for the reinforcement.

Panels 41 1/2"x 41 1/2"x2" were exposed to surface demolition charges up to 20 pounds of TNT to obtain lower bound results for guidance in the design of underwater experiments. Panels of this size in different arrangements, numbers in tandem and standoff distances from a simulated bridge pier were exposed under 11 feet to 16 feet of water to TNT charges up to 20 pounds.

Panels 27 1/2"x 27 1/2"x1" were exposed to the blast and fragmentation of the M26 hand grenade, 81mm and 4.2 inch mortar shells, 105mm Howitzer shell and to 66mm and 3.5 inch rockets, HEAT. This ordnance was statically detonated by replacing the fuze with a wad of composition C4, primed, and time-fuzed.

The M16 rifle and M79 cartridge grenade launcher were fired on 27 1/2"x 27 1/2"x1" panels.

Panels 41 1/2"x 41 1/2"x2", placed horizontally 6 feet apart were exposed to the bursts of 81mm mortar and 105mm Howitzer shells statically detonated midway between them.

The experiments demonstrated that two 1-inch panels separated by an air space of 6" or more will stop the fragments of 81mm mortar shells bursting 3 feet away, 4.2 inch mortar and 105mm Howitzer shells bursting 5 feet away, contact bursts of grenades, hand, M26 and cartridge, M79, and fire of the M16 rifle. They are ineffective against HEAT rockets and shell bursts between panels. Minor damage to the pier simulator from a 20 lb. TNT charge on a 2-inch panel 6 feet away with two intervening panels demonstrated the effectiveness of the enforced 6 ft. standoff. The panel at 6 ft. was destroyed and the intervening panels were damaged.