

Composite Hypar Structural System (U)

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) A new underground shelter to resist explosions of 500 pounds (226.8 kg) of TNT is currently under development. This shelter uses prefabricated hyperbolic paraboloids with a coating of reinforced concrete and asphalt composite. The new design reduces the required structural wall thickness from 31.7 inches (0.805 meters) needed in the conventional concrete barrel vault design, or from 37.4 inches (0.950 meters) needed in the conventional concrete rectangular box design to resist localized effects of conventional weapons blast, to only 6 inches (0.152 meters). The HYPAR shelter also has the following design advantages: rapid deployment; ease and simplicity of construction; elimination of formwork; modular designed interconnecting shelters; ability to shock isolate the interior ground slab; large foundation footprint for poor soil conditions; exceptional resistance to "floating" in high water table applications; excellent intergral waterproofing; elimination of internal destructive spalling; excellent sealing against chemical or biological agents even if the main structure is fractured; ability to function as an economical, permanent multiuse space; overall economic advantage.			
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