

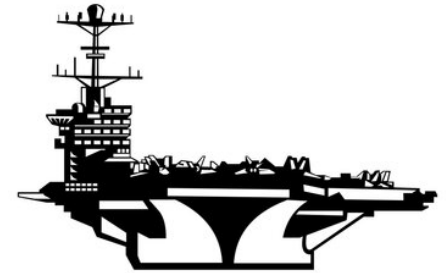
CPS Technologies

HYBRIDTECH ARMOR®

Ceramic tiles and fibers combine with aluminum to form metal matrix composite (MMC) armor that is trusted by the U.S. Navy to protect crew-served weapons stations aboard the aircraft carrier fleet.

Benefits

- A patented approach providing an alternative to High Hard Steel (HHS) at half the weight, with validated multi-hit performance
- Fully qualified to U.S. Navy specifications for Ballistic, Shock, Vibration, Fit, and Function
- Capable of defeating heavy kinetic threats (>.50 Cal) for protection in austere environments (STANAG 4569 AEP 55 Vol. 1 up to Level 6 protection)
- Modular assembly offers greater configurational freedom
- Environmental stability yields reduced life-cycle cost and improved long-term reliability



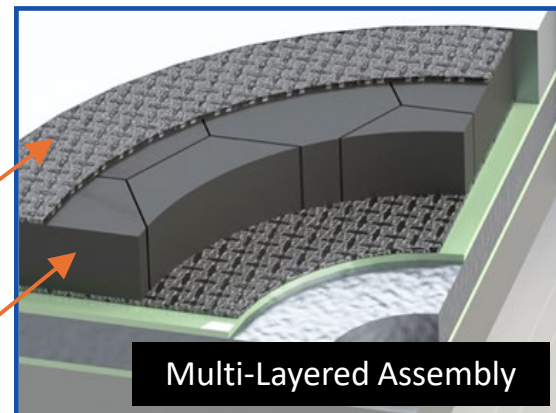
Installation underway on
U.S. Navy Aircraft Carriers

Approach

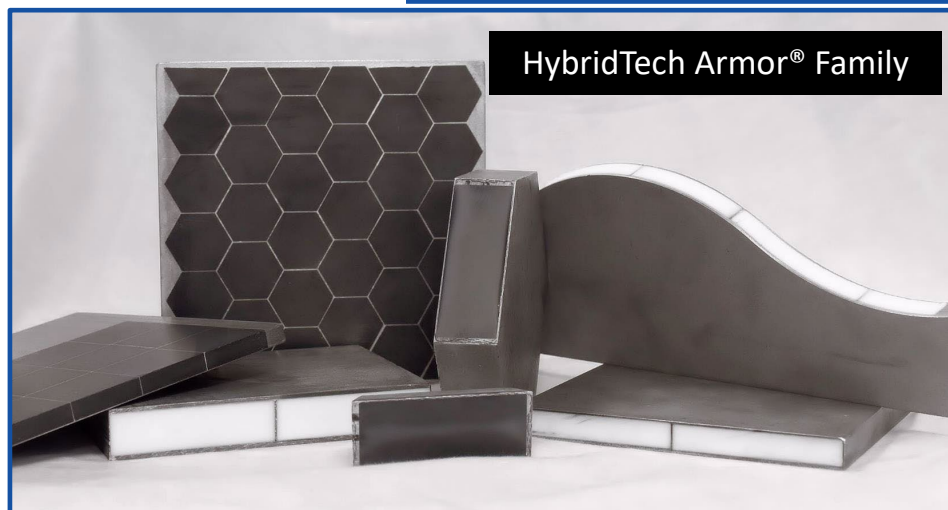
- a) Ceramic tiles are surrounded by high-strength ceramic fibers
- b) Molten aluminum is introduced at high pressure, infiltrating the ceramic fibers and encapsulating the tiles between layers of fiber-reinforced aluminum composite
- c) Tiles are held in compression, improving ballistic efficiency
- d) Tile size, thickness, and composition, and MMC layer thicknesses are highly adjustable and designed to meet specified threat levels and weight targets
- e) Mixed-material approach provides material properties that promote threat fragmentation and limit penetration

Aluminum
Composite

Ceramic Tiles



Multi-Layered Assembly



HybridTech Armor® Family

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HYBRIDTECH ARMOR®

Uniquely suited to reduce the mass of high-threat ballistic protection systems, HybridTech Armor® can also dramatically increase the ballistic performance of thin systems for applications such as helicopter flooring.

U.S. Army Solicitation:

".... develop a structural armor floor system that can be used as a lightweight, reconfigurable floor for the UH-60 fleet...."

- Reduce system mass
- Introduce removable armor layer
- Interface successfully with UH-60 configured for medical service
- V50 > 2,500 fps against 0.308 caliber M2 AP Rounds



CPS Solution:

- (1) Design a removable HybridTech Armor® strike face optimized for ballistic performance at decreased areal density compared to traditional steel overlay.
- (2) Combine with lightweight, high-strength composites to achieve a fully integrated flooring package that is adaptable to both legacy airframes and future vertical lift (FVL).

Results:

- Greater than 70% weight savings compared to legacy steel armor overlays
- Tested against 0.308 caliber M2 AP Rounds
- 10 documented shots on single armor panel, estimated 2,942 ft/s V50, well above targeted V50 of 2,500 ft/s
- Demonstrates weight savings and performance improvements by integrating removable HybridTech Armor® into modular flooring package

Armor Comparison	Legacy	HybridTech Armor® Assembly
Thickness	0.85"	0.76"
Areal Density: BAPS (lbs/ft²)	>25	7.2
V50 (ft/s)	2,500	2,942

