

POLYMERIC MATERIALS FOR STRUCTURAL PROTECTION

Beyond Research into Actual Use

C. Liu¹, D. Palermo²

¹*Karagozian & Case.*

2550 N. Hollywood Way, Suite 500, Burbank, CA, 91505, USA

²*The Sherwin-Williams Company*

192 W. 155th Street, South Holland, IL, 60473, USA

ABSTRACT

The protection of lives from an explosive event is a responsibility not taken lightly by any organization or company. The research, development, and testing of technologies that are used to reduce the loss of life and damage to assets have led to the validation of live blast test protocols, instrumentation, and computer modeling. Typical protection concepts explored are structural hardening or increasing the standoff against the threat. Often this research is done in collaboration between government and private industry.

An explosive blast mitigation concept that is being used with increasing frequency to increase the safety of structures is the use of “catcher” systems. They can be designed to be stand-alone in new construction and retrofits or used to augment structural hardening techniques. Cables, fabrics, and thin gauge sheet steel are examples of commonly used catchers used on the inner face of an exterior wall or window. An evolving category of catcher systems are polymeric materials that can be used for both wall and window upgrades. These commercial on the shelf (COTS) products started innocuously in the commercial marketplace and through insightful curiosity were tested and proven effective against explosive blast loads well over a decade ago. With the mitigation concept proven, Sherwin-Williams uses material engineering principles together with K&C Protective Technologies Pte Ltd to create materials for even greater in-use performance.

This paper will provide an overview of this reverse material evolution in the United States, from COTS to engineered materials during the last six years. Additionally, a need for specifications will be briefed. It is necessary to have a controlled procurement mechanism that allows for the discrimination between real and “hyped” products in the marketplace. Comparisons between US and International standards will be discussed where appropriate, as international cooperation is required for successful implementation of blast mitigation technologies.