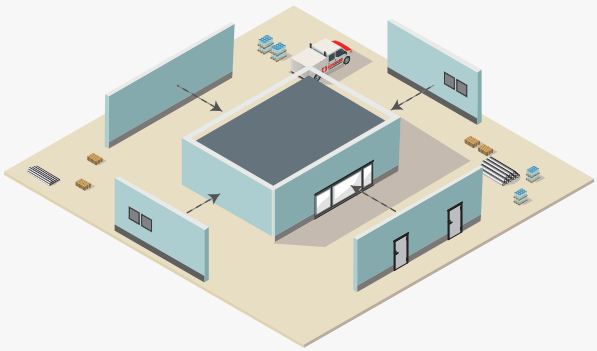
ENGINEERING SERVICES
BLAST RETROFIT AND UPGRADE DESIGN

REDGUARD®

TESTED FOR LIFE



When issues are found during a Process Hazard Analysis, RedGuard includes a Conceptual Mitigation Study. This presents mitigation options for either reinforcing existing structures (retrofitting) or replacing them. A Final Retrofit Design will offer solutions that can be used to bring an existing facility into compliance.

BLAST RETROFIT AND UPGRADE DESIGN

Conceptual Mitigation Studies from RedGuard

As part of a company's Process Hazard Analysis (PHA), the facility siting study may recommend that existing buildings be either moved, replaced or retrofit. At RedGuard, the facility siting study is coupled with a Conceptual Mitigation Study, which is a high-level tool that aides in the decision making process after issues are identified. This tool allows managers to weigh budgetary costs against potential project risks. Be sure to ask whether a Conceptual Mitigation Study is included in your Facility Siting Study.

Reasons to Retrofit a Building...or Not

Occupied buildings may not have enough blast capacity to resist the blast loads calculated in the explosion analysis studies such as facility siting, QRA, etc. Sometimes upgrades, or retrofits, can be made to existing structures so that the damage they sustain due to the blast load would be considered acceptable. Retrofitting a building may be a cost saving measure in terms of time and material, specifically when a building needs to retain a special purpose. For example, when a facility siting study shows that an existing control room building will sustain high damage or collapse when subjected to the blast load, sometimes a blast retrofit/upgrade can be performed in order to minimize, or eliminate, the need to update or move equipment, which could be a major cost factor.

Another consideration is the amount of interruptions to day to day business. Careful consideration must be taken to determine if more time will be lost while a building is completely taken down and rebuilt, or while the building is offline during a retrofit. If a building contains critical infrastructure, replacement of the building could result in the entire plant requiring shutdown while it is replaced. A plant shutdown has major financial implications, so in this case, a building retrofit makes more sense.

When you work with RedGuard, you will get a turnkey set of plans to take to your contractor. The final retrofit design project will include a detailed cost estimate and construction documents, including plans and specifications.

Possible Retrofit/Upgrade Suggestions Might Include:

- Shield (Cocoon) Structures (Steel, R/C and RM)
- Strongback Methods
- Catch Systems (Shield Panel, FRP, etc.)
- Steel Build Upgrades (E.g. Maintenance shops)
- Shield Wall Upgrades
- Window Upgrades or New Blast Resistant Window and Window Frame Design
- Door Upgrades and New Blast Resistant Door and Door Frame Design
- CMU (Cinder block) Building Upgrades (e.g. CMU Control Room Buildings)
- Brick Building Upgrades (e.g. Admin Buildings)
- Wood Trailer Upgrades

RedGuard builds modular solutions that protect lives and assets. It is the leading supplier of blast-resistant buildings and modular safe spaces. RedGuard's other innovative divisions and product lines specialize in modular safe structures, most with threat mitigation. The company is dedicated to five key disciplines: concept, design, build, installation and operation. Its success across these areas of expertise has led some of the world's largest organizations to trust their employees' lives to RedGuard products.

CONTACT US **ONLINE** | REDGUARD.COM **TOLL-FREE** | 855.REDGUARD **EMAIL** | SALES@REDGUARD.COM

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