

SLAPSHOT* INSURANCE

Masonry Walls for
Impact Resistance

*Man-made Impact and Abrasion
Weather Related Damage
Ballistics Research - RCMP Study
Explosion/Blast Resistant Construction*

** includes coverage for golf balls, baseballs, lacrosse balls, etc.*



Choose masonry...

for whatever Mother Nature and man dish out

Weather Protection and Accidental Impact



Steel cladding dented by parking cars.



Stucco corner abrasion due to human traffic.

“Impact resistance” with regard to construction means the ability of building materials to resist repetitive contact or accidental impact without damage. Exterior walls of steel, aluminum or vinyl siding, stucco or wood will often not withstand impact without damage, unlike masonry walls.

Building interiors are also subject to wear and tear from human traffic. Masonry resists abrasion far better than drywall finishes, particularly for institutions such as schools and hospitals.

Impact can also include accidents of man or nature ranging from explosions to tornadoes. For many who are involved in the design, construction or ongoing maintenance of buildings, impact resistance is an important consideration.



High winds turn debris into missiles.



EIFS penetrated by wind-blown debris.

In Canada we are no strangers to severe weather damage. Masonry provides an ideal barrier to the elements. Vinyl siding and other exterior surfaces do not provide protection from hail, strong wind forces and other damaging weather conditions.

The house in the above photo was seriously damaged by hail and required complete replacement of the vinyl siding while the brick easily withstood this storm.

The Insurance Bureau of Canada notes that Canadian governments have spent an average of \$500 million a year over recent years to repair damage caused by extreme weather including tornadoes in Barrie, Edmonton, Sarnia and Pine Lake.

Going Ballistic

Today, the increasing occurrences of terrorist attacks and “drive-by shootings” pose a great threat to public safety.

Bullet and projectile resistance is also of great concern to police forces in the event of exchange of fire. To address these issues, a research program was initiated by the Canadian Masonry Research Institute and the Royal Canadian Mounted Police to investigate the performance of complete wall assemblies subjected to direct gun shots.

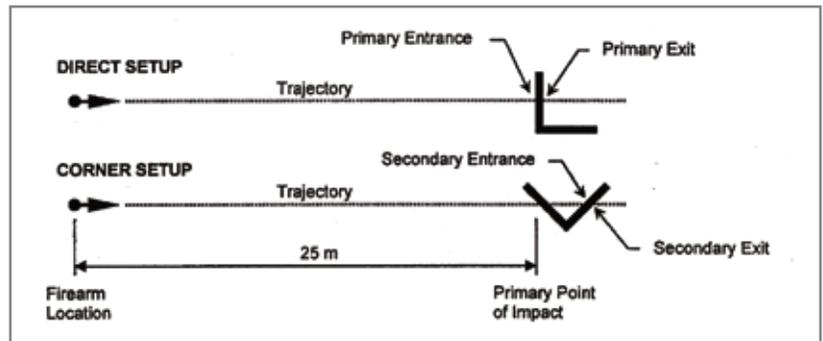
To conduct this study, a total of 16 wall assemblies were constructed in an “L-shape” as viewed in plan. For 13 of the walls, the main framing consisted of 2”x 4” wood studs spaced at 16” on centre covered with 1/2” thick wood sheathing and exterior tar paper, while fiberglass insulation was placed between the studs and drywall on the interior. The remaining three walls were constructed using standard 150 mm hollow concrete blocks as the backup wall system and 50 mm of rigid foam insulation. The walls were then clad with a variety of masonry, siding and stucco finishes.

Police forces need to know the bullet resistance of walls during exchanges of fire.



Because literally thousands of different types of firearms exist, a sample of common firearms and ammunition typically available to civilians and police was used.

The walls were tested in the firing range at the Royal Canadian Mounted Police (RCMP) forensic laboratory located in Edmonton, Alberta. Testing was performed on one wall at a time at a horizontal distance of 25 metres from the location of the firearm. Shots were taken straight on and through a corner.



This diagram shows the trajectory of the bullet and wall orientation during testing.

The results of this project were somewhat unexpected. The ability of a .22 Long Rifle bullet to easily travel completely through the corner of a typically constructed vinyl sided house was as unforeseen as the brick walls stopping all but the bullet with the greatest velocity. Standard stucco finishing does not significantly reduce life-threatening situations for people inside or outside a wall that is subjected to most centrefire bullet impacts. This danger increases with the velocity and energy of the bullet fired. Secondary projectiles (wood, lathe, stucco, etc.) produced by a bullet travelling through one of these walls would also present risk to a person.

These tests have provided valuable forensic firearms information regarding the type of damage expected to buildings after they have been struck by gunfire. The results provide members of law enforcement agencies with the knowledge of what they can expect in situations where firearms are being used by and/or against them.

Photos taken at RCMP Forensic Lab of test panels using common .308 Winchester rifle (cartridge size 7.62 x 51 mm).



Above photo shows entrance point of impact. Bullet failed to pass through brick wall.



Above photo shows exit point of stucco wall after bullet has passed through corner (i.e. two complete walls).

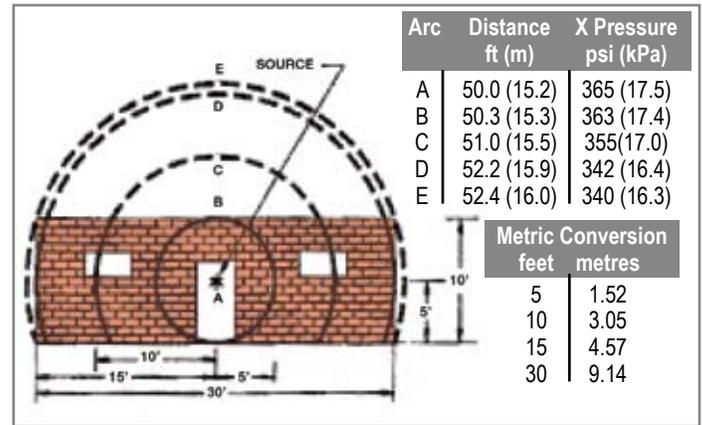


Above photo shows exit point of vinyl sided wall after bullet has passed through corner (i.e. two complete walls).

Explosion & Blast Resistance

Blast loads can occur during acts of war or terrorism or during industrial and transportation accidents. The peak load lasts only a fraction of a second while the intensity of the load can be several orders of magnitude larger than any conventional design loads such as wind.

Common blast design philosophies recognize that protection is not an absolute. The goal is not necessarily to withstand the blast, but to limit the extent of collapse, loss of life and to facilitate evacuation and rescue.



The above diagram shows the pressure distribution model from 25 lbs of TNT with standoff distances of 50 feet and 5 feet above the ground. Masonry, designed effectively, can provide a first line of defence against blast impact.

Canadian Concrete Masonry Producers Association
Region 6 of the National Concrete Masonry Association



Summary of impact resistance

Resistance of Wall Type to Impact:	Masonry Cavity Wall (brick & block)	Brick Veneer on Wood Frame	Vinyl Siding on Wood Frame	Stucco on Wood Frame & EIFS	Metal Cladding
Pucks, balls, etc	Unaffected	Unaffected	Punctures	Cracks	Dents
Hailstones	Unaffected	Unaffected	Punctures	Surface erosion	Dents
Wind blown objects	Unaffected	Unaffected	Punctures	Punctures	Dents or punctures
Human abrasion	Unaffected	Unaffected	Tears, Punctures	Cracks, flakes	Dents
Auto nudges	Cosmetic	Cosmetic	Cracks in cold	Cracks	Dents
Firearm shots	Chips	Chips	Penetrates completely	Penetrates completely	Penetrates completely
Explosions	Maximum protection	Better protection	Little protection	Little protection	Little protection

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