

BULLET BAFFLES

In the scope of improving shooting ranges security, we tried several bullet baffles of different composition and structure in real shooting conditions. We think that the results of these tests could be of some interest to members.

The baffles were set at 8 meters (26 feet) from the muzzle of the firearms used and perpendicularly to the bore's axis excepted when an angle is mentioned.

Test series number 1:

Composition of the baffle (one layer): one pine board 65 mm (2" ½) thick.

22LR caliber:

- CCI Mini Mag copper plated lead bullet MV 375 m/s (1230 fps): the bullet is stopped but the board is almost perforated. The nose of the bullet is visible behind the board.
- Stinger copper plated lead bullet hollow point MV 464 m/s (1522 fps): stopped.
- Blazer lead bullet MV 271 m/s (889 fps): stopped.

In this sample of tests we got the maximum velocity it is possible to obtain with the 22LR caliber. It is a bullet which is easily stopped.

Test series number 2:

Composition of the baffle (two layers):

- One pine board 65 mm (2" ½) thick.
- One railroad tie (oak) 145 mm (5" ³/₅) thick located 30 mm (1" ¹/₅) behind the board.

22 Hornet caliber:

- Soft nose bullet 45grs MV 707 m/s (2320 fps): the bullet went through the board but was stopped by the railroad tie.
- Full metal jacket bullet 55grs MV 628 m/s (2060 fps): the bullet went through the board but was stopped by the railroad tie.

6.5x39 (6.5 Kalashnikov) caliber:

- Soft nose bullet 129 grs MV 587 m/s (1926 fps): the bullet went through the board but was stopped by the railroad tie.

7BR caliber:

- Match bullet 150 grs MV 556 m/s (1824 fps): the bullet went through the board but was stopped by the railroad tie.

45-70 GVT caliber:

- Hollow-point soft nose bullet 300 grs MV 534 m/s (1752 fps): the bullet went through the board but was stopped by the railroad tie.

243 Winchester caliber:

- Soft point bullet 80 grs MV 932 m/s (3058 fps): the bullet went through the board but was stopped by the railroad tie.

7x64 Brenneke caliber:

- Soft point bullet 154 grs MV 835 m/s (2740 fps): the bullet went through the board but was stopped by the railroad tie.

300 Winchester Magnum caliber:

- Silver-tip bullet 220 grs MV 782 m/s (2566 fps): the bullet went through the board but was stopped by the railroad tie.

6.5x57 caliber:

- Full metal jacket bullet 92 grs MV 900 m/s (2953 fps): the bullet went through the board but was stopped by the railroad tie.

Railroad ties are really bullet proof.

Test series number 3:

Composition of the baffle (five layers):

- one pine board 65 mm (2" ½) thick.
- Four ordinary steel plates 3mm (12/100") thick set with a 30 mm (1" ^{1/5}) space between them, the first plate being 60 mm (2" ^{2/5}) behind the board.

22 Hornet caliber:

- Soft nose bullet 45grs MV 709 m/s (2326 fps): the bullet was stopped by the first plate which is bulged
- Full metal jacket bullet 55grs MV 619 m/s (2031 fps): the bullet went through the first plate but was stopped by the second plate which is badly bulged.

7BR caliber:

- Match bullet 150 grs MV 556 m/s (1824 fps): the bullet went through the first plate but was stopped by the second plate which is perforated. The third plate is intact (the bullet disintegrated on the second plate making a hole through it in the process).

357 Maximum caliber:

- Soft point bullet 200 grs MV 386 m/s (1266 fps): stopped by the first plate which is perforated. The second plate is intact (the bullet disintegrated on the first plate making a hole through it in the process).

30-20 Caliber:

- Soft point bullet 150 grs MV 530 m/s (1739 fps): the bullet went through the first plate but was stopped by the second plate which is perforated. The third plate is intact (the bullet disintegrated on the second plate making a hole through it in the process).

44 Magnum caliber:

- Soft point bullet 240 grs MV 400 m/s (1312 fps): stopped by the first plate which is perforated. The second plate is intact (the bullet disintegrated on the first plate making a hole through it in the process).

7x64 Brenneke caliber:

- Soft point bullet 154 grs MV 835 m/s (2740 fps): the bullet went through the first plate but was stopped by the second plate which is perforated. The third plate is intact (the bullet disintegrated on the second plate making a hole through it in the process).

243 Winchester caliber:

- Soft point bullet 80 grs MV 932 m/s (3058 fps): the bullet went through the first plate but was stopped by the second plate which is bulged.

Ordinary steel plates are effective when set in separate layers.

Test series number 4:

Composition of the baffle (four layers):

- one pine board 65 mm (2" ½) thick.
- One ordinary steel plate 6 mm (24/100") thick set 90 mm (3" 3/5) behind the board.
- Two ordinary steel plates 3 mm (12/100") thick set with a 30 mm (1" 1/5) space between them, the first being 30 mm (2" 2/5) behind the first plate.

7x64 Brenneke caliber:

- Soft point bullet 154 grs MV 835 m/s (2740 fps): the bullet went through the first plate but was stopped by the second plate which is perforated. The third plate is intact (the bullet disintegrated on the second plate making a hole through it in the process).

Replacing the first two 3 mm plates by a single plate of 6 mm lessens the effectiveness of the baffle: two plates of 3 mm (total 6 mm) are as effective as one plate of 6 mm plus one plate of 3 mm (total 9 mm).

Test series number 5:

Composition of the baffle (four layers):

- one pine board 65 mm (2" ½) thick.
- One ordinary steel plate 8 mm (3/10") thick set 90 mm (3" 3/5) behind the board.
- Two ordinary steel plates 3 mm (12/100") thick set with a 30 mm (1" 1/5) space between them, the first being 30 mm (2" 2/5) behind the first plate.

7x64 Brenneke caliber:

- Soft point bullet 154 grs MV 835 m/s (2740 fps): the bullet was stopped by the first plate which is slightly bulged.

A single plate of 8 mm is slightly better than two 3 mm plates.

Test series number 6:

Composition of the baffle (five layers):

- one pine board 65 mm (2" ½) thick.
- Four ordinary steel plates 3 mm (12/100") thick set with a 30 mm (1" 1/5) space between them. They are canted toward the firing point with a angle of about 55 degrees. The top edge of the first plate is at 40 mm (1" ½) from the board and the bottom edge at 420 mm (16" ½).

7x64 Brenneke caliber:

- Soft point bullet 154 grs MV 835 m/s (2740 fps): the bullet went through the first plate but was stopped by the second plate which is bulged.

17 Remington caliber:

- Hollow-point soft point bullet 25 grs MV 1050 m/s (3445 fps): the bullet was stopped by the first plate which is dented.

222 Remington caliber:

- Match bullet 52 grs MV 860 m/s (2822 fps): the bullet went through the first plate but was stopped by the second plate which is dented

300 Winchester Magnum caliber:

- Silver-tip bullet 220 grs MV 782 m/s (2566 fps): the bullet went through the two first plates but was stopped by the third which is bulged.

6.5x57 caliber:

- Full metal jacket bullet 92 grs MV 900 m/s (2953 fps): the bullet went through the two first plates but was stopped by the third which is perforated. The fourth plate is intact (the bullet disintegrated on the third plate making a hole through it in the process).

Canted plates are more effective than perpendicular ones.

Test series number 7:

Composition of the baffle (two layers):

- one pine board 65 mm (2" ½) thick.
- One armoured steel plate (444 BHN) 6 mm (24/100") thick. It is canted toward the firing point with a angle of about 55 degrees. The top edge of the first plate is at 40 mm (1" ½) from the board and the bottom edge at 420 mm (16" ½).

270 Winchester caliber:

- Soft point bullet 150 grs MV 874 m/s (2867 fps): the bullet was stopped by the plate which is dented.

300 Winchester Magnum caliber:

- Silver-tip bullet 220 grs MV 782 m/s (2566 fps): the bullet was stopped by the plate which is dented.

Test series number 8:

Composition of the baffle (three layers):

- one pine board 65 mm (2" ½) thick.
- One armoured steel plate (444 BHN) 6 mm (24/100") thick. It is canted toward the firing point with a angle of about 55 degrees. The top edge of the first plate is at 40 mm (1" ½) from the board and the bottom edge at 420 mm (16" ½).
- One ordinary steel plate 3 mm (12/100") thick set 30 mm (1" 1/5) behind the first plate with the same angle.

6.5x57 caliber:

- Full metal jacket bullet 92 grs MV 900 m/s (2953 fps): the bullet went through the first plate but was stopped by the second which is bulged.
- Soft point bullet 92 grs MV 900 m/s (2953 fps): the bullet was stopped by the first plate which is dented.

Conclusion:

1. Ordinary thin steel plates are effective if set in separate layers.
2. Steel plates are more effective if the bullets hit them with an angle.
3. Full metal jacket bullets are a little more difficult to stop than soft points, hollow-point or match type bullets.

There are many other possibilities like the use of the armoured rubber bands used in quarries to transport stones or sand. These bands are particularly effective when they are used in suspended layers left to the action of gravity.

It appeared during subsequent tests that the distance between the layers of material used is very important. A too small distance lessens the efficiency a lot. May be this is due to the fact that after going through some material, the bullet needs some distance to become unstable and hit the next layer with some angle.

JPB