STEEL TARGET SAFE USE GUIDE

FOR PISTOL SHOOTING

(Includes 3 Gun and Multi-gun disciplines)

DATE: 28th May 2025

WARNING

Any use of steel targets that have serious impact damage, such as craters or curving of the plate has the potential to cause serious harm injuries to users and bystanders

Minimum grade of steel must have a Britnell hardness of 450-520HB
Recommended grade is Bisalloy AR500 or equivalent for both rifle and pistol targets.
CAS TARGETS – pistol & rifle minimum thickness 10mm.
IPSC pistol, minimum thickness 10mm.
IPSC rifle, minimum thickness 12mm.
SPEED pistol, minimum thickness 10mm.
.22LR Rile minimum thickness 6mm
Silhouette 22LR pistol, minimum thickness 6mm.
Silhouette centre fire field pistol, minimum thickness 10mm.
Silhouette full-bore pistol, minimum thickness 12mm.

1 Introduction

It is important that steel plate targets are set and used correctly; their continued safe use depends on you. Whilst we cannot control how you use your targets, you as a range user must assume responsibility for their correct use

There are several things that are important for you to know. Firstly, all shooting and gun handling activities involve certain risks. Most of these risks can be reduced, but cannot be completely eliminated despite your best efforts. Steel plate targets are intended for use by experienced and competent shooters, who are in a position to evaluate and control the risks involved. Beginners and less knowledgeable shooters should use steel plate targets only under the direct supervision of experienced shooters, or better yet, range officers.

Shooting ranges must be properly constructed, with backstops and side berms that will safely stop and contain all rounds fired, including those projectiles and fragments that deflect from steel targets. Even on the best-constructed range, safe range procedures are essential for your safety and that of everyone else present

Ranges on which more than one or two shooters are firing should be controlled by a trained, experienced range officer, who can control and coordinate the shooting activities. Shooting competitions, including ones in which steel targets are used, should be designed and run by a trained Range Officer, with experience in that type of competition and the types of targets and firearms used. Trained Range Officers should control each course of fire.

For the safest results, use steel targets that are made from the correct grade of material and maintained to keep them within a minimum design criteria.

2. Do not use the following ammunition on hard targets.

SERIOUS PERSONAL INJURY, AND/OR PERMANENT DAMAGE TO THE TARGETS MAY RESULT:

- Any pistol ammunition in (a handgun) above **1,600** feet per second.
- Any pistol ammunition in (a rifle) above **2,148** feet per second.
- Any rifle ammunition above **3,200** feet per second.
  (Minimum engagement distances apply to prevent excess damage to plates)
- Any armour-piercing ammunition or ammunition with steel or other hardened metal cores.
- Low velocity, mid-range or target- type ammunition, BB's and pellets from air guns and other pellet guns, and other projectiles which lack sufficient velocity to disintegrate when they strike the plate. **(Minimum velocity 400fps)**
- Under no circumstances should you use steel / bismuth shotgun pellets or steel BB"s on steel targets. These will bounce back and could cause serious injury to the shooter of spectators.
- Shotgun rifled slugs, must only be used on angled (min 15deg) non-reactive steel plate targets

3. Steel types suitable for targets:

BISALLOY is a trade name. Bisalloy Steels produces the BISALLOY® range of quench and tempered performance steels across the three main product areas of high wear, high strength and armour grade specialty steels.

Armour plate is a heat-treated alloy with hardness about 450-520HB (Britnell hardness). This is the best steel for pistol & rifle targets. This grade of plate will handle .308 ball ammo at 150 metres or .223 at 200 metres with minimal damage. (Steel Jacketed, Steel Core or Armour Piercing Ammo will damage the steel and must not be used under any circumstances). Copper Jacketed Lead bullets are recommended for rifle use.

PNZ recommendation is to use Bisalloy AR500 450-520HB for all steel targets.

READ AND UNDERSTAND THE INFORMATION IN THIS SAFETY GUIDE BEFORE USING STEEL TARGETS

4 Steel Targets Are Safer to Shoot When:

- **Shooters and spectators stay within the recommended safety zones.**
- **Approved eye & hearing protection is worn at all time**
- **Projectiles are fired at right angles to the impact plates**
- **The target's steel meets the minimum standard for steel targets**
- **(Brinell Hardness HB 450-520HB)**
- **Multiple targets are positioned in each other's safety zone.**
- **Shooters observe the approved minimum shooting distances.**
- **Users read and follow this safety and target use guide.**
- **When needed shrouds should be used to prevent backsplash or ricochet's**

5. Up-right or angled "impact" plates versus reactive plates

- Impact plates are those used in CAS and Speed shooting. These do not fall when struck.
- A reactive target is one that falls when struck such as those used in IPSC, Silhouette and NRA events.

6. Explanation of Safety Hazard

Projectiles that hit steel targets squarely will usually break into fragments that deflect or "bounce" off the surface of the target. Depending on the type of ammunition used and the exact angles involved, some of these fragments can be sizable, and can travel for a considerable distance.

Very low-velocity projectiles, very heavily jacketed or solid metal (non-lead) projectiles designed for deep penetration, and many types of shotgun pellets, may not fragment at all, even when they hit the target squarely, but may instead deflect as whole projectiles

Also, any type of projectile may deflect in whole, un-fragmented form if it glances off the very edge of the target. It is important that any edge deflections are caught by properly constructed range backstops or side berms or by the use of properly constructed shrouds.

The most common injuries from using unsafe steel targets, or from using steel targets in an unsafe manner, are small cuts, scratches and bruises caused by fragments hitting the shooter or bystander at close range

Steel plate targets that are designed to deflect projectiles and fragments in predictable directions make the range safer for users and spectators. Deflected projectiles and fragment can be stopped and contained by proper range ground surfaces, backstops and side berms. Proper range surfaces, backstops and side berms are thus essential to the safe use of steel targets. The predictable "splatter zone" produced creates a reliable "safety zone" within which shooters and others can stand. Among other things, this Guide will show you how to create and use the safety zone most effectively.

! WARNING

Even when targets are maintained and used properly, shooters and others in the "safety zone" at close range may occasionally be struck by tiny fragments. This may be due to specific projectile types, uneven range surfaces, or other targets or objects within the "splatter zone" of the target being used.

WEARING PROPER EYE PROTECTION AT ALL TIMES is absolutely essential in order to prevent serious eye injury from these occasional tiny fragments.

THE SAFE USE OF ANY STEEL TARGETS DEPENDS ON YOU!

7 Eye protection and other protective equipment.

Eye Protection

Wearing proper eye protection is a critical safety precaution in any shooting activity, but it is especially important when using steel targets, which generate projectile fragments that leave the target surface with sufficient velocity to cause serious eye injury.

Even if you understand how to manage the "splatter zone" created when projectiles strike steel targets, a damaged plate, a single round of non-standard ammunition, or some other change in conditions could cause fragments to fly in an unexpected direction.

Every shooter, spectator, and anyone else present while firing is in progress **must** wear good quality eye protection to prevent possible injury from fragments bouncing back from targets and other range equipment, etc.

For shooters who wear prescription glasses, there are polycarbonate safety glasses and goggles designed to fit right over the prescription glasses. There is simply no excuse for not wearing adequate eye protection while shooting, you only have one set of eyes, and they are easily injured and irreplaceable!

Whatever kind of eye protection you choose; it won't help you if you don't wear it. Leave it on whenever firing is in progress, whether you are doing the shooting or not. Put it on before you enter the range area, and leave it on until you leave.

8 What happens when a projectile hits Steel? The Splatter Pattern

What happens when a projectile hits an upright plate?

When a projectile hits an upright steel plate (such as on a plate rack or on some IPSC poppers, at more or less than a 90-degree angle, the projectile usually fragments into many small pieces of projectile jacket and core. Provided the plate is flat and smooth, these fragments splatter off it at angles of 0 degrees (that is, flat along the surface of the plate) to about 20 degrees from the surface of the plate. (See Figure 1). This 0-20 degree "splatter pattern" extends in a complete 360-degree circle (like a clock face) around the plate. In other words, on an upright plate, the splatter pattern extends not only out to either side and down to the ground, but also straight up from the plate into the air above it.

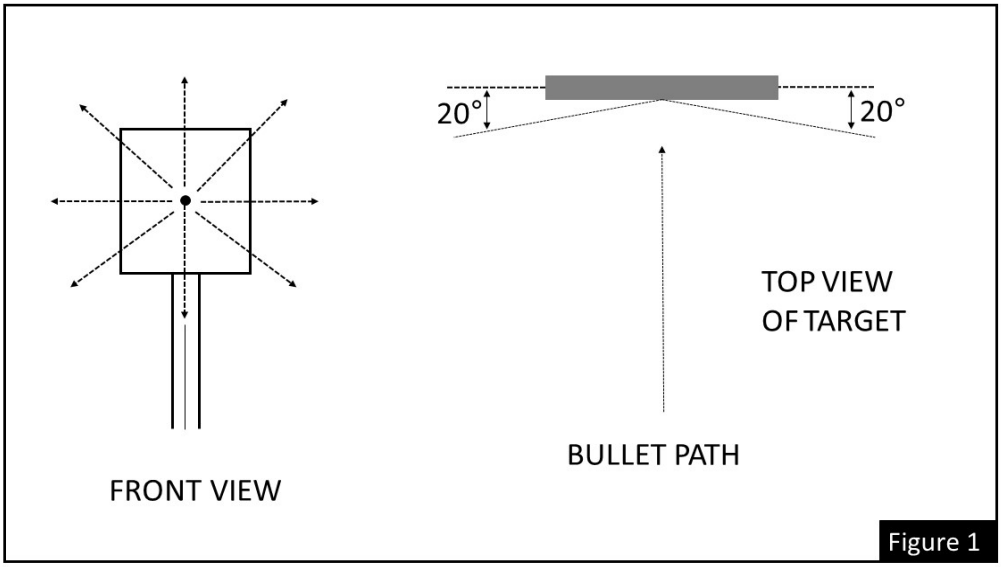


Figure 1

How far is the side splatter dangerous?

The size of the fragments, the velocity with which they splatter off the plate, and the resulting distance from the plate at which the fragments will cause injury to a person standing in the splatter zone, will depend largely on the construction, velocity and exact impact angle of the projectiles being fired. Any type of ammunition will send splatter sideways at least 25-30 metres from an upright plate. Using angled plates will reduce this distance considerably.

Because you cannot be sure of the exact distance to which side splatter will travel - and because this distance may vary from one shot to the next, depending on the variables involved - you must assume that the side splatter can cause injury at any distance within the splatter zone, and you must Keep all people, animals and property which could be damaged (such as cars) out of the 0–20-degree splatter zone to either side of an upright plate while firing is in progress. Also, because you cannot precisely judge the 20-degree angle of splatter - and because of the danger of "secondary splatter" you should keep everyone well back from the splatter zone, rather than trying to "cut it close".

Using side berms, shrouds or barriers to limit the side splatter danger zone.

Side berms, walls, or range dividers and target shrouds can be used to stop the travel of side splatter from upright plate targets, and to protect people on adjacent ranges.

Be sure the side berms, walls, dividers or shrouds present a complete, unbroken surface, with no gaps through which splatter could escape to injure someone on an adjacent range or other adjacent area. (See Figure 2).

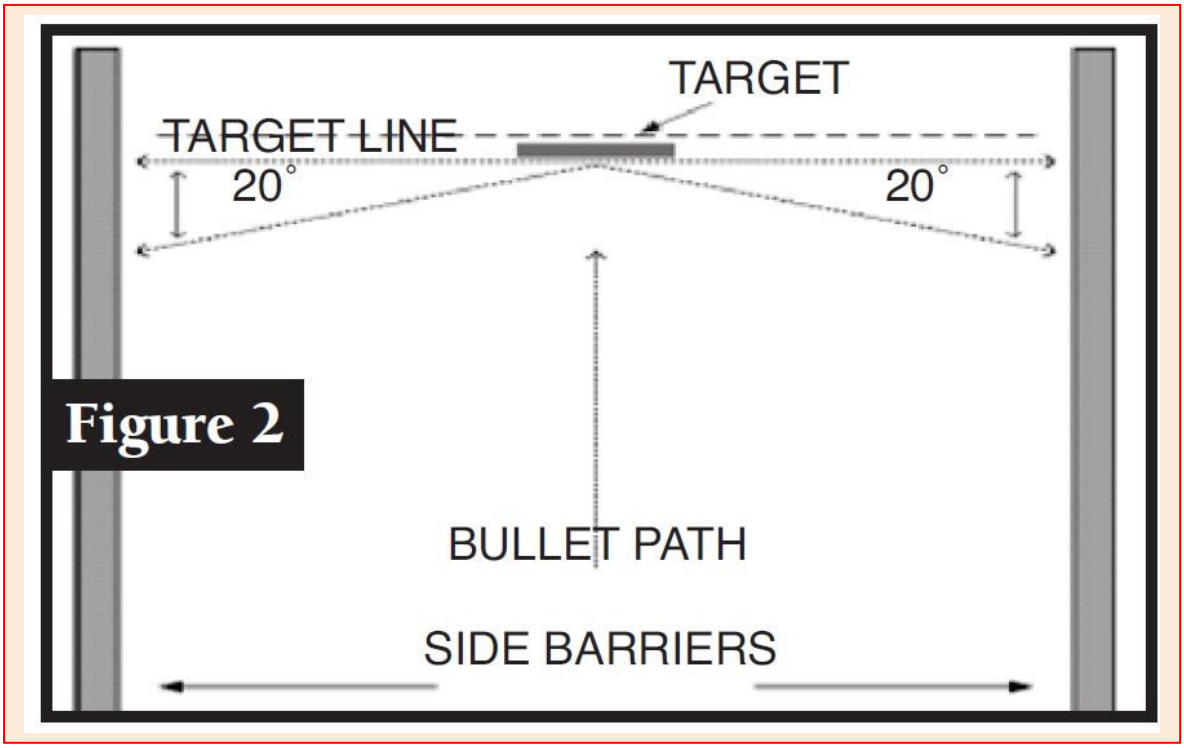


Figure 2

If range dividers are made of wood or similar soft material and are placed close to the steel targets, the side splatter may eventually erode or cut through the barrier material. Especially at close range to the target, where the velocity of the side splatter is still high.

You can test for this "secondary splatter" by positioning some portable target frames with "witness" paper or cardboard targets at right angles to the side barriers, 800mm to 1000mm up range (that is, closer to the firing line) from the point of impact of the splatter with the side walls. Then, making sure no one is close to the side walls, fire one shot at the steel target. Then check the "witness" targets to see whether any fragments bounced off the side walls in the direction of the firing line. If the "witness" targets are clean, fire 3 more shots, and again inspect the "witness" targets for evidence of secondary splatter. If they are still clean, fire extensively, using all of the types of ammunition that will be used, and firing from the full range of angles and shooting positions that will be permitted when the target is used. (See Figure 3.

Do not take shortcuts! The more thoroughly you test your side barriers, the more certain you will be that your system is safe to use. Check the "witness" targets frequently throughout your testing process, to be sure none of your variations in firing are creating a safety problem.

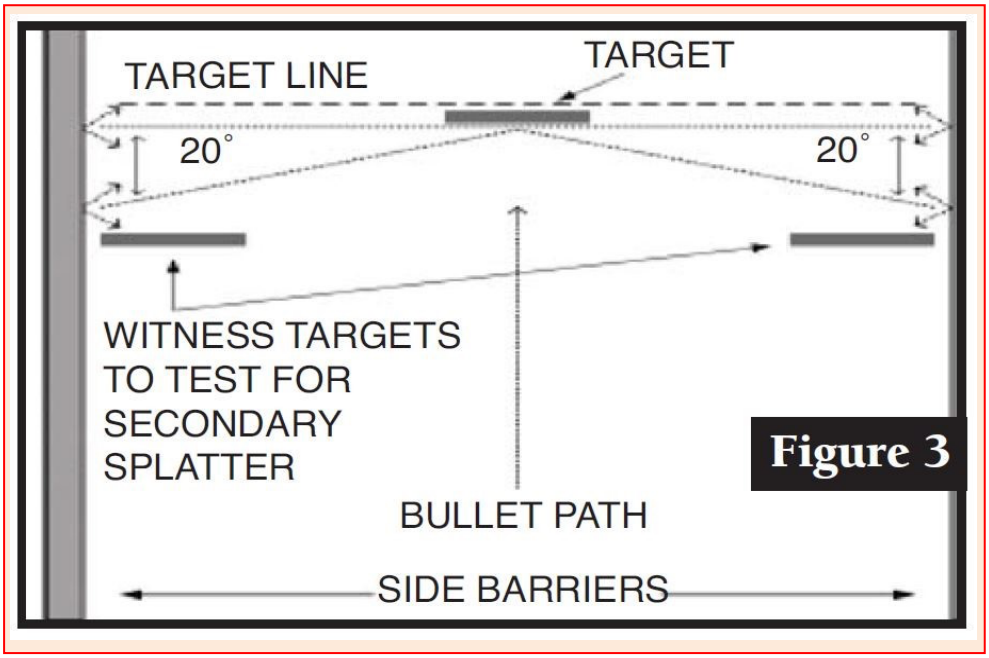


Figure 3

If range dividers are made of wood or similar soft material and are placed close to the steel targets, the side splatter may eventually erode or cut through the barrier material. Especially at close range to the target, where the velocity of the side splatter is still high, continued impact from splatter can even cut through a masonry wall. Wood is cut through, the wood may become filled with imbedded, jagged fragments of projectile jacket or projectile metal.

To prevent injury, wood or other soft barriers should be inspected before each use, and should be repaired or replaced if cut-through or imbedding problems are observed.

Depending on all of the variables of projectile construction, velocity, angle of impact with the target, etc., side walls or barriers may allow some side splatter to bounce off in the direction of the firing line - especially if the side walls are made of hard material and are positioned close to the targets, where the velocity of the side splatter is still high.

Caution! If, at any time, the "witness" targets show that fragments are bouncing off the side barriers and traveling toward the firing line, the side barriers are not safe, and no more firing should be done until the situation is corrected!

Problems with secondary splatter from side barriers can be remedied by changing the barrier material, angling the barriers to deflect any secondary splatter safely downrange (see Figure 4.), or building baffles outward from the barriers to contain the secondary splatter. (See Figure 5)

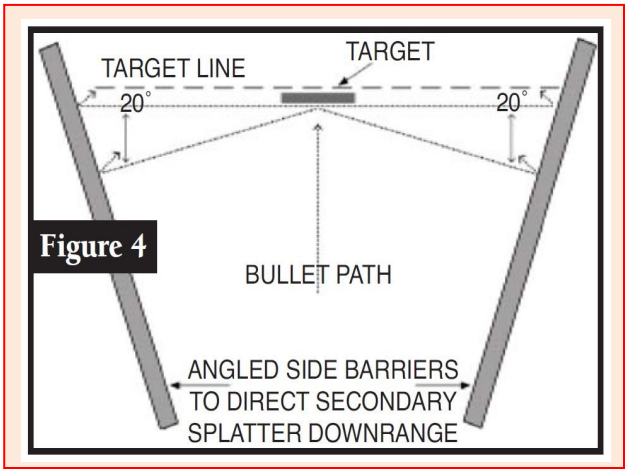


Figure 4

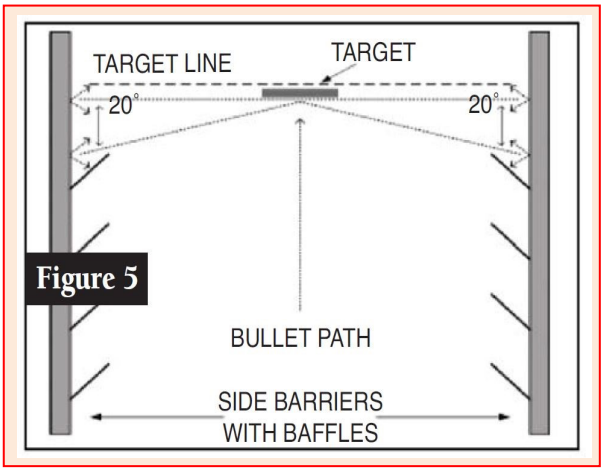


Figure 5

9 What happens when a projectile hits an angled plate?

When a projectile hits an angled plate it usually fragments, sending a shower of splatter off the plate. However, unlike the splatter pattern described above for upright plates, the pattern from an angled plate is directed downward in a fan-shaped configuration, into the ground below and slightly behind the plate, and sideways to about 45 degrees to both sides of the plate (see Figure 4). Provided the range surface can safely absorb the splatter without producing "secondary splatter" in dangerous directions.

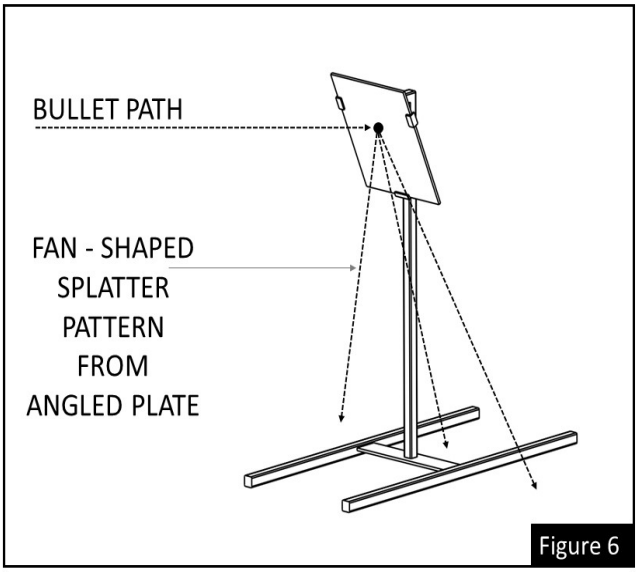


Figure 6

The angled plate design thus serves to contain the splatter closer to the plate, reducing (but not eliminating) the safety hazard to either side of the target.
Some projectiles, including extremely low-velocity ones, solid non-lead projectiles or very heavily jacketed projectiles designed for deep penetration, may not fragment when they strike the plate, but may bounce off the plate in whole form.

10 Placing the targets on the range.

The elements of positioning that are most critical from a safety standpoint are:

(1) The range surface on which the targets will be placed;
(2) The array of multiple targets, or other objects in the splatter zone; and
(3) Safe "minimum shooting" distances.
(4) It is recommended that steel targets be placed as close as is practicable to the backstop/bullet catcher or to the side berms.
(5) If targets are to be placed up range mobile bullet catchers may be required to catch missed rounds/ricochet's/splatter. In some cases, shrouds may also be required.

Ground or Range Surface

As previously described, when projectiles hit the steel impact plate, a shower of fragments leaves the surface of the plate at angles ranging, in the case of a straight upright plate, from 0 degrees (flat along the surface of the plate) to about 20-degrees. Or, in the case of angled plates, in a fan-shaped configuration angling downward and rearward from the plate, and sideways about 45 degrees to both sides of the plate. In either case, the movement of these high velocity fragments after they hit the ground or range surface needs to be controlled in order to pre- vent them from coming back toward the shooter and others.
We recommend placing the targets on loose dirt or sand to absorb the fragments and eliminate ricochet from entering the safety zone. A range surface of growing grass is also good, as is soft mulch or sawdust. The absorbent material under the targets must be free of rocks (from which the fragments could ricochet).

DO NOT place the targets on concrete, asphalt, hard-packed clay, rocks, gravel, or other hard or rough surfaces that can cause fragments to ricochet back toward the shooter or others, or to ricochet in any unpredictable directions.

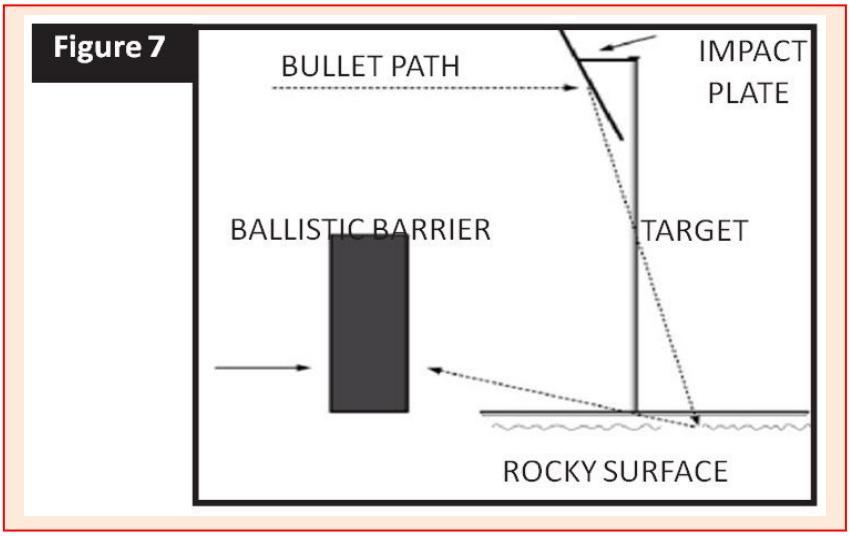
Also, fragments repeatedly hitting a concrete or other hard, finished surface will quickly erode and damage the surface. Rough or finished surfaces under the targets can be covered with pieces of old carpeting, plywood, or other soft, absorbent material to address the problems of splashback and surface damage. Be sure to cover the entire splatter zone under the targets with the absorbent material, and test it thoroughly for safety from the distances and angles at which shooting will be conducted before allowing others to shoot at the targets. The carpeting, ply-wood or other absorbent material will have to be replaced before it becomes filled with projectile fragments, as it will lose its fragment-absorbing qualities and will begin to allow fragments to bounce off at unpredictable angles with the potential to cause injury.

If you place the targets on a soft, absorbent surface such as loose dirt, sand, grass or mulch, repeated firing with the targets in the same position can erode (wear away) the absorbent material to expose rocks or other hard, unsafe materials underneath. Also, continued firing can cause an accumulation of metal fragments to build up in sufficient quantities that they can cause new fragments to ricochet back toward the shooter and others. Before an unsafe condition develops, either repair the range surface or move the targets to a new location on the range.

To prevent these safety hazards, you must inspect the surface under the targets before each shooting session, and at regular intervals while shooting.

Splatter Barrier

For safety when using any steel targets on hard, rough or questionable surfaces, erect a barrier - such as hay bales or low wooden wall filled with pea gravel in front of the targets, to stop ricocheting fragments from coming back toward the shooter or others. (See Figure 7).



Depending on your needs, the "wall" can be temporary, such as hay bales or timber you put in place for the purpose, and then removed when you are finished using the targets.

For short-term use, a splatter barrier can even be made of heavy cardboard target backers, folded in half and placed on the ground like tents using pieces of wood, if necessary, to hold them in place, provided you check frequently and re-place the cardboard before fragments cut through and penetrate it. Replace the cardboard before fragments have penetrated the side closer to the targets. Again, this option is for short-term use only, and is not as good as a more solid splatter barrier.

Whatever kind of barrier you construct must be:

(1) Continuous (with no breaks or gaps) throughout the splatter zone,
(2) Far enough in front of the targets (that is, in the direction of the shooter), and
(3) High enough, in order to stop all splatter from flying toward the shooter or others.

Array of Multiple Targets (and Other Objects in the Splatter Zone)

If you use multiple targets or range props, each target or prop must be placed in each other's safety zone, in order to prevent side splatter from one target from hitting another target or object, and ricocheting toward the shooter or others. (See Figure 8).

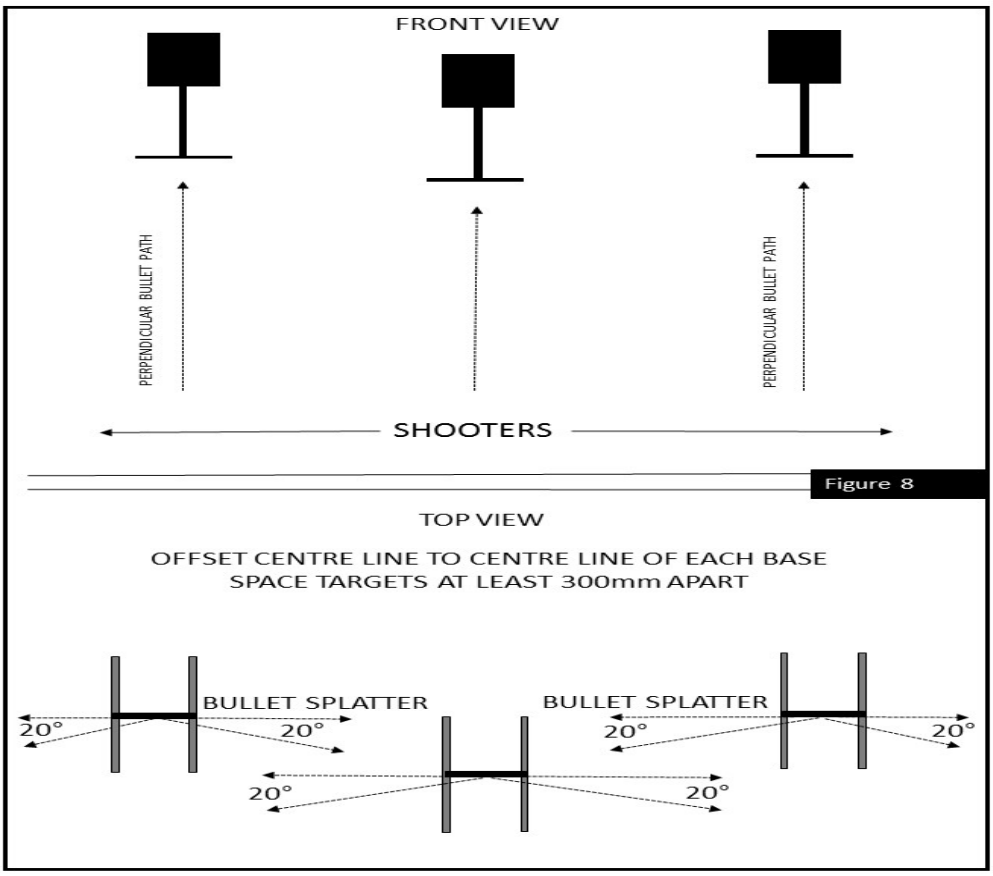


Figure 8

By putting all multiple targets, props and other objects in each other's safety zone (See Figure 9), this hazard will be avoided. You must also avoid placing the targets where side splatter will strike - and possibly ricochet from - range fixtures, such as target frames, utility poles, light stanchions, etc.

On indoor ranges, and on outdoor ranges with overhead baffles or other overhead construction, you must also consider upward splatter from the plates, especially from straight upright plates. Position the targets where upward splatter will not break lights or cause other damage above the targets, and where the upward splatter will not strike anything that could cause it to ricochet back toward the shooter or others.

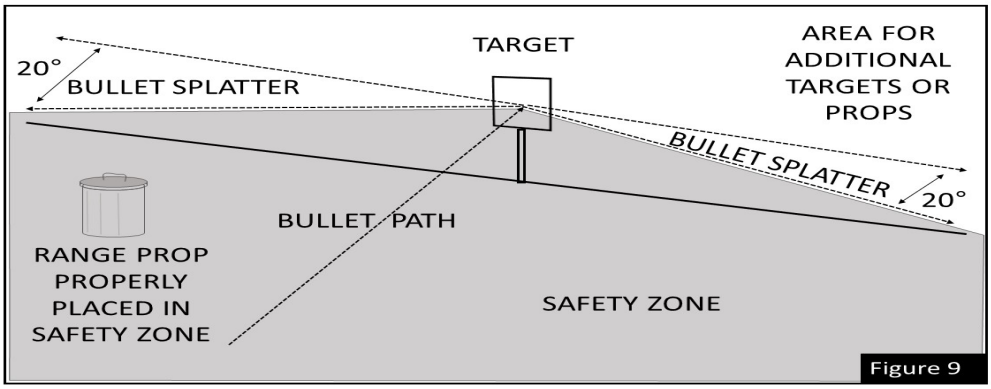


Figure 9

11 Recommended Minimum "Shooting" Distances

Provided the range surface underneath the target is suitably absorbent, and provided the surface of the plate is undamaged, and provided there is nothing in the target's splatter zone to cause fragments to bounce back toward the shooter, and provided you are using appropriate ammunition and wearing proper safety equipment, you should be able to stand as close as 5 metres to the target (as long as you are not within the 20-degree downward splatter zone and fire at it safely.
Nevertheless, while most targets have been shot thousands of times at distances of 5 to 7 metres with no injury to the shooter, in the interest of safety, and because some of the variables involved in your own use of the targets may not always be perfect, we recommend you take a conservative approach and While these setback distances will NOT ensure your safety in the event you are using the target improperly (for instance, using a pockmarked target, or placing the target on an improper range surface), they may possibly reduce the likelihood or severity of an injury compared to what might occur if you were firing at closer range to the target.

Adopting this "conservative" approach will probably cost you little in training terms. You can simply do your closest range exercises on paper or cardboard targets, and it may prevent or minimize an injury. Accordingly, we recommend it.

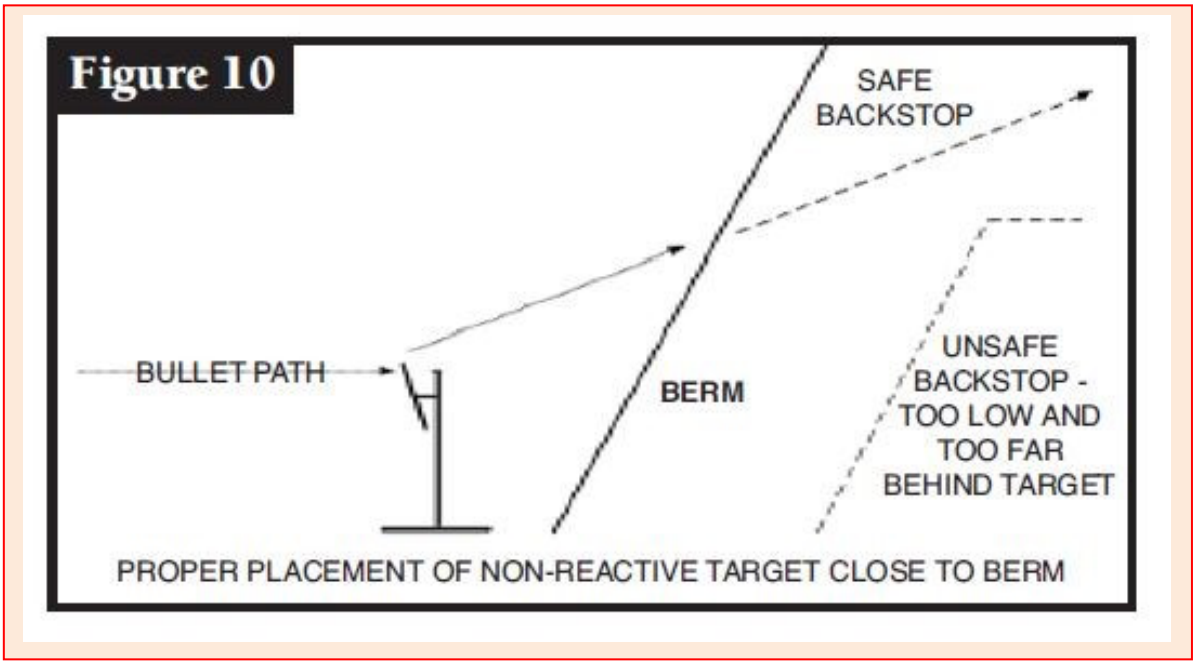
12 Direction of Target Placement

Targets should be built/positioned to be shot **from directly in front only**. Never position targets where projectiles may hit the target's back, sides, mechanism or supports, other than the surfaces that are exposed when the target is viewed directly from the front.

13 Backstops

Place targets close to a backstop of adequate height. (For approved backstop heights refer to PNZ Range Manual) With any steel target a projectile hitting or skimming off the very top edge of an impact plate may glance upward off the target, with the potential to overshoot (miss) the range backstop. This can be prevented if targets are placed close enough to a backstop to guarantee the containment of any stray high shots fired by the shooters.

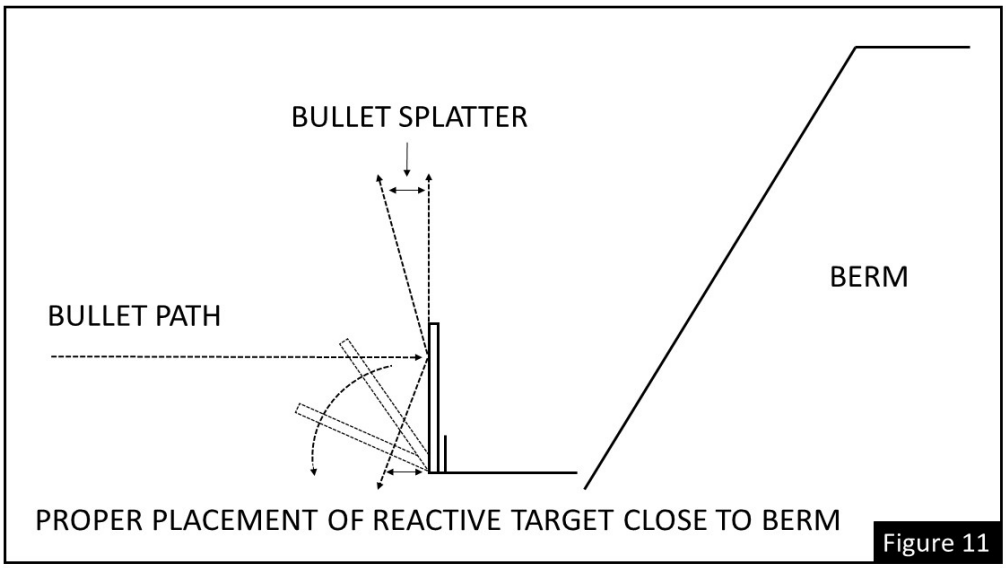
For example, placing a target immediately in front of a 5-metre-high backstop with an impact surface sloping down at an angle of 15 degrees toward the shooters should normally contain any fragments or projectiles which glance off the top edge of the target, while placing the target 20 metres in front of the same backstop might not do so. (See Figure 10).



14 Special Precautions on IPSC Poppers

Backward falling IPSC Poppers present a constantly changing angle to a shooter who continues to fire as the target is falling and these are **no longer approved** for use on PNZ Certified ranges. See Figures 11. This may cause fragments and whole projectiles to ricochet off the falling target at a high angle, possibly overshooting the range backstop.

*To further improve safety IPSC poppers **must** be manufactured to fall forward when struck.*



15 Shooting from High and Low Angles

Targets should be designed to be shot approximately horizontally, that is, by a shooter firing a gun held on the same level as the target's impact plate. Changing the angle of fire may change the splatter zone that is produced.
For instance, firing at targets placed higher than the shooters, including firing at angled targets from a prone or low kneeling position at very close range (typically, 10 metres) can partially or totally negate the safety effects of the angled impact surface, by allowing the projectile to strike the plate at close to a right angle. The result may be splatter directed back toward the shooters or observers.

Shooting at a target which is lower than the shooter may allow high rounds that go over the top of the impact plate to hit the target bracket or frame behind the plate, causing dangerous splashback. Be sure that only the impact plate and upright stand are visible to the shooter when firing.

16 Special Precautions with Bianchi Plate Racks

The safety of Bianchi Plate Racks depends on all of the standing impact plates being aligned with each other - that is, positioned in the same plane. If a projectile is fired at a plate which is, for example, leaning back 25mm from the other plates which are still standing on either side of it, side splatter may glance off the edges of the neighbouring plates and come back toward the shooter and observers, causing injury.

When you position the plate rack on the range, check to be sure all of the plates are aligned, and that there are no fragments of projectile metal or other debris that can keep the plates from aligning when they are set up again after each shot. In use, check the plate rack periodically to remove any such debris. Do not shoot at any plate which is not fully upright, or appears to be out of alignment with the other plates.

17 Target Shrouds

Shrouds need to cover a minimum of 20-degree angle front and rear of the target.
Shrouds can be made from plastic drums cut to size, or other similar plastic material
Wood or plywood may also be used. The size will depend on the distance from the target that the shroud is placed and are to go to the bottom of the target. (Figure 12)

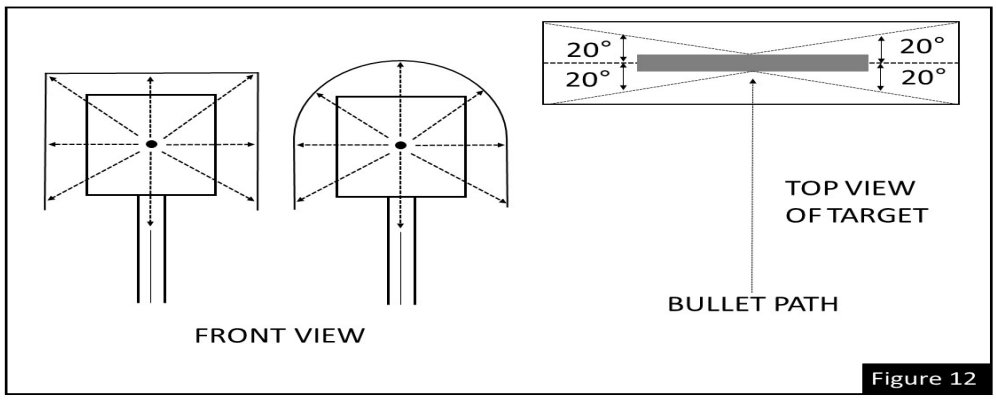


Figure 12

18 Secure all Steel Targets (or the Range) When Not in Use

It should be apparent to you by now that the safe use of steel targets requires some knowledge on the part of the shooters as to proper calibres, minimum stand-off distances, personal safety equipment, angles of fire, and many other factors. Steel targets are often ruined, and unsafe conditions created, when targets left out on ranges are fired at by shooters who don't know what they are doing, are using un- safe calibres, ammunition types, distances or angles, or are otherwise failing to take proper safety precautions. A steel target left out on an unsupervised range is an "attractive nuisance" to the untrained shooter. To prevent targets from being ruined and shooters from being injured, either the targets or the range itself should be secured when knowledgeable instructors or range officers are not present to supervise the shooting activities.

19. Acceptable Ammunition Types

Use of improper calibres, types or velocities of ammunition on steel or other targets can result in serious injury as well as permanent damage to the targets.

Safe use of your steel targets depends on using appropriate ammunition calibres, types and velocities. Use of inappropriate ammunition cannot only create a serious hazard to your safety and that of everyone else in the vicinity, it may also permanently damage your targets, making them unusable without extensive and costly repair or replacement.

20 Firearm Types & Minimum shooting distances.

(Please refer to match rules for minimum distances that may be used in official PNZ approved matches i.e., CAS & IPSC & Speed steel & Silhouette)

Pistol / Pistol Carbine – minimum 7 metres (velocities no greater than 1600 fps)

- .22 Rim Fire Rifle & Pistol, 9mm, .38 Special.
- .357 Pistol, .40 S&W, .45 Colt, .44 Special, .45acp, 357 Sig.

Shotgun – (IPSC & MULTI - GUN)

- Shotgun w/ lead bird shot – **8 metres**
- Shotgun w/ standard velocity 00 lead buck – **8 metres**
- Shotgun w/ standard velocity lead slug - **50 metres**

Mini Rifle- .22 LR Rim Fire Rifle. 7 metres (Velocities no greater than 1600fps)

CAS Revolver / Pistol – 5 metres (velocities no greater than 1000 fps)

- .22 Rim Fire Rifle & Pistol, 9mm, .38 Special.
- .357 mag, 44/40, 45 colt, 44 special, 45ACP
- 32-20, 38 Special, 357 Mag, 44.40, 45 Long Colt

CAS Rifles firing pistol calibres - 7 metres (velocities no greater than 1400fps)

- 32-20, 38 Special, 357 Mag, 44.40, 45 Long Colt

CAS Shotgun - 7 metres lead Birdshot only.

Centre Fire Rifle – 50 metres. (Velocities no greater than 3200 fps)

- 45-70, 556/.223, 7.62/308 win, 7.62 x39,

Silhouette Pistol / Revolver – 25 metres field pistol (velocities no greater than 1600fps)
Silhouette Pistol / Revolver – 50 metres full bore (velocities no greater than 2148fps)

With the rifle it is more a matter of keeping your distance so you don't damage the target. Once you damage the target, it becomes unsafe at closer ranges under 50 metres.

Another way to look at this is to keep your impact velocity under 3200 fps to avoid damage.

You may use either plain lead or copper jacketed lead. Do not use steel core, steel jacket, or Armour Piercing.

Under no circumstances should you use steel/bismuth shotgun pellets or steel bb's on any steel targets. These will bounce back and may cause serious injury.

21 Test the ammunition first, before firing at steel targets!

Chronographing: Inexpensive chronographs (in the $100-$200 range - less than the cost of the target you may ruin!) are available from several manufacturers. You may be able to borrow the use of a chronograph from a fellow shooter, or one may be available for use at your Club. We suggest you chronograph ten (10) rounds of the ammunition you plan to use, fired through the firearm you will use, at about the same air temperature in which you will be shooting. (Ammunition pressures and velocities are often higher on a hot day than a cold one. Ammunition allowed to sit in direct sunlight on a hot summer day can sometimes produce a velocity which is as much as 150 f.p.s. higher than the same ammunition would if kept in the shade.) In chronographing the ammunition, it is not the average velocity that matters for this purpose, but rather the highest velocity displayed by any of the 10 rounds. Even if 9 out of the 10 rounds are below 1,600 f.p.s., if the tenth round exceeds the plate's velocity limit, it may damage the plate and/or cause serious injury. Every round must be within the velocity limit for proper use. Good quality ammunition should be quite uniform in velocities from shot to shot, not varying more than about 50 f.p.s. for pistol ammunition (80 f.p.s. for rifle) from highest to lowest velocity over ten rounds chronographed. Be suspicious of ammunition that varies wildly from shot to shot, especially if the higher velocities are close to the 1,600 f.p.s. limit of the plate. With erratically-performing ammunition of this sort, you cannot predict whether or not some of the rounds to be fired will exceed the plate's velocity limit.

Frangible Ammunition: The increasing demand for environmentally cleaner, and lead-free ammunition set in motion the development of frangible ammunition during the early 1990's. Frangible projectiles are usually made of tungsten and copper powder in a nylon polymer matrix. These composite metal and nylon projectiles are designed to shatter into tiny fragments upon impact with hard surfaces, thus reducing back splatter.

However, not all frangible ammunition is alike, and all types do not work well on steel targets. Ensure you test this type of ammunition on your targets before approving them for use.

Frangible ammunition requires the same minimum shooting distances as any other ammunition type.

Rifled Shotgun Slugs: Use of shotgun rifled slugs on **upright** steel plates can cause serious injury or death!

Conventional Foster-type (hollow-base) lead rifled slugs should not be used on any upright (not angled) steel target. Use of hollow-based rifled slugs on an upright (not angled) steel plate can cause the hollow base of the slug to invert on impact, sending a large, teardrop-shaped piece of lead bouncing straight back toward the shooter to a distance of 50 metres or more from the plate.,
Again, do not fire rifled slugs at any upright (not angled) steel plate - use them ONLY on angled Non-Reactive Plate targets!

Rifled slugs should be used only on **angled,** (*at a minimum of 15 Degrees) Non*-Reactive Plates.

DO NOT USE ANY OF THE FOLLOWING TYPES OF AMMUNITION ON PLATES:

Armour-piercing ammunition or ammunition with steel or other hardened metal cores or projectiles. Armour-piercing ammunition (often, but not always, designated in military ammunition by black-painted projectile tips) is made to penetrate steel armour and not to fragment on impact the way conventional ammunition would. Accordingly, it may damage steel plates and/or may send whole projectiles and/or steel or other hardened metal cores ricocheting in dangerous and unpredictable directions to great distances, with chance of serious injury or death to the shooter or anyone else within range! This includes steel-core military armour-piercing ammunition in calibres such as 7.62mm NATO, .30-06, 50BMG (Browning machine gun), 7.62 x 39mm and 5.56mm steel-core SS109 military ammunition (often designated by green painted projectile tips). It also includes certain armour-piercing or specialty handgun ammunitions which use hardened tungsten, bronze, brass or similar non-lead and non-frangible projectiles.

New and Unusual Ammunition Types.
The varieties of ammunition, including specialty ammunition and hand loaded ammunition, are endless, and new ammunition types appear on the market weekly. There are undoubtedly types of ammunition we have never seen, and have never tested on steel targets. Because there is no way we can test (or even know about) all possible types of ammunition, our recommendation is that you stick to conventional types of ammunition, and that you **DO NOT USE EXOTIC, SPECIALTY, UNCONVENTIONAL OR UNKNOWN AMMUNITION TYPES ON ANY STEEL TARGETS.** Use those types of ammunition on paper or cardboard targets instead, and do not risk damage to targets or anyone's safety by shooting untested ammunition on steel, with unpredictable results!

IF IN DOUBT ABOUT THE SAFETY OF YOUR AMMUNITION YOU INTEND TO SHOOT ON STEEL TARGETS: DON'T, DO NOT EXPERIMENT!

The results could be disastrous.

22 Maintenance of Steel Targets

The safe use of steel targets depends on the target's impact surfaces remaining flat and free of concave or pockmarked surfaces that will direct splatter back toward the shooters or in any unpredictable directions. In order to keep your steel targets safe for use, you will need to do the following:

23 Inspect Impact Plates before each use

If appropriate calibres and ammunition types are used, the impact plates of your steel targets should remain quite flat and undamaged indefinitely. Inspect your targets before each use, and periodically during use, and replace or remove from use any plate that has a pockmark or dimple deeper than 1mm. You should determine what ammunition is causing the damage, so that other plates are not damaged by continuing to use the same ammunition. Also replace any plates that show cracks or other damage.

24 Reverse Impact Plates before they Become Curved

Continued heavy use of an impact plate will eventually cause the edges of the plate to curve away from the shooters. In order to preserve plates in a flat condition, and get the longest use out of them, targets should be reversed. If possible, reverse your plates frequently, before they become deformed by heavy use. A straightedge placed horizontally across the concave side of the plate should be less than 5mm away from the plate at its centre regardless of the width of the plate. Once plates have become curved more than this, do not use them with the concave surface facing the shooters.

25 Impact Plates Should be Replaced when Damage Appears

Unlike target stands and uprights which can be repaired locally, impact plates with pockmarks, pits, holes or cracks, or plates which have become severely curved, should be replaced. Use only qualified and competent engineers to construct your new plates. Your local back yard welder will have neither the knowledge nor the type of steel needed to do a safe and proper repair on impact plates.

26 Targets that are not approved by PNZ

Soft steel. (Pistol rounds will damage the steel over time and send bullet splatter or full projectiles back towards the shooter).
Targets hung by exposed chain. (Rounds hitting the chain will send ricochets in an un-predictable angle).
Steel tube, dive bottles, cylinders of any type. (The rounds that hit the round surface will ricochet in un-predictable angles).
Bowling pins. (You really don't want to shoot these; they tend to ricochet projectiles in all sorts of random directions and if you shoot them with shotgun, they can send shot straight back at you).