

# Know your Enemy!

and *Define the line.*

At the Angle Port Open shoot recently here in Dallas, I had the chance to mingle with some of the top names in the shooting world. Jon Kruger was there, Bobby Fowler, Andy Duffy, Deeanne Massey and many more. The targets were tough at this event, as they should be. I always feel that at an event of this magnitude, to reduce the number of ties and shoot-offs, the targets should be stepped up a notch.

I was a spectator at one of the stations just as a group of these top-level shooters arrived to take their turn. This particular presentation was a pair of very testy chandelles and the whisper went round the ground that this was one of the toughest stations. As the other competitors were shooting at this stand, many of them would quit the confinement of the safety cage with the dejected look of a whipped pup, as they repeatedly missed the tricky pair of targets. But the group of professionals, these “big dogs” of the shooting world, stood discreetly in the background, patiently waiting for their turn. There was no jovial banter from these guys as they observed the others shooters, just concentrated concentration. Each of them repeatedly went through their pre-shoot routine ritual, capitalizing on the precious moments that they had to evaluate the enemy, pointing at the target with an outstretched finger to define the line and attempt to unravel all the subtle nuances. As they did this, (without, might I add, intentional intrusion!), I overheard the conversation.

“What is that, is it a standard target?” one of these shooters quizzed his buddies.

“I don’t think so,” his squad mate whispered, “I think it’s a rabbit.”

The first competitor walked over to get a closer look.

“Yep, it’s a rabbit” he confirmed as he re-joined his squad. So why were some of these aspiring champions being so “picky?” Because these experienced shooters knew that although the presentation was classed as a chandelle, the type of target used in the presentation could make a big difference to the outcome of the shot. Let me explain what I mean by this.

I often stress to all my students that when we shoot any moving target, developing the line is the most important thing to consider. Line is more important than lead. Lead is more difficult to evaluate because it is determined by three factors: angle, speed and range. Line is merely the two-dimensional segment that we perceive the target to be traveling along relative to the position of our eyes. Unfortunately for some of us, this is where our troubles begin. Read the line wrong and we may as well forget the lead, because a miss is inevitable.

Airborne targets, due to the downward gravitational pull, prescribe a parabolic trajectory. The target rises, there is a period of transition and then it begins to fall. As soon as the target reaches the highest point of this parabolic curve, in other words, the

transitional segment of its flight path, energy is bleeding off and the target is slowing down as a result. Without getting too much into the laws of Kinetic energy and aerodynamics, the distance the target travels and also the way in which it behaves as it prescribes this trajectory is proportional to its weight and its aerodynamic qualities. Simple. We all knew that didn't we? But hold on a minute. Because we see more of them, our onboard computer registers that for the most of us the flight path of a standard target is the one that we are familiar with. When it is thrown from a machine in level flight, the standard target defines a reasonably predictable line. But when we consider the specialty targets, reading the line on these may not be as straightforward as many of us think. Because of the diversity of target presentations that we encounter on a sporting clays course, this bleed off of energy may occur quicker in some targets and slower in others and as the weight of the target and aerodynamic qualities vary, so do the trajectories. Simply put, with specialty targets, different kinds have different lines.

If we return to the chandelle presentation, the word "chandelle" describes a specific aerobatics term. It relates to a maneuver where an aircraft executes a steep climbing turn to gain altitude and change of direction simultaneously. In the sport of stunt flying, judges give points on a pilots ability to do this. With a perfectly executed chandelle the pilot attempts to make a 180-degree directional turn, rapidly gaining altitude as he does this, eventually leveling out to end up flying in the opposite direction. Of course we can't replicate this flight-path as accurately with a simple clay target but the one that emulates the subtle curve of the chandelle trajectory better than any other is the standard target, thrown at a steep angle from a canted machine. Machine manufactures have all been quick off the mark to develop and incorporate this modification in their machines to simulate and present this confusing target line. Most of them are now producing an in-built tilting mechanism in their machines to allow the course designer to do this better. The chandelle target gives many shooters problems because the line is so deceptive, in fact I have many students that will book an hour or so, dedicating all the time to this type of presentation, at various ranges and angles.

Years ago, rabbit targets thrown on edge were called chandelles by many people, but others (especially in the UK) called them "loopers." In effect, that's exactly what they are and with the heavy, rabbit target, deviation from the vertical line that they are thrown on, is influenced only slightly by wind interference for two reasons. If we look at the physical characteristics of the rabbit target, first of all they are heavy which gives them more airborne stability. The auto rabbit target was designed to roll along the ground at high speed and also resist fragmenting by hitting small stones, bit of debris that it encounters as it does this. Although visually the same size as a standard target at 110 mm, it is thinner at 16mm but a lot heavier at 120 grams. Secondly they are and more robust to reduce breakage and (more or less) flat, without the convex or concave surface of the standard target. The weight of the target influences the rate at which this slow down occurs and because of this, the parabolic curve of the standard target that is thrown as a chandelle, will be completely different to the trajectory of the rabbit target in a similar presentation. The target with the most mass will respond less to this gravitational pull and the parabolic curve will be flatter for longer with the rabbit than the standard target. Also, because of the aerodynamic difference between the rabbit and standard, side

wind will influence the line of the standard target far more than the rabbit target. Depending on from which side this wind interference occurs, a sudden puff of wind hitting either the convex or concave side of the target can dramatically influence the line and as a result, the outcome of the shot. Ignore these subtle differences at your peril! With any target presentation, the muzzles of the gun must move in empathy with the target to ensure successful interception. If either a true chandelle or a looping rabbit are taken under power before the transitional part of the trajectory, the muzzle movement required to do this is easier, because it is always easier to control the gun as we lift it than when we lower it. In other words, our mechanics will be better with the lifting motion. If a cunning course designer gives the shooter no alternative but to shoot the target after it transitions, he may have a problem with his muzzle management. If the muzzles of the gun are allowed to stray outside the parabolic curve of the trajectory because of this, even for an instant, a miss off-line may be the result. The combined product of this difficult gun movement, plus a target miss read usually spells disaster and a miss is certain.

Another target that will give shooters fits, seen often in the UK but rarely seen over here is the “stealth” target, sometimes called the rocket. The stealth is similar to the rabbit, but slightly lighter at 115 grams to the rabbit's 120 grams. It resembles an extra thick battue and it is used as an airborne target with a flat trajectory. Because of the weight of this target, the energy bleeds off rapidly towards the end of its flight path, once again inviting the inexperienced shooter to miss over the top.

Now what about the battue? Most shooters are familiar with the rapid acceleration of the edge on battue, the ultra thin profile of 9mm presenting initially a difficult “razor blade” visual impression to the shooter. Of course, we all wait for this target to “develop” as it reaches the peak of its parabolic curve and attempt to take it as it runs out of steam and rolls over to present a full face and for most of us, this is where the target is most visually acceptable and vulnerable to our gun. But beware, the low weight of the battue at 76 grams combined with the absence of the deep concave profile, makes the battue the most aerodynamically unstable of all the targets and wind interference will effect it more than we think. With a battue target coming from right to left and a sudden gust of wind from the same direction, the target may refuse to develop at all, never presenting its full face. With a gust from the opposite direction, it will climb steeply and then develop in a completely different place on its trajectory, catching the unprepared shooter off guard as it does this.

The midi target, especially when it is thrown in tandem with a standard target, can present a visually tricky combination. When thrown as a true pair from machines with similar spring tension, the midi will rapidly gain on the standard and overtake it. But because of the lighter weight of the midi, 74 grams as opposed to the standard target's 105 grams, this initial rapid deceleration will bleed off quickly and the target will transition rapidly. Visual discipline is of paramount importance with a combination like this and although initially visually similar, at a distance the lines of each target will be completely different. Most shooters, especially if this is a long presentation, will have too much gun speed, producing horizontal momentum with the gun barrels as they shoot

the standard and what happens then? Of course the target line of the midi isn't as horizontal as they thought and you've guessed it, the shot goes over the top.

Lastly, lets look at the baby of the bunch, the mini target. The diminutive mini, 60 mm in diameter with it's light weight a mere 35 grams, retracts very little energy and slows down quicker than any other target. One of my favorite target presentations is a mini target coming from a machine that is positioned underneath the safety platform and going straight away from the shooter. It's a simple, going away trap-type presentation but watch what happens when the shooters take the stage! Unless they are very careful about selecting which part on the trajectory they intend to break the target, my guess is that a huge proportion of them will shoot over the top of it before they realize this rapid bleed off of energy is happening. The mini target with a height of 21 mm also has a deeper convex surface than any other target and this light weight combined with this relatively large convex surface area makes the mini, in certain presentations, a formidable opponent. On the presentation described with the wind coming into the shooters face the target will stay up forever but with the wind coming from behind the shooter, even a light gust can push the target down rapidly.

So at your next tournament, just like the guys at the start of this article, it's often wise to spend a little time to identify just what you're dealing with at each presentation. Know your enemy and always be prepared to expect the unexpected, especially with a target in the transitional phase. You may reap the benefit on your score-card with an extra point or two if you do.