

Crossbow myths explained video text

Introduction

This document contains a fuller text from the video entitled “crossbow myths explained”, as posted on YouTube at <http://www.youtube.com/watch?v=17be0jOCJpY>.



Brief history

The crossbow has been around for a very long time as a military weapon, falling gradually into decline following the advent of firearms.

The crossbow regained popularity as a modern hunting and target equipment after the second World War. Over the last 20 years the Sport crossbow has developed into a sophisticated and effective means for helping control feral pests. Modern Target crossbows shoot side-by-side with vertical bows at archery clubs.

The crossbow is a legitimate member of the archery family and is not a firearm by definition.

The crossbow has not enjoyed a good image since medieval times and this persists today.

What types of crossbow are there?

Essentially there are two main types of contemporary crossbow being Target (also called Field crossbow) and Sport (or hunting) crossbow.

Target crossbows are more akin to archery bows and are used on archery-type shooting ranges on an oval, in an open field, in a woodland setting or indoors.

Competition includes target, field and 3D.

Sport crossbows are mass-produced whereas Target crossbows are hand-made.



Target crossbow



Sport or hunting crossbow

Some popular crossbow myths

Myth 1 “Crossbows are more powerful than other bows”

The crossbow is not as efficient at storing energy as a “vertical” bow. This is because the bow is shorter than that of a vertical bow and the “power stroke” or the distance that the string is moved from rest to catch is also much shorter. Therefore to obtain the same ballistic performance as a vertical bow the crossbow needs to have more than twice the draw weight of a vertical bow.

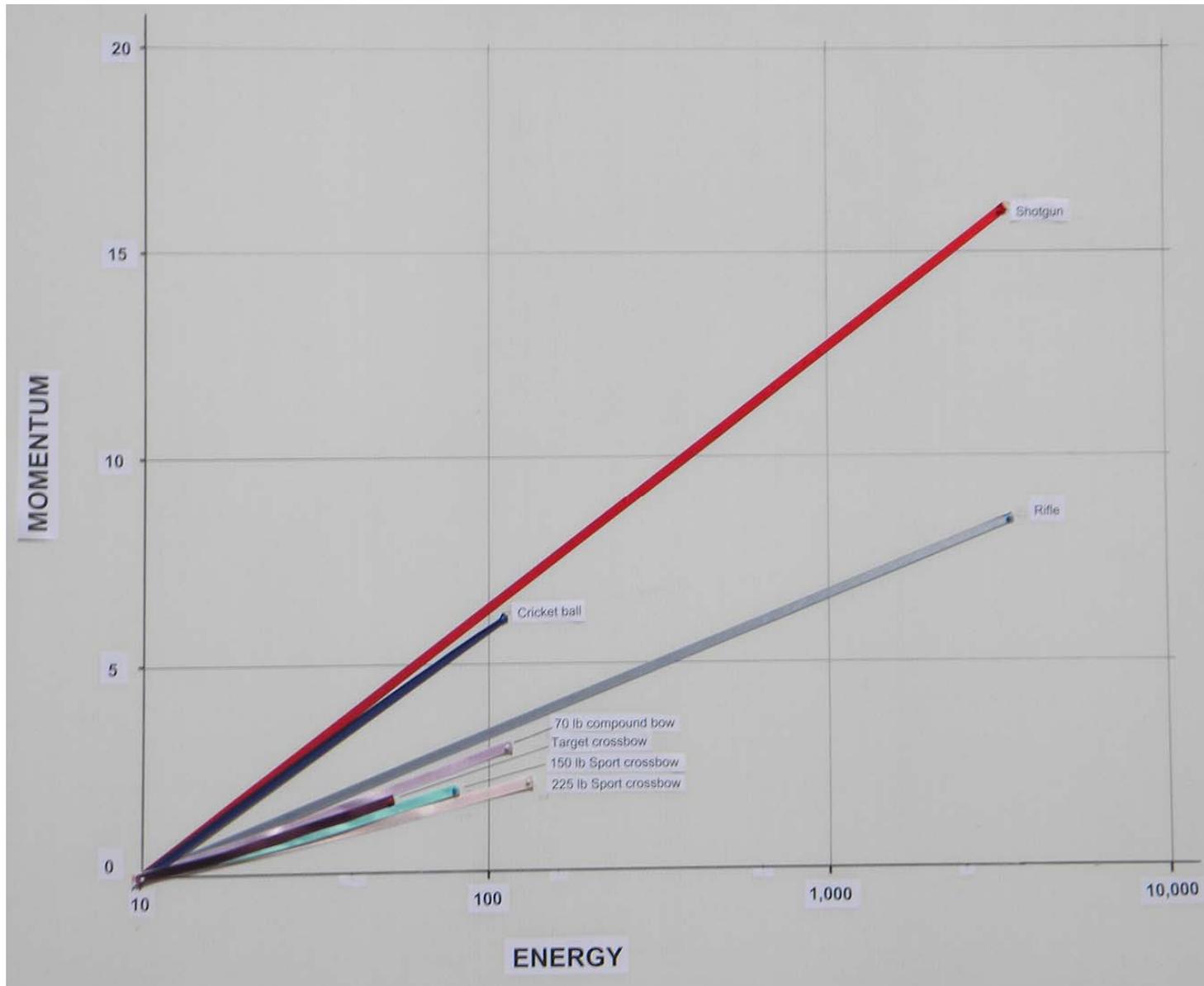
Crossbow bolts are also shorter than arrows.

A typical Sport crossbow has a power stroke of 14.5 inches and shoots a 20 inch bolt; whereas a Target crossbow has a power stroke of less than 12 inches and shoots a 13 inch bolt and a vertical compound bow may shoot a 30 inch arrow and have a power stroke of perhaps 20 inches.

Stored or kinetic energy, momentum and comparative ballistics

To understand the comparative ballistics of various projectiles we need to know the speed of the projectile and its mass. We can then calculate the stored or kinetic energy and momentum. Momentum is arguably more important than KE as it relates to what some people call “hitting power”.

The table and associated diagram represents of a number of different projectiles for Momentum plotted with Energy. The length of the line on the diagram is an indication of the ballistic effectiveness of the projectile.



We can see that a 150 lb Sport crossbow (aqua line) is less effective than a 70 lb vertical compound bow (mauve line) and that a 225 lb Sport crossbow (pink line) is approximately the same as the compound bow.

The 95 lb Target crossbow (purple line) is much less effective and is roughly equivalent to a 40 lb vertical Recurve bow, although not shown on the diagram.

Interestingly a cricket ball (blue line) is far more effective than any of the bows depicted and both a military rifle (red line) and shotgun (grey line) are far superior than any of the bows by 2 orders of magnitude. (Note that the Energy axis is logarithmic).

So we can reasonably conclude that:

- Crossbows are comparable with vertical bows in ballistics terms, and,
- Crossbows are as effective as firearms, but only over comparatively short distances, and,
- A cricket ball is more dangerous than any archery equipment”

Weapon	Projectile mass grains/ grams	Projectile speed feet per second/ m/s	Projectile Kinetic Energy ft lb/ Joule Note 1	Projectile Momentum ft seconds/ Newton seconds Note 2
150 lb sporting crossbow	325 / 21	285 / 87	59 / 79	0.41 / 1.83
225 lb sporting crossbow	350 / 23	350 / 107	95 / 129	0.55 / 2.42
95 lb target crossbow	367 / 24	215 / 66	38 / 51	0.35 / 1.56
70 lb compound hunting bow	600 / 39	250 / 76	83 / 113	0.67 / 2.96
60 lb compound target bow	300 / 19	340 / 104	77 / 104	0.46 / 2.01
40 lb recurve target bow	340 / 22	220 / 67	36.5 / 49.5	0.33 / 1.48
cricket ball	2640 / 171	117 / 36	80 / 109	1.38 / 6.10
7.62 mm service rifle	150 / 9.7	2850 / 869	2706 / 3667	1.91 / 8.44
12 gauge field shotgun	600 / 39	1350 / 411	2429 / 3291	3.62 / 16.0

Note 1: Kinetic Energy = mass * speed squared/ 450240 foot pounds

Note 2: Momentum = mass * speed / 224000 foot seconds

Myth 2: “The crossbow is silent and can be used for illicit activity”.

The crossbow is only relatively silent (compared with a firearm), is very cumbersome and difficult to conceal, and the projectile is travelling relatively slowly (again compared with firearms). The shooter has only one shot. The crossbow is definitely not the instrument of choice for criminals, is seldom used for poaching, and is definitely not the snipers’ choice.

It is not unusual for a game animal (for example a deer) to hear the crossbow discharge and jump out of the path of the bolt.

The effective shooting range of the crossbow is comparable with a vertical bow and the bolt has a “rainbow trajectory” just as that of an arrow.

The maximum ethical hunting distance for any bow is about 50m. Unlike a high-power rifle it is not possible to shoot at distances of 200m plus.

In competition the maximum distance shot by a Target crossbow is 70m.

The maximum carry distance for a crossbow bolt is perhaps 350 to 400m at an angle of 45 degrees.”

Myth 3: “Crossbow bolts cause more damage to target butts than others bows”

This is totally false. Crossbow bolts cause no more damage than any other type of bow. This is supported by the comparative ballistics relating to momentum.

A bolt delivered by a 95lb Target crossbow penetrates a target about the same distance as a carbon arrow from a 40lb recurve or Olympic bow. Vertical compound bows can penetrate a target further. The main damage to targets comes from accurate shooting and consequent tight grouping of bolts or arrows in the centre of a target. The smaller crossbow face can be moved so as to even the wear.

Myth 4: Crossbows are dangerous and have no place in the community

Crossbows, just as with all shooting equipment, can be dangerous. Provided that the proper safety procedures are followed, they are no more dangerous than other equipment. Modern crossbows are very effective and safe. If the trigger fails in a crossbow, it usually fails safe, that is, it locks rather than prematurely releasing.

Crossbows also allow many sportsmen to pursue a pastime which is safe, clean, green and non-contact. Crossbow shooting requires intense concentration and this is character and discipline building. Accidents do not happen on a properly controlled crossbow target range.

Controlling bodies such as the World Crossbow Shooting Association have strict safety rules.

Crossbows also provide a means for disabled shooters to pursue their chosen sport.



Myth 5: “Crossbows are not effective for hunting”

Some ill-informed vertical bow hunters may say this. While this may have been true 30 years ago, the facts are that modern, properly designed Sport crossbows, combined with the appropriate weight bolts and sharp broadheads, are just as effective as any other type of bow. This is borne out by the comparative ballistics.

Crossbows are also intrinsically more accurate than vertical bows.

Myth 6: “Anyone can shoot a crossbow – they are just like a rifle!”

Yes, anyone can shoot a crossbow, but they are most un-forgiving and require mastery. An arbalist can become safe and proficient within half an hour, which is much quicker than with other archery equipment. Mastery however takes much longer.

Crossbows cannot be compared with a rifle because the bolt trajectory is not flat, and the bolt speed is less than 400 fps – perhaps only one sixth that of a high power rifle and about two-thirds the speed of an air rifle pellet.

Myth 7: “Crossbows are used for shooting pets and wildlife”

Unfortunately there are sensational reports in the media regarding the shooting of a native animal or domestic pet or livestock. The incidence of this unacceptable behaviour is extremely low and often the blame is wrongly levelled at the crossbow. Often these incidents are caused by people using vertical bows and sometimes the arrows are broken, making them appear to be crossbow bolts. Detailed analysis of media reports also suggests that some of these reports are indeed fabricated. Don't believe all that you read in the newspaper or see on TV! For every crossbow-related misdemeanor there are many more unacceptable actions using other methods of cruelty, but they do not excite the same media coverage.

Who else use crossbows?

Crossbows are not only used for sporting purposes. They are used to shoot lines over trees and rivers, for veterinary and marine biological applications such as tranquiliser darts and taking samples and in theatrical productions.

In countries where feral animals are a problem, the crossbow provides a cost-effective and relatively safe means of helping to control the problem. The crossbow is relatively quiet compared with firearms and the projectiles do not travel very far in the event of missing the quarry.

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