Bench testing a Steyr air pistol

For some considerable time, many of our club air pistol shooters have often wondered how much positional deviation is caused to the pellet by variations in muzzle velocity.

There have been several efforts made at checking the muzzle velocity with a chronoscope to try to determine the most consistent brand, size and weight of pellet under the prevailing ambient conditions at the time of the test. All of these tests have been carried out with the pistol held in the hand, as that was the easiest way for these simple tests to be executed.

The subject of bench testing had often been discussed, but had never been actioned, due to lack of time and range space.

It was decided to persue these ideas further. A substantial pistol clamping bench was created and situated 10 metres from the target in the hope that some realistic information could be learnt from the exercise.

As the previously mentioned batch selecting tests had been carried out, it was decided to use Air Arms 4.49mm diameter 0.475grams pellets as these had shown to be the most consistent when used with the Steyr LP1.

The following shot patterns were obtained with a pre-charged Steyr LP1 air pistol clamped in the bench test. The testing was carried out to try to establish the correlation between the muzzle velocity and the resultant group size and relative position on the target.

Adjustments were made to the air pressure regulator after each 5 shots, a stabilisation shot was fired after each adjustment and before the next series of readings were taken.

All readings were taken using a Combo chronoscope. The air cylinder for the pistol was pre-charged to 200 bar before the first tests were carried out. As only a total of approximately 80 shots were fired, there is no reason to doubt the consistency of the air supply to the pistol.

The ambient temperature was 10^{o} c and the relative humidity was 55%. It is not expected that there would be any significant variations to the results with changes in the ambient temperature conditions, however changes in relative humidity and subsequent density of the air may change the relative position of the shot on the target, but should not affect the group size.

The first tests were taken with the air pressure set as had been last used for normal shooting. Subsequently the pressure was gradually reduced to a point where the performance might be expected to fall off.

The final tests, figures 11 &12 were the results obtained by resetting the air pressure to maintain approximately 525 feet per second, as the tests appeared to indicate that the best groups were obtained at this muzzle velocity. All figures in the tables are in feet per second for convenience. These could be converted to metres per second if required.

It has not been possible to transcribe the resultant images exactly to scale, but they are all in proportion to each other.

Shot no.	FPS	Ave.
1	544	553
2	553	
3	552	
4	550	
5	547	

Fig.1

Shot no.	FPS	Ave.
1	540	542
2	539	
3	542	
4	544	
5	549	

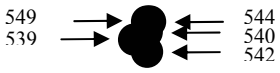

Fig.2

Shot no.	FPS	Ave.
1	541	545
2	541	
3	550	
4	551	
5	544	

Fig.3

Shot no.	FPS	Ave.
1	532	529
2	524	
3	528	
4	535	
5	527	

Fig.4

Shot no.	FPS	Ave.
1	519	520
2	522	
3	517	
4	523	
5	521	

Fig.5

Shot no.	FPS	Ave.
1	525	526
2	527	
3	526	
4	528	
5	527	

Fig.6

Shot no.	FPS	Ave.
1	526	522
2	526	
3	525	
4	520	
5	519	

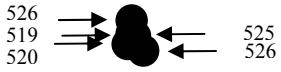

Fig.7

Shot no.	FPS	Ave.
1	508	512
2	512	
3	514	
4	512	
5	516	

Fig.8

Shot no.	FPS	Ave.
1	512	512
2	510	
3	514	
4	507	
5	520	

Fig.9

Shot no.	FPS	Ave.
1	513	510
2	511	
3	517	
4	505	
5	505	

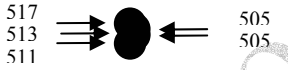

Fig.10

Shot no.	FPS	Ave.
1	522	526
2	524	
3	528	
4	530	
5	526	

Fig.11

Shot no.	FPS	Ave.
1	524	523
2	523	
3	520	
4	521	
5	527	

Fig.12