



WOUND BALLISTIC WORKSHOP

Host Agency: Los Angeles County
Date: July 15th, 2007



Hosted By:

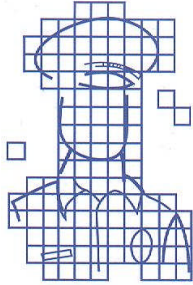
**Los Angeles County
SHERIFF'S DEPARTMENT**



Attending Agencies:

Los Angeles County
Manhattan Beach Police Department

ATK Distributor Information



***San Diego Police
Equipment Co., Inc.***

Don Hacklander

San Diego Police Equipment
8205-A Ronson Road
San Diego, CA 92111
(800)367-8989
don@sandiegopoliceequipment.com

Ryan King

San Diego Police Equipment
8205-A Ronson Road
San Diego, CA 92111
(800)367-8989
ryan@sandiegopoliceequipment.com

Derek Russell

San Diego Police Equipment
8205-A Ronson Road
San Diego, CA 92111
(800)367-8989
derek@sandiegopoliceequipment.com



Contact Information

Stephen McGrory

ATK Law Enforcement Sales
2299 Snake River Ave
Lewiston, ID 83843
(800) 256-8685 ext. 2364
stephen.mcgrory@atk.com

ATK Factory

2299 Snake River Ave
Lewiston, ID 83501
(800)256-8685
www.le.atk.com



Stephen McGrory
Law Enforcement Sales
2299 Snake River Ave
Lewiston, ID 83501

208-799-3582

Dear Wound Ballistic Workshop attendees,

Thank you all for your attendance at the Wound Ballistic Workshop that we conducted at the Los Angeles County Training Facility in conjunction with the Los Angeles County Sheriff's Office. We know that you have a hectic schedule and we appreciate you taking the time to evaluate our ammunition and acquaint yourself with our products.

As you may already be aware, ATK is the proud manufacturer of *Speer Gold Dot*, *Federal Tactical*, and of our newest product, *Federal HST*. We are very excited about *HST* and as you witnessed at the shoot it is a very formidable round through all of the test barriers. We are including the test data from that shoot for you to review. The goal for the design of *HST* was to provide Law Enforcement with a product that would make little if any compromises in performance and yet be affordable in this time of ever increasing budget cuts. *Gold Dot* and *Tactical* are our bonded products that remain as the leaders in Law Enforcement ammunition.

Again, we thank you for your participation in this shoot and would encourage anyone that may have some additional questions to contact Steve at 208-799-3582 or contact San Diego Police Equipment at 858-974-8500.

Sincerely,

Stephen McGrory
Law Enforcement Specialist
ATK

Wound Ballistic Workshop Report

On July 11th, 2007 Los Angeles County Sheriff's Department hosted a Wound Ballistic Workshop at their training facility to evaluate performance duty ammunition. Invitations went out and the following agencies were present:

Los Angeles County Sheriff's Dept.
Manhattan Beach Police Department



In some workshops we begin in the classroom with a discussion of wound ballistic theory and history of ammunition selection. These discussions are usually centered around the science that agencies should be basing their ammunition selection on and why. After an approximate hour and a half classroom presentation on ballistics the class will then move to the range for hands on ballistic testing. Due to time restraints on the range the participants opted out of the classroom presentation to focus more on the hands on ballistic testing. However, out on the range we did discuss wound ballistics. When conducting a workshop often times firearms instructors, SWAT personnel, criminalists, rangemasters, lab technicians, and snipers are present which brings a vast array of application and knowledge to the table when evaluating ballistic performance.

The workshop follows the FBI Wound Ballistic Testing Protocol. This test is specific to penetration, retained weight and expansion through multiple test events. These events are listed below by corresponding number:

#1 – Bare Gelatin @ 10 ft
#2 – Heavy Clothing @ 10 ft
#3 – Steel @ 10 ft
#4 – Wallboard @ 10 ft

#5 – Plywood @ 10 ft
#6 – Auto Glass @ 10 ft
#7 – Heavy Clothing @ 20 yd
#8 – Auto Glass @ 20 yd

The agencies then chose which rounds that they were going to shoot through which protocol. The agencies keyed on events #1 – Bare Gelatin, #2 – Heavy Clothing, #6 – Auto Glass. Demonstrated Calibers - 9MM, 45 Auto, and some 223.

***NOTE: ALL COMPETITORS AMMUNITION WAS SUPPLIED BY AGENCY NOT ATK PERSONNEL ***
*** THE PURPOSE OF THIS IS TO ENSURE THE INTEGRITY OF THE TEST ***

Please note that the shooting, measuring, weighing, and data entry is all done by the participants and not by ATK personnel. This is to allow participants a “hands on” and “unbiased” approach to ballistic testing.

Test Event #1 – Bare Gelatin @ 10 Feet

The gelatin used for this test is 10% gelatin as called out in the FBI Protocol and was calibrated by temperature as well as BB penetration at a specified velocity.

Bullet	Caliber/Weight	Penetration	Expansion (in.)	Retained Weight
Federal HST	9MM 147 gr.	13.50”	0.771”	101.70%
Winchester SXT	9MM 147 gr.	13.25”	0.607”	94.69%
Winchester JHP	9MM 115 gr.	9.50”	0.552”	56.96%

**Retained weight may exceed 100% due to test media being trapped in the bullet.*

As noted in the table above the Federal HST out penetrated, had larger expansion, and retained more weight than both the SXT and the 115 grain JHP. The expanded diameter of the HST was 27% larger than the SXT and 39% larger than the JHP.



Bullet	Caliber/Weight	Penetration	Expansion (in.)	Retained Weight
Federal HST	45 Auto 230 gr.	12.50”	1.190”	101.30%
Winchester SXT	45 Auto 230 gr.	13.00”	0.781”	102.00%

**Retained weight may exceed 100% due to test media being trapped in the bullet.*

In the 45 Caliber 230 grain both manufactures performed well in the penetration and retained weight categories in testing through bare gelatin. However, the HST expanded to 1.19” which is almost 52% larger than the SXT. While this is an extreme expansion, a typical expansion for this HST round is 0.95 inches, which is still significantly larger than Winchester’s SXT.

Test Event #2 – Heavy Clothing @ 10 Feet

The gelatin block is covered with four layers of clothing: One layer of cotton T-shirt (48 threads per inch); one layer of cotton shirt material (80 threads per inch); a 10 ounce down comforter in cambric shell cover (232 threads per inch); and one layer of 13 ounce cotton denim (50 threads per inch). This simulates typical cold weather wear. The block is shot at ten feet, measured from the muzzle to the front of the block.

Bullet	Caliber/Weight	Penetration	Expansion (in.)	Retained Weight
Federal HST	45 Auto 230 gr.	16.00"	0.877"	100.87%
Winchester SXT	45 Auto 230 gr.	13.00"	0.765"	101.04%

**Retained weight may exceed 100% due to test media being trapped in the bullet.*

As evident in the table above, HST penetrated 3.0" further than the SXT and had a 15% larger expansion than the SXT. With increasing expansion there is an inherent increased drag on a bullet, thus reducing penetration. The HST still out penetrated the SXT even though it had a larger expansion.

Test Event #6 – Auto Glass @ 10 Feet

One piece of A.S.I. ¼" laminated automobile safety glass measuring 15" X 18" is set at an angle of 45 degrees to the horizontal. The line of bore of the weapon is offset 15 degrees to the side, resulting in a compound angle of impact for the bullet upon the glass. The shot is made at ten feet, measured from the muzzle to the center of the glass pane. This test event with its two angles simulates a shot taken at the driver of a car from the left front quarter of the vehicle, and not directly in front of it.

Bullet	Caliber/Weight	Penetration	Expansion (in.)	Retained Weight
Federal HST	9MM 147 gr.	7.50"	0.799"	96.26%
Winchester SXT	9MM 147 gr.	10.00"	0.652"	70.48% **
Winchester JHP	9MM 115 gr.	9.00"	0.568"	58.78% **

***Core Jacket Separation ***



Core jacket separation is common when firing through auto glass, however Federal's HST round did not shed its jacket and expanded 22% larger than Winchester's SXT and 40% larger than Winchester's JHP. The HST also retained 26% more weight than the SXT.

Bullet	Caliber/Weight	Penetration	Expansion (in.)	Retained Weight
Federal HST	45 Auto 230 gr.	11.00"	0.742"	95.39%
Winchester SXT	45 Auto 230 gr.	11.50"	0.653"	79.30% **

Core Jacket Separation

As in the 9MM, Winchester SXT had core jacket separation in the 45 caliber round. The HST expanded almost 13.5% larger in diameter than the SXT and retained 16% more of its weight than the SXT.

Overall, Federal's HST had greater weight retention, larger expansion, and retained its jacket when being shot through auto glass. In almost all of the test events the HST had the largest expansion and retained weight.



Wound Ballistic Workshop

Rep Initials (ex RE): Stephen McGrory
 Date: 7/11/2007
 Host Agency: Los Angeles County
 Agency Contact: Sargent Nell
 Telephone: _____
 Range Contact: Sargent Nell

Recorder: Stephen McGrory Assist: _____
 Statistician: Jason Schuster
 Shooter: Rob Cochran
 Judge: Mike Rosenberger
 Agencies Attending: LA County, Manhattan Beach PD
 Agency Personnel: _____

Type of Range: Outdoor
 Chronograph: _____
 Temperature: 75 Degrees
 Weather: Overcast
 ATK Rep: EP
 5 Shot BB Average: _____

Shot #	Firearm	Test Event	Part Number	Lot Number	Ammo Mfg	Ammo Type	Caliber	Bullet Weight (Grains)	Velocity (Ft./Sec.)	Penetration (Inches)	Expand (Low)	Expand (High)	Expand Avg. (Inch)	Retained Weight (Grains)	% Weight Retention	Comments
1	BB	1	BB		Daisy	BB	0.177	0	585	3.00			#DIV/0!			
2	Bretta 92F	1	P9HST2		Federal	HST	9MM	147		13.50		0.771	0.77	149.5	101.70%	
3	Bretta 92F	1	RA9T		Winchester	SXT	9mm	147		13.25		0.607	0.61	139.2	94.69%	
4	Bretta 92F	1	RA9115HP+		Winchester	JHP	9mm	115		9.50		0.552	0.55	65.5	56.96%	
5	Sig P220	1	P45HST1		Federal	HST	#5 AUTO +F	230		12.50		1.190	1.19	233	101.30%	
6	Sig P220	1	RA45TP		Winchester	SXT	#5 AUTO +F	230		13.00		0.781	0.78	234.6	102.00%	
7	Bretta 92F	2	P9HST2		Federal	HST	9MM	147		14.00		0.633	0.63	148.6	101.09%	
8	Bretta 92F	2	RA9T		Winchester	SXT	9mm	147		12.00		0.615	0.62	150.5	102.38%	
9	Bretta 92F	2	RA9115HP+		Winchester	JHP	9mm	115		8.50		0.810	0.81	116.1	100.96%	
10	Sig P220	2	P45HST1		Federal	HST	#5 AUTO +F	230		16.00		0.877	0.88	232	100.87%	
11	Sig P220	2	RA45TP		Winchester	SXT	#5 AUTO +F	230		13.00		0.765	0.77	232.4	101.04%	
12	Bretta 92F	6	P9HST2		Federal	HST	9MM	147		7.50		0.799	0.80	141.5	96.26%	
13	Bretta 92F	6	RA9t		Winchester	SXT	9mm	147		10.00		0.652	0.65	103.6	70.48%	Core Jacket Separation
14	Bretta 92F	6	RA9115HP+		Winchester	JHP	9mm	115		9.00		0.568	0.57	67.6	58.78%	Core Jacket Separation

#1	Bare Gelatin @ 10 Feet	#3	Steel @ 10 Feet	#5	Plywood @ 10 Feet	#7	Heavy Clothing @ 20 Yards
#2	Heavy Clothing @ 10 Feet	#4	Wallboard @ 10 Feet	#6	Auto Glass @ 10 Feet	#8	Auto Glass @ 20 Yards
						#9	IWBA 4 Layers of Denim



Wound Ballistic Workshop

Shot #	Firearm	Test Event	Part Number	Lot Number	Ammo Mfg	Ammo Type	Caliber	Bullet Weight (Grains)	Velocity (Ft./Sec.)	Penetration (Inches)	Expand (Low)	Expand (High)	Expand Avg. (Inch)	Retained Weight (Grains)	% Weight Retention	Comments
15	SigP220	6	P45HST1		Federal	HST	#5 AUTO +P	230		11.00		0.742	0.74	219.4	95.39%	
16	SigP220	6	RA45TP		Winchester	SXT	#5 AUTO +P	230		11.50		0.653	0.65	182.4	79.30%	Core Jacket Separation
17	M16 81 Carbine	1	R223R1		Remington	PSP	223	55		10.25		0.492	0.49	28.4	51.64%	
18	M16 81 Carbine	1	T223A		Federal	TRU SP	223	55		10.50		0.532	0.53	31.5	57.27%	
19	M16 81 Carbine	1	T223F		Federal	TRU Nosler BT	223	55		11.00		0.224	0.22	10.3	18.73%	
20	M16 81 Carbine	1	LE223T1		Federal	Bonded SP	223	55		14.50		0.482	0.48	54.9	99.82%	
21	M16 81 Carbine	6	R223R1		Remington	PSP	223	55		4.50			#DIV/0!			
22	M16 81 Carbine	6	T223A		Federal	TRU SP	223	55		5.00			#DIV/0!			No Round Retrieved
23	M16 81 Carbine	6	T223F		Federal	TRU Nosler BT	223	55		9.00		0.257	0.26	10.3	18.73%	
24	M16 81 Carbine	6	LE223T1		Federal	Bonded SP	223	55		12.00		0.373	0.37	30.1	54.73%	
25	M16 81 Carbine	1	M855		XM	Ball	223	62		13.00		0.181	0.18	10.2	16.45%	
26	M16 81 Carbine	1	8126N		Hornady	Tap	223	75		11.00		0.540	0.54	32.3	43.07%	
27													#DIV/0!			
28													#DIV/0!			
29													#DIV/0!			
30													#DIV/0!			
31													#DIV/0!			
32													#DIV/0!			
33													#DIV/0!			
34													#DIV/0!			
35													#DIV/0!			

#1	Bare Gelatin @ 10 Feet	#3	Steel @ 10 Feet	#5	Plywood @ 10 Feet	#7	Heavy Clothing @ 20 Yards
#2	Heavy Clothing @ 10 Feet	#4	Wallboard @ 10 Feet	#6	Auto Glass @ 10 Feet	#8	Auto Glass @ 20 Yards
						#9	IWBA 4 Layers of Denim



Wound Ballistic Workshop

Shot #	Firearm	Test Event	Part Number	Lot Number	Ammo Mfg	Ammo Type	Caliber	Bullet Weight (Grains)	Velocity (Ft./Sec.)	Penetration (Inches)	Expand (Low)	Expand (High)	Expand Avg. (Inch)	Retained Weight (Grains)	% Weight Retention	Comments
36													#DIV/0!			
37													#DIV/0!			
38													#DIV/0!			
39													#DIV/0!			
40													#DIV/0!			
41													#DIV/0!			
42													#DIV/0!			
43													#DIV/0!			
44													#DIV/0!			
45													#DIV/0!			
46													#DIV/0!			
47													#DIV/0!			
48													#DIV/0!			
49													#DIV/0!			
50													#DIV/0!			
51													#DIV/0!			
52													#DIV/0!			
53													#DIV/0!			
54													#DIV/0!			
55													#DIV/0!			
56													#DIV/0!			

#1	Bare Gelatin @ 10 Feet	#3	Steel @ 10 Feet	#5	Plywood @ 10 Feet	#7	Heavy Clothing @ 20 Yards
#2	Heavy Clothing @ 10 Feet	#4	Wallboard @ 10 Feet	#6	Auto Glass @ 10 Feet	#8	Auto Glass @ 20 Yards
						#9	IWBA 4 Layers of Denim