

LAW ENFORCEMENT MANAGEMENT INSTITUTE

CHOOSING LAW ENFORCEMENT FIREARMS AND AMMUNITIONS

A RESEARCH PAPER  
SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE  
LAW ENFORCEMENT MANAGEMENT INSTITUTE

BY

MARK W. CORY

ROCKPORT POLICE DEPARTMENT

ROCKPORT, TEXAS

SEPTEMBER, 1993

#48

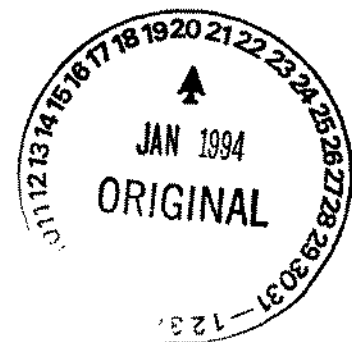


TABLE OF CONTENTS

Introduction.....1  
Ergonomics.....3  
Training.....8  
Police Pistol Ammunitions.....13  
Autoloaders.....21  
Management Issues Concerning Firearms.....22  
Summary.....24  
Bibliography.....25  
End Notes.....29

## Introduction

The purpose of this paper is to identify and profile major types of semi-automatic pistols used in law enforcement including the different calibers of these pistols. In addition, this paper will discuss different types of bullets, which are used in these pistols for law enforcement.

There has been a major change in law enforcement handguns over the last decade. A majority of law enforcement agencies throughout the country have adopted one or more of the variations of the semiautomatic pistol. Two departments, for example, are the Rockport Police Department and the Texas Department of Public Safety.

The standard side arm for the Rockport Police Department was the Smith and Wesson Model 29 .44 magnum revolver. The standard bullet was a midrange load or a .44 special load. In 1989, The Rockport Police Department determined the six shot revolver was no longer sufficient for officers to use since there is only six bullets in the handgun. With violent crime and criminal's use of automatic weapons on the rise, law enforcement officers are now relying on the higher capacity semi-automatic pistols, which are capable of holding up to twenty rounds of ammunition in one clip. These pistols provide the officer with the necessary fire power to combat the sophisticated weaponry of today's violent criminal. In 1989, the Texas Department of Public Safety (TDPS) set out to adopt a double action semiautomatic pistol in 9mm and .45 caliber. TDPS drew up a set of 21 specifications, which the

pistol was required to meet. After exhaustive tests and evaluations, the pistol chosen by TDPS was the Sig Sauer P220, P226, and the P228. These pistols provide the officers of TDPS with a high capacity semiautomatic pistol that will better serve their current needs.

### Ergonomics

Up until the advent of the "computer revolution", little thought was given to the match between humans and the equipment they use in their work. We seem to have forgotten, or ignored, the old adage that "a craftsman is no better than his tools."

When making the switch from revolvers to auto-loaders, department administrators often standardize by specifying a particular make and model of weapon for all officers to carry. If the department is funding the changeover, i.e., they provide the weapons, leather gear, and the ammunition, then certain fiscal advantages likely take place from this approach. Other departments may specify that a certain caliber of weapon is to be carried and then list the various makes and/or models of weapons officers may choose from with either the department or officers paying the changeover costs. Still other departments mandate the change and leave it up to individual officers to select the weapon and caliber with either the department or the individual paying the changeover costs. A variety of approaches are being used, but many of them overlook the importance of the human-equipment match.

Forgotten is that police officers come in all sizes and shapes, and have varying degrees of strength. The individual strength necessary to properly squeeze the trigger on some auto-loaders, especially those that fire double-action, may eventually be acquired if it is deficient, but nothing can be done about enlarging the size of a person's hands.

Some auto-loaders, particularly those with "double-stack" magazines, have enormous magazine wells, with correspondingly large frames that are simply too much for some shooters to handle. The beretta line of pitstols comes to mind when this is mentioned. When confronted with a high-capacity auto-loader, shooters with average or small hands must literally destroy the proper orientation of the weapon in their strong hand in order to establish proper trigger finger placement.

This is especially true if the weapon is fired double-action. It's a choice between proper weapon orientation in the hand or proper trigger finger placement; you can't have both. Such weapons may be selected because of their "firepower" capability, but in the hands of such a shooter, fire-power is of little use if you can't accurately hit you intended target; i.e., a lack of trigger control equal inaccurate shots.

Further, trigger-cocking auto-loaders, even though they may become single-action after the first shot, require some degree of physical strength for proper trigger squeeze. The double-action press on most of these weapons is notoriously long and requires strength, endurance, and patience on the part of the shooter if accurate shots are to be made.

Conversely, auto-loaders that fire consistently in the single-action mode present a far easier opportunity for proper trigger finger placement, without necessarily destroying weapon orientation in the strong hand, and require less strength for trigger squeeze. But, automatically "thumb-cocking" the double-

action auto-loaders into the single-action mode every time for the first shot makes no sense from a tactical perspective in most potential confrontation situations.

Hand size and relative strength also affect a shooter's pistol handling skills. For example, people with small hands may have difficulty properly handling high capacity magazines during the tactical re-loading process; The high firepower capability of such weapons is of little value if a shooter cannot effectively change magazines to utilize it.

In addition, it may be difficult for shooters to simply remove even partially full, especially "double-stack," magazines from the weapon during the tactical re-loading process, because the sides of the magazine have "swollen" against the inside of the magazine well. Further, large caliber, high capacity, auto-loaders may generate so much recoil that some shooters may experience difficulty just "hanging on" to the weapon when it fires.

Also, the simple act of "charging" some auto-loaders is a test of strength because of the weapon's recoil spring tension. Still others may have problems properly executing routine malfunction drills.

Although it's no longer the case, for a time virtually all auto-loading handguns were designed with only the right-handed shooter in mind. Even now, only some makes and models readily accommodate the needs of the left-handed shooter. Since we're all not right-handed, that's a problem in terms of handling and

manipulating the weapon for left-handers stuck with a right-handed weapon.

If the shooter happens to have small hands in addition to being left-handed, then even more potential problems emerge. They are not necessarily incurable problems, but can emerge with adverse consequences in high stress situations. Slide stops, magazine releases, and decocking levers need to be located where they are readily accessible to the shooter whether they be right- or left-handed.

Auto-loading handguns come with a variety of "bells and whistles" that further complicate the mastery process. Some have de-cocking levers, some don't; some de-cocking levers are underneath the slide while others are at the rear of the slide itself; and, some are only de-cocking levers but others combine the de-cocking function with a safety.

As for safeties, only some auto-loaders have a magazine safety; some have a thumb safety; a few have a grip safety; and, some have a safety disconnect built into the trigger. All various button and lever combinations and locations possible on the makes and models of the weapons currently on the market can confuse even the most dedicated shooter.

This is further complicated by the operating characteristics of the various weapons. Some fire only in the single-action mode; some fire only in the double-action mode; and, others are double-action for the first shot and single-action thereafter.

Simply from the perspective of ergonomics, a number of



questions need to be addressed as a part of the overall change process.

- \* Can proper trigger finger placement be attained without destroying proper weapon orientation in the strong hand?
- \* Can the magazine release be reached with the strong-hand thumb without destroying the shooter's firing grip?
- \* Can both right- and left-handed shooters effectively manipulate the weapon's slide stop, de-cocking lever and/or safety, and magazine release?
- \* Do shooters have the strength necessary for proper trigger squeeze; especially with double-action weapons?
- \* Can shooters effectively manipulate magazines during the tactical re-loading process?
- \* Can shooters effectively perform malfunction drills?
- \* Can officers sufficiently control weapon recoil in order to make rapid, accurate shots?

## Training

Regardless of the weapon selected, once the decision to change from revolvers to auto-loaders is made, the real problems begin. When a new and different piece of equipment is placed in someone-s hands, everyone virtually becomes a novice in its use whether they be a veteran or new recruit. Training someone to effectively use an auto-loading pistol, as compared to training someone to use a revolver, is far more difficult than most would imagine.

Marksmanship with a revolver requires a mastery of sight alignment and trigger control. Once speed-loaders were introduced, re-loading became a snap, and failure to fire malfunctions from a tactical perspective were simple; just pull the trigger again. Not so with the auto-loader. In most instances the only thing that stays the same is sight alignment.

Depending on the gun selected, the second marksmanship component, trigger control, will either be slightly different than a revolver's, or, substantially different. Some trigger-cocking auto-loaders have relatively smooth, although long, double-action squeeze; others do not. The single-action models, while presenting the same trigger squeeze each time, still afford something new for the shooter to master. No matter which make and model is selected, the shooter has a different means of trigger squeeze to conquer.

Revolver shooters must master a continuous double-action trigger squeeze, but with a trigger-cocking auto-loader, two

separate trigger squeeze techniques must be learned, one double-action and one single-action. Rarely, does a shooter learn to master both at the same time; usually one of the shots is consistently "jerked." Single-action auto-loaders present only the one trigger squeeze to master, but it's vastly different than what one was accustomed to. Of course the difficulties in mastering the necessary trigger squeeze techniques are further compounded by the trigger finger placement, large frame, height capacity magazine issues mentioned previously. Depending upon the circumstances, i.e., small hands and/or relatively limited strength coupled with a large frame weapon, the mastery of the trigger may take some shooters quite a long time.

Then there's the problem of malfunctions. Any weapon, for a variety of reasons, may fail to fire. From the tactical perspective, they are relatively easy to cope with for revolver shooters. Not so for an officer carrying an auto-loader. In addition to the problem of bad ammunition, add several other possible malfunction sources: (1) failure to seat the magazine properly; (2) no round chambered; (3) de-cocking lever improperly positioned; (4) failure to extract; (5) "stovepipes" failure to feed; (6) defective magazine; and, (7) the double-feed.

For an auto-loader equipped officer it's not just a matter of squeezing the trigger again. It's a process of going through a series of sequential steps, all of which take the shooter out of action for varying lengths of time to clear the source of the malfunction.

Nothing separates the two weapon types more than the procedures required to cope with malfunctions. For those equipped with auto-loaders, the malfunction clearing drills must be mastered until they are instinctive--something that's not an easy process for even the most dedicated of shooters.

If the foregoing were not enough to give a new auto-loader shooter nightmares, there's the matter of properly maintaining the weapon. Revolvers are a relatively simple matter regardless of make and model; they are all pretty much the same. The overall reliability of revolvers is such that many officers just holster them and forget them; maintenance either becomes an annual "event" or something done after a periodic departmental "qualification" shoot.

That approach to maintenance will never work with an auto-loading pistol. In addition to what might be called the normal maintenance tasks familiar to revolver shooters, slide rails must be cleaned and properly lubricated, feed ramps and chambers need to be virtually spotless, extractors must be free of dirt or debris, spring tensions monitored, and magazines must be regularly inspected, disassembled, and cleaned. There are a lot of new things that need care and cleaning and it must be done on a regular and continuous basis if the probability of malfunctions is to be reduced.

All of these factors mean that the changeover from revolvers to auto-loaders must be accompanied by intensive and well-conceived training programs that require a demonstrated mastery

of the weapon selected in terms of both marksmanship and gun handling skills. The training program must also insure that the mastery of these skills is constantly maintained.

When the change from revolvers to autos is made, the days of the semi-annual "qualification " shoot as the departmental firearms training program are over.

A well-conceived training program should contain components such as:

- \* Weapon function and nomenclature;
- \* Weapon maintenance/care;
- \* Tactical re-loading procedures;
- \* Malfunction causes and drills;
- \* Marksmanship development;
- \* Tactical decision-making;
- \* Tactical planning;
- \* Cover utilization/shooting positions;
- \* Reduced light shooting/gun handling;
- \* On- and Off-duty carrying and use.

Once the requisite skills and knowledge are acquired, the training process cannot stop; the skills must be maintained. Mastery of marksmanship fundamentals should be demonstrated at least every six months; although every other month would be better. Competency in gun handling, e.g., malfunction drills and re-loading skills at a minimum, should be demonstrated on a monthly or bi-monthly basis at a minimum.

Tactical skills, e.g., cover utilization, tactical planning

and decision-making, reduced light shooting, and shooting positions, should be satisfactorily demonstrated at least every six months, or more often if possible. The training process can never stop regardless of assignment.

On its face, the change in on-duty handguns from a revolver to an auto-loader may appear to be a relatively simple process, but, it obviously isn't. The process of deciding whether to make the basic change should incorporate a reasoned assessment of the advantages and disadvantages of both alternatives with full consideration given to the effects of the proposed change. The basic decision to change over may be the easiest of all given the many ramifications that follow the decision to change.

Once the decision to make the switch has been made, then comes the decision as to make and model alternatives including caliber; again, not an easy decision with so many choices available. It's at this step in the process that issues such as ergonomics and training come to the fore.

Police administrators have the responsibility to ensure that their officers have the equipment necessary to meet the demands of the job. They also have the responsibility to ensure that their officers can effectively and efficiently use that equipment.

Police administrators who are unwilling to address the second responsibility, and all its latent and obvious ramifications, have no business even contemplating a change from revolvers to auto-loaders.

### Police Pistol Ammunition

CCI: The 9mm cartridge continues to be the one in greatest demand, particularly in the 147-grain JHP loading, although there is evidence that some departments are looking toward the 124-grain JHP bullet weight as an option to the 147-grain bullets. There is increasing interest in the .40 (both with 180- and 155-grain bullets), and "the .45 Auto cartridge remains strong." In .45, the 230 and 185 grain weights continue to be in demand.<sup>1</sup>

The FBI test protocol has caused all bullet makers to take a hard look at construction of pistol bullets. The protocol includes barrier testing through resistant materials such as clothing, glass, plywood, wallboard, and sheet metal. These materials are placed in front of a gelatin block.<sup>1</sup>

The big news from CCI this year is Speer Lawman service ammunition loaded with the new Gold Dot hollow-points--a bullet construction developed specifically for law-enforcement situations and built to the standards of performance required in the current FBI test protocol. The loadings include 9mm, 115-, 125-, and 147-grain GDHP; .40 155- and 180-grain GDHP; and .45 185- and 230-grain GDHP.<sup>1</sup>

All Gold Dot bullets feature Speer's Uni-Cor construction, with a pure copper jacket built up on the core one molecule at a time. The resulting jacket is thick yet flexible, and the electro-chemical bond virtually eliminates core jacket separation. To maximize performance through barriers, a unique core chemistry enhances penetration through resistant materials,

and the very sharp hollow-point opening allows a cutting action in wallboard and plywood before the bullet expands. Gold Dot bullets pass through two layers of wallboard with almost no deformation, yet expand properly when they strike the gelatin block behind it.<sup>1</sup>

Here are a couple of examples of FBI test results with the Gold Dot bullets in 9mm: 124-grain bullets achieved 16.93 inches of penetration, retained 96 percent of their weight, and expanded to .479-inch in ordnance gelatin after passing through the barriers; 147-grain bullets penetrated 14.94 inches, retained 95.3 percent of their weight, and expanded to .509-inch. These figures are 40-shot averages, fired with a SIG P 226 pistol, which has a 4 1/4-inch barrel.<sup>1</sup>

CCI has also been placing strong emphasis on economical training ammunition. Training has been identified as a major factor in successful shooting encounters. Departments will soon feel additional pressure to increase training. This is the reasoning behind the aluminum-cased CCI Blazer training ammunition, which is designed to duplicate the recoil and point of impact of service ammunition. Both the bullets and primers of Blazer Clean-Fire ammunition significantly reduce the health hazard of airborne lead at indoor ranges. The primer formulation contains no lead, barium, or antimony, and the TMJ (Totally Metal Jacketed) bullets are completely encased in pure copper to prevent the hot powder gases from melting the lead.<sup>1</sup>

In addition, CCI is in the final stages of development of a



9mm non-toxic cartridge with a 115-grain solid copper bullet containing no lead alloys. Scheduled for availability late this year, its performance duplicates that of conventional 115-grain 9mm rounds. It should facilitate disposal of backstop residue, since the copper can be sold as scrap for reprocessing.<sup>1</sup>

**Federal:** the most popular police round remains the 9mm, with the 147-grain bullet weight predominating. In this weight, the Federal loading ordered by most law-enforcement agencies is the Hydra-Shok.<sup>1</sup>

Contrary to some statements in the carcasses, in which the projectiles were required to penetrate through shoulder joints and organs, and impact the hind quarters, average expansion was .557-inch, with 95 percent retained weight, producing a large permanent wound cavity and high tissue destruction. Following closely behind the 9mm is the new .40.<sup>1</sup>

The preferred bullet weight in this caliber is 180 grains, and both the Hydra-Shok and the Hi-Shok JHP are very popular. Whereas the Hydra-Shok employs a post centered in the hollow-point cavity, the Hi-Shok has a tapered hollow point combined with other features of design and composition to achieve controlled expansion. In addition to these, Federal recently introduced a 155-grain Hydra-Shok to meet a growing interest in a lighter bullet for the .40 caliber.<sup>1</sup>

Without question, however, many agencies will continue to rely on the heavier bullet. In ballistic tests, 180-grain Hydra-Shoks penetrated 12 inches of 10 percent gelatin, expanding to

.709-inch with retained weight of 94.4 percent, and in the swine-tissue tests the average expansion was .624-inch with 99 percent retained weight.<sup>1</sup>

Third place in demand by law-enforcement agencies is shared by the .45 ACP and the old .38 Special still needed by agencies that haven't yet switched from revolvers to semiautomatics. The preferred bullet in the .45 is the 230-grain JHP. Although .38s are supplied in a variety of bullet weights, the heavier projectiles--147-150 grains--are favored.<sup>1</sup>

Nylon-coated bullets such as Federal's 124-grain 9mm hollow-point Ny-clad continue to be popular. An important claim for such projectiles is that they achieve expansion and kinetic energy transfer comparable to the performance of conventional jacketed bullets but at somewhat lower velocities and pressures. Test firings into ordnance gelatin and clay blocks have shown excellent mushrooming to about twice the original caliber with 97 percent of weight retained; there was massive cavitation and penetration up to 15 inches.<sup>1</sup>

Nylon-coated or full-metal-jacket bullets are also useful for practice and qualification because they significantly reduce the percentage of airborne lead in indoor ranges. Federal's American Eagle line, which is promoted for economical range use, includes 115- and 124-grain FMJ 9mm rounds and a 230-grain FMJ .45 ACP loading.<sup>1</sup>

**Remington:** With regard to pistol calibers and bullet weights most in demand by law-enforcement agencies, Remington

confirms the same experience reported by the other ammunition manufacturers--top combinations being the 147-grain 9mm, 180-grain .40, and the 230-grain .45.<sup>1</sup>

These choices are reflected in Remington's new Golden Saber line of high performance pistol and revolver ammunition, which includes the above mentioned calibers and bullet weights plus 125-grain .38 Special and .357 Magnum revolver rounds.<sup>1</sup>

The Golden Saber is truly innovative in several ways, but the new bullet is the most unusual component. Designed to achieve the optimum combinations of deep penetration and dramatic expansion with high weight retention, it employs a much-thicker-than-normal jacket made entirely of cartridge brass instead of copper gilding metal. The forward part of the jacket's nose section is cut completely through at six points to promote excellent mushrooming over a wide range of velocities, and the stiff jacket material peels out radially--to more than 1.65 times the caliber diameter--rather than sliding back along the core body. Expansion is extremely uniform, weight retention is almost total, and energy is released over a greater than normal depth of penetration. Deep penetrations is promoted by an extremely precise hollow-point design that minimizes lead-core deformation, thus retaining a greater percentage of core weight to continue driving the bullet.<sup>1</sup>

According to Remington, the initial impact of the Golden Saber bullet produces a longer temporary stretch cavity because of the jacket stiffness. The radial swing of the six jacket

sections then enhance terminal performance and final mushroom diameter, creating a large permanent cavity. After final expansion, the bullet continues to penetrate, delivering additional energy.<sup>1</sup>

The new bullet design also includes a "Driving Band" that locks the core to the jacket, reducing rifling-contact friction for higher muzzle velocity. The nose diameter is slightly reduced to allow precise bullet/bore alignment before the Driving Band engages the rifling. Remington states that this feature produces better accuracy than this normally achieved with hollow-points.<sup>1</sup>

Another very recent Remington introduction is the 147-grain 9mm metal-case match round for law enforcement. Designed for accuracy and versatility, this new loading features a flat-nosed, metal-case match bullet engineered for highly dependable functioning in all types of semiautomatic and automatic law-enforcement firearms. Remington suggests its use for duty, training, and competition, and stresses its accuracy as well as the advantage of using training ammunition with the same weight and characteristics as that carried on duty.<sup>1</sup>

**Winchester:** Leading the list of Winchester pistol ammunition in greatest demand by law-enforcement agencies is the 147-grain 9mm round, particularly in the loading with the Black Talon HP introduced in 1992. Next comes the 9mm lightweight hollow-point, the 115-grain bullet, and not far behind is the .45 Auto HP in 230- and 185-grain weights. It's interesting to note

that the .40-caliber, particularly with the heavier HP bullets (180-grain) is quickly gaining on these others in terms of police demand. For agencies that have not yet switched to semiautomatics, the .38 Special is ordered in a number of hollow-point loadings, but with a preponderance of 158- and 125-grain bullets.<sup>1</sup>

Significantly, the development of Black Talons has centered on subsonic loadings engineered for accuracy, deep penetration, controlled (gradual) expansion, low muzzle flash, and low recoil to ensure fast on-target follow-up shots. Muzzle velocities are: 990 fps for the 147-grain 9mm and the 180-grain .40; 850 ups for the 230-grain .45 ACP. A 10mm loading with a 200-grain Black Talon HP is also supplied, and it has a muzzle velocity of 990 fps.<sup>1</sup>

Winchester's line of Supreme Black Talon cartridges utilized the SXT (Supreme Expansion Talon) bullet design, with a reverse-taper black brass jacket. Briefly, the jacket is thicker at the bullet's tip rather than at the heel, and it lines the hollow-point cavity to encapsulate the lead core. A unique notching process facilitates controlled expansion of both the jacket and the core. The core is locked in place to prevent separation during upset, and the pre-cutting, or notching, of the thick portion of the jacket produces radial petals for optimum mushrooming without fragmentation. Thus there is virtually total weight retention during penetration and expansion. In subsonic velocities, the expansion sequence is slightly delayed to achieve

deeper penetration, and during this penetration the bullet retains higher velocity. Like the other new bullets and loadings designed in accordance with today's trends and test standards for performance, these are designed and constructed for maximum cavitation and energy transfer combined with deep penetration.<sup>1</sup>

It should be noted that, despite the growing popularity of the Black Talons two other loadings remain in strong demand with the same bullet weights and velocities--the Super-X Subsonic JHP DP (for Deep Penetration) line and the Super-X Silvertip HP line. For target shooting, the company also supplies Super-X Super Match rounds with full metal jackets--the 147-grain 9mm TCM (Truncated Cone-Match), 155-grain .40 TCM, 155-grain 10mm TCM, and 185-grain .45 SWC (Semi Wad Cutter).<sup>1</sup>

### AutoLoaders

Sig Sauer pistols are built in West Germany. The pistols feature a frame mounted decocking lever and no safety. The pistol are the P220 .45 caliber, the P225, P228, and P226 9mm, the P229 .40 caliber, and the P230 .38 caliber. All of these pistols are currently being used to some degree in the law-enforcement community today. It is interesting to note that originally the P225 9mm pistol was developed for use by the West German Police and after that occurred, the Sig Sauer pistol became popular in the United States. The P220 and P226 are the issue pistols of the Texas Department of Public Safety.

The Baretta pistols were originally built in Italy. They are also being built in the United States. These pistols feature a slide mounted safety and have no frame mounted decocking lever. Some of the pistols offered in the baretta line are the 92 series 9mm pistols, the 96 series .40 caliber pistols, and the 80 series .38 caliber pistols. The pistols are manufactured with high quality, however; there is one problem with the 9mm and .40 caliber pistols. These pistols have a large magazine well which in turn makes the grips larger than other pistols. Officers with smaller hands are unable to properly grip and work the pistol because of this. the Baretta line of pistols are most noted for the fact that in the mid 1980's, the 92F 9mm pistol was selected as the official duty pistol for the United States military services.

### Management Issues Concerning Firearms

One of the initial concerns an administrator must address regarding firearms is what type he will allow his officers to carry while on and off duty. Extensive research should be conducted by departmental personnel to identify the most desirable firearm to meet the needs of the officers and the department. The research should include but not be limited to the following:

1. Type of Pistol
2. Caliber of Pistol
3. Functions of the Pistol
4. Cost of the Pistol
5. Availability to purchase the Pistol
6. Type of warranty available on the Pistol

Depending in the budgetary constraints on the department, the administrator may elect to have the officers purchase their own firearms. This would alleviate the cost of having the department purchase the firearms and issuing them to the officers.

The administrator must also address the issue of ammunition. At the Rockport Police Department, officers are issued inexpensive full metal jacket ammunition for qualification. For on duty use, officers are issued Winchester Black Talon ammunition. There is a large variety of ammunition available to Law Enforcement agencies. Research and tests should be conducted by each department to determine which particular bullet will best



suit the departments needs.

All Law Enforcement agencies need to have a comprehensive firearms training program. This program should also include firearms qualification by each officer. It is essential that the training and the qualifications are documented for future reference. The documentation can be used by the department and the officers in court if they are involved in a shooting incident.

I believe the most important aspect of firearms an administrator must address is developing a comprehensive departmental policy. The policy must address when an officer is justified in using deadly force. The policy should also outline the use of force continuum. The policy should be discussed with each officer to insure they understand it's intent and so that any questions can be answered. An officer must be able to make the split second decision whether to use deadly force or not. In most cases, an officer will not have the time to consult a supervisor prior to the use of deadly force. He will have to rely on his knowledge of the departmental firearms policy.

### Summary

Police administrators and supervisors should have information and insight about what is involved in implementing a change from a revolver to a pistol after studying this research paper. This research paper details the many different aspects prior to and during a change over. Police administrators must be willing to invest the proper time and training to have a successful implementation of this magnitude. This research paper should serve as a guide to follow and as a resource from which an administrator can look when developing rules and regulations about firearms for his department.

## Bibliography

### Periodicals

- Ayoob, Massad. "Ayoob For The Defense" Guns Magazine, vol. XXXVIII, no. 4-448, (April 1992):
- Ayoob, Massad. "Combat Handgun Ammo" Guns And Ammo Combat Handguns, vol. 10, no. 4, (July 1992):
- Ayoob, Massad. "Tao of the DAO" Guns Magazine, vol. XXXVIII, no. 1-445, (January 1992):
- Boyle, Mike. "Beretta On Duty" Guns And Weapons For Law Enforcement, vol. 7, no. 2, (Spring 1992):
- Boyle, Mike. "Beretta's First Big Bore" Combat Handguns, vol. 13, no. 3, (June 1992):
- Boyle, Mike. "The Glock 10" Combat Handguns, vol. 8, no. 4, (April 1992):
- Boyle, Mike. "New S&W Model 4044" Guns And Weapons For Law Enforcement, vol. 6, no. 3, (Fall 1992):
- Clapp, Wiley, ".45 ACP vs. .40 S&W" Shooting Times, vol. 33, no. 7, (July 1992):
- Clapp, Wiley. "Everybody Needs A .45..." Shooting Times, vol. 33, no. 6, (June 1992):
- Clapp, Wiley. "Glock Model 21 .45 Auto" Guns And Ammo, vol. 35, no. 10, (October 1991):
- Clapp, Wiley. "The "Unsinkable" Glock" Shooting Times, vol. 33, no. 3, (March 1992):
- Clapp, Wiley. "Wiley's Half Dozen" Handgunning, vol. 6, no. 1, (Jan. Feb. 1992):
- Creson, Chris. "What's The Best Defense Gun: Auto Or Revolver?" Handgun Shootout, vol. 9 no. 6, (January 1992):
- Eades, Dick. "Texas Department Of Public Saftey Chooses SIG" Sigarms Quarterly, vol. 4, no. 2, (Spring 1992):
- Ellis, Tom. "The Glock Heavies: Models 20 & 21" Law Enforcement Technology, vol. 19, no. 7, (July 1992):
- Fears, J. Wayne. "The Gun Rack," Shooting Times, vol. 32, no. 11, (November 1991):

- Ferber, Stephen. "Latest Trends in Police Ammunition" Sigarms Quarterly, vol. 5, (Summer 1993):
- James, Garry. "Best Buy Combat Auto" Guns And Ammo Handguns, vol.6, no. 7, (July 1992):
- Jason, Alexander. "A New Era Begins In Combat Handguns" Police Marksman, vol. 5, no. 3, (May/June 1989):
- Johnston, Gary Paul. "New S&W Model 915 9MM" Guns And Survival, vol. 7, no. 1, (1992):
- Johnston, Phil. ".45 vs. 10MM: And The Winner Is..." Handgun Shootout, vol. 9, no. 6, (January 1992):
- Johnston, Phil. "Shootout Of The Century .40 vs. 9MM!" Handgun Shootout, vol. 9, no. 6, (January 1992):
- Karwan, Chuck. "Operation Shootout: 1911 vs. M9," Handgun Shootout, vol. 9, no. 6, (January 1992):
- Libourel, Jan. "Handguns Trends For 1992" Guns And Ammo, vol. 36, no. 4, (April 1992):
- Libourel, Jan. "Strictly Handguns" Guns And Ammo, vol. 36, no. 4, (April 1992):
- Libourel, Jan. "The Superb Sig P-210" Guns And Ammo, vol. 36, no. 1, (January 1992):
- Libourel, Jan. "What Are Top 10 Combat Handguns?" Guns And Ammo Handguns, vol. 6 no. 5, (May 1992):
- Libourel, Jan. "What Are The Top 10 Handgun Trends?" Guns And Ammo, vol. 36, no. 9, (September 1992):
- Marshall, Evan. "Handgun Stopping Power" Guns And Weapons For Law Enforcement, vol. 7, no. 2, (Spring 1992):
- Marshall, Evan. "Why Soft Points?" Guns And Weapons For Law Enforcement, vol. 6, no. 3, (Fall 1992):
- Metcalf, Dick. "Black Talon" Shooting Times, vol. 33, no. 7, (July 1992):
- O'Brian, Bill. ".45 ACP Roundup" Guns And Ammo, vol. 36, no. 3, (March 1992):
- O'Brian, Bill. "Home Defense Gun Buyer's Guide" Guns And Ammo, vol. 36, no. 7, (July 1992):

- Prisbrey, Denis. "Glocks On\Off Duty" Guns And Weapons For Law Enforcement, vol. 6, no. 3, (Fall 1992):
- Rauch, Walt. "What's New For '92" Combat Handguns, vol. 13, no. 3, (June 1992):
- Sanow, Ed. "Latest Trends In Police Pistol Ammo" Sigarms Quarterly, vol. 4, no. 2, (Spring 1992):
- Sanow, Ed. "New Lead-Free CCI/Blazer Ammo" Combat Handguns, vol. 8, no. 4, (April 1992):
- Sanow, Ed. "The Phenomenal .40-Cartridge for the '90s" Sigarms Quarterly, vol. 4, no. 2, (Spring 1992):
- Sanow, Ed. "The Question Of Penetration" Combat Handguns, vol. 13, no. 4, (August 1992):
- Sanow, Ed. "Starfire" Guns And Weapons For Law Enforcement, vol. 6, no. 3, (Fall 1992):
- Sanow, Ed. "Stopping Power...and How to Predict It!" Guns And Ammo Handguns, vol. 6, no. 6, (June 1992):
- Sanow, Ed. "Tom "Hydro-Shok" Burczynski" Guns And Ammo For Law Enforcement, vol. 7, no. 2, (Spring 1992):
- Savino, Richard. "S&W Model 4026 .40 S&W" Guns And Survival, vol. 7, no. 1, (1992):
- Shimek, Bob. "Beratta Desert Storm" Combat Handguns, vol. 8, no. 4, (April 1992):
- Shimek, Bob. "Sig's "JP226" Jubilee" Combat Handguns, vol. 13, no. 4, (August 1992):
- Shimek, Robert. "Combat Double Action Auto Pistols" Guns And Ammo Combat Handguns, vol. 10, no. 4, (July 1992):
- Siemon, Ed. "New Cor-Bon .40 S&W" Special Weapons, vol. 9, no. 1, (1992):
- Skelton, Bart. "A Handgun For Home Defense; What's The Best Choice?" Shooting Times, vol. 32, no. 11, (November 1991):
- Spaulding, Dave. "Cor-bon Ammunition" Guns And Ammo For Law Enforcement, vol. 7, no. 2, (Spring 1992):
- Swiggett, Hal. "New Ammo From Winchester" Guns And Survival, vol. 7, no. 1, (1992):

- Thomas, Duane. "10MM Gunfight" Guns&Ammo 1992 Annual Handguns, vol. 10, no. 1, (1992):
- Venturino, Mike. "Bullet Alloys And Hardness" Guns And Ammo, vol. 36, no. 1, (January 1992):
- Venturino, Mike. "Gun Control...Shooting Big-Bore Autos" Guns And Ammo, vol. 36, no. 7, (July 1992):
- Venturino, Mike. "Reloading" Guns And Ammo Handguns, vol. 6, no. 7, (July 1992):

## End Notes

1. Ferber, Stepehn. Latest Trends in Police Ammunition:  
Sigarms Quarterly. Vol. 5, Summer, 1993