

Department of Forensic Science

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**FORENSIC SCIENTIST I
NIBIN
TRAINING MANUAL**

TABLE OF CONTENTS

1 Introduction and Orientation

- 1.1 Purpose and Scope**
- 1.2 Coordination of the Program**
- 1.3 Training Period**
- 1.4 Location of Training**
- 1.5 Training Goals**
- 1.6 Instructions to the Trainee**
- 1.7 Instructions to the Training Coordinator**
- 1.8 Mock Trials**
- 1.9 Guidelines for the Competency Examination**
- 1.10 Transition from Trainee to Examiner**
- 1.11 Experienced Personnel**
- 1.12 Orientation**
- 1.13 Firearms Safety Training**
- 1.14 Modes of Evaluation**

2 Evidence Handling

- 2.1 Objectives**
- 2.2 Modes of Instructions**
- 2.3 Assignments**
- 2.4 Study Questions**
- 2.5 Practical Exercises**
- 2.6 Mode of Evaluation**
- 2.7 References**

3 Report Writing, Expert Testimony, and Professionalism

- 3.1 Objectives**
- 3.2 Modes of Instruction**
- 3.3 Assignments**
- 3.4 Practical Exercises**
- 3.5 Modes of Evaluation**
- 3.6 References**

4 Instrumentation

- 4.1 Objective**
- 4.2 Modes of Instruction**
- 4.3 Assignments**
- 4.4 Study Questions**
- 4.5 Practical Exercises**
- 4.6 Modes of Evaluation**
- 4.7 References**

5 Ammunition

- 5.1 Objective**
- 5.2 Modes of Instruction**
- 5.3 Historical Development of Ammunition**
- 5.4 Ammunition Components**
- 5.5 Caliber/Gauge**
- 5.6 Modes of Evaluation**
- 5.7 References**

6 Firearms

- 6.1 Objectives**
- 6.2 Modes of Instruction**
- 6.3 Examination of Firearms – Study Questions**
- 6.4 Revolvers – Study Questions**
- 6.5 Revolvers – Practical Exercises**
- 6.6 Pistols – Study Questions**
- 6.7 Pistols – Practical Exercises**
- 6.8 Rifles – Study Questions**
- 6.9 Rifles – Practical Exercises**
- 6.10 Shotguns – Study Questions**
- 6.11 Shotguns – Practical Exercises**
- 6.12 Mode of Evaluations**
- 6.13 References**

7 NIBIN

- 7.1 Objectives**
- 7.2 Modes of Instruction**
- 7.3 Assignments**
- 7.4 Study Questions**
- 7.5 Practical Exercises**
- 7.6 Modes of Evaluation**
- 7.7 References**

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Appendix A Individual Training Plan Template OF

FORENSIC SCIENCE

1 INTRODUCTION AND ORIENTATION

1.1 Purpose and Scope

- 1.1.1 The purpose of this manual is to provide uniform training of Forensic Scientist I – NIBIN employed by the Commonwealth of Virginia Department of Forensic Science. This manual is intended to be used in a formal training program that will establish a certain minimum standard of professional competency throughout the statewide branches of the Department of Forensic Science.
- 1.1.2 Certain inherent qualities of firearm evidence prohibit the establishment of a rigid set of standard procedures to cover each and every case. Therefore, enough latitude has been given to allow for independent thought and individual freedom in selecting alternative courses of action. Upon completion of this course the trainee will be thoroughly familiar with the options available to handle most pieces of evidence that will be encountered.
- 1.1.3 The sequence in which the tasks are presented in the outline should not necessarily be considered as a mandatory order of instruction. Exposure to legal aspects and testimony will be continuous throughout the training.

1.2 Coordination of the Program

- 1.2.1 Unless otherwise designated by the Physical Evidence Program Manager (PM), the Training Coordinator (TC) will be the Section Supervisor in each lab.
- 1.2.2 The TC will be responsible for the overall training, but may delegate certain duties and blocks of instruction to other qualified examiners.

1.3 Training Period

- 1.3.1 The length of the training period is approximately 6 months. Certain individuals may require less time than others, depending on experience, education, or learning ability.
- 1.3.2 Under the direct supervision of a qualified examiner, the trainee will assist with casework throughout the training period. This will familiarize the trainee with different forms of case evidence, packaging, applied analytical techniques and note-taking.

1.4 Location Of Training

Whenever practical, the bulk of an individual's training will occur in the lab to which they will be assigned.

1.5 Training Goals

The training shall culminate so that the trainee has the following:

- The knowledge of the principles and practices of firearm actions and marks imparted by each tool working surface of a firearm.
- The knowledge of the theory and applications of stereo microscope techniques used in the analysis of evidence.
- The ability to enter items into NIBIN and accurately review the correlation results.
- The ability to perform accurate forensic analysis independently and proficiently.
- The ability to skillfully present and defend analytical findings in courts of record.

1.6 Instructions to the Trainee

- 1.6.1 The trainee is expected to keep a notebook of information compiled for each Module of this manual. This

notebook will be evaluated by the TC throughout the course of the training and by the PM and Quality Assurance Coordinator upon completion of the training.

- 1.6.2 The written answers to the study questions listed in each section will be used as reference material once the trainee is qualified as an examiner. Therefore, references are to be listed for each answer whenever possible. The completed study questions are to be turned into the TC as scheduled. A list of useful references has been provided in the Reference section of each module.
- 1.6.3 References listed as “Required Reading” are required for an adequate understanding of the subject matter. Required readings are designated by section numbers listed after the assignment.
- 1.6.4 The trainee’s progress will be evaluated with written examinations, practical exercises, practical examinations, oral sessions, mock trials and competency examinations. Passing for a written examination is at least 85% correct responses. Passing for a practical examination is arriving at the expected result.
- 1.6.5 Oral sessions are question and answer sessions that will be conducted throughout the training period. They will be cumulative. There will be two different types of expected responses. First, there will be technical responses. Second, there will also be times where the trainee will need to respond as if speaking to a jury. It will be made clear during the question which type of response is expected. The Oral Session Rubric (DFS form 240-F128 FX-TM Oral Session Rubric) shows the trainee what will be expected of them in these oral sessions. This rubric will be used to evaluate the trainee during the oral sessions.
- 1.6.6 The trainee should provide a monthly written progress report to the TC.

1.7 Instructions to the Training Coordinator

- 1.7.1 As previously stated, the intent of the manual is to provide a guide that will ensure each and every trainee will receive certain basic principles and fundamentals necessary to the complete education of a Forensic Scientist I – NIBIN. All of the listed topics must be incorporated into the program. Some of the topics will strongly suggest an order of events and this ranking should be followed. Any significant deviation from the manual must be approved by the PM.
- 1.7.2 The performance of the trainee will be evaluated during the course of the program. The TC must submit monthly written evaluations, per the Quality Manual (QM), to the PM and Laboratory Director. The TC is to discuss this evaluation with the trainee prior to forwarding it to the PM. Any relevant comments by either the trainee or TC are to be included with the report. A copy of the report will be placed in the training file.
- 1.7.3 The TC is responsible for maintaining the Department’s training program documentation during the training period. Each module in the Training Record (DFS form 240-129 FX-TM FS I NIBIN Training Record) must be initialed and dated upon completion of the specified task. If any task is not completed, for any reason, this must be explained in the training file and approved by the PM.
- 1.7.4 Written and/or oral examination questions for each module will be selected or derived from the study questions and required readings by the TC.
- 1.7.5 The written and/or oral examination will be given in a “closed book” format.

1.8 Mock Trials

- 1.8.1 The TC is responsible for ensuring that the trainee is thoroughly prepared for legal questioning. This can be done by a combination of practice mock trials, impromptu oral sessions, and observation of courtroom testimony given by experienced examiners.
- 1.8.2 The scheduling of practice mock trials is to be done by the TC. These are to be conducted throughout the training period.

1.9 Guidelines for the Competency Examination

1.9.1 Practical Test

The practical test is a mock case, intended to simulate an average case in difficulty and complexity. The test shall be approved by the PM prior to being presented to the trainee.

1.9.2 Technical Final

The technical final examination will be given by the Laboratory's Firearms and Toolmarks Section Supervisor and TC in the presence of the PM and other Department management (as needed) to ascertain the technical knowledge of the individual. This examination will be limited to three (3) hours. After the examination, the TC, PM and relevant management with input from other attendees, will assess the individual's performance. The performance of the individual will be determined to be either satisfactory or unsatisfactory. The trainee must clearly demonstrate sufficient technical knowledge to perform examinations unaided and to draw correct conclusions. If the performance is deemed to be unsatisfactory, the TC, Section Supervisor, PM and Laboratory Director will determine the appropriate action. After satisfactory completion of the technical oral examination, the individual will be subjected to a final mock trial.

1.9.3 Mock Trial

A mock trial will follow the successful completion of the technical final examination. The QM outlines the roles and responsibilities of the participants as well as evaluation and grading guidelines.

1.9.4 Training Documentation

The following shall be maintained and serve as the technical training file:

- written tests
- description of practical exercises, with results as applicable
- copies of the presentations
- competency practical test
- signed and dated Forensic Scientist I – NIBIN Training Record
- monthly training reports

At the completion of the training the technical training file should be retained by the trainee or supervisor and be accessible for internal and external quality audits.

1.10 Transition from Trainee to Examiner

1.10.1 The job of the TC is to ensure that this transition from training to case work takes place as smoothly as possible.

1.10.2 For at least six months all reports must be technically reviewed prior to release by the supervisor or designee.

1.10.3 The supervisor, TC, or designee will accompany and monitor the newly qualified examiner to court for at least the first three times they testify.

1.10.4 The new examiner will complete the DFS Training Evaluation Form per the QM.

1.11 Experienced Personnel

A technical assessment interview will be conducted with new employee, Section Supervisor, TC and PM. The interview will contain questions from each module of this training manual.

1.11.1 Individual Training Plan (ITP)

1.11.1.1 The ITP, see Appendix A for template, will address what additional training is needed for each module. The ITP is written by the TC and approved by the PM and Section Supervisor. If no additional training is required for a specific module the plan must contain documentation related what training the new employee received in the subject matter.

1.11.1.2 At a minimum, the new employee should take a written, oral or practical test for each module.

1.11.2 Training Documentation

See Section 1.9.4

1.11.3 Guidelines for Competency Examination

An experienced examiner shall complete a Practical Test, Technical Final and Mock trial as outlined in this manual for a new examiner.

1.12 Orientation

1.12.1 Before beginning the training program, an orientation of the new employee will include an introduction to the operating facilities and personnel.

1.12.2 The following documents will be covered:

- Quality Manual
- Firearm/Toolmark Procedures Manual
- Forensic Scientist – NIBIN Training Manual

1.12.3 An introduction to the technical capabilities of all regional laboratories, to include the definitions of the regional boundaries and areas of overlap will be discussed.

1.12.4 The outline of the training program and the expectations of both the TC and the trainee will be discussed.

1.12.5 The duties of a Forensic Scientist I – NIBIN , as determined by the classification of the position, will be clarified.

1.12.6 An introduction to the LIMS system will be given.

1.13 Firearms Safety Training

The trainee will be routinely handling a variety of firearms; therefore, it is imperative that the trainee understand how to safely handle a firearm. All firearms must be treated as though they are loaded. This rule cannot be over-emphasized and must be followed at all times.

1.13.1 Safe Firearm Handling

1.13.2 Training Assignments

- Always treat firearms as if they are loaded.
- The muzzle of the firearm must always be pointed in a safe direction.
- Always wear appropriate eye and ear protection when shooting.
- Keep your finger out of the gun's trigger guard and off of the trigger until you have made the decision to fire.
- Always be certain that your target and the surrounding area are safe before firing.

- Test firing or any examination of the firearm that utilizes ammunition or an ammunition component, will only be performed in designated test firing areas.
- A firearm will not be returned to any agency in a loaded condition.

1.13.2.1 Attend a Basic Firearm Safety Course at a local police department, online or complete a comprehensive review of firearm handling and safety with the TC. Discuss the course with the TC and document information learned.

1.13.2.2 Study and become familiar with the DFS Safety Manual and the Firearm/ Toolmark Technical Procedures Manual as it relates to safely handling and test firing firearms.

1.13.2.3 Become familiar with the laboratory bullet recovery tank and firing range with the TC.

1.13.2.4 Review literature and shadow examiners in the laboratory as they prepare case work to become familiar with basic firearm nomenclature and functioning.

1.14 **Modes of Evaluation**

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1.14.1 Oral Session

1.14.2 Written Examination

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2 EVIDENCE HANDLING**2.1 Objectives**

- 2.1.1 For the trainee to understand the fundamentals of evidence security
- 2.1.2 To familiarize the trainee with the chain of custody portion of LIMS

2.2 Modes of Instruction

- 2.2.1 Demonstration by the TC of evidence handling
- 2.2.2 Self-directed study through reading assignments and study questions

2.3 Assignments

- 2.3.1 Completion of required reading assignments (2.6)
- 2.3.2 Study questions
- 2.3.3 Practical exercises

2.4 Study Questions

- 2.4.1 Explain the parallel chain of custody documentation methods used by the Department.
- 2.4.2 Define a proper seal.
- 2.4.3 What is the proper way to mark evidence?
- 2.4.4 Who has access to the main evidence storage room in the section? Your personal locker?
- 2.4.5 Who has access to your work area?
- 2.4.6 Describe the procedures for access to your locker in your absence.
- 2.4.7 Explain the lock box procedure.
- 2.4.8 Explain how to handle evidence which also needs a latent print analysis.
- 2.4.9 Explain how to handle evidence which also needs a DNA analysis.
- 2.4.10 Define the following terms:
 - chain of custody
 - lock box
 - evidence seal
 - convenience packaging
 - RFLE
 - FS Lab #
 - LIMS
- 2.4.11 What is the typical pathway that an item of evidence goes through from the time it enters DFS to the time it is returned to the agency?
- 2.4.12 Discuss with your TC the standards regarding chain of custody as they relate to the QM and the Firearm /Toolmark Technical Procedures Manual.

2.4.13 Demonstration of proper chain of custody practices with the TC.

2.5 Mode of Evaluation

Written Examination

2.6 References

2.6.1 Quality Manual, Section 14 and 15

2.6.2 Firearm/ Toolmark Technical Procedures Manual

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3 REPORT WRITING, EXPERT TESTIMONY, AND PROFESSIONALISM

3.1 Objectives

- 3.1.1 To become familiar with the QM in regards to note taking, chain of custody and report writing.
- 3.1.2 To become familiar with the Firearm /Toolmark Technical Procedures Manual in regards to note taking, chain of custody and report writing.
- 3.1.3 To become familiar with the LIMS.
- 3.1.4 To become familiar with technical and administrative review of case files.
- 3.1.5 To become proficient at presenting findings in court.

3.2 Modes of Instruction

- 3.2.1 Self-directed study through study questions and practical exercises
- 3.2.2 Observations

3.3 Assignments

- 3.3.1 Define the following:
 - Expert witness
 - Opinion
 - Voir dire
 - Ethics
 - Bias
 - Forensic science
- 3.3.2 What is the CSI Effect and how has it impacted forensic expert testimony?
- 3.3.3 Discuss non-verbal cues and delivery influences on expert credibility.
- 3.3.4 Discuss evidence packaging and marking criteria as listed in the QM.
- 3.3.5 Discuss the general examination documentation requirements in the QM and the Firearm / Toolmark Procedures Manual.
- 3.3.6 What is the standard for admissibility of expert testimony in Virginia and how would that differ from Federal Court?

3.4 Practical Exercises

- 3.4.1 Discuss with your TC the standards regarding note taking, chain of custody and report writing as they relate to the QM and the Firearm / Toolmark Technical Procedures Manual.
- 3.4.2 Discuss with your TC the standards regarding file maintenance and location and courtroom testimony monitoring as they relate to the QM.
- 3.4.3 Read through copies of reports generated by examiners to familiarize yourself with report formats and phraseology.
- 3.4.4 Discuss with your TC the operation of local, state and federal law enforcement agencies and court systems.

- 3.4.5 When possible, observe examiners testifying; discuss with your TC their demeanor and professionalism.
- 3.4.6 Confer with other examiners regarding personal hints and recommendations in regards to courtroom testimony.
- 3.4.7 Using current ASCLD/LAB criteria and the Department's QM and Section Procedures manual, discuss with your TC how the laboratory meets the accreditation standards.
- 3.4.8 Prepare a list of "qualification questions" which can be used by the prosecutor to qualify you as an expert witness. Discuss with your TC.
- 3.4.9 Discuss with the TC the laboratory policy regarding the reexamination of evidence.
- 3.4.10 Discuss with the TC the laboratory policies regarding the following:
 - Providing verbal results prior to issuance of a final laboratory report
 - Inquiries from the press and other media
 - Providing a laboratory report to other agencies and Medical Examiner
 - The Department's subpoena policy (to include, civil, federal, and state courts)
 - The Department's policies on case file check out; SDT for notes; FOIA requests; taking cases to court; providing copies of notes to attorneys; deposition requests
- 3.4.11 Discuss with the TC the Department's proficiency testing program as it relates to the Firearm/Toolmark section and be able to discuss this topic.
- 3.4.12 The trainee should document the review of at least five case files using the appropriate Technical Review Form. Case files should be generated by multiple examiners, if possible. The potential findings of the reviews shall be discussed with the TC. Technical Review forms generated in this capacity shall be marked as Training and retained in their Training File. The case files shall be technically reviewed by an authorized examiner pursuant to QM 17 prior to release.
- 3.4.13 Complete an ASCLD/LAB-*International* Audit Trail Worksheet on at least one case.
- 3.4.14 Complete required reading assignments (3.6.1-3.6.26)
- 3.4.15 Complete a technical interview, mock case and mock trial

3.5 Modes of Evaluation

- 3.5.1 Practical Exercises
- 3.5.2 Oral Sessions

3.6 References

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- 3.6.22 Quality Manual – Section 17 Monitoring Results
- 3.6.23 Firearms and Toolmarks Procedure Manual Sections, referring to Examination Documentation
- 3.6.24 DFS Document 100-F111 Technical Review Form
- 3.6.25 ASCLD/LAB-*International* Supplemental Requirements for Accreditation of Forensic Science Testing Laboratories (2011)
- 3.6.26 ISO/IEC 17025:2005 – accessible through DFS Intranet

4 INSTRUMENTATION

4.1 Objective

To make the trainee proficient in the use of the equipment used in the firearm/toolmark laboratory

4.2 Modes of Instruction

4.2.1 Self-directed study questions and practical exercises

4.2.2 Observations

4.3 Assignments

4.3.1 Completion of required reading assignments and PowerPoint presentations (4.7.1 – 4.7.6)

4.3.2 Study questions

4.3.3 Practical exercises

4.4 Study Questions

4.4.1 What are the major characteristics of a stereo microscope?

4.4.2 Describe the laboratory's QA procedures that are in place to ensure that your stereomicroscope and other applicable equipment are performing up to specifications.

4.5 Practical Exercises

4.5.1 Familiarize yourself with the various brands of stereo microscopes. Discuss with your TC how to performance check the stereo microscopes.

4.5.2 Demonstrate the use of the equipment and, as applicable, how to ensure the equipment is in proper working condition.

- Inertial bullet puller
- Remote Firing Device
- Sonicator

4.6 Modes of Evaluation

4.6.1 Practical Exercises

4.6.2 Oral Session

4.7 References

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4.7.5 Microscopy PowerPoint Presentation

4.7.6 Remote Firing Device instructional videos and instructional handout

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5 AMMUNITION

5.1 Objective

To become knowledgeable about the historical developments and current manufacture of gunpowder and ammunition components.

5.2 Modes of Instruction

5.2.1 Self-directed through reading assignments, training assignments, study questions and practical exercises

5.2.2 Observations

5.3 Historical Development of Ammunition

5.3.1 NIJ Firearms Examiner Training on-line Module 3 (Propellants, Ammunition and Firearms Development) and Module 5 (Small Arms Ammunition)

5.3.2 Describe the development of ammunition up to the advent of and including metallic cartridges. Include, at a minimum, the following milestones: rimfire, centerfire, Berdan primers and cases, Boxer primers and cases.

5.4 Ammunition Components

5.4.1 Define with the following terms from the current version of the AFTE Glossary:

- | | | |
|---------------|--------------|------------------|
| • Ammunition | • Flash hole | • Rimfire |
| • Anvil | • Gauge | • Shot |
| • Battery cup | • Grain | • Shot cartridge |
| • Blank | • Gunpowder | • Shot collar |
| • Brass | • Headspace | • Shot column |
| • Buckshot | • Headstamp | • Shot cup |
| • Buffer | • Obturation | • Shotshell |
| • Bullet | • Pellet | • Shotshell case |
| • Bunter | • Primer | • Slug |
| • Cartridge | • Projectile | • Wad |
| • Downloading | • Propellant | |

5.4.2 Using the provided items of ammunition describe the following for each item using terms from the current version of the AFTE Glossary:

- Type of cartridge (ex. centerfire/rimfire, rimmed, rimless, etc.)

5.5 Caliber/Gauge

5.5.1 Using the laboratory's ammunition reference collection, look at cartridges in each of the calibers and note their design differences.

- | | | |
|-----------------|----------------------|----------------------|
| • 22 Short | • 32 Colt New Police | • 38 S&W Long |
| • 22 Long | • 380 Auto | • 38 Colt New Police |
| • 22 Long Rifle | • 9mm Luger | • 38 Short Colt |
| • 32 Auto | • 9mm Makarov | • 38 Long Colt |
| • 32 S&W | • 38 Special | • 10 mm Auto |
| • 32 S&W Long | • 357 Magnum | • 40 S&W |
| • 32 H&R Magnum | • 357 SIG | • 44 Magnum |

- 32 Short Colt
- 32 Colt New Police
- 38 S&W Long
- 38 Colt New Police
- 45 GAP
- 45 Colt

5.5.2 Compare the following cartridges and describe their interchangeability:

- 45 Auto and 45 GAP
- 10 mm Auto and 40 S&W
- 44 Magnum and 44 Special
- 9mm Luger and 357 SIG
- 357 Magnum, 38 Special, and 38 S&W
- 9mm Luger, 380 Auto, and 9mm Makarov
- 32 S&W and 32 Auto

5.5.3 Using the laboratory's ammunition reference collection, look at cartridges in each of the calibers and note their design differences.

- 30-30 Winchester
- 30-06 Springfield
- 270 Winchester
- 30 Carbine
- 5.56 NATO
- 7.62 x 39 Soviet
- 308 Winchester
- 223 Remington

5.5.4 What is the bore diameter of the following firearms?

- 10 gauge shotgun
- 12 gauge shotgun
- 16 gauge shotgun
- 20 gauge shotgun
- 28 gauge shotgun
- 410 bore shotgun

5.5.5 Define caliber.

5.5.6 Give an example of a caliber designation and explain where it originated from.

5.5.7 List the metric equivalents of the following cartridges: 223 Remington, 25 Auto, 32 Auto, 380 Auto, 9mm Luger, 9mm Makarov.

5.5.8 What does the designation "30" in caliber 30-30 Winchester and 30-06 Springfield indicate?

5.5.9 What do the numerical designations in 7.62 x 39mm each refer to?

5.5.10 What are the differences between 22 Short, 22 Long, and 22 Long Rifle cartridges?

5.5.11 What is a 9mm Corto? 9mm Kurz?

5.6 Modes of Evaluation

5.6.1 Practical Exam

The trainee will receive a plastic bag containing twenty smaller plastic bags each holding a cartridge or single cartridge case. The trainee should be able to determine the following as applicable:

- manufacturer, caliber, bullet load/design of each cartridge
- manufacturer and caliber of each cartridge case

5.6.2 Oral Session

5.6.3 Written exam

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- 5.7.10 Klatt, P., "American Rimfire Cartridges Part II," American Rifleman, June 1981, pp. 48-51.
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- 5.7.13 NRA Firearms Fact Book Third Edition, National Rifle Association of America, Washington, D.C., 1989, pp. 51-56, 65-70.
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- 5.7.16 Taylor, J., Shotshells & Ballistics, Safari Press, Inc., Long Beach, CA, 2003, pp. 25-38.
- 5.7.17 Wallace, J.S., "Chemical Aspects of Firearms Ammunition," AFTE Journal, 1990; 22(4): 364-375.
- 5.7.18 Forker, B., "The 7.62x39," Guns & Ammo, Sept. 2007, pp. 36-38.

6 FIREARMS**6.1 Objectives**

- 6.1.1 Trainee will be able to explain the mechanisms of function and safety features on a variety of firearms.
- 6.1.2 Trainee will be able to disassemble, reassemble, and test fire a variety of firearms.
- 6.1.3 Trainee will be able to restore inoperable firearms to mechanical operating condition.
- 6.1.4 Trainee will be able to discuss a variety of common mechanical malfunctions encountered in the examinations of firearms.

6.2 Modes of Instruction

- 6.2.1 Self-directed through reading assignments (all references listed in 6.13 are required reading), study questions and practical exercises.
- 6.2.2 Observations

6.3 Examination of Firearms – Study Questions

- 6.3.1 Define the following terms using the current version of the AFTE Glossary:

- Revolver
- Pistol
- Rifle
- Shotgun
- Semiautomatic
- Automatic
- Derringer
- Muzzleloader
- Percussion firearm
- Bolt-action
- Slide (pump) action
- Single shot
- Submachine gun
- Machine gun
- Assault rifle

- 6.3.2 Define the following terms from the current version of the AFTE Glossary:

- Action
- Barrel
- Bore
- Breech
- Breechface
- Butt
- Chamber
- Crown
- Discharge/Fire
- Double Action
- Dry firing
- Ejection
- Extraction

- Firearm
- Firing pin
- Firing pin aperture
- Frame
- Function testing
- Grip
- Grooves
- Hammer
- Hammerless
- Handgun
- Hybrid Action
- Mainspring
- Muzzle
- Safety mechanism
- Sear
- Sights
- Single action
- Test fire
- Trigger
- Trigger bar
- Trigger group
- Trigger guard
- Trigger pull

6.3.3 Do all firearms have a serial number? Why or why not?

6.4 Revolvers – Study Questions

6.4.1 Define the following terms from the current version of the AFTE Glossary:

- Crane
- Cylinder
- Cylinder Gap
- Cylinder alignment
- Ejector Rod
- Forcing Cone
- Yoke
- Sear notch
- Sear spring
- Side plate
- Loading gate
- Recoil shield
- Hammer Notch
- Hammer Shroud
- Hammer Spur
- Rebound slide
- Hammer block
- Transfer bar

6.4.2 Discuss with the TC how the following safeties function and how to check their function:

- Hammer block
- Safety notch/quarter cock, half cock
- Rebounding hammer

- Transfer bar
- Key lock

- 6.4.3 Explain the cycle of fire as it relates to single/double action revolvers.
- 6.4.4 What does the direction of cylinder stop notches on a revolver indicate?
- 6.4.5 What is a top break revolver?
- 6.4.6 Of Colt, Smith & Wesson, and Ruger; which manufacturer does not use a side plate?

6.5 Revolvers – Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload the firearms listed. Demonstrate these safety techniques to the instructor.

Document each firearm on a firearm worksheet. Obtain a copy of an exploded drawing of each of the firearms listed below. Choose appropriate ammunition. Label and maintain the ammunition components produced as a result of the following examinations. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection.

R.G. Industries model RG23, caliber 22 Long Rifle

- Test fire two (2) 22 Long Rifle cartridges in single action

Ruger New Model Single-Six, caliber 22 Magnum

- Test fire two (2) 22 Magnum cartridges

Iver Johnson model Top Break, caliber 32 Smith & Wesson

- Test fire two (2) 32 S&W cartridges
- Test fire two (2) 32 Auto cartridges

Smith & Wesson model 686, caliber 357 Magnum

- Test fire two (2) 357 Magnum cartridges
- Test fire two (2) 38 Special cartridges
- Detail Strip

Colt model Lawman, caliber 357 Magnum

- Test fire two (2) 38 Special cartridges

Ruger model Security Six, caliber 357 Magnum

- Test fire two (2) 38 Special cartridges

6.6 Pistols – Study Questions

- 6.6.1 Discuss with the TC the following types of semi-automatic pistols and list several examples of firearms using these mechanisms.

- Blowback action
- Delayed blowback action
- Gas delayed blowback action
- Gas operated
- Short recoil action

- 6.6.2 Define the following terms using the current version of the AFTE Glossary:

- Backstrap

- Chamber
- Front Strap
- Ejector
- Ejection port
- Extractor
- Feed ramp
- Magazine
- Magazine floorplate
- Receiver
- Take down
- Barrel lug
- Inertia firing pin
- Striker
- Magazine follower
- Magazine spring
- Magazine well
- Recoil spring
- Recoil spring guide
- Slide
- Slide Stop

6.6.3 Discuss with the TC how the following safeties function and how to check their function:

- Grip safety
- Magazine safety
- Thumb/manual safety
- Decocker
- Trigger safety
- Disconnect
- Cocking indicator
- Loaded chamber indicator
- Firing pin block
- Key

6.6.4 Explain the cycle of fire for a semiautomatic pistol.

6.6.5 Where are the serial number locations for Glock, Taurus, Ruger, Hi-Point, and Smith & Wesson pistols?

6.6.6 Name some pistol manufacturers that use hidden serial numbers.

6.6.7 Describe how to perform a function check on a pistol with an exposed hammer versus a striker fired pistol.

6.6.8 Describe the differences between Smith & Wesson model Sigma series and Glock pistols.

6.7 Pistols – Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload the firearms listed. Demonstrate these safety techniques to the instructor.

Document each firearm on a firearm worksheet. Obtain a copy of an exploded drawing of each of the firearms listed below. Choose appropriate ammunition. Label and maintain the ammunition components produced as a result of the following examinations. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection.

- 6.7.1 Trainee will receive five fired cartridge cases and complete the documentation of the extractor and ejector position, class characteristics on the firearm worksheet and determine NIBIN suitability.

Ruger model MKII, caliber 22 Long Rifle

- Test fire two (2) 22 Long Rifle LRN cartridges
- Field Strip

Phoenix Arms model HP 22, caliber 22 Long Rifle

- Test fire two (2) 22 Long Rifle cartridges

Jennings model J-22, caliber 22 Long Rifle

- Test fire two (2) 22 Long Rifle cartridges
- Field strip

Davis Industries model D22, caliber 22 Long Rifle derringer

- Test fire two (2) 22 Long Rifle cartridges

Beretta model 950BS, caliber 25 Auto

- Test fire two (2) 25 Auto cartridges
- Field strip

Raven model P-25 or MP-25, caliber 25 Auto

- Test fire two (2) 25 Auto cartridges
- Field strip

Bersa model Thunder 380, caliber 380 Auto

- Test fire two (2) 380 Auto PMC FMJ cartridges

Ruger model LCP, caliber 380 Auto

- Test fire two (2) 380 Auto cartridges

Walther model PPK, caliber 380 Auto

- Test fire two (2) 380 Auto cartridges

Baikal model IJ-70, caliber 9mm Makarov

- Test fire two (2) 9mm Makarov cartridges
- Test fire two (2) 380 Auto cartridges

Beretta model 92, caliber 9mm Luger

- Test fire two (2) 9mm Luger cartridges
- Field strip

Intratec model Tec-9, caliber 9mm Luger

- Test fire two (2) 9mm Luger cartridges
- Field strip

Jimenez Arms model J.A. Nine, caliber 9mm Luger

- Test fire two (2) 9mm Luger cartridges
- Become familiar with limitations of the magazine safety for this firearm

Hi-Point model C9, caliber 9mm Luger

- Test fire two (2) 9mm Luger cartridges
- Test fire two (2) 380 Auto cartridges
- Field strip

Ruger P-series, caliber 9mm Luger

- Test fire two (2) 9mm Luger cartridges

Glock model 31, caliber 357 SIG

- Test fire two (2) 357 SIG cartridges
- Field strip

Ruger model SR40c, caliber 40 S&W

- Test fire in remote firing device two (2) 40 S&W cartridges

Smith & Wesson model SD40VE, caliber 40 S&W

- Test fire two (2) 40 S&W Speer cartridges
- Field Strip

Springfield Armory model XD-40, caliber 40 S&W

- Test fire two (2) 40 S&W cartridges

Smith & Wesson model 1006, caliber 10 mm Auto

- Test fire two (2) 40 S&W cartridges
- Test fire two (2) 10mm Auto cartridges

IMI/Magnum Research model Desert Eagle, caliber 357 Magnum

- Test fire two (2) 357 Magnum cartridges

Colt model 1911A1, caliber 45 Auto

- Test fire two (2) 45 Auto cartridges
- Field strip

Taurus model PT 145 Millennium Pro, caliber 45 Auto

- Test fire two (2) 45 Auto cartridges
- Field strip

Heckler & Koch Model USP, caliber 45 Auto

- Test fire two (2) 45 Auto PMC cartridges

6.8 Rifles – Study Questions

6.8.1 Define the following actions and provide an example of a firearm which uses each mechanism:

- Blowback
- Gas operated (to include direct impingement and gas piston)
- Bolt action
- Lever action

6.8.2 Define the following terms:

- Long gun
- Carbine
- Rifle
- Mannlicher Type Bolt
- Mauser Type Bolt
- Stock
- Stripper Clip
- Rotary magazine
- Drum magazine

- Machine gun
- Rotating bolt
- Muzzle flash
- Muzzle break
- Flash suppressor

- 6.8.3 Explain the difference between push feed and control feed.
- 6.8.4 Why can only blunt-nose bullets be used in tubular magazines?
- 6.8.5 What is selective fire?
- 6.8.6 What does it mean to fire from an open bolt?
- 6.8.7 Describe the differences between an AK-47 and SKS.
- 6.8.8 Describe how to perform a function check on a lever action rifle.

6.9 Rifles – Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload the firearms listed. Demonstrate these safety techniques to the instructor.

Document each firearm on a firearm worksheet. Obtain a copy of an exploded drawing of each of the firearms listed below. Choose appropriate ammunition. Label and maintain the ammunition components produced as a result of the following examinations. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection.

Winchester model 94 caliber 30-30 Winchester

- Test fire two (2) 30-30 Winchester cartridges

Savage model 340 Series E caliber 30-30 Winchester

- Test fire two (2) 30-30 Winchester cartridges using the remote firing device

Norinco Type 56S (or other AK-type) caliber 7.62x39mm

- Test fire two (2) 7.62x39mm Wolf FMJ cartridges

Norinco model SKS rifle (or other SKS-type) caliber 7.62x39mm

- Test fire two (2) 7.62x39mm cartridges

Colt model HBAR rifle (or other M16/AR15 type) caliber 223 Remington

- Test fire two (2) 223 Remington cartridges
- Test fire two (2) 223 Remington cartridges using the remote firing device
- Field strip

Ruger model Mini-14 caliber 223 Remington

- Test fire two (2) 223 Remington cartridges

6.10 Shotguns – Study Questions

6.10.1 Define the following actions and provide an example of a firearm which uses each mechanism:

- Pump action
- Long recoil
- Break open

6.10.2 Define the following terms:

- Forearm
- Forend
- Shotgun
- Double barrel shotgun
- Over/under shotgun
- Side by side shotgun
- Nonselective single trigger
- Single - Double trigger
- Cartridge stop
- Barrel selector
- Automatic safety
- Inertia block
- Recoil pad
- Combination gun
- Pistol grip

6.10.3 Describe magazine cut off and its purpose.

6.10.4 Describe magazine plug and its purpose.

6.10.5 Describe the function of the front trigger and back trigger in a break open shotgun.

6.10.6 Describe how a gas operated shotgun can malfunction and how the malfunction can be fixed?

6.11 Shotguns – Practical Exercises

Observe an instructor demonstrate how to safely handle, load, and unload the firearms listed. Demonstrate these safety techniques to the instructor.

Document each firearm on a firearm worksheet. Obtain a copy of an exploded drawing of each of the firearms listed below. Choose appropriate ammunition. Label and maintain the ammunition components produced as a result of the following examinations. Have an instructor function check all firearms before test firing and returning them to the firearm reference collection.

Harrington & Richardson Topper Model 158, 12 gauge (shortened barrel)

- Test fire in remote firing device two (2) 12 gauge shotshells

Savage Stevens model 311E, 410 bore, side by side

- Test fire two (2) 410 shotshells

Remington model 1100, 12 gauge

- Test fire two (2) 12 gauge shotshells

Browning model Light Twelve or Auto 5, 12 gauge

- Test fire two (2) 12 gauge shotshells

Remington model 870, 12 gauge

- Test fire two (2) 12 gauge shotshells
- Field strip

Mossberg model 500A, 12 gauge

- Test fire two (2) 12 gauge shotshells

Ithaca model 37R Featherlight, 16 gauge (shortened barrel)

- Test fire in remote firing device two (2) 16 gauge shotshells

6.12 Mode of Evaluation

6.12.1 Oral Sessions

6.13 References

6.13.1 Historical Development of Firearms

NFSTC "Evolution of Firearms". This course of instruction may be found at <http://projects.nfstc.org/firearms/>

Peterson, H.L., "The Development of Firearms," American Rifleman, Parts 1 and 2, Mar. and Apr., 1960.

Smith, W.H.B., Small Arms of the World, 10th revised edition: (p. 15-38)

NRA Firearms Fact Book, 3rd edition, National Rifle Association, Fairfax, VA, 1989. (p. 31-46)

6.13.2 Firearms Examination

Virginia Department of Forensic Science Firearm/Toolmark Procedures Manual – Physical Examination and Classification of Firearms.

Dutton, G., "Firearms Safety in the Laboratory," AFTE Journal, Vol. 29, No. 1, Winter 1997, pp. 37-41.

6.13.3 Revolvers

NFSTC "Examination of Firearms – Handguns – Single Action Revolvers and Double Action Revolvers". This course of instruction may be found at <http://projects.nfstc.org/firearms/>

Berg, S.O., "History of Revolver Safeties," AFTE Journal, 1982; 14(4): 29.

6.13.4 Pistols

Greenspan, A., "The Case of the Unsafe Magazine Safety," AFTE Journal, 1999, 31(3): 379-381.

Ayoub, M., "Handguns," Guns Magazine, February 2001: 16.

6.13.5 Testing Problem Firearms

Voth, A., "Testing a Ruptured Shotgun Barrel," AFTE Journal, Vol. 29, No. 2, Spring 1997, pp. 188-189.

6.13.6 Obstructions and Fractures

Berg, S., "Rifle Barrel Obstruction Tests and Experiments," AFTE Journal, Vol. 23, No. 4, October 1991, pp. 951-957.

Edwards, R., "Circumferential Fractures," AFTE Journal, Vol 23, No. 3, Summer 1991, pp. 806-807.

Ben-Moshe, T., Giverts, P., Hocherman, G., and Schecter, B. "Cracks Observed in Glock Pistols," AFTE Journal, Vol. 42, No. 1, Winter 2010, pp. 74-76.

Kloppers, B., "Unusual Barrel Obstruction," AFTE Journal, Vol. 32, No. 4, Fall 2000, pp. 359-360.

French, M., "Obstructed Barrel Tests Using 25 Caliber Pistols," AFTE Journal, Vol. 33, No. 1, Winter 2001, pp. 58-59.

6.13.7 Accidental Discharge and Design Problems

Horn, A., Amberger, R., "Firearm Safety Warning for Bryco Arms model Jennings Nine," AFTE Journal, Vol. 33, No. 2, Spring 2001, pp. 145-147.

Chenow, R., "False Half Cock Position in Semiautomatic Handguns," AFTE Journal, Vol. 9, No. 2, pp. 179.

Robinson, M., "Raven Pistol Firing Out of Battery," AFTE Journal, Vol. 20, No. 2, April 1988, pp. 207-208.

Flaskamp, J., "Sympathetic Firing in a Rohm RG10 Facilitates an Identification," AFTE Journal, Vol. 38, No. 4, Fall 2006, pp. 359-361.

Lipscomb, J., Harden, L., "Evaluating Trigger Mechanisms for Sensitivity to Shock," AFTE Journal, Vol. 17, No. 4, pp. 4.

Kosachevsky, P., Siso, R., "FN Pistol Accidental Discharge Due to Magazine Safety Mechanism Bypass," AFTE Journal, Vol. 46, No. 1, Winter 2014, pp. 76-79.9.11.9.35

Wolslagel, P., "Case Report: Accidental Discharge Potential of Lorcin, Bryco, and Related Pistols," AFTE Journal, Vol. 33, No. 1, Winter 2001, pp. 48-49.

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7 NIBIN

7.1 Objectives

- 7.1.1 To attend and successfully complete the BATF/FTI NIBIN System Training Course
- 7.1.2 To become proficient in NIBIN entries and NIBIN correlation reviews

7.2 Modes of Instruction

- 7.2.1 Completion of the BATF/FTI NIBIN System Training Course
- 7.2.2 Self-directed study questions and practical exercises
- 7.2.3 Observations

7.3 Assignments

- 7.3.1 Complete NIBIN System pre-course material
- 7.3.2 Study and become familiar with the NIBIN training guide
- 7.3.3 Study questions
- 7.3.4 Practical exercises

7.4 Study Questions

- 7.4.1 Describe (briefly) the history of the NIBIN program.
- 7.4.2 What is IBIS and how does it relate to the NIBIN program?
- 7.4.3 Describe the different components of the IBIS System and how they are used.
- 7.4.4 Describe the proper orientation for NIBIN entry for the following
 - Centerfire: Parallel BFM
 - Centerfire: Arched BFM
 - Centerfire: Circular/Granular BFM
 - Rimfire: Circular FPI
 - Rimfire: Rectangular FPI
- 7.4.5 What is the procedure for documenting and reporting a potential NIBIN association?

7.5 Practical Exercises

- 7.5.1 Trainee will review 10 correlation results of cases entered by other examiners.
- 7.5.2 Trainee will enter 10 cases, review the correlation results and have the results verified by a qualified examiner.

7.6 Modes of Evaluation

- 7.6.1 Practical Exercises
- 7.6.2 Oral Session

7.7 References

7.7.1 IBIS BrassTrax User Guide

7.7.2 IBIS Matchpoint User Guide

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Appendix A - Individual Training Plan (ITP) Template

For each section listed below include the following information:

- List previous documented training received
- Provide detailed plan, including assignments, exercises, exams and presentations to be completed with dates, for each section.

The objectives listed in the Forensic Scientist I – NIBIN Training Manual should be used as a guide for questions during the assessment to determine the individual’s knowledge level.

Quality Manual/Firearms Safety
Evidence Handling
Report Writing, Expert Testimony, and Professionalism
Instrumentation
Ammunition
Firearms
NIBIN

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The expected completion date of this training plan is _____.

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