Fracture Match – Physical Fit Training Guide

Objectives

Through completion of this module the trainee will have developed and demonstrated theoretical knowledge and/or practical skills to:

- Describe the difference between class and individual characteristics;
- Describe how a fracture match may be made and why it is considered conclusive that the two objects were at one time a part of the same unit;
- document a positive fracture match; and,
- Write reports for positive fracture matches and negative fracture matches where additional testing has been or will be completed.

Skills Required

- Use of stereomicroscope
- Correct evaluation of characteristics observed on fractured edges
- Ability to produce, through photographic methods a representative record of the match comparison microscopically or macroscopically
- Proper note taking techniques
- Proper methods for marking evidence

Training Steps

- Read and compile literature (using and adding to the current reading list).
- The trainee will cut, tear, break and compare the following samples:
    - Wood
    - Metal (soft and hard)
    - Glass
    - Tapes
    - Plastic bags
    - Plastic
    - Paper matches
- The trainee will note class characteristics and compare unique characteristics including, but not limited to:
    - Incidental striations or scratches
    - Irregular fracture edges
    - Inclusions
    - Cross-sectional contours (valleys and ridges)
    - Extrusion markings
    - Conchoidal stress lines and hackle marks
- Note and compare distortions and their effect on a physical match.
- Photograph physical matches by macroscopic and microscopic methods.

Reading List

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- Christophe, Deion P. and Cecil Daniels, "An Unusual Technique for Physical Match Comparison," AFTE Journal, 2008; 40(4): 396-398.
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- Striupaitis, P., "Physical Fit Public Utility Cable," AFTE Journal, 1981; 13(4):48-49.
- Swanepoel, Jaco, "Physical Matching as Duties of a Firearms and Toolmark Examiner," AFTE Journal, 2007; 39(3): 224-235.
- Townshend, D.G., "Identification of Fracture Marks," AFTE Journal, 1976; 8(2):74-75.
- Trace Evidence Procedure Manual, Virginia Department of Forensic Science, Section 5: Fracture Match, Issue Date January 9, 2012, pages 63-65.

- Van Hoven, H.A. and H. D. Fraysier, "The Matching of Automotive Paint Chips by Surface Striation Alignment", Journal of Forensic Sciences, Vol. 28, No. 2. 1983. pp. 463-67.
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Questions

The trainee will provide written answers to the following questions:

- What is a class characteristic?
- What is an individual characteristic?
- What physical characteristics are commonly used in fracture match comparisons?
- Is a fracture match considered to be a conclusive identification? Why?

Practical Exercises

The trainee will be given at least five mock cases and will be required to work the cases as if they were real. An accuracy of 100% will be required. Laboratory reports will be prepared in each case. The mock cases will include at least:

- test samples of broken tools and will be asked to fracture match the pieces, if possible;
- test samples of tape and will be asked to fracture match the pieces, if possible; and
- test samples broken of broken firearm grips and will be asked to fracture match the pieces, if possible.

Evaluation

- The trainer will review the written answers to the questions with the trainee.
- The trainer and the trainee will review and discuss the pertinent points of each of the required readings.
- Review of practical exercises.

Forensic Significance of Fracture Matches

The trainer and the trainee will discuss the interpretation of fracture match evidence and its relevance and weight in reports and in testimony.

Report Writing

- The trainer will review and discuss with the trainee the standard report wording in the Fracture Match section of the Trace Evidence Standard Operating Procedures.

- The trainer will provide five cases previously examined by other qualified forensic examiners for the trainee to review and discuss with the trainer.
- The trainee will draft report wording as a part of the analysis of their training sets as well as when performing supervised casework.
- Report writing will be evaluated throughout the training period by the trainer.

Competency Evaluation and Moot Court

The trainee will successfully complete at least one fracture match as a part of their subdiscipline competency test and will defend their results as a part of their moot court in that subdiscipline.

Supervised Casework

The trainee will work as many forensic cases as are available during the training period as a technician for a qualified forensic examiner.

Issue Date	History
06/01/2012	Original Issue

Approval

Director _____ Date:
Matthew C. Mathis

Chief Criminalist _____ Date:
Todd J. Nordhoff

Jeffrey S. Taylor

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