Standard for Examining Friction Ridge Impressions

Friction Ridge Subcommittee
Physics/Pattern Scientific Area Committee
Organization of Scientific Area Committees (OSAC) for Forensic Science

OSAC Proposed Standard

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Organization for Scientific Area Committees (OSAC) for Forensic Science

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Disclaimer:

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This document has not been published by a SDO. Its contents are subject to change during the standards development process. All stakeholder groups or individuals are strongly encouraged to submit comments on this proposed document during the open comment period administered by the Academy Standards Board (ASB).

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1. Introduction

1.1. This document has been developed with the objective of improving the quality and consistency of friction ridge examination practices.

1.2. The examination of friction ridge impressions is conducted in accordance with a methodology consisting of Analysis, Comparison, and Evaluation. Analysis is the interpretation of observed data in a friction ridge impression in order to categorize its utility. Comparison is the search for and detection of similarities and differences in the observed data between two potentially corresponding friction ridge impressions. Evaluation is the weighting of the aggregate strength of the observed similarities and differences between the observed data in the two friction ridge impressions in order to formulate a source conclusion.

1.3. In this document, the following verbal forms are used: "*shall*" indicates a requirement, "*should*" indicates a recommendation; "*may*" indicates permission; and "*can*" indicates a possibility or capability.

2. Scope

2.1. This document specifies the minimum requirements for conducting friction ridge examinations. It includes the overarching examination framework as well as specific requirements for each component of any examination methodology. This document includes minimum requirements for conducting, documenting, and justifying examinations based on clearly demonstrable and articulable criteria.

2.2. This document does not address specific requirements for quality assurance / quality control of the examination methodology.

3. Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1. Analysis (phase of the Examination methodology): The interpretation of observed data in a friction ridge impression in order to categorize its utility.

3.2. Comparison (phase of the Examination methodology): The search for and detection of similarities and differences in observed data between two potentially corresponding friction ridge impressions.

3.3. Complexity (of a Comparison): A characteristic of a comparison in which the attributes of one or both impressions may require additional consideration and quality control measures as it relates to the evaluation of a source conclusion. Comparisons can be designated as high complexity, low complexity, or non-complex.

3.4. Complexity (of an Impression): A characteristic of an impression whose attributes may require additional consideration and quality control measures. Impressions can be designated as high complexity, low complexity, or non-complex.

3.5. Evaluation (phase of the Examination methodology): The weighting of the aggregate strength of the observed similarities and differences between the observed data in the two friction ridge impressions in order to formulate a source conclusion.

3.6. Examination: The act or process of observing, searching, detecting, recording, prioritizing, collecting, analyzing, measuring, comparing, and/or interpreting.

3.7. Exemplar Impression: An impression to which a questioned impression is compared; it can include impressions from an unknown source or a known source.

3.8. Forensic Service Provider (FSP): A forensic science entity or forensic science practitioner providing forensic science services.

3.9. Friction Ridge Detail/Features: The combination of ridge flow, ridge characteristics, and ridge structure of friction ridge skin, as observed and reproduced in an impression. A large subset of the observed data used to compare and interpret similarity or dissimilarity between two impressions.

3.10. High Quality Impression: An impression with observed data that are unambiguous and self-evident due to high clarity and quantity.

3.11. Interpretation: Explanations for the observations, data, and calculations.

3.12. Observed Data: Any demonstrable information observed within an impression that an examiner relies upon to reach a decision, conclusion, or opinion. This has historically been expressed as “features” or “minutiae,” but the use of the broader term “observed data” is inclusive of other types of data that may be considered beyond minutiae, such as quality, scars, creases, edge shapes, pore structure, and other friction ridge features.

3.13. Questioned Impression: An impression used for comparison against an exemplar impression; it can include impressions from an unknown source or a known source.

3.14. Suitability for Comparison Decision (Suitability for Source Conclusions): A decision made by an examiner in accordance with FSP policy and/or procedure, that a friction ridge impression contains sufficient observed data to be utilized for comparison and a Source Conclusion can potentially be reached. This designation is often referred to as “suitable for comparison” or “of value for comparison”.

3.15. Utility: The usefulness of an impression for a further step in the examination process, such as comparison or Automated Biometric Identification System entry.

4. General Requirements

4.1. Analysis

4.1.1. The FSP shall define the observed data examiners may use during the examination of friction ridge impressions. The observed data that the FSP may consider include:

4.1.1.1. Size and shape of the impression: the (surface area) and the outline of the impression border

4.1.1.2. Classification patterns: the presence, size, and shape of defined classifiable patterns present in the friction ridge skin (e.g. arch, loop, whorl).

4.1.1.3. Cores and deltas: the existence, number, position, and shape of the cores and deltas.

4.1.1.4. Ridge flows: the overall ridge flow that may lack a classifiable pattern but facilitate the search.

4.1.1.5. Flexion crease: the existence, position, and path of flexion creases.

4.1.1.6. Secondary creases or wrinkles: the existence, position, path, and density of secondary creases or wrinkles.

4.1.1.7. Scars: the existence, position, and path of scars.

4.1.1.8. Occasional features: the existence, position, and path of occasional features (e.g. warts or healing skin).

4.1.1.9. Ridge paths: the location, direction, length, width, and curvature of the path of a ridge.

4.1.1.10. Minutiae: the location, type, and direction of minutiae.

4.1.1.11. Ridge morphology: the edge shapes or texture of a ridge.

4.1.1.12. Incipient ridges: the location, direction, length, width, morphology, and density of incipient ridges.

4.1.1.13. Flexion crease morphology: the edge shapes or texture of a flexion crease.

4.1.1.14. Scar morphology: the edge shapes or texture of a scar.

4.1.1.15. Occasional feature morphology: the edge shapes or texture of an occasional feature.

4.1.1.16. Spatial relationships: the ridge counts, distances, directions, and angles between features.

4.1.2. The FSP shall have a written procedure for routinely monitoring examiners' ability to interpret observed data. This monitoring shall be planned and documented.

4.1.3. The FSP shall define the utility decisions that may be used in casework. This is an operational decision, not a scientific one, and FSP policies shall include a statement of this effect. At a minimum, the utility decisions shall include suitability for proceeding to a comparison. If applicable, it shall also include suitability for database search.

NOTE: While there is no scientific basis for selecting a particular threshold to establish the utility of an impression, an agency may choose to set a threshold for operational reasons, such as available resources. In theory, any friction ridge impression *could* be compared, but many are so fragmentary that a meaningful conclusion could not be reached or supported, thus it would be inefficient and ineffective to do so. Similarly, an agency may make an operational decision not to proceed with comparison of some impressions because of a higher perceived risk of error.

4.1.4. The FSP shall have a written procedure for documenting the anatomical region(s) and orientation(s) assigned.

4.1.5. The FSP shall have a written procedure for routinely monitoring examiners' assignments of anatomical region and orientation. This monitoring shall be planned and documented.

4.1.6. The FSP shall define the criteria for utility decisions. At a minimum, the criteria shall include the observed data necessary to decide the utility of the impression.

4.1.7. The FSP shall have a written procedure for documenting which impressions will proceed to a further step (commonly known as "of value" or "suitable") and, if applicable, database search. This procedure shall include a method for indicating which impressions will not proceed to a further step (commonly known as "no value" or "not suitable" impressions).

NOTE 1: This may be achieved by a blanket policy stating that any unlabeled impressions will not proceed to a further step.

NOTE 2: "Unlabeled" means an impression that has not been marked or named to "claim" it for further use.

4.1.8. The FSP shall have a written procedure for documenting which impressions have been designated as "complex" and may have a procedure for documenting which impressions have been designated as "high quality".

4.1.9. The FSP shall have a written procedure for documenting the information that supports the utility decision. The procedure shall address:

4.1.9.1. Method of documentation (e.g. marking hard-copies or using software programs).

NOTE: For automated search processes, the auto-encoded features may be retained as documentation.

4.1.9.2. Documentation of the support for the utility decision. This shall include, at a minimum, the observed data relied upon. Documentation of the observed data in the unknown friction ridge impression shall take place prior to proceeding to the next step.

4.1.9.3. Criteria for increasing or decreasing the level of documentation of the information (generally based on the complexity of the impression or the complexity of the case)

4.1.10. The FSP shall have a written procedure for routinely monitoring examiners' utility decisions and their documentation of the observed data used to support the utility decision. This monitoring shall be planned and documented.

4.2. Comparison

4.2.1. The FSP shall have a written procedure for specifying and documenting which questioned friction ridge impressions and individuals were compared.

4.2.2. The FSP shall have a written procedure for documenting relevant information regarding the known friction ridge impression (e.g. name, identifier, date recorded).

4.2.3. The FSP shall have a written procedure for documenting exemplar friction ridge impressions that are not suitable to complete comparisons.

NOTE 1: Requirements for documentation of corresponding regions are specified in section 4.3.4.

NOTE 2: The requirements in Section 4.2 do not apply to comparisons made during database candidate list screening/comparison.

4.3. Evaluation

4.3.1. The FSP shall define the source conclusions available for use in casework.

4.3.2. The FSP shall define the criteria for each source conclusion.

4.3.3. The FSP shall require that the source conclusion reached for each comparison be recorded.

4.3.4. The FSP shall have a procedure for documenting the observed data that support source conclusions. The procedure shall address:

4.3.4.1. Method of documentation (e.g. marking hard-copies or using software programs).

4.3.4.2. The observed data used to support the conclusion.

4.3.4.3. Criteria for increasing or decreasing the documentation of the observed data (generally based on the complexity of the comparison or the case).

4.3.4.4. Changes in the interpretation of the observed data in the questioned friction ridge impression after the initiation of the comparison process.

4.3.5. The FSP shall have a procedure for routinely monitoring examiners' ability to appropriately formulate source conclusions. This monitoring shall be planned and documented.

NOTE: In addition to the source conclusions, the procedure should also include the monitoring of the examiners' documentation of observed data.

5. Appendix A: Change Log

Version	Date	Change
1.0	09/30/2020	Original Issue