Document #20
Standard for Simultaneous Impression Examination
(Latent)

1. Preamble

1.1. This standard addresses latent print examinations when two or more friction ridge impressions are considered to be deposited on an object as a single act of touch, also referred to as a simultaneous impression.

1.2. The SWGFAST Glossary defines a simultaneous impression as "Two or more friction ridge impressions from the same hand or foot deposited concurrently." Two or more latent friction ridge impressions from the same hand that are consistent with simultaneity can be used in the aggregate and considered a single impression when conducting examinations [1, 2]. The use of the term simultaneous impressions, with an "s", infers that more than one simultaneous impression exists in a case.

1.3. This document sets forth the standard for (1) analyzing two or more friction ridge impressions to determine whether they are consistent with having been deposited on an object simultaneously, (2) analyzing a simultaneous impression to determine how it will be compared, (3) conclusions from the comparison of a simultaneous impression with known exemplars, (4) verification of conclusions, (5) documenting the examination, and (6) reporting results.

1.4. Independent of the value for individualization or exclusion, a simultaneous impression may support the ability to infer the handling or circumstance of touch by the fingers, hand, or foot of an object. Specific circumstances within a case may permit an examiner to offer an opinion as to how the simultaneous impression relates to the touch or grasp of an object, which subsequently may support or refute the circumstances of touch.

1.5. There is added discriminative value in using impressions that display evidence of simultaneity. For example, the aggregate comparative value of fingerprints in corresponding positions has been shown to be highly reliable for effecting identifications in the Automated Fingerprint Identification System (AFIS) environment [3].

1.6. Simultaneous impression examination is a complex application of Analysis, Comparison, Evaluation, and Verification (ACE-V). Before conducting a forensic examination of a simultaneous impression, examiners shall have completed specialized training in the examination of latent print simultaneous impressions. This training should include successfully completing formal instruction, literature reading and testing to demonstrate competency. This training and testing may be conducted internally or externally.

1.7. If a conclusion of individualization (identification), inconclusive or exclusion can be derived without invoking simultaneity, or if the issue of simultaneity itself is not relevant, then this standard may not apply [4].

2. Analysis

2.1. An analysis of the impressions must occur before concluding simultaneity [2, 3, 5]. The analysis shall include (1) the determination whether the friction ridge impressions are consistent with a simultaneous impression and (2) the determination whether each friction ridge impression within the simultaneous impression stands alone or must be compared in the aggregate. The term "stand alone" means that a conclusion of individualization for a single impression can be reached independently of other impressions within the aggregate.

2.2. Analysis of two or more friction ridge impressions as a simultaneous impression

2.2.1. The following factors for each friction ridge impression and the aggregate shall be analyzed to confirm or refute that the impressions are consistent with having been deposited concurrently:

2.2.1.1. The object(s) upon which the friction ridge impressions exist.

Determine that one or more friction ridge impressions are present on a single or multiple objects (Figures 1 – 4).

Figure1: Simultaneous impression on a single surface.

Figure 2: Simultaneous impression with a void due to substrate gap (shape of the revolver in this image).

Figure 3: Simultaneous impression across a semi-porous surface (label) and a nonporous surface (plastic).

Figure 4: Simultaneous impression across two pieces of paper.

2.2.1.2. Orientation

Determine that the orientation is consistent between (1) friction ridge impressions within the aggregate, (2) each friction ridge impression and the hand or foot morphology, and (3) the hand or foot morphology and the object.

2.2.1.3. Spatial relationship

Determine that each friction ridge impression within the aggregate is within anatomical spatial tolerances of the hand or foot with the object(s).

2.2.1.4. Substrate (surface)

2.2.1.4.1. Determine that the aggregate of the friction ridge impressions is consistent with the surface(s) on which it appears. Substrate examples are as follows:

2.2.1.4.1.1. A single surface such as one side of a piece of paper on which all friction ridge impressions appear.

2.2.1.4.1.2. Two surfaces such as opposite sides of a piece of paper with one or more friction ridge impressions appearing on each side, such as a thumb print on the corner of one side and the index and middle finger on the other side.

2.2.1.4.1.3. Two different surfaces on a single object, such as the paper label on a glass bottle; one fingerprint on the paper label and two fingerprints on the glass bottle.

2.2.1.4.1.4. Two surfaces on two objects, such as two pieces of overlapped paper on which the fingerprints appear on one and the lower joints and a partial palm print appear on the other.

2.2.1.5. Friction ridge skin features and anatomical features

2.2.1.5.1. Determine that the friction ridge skin features, for example ridge width, ridge flow, and creases, are consistent with simultaneity.

2.2.1.5.2. Determine that the anatomical features, for example finger height, toe span, and impression size are consistent with simultaneity.

2.2.1.6. Processing technique and matrix

Determine that each friction ridge impression within the aggregate has similar and consistent appearance for the matrix or specific processing technique(s) used to visualize it.

2.2.1.7. Distortion

2.2.1.7.1. Determine that the friction ridge impressions have consistent appearance insofar as deposition pressure, lateral pressure, and twisting (Figure 1).

2.2.1.7.2. Determine that the distortion(s) within the aggregate of the friction ridge impressions exhibit consistent appearance for the object and substrate.

2.3. Simultaneous impression determination

2.3.1. In determining whether two or more friction ridge impressions are a simultaneous impression the examiner must consider each factor listed in 2.2, individually and in the aggregate. The analysis of the applicable factors must support or refute the determination of simultaneity. The outcome of this analysis will result in one of the following scenarios:

2.3.1.1. All friction ridge impressions are consistent with having been deposited concurrently, and as such, are considered to be a simultaneous impression.

2.3.1.2. A subset of the friction ridge impressions are consistent with having been deposited concurrently, and the subset is considered to be a simultaneous impression.

2.3.1.3. None of the friction ridge impressions are consistent with being deposited concurrently, and as such, are not considered to be a simultaneous impression.

2.3.1.4. Simultaneity cannot be supported or refuted.

2.4. Simultaneous impression assessment

2.4.1. Each individual impression within the aggregate must be analyzed and will result in one of the following scenarios:

2.4.1.1. All friction ridge impressions stand-alone (Figure 5).

Figure 5: Simultaneous impression where all impressions stand-alone.

2.4.1.2. One or more, but not all, of the friction ridge impressions will stand-alone. Those friction ridge impressions which do not stand-alone must be compared in the aggregate in order to reach a conclusion (Figure 6).

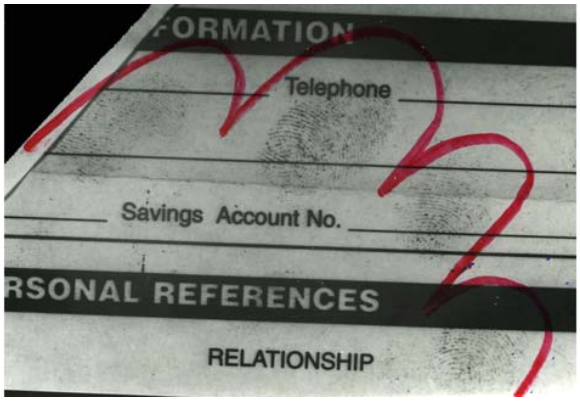

Figure 6: Simultaneous impression with three impressions that stand-alone and one impression that must be compared in the aggregate. The far right impression must be compared in the aggregate.

2.4.1.3. At least one of the friction ridge impressions will stand-alone and at least one of the remaining friction ridge impressions only provides anatomical or spatial information. Friction ridge impressions that do not stand-alone may be compared in the aggregate in order to reach a conclusion, whereas those providing anatomical or spatial information may be used to support or refute simultaneity (Figure 7).

Figure 7: Simultaneous impression with two impressions that stand-alone (2 on left), one impression that must be compared in the aggregate (2nd from right), and one impression that only supports simultaneity (far right).

2.4.1.4. None of the friction ridge impressions stand-alone so all of them must be compared in the aggregate to reach a conclusion (Figure 8).

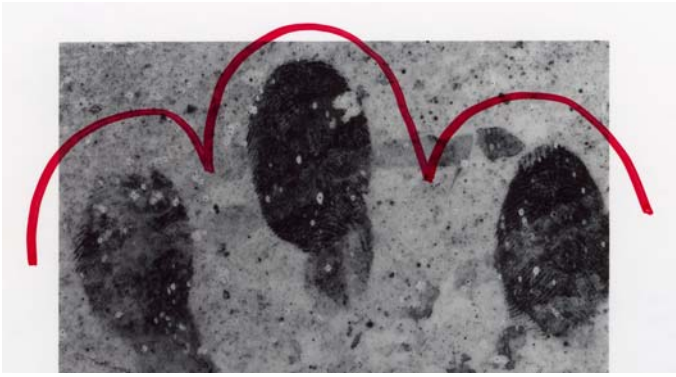

Figure 8: Simultaneous impression where all of the impressions must be compared in the aggregate.

2.4.1.5. None of the friction ridge impressions stand-alone and some of them provide only anatomical or spatial information. Those providing anatomical or spatial information may be used to support or refute simultaneity, whereas the remaining impressions may be used in the aggregate for reaching a conclusion (Figure 9).

Figure 9: Simultaneous impression with two impressions that must be compared in the aggregate (two on right) and one impression that only supports simultaneity (far left).

2.4.1.6. The impressions may provide only anatomical or spatial information (Figure 10).

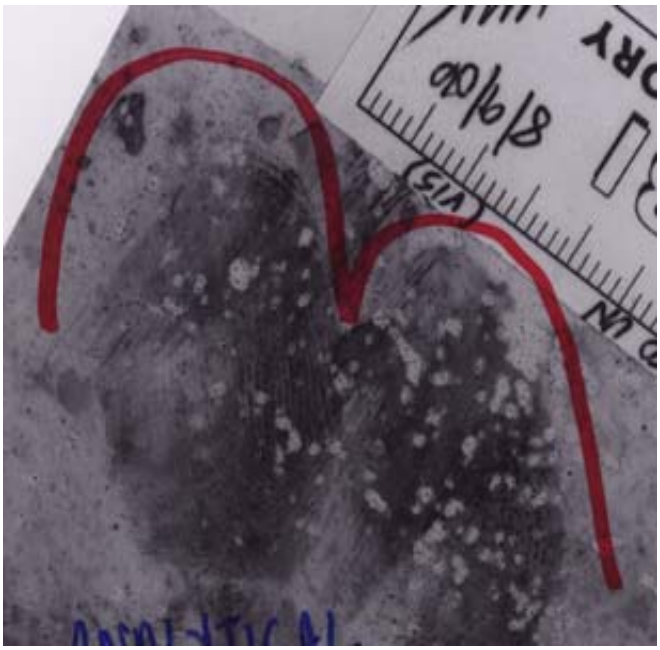

Figure 10

3. Comparison of Simultaneous Impression(s)

3.1. Prior to comparison, an analysis of the known exemplars must be performed ensuring that all impressions are in proper sequence and attributable to the same person.

3.2. For each friction ridge impression determined to be of value, the examiner should proceed to the comparison phase.

3.3. Simultaneity can be supported or refuted during the comparison, evaluation, or verification phase. If it is refuted then re-analysis shall occur.

4. Evaluation of Simultaneous Impression(s)

4.1. For each of the scenarios provided in 2.4, an evaluation conclusion can support or refute simultaneity. If simultaneity is refuted, re-analysis is required. If the impressions are consistent with simultaneity, standards for conclusions are applied to the impression in the aggregate. Friction ridge impressions that do not stand-alone must be compared in the aggregate in order to reach a conclusion.

4.2. For a conclusion of individualization, the details contained within all friction ridge impressions must be in agreement across all corresponding impressions.

5. Verification of Simultaneous Impression(s)

5.1. When a conclusion is based on simultaneity:

5.1.1. The determination of simultaneity for the impression shall be verified.

5.1.2. The conclusion of individualization shall be verified.

5.1.3. The conclusion of exclusion or inconclusive should be verified.

5.2. Conflicts shall be addressed within the agency's conflict resolution process.

5.3. Blind verification should be utilized where none of the impressions within a simultaneous impression stand-alone [7].

6. Documentation of Simultaneous Impression(s)

6.1. Case note documentation should reflect the ACE-V methodology as it applies to the simultaneous impression examination.

6.2. Documentation of analysis

6.2.1. For each applicable analysis factor listed under section 2.2, the case note documentation shall reflect the pertinent information. This information shall be documented by a photograph, lift, or legible copy with sufficient annotation in the written examiner notes for another competent examiner to interpret what was done, and allow replication of the analysis decision.

6.2.2. For each analysis factor that supports simultaneity under section 2.2, it may be necessary to document factual case information or qualitative information derived during the analysis.

6.2.2.1. An example of factual case information is knowledge that the object is a bottle because the examiner personally processed it.

6.2.2.2. An example of qualitative information derived by the examiner is the presence and consistency of lateral pressure in a friction ridge impression or across all impressions.

6.2.3. Due to circumstances of touch, there may be factors that should be documented other than those listed under analysis section 2.2.

6.2.4. For each friction ridge impression within a simultaneous impression the orientation, spatial relationship, and anatomical features shall be captured using an annotated photograph, lift, or legible copy. Each agency performing simultaneous impression examinations should establish a policy for consistent annotation of simultaneous impressions. The following examples demonstrate some of the various ways that these annotations can be made.

6.2.4.1. Distal segment of the fingerprints

Draw a horseshoe-shaped mark over the top of the distal segment of the fingerprint using one continuous line connecting all the fingerprints (Figure 11).

Figure 11

6.2.4.2. Proximal and medial segments (commonly known as lower joints) of fingerprints

Draw one line on each side of the proximal and medial segments with the notation "LJ" indicating it is a lower joint. Draw one lower line to connect all LJ impressions (Figure 12).

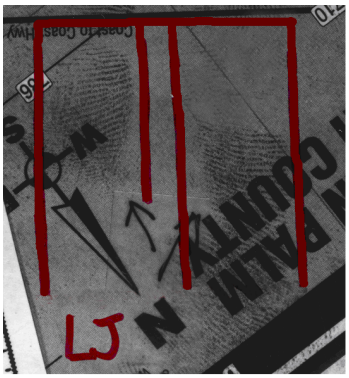

Figure 12

6.2.4.3. Distal, proximal, and medial segments of fingerprints and palmprint

Draw a horseshoe-shaped mark over the top of the fingerprints using one continuous line connecting all the fingerprints. Draw a bracket at the bottom of the palm print. Draw one line on the hypothenar or thenar side to connect the palm print to the fingerprints or lower joint(s) (Figures 13 & 14).

Figure 13

Figure 14

6.2.4.4. Toeprint and footprint

Same as fingerprints and palmprints but include footprints or toeprints as notation (Figures 15 & 16).

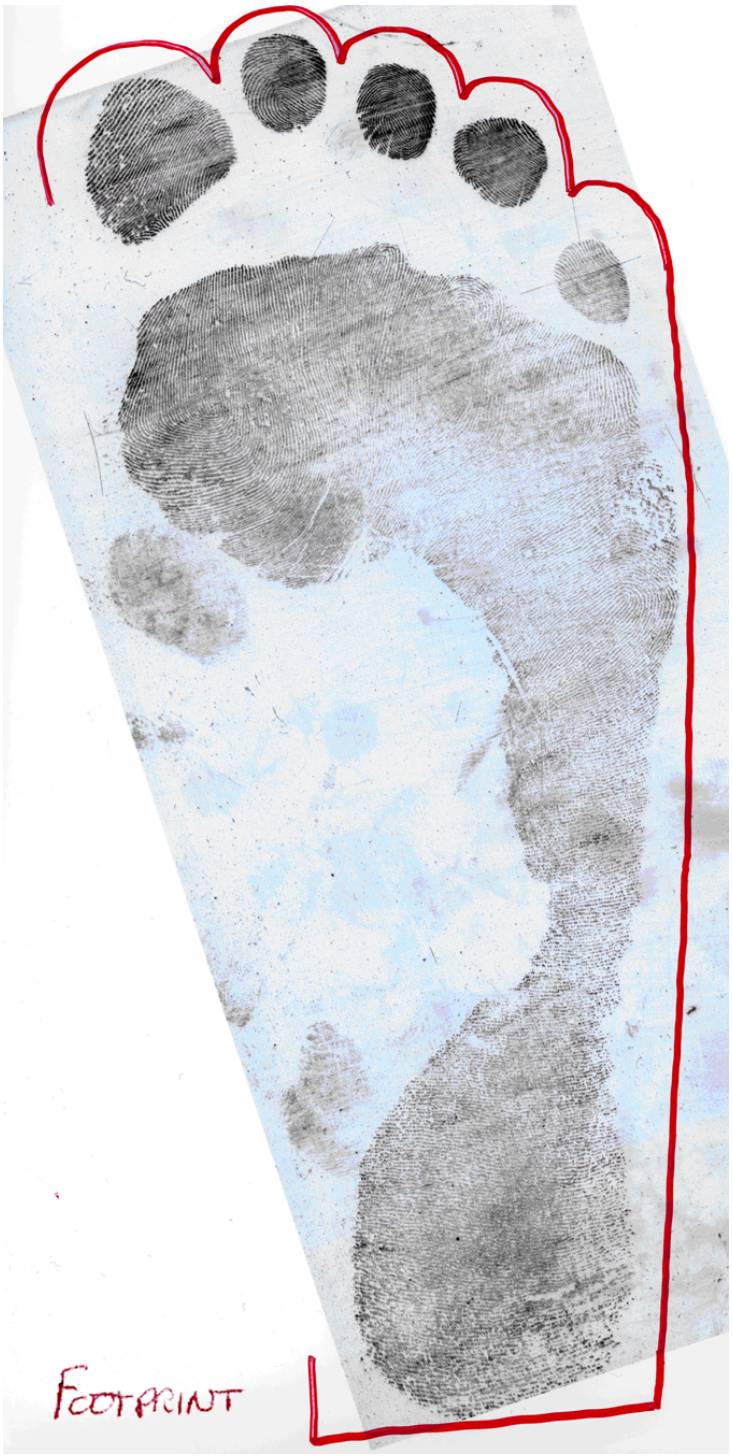

Figure 15

Figure 16

6.2.5. For each separate friction ridge impression contained within the simultaneous impression, the case note documentation, either in writing or annotations on a photograph, lift, or legible copy must reflect whether the impression (1) is part of an aggregate, or (2) provides only anatomical or spatial information but supports the simultaneity decision.

6.2.5.1. Friction ridge impressions that stand-alone need not be labeled as such (Figure 17).

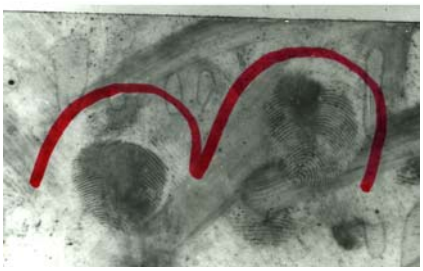

Figure 17

6.2.5.2. Friction ridge impressions of value for comparison that do not stand-alone but require the aggregate of all impressions must be labeled as an aggregate (e.g., “AGG”) (Figure 18).

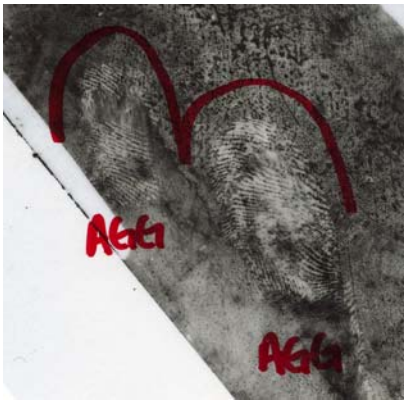

Figure 18

6.2.5.3. Friction ridge impressions that are considered as being of value for supporting simultaneity but are considered of no value for comparison should be noted as no value (e.g., “NV”- Figure 19).

Figure 19

6.2.6. For each friction ridge impression deemed to be of value for comparison, the detail relied upon in reaching that determination should be documented. This may be done using annotated photographs, lifts, legible copies, or other case notes. This information may be annotated as “analysis” data (Figure 20).

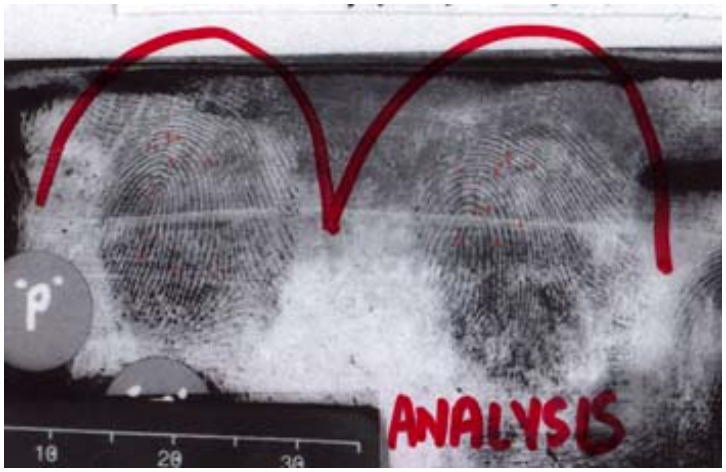

Figure 20

6.2.7. Other impressions of value present on the lift or photograph that are not within the annotated simultaneous impression are marked separately and not joined to the aggregate.

6.3. Documentation of comparison

6.3.1. For each simultaneous impression, the case documentation must reflect all comparisons conducted with known exemplars by name or unique identifier.

6.3.2. A simultaneous impression compared with other simultaneous impressions (latent prints to latent prints) must also be documented.

6.3.3. For each friction ridge impression deemed of value for comparison, the detail relied upon during the comparison should be documented. This may be done using annotated photographs, lifts, legible copies, or other case notes. This information may be annotated as "comparison" data (Figure 21).

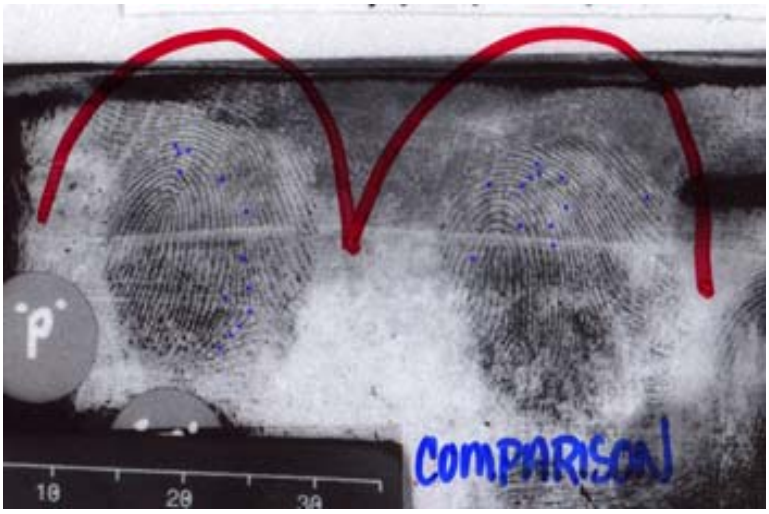

Figure 21

6.3.4. This documentation may be different than set forth in the analysis photograph and would require separate and additional documentation, for example, a second photograph. If it is not different, then the documentation can be modified by adding the “comparison” annotation.

6.4. Documentation of evaluation

6.4.1. Each simultaneous impression will require case documentation of the conclusion reached when compared with a known exemplar or other latent impression. The Standard for Examining Friction Ridge Impressions and Resulting Conclusions [4] and Standard for a Quality Assurance Program in Friction Ridge Examinations [7] shall be followed. The documentation must enable a reviewer to associate each impression with the comparisons conducted and conclusions rendered.

6.4.1.1. Individualization

Document the name or unique identifier of the person identified, along with the respective finger or palm designation, in the case record. The case record shall include annotated photographs, lifts, legible copies, or other notes (Figure 22).

Figure 22

6.4.1.2. Exclusion

Document the name or unique identifier of the person in the case record.

6.4.1.3. Inconclusive

Document the name or unique identifier of the person in the case record (Figure 23).

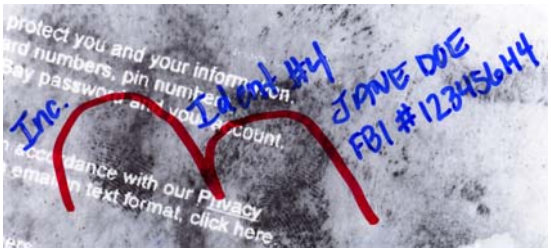

Figure 23

6.5. Documentation of Verification

6.5.1. Verification documentation should be made on an unmarked photograph or legible copy and also recorded in the case record.

6.5.2. The case record shall reflect the conclusions and name or initials of the verifying examiner.

7. Reporting of Simultaneous Impression(s)

7.1. Individualizations where none of the impressions within the aggregate stand-alone shall be reported as a simultaneous impression.

7.2. Simultaneous impression(s) where one or more of the impressions within the aggregate stand-alone may be reported as simultaneous depending on how the impression relates to the circumstances of the touch.

7.3. Report wording examples are included in the Appendix.

8. References

[1] Ashbaugh, D. R. *Quantitative-Qualitative Friction Ridge Analysis: An Introduction to Basic and Advanced Ridgeology*; CRC Press LLC: Boca Raton, FL, 1999, 134-135.

[2] Cowger, J. F. Friction Ridge Skin; CRC Press LLC: Boca Raton, FL, 1993, 154-156.

[3] Wein L. M. and Baveja M. (2005) "Using fingerprint image quality to improve the identification performance of the U.S. Visitor and Immigrant Status Indicator Technology Program", Proceedings of the National Academy of Science of the United States of America, 102(21), pp. 7772–7775.

[4] SWGFAST, *Standards for Examining Friction Ridge Impressions and Resulting Conclusions*, 9/13/11, ver.1.1.

[5] Wisniewski, P. Comparison of Fingerprints Recovered in a Composite Way. Problemy Kryminalistyki. 2003, 239, 21-29.

[6] Black, J. P. Pilot Study: The Application of ACE-V to Simultaneous (Cluster) Impressions. *Journal of Forensic Identification*. 2006, 56 (6), 933 - 971.

[7] SWGFAST, *Standard for a Quality Assurance Program in Friction Ridge Examinations*, 9/11/12, ver. 5.0.

9. Further Reading

Budowle, B., Buscaglia, J., and Perlman, R. Review of the Scientific Basis for Friction Ridge Comparisons as a Means of Identification: Committee Findings and Recommendations. *Forensic Science Communications*. 2006, 8 (1).

Gaudes, C. Digit Determination. *Identification Canada*. 2002, 25 (4), 11-15.

Ostrowski, S. Simultaneous Impressions: Revisiting the Controversy. The Weekly Detail #13. www.clpex.com. November 5, 2001 (accessed September 2007).

An Analysis of Standards in Fingerprint Identification. FBI Law Enforcement Bulletin. 1972 46 (6), 1-6.

Method for Fingerprint Identification. Part II: Detailing the method using common terminology and through the definition and application of shared principles. Interpol European Expert Group on Fingerprint Identification. www.interpol.int/Public/Forensic/fingerprints/WorkingParties/IEEGFI2/default.asp (accessed October 30, 2007).

Appendix

The following are examples for different methods of reporting a simultaneous impression. These examples include multiple scenarios of individualized simultaneous impressions.

- A simultaneous impression containing three latent fingerprints has been detected on Q1. The simultaneous impression has been individualized with JOHN DOE.

- A simultaneous impression containing one latent fingerprint and one latent palm print of value for comparison has been detected on Q1. The simultaneous impression has been individualized with JOHN DOE.

- Examination of Exhibit 1 revealed one simultaneous impression consisting of three latent fingerprints, each suitable for identification, designated L-1, L-2 and L-3. The simultaneous impression was individualized as the right index, right middle and right ring fingerprints, respectively, of the person whose record fingerprints are marked “Exhibit 2 - JOHN DOE.”

- Examination of Exhibit 1 revealed one simultaneous impression of value for comparison consisting of three latent fingerprints designated collectively as L-1. The simultaneous impression, in the aggregate, was individualized as the right index, right middle and right ring fingerprints, of the person whose record fingerprints are marked “Exhibit 2 - JOHN DOE.”

- Examination of the shovel (Exhibit 1) revealed three identifiable latent fingerprints consistent with simultaneous deposition (one touch) on the shovel handle. JOHN DOE made the three latent fingerprints on the shovel handle.

- Examination of Exhibit 1 revealed one simultaneous impression consisting of three latent fingerprints designated L-1. The simultaneous impression was individualized as the right index, right middle and right ring fingerprints of the person whose record fingerprints are marked “Exhibit 2 - JOHN DOE.”

This example is for a simultaneous impression that is not suitable for individualization.

- A simultaneous impression of the right hand consisting of three fingers and a partial palm deposited in apparent dried blood has been detected on the axe handle of Exhibit Q1. It has been determined to be of no value for individualization but may be of value for exclusion. Photographs of the impression are on file for comparison with any record prints that may be submitted.

10. Revision Table

Version	Effective Start	Effective End	Posted	Archived	Change
1.0	09/12/08	11/17/12	09/12/08	11/17/12	Original issue
2.0	11/17/12	N/A	12/24/12	N/A	Updated version Reformatted (start of new version number)