

Appendix A: Methods, Limitations, and Interpretations

Friction ridge skin consists of ridges, which are raised portions of skin, and furrows, which are the valleys in between the ridges. Friction ridge skin is found on the fingers, palms, and soles of the feet. A friction ridge print is a transfer of the ridge arrangements from the friction ridge skin onto an item. Items of evidence submitted to the Latent Print Operations Unit for examination may be examined visually, examined with various light sources, and processed with chemicals and powders to detect the presence of friction ridge prints. The specific sequence of examinations and processes depends upon the nature of the evidence.

Friction ridge print examinations are conducted using Analysis, Comparison, and Evaluation (ACE) (1), which includes an assessment of the quantity and quality of the information present. The steps of ACE are applied to friction ridge prints as appropriate.

Analysis is the assessment of a friction ridge print by a qualified examiner, accounting for the quantity and quality of the features detected in the print. An examiner will assess the types of features and the spatial relationships of the features to one another, which may be affected by factors such as pressure and movement when the print is transferred (2) (3). The print is deemed to be of value when the examiner determines that sufficient reliable information is present, such that, when compared to another print from the corresponding area of the same source, an identification decision can be reached. A thorough analysis is conducted on friction ridge prints prior to conducting comparisons. Analysis is documented by marking observed information in accordance with the Latent Print Operations Unit's standard operating procedures (4).

Comparison is the direct side-by-side observation of friction ridge prints of value to determine whether the information observed during Analysis is in disagreement or agreement between two prints. When determining if features correspond, an examiner accounts for variation in the appearance of the friction ridge prints due to factors such as pressure and movement (2).

Evaluation is the formation of a conclusion based on the examiner's observations, assessments, and documentation generated during the analysis and comparison of the friction ridge prints. Decisions that may be reached are as follows:

- Identification is the determination that two friction ridge prints originated from the same source because there is sufficient quality and quantity of corresponding information. While an identification to the exclusion of all others is not supported by research, studies have shown that as more reliable features are found in agreement, it becomes less likely to find that same arrangement of features in a print from another source (5).
- Exclusion is the determination that two friction ridge prints did not originate from the same source because there is sufficient quality and quantity of information in disagreement.

- Inconclusive is the determination that an identification or exclusion decision cannot be reached because the corresponding area in the known friction ridge print is absent or unreliable.

While the examination process is subjective in nature (6), the Latent Print Operations Unit has quality assurance measures in place to minimize variability and reduce the chance of error. Examples include but are not limited to verification and blind verification, which are implemented in accordance with the Latent Print Operations Unit's standard operating procedures (4) (8).

- Verification is the independent application of ACE to a friction ridge print by another qualified examiner.
- Blind verification is the independent application of ACE to a friction ridge print by another qualified examiner with limited awareness of the details of the case and no knowledge of the conclusion of the primary examiner.

There is no meaningful predictive rate of error for the entire comparison process (9) (10); however, recent studies have demonstrated that examiners reach accurate and reliable conclusions under specific test conditions (7) (11) (12).

The presence of a friction ridge print on an item of evidence indicates contact was made between the source and the item. The presence of a friction ridge print alone does not necessarily indicate the significance of the contact or the time frame during which the contact occurred.

Due to a variety of factors, the recovery of friction ridge prints on items of evidence is not always successful. A lack of friction ridge prints on an item or the exclusion of a friction ridge print from a given source does not necessarily mean that the given source did not come into contact with the item.

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