Impressions Section Overview

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Impressions Services

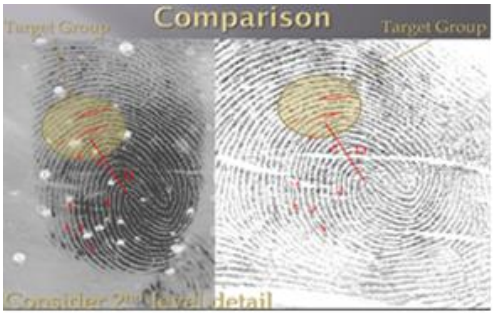
The Impressions Section provides services related to the area of forensic science referred to as Physics/Pattern Interpretation. These services are only provided at the Headquarters Campus of the Georgia Bureau of Investigation, Division of Forensic Sciences located in Decatur, Georgia.

The sub-disciplines in which services are provided:

Friction Ridge (Fingerprints)

- **Latent Print (LP) Processing request**
    - The purpose of this service is to recover and preserve friction ridge impressions from items of evidence through a series of optical, physical, and chemical processes.
    - Cases submitted for this service usually contain physical items of evidence that require processing to detect and collect friction ridge impressions to be used in friction ridge examinations.
    - This service is also used to obtain and preserve exemplars from unknown deceased persons for possible identification.

- **LP Examination request**
    - The purpose of this service is to determine whether a friction ridge impression of unknown origin came from a specified known source.
    - Cases submitted for this service usually contain friction ridge impressions recovered by a lifting material, such as lift cards, gel lifters or casting material like Mikrosil, or digital media containing digital images of friction ridge impressions, either photographed at the scene of crime or imaged from physical items from the scene.
    - Known exemplars, usually 10-print cards or major case prints, taken from subjects of interest must accompany this evidence. Known exemplars taken from victims/witnesses may be submitted for elimination purposes.



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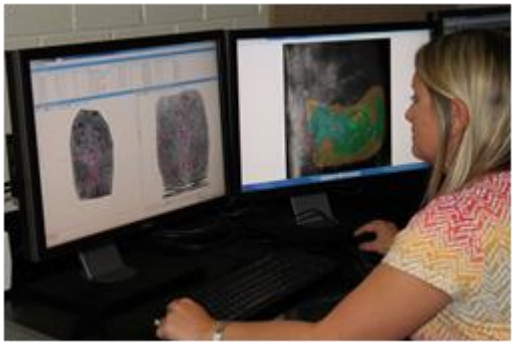
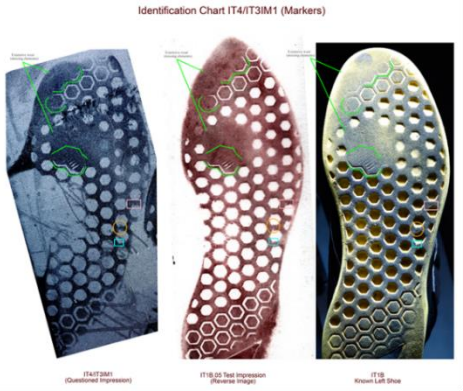
- **AFIS request**
  - The purpose of this service is to provide possible investigative leads through a database search on the State of Georgia and/or Federal Databases, primarily in those cases where limited subject information is available.
  - Cases submitted for this service usually contain items with friction ridge impressions originating from an unknown source, similar to items submitted for LP Examination requests, with the exception that no known exemplars or state/federal identification numbers are provided for the listed subject(s).
  - This is also the primary service used for victim identification.



FW (Footwear)/Tire

- **FW/Tire Processing request**
  - The purpose of this service is to recover and preserve FW/Tire impressions from items of evidence through a series of optical, physical, and chemical processes.
  - Cases submitted for this service usually contain physical items of evidence, that require processing to detect and collect footwear/tire impressions for FW/Tire examinations.

- **Footwear/Tire Examination request**
  - The purpose of this service is to determine whether a FW/Tire impression of unknown origin came from a specified known source.
  - Cases submitted for this service usually contain impressions recovered by means of a lifting material, such as lift cards, gel lifters, casting material like Dental Stone, electronic dust lifts, or digital media containing digital images of footwear/tire impressions.
  - FW/Tire Examinations rely heavily on the ability to analyze the actual shoe or tire. For this type of examination, exemplars taken from a



known source will only be accepted if the original shoes and/or tires are available at the submitting agency.

- **Footwear Make and Model Determination request**
    - The purpose of this service is to provide possible investigative leads regarding manufacturers/make/model of footwear impressions through a FW reference database and published resources. This is primarily done in those cases where limited subject information is available, and no known shoes could be obtained.

Case Acceptance Criteria

During the initial assessment of the case submission, the specific requirements and expectation of the customer is evaluated based on the investigative question that needs to be addressed and the capability of the section.

If the expectation of the customer is unclear or unattainable based on the available information, the customer will be contacted to clarify and establish attainable expectations.

Case acceptance is dependent on specific factors such as case circumstances, capacity of the Impressions Section, possibility of other forensic evidence, type of substrate, history and prior exposure of the evidence, etc.

The GBI DOFS Impressions Section does not routinely:

- Conduct re-examination for cases previously worked by other agencies.
- Process drug packaging and/or paraphernalia from possession cases for friction ridge impressions. Prior approval from the Impressions Manager is required for these types of cases and approval is usually dependent on whether any charges, in addition to possession-only, are being pursued. If it is decided that the Impressions section will accept this type of evidence, the content may need to be removed prior to submission of the evidence to the Impressions section.
- Accept printed photographs of impressions as evidence. The original digital images are required in order to create actual size images for the comparison process.
- Accept digital images of insufficient quality. Digital images submitted electronically to the Impressions section must meet at least the following requirements:
    - The impressions must be photographed with a high-resolution digital camera. The absolute minimum requirement is for a camera to have no less than 2 megapixels. It is recommended that cameras with >11 megapixels and macro capability be used.

  - Images must be in focus.
  - A scale must be included in the image on the same plane as the impression.
  - The camera must be set at right angles to the impression.
  - Digital images should be saved in a lossless compression file format, either TIFF or BITMAP.
- Known Exemplars:
  - LP Examination requests – Will not be accepted without known exemplars or reference numbers (GASID#/FBI#) of individuals that require comparison.
  - Photocopies of friction ridge exemplars will not be accepted without prior approval from the Impressions Section Manager.
  - Scanned images of known friction ridge exemplars must be scanned at a resolution no less than 600ppi.
  - For FW/Tire examination request, the actual shoes or tires are used for comparison purposes. The GBI Impressions section will receive known FW/Tire exemplars in the form of test impressions, but only if the original shoes and/or tires are available at the submitting agency if needed.

Case Prioritization

Cases are prioritized for court based on upcoming court dates provided by our customers, and we will make every effort to provide results by the requested due date. Impressions requests are usually prioritized with a 15-day turnaround time depending on the complexity of the requested services.

Cases are also prioritized for critical investigative purposes as follows:

- **Tier 1** – Primarily cases involving wrongful death, Officer Involved Shooting incidents, and in-custody death investigations.
- **Tier 2** – Primarily cases that had the potential of resulting in serious bodily harm, Juveniles involved, and time sensitive processing e.g. where large sums of Currency are submitted for LP Processing.
- **Tier 3** – All cases not classified as Tier 1 or 2
- Tier 1 and 2 cases are assigned as they come in the door on a first in first out (FIFO) basis as far as possible.
- Tier 3 cases are assigned on a last in first out (LIFO) basis and may accrue in the backlog.

In cases where large numbers of evidence items are submitted, the extent of the examination will depend on the investigative needs determined by the examiner based on the case circumstances, and through consultation with the customer:

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- **The most probative item(s)** in the case will be examined first
- **The fewest possible number of items** will be examined to answer the investigative question(s) posed.

Evidence Submissions

Please see the general Evidence Submission Guidelines on the GBI Web page for information regarding evidence submissions to the GBI Crime Lab. Information regarding the submission form can also be found on the Web page.

More specific information regarding Impression Evidence can be found on the Evidence guidelines video.

Some General Considerations Regarding Friction Ridge Impression Evidence

- **Persistence of Friction Ridge Impressions** - According to the HOM[1] 2.2.17, the following "…three elements will challenge singly or in combination *the ability of the fingermark to persist and therefore dictate its potential to provide a viable contribution to the investigation…*".
  - These three elements are:
    - Composition of the Impression (Matrix),
    - Surface receiving the impression (Substrate), and
    - The Environment
  - According to the HOM[2] "…Water accounts for between 98% and 99.5% of eccrine sweat…". Because of the water content, friction ridge impressions can be very fragile and easily wiped off. It should be handled in a way to prevent placing further impressions on the item, as well as damaging impressions already on the item through careless handling.
  - Friction ridge impressions remain on the surface of a non-porous item, such as a firearm magazine or glass bottle, regardless of the matrix of the impressions. These items should be handled in a way to avoid wiping off any previously deposited impressions.
  - High heat is extremely deleterious for friction ridge impressions and evidence left in the sun in the trunk of a patrol car for extended periods of

[1] Fingermark Visualisation Manual, Home Office, Center for Applied Science and Technology, First Addition, Chapter 2.2.17, January 2014

[2] Fingermark Visualisation Manual, Home Office, Center for Applied Science and Technology, First Addition, Chapter 2.2.11, January 2014

time will degrade significantly. This will significantly limit the possibility to recover useful impressions.

- Evidence submitted for LP Processing should be submitted as soon as possible after its recovery.
- A good practice is to "double glove" when collecting evidence for friction Ridge examination to prevent leaving your own impressions on the evidence.
- Never wrap nonporous items in cotton or cloth – doing so may damage or destroy the latent impressions.
- Do not cover exhibits to be processed for latent prints with tape.
- The items should be placed in a bag and properly marked on the exterior with the agency name and case number.
- Identify all evidence, indicating if it is an original article, a lift, or disc with digital images.
- Put developed latent lifts in envelopes, mark, and seal. Mark the packaging "Latent Print Evidence" and add the biohazard symbol if it contains bloodstained evidence.
- Any number of standard latent lift cards may be placed in a single container for submission.
- Large articles being submitted for processing should be secured with string or wire to a rigid substrate to prevent shifting and contacting other items.
- Exposure to water or dampness does not necessarily destroy all latent prints. Any wet or damp object must be air dried before it is packaged for shipment. The exception is with metal items that are prone to rust which are recovered from a body of water (e.g. recovered from lake). These should be kept in and submitted in a container with water.
- Items of evidence that are submitted for latent print processing may be submitted for testing in other sections prior to being processed in the Latent Print section. Some items may require coordination between sections to ensure that the proper sequences of analyses are completed. It is good practice to indicate all discipline specific testing that is requested on the same submission form.
- **Submission of Known Exemplars for LP Examination:**
  - Known exemplars must be submitted as separate items of evidence.

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- Photocopies of known exemplars will only be accepted with prior approval from the Impressions Manager or designee.
- If known exemplars are not available, the submitting agency can provide the name of the individual along with identifying reference numbers (GASID#/ FBI#/UCN).
- Often, latent prints found at the scene of a crime involve areas of the palms, soles of the feet, or second and third joint of the fingers, to include the finger sides and tips. Under these circumstances submitting agencies may be requested for additional major case prints.
- Information on how to obtain good known exemplars can be found on the FBI Web page.

Some General Considerations Regarding FW/Tire Impression Evidence

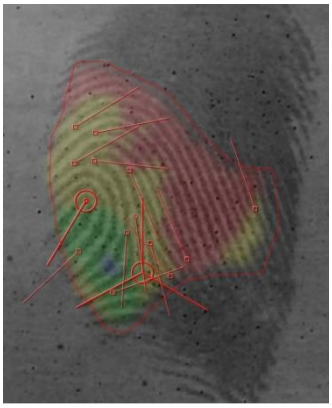
- Items of evidence that are submitted for footwear/tire processing may be submitted for testing in other sections prior to being processed in the Impressions section. Some items may require coordination between sections to ensure that the proper sequences of analyses are completed. It is good practice to indicate all discipline specific testing that is requested on the same submission form.

Impressions Examination Methodology

The methodology used at the GBI for all Impressions comparisons is commonly referred to as ACE-V (an acronym for Analysis, Comparison, Evaluation and Verification). An example of the Methodology for Friction Ridge examination can be found on the OSAC Web page.

Analysis

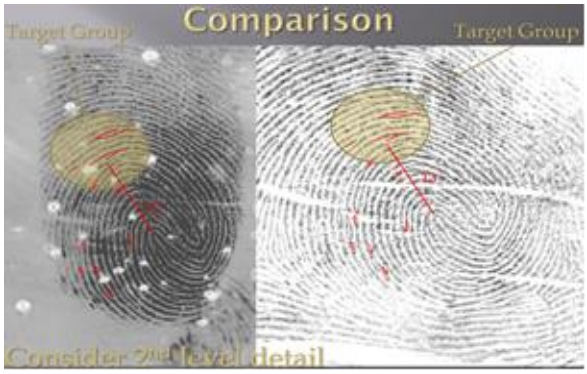
- At the GBI Crime Lab, analysis is a step in the ACE-V Methodology during which a forensic examiner considers the unknown item and/or known reference sample in terms of its properties, features or characteristics, which may be directly observable, measurable, or otherwise perceptible qualities, to assess whether a given item is suitable for potential comparison. It is a product of the quality and quantity of the objective data under observation e.g.:
    - In Friction Ridge, the data can consist of friction ridge features like general ridge flow, ridge events, creases, scars, etc..
    - In FW/Tire, the data can consist of general class characteristics, such as design elements, that exist



as a result of the manufacturing process or randomly acquired features such as damage that occurs as a result of wear.

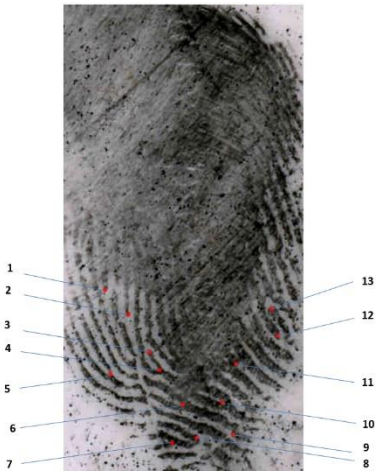
Comparison

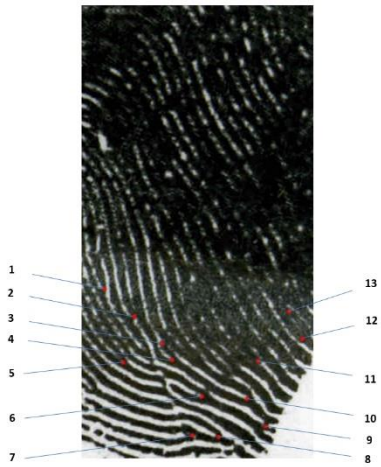
- Comparison involves the comparison between an unknown impression and a known exemplar to determine agreement or disagreement of features in the two impressions. It involves finding features/characteristics in sequence, in the same spatial relationship, and looking the same in terms of size and shape, to determine if they originated from a common source.



Evaluation

- Evaluation is the determination whether the information gathered during the comparison phase is enough to form a conclusion and ultimately decide whether the unknown impression is from the same source or a different source as the known exemplar.





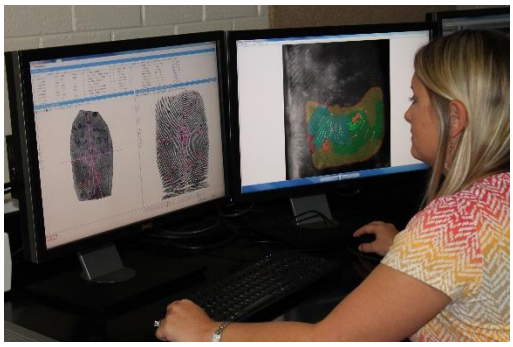
    - In Friction Ridge, an identification conclusion is reached when the friction ridge impressions have corresponding ridge detail and the examiner would not expect to see the same arrangement of details repeated in an impression that came from a different source.
    - In FW/Tire, an identification is reached when the questioned impression and the known footwear/tire reveal sufficient quantity and quality of class and randomly acquired characteristics in agreement to conclude that the questioned impression was made by the known footwear/tire.

Impressions Section Overview

Automated Fingerprint Identification System (AFIS)

The Georgia Automated Fingerprint Identification System (AFIS) is a computerized system utilized to search latent friction ridge impressions, submitted by criminal justice agencies across the state of Georgia, against a database consisting of known finger and palm print images, with the objective of identifying the unknown sources.

The Latent Print section is also connected to the FBI Next Generation Identification system (NGI) and impressions that do not result in identifications on the Georgia AFIS system are routinely searched on the FBI NGI system.
By examining the evidence submitted, the laboratory may be able to determine the presence of database quality friction ridge impressions for possible entry or to establish the identity of unknown deceased persons.



Unidentified Latent Prints

Storage of unidentified latent friction ridge impressions in the Georgia AFIS and FBI NGI systems is determined by case circumstances. When unidentified latent friction ridge impressions are entered into the unsolved latent databases, they are continuously compared against new finger and palm print records being added to the main database. Generally, unidentified latent friction ridge impressions will be registered to the unsolved databases only after elimination prints have been compared; this is especially true of cases of home burglaries and entering autos. If an identification is made to a registered latent friction ridge impression, a DOFS Official Report will notify the submitting agency.

If the submitting agency later identifies any latent friction ridge impressions previously submitted to the laboratory for an AFIS request, or the case concerning the fingerprints is cleared for any reason, the agency should notify the laboratory so that these latent friction ridge impressions can be purged from the databases.

Identifying the Deceased

In order to identify a deceased individual, postmortem friction ridge impressions should be taken for comparison purposes. These prints should be fully and clearly represented enough to be suitable for searching against the Georgia AFIS and FBI NGI databases, if no other known prints are available. When possible, a GA-SID or FBI#/UCN should be provided in order to expedite the time necessary to obtain known prints and identify the decedent.