The Lab Report

Volume 5, Issue 2 July 2015

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In This Issue...

In this second quarterly issue of *The Lab Report*, we will be discussing a number of topics. Registration is open for the Fall 2015 session of the NSP Crime Laboratory field training series, the Crime Lab Road Show! This training is open to all of the law enforcement officers and crime scene analysts in Nebraska and is FREE. The featured training topic, dates/locations, and additional information can be found on page 2. Also included in this issue is an in depth look at the investigative value of toolmark evidence, the NSP toxicology section capabilities, and an important update on the NSPCL laboratory facility relocation project!

For convenience, any links that are embedded in *The Lab Report* pdf documents can be accessed simply by clicking on the link! This includes the newest feature in the newsletter - links to laboratory supervisor contact information (see page 12). This feature allows for quick and easy contact with supervisors with a quick "click" of the mouse!

If you have any questions/concerns regarding the topics related to this issue of *The Lab Report*, please do not hesitate to contact us (laboratory contact information - pg. 12).

Enjoy!
Amy Weber (Firearm/Toolmark Section Analyst - Editor)

The Backlog Corner

(*approximate turnaround times are calculated for routine cases only - RUSH cases not included)

Biology Unit: 201 assignments (approx. 6 month turnaround time)

Physical Sciences Unit:

Firearm/Toolmark cases: 10 assignments (approx. 3 month turnaround time)

Footwear/Tire cases: 1 assignment (approx. 1 month turnaround time)

Latent Fingerprints Section: 71 assignments (approx. 2.5 month turnaround time)

Chemistry Unit:

Controlled Substances: 768 assignments (approx. 4 month turnaround time)

Toxicology: 167 assignments (approx. 3 month turnaround time)

Trace: 4 assignments (approx. 2 month turnaround time)

Free Training!! NSP Crime Laboratory Roadshow (Fall 2015)

Firearm & Toolmark Evidence:

Collection, Capabilities, and Conclusions

Provided By: NSP Crime Laboratory Firearm/Toolmark Section Analysts

Dates/Locations:

October 1, 2015	Norfolk	Northeast Comm. College
October 2, 2015	Omaha	DEA Facility (Emerald Pointe Bldg.)
October 5, 2015	Lincoln	Southeast Comm. College, East O. St.
October 6, 2015	Grand Island	Nebr. Law Enforcement Training Ctr
October 8, 2015	Scottsbluff	Western Nebraska Comm. College
October 9, 2015	North Platte	Mid-Plains Comm. College, North Campus

Time: 0900-1600 with a break for lunch

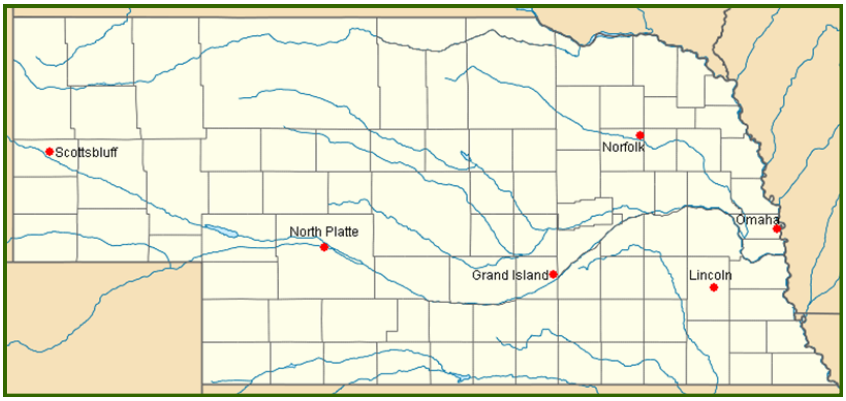
Who Can Attend?: Open to all Nebraska law enforcement officers and crime scene analysts

Cost: **FREE!!!!!** Class sizes will be limited (maximum 30 people), so sign up early!

Continuing Education Credit: 5.25 hours

Registration:

For additional details, to register, cancel registration, or add a name to the wait list, please contact Sarah Zarnick (Sarah.Zarnick@nebraska.gov), Amy Weber (Amy.Weber@nebraska.gov), or call the NSP Crime Lab @ 402-471-8950.



Firearm/Toolmark Section

Kent Weber (Sup.)

Amy Weber

Sarah Zarnick

The Investigative Value of Toolmark Evidence

The analysis and microscopic comparison of toolmark evidence is a type of examination performed by the Firearm/Toolmark Section of the NSP Crime Laboratory (NSPCL). As the weather gets warmer, the number of burglaries and thefts from residences, businesses, storage units, vehicles, and construction sites tends to increase. Toolmark evidence is often left behind that, if collected and submitted for analysis (with or without a tool), can help link a suspect to the scene of a crime. Other indications of crimes in which one might expect to find toolmark evidence are: intentional knife marks in tires, hit and run accidents, and cut marks in bone. **The following article is intended to introduce the reader to some of the more commonly observed types of toolmark evidence that is found at the scene of a crime as well as in the suspect's possession and the types of analysis that the NSPCL Firearm/Toolmark Section can provide!**

Toolmark Evidence

Common Types of Tools:

⇒ **Cutting Tools** (bolt cutter, cable cutter, wire cutter, knife, saw, etc.)

⇒ **Compression Tools** (hammer, pry bar, blunt objects, etc.)

⇒ **Gripping Tools** (vice grips, pipe wrench, pliers, channel lock, etc.)

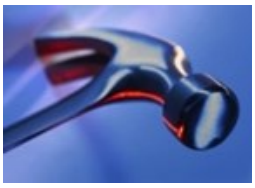
⇒ **Prying Tools** (screwdriver, pry bar, paint can keys, etc.)

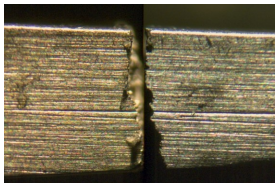
⇒ **Power Tools** (reciprocating saw, drills, etc.)

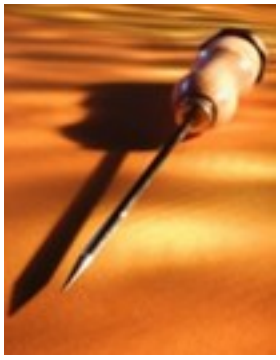
Common Examples of Evidence Toolmarks:

Obvious: Distressed/distorted surface material, impressed marks, striated marks, saw marks, etc.

Not So Obvious: Cuts in tires or wire/cable insulation material, drill marks, fractured pieces of tools and/or surface material (metal theft), paint chips, dies/stamps, sharp force trauma to bone/cartilage, severed body parts.







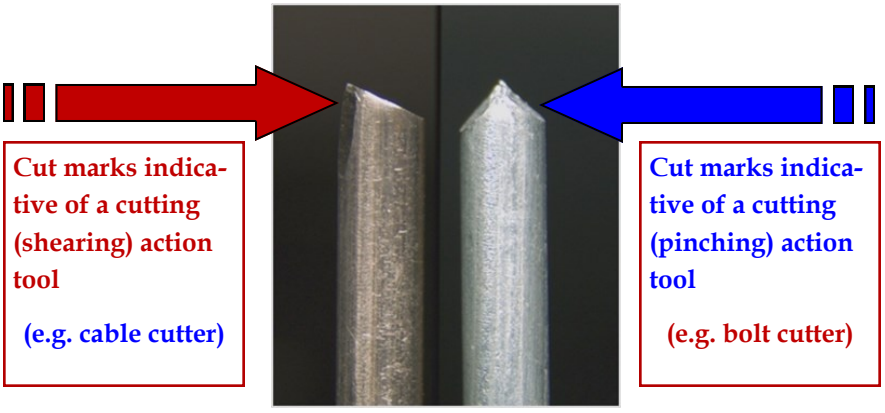
The Investigative Value of Toolmark Evidence

Evidence Toolmarks (No tool submitted/recovered on scene)

There are times when evidence toolmarks are collected at the scene of a crime (e.g. cut padlocks) in which there is no suspect developed or suspect tool recovered. **Laboratory analysis of the evidence toolmarks can provide the following investigative leads:**

Case Example #1

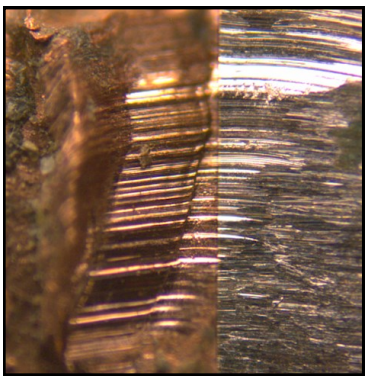
Cut fence wire from the point of entry of a construction site where items were stolen submitted to the laboratory.



Analysis of the class characteristics (type of cut marks) of the wires can provide the TYPE of suspect tool that needs to be recovered for a microscopic comparison (also can indicate what suspect tools to NOT collect and submit)

Case Example #2

Multiple cut padlocks recovered from the scene of a storage unit burglary submitted to the laboratory.

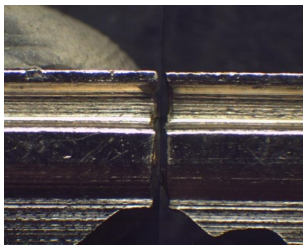


- **Analysis of TYPE of cut to determine tool type used to cut the shackles.**
- **Microscopic comparison to determine if the evidence toolmarks are from the same tool source or different tools.**

Firearm/Toolmark Section

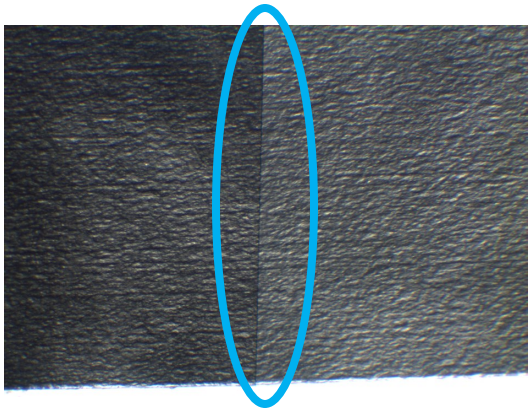
Kent Weber (Sup.)
Amy Weber
Sarah Zarnick

The Investigative Value of Toolmark Evidence



Case Example #3

Electrical tape used to bind a victim's hands as well as a roll of similar tape recovered after a search warrant at the suspect's home submitted to the laboratory.

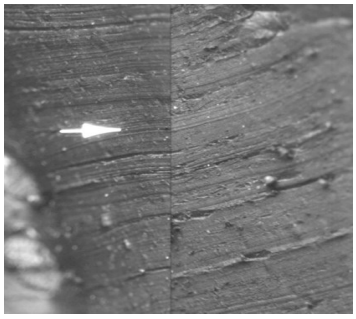


Microscopic comparison of extrusion marks from the manufacturing process between the piece of tape and the roll of tape can provide a common linkage between items in a suspect's possession to items found at the scene.

Evidence Toolmarks (Tool recovered and submitted)

Case Example #4

Victim's car tires were found "slashed" and a suspect knife was recovered on the suspect. The portion of the tire sidewall containing the evidence cut mark and the knife submitted to the laboratory.



Test toolmarks produced in the laboratory by the suspect knife were microscopically compared with the evidence toolmark and determined to be the source of the evidence toolmark.

Microscopic comparisons can be used to identify/eliminate source tool(s)

The Investigative Value of Toolmark Evidence

Fracture Match/Physical Fit Analysis

Fracture match/physical fit analysis can be used to provide a linkage between a broken object (or objects) recovered from a crime scene to a broken object found in the possession of a suspect. Some common examples of scenes where this type of evidence can be valuable are: hit and run accidents, broken pieces of tools found in another object (knife tips in bone, screwdriver tips in safes, severed wire insulation, etc.), ripped/cut tape ends., and torn shoe outsoles.

Analysis consists of visual and microscopic evaluation of media type, fracture planes, randomly occurring toolmark carryover, and manufacturing mark carryover.

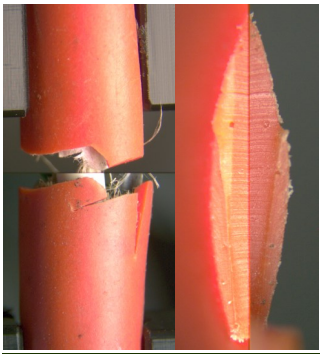
When submitting items to the NSPCL for physical fit analysis, be mindful to carefully package the ends of the items that require comparison. Oftentimes, this type of fractured evidence can be fragile!

Firearm/Toolmark Section

Kent Weber (Sup.)

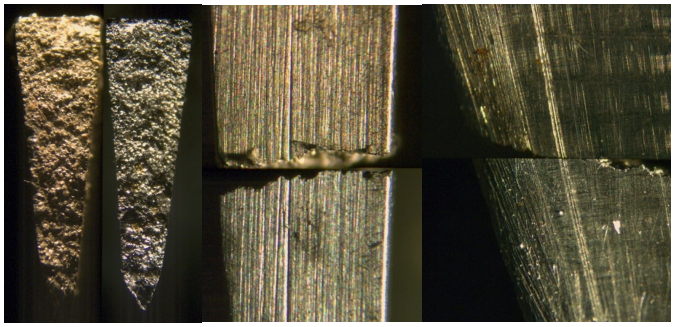
Amy Weber

Sarah Zarnick



Cut wire insulation from scene and suspect home (phys fit and microscopic comparison)

Screwdriver tip found in an object that had been pried open physically fit to a broken suspect screwdriver



Broken knife tip recovered from a point of entry physically fit to a suspect knife.

(lft) micro fractured surfaces

(mid) manufacturer markings

(rgt) individual marks from blade sharpening

The Investigative Value of Toolmark Evidence

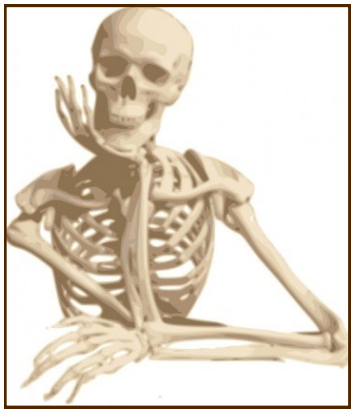
Things to Consider...

- **Many metals are case hardened during production (e.g. padlock shackles) making the metal extremely brittle. When these metals are cut with a bolt cutter/cable cutter, the cut ends tend to fracture. Striations on the cut surfaces can still exist, but may not be readily visible to the naked eye. For this reason, send ALL evidence toolmarks to the laboratory for microscopic analysis—don't SCREEN toolmark evidence!**
- **If possible, send in samples of the media in which the evidence toolmarks were found (e.g. extra fencing, chain links, wires/cable bundles, etc.). This media can change over time and is not always readily available at the laboratory. Extra media references can be used to make test toolmarks with the suspect tool for comparative purposes.**
- **When objects containing evidence toolmarks are too large to remove and send to the laboratory, take photos of the toolmarks and then use a silicon casting material (e.g. Mikrosil) to make casts of the toolmarks to submit for comparison. Submit the casts and digital images of the toolmarks for reference.**
- **Use care when packaging all toolmark evidence (tool working surfaces and evidence toolmark ends). This type of evidence can be fragile— any damage to the tool after collection can change the appearance of the toolmarks the tool produces.**
- **NEVER insert a tool back into the evidence toolmark!! This action can obliterate comparable striations/impressions vital for analysis!!**

Toolmarks in Bone (Special Consideration)

On occasion, analysis is required to compare toolmarks found in bone and/or cartilage to a suspect cutting tool (e.g. knife, saw, etc.). Marks found in bone or cartilage can be identifiable to a source tool.

The condition and/or age of toolmarks found in bone/cartilage may require special preservation to prevent further degradation of the evidence prior to analysis.



For this type of case, please contact an NSPCL Firearm/Toolmark analyst for detailed preservation information.

NSPCL Toxicology Section Capabilities

The Toxicology Section of the NSP Crime Laboratory performs testing for the presence of drugs and drug metabolites in urine. The majority of the cases submitted to this section involve **drugged driving (DUID) cases** where the identification of drug/drug metabolite substances in the urine, along with the testimony of a law enforcement officer regarding the signs of impairment, can lead to successful prosecution of the specific case.

For DUID cases specimen collection and preservation, how the urine samples are screened and confirmed, and what is reported are covered in the State of Nebraska Regulations Title 177 NAC 7. As per these regulations, anyone performing urine testing for use in DUID prosecutions must possess a Class D permit issued by the Department of Health and Human Services. Title 177 also includes "cutoff" levels for some specific drugs. These cutoff levels do not have any correlation to impairment and it should not be considered that the substances listed with these levels are the only ones which can be tested.

Chemistry Unit/ Toxicology Section

Celeste Laird (Mgr.)
Brad Rutledge

Based upon the rules in Title 177, when the NSP crime laboratory receives samples from suspected DUID cases, the urine is first screened for the possible presence of impairing substances or their metabolites. Once this screening is complete, the toxicologist will perform confirmation testing to positively identify the exact substances present.

In addition to the samples received for DUID testing, the toxicology section sometimes receives samples taken from suspects of possession of drug cases, homicides etc. Regulations for testing of these types of samples are not included in Title 177 NAC 7.

NSPCL Toxicology Section Capabilities

In the past year the toxicology section of the lab has seen a considerable increase in submissions and as a result the turnaround time of the section has increased. **In order to continue to provide the timeliest service possible, the laboratory has implemented the following policies:**

- **Many of the urine samples received at the laboratory for testing in relation to DUID cases are termed "polydrug" samples, meaning they contain multiple drugs or drug metabolites. In many instances the prosecution of the DUID case will not require confirmation of all the substances found during screening. The laboratory will communicate with prosecutors regarding what confirmations are absolutely needed for prosecution and only report screening information for all other substances.**

- **The Crime Laboratory will only routinely report screening results for urine samples submitted in drug possession cases which do not include a driving offense. Communication should be initiated by the submitting agency if confirmation is required.**

- **Samples submitted which are being utilized for Drug Recognition Expert Certification (DRE) only (not for prosecution) will only be screened and not confirmed.**

UPDATE: NSP Crime Laboratory Relocation Information

Construction progress on the new NSP Crime Laboratory facility is moving along at a rapid pace. The new laboratory will be located in Lincoln on the corner of NW 39th and Air Park Road, allowing for easy access from I-80 using Exit 395 north, and from Highway 34 exiting south on NW 48th Street. We anticipate that the move will take place sometime in September 2015.

We want to provide you, our customers, with as much advance information as possible so that impacted agencies can plan accordingly. While exact move dates and details have yet to be determined, in general the following will occur:

- Evidence Handling: There will be a large push from the Evidence Section to return as much completed evidence as possible back to the submitting agencies prior to the move. The goal of this push is to attempt to minimize the amount of evidence that must be inventoried, secured, moved and accounted for in the new facility. **We would appreciate your help in picking up completed evidence that cannot be mailed as soon as feasible after you are notified that the testing has been completed**.
- There is an anticipated period of approximately 3 weeks during which no new evidence will be accepted at the old or new lab facilities.
- **All analytical processes will cease for a period of time.** This time period will vary depending upon the type of analysis and the steps involved in getting required instruments/equipment relocated, installed and tested to ensure proper functioning at the new facility. We will regularly disseminate updates on our progress relevant to each analytical service we provide.
- **During the time that our services are suspended, we will be unable to accommodate emergency rush requests due to the fact that we will be unable to access the instruments/equipment that we need to perform our testing.**

UPDATE: NSP Crime Laboratory Relocation Information

Be on the lookout for more information from us with move dates and details, such as:

- **Date that the laboratory will cease accepting new evidence submissions**
- **Date ALL analysis will cease**
- **Address for mailing and delivery of evidence to the new location**
- **Date the laboratory will resume accepting new evidence submissions**
- **Notifications of examination resumption as each discipline develops the ability to perform testing in the new location.**

Relocating a forensic laboratory is a complex process involving a lot of coordination between laboratory personnel, instrument vendors, and moving companies. Due to this fact, the moving process will require a temporary lapse in analytical services. Analytical instruments/equipment are required to be taken down, packed and set up again by their specific vendors in order not to void our maintenance contracts as well as to ensure they are working properly at the new location. Many different instrument vendors will be involved in this move.

In addition, our existing evidence room storage shelving is slated to be used at the new location. This will require packing and storing of evidence into a temporarily secured area while the current shelving is removed and set up at the new building location, prior to the evidence itself being moved. Evidence and other items that must be kept cold or frozen must also be temporarily relocated while our storage refrigerators and freezers are moved, installed, and returned to proper temperature. The above listed items are just a few of the complications that make this a difficult, time consuming move and will require a period of down time.

We apologize in advance for any inconvenience this may cause, but look forward to being up and running in our new and greatly improved facility soon.

For questions/concerns, feel free to contact NSPCL Laboratory Director, Pam Zilly (Pam.Zilly@nebraska.gov) or call 402-471-8950.

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Evidence Receipt Hours:
Monday-Friday
9am-4pm

To contact the crime lab with general laboratory questions, call the main phone number or email Vicki Hopkins at:

NSP.CrimeLab@nebraska.gov

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Information / Data current as of June 26, 2015