



## Toolmarks Examination Test No. 14-528 Summary Report

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This test was sent to 245 participants. Each sample set contained a bolt cutter (Item 1) and two padlocks containing questioned toolmarks (Items 2 and 3). Participants were requested to examine these items and report their findings. Data were returned from 202 participants (82% response rate) and are compiled into the following tables:

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This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

# Manufacturer's Information

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Each sample set contained a bolt cutter (Item 1), two padlocks containing questioned toolmarks (Items 2 and 3) and a 5" piece of soldering wire for test cut purposes. Participants were requested to determine which, if any, of the questioned toolmarks were made by the submitted tool. The Item 2 padlock was cut by the Item 1 bolt cutter. The Item 3 lock was cut by a bolt cutter not provided for examination.

## SAMPLE PREPARATION-

Items 2 and 3 were Master Lock® 20mm Padlocks, Item #121T. The Lead Free Soldering wire used for test cutting purposes was Bernzomatic® Lead-free Solid Wire Solder, Item #SSW300.

ITEM 3 (PREPARATION and ELIMINATION MARKS): A green dot was painted on the elimination padlock. The padlock was cut using a Pittsburgh® 12" Bolt Cutter, Item #32251 and packaged into a pre-labeled Item 3 envelope. The above process was repeated until all elimination toolmarks had been prepared.

ITEMS 1 and 2 (PREPARATION and IDENTIFICATION MARKS): Each bolt cutter (Michigan Industrial Tools® Tekto™ 8" Bolt Cutter, Item # 3386) was opened and inspected for defects. The bolt cutters were used to cut spare solder wire to remove manufacturing defects and residue. This process was done to break in the tools. After the bolt cutters were broken in, an Item 1 label was attached to the handle of each bolt cutter. The padlock was cut and packaged into a pre-labeled Item 2 envelope. The corresponding bolt cutter and matching Item 2 padlock were immediately assembled into the sample pack as described below. The above process was repeated until all identification toolmarks had been prepared.

SAMPLE SET ASSEMBLY: The corresponding Item 1 bolt cutter and the Item 2 padlock were packaged into a pre-labeled sample pack box along with an Item 3 padlock. An additional 5" piece of solder wire was included for testing purposes. This process was repeated until all of the sample sets were prepared. Once verification was completed, the sample sets were sealed with evidence tape and initialed "CTS."

## VERIFICATION -

In addition to the sets examined by predistribution laboratories and an AFTE representative, 10 sample sets were examined by a qualified tool mark examiner who confirmed the expected identification between Items 1 and 2.

*Release Date of Manufacturer's Information: 18-August-2014*

## **Summary Comments**

This test was designed to allow participants to assess their proficiency at a toolmark examination involving striated type toolmarks. Each sample set consisted of one bolt cutter (Item 1) and two padlocks (Items 2 and 3) containing the questioned toolmarks. Participants were requested to determine if the recovered bolt cutter could have cut either of the questioned padlocks. The Item 2 padlock was cut by the Item 1 bolt cutter. The Item 3 padlock was cut by a bolt cutter that was not provided for examination. [Refer to Manufacturer's Information for preparation details.]

Of the 202 responding participants, 200 (99%) identified the Item 1 bolt cutter as having cut the Item 2 padlock and either eliminated it (166) or were inconclusive (34) as to it having cut the item 3 padlock. One participant identified the Item 1 bolt cutter as having cut both the Items 2 and 3 padlocks and one other participant eliminated it as having cut either of the padlocks..

Several participants commented that the toolmarks produced by the Item 1 bolt cutter and the questioned toolmarks on the Item 3 padlock shared class characteristics, but insufficient corresponding individual characteristics were observed. [As a matter of policy, many labs will not eliminate without access to the tool or when class characteristics match.]

# Examination Results

*Was the questioned bolt cutter (Item 1) used to cut either of the padlocks (Items 2 or 3)?*

TABLE 1

| WebCode | Item 2 | Item 3 | WebCode | Item 2 | Item 3 |
|---------|--------|--------|---------|--------|--------|
| 24WEA4  | Yes    | No     | 4ZBAU7  | Yes    | No     |
| 269E7Y  | Yes    | No     | 6EN3X3  | Yes    | Inc    |
| 26ZC7Z  | Yes    | No     | 6J4VJ9  | Yes    | No     |
| 29HJGK  | Yes    | No     | 6JR97E  | Yes    | No     |
| 29T26D  | Yes    | No     | 6NU6ZE  | Yes    | No     |
| 2EKVBW  | Yes    | No     | 6PATPR  | Yes    | No     |
| 2GKGW3  | Yes    | No     | 6VKNYT  | No     | No     |
| 2MTCXW  | Yes    | No     | 722K9B  | Yes    | No     |
| 2T4FUQ  | Yes    | No     | 74LQ7C  | Yes    | Inc    |
| 2V2EYH  | Yes    | No     | 78BTF8  | Yes    | No     |
| 2XXF8Z  | Yes    | Inc    | 7PNDCB  | Yes    | No     |
| 2YCLQW  | Yes    | No     | 7QCJ4F  | Yes    | No     |
| 329U46  | Yes    | No     | 7R7CYY  | Yes    | No     |
| 36WY8B  | Yes    | No     | 7TH7EY  | Yes    | No     |
| 37UFM7  | Yes    | No     | 86TUC3  | Yes    | No     |
| 3G3EQK  | Yes    | No     | 8E86VZ  | Yes    | No     |
| 3GQFXW  | Yes    | No     | 8KMV7U  | Yes    | No     |
| 3H2D88  | Yes    | No     | 8WMBXC  | Yes    | No     |
| 3HDK9A  | Yes    | Inc    | 938UZY  | Yes    | No     |
| 3VJEEX  | Yes    | No     | 9EKWVG  | Yes    | No     |
| 3WGE4X  | Yes    | No     | 9GXJH3  | Yes    | Inc    |
| 3WPBWB  | Yes    | No     | 9RHT6B  | Yes    | Inc    |
| 3X2Z4U  | Yes    | No     | 9XPTNY  | Yes    | No     |
| 3XMB6N  | Yes    | No     | A7DE6C  | Yes    | No     |
| 4EW9NJ  | Yes    | No     | A7TN2J  | Yes    | No     |
| 4JAU2W  | Yes    | No     | AAMUWM  | Yes    | No     |
| 4WDF32  | Yes    | No     | ADCWJN  | Yes    | No     |
| 4YWXZ8  | Yes    | No     | AQ8MGK  | Yes    | No     |

TABLE 1

| WebCode | Item 2 | Item 3 | WebCode | Item 2 | Item 3 |
|---------|--------|--------|---------|--------|--------|
| AZPUYB  | Yes    | No     | FY4HX6  | Yes    | No     |
| B6FENC  | Yes    | No     | G668XA  | Yes    | No     |
| BCMFB7  | Yes    | Inc    | GDN4MH  | Yes    | No     |
| BCMM7C  | Yes    | No     | GFJACU  | Yes    | No     |
| BGXKPR  | Yes    | No     | GYNKRC  | Yes    | No     |
| BHC3UJ  | Yes    | Inc    | H4899A  | Yes    | No     |
| BRZRKR  | Yes    | No     | H4XZWU  | Yes    | No     |
| BUVABL  | Yes    | No     | HAB6Y2  | Yes    | Inc    |
| BZT3VM  | Yes    | Inc    | HCEXVK  | Yes    | No     |
| CMKP2T  | Yes    | No     | HGBZV9  | Yes    | No     |
| CUBQ8Y  | Yes    | Inc    | HHGKJ9  | Yes    | No     |
| DCFZYH  | Yes    | No     | HHHKBW  | Yes    | No     |
| DGG2JD  | Yes    | No     | J6TTDY  | Yes    | No     |
| DU46QA  | Yes    | No     | JP6URC  | Yes    | Inc    |
| DW77CE  | Yes    | No     | JTN8DZ  | Yes    | Inc    |
| DWBNRQ  | Yes    | Inc    | JZWF6F  | Yes    | No     |
| DXTW9D  | Yes    | No     | K7PTLG  | Yes    | No     |
| DZ6PCR  | Yes    | No     | KA88W4  | Yes    | No     |
| E6BMAX  | Yes    | No     | KBEM9G  | Yes    | No     |
| E9NZQ7  | Yes    | Inc    | KGT9AZ  | Yes    | No     |
| EAF4B2  | Yes    | No     | KH28F3  | Yes    | No     |
| EBE6JD  | Yes    | No     | KPFGJP  | Yes    | No     |
| EHA6VK  | Yes    | Inc    | KT23CD  | Yes    | No     |
| F26LM7  | Yes    | No     | LJND8D  | Yes    | Inc    |
| F4Y4CM  | Yes    | No     | LYBG6M  | Yes    | No     |
| F8FGMA  | Yes    | No     | M4VYQJ  | Yes    | No     |
| FC9UBJ  | Yes    | No     | MAKF3A  | Yes    | No     |
| FNUK24  | Yes    | No     | MLUDM4  | Yes    | No     |
| FPT2JD  | Yes    | No     | MY3UZ2  | Yes    | No     |
| FQXLJR  | Yes    | Inc    | N2AJ4N  | Yes    | No     |
| FUCAUX  | Yes    | No     | N6CK2Y  | Yes    | No     |

TABLE 1

| WebCode | Item 2 | Item 3 | WebCode | Item 2 | Item 3 |
|---------|--------|--------|---------|--------|--------|
| NDWVUD  | Yes    | Inc    | TUQWWL  | Yes    | No     |
| NHYK2E  | Yes    | No     | TY8AYM  | Yes    | No     |
| NNQU9R  | Yes    | No     | TZR74E  | Yes    | No     |
| NPNCV9  | Yes    | No     | U3QKU7  | Yes    | Inc    |
| NWL42G  | Yes    | No     | U87CDQ  | Yes    | No     |
| P3UXL4  | Yes    | No     | U9E98N  | Yes    | No     |
| P7MGDV  | Yes    | No     | UAAGHY  | Yes    | No     |
| PDUHX6  | Yes    | No     | UDETT7  | Yes    | No     |
| PE6CHB  | Yes    | No     | UE33AF  | Yes    | No     |
| PUB3GN  | Yes    | No     | ULZJWE  | Yes    | Yes    |
| PVJJ9T  | Yes    | No     | UZK4EM  | Yes    | No     |
| PXTCHA  | Yes    | No     | VGKGDF  | Yes    | No     |
| Q4PT4Y  | Yes    | No     | VGRXZZ  | Yes    | Inc    |
| Q83P62  | Yes    | No     | VNJXZF  | Yes    | No     |
| QAZUBN  | Yes    | No     | VNPP6N  | Yes    | No     |
| QEYFTX  | Yes    | No     | VXRMJ6  | Yes    | Inc    |
| QH2CKD  | Yes    | No     | W3T7WB  | Yes    | Inc    |
| QKN3GC  | Yes    | No     | W9WDDY  | Yes    | No     |
| QPC78N  | Yes    | No     | WFDT23  | Yes    | No     |
| R2UJAV  | Yes    | No     | WK66VD  | Yes    | No     |
| R9BC37  | Yes    | No     | WMMY28  | Yes    | Inc    |
| RMN264  | Yes    | Inc    | WQ48ML  | Yes    | No     |
| RQJWKW  | Yes    | No     | WXQG62  | Yes    | No     |
| RTQ8MR  | Yes    | No     | WYQFLP  | Yes    | No     |
| RVTB9M  | Yes    | No     | XBNQTN  | Yes    | No     |
| RVV3Z4  | Yes    | No     | XFJA2E  | Yes    | Inc    |
| T6DYK2  | Yes    | No     | XFQVY2  | Yes    | No     |
| TBKHPL  | Yes    | No     | XGDWWQ  | Yes    | No     |
| TE9DPD  | Yes    | No     | XGNAD7  | Yes    | No     |
| TFMLAZ  | Yes    | Inc    | XHYYTC  | Yes    | No     |
| THAC7X  | Yes    | No     | XVYBX6  | Yes    | No     |

TABLE 1

| WebCode | Item 2 | Item 3 | WebCode | Item 2 | Item 3 |
|---------|--------|--------|---------|--------|--------|
| XXMJ36  | Yes    | No     |         |        |        |
| XZTBCZ  | Yes    | No     |         |        |        |
| Y28EXA  | Yes    | No     |         |        |        |
| Y6GCQJ  | Yes    | No     |         |        |        |
| Y6VX38  | Yes    | Inc    |         |        |        |
| Y7JNKD  | Yes    | No     |         |        |        |
| Y7KEWM  | Yes    | No     |         |        |        |
| YEBUP8  | Yes    | No     |         |        |        |
| YEX7KY  | Yes    | Inc    |         |        |        |
| YJZH2   | Yes    | No     |         |        |        |
| YJZZ33  | Yes    | Inc    |         |        |        |
| YM9PJP  | Yes    | No     |         |        |        |
| YTR6YF  | Yes    | No     |         |        |        |
| YULQT7  | Yes    | Inc    |         |        |        |
| YW8CLU  | Yes    | No     |         |        |        |
| YWT74J  | Yes    | No     |         |        |        |
| Z7XBVZ  | Yes    | Inc    |         |        |        |
| ZGPJZP  | Yes    | Inc    |         |        |        |
| ZKR3CU  | Yes    | No     |         |        |        |
| ZQTRLG  | Yes    | No     |         |        |        |
| ZVXPMF  | Yes    | Inc    |         |        |        |
| ZZTCJP  | Yes    | No     |         |        |        |

| Response Summary  |     | Total Participants: 202 |                    |
|---|-----|-------------------------|--------------------|
| <i>Was the questioned bolt cutter (Item 1) used to cut either of the padlocks (Items 2 or 3)?</i> |     |                         |                    |
| <b>Responses</b>  |     | <u>ITEM 2</u>           | <u>ITEM 3</u>      |
|   | Yes | <b>201</b> (99.5%)      | <b>1</b> (0.5%)    |
|   | No  | <b>1</b> (0.5%)         | <b>167</b> (82.7%) |
|   | Inc | <b>0</b> (0.0%)         | <b>34</b> (16.8%)  |

# Conclusions

TABLE 2

| WebCode | Conclusions   |
|---------|---|
| 24WEA4  | Item #1.1 (CTS Item #1) bolt cutter was identified as the tool that made the toolmarks present on Item #1.2 padlock (CTS Item #2). Item #1.1 (CTS Item #1) bolt cutter was eliminated as the tool that made the toolmarks present on Item #1.3 padlock (CTS Item #3).   |
| 269E7Y  | (1) Microscopic comparative examination disclosed that Item #2 was cut by Item #1. (2) Microscopic comparative examination disclosed that Item #3 was not cut by Item #1, due to difference in individual characteristics.  |
| 26ZC7Z  | Item 2 is caused by item 1. Item 3 is not caused by item 1.   |
| 29HJGK  | The Item one (1) bolt cutter cut the Item two (2) padlock. The Item one (1) bolt cutter did not cut the Item three (3) padlock based on differences in class characteristics.   |
| 29T26D  | Item 2 (padlock) have been cut by item 1 (bolt cutter). Item 3 (padlock) haven't been cut by item 1 (bolt cutter).  |
| 2EKVBW  | Toolmarks present on Item 2 were microscopically examined and identified as having been produced by the Item 1 bolt cutter. Toolmarks present on Item 3 were microscopically examined, compared and eliminated as having been produced by the Item 1 tool due to differences in individual characteristics. Three (3) tests produced using Item 1 are being returned as Item 1T and should be maintained for possible future examinations.  |
| 2GKGW3  | Results of Examinations: The Item 2 padlock was identified as having been cut by the Item 1 bolt cutters. Due to a difference in class characteristics (i.e. manufacturing process of the blade) the Item 3 padlock was excluded as having been cut by the Item 1 bolt cutters. Methods: Toolmarks, whether they are present on two evidence items or on one evidence item and one test-mark created in the Laboratory, undergo two stages of comparison. First, the toolmarks are examined to determine and compare their class characteristics. The class characteristics of toolmarks include type of cutting action and the size and orientation of gripping or cutting surfaces. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. [Participant included an association scale that could not be replicated within the report.] |
| 2MTCXW  | Toolmarks present on Item #2 were identified as having been made by Item #1<br>Tollmarks[sic] present on Item #3 were not made by Item #1   |
| 2T4FUQ  | The bolt cutter Exhibit 1 was used to make tests in suitable laboratory material. The toolmarks on the cut ends of the shackle from the padlock Exhibit 2 were compared microscopically with tests. The padlock Exhibit 2 was cut by the bolt cutter Exhibit 1. The padlock Exhibit 3 was not cut by the bolt cutter Exhibit 1. Any pinching/cutting tool that becomes suspect should be submitted to this laboratory for examination.  |
| 2V2EYH  | Lock L-1 (Item #2) was cut by Bolt Cutter BC-1 (Item #1). Lock L-2 (Item #3) was not cut by Bolt Cutter BC-1 (Item #1).   |
| 2XXF8Z  | The first padlock (item 2) was cut by the bolt cutters (item 1). Comparisons of the second padlock (item 3) to the bolt cutters (item 1) and to the first padlock (item 2) were inconclusive due to agreement in discernible class characteristics, but insufficient agreement or disagreement of individual details to permit an identification or an elimination. The lock (item 3) was cut by a pinching type tool, such as bolt cutters. Any tool suspected of  |



TABLE 2

| WebCode | Conclusions   |
|---------|---|
| 2YCLQW  | involvement with the offense should be submitted to a qualified toolmarks examiner for further comparisons.   |
| 329U46  | Test toolmarks made using the bolt cutters (Item 1) were microscopically compared to the toolmarks present on the padlocks (Items 2 and 3). Based on these comparative examinations, the following were determined: The bolt cutter was identified as having made the cut through the shackle of the first padlock (Item 2). The bolt cutter was eliminated as having made the cut through the shackle of the second padlock (Item 3).<br>Item 1 One (1) Tekton bolt cutter tool. Item 1T Test cuts produced from Item 1 (Item created at the Eastern Laboratory). Item 2 Cut Padlock. Item 3 Cut Padlock. Item 1 was examined. The three (3) test cuts produced using Item 1 are being returned as Item 1T in container 1 and should be maintained for possible future examinations. Toolmarks present on Item 2 were microscopically examined and identified as having been produced by Item 1. Toolmarks present on Item 3 were microscopically examined, compared, and eliminated as having been produced by the Item 1 tool due to differences in class characteristics.   |
| 36WY8B  | Test cuts were made on the submitted test material using the Item 1 bolt cutters for comparison to the cuts present on the shackles of the Item 2 and Item 3 padlocks. The tool marks present in the cuts on the Item 2 padlock were made using the Item 1 bolt cutter. The tool marks present in the cuts on Item 3 padlock were not made using the Item 1 bolt cutter due to differences in class characteristics.  |
| 37UFM7  | A visible length of half-moon shaped deposits, approximately ¼ inches long, was present on both sides of the lower portion of the cutting edge of each bolt cutter jaw, item 1. Potential trace evidence consisting of sliver colored fragments resembling metal was found in these areas. These fragments were collected and designated collectively as item 1A. A silicone rubber cast was made of the cutting edge of each bolt cutter jaw in the half-moon shaped deposit area. These two casts were designated collectively as item 1B. An examination of the two cut edges of each padlock shackle, items 2 and 3, revealed toolmarks with sufficient microscopic detail for comparison and identification purposes. No trace evidence was found on either of these cut shackles. A comparison of the casts from the bolt cutter jaw edges with the toolmarks on the cut shackle ends from padlock 2 revealed sufficient agreement of individual toolmark detail to establish that this shackle was cut into two pieces using the submitted bolt cutter, item 1. A comparison of the casts from the bolt cutter jaw edges with the toolmarks on the cut shackle ends from padlock 3 revealed sufficient differences both in microscopic toolmark detail and in class characteristics, such as the width of the cutting edge and shape and the angle of grinding marks on the beveled side of the cutting surfaces, to establish that the submitted bolt cutter, item 1, was not used to cut this shackle. |
| 3G3EQK  | Examinations showed the tool mark within Item 2 was created by Item 1. Examinations showed the tool mark within Item 3 was not created by Item 1.   |
| 3GQFXW  | Four (4) test marks were produced using the Item 1 bolt cutter. These test marks are being returned as Item 1T in container 1 and should be maintained for possible future examination. Items 2 and 3 were microscopically examined and compared to the test marks produced using the Item 1 bolt cutter. Item 2 was identified as having been cut by Item 1. Item 3 was eliminated as having been cut by Item 1 due to sufficient differences in individual characteristics.   |
| 3H2D88  | Item #2 (Padlock Shackle) was identified as having been cut by Item #1 (Tool). Item #3 (Padlock Shackle) was not cut by Item #1 (Tool) based on differences in class characteristics.   |
| 3HDK9A  | The Item 2 cut padlock was microscopically compared to test cuts (Item 1.1) from the Item 1 bolt cutters with positive results. The Item 2 padlock was identified as having been cut by the   |

TABLE 2

| WebCode | Conclusions  |
|---------|--|
| 3VJEEEX | Item 1 bolt cutters. The Item 3 cut padlock was microscopically compared to test cuts (Item 1.1) from the Item 1 bolt cutters with inconclusive results. The Item 3 padlock could neither be identified nor eliminated as having been cut by the Item 1 bolt cutters.  |
| 3WGE4X  | I have found a match between the marks found on the 1st cut pedlock Item 2 and the marks produced by the bolt cutter Item 1. This tool (Item 1) was used for cutting this pedlock (Item 2), and left its marks on it. I have found differences between the marks found on the 2nd cut pedlock Item 3 and the marks produced by the bolt cutter Item 1. This tool (Item 1) was not used for cutting the 2nd pedlock (Item 3). This cut pedlock (Item 3) was cut but another type of tool. [sic]   |
| 3WPBWB  | The toolmarks displayed on the cut shackle of Item 2 were identified as having been produced by the Item 1 bolt cutter. The toolmarks displayed on the cut shackle of Item 3 were not produced by the Item 1 bolt cutter.  |
| 3X2Z4U  | Item 2: Due to the corresponding characteristics found on the cut surface of the item 2 and characteristics on cut surface of the questioned bolt cutter (item 1)the padlock (item 2) was cut with the questioned bolt cutter (item 1). Item 3: Due to the differences found in characteristics on the cut surface of the item 3 and chracteristics[sic] on cut surface of the questioned bolt cutter (item 1) the padlock (item 3) was not cut by the questioned bolt cutter.   |
| 3XMB6N  | The item 1 bolt cutter was determined to be functional as received. Test cuts were made using the submitted solder wire and were compared to the questioned toolmarks on the submitted padlocks. The questioned toolmarks on the item 2 padlock were identified as having been caused by the cutting blades of the item 1 bolt cutter. The questioned toolmarks on the item 3 padlock were not caused by the cutting blades of the item 1 bolt cutter.   |
| 4EW9NJ  | The Item 2 shackle was identified as having been cut by the Item 1 bolt cutter. The Item 3 shackle was not cut by the Item 1 bolt cutter. The shackle was cut by another tool employing a pinching action.   |
| 4JAU2W  | Examinations showed Item 2 was cut by Item 1. Examinations showed Item 3 was not cut by Item 1.  |
| 4WDF32  | The shackle of one of the two padlocks (2) was cut by the mini bolt and wire cutters (1). The shackle of the second padlock (3) was not cut by the mini bolt and wire cutters (1).   |
| 4YWXZ8  | One of the submitted cut padlocks (Item 01-02) was identified as having been cut by the submitted bolt cutter (Item 01-01). One of the submitted cut padlocks (Item 01-03) was eliminated from having been cut by the submitted bolt cutter (Item 01-01).  |
| 4ZBAU7  | Through microscopic comparison it was determined that: Item #1 (Bolt cutter) was the tool that cut Item #2 (Padlock #1). Item #1 (Bolt cutter) did not cut Item #3 (Padlock #2) due to differences in individual characteristics.  |
| 6EN3X3  | Test toolmarks made using the item 1 bolt cutters with the submitted solder wire were microscopically compared to each side of the shackle heel and to each side of the shackle toe of both of the padlocks, items 2 and 3. The item 1 bolt cutters were identified as having cut the shackle of the item 2 padlock based on significant agreement of the microscopic individual characteristics observed. Conversely, the item 1 bolt cutters were eliminated as having cut the shackle of the item 3 padlock based on differences in the observed class characteristics. |
| 6EN3X3  | The bolt cutters in Item #1 were identified as having cut the shackle of the padlock in Item #2. The bolt cutters in Item #1 could not be identified as or excluded from having cut the shackle of the padlock in Item #3 based on class characteristic similarities (type of cut).  |

TABLE 2

| WebCode | Conclusions  |
|---------|--|
| 6J4VJ9  | The submitted Tekton bolt cutter (Item 1) was examined, compared and identified as having been used to cut the small Master padlock (Item 2). The bolt cutter (Item 1) was not used to cut the small Master padlock (Item 3). The two padlocks (Items 2 and 3) were cut by two different tools. Casts of the cuts on the padlocks and test cuts made with the bolt cutter will be retained in the open case files.   |
| 6JR97E  | Item 1 is a functional Bolt cutter. The bolt cutter, item 1 was used to produce reference toolmarks. The reference toolmarks made were microscopically compared to the toolmarks on the cut padlocks, item 2 and item 3 with the following results: The toolmarks on the cut padlock, item 2 were positively identified as having been made by the bolt cutter, item 1, since there is an agreement of class characteristics and sufficient matching of individual microscopic details. The toolmarks on the cut padlock, item 3 does not possess similar class characteristics as those exhibited by the reference toolmarks created by the bolt cutter, item 1. There is also a lack of matching of individual microscopic details. The cut padlock, item 3 was eliminated as having been cut by the bolt cutter, item 1.  |
| 6NU6ZE  | With the questioned bolt cutter (item 1) test marks were made in lead. Casts of the mentioned test marks were made and compared with casts of the questioned marks on item 2 and item 3 to investigate similarities and dissimilarities of the toolmarks. The microscopical investigation revealed that the surface structures of the test marks caused by item 1 correspond with the surface structures of the toolmarks on item 2. The toolmarks on the surface of item 3 are different to the test marks. On the active surfaces of the bolt cutter are grooves from various shape cutting manufacturing processes. The alignment and combination of the different manufacturing marks are unique in their shape, position and size. Therefore the bolt cutter labeled as item 1 is identified as the tool that caused the toolmarks on item 2. The toolmarks on item 3 are caused by a different tool. |
| 6PATPR  | Toolmarks present on Item 2 were examined microscopically and identified as having been produced by the Item 1 tool. Toolmarks present on Item 3 were examined microscopically, compared, and eliminated as having been produced by the Item 1 tool due to differences in class characteristics.   |
| 6VKNYT  | Padlock 2 - Test cuts made with the submitted tool were examined and compared to the damaged padlock. Differences were noted in the subclass characteristics of the test cut compared to the damaged padlock such that in our opinion the submitted tool was not responsible for cutting the padlock. Padlock 3 - Test cuts made with the submitted tool were examined and compared to the damaged padlock. Differences were noted with respect to the direction of the fine detail (striae)[sic] present such that in our opinion the submitted tool was not responsible for cutting the padlock.   |
| 722K9B  | Test toolmarks from the bolt cutter in Item 1 were examined in conjunction with the cut lock shackles in Item 2 and Item 3. Microscopic comparison revealed the following: A. The lock shackle on Item 2 had been cut by Item 1. B. The lock shackle on Item 3 bears no individual characteristics to indicate that it had been cut by Item 1.   |
| 74LQ7C  | Examination of the padlocks in Items 2 and 3 revealed that the shackles had both been cut by an opposed blade cutting tool. Test toolmarks were produced using the bolt cutters in Item 1 and the silver colored wire provided and a sheet of lead. Microscopic comparison of these test toolmarks in conjunction with those on Items 2 and 3 revealed the following: A) The toolmarks present on Item 2 had been made by Item 1. B) The toolmarks present on Item 3 bear similar class characteristics as tests from Item 1; however, no similar individual characteristics were found to link Item 3 with Item 1.  |
| 78BTF8  | The cut shackles from evidence items 1.2 and 1.3 were microscopically compared to test cuts from evidence item 1.1 with the following results. The cut in the shackle of evidence  |

TABLE 2

| WebCode | Conclusions  |
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| 7PNDCB  | <p>item 1.2 was positively made by evidence item 1.1. The cut in the shackle of evidence item 1.3 is excluded as to having been made by evidence item 1.1.</p> <p>1. Examination of Exhibit 1 (Tekton 8-inch bolt cutter) disclosed that it is designed as an opposed blade cutting tool. Exhibit 1.1 (Test toolmark standards) was created for comparison purposes and is being returned along with Exhibit 1. 2. Visual and microscopic examination of Exhibits 2 and 3 (Cut padlocks) disclosed toolmarks consistent with an opposed blade cutting tool such as a bolt cutter. Exhibits 2 and 3 were microscopically compared to test toolmarks from Exhibit 1. a. Exhibit 1 (Bolt cutters) caused the damage on Exhibit 2. b. Exhibit 1 (Bolt cutters) did not cause the damage on Exhibit 3.</p>  |
| 7QCJ4F  | <p>Item #2 was cut by the boltcutter in Item #1. Item #3 was not cut by the boltcutter in Item #1.</p>   |
| 7R7CYY  | <p>Results of Examination: Item 1 is a Tekton brand bolt cutter and Item 2 and Item 3 are Master brand padlocks. Toolmarks present on the Item 2 shackle were identified as having been produced by the Item 1 bolt cutter. Due to differences in class characteristics the Item 1 bolt cutter was excluded as having created the toolmarks present on the Item 3 padlock shackle. Toolmark Examination: Methods: Toolmarks, whether they are present on two evidence items or on one evidence item and one test-mark created in the Laboratory, undergo two stages of comparison. First, the toolmarks are examined to determine and compare their class characteristics. The class characteristics of toolmarks include type of cutting action and the size and orientation of gripping or cutting surfaces. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. [Participant included an association scale that could not be replicated within the report.]</p> |
| 7TH7EY  | <p>Results of Examinations: The Item 2 padlock was identified as having been cut by the Item 1 bolt cutters. Due to a difference in class characteristics (i.e. manufacturing process of the blade) the Item 3 padlock was excluded as having been cut by the Item 1 bolt cutters. Methods: Toolmarks, whether they are present on two evidence items or on one evidence item and one test-mark created in the Laboratory, undergo two stages of comparison. First, the toolmarks are examined to determine and compare their class characteristics. The class characteristics of toolmarks include type of cutting action and the size and orientation of gripping or cutting surfaces. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. [Participant included an association scale that could not be replicated within the report.]</p>   |
| 86TUC3  | <p>Microscopic comparison was conducted with the following results: L1 (Item #2) was cut by T1 (Item #1). L2 (Item #3) was cut by a different tool than T1.</p>  |
| 8E86VZ  | <p>Using a comparison microscope and casting material I conducted an examination of toolmarks associated with Items 2 &amp; 3 (padlocks) and compared them to casts obtained from test cuts produced from Item 1 (bolt cutters). In my opinion the toolmarks on Item 2 are a positive match to those produced by Item 1 and is therefore reported as an identification. The toolmarks produced on Item 3 could not be matched to any of the four test cuts produced by Item 1. There is significant differences in both class and individual characteristics and as such Item 3 is eliminated as having had its shackle cut by Item 1 (bolt cutters).</p>  |
| 8KMV7U  | <p>The tool mark located on Q-1 (Item 2) was produced by the K-1 tool (Item 1). The tool mark</p>  |

TABLE 2

| WebCode | Conclusions   |
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|         | located on Q-2 (Item 3) was not produced by the K-1 tool (Item 1).  |
| 8WMBCX  | The toolmarks observed on the shackles of the lock in Item 2 were produced by the bolt cutters in Item 1. The toolmarks observed on the shackles of the lock in Item 3 were not produced by the bolt cutters in Item 1.   |
| 938UZY  | 1. Padlock item 2 was identified as having been cut by the exhibit bolt cutters item 1. 2. Padlock item 3 was eliminated from having been cut by the exhibit bolt cutters item 1.   |
| 9EKWGM  | Bolt cutter Item 1 cut the shackle of padlock Item 2. Bolt cutter Item 1 is excluded as having cut the shackle of padlock Item 3.   |
| 9GXJH3  | Two padlocks (items 2 and 3) were examined for tool marks resulting from cutting them open with the bolt cutter (item 1). The examination comprised test cuts with the bolt cutter in soft metal, producing moulds of the cut surfaces and using a comparison microscope. The comparison of tool marks on item 2 with test cuts made with the bolt cutter showed that the cut on the padlock was performed by a two faceted tool like the bolt cutter. The surfaces formed by the application of the unknown tool on the padlock show the same striation pattern the bolt cutter produced in soft metal. Because of identical class characteristics and identical individual characteristics of the test cut as well as on item 2, item 2 has been cut open with item 1. The comparison of tool marks on item 3 and the test cuts made with the bolt cutter showed similar class characteristics of a two faceted tool. The striation pattern on padlock item 3 is similar to the striation pattern on the surfaces of the test cut. Nevertheless the quality of the striation pattern of the cut on item 3 is of poor quality. Therefore no conclusive decision was possible whether the bolt cutter was used to cut open item 3 or not. |
| 9RHT6B  | Item #1 and Item #2, when compared to each other, exhibit tool marks from the same tool, however, when compared against Item #3 exhibit insufficient corresponding microscopic markings for an identification.  |
| 9XPTNY  | Item 2 and 3 were examined and analyzed using microscopy. Toolmarks present on the Item 2 padlock were identified as having been produced by the Item 1 boltcutter. Toolmarks present on the Item 3 padlock were eliminated as having been produced by the Item 1 boltcutter due to a difference in class characteristics. Toolmarks present on the Item 3 padlock are consistent with having been produced by a shearing type tool and exhibit markings which may be suitable for identification with the tool by which they were produced. Five (5) tests produced using the Item 1 boltcutter are being returned as Item 1T and should be maintained for possible future examinations. No examinations were conducted on the Items 2 and 3 keys.   |
| A7DE6C  | Toolmarks on Item #2 and Item #3 were microscopically examined and compared to test marks from Item #1, the bolt cutters recovered from the suspect. In my opinion Item #2 was identified as being cut by the submitted bolt cutter, Item #1. Item #3 was not cut by Item #1.   |
| A7TN2J  | Item 2 - The toolmarks on the Item 2 padlock were made by the Item 1 bolt cutter. Item 3 - The toolmarks on the Item 3 padlock were not made by the Item 1 bolt cutter.   |
| AAMUWM  | Toolmarks found on the cut ends of Item 2 padlock shackle were identified as having been produced by Item 1 based on sufficient agreement of individual characteristics. Toolmarks found on the cut ends of Item 3 padlock shackle were eliminated as having been produced by Item 1 based on disagreement of class characteristics. Lab generated evidence (tests and a cast made with Item 1) were packaged and retained with Item 001. This report contains the conclusions, opinions, and interpretations of the analyst whose signature appears on the report.   |

TABLE 2

| WebCode | Conclusions   |
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| ADCWJN  | Examinations showed Item 2 was cut with Item 1. Examinations showed Item 3 was not cut with Item 1.   |
| AQ8MGK  | A microscopic comparison was conducted between test toolmarks made with Item #1 and toolmarks on Item #2, a padlock. The examinations determined that Item #2 was cut with Item #1 due to matching striations on the items. A microscopic comparison was conducted between test toolmarks made with Item #1 and toolmarks on Item #3, a padlock with green paint. The examinations determined that Item #3 was not cut with Item #1 due to a noticeable difference in striations on the items.  |
| AZPUYB  | Item 1 was used to cut Item 2. Item 1 was not used to cut Item 3.   |
| B6FENC  | Identification: Based on the comparison of class and individual characteristics of test tool marks created using the bolt cutters (Item 1) with the tool marks exhibited on the shackle of the padlock (Item 2), the tool marks on the shackle of the padlock (Item 2) were identified as having been created by the use of the bolt cutters (Item 1). Elimination: Based on the difference of class and/or individual characteristics of test tool marks created using the bolt cutters (Item 1) with the tool marks exhibited on the shackle of the padlock (Item 3), the tool marks on the shackle of the padlock (Item 3) were eliminated as having been created by the use of the bolt cutters (Item 1). |
| BCMFB7  | Examination of the cut padlock shackles in Item 2 and Item 3 revealed that both had been cut by a double-bladed, pinching type tool, such as boltcutters. Using the boltcutters in Item 1, test cuts were produced and compared to the cut ends of the shackles in Item 2 and Item 3. Based on these comparative examinations and observed class and individual characteristics, it was determined that: A) The boltcutters in Item 1 produced the cut on the padlock shackle in Item 2. B) No similar individual characteristics could be found to link the boltcutters in Item 1 to having produced the cut on the padlock shackle in Item 3.   |
| BCMM7C  | I microscopically compared the test marks made using the submitted bolt cutter (Item 001-1) to the marks exhibited on the submitted padlock shackle (Item 001-2). I observed sufficient agreement of individualistic characteristics to conclude that the padlock shackle (Item 001-2) was cut with the submitted bolt cutter (Item 001-1). I microscopically compared the test marks made using the submitted bolt cutter (Item 001-1) to the marks exhibited on the submitted padlock shackle (Item 001-3). I observed significant differences in the class characteristics to conclude that the padlock shackle (Item 001-3) was not cut with the submitted bolt cutter (Item 001-1).                      |
| BGXKPR  | 1. The shackle of the padlock (#2) was cut by the bolt cutter (#1). 2. The shackle of the padlock (#3) was not cut by the bolt cutter (#1). This elimination is based on observed differences in both class and sub-class characteristics.  |
| BHC3UJ  | The padlock, sub-item 1b (CTS item 2), was microscopically compared to test cuts in lead and in lead free solder made by the submitted bolt cutters. It was determined that the shackle of the padlock was cut using the Tekton bolt cutters, item 1a (CTS item 1). The padlock, sub-item 1c (CTS item 3), was microscopically compared to test cuts in lead and in lead free solder made by the submitted bolt cutters. This comparison was inconclusive. There was agreement in all discernible class characteristics but insufficient agreement of individual characteristics for an identification.   |
| BRZRKR  | Item 2 padlock shackle was cut with Item 1 bolt cutter. Item 3 padlock shackle was not cut with Item 1 bolt cutter.   |
| BUVABL  | There are toolmarks present on the padlock, Exhibit 2, that were produced with the bolt cutter, Exhibit 1. The toolmarks present on the padlock, Exhibit 3, were not produced with  |

TABLE 2

| WebCode | Conclusions   |
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|         | the bolt cutter, Exhibit 1.   |
| BZT3VM  | Exhibit #1 was examined and tested. Toolmarks present on Exhibit #2 were made by Exhibit #1. Toolmarks present on Exhibit #3 could not be identified or eliminated as having been made by Exhibit #1.   |
| CMKP2T  | Identification-the cut toolmark to the padlock item 2 was made by the bolt cutter item 1, based on microscopic comparison with agreement of discernible class characteristics and sufficient matching individual detail. Elimination-the cut toolmark to the padlock item 3 was not made by the bolt cutter item 1, based on microscopic comparison and significant disagreement of individual detail, despite similar class characteristics.   |
| CUBQ8Y  | The striated marks on the padlocks marked "Item 2" and "Item 3" were compared with those on the test-cuts made using the bolt cutter marked "Item 1". a. Based on agreement of class characteristics and sufficient agreement of individual characteristics, the padlock marked "Item 2" was found to have been cut using the bolt cutter marked "Item 1". b. Agreement of class characteristics, as well as areas of correspondence and areas of non-correspondence of striated marks were observed. Hence, it could not be determined if the padlock marked "Item 3" had or had not been cut using the bolt cutter marked "Item 1". |
| DCFZYH  | A microscopic comparison was conducted between test toolmarks made with Item 1 and toolmarks on Item 2 a padlock. The examinations determined that Item 2 was cut with Item 1 due to matching striations on the items. A microscopic comparison was conducted between test toolmarks made with Item 1 and toolmarks on Item 3 a padlock with green paint. The examinations determined that Item 3 was not cut with Item 1 due to a noticeable difference in striations on the items.  |
| DGG2JD  | striations of item 2 are in agreement with striation of item 1. striations of item 3 are not in agreement with striation of item 1.   |
| DU46QA  | The toolmarks on Item 2 match with the test toolmarks produced by Item 1. Therefore, Item 2 was identified as having been produced by Item 1. The toolmarks on Item 3 couldn't be found the match with the test toolmarks produced by Item 1. Therefore, Item 3 was excluded as having been produced by Item 1.   |
| DW77CE  | Item 2 was cut by the Item 1 bolt cutters. Item 3 was not cut by the Item 1 bolt cutters.   |
| DWBNRQ  | The Item 2 padlock shackle was identified as having been cut by the Item 1 bolt cutter. The Item 3 padlock shackle cut bears toolmarks that are consistent with the toolmarks that are produced by the Item 1 bolt cutter. However, due to a lack of sufficient corresponding microscopic marks of value, the Item 3 padlock could not be identified as having been cut by the Item 1 bolt cutter.  |
| DXTW9D  | 1. The tool marks on Item 2 were made by Item 1. 2. The tool marks on Item 3 were not made by Item 1.   |
| DZ6PCR  | Based on the correspondence of both class and individual characteristics, I am of the opinion that: Item 1 was responsible for cutting Item 2 and the extent of correspondence is enough to eliminate other similar tools. Whilst the cut on Item 3 has similar class characteristics to Item 1, there is sufficient difference in the individual characteristics to exclude it from being responsible.   |
| E6BMAX  | Microscopic examination & comparison of the lock, Item 2, revealed that it was cut by the boltcutters, Item 1. Microscopic examination & comparison of the lock, Item 3, revealed that it was not cut by the boltcutters, Item 1.   |
| E9NZQ7  | The cut padlock shackles in Items #2 and #3 were compared to test marks made by Item  |

TABLE 2

| WebCode | Conclusions  |
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| EAF4B2  | <p>#1. Toolmarks on Item #2 were made by the tool in Item #1. Toolmarks on Item #3 could not be identified or eliminated as having been made by Item #1.</p> <p>1) In my opinion, the submitted bolt croppers (Item 1) have been used to cut the shackle of the padlock (Item 2). 2) In my opinion, the submitted bolt croppers (Item 1) have not been used to cut the shackle of the padlock (Item 3).</p>  |
| EBE6JD  | <p>The Exh. 1 bolt cutters cut the Exh. 2 padlock. The Exh. 1 bolt cutters did not cut the Exh. 3 pad lock.</p>  |
| EHA6VK  | <p>Microscopic comparison examination of evidence cut padlocks Items #'s 2 and 3 with test cuts from Item #1 boltcutters has revealed: Evidence padlock Item #2 was cut with Item #1 boltcutters. Due to insufficient agreement of individual microscopic markings, evidence padlock Item #3 could not be identified or eliminated as having been cut with Item #1 boltcutters.</p>  |
| F26LM7  | <p>Item: 1 One Tekton brand 8 inch bolt cutter, described as "recovered from suspect". Item: 1.1 Test specimens made by the Item 1 bolt cutter using laboratory supplied materials. Item: 1.2 Debris consistent in appearance with a metal flake, removed from the blades of Item 1. Item: 2 One Master Lock 20mm covered padlock, described as "First cut padlock recovered from the locker". Item: 3 One Master Lock 20mm covered padlock, described as "Second cut padlock recovered from the locker. (painted green)". RESULTS: Item 1 was visually examined and debris consistent in appearance with a metal flake was observed on the blades of Item 1. This debris was removed and packaged for return with Item 1 without further analysis. The test specimens made using the Item 1 bolt cutter were microscopically compared to the toolmarks found on the Item 2 and 3 padlocks with the following conclusions: The toolmarks found on the Item 2 padlock were made by the Item 1 bolt cutter. The toolmarks found on the Item 3 padlock were not made by the Item 1 bolt cutter due to differences in the individual characteristics. The Item 1.1 test specimens will be retained by the Firearms Department for a short period of time and will then be returned to your agency for long term storage as evidence.</p> |
| F4Y4CM  | <p>Tool Mark Analysis: Methodology - Comparison Microscopy. Test marks and casts were made with Item 1, the bolt cutter, using submitted and laboratory testing media. Item 1A, the test marks/casts, was sealed in a manila envelope and will be retained in the laboratory for possible future analysis. The tool mark on Item 2, the lock, was made with Item 1, the bolt cutter, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the lock, was not made with Item 1, the bolt cutter, based upon different individual microscopic characteristics.</p>   |
| F8FGMA  | <p>Tests from the submitted Tekton brand bolt cutters have been compared microscopically with the cut/damaged areas on the submitted Master brand padlocks Item 2 and Item 3. Based on the agreement of all discernible[sic] class characteristics and a sufficient agreement of individual characteristics Item 1 has been identified as having made the cut in Item 2. Based on the disagreement of class and individual characteristics Item 1 is eliminated as having made the cut in Item 3.</p>  |
| FC9UBJ  | <p>The tool marks on the cut shackle of the Master brand padlock, item 2, were microscopically compared and identified as having been made by the Tekton brand bolt cutters in item 01 by sufficient corresponding individual markings. The tool marks on the cut shackle of the other Master brand padlock, item 3, were microscopically compared and excluded as having been made by the Tekton brand bolt cutters in item 01. Further comparison of these tool marks to another opposed blade cutting tool can be done pending submittal of a suspect tool.</p>   |



TABLE 2

| WebCode | Conclusions   |
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| FNUK24  | The toolmarks present on the cut padlock in item 2 were determined to have been made by the bolt cutter in item 1. The toolmarks present on the cut padlock in item 3 were determined not to have been made by the bolt cutter in item 1.   |
| FPT2JD  | The bolt cutter Item 1 was used to make casts in laboratory materials and a test cut was made with the submitted wire Item 4. The cut ends of the shackle on the lock Item 2 were compared microscopically with a test cut. That shackle was cut with the bolt cutter Item 1. The cut ends of the shackle on the lock Item 3 were not cut with the bolt cutter. Item 1; however, a similar type of tool (compression type cutter) was used to cut it. Any compression type cutter that becomes suspect should be submitted to this laboratory for examination.  |
| FQXLJR  | The item 2 padlock was identified as having been cut by the item 1 bolt cutters. The item 3 padlock cannot be identified or eliminated as having been cut by the item 1 bolt cutter.  |
| FUCAUX  | Item #2: The cut ends of the padlock shackle were compared to test exemplars obtained from the bolt cutter, Item #1. Sufficient corresponding individual tool mark signatures were observed to conclude that the cut ends of the shackle were made by the bolt cutter. Item #3: The cut ends of the padlock shackle were compared to test exemplars obtained from the bolt cutter, Item #1. Differences in subclass characteristics were observed to conclude that the cut ends of the shackle were not made by the bolt cutter.  |
| FY4HX6  | Item: 1 One Tekton brand bolt cutter described as "recovered from suspect". RESULTS: The Item 1 bolt cutter was visually and microscopically examined and found to be in working order. Item: 1.1 Brown/black debris swabbed from the Item 1 bolt cutter. RESULTS: Debris was swabbed from Item 1, labeled Item 1.1, and packaged for return with Item 1 without analysis. Item: 1.2 Test specimens made by Item 1 using Laboratory supplied medium. RESULTS: Test specimens will be retained by this Agency for a short period of time and will then be returned to your Agency for long term storage as evidence. Item: 2 One cut Master Lock padlock with key described as "First cut padlock recovered from the locker." Item: 3 One cut Master Lock padlock with key described as "Second cut padlock recovered from the locker. (painted green)". RESULTS: The Item 2 and 3 cut padlocks were microscopically compared with test specimens made by the Item 1 bolt cutter with the following conclusions: Matching individual identifying characteristics were found and it was concluded that the Item 2 padlock was cut by the Item 1 bolt cutter. Due to differences in the individual characteristics, the Item 3 padlock was not cut by the Item 1 bolt cutter. No examination was conducted on the Item 2 and 3 keys. |
| G668XA  | Item 1.1 is a Tekton brand bolt cutter. Test cuts were made using the provided material. Item 1.2 is a Master Lock brand padlock with a cut hasp. The area of damage was microscopically compared to the tests from Item 1.1. Item 1.2 was identified as having been cut by Item 1.1. Item 1.3 is a Master Lock brand padlock with a cut hasp. The area of damage was microscopically compared to the tests from Item 1.1. Item 1.3 can be eliminated as having been cut by Item 1.1.   |
| GDN4MH  | To examine if any of the padlocks, item 2 and 3, have been cut with the bolt cutter, item 1. Both padlocks had impressed and striated toolmarks and showed cutting characteristics that indicated that both had been cut with the same type of tool, for example a bolt cutter. The cutting edges of the padlocks were compared with the jaws of the bolt cutter, using a microscope. The cutting edges of padlock, item 2, showed similarities in individual characteristics with the ones found on the jaws of the bolt cutter. To further characterize these individual characteristics, the compression marks on the padlock were compared with the jaws using casted molds. The microscopic comparison examination of the molds revealed several details that corresponded such as specific peaks, ridges and furrows between the two items (Fig I). These correlations were considered to be highly specific and  |

TABLE 2

| WebCode | Conclusions  |
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|         | therefore practically impossible to obtain with any other tool. Therefor[sic] it was concluded that padlock, item 2 have been cut with bolt cutter, item 1. The toolmarks found on item 3 showed several differences in individual characteristics compared to the jaws on the bolt cutter, item 1. Therefore the conclusion was that the bolt cutter has not been used to cut padlock, item 3. [Participant included an image that could not be replicated within the report.]  |
| GFJACU  | The Item 1 boltcutters were used to make test cuts for comparison to toolmarks on the Item 2 and Item 3 locks. The toolmarks on the Item 2 lock were made by the Item 1 boltcutters. The toolmarks on the Item 3 lock were not made by the Item 1 boltcutters, due to a difference in class characteristics.   |
| GYNKRC  | The shackle of the Item 2 padlock was cut by the Item 1 bolt cutter. The shackle of the Item 3 padlock was not cut by the Item 1 bolt cutter. The keys were not further examined.  |
| H4899A  | The bolt cutter Exhibit 1 was used to make test cuts in submitted materials. The cut ends of the shackle of the padlock Exhibit 2 were compared microscopically with tests. The shackle was cut by the bolt cutter Exhibit 1. The shackle of the padlock Exhibit 3 was not cut by the bolt cutter Exhibit 1.   |
| H4XZUW  | Comparative examinations of the tool marks on Item 2 (one padlock with a cut shackle) against test marks made with Item 1 (a Tekton bolt cutter) showed the presence of matching features. This means that Item 1 was used to cut Item 2. Comparative examinations of the tool marks on Item 3 (one green painted padlock with a cut shackle) against test marks made with Item 1 showed the presence of different class characteristics. This means that Item 1 was not used to cut Item 3.   |
| HAB6Y2  | Examination of the padlock shackles in Items 2 & 3 revealed the presence of toolmarks created by a double bladed cutting tool. Test toolmarks produced using Item 1 bolt cutters were microscopically examined in conjunction with the toolmarks on Items 2 & 3. Based on these comparative examinations it was determined that: A. Item 2 had been cut by Item 1. B. Item 3 bears no marks to link it as having been cut by Item 1.   |
| HCEXVK  | Evidence Description, Results of Analysis and Interpretation: 01: 11x4x2 white box. 01-01: One Tekton brand bolt cutter (Item 1) - The submitted bolt cutter was identified as having been used to cut the Item 1-02-AA padlock due to consistent and reproducible marks and eliminated as having been used to cut the Item 1-03-AA padlock due to differences in class and individual characteristics. 01-02-AA: One cut Master brand padlock and key (Item 2) - The submitted bolt cutter was identified as having been used to cut the submitted Master brand padlock due to consistent and reproducible marks. 01-03-AA: One cut Master brand padlock and key (Item 3) - The submitted bolt cutter was eliminated as having been used to cut the submitted Master brand padlock due to difference in class and individual marks. 01-04: One piece of solder (submitted for testing purposes) - The solder was submitted for testing purposes only. |
| HGBZV9  | The Item 2 pad lock was identified as having been cut by the Item 1 bolt cutter. The Item 3 pad lock was not cut by the Item 1 bolt cutter. The keys were not further examined.  |
| HHGKJ9  | Item 1 was identified as having made the toolmarks on the Item 2 padlock. Item 1 was eliminated as having made the toolmarks on the Item 3 padlock.  |
| HHHKBW  | The cutting surface of the bold cutter are honed and thus are unique. In addition, they show signs of usage which make the tool even more unique. The surfaces show signs of usage and deposition of material forming a half circle, which indicate the cutting of a round object. We scanned both sides of the cutting surfaces using the ToolScan and compared them to the scanned sections of Item 2 and 3. We renounced doing comparison cuts. All 4 sections of   |

TABLE 2

| WebCode | Conclusions  |
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| J6TTDY  | <p>Item 2 could be assigned to the bold cutter (Item 1). So it is certain, that the first padlock (item 2) has been cut with the bold cutter (Item 1). The sections of Item 3 show different individual marks. So the second padlock was certainly not cut with the bold cutter (Item 1). [sic]</p> <p>Microscopic examination and comparison of known tests from Item #1 with the submitted padlocks containing questioned toolmarks revealed the following: Item 2 had been cut by the submitted bolt cutter. Item 3 had not been cut by the submitted bolt cutter.</p>  |
| JP6URC  | <p>Item 1 - The jaws of the bolt cutters were approximately 5/8" in length. The jaws were labeled as A, B, C, and D. Item 1A - The casts were used for comparison to the Item 2 and 3 padlocks. Item 2 - The shackle of the padlock had been compromised. Striated toolmarks were observed on the shackle. The toolmarks were microscopically compared to the toolmarks observed on the Item 1A Mikrosil casts and an identification was made. The toolmarks observed on the Item 2 padlock were produced by the Item 1 bolt cutters. The identification was based on the agreement of individual characteristics observed during the microscopic comparison. Item 3 - The shackle of the padlock had been compromised. Striated toolmarks were observed on the shackle. The toolmarks were microscopically compared to the toolmarks observed on the Item 1A casts with inconclusive results. The toolmarks were the same class as the toolmarks observed on the Item 1A casts, however, no identification or elimination could be made due to a lack of agreement or disagreement of individual characteristics.</p>   |
| JTN8DZ  | <p>1 - (1) Bolt cutter recovered from the suspect. 2 - (2) First cut padlock recovered from the locker. 3 - (3) Second cut padlock recovered from the locker (painted green). 1. Microscopic examinations were conducted on the evidence listed above. The findings are the following: a. Exhibits 2 and 3 (cut padlocks) revealed the presence of tool markings that are consistent with the type produced by a pair of bolt cutters or similar tool. b. Exhibit 2 was identified as being cut by Exhibit 1. c. Exhibit 3 could have been cut by Exhibit 1 based on class characteristics; however there are no individual characteristics to indicate this.</p>  |
| JZWF6F  | <p>The cut-mark(s) in the padlock (Item 2) showed characteristics reminiscent of the jaws on the bolt clipper (Item 1). A casting was made from the best part (an impression) of the cut-mark and this casting was compared with test marks from the jaws. Hereby numerous microscopic details in the cut-mark corresponded with specific details (individual characteristics) in one of the jaws, (Picture I). The details in the bolt clipper apparently originate both from the manufacturing process and from usage. Therefore the conclusion based on the overall correspondence is a Positive Identification, which is the highest degree of association. The cut-mark in the padlock (Item 3) showed characteristics nonconforming from the jaws on the bolt clipper (Item 1). Nevertheless, the best parts of the cut-mark was compared with test marks from the jaws. Hereby significant difference was found between details in the cut-mark and the jaws on the bolt clipper. The conclusion is therefore a definitive exclusion, which is the highest degree of non-association. [Participant included an image that could not be replicated within the report.]</p> |
| K7PTLG  | <p>The tool mark on Item 2, the lock, was made with Item 1, the Tekton bolt cutters, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the lock with green paint, was not made with Item 1, the Tekton bolt cutters, based upon different class and microscopic characteristics.</p>   |
| KA88W4  | <p>Tests were made using Item #1. These tests were compared with the cut marks on Items #2 and #3. #1 to #2: There is agreement in all discernible class characteristics and sufficient agreement in individual characteristics within the cut areas stria for Identification. #2 was cut by #1. #1 to #3: There is disagreement in class characteristics in the structure and spacing</p>   |

TABLE 2

| WebCode | Conclusions  |
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|         | of the stria on cut areas on #3 (coarse and evenly spaced) to the fine and random stria observed on multiple tests from #1. #1 is eliminated from cutting #3.  |
| KBEM9G  | Toolmarks exhibited on the cut surfaces of the locks submitted as Items 2 and 3 were microscopically compared to tests made with the bolt cutters submitted as Item 1. Item 2 was cut by Item 1. Item 3 was not cut by Item 1.   |
| KGT9AZ  | Summary/Results: The Toolmark on the first cut padlock from the locker (Item 2) was made with the bolt cutters recovered from the suspect (Item 1). The toolmark on the second cut padlock from the locker (Item 3) was not made with the bolt cutters recovered from the suspect (Item 1). Examination: Test marks made with the bolt cutters (Item 1) were microscopically compared to the toolmarks on the two padlocks from the locker (items 2 and 3). An identification was made between the test marks made with the bolt cutters (Item 1) and toolmarks on the first cut padlock from the locker (Item 2) based on sufficient corresponding individual agreement observed. An elimination was made between the test marks made with the bolt cutters (Item 1) and the toolmarks on the second cut padlock from the locker (Item 3) based on class characteristic differences observed in the toolmarks.  |
| KH28F3  | Item: 1 One Tekton brand nominal 8 inch Heavy-Duty Mini Bolt and Wire Cutter "removed from suspect". RESULTS: Item 1 was used to create test toolmarks for microscopic comparisons. Item: 1.1 Test toolmarks made using the Item 1 bolt cutter. RESULTS: The Item 1.1 test toolmarks will be retained by this Laboratory for a short period of time and will then be returned to your Agency for long term storage as evidence. Item: 2 First padlock with cut shackle and key "recovered from the locker". Item: 3 Second padlock with cut shackle and key "recovered from the locker (painted green)". Please note that the Item 2 and 3 keys were not listed on the evidence submission forms. RESULTS: The toolmarks found on the shackles of Items 2 and 3 were microscopically compared with each other and with test toolmarks made by the Item 1 bolt cutters. From these comparisons, the following conclusions were reached: The toolmarks found on both pieces of the Item 2 padlock's shackle were made by the Item 1 bolt cutters based on matching individual characteristics. The toolmarks found on both pieces of the Item 3 padlock's shackle were not made by the Item 1 bolt cutters based on differences found in the individual characteristics. |
| KPFGJP  | The Item 2 and Item 3 questioned toolmarks were compared to tests marks produced using the Item 1 bolt cutter. The Item 2 questioned toolmark was made using the Item 1 bolt cutter. The Item 3 questioned toolmark was not made using the Item 1 bolt cutter due to a difference in class characteristics.  |
| KT23CD  | The shackle of one of the Master padlocks (Item 2) was identified as having been cut by the submitted bolt cutters (Item 1). The second Master padlock (Item 3) had not been cut by these bolt cutters.  |
| LJND8D  | Item #1 was identified as having made the toolmarks present on Item #2. Item #1 could not be identified or eliminated as having made the toolmarks present on Item #3.   |
| LYBG6M  | The tool in Item 1 was used to cut the lock in item 2. The tool in Item 1 is eliminated as to cutting the lock in Item 3.  |
| M4VYQJ  | The padlock, Item 2, was cut by the bolt cutters, Item 1. The padlock, Item 3, was not cut by the bolt cutters, Item 1.  |
| MAKF3A  | I visually and microscopically examined the bolt cutter and the two cut locks. I created test cuts with the provided wire and with locks similar to items 2 and 3 using the bolt cutters, Item 1. I microscopically compared test cuts made with the bolt cutters to the cuts on the submitted locks, Items 2 and 3, with the following results: I observed sufficient matching stria between the cut on Item 2 and test cuts made using the bolt cutters to conclude the cut in   |

TABLE 2

| WebCode | Conclusions   |
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|         | Item 2 was made by the bolt cutters, Item 1. I observed differences in the markings within the cuts on Item 3 and test cuts made using the bolt cutters, Item 1. These differences along with a lack of matching stria are sufficient to conclude the cut in Item 3 was not made by the bolt cutter, Item 1.  |
| MLUDM4  | Examinations showed that Item 2 was cut by the Item 1, bolt cutter. Examinations showed that Item 3 was not cut by the Item 1 bolt cutter.  |
| MY3UZ2  | The findings of this examiner are as follows: 1. The toolmarks found on the submitted first padlock, Item 2, were made by the submitted bolt cutter, Item 1. 2. The toolmarks found on the submitted second padlock, Item 3, were not made by the submitted bolt cutter, Item 1, based on differences in class characteristics.   |
| N2AJ4N  | [No Conclusions Reported.]  |
| N6CK2Y  | The bolt cutter, item 1, produced the questioned tool mark on the cut arm of the padlock item 2. The bolt cutter, item 1, did not produce the questioned tool mark on the cut arm of the padlock item 3.  |
| NDWWUD  | Item 2 was identified as having been cut by Item 1. Item 3 could neither be identified nor eliminated as having been cut by Item 1 due to insufficient correspondence of individual microscopic marks of comparative value.   |
| NHYK2E  | Results of Examination: Item 1 is a Tekton brand bolt cutter that was identified as having cut the shackle of the Item 2 lock. Due to differences in blade width, Item 1 was eliminated as having cut the Item 3 shackle. Methods: Toolmarks, whether they are present on two evidence items or on one evidence item and one test-mark created in the Laboratory, undergo two stages of comparison. First, the toolmarks are examined to determine and compare their class characteristics. The class characteristics of toolmarks include type of cutting action and the size and orientation of gripping or cutting surfaces. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. A microscopic comparison examination consists of a search of the impressed and striated marks present in two toolmarks to determine if patterns of similarity exist. [Participant included an association scale that could not be replicated within the report.] |
| NNQU9R  | The laboratory examinations of the two padlocks (item 2 and 3) and bolt cutter (item 1) by of the comparison microscope Leica FS C. The enclosed evidence material (item 2 and 3) as well as the comparative material obtained with the bolt cutter (item 1) were examined in order to find individual characteristics presented on their surfaces. With regard to the results obtained due to performed comparative analysis with the use of above-mentioned methods we conclude that the bolt cutter (item 1) most probably were used to cut the padlock marked item 2. On padlock marked as "item 2" we found some features similar those characteristic for bolt cutter (item 1). Padlock marked as "item 3" was different than item 1 and 2.   |
| NPNCV9  | Item 1 is a small, black coated "Tekton" brand bolt cutter with red polymer handles. Items 2 and 3 each consist of a small "Master" brand padlock with a cut shackle and a key inserted into its cylinder. Based on sufficient correspondence of class and individual details, the marks on the cut sections of shackle on the Item 2 padlock were identified as having been made by the Item 1 bolt cutter. Due to differences in class and individual characteristics, the marks on the cut shackle of the Item 3 padlock could not have been produced by the Item 1 bolt cutter.   |
| NWL42G  | Item 1B (#2) was identified as having been cut by item 1A (#1) based on the agreement of class and individual characteristics. Item 1C (#3) was eliminated as having been cut by  |

TABLE 2

| WebCode | Conclusions   |
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|         | item 1A (1) due to the differences in class characteristics.  |
| P3UXL4  | A microscopic comparison was conducted between test toolmarks made with Item 1 and toolmarks on Item 2, a padlock. The examinations determined that Item 2 was cut with Item 1 due to matching striations on the items. A microscopic comparison was conducted between test toolmarks made with Item 1 and toolmarks on Item 3, a padlock with green paint. The examinations determined that Item 3 was not cut with Item 1 due to a noticeable difference in striations on the items.      |
| P7MGDV  | Microscopic comparison conducted with the following results: 1. Item 2 padlock bolt cut by item 1 bolt cutter. 2. Item 3 padlock bolt was not cut by Item 1 bolt cutter (different characteristic markings).  |
| PDUHX6  | The bolt cutters Exhibit 1 were used to make tests in suitable materials. The shackle of the padlock Exhibit 2 was identified as having been cut by the bolt cutters Exhibit 1. The key in Exhibit 2 was used to remove the heel section of the padlock shackle. The shackle of the padlock Exhibit 3 was not cut by the bolt cutters Exhibit 1. The key in Exhibit 3 was used to remove the heel portion of the padlock shackle.   |
| PE6CHB  | The bolt cutters submitted Item 1 were examined and test cuts were made. The locks submitted Items 2 & 3 were examined and found to exhibit a cut in the shackle of each lock. Toolmarks in the cuts were microscopically compared to the test marks produced with the bolt cutters submitted Item 1. The shackle of the lock submitted Item 2 was cut with the bolt cutters submitted Item 1. The shackle of the lock submitted Item 3 was not cut with the bolt cutters submitted Item 1. |
| PUB3GN  | As a result of the macroscopic and microscopic comparison it is certain that the questioned toolmarks present on the first cut padlock (Item 2) have been caused by the bolt cutter (Item 1) recovered from the suspect. The questioned toolmarks present on the second cut padlock (Item 3) have been excluded to have been caused by the bolt cutter Item 1.  |
| PVJJ9T  | [No Conclusions Reported.]  |
| PXTCHA  | The bold[sic] cutter - Item 1 used to cut the padlock - Item 2.   |
| Q4PT4Y  | Based on the cross sectional characteristics of a test mark, item 2 and item 3, the questioned bolt cutter was used to cut the item 2 padlock, not the item 3.  |
| Q83P62  | 1. Examinations showed that the lock shackle on the Item 2 padlock was cut by the Item 1 bolt cutters. 2. Examinations showed that the lock shackle on the Item 3 padlock was not cut by the Item 1 bolt cutters.   |
| QAZUBN  | The shape and striation marks on the cutting side of Item 2 is very similar with those on the cutting side of a sample cut by Item 1. The shape and striation marks on the cutting side of Item 3 is not similar with those on the cutting side of a sample cut by Item 1.  |
| QEYFTX  | The Item 1 bolt cutter cut the Item 2 pad lock. The Item 1 bolt cutter did not cut the Item 3 pad lock based on differences in class characteristics.   |
| QH2CKD  | The results of the examination extremely[sic] strongly support that the questioned bolt cutter (Item 1) was used to cut the padlock (Item 2) (Level +4). The results of the examination extremely[sic] strongly support that the questioned bolt cutter (Item 1) was not used to cut the padlock (Item 3) (Level -4).   |
| QKN3GC  | The tool mark located on the cut shackle of Q-1 (your item 2) was produced by the K-1 tool (your item 1). The tool mark located on the cut shackle of Q-2 (your item 3) was not produced by the K-1 tool (your item 1).   |

TABLE 2

| WebCode | Conclusions   |
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| QPC78N  | The cut shackles of the padlocks in items #2 and #3 were microscopically compared to test cuts made using the cutters submitted as item #1 with the following conclusions: The shackle of item #2 was microscopically identified as having been cut by the cutters of item #1. The shackle of item #3 was microscopically eliminated as having been cut by the cutters of item #1.  |
| R2UJAV  | Item 2 was cut by the submitted bolt cutter (Item 1). Item 3 was cut by a second tool, possibly a different type of pinching tool, based on differences in class characteristics.   |
| R9BC37  | Item 1 - Tekton brand bolt cutter (1) Item 2 - Padlock (2) Item 3 - Padlock (3) The submitted specimen marked Item 1 was examined and identified as a bolt cutter. The submitted specimens marked Item 2 and Item 3 were examined and identified as padlocks exhibiting toolmarks on their shackles. Test toolmarks were generated using Item 1 and microscopically compared with toolmarks exhibited on Item 2 and Item 3. As a result of microscopic examination, Item 1 was identified as having created the toolmarks exhibited on Item 2. Item 1 was eliminated as having created the toolmarks exhibited on Item 3 due to differences in class characteristics.   |
| RMN264  | The pair of bolt cutters (item 1) were identified as having cut the shackle of the padlock (item 2). Agreement of the characteristics is sufficient to identify the bolt cutters as the source of the toolmarks. The pair of bolt cutters (item 1) could not be identified or excluded as having cut the shackle of the padlock (item 3). However, it is unlikely the bolt cutters are the source of the toolmarks.   |
| RQJWKW  | Examination of Items 2 and 3 revealed that the shackles of both locks had been cut by opposing-blade cutting tools. Test cuts were produced by Item 1 for the purposes of microscopic comparisons with the cut surfaces on Items 2 and 3. Sufficient matching individual identifying characteristics were found, and it was concluded that the shackle of the Item 2 lock had been cut by the Item 1 bolt cutters. Differences in both class and individual characteristics were sufficient to determine that the shackle of the Item 3 lock was not cut by the Item 1 bolt cutters.  |
| RTQ8MR  | The bolt cutter in item 1 was used to cut the first cut padlock in item 2. The bolt cutter in item 1 was not used to cut the second padlock in item 3.  |
| RVTB9M  | The small pair of bolt cutters (exhibit 1) and the cut shackles of the two locks (exhibits 2 & 3) were microscopically compared. The shackle on the lock (exhibit 2) was determined to have been cut by the "bolt cutters" (exhibit 1). The shackle on the lock (exhibit 3) can be eliminated as having been cut by the "bolt cutters" (exhibit 1).   |
| RWV3Z4  | 1. There are toolmarks on the cut shackle of the padlock, Exhibit 2, that were produced using the bolt cutter, Exhibit 1. 2. The toolmarks on the cut shackle of the padlock, Exhibit 3, were not produced using the bolt cutter, Exhibit 1.  |
| T6DYK2  | The Item 1 bolt cutters were identified as having made the toolmarks on the Item 2 padlock. The toolmarks on the item 3 padlock were not made by the Item 1 bolt cutters.   |
| TBKHPL  | Microscopic examinations of the cutting blades of the Item #1 bolt cutters disclose a faint silver color residue. Test cuts were made in lead sheet material using the bolt cutters from Item #1. Microscopic comparisons of the cut ends of the lock shackle of the Item #2 Master Pad lock with the test cuts made with the bolt cutter of Item #1 disclosed that the lock shackle of the Item #2 Master pad lock was cut with the bolt cutters of Item #1. Microscopic comparisons of the cut ends of the lock shackle of Item #3 with the test cuts made with the Item #1 bolt cutters disclosed significant differences in both the class and individual characteristics. Therefore the bolt cutters of Item #1 can be eliminated as the tool that cut the shackle of the Item #3 Master lock. |

TABLE 2

| WebCode | Conclusions  |
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| TE9DPD  | Items 2 and 3 were examined microscopically. Item 2 was identified as having been cut by Item 1. Item 3 was cut by an opposed blade pinching type tool. However, due to differences in class characteristics, Item 3 was eliminated as having been cut by Item 1. Two (2) tests made using Item 1 and laboratory stock lead are being returned as Item 1T in Sample Pack T1 and should be maintained for possible future examinations.   |
| TFMLAZ  | It is the opinion of the examiner that Laboratory Item (001.B) (item 2) cut pad lock is identified as having been made by Laboratory Item (001.A) (item 1) Tekton brand bolt cutter. For the purposes of this report, the term identification means that there is agreement between a combination of individualizing characteristics as well as all class characteristics. The extent of this agreement exceeds any agreement of characteristics that may be made by different tools, and is consistent with characteristics that were made by the same tool. In the opinion of the examiner, it is inconclusive as to whether Laboratory Item (001.C) (item 3) cut Master brand pad lock was made by Laboratory Item (001.A)(item 1) Tekton brand bolt cutter. An inconclusive finding resulted from agreement between all class characteristics, but insufficient information regarding individualizing characteristics (due to absence, insufficiency, or lack of reproducibility). |
| THAC7X  | Examinations showed the marks on Item 2 were produced by Item 1. Examinations showed the marks on Item 3 were not produced by Item 1.  |
| TUQWWL  | Item #2: The tool mark on the shackle of the padlock was compared to the test exemplars obtained from the bolt cutter, Item #1. Sufficient corresponding individual tool mark signatures were observed to conclude that the bolt cutter had cut the shackle of the padlock. Item #3: The tool mark on the shackle of the padlock was compared to the test exemplars obtained from the bolt cutter, Item #1. A portion of the tool mark on the shackle exhibited sub-class characteristics that are not present on the bolt cutter, to conclude that the shackle was not cut by the bolt cutter.  |
| TY8AYM  | By means of microscopic examination and microscopic comparison of toolmarks it was determined that: 1. The bolt cutter (recovered from suspect) described in item 1, was the tool used to produce the toolmarks present in the padlock (first cut padlock recovered)described in item 2. 2. The bolt cutter (recovered from suspect) described in item 1, was not the tool used to produce the toolmarks present in the padlock (second cut padlock recovered)described in item 3.   |
| TZR74E  | The shackle of Item 2 was identified as having been cut by Item 1. The shackle of Item 3 was eliminated as having been cut by Item 1 based on differences in class characteristics.  |
| U3QKU7  | Microscopic comparison of evidence padlock Item #2, and evidence padlock Item #3, with bolt cutter Item #1 reveals the following: Evidence padlock Item #2 was cut with bolt cutter Item #1. Evidence padlock Item #3 cannot be identified or eliminated as having been cut with bolt cutter Item #1, due to insufficient agreement of microscopic striations between Item #2 and Item #1. They do bear similar class characteristics to each other.   |
| U87CDQ  | Comparison microscope examinations were conducted on exhibits 2 & 3 to standard tests created using exhibit 1. The findings of this examiner are the following: 1. Exhibit 2 was cut using the submitted bolt cutters. 2. Exhibit 3 was eliminated as being cut using the submitted bolt cutters due to differences in individual characteristics.   |
| U9E98N  | The padlock (item No. 2) was cut by the bolt cutter recovered from suspect.  |
| UAAGHY  | The bolt cutter Exhibit 1 was used to make tests in suitable laboratory material. The cut shackle portions of the padlock Exhibit 2 were compared microscopically with tests. The padlock Exhibit 2 was cut by the bolt cutter Exhibit 1. The cut shackle portions of the padlock  |



TABLE 2

| WebCode | Conclusions  |
|---------|--|
| UDETT7  | Exhibit 3 were not cut by the bolt cutter Exhibit 1. Therefore, any suspect pinching/cutting tool should be submitted to this laboratory for examination.  |
| UE33AF  | Test marks were made with Item 1, the Tekton bolt cutter, using submitted and laboratory standard testing media. Item 1A, the test tool marks, were sealed in a manila envelope and will be retained in the laboratory for possible future analysis. Methodology - Comparison Microscopy. The tool mark on item 2, the Master padlock, was made with Item 1, the Tekton bolt cutter, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the Master padlock, was not made with Item 1, the Tekton bolt cutter, based upon different class and individual microscopic characteristics.  |
| ULZJWE  | Conclusions - A microscopic comparison was conducted with the following results: The shackle[sic] of item #2 was cut using the bolt cutters submitted as item #1. The shackle[sic] of item #3 was not cut by item #1 due to different individual characteristics.  |
| UZK4EM  | After comparing item No.2 and item No.3, with the control marks made by bolt cutter (item No.1) by using comparison microscope it was found that the marks on the item No.2 and Item No.3 are similar. Therefore, it was concluded that the same bolt cutter (item No.1) was used to cut both the padlocks.  |
| VGK3DF  | Through microscopic and microscopic comparison examinations of toolmarks the following was determined: 1. The bolt cutter described in Item 1, was the tool used to produce the toolmarks found in the cut padlock shackle, described in Item 2. 2. The bolt cutter described in Item 1, was not the tool used to produce the toolmarks found in the cut padlock shackle, described in Item 3.   |
| VGRXZZ  | Test cuts made with the bolt cutter (Item 1) and the cut ends of the shackle of the padlock (Item 2) were microscopically examined and compared. Based on the agreement of their class characteristics and sufficient agreement of their individual characteristics, the bolt cutter (Item 1) is identified as the tool that made the cut on the shackle of the padlock (Item 2). Test cuts made with the bolt cutter (Item 1) and the cut ends of the shackle of the padlock (Item 3) were microscopically examined and compared. Based on the disagreement of their class characteristics, the bolt cutter (Item 1) is eliminated as being the tool that made the cut on the shackle of the padlock (Item 3).  |
| VNJXZF  | Item 1 (a bolt cutter) produced the toolmarks on Item 2 (a padlock). It could not be determined if Item 1 produced the toolmarks on Item 3 (a padlock). 1The comparative examinations showed disagreement of individual characteristics, but insufficient for an elimination. The comparative examinations were inconclusive.  |
| VNJXZF  | The submitted bolt cutter and two padlocks were examined and documented. The bolt cutter was used to make test cuts in the supplied solder for comparison purposes. The test cuts were microscopically inter-compared and determined to have good reproducibility of individual characteristics. The tool working surface (edges) were examined and determined not to have subclass characteristics. The test cuts were compared to the cut shackles from the padlocks. All class characteristics and sufficient agreement of individual characteristics were observed in the toolmarks between test cut piece #3 and the short shackle of padlock #2. The bolt cutter was used to cut the shackle of padlock #2. Digital photographs were taken to document the comparison. Microscopic comparison of the test cut pieces from the bolt cutter to the cut shackles of padlock #3 showed no agreement of individual characteristics. There was an observable difference in the nature and form of the toolmarks on the shackle from padlock #3 to those of the test cut pieces and padlock #2. These differences are indicative of a tool that is not as sharp and possibly thicker in width at the edge. The bolt cutter can be excluded as cutting the shackle on padlock #3. Digital photographs were taken to document the comparison. |

TABLE 2

| WebCode | Conclusions  |
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| VNPP6N  | 1. Exhibits 2 and 3 (Two small padlocks) have cut damage on the shackles consistent with a double-bladed tool, such as bolt cutters, wire cutters or similar tool. 2. Exhibit 1 (One pair of small bolt cutters) was visually examined and used to create Exhibit 1.1 (Test toolmarks). The cut damage on the padlock shackles of Exhibits 2 and 3 was microscopically compared to the test toolmarks of Exhibit 1.1. 3. The Exhibit 1 cutters caused the damage to the Exhibit 2 padlock shackle. 4. The Exhibit 1 cutters did not cause the damage to the Exhibit 3 padlock shackle.             |
| VXRMJ6  | Microscopic comparison examination of evidence cut padlocks Item 2 and Item 3 with bolt cutters recovered from suspect Item 1 revealed that padlock Item 2 was cut with bolt cutters recovered from suspect Item 1. Cut padlock Item 3 could not be identified or eliminated as having been cut by bolt cutters recovered from suspect due to insufficient agreement of the microscopic markings present on cut padlock Item 1.  |
| W3T7WB  | I conducted a comparative microscopic examination between the four cut surfaces present on each of the cut shackles of the Item 2 and Item 3 padlocks. My examination revealed: The cutters (Item 1) had been responsible for cutting the padlock shackle (item 2). The results of the comparison between the cutters (Item 1) and the cut padlock shackle (Item 3) was inconclusive. The cutters could neither be identified, nor eliminated as having been responsible.  |
| W9WDDY  | The submitted padlocks, items 2 and 3, were each observed to have a cut shackle. The padlock, item 2, was identified as having been cut by the submitted bolt cutter, item 1. The remaining padlock, item 3, was not cut by the submitted bolt cutter, item 1. The toolmark on this padlock exhibits class characteristics consistent with having been produced by an opposed blade cutting tool.  |
| WFDT23  | Item 2, the cut padlock was cut by the bolt cutters marked as item 1. This identification is established by having sufficient agreement of unique surface contours. Item 3, the cut padlock was not cut by item 1. Sufficient differences exists to eliminate the bold[sic] cutters from item 1 as having made the cut.  |
| WK66VD  | The submitted bolt cutter, Item 1, produced the severing toolmark present on the submitted lock shackle, Item 2. The submitted bolt cutter, Item 1, did not produce the severing toolmark present on the submitted lock shackle, Item 3.   |
| WMMY28  | Toolmark examination determined that the shackle portion of both Item 2 and Item 3 were cut by a tool employing a pinching-type action, such as th[sic] Item 1 bolt cutter. It was determined that toolmarks present on the shackle portion of Item 2 were produced by the Item 1 bolt cutters. Additionally, the shackle portion of Item 3 bears toolmarks similar to those produced by the Item 1 bolt cutters and thus Item 3 could have been cut by the Item 1 bolt cutters but due to a lack of sufficient corresponding individual toolmarks of value, no further association could be made. |
| WQ48ML  | The bolt cutter item 1 was used to cut the padlock item 2. The marks on the padlock item 3 originate from a different tool.  |
| WXQG62  | Results: Test tool marks were created with the Item 1 cutters using the extra wire provided. The evidence tool mark present on Item 2 was identified as having been created with the Item 1 cutters based on sufficient agreement of individual characteristics. The evidence tool mark present on Item 3 was excluded from having been created by the Item 1 cutters based on differing class characteristics.  |
| WYQFLP  | Item 2 was cut by the submitted tool, item 1. Item 3 was not cut by the submitted tool, item 1 based on a difference in class and subclass characteristics.  |

TABLE 2

| WebCode | Conclusions   |
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| XBNQTN  | In my opinion, the first padlock recovered from the locker, item 2, was cut by the bolt cutter recovered from the suspect, item 1. In my opinion, the second padlock recovered from the locker, item 3, was not cut by the bolt cutter recovered from the suspect, item 1.  |
| XFJA2E  | The questioned toolmarks in Item 2 had class and individualizing characteristics that were compared with test marks made with Item 1. Sufficient matching striae was found to reach the conclusion that Item 1 caused the damage to Item 2. The questioned toolmarks in Item 3 had class and individualizing characteristics that were compared with test marks made with Item 1. There was some agreement of the individual characteristics and all discernable class characteristics, but it was insufficient for an identification. The Item 2 toolmarks is identified as having been made by Item 1. The Item 3 toolmarks can neither be identified nor excluded as having been made by Item 1. |
| XFQVY2  | TOOLMARKS PRESENT ON EXHIBIT 2 WERE MADE BY EXHIBIT 1. TOOLMARKS PRESENT ON EXHIBIT 3 WERE NOT MADE BY EXHIBIT 1. EXHIBIT 1 WAS EXAMINED AND TESTED.  |
| XGDVWQ  | The cut marks found at padlock identified as item 2 were caused by the bolt cutter (item 1). The cut marks found at padlock identified as item 3 were not caused by the bolt cutter (item 1).   |
| XGNAD7  | (i) The shackle of the first cut padlock (item 2) was cut by the pair of bolt cutters (item 1). (ii) The shackle of the second cut padlock (item 3) was not cut by the pair of bolt cutters (item 1).   |
| XHYTC   | Item #1 (Tekton) bolt cutter, Item #2 (Masterlock) padlock with cut shackle, and Item #3 (Masterlock with green paint mark) padlock with cut shackle were examined on 6/12 - 13/2014. Item #1 (Tekton) bolt cutter cut the shackle of the submitted padlock (Item #2). The questioned toolmarks on Item #2 (lock shackle) were positively identified as having been produced by Item #1 (Tekton bolt cutter). Item #1 (Tekton) bolt cutter did not cut the shackle of the submitted padlock (Item #3). The questioned toolmarks on Item #3 (lock shackle) were eliminated as having been produced by Item #1 (Tekton bolt cutter).  |
| XVYBX6  | Conclusive evidence to show Item 1 was used to cut Item 2 but was not used to cut Item 3.   |
| XXMJ36  | Test tool marks made with item 1 were compared to the tool marks on items 2 and 3 using stereomicroscopes and a tool mark comparison microscope. There was significant agreement of individual characteristics (striations) and all discernible class characteristics between the test tool marks made with item 1 and the tool marks on item 2. I conclude item 1 made the cut on item 2. There was a significant disagreement of discernible class characteristics between item 1 test tool marks and item 3 tool marks. The width of the base cut was larger in item 3 than in item 1. Item 1 is eliminated as causing the cut to item 3.  |
| XZTBCZ  | Investigation are accomplished with a comparison light microscope and led to the following result: Item 2: The characteristics of the bolt cutter (Item 1) match with the characteristics of the tool marks (Item 2) in general and individualizing characteristics. It is clear that these tool marks (Item 2) were caused by the bolt cutter (Item 1). The padlock was cut by this bolt cutter. Item 3: Our investigation don't show any accordence between the comparative tracks of the bolt cutter (Item 1) and the tool marks (Item 3). The bolt cutter (Item 1) didn't cause the tool marks of Item 3.   |
| Y28EXA  | Test marks were made using the exhibit boltcutters (Item 1). These test marks were compared to the cut shackles on the padlocks (Items 2 & 3) using a comparison microscope. This type of examination allows two objects to be viewed simultaneously so that microscopic marks caused by the application of a tool can be compared and assessed. As a result of this examination I formed the opinion that the padlock, Item 2, had been cut by the exhibit   |

TABLE 2

| WebCode | Conclusions  |
|---------|--|
|         | boltcutters (Item 1). A different tool, possibly another set of boltcutters, had cut the shackle of the other padlock.   |
| Y6GCQJ  | All discernable class characteristics and a significant combination of individual characteristics of item2 match those of item1. Insuffiant[sic] class characteristics and no significant individual characteristics of Item3 can be matched to those of Item1. Therefore we conclude, on the one hand, that Item1 was used to cut Item2 and, on the other hand, that Item1 could not be used to cut Item3.  |
| Y6VX38  | The bolt cutters in Item #1 were identified as having cut the padlock in Item #2. The bolt cutters in Item #1 could not be identified as or excluded from having cut the padlock in Item #3 based on similar class characteristics (type of cut and striations).   |
| Y7JNKD  | The toolmarks present on Item 2 were microscopically identified as having been made by the bolt cutter of Item 1. The toolmarks present on Item 3 were microscopically eliminated as having been made by the bolt cutter of Item 1 based on different individual characteristics.  |
| Y7KEWM  | One of the two locks (Item 2) was cut by the submitted bolt cutters (Item 1). The remaining lock (Item 3) was cut by a second tool having a pinching type of cutting action.   |
| YEBUP8  | The toolmarks observed on Item #2 were caused by the submitted boltcutters (Item #1). The toolmarks on Item #3 were not caused by the submitted boltcutter (Item #1).  |
| YEX7KY  | The padlock (01-AB) was microscopically compared to test cuts from the bolt cutters (01-AA) with POSITIVE results. The padlock was cut by the bolt cutters. The padlock (01-AC) was microscopically compared to test cuts from the bolt cutters (01-AA) with INCONCLUSIVE results. The padlock could neither be identified nor eliminated as having been cut by the bolt cutters due to a lack of agreement or disagreement of individual characteristics.   |
| YJTZH2  | Methodology - Comparison Microscopy. Test marks were made with Item 1, the Tekton bolt cutters, using laboratory testing media. Item 1A, the test marks, was sealed in a manila envelope and will be retained in the laboratory for possible future analysis. The tool mark on Item 2, the padlock, was made with Item 1, the Tekton bolt cutters, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the padlock with green paint, was not made with Item 1, the Tekton bolt cutters, based upon different class and individual microscopic characteristics.   |
| YJZZ33  | Microscopic comparisons of evidence toolmarks on first cut padlock (Item 2) and second cut padlock (Item 3) with test toolmarks from K1 suspect bolt cutter (Item 1) revealed the following: The toolmarks present on the first cut padlock (Item 2) were created with K1 suspect bolt cutter (Item 1). Although the toolmarks present on the second cut padlock (Item 3) bear similar class characteristics to K1 suspect bolt cutter (Item 1), they cannot be identified or eliminated as having been created by K1 suspect bolt cutter (Item 1) due to the insufficient agreement of microscopic markings present. Should another suspect tool be recovered, please submit it in reference to the above number. |
| YM9PJP  | The shackles of the two padlocks (Items 2 and 3) had been cut by a tool with opposing jaws. Test toolmarks were made by the submitted bolt cutters (Item 1) for microscopic comparison to the cut ends of the lock shackles. From the correspondence of microscopic characteristics, it was concluded that the shackle of the first padlock (Item 2) was cut by the submitted bolt cutters. From the visual difference and lack of correspondence of microscopic characteristics, it was concluded that the shackle of the second padlock (item 3) was not cut by the submitted bolt cutters.  |
| YTR6YF  | Using the boltcutters in Item 1, test toolmarks were produced and microscopically examined in conjunction with the lock shackles in Items 2 and 3. Based on these comparative  |

TABLE 2

| WebCode | Conclusions   |
|---------|---|
|         | examinations and observed class and individual characteristics, it was determined that: A) The toolmarks on the shackle in Item 2 had been made by the boltcutters in Item 1. B) No similar individual characteristics could be found to link the boltcutters in Item 1 to having produced the toolmarks on the shackle in Item 3.  |
| YULQT7  | The cut in Agency Exhibit 2, the submitted padlock was identified as having been made by the submitted bolt cutters Agency Exhibit 1. The cut in Item 3, the submitted padlock, could neither be identified or eliminated as having been made by the submitted bolt cutters Item 1, due to poorly defined class characteristics and lack of reproducible individual characteristics.  |
| YW8CLU  | Examinations showed Item 2 was cut with Item 1. Examinations showed Item 3 was not cut with Item 1.   |
| YWT74J  | 1. Exhibit 1 (TEKTON brand 8-inch bolt cutter) and[sic] is an opposed blade cutting tool and was used to create Exhibit 1.1 (Test standards) for comparison. Exhibit 1.1 is being returned with Exhibit 1. 2. Exhibits 2 and 3 (Padlocks with cut shackles) were visually and microscopically examined and compared to test toolmarks from Exhibit 1. a. Exhibit 1 cut Exhibit 2. b. Exhibit 1 did not cut Exhibit 3.       |
| Z7XBVZ  | Item 1 is a pair of 8" bolt cutters. Item 2 was identified as having been cut by Item 1. Item 3 was neither identified nor eliminated as having been cut by Item 1. A significant agreement of individual characteristics was not observed.   |
| ZGPJZP  | The damaged area on the padlock (item 2) was identified as having been made by the bolt cutter tool (item 1). The damaged area on the padlock (item 3) exhibits similar class characteristics as those produced by the bolt cutter tool (item 1). However, due to the lack of corresponding individual characteristics, it is not possible to identify that bolt cutter tool as having made the damage.                     |
| ZKR3CU  | The shank of Item 2 (small Master lock with key) was cut by Item 1 (Suspect's bolt cutter). The shank of Item 3 (small Master lock with key and marked with a green dot) was not cut by Item 1. However, the shank of Item 3 was cut by a tool with a pinching action (e.g. bolt cutters, diagonal cutting pliers).   |
| ZQTRLG  | Bolt Cutter recovered from suspect (Item 1) was used to cut First cut padlock recovered from the Locker (Item 2). Second cut padlock recovered from the Locker (item 3) was cut by another Bolt Cutter.   |
| ZVXPMF  | Test toolmarks produced by the Item 1 boltcutters were microscopically examined in conjunction with the toolmarks found on Items 2 and 3. Based on these comparative examinations, it was determined that: A. The toolmarks present on Item 2 had been produced by the blades of Item 1. B. The toolmarks present on Item 3 bear insufficient characteristics to link them as having been produced by the blades of Item 1. |
| ZZTCJP  | The submitted tool mark on Item #2 was made by the submitted bolt cutter, Item #1. The submitted tool mark on Item #3 was not made by the submitted bolt cutter, Item #1, based on differences in class characteristics.  |

# Additional Comments

TABLE 3

| WebCode | Additional Comments   |
|---------|---|
| 26ZC7Z  | The cutting face of the plier that was used for item 3 is wider and has another striation pattern than item 1.  |
| 2XF8Z   | The toolmarks on the second padlock (item 3) were compared to the bolt cutter (item 1). The comparisons were inconclusive due to agreement in discernible class characteristics, but insufficient agreement or disagreement of individual details to permit an identification or an elimination.  |
| 2YCLQW  | Item 3 eliminated due to different characteristics of toolmarks. The test toolmarks are well defined with linear striations and the toolmarks present on Item 3 are feathered.  |
| 37UFM7  | Strength of Associations made in the Identification of Toolmarks. The identification of toolmarks is made to the practical, not absolute, exclusion of all other tools. This is because it is not possible to examine all tools in the world, a prerequisite for absolute certainty. The conclusion that sufficient agreement for identification exists between two toolmarks means that the likelihood another tool could have made the questioned mark is so remote as to be considered a practical impossibility. Note: In our laboratory, the "Strength of Association" statement above appears in every report where either firearm or non-firearm toolmark identifications are made. The 2008 NRC and 2009 NAS Reports are correct when they report that we cannot ever make absolute toolmark identifications. |
| 3HDK9A  | Inconclusive based on insufficient agreement or disagreement of individual characteristics.   |
| 6EN3X3  | Per laboratory policy, exclusions can only be made based on class characteristic differences.   |
| 6JR97E  | The damage to the cut padlock, item 3 was caused by another tool.   |
| 6VKNYT  | The examinations of the padlocks were performed on the understanding that they had both been in the locked position when cut. As a result, the cut could only have been made from the "outside" of the loop with the boltcutters in one of two orientations.  |
| 7QCJ4F  | Add more material to make test marks in the future.   |
| 8E86VZ  | Positive ID was made from a test cut made three quarters along the blades measured from the bolt cutters tip (one quarter of the way from the pivot).   |
| 9GXJH3  | The test cuts with the bolt cutter were done on the soft metal provided with the test. All surfaces formed by the cutting tools were moulded with a special silicon mould. Later on the moulds were examined by using a comparison microscope. In case of item 3 the quality of the tool marks was not good enough to reach a conclusive decision.  |
| A7TN2J  | Another tool is involved.   |
| AAMUWM  | Significant observable differences in blade width between the toolmarks observed on Item 3 and the blade width of Item 1. Item 3 toolmarks indicate a tool with working surfaces finished with much more pronounced linear striated markings at semi-regular intervals and at a different angle (more acute) than those observed on Item 1.   |
| BCMFB7  | The striae present on the blades of Item 1 are parallel to one another and perpendicular to the cutting edge. It appears that the padlock shackle in Item 3 was cut with a different tool, i.e. one that has striae that are parallel to one another, but angled to the cutting edge. This suggests a different class or subclass of tool*. However, it was determined that this difference   |

TABLE 3

| WebCode | Additional Comments  |
|---------|--|
|         | is insufficient to exclude Item 1 from having cut Item 3. *In order to test this theory, additional tests were made using a boltcutter from my laboratory. This boltcutter has angled striae on its blades. These tests had some angled striae, but also some striae similar to those present on Item 2. These tests were the predominant reason for the inconclusive result on Item 3, even though I believe it was likely cut by a different tool than Item 1.   |
| BHC3UJ  | While there was no visible agreement in individual characteristics between the padlock (item 3) and the test cuts by the bolt cutters, there was also no visible disagreement in class characteristics. In this laboratory we rarely exclude exhibits based solely on individual characteristics when class characteristics agree.   |
| BZT3VM  | The findings for Exhibit #3 are inconclusive because the class characteristics were very similar. Exhibit #3 was cut from both side(s) in a similar manner as Exhibit #2. Exhibit #3 has more break than cut. There are many areas of the tests that appear to be a similar pattern present on Exhibit #3, not just one. If this was an actual case, after the identification of Exhibit #2, we would stop further comparison.   |
| CUBQ8Y  | An "inconclusive" finding was given for "Item 3" as areas of correspondence and areas of non-correspondence of striated marks were observed. In addition, overlapping striated marks were observed on the padlock.   |
| DWBNRQ  | Shackle cut of Item 3 had some class characteristics that are produced by Item 1, however, there was a lack of sufficient corresponding individual microscopic marks for ID. I only Non-ID on a difference in class characteristics. Therefore, no-conclusion or inconclusive.   |
| E9NZQ7  | Item #3 was inconclusive to Item #1 because no discernible class characteristic differences were observed to allow for an elimination and a sufficiently similar microscopic pattern was not observed to allow for an identification.  |
| H4XZUW  | Two additional pieces of solder to make test marks would have been helpful.  |
| HAB6Y2  | The stria (individual characteristics) present on the toolmarks on Item 2 and tests from Item 1 are perpendicular to the cut edge, while those on Item 3 have angled stria and are coarser in appearance.  |
| JP6URC  | Item 3 inconclusive due to same class of marks on Items 1A & 2. Quality of marks on Item 3 were not as good as those found on Items 1A & 2.  |
| JTN8DZ  | The microscopic examination between Exhibit 1 and Exhibit 3 is inconclusive. Exhibit 3 seem to have more modeled marks. I did not want to eliminate based on individual characteristics and without a second opinion I chose to go conservative.   |
| LJND8D  | In regard to Item #1 being inconclusive to Item #3: The test marks & evidence marks contain the same class characteristics but there is insufficient similar/different individual characteristics to render an opinion as to whether or not the tool did or did not make one or all of the evidence marks.   |
| MAKF3A  | Based on the orientation of the cut in the locks the submitted bolt cutters could only have been positioned in one of two ways when making the cut. The orientation of the tool then limits the cutting surface that could have logically made the cut. This information was considered when making the elimination of Item 3 as having been cut by item 1. I found that using a similar lock as test material (which was not provided) was needed. I found that the wire provided was not a sufficient material for test cuts. Test cuts using similar locks made identification/elimination much easier/quicker. |
| PUB3GN  | The toolmarks for comparison have been produced in our lab using the bolt cutter Item 1 and both lead and the solder material provided. The toolmarks produced with the known tool and the questioned toolmarks (Items 2 and 3) have been moulded using a suitable moulding  |

TABLE 3

| WebCode | Additional Comments  |
|---------|--|
| PXTCHA  | <p>material (AccuTrans). The comparison has been performed with a comparative macroscope. The method "Toolmarks examination" is accredited according to ISO 17025.</p> <p>Examination was done with the the[sic] comparison microscope.</p>  |
| RMN264  | <p>The toolmarks present on the shackle of the padlock (item 3) possessed some correspondence of class characteristics to those capable of being produced by the pair of bolt cutters (item 1). Although differences were noted between some of the individual characteristics, these differences were insufficient for exclusion.</p>   |
| RQJWKW  | <p>In addition to the provided test material (lead-free solder), test cuts were produced in sheet lead. This allowed the capture of the entire cutting surface of Item 1 with one test. The reported identification was made using this test method.</p>   |
| TFMLAZ  | <p>In the opinion of the examiner, it is inconclusive as to whether Laboratory Item (001.C) (item 3) cut Master brand pad lock was made by Laboratory Item (001.A)(item 1) Tekton brand bolt cutter. An inconclusive finding resulted from agreement between all class characteristics, but insufficient information regarding individualizing characteristics (due to absence, insufficiency, or lack of reproducibility).</p>  |
| TY8AYM  | <p>The types of toolmarks observed in the padlocks described in items 2 and 3, are striated and impression toolmarks.</p>  |
| TZR74E  | <p>coarse / angular marks in Item 3 vs. fine parallel on Item 2</p>  |
| UZK4EM  | <p>The toolmarks found in the cut padlock shackle, described in Items 2 and 3, are impression and striated toolmarks type.</p>   |
| VGRXZZ  | <p>-the TMs on Item 3-neither be identified nor eliminated as having been produced by Item 1 ; however, there are indications another tool may have been used -saw some possible similar individual characteristics -apparent diagonal striae on Items 3A and 3B -Item 1 test TMs (and Item 2) do not have apparent diagonal striae -the overall character and quality of the marks on the edge appear different -Items 3A and 3B-"chatter-like" appearance of the parallel striae, whereas Item 1 test TMs (and Item 2) have a more granular-like appearance -also should be noted that Items 2B-1 and 2A-2 are readily idable to Item 1 test TMs and Item 3 (regardless of the side) is not</p>  |
| VNJXZF  | <p>The identifications of the toolmarks above are made to the practical, not absolute, exclusion of all other tools. This is because it is not possible to examine all firearms or tools in the world, a prerequisite for absolute certainty. The conclusion that sufficient agreement for identification exists between two toolmarks means that the likelihood another firearm or tool could have made the questioned mark is so remote as to be considered a practical impossibility. The phrase "practical impossibility", which currently cannot be expressed in mathematical terms, describes an event that has an extremely small probability of occurring in theory, but which empirical testing and experience has shown will not occur. In the context of firearm and toolmark identification, "practical impossibility" means that based on 1) extensive empirical research and validation studies, and 2) the cumulative results of training and casework examinations that have either been performed, peer reviewed, or published in peer-reviewed forensic journals, no firearms or tools other than those identified in any particular case will be found that produce marks exhibiting sufficient agreement for identification.</p> |
| VXRMJ6  | <p>Cut padlock Item 3 could not be identified or eliminated as having been cut by bolt cutters recovered from suspect due to insufficient agreement of the microscopic markings present on cut padlock Item 1.</p>   |



TABLE 3

| WebCode | Additional Comments   |
|---------|---|
| W3T7WB  | The evidence is more indicative that a different set of cutters to Item 1 was responsible for cutting the shackle on the padlock (Item 3). But I could not state this as a definitive elimination. Although the shape and contour of the cut was different in places, some areas were also similar. I could find no corresponding individual striated detail to suggest to me the cutters could have cut this item. But there were too many class similarities in the cut itself to be able to eliminate with certainty. The only outcome for this comparison could be 'inconclusive'.  |
| WFDT23  | I would like to have had a third uncut padlock for testing material.  |
| WMMY28  | due to a lack of sufficient corresponding individual toolmarks of value, no further association could be made between the toolmarks on the shackle portion of Item 3 and the Item 1 bolt cutter.  |
| WXQG62  | Remarks: Identifications are made to a practical certainty, not to the absolute exclusion of all other possible sources (firearms/tools). This is based upon the fact that it is not possible to examine all firearms or tools in the world, a prerequisite for absolute certainty. Whether statistically or verbally stated, the principle of absolute versus practical certainty is common in forensic science disciplines. The conclusion that sufficient agreement exists between two tool marks, the basis for an identification, means that the likelihood another tool could have made the questioned tool mark is so remote as to be considered a practical impossibility.  |
| XFJA2E  | A large percentage of the cut surfaces of Item 3 were unsuitable for examination. There were small areas on three of the cut surfaces (one area that was not continuous (partly obliterated) and two ridges that were slightly deformed towards the ends) which had some degree of agreement of individual characteristics to three corresponding cut surfaces of the test mark that identified Item 2 as having been made by Item 1. By the AFTE Theory of Identification, this may have been identified as there were unique surface contours with some level of agreement. However, if we were to process these areas utilizing the Continuous Matching Striae (CMS) approach, this area would be seen as lacking. Since it is an AFTE recommendation to be "conservative when reporting the significance of these observations", this analysis was determined to be inconclusive. |
| Y6VX38  | Laboratory policy states that exclusions can only be made based on class characteristic differences.  |
| YEX7KY  | The padlock (01-AC)(Item 3) could neither be identified nor eliminated as having been cut by the bolt cutters (01-AA)(Item 1) due to a lack of agreement or disagreement of individual characteristics.   |
| YULQT7  | Item 3 could not really determining[sic] the type of cut however the direction of the individual stria was at 45° and the tool cut in 90° so that was different.  |
| Z7XBVZ  | Some angular toolmarks were observed on two of the cut edges of Item 3 along with toolmarks perpendicular to the cutting action used to cut Item 3. While these angular markings could not be completely reproduced in the test toolmarks made with Item 1, the toolmarks observed on Item 3 are not dissimilar enough to eliminate it from having been cut by Item 1.  |
| ZGPJZP  | There are some straight, even stria on the inner edge (near the fracture point) of Item 3. The characteristics leading to the straight stria are on an angle and grainy (broken up), unlike the tests which are all straight. Enough straight, even stria exist but there is not enough correspondence to the tests. The laboratory does not normally eliminate on lack of individual characteristics alone.  |

# Appendix

Collaborative Testing Services ~ Forensic Testing Program

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## **Test No. 14-528: Toolmarks Examination**

DATA MUST BE RECEIVED BY July 28, 2014 TO BE INCLUDED IN THE REPORT

Participant Code:

WebCode:

### **Accreditation Release Section**

CTS submits external proficiency test data directly to ASCLD/LAB and ANSI-ASQ NAB/FQS. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ASCLD/LAB and/or ANSI-ASQ NAB/FQS. (Accreditation Release section on the last page must be completed and submitted.)
- This participant's data is **NOT** intended for submission to ASCLD/LAB or ANSI-ASQ NAB/FQS.

### **Online Data Entry**

Visit [www.cts-portal.com](http://www.cts-portal.com) to enter your proficiency test results online. If you have any questions please do not hesitate to contact CTS.

#### Scenario:

Police are investigating a theft at a high school. Two lockers were broken into and the contents stolen. Both lockers were locked with the same type of padlock that was cut to gain access. Investigators recovered a bolt cutter the next day from the suspect. They are submitting the bolt cutter along with the two cut padlocks.

*Please note the following:*

*-A piece of lead-free solder has been included for possible test mark purposes.*

*-To assist in distinguishing the two submitted padlocks, the Item 3 padlock has been marked with green paint.*

#### Items Submitted (Sample Pack T1):

Item 1: Bolt cutter recovered from suspect.

Item 2: First cut padlock recovered from the locker.

Item 3: Second cut padlock recovered from the locker. (painted green)

1.) Was the questioned bolt cutter (Item 1) used to cut either of the padlocks (Items 2 or 3)?

|        |     |                          |    |                          |               |                          |
|--------|-----|--------------------------|----|--------------------------|---------------|--------------------------|
| Item 2 | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | Inconclusive* | <input type="checkbox"/> |
| Item 3 | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | Inconclusive* | <input type="checkbox"/> |

\*Should an item(s) be marked "Inconclusive", please document the reason in the Additional Comments section of this data sheet.

**Please return all pages of this data sheet.**

Page 1 of 3

Participant Code:

WebCode:

2.) What would be the wording of the Conclusions in your report?

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3.) Additional Comments

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|---|--|
| <p><b>Return Instructions:</b> Data must be received via online data entry, fax (please include a cover sheet), or mail by <i>July 28, 2014</i> to be included in the report.</p>   | <p>Participant Code:<br/>         ONLINE DATA ENTRY: <a href="http://www.cts-portal.com">www.cts-portal.com</a><br/>         FAX: +1-571-434-1937<br/>         or Toll-Free: 1-866-FAX-2CTS (329-2287)</p> |
| <p>QUESTIONS?<br/>         TEL: +1-571-434-1925 (8 am - 4:30 pm EST)<br/>         EMAIL: <a href="mailto:forensics@cts-interlab.com">forensics@cts-interlab.com</a><br/> <a href="http://www.ctsforensics.com">www.ctsforensics.com</a></p> | <p>MAIL: Collaborative Testing Services, Inc.<br/>         P.O. Box 650820<br/>         Sterling, VA 20165-0820 USA</p>  |

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## RELEASE OF DATA TO ACCREDITATION BODIES

The following Accreditation Releases will apply only to:

Participant Code:

WebCode:

for Test No. **14-528: Toolmarks Examination**

This release page must be completed and received by **July 28, 2014** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

### ASCLD/LAB RELEASE

If your lab has been accredited by ASCLD/LAB and you are submitting this data as part of their external proficiency test requirements, have the laboratory's designated individual complete the following.

**The information below must be completed in its entirety for the results to be submitted to ASCLD/LAB.**

ASCLD/LAB Legacy Certificate No. \_\_\_\_\_ ASCLD/LAB International Certificate No. \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Laboratory Name \_\_\_\_\_

Location (City/State) \_\_\_\_\_

### ANSI-ASQ NAB/FQS RELEASE

If your laboratory maintains its accreditation through ANSI-ASQ NAB/FQS, please complete the following form in its entirety to have your results forwarded.

ANSI-ASQ NAB/FQS Certificate No. \_\_\_\_\_

Signature and Title: \_\_\_\_\_ Date \_\_\_\_\_

Laboratory Name \_\_\_\_\_

Location (City/State) \_\_\_\_\_

### Accreditation Release

#### Return Instructions

*Please submit the completed Accreditation Release at the same time as your full data sheet. See Data Sheet Return Instructions on the previous page.*

*Questions? Contact us 8 am-4:30 pm EST*

Telephone: +1-571-434-1925

email: [forensics@cts-interlab.com](mailto:forensics@cts-interlab.com)

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