

TECHNICAL NOTE

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Using the Video Spectral Comparator in the Comparison of Carbon Copies and Carbon Paper Impressions

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ABSTRACT: Provided with overwritten carbon paper images and one carbon copied document produced by the carbon paper, decipherment of the overwritten entries can be made. A technique using the Video Spectral Comparator with the Image Integration Comparator can reveal overwritten entries by storing and superimposing images of the carbon paper and carbon copied document.

KEYWORDS: questioned documents, carbon paper, video spectral comparator

Since the introduction of the office photocopier and carbonless paper, the use of carbon paper to make duplicates of documents seems to have become a thing of the past. Carbon paper is still used to reproduce some documents, however, and carbon copies could, therefore be used in the commission of a crime, which may lead to the subsequent examination by a forensic laboratory.

One such case entered the U.S. Army laboratory for examination. A carbon copy document was submitted as a questioned document for handwriting identification (Fig. 1). The carbon paper thought to have been used to produce the questioned carbon copy was also submitted (Fig. 2). The document in question is a form used for the issue and turn-in of military equipment. In this case, the form had been used to issue a U.S. Government weapon that was subsequently stolen. It was suspected that the questioned carbon copy form had been prepared in an effort to cover up the crime.

The carbon paper submitted with the questioned document had been used at least twice, but the handwritten entries overlapped and were, for the most part, illegible. It was, however, believed that the carbon paper might contain information that would assist the investigator.

Researching this matter in the available questioned document literature revealed some information regarding carbon copies and

carbon paper examination. Ruenes [1] and Wenderoth [2] noted that making a reverse color negative of carbon paper aids in reading the carbon paper impressions. In the case at hand, the overwritten nature of the images made deciphering the reverse color negative difficult. Ruenes also stated the examination of overwritten (type-written) impressions on carbon paper requires microscopic examination with patience. Osborn [3] noted transparencies of questioned documents can be overlaid to determine the origin of offsets of carbon. Transparencies were made in this case with fair results. Some of the entries on the carbon paper, however, were still difficult to read. Hilton [4] and Conway [5] only describe examination of carbon paper as sources of carbon copy documents. Masson [6] used several photographic techniques to assist in deciphering obliterated carbon impressions with some success. Also, Purtell [7] listed three unsuccessful techniques attempting to decipher carbon paper impressions. Most of the literature only discusses carbon paper and carbon copy examinations in regard to typewritten documents.

It was not known, in the beginning, whether the questioned carbon paper had been used to prepare the questioned carbon copy form. The objectives of this author's examinations were:

1. Determine if the questioned carbon copy writing was contained on the carbon paper, and if so;
2. Isolate the questioned writing from the carbon copy so the other writing on the carbon paper could be seen and deciphered, and;
3. Reproduce the decipher writing images for demonstrative purposes.

Methods

Transmitted light was used in order to see the writing images on the carbon paper more clearly. The questioned carbon copy was then superimposed on the carbon paper to determine if this carbon paper had been the used in producing the questioned document. An examination with a transmitted light box revealed the carbon copy entries matched the carbon paper impressions revealing the carbon paper was the sheet used to make the questioned carbon copy. The remaining text could then be partially deciphered, but was difficult to read, and was not clear for demonstrative purposes due to the opacity of the carbon copy paper. The Video Spectral Comparator (VSC-1) was then considered as a choice for further examination.

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REQUEST FOR ISSUE OR TURN-IN (DA FORM 710-2-1)				XX ISSUE TURN-IN	SHEET NO. 1	NO SHEETS	3. REQUEST NO.	4. VOUCHER NO.			
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3. REQUEST FROM: HNS 4-82 FA				9. END ITEM IDENT			9a. NAME/MANUFACTURER		9b. MODEL	9c. SERIAL NO.	
*CODE ISSUE F-Initial R-Replacement				TURN-IN FRT-Fair Wear And Tear RS-Report of Survey			EX-Excess EC-Email of Changes		10. PUBLICATION		11. JOB ORDER NO.
12. ITEM NO.	STOCK NO.	ITEM DESCRIPTION	UNIT OF ISSUE	QUANTITY	CODE*	SUPPLY ACTION	UNIT PRICE	TOTAL COST	13. POSTED		
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DA FORM 3161 MAY 63
REPLACES EDITION OF JUN 72 WHICH WILL BE USED UNTIL EXHAUSTED.
US GOVERNMENT PRINTING OFFICE : 1967 O - 189-109

FIG. 1—Document bearing questioned carbon copy entries.

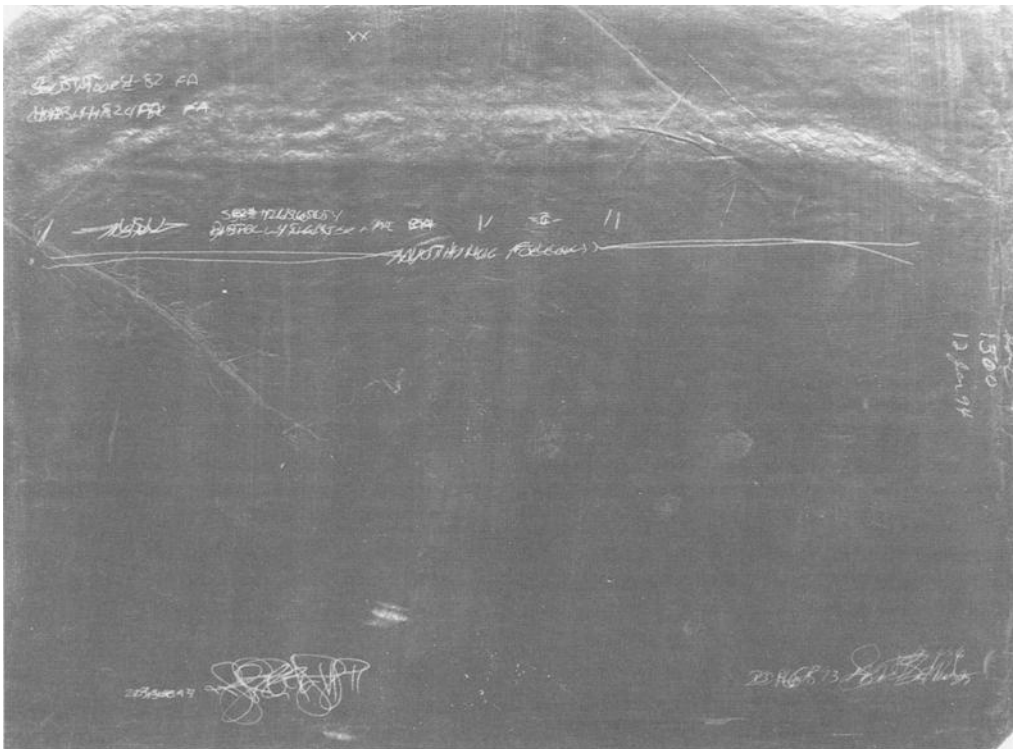


FIG. 2—Questioned carbon paper with carbon writing images.

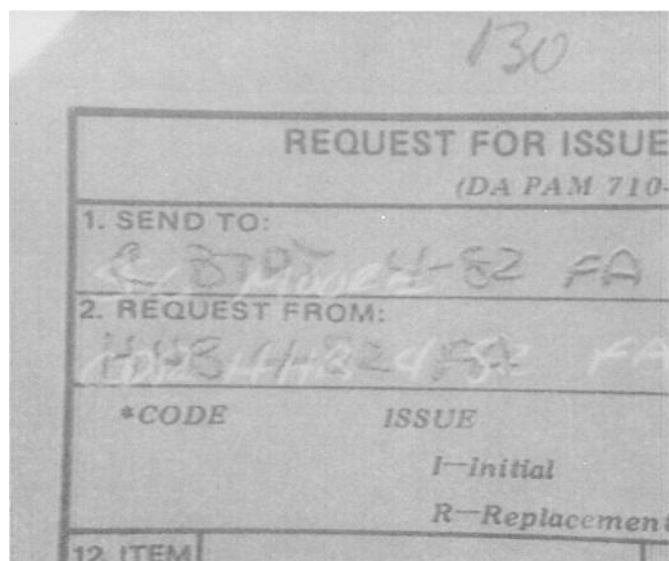


FIG. 3—VSC-1 video image of the superimposed carbon paper and carbon copy document. The white entries depict the nonmatching entries on the carbon paper.

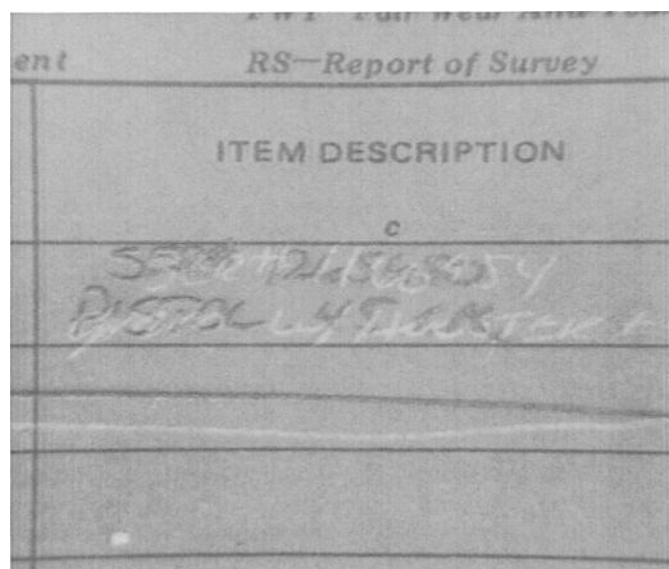


FIG. 4—VSC-1 video image of the superimposition of the serial number entries. "Ser # 1166954" can now be deciphered.

A 1991 version of the VSC-1 was used in this examination. This version is equipped with CCD camera unit, video monitor, the Image Integration Comparator (IC-8), and a transmitted light box in the mainframe. All of this equipment was used in the examination of the carbon paper and copy. The IC-8 was essential because it provides image overlays and image conversion functions [8].

First, the carbon paper was placed in the VSC-1 and an image of the overwritten text was made using transmitted light. Magnification was used to help make the images clear and distinct. The transmitted light naturally made the writing images appear white against a black background. The image was then saved by loading it into memory by using the LOAD function on the IC-8.

Once the carbon paper image was stored in memory, the VSC-

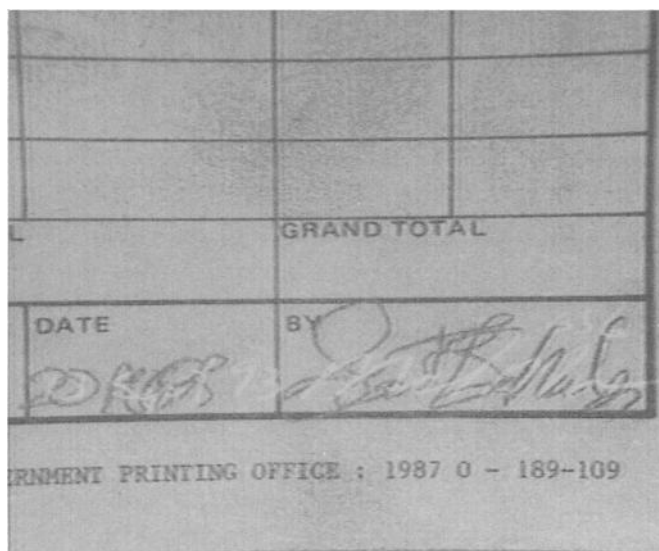


FIG. 5—VSC-1 video image of the signature entry with the now decipherable "13 Sept 93" date entry.

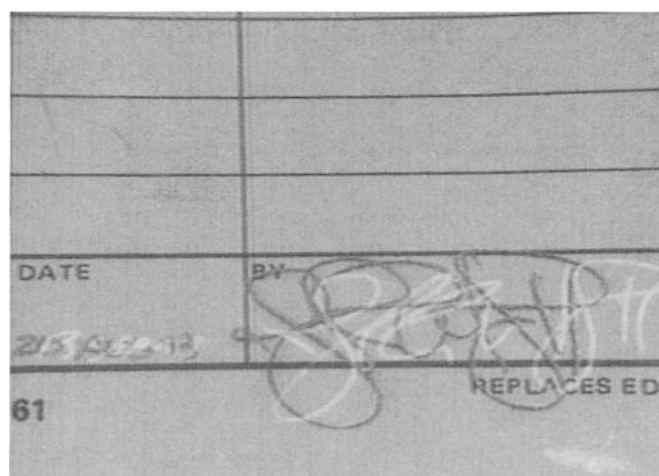


FIG. 6—VSC-1 video image of the other signature entry with the now decipherable "13 SEP 93" date entry.

1 was then placed in the Infrared Reflectance mode, switching the transmitted light off. The MIX function on the IC-8 was then used and the questioned carbon copy was placed in the VSC-1. The Visible/IR Interference filter (FS2) and white light of the VSC-1 were used in order to achieve maximum darkness of the carbon writing images. The questioned carbon copy was then positioned to overlay the matching text of the stored carbon paper image. This left readable white writing images which could be deciphered.

As shown in Fig. 3 "SSG MOORE", and "CDR HHB 4- __ 2 FA" can be seen clearly. Other text could be deciphered, such as the serial number (Fig. 4). The signature entries were more easily distinguishable, along with the date entries (Figs. 5, 6).

It is possible to reverse colors on the images using the inverse (INV) mode of the IC-8. This mode made the carbon paper entries appear black and the carbon copy entries white. In this case, however, the normal mode made the best quality images for viewing.

Conclusion

Using the VSC-1 in the described procedure can help in those rare carbon paper cases. This method can be used to make carbon paper entries readable and prove, or disprove, whether a questioned carbon copy was made with a certain sheet of carbon paper. The procedure described takes minimal time to set up and view on the VSC-1, and the entries can be deciphered without making photographic copies as shown here.

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References

- [1] Ruenes, R. F., "Reproduction and Decipherment of Typing Imprints on Carbon Paper," *Intercommunicating Correspondence for the American Society of Questioned Document Examiners*, August 1963.
- [2] Wenderoth, M. "The Use of Contact Prints in the Examination of Carbon Paper," presented at the annual meeting of the American Academy of Forensic Sciences, Cincinnati, OH, 1990.
- [3] Osborn, J. P., "Problem of Proof: Transfer of Impressions from Carbon Paper," presented at the annual meeting of the American Society of Questioned Documents Examiners, Washington, DC, August 1989.
- [4] Hilton, O., *Scientific Examination of Questioned Documents*, Elsevier Science Publishing Co, Inc., New York, NY, 1982.
- [5] Conway, J. V. P., *Evidential Documents*, Charles C Thomas, Springfield, IL, 1959.
- [6] Masson, J. F., "The Case with Everything," presented at the annual meeting of the American Society of Questioned Document Examiners," Boston, MA, 1982.
- [7] Purtell, D. J., "Carbon Paper and Carbon Copy Impressions," undated.
- [8] VSC-1 Instruction Manual (1991 Model Onwards), October 1991.

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