

J28 Remedial Paper Examinations

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Learning Overview: The goal of this presentation is to remind document examiners of some of the recommended basic techniques of paper examinations, to expose them to others they may not be aware of, and to provide information on the frequency of use of methods within the discipline.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by enhancing the competence of document examiners through familiarity with techniques regarding paper examinations.

All routine document examinations begin with paper. Several standard references list various methods for examining paper.¹⁻³

The Scientific Working Group for Forensic Document Examination (SWGDOC) Standard for Non-Destructive Examination of Paper guidelines lists 20 discrete/different examinations, paraphrased as follows: (1) 7.5—using transmitted light for watermarks; (2) 7.6—for color; (3) 7.7—for thickness; (4) 7.8—for Ultraviolet (UV) fluorescence and Infrared Luminescence (IRL); (5) 7.9—for chemical or other contamination, alterations, and carbonless paper transfers; (6) 7.10—for relative opacity; (7) 7.11—for surface texture; (8) 7.12—for length and width; (9) 7.13—for weight; (10) 7.14—of corners and evaluate angles (for example, squared, curved, rough finish); (11) 7.15—of edges (for remnants of binding, adhesives, or padding material); (12) 7.16—of edges for manufacturing markings (for example, cut marks, striations or coloration); (13) 7.17—of lines or other printed material (for line length, spacing, and for broken or deformed patterns); (14) 7.18—for security features (for planchettes or security fibers); (15) 7.19—for carbonless paper chemicals and evidence of a carbonless system; (16) 7.20—for trace materials (for example, opaqueing solution, correction strips, tape, or other materials); (17) 7.21—for surface damage due to abrasions, handling, storage, or other physical changes (for folds, creases, crimp markings, fiber disturbances, or other relevant characteristics); (18) 7.22—for staples and staple holes; (19) 7.23—for perforations, hole punches, or other torn portions; and (20) 7.24—for indentations (of handwriting, clipboard marks, paper clip impressions, and other extraneous markings).⁴ A demonstration of the paper making process will show how certain characteristics occur.

Routine Examinations: It is assumed three of the above examinations are routinely done by all examiners: (1) examinations for watermarks (to determine the manufacturer, and possibly the date of the paper's manufacture); (2) examinations with UV and IR illumination (to determine the fluorescence/luminescence characteristics to evaluate a common source); and (3) examinations for indentations of handwriting, paper fiber disturbances, etc.

The determination of the manufacturer by watermark requires some research, but can be fruitful, as it may allow determination of a common source or the date the paper was made. This presentation will summarize a couple of different types of watermarks and suggest a streamlined method and suggest useful contacts to facilitate this research.

Hilton long ago cautioned that differences in fluorescence between questioned sheets of paper do not necessarily indicate a different source, because of the variations inherent in the manufacturing process.⁵ This presentation will illustrate the manufacturing and conversion process and the reasons for difference in fluorescence.

Indentations may be caused on paper from a variety of sources, especially handwriting. Some indentations may be created on the blank paper stock during the paper conversion process. This presentation will present examples to look out for.

Less Routine Examinations: Several of the examinations are possibly less routinely done, such as measuring papers for thickness (7.7), opacity (7.10), and weight (7.13). These require more specialized instruments, which may need to be calibrated, and many labs nowadays have procedures involving calibration. Measuring the size of a document for its length and width (7.12) is relatively easy and may help determine its geographical origin (that is, North American or European). But, unless the paper is of an untypical or unfamiliar size, is it routinely performed?

In addition to measuring the dimensions, a third group of examinations, if performed, may indicate whether a paper has been trimmed or modified in some way (1) examining the document corners and evaluate angles (7.14), and (2) microscopically examining edges for remnants of binding, adhesives, or padding material (7.15) or for cut marks or striations or coloration (7.16).

In the absence of obvious evidence of alteration, are these examinations done by many?

This presentation will conclude with the results of a survey done within the discipline on the prevalence of these methods above and the tools used.

Reference(s):

1. Hilton, O. *Scientific Examination of Questioned Documents*. Revised Edition, Elsevier, New York, 1982.
2. Browning, B. *Analysis of Paper*. New York: Marcel Dekker, 1977.
3. *Pocket Pal: A Graphic Arts Production Handbook*, 20th Ed. Memphis: International Paper Company, 2007.
4. Scientific Working Group for Documents. *SWGDOC Standard for Physical Match of Paper Cuts, Tears, and Perforations in Forensic Document Examinations*. Accessed October 19, 2020. <https://www.swgdoc.org/documents/SWGDOC%20Standard%20for%20Non-destructive%20Examination%20of%20Paper.pdf>.
5. Hilton, O. Pitfalls in the Use of Ultraviolet Examination to Differentiate Between Writing Papers. *J Criminal Law and Criminology* 1949:40(4):519-522.

Paper Examinations, Watermarks, Machine Indentations

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