

TECHNICAL NOTE

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Electronic Typewriter Grids

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ABSTRACT: In order to determine if misalignments of typewritten characters or entire typewritten passages are present, forensic document examiners have long made use of glass and acetate grids. These grids come with varying spaces between their lines and are physically placed on top of the typewritten document to check the alignment characteristics of the typewriting. Computer technology allows for these grids to be created in any spacing desired and overlaid on an image that has been imported into the computer. The two primary advantages of this are the ability to create a grid with any line spacing that might be necessary and the relative ease with which the results can be displayed for others.

KEYWORDS: forensic science, questioned document examination, typewriting, grids, alignment, Adobe Photoshop®

Precise measurement of spacing and alignment of typescript has long been a requirement in the examination of typewritten documents (1–4). For years, this has been accomplished with the use of grids on glass plates or acetate sheets and these grids, in various forms, are used by forensic document examiners throughout the world. The history of these measurement devices are reviewed in the excellent paper by Tytell (5). It has always been a little difficult to obtain these typewriter grids. With the somewhat limited customer base, the number of companies willing to produce these precision grids has never been large, but the document community has always been able to find this product when it was needed. Modern technology has made it possible for individual examiners to create a grid of any desired spacing and print it onto an ordinary sheet of transparency film (6).

One of the problems with all of these grids is in demonstrating the alignment characteristics noted on the document to others. Rather careful photography followed by the enlargement of the images is necessary. Once again, however, modern technology has provided us with a much easier way to demonstrate these alignment characteristics. If the image of a sample of typewriting can be imported into a computer, a software program called Adobe Photoshop® 4.0 can be used to create an electronic typewriter grid over the image of the typewriting. The resulting image can be viewed on the computer's monitor, projected onto a screen or printed out and distributed.

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It is not anticipated that this technique will render obsolete any of the grids currently being used or obviate the need for new examiners to purchase a good set of measurement grids. However, it should provide forensic document examiners with another option for demonstrating their results to others.

Preparing the Image

The method for capturing the image and importing it into the computer is not limited to any particular device. It is more important that the document be perfectly flat when the image is captured. Also, high resolution is not needed. A resolution of 300 dpi (dots per inch) is certainly adequate.

Because a large image requires the computer to work harder in executing any commands it is given, it is suggested that, when possible, only a limited area of the questioned document be captured. If only a single entry is suspected of being out of alignment, it is best to capture this entry and the immediately surrounding area. This extra typewriting provides a reference point to help determine the alignment characteristics of the questioned material.

The grid that will be created later can't be rotated, so it is imperative that the baseline of the typewriting in the image window be level. Rather than going to a great deal of trouble with this on the input end, it is easier to correct an unlevel baseline after the image has been opened in Photoshop. To check the angle of the baseline, double-click on the Line Tool button on the Tools Palette. This will open the Line Tool Options Palette. In this palette, select a Line Width of 0 pixels. Now, click on the Info tab in this same palette. This palette is divided into four quadrants. The upper right quadrant has CMYK values. The mouse should now be used to draw a line under the letters on one line of typewriting. Place the cursor on the bottom of a letter on the left side of a line, click and drag the cursor across to the bottom of a letter on the right side of the same line. As long as the left mouse button is depressed, the values in the upper right quadrant of the Info Palette change to ΔX , ΔY , A, D. The A value is the angle of the line being drawn. A negative value means that the line is lower on the right end than on the left. Make note of this angle value, as this number will be used when rotating the typewriting image later. When the mouse button is released, the line that was drawn will disappear, since it had a 0 pixel width.

To rotate the image of the typewriting, go to IMAGE, ROTATE CANVAS, ARBITRARY. This will open the Rotate Canvas Dialogue Box. Enter the angle value and check either CW (Clockwise) or CCW (Counter Clockwise) to denote the direction of rotation

to be applied to the image and click the OK button. This rotation will be applied to the image.

Creating the Grid

If the examiner has a glass or acetate measuring grid, this should be used to measure the spacing of the typewriting on the questioned document. This value is then used in creating the grid in Photoshop.

Go to FILE, PREFERENCES, GUIDES & GRID... and open the Preferences Dialogue Box. In the Grid section on the lower part of this box, the examiner can select the color of the lines to be used in the grid, the style of the lines (Lines, Dashed Lines, Dots) and the number of subdivisions. A value of 1 in the subdivisions area is usually preferable but, for more accurate alignment, a value of 2 will split each square in the grid into four squares. A color other than black will let the lines on the grid stand out from the black letters. Next to Gridline Every, enter the value of the spacing determined earlier and select either Pixels, Inches, Centimeters, Points or Picas. Click on OK.

To make the grid appear in the image window, go to VIEW, SHOW GRID. Make sure there is not a check mark next to SNAP TO GRID. If there is a check mark here, click and deselect it. A grid with a spacing between each line equal to the value entered earlier will now overlay the typewriting in the image window (Fig. 1). To position the typewriting correctly within the grid, it may be necessary to move it slightly. Click on the Move Tool button in the Tools Palette. Place the cursor in the image window, click and drag the image to the desired location. For more control in the movement of the image, use the Arrow keys on the keyboard. Any character or word that is out of alignment will not be centered in its grid box. This technique is equally useful in demonstrating misalignment of individual letters or in showing that an entire passage is out of alignment (Fig. 2). The image can be magnified using the Zoom Tool button or the Zoom Slider in the Navigator Palette.

A problem in checking typewriter alignment on photocopies is

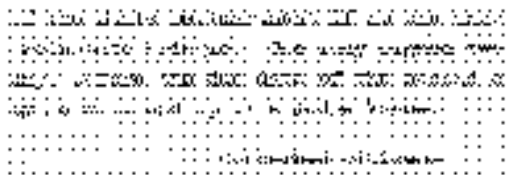


FIG. 1—Grid reveals alignment and slant characteristics of the typewriting.

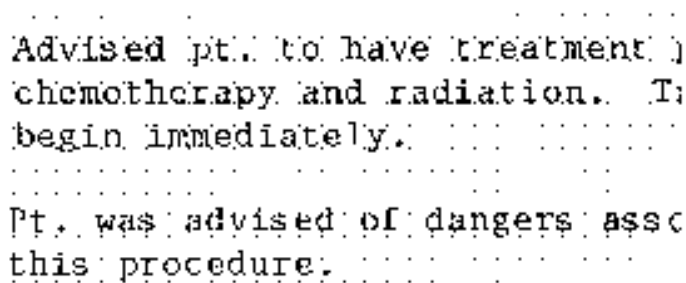


FIG. 2—Misalignment of the last two lines is obvious.

that the copying process itself can subtly reduce or, more often, enlarge the image. This requires a new measurement grid with a different grid spacing. Nemechek proposed an effective, if somewhat time-intensive, method for producing these grids (7). One of the strong advantages of the electronic grid is that the spacing of the lines in the grid can be changed very easily. Also, there is never a shortage of proper typewriter grids for measuring any typewriting sample that might be submitted. Unfortunately, the spacing between the grid lines is the same in the vertical direction as it is horizontally. This requires separate grids to be created for measuring horizontal and vertical spacing.

Presentation Options

Once the grid has been created and the text properly aligned, several options exist for presenting the results. If the chart needs to be shown to only a few people, they can gather around the computer monitor. To present the findings to a large number of people, a projector can be attached to the computer and the image can be shown on a large screen. Printing the image is a bit more difficult than would be expected. The reason for this is that Photoshop doesn't recognize the lines in the grid as a layer. The grid, in essence, doesn't exist as far as Photoshop is concerned, so what is seen on the screen can't simply be printed out. It is necessary to copy the image into the Windows Clipboard, import it into the Paint program and then print it. In order to make a copy of the image on the screen in Photoshop, press Print Screen. Now, open the Paint program and go to EDIT, PASTE and the captured image will be imported. This image can now be cropped further, printed or saved and imported into another program, like a word processor, and included in a report.

Conclusion

The use of digital imaging now allows forensic document examiners to have available typewriter measurement grids of any spacing needed and to easily demonstrate the typewriter alignment characteristics revealed by these grids.

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