J4 An Update on the Study of the Randomness of Smith Corona Typescript Defects

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After attending this presentation, attendees will understand results from tests on the randomness of typescript character defects caused by the improper insertion of monoplastic printwheels in Smith Corona electronic typing systems will be presented.

This presentation will impact the forensic community and/or humanity by demonstrating the use of statistical tools to evaluate the results of a common forensic document examination that can result in typewriter identifications.

During the 1999 American Academy of Forensic Sciences meeting in Orlando, FL, the authors presented the primary results of their study *An Empirical Study of the Randomness of Smith Corona Typescript Defects.* This work examined the character defects produced in monoplastic printwheels after incorrect or backwards insertion. The study attempted to determine if the incorrect insertion of the printwheels into the Smith Corona typing systems resulted in predictable or random placement of defects. The following tests were performed using four (4) Smith Corona typing systems and seven (7) Smith Corona and GP Technologies printwheels:

Test I - The effect of correct printwheel insertion on the alignment spin prior to typing.
Test II - The effect of incorrect (backwards) printwheel insertion on the alignment spin prior to typing.
Test III - The relationship of the character struck on the keyboard and the printwheel character struck by the typing system hammer after incorrect printwheel insertion.
Test IV - The maximum number of defects that can occur with one incorrect printwheel insertion.

The tests were performed and the data collected was subjected to chi-square analysis. The predictability of defects and activity of the typing system on the incorrectly inserted printwheels was examined. Conclusions that were presented at the 1999 meeting included:

- correct printwheel insertion lead to consistent performance
- in 75% of the testing incorrect insertion affected the alignment spin and could have produced random defects
- striking a key for a character 180„a away from alignment char acter after incorrect insertion produced defects in a limited number of characters
- one incorrect insertion can lead to many defects

Based upon a study of the original results additional work will be performed in the following areas:

- Testing to study the correlation of the starting position to the final character after alignment spin
- Testing to calculate the frequency of defects in specific characters

Test II (effect of incorrect printwheel insertion on the alignment spin prior to typing) will be repeated with additional printwheels and possibly additional typing systems. Previously only four (4) characters were used as starting positions for the incorrect insertions. The additional work will use a random selection of starting characters to examine the effect on the alignment spin. Previously data was recorded by dividing the printwheel into quadrants (each containing 24 characters). In the new tests, specific data (i.e., the character or smaller groups of characters) will be used to determine the correlation between incorrect insertion, starting position and final printwheel character.

Test III (relationship of the character struck on the keyboard and the printwheel character struck by the typing system hammer after incorrect insertion) will be repeated using additional printwheels and possibly additional typing systems. Previously, keys corresponding to four (4) characters at fixed positions on the printwheel were struck after incorrect insertion. The keys were always struck in the same order. The new work will strike random keys in a random order to more closely study the correlation between the key struck, the starting position and final printwheel character. The frequency of defects in specific characters will also be calculated.

Data will be analyzed using similar statistical tests and compared to the previously recorded data. The additional work should provide a clearer picture of the nature of the Smith Corona typing systems and predictability of typescript defects caused by incorrect insertion of printwheels.

Typewriting, Smith Corona, Identification

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