THE IDENTIFICATION OF TOOL MARKS PRODUCED FROM CONSECUTIVELY MANUFACTURED KNIFE BLADES IN SOFT PLASTICS

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The importance of testing two consecutively manufactured knives was established during a recent murder case when it was necessary to examine the tool mark left in a plastic insulator on a telephone cord to determine whether or not it had been produced by a particular Buck Knife. A factory tour of the Buck Knife Inc., facilities in El Cajon, California was arranged and two consecutively manufactured knives were obtained from the production line.

The examination of the consecutively manufactured knives would assist in:

a) determining the consistency or otherwise of tool marks produced by the knives in the soft plastic.
b) determining whether or not there is any 'carry-over' of engraving from one tool to another.

This would allow the examiner to answer the following questions:

a) does the knife produce sufficient accidental characteristics of a sufficiently high probative value so that an examiner may arrive at a positive opinion?
b) does 'carry-over' of accidental characteristics occur to such a degree, when comparing tool marks produced by consecutively manufactured knives, that a positive identification of a particular knife is impossible?

Manufacturing Procedure

A Buck Knife begings life as a rectangular blank of greater length, width and thickness than the finished product. The blank is cut to a rough blade shape by a stamping machine and then reduced to an approximate width by a grinding operation which removes about 4-6 thousandths of metal. The blades are then surface ground, chamferred, the blood groove cut and magnafluxed before it is sent to the assembly plant. Thick blade knives like the Model 911 are hollow ground before heat treating, the thinner blade models are heat treated then hollow ground. The heat treating operation brings the blades to a Rockwell hardness of about 58C. The blade may be straightened up to three times during the shaping operations.

The blade is then shipped to the assembly plant. Here the blade is out into finished form and the handle is attached. The first series of operations finish shaping the blade and put on the chamfer. These operations are done with sanding belts and are controlled by hand. Various operations shape the handle and then blend the finish to a uniform mat finish.

The final edge is put on the blade with a 220 grit sanding belt

and then de-burred using a buffing wheel with green polishing compound. This produces a smooth, sharp cutting edge on the blade. As a final operation each blade is used to cut a bolt before packaging for shipment from the factory.

Examination/Testing Procedure:

The knives used in the examination were Buck, Model 119 knives which have an overall length of approximately 10 inches. Test material was a soft extruded plastic of approximately the same strength flexibility and texture as telephone wire insulation. Each side of each blade was marked with an identifying color prior to making the test cuts and an area of blade selected for taking the consecutive tests.

Tool marks produced in cutting the test material were microscopically compared with tool marks produced by both sides of the same blade in successive tests and with tool marks produced by both sides of the blade of the other knife.

Conclusions:

a) It was found that the tool marks produced by each side of the blade of Knife #1 had sufficient number of accidental characteristics which reproduced in a consistent manner to permit a positive opinion to be expressed as to the particular side of the blade which produced the tool mark on the plastic. The tool mark produced by one side of the blade was found to have no 'carry-over' of engravings to the other side of the blade.

   Similarly, it was ascertained that the tool mark produced by each side of the blade of Knife #2 had a sufficient number of accidental characteristics which reproduced in a consistent manner and hence permitted a positive opinion to be expressed as to the particular side of the blade which produced the tool mark on the plastic.

b) Upon comparing the tests from the blade of Knife #1 to tests from the blade of Knife #2, no correspondence was observed in the pattern of accidental characteristics present on test from blade of Knife #1 to the pattern of accidental characteristics from the blade of Knife #2.

Summary:

This experiment enables an Examiner to answer the conditions necessary to express a positive opinion with respect to a tool mark produced in soft plastic insulation by a knife blade. That is to say, a sufficient number of the same elements all in the same sequence were present. Second, the identifying elements form a combination the coexistence of which is highly improbable in a tool mark produced by another knife. Third, all variations in the tool marks were capable of rational reconciliation.

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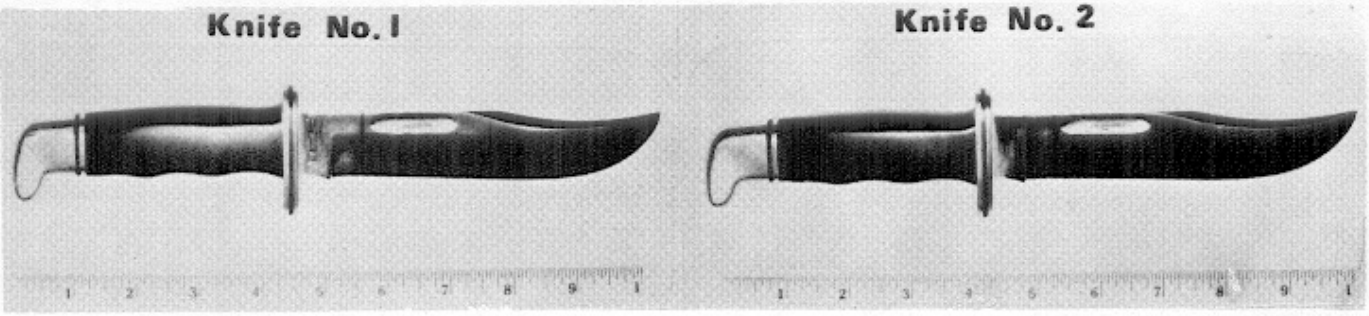

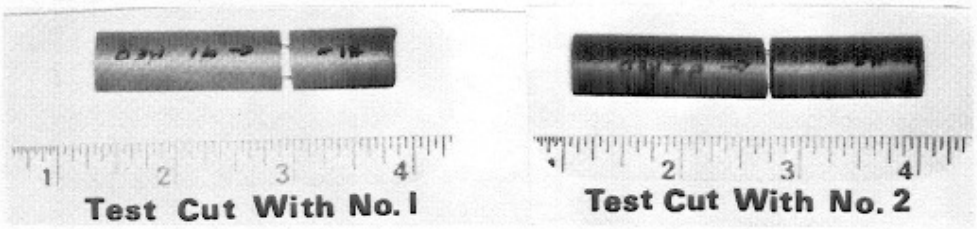

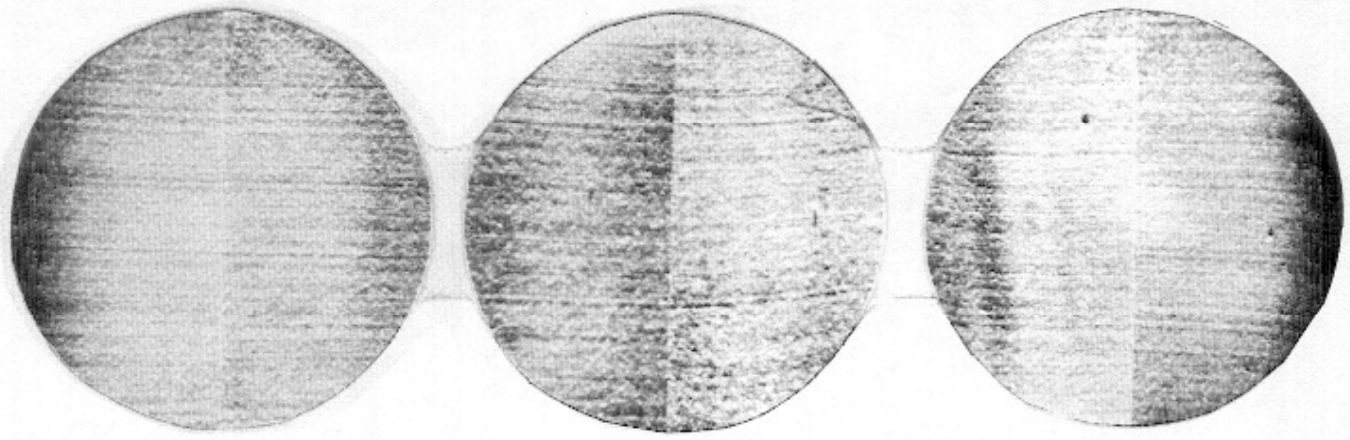

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