

CASE REPORT

Frederick C. Drummond,¹ B.S. and Peter A. Pizzola,² M.S.

An Unusual Case Involving the Individualization of a Clothing Impression on a Motor Vehicle

REFERENCE: Drummond, F. C. and Pizzola, P. A., "An Unusual Case Involving the Individualization of a Clothing Impression on a Motor Vehicle," *Journal of Forensic Sciences*, JFSCA, Vol. 35, No. 3, May 1990, pp. 746-752.

ABSTRACT: In the case reported herein, the authors compared two articles of clothing (a belt and pants) with the impression found on the bumper of an automobile alleged to have impacted a pedestrian, thereby causing his death. The following aspects of the clothing corresponded to sites in the impression: the weave pattern of the pants and belt loop, stitching of the belt loop, orientation of the belt and belt inscription with respect to the pants, and individual characteristics on the border of the belt. This unusual combination of features allowed an individualization to be made between the impression of the motor vehicle and the clothing of the victim.

KEYWORDS: criminalistics, clothing, motor vehicle accidents

It is not uncommon for fabric impressions to be found on chrome body parts of motor vehicles involved in motor vehicle/pedestrian collisions. While the presence of this type of impression on a chrome substrate has been reported [1,2], the authors of this paper are not aware of any literature discussing clothing impressions that contained individual characteristics of a sufficient quantity to permit an individualization to be made between the impression and the clothing. In the case discussed herein, such an association was made. Specifically, the authors were able to compare two articles of clothing (a belt and pants) with the impression found on an automobile and conclude positively that the impression on the bumper came from the two articles of clothing.

Background

A construction worker, while in a crouched position on the shoulder of a roadway, was struck by a motor vehicle on the right side of his body, which caused his death. The

Presented by Peter A. Pizzola at the 40th Annual Meeting of the American Academy of Forensic Sciences, Philadelphia, PA, 15-20 Feb. 1988. Received for publication 13 April 1989; accepted for publication 6 June 1989.

¹Chief, Westchester County Forensic Science Laboratory, Department of Laboratories and Research, Valhalla, NY.

²Detective sergeant and laboratory director, Yonkers Police Department Forensic Science Laboratory, Yonkers, NY.

motor vehicle of the defendant was recovered by the police at the scene. It was reported by witnesses that, immediately after striking the victim, the motor vehicle operated by the defendant struck the rear of the victim's pickup truck, which was parked in the roadway adjacent to where the victim was setting brick. The defendant was reported to have then backed up his vehicle and struck the victim's vehicle a second time in approximately the same place. A routine examination by police identification and evidence technicians did not yield any meaningful physical evidence to link the vehicle and the construction worker. Although there was no apparent doubt as to what had happened, the investigating police agency requested one of the authors to examine the aforementioned vehicle for associative physical evidence. On the following day, after the vehicle had been towed from the scene to a police garage, one of the authors carefully examined the front passenger section of the vehicle. The damaged region of the vehicle was examined painstakingly for some period of time with the aid of a photoflood lamp until a clothing impression was recognized in a dull, thin surface film on the chrome bumper (in the front passenger section). A close-up view of the impression is shown in Fig. 1.

Investigation

Ordinarily, the authors advocate the use of large-format cameras to document patterns of this nature, such as a 4 by 5-in. or 120-mm camera. However, for convenience, a 35-mm Nikon single-lens reflex (SLR) (FM2) was used with a macro lens (f/2.8, 105 mm), with adequate results. The film used was Kodak Plus-x-Pan (ASA 125), because of its fine grain, reasonable light sensitivity, and wide exposure latitude. For illumination of the subject, two photoflood lamps were positioned on the floor in front of the bumper to produce sufficient intensity while keeping the light diffuse to reduce glare. The intensity of the glare was somewhat less than would be expected because of the presence of the dull, thin film where the impression was located. The camera was placed on a tripod and the lens was made parallel to the plane of the bumper specifically in the area where the

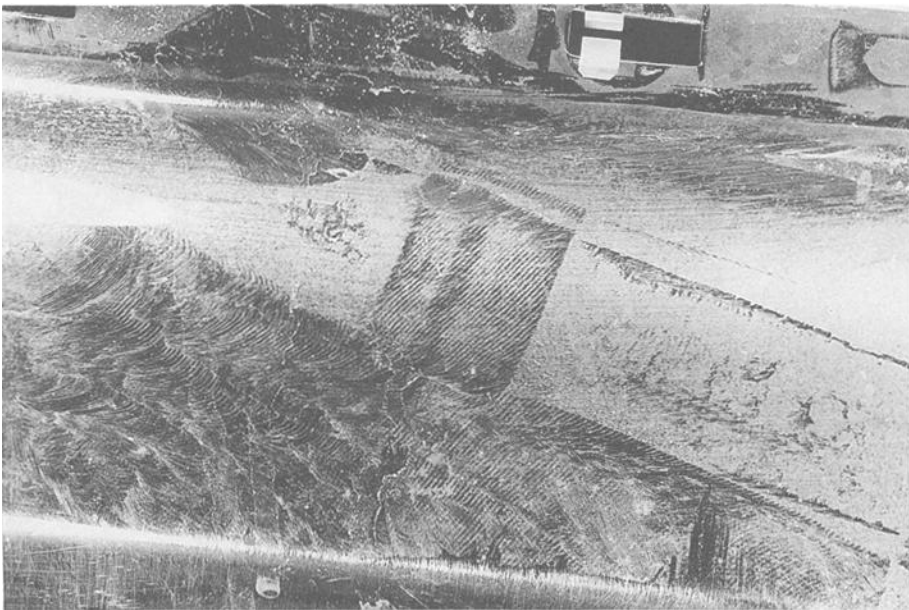


FIG. 1—Impression on the chrome bumper.

impression was located. The approximately correct exposure was determined with the use of a neutral test card (18% reflectance). The nominal value obtained from the gray card measurement was used as a starting point for exposure and was bracketed widely to ensure that a useful exposure was obtained. The impression was first photographed without any reference scale present to document the entire image in an unaltered state (Fig. 1). Subsequently, this step proved to be of importance. Once the entire image had been photographed, the photographic process was repeated with a rule present, without disturbing the original position of the camera (see Fig. 2). The exposed film was developed in D76 (full strength) for 5½ min.

During the on-site examination of the questioned impression, certain peculiarities were noted in the area corresponding to the belt, but their significance was not realized at that time. In fact, one of these features was covered inadvertently by the placement of the ruler over what appeared to be an unimportant region of the impression. It was not until the actual belt of the victim was viewed by the other author that it was realized that these peculiarities were, in fact, designs embossed in the belt surface (see Fig. 3). Also noted in the upper region of the impression were fine details corresponding to the top of the belt. These details corresponded to cracks due to aging and flexing of the belt leather (see Fig. 4). Thus, these features are individual characteristics.

Comparison of the questioned fabric impressions with the clothing of the victim could be done by the conventional method utilizing inked exemplars. However, the fine detail in the belt, especially the individual characteristics in the upper region, as well as the unusual designs, would be obscured by the ink. Therefore, an alternate means of preparing exemplars for comparison was needed. It would also be advantageous if this technique could be used to produce an exemplar for the belt loop and belt together (see the clothing in Fig. 5).

A method developed by Petraco et al. [3] for the preparation of footwear exemplars, which had been taught to one of the authors by Petraco for footwear comparisons, was used. The concept of utilizing this method for preparation of the leather belt exemplars

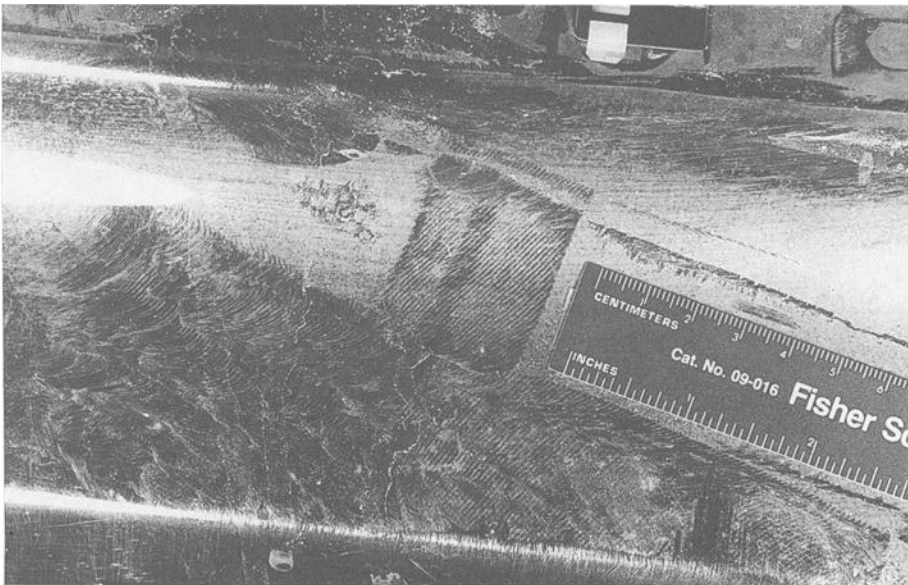


FIG. 2—*Impression on the chrome bumper with a rule present.*

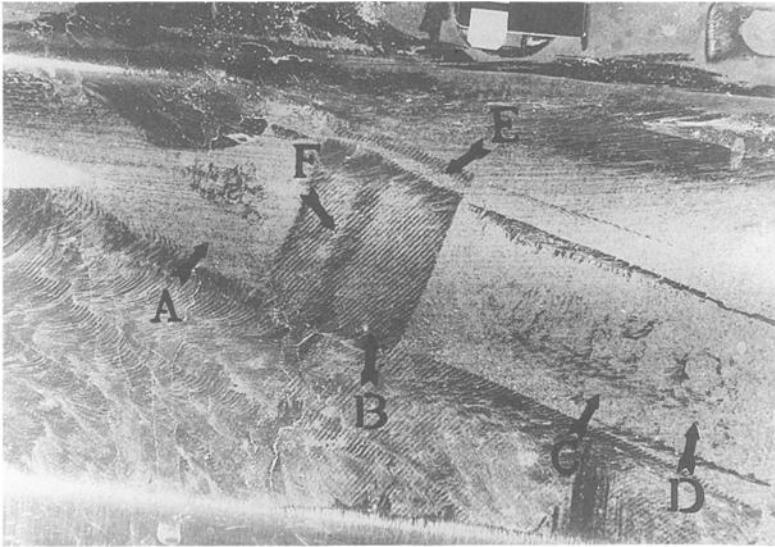


FIG. 3—Class characteristics of the impression: A, tooling (stamped design); B, fabric weave impression of the loop; C and D, tooling (stamped design); E, gap in the impression due to partial contact of the loop with the bumper; and F, region corresponding to a protrusion in the loop (the protrusion was caused by a fabric seam on the opposite side of the loop).

was simply a natural extension of its original purpose, since the details and composition of the belt were similar to those commonly found in footwear.

The technique used is exactly the same as that published by Petraco et al. [3] for footwear, except that a laboratory press was used to exert pressure when the transparencies were prepared. The method used is summarized here: the belt was thoroughly dampened with water. Any excess water was removed with a dry paper towel. The belt

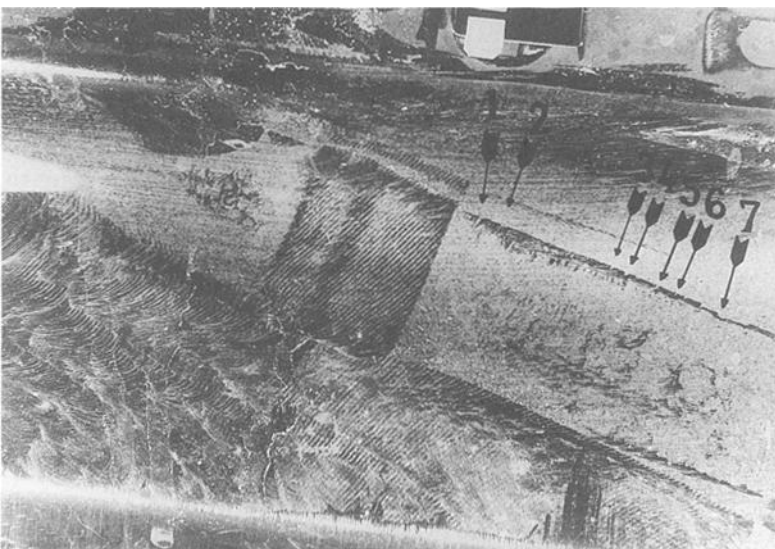


FIG. 4—Individual characteristics in the impression.

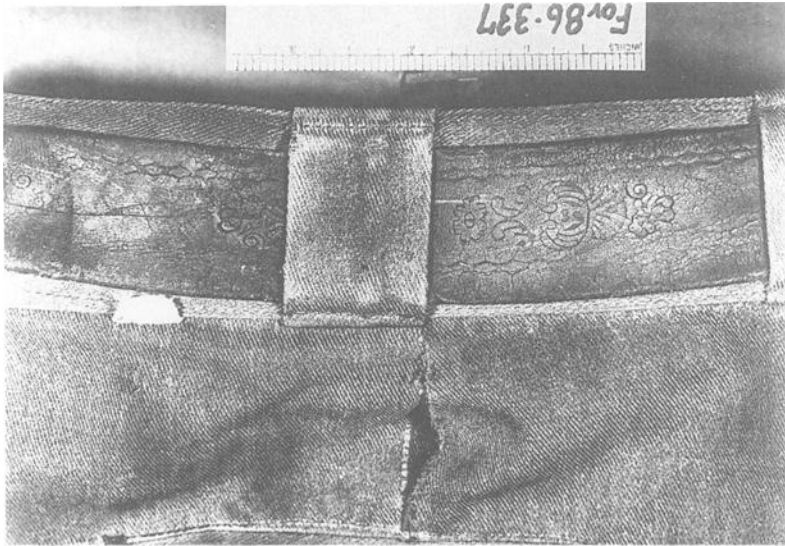


FIG. 5—*Photograph of the pants and belt.*

and pants were then dusted with fingerprint powder. A few millilitres of water were spread over one side of a sheet of Kodak roller transport film (Catalog No. 114-1555) and rapidly removed with a squeegee. After a few moments, when the sheet was somewhat tacky, it was placed in contact with the clothing. The film and the clothing were compressed in the Carver hydraulic press. The press was used at various pressures to simulate the relatively high pressure exerted by the motor vehicle on the victim's clothing. This approach was needed to obtain exemplars of the belt and pants together. Several exemplars were prepared to ensure reproducibility and to enhance specific details in selected regions of the clothing.

The exemplar was then compared directly with the photograph of the impression one to one. In Fig. 6 the exemplar and the questioned pattern are shown corresponding to the belt loop and a portion of the design. The excellent agreement of the class characteristics of the belt loop shown in the exemplar with the photograph of the questioned impression is apparent. The quality of the detail in the questioned pattern is somewhat surprising. The more subtle detail of the embossed design can also be noted to the left of the belt loop in both the exemplar and the questioned pattern. The actual comparison was conducted by superimposing the exemplar over the photograph of the impression, as well as by placing the exemplar and the photograph adjacent to one another. In Fig. 7 a close-up view of the region of the exemplar corresponding to the individual characteristics on the upper region of the belt is shown adjacent to the corresponding region of the photograph of the impression. Many individual characteristics are apparent, and again, the quality of the detail is surprising.

Conclusions

The presence of either unusual class characteristics or individual characteristics, or a combination of both features, should be considered a possibility by the criminalist in situations similar to the one presented here. While the examinations conducted in this particular case were for the most part academic, in other cases this kind of evidence can

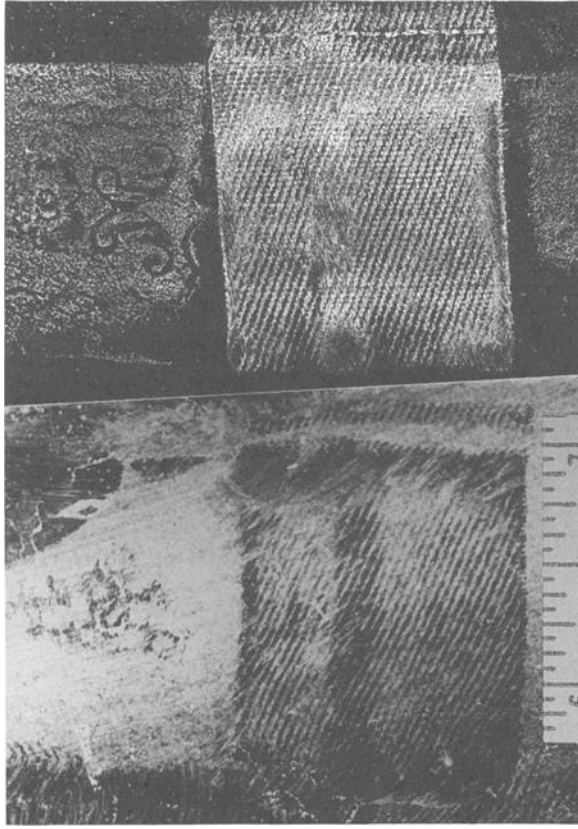


FIG. 6—Exemplar of the belt and loop (upper portion of the figure) juxtaposed to the corresponding region of the photograph of the impression on the bumper (lower portion of the figure).

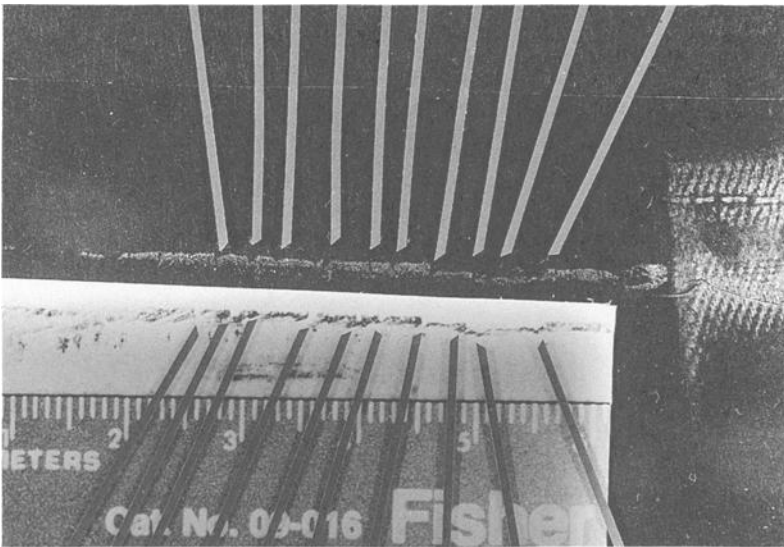


FIG. 7—Region of the exemplar with individual characteristics (upper portion of the figure) juxtaposed to the corresponding region of the photograph of the impression (lower portion of the figure).

obviously be of extreme importance. The authors hope that this paper illustrates the potential for discovering evidence of this type in cases involving pedestrian/motor vehicle impacts. Furthermore, not only must special care be taken in preparing useful exemplars for comparison, but also the difficulty of recognizing the presence of such impressions should be realized.

Acknowledgments

The authors are grateful to W. Reid Lindsay, of the Westchester County Forensic Science Laboratory, and John Perkins, of the Yonkers Police Department Forensic Science Laboratory, for their assistance in preparing the photographic prints.

References

- [1] De Forest, P. R., Gaensslen, R. E., and Lee, H. C., *Forensic Science: An Introduction to Criminalistics*, McGraw-Hill, New York, 1983.
- [2] Fox, R. H. and Cunningham, C. L., *Crime Scene Search and Physical Evidence Handbook*, U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, National Institute of Justice, Washington, DC, 1973.
- [3] Petraco, N., Resua, R., and Harris, H., "A Rapid Method for the Preparation of Transparent Footwear Test Prints," *Journal of Forensic Sciences*, Vol. 27, No. 4, Oct. 1982, pp. 935-937.

Address requests for reprints or additional information to
Frederick C. Drummond
Westchester County Forensic Science Laboratory
Department of Laboratories and Research
Grasslands Reservation
Valhalla, NY 10595