Firearms Microstamping Feasible but Variable, Study Finds

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New technology to link cartridge cases to guns by engraving microscopic codes on the firing pin is feasible, but did not work equally well for all guns and ammunition tested in a pilot study by researchers from the forensic science program at the University of California, Davis. More testing in a wider range of firearms is needed, the researchers said.

Microstamping technology uses a laser to cut a pattern or code into the head of a firing pin or another internal surface. The method is similar to that used to engrave codes on computer chips. When the trigger is pulled, the firing pin hits the cartridge case or primer and stamps the code onto it. In principle, the spent cartridge can then be matched to a specific gun.

In October 2007, Gov. Arnold Schwarzenegger signed into law AB 1471, requiring that all new models of semiautomatic pistols sold in California on or after Jan. 1, 2010, be engraved in two or more places with an identifying code that is transferred to the cartridge case on firing. Similar legislation has been proposed in other states and at the federal level.

In March 2008, a report from the National Research Council, part of the National Academies of Science, described microstamping as a "promising" approach and called for more in-depth studies on the durability of microstamped marks under different firing conditions.

"Our study confirms the NRC position that more research should be

conducted on this technology," said Fred Tulleners, director of the forensic science graduate program at UC Davis. Tulleners is former director of the California Department of Justice crime labs in Sacramento and Santa Rosa.

If successfully implemented, microstamping would be one additional piece of evidence for investigators to link various shooting events, Tulleners said.

UC Davis graduate student Michael Beddow looked at the performance of microstamped marks in one location, the firing pin. He tested firing pins from six different brands of semi-automatic handguns, two semi-automatic rifles and a shotgun. The firing pins were engraved with three different types of code: a letter/number code on the face of the firing pin; a pattern of dots or gears around the pin; and a radial bar code down the side of the pin. The engraved firing pins were purchased from ID Dynamics of Londonderry, N.H.

To test the effects of repeated firing, Beddow fitted engraved firing pins into six Smith and Wesson .40-caliber handguns that were issued to California Highway Patrol cadets for use in weapons training. After firing about 2,500 rounds, the letter/number codes on the face of the firing pins were still legible with some signs of wear. But the bar codes and dot codes around the edge of the pins were badly worn.

"They were hammered flat," Beddow said.

Tests on other guns, including .22-, .380- and .40-caliber handguns, two semi-automatic rifles and a pump-action shotgun, showed a wide range of results depending on the weapon, the ammunition used and the type of code examined, Beddow found. Generally, the letter/number codes on the face of the firing pin and the gear codes transferred well to cartridge cases, but the bar codes on the sides of the firing pin performed more

poorly. Microstamping worked particularly poorly for the one rimfire handgun tested.

The researchers did not have access to patented information allowing them to read the bar- or gear-codes, and so could not determine if these remained legible enough to be useful.

Codes engraved on the face of the firing pin could easily be removed with household tools, Beddow found.

The researchers estimated that setting up a facility to engrave alphanumeric codes on firing pins would cost about $7 to $8 per firing pin in the first year, assuming that such marks would be required on all handguns sold in California, and based on the efficiencies associated with high-volume production costs, Tulleners said.

Tulleners said that a larger test of about 3,000 firing pins, from a wider range of guns, would allow for a more "real-world" test of the technology, as called for by the National Research Council report. About 2,000 makes and models of handguns are sold in California, compared with the nine tested, Beddow estimated in the study. A larger study would also help show how useful this technology might be in detecting and preventing crime.

AB1471 also requires at least one other internal location for microstamping a number. Microstamping on areas other than the firing pin was not tested in this study. Based on the study's preliminary results with a .22-caliber pistol, where the code on the firing pin was transferred to the brass of the cartridge rather than the softer primer, the effectiveness of such a requirement needs further assessment, Tulleners said.

David Howitt, professor of chemical engineering and materials science

at UC Davis, supervised the project.

The study was funded by a grant from the California Policy Research Center, part of the University of California Office of the President. The report has completed peer review by experts selected by the center, and a paper describing the results has been accepted and scheduled for publication in an upcoming issue of the Association of Firearm and Toolmark Examiners (AFTE) Journal.

Source: UC Davis