OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need: Development of Improved Multi-Use Casting Materials

Describe the need: Currently a significant number of three-dimensional footwear/tire impressions are not being recovered correctly from crime scenes, particularly in snow. The correct recovery method is photography followed by casting. The reasons for this are the amount of time needed to cast an impression using traditional materials (dental stone), the specialist knowledge necessary (training), and the variability of results (the method needs to be tweaked depending on environmental conditions). There is therefore a need to perform research to identify or develop materials that overcome the limitations of traditional materials. Such materials must have the following properties: set quickly even at low temperatures, be easy to apply/use, have minimal expansion, be able to record fine detail with high fidelity, and be affordable.

Keyword(s): Footwear, Tires, Three-Dimensional Impression, Casting, Snow

Submitting subcommittee(s): Footwear & Tire **Date Approved:** February 23, 2021

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

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- Hammer, L.; Wolfe, J. Shoe and Tire Impressions in Snow: Photography and Casting. Journal of Forensic Identification 2003, 53 (6), 647-655.
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- Daulby, F. An Evaluation of Snow Casting Materials. Identification Canada 1987, 10 (1), 10-11.
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- Nause, L. A. Casting Footwear Impressions in Snow: Snowprint-Wax vs. Prill Sulphur. R.C.M.P. Gazette (Cand.) 1992, 54 (12), 1-7.
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4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest? Is your research need identified by NIJ?

No.

5. In what ways would the research results improve current laboratory capabilities?

An increase in quality and quantity of 3D impressions coming into the laboratory would allow for more comparisons to be conducted and more accurate results to be reported.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

Limited impact.

7. In what ways would the research results improve services to the criminal justice system?

Currently there is a significant amount of footwear/tire evidence not being collected or not being collected properly. Accurate collection would benefit the criminal justice system as more cases would now be able to use footwear/tire evidence and results would be reported with greater accuracy.

8. Status assessment (I, II, III, or IV): III

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III

Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.