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## Impression Evidence

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 by Dick Warrington

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Suspects often leave important evidence throughout crime scenes: tire tracks, footprints, tool marks, extruder marks on different casings, etc. Casting can preserve this impression evidence for comparison work and analysis at the lab. Since this evidence can be crucial for your court case, you need to know the proper way to handle it. While a thorough discussion would require a separate article for each type of evidence and product, I can help get you started with an overview of the products available to you.

Let me begin by reminding you that before you do anything with impression evidence, you need to photograph it. This is a key step that you can't afford to miss. If something goes wrong during the processing and you forgot to take photographs, then you'll be left with nothing. So get in the habit of taking your photographs first, and remember to use the proper labeling, lighting, and scale with the evidence. For example, if you're working with tracks, you need side lighting, which creates shadows that provide 3-D depth and allows you to see the details of the evidence. Also, you should always insert the scale at the same depth as the track impression—otherwise, if you place the scale on the surface, you'll throw off its accuracy.

A number of products are available for casting larger items like tire and shoe tracks. Today, the

primary product used for casting is dental stone. In the past, Plaster of Paris was widely used because it gives good results and is inexpensive, but it does have some drawbacks. Besides being messy, it is not very strong, so it has to be about two inches thick and reinforced with screens or sticks. But even with reinforcements, it still might break.

Dental stone, on the other hand, provides excellent results and is durable, convenient, and cost effective. Because it is so strong, it only needs to be a half inch thick and does not require any reinforcement. It is also very easy to use. You can buy dental stone in a pouch that has a water bladder right there—when you're ready to make the cast, you just break the bladder and shake to mix.



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Dental stone is also versatile. It is the only product that works on concrete: you just apply powder to the track on the concrete, and then apply dental stone to make the cast. It can also be used in hot or cold weather, and with tracks in dirt, mud, sand, and snow. In some cases you do need to take an extra step to protect the impression before you begin casting with dental stone. For loose or sandy soil, you first need to spray the impression with hairspray to hold it in place. For snow or slush, you must apply Snow Print Wax™ first. These layers build up the impression and keep it from collapsing once you pour in the dental stone.

You can also cast prints left in snow with liquid sulfur. Sulfur comes in pellets that melt at a low temperature, so you first melt the pellets in a pot over a heat source like a camp stove. Once the sulfur is melted, you spray the print with grey primer and then carefully pour in the sulfur. The cast sets in a minute. Sulfur gives great results, but it's less convenient to use than dental stone since you need a heat source and extra container.

Another product used for a variety of casting purposes is silicone. It's easy to prepare and gives excellent results for both footprints and tool marks. You simply mix the clear silicone solution with a catalyst and then pour it into the impression. But silicone is much more expensive than dental stone, so it is not as widely used for tracks.

In many cases you'll need to cast smaller items like tool marks, firing pin marks, breech face marks on weapons and cartridge casings, and latent fingerprints. One of the most popular products for casting small details from this evidence is Mikrosil,™ which has been around for years and comes in white, grey, brown, and black. Use the brown when you are processing tool marks; the tool mark experts back at the lab prefer it because of the contrast it provides. The grey works well when you need good contrast from a light colored surface and shadows created by side lighting. The white and black allow you to create casts of developed latent prints. If you used white powder to develop the latent, use black Mikrosil™ to make the cast. If you used black powder, use the white Mikrosil.™

To prepare the Mikrosil,™ you squeeze out equal lengths of base and hardener, mix them together using a tongue depressor or a spatula, and then spread the mixture over the area of the impression. At room temperature, Mikrosil™ sets in less than ten minutes. The colder it is, the longer the set up time.

An even more convenient tool for casting small areas is the extruder gun. The extruder gun has a dispenser that holds a cartridge of polyvinylsiloxane (PVS) base and a cartridge of catalyst. All you have to do is squeeze the trigger, and a specially designed mixing tip combines the base and the catalyst. You can then apply the compound directly onto the impression you want to cast. PVS works well for getting prints off textured surfaces; it can even be used on fingers or the palms of hands (after first dusting). It also can be spread over an impression left on Styrofoam.

A product similar to the extruder gun, AccuTrans® is a particularly useful polyvinylsiloxane (PVS) that you also use with a dispenser gun. It comes in white, brown, and clear; it works well on tool marks, fingerprints, shell casings, gun barrel, and Styrofoam. The clear version offers an advantage when you are lifting prints done with black powder: once you lift the prints, they can be added directly into AFIS without needing to be reversed. AccuTrans® also sets up in only two minutes in 90 degree weather and 32 minutes at a temperature of 14 degrees.

From this overview, you can see that there are a number of excellent products out there that allow you to recover detail so fine that you can see everything. Test the various products available. Once you figure out which ones you like to use best, be sure to add them to your crime scene kit. Then, when you're at the crime scene, you're ready whether you're faced with a tire track in snow, a tool mark on a door jamb, or a track on concrete.

*Disclaimer: Forensic Magazine® does not endorse any of the products mentioned in this column.*

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