



New Technique for Casting Three-Dimensional Shoeprint in Wet Mud

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ABSTRACT

As fingerprints, footprint are also considered as most common type of criminal evidence at crime scene. There may be the presence of negative or positive footprints at the crime scene. Sunken footprints are of more importance as it is positive evidence that links the suspect to crime scene and gives very minute details of the footprint. Sunken Shoeprints are the impressions which is due to pressure held against the ground surface whether it may be mud, sand or snow. This type of impressions are said as Three-Dimensional (3D) footprints because it separates into three measurements length, width, and depth. 3D impressions positively link the suspect to the crime scene as many heinous crimes have been solved successfully. Hence it is important forensic evidence in solving crime cases. Many materials have been tested for casting 3D footprints such as paraffin wax, plaster of paris, resin, sulphur and many more but casting with plaster of paris have been the first choice of investigators as it is simplest and easy method to cast. The current research of developing cast is carried out with new material that is soap. Soap as chemical compound with property of hardness in water is used for casting 3D shoeprints. It was easy to cast the impression with soap and it gave effective results on casting. This study is carried out into three simple steps. First, clean the questioned prints with the tweezers or forceps if any material is present. Second, mount any board material around the impressions so that the solution will not escape. Third, prepare the solution and pour it on sunken footprints. Through this few steps the cast was developed which successfully gave good results. Casting with soap is simple and very easy.

Keywords: Sunken Shoeprints, Three-Dimensional, Heinous, Casting, Soap.

1. INTRODUCTION

The most probably found evidence at crime scene is impressions such as fingerprints, footprint, tire impression, palm impressions, etc but out of it fingerprints and footprints are most crucial evidence as they have more possibility to be encountered at crime scene. As criminals are not much aware of foot wear impression which makes an investigator to encounter the footwear impression at crime scene which is volume wise the largest type of impression evidence found [1,2]. Casting is the best method for the collection of three-dimensional footwear impressions. From many decades casting is being practiced since from 1854 when Hugoulin first time used plaster of paris for casting 3D footprints [3]. Casting Technique can not only be used on soil, snow or sand but also in soluble food products and in lifting 2D bloody impressions [4].

Many materials have been used to cast three-dimensional shoe impression on various surfaces such as sand, soil, snow, dirt, damp, etc. In damp footwear impressions give more details of outsole of impression as compared to any other surface. Materials used are different for different surfaces such as sulphur and foam blocks are used to cast in snow. Other surfaces such as soil, sand, dirt, etc use different materials that are plaster of paris, resin, paraffin wax, rubber, dental stones, etc. out of which materials were compared to conclude the best one. Dental stone and POP were considered good material as they were hard and tough. For making good cast investigators use fixatives so that cast can be easily develop in soil and at various dry surfaces. Acetate cellulose is used as good fixative which hardens the soil and hairspray pump as fixative also gives us undentifiable unique characteristics [5-9].

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In this research we have not used any fixative as we have done the material testing on wet mud due to lack of availability of dry surface. In our study of developing a cast of shoe impressions we have used a new material soap which is commercially available and also available at home itself. As soap is hard and can be remolded it was considered as suitable material to cast foot wear impressions.

2. METHODOLOGY

Before casting the impressions with soap, the questioned footwear impressions should be photographed digitally and also be documented properly. Casting can destroy the details of the evidence so before making any attempt to cast documentation and photography is necessary.

Materials that are required for casting footprints are as follows:

1. Burner or electrical heating gadget.
2. Two soap bars of 50g.
3. Vessel.
4. Spoon/scoop for stirring.
5. Grater or grinder.
6. Tweezers/ forceps.
7. Cardboard for mounting around footprints.

Before starting the procedure make sure that the questioned impressions have been cleaned properly. With the help of tweezers remove the leaves and solid particles carefully from the impressions without destroying the details [10]. To prepare solution first take two soap bars and grate it with the help of grater or can use grinder as well. Then pour this powder into the vessel and add 2 cup water into vessel. Now keep the vessel on the burner on high flame or can use electrical heater. Take the spoon and start stirring until all coarse fat disappears. Now remove the vessel from the burner and let it cool for 2 minute and then again stir it for 5 to 6 minutes. Now the solution is ready to pour on the impression. Pour this solution with the help of spoon or scoop as shown in fig1. Leave it for 20 to 25 minutes. Within 20 to 25 minute the soap cast will get dried. Remove the soap cast gently by holding one end of the cast.



Fig.1- (a) Soap solution poured on footwear impression. (b) Footwear impression on wet mud. (c) Soap cast of footwear impression.

Casting with soap does not need any training or practice. It is very easy and simple to cast with it as compared to other materials. Soap is easily available everywhere as compared to other materials and is not cost effective. As soap is soft and can also be remolded it was easy to use it as casting material.

3. Result and discussion

Soap molding is a very easy and simple way to shape shoeprints. Soap has many positive properties, making it a suitable material for accurate reproduction of footwear imprints. Soap is soft, sensitive, easy to handle, and can adapt to any shoe shape and design. It is simple and easy to remove the soap casting, just push the wet mud against the cast and hold one end of the cast and slowly remove it. It will easily get removed.

While conducting this research we didn't use any fixative, because the soil on which we tested material was wet and the details of the impressions were clearer and more fixed. The soap mold provides perfect and tiny details of the sole pattern of impressions. The soap gypsum get cast quickly and also dries and settles down within 20-25 minutes, so we can remove it easily.



Fig.2- (a) Footwear used for making impressions. (b) Footwear impression on wet mud. (c) Soap cast of footprint.

Soap is a good melting material, because it can be found everywhere in the market and can also be bought at home, so we can easily get soap wherever we need it. When casting with soap, if the burner is not available then we can use electrical appliance to melt the soap powder. We can also use a wax heater as an electronic device to melt the soap powder, so the melting time is not long, it takes 5-10 minutes to melt at high temperature, and keep stirring. Many other materials used in casting require some reagents to dry quickly. Soap does not need this agent, but if someone wants to add it, you can add a desiccant to the soap solution. The soap model will dry out soon, which is an advantage for the investigators. When compared to any other casting material, soap will give clearer results. It can quickly provide a reproducible sole. According to the author, casting with soap can provide more detail than other casting materials. Any proposed method of pouring shoe prints into mud must be capable of collecting and preserving all of the characteristics, wear and tear patterns, and personalized characteristics that the sole of the shoe in question imparts to the mud.

The soap material can not only used for footwear impression collection but also can be used to cast the tyre mark impressions. We can also try it for dental cast. This method also allows secure collection of the details of the outsole pattern of footwear. You can see in fig 1 and 2 that the soap cast had revealed all detailed and very minute patterns of the footwear impression. The soap cast also reveals the wear and tear of the outsole of footwear if present. As seen in both the figure that soap cast reproduced very minute result of the footwear so as a result this material is very useful for casting three-dimensional impressions.

4. Conclusion

This article describes an alternative process and material for casting suspicious footwear left in wet mud. The method used in this research is very useful to the forensic community. This method gives an accurate results of the genuine shoeprints in wet mud. As soap is commercially available everywhere so can be performed in any region. The soap is easy and simple to cast and requires minimal training to learn how to use it. This method provides easy, secure and fast method to copy shoeprints left on the wet mud. This procedure greatly reveals the detailed feature, wear and tear patterns and also the personalized feature of the outsole pattern of questioned shoeprint. This article is not intended to replace any mature materials currently used, but to provide new extraordinary material for the forensic science community.

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