

# Explosive Effects on Latent Print Evidence

by Scott R. Lanagan  
Woodbury County Sheriff's  
Office, Sioux City, IA

## Introduction

In a recent joint explosives exercise with the State Fire Marshal, an experiment was conducted to determine the extent of damage that an explosive blast would cause to undeveloped latent prints. The interior of the car and items placed in the car were prepared with latent prints. The goal was to recover and process the items for latent prints after the detonation of two explosive devices.



Figure 1  
Preblast vehicle and area conditions.

## Method

A compact two-door passenger car was donated for testing purposes. The State Fire Marshal provided two explosive devices to create a simulated post blast crime scene. A harvested soybean field was selected to provide sufficient safe space for the expected distribution of debris.

Two explosive devices were placed in the target vehicle. The first explosive was a galvanized pipe bomb; it was placed under the vehicle dashboard near the operator pedals. This device measured approximately 2 inches in diameter and 10 inches in length and contained one stick (0.25 pound) of symtex ammonium nitrate-based dynamite. Symtex is a high explosive with a velocity of approximately 18,000 feet per second. The second device was approximately two and a half pounds of Composition B. [Composition B is a mixture of cyclotrimethylenetrinitramine (RDX) and trinitrotoluene (TNT).] This mixture explodes at a velocity of 22,000 to 26,400 feet per second. The Composition B device was placed between the two front seats on a center console.

Prior to bomb placement, test prints were placed on several items (three air pistols, the plastic panel on the face of the speedometer, a seat belt buckle, and both exterior door handles). The test

prints were created with sebaceous material from the forehead and careful touching of the surfaces. All latents were clearly visible with oblique lighting prior to the blasts. The locations of these latents were highlighted with a permanent marker to assist in the documentation and recovery. The air pistols were placed on the driver's seat, the right rear passenger seat, and in the passenger side door compartment.



Figure 2  
Vehicle and area subsequent to two separate explosions.

## Results

The detonation of the pipe bomb caused fragmentation damage and only minor structural damage to the vehicle (Figure 1). The Composition B blast, however, was devastating. Structurally, the vehicle was severely damaged, and the recovery of the marked items was difficult and, in some cases, impossible (Figure 2). The outer panels of both doors flew nearly 110 feet and the roof landed approximately 100 yards from the vehicle. One air pistol was almost completely incinerated, another was never recovered, and only small pieces of the third air pistol were located. The largest piece recovered measured approximately 4.5 by 1.5 inches (Figure 3). The smallest piece was located approximately 56 feet away from the vehicle and the remaining pieces ranged up to 106 feet away. The dashboard panel was completely destroyed and the driver's seat belt buckle was never located. The recovered marked items were analyzed using a Ruvis Krimesite Imager (with the aperture at 3.5).



Figure 3 Gun parts recovered.



Figure 4  
Postblast condition of the deposited latent print  
on the passenger's side door handle.

The ridge detail planted on the air pistol slide and the passenger door handle was located, but it had been completely incinerated (Figure 4). Only very faint ridge detail was observed on the driver's door handle, and the majority of this detail was burned beyond usefulness (Figure 5).



Figure 5  
Postblast ridge detail on the driver's side door handle, as viewed  
with the RUVIS imager.

Subsequent to the initial RUVIS viewing, the recovered marked items were processed using cyanoacrylate and finger-print powder without any enhancement of the latent on the door handle or development of additional latents. (RUVIS examination was attempted after each step in the processing sequence.)

#### Conclusions

After the detonation of the explosive material, the items marked with latent prints were exposed only momentarily to heat and flames as they were blown from the vehicle, yet this exposure was still sufficient to destroy most of the ridge detail deposited and rendered the remaining detail useless.

Because of the lack of previously published research on this topic, the author believes that there is a definite need for further

research of this type, possibly with varying explosive charges. Other examiners are also encouraged to explore this important topic.

#### Acknowledgments

My sincerest thanks to Iowa State Fire Marshals Ray Reynolds and John Ticer for their cooperation and expertise. I also want to thank George Quint, of South Sioux Towing, for providing us with the vehicle for our testing procedures. 🍷

For further information, please contact:

Scott R. Lanagan  
Senior Crime Scene Analyst  
Woodbury County Sheriff's Department  
407 Seventh Street  
Sioux City, IA 51101-1000  
[slanagan@sioux-city.org](mailto:slanagan@sioux-city.org)

*“One’s lifework, I  
have learned, grows  
with the working and  
the living. Do it as  
if your life depended  
on it, and first thing  
you know, you’ll have  
made a life out of it.  
A good life, too.”*

*- Theresa Helburn,  
American producer (1887-1959)*