

SHOOTING RECONSTRUCTION

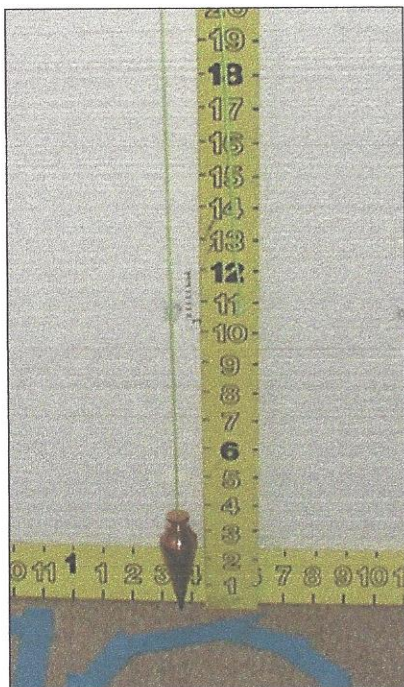
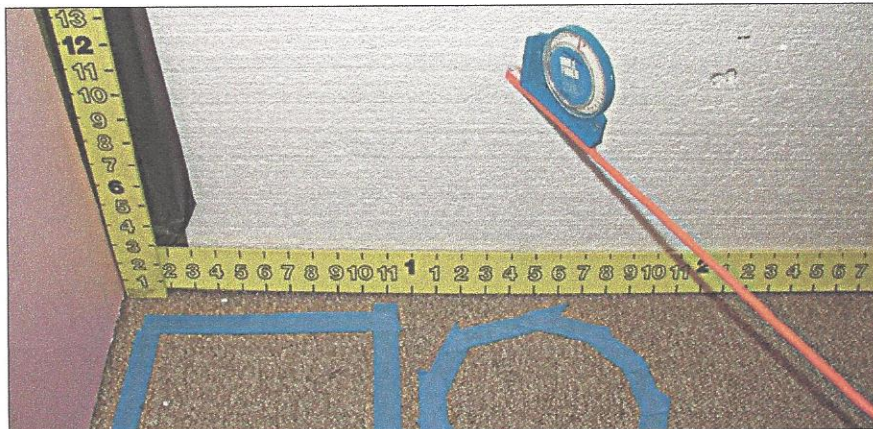


Figure 5—The use of a plumb bob will help you get an accurate reading. Just hold the string so that it cuts through the BHE. Gravity does the rest.

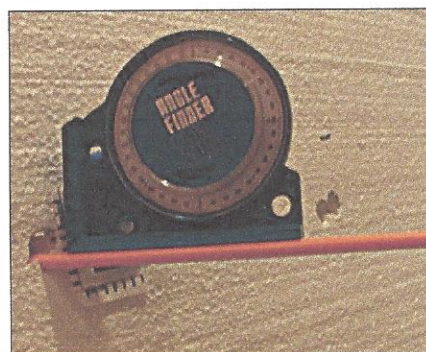
through the center of the BHE and gravity does the rest (Figure 5).

In a situation where the BHE is shallow or has not perforated the material, it may be impossible for a rod to be inserted to demonstrate the estimated angle of impact (EAI). In these cases, the investigator can utilize a trigonometric system in attempting to develop the EAI. The use of a scientific calculator makes this method efficient and simple. The formula for this process, using a scientific calculator, is: *Width of the BHE* divided by the *length of the BHE*. With the result of that calculation on screen, touch *INV* (or *2nd*) and then touch *sin* (\sin^{-1} or *arcsin*). The result is the EAI (in degrees). When using the trigonometric system, there is a standard deviation of plus or minus 7°. The investigator should always remember to document the findings.

The writer has found that in most instances where a bullet has penetrated or scarred a wall, it usually takes at least three sketches to document the vertical angle, horizontal angle,



Figures 6 (above) and 7 (right)—Documentation of vertical angles can be done by using angle finder as shown in these photos.



By adhering to a set of proven procedures, you should achieve a finished report that accurately documents the shooting incident.

and placement of the BHE. Such an example pertaining to the horizontal plane is seen in Figure 8. The use of a 180° protractor facilitates this horizontal measurement.

The documentation of the vertical angle can be simply accomplished by using an angle finder (Figures 6 and 7). Initiate a sketch to illustrate the findings.

The last steps include bullet recovery (with photographic documentation), a final survey documented with closing photographs, and eventual release of the scene.

In closing, the eight basic steps for documentation of a shooting-incident scene are:

- 1) Take a new set of photographs before reconstruction of the shooting-incident scene.
- 2) Sketch the immediate scene to be reconstructed.
- 3) Outline with tape the position of major items in the scene that will need to be moved.
- 4) Position large, readable photo scales on horizontal and vertical planes.
- 5) Determine X and Y measurements utilizing baseline or triangulation methods.
- 6) Determine horizontal angle.
- 7) Determine vertical angle.
- 8) Take closing photographs.

The accomplishment of all steps should lead to a finished product in the form of a report that not only documents the placement of the BHE and defects, but also the participant's shooting zone. This sort of incident-scene study and reconstruction can become a critical element in cold-case investigations or for proving or disproving hypotheses regarding shooting incidents. ☺

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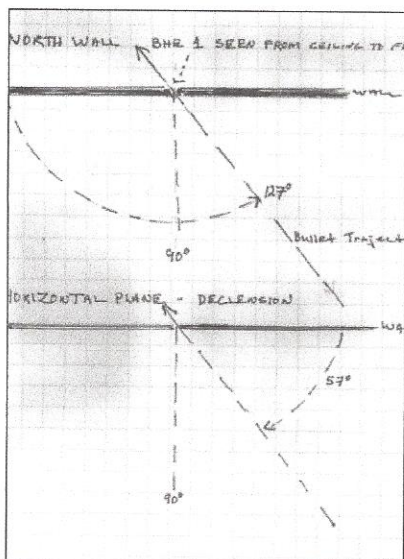


Figure 8—It usually takes at least three sketches to document the vertical angle, horizontal angle, and placement of the BHE. The use of a 180° protractor facilitates this horizontal measurement.

Recommended Reading

- ❑ *Practical Crime Scene Analysis and Reconstruction*, Chapter 7. Written by Ross M. Gardner and Tom Bevel. Published 2009 by CRC Press.
- ❑ *Practical Shooting Scene Investigation: The Investigation & Reconstruction of Crime Scenes Involving Gunfire*, Chapters 2-4. Written by Dean H. Garrison, Jr. Published 2003 by Universal Publishers.
- ❑ *Shooting Incident Reconstruction*, Chapter 8. Written by Lucien C. Haag. Published 2006 by Academic Press.
- ❑ *Practical Analysis and Reconstruction of Shooting Incidents*, Chapter 4. Written by Edward E. Hueske. Published 2005 by CRC Press.

About the Author

John Louis Larsen served as a Special Agent with the FBI for 22 years and was one of the founders of the FBI's

Evidence Response Team (ERT) program. His last duty assignment was to the FBI's Chicago Division as Senior ERT Leader. Larsen currently is president of Larsen Forensics, Inc. and a principal Forensic Instructor at the Suburban Law Enforcement Academy at College of DuPage in Glen Ellyn, Illinois. As part of this consultant service, he has worked as an anti-terrorism advisor for the U.S. Department of State, and helped the Chicago Police Department and the West Suburban Violent Crimes Task Force develop their own ERTs. Larsen is also Senior Forensics Consultant with Quest Consultants International, Ltd.; a sworn officer with the Office of the Special Prosecutor of Cook County (Illinois); and is a training instructor for Sirchie Laboratories, Inc. in the use of the Reflective Ultra-violet Imaging System (RUVIS). He can be reached by phone at:

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SHOOTING-INCIDENT RECONSTRUCTION WITHIN A ROOM

Written by John Louis Larsen
Photographs by Virginia Larsen

THE OVERALL OBJECTIVE of any crime-scene or incident-scene processing is the eventual presentation of facts before the grand jury, in court or during deposition. The purpose of this article is to provide the reader with two protocols to utilize when documenting a bullet-hole entry (BHE) and when reconstructing the event.

To determine the position of the shooter and victim within any shooting-incident scene, investigators and evidence technicians should leave the reconstruction and bullet recovery until the end of their crime-scene processing. General crime-scene work should be completed before trajectory reconstruction and retrieval of the bullets are undertaken. In many instances, the very act of recovering the bullet can distort and skew the findings of a reconstruction. All items in the room need to be documented by way of photography and sketches. Large items such as couches and tables should be outlined in tape or chalk before they are removed from the area where the retrieval of bullets is to take place (Figure 1).



When reconstructing a shooting incident, the investigator should have the right tools and materials on hand to properly document the incident. A detailed list of these items is shown below.

Before starting the final step of clearing the area and placing photo scales in the reconstruction site, the investigator should have the right materials on hand to properly document the shooting incident. This equipment consists of the items listed in the box at the bottom of this page.

The execution of a written narrative dealing with detailed observations about the BHEs, defects, and other ballistic-related items present at the scene will aid the investigator when the final investigative report is written. This narrative deals with the investigator's observations, not those of other individuals who may have interacted at the scene. The narrative assists the investigator in articulating initial general findings in writing. This becomes the foundation of the report of reconstruction.

A completely new set of photographs needs to be taken before and after the movement of items in the room where the shooting incident took place. This is an essential step in establishing the position of key physical items within the scene. If located in a wall, the BHE can be visible in the initial crime-scene photographs

Here is a list of tools and materials to help you document the incident:

- ☐ auto-focus camera with a zoom lens
- ☐ tripod
- ☐ surveyor's twine in different colors
(the brighter the color the better)
- ☐ sketch pad
- ☐ pencils
- ☐ graph paper
- ☐ clipboard
- ☐ plastic see-through protractor
- ☐ plumb bob
- ☐ angle finder
- ☐ try square/miter square
- ☐ dowel rods, each two feet long
with variety of different diameters
- ☐ two 25-foot tape measures
- ☐ two 50-foot and/or 100-foot tape measures
- ☐ assorted fixed and throwaway
large scales for horizontal and vertical measurements
- ☐ self-adhesive marking/scale labels
- ☐ scientific calculator
- ☐ pen-light laser
- ☐ Post-it Notes
- ☐ stick-on putty
- ☐ roll of blue 0.5-inch painter's tape

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taken at the opening of the processing. This new or secondary set of photographs will detail the area that the bullet penetrated, perforated, or deflected. Large, readable photo scales should be incorporated (*Figures 2 and 3*).

Good photographs will allow the examiner to perform an accurate interpretation of the event at a later date.

Once the BHE or defects are photographed, they need to be measured by using triangulation or baseline methods to affix their positions. Large, readable horizontal and vertical scales will make the job of interpreting and reconstructing the scene easier. Note that the camera should be perpendicular to BHEs and scales.

Sketches serve as supportive documentation to the photographs, and they will assist in the clarification of the scene before and after the recovery of the bullet. A sketch is an excellent orientation tool that can greatly assist

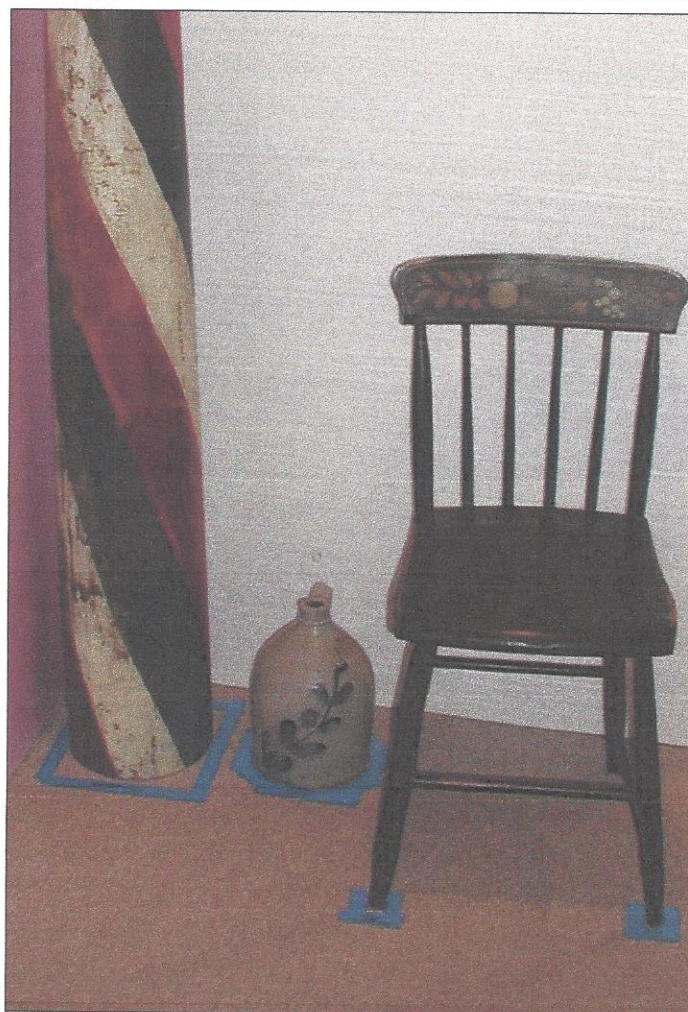


Figure 1—Make sure to outline all large items with tape or chalk before they are removed from the area where the retrieval is to take place. In this photo, blue tape has been used to mark the location of the chair, the jug, and the barber pole.

examiners, jurors, and the court in more easily understanding the dynamics of the scene.

The first series of sketches should be the plan view that would provide the viewer with a general orientation of the shooting-incident scene. The next sketch would be an exploded view of the wall. This will facilitate and simplify describing the action within the room (*Figure 4*).

Once the scene has been clarified, measurements can be taken. When documenting where the BHE is located, it is important to establish its position on the wall with a height measurement (Y) and width measurement (X). This operation of determining X and Y is made simpler by using a level to create the X axis and a plumb bob to make the Y axis.

The use of the plumb bob makes it very easy to obtain an accurate reading. The string is held in such a way as to cut

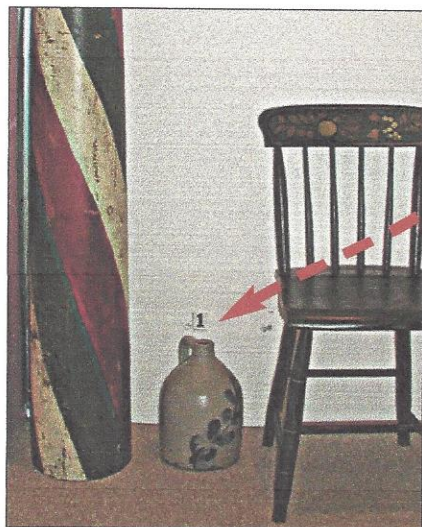


Figure 2 (left)—The secondary set of photographs should detail the area that the bullet penetrated, perforated, or deflected.

Figure 3 (above)—Large and readable photo scales should be incorporated.

Figure 4 (right)—A series of sketches will help to describe the action within the room.

