

TENNESSEE BUREAU OF INVESTIGATION
Forensic Services Division

Violent Crime Response Team Standard Operating Procedures
Bullet Path Trajectory



10. VCRT Procedures

10.22 Bullet Path Trajectory

10.22.1 Scope

This procedure provides general guidelines in the identification, reconstruction, and documentation of bullet flight paths based on impact marks including penetrating, perforating, or non-penetrating points of impact.

10.22.2 Definitions

Refer to VCRT 11.0 Definitions and Abbreviations

10.22.3 Chemicals and Reagents

Sodium Rhodizonate

10.22.4 Equipment and Supplies

Note Taking Materials

String

Trajectory rods

Laser devices

Angle measuring devices

Level

Plumb bob and line

Protractor

Measuring devices

10.22.5 Documentation Procedure

Projectile paths can be important in determining the approximate physical origins of gunshots, location of additional physical evidence and other general crime scene reconstruction.

At least two points of reference are generally needed to establish a path. A single hole may sometimes be used to estimate a path based on the associated shape, relative dimension, depth, and/or trace deposits.

Direction of travel can sometimes be determined from the shape and characteristics of an impact mark, as well as from bullet material deposition.

Caution should be used when attempting to determine the projectile diameter from the hole or impact.

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Over relatively short distances, projectile trajectories can be represented by a straight line notwithstanding deflection or ricochet. Therefore, readily available aids such as string, trajectory rods and lasers can be used to illustrate or document the projectile path.

Points along a path may be delineated by penetrating, perforating, or non-penetrating points of impact.

A projectile path consists of both the line and direction along which a projectile travels.

The angle of incidence and the angle of departure can sometimes be estimated using the physical characteristics of the impact mark, and the nature of the impacted material and/or projectile.

Care should be taken to preserve evidence associated with projectile impacts as well as to avoid damaging the projectile during collection.

Sodium Rhodizonate is a chemical test that can be used to locate the presence of lead and to recognize possible impact marks or holes as well as direction of fire. Refer to VCRT 10.2 Sodium Rhodizonate for additional information.

Documentation

A variety of methods and tools are available to document the projectile path relative to fixed locations or relative to evidence items. These may include:

- Sketching
- Narrative description
- Photographic
- Video recording
- Measurements
- Computer Programs
- Trajectory rods
- String
- Laser