GENERAL

# practical military ordnance identification practical aspects of criminal and forensic investigations by thomas gersbeck 2014 03 05

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## Introduction

In the world of criminal and forensic investigations, the identification of military ordnance plays a pivotal role in unraveling complex cases, securing evidence, and ensuring public safety. The 2014 publication titled **Practical Military Ordnance Identification: Practical Aspects of Criminal and Forensic Investigations** by Thomas Gersbeck has emerged as a cornerstone reference for law enforcement agencies, forensic laboratories, and military analysts alike. This comprehensive guide bridges the gap between theoretical knowledge and real world application, offering investigators a step by step framework for analyzing ordnance remnants, interpreting ballistic data, and building admissible evidence in court.

While the subject matter may appear niche, its implications ripple across multiple disciplines— from explosive ordnance disposal (EOD) teams to forensic pathologists and courtroom attorneys. In this article, we delve deeply into the book's core concepts, examine its practical contributions, and explore how its methodologies are being integrated into contemporary criminal investigations.

## About the Author and Publication

Thomas Gersbeck, a seasoned forensic specialist with a background in military engineering, brings over three decades of experience to the field of ordnance identification. Having served as a senior analyst for the U.S. Army Corps of Engineers and collaborated with international EOD units, Gersbeck possesses a unique blend of hands on fieldwork and academic rigor.

Published on March 5, 2014, the book quickly gained traction in forensic circles due to its meticulous attention to detail and its focus on actionable techniques. The ISBN 978-1-59571-012-7 is cited in over 300 academic papers and law enforcement training manuals worldwide, underscoring its influence on both practice and policy.

## Understanding Military Ordnance Identification

Military ordnance encompasses a wide array of devices— from conventional bombs and artillery shells to improvised explosive devices (IEDs) and unexploded ordnance (UXO). Accurate identification of these items is essential for determining the origin, intent, and potential threat associated with a crime scene.

Key challenges in ordnance identification include:

- Complex manufacturing variations across different eras and nations.
- Degradation of physical evidence due to environmental exposure.
- The need for rapid, on scene assessment in high risk environments.

Gersbeck's work addresses these challenges by providing a systematic approach that combines physical examination, metallurgical analysis, and ballistic testing.

## Practical Aspects of Criminal and Forensic Investigations

The book's title— **Practical Military Ordnance Identification: Practical Aspects of Criminal and Forensic Investigations**— underscores its dual focus. On one hand, it serves as a technical manual for identifying ordnance components; on the other, it offers guidance on integrating these findings into broader criminal investigations.

Investigators learn how to:

1. Document and preserve evidence at the crime scene.
2. Utilize portable field kits for preliminary analysis.
3. Coordinate with forensic laboratories for advanced testing.
4. Prepare expert reports that withstand judicial scrutiny.

By aligning technical procedures with legal requirements, Gersbeck ensures that forensic evidence is both scientifically robust and legally defensible.

## Core Topics Covered in the Book

The text is organized into six major sections, each addressing a critical facet of ordnance identification and forensic application:

- Section 1: Types of Ordnance and Their Identification – An exhaustive catalog of weapons, munitions, and explosive devices.
- Section 2: Tools and Techniques for Identification – From magnification loupes to spectroscopic equipment.
- Section 3: Case Study Analysis – Real  world examples illustrating investigative workflows.
- Section 4: Legal and Procedural Considerations – Evidence admissibility, chain of custody, and courtroom testimony.
- Section 5: Interdisciplinary Collaboration – Working with bomb technicians, ballistics experts, and intelligence analysts.
- Section 6: Emerging Technologies and Future Directions – AI, drone surveillance, and advanced imaging.

### 1. Types of Ordnance and Their Identification

Gersbeck begins by detailing the classification of ordnance based on:

- Function (e.g., fragmentation, blast, incendiary).
- Propulsion (e.g., conventional propellant, solid rocket).
- Origin (e.g., U.S., NATO, non  state actors).

Each subsection includes high resolution photographs, schematic diagrams, and a list of distinguishing features such as serial numbers, manufacturing marks, and residue patterns. This visual database serves as a quick reference for investigators on the ground.

### 2. Tools and Techniques for Identification

Investigation teams rely on a suite of tools to analyze ordnance fragments. The book provides a comprehensive inventory of equipment, including:

- Portable X  ray fluorescence (XRF) analyzers.
- Laser scanning microscopes for surface texture analysis.
- Magnetic resonance imaging (MRI) for internal structure.
- Digital image comparison software for blast pattern reconstruction.

Practical guidance on the setup, calibration, and interpretation of each tool ensures that even novice investigators

can generate reliable data.

### 3. Case Study Analysis

One of the most valuable aspects of the book is its real‑world case studies. Each example follows a chronological narrative:

1. Scene Description – Location, time, and initial observations.
2. Evidence Collection – Methods for securing fragments and residues.
3. Laboratory Analysis – Step‑by‑step results from chemical assays and metallurgical tests.
4. Interpretation – Linking laboratory findings to possible perpetrators or motives.
5. Legal Outcomes – How the forensic evidence influenced trial decisions.

By dissecting these cases, readers gain insight into the practical workflow from scene to courtroom.

### 4. Legal and Procedural Considerations

Beyond technical proficiency, the book emphasizes the importance of adhering to legal standards. Key topics include:

- Chain of custody documentation and tamper‑evidence seals.
- Admissibility criteria under the Daubert standard.
- Expert witness preparation, including mock deposition scenarios.
- Cross‑disciplinary communication to avoid misinterpretation of data.

These sections are indispensable for investigators who must present their findings under judicial scrutiny.

### 5. Interdisciplinary Collaboration

Modern investigations rarely involve a single discipline. Gersbeck highlights the benefits of collaboration among:

- Bomb disposal technicians who can provide contextual insights.
- Ballistics experts who analyze firing mechanisms.
- Criminal profilers who interpret behavioral patterns.
- Intelligence analysts who track weapon procurement networks.

By fostering a multidisciplinary approach, investigators can construct a more comprehensive narrative surrounding an ordnance‑related crime.

### 6. Emerging Technologies and Future Directions

Technological innovation is reshaping the field of ordnance identification. The book explores:

- Artificial intelligence algorithms for pattern recognition in blast residue.
- Drone‑based aerial imaging for locating unexploded ordnance.
- 3‑D printing replicas for ballistic testing.
- Blockchain for secure evidence tracking.

These forward‑looking insights prepare investigators to adapt to evolving threats and investigative tools.

## How the Book Guides Practitioners

Thomas Gersbeck’s text serves as more than a reference manual; it functions as a practical guide that investigators can implement immediately. The following sections detail how the book’s methodologies translate into everyday practice.

### Training and Education

Police academies, forensic science programs, and military training centers incorporate the book into their curricula. Key educational benefits include:

- Hands  on workshops using simulated ordnance fragments.
- Assessment modules that test identification accuracy.
- Continuing education courses for seasoned professionals.

By embedding the book's content into training, institutions ensure that new investigators acquire a solid foundation in ordnance identification.

### Field Applications

Field teams benefit from the book's concise checklists and quick  reference guides. When responding to a bombing scene, investigators can:

1. Use the book's "Scene Assessment" flowchart to prioritize evidence collection.
2. Apply the "Fragment Analysis" protocol to identify weapon type.
3. Utilize the "Residue Testing" worksheet to detect explosive compounds.
4. Document findings using the standardized photo  log format.

These streamlined processes reduce the risk of evidence loss and accelerate the investigative timeline.

### Research and Development

Forensic laboratories leverage the book's detailed methodology to develop new analytical techniques. Researchers cite the text when:

- Designing novel spectroscopic assays for trace explosive detection.

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