Tire Tread and Tire Track Evidence

Recovery and Forensic Examination

William J. Bodziak

Practical Aspects of Criminal and Forensic Investigations Series

CRC Press
Taylor & Francis Group

Tire Tread and Tire Track Evidence

Recovery and Forensic Examination

CRC Press
Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300
Boca Raton, FL 33487-2742

Printed in the United States of America on acid-free paper
10 9 8 7 6 5 4 3 2 1

International Standard Book Number-13: 978-0-8493-7247-6 (Hardcover)

Library of Congress Cataloging-in-Publication Data

Bodziak, William J.
Tire and tire track evidence : recovery and forensic examination / author William J. Bodziak.
p. cm. -- (Practical aspects of criminal and forensic investigations)
Includes bibliographical references and index.
ISBN 978-0-8493-7247-6 (alk. paper)
1. Motor vehicles--Tires--Identification. 2. Criminal investigation--United States. I. Title.

HV8077.5.T57B63 2008
363.25'62--dc22 2007042612

Visit the Taylor & Francis Web site at
http://www.taylorandfrancis.com

and the CRC Press Web site at
http://www.crcpress.com

CRC SERIES IN
PRACTICAL ASPECTS OF CRIMINAL AND FORENSIC INVESTIGATIONS

VERNON J. GEBERTH, BBA, MPS, FBINA *Series Editor*

Practical Homicide Investigation: Tactics, Procedures, and Forensic Techniques, Fourth Edition
Vernon J. Geberth

The Counterterrorism Handbook: Tactics, Procedures, and Techniques, Third Edition
Frank Bolz, Jr., Kenneth J. Dudonis, and David P. Schulz

Forensic Pathology, Second Edition
Dominick J. Di Maio and Vincent J. M. Di Maio

Interpretation of Bloodstain Evidence at Crime Scenes, Second Edition
William G. Eckert and Stuart H. James

Tire Imprint Evidence
Peter McDonald

Practical Drug Enforcement, Second Edition
Michael D. Lyman

Practical Aspects of Rape Investigation: A Multidisciplinary Approach, Third Edition
Robert R. Hazelwood and Ann Wolbert Burgess

The Sexual Exploitation of Children: A Practical Guide to Assessment, Investigation, and Intervention, Second Edition
Seth L. Goldstein

Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques, Second Edition
Vincent J. M. Di Maio

Friction Ridge Skin: Comparison and Identification of Fingerprints
James F. Cowger

Footwear Impression Evidence, Second Edition
William J. Bodziak

Principles of Kinesic Interview and Interrogation, Second Edition
Stan Walters

Practical Fire and Arson Investigation, Second Edition
David R. Redsicker and John J. O'Connor

The Practical Methodology of Forensic Photography, Second Edition
David R. Redsicker

Practical Aspects of Interview and Interrogation, Second Edition
David E. Zulawski and Douglas E. Wicklander

Investigating Computer Crime
Franklin Clark and Ken Diliberto

Practical Homicide Investigation Checklist and Field Guide
Vernon J. Geberth

Bloodstain Pattern Analysis: With an Introduction to Crime Scene Reconstruction, Second Edition
Tom Bevel and Ross M. Gardner

Practical Aspects of Munchausen by Proxy and Munchausen Syndrome Investigation
Kathryn Artingstall

Quantitative-Qualitative Friction Ridge Analysis: An Introduction to Basic and Advanced Ridgeology
David R. Ashbaugh

Practical Criminal Investigations in Correctional Facilities
William R. Bell

Officer-Involved Shootings and Use of Force: Practical Investigative Techniques
David E. Hatch

Sex-Related Homicide and Death Investigation: Practical and Clinical Perspectives
Vernon J. Geberth

Global Drug Enforcement: Practical Investigative Techniques
Gregory D. Lee

Practical Investigation of Sex Crimes: A Strategic and Operational Approach
Thomas P. Carney

Principles of Bloodstain Pattern Analysis: Theory and Practice
Stuart James, Paul Kish, and T. Paulette Sutton

Cold Case Homicides: Practical Investigative Techniques
Richard H. Walton

Practical Crime Scene Processing and Investigation
Ross M. Gardner

Practical Bomb Scene Investigation
James T. Thurman

Practical Analysis and Reconstruction of Shooting Incidents
Edward E. Hueske

To my grandchildren—
Haley, Peyton, Ryan, Jordan, Griffin, and Will

Editor's Note

This textbook is part of a series titled *Practical Aspects of Criminal and Forensic Investigation*. This series was created by Vernon J. Geberth, New York City Police Department lieutenant commander (retired), who is an author, educator, and consultant on homicide and forensic investigations.

This series has been designed to provide contemporary, comprehensive, and pragmatic information to the practitioner involved in criminal and forensic investigations by authors who are nationally recognized experts in their respective fields.

Preface

Millions of cars and trucks are currently in use in the United States. Since the early twentieth century, the automobile has been a part of our freedom of movement, of choice and convenience. Today, young boys and girls frequently learn to drive at the age of 16, while our senior citizens often drive into their 80s and 90s. Unfortunately, our highly mobile society also provides criminals the means to travel discreetly to and from the scenes of the crimes. In fact, with the exception of domestic crimes, neighborhood burglaries and crimes committed by juveniles of pre-driving age, it is difficult to find many other examples of major crimes that do not involve the use of a vehicle. Criminals drive to commit burglaries, to stalk or abduct their victims, to rob banks and stores, and to distant locations where they might dispose of victims. Their vehicles not only provide a quick entrance into and exit from the crime area but provide a certain degree of secrecy and security.

In the Oklahoma City bombing incident, surveillance cameras recorded Timothy McVeigh as he drove the Ryder rental truck on the way to the Alfred P. Murrah Federal Building. That morning he innocently appeared like any other driver, arousing no suspicion as he parked the Ryder truck in front of that building and activated the truck bomb that minutes later killed 168 men, women, and children and injured countless others. Just prior to the explosion, McVeigh safely exited the area in his old Mercury Marquis that had been previously parked nearby.

In the famed sniper homicides in the Washington, DC area in 2002, John Muhammed and Lee Malvo used their car to convey them to and from the various areas where they committed these crimes. In some instances they actually used the converted trunk of their car from which to shoot their victims. In child abduction cases, Amber Alerts have become a commonly used and sometimes successful method of utilizing the mobile public to look out for any perpetrators escaping the area in their vehicles. Some of these cases have resulted in the return of the victim, but in other cases the vehicle provided the perpetrator the means to abduct and harm the victim.

Long before modern forensics and the use of tire impression evidence in court, the wheels of horse drawn wagons left their tracks over unpaved roadways that retained their distinctive features and visual proof of their passage. Interpretation of those tracks was made by those who out of necessity and experience acquired the observation skills, knowledge, and experience to do

so. The invention of the horseless buggy that led to today's modern automobile and the invention and evolution of the pneumatic tire have only provided increased numbers of vehicles and a different set of features to examine.

Today's modern tires are highly engineered and complex items built from rubber, fabric, and steel components and then molded to take on their final tread design, sidewall design, and final shape. A tire's complexity and variations along its full circumference require a general understanding of its construction and features in order to assure that tire evidence is properly recovered, documented, and evaluated.

Police laboratories around the world have long provided forensic examination of tire evidence. Their long-standing success in linking vehicles to crime scenes through the impressions and tracks vehicles have left behind have served as successful and reliable forensic tools in countless cases. Today, crime scene technicians routinely search for, document, and recover tire tracks and impressions when collecting evidence from a crime scene. Once that evidence is collected, forensic examiners with specialized knowledge, training, and expertise in this discipline compare this evidence with the tires and track dimensions of suspect vehicles.

I first examined tire evidence as a trainee in the FBI laboratory in 1973 and have since conducted thousands of tire evidence examinations. I've been fortunate to have accumulated a great deal of information and experience that has resulted from working with several very knowledgeable FBI Laboratory examiners, visiting numerous tire manufacturing facilities, interacting with examiners from other laboratories, from educational seminars, and years of casework experience. I am hopeful that sharing the information I have provided in this book will not only encourage the increased use of tire evidence, but will be informative, useful, and provide assistance to those tasked with its collection, recovery, and examination.

Acknowledgments

Many provided considerable support during the preparation of this book. I would like to extend special thanks to Sandra J. Wiersema for the considerable amount of assistance she provided. I would also like to extend my sincere appreciation to David Bicigo, Anthony Brinkman, Harvey Brodsky, Karen Elliott, Nancy Garfield Chychrun, Paul Gage, James Garfield, Rocky S. Stone, Teresa A. Stubbs, and Mark Thomas for their generous contributions of time and support.

Love and appreciation go to my wife Shirley for her patience and understanding during its preparation.

About the Author

William J. Bodziak is a forensic consultant and operates Bodziak Forensics in Palm Coast, Florida. He received a Bachelor of Arts degree in Biology from East Carolina University in Greenville, North Carolina, and a Masters of Science in Forensic Science degree from the George Washington University in Washington, DC. In January 1970, Mr. Bodziak was appointed a Special Agent of the Federal Bureau of Investigation, serving in an investigative capacity in FBI offices in Connecticut, Maryland, and Florida. In 1973 he was assigned to the FBI Laboratory in Washington, DC, where he served for nearly 25 years in the Laboratory as an examiner of questioned documents and footwear and tire impression evidence until his retirement in 1998.

He has testified as an expert witness in federal, state, and local courts throughout the United States and also in courts in Guam, Puerto Rico, the U.S. Virgin Islands, South Africa, and Canada. He has lectured and provided instruction on footwear and tire tread impression evidence at the FBI Academy in Quantico, Virginia; at the FBI International Law Enforcement Academy in Budapest, Hungary; and at numerous seminars, classes, and conferences throughout the United States, Europe, Australia, and New Zealand.

Mr. Bodziak authored the text, *Footwear Impression Evidence* (Elsevier, 1990 and CRC Press, 2000) and has also authored chapters in other books as well as articles in professional journals in the areas of questioned documents and impression evidence. He is a member of the International Association for Identification where he is a certified footwear examiner, has served as the chairman of the Footwear and Tire Track Section, and in 2006, was the recipient of the John A. Dondero Memorial Award. In addition, he is a Fellow of the Questioned Document Section of the American Academy of Forensic Sciences and has served as both secretary and chairman of that section. He is a member of the American Society of Questioned Document Examiners and is a certified Diplomate of the American Board of Forensic Document Examiners.

Contents