TRAFFIC CRASH INVESTIGATORS' MANUAL

ABOUT THE AUTHOR

R. W. Rivers is a graduate of Northwestern University Traffic Institute's traffic accident investigation and police management training programs. He has also completed training with the Canadian Institute of Science and Technology in technical mathematics and areas of physics, studied psychology at the Okanagan Regional College, studied police administration through the University of Minnesota, completed patrol management training with the IACP, developed the traffic accident investigation and traffic law enforcement training programs of the Royal Canadian Mounted Police and the course training standards for the Canadian Police College and University of Alberta in technical traffic accident investigation. During his 33 years service with the Royal Canadian Mounted Police, Inspector Rivers was employed extensively in general police work, highway patrol, accident investigation, research and planning, and training and development. Since his retirement, Inspector Rivers has acted as a consultant and has assisted in traffic accident investigation training on an international basis and accepted a position as adjunct faculty member and director of correspondence training with the Institute of Police Technology and Management (IPTM), University of North Florida (http://www.members.shaw.ca/mudrivers).

Third Edition

TRAFFIC CRASH INVESTIGATORS' MANUAL

A Levels 1 and 2 Reference, Training and Investigation Manual

By

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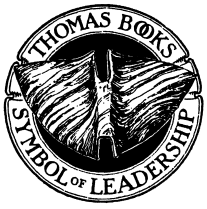

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To my daughter Roberta Baranyai

for her guidance over the past many years
in getting me started and working with various
complicated word processing programs, leading to
the completion of many now published textbooks

and to

David Bromfield

in appreciation for his professional assistance in
preparing a computerized document that
formed the basis for this third edition of the
Traffic Crash Investigators' Manual

FOREWORD

Webster defines an *accident* as a happening that is not expected, foreseen, or intended. He also states that in law, an accident is an unforeseen event that is not anyone's faulty.

Many traffic "accidents" are someone's faulty. Some are intended. Others can be foreseen. It is the traffic accident investigator's role to determine through the gathering of evidence and an analysis of circumstances, that which is an accident and that which is not. This *Traffic Crash Investigators' Manual* launches the trainee on the road to the scientific approach to determining which incident falls into what category.

Inspector Bob Rivers, Royal Canadian Mounted Police (retired), built his outstanding professional career around the theoretical and practical approaches to accident investigation and reconstruction. His expertise and reputation are recognized internationally. Few people would be as qualified as he to instruct the aspiring police person or the emerging traffic accident specialist on the correct scientific approach to traffic accident investigation.

Inspector Rivers' *Traffic Crash Investigators' Manual* will be an indispensable training guide and reference book for all who are required to bring the highest standards of professional endeavor to this complex facet of effective law enforcement.

D. K. WILSON

PREFACE

One of the most important phases of any investigation into a traffic crash is that which is conducted at the scene. The traffic crash investigator must be aware of his or her responsibilities in this regard and to how to properly fulfill them from the time of being advised of the occurrence of a crash to the time the report is completed based upon the investigation.

This manual sets out in detail the requisites for a properly conducted crash investigation by delineating the types of evidence to look for and how to recognize, interpret, gather, and record evidence such as skid marks, yaw marks, roadway and vehicle marks, and damages; and environmental, human, and mechanical factors. Only by understanding and applying these principles will the objectives of a traffic crash investigation be met: (1) WHAT happened; (2) WHERE the crash occurred; (3) WHEN the crash occurred; (4) WHY the crash occurred; and (5) WHO was involved. Certainly, a passive or uneducated approach to such investigations could result in improper conclusions as to why the collision occurred. Of equal importance, the investigator must be aware of his or her limitations in the investigation process and to know what evidence should be gathered and/or referred to those having particular expertise in specialized areas such as that found with the professional reconstructionist or with a forensic services facility. This manual is intended to meet all these requirements.

Mathematical equations and examples are completed in both the United States (Imperial) and metric (SI) measurement systems. In many of the problem examples, exact conversions from United States to SI systems are not made or used in order to avoid an unnecessary use of multiple decimal places. Corresponding values in these cases should, therefore, be considered approximations. However, to assist the student or investigator, examples are worked out separately for each system and they should be considered independent of each other so as to avoid any unnecessary confusion.

Many published books and papers have been studied and tests conducted in the research and preparation of this revised manual. A bibliography lists several of these works.

The contents of this *Traffic Crash Investigators' Manual* are not intended to supercede policies or legislation that are now or may in the future be in effect in any jurisdiction.

R. W. R.

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The author wishes to acknowledge with thanks the permission granted by the Director, Institute of Police Technology and Management (IPTM), University of North Florida, to use selected IPTM training reference materials for inclusion in this manual. Most particularly from *IPTM's Speed Analysis for Traffic Accident Investigation,* prepared by R. W. Rivers, in the areas of speed analysis; and *Training and Reference Manual for Traffic Crash Investigation,* Third Edition.

The author wishes also to acknowledge the personal communication (technical report) dated November 1, 1993, supplied by Dr. Bernard S. Abrams, O.D., specially prepared for the author and this manual. Dr. Bernard S. Abrams, O.D. (1929–2003) was the founder of the Institute of Vehicular Safety. He received his B.S. in Visual Optics at Ohio State University. Dr. Abrams began pursuit of his lifelong interest in Traffic Safety in 1954 as a member of the Columbus Ohio Traffic Commission. Over the years, his interest in night vision and vehicular crashes was enhanced by his work in electro-physiological testing for the night vision of the aged. He lectured about vision on three continents, designed and built optical factories in several countries, and was Chairman of the Board of B.S.A. Industries. Dr. Abrams, a nationally recognized expert witness in nighttime/daytime vehicular crashes, authored numerous papers and articles dealing with driver visibility, object conspicuity, and nighttime discernibility. He conducted research projects and served on committees related to the vision requirements of the older driver, and also served as a consultant to industries, attorneys, and governmental agencies.

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TRAFFIC CRASH INVESTIGATORS' MANUAL

Chapter 1

INTRODUCTION TO TRAFFIC CRASH INVESTIGATION

TRAFFIC CRASH DEFINED

1.001 *A traffic crash is "that occurrence in a series of events which usually produces injury, death, or property damage."* For the purposes of this manual, the term traffic crash can be considered synonymous with the terms traffic accident, collision or incident, or similar, applicable terms used in various jurisdictions and in many published works, when these are used in the context of an event involving a vehicle or a pedestrian that produces injury, death, or property damage.

OBJECTIVES OF A TRAFFIC CRASH INVESTIGATION

1.002 The objectives of a traffic crash investigation are to determine:

a. WHAT happened, i.e., the type of crash.
b. WHERE the crash occurred.
c. WHEN the crash occurred.
d. WHY the crash occurred, e.g., violation of law, engineering defects, etc.
e. WHO was involved.

1.003 A traffic crash investigation can be divided into at least five segments:

1. *Receiving the call.* As much information as possible should be obtained at this time, such as the precise location of the crash, any injuries sustained, and emergency equipment and other resources that might be required.
2. *At-scene investigation.* This is perhaps the most important part of the whole traffic crash investigation process. In most cases, the success or failure of all other segments of the investigation depends almost entirely upon the evidence gathered during the at-scene investigation.
3. *Follow-up investigation.* The at-scene investigation very often has its limits in terms of gathering evidence such as the taking of statements of witnesses who do not remain at the scene, tracing the pre-scene paths and actions of those involved in the crash, and the ability to conduct a thorough mechanical inspection of the vehicles involved. Under these circumstances, a follow-up investigation is required to gather or obtain this type of evidence.
4. *Reconstruction.* The reconstruction segment determines how the crash occurred based on all available evidence gathered at the scene or during the follow-up investigation.
5. *Crash cause analysis.* A cause analysis is carried out after the investigation and gathering of evidence is complete by taking into consideration and analyzing all aspects of the crash such as, but not limited to, the drivers, vehicles, roadway, and other environmental factors.

AT-SCENE INVESTIGATORS' RESPONSIBILITIES

1.004 Upon the arrival at the scene of a traffic crash, the responsibilities of the investigator include:

a. Caring for the injured.
b. Protecting persons and property from further injury, damage, or loss.
c. Gathering evidence at the scene, including:
   (i) interviewing drivers, victims, and other witnesses;
   (ii) examining for physical evidence, e.g., highway marks and

damage and environmental factors; and
(iii) conducting mechanical inspections of the vehicles involved.

d. Recording facts including the taking of notes, statements, scene measurements, and photographs.

1.005 Generally, an at-scene investigator should gather facts and information that will:

a. Determine the cause of the crash.
b. Provide information that will assist in crash prevention including *Engineering, Enforcement,* and *Education* programs.
c. Provide evidence for the prosecution in the event there has been a violation of law.
d. Meet the requirements of crash report completion.
e. Provide sufficient information to meet the requirements of follow-up investigation and reconstruction.
f. Ensure that evidence is collected that will support those who are involved in a crash in exercizing legitimate claims under civil proceedings.

1.006 After completing the actual at-scene investigation, the investigator must ensure that all points of an investigation are completed by either personally carrying out any follow-up investigations that are required or by coordinating those investigations by others.

PERSONNEL SELECTION AND TRAINING

1.007 Any person assigned to traffic crash investigation, duties, and responsibilities should:

a. Have a particular aptitude for traffic crash investigation.
b. Have a good basic knowledge of crash causes and investigational methods and techniques, and have at least a general knowledge of accident reconstruction principles.
c. Further his or her expertise and competency by taking training in advanced crash investigation techniques and undertaking self-study through various available literature and training courses.