



Guidelines for Chemical Transportation Safety, Security, and Risk Management

Center for Chemical Process Safety
New York, New York



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Guidelines for Chemical Transportation Safety, Security, and Risk Management

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PREFACE

The transportation of chemicals and other hazardous materials on roads, railways, waterways, through pipelines, and by other modes and systems provides vital support for today's economy and standard of living. Global trade has resulted in more transborder shipments of raw materials, consumer products, and hazardous wastes than ever before. The volume of traffic and the speed with which it moves continue to increase in both developed and developing countries, with some transportation systems operating at full capacity, thereby challenging the supporting infrastructure. Urban sprawl and population growth have brought people into closer contact with established transportation corridors, with much of the physical transportation infrastructure carrying both people and industrial shipments.

Because the release of a chemical during transit poses a potential risk to surrounding communities, property, and the environment, the transportation of hazardous materials must be carefully managed. It is widely recognized that chemical transportation is more than just a service function that fills a business void; it is a comprehensive system of activities that involves numerous stakeholders with varying backgrounds and interests. Therefore, chemical transportation should address the entire supply chain of a commodity, spanning the delivery and handling of raw materials through the offloading and unpacking of finished products. Additionally, beyond the desire for accident-free chemical transport, the evolving threat of terrorism and other security concerns should be considered as part of a transportation risk management program. Since there may be tradeoffs between safety and security, this balance can challenge even the best business plans and risk management programs.

In 1995, the Center for Chemical Process Safety (CCPS) published a book titled *Guidelines for Chemical Transportation Risk Analysis*. This publication provided a technical review of risk analysis techniques used to evaluate chemical transportation operations. In particular, it provided detailed methods and techniques for designing and conducting a formal transportation risk analysis, extending the risk analysis concepts developed and applied for fixed chemical process sites. Supporting the technical background and methodologies, the book included detailed examples illustrating the application of risk analysis techniques in a chemical transportation setting, and an extensive set of appendices containing case studies, data sources, and references.

In the decade since this first book was published, it has received widespread recognition as an excellent resource on transportation risk analysis. It has been

used extensively by major chemical companies and shipping organizations both domestically and internationally. In order to best serve the needs and interests of its clients and stakeholders, CCPS periodically reviews the use and effectiveness of its publications and issues updates or revisions. This new book is not meant to replace the earlier 1995 edition, but rather to augment it. The new publication deals with transportation, security, and risk management on a broader basis and provides tools and methods to benefit a wider range of transportation professionals and associated stakeholders. In particular, it introduces more qualitative and practical techniques for screening, identifying, and managing higher-level risks issues that balance both safety and security. These two books should be used in combination to effectively manage and analyze transportation risk. For this reason, the original Guidelines for Chemical Transportation Risk Analysis is reproduced on the enclosed CD, as Appendix A.

This new publication provides a framework and common practices that will allow shippers and supply stakeholders to manage chemical transportation networks. The framework should embrace and utilize a company's existing systems, but must meet regulatory requirements in areas where shipping activities occur. It is written from an international perspective, recognizing that many companies transport materials across country borders and around the globe. Local customs, regulations, and working cultures may vary, but the common principles of safety, security, and risk management should always be recognized.

The development of this newly expanded transportation risk management guidelines book involved several discussions with stakeholder groups in the manufacturing, shipping, and regulatory sectors. Many participants in these sessions identified the need for a practical set of tools that would mesh with existing management practices and make optimum use of existing resources. To that end, this book attempts to provide useful tools and information covering a wide range of chemical transportation applications for all user groups. This book is a tribute to the many dedicated transportation, safety, security, and risk professionals who provided countless hours discussing issues, sharing information, and reviewing documentation to make possible both the original book and this new valuable publication.

The final chapter of this book, Program Sustainability, discusses keeping risk management practices current with changing trends and regulations. To support this need, a comprehensive set of appendices, in CD format, is included. In addition to the original 1995 book, the appendices include tools shared by stakeholder companies, links to current and pending regulations and to additional resources current at the time of publication, and the complete example of the transportation concepts that are developed throughout each chapter of this book.

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ITEMS ON THE CD ACCOMPANYING THIS BOOK

Appendix A: Guidelines for Chemical Transportation Risk Analysis (CCPS, 1995)

Appendix B: Industry Tools

Appendix C: Regulation Links

Appendix D: Resource Links

Appendix E: Worked TRM Example