

Introduction

This report provides summary descriptions of Intelligent Compaction (IC) and Continuous Compaction Control (CCC), as well as trends for their future development. The report is intended for readers who are familiar with soil and pavement compaction, but who have little or no prior knowledge of IC or CCC.

This report is formatted in outline style with a series of succinct paragraphs for each topic. Especially important information, usually the leading sentence in a paragraph, is in bold text. The report includes the following sections.

Part I. Overview and Background: This part of the report includes the following subsections to provide general overview and background information about IC and CCC:

A. Key terms and Concepts: Includes definitions pertaining to intelligent compaction and continuous compaction control. This section also includes a concise discussion of stiffness and modulus for geomaterials and asphalt.

B. Trends in compaction quality control and quality assurance in U.S. construction practice: Presents an overview of the Mechanistic-Empirical (M-E) design methodology for pavements in the context of integrating IC/CCC technology into construction quality assurance testing. This section also includes a discussion of performance specifications and warranty contracting as they relate to IC/CCC.

C. Advantages and disadvantages of using IC/CCC technology: This section lists the benefits and drawbacks of using IC/CCC technology compared to conventional compaction.

Part II. Equipment Manufacturers and the Emergence of IC/CCC Technology: This section introduces the current players in the field of IC/CCC equipment development and manufacturing. A short narrative of the emergence of IC/CCC technology into the European marketplace and how this technology has been integrated into common compaction operations is also presented.

Part III. Development of Theory and Equipment: This section covers the background of modeling the dynamics of a vibratory compactor and the development of the various IC/CCC systems organized by manufacturer.

Part IV. Implementation in the United States: This section presents some of the recent steps taken towards implementing IC/CCC technology in the U.S. This section also addresses key issues, the outcomes of which will heavily influence the integration of IC/CCC technology domestically. The issues are discussed as

they relate to equipment manufacturers, transportation agencies, private engineering firms, and contractors.

Appendix A. IC/CCC Equipment Matrices: Summarizes the IC/CCC equipment offered by each manufacturer in table format.

Appendix B. 2008 Update to Literature Review on Intelligent Compaction Technology and Products: Original work on this report was performed between August 2005 and February 2006, but publication was delayed until 2008. Appendix B provides an update performed in late 2008, based on review of manufacturers' web sites and recent published literature.

Supplementary Material on CD-ROM.

Supplement I. Intelligent Compaction Database: This electronic document in Adobe PDF® format document provides (1) a comprehensive bibliography listing 142 sources of information about intelligent compaction and (2) searchable summaries of 43 of those sources.

Supplement II. An Adobe PDF® copy of the German specification "*Surface covering dynamic compaction control methods*" (Neumunster 1994) for the use of CCC for compaction acceptance testing.

Readers wishing to quickly obtain an overview of IC and CCC may wish to read the headings and bold sentences in Parts I, II, and IV, as well as the 2008 update in Appendix B.