

COLD REGIONS ENGINEERING 2006

Current Practices in Cold Regions Engineering

PROCEEDINGS OF THE 13TH INTERNATIONAL CONFERENCE

July 23–26, 2006
Orono, Maine

SPONSORED BY
Technical Council on Cold Regions Engineering (TCCRE) of
the American Society of Civil Engineers

COOPERATING ORGANIZATIONS
International Society of Soil Mechanics and Geotechnical Engineering
(ISSMGE) - Technical Committee on Frost in Geotechnical Engineering
(TC 8 on Frost)

Finnish Association of Civil Engineers (RIL)

United States Permafrost Association (USPA)

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EDITED BY
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Jon E. Zufelt, Ph.D., P.E.

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Foreword

The Thirteenth International Conference on Cold Regions Engineering was organized by the Technical Council on Cold Regions Engineering (TCCRE) and the American Society of Civil Engineers (ASCE). The conference was held on the campus of the University of Maine, Orono, from July 23 through 26, 2006.

The Cold Regions Engineering conference series is the only known venue that focuses on all aspects of cold regions engineering – from infrastructure, transportation, and construction challenges to frozen ground and water resources issues – from both research and applied engineering points of view. The Conference theme, “**Current Practices in Cold Regions Engineering**,” takes you well beyond transportation and infrastructure into the wider spectrum of cold regions engineering challenges encountered in the United States as well as in cold regions throughout the world. The Conference presents a unique opportunity for the best minds in the field of cold regions engineering to share the latest in technology and new research ideas. It provides an open forum for practicing engineers and scientist to discuss cold regions engineering problems and their solutions and best practices. The papers in the Proceedings represent cold regions engineering research and practices in Australia, Belgium, Canada, China, Finland, Germany, Japan, Norway, Russia, Sweden, the United Kingdom, and the United States.

The broad reaching support and interest in this Cold Regions Engineering Conference is a result of the dynamic partnership between TCCRE, ASCE National, the Maine Section of ASCE, and our co-sponsors; International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), ISSMGE - Technical Committee on Frost in Geotechnical Engineering (TC 8 on Frost), Finnish Association of Civil Engineers (RIL), United States Permafrost Association (USPA), and the International Permafrost Association (IPA). We are grateful for their cooperation and ongoing support of this technical conference.

All papers in the proceedings have undergone a peer review by qualified individuals working in related fields. We would like to thank the reviewers who provided meaningful comments and suggestions to each author. Their efforts have ensured that a quality proceeding could be compiled and made available to all Conference attendees. All papers in the proceedings are eligible for discussion in the Journal of Cold Regions Engineering as well as being eligible for ASCE awards. This conference included three days of concurrent technical sessions, a luncheon, a banquet, and engaging technical tours.

The organizing Committee would like to extend our thanks and appreciation to the Maine Section of ASCE for hosting the Conference and or co-sponsors for their

continued support. It would be impossible to name every person who has helped in some way to bring this conference and proceedings to life. The efforts must surely surpass thousands of volunteer hours on the part of the authors, reviewers, and organizing committee members.

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