Slope Preparation and Grooming

A Handbook for Practitioners

Fabian Wolfsperger, Hansueli Rhyner, Martin Schneebeli
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Foreword

Snow sports remain very popular. As well as classic skiing on slopes in traditional winter sports destinations like the Alps, new and often fun alternatives are now available in snow parks. Meanwhile, populous countries in Asia are discovering the potential of skiing as a recreational sport. All these developments are imposing increasingly stringent requirements on snow preparation. At the same time, climate change is presenting additional challenges for managers of slopes and cross-country ski trails.

This new edition of Slope Preparation and Grooming: A Handbook for Practitioners takes account of the rapid developments in snow sports from both a scientific and practical point of view. The book starts with an in-depth summary of the relevant scientific principles, written in readily understandable language so that readers can learn all about the processes taking place in snow. Subsequent more detailed chapters and sections deal with specific topics, including snowmaking, snow farming, measurement technology, and climate change. The book not only provides information for professionals in slope preparation and snow and ski management to consult, but is also a straightforward and highly readable guide for interested non-specialists that can be used for training and teaching purposes.

The text, drawn up in close collaboration between scientists and practitioners, was designed to be of practical use. At the same time, it is meant to help reconcile ecological standards and economic constraints. The efficient use of energy and other resources is crucial in a world where resources are limited and waste is no longer acceptable. Dealing efficiently with snow as a resource is not just economically beneficial for ski resorts: it can also help to make snow sports safer and can play a vital role in protecting the environment.

So I would like to offer profuse thanks to all the authors and other, unnamed contributors who selflessly allowed their material, know-how, and experience to be used for this book. Many employees at the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), and in particular at the WSL Institute for Snow and Avalanche Research (SLF), and numerous snow sports enthusiasts in Switzerland and abroad deserve credit for this updated edition of the handbook. Applying the latest scientific findings in this handbook for practitioners is a prime example of the work done by SLF Davos.

Michael Lehning
Former Head of the Snow and Permafrost Research Unit
Contents

Foreword 3
Acknowledgments 9
Introduction 11

1 Snow as a Material 13
   1.1 Basic Structural Characteristics 13
      1.1.1 Snow Density 13
      1.1.2 Snow Structure 15
      1.1.3 Snow Wetness 18
   1.2 Thermal Properties 20
      1.2.1 Snow Temperature 20
      1.2.2 Thermal Conductivity 21
   1.3 Processes in Snow 24
      1.3.1 Phase Transitions 24
      1.3.2 Sintering 27
      1.3.3 Settlement 31
      1.3.4 Snow Metamorphism 32
   1.4 Mechanical Properties 36
      1.4.1 Factors Influencing Mechanical Properties 38
   1.5 Formation of Natural Snow 43
      1.5.1 Atmospheric Conditions Required for the Formation of Snow 43
      1.5.2 Precipitation Particles 43
      1.5.3 Deposition of New Fallen Snow 45
      1.5.4 Man-Made Nature-Identical Snow 46
   1.6 Machine-Made Snow 48
      1.6.1 Properties of Snowmakers (Snow Guns) 48
      1.6.2 Snowmaking Technologies 55
      1.6.3 Properties of Machine-Made Snow 66

2 Meteorological Influences on Snow 73
   2.1 The Atmosphere 73
      2.1.1 Air and Humidity 74
      2.1.2 Radiation 74
      2.1.3 Temperature and Heat 76
### 2.2 Thermal Balance of the Snow Surface
- 2.2.1 The Influence of Ambient Air 78
- 2.2.2 The Impact of Radiation 79
- 2.2.3 The Impact of Precipitation 85
- 2.2.4 Changes in the Properties of Snow 85

### 3 Ski Slope Preparation and Grooming

#### 3.1 The Optimal Slope
- 3.1.1 Demands on Snow as a Material 88
- 3.1.2 Demands on the Snow Surface 88
- 3.1.3 Further Demands on Slopes 88
- 3.1.4 Requirements to be met by Regular Ski Runs 90
- 3.1.5 Requirements to be met by Ski Racing Tracks 91
- 3.1.6 Requirements to be met by Cross-Country Ski Trails 92
- 3.1.7 Requirements to be met by Parks 93

#### 3.2 From Snow to Slope: Principles of Snow Consolidation
- 3.2.1 Compaction 94
- 3.2.2 Strengthening bonds between Grains (Dry Sintering) 98
- 3.2.3 Freezing (Liquid Sintering) 100

#### 3.3 Slope Preparation: Working Snow in keeping with its State and the Weather
- 3.3.1 Preparing a Resistant Slope (Basic Preparation) 103
- 3.3.2 Slope Grooming and Maintenance 104
- 3.3.3 Principles and Rules of Thumb for Slope Grooming 105

#### 3.4 Equipment: How Best to Use it
- 3.4.1 Snowcats (Cabin, Engine, and Propulsion System) 110
- 3.4.2 Dozer Blades 113
- 3.4.3 Tillers and Finishers 113
- 3.4.4 Smoothing Boards 114
- 3.4.5 Cable Winches 114
- 3.4.6 Compactors 114
- 3.4.7 Front Renovators and Snow Cutters 115
- 3.4.8 Front-Mounted Rotary Snowplows 115
- 3.4.9 Dozer Shovels 115
## Contents

### 4 Race Track Preparation and Grooming 117
- 4.1 Aims of Race Track Preparation 117
- 4.2 Basic Preparation (Starting Point) 119
- 4.3 Watering Slopes 119
  - 4.3.1 Preparing Slopes for Watering 123
  - 4.3.2 Hose Watering 124
  - 4.3.3 Injection Bars 126
  - 4.3.4 Dozer Bars 127
  - 4.3.5 Norwegian Sprinklers / Fire-Department Sprinklers 131
  - 4.3.6 Tilling the Surface 132
- 4.4 Chemical Hardening of Snow 132
  - 4.4.1 The Snow Hardening Process 133
  - 4.4.2 Practical Snow Hardening Tips 135
- 4.5 Removing Snow 137
  - 4.5.1 Repairing Damage 137

### 5 Cross-Country Ski Trail Preparation and Grooming 139
- 5.1 Preparing Tracks for Classic Cross-Country Ski Trails 140
- 5.2 Grooming Cross-Country Ski Trails 143
- 5.3 Preparation and Grooming of Competition Trails 143

### 6 Snow Park Construction, Maintenance, and Management 147
- 6.1 Freestyle Parks 149
  - 6.1.1 Jumps 151
  - 6.1.2 Jibs 157
  - 6.1.3 Planning and Constructing Freestyle Parks 157
  - 6.1.4 Maintaining and Running Freestyle Parks 161
- 6.2 Cross Courses 164
  - 6.2.1 Cross Courses Features 166
  - 6.2.2 Planning, Constructing, Maintaining, and Operating Cross Courses 169
- 6.3 Halfpipes 170
  - 6.3.1 Construction and Maintenance of Halfpipes 172
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Introduction

The book Preparation and Maintenance of Pistes was first published in 2002. Shortly afterwards, it was translated into various languages, and since then has been used in many institutions and associations worldwide as a textbook and basic training manual on slope preparation and grooming.

Our prime reason for completely reworking the first edition was the rapid practical progress made for example in snowmaking, the construction of increasingly diverse snow parks, or the use of satellite snow-depth measurements during slope preparation. In addition, more and more research in recent years has been devoted to topics relevant to skiing facilities. Examples include the physics of snow farming, the preparation of race tracks, and the issue of water loss in snowmaking.

Last, but not least, increasingly strict quality requirements and the expanding range of snow sports on offer have created a need for sound, up-to-date sources of information, particularly since climatic conditions are becoming increasingly unfavorable for snow sports and making snow an increasingly expensive resource in ski resorts. This is making it more and more important to handle snow the right way as a building material. The book focuses on the sustainable management of snow as a resource while presenting international state-of-the-art knowledge on the subject.

This new edition contains a completely new introductory chapter on snow as a material, making snow’s physical processes and resulting properties understandable even to non-specialist readers. For the first time, current snowmaking technologies are contrasted and new knowledge with practical applications is summarized in a readily comprehensible way. The core chapter Ski Slope Preparation and Grooming has been restructured to make it clearer, and some interesting data have been added. During the 2017 Alpine World Ski Championships, race track preparation as a whole and the watering of ski slopes in particular were analyzed. The results are described in the chapter Race Track Preparation and Grooming. The chapter Snow Park Construction, Maintenance, and Management has been updated with help from experts with practical experience. A new chapter, Snow Management, covers methods of managing snow, research results on future snow reliability in the Alps, and practical information on conducting snow farming projects. The book then ends with the chapter Measure-
ment Methods and Tools, which describes both established and new tools for practitioners who work with snow every day. We hope readers enjoy the book and wish them every success in their daily work with the captivating medium that snow is.

The team of authors