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Nota di contenuto	Title Page -- Preface -- Contents -- List of Symbols and Abbreviations -- Introduction of the Blast Furnace Process -- What is driving the furnace? -- The equipment -- Book overview -- The Blast Furnace: Contents and Gas Flow -- The generation of gas and gas flow through the burden -- Furnace efficiency -- An example of gas flow and contents of a blast furnace -- The Ore Burden: Sinter, Pellets, Lump Ore -- Introduction -- Iron ore -- Quality demands for the blast furnace burden -- Sinter -- Pellets -- Lump ore -- Interaction of burden components -- Coke -- Introduction: function of coke in the blast furnace -- Coal blends for coke making -- Coke quality concept -- Coke size distribution -- Mechanical strength of coke -- Overview of international quality parameters -- Injection of Coal, Oil and Gas -- Coal injection: equipment -- Coal specification for PCI -- Coal injection in the tuyeres -- Process control with pulverised coal injection -- Circumferential symmetry of injection -- Gas and oil injectants -- Burden Calculation and Mass Balances -- Introduction -- Burden calculation: starting points -- An example of a burden calculation --

Process calculations: a simplified mass balance -- The Process: Burden Descent and Gas Flow Control -- Burden descent: where is voidage created? -- Burden descent: system of vertical forces -- Gas flow in the blast furnace -- Fluidisation and channelling -- Burden distribution -- Coke layer -- Ore layer thickness -- Erratic burden descent and gas flow -- Blast furnace instrumentation -- Blast furnace daily operational control -- Blast Furnace Productivity and Efficiency -- The raceway -- Carbon and iron oxides -- Temperature profile -- What happens with the gas in the burden? -- Oxygen and productivity -- Use of metallic iron -- How iron ore melts -- Circumferential symmetry and direct reduction.
Hot Metal and Slag -- Hot metal and the steel plant -- Hot metal composition -- Silicon reduction -- Hot metal sulphur -- Slag -- Hot metal and slag interactions: special situations -- Casthouse Operation -- Objectives -- Liquid iron and slag in the hearth -- Removal of liquids through the taphole -- Typical casting regimes -- Taphole drill and clay gun -- Hearth liquid level -- Delayed casting -- No slag casting -- One--side casting -- Not dry casts -- Defining a dry hearth -- Oxygen lancing -- Cast data recording -- Special Situations -- Fines in ore burden -- Moisture input -- Recirculating elements -- Charging rate variability -- Stops and start--ups -- Blow--down -- Blow--in from new -- Glossary -- Annex I Further Reading -- Annex II References -- Annex III Rules of Thumb -- Annex IV Coke Quality Tests -- Index.

Sommario/riassunto

This book describes the principles of the blast furnace process and especially the control of the process. As a starting point, the blast furnace is seen as a simple iron ore smelter, while gradually the physical, chemical and metallurgical background of the blast furnace process is clarified. The book focuses on the control of the blast furnace process with respect to thermal control, gas flow control and casthouse operation. In this book, all essential process details are described and a special focus is on optimization of coal injection. The optimization of the blast furnace process is not only based on 'best practice transfer', but also requires conceptual understanding as to why a measure works well in some cases and does not work in other situations. In other words: operational improvement is not only based on know-how, but on know-why as well. This publication was and can be used as an introductory text for students of metallurgy as well as for blast furnace operators and management. The latter will benefit to solve operational problems and process optimization issues. The authors have very extensive experience as operators as well as consultants to many steel plants worldwide. With Modern blast furnace ironmaking - An Introduction the reader has a compact compendium of the blast furnace process available: by operators and for operators and for those who are preparing to become operators.