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Nota di contenuto	chapter 1 Introduction -- chapter 2 UCIS – Underground Construction Information System -- chapter 3 Computer-support for the design of underground structures -- chapter 4 A virtual reality visualisation system for underground construction -- chapter 5 From laboratory, geological and TBM data to input parameters for simulation models -- chapter 6 Process-oriented numerical simulation of mechanised tunnelling -- chapter 7 Computer simulation of conventional construction -- chapter 8 Optical fiber sensing cable for underground settlement monitoring during tunneling -- chapter 9 Tunnel seismic exploration and its validation based on data from TBM control and observed geology -- chapter 10 Advances in the steering of tunnel boring machines -- chapter 11 Real-time geological mapping of the front face -- chapter 12 Reducing the environmental impact of tunnel

boring (OSCAR) -- chapter 13 Safety assessment during construction of shotcrete tunnel shells using micromechanical material models -- chapter 14 Observed segment behaviour during tunnel advance -- chapter 15 Optimizing rock cutting through computer simulation -- chapter 16 Innovative roadheader technology for safe and economic tunnelling -- chapter 17 Tube-a-manchette installation using horizontal directional drilling for soil grouting -- chapter 18 TBM technology for large to very large tunnel projects -- chapter 19 Real-time monitoring of the shotcreting process -- chapter 20 Environmentally friendly, customised sprayed concrete -- chapter 21 Innovations in shotcrete mixes -- chapter 22 High performance and ultra high performance concrete segments – development and testing -- chapter 23 Robotic tunnel inspection and repair -- chapter 24 An innovative geotechnical characterization method for deep exploration.

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### Sommario/riassunto

"This richly-illustrated reference guide presents innovative techniques focused on reducing time, cost and risk in the construction and maintenance of underground facilities: A primary focus of the technological development in underground engineering is to ease the practical execution and to reduce time, cost and risk in the construction and maintenance of underground facilities such as tunnels and caverns. This can be realized by new design tools for designers, by instant data access for engineers, by virtual prototyping and training for manufacturers, and by robotic devices for maintenance and repair for operators and many more advances. This volume presents the latest technological innovations in underground design, construction, and operation, and comprehensively discusses developments in ground improvement, simulation, process integration, safety, monitoring, environmental impact, equipment, boring and cutting, personnel training, materials, robotics and more. These new features are the result of a big research project on underground engineering, which has involved many players in the discipline. Written in an accessible style and with a focus on applied engineering, this book is aimed at a readership of engineers, consultants, contractors, operators, researchers, manufacturers, suppliers and clients in the underground engineering business. It may moreover be used as educational material for advanced courses in tunnelling and underground construction."-- Provided by publisher.

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