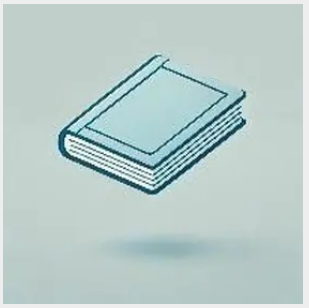
Firoozi

Underground Space Development

Engineering, Construction, and Management Principles and Practices



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Underground Space Development: Engineering, Construction, and Management Principles and Practices provides an integrated, practice-oriented framework for developing underground infrastructure from initial planning and ground investigation through design, construction, commissioning, operation, maintenance, and rehabilitation. It connects engineering geology, soil and rock mechanics, hydrogeology, structural analysis, excavation, ground support, linings, waterproofing, and drainage with project delivery, construction management, risk governance, fire and life safety, environmental performance, and life-cycle asset management. The book covers tunnels, shafts, caverns, metro systems, utility corridors, storage facilities, and multiuse underground spaces. Dedicated chapters examine numerical modeling, BIM, GIS, digital twins, IoT, sensing, data analytics, automation, and artificial intelligence, together with subsurface rights, regulatory compliance, cost estimation, financing, stakeholder engagement, social value, and cultural heritage. International case studies identify transferable lessons from successful projects, failures, and challenging geological and urban settings. Written for advanced students, researchers, consulting engineers, contractors, asset owners, planners, regulators, and decision-makers, the book supports technically sound, safe, resilient, low-carbon, and economically responsible underground development.

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