In dredging, trenching, (deep sea) mining, drilling, tunnel boring and many other applications, sand, clay or rock has to be excavated. This book gives an overview of cutting theories. It starts with a generic model, which is valid for all types of soil (sand, clay and rock) after which the specifics of dry sand, water saturated sand, clay, atmospheric rock and hyperbaric rock are covered. For each soil type small blade angles and large blade angles, resulting in a wedge in front of the blade, are discussed. For each case considered, the equations/model for the cutting forces, power and specific energy are given. The models are verified with laboratory research, mainly at the Delft University of Technology, but also with data from literature.
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4: Which Cutting Mechanism for Which Kind of Soil?
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8: Rock Cutting- Atmospheric Conditions
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Thumbnail: A tunnel boring machine that was used at Yucca Mountain nuclear waste repository. (Public Domain; via Wikipedia)