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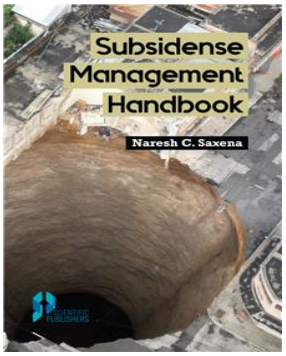
Subsidence Management Handbook



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Blurb

Subsidence movements due to various natural and manmade activities have been attracting attention of the people all over the globe because these movements have been affecting the life in many ways due to the impacts the movements cause to the surface, sub-surface and underground properties. Among the various subsidence causing activities the author has considered the underground mining in sedimentary deposits and withdrawal of water from the underground sources as the most important from the point of view of Indian scenario. Underground mining of sedimentary deposits in India has been going on for more than 225 years and as yet there is practically no indigenous literature available for the use of the mining operators, planners, students, etc. All these people in the country have to depend on the foreign literature although the knowledge of subsidence movements and their management is not only essential for underground mine planning but also for getting the environmental clearance and ensuring the safety of the underground workings. An analysis of the indigenously available literature revealed that there is an urgent necessity of simple but effective guidelines useful to the mining operators, etc. Therefore, the author has made an effort in this book to make the operators aware of the importance of subsidence management and then of the methodology for the management so that in majority of the situations they can take their own decisions and for the complicated cases they can seek expert advice. The activity of the withdrawal of water from the underground sources in the country is many decades old as for the various purposes, e.g., agriculture, industries, and domestic uses, water from these sources is being pumped out. Although, globally the subsidence movements due to this activity have attracted attention, the concern in India has not yet come to any age as hardly any literature is available on this subject. Keeping the above facts in view the following aspects of the subsidence movements due to the two activities have been discussed in this book. 1 Causes of subsidence movements 2 Impacts of subsidence movements 3 Potential areas in India 4 Dangers to underground workings 5 Two and three dimensional prediction of subsidence movement in sedimentary deposits with suitable examples 6 Prediction of the impacts of subsidence movements in sedimentary deposits with examples 7 Subsidence management in sedimentary deposits, including optimization of the subsidence movements with suitable examples, impact mitigation, management of subsided land for various uses, and converting impacts into resources 8 Monitoring of subsidence movements in mining areas and their interpretation 9 Subsidence prediction requirements 10 Five case studies of coal mining subsidence covering the situations of the extraction below surface properties and mine planning below forest areas The above for the sedimentary strata mining subsidence have been explained in such a manner that the mine officials at the site can use the subsidence management know-how without practically any difficulty. In respect of the subsidence movements due to withdrawal of water from the underground sources the following aspects have been outlined. 1 Phenomenon of subsidence due to ground water withdrawal 2 Factors that affect this subsidence 3 Impacts of the subsidence movements 4 Land subsidence management Since, this subject is not well developed in the country it has been suggested that an urgent attention should be given to develop the know-how so that the measure required to take care of the impacts of subsidence movements due to ground water withdrawal can be taken before any major problem comes up.