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Innovative Ground Improvement for Civil Infrastructure Development

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Unstable soils, characterized by attributes such as looseness, erodibility, and collapsibility, present considerable engineering challenges due to their low bearing capacity and high compressibility. Such problematic soils are prevalent worldwide and impede the progress of civil infrastructure development, including building foundations, roads, railways, embankments, retaining walls, etc. Ground improvement is thus necessary for stabilizing these soils before construction, hence, preventing excessive post-construction soil deformations or failures and associated structural damages. However, conventional ground improvement relies on chemical soil treatment by additives such as lime or Portland cement. Despite their effectiveness, chemical additives are recognized for their notable environmental and, at times, toxic repercussions. This keynote lecture aims to introduce an innovative and environmentally friendly ground improvement alternative using bio-geotechnical engineering. The lecture discusses the principles and applications of this green and eco-friendly technology in civil infrastructure development. The anticipation is that this novel approach will gradually supplant soil stabilization involving chemical additives, paving the way for future superior and eco-friendly conscious ground improvement technology.