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(57) Abstract :
 ADVANCED GEOTECHNICAL MONITORING AND REINFORCEMENT SYSTEM FOR ENHANCED SLOPE STABILITY IN CIVIL ENGINEERING PROJECTS ABSTRACT This patent presents an innovative system designed to improve slope stability in civil engineering projects through advanced geotechnical monitoring and reinforcement techniques. The system integrates a network of high-precision sensors to continuously monitor soil movement, moisture levels, and stress distribution in real-time. Data from these sensors is analyzed using advanced algorithms to predict potential slope failures. The system also features automated reinforcement mechanisms, including adaptive ground anchors and geosynthetic materials, which are deployed based on real-time data to mitigate risks. By combining predictive analytics with proactive reinforcement strategies, this system significantly enhances the stability and safety of slopes, reducing the likelihood of landslides and related hazards. This technology is particularly beneficial for infrastructure projects in geologically unstable regions, providing a robust and efficient solution for long-term slope management and disaster prevention.

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