

Risk management in the construction of molded and driven ductile piles and its economic implications

Summary

Geotechnical risk management must cover infrastructure works smaller than dams and tunnels. In this context, a risk management methodology was developed, using real cases, to be applied at the construction stage of bored piles (Kelly technique) and ductile driven piles, aiming to improve the sustainability of the construction and avoid litigation.

The methodology was based on occurrences recorded at construction contracts for bored and ductile piles coordinated by the PhD student, in Angola, in non-seismic areas, in about 70,000 m of piles. The potential hazards were identified, and their likelihood values were obtained for the hazardous events. Based on this, a set of event trees were conceived. The developed methodology identifies potential geological-geotechnical, technical, human, and economic-financial hazards, through checklists, assess the associated risks and classifies their magnitude, and proposes a set of measures to control them, eliminating or mitigating such risks, whenever the economic values involved, are considered unacceptable.

To validate the methodology, risk management was applied to 12 contracts, involving the construction of about 50,000 m of bored and ductile driven piles into coarse soils, with thin intercalations of clays. In addition, it shows how the economic component of the contract is changed and can influence and/or be affected, depending on the decision to deal with the risk. The simple implementation, allied to the effective cost control, in real-time, of the production results in the context of risk management obtained in those cases of study, validate the proposed methodology.

It was concluded that the methodology reveals applicability and efficiency in the construction of those piles in coarse soils, with or without intercalations of clays, verifying an improvement in production margins compared to the predicted commercial ones. If the risk management methodology had not been applied, the results of the economic margins of the works would have been about 21% more burdensome in relation to the real margins obtained.

Keywords

Risk management, construction phase, deep foundations, bored piles, ductile piles, cost control, coarse soils.



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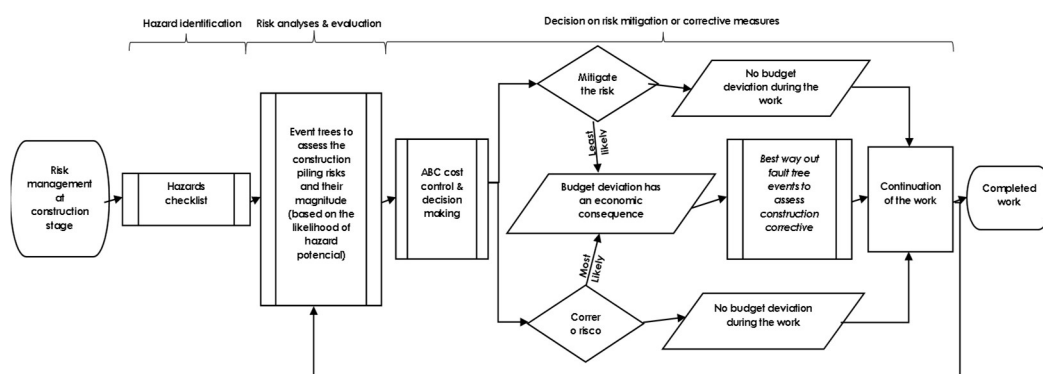
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Schematic for risk management procedure at construction stage of bored piles (Kelly method) and driven ductile piles.