Case Study: Optimization of Contractor's Financing through Allocation of Subcontractors

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Abstract : In many countries, the construction industry relies heavily on outsourcing models in executing their projects and expanding their businesses to fit in the diverse market. Such extensive integration of subcontractors is becoming an influential factor in contractor's cash flow management. Accordingly, subcontractors' financial terms are important phenomena and pivotal components for the well-being of the contractor's cash flow. The aim of this research is to study the contractor's cash flow with respect to the owner and subcontractor's payment management plans, considering variable advance payment, payment frequency, and lag and retention policies. The model is developed to provide contractors with a decision support tool that can assist in selecting the optimum subcontracting plan to minimize the contractor's financing limits and optimize the profit values. The model is built using Microsoft Excel VBA coding, and the genetic algorithm is utilized as the optimization tool. Three objective functions are investigated, which are minimizing the highest negative overdraft value, minimizing the net present worth of overdraft, and maximizing the project net profit. The model is validated on a full-scale project which includes both self-performed and subcontracted work packages. The results show potential outputs in optimizing the contractor's negative cash flow values and, in the meantime, assisting contractors in selecting suitable subcontractors to achieve the objective function.

Keywords : cash flow optimization, payment plan, procurement management, subcontracting plan

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