

Abstract

Large housing projects require careful construction planning for their timely completion. Traditional construction project management methods, however, are not entirely adequate for managing such complex projects. Problems encountered in the planning and controlling of construction projects are inherently dynamic but they are treated statically in the network-based scheduling methods. These methods tend to view the construction projects as deterministic and concentrate on developing plans for higher management levels, but cannot identify the realities of actual site conditions. In such situations, a holistic approach to integrate the objectives of higher management planning with the operational scheduling at the construction-site level is identified as the need of the day. The present study attempts to address this need by proposing a simulation-based optimization method for scheduling the construction of large housing projects. The proposed method considers the variations in the productivities of various construction activity teams and material prices in the market, while progressively deriving the optimum construction schedules. The effectiveness of the proposed method was tested on three large residential projects comprising walk-up apartments and high-rise apartment tower blocks. Simulation-based activity models for these three case-studies were developed. By employing the proposed optimization method through these models, optimum construction schedules for an array of construction durations were derived for all the three case-studies. It was observed that, compared to the actual construction, considerable reduction in total construction duration and construction cost could be achieved.