FINANCE-BASED SCHEDULING OF CONSTRUCTION PROJECTS USING INTEGER PROGRAMMING

ABSTRACT:

Construction Scheduling is the process of devising schemes for sequencing activities. A realistic schedule fulfills the real concerns of users, thus minimizes the chances of schedule failure. The minimization of total project duration has been the concept underlying CPM/PERT schedules. Subsequently, techniques including resource management and time-cost trade-off analysis were developed to customize CPM/PERT schedules in order to fulfill users' concerns regarding project resources, cost, and time. However, financing construction activities throughout the course of the project is another crucial concern that must be properly treated, otherwise, non-realistic schedules are possibly rendered. Unless contractors manage to procure adequate cash to keep construction work run according to schedule, the pace of work will definitely be relaxed. Therefore, making scheduled activities always in balance with the available cash has a potential contribution to producing realistic schedules. This paper introduces an integer-programming finance-based scheduling method to produce financially feasible schedules that balance the financing requirements of activities at any period with the cash available during the same period. The proposed method offers twofold benefits of minimizing total project duration and fulfilling finance availability constraints.