TITLE OF DIPLOMA THESIS

Dynamic Planning of Construction Sites in Linear Projects Aiming to Cost Savings

AUTHOR

Zarkada Athanasia – Ntokou Aneta

ACADEMIC YEAR

2019-2020

ABSTRACT

Optimization is a process that focuses on finding the ideal solution of problems with a variety of alternative results, taking into consideration specific restrictions and criteria. The thesis addresses the application and the assessment of an optimization method of dynamic planning of construction sites in order to save cost. In addition, an algorithm based on this method is presented, which gives the ability to users to calculate the ideal location and cost in a linear project. Dynamic planning of construction site is an unexplored area. The aim of this thesis is to highlight this issue and to explore its value through practical applications of road construction projects. Road construction projects are the most representative type of projects with dynamic nature, whose progress requires changes in the workplace and changes in the location of the construction site in order to reduce the project's total duration and cost as well as to maintain or/and enhance its productivity through the restriction of non-productive movements. The calculations take into consideration quantitative as well as quality criteria. According to quantitative criteria the site location with the lowest cost is found. If this location matches the quality criteria (morphology and quality of the terrain, surface gradient, accessibility, legislation, availability of water and electricity supplies), then it is selected as the ideal location of the site. In addition, to examine the dynamic sector of this problem, the ideal location of the site is considered, at shorter intervals, which involves a different division of jobs and quantities per job, and thus possibly different results from the first scenario. The composition of these intervals with their respective costs adding the cost of relocating the site, give the total cost for the whole project. This cost is compared with the first one, and it is thus apparent whether it is advantageous to install a site in one or more locations. The results of all these combinations are recorded and their conclusions are declared sufficient. For more efficient results, the implementation of this method should be done in parallel with the schedule of and the workflow of the project with the goal to minimize the cost.

KEYWORDS

Construction site, Dynamic planning of construction sites, Relocation cost, Road construction project, Optimization, Construction machinery.