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# A spatial decision support system for construction progress monitoring in linear projects

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**Abstract**

This paper presents a model, designed to progress monitoring of linear projects. In this paper all aspects of progress monitoring process including data acquisition, processing, comparing and visualization of useful information have been considered in a DSS. The system uses spatial-DSS based on GPS, for data collecting, and GIS, for information visualization, to provide an effective environment for decision making. By conducting a case study in pipeline project, has been adopted. Consequently the results show that the DSS provide strong support by using proposed dashboards for decision makers to make effective decisions in a timely manner.

**Keywords: DSS, Progress Monitoring, Linear construction projects, GIS, GPS.**

## 1. INTRODUCTION

Project managers and engineers are constantly making decisions [1]. Good decision making is crucial in construction projects and can save a considerable amount of money. Therefore, a reliable decision support tool is essential for project managers make effective and on-time decisions [2]. In a complex and stressful environment of construction projects, the decision-making process is one of significant and important tasks of project managers. Decision-making levels in construction management with a hierarchy level are different; In upper levels are consist of managerial issues about the company, whiles in the project and operational levels are about the executive phase [3].

The major challenge for launching a new product depends on the manager's capability to exercise control on the project development process [4], while clients are nowadays demanding to accomplish the project in "record time" [5]. Through control, managers and planners allocate resources, adjust investments, monitor performance, identify corrective actions, and regulate the flow of human capital [4].

In general, construction projects can be divided into as a project that integrated into a limited site, such as bridge construction, high-rise buildings and multiple housing construction; and linear projects. Linear projects are common to many types of projects, including railroads, pipelines, and highways construction projects. A linear construction project always consists of a number of similar or identical units, which are repetitive in nature [6]. Projects that are generally classified as linear can be divided into two categories: discrete linear projects and continuous linear projects. This has a huge budget and high technical demands, as a consequence, deviation during the life-cycle of construction. Common challenges of linear projects that complicate the overall project management are due to being long construction period, having many participating units, spreading in a large scale, discredited locations of construction facilities, characterized by complex and continuously changing geometric configurations, multiple decision makers present in different locations and mostly the fast changing conditions on the site [7, 8].

In construction projects, the main purpose of project control is to finish the project within the allocated time and the preset budget and in accordance with the set quality standards. To this end, this is a difficult task undertaken by the project managers, by way of continually measuring progress, assessing plans and deciding on corrective actions when needed [9]. Assessing project does the process of identifying deviations. For this purpose, would be compare progress versus program, which called progress monitoring. Construction project