THE EFFECTS OF BUILDABILITY FACTORS ON REBAR FIXING LABOUR PRODUCTIVITY OF ISOLATED FOUNDATIONS

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Abstract
Buildability is one of the most important factors affecting labour productivity. Nonetheless, an extensive search of the literature revealed a dearth of research into its effects on labour productivity in in-situ reinforced concrete construction. Since rebar fixing is an essential, labour intensive, trade of this type of construction material, and isolated foundations are among the major activities of low to medium-rise construction projects, the objective of this research is to investigate the effects and relative influence of the variability of foundation sizes; rebar diameter; and quantity of reinforcement fixed, on rebar fixing labour productivity of this activity. To achieve this objective, a sufficiently large volume of productivity data was collected and analyzed using the multiple linear regression method. As a result, the effects and relative influence of these factors are determined. Apart from the variability of foundation sizes, the findings show significant effects of the buildability factors investigated on the labour efficiency of the fixing operation, which can be used to provide designers feedback on how well their designs consider the requirements of the buildability concept, and the tangible consequences of their decisions on labour productivity. In addition, a set of recommendations are presented, which can improve the buildability level of this activity and hence translate into higher labour efficiency and lower labour cost. On the other hand, the depicted patterns of results may provide guidance to construction managers for effective activity planning and efficient labour utilization.

Keywords
Buildability, Constructability, Labour Productivity, Isolated foundations, Rebar Fixing, Characteristic Rebar Diameter.

INTRODUCTION

Construction is the world's largest and most challenging industry (Tucker, 1986). On average, it contributes 3 to 8% of the Gross Domestic Product (GDP) in most countries (Arditi and Mochtar, 2000). Since construction is a labour intensive industry, the significance of this effect, clearly justifies the concern over its labour productivity. Several factors affect labour productivity, but buildability is among the most important (Adams, 1989; Horner et al., 1989). Buildability, as defined by the Construction Industry