BUILDABILITY FACTORS INFLUENCING FORMWORK LABOUR PRODUCTIVITY OF WALLS

Abdulaziz M. JARKAS
Senior Vice President & Consultant, Mazaya Real Estate Development Co., KSCC, Kuwait
Email: jarkas@mazayarealestate.com

Abstract
Several factors affect construction labour productivity, but one of the most important is buildability. Despite the plethora of research into labour productivity, a thorough examination of the literature revealed a dearth of research into the influence of buildability factors on the labour productivity of in situ reinforced concrete construction. Since walls form major parts of many reinforced concrete structures; especially slab-wall structural configurations, the objective of this research is to investigate the influence of the wall surface area and perimeter geometry on formwork labour efficiency. To achieve this objective, a sufficiently large volume of formwork productivity data were collected and analyzed using the multiple regression method. As a result, the effects and relative influence of the shutter surface area and the number of angles formed along the wall perimeter on formwork labour productivity were determined. The results obtained show significant influence of the factors investigated on the efficiency of the formwork operation that can be used to provide designers with feedback on how well their designs consider buildability, and the tangible consequences of their decisions on labour productivity. On the other hand, the findings provide guidance to construction managers for effective activity planning and efficient labour utilization.

Keywords
Buildability, Formwork, Labour productivity, Rationalization, Standardization, Walls

INTRODUCTION
A 10% increase in construction labour productivity would yield annual savings of about £1 billion to the British economy (Horner et al., 1989); a similar conclusion was echoed by Stoekel and Quirke (1992). The construction industry, on average, contributes 3 to 8% of the Gross Domestic Product (GDP) in most countries (Arditi and Mochtar, 2000). Consequently, improving the productivity of this industry would translate into national economic prosperity and higher demand for construction projects.

In the most general terms, productivity is an economic measure defined as the ratio of output to input (Adrian, 1987). Consequently, construction productivity can be regarded as a measure of outputs which are obtained by a combination of inputs. In view of this, two measures of construction productivity emerge: (1) total factor productivity, where