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# **MARGINAL PRODUCTIVITY IMPROVEMENT ACHIEVABLE BY THE USE OF PREFABRICATION: CASE STUDIES OF BUILDING PROJECTS IN AUCKLAND**

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This study aimed to analyse the cost and time savings, and the productivity improvement achievable by the use of prefabrication system (prefab) in place of the traditional building system (TBS). The research was based on the records of the completion times and the final contract values of 30 building projects implemented using the prefab in Auckland.. The building types included office/ commercial, residential, schools/ educational, healthcare, industrial and retail buildings. The project details included the final costs, completion dates, the gross floor areas, number of floors, and the level of complexity. Based on these details, the equivalent completion times and the final cost estimates for similar buildings implemented using the TBS were obtained from the Rawlinsons construction data handbook, as well as feedback from some designers and contractors. The productivity outcome for each building system was computed as the product of the outturn cost and time savings recorded for the buildings involved. The SPSS-based univariate ANOVA was used to test the null hypothesis which assumed that the fixed factor of 'building type' had no statistically significant effect on the observed cost, time and productivity improvements in the projects.

Results showed that the use of prefab in place of the TBS for the building projects and across all building types resulted in 25% and 10% reductions in the completion times and costs, with standard deviations of 12% and 15%, respectively. This also translated to overall 3% improvement in the productivity outcomes in the building projects with a standard deviation of 1.5%. Univariate test results showed that the fixed factor of 'building type' had significant effects on observed results.

The study provides evidence-based benefits in terms of the marginal time, cost and productivity improvement achievable through the use of prefab in place of the TBS for various building types. The findings could therefore support decision-making in relation to choosing between the two building systems for specific building application.

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