

**WASTE MINIMIZATION OF REINFORCING STEEL
BARS IN RESIDENTIAL BUILDINGS**

By

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Abstract

Material management systems' functions include identifying, acquiring, distributing and disposing of materials for a specific project. More recently the construction industry has become more cognizant of project materials' costs, which can represent 50% or more of project costs. For this reason, minimizing materials' wastes is considered an important feature for reducing project's costs.

Previous researches studied the optimization of concrete structures materials' wastes such as gravel and cement. Unfortunately, these studies that are concerned with steel bars' cost optimization get the solution using logical algorithm and ignore wastes that are produced from each stage and can be re-used in next stages.

The objective of this research is to develop a new technique of cutting and setting up of steel bars. This objective can be achieved through: (1) development of a mathematical model that can be applied to the construction variables of steel bars, (2) determination of wastes generated from each stage that can be re-used, and (3) development of graphical interface and well designed environment. To demonstrate the objective of this study a computer program, designed by Microsoft Visual Basic language, is developed. This program utilizes integer linear programming procedure to minimize steel bars' wastes.

Finally, a case study is presented to verify the computer program and to compare the results with traditional methods that are used in determining steel bars' cuttings methods and wastes. The analysis presented in this case study illustrates that the designed program minimize steel bars' wastes efficiently compared with traditional techniques.