Cairo University
Faculty of Engineering
Department of Construction
Engineering and Project Management

A COMPREHENSIVE ANALYSIS OF THE SLUMS IN JEDDAH AND MAKKAH, EVALUATION OF THE CURRENT SITUATION AND FUTURE DEVELOPMENT PLANS

By:
Mamdouh Mohamed Al-Gendy

A Thesis submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirement for the Degree of

DOCTOR OF PHILOSOPHY

in:

Structural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis: A COMPREHENSIVE ANALYSIS OF THE SLUMS IN JEDDAH AND MAKKAH, EVALUATION OF THE CURRENT SITUATION AND FUTURE DEVELOPMENT PLANS

Key Words: Slums, Upgrading, Municipality, Construction-challenges, Slum-dwellers, Optimization, Socioeconomic impacts.

Summary:

In the last few decades, the problem of slums increased in Saudi Arabia in general and in Makkah and Jeddah particularly. The research presents the current situation of slums in the two cities including the existing upgrading projects. It focuses on two case studies; Ruwaise slum in Jeddah and King Abdulaziz street slum in Makkah. The research shows the different challenges that are faced by the construction authorities in both slums upgrading and replacement projects in Makkah and Jeddah. The study focuses on the social, economical and constructional challenges on both dwellers and constructors. Interview surveys were conducted with number of specialist engineers and randomly selected dwellers from Makkah and Jeddah slums. The data were collected through prolonged interviews with each person through which concerning questions were answered. The surveys proved that there are high needs to revise properties compensation system concerning paid amounts and timings since the majority of interviewed persons reported dissatisfaction. The most significant construction challenge is the rejection and violent resistance of dwellers to evacuate slums for the demolition process even after the delivery of compensation. A non-linear multi-objective optimization model was developed to determine the optimum upgrading intervention for a particular slum area. The optimization tool, which was developed using MatLab software, aims to maximize the life quality of the slum dwellers and minimize both construction cost and duration of upgrading projects. The tool enables decision makers to select the optimum upgrading intervention strategy for each zone of the same slum.

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Abstract

In the last few decades, the number and size of slums increased in Saudi Arabia in general, and in Makkah and Jeddah in particular. Previous corresponding researches did not cover all aspects of the problem. This research presents the current situation of slums in the two cities including the existing upgrading projects. It focuses on two case studies; Ruwais slum in Jeddah and King Abdulaziz road slum in Makkah. The study identifies the social and economic impacts on slum dwellers. In addition, it investigates the different constructability challenges faced by the construction authorities and personnel in slums upgrading projects, which are associated with the different intervention types from both the contractors and dwellers points of view.

Interview surveys were conducted with a number of specialist engineers who are working in slums projects in the two cities and dwellers from Makkah and Jeddah slums. The data were collected through prolonged interviews through which concerning questions were answered. The questionnaire and interviews results are analyzed and findings are extracted. The surveys proved that there are high needs to revise properties compensation system concerning paid amounts and timings since the majority of interviewed persons reported dissatisfaction by slums dwellers. The most significant construction challenge is the rejection and violent resistance of dwellers to evacuate slums for the demolition process even after compensation is delivered. Other obstacles stem from the nature of the slums areas and the inaccessibility of regular construction equipment because of the confinement of the place boundaries.

A multi-objective optimization model was developed to determine the optimum upgrading intervention for a particular slum area. The optimization tool, which is developed using MatLab software, aims at quantifying and minimizing the negative socioeconomic impacts of slums upgrading and replacement projects and their costs, while maximizing and accelerating the benefits of these projects. The optimization model enables decision makers to select the optimum upgrading intervention strategy for each zone of the same slum.