Project Name: Al - Rehan Hospital Academic year: 2012 / 2013

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**Abstract**

Al - Rehan Hospital is an eleven floors building with a total area of 1730 m2 located in Ramallah, Palestine. It consist of a various rooms and sections such as: operating rooms, patients rooms, I.C.U area, recovery rooms, store rooms, emergency rooms, delivery rooms, laboratory, photography and laser sessions, pharmacy, waiting rooms, offices, etc. The first four floors are basement floors. The building is composed of two blocks: block “A” with an area of 1046 m2 and block “B” with an area of 684 m2.

The elevation of each floor is 4 m, and the total height of the building is 44 m. The exterior walls are masonry walls formed of concrete, blocks and stones, while the interior walls are made of hollow concrete blocks. The exterior walls of basement floor B4 and part of the exterior walls of floors B3 and B2 are shear and retaining walls which made of reinforced concrete.

In this project, Al-Rehan Hospital will be deigned to satisfy strength, stability and serviceability aspects by applying the main concepts of structural design. In this project, there are different structural elements need to be designed such as: shear walls, retaining walls, slabs, footings and columns, which in turn will provide us a chance to apply what we had learned.

The design will be performed manually along with SAP2000 software to assure double check for the results since the software alone could lead to wrong or unrealistic results. We will discuss the analysis and design of a reinforced concrete structure as graduation project.

A summary of the analysis and design processes of different structural elements in the project will be contained in this project using two and three dimensional structure analysis. The final design output will be detailed as structural drawings attached as an appendix.

The project report consists of five main chapters. Chapter one includes the introduction, general description of the structure, loads, materials and basic structural systems used. Chapter Two: the preliminary design of the different structural elements preformed manually. Chapter Three: a three dimensional analysis of the computerized structure using SAP2000 software. Chapter for: the three dimensional analysis of dynamic loads. Chapter five: the final structural design of the building, in addition to detailed structural drawings in the appendix.

In the first phase of this project, elements such as beams, columns and slabs will be modeled and designed as one-dimensional elements via SAP2000. Manual checks will be used to make ensure the results obtained from SAP2000.

In the second phase, the structure will be analyzed and designed based on three dimensional structural models using the analysis and design software “SAP2000”. Slabs and reinforced

concrete walls will be modeled as area elements, while frame element modeling will be used for beams and columns. All possible loads will be considered, gravity and seismic loads, in the structural model to get the critical design results.

The structural elements will be designed using the ultimate strength method with load combinations according to ACI 318M-11 specifications.