Department of Mechanical Engineering
Senior Graduation Project

Design of a **Hospital Bed** Low Cost
To be Manufactured in Saudi Arabia

Done by the Students:
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Under the supervision of:
Dr. Emad Y. Tanbour
Every person has to be treated with respect and dignity. Especially people in need of care. We think develop and design with this in mind.
Statement of Purpose

To Apply our knowledge and skills in (CAD) SolidWorks program and in other course that we take during our study in the university

To design a hospital bed with low cost to be manufactured and used in Kingdom of Saudi Arabia
Out Line

- Introduction
- Design Approach
- Project duration (Gantt Chart)
- Objective of the project
- Demand of hospital bed in Saudi
- Anthropometric Data (Human Measurements)
- Selecting the Best Bed Design
- Hospital bed Prototype
- Conclusion
Introduction

- Designing a hospital bed
- Duration of one semester
- project requires solidWorks (CAD)
- visiting hospitals, and workshops for Medical Equipments
- Basically main process involved in the conceptual drawing of the bed, stress analysis, and studying the motion and enter furnace of the parts
- The project prerequisites are good designing skills
Design Approach

Group Brainstorming

Prototyping by CAD Solidworks

Gather Literatures from the web

Sizing and Strength Calculations

Design Conceptualization

Design of a Hospital Bed Low Cost To be Manufactured in Saudi Arabia – Fall 2012
**Project duration (Gantt Chart)**

### Design of Hospital Bed

<table>
<thead>
<tr>
<th>Task's</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
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<tbody>
<tr>
<td>Brainstorming</td>
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<td>General tasks</td>
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<tr>
<td>Research about the hospital bed on the internet to know what’s out</td>
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<td>Conceptual design on how to move back segments</td>
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<td>Research patents using Dr. Email sign in account to US Patent office</td>
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<td>Developed a selection criteria for deciding one concept to design the mechanism</td>
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<td>Refine design into one option by meeting with Dr. Email in solidworks lab</td>
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<td>Detailed sketching of final option</td>
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<td>3D drawing</td>
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<td>3D hand drawing</td>
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<td>Dimensions</td>
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<td>Information about process to make</td>
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<td>selection of the part</td>
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<td>Standard parts bearing bolts, nuts, screws, bolts, washers, wheels, frames</td>
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<td>Solidworks implementation Computer Aided Design (CAD)</td>
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<td>Parts</td>
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<td>Assembly</td>
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<td>Drawing</td>
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<td>Revision for all the design</td>
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<td>Motion study</td>
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<td>Power Point presentation</td>
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<td>Total Percentage of Completion</td>
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Objective of the project

- To help middle income people to buy
- Push forward the production of Saudi economy
- Increase the average of careers by promoting the national industry
- Not rely on the West in all industries
Demand of hospital bed in Saudi

Increasing awareness has raised patients’ expectation levels in terms of quality care. The government is finding it difficult to meet the expected quality standards. According to a study, the demand for beds in Saudi will double by 2025, to reach nearly 162,000.

Source: Gulf Cooperation Council Healthcare, Mckinsey Analysis

Figure 1: The Demand for Hospital Beds in Saudi
we find that the length from the top of a person’s head to the bottom of a person’s lower back is 47% of their total height
Selecting the Best Bed Design

In order to properly assess a bed design for the demands of the Saudis hospital, we had to develop and appropriate matrix for evaluation:

- Curatorial Industry Standards (20%)
- Durability (15%)
- Safety (15%)
- Ease of Manufacturing (15%)
- Cost (20%)
- Ease of Operation (10%)
- Electric Functions (5%)
Hospital bed Prototype

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Hospital bed Prototype

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Hospital bed Prototype

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Hospital bed Prototype
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Overall Bed Dimensions (inches)
Design of a Hospital Bed Low Cost To be Manufactured in Saudi Arabia – Fall 2012
Design of a Hospital Bed Low Cost To be Manufactured in Saudi Arabia – Fall 2012
Design of a Hospital Bed Low Cost To be Manufactured in Saudi Arabia – Fall 2012
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- Foot Rest Frame
- Jack
- Sliders
Sliders

Foot Rest Frame

Wheel

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Adjustable Boards
Other Component

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Conclusion

- Through the completion of this design project our group has concluded that there is still much the Saudis can do to advance their health care system.

- Additionally work must be done in the manufacturing area of the design.

- Our team feels that with a minimal amount of additional work this bed design would be an economical and effective alternative to the beds that are currently being used in Saudi.

- Our team feels that these steps would be worth perusing and that this bed design would allow for the continued expansion of Saudi’s developing health care industry.
Thank You For Listening Any Question