الآيـــــــة

قال الله تعالى:

((وَقَضَى رَبُّكَ أَلَّا تَعْبُدُوا إِلَّا إِيَّاهُ وَبِالْوَالِدَيْنِ إِحْسَانًا إِمَّا يَبْلُغَنَّ عِندَكَ الْكِبَرَ أَحَدُهُمَا أَوْ كِلَاهُمَا فَلَا تَقُل لَّهُمَآ أُفٍّ وَلَا تَنْهَرْهُمَا وَقُل لَّهُمَا قَوْلًا كَرِيمًا . وَاخْفِضْ لَهُمَا جَنَاحَ الذُّلِّ مِنَ الرَّحْمَةِ وَقُل رَّبِّ ارْحَمْهُمَا كَمَا رَبَّيَانِي صَغِيرًا. رَّبُّكُمْ أَعْلَمُ بِمَا فِي نُفُوسِكُمْ إِن تَكُونُوا صَالِحِينَ فَإِنَّهُ كَانَ لِلْأَوَّابِينَ غَفُورًا)).

الإسراء (23-25)

Dedication

"Success or failure is own decisions"

Every challenging work needs self efforts as well as guidance of elders especially those who were very close to our heart.

My humble effort I dedicate to my " family and friends " whose affection, love, encouragement and prays of day and night make me able to get such success and honor.

Along with all hard working and respected Teachers

Acknowledgement

Much of this work would have been impossible without the support, help and suggestions from our families and Teachers. In particular, we wish to thank **Dr Hassan Abdulateef Osman** for his efforts to give us the keys of this knowledge step by step and for his encouragement also **Eng Ayman Ibrahim Mohammed** who are responsible for the practical part of this project and for his encouragement and support throughout the preparation of this project .

We also wish to remember all invisible hands of the teachers of **School of Mechanical Engineering (SUST)**. We are privileged to know them.

Abstract

This study aimed at designing and selecting the Air-Conditioning system for Health Care hospital in accordance with international specifications and to what extends do hospitals in Sudan implement these specifications, this study adopted the descriptive and analytic method. It is also based upon information collected from secondary sources, firstly a research plan was put, the literature review had been done by researcher, then the description of the hospital and data analysis had been discussed, after that it will be clear to estimating the thermal load with computer program called hourly analysis program **(HAP)** version **4.61**and according to it the selection of the Air-Conditioning will take place.

التـــجـــريـــد

تبحث هذه الدراسة في تصميم واختيار منظومة تكييف لمستشفي هيلث كير بالمواصفات العالمية ومدي تطبيق مستشفيات السودان لهذا النظام, اتبعت الدراسة المنهج الوصفي والتحليلي وقد بنيت الدراسة علي المعلومات التي تم جمعها من المصادر الثانوية, لتنفيذ هذا المشروع اتبعت خطوات تتمثل في التالي , اولا تم وضع خطة لتنفيذ المشروع, ثم بعد ذلك تم تجميع عدد من الدراسات السابقة ذات الصلة بتكييف المستشفيات, ثم بعد ذلك سيصبح من الممكن تقدير الحمل الحراري للمبني وبناءا عليه سيتم اختيار منظومة التكييف للمستشفي.

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Table of Abbreviation Definition

Abbreviation	Definition
HVAC	Heating, ventilation and air conditioning
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ACH	Air Change per Hour
AIA	American Institute of Architect's
NFPA	National Fire Protection Association
NFPA	National Fire Protection Association
CDC	Centers for Disease Control and Prevention
ICBO	International conference of building officials
LCCA	life-cycle cost analysis
DB	dry-bulb
MWB	mean coincident wet-bulb
EP	Emergency power
SMACNA	Sheet metal and air conditioning contractor’s national association
DX	direct expansion
AHUs	air-handling units
TR	Ton of Refrigeration
BTU	British thermal unit
COP	coefficient of performance
CAV	Constant air volume
VAV	Variable Air Volume
VRF	Variable Refrigerant Flow
CFM	cubic feet per minute
PTAC	Package terminal air conditioners
HEPA	high efficiency particulate air
ULPA	Ultra low particular air
BOCA	Building officials code administrators international
IAQ	Indoor Air Quality

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