

THESIS ABSTRACT

STUDENT NAME **KHURSHID ALAM SIDDIQUI**

TITLE OF THE STUDY **IMPACT OF BUILDING REZONING & CHANGE OF
USE ON ENERGY CONSUMPTION AND OCCUPENTS
THERMAL COMFORT**

MAJOR FIELD **ARCHITECTURAL ENGINEERING**

DATE OF DEGREE **2002**

This thesis presents a study on the impact of building rezoning and change of use on energy consumption and occupants' thermal comfort. Most buildings are subjected to a change in function as well as modifications in partitions layout, which normally impacts space thermal loads. The architectural and structural drawings and interior layouts are normally reviewed during modification planning but the suitability of the HVAC system to the required alterations is normally neglected. This usually causes numerous problems, such as poor air distribution and balancing, which results in thermal discomfort and unacceptable indoor air quality. Additionally, these modifications affect building energy consumption if proper HVAC design and thermal rezoning are not considered accordingly.

In this research, building - 19 at King Fahd University of Petroleum & Minerals (KFUPM) is taken as a case study. The original building layout was changed by partitioning the large design studios into classrooms and offices at various locations in the building. Quantitative and qualitative analyses were carried out to assess the impact of imposed modifications on occupants' thermal comfort, while the study of building energy consumption was performed through building energy analysis. The thermal comfort qualitative analysis was performed through occupants' responses obtained by distributing questionnaire, while the quantitative analysis was conducted by measuring the temperature and relative humidity at various places in the building. DOE-2.1D energy analysis software was used for the calculations of building energy consumption. In this work, a systematic approach for building HVAC system retrofitting is proposed. This approach can be very useful in planning of building retrofit projects, to ensure proper HVAC system design that will maintain the required thermal comfort with minimum possible energy use.

MASTER OF SCIENCE DEGREE
KIND FAHDUNIVERSITY OF PETROLEUM AND MINERALS
DHAHRAN – SAUDI ARABIA
YEAR - 2002

