Chapter 7

Conclusions

7.1 Conclusions, remarks and discussion

Outcome of this research provides the necessary tools and background for energy conservation concept that concentrates heavily on building envelop and its materials, and orientation.

The cooling load and energy consumption were calculated utilizing a mathematical/graphical model and computer simulation. Series of computer simulation was carried out by using DEROB-LTH software. This tool was used to collect peak cooling load which was passed through common materials, with different building orientations.

The methodology used in this repot was successful in finding a most influenced materials/elements by means of cooling load, AC capacity level and energy conservations. Out of all material, glass found to be the most influence element/material followed by Timber and Walls. The result obtained in this study reveals that improvement of element/material conserves the energy; the usage of double glass windows instead of plain glass through 1000 ft^2 area contributes to reduce AC capacity from 17.61 to 15.88 tons. Also, the monthly electricity bill reduces from Rs. 1426854 .49 to Rs. 1268714.44, the overall saving of 11%.

The Air Condition System is the most energy consuming sub-system of the building. Hence, any improvements implementing by means of optimization to Air-conditioning system would be a direct and considerably contribute to saving total energy cost. The result of this study reveals that the use of tinted glasses comparatively over plain glasses contributes to save energy consumption as reducing A/C capacity and electricity usage by 1/3.

The cooling load through walls provides a significant savings to energy bills. The average A/C capacity can be reduced by improving wall types, as well as the orientation of the building; the maximum value obtains for East /West direction.

The cooling load for residential house was calculated by both theoretical and practical. The mathematical equation develops in relation with thermal conductance (U) for Walls and Timber materials. But, Glass material could not be developed, as Glass materials influence two factors, Conductance and Radiation. The developed mathematical model in this study will help to generalized model.

The theoretical values matches with practical values, which justify the validity of the simulation and applicability of the developed equation

7.2 Recommendation

1. A propose construction material of Building must closely analyze interns of the cooling load through each material and identifies lowest impact to the cooling load. Specially, air-condition capacity and electricity bills

2. Special care should be given when implementing improvement of exiting Building since additional cost involve

3. To enable proper monitoring and verification, it is required to ensure that acceptable results have been achieved or not.

4. Even though the Air conditioning system is design to meet the peak load, most of the time it operates under partial load and it is very much lesser than the peak load. Thus, it should be thoroughly consider and exploited when identify energy optimization.

5. As per derived mathematical expression, total cooling load approximately proportional to change of room sensible cooling load, only when enthalpy of mixing air and outdoor air not change. This result can be applicable in warm climatic conditions, only.

6. Development of daylight system, try to develop various options to reduce electric lights through development of daylight system.

7. Develop architectural view to minimize impacts, especially in east and west

8. Research to be developed to improve east and west side of the building and much more day delight from North and south side.

9. Reduce impact by planting much more trees especially on east and west side.

10. Develop windows shade by means of natural (trees) and man-made ways (blinds).

11. Walls facing directly to east and west can be use to paste photovoltaic panel to improve self generation of green energy.