ABSTRACT

“Purpose of this innovation......is not just for few people....not for few lucky guys......it’s for whole world”. Energy saved is Energy generated.

Buildings in the rural areas are constructed traditionally without paying much attention towards the ventilation, lighting and the indoor hygiene which are the important principles of planning. People live in such poorly ventilated buildings from generations to generations without any thought. Rather they are unaware about the latest trends in building planning and construction techniques. Conventionally the small open to sky duct (Zarokha) is provided in the roof of building for lighting and ventilation purpose, which proves to be inadequate. The habitants construct the buildings conventionally without thinking about its inconvenience. As discussed with practicing ophthalmologist and physicians in Dhule city, large number of patients suffering from defective eye sight and sick building syndrome prevail in rural areas as compared to urban areas where majority of the buildings are constructed as isolated buildings. The practicing Engineers and Architects in urban areas are least interested to work in rural areas, might be due to uncertainty about receiving their consultancy charges. Thus the problem of ventilation for enclosed buildings in rural areas remains unsolved even today. Social awareness and competitiveness among practicing Engineers and Architects to work out some viable, feasible, and maintenance free solution to this problem is the need of TIME.

This thesis, Natural ventilation for enclosed buildings in rural areas is the result of a research study conducted in rural areas of Dhule District of Maharashtra State in India. The main objective of this work is to identify and investigate the possibilities to improve comfort conditions in the enclosed buildings in rural areas, energy conservation and a step towards Green Building concept. The interviews with habitants (especially the house wives who spend maximum time in the enclosed buildings) living in rural areas, practicing Ophthalmologists and Physicians in Dhule city, artisans working in rural areas has been the most central research instrument focusing the problem which motivated to work out permanent solution. The case studies conducted on two buildings constructed specifically one at Chimthane in Tehsil Sindkheda of District Dhule in Maharashtra State, India and the second at
Nimkhedi in Tehsil and District Dhule in Maharashtra State, India have been dealt in detail.

Chapter one contains the introduction of the research topic “Natural Ventilation of Enclosed Buildings in Rural Areas” clearly focusing on the current situation about the housing pattern in the rural areas, the trend of building construction followed, the problems faced by the habitants living in the conventional buildings for years together, the lack of awareness amongst the rural habitants about the principles of planning and the latest trends in building construction technique. The later part of this chapter deals with the literature survey of the research topic. The research work done till date is restricted up to Natural ventilation for isolated buildings only. Not as much of literature is available on the Natural ventilation for enclosed buildings in rural areas. The guidelines drawn from literature review are feasible for the developed nations like America, Britain etc, but are not feasible for the developing nations like India. However guidelines are helpful Natural ventilation for isolated buildings.

Chapter two discusses about the problem on which the entire research work is based. The present research is problem oriented research; this chapter describes the problem in detail right from its origin. The lack of awareness among the rural habitants about the age old problem, the adverse effects occurring due to the problem such as defective eye sights, sick building syndrome etc. The interviews with practicing ophthalmologists and the physicians in Dhule city highlighted the problem stating that the percentage of patients from rural areas (especially house wives and elderly people) is more as compared to those from urban areas.

Chapter three explains the realistic and viable solution for the problem discussed in second chapter. The solution suggested is affordable, easy to implement, maintenance free, durable and efficient. Even the local artisans if trained properly can execute it.

Chapter four discusses the case studies conducted at two sites, one in the village Chimthane in Tehsil Sindkheda of Dhule District in Maharashtra and the second in the village Nimkhedi in Dhule Tehsil of Dhule District in Maharashtra State. The peculiarities of both the sites are discussed in details with the help of
detailed drawings and figures. The comparative estimate of NVEB and CVEB is attached to work out the cost and the percentage rise in cost of construction for NVEB and CVEB. The works completed and those in progress are also discussed. Finally the task of converting existing CVEB in to NVEB is discussed in detail with the practical solution.

Chapter five discusses the findings of the research obtained from the case study sites where the readings of Daylight are recorded in NVEB and CVEB. Similarly the feedback is taken from the habitants of both the case study sites. The results after adopting the methodology suggested in the research work are noted down. The lacunae’s are discussed at large with them and accordingly the modifications are made in the final design discussed at the end of the chapter.

The last chapter discusses the final conclusions drawn from the research work. The most important findings of this research work are that:

The indoor comfort conditions are improved to the greater extent in NVEB. The indoor light quality and quantity is improved to the greater extent minimizing the probability of defective eyesight. The construction technique of NVEB being simple for execution can easily implemented if the artisans in rural areas are trained properly. The construction cost of NVEB is 11.75% more initially as compared to CVEB, however considering the recurring energy bills throughout the lifecycle of the building it is worth to invest more initially. The payback period for the excess investment done initially is about 9.5yrs to 10yrs. Considering the average life of building as 60yrs, deducting 10 yrs payback period from 60yrs, the habitants of NVEB will have to pay only 50% electric bill for the remaining life of building i.e for 50yrs. This is the most valuable achievement in this research. Guaranteed energy conservation since no mechanical means of ventilation are required in NVEB resulting in the curtailment in the electricity bills to a larger extent, which otherwise may shoot up due to consumption of electricity to operate tube lights, lamps and fans during the day hours round the year. i.e “Energy saved is Energy generated”.

Rain water harvesting is achieved intentionally. Minimizing the energy requirements of each building constructed in future will lead our NATION towards prosperity. A step towards Green Building concept........!!!!!!!