

# Ventilation of Enclosed Buildings in Rural Areas an Unsolved Problem

Prof. Satish Baliram Patil, Dr.S.V.Deodhar

**Abstract** –The Buildings in rural areas are constructed traditionally without paying much attention towards the Ventilation, Lighting and the indoor Hygiene. These all are the important principles of planning. People live in such poorly ventilated houses since ages without much bothering. Rather they are least aware about the latest trends in building planning and construction techniques. Traditionally the small opening or a duct open to sky is provided in the roof of building for ventilation purpose, but it proves to be insufficient. The habitants use the technique blindly without wondering and thinking about its inconvenience. Also the practicing Engineers and Architects in urban areas are less interested to work in rural areas due to certain reasons. Thus the problem 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.

**Index Terms** - ventilation, enclosed buildings, rural area, unhygienic conditions, principles of planning open to sky ducts.

## I. INTRODUCTION

The layout of houses in rural areas is the typical row housing pattern with common walls either on both sides or on three sides as the case may be. Due to such layout pattern, practically it is not possible to provide windows in common walls. Thus the buildings in rural areas remain poorly ventilated creating unhygienic, uncomfortable conditions directly affecting the health of the habitants. Even today the buildings are constructed traditionally without paying much attention towards the principles of planning. In rural areas the labor contractor who executes the construction work thinks himself to be an engineer, an architect, valuer and even structural designer i.e. whole and sole all in one consultant. The people living in rural areas are not much aware of the importance of principles of planning, new trends in

construction techniques, hygiene, light ventilation etc.

That is not the case in urban or city areas. The layout pattern in urban areas is plot system i.e. individual owner has a separate plot for building construction. Secondly buildings are constructed leaving marginal spaces from the boundaries as per prevailing bylaws and regulations. Due to the marginal spaces, windows can be provided in all external walls of the building thus achieving proper light and ventilation. All the Principles of planning are taken into considerations while planning the building so that the habitants enjoy the natures gift i.e. sunrays, breeze, daylight etc.

## II. PROBLEM

Majority of the buildings constructed in rural areas abut each other i.e. enclosed from all the sides except front and back which either abut the road or back lane since rural areas do not follow Building Bylaws and Regulations if any. Considering individual joint family, the building site of a single joint family is shown in Figure 1

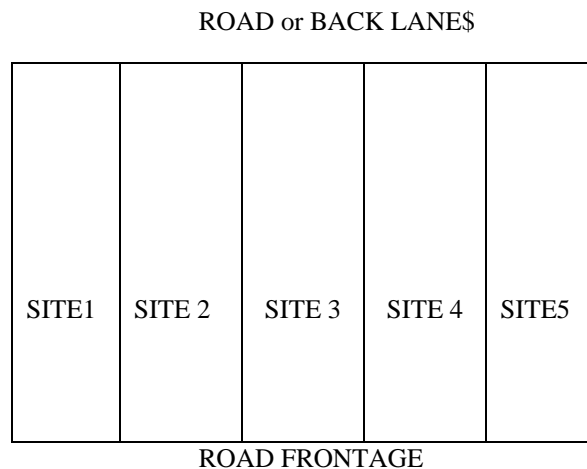


Figure.1 Site layout plan for a joint family

As the time passes on, the joint family gets divided in to two/three/four separated families and as such the corresponding site also get divided accordingly as shown in Figure 2

ROAD FRONTAGE FOR PLOTS B

SITE	SITE	SITE	SITE	SITE
1 B	2 B	3 B	4 B	5 B
SITE	SITE	SITE	SITE	SITE
1 A	2 A	3 A	4 A	5 A

ROAD FRONTAGE FOR PLOTS A

Figure .2 Site layout plan for divided family

Above two figures clearly shows that for such enclosed site no marginal distances from plot boundaries are left since rural areas do not follows any Building Bylaws and Regulations. Thus there is no alternative left for the people in rural areas to construct abutted or enclosed buildings with common walls. Practically it is not possible to provide windows in common walls of such buildings. As such the problem of ventilation of abutted enclosed buildings in rural areas starts. The habitants living in such buildings are little aware about the ventilation issue, health, hygiene and comfort conditions inside the buildings. Plate 1 and Plate 2 show these problems in existence in two such houses.



Plate.1 Walvadi village Tal.Dist. Dhule



Plate .2 Walvadi village Tal.Dist. Dhule

III. PRESENT SCENARIO

At present to overcome the above problem of poor ventilation usually a small opening of size 0.45m x 0.6m is provided as shown in Plate 3 and their effect in Plate 4 to Plate 6.



Plate . 3 Walvadi village Tal.Dist. Dhule



Plate. 5 Walvadi village Tal.Dist. Dhule



Plate 4 Walvadi village Tal.Dist. Dhule



Plate. 6 Walvadi village Tal.Dist. Dhule

From these photographs it can be seen that the traditional methods of providing open to sky ducts as means of ventilation in abutted enclosed buildings in rural areas is having following drawbacks

- i. Light entering indoor is concentrated only below the opening thus keeping the corners and other areas in dark.(Plate no.3 &5)
- ii. The light is insufficient to conduct routine indoor activities even during the day time.(Plate no.4&6)
- iii. Debris, dust, insects etc finds easy indoor access.
- iv. Needs frequent covering with polythene paper during rainy season to prevent entry of rain water.
- v. Privacy of the building (especially bedrooms, kitchens etc) is disturbed since the roofs of abutted enclosed buildings are easily accessible by neighbors.
- vi. Major drawback of such openings in roof is that they need to be closed permanently if first floor is constructed thus creating total darkness inside the building.

It can be seen further from these plates that the light entering from entrance door do not reach up to the interior of the building since the dimension of building perpendicular to the road i.e. depth is very large as compared to the its width of the building. In such situation the only alternatives remains is to use mechanical means for ventilation and lighting even during daytime for which electricity is only the main source of energy. As on today the rural areas are already facing very acute shortage of energy due to frequent load shading which is a very common phenomenon in day to day life of rural people. Thus practically it is difficult to use mechanical means such as fans, air conditioners and coolers for maintaining the inside temperature cool. Further due to non availability of regular and continuous power supply use of bulbs, lamps during daytime is also difficult. Electricity can be used only when it is available. The present scenario in rural areas is that there is always a load shading of 10 to 14 hours even during the daytime.

The people in rural areas can hardly afford inverters to use mechanical means due to load shading. Thus the question of using electricity doe not arises at all. Ultimately there is no alternative to rural habitants than to live in uncomfortable, unhygienic conditions prevailing in their houses since ages.

#### IV.CONCLUSION

As such based on visits of these areas and others following conclusions can be drawn

- i. The attention towards the ventilation of abutted enclosed buildings in rural areas is urgently needed at government level,
- ii. To innovate Advanced Construction Technology to solve these problem.
- iii. To train the masons and artisans' to use the innovative technology effectively.
- iv. To create awareness among the rural people to live in comfortable indoor conditions and protect their health from various deceases.
- v. To create social awareness and competitiveness among practicing Engineers and Architects to work out some viable, feasible, and maintenance free solution to this problem.

#### V. REFERENCE

[1] Application number 215/MUM/2010 filed for Indian Patent on 27.01.2010 on "Natural Ventilation of Enclosed Buildings in Rural Areas" By Prof.Satish B Patil Associate Professor. S.S.V.P.S.'s B S Deore College of Engineering and Polytechnic Dhule Maharashtra.



**First Author: Prof.Satish.B.Patil** M E Building Science and Technology from North Maharashtra University Jalgaon Maharashtra .Published Two Research Papers in International Journals "The Technology World" April 2010 issue and in "INJOREST" 2011 January issue. Six papers presented in International Conferences and Two in National Conferences. Research Scholar pursuing PhD in SJJTU Rajasthan. Presently working as Associate Professor in Civil Engineering Department of S S V P S's B S Deore College of Engineering and Polytechnic Dhule Maharashtra. Life Member of ISTE, MIE, FIV.



**Second Author: Dr.S.V.Deodhar** PhD from DAVV Indore, M E Building Science and Technology from University of Roorkee. Published more than 120 Research Papers in Referred International Journals and seminars. Published Six Reference Books. Worked as Referee to Trainee Engineers class I and class II of PWD and Irrigation Dept of Govt. of Maharashtra through MERI, To scrutinize technical papers published in Journal of Institution of Engineers ( India ) Presently working as Dean and Professor of Civil Engineering at SVITS Indore M.P.