APPENDIX–A

PATENTS

1) “Natural Ventilation for Enclosed Buildings in Rural and Gaothan Areas”
To,

PATIL SATISH BALIRAM,

PATIL SATISH BALIRAM, 4, Yogakshema, Shreekiya Yasvanta, WB Road, Deoghar, Dhule 424 002, Maharashtra, INDIA.

References: CBR NO: 11386 Dated: 27/01/2010 15:31:14

Received documents purporting be to an application for a patent, number "2105/UM/09/10" dated 27/01/2010 15:31:14 by "PATIL SATISH BALIRAM" of "4, Yogakshema, Shreekiya, Yasvanta, WB Road, Deoghar, Dhule 424 002, Maharashtra, INDIA" relating to "Natural Ventilation for Enclosed Buildings in Rural and Gaonhun Areas" together with the "Complete Specification" and its copies, ten (10) thousand only.

Note: Time to file a request for examination is 41 months from the date of Priority or date of filing of Application whichever is earlier.

[Signature]

Note: A complete specification should be filed within 12 months of filing your provisional application if a provisional is filed first.

A request for examination has to be filed within the prescribed period.

The Term of the Patent has been increased to 20 Years from the Date of Filing the Application. You are therefore requested to pay the renewal fees as per fee schedule.
C.B.R. NO.: 1524

To

PATL. SATHI. BALIRAN
R. YOGAKHEM. SHAHRIYA VASHAT. JVE ROAD. DEVIK. DHULE. 424 022. M.S. INDIA.

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For Control of Finance & Designs.
C.B.R. NO : 1936

To

PATIL SATISH BALRAM
4 YOGJAKSHEM SHASKIYA VASAHAT WB ROAD, DEOPUR DHULE 424402 MAH.

Date/Time : 27/01/2013 16:34:14

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For Controller of Patents & Designs
APPENDIX-B

PUBLICATIONS


Ventilation of Enclosed Buildings in Rural Areas: An Unsolved Problem

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

Abstract—The buildings in rural areas are constructed traditionally without paying much attention towards 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 of 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 is proven to be insufficient. The inhabitants 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 unresolved even today. Social awareness and competitiveness among practicing engineers and architects to work out some viable, feasible and maintenance free solutions to this problem is the need of TIME.

Keywords: 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 nature’s gift i.e. sunnys, breeze, daylight etc.

II. PROBLEM

Majority of the buildings constructed in rural areas about each other i.e. enclosed from all the sides except front and back which either about 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.

![ROAD or BACK LANES Diagram]

![SITE 1 SITE 2 SITE 3 SITE 4 SITE 5]

![ROAD FRONTAGE Diagram]
As the land grows or the joint family gets divided into two/three/four separated families and in such the corresponding site also get divided accordingly as shown in Figure 2.

**Figure 1. Site layout plan for a joint family**

Above two figures clearly shows that for such enclosed site no marginal spaces from plot boundaries are left since rural areas do not follow any building bylaws and regulations. Thus there is no alternative left for the people in rural areas to construct abated 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 abated enclosed buildings in rural areas starts. The habitats living in such buildings are little aware about the ventilation issue. build, hygiene, and comfort conditions inside the buildings. Plate 1 and Plate 2 show these problems in existence in two such houses.

**Figure 2. Site layout plan for divided family**

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.  

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Plate 1: Vahasdi village Tal. Dist. Dhule  
Plate 2: Vahasdi village Tal. Dist. Dhule  
Plate 3: Vahasdi village Tal. Dist. Dhule  
Plate 4: Vahasdi village Tal. Dist. Dhule
Natural Ventilation of Enclosed Buildings in Rural Areas........ need of the TIME!!

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

Abstract: The buildings in rural areas are constructed traditionally without paying much attention towards the ventilation. Lighting and the indoor hygiene. Hence all are the important principles of planning. People live in such poorly ventilated houses since ages without much bothering about their hygiene and the indoor comfort conditions. Traditionally the small opening at a door or window is open to the sky often called as gharokh is provided in the roof of the building for ventilation purpose, but it proves to be insufficient. The practicing Engineers and Architects in urban areas are least interested to work in rural areas. The problem can be solved by adopting the construction technique of natural ventilation of enclosed buildings in rural areas by providing a continuous narrow strip of opening 0.3 m wide open to the sky in the roof along the periphery of the building. This strip of opening is covered by using FRP sheet to allow daylight to enter inside the building and simultaneously prevent the entry of rainwater during monsoons. assures daylight and continuous fresh air circulation for 24 hrs. 365 days saving electricity.

Index Terms: natural ventilation, enclosed buildings in rural areas, principles of planning, strip of opening open to sky, FRP sheet, assured daylight, air circulation, rainwater harvesting, ‘Electricity saved is Electricity generated’.

I. INTRODUCTION

The layout of houses in rural areas is the typical row housing pattern with common walls either on both sides or on one side 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 finds 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 have 100% trust in these artisans and also they 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 space, 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 nature's gift i.e. sunshine, breeze, daylight etc.

II. PROBLEM

Majority of the buildings constructed in rural areas abut each other i.e. enclosed from all 4 sides except front and back which either open the road or back lane since rural areas do not follow building byelaws and regulations if any. Considering individual joint family, the building site of a single joint family is shown in Figure 1.

![Site layout plan for a joint family](image)

Figure 1: Site layout plan for a joint family
As the years pass 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

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### ROAD FRONTAGE FOR PLOTS A

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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 follow any Building Bylaws or Regulations. Thus there is no alternative left for the people in rural areas to construct sheltered 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 sheltered 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 no.1 and Plate no.2 show these problems in existence in two such houses.

It can be seen further from these two 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 shedding 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.

![Plate no.1. Traditional Zarokha](image1)

![Plate no.2 Insufficient light entering through Zarokha](image2)
III. SOLUTION

To overcome this age old problem faced by common people living in rural areas the following technique is used. A continuous narrow strip of opening 0.3m wide is provided all along the periphery of the building i.e. along the common wall in the roof as shown in Plate no.3 and Appendix A.

The double panopt walls are constructed along the periphery of building, one on the external common wall boundary & the other above inner beam provided at roof level as shown in Appendix A.

The level difference of about 0.3m between the external panopt wall and internal panopt wall is maintained so that transparent FRP sheets are fitted with the inward slope thus draining off rain water on the terrace. The terrace is treated with china mosaic water proofing treatment maintaining proper slope as seen in the plates no 4 to 7. Thus Belt water harvesting is achieved by default as to before, which Cost has made it mandatory almost everywhere. The rain water thus harvested is collected in the storage tank kept in the kitchen.

The F.E.P sheets play major role in this technique, permitting uniformly distributed daylight in the building from 6 a.m to 6 p.m throughout the year. Thus maintaining indoor freshness and hygienic comfortable conditions.

Another important component of this technique is the lowered glazed ventilators fixed in the inner panopt wall at the spacing of about 1.2m to 1.5m as seen in Plate no.4 to 7 and Appendix A. Depending on the length of the common wall the number of ventilators may increase. The ventilators play important role in air circulation. During summer season the hot air inside the building moves up towards the roof. The rate of air circulation is accelerated and the number of air changes inside the building is increased.

The combined effect of FRP sheet covered opening and glazed lowered ventilator is that electricity consumption in such buildings is drastically reduced since there is no need for illumination during the day time i.e from 6 a.m to 6 p.m. Thus saving the electricity to a large extent, which itself is a great achievement. Because it is always said "Electricity saved is Electricity generated". Similarly, the building remains cool in summer and warm in winter season since the entire terrace is protected from direct exposure to sunrays by providing china mosaic treatment. The roof of the building remains cool thus maintaining inside and outside temperature difference of about 4° to 5° in summer season.
Plate no. 5: Fixed Glass Louvered Ventilator.

Plate no. 6: Fixed Glass Louvered Ventilator.

Plate no. 7: Top view from terrace.

Plate no. 8: Natural daylight entering in bedroom through transparent FRP sheets.

Plate no. 9: Natural daylight entering in kitchen through transparent FRP sheets.
Plate no. 11: Natural daylight entering in Laboratory through transparent FRP sheets.

Plate no. 12: Natural daylight entering in bathroom through transparent FRP sheets.

Plate no. 14: Natural daylight entering in bedroom through transparent FRP sheets.
IV. CONCLUSION

From the above discussion the following conclusions can be drawn,

i. The overall problem of ventilation of enclosed buildings in rural areas is solved permanently by providing a maintenance free, durable, lifelong and affordable solution.

ii. The electricity consumption for such buildings is reduced to the great extent since no lights and fans i.e mechanical means of ventilation are required to be operated during the hours.

iii. Rainwater harvesting is achieved by default in such buildings, which Govt. has made mandatory everywhere.

iv. The transport F.R.P sheet fixed to cover the opening need to be cleaned frequently by spraying water on it since dust particles accumulate on it.

v. Though the cost of construction initially increases by about 1.2% to 5%, considering the life of building and corresponding electricity consumption, it proves very wise to invest this amount initially than to pay increasing heavy electricity bills in the future lifecycle of building.

vi. The only disadvantage of using this technology is that the floor area on first floor is reduced by about 10% to 15% depending upon the dimension of the site.

V. REFERENCE

[References provided, including details about authors, institutions, and publications, with contact information for further queries.]
CROSS SECTION OF A BUILDING SHOWING DOUBLE PARAPET WALLS COVERED WITH FRP SHEET

APPENDIX A
APPENDIX–C

CONFERENCES AND TRAINING PROGRAMMES ATTENDED


3) National Conference on “Environmental Surveillance for Natural Resource Management” organized by North Maharashtra University Jalgaon Maharashtra. 9/01/2012 to 10/01/2012.

4) International Conference on “Recent Trends in Engineering and Technique” organized by S.N.J.B’s L.S.K.B.Jain College of Engineering Chandwad Dist Nashik Maharashtra. 24/03/2012 to 25/03/2012.

5) National Conference on “Advances in Communication and Computing” organized by R.C.Patel Institute of Technique Shirpur Dist Dhule Maharashtra. 21/04/2012.

6) Training on “Green Buildings” organized by MSBTE Mumbai conducted at Govt. Polytechnic Aurangabad Maharashtra. 15/01/2013 to 19/01/2013.
Certificate

This is to certify that ___________________________

of ___________________________

has participated in the presented a Research paper entitled ___________________________

in the "RECENT TRENDS IN ENGINEERING SCIENCES" held during 4th & 5th Jan. 2012

Prof. Y. R. Bhole
Chairman NCRTES 2012

Prof. N. D. Narkhede
Convener NCRTES 2012

Dr. Bimlesh Kumar
Principal, J. T. Mahajan College of Engineering, Faizpur
National Conference on
ENVIRONMENTAL SURVEILLANCE FOR
NATURAL RESOURCE MANAGEMENT
(ESNRM 2012) JANUARY 9-10, 2012

Certificate

This is to certify that, Prof./Dr./Mr./Mra./Ms. Patil S. B.
of S.S.V.P.'s BSD Poly, Dhule
Presented Paper / Poster entitled

at two days National Conference on 'Environmental Surveillance For Natural Resource Management' held on 9th and 10th January, 2012 organized by School of Environmental and Earth Sciences, North Maharashtra University, Jalgaon.

Dr. S. N. Patil
Organizing Secretary

Prof. S. K. Ingle
Convener
SNJB's
Late Sau. Kantabai Bhavarlalji Jain College of Engineering
(Jain Gurukul) Neminagar, Chandwad - 423101, Dist - Nashik, M. S., India

1st International Conference on
"Recent Trends in Engineering and Technology"

Certificate of Participation

This is to certify that Dr/Mr/Ms/Mrs Patil Satish B.
of S.S.V.P.S's B.G.D Polytechnic College, Dhule presented/participated
a paper

in the International Conference held during 24th & 25th March 2012.

Prof. P. R. Bhaladhare
Program Director

Dr. V. J. Gond
Principal
Certificate

This is to certify that,

Mr./Mrs. Satish B. Patil

from SSNPS B&D Polytechnic, Dhule has attended and presented paper/Paper accepted.


Prof. Dr. A. B. Patil
Principal

Prof. Dr. A. More
Convenor

In Association with: WJST World Journal of Science and Technology
CERTIFICATE

This is to certify that Shri/Smt. [Name] has successfully completed the training in [Course/Program] conducted by [Institute/College] from [Start Date] to [End Date].

Designation: [Designation]

Institute: [Institute Name]

Building: [Building Name]

Date: [Date]

Director

Deputy Secretary

Program Coordinator

[Signature]

[Stamp]