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Vaastu principles and natural ventilation: A symbiotic relationship

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Abstract

Vaastu Shastra is an ancient Indian system based on building principles. It is thought that natural ventilation utilizes the natural forces of wind and buoyancy to bring air in and out of the building to maintain interior temperatures at comfortable levels. Despite being perceived traditionally, Vaastu Shastra helps in the creation of a healthy and comfortable living condition and may also carry some scientific validity. The article discusses the basic elements of Vaastu Shastra and natural ventilation, emphasizing the possible alignment between them. The study will clarify how natural strategies in Vaastu objectives for window location, space placement, and courtyard design can help improve natural ventilation or sustainable ventilation strategies that improve the quality of indoor air and airflow in a building. The paper highlights the limitations of the existing research conducted in terms of scientific certification of Vaastu Siddhi Principles. However, it recommends further analysis to recognize the link between traditional knowledge and new configurations in science.

Keywords: Vaastu Shastra, natural ventilation, courtyards, indoor air quality, vernacular architecture

Introduction

Vaastu Humanity has lengthy strived to create comfortable and healthy living areas. Traditional architectural practices around the world regularly integrated elements that addressed nearby climates and environmental situations. Out of which Vaastu shastra being an age-old element that is being running in our societies for the long past years, Vaastu in literal sense means, "Science of dwellings". When we talk about the concise history of Vaastu it dates back to the Era of Vedas – which was seen between 4000 and 2000 B.C. A section of Yajur Veda called 'Sthapatha Vidya' which means the art of building, mainly deals with the principles of architecture and housing. In fact, there are nearly 32 books written on the subject of Vaastu from 3000 B.C. to 600 A.D. by various authors in Sanskrit language dealing with the construction methods, special placements of the house features and the rituals to be done in each stage. When we speak of the concept of Vaastu Shastra is it ideally deals with or guides people to create dwellings that harmonise with nature and various other unknown forces.

When dealing with Vaastu Science, one must know that Vaastu is not just applied generally, but the various components are taken into consideration, "Vaastu is applied to both the site of the building, and the building itself. Hence selection of the site, architecture, landscape and the science of the structures as well as astrology are all part of Vaastu Science." Earlier Vaastu according to Vedas was construction of religious buildings and not actual dwellings. A misconception that is beholden against Vaastu is that, these principles are just mythic superstitions but in reality Vaastu is based on laws of nature and surrounding environment, hence we can say that Vaastu is similar to Yoga and Ayurveda as it denotes laws of nature that governs the body and processes that governs the nature.

Natural Ventilation

Natural ventilation is a method that makes use of herbal air movement to chill and ventilate buildings, decreasing reliance on mechanical systems and growing a healthier indoor environment. Natural ventilation uses natural forces like wind and buoyancy systems to introduce fresh air within a structure for the enhancement of thermal comfort within the structure. Air movement is caused by different power resources, including wind (as a momentum-induced airflow), buoyancy effect (produced by internal and external air density differences), or both of them, humidity

difference, and mechanical power, which exchange stale indoor air and ventilates the interior spaces.
Natural ventilation also known as passive ventilation is becoming an attractive alternative for mechanical air conditioning, due to it being energy and cost saving process. Natural Ventilation works best when the openings within the building is done in a right way, openings produced at pressure side of the building according to research shows that the building gets greater air flow within the building. Overall natural ventilation provides for good indoor air quality, which reduces the chances of having sick building syndrome.

Symbiotic Relationship
Symbiotic relationships are of various types but the one that we are talking about is mutualism, now mutualism is a term which refers to having the same interests and extracting the same benefits. For an example, Clownfish stay a few of the stinging tentacles of anemones, which shield them from predators, even as the clownfish assist scare away the anemone's predators and occasionally provide nutrients through their waste. If we try drawing an analogy, we could presume that clownfish is natural ventilation and tentacles of anemones is Vaastu Shastra where these two elements work together and mutually extract benefits. Speaking of the potentiality of this Analogy is the part of research that will be further done in this paper. When we talk about this relationship there is not much scientific research or evidences that comes into light, hence more established research on this subject has to be done keeping in mind the careful considerations of the site, the principles of Vaastu Shastra and the openings.
Major focuses on the limitations and challenges on the working of this mutualism. Speaking of Limitations, those are limited scientific data - there is no evaluated data on the effectiveness of Vaastu principles in terms of natural ventilation. Secondly, Site-specifications – natural ventilation depends on factors like wind directions and topography and Vaastu being very rigid in nature might cause hindrance while providing for openings. Thirdly, complexity of building structures or layouts can create a problem while designing according to Vaastu and keeping in mind the wind flow would cause another sort of a problem. From the above stated paragraphs only a question arises, “Is Vaastu shastra and natural Ventilation Related?”.

Vaastu Shastra And Natural Ventilation
Vaastu Foundations
Environment has been the first rule of Vaastu Principles as everything is placed in accordance with the environment so that one could create the required environment within the building. When we speak of Vaastu and its principles they are the values or beliefs that can influence the built-in environment and well-being of the occupants. Practitioners believe that Vaastu regulates the prosperity, health and various other things that takes place within the structure hence placing elements according to the Vaastu pursha mandala can create more effectiveness or it may cause destruction. Super imposition of the mandala takes place on the layout and based on the cardinal directions arrangement of spaces are done, hence alignment of the building to the mandala is a must.

When we speak of the universal features those are the sun, stars, moon, and the earth itself, these universal features are the considerations of environmental features of principles in Vaastu, in simple words universal features are the elements of Vaastu and the way these elements are used and played in the structure are nothing but it’s principles or rules. These principles are majorly focused on the Movement of sun and study of sunrays, geopathic zones, concentric zones and magnetic poles are the important considerations as principles.

A brief on each of these principles
- **Study of sun-rays:** The inclination of the earth’s axis is at 23.5 degrees hence the sun rises from the north east and ends at south west, hence the north east corner is the first to receive the sun rays and morning sun rays are ideally good for the human body as it contains the effect of infrared rays which has purifying effects; hence water elements are present in the NE, north and east regions.
- **Orientation of the structure:** The orientation of the building should be done in such a way that it can maximise the benefits of the solar radiations and air inflow withing the building hence fixing of cardinal points in the mandala is very important.
- **Site planning:** Site planning takes into consideration the soil, size, shape, taste, colour of the site and if it matches the criteria the site is selected. Post the selection of site the blueprint of Vaastu purusha mandala is imposed on the site, now this is like a metaphorical expression it’s a plan of the universe and depicts the connection between human, buildings and nature.
- **Five elements:** According to Vaastu there are five elements each element is indirectly applied synced within the space the elements are: Vayu (air), Agni (fire), Jal (water), Bhoomi (earth), Brahma (space).

Alignment of Vaastu and natural ventilation
There is mutual dependency of both the topics on each other, when we speak of how Vaastu Shastra supports natural ventilation the directional placement of windows which are most commonly seen in the North sides and east side of the structure as major of the sites have the prevailing winds coming from those directions and according to natural ventilation windows on high pressure side which is the windward side has greater inflow hence orientation of window is a must, secondly positioning of spaces within the structure also supports as space which generates plenty heat for example- kitchen are often found to placed within the zone south and cooler areas which is the north, NE, and east often has spaces like bedrooms, pooja rooms, and meditational spaces. The entrance hall is preferred in the east as it is the space where the occupants spend more time hence good natural ventilation is required. The table provides for the arrangement of components in the direction according to the usage of time.
The Area which you spend the most time during the morning hours is the pooja room and the drawing room hence the placement of it is in the north east or east direction, when we speak of the rationale for the above as these rooms are more active in terms of occupants and require more energy and radiations and good air breeze.

Table 1: Arrangement of components

Activities/ Rooms/comp-onents	Time of use	Location of sun	Deity at that locati-on	Location of room/ component
Pooja/Exercise	3:00-6:00	North - East	Isa	North – East/East
Bath room /Main door/Drawing room	6:00-9:00	East	Sun	East
Kitchen	9:00-12:00	South-East	Agni	South-East/South
Work Place/office	12:00-15:00	South	Yama	South
Study of children/back-yard	15:00-18:00	South-west	Pitru	South-west/north
Relaxation and dining	18:00-21:00	west	Varuna	West
Sleep	21:00-00:00	No sun hour	Naga	North-west/South -west
Cash room or strong room	00:00-3:00 (time of complete darkness)	No sun hour but sun is consider in north	Soma (moon)	North/ north west

Courtyard History

When we speak of the alignment we date back to a few years back in India, where the design of courtyards was prominently seen in the dwellings, courtyard designs were famous both in the north and south zones of India, each of these zones had its own significance of having a courtyard. Courtyards have defined the Indian Architecture and it plays a very crucial role in terms of both symbolic and practical significance. Courtyards were used just not for climate control with a dwelling, but was also used in terms of having water elements or water storage like pools, ponds etc. Was also used for religious purposes and provided for a sense of openness and privacy.

Courtyard designs were often of different types in different zones or it had different architectural styles in different zones,

- Haveli – Rajasthan.
- Wada – multi-stored houses in Gujarat.
- Nalukettu- houses in Kerala.

Vaastu and natural ventilation in courtyard

Vaastu and natural ventilation are seen in the courtyard design and both have combined benefits to create a healthy and comfortable living environment for the occupants. According to Vaastu the centre of the space is called as the Brahma stan or the space, and it is said that the centre should always be free and clean, the logical rationale behind it is for the purpose of entry of good daylight and natural air flow within the building. Rooms surrounding the courtyards often have large window openings facing the courtyard so that the air could circulate more freely within the rooms.

In terms of natural ventilation Vaastu principles align as it provides for airflow within the structure in natural ventilation wind direction plays a key role, courtyard designs can be fully effective if they are placed on the windward side of the building. Another alternative to this is to provide for maximum openings on the windward side to allow the air within the space to circulate and then leave through the courtyard. Natural ventilation is of two types which is the air-driven ventilation and buoyancy-driven stack ventilation, the latter is the effect that is been used in the design of the courtyard.

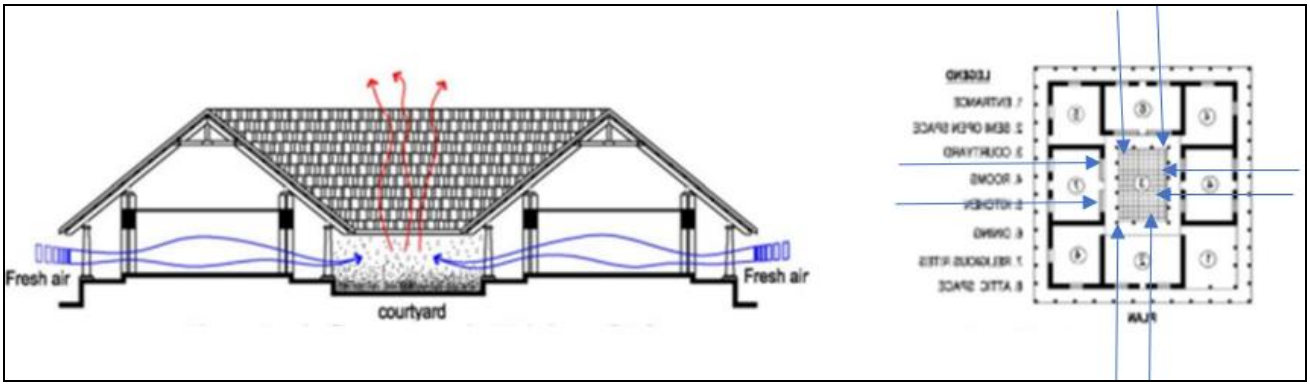

Fig 1: Airflow in a courtyard

Buoyancy driven stack ventilation is a natural ventilation which uses the buoyancy of the air where the cool breeze being heavy settles down in the space and the hot breeze within the space rises up in the courtyard and leaves through the courtyard. The stack effect is nothing but this hence windows for air inlet are always kept down for the air to enter and vents are placed high above for the removal of air.

Exploring Symbiosis

The combined benefits of natural ventilation and Vaastu provide for good indoor air quality, as the air circulates around the house it removes the pollutants and stale air from the house. Secondly, it enhances comfort as Vaastu's focus in on the well-being providing for natural air breeze to keep the building cool which aligns with the principles of natural ventilation. Thirdly, Aesthetics which is an important part of modern days interiors as it achieves a sense of openness and creates a space which feels lighter and brighter, the lightness and brightness of this space directly aligns with the pursha mandala of Vaastu which suggests that this space should be kept light and weight free.

From the above stated pages, Natural ventilation and Vaastu Shastra align together or create a symbiotic relationship because both the Vaastu Principles and natural ventilation functions are quite similar in nature. Both use the wind directions and cardinal directions while placement of the

site. One can even say that natural ventilation is a small part within the Vaastu dynamics where natural ventilation plays a important part in the well-being of the occupants. Natural ventilation is more of an advanced scientific approach where as Vaastu is more of a old historical scientific approach, it is just so that the audience still does not know the real history and research behind Vaastu Shastra.

Case Study

The above provided example of a courtyard design is a reference from the case study that was done on a nalukettu house of Kerela. The house is almost around 5000 sqft and is designed around the concept of vernacular architecture and interiors where the materials and design concept were purely based on traditional practises of architecture and design. The traditional practises of architecture seen in the house was a courtyard, surrounded by a corridor to prevent excess water from coming into the actual space and surrounded by the courtyard were the spaces or zones. A depth creation provided within the courtyard is for the cool air to settle within the space. Spaces like the dining room, drawing room, meditation room are all kept open and visibly connected to each other, which creates a visual connection.

Is it a symbiotic relationship

The analysis of this nascent conjecture linking Vaastu Shastra and natural ventilation offers potential new avenues for an enduring habitat in unison with the environment and a deep morphology. Vaastu schemes invoke the cardinal directions for placement, courtyards and more for light, which seems like a worthwhile endeavour that also may result in refining natural ventilation scenarios through Courtin lets and courtyard shutters. Courtyards, if tactically laden on the direction of the wind, can serve as air flumes and work as a stack cold draught. Equivalently, there are also Vaastu-compatible window placement proposals, which can effectively boost cross-ventilation on windward elevations. This collaborative research seeks to realise a number of advantages. There is a positive correlation between better airflow and promoting respiratory health, and overall, the well-being of occupants. Furthermore, natural ventilation can marginally increase thermal comfort, lowering the need for mechanical air conditioning and energy expenditure. Nevertheless, more work must be done to verify the efficacy of Vaastu principles to positively impact natural ventilation by experiment. Researchers have a wealth of data about the climate around a building, its orientation and its construction, for example, and combined with knowledge of Vaastu religious practices, they might be able to identify precisely how to create the perfect laboratory for airflow in the wind of a Vaastu Partner Retreat (Experimental Home). Merging insights from ancient knowledge into today's modern designs will create sustainable building, due to a number of factors supporting satisfaction due to the climatic appropriateness and cultural affinity. By fostering a new harmony between Vaastu Shastra and natural ventilation, we can design residences that are not only aesthetically pleasing but also support health and contribute to a sustainable human ecology.

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