Musical pillars in south Indian temples: A review

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Abstract

The paper discusses various studies on musical pillars that have been conducted till now. A review work on various studies is done which discusses about Spectrographic analysis of musical notes and the genesis of sound generation from musical pillars, as well as material composition studies conducted through non-destructive tests which have been carried out in Hampi, Madurai and many other historical places in South Indian Temples. Struck with hand or other materials, the pillars are found to generate actual bell-like sounds and even the saptaswaras of music.

Keywords: Musical pillars, spectrographic analysis, sound generation

Introduction

Bharatha, a country known for its ethnicity, morals and rituals, has had countless emperors interested and well versed in art and architecture. Their patronage has, over the centuries, left for us many outstanding structures, wonderful forts, temples and places that overawe us at the very first sight.

Though devotion and science are dissimilar, they do occasionally morph into a union that is difficult to make sense of or justify. The former presupposes a convenient but very often irrational conclusion whereas the latter always demands reason and irrefutable proof. Still, history has bestowed at us with sculptures and structures that defy methodical explanations. When trying to delineate them, scientific principles and technical rules take a backseat, leaving the field wide open for mythical beliefs and tantalising tales. Musical or melody pillars that are found in different parts of India are prime examples of this phenomenon. A structured and scientific study is a sine qua non for revealing the actual secrets of the mellifluous notes emanating from such pillars.

Divinity of temples with musical pillars in South India

Madurai: It is fascinating that the prehistoric city of Madurai was designed with the Meenakshi temple as its religious epicentre. Streets start radiating from the temple like the petals of a lotus, linking concentric squares of the city. Centuries have passed by, and Madurai has boomed as a smart city. Many flyovers, malls and modern structures have changed the city space; yet, its spiritual heart with the heavenly domicile of goddess Meenakshi remains the same.

A closer look will reveal that the beautiful Meenakshi temple has been designed as per the ancient Indian building ideas and principles. The shilpasasstra which was typical of Dravidian architecture is clear to the shrewd eye. The covered porches, pillared halls and water tank for ritual bathing are proof of this. The gathering of twelve multi-storied towers or Gopuras in the fourteen-acre compound is a tribute to the taste of the builders.

Masterpiece in stone: The detailed sculpture-loaded pillars, including the reflection of Rati Devi, Lord Karthikeya, Lord Ganesha, and Lord Shiva in the Thousand Pillared Hall are a sight to be seen. Each sculpture tells a special story with matchless expressions and poses. But the most impressive aspect of the Thousand Pillared hall is the cluster of musical pillars. Each of the thousand pillars have slimmer pillars that produce musical notes when tapped with stones. Once upon a time this place was a space to perform sacred dance and musical performances to praise the lord. The entire hall used to be lit with thousands of oil lamps and filled with dedicated devotees. Today, the Thousand Pillared Hall is a museum displaying bronze sculptures, paintings and other memorabilia attesting to the great vision of King Thirumalai Nayak.
Vijaya Vittal temple in Hampi

South India is a place full of temples containing unanswered secrets and events that challenge the scientific world. Hampi’s Vijaya Vittal temple is one such. Located on the banks of river Tungabhadra and in the 15th century, it is dedicated to Lord Vishnu. Scriptures identify ‘Vital’ as the living form of Lord Vishnu. The main attraction of this temple is the 56 mysterious musical pillars. When tapped in tandem, they produce musical notes resembling SaReGaMa. The sounds are similar to the melody of the string, drum and wind instrument being played. What’s thrilling is that the rationale behind this sound generation is yet an enigma. The architecture and the science of this temple speaks a lot about the incomparable craftsmanship of that era.

Vijaya Vitala Temple in Hampi

With due curtsey - Photo by Shivajidesai29, Creative Commons Attribution Licence

Nellaiappar Temple

Dedicated to Lord Shiva and Lord Vishnu, this temple is located in the northern banks of Thamirabarani river, in a place called Tirunelveli in Tamilnadu. The main attraction of this place is the main mandapam consisting of musical pillars and stone inscriptions.

Study and Survey of Musical pillars in India

Nondestructive characterization of Musical Pillars of Mahamandapam of Vittal temple in Hampi, India


The authors have taken primary steps to distinguish the pillars. They have emphasized many methods to learn about the composition of the pillars, to evaluate the proof of the sound generated. In-situ metallographic study indicated that granite has characteristic microstructures. The low-frequency ultrasound and impact-echo testing gave them the idea that all the columns are solid shafts. The researchers ultimately concluded that the sound generated in musical pillars could be the result of flexural mode of vibrations.

Study on how the columns can be excited by just a tap.


Amer. 2008. - Stephen G. Benka

“In this paper the methodical investigation was carried out regarding the sound generated from the musical pillars in Vital temple. 11 pillars were considered for the investigation and the sound generated was recorded thoroughly. Various non-destructive testing techniques were carried out. Among the test carried out, few were related to low frequency ultrasonic test, Impact echo test and in-situ metallography test.

Low frequency ultrasonic testing: In this test, DPC transducers were used to test the concrete and other solid materials. The tests were conducted in both longitudinal and shear wave’s direction.

Impact echo testing: In early days, this method was taken up by a slow, manual working process. The impact echo detection is a non-destructive technique for subsurface cracking process on the concrete surfaces and measurement of slab thickness.

In-situ metallography: One of the advantages of in-situ metallography is that there is no need to destroy the metallic component. In order to get metallurgical information, the application of this technique can be considered as non-destructive”.

Study on Musical pillars and singing rocks M.G. Prasad and B. Rajavel

“This paper explains about the ancient temples famous for their architecture. The paper gives details about how the pillars with carvings and without carvings produce pleasing tones when struck. The paper also describes about the rich heritage of south India which has many number of musical pillars. The pillars are not hollow and thus these musical pillars point toward the sound knowledge of the architects. Moreover, the art of music and dance is regarded as a tribute to god in Hinduism”.

Singing rocks and Lithophones: “In nature, rocks have the property of sounding like a bell when struck or rubbing them and they are called as singing or ringing rocks. Some of the places where we come across such ringing rocks are found at Upper Black Eddy and Lower Pottsgrove Township (Pennsylvania, United States), Western Australia, Cambria (England), Montana (United States), Querétaro (Mexico) and Tire(Scotland). The musical instruments which are made with rock or pieces of rock when struck produce musical notes called Litho phone. Natural rocks not only sing but they can generate notes with particular frequencies. The singing rocks are found in many places throughout the world”.

“Acoustical analysis of musical pillar of great stage of Vital temple in Hampi, India”.

Hemant A. Patil and Shrishail S. Gajbhar
The paper discusses about the world heritage temple located in Hampi. Analysis was performed to model the dynamics of columns. The analysis gives the result of flexural frequencies along with its Eigen modes. It was noted that there is a close relation of the bell sound generated from pillar and an actual bell sound. The model taken for the analysis shows the effect of resonant frequency of the bell sound produced in the musical pillars.

**Study on Musical pillars in Hindu Temples in India** M. G. Prasad, B. Rajavel
The study showed that the Musical pillars were of solid granite stone. When these pillars were tapped with fingers, they produced musical sounds of various types. Two of the pillars were chosen for analysis and the sound generated was recorded with audio player. By tapping one after another pillar, doorbell like ‘ding dong’ sound was produced. The recorded audio file was changed to wave format and was used as input for frequency analysis.

**Vijay Vital Temple, an Architectural Masterpiece with Mysterious Musical Pillars** Ranjana Gour, Dr. Ankita Shrivastava, Dr. Shashi Saxena
The paper elaborates about the architectural style of the temple having beautiful stone chariot and musical pillars. It speaks about the architects and artisans who contributed giving the Vijay Vital temples the charming look. Musical pillars are made of stone which has been conserved with large information about ancient music and art. Another attraction of the temple is the stone chariot dedicated to Lord Garuda having carvings depicting legendary battle scenes. UNESCO has named the temple as a World Heritage Site.

**Acoustical analysis of Musical Pillar at Elephant Temple, Chennai**
The paper talks about the “Sound spectral analysis” of the musical pillar at elephant temple, located in Chennai, Tamil Nadu. The musical pillars were taken as model for this study. The sound extracted from this musical pillar is used for the FFT analysis. A plot of time and frequency of this pillar was taken. It was observed that similar to the Vital temple, these pillars also produced two different sounds by striking at two different places. It was seen that the frequency from the measured sound spectrum agrees well with the earlier reported literature data. It is also seen that even though musical pillars are available in many temples in south India, only limited studies are carried out till date to understand the acoustical and design aspects of these charismatic musical pillars.

**Musical pillars made of Solid granite** Stephen G Benaka
A technical study on musical pillars has led to the researchers classifying the columns. Physicists have applied three techniques to study about the structure of the columns and also analysed the recordings of the sound generated. In-situ metallography test showed that granite has typical microstructure of low-frequency ultrasound. The impact-echo testing revealed all the columns to be solid shafts. From these studies, the researchers came to conclusion that the pillar’s sound comes from the flexural mode of vibration.

**The Musical Pillar effect**
A. Kumar J. Acoust *et al*, This paper discusses how all of us are living in an energy-field. It briefs about how our body and brain are composed of millions of cells, which are energy-producing devices. These cells are in constant vibratory motion and transactions are taking place effectively. As to how hundreds of years ago from today, the ancient town planners, architects and builders were aware of this (bio-energetic) phenomenon and had tried their best to design and build places of worship and other facilities used for social worships, cemeteries, burial grounds, conference halls etc, there are very few answers. The structures were planned in such a way that people who went there would experience their negative vibrations getting converted into positive rhythms.

The Vital temple of Hampi was built for the worship of Lord Vishnu. Like the Konarak Sun Temple in Odisha, this temple also had a special feature of a stone chariot dedicated to Lord Vishnu’s “vahana” - the Eagle God Garuda. Art, music, and dance were celebrated in the Vijaya nagara kingdom as it was considered as a way to worship god. In the due course of time many of the Mughal invaders burnt the stone pillars with fire for months, they could only reduce the decibel levels of the musical sounds but could not eliminate the melody altogether. During the later British rule, two of the pillars were cut to check if there was something else inside the pillars which produced the musical sound. But they were utterly disappointed to discover nothing inside. The pillars were found to be made of solid rock. In 2006-07, scientists conducted initial technical study on the sound properties of the musical pillars. They found that the low frequency ultrasonic testing and in-situ metallography test gave them the indication that the microstructures of the pillars were same as a typical granite microstructure. Impact echo testing revealed that all the musical pillars were solid shafts. Later it was said that different pillars generated sounds in various frequencies and the sound arose from the “flexural mode of vibrations”. The geological analysis of these pillars exposed that the rocks were resonant not only because of the existence of the metallic ore but also because of huge amounts of silica.

**Note of caution - Heritage activists strike a caution on Hampi Musical Pillars**
It’s a well-known fact that Hampi is famous for stone chariot and musical pillars. Heritage activists are concerned about the reality that if in upcoming days these pillars are not preserved, then they will soon disappear. They are insisting to not allow visitors to touch the musical pillars. People’s curiosity has already disfigured and damaged a few pillars and the remaining beautifully carved pillars are in a state of losing their shine. Thus, serious measures have to be taken to preserve this beautiful jewel of our country.

Subsequent to MUSICAL PILLARS, MUSICAL PLATES of Hampi leave netizens enthralled. The MUSICAL PLATES were built near the octagonal pavilion in the royal area in the 15thcentury.

**Conclusion**
Students of Civil engineering can concentrate on aspects of study related to Stone properties, Composite material, Vibration analysis, Acoustic analysis, Spectrum analysis and Frequency analysis of musical pillars. Musical instruments like jalatarang, tabala, gatam veena etc produce melodious sounds to hear. These are made out of materials which are hollow and it is necessary to study...
about the sound generated in materials like wood and ceramics such that the same can be correlated and analyzed for further study.

The musical notes’ coming out from the musical pillars signifies the depth of acoustical knowledge which the artisans of that era had acquired.

Many more researches have to be taken up in this area until the acceptable answer about the sound formed by these musical pillars is known which is still a mystery.

References