

ANALYSIS OF HOLLOW SPACED STUPAS IN MYANMAR

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Abstract

There are many religious buildings in Myanmar such as stupas, temples, monasteries, etc. In Myanmar religious monuments, the stupas and temples are mostly found.⁷ The stupas and temples in Bagan and Mrauk-U are always monumental for the Myanmar people.⁶ The stupa is usually solid structure and the temple is usually hollow structure.¹ The external characters of stupas and temples are very different. But there are many stupas similar to temples in Myanmar. Although the exterior form is a stupa form, it has a hollow space to enter for certain functions as a temple. In this paper, these stupas are called the hollow spaced stupas. The hollow spaced stupas will be analyzed from the origin of them. In Myanmar, it is assumed that the hollow spaced stupas were first constructed in about 11th century according to my research. In this paper, the hollow spaced stupas from the 11th century to the 19th century will be analyzed. First, the hollow spaced stupas in Myanmar will be studied according to spatial composition and form composition. Especially, the evolution of space will be analyzed in two parts – (i) stupas from the 11th to 13th century and (ii) stupas from the 14th to 19th century.

Keywords: Hollow spaced stupa, Spatial and Form composition, Evolution of the space

1. Introduction

Myanmar Buddhists worship and believe the Buddha Image. Later, people constructed the stupas which enshrined the sacred relics of Buddha.¹ Temples are constructed to worship Buddha image and meditate in the interior space.³ And then, the people got the idea for some extensive functions in the stupas and they constructed the hollow spaced stupas. In the early centuries, the hollow spaced stupa intends to meditate.³ So, the hollow space is not very large and gets the dim light only. They developed their space and technology in the stupa. At the present day, the hollow space with the large span can be created because of the high technology. In Myanmar, many hollow spaced stupas with large span are constructed in many places nowadays. In this paper, the hollow spaced stupas between 11th century and 19th century will be analyzed with two parts. It is found that most of people are satisfied because such hollow spaced stupa intends not only to perceive the stupa on the platform but also to pray, meditate and count beads peacefully inside the hollow space of the stupa.

2. Methodology

There are many hollow spaced stupas in Myanmar. In this paper, 20 hollow spaced stupas were selected from the 11th century to the 19th century. In *Table 2.1 and Table 2.2*, they are expressed with their name, stupa number, location, century, size, number of porch, plan and section. The interviews and field measurements have been employed in research data gathering. The historical data have been gathered from relevant archeological records, books and articles. First, they have been studied according to the spatial and form composition. Then, the evolution of space will be analyzed with two parts – (i) from the 11th century to the 13th century and (ii) from the 14th century to the 19th century.

2.1 Quantitative Approach







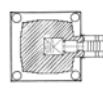

















a. Selected Places for Hollow Spaced Stupas







In Myanmar, there are many places where the hollow spaced stupas are constructed. Among them, Bagan and Mrauk-U are selected for this paper because they are the most famous and ancient cities. And the religious monuments and ancient historical buildings can be mostly found there.⁶

b. Quantity of Hollow Spaced Stupas




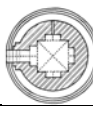








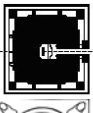



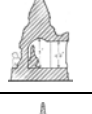

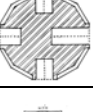
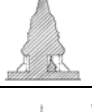

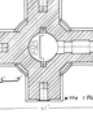


In Myanmar, there are over 80 hollow spaced stupas from 11th century to the 19th century. Among them, 20 hollow spaced stupas (about 25%) are selected here. District and unique stupas are selected and some of the similar stupas according to their space or form are left in the sampling.

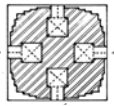


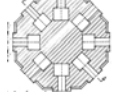


Table 2.1. Inventory of the Selected Hollow Spaced Stupas in Myanmar (11th -13th century)

Part I (11 th -13 th century)								
No.	No. & Name	Location	Century	Size	No. of Porch	Plan	Section	
1	#1653 <i>Pepin</i>	Bagan	11 th	S	1(E)			
2	#296 <i>Thi Ho 1</i>	Bagan	12 th	S	1(W)			
3	#277 <i>Thi Ho 2</i>	Bagan	13 th	S	1(E)			
4	#1573	Bagan	13 th	S	1 (W)			
5	#474	Bagan	13 th	S	1 (W)			
6	#680 <i>Min Wai</i>	Bagan	13 th	M	4			
7	#487 <i>Tu Yin</i>	Bagan	13 th	M	4			
8	#1885 <i>Le Myet Na</i>	Bagan	13 th	S	4			

Part I (Continue)								
No.	No. & Name	Location	Century	Size	No. of Porch	Plan	Section	
9	#1883 Nga Mode	Bagan	13th	M	5 (based on E)			
10	#1853 Nga Myet Na	Bagan	13th	S	5 (based on E)			

*Table 2.2. Inventory of the Selected Hollow Space Stupas in Myanmar
(14th -19th century)*

Part II (14 th -19 th century)								
No.	No. & Name	Location	Century	Size	No. of Porch	Plan	Section	
1	#684	Bagan	14 th	S	1(N)			
2	#466	Bagan	14 th	S	1(W)			
3	Maha Bodi Shwe Gu	Myauk-U	15 th	S	1(S)			
4	Zina Man Aung	Myauk-U	17 th	M	1 (W)			
5	Loka Man Aung	Myauk-U	17 th	M	1 (W)			
6	#1830	Bagan	18 th	S	1(E)			
7	#2078	Bagan	18 th	S	1(E)			
8	#778 Kazun-O-Hla	Bagan	18 th	M	1(E)			

Part II (14 th -19 th century)								
No.	No. & Name	Location	Century	Size	No. of Porch	Plan	Section	
9	# 1083 Thi Ho 3	Bagan	19th	S	4			
10	#1621	Bagan	19th	S	8			

*Classification of the stupa size based on its width⁵

Small size (S)	→	under 40 ft
Medium size (M)	→	between 40 ft and 80 ft
Large size (L)	→	between 80 ft and 160 ft
Very large size (VL)	→	over 160 ft

2.2 Qualitative Approach

In this paper, the spatial composition and form composition of the hollow spaced stupas have been studied and analyzed. And the evolution of space has been analyzed in the hollow spaced stupas.

2.2.1 The Spatial Composition

a. Part I (11th – 13th Century)

In part I, 10 hollow spaced stupas are selected and they are located in Bagan. In the 11th century, only porch, vestibule and shrine can be found in *Pepin* (#1653). It gets the dim light and it is suitable for meditation. Its hollow space utilization is 12.86% of the volume of the whole stupa. In the 12th century, *Thi Ho 1* (#296) consists of porch and shrine only. It gets lighting from the porch. Its hollow space utilization is 28.18% of the volume of the whole stupa. (See *Table 2.1*)

The 13th century stupa, *Thi Ho 2* (#277) is composed of porch, vestibule and shrine. It gets little lighting and its hollow space utilization is 10.77% of the volume of the whole stupa. The stupa number (#1573) consists of two niches on either sides of the shrine as well as the porch, vestibule and shrine. Its hollow space utilization is 39.7% of the volume of the whole stupa. The stupa number (#474) consists of a small aperture at about 4 ft height from the floor level of the shrine as well as porch, vestibule and shrine. And it also contains two niches on both sides of the shrine. Its hollow space utilization is 29.13% of the volume of the whole stupa. In *Minn Wai* (#680), it can be found that the space is subtracted from the plain to create four porches and four shrines. The hollow space utilization is 29.92% of the volume of the whole stupa and it gets lighting moderately because of the large entrance. (See *Table 2.1*)

In *Tu Yin* (#487), the central shrine with four porches and four vestibules can be found. It gets lighting well and good air circulation due to four entrances. Its hollow space utilization is 36.71% of the volume of the

whole stupa. In *Le Myet Na* (#1885), there are four porches, four vestibules and inner corridor with solid core. There are four Buddha images on all sides of solid core. Its hollow space utilization is 40.83% of the volume of the whole stupa. Lighting and ventilation are middle condition. (See *Table 2.1*)

At the late 13th century, it can be found that it became five porches, five vestibules and five shrines. It can be created in *Nga Mode* (#1883) and its hollow space utilization is 29.23% of the volume of the whole stupa. Finally, it became five porches, five vestibules and inner corridor with solid core. It can be found in *Nga Myet Na* (#1853). Five Buddha images, in each niche on the five sides of solid core, can be found. It gets lighting well from five porches and its hollow space utilization is 32.77% of the volume of the whole stupa. The hollow spaced stupas in Part I are the small stupas except *Minn Wai* (#680), *Tu Yin* (#487) and *Nga Mode* (#1883). They are the medium stupas. In Part I, the large and very large hollow spaced stupas cannot be found. (See *Table 2.1*)

At the ancient year, there are only central shrine, vestibule and porch in the hollowed spaced stupas. The development of niche and aperture can be found in the late period. And then, it can be found that the space is subtracted from the plain to create four shrines and five shrines. In the late 13th century, they became four or five porches with solid core and internal passage. It can be found that the maximum hollow space utilization of the hollow spaced stupas in Part I is 40.83% of the volume of the whole stupa.

b. Part II (14th – 19th Century)

In part II, there are 10 hollow spaced stupas. There are seven stupas in Bagan and three stupas in Mrauk-U. In the 14th century, the stupa number (#684) consists of the porch, vestibule and circular shrine. It gets the dim light and the hollow space utilization is 27.81% of the volume of the whole stupa. Three niches and one aperture as well as the porch, vestibule and shrine can be found in the stupa number (#466). Its hollow space utilization is 35.65% of the volume of the whole stupa and it gets little lighting. (See *Table 2.2*)

In the 15th century, *Mahabodi Shwegu* in Mrauk-U⁶ can be found only. It has porch and octagonal shrine with one Buddha image. There are eight small apertures for good air circulation and four niches in shrine.⁴ It cannot get lighting well and its hollow space utilization is 15.01% of the volume of the whole stupas. In 16th century, the hollow spaced stupas cannot be found. (See *Table 2.2*)

In the 17th century, *Zina Manaung* and *Loka Manaung* in Mrauk-U⁶ include the shrine and porch only. The oval shrine can be found in *Zina Manaung* and its hollow space utilization is 6.82% of the volume of the whole stupa. The hollow space utilization of *Loka Manaung* is 16.72% of the volume of the whole stupas. There is one Buddha image respectively. They get the dim light and they are suitable for meditation.⁴ (See *Table 2.2*)

In the 18th century, the stupa number (# 1830) has only porch and vestibule. There is one Buddha image facing east and gets the dim light. Its hollow space utilization is 23.7% of the volume of the whole stupa. In the stupa number (#2078), the central shrine and three niches can be found simply and its hollow space utilization is 16.63% of the volume of the whole stupa. In *Kazun-O-Hla* (#778), it includes three small shrines on south, west and north as well as porch, vestibule and central shrine. There are four Buddha

images in central shrine and three small shrines. It is dark in central shrine because of long corridor length and its hollow space utilization is 24.3% of the volume of the volume of the whole stupas.

In the 19th century, it is found that *Thi Ho 3* (#1083) has four porches and four shrines with four Buddha images. Its hollow space utilization is 16.28% of the volume of the whole stupas. Finally, in *Shit Myet Hna* (#1621), it can be found that it became eight porches and eight shrines. And the eight niches can be found around the first terrace of the stupa and one Buddha image is located in each niche. Its hollow space utilization is 21.51% of the whole stupas. *Zina Manaung*, *Loka Manaung* and *Kazun-O-Hla* (#778) are medium sizes. The other hollow spaced stupas in Part II are the small stupas and there are no the large and very large stupas. (See *Table 2.2*)

In the early period, the hollow spaced stupas consist of shrine, porch and vestibule only. It developed the niche and aperture in later. Four shrines and four porches can be found in some hollow spaced stupas. Finally, it can be found that it became eight porches and eight shrines in the 19th century stupas. It can be found that the maximum hollow space utilization of the hollow spaced stupas in Part II is 35.65% of the volume of the whole stupas.

2.2.2 The Form Composition

The form composition of the hollow spaced stupas will be studied with four parts such as portion A, B, C and D. (See *Table 2.3*, *Table 2.4* and *Figure 2.1*)

a. Part I (11th – 13th Century)

Table 2.3. Form Composition of Part I (11th -13th century)

No.	No. and Name of Stupas	Portion											Corner					
		A				B		C	D					Stupa	Urn (Pot)	Lion	Sphinxes	
		Plinth	No. of Terrace	Polygonal terrace	Bell-rest	Bell shaped dome	Decorative belt	Harmika	No. of Conical Spire	Lotus petal & boss	Banana bud	Umbrella	Vane					Diamond bud
1	#1653 <i>Pepin</i>	√	-	-	-	√	-	√	19	-	-	-	-	-	-	-	-	-
2	#296 <i>Thi Ho 1</i>	√	1	-	-	√	√	√	11	√	√	-	-	-	-	-	-	-
3	#277 <i>Thi Ho 2</i>	√	1	-	√	√	√	√	15	√	√	-	-	-	√	-	-	-
4	#1573	√	1	-	-	√	-	√	5	√	√	-	-	-	-	-	-	-
5	#474	√	3	-	-	√	√	√	5	√	√	-	-	-	-	-	-	-

Table 2.3. (Continue)																	
6	#680 <i>Min Wai</i>	√	3	√	-	√	2	-	15	√	√	-	-	-	-	-	-
7	#487 <i>Tu Yin</i>	√	3	-	-	√	√	-	7	√	√	√	√	√	√	√	-
8	#1885 <i>Le Myet Na</i>	√	1	-	-	√	√	√	15	√	√	-	-	-	√	√	-
9	#1883 <i>Nga Mode</i>	√	3	√	-	√	√	-	11	√	√	-	-	-	-	-	-
10	#1853 <i>Nga Myet Na</i>	√	3	√	-	√	√	-	11	√	√	-	-	-	-	-	-

When the hollow spaced stupas in Part I have been studied, one terrace and three terraces can be found. But there is no terrace in *Pepin* (#1653). In *Minn Wai* (#680), two decorative belts are created although there is one decorative belt in the others. In 40% of the hollow spaced stupas in Part I, it can be found that they include *harmika* (Portion C). There are between five and nineteen conical spires, especially eleven and fifteen. The corner stupa in the early period and the corner urn in the late period can be found.

b. Part II (14th – 13th Century)

Table 2.4. Form Composition of Part II (14th -19th century)

No.	No. and Name of Stupas	Portion											Corner					
		A				B		C	D					Stupa	Urn (Pot)	Lion	Sphinxes	
		Plinth	No. of Terrace	Polygonal terrace	Bell-rest	Bell shaped dome	Decorative belt	Harmika	No. of Conical Spire	Lotus petal & boss	Banana bud	Umbrella	Vane					Diamond bud
1	#684	√	1	-	-	√	√	√	9	√	√	-	-	-	-	-	-	-
2	#466	√	1	-	√	√	√	√	13	√	√	-	-	-	-	-	-	-
3	Mahabodi Shwegu	-	3	-	-	√	-	√	-	-	-	-	-	-	-	-	-	-
4	Zina Man Aung	√	4	-	-	√	√	-	7	√	√	√	√	√	-	-	√	-
5	Loka Man Aung	√	3	-	√	√	√	-	7	√	√	√	√	√	√	-	-	√

Table 2.4. (Continue)																	
6	#1830	√	3	-	-	√	2	-	9	√	√	-	-	-	-	√	-
7	#2078	√	1	-	-	√	√	-	17	√	√	-	-	-	-	-	-
8	#778 <i>Kazun-O-Hla</i>	√	1	-	-	√	√	-	9	√	√	√	√	√	√	-	-
9	#1083 <i>Thi Ho 3</i>	√	3	-	-	√	√	-	17	√	√	-	-	-	√	√	-
10	#1621	√	3	√	-	√	√	-	15	√	√	√	√	√	√	-	-

(√)- Present (-)- Absent

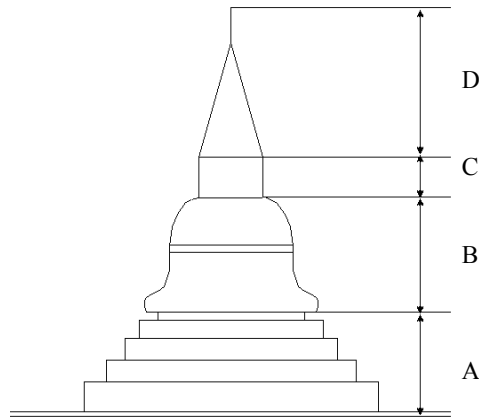


Figure 2.1. Four portions of stupa

In Part II, between one terrace and four terraces can be found especially three terraces. One decorative belt can be found only. In 30% of the hollow spaced stupas in Part II, it can be found that they include *harmika* (Portion C). The conical spires are between seven and seventeen. The corner stupa can be found in 40% of the stupas in Part II. 20% of the stupas have the corner lions. The corner sphinxes in *Loka Man Aung* and the corner urn in *Thi Ho 3* (#1083) can be found.

2.2.3 Analysis of the Hollow Spaced Stupas

a. Evolution of Space

i Part I (11th – 13th Century)

In the early period, it is composed of the shrine, vestibule and porch only. The hollow space utilization is between 10% and 30% of the volume of the whole stupa and they are small stupas. Then, it can be found that the two niches on the either side of central shrine are constructed. Then, not only the shrine, vestibule, porch, niches but also the aperture is created. The hollow space utilization became about 40% of the volume of the whole stupa but it is a small stupa only. They get lighting dimly and are not sufficient. But it gives calm and peace for meditating and counting beads. (See Figure 2.2.)

And the space is subtracted from a plane to create four shrines. Then, four porches are related by the inner corridor and there are niches for the Buddha images at all sides of the central solid core. They became the medium sizes and the hollow space utilization became nearly 40% of the volume of the whole stupa. Then, it became four porches with central shrine. It is a medium sized stupa. It gets the sufficient light. (See *Figure 2.2.*)

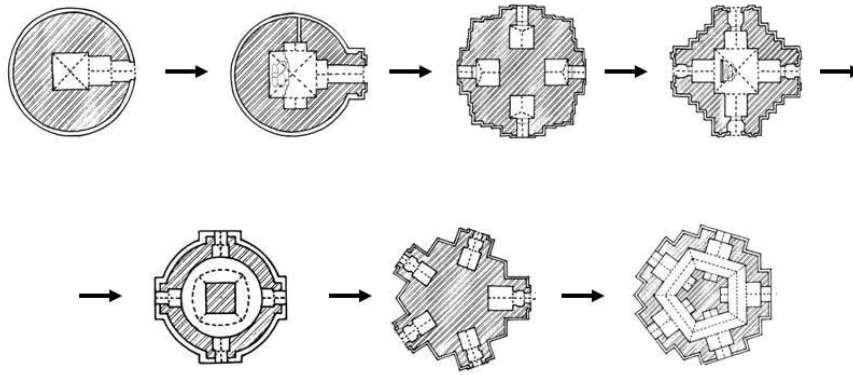


Figure 2.2. Stage by Stage Developments of Space in Part I (11th -13th century)

In later, the space is subtracted from a plane to create five shrines. Finally, five porches are related by the inner corridor and there are niches for the Buddha images at all sides of the central solid core. They are the medium sized stupas and the hollow space utilization became over 40% of the volume of the hollow spaced stupa. (See *Figure 2.2.*)

When the hollow spaced stupas from the 11th century to the 13th century are analyzed, it can be found the space developments. But the medium sized stupas are largest among the hollow spaced stupas in Part I. The maximum span of the shrine is 16 ft only and the maximum hollow space utilization is 40.83% of the volume of the whole stupa. Stage by stage developments of the hollow spaced stupas between the 11th century and the 13th century can be seen in *Figure 2.2.*

ii Part II (14th – 13th Century)

In the early 14th century, the hollow spaced stupas are composed of the central shrine, porch and vestibule only. Then, it can be found that the hollow spaced stupa consists of the two niches on either side of central shrine and the aperture is created at the niche. They are the small stupas and the hollow space utilization is between 30% and 40% of the volume of the hollow spaced stupa. The 18th century hollow spaced stupas, they have not only shrine and porch but also three niches on north, west and south. They are the small stupas and the hollow space utilization is under 20% of the volume of the hollow spaced stupa only. (See *Figure 2.3.*)

Later, the hollow spaced stupas have the circular central shrine with two niches and the three small shrines. The central shrine gets the dim light only because of the narrow and long vestibule and porch. It is a medium sized stupa and its hollow space utilization is about 30% of the volume of the hollow spaced stupa. Then, the space is subtracted from a plane to create four shrines and four porches with the central core. It is also the small stupa and

the hollow space utilization is under 20% of the volume of the hollow spaced stupa only.

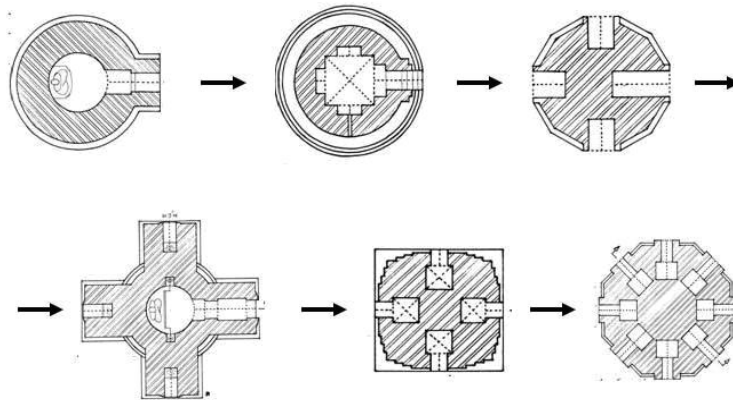


Figure 2.3. Stage by Stage of the Development of Space in Part II (14th -19th century)

In the 19th century, it can be found that the space is subtracted from a plane to create eight shrines and eight porches with the central core. It is a small sized stupa and the hollow space utilization is between 20% and 30% of the volume of the whole stupa. (See Figure 2.3.)

When the hollow spaced stupas from the 14th century to the 19th century are analyzed, it can be found the developments in their spatial composition. But all of them in Part II are the small stupas and medium sized stupas. It cannot be found that the longer span and the larger one than the medium size as part I. The maximum span of the shrine is 12 ft only and the maximum space utilization is 35.65% of the whole stupa. Stage by stage of the development of hollow spaced stupas between 14th century and 19th century can be seen in Figure 2.3.

Table 2.5. Analysis of the Hollow Spaced Stupas

No.	Name/ Number	Light- ing	Ventila- tion	Technology	Proportion	Decor	Circula- tion Space
1	<i>Pepin</i> (#1653)	C	C	B	C	C	C
2	<i>Thi Ho 1</i> (#296)	C	C	B	B	B	C
3	<i>Thi Ho 2</i> (#277)	C	C	B	B	B	C
4	#1573	C	C	B	B	B	B
5	#474	B	B	B	B	A	B
6	<i>Min Wai</i> (#680)	B	C	B	B	A	B
7	<i>Tu Yin</i> (#487)	A	A	A	B	A	A
8	<i>Le Myet Na</i> (#1885)	A	A	A	B	A	A
9	<i>Nga Mode</i> (#1883)	B	C	B	B	A	B
10	<i>Nga Myet Na</i> (#1853)	A	A	A	B	A	A

<i>Table 2.5. (Continue)</i>							
11	(#684)	C	C	B	B	A	B
12	(#466)	B	B	B	B	C	B
13	Mahabodi Shwegu	B	B	B	C	B	C
14	Zina Man Aung	C	C	B	A	C	C
15	Loka Man Aung	C	C	B	A	C	B
16	(#1830)	B	C	B	B	B	B
17	(#2078)	B	C	C	B	C	B
18	Kazun-O-Hla (#778)	C	C	B	B	B	B
19	Thi Ho 3 (# 1083)	C	C	B	B	C	B
20	(#1621)	B	C	A	A	B	B

A- Excellent
Unsatisfied

B- Good

C- Fair

D-

3. Conclusion

In Myanmar, it is assumed that the hollow spaced stupas were constructed at the 11th century. In the ancient time, there are only central shrine, vestibule and porch in the hollow spaced stupas. The development of niche and aperture can be found later. Then, they became four shrines and five shrines with four or five porches. In the late 13th century stupas, they became four or five porches and shrines with solid core and internal passage. In the early centuries, it intends to meditate. So the hollow space of the stupa is not very large and gets the dim light only. The hollow spaced stupas can be mostly found in the 13th century and they cannot be found in the 16th century. In the late 19th century, the hollow spaced stupa with eight porches and eight shrines can be found. In the later period, the people considered for getting good ventilation and lighting.

In the earlier period (in Part I), the long span is not found and the maximum hollow space utilization is 40.83% of the volume of the whole stupa. In the later period (in Part II), the long span is not found too and the maximum hollow space utilization is 35.65% of the volume of the whole stupa. The large hollow spaced stupas cannot be found between 11th century and 19th century although the very large hollow spaced stupas with long span started to construct mostly at the present.

The plans of *Tu Yin* (#487), *Le Myet Na* (#1885) and *Nga Myet Na* (#1853) are the best according to my research. (See *Tabla 2.5*) They get good lighting and ventilation. So, it can be found that these plans are mostly constructed at the present. The inventory and conservation of the historic monuments are essential. After the historic monuments are analyzed carefully, the best factors are emulated and it should create the excellent hollow spaced stupas. It is hoped this research paper would support the Historical and Religious Architecture.

4. References

- [1] Min Thet Mon, Daw, M.Arch. (Thesis), December 1998, *Appreciation on the Reflections of Buddhism in Early Bagan Architecture (11th to 12th Century)*, Department of Architecture, Yangon Technological university, Yangon.
- [2] Mya Mya Hnit, Ma, and Khin Lin Nwe, Ma, M.Arch. (Thesis), November 2003, *Comparative Study on Pyu and Bagan* university, Yangon.
- [3] Nay Thu Win, Ma, Nan Saw Htet Htet Lin, Ma and Thet Thet Mon, Ma, M.Arch. (Thesis), November 2003, *Study on Architecture of Small Temples in Bagan (11th century to 13th century)*, Department of Architecture, Yangon Technological university, Yangon. *Architecture Before 11th Century AD*, Department of Architecture, Yangon Technological
- [4] Ngwe Soe, U, M.Arch. (Thesis), December 1998, *Study on Religious Architecture in Mrauk-U, Rakkhine*, Department of Architecture, Yangon Technological university, Yangon.
- [5] Pichard, Pierre, *Inventory of Monuments at Bagan* UNDP/UNESCO, Volume 1 to 8.
- [6] Shwe Zan, U (1997). *The Golden Mrauk-U, An Ancient Capital of Rakhine*, Second Edition.
- [7] Sun Oo, U, Preliminary Research Report, June, 2001, *The Architectural Aspects of the Monasteries of Bagan*, Department of Architecture, Yangon Technological university, Yangon.
- [8] Aung Kyaing, Min-Bu, 1981, *The Architectures in Bagan Era*.