Ancient Chinese Architectural Modulus-Main Hall of the Erxian Temple at Jincheng

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Article

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Abstract: The original construction ruler (Yingzao chi) is calculated to be 29.939 centimetres long. It conforms to the long and short ruler system since the Tang and Song dynasties. Each ruler (1 chi) is 10 cun [寸], and each chi is divided into 12 small cun. The construction module was adopted. The basic modulus is 1 chi. 4 small cun is the infra - module, which is 1/3 of the basic modulus. 0.4 small cun is also an infra - module, which is 1/30 of the basic modulus. 30 cun is the multi - module, which is three times the basic modulus of 1 chi. This module is very similar to modern building modules. The building shape is in a proportional relationship under integer - size constraints.

Keywords: Erxian(two immortals) Temple at Jincheng; construction ruler (Yingzao chi);architectural modulus; proportion; Damuzuo(greater structural carpentry)

1. Overview and Existing Research

Jincheng Erxian Temple is located in the southeast village of Jincun Town, Zezhou County, Jincheng City, Shanxi Province. Its main hall is the most ancient part, built between the fourth year of Song Shaosheng (1097 AD) and the seventh year of Zhenghe (1117 AD). There are precious small wooden account niches and colored sculptures of the Song Dynasty in the hall. In 1996, it was included in the fourth batch of national key cultural relics protection units, and the cultural relics protection information mainly focuses on the Song Dynasty.

In September 2009, Shanxi Ancient Building Protection Engineering Co., Ltd. undertook the renovation project of this temple, which was completed in August 2011. In March 2019, the "Completion Report of the Renovation Project of Erxian Temple in Jincheng" was published, announcing the repair process and surveying and mapping drawings of the temple(SXZDGJ 2019). Most of the data in this article are cited from this source.

From 2013 to 2015, the National Heritage Center of Tsinghua University conducted 3D laser scanning and surveying. In October 2017, the "Investigation and Research Report on the Small Wooden Tent Niche of Jincheng Erxian Temple" was published, and the survey information and measured data were published, and the analysis and fitting scale was 314 mm(Lü,Zheng,and Jiang 2017). Some of the data in this article are cited here.

The belief in the two immortals is a unique local belief in the southeast of Shanxi Province, and it has a broad and lasting base of believers in the local area. There are many temples of two immortals in the southeast of Shanxi, and There are many that are included in the national protection list, and the naming is generally distinguished by the village where it is located. In 1996, when the temple was included in the national security, the village was named Xiaonan Village, and later renamed Southeast Village. The above two documents refer to this temple as the Erxian Temple in Jincheng(SXZDGJ 2019;Lü,Zheng,and Jiang 2017), and this article also uses this name.

2. Construction Ruler and Appearanc

2.1. Constraints on the Fitted Ruler Length

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Architecture serves people, so the preferred measurement standards for construction should also be commonly used. In ancient China, the commonly used units of measurement included zhang (丈), chi (尺), cun (寸), fen (分), etc., and these should have been the main units for measurement. The "Yingzao Fashi" ((The Methodology of Official Architecture in the Northern Song Dynasty)) stipulated the cai-fen system(Pan and He 2017), which essentially took cun and fen as units and was flexibly converted into fen values according to proportional relationships. The construction ruler is of great significance for the study of ancient architecture. There are several constraints that need to be clarified when fitting and calculating the construction ruler.

First is the length of the ruler. The length of the ruler in the Song Dynasty was quite variable(Lu and Qiu 2001). Modern scholars have conducted textual research on the Song Dynasty rulers. Taking into account the regions and the existing structures of the same period, the length of the ruler is limited to the range from 28 centimeters to 32 centimeters.

Second is the large and small cun system. All dynasties after the Tang Dynasty adopted the long and short ruler system. In the north, 100 grains of broomcorn millet made up a short ruler, while 120 grains made up a long ruler. The long ruler was the official and commonly used ruler, and the short ruler was used for measuring in rituals, music, astronomy, and medicine. Among the 41 Tang Dynasty rulers recorded in "Science and Civilisation in China: Volume on Weights and Measures", one was a short ruler and 40 were long rulers. Each ruler was divided into 10 grids. Obviously, the commonly used rulers were long rulers, which were decimal-based, with each ruler having 10 cun, equivalent to 12 small cun. The length of a small cun was equal to 10 grains of broomcorn millet(Lu and Qiu 2001). This is quite similar to the relationship between inches and feet.

Third, the Yingzao Fashi stipulates the use of "fen" (份). This represents a rule that gives precedence to proportion over size when it comes to "cai" (材) and "qi" (栔). The relationship between the regulations in the Yingzao Fashi and folk construction is still unclear, but they surely influence and permeate each other. Thus, the measurement in terms of "fen" should be taken into account.

Fourth is the proportional relationship and integer dimensions. Integer dimensions are a measurement method, and the proportion of each part is the soul of architecture. It is difficult to have both, and a choice must be made during construction. Considering problems from these two aspects is the key to unlocking ancient architecture.

2.2. Calculate the Construction Ruler

Timber framing(Damuzuo) forms the skeleton, which is the foundation of the exterior shape, so it should be the starting point. The main framework data are listed in Table 1.Generally speaking, calculated from the column top, the ratio of the width, depth, and overall height is approximately 9:7:8. The simplest fit within the specified measuring scale is 27 chi(324 small cun), 21 chi(252 small cun), and 24 chi(288 small cun). The fitting is shown in Figures 1 and 2.

SXZDGJ(2019,19 and 95) provides data calculated from the column base, including the width, depth, and Cejiao (inclination of the corner col- umn), based on which the data of the column top can be obtained.The calculated construction ruler (Yingzao chi) is 299.39 mm accordingly. In Lü,Zheng ,and Jiang(2017,113), only the overall width and overall depth data are available, and the deduced construction ruler is 299.35 mm. When comparing the data from the two sources, the differences are negligible, and the fitted lengths of the chi (a traditional Chinese unit of length) are strikingly similar, which can be determined to be approximately 299 millimeters. The data from SXZDGJ (2019) is complete, and as it will be cited more frequently hereinafter, the fitted length of the construction chi is taken as 299.39 millimeters.

As shown in Figures 1 and 2 and Table 1, the three main data of the timber framing are not only integer chi, but can also be converted into integral small cun. They are also integral multiples of 0.4 small cun, and of course, integral multiples of 4 small cun as well.

Table 1. Deduce the length of the ruler (chi, Chinese unit of length) using a large-scale timberwork(Damuzuo) framework.

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Table 1. Deduce the length of the ruler (chi, Chinese unit of length) using a large-scale

	Deduce the length of the chi from the original numbers.			Suppose the cun is converted into millimeters		Fitted value			Proportion	Remarks
	mm	Suppose it is a cun	length of the chi	millimeters	Similarity rate	cun	small cun	Multiples of 0.4 small cun		
Height of the damuzuo	7235	240	301.458	7185.466	99.32%	240	288	720	7:8:9、An integral multiple of 30 cun	SXZDGJ(2019,19 and 95)
Overall width	8090	270	299.630	8083.649	99.92%	270	324	810		
Overall depth	6239	210	297.095	6287.282	100.77%	210	252	630		
Mean value			***299.394***							
Overall width	8096.5	270	299.870	8082.564	99.83%	270	324	810	7:9	Lü, Zheng , and Jiang(2017, 113)
Overall depth	6275.6	210	298.838	6286.439	100.17%	210	252	630		
Mean value			***299.354***							

3. Taiming (The Part of the Foundation That Protrudes Above the Ground Level) and Bay Width

3.1. Xia Taiming (Lower Salient Part of Foundation)

The Taiming has two layers. For the lower layer, only one layer of rectangular stone slab has been detected, and its height remains unascertainable. The inscription recorded in SXZDGJ(2019,129), which was engraved in the seventh year of Zhenghe during the Song Dynasty (1117 AD), states: "The palace steps are three chi high, following the remaining foundation of the Yao court." It is assumed that the height of the Xia Taiming is 30 cun, which equals 36 small cun.

As shown in Figure 1 and Table 2, based on the original data,The Xia Taiming has a depth of building of 34 chi and a width of 40 chi.

Figure 1. Schematic diagram of the platform base and the bottom plane of the column.

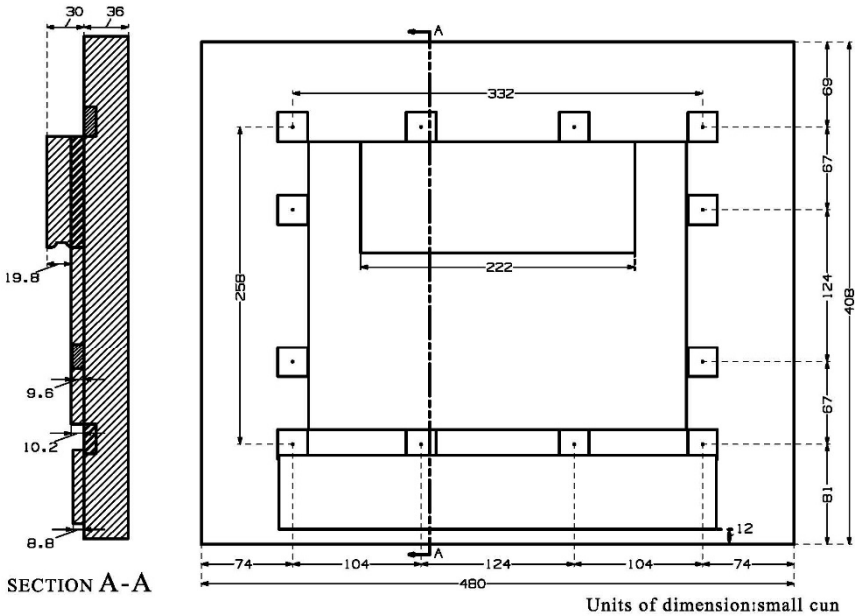

Figure 1. Schematic diagram of the platform base and the bottom plane of the column.

Table 2. salient part of foundation(taimin)and bay width.

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The chi is 299.39mm

name		original numbers			Fitting number			Similarity rate	Remarks
		mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun		
column height	eave column	2980	99.536	119.443	**100**	120	300	100.47%	(SXZDGJ 2019, 19))
	hypostyle column	3290	109.890	131.868	110	132	330	100.10%	
	corner column	3020	100.872	121.046	101.333	121.6	304	100.46%	
bottom plane of the column	The width of the central bay	3080	102.876	123.451	103.333	124	310	100.44%	
	The width of the secondary bay	2590	86.509	103.811	86.667	104	260	100.18%	
	total width	8260	275.894	331.073	276.667	332	830	100.28%	
	width of the secondary bay in depth	1660	55.446	66.535	55.833	67	167.5	100.70%	
	width of the central bay in depth	3090	103.210	123.852	103.333	124	310	100.12%	
	total width	6410	214.102	256.922	215	258	645	100.42%	
Lower salient part of foundation(xia taimin) and bottom plane of the column	From the front end of the xia taimin to the center of the column base	2015	67.304	80.764	67.500	81	202.5	100.29%	(SXZDGJ 2019, 95)
	From the rear end of the xia taimin to the center of the column base	1720	57.450	68.940	57.500	69	172.5	100.09%	
	The depth of the xia taimin	10145	338.856	406.627	**340**	**408**	1020	100.34%	
	From the side end of the xia taimin to the center of the column base	1825	60.957	73.149	61.667	74	185	101.16%	
	The width of the xia taimin	11910	397.809	477.371	**400**	**480**	1200	100.55%	
inclination of the corner col-umn(Cejiao) (batter)	Forward batter	85	2.839	3.407	2.5	3	7.5	88.06%	(SXZDGJ 2019, 19a nd98)
	Side batter	85	2.839	3.407	3.333	4	10	117.41%	
Plane of column capital	The width of the central bay	3080	102.876	123.451	103.333	**124**	310	100.44%	(SXZDGJ 2019, 95a nd99)
	The width of the secondary bay	2505	83.670	100.404	83.333	**100**	250	99.60%	
	total width	8090	270.216	324.259	**270**	**324**	810	99.92%	
	width of the secondary bay in depth	1575	52.607	63.128	53.333	**64**	160	101.38%	
	width of the central bay in depth	3090	103.210	123.852	103.333	**124**	310	100.12%	
	total width	6240	208.424	250.109	**210**	**252**	630	100.76%	
xia taimin and Plane of column capital	From the front end of the xia taimin to the center of the column capital	2100	70.143	84.171	70	84	210	99.80%	(SXZDGJ 2019, 95a nd98)
	From the rear end of the xia taimin to the center of the column capital	1805	60.289	72.347	60	72	180	99.52%	
	From the side end of the xia taimin to the center of the column capital	1910	63.796	76.556	65	78	195	101.89%	
Lower salient part of foundation(shang taimin)	width	8810	294.265	353.118	295	354	885	100.25%	
	The distance between the front ends of the two platform bases(taimin)	300	10.020	12.024	10	12	30	99.80%	
	height	220	7.348	8.818	7.333	8.8	22	99.80%	

3.2. Shang Taiming (Upper Salient Part of Foundation)

The Taiming has two layers. In addition, there are old altars and wooden pedestals in the shape of a sumeru in the main hall. with a complex stratigraphic relationship. with a complex stratigraphic relationship. The sequence can inferred according to the original data and the structure.

As shown in Figures 1, 2, 3, 4 and Table 2, when the main hall was initially constructed, the divine altar was built first, taking the Xia Taiming as the reference. Its clear height was 30 small cun, which is equivalent to 25 cun. Afterwards, the ground indoors and outdoors was raised. The cushion layer serves as the Shang Taiming. This buried the hypostyle column(Indoor columns) bases and a small section of the column bottoms. The distance from the hypostyle column bottoms to the lower platform base is 9.6 small cun. Subsequently, the shrines were added.

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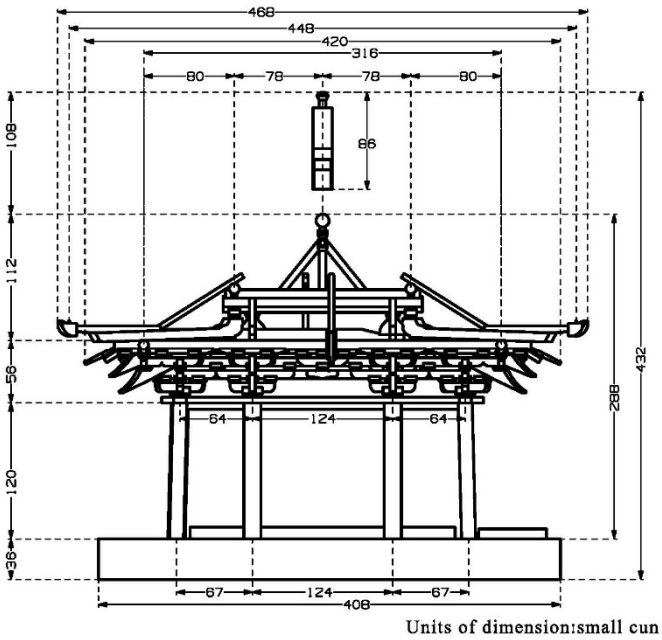

Figure 4. Side view schematic diagram

Figure 4. Side view schematic diagram.

3.3. Bay Width

As shown in Table 2 and Figure 2,the width of the central bay and the width of the central bay in the depth direction are both 124 small cun, which is equivalent to 31 units of 4 small cun. The widths of other bays are not in integer chi, but they are all divisible by 4 small cun.

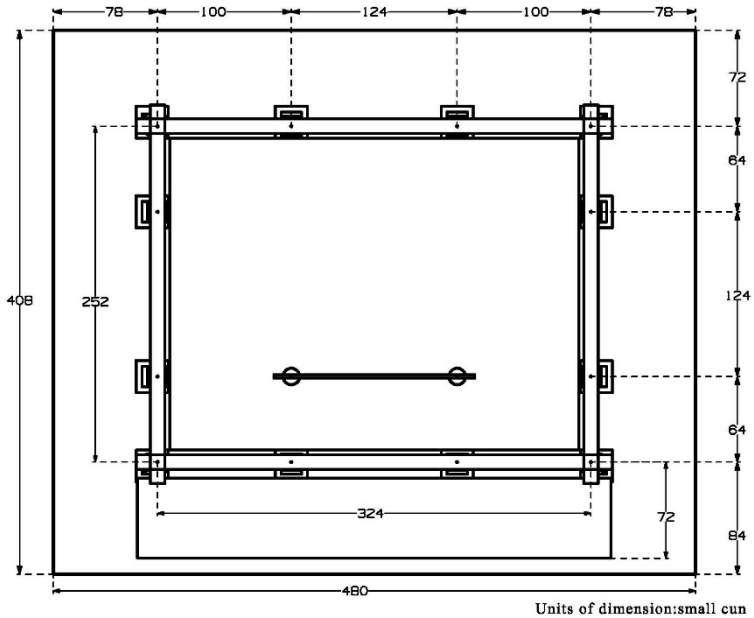

Figure 2. Schematic diagram of the bay of the column head

Figure 2. Schematic diagram of the bay of the column head.

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3.4. Cejiao(Inclination of the Corner Col- Umn)

The Cejiao is 85 millimeters, approximately between 3 and 4 small cun. In the Yingzao Fashi ,the Cejiao was calculated as a proportion of the column height.After more than 900 years of wind and rain,the surveying and mapping data can no longer reflect the original calculation method for Cejiao. Proportionally, the Cejiao is approximately between 1/40 and 1/30 of the column height. It is estimated that the Cejiao in the facade width direction is 4 small cun, and 3 small cun in the depth direction, as shown in Table 2. See Figures 1, 2, 3, and 4.

3.5. The Height of the Column

As shown in Table 2, Figures 3 and 4,The eave columns are 120 small cun, which is exactly 10 chi. The corner columns have a rise. Based on the original data, they are estimated to be 121.6 small cun, with a rise of 1.6 small cun. For the convenience of drawing, the rise of the corner columns is not shown.

The clear height of the hypostyle column is 3290 millimeters, which is approximated to 132 small cun, exactly 120 cun. As shown in Figure 1, the upper surface of the hypostyle column base is 9.6 small cun higher than that of the outer column base.

4. Cai(Dimension Lumber) and Puzuo (Bracket Set)

4.1. Cai and Fen

The data of "cai" is listed in Table 3. The data from SXZDGJ (2019,101and102) is comprehensive, while the data from Lü, Zheng, and Jiang (2017) is more detailed. SXZDGJ (2019, 101) doesn't pay special attention to the differences in zucai (full-sized timbers) of each layer of the column - head bracket set, with the zucai of the first and second layers being the same. The surveying and mapping in Lü, Zheng, and Jiang (2017) takes the average value from multiple samples. The height of the dang cai (single - sized timbers) of the first-layer hua-gong and nidao-gong is 198.8 mm, which is significantly larger than that of others. Based on this, it is fitted to a dangcai of 8 small cun. Lü, Zheng, and Jiang (2017) recorded 23 data of the width of timbers. There are 16 data of the width of timbers at the end of the first jump, with an average value of 135.3 mm. There are 7 data of the width of shua-tou, with an average value of 130.85 mm.

As shown in Table 3, the differences in the cai are not limited to the first and second floors. There are also variations in other positions. Generally speaking, the timbers can be classified into several types.

First, for the first layer of cai in the column-top bracket set, the dang cai component measures 8 small cun in height, 5.4 small cun in width, with a qi of 3.6 small cun, and the zu cai component is 11.6 small cun. This type of component includes the first-layer hua-gong (flower-shaped bracket arms) and nidao-gong (axial bracket arm).

Second, for the second to fourth layers of cai in the column-top bracket set, the zu cai timbers are 11.2 small cun, the qi is 3.6 small cun, the dang cai timbers are 7.6 small cun, and the width of the timbers is 5.2 small cun.

Third, for the transverse brackets at the end of the bracket-arms in the column-top bracket set, including the guazi-gong, guazi-man-gong, and ling-gong, all of which are moxie-gong. Their width is 4.8 small cun, equivalent to 4 cun. The dang cai timbers are 7.6 small cun, the qi is 3.6 small cun, and the zu cai timbers are 11.2 small cun.

Fourth, for the timbers used in the inner-column bracket sets, the dang cai are 8 small cun, and the width is 5.6 small cun. The qi measurements are surprisingly different. The qi of the jiaohu-dou (a type of block) at the end of the hua-gong bracket-arms is 3.6 small cun, and the zu cai timbers are 11.6 small cun. The qi of the sandou (a type of block) on the nidao-gong is 4 small cun, and the full-sized timbers are 12 small cun. Here, the heights of the zu cai timbers of the nidao-gong and the hua-gong are different.

Fifth, for other cai on the upper frame, the width ranges from a minimum of 3.8 small cun to a maximum of 4.4 small cun, and the height of the timbers also varies.

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As shown in Table 3, all the cross-sectional data of the timbers can be expressed as multiples of 0.4 small cun. The unit "fen" originated from the Yingzao Fashi. It is a measurement unit that was flexibly adjusted according to a unified proportion after the timbers were measured in cun. It is inappropriate to rigidly apply the rules in the Yingzao Fashi to this hall. However, using 0.4 small cun as a measurement unit is worth a try. Here, borrowing the concept of "cai-fen" from the Yingzao Fashi, we take 0.4 small cun as one "fen". This "fen" is the one restricted by the construction ruler, which is a sub-modulus in the architectural modular system, rather than the "fen" in the Yingzao Fashi.

Table 3. Some timber module(cai)(qi).

Table 3. Some timber module(cai)(qi)

The chi is 299.39mm

cai of the column-top bracket set	original numbers			Fitting number			Similarity rate	Remarks
	mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun		
width of cai	130	4.342	5.211	4.333	**5.2**	13	99.80%	SXZDGJ (2019.102)
height of dang cai	190	6.346	7.615	6.333	7.6	19	99.80%	
qi	90	3.006	3.607	3	3.6	9	99.80%	
Width of the transverse arch timber at the end of the cantilever arm	120	4.008	4.810	4	4.8	12	99.80%	
height of zu cai	280	9.352	11.223	9.333	11.2	28	99.80%	
width of cai	134	4.476	5.371	4.5	5.4	13.5	100.54%	(Lü, Zheng, and Jiang 2017, 113)
Height of a dang cai in the first layer	198.8	6.640	7.968	6.667	**8**	20	100.40%	
Height of a dang cai in the second layer	187.5	6.263	7.515	6.333	**7.6**	19	101.13%	
Height of a zu cai in the first layer	291.9	9.750	11.700	9.667	**11.6**	29	99.15%	
Height of a zu cai in the second layer	284.2	9.493	11.391	9.333	**11.2**	28	98.32%	
First layer qi	93.1	3.110	3.732	3	**3.6**	9	96.47%	
Second layer qi	96.7	3.230	3.876	3	**3.6**	9	92.88%	

cai of the hypostyle column bracket set	original numbers			Fitting number			Similarity rate	Remarks
	mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun		
Height of a zu cai in the second layer	290	9.686	11.624	9.667	11.6	29	99.80%	SXZDGJ (2019.101)
Height of a zu cai in the first layer	295	9.853	11.824	9.667	11.6	29	98.11%	
Height of a dang cai in the first layer	200	6.680	8.016	6.667	**8**	20	99.80%	
width of cai	140	4.676	5.611	4.667	5.6	14	99.80%	
qi of the connection block	90	3.006	3.607	3	3.6	9	99.80%	
qi of the small block	105	3.507	4.209	3.333	4	10	95.04%	
Height of Pan Jian Fang	180	6.012	7.215	6	7.2	18	99.80%	

其他材		original numbers			Fitting number			Similarity rate	Remarks
		mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun		
cantilever block(Ti Mu) of ridged purlin	length	1430	47.714	57.257	47.667	57.2	143	99.900%	SXZDGJ (2019.101)
	width	120	4.004	4.805	4	4.8	12	99.900%	
	height	140	4.671	5.606	4.667	5.6	14	99.900%	
Ti Mu of intermediate purlin	length	1430	47.714	57.257	47.667	57.2	143	99.900%	
	width	120	4.004	4.805	4	4.8	12	99.900%	
	height	110	3.670	4.404	3.667	4.4	11	99.900%	
Ti Mu of the column-top bracket set	width	120	4.004	4.805	4	4.8	12	99.900%	
	height	130	4.338	5.205	4.333	5.2	13	99.900%	
Chuan Fang of hypostyle column	width	110	3.670	4.404	3.667	4.4	11	99.900%	
	height	190	6.340	7.608	6.333	7.6	19	99.900%	
Chuan Fang of Ping Lang	width	95	3.170	3.804	3.167	3.8	9.5	99.900%	
	height	150	5.005	6.006	5	6	15	99.900%	
Height of Pan Jian Fang	width	100	3.337	4.004	3.333	4	10	99.900%	
	height	170	5.672	6.807	5.667	6.8	17	99.900%	

4.2. Bearing Block(Dou)

The data of the dou are listed in Table 4. By comparison, it can be seen that each part of the dou can also be measured in two ways: small cun and fen. The size of the dou also varies slightly

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according to its position. Macroscopically, it can be classified into two categories: large and small.As shown in Figure 5.

Although there are differences between the cap block(ludou) on the outer eaves and those on the hypostyle columns,their dimensions are close and their shapes are relatively large, Fall into a large category.The widths at the upper part of the intersecting dou, diagonal dou, and scattered dou are quite close, about 25 fen. Since they are similar in size, they are classified into the same category.

Overall, the sizes of the dou are not uniform. This lack of uniformity may be due to precision errors, but the differences are clearly noticeable. The dou does not have fixed proportions and specifications; essentially, it varies according to the material and the requirements of the structure.

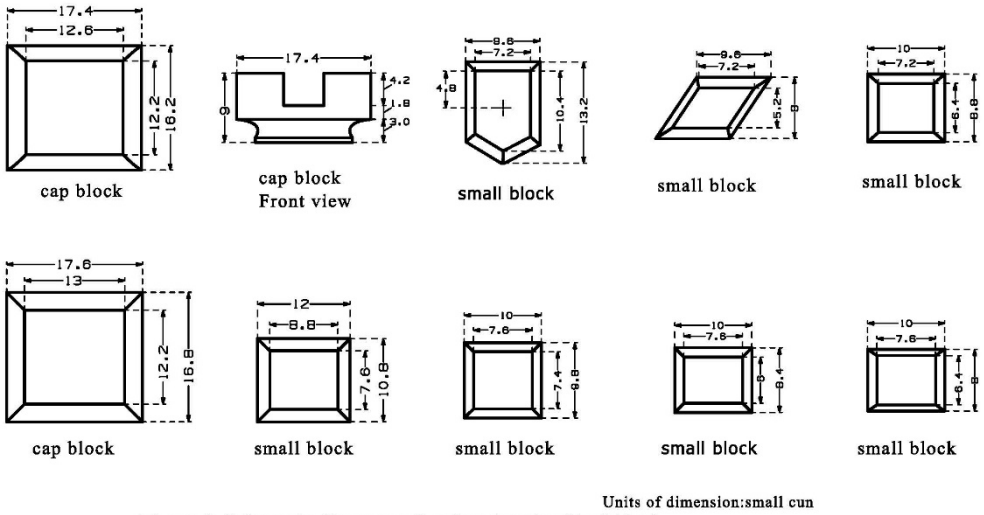

Figure 5. Schematic diagrams of various bearing block(dou)

Figure 5. Schematic diagrams of various bearing block(dou).

Table 4. bracket set(Dou).

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Table 4. bracket set(Dou)

The chi is 299.39mm

	cap block of Outer eave	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	435	315	405	305	105	45	60	15	225	(SXZDGJ 2019, 102)
	cun	14.530	10.521	13.528	10.187	3.507	1.503	2.004	0.501	7.515	
	small cun	17.435	12.626	16.233	12.225	4.209	1.804	2.405	0.601	9.018	
Fitting number	small cun	**17.4**	**12.6**	**16.2**	**12.2**	**4.2**	**1.8**	**2.4**	**0.6**	**9**	
	cun	14.5	10.5	13.5	10.167	3.5	1.5	2	0.5	7.5	
	Fen	43.5	31.5	40.5	30.5	10.5	4.5	6	1.5	22.5	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	small block	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	250	190	245	185	60	30	50	10	150	(SXZDGJ 2019, 102)
	cun	8.350	6.346	8.183	6.179	2.004	1.002	1.670	0.334	5.010	
	small cun	10.020	7.615	9.820	7.415	2.405	1.202	2.004	0.401	6.012	
Fitting number	small cun	**10**	**7.6**	**9.8**	**7.4**	**2.4**	**1.2**	**2**	**0.4**	**6**	
	cun	8.333	6.333	8.167	6.167	2	1	1.667	0.333	5	
	Fen	25	19	24.5	18.5	6	3	5	1	15	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	connection block	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	240	180	328	262	60	30	50	10	150	(SXZDGJ 2019, 102)
	cun	8.016	6.012	10.956	8.751	2.004	1.002	1.670	0.334	5.010	
	small cun	9.620	7.215	13.147	10.501	2.405	1.202	2.004	0.401	6.012	
Fitting number	small cun	**9.6**	**7.2**	**13.2**	**10.4**	**2.4**	**1.2**	**2**	**0.4**	**6**	
	cun	8	6	11	8.667	2	1	1.667	0.333	5	
	Fen	24	18	33	26	6	3	5	1	15	
	Similarity rate	99.797%	99.797%	100.405%	99.035%	99.797%	99.797%	99.797%	99.797%	99.797%	

	parallelogram block	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	240	180	200	130	50	30	50	10	140	(SXZDGJ 2019, 102)
	cun	8.016	6.012	6.680	4.342	1.670	1.002	1.670	0.334	4.676	
	small cun	9.620	7.215	8.016	5.211	2.004	1.202	2.004	0.401	5.611	
Fitting number	small cun	**9.6**	**7.2**	**8**	**5.2**	**2**	**1.2**	**2**	**0.4**	**5.6**	
	cun	8	6	6.667	4.333	1.667	1	1.667	0.333	4.667	
	Fen	24	18	20	13	5	3	5	1	14	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	cap block of hypostyle column	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	440	325	420	305	90	50	90	20	250	(SXZDGJ 2019, 102)
	cun	14.697	10.855	14.029	10.187	3.006	1.670	3.006	0.668	8.350	
	small cun	17.636	13.026	16.834	12.225	3.607	2.004	3.607	0.802	10.020	
Fitting number	small cun	**17.6**	**13**	**16.8**	**12.2**	**3.6**	**2**	**3.6**	**0.8**	**10**	
	cun	14.667	10.833	14	10.167	3.000	1.667	3	0.667	8.333	
	Fen	44	32.5	42	30.5	9	5	9	2	25	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	small block of hypostyle column	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	250	190	210	150	45	45	50	10	150	(SXZDGJ 2019, 102)
	cun	8.350	6.346	7.014	5.010	1.503	1.503	1.670	0.334	5.010	
	small cun	10.020	7.615	8.417	6.012	1.804	1.804	2.004	0.401	6.012	
Fitting number	small cun	**10**	**7.6**	**8.4**	**6**	**2**	**1.6**	**2**	**0.4**	**6**	
	cun	8.333	6.333	7	5.000	1.667	1.333	1.667	0.333	5.000	
	Fen	25	19	21	15	5	4	5	1	15	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	110.885%	88.708%	99.797%	99.797%	99.797%	

	connection block of hypostyle column	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	250	190	320	260	60	30	50	10	150	(SXZDGJ 2019, 102)
	cun	8.350	6.346	10.688	8.684	2.004	1.002	1.670	0.334	5.010	
	small cun	10.020	7.615	12.826	10.421	2.405	1.202	2.004	0.401	6.012	
Fitting number	small cun	**10**	**7.6**	**12.8**	**10.4**	**2.4**	**1.2**	**2**	**0.4**	**6**	
	cun	8.333	6.333	10.667	8.667	2	1	1.667	0.333	5	
	Fen	25	19	32	26	6	3	5	1	15	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	cap block of 3-purlin beam	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	300	220	270	190	65	40	75	10	190	(SXZDGJ 2019, 102)
	cun	10.020	7.348	9.018	6.346	2.171	1.336	2.505	0.334	6.346	
	small cun	12.024	8.818	10.822	7.615	2.605	1.603	3.006	0.401	7.615	
Fitting number	small cun	**12**	**8.8**	**10.8**	**7.6**	**2.6**	**1.6**	**3**	**0.4**	**7.6**	
	cun	10	7.333	9	6.333	2.167	1.333	2.5	0.333	6.333	
	Fen	30	22	27	19	6.5	4	7.5	1	19	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	small block of ridged purlin	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	250	190	200	160	50	40	60	10	160	(SXZDGJ 2019, 102)
	cun	8.350	6.346	6.680	5.344	1.670	1.336	2.004	0.334	5.344	
	small cun	10.020	7.615	8.016	6.413	2.004	1.603	2.405	0.401	6.413	
Fitting number	small cun	**10**	**7.6**	**8**	**6.4**	**2**	**1.6**	**2.4**	**0.4**	**6.4**	
	cun	8.333	6.333	6.667	5.333	1.667	1.333	2	0.333	5.333	
	Fen	25	19	20	16	5	4	6	1	16	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

	small block of intermediate purlin	Upper width	Lower width	Upper depth	Lower depth	Er	ping	qi	min bang	Total height	Remarks
original numbers	mm	250	180	220	160	50	40	60	10	160	(SXZDGJ 2019, 102)
	cun	8.350	6.012	7.348	5.344	1.670	1.336	2.004	0.334	5.344	
	small cun	10.020	7.215	8.818	6.413	2.004	1.603	2.405	0.401	6.413	
Fitting number	small cun	**10**	**7.2**	**8.8**	**6.4**	**2**	**1.6**	**2.4**	**0.4**	**6.4**	
	cun	8.333	6	7.333	5.333	1.667	1.333	2	0.333	5.333	
	Fen	25	18	22	16	5	4	6	1	16	
	Similarity rate	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	99.797%	

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表5-1 The distance from the outer end of the small dou (block) on the gong (arch).

	small cun	0.4 times the small cun	cun	Multiples of 0.4 small cun
axial bracket arm	42	105	35	10.5
Second axial bracket arm	76	190	63.333	**19**

The ratio is 5 to 9.

4.3. Length of the Out-Jump, Xin Chang (The Center - to - Center Distance of the Assembly Joints), and Length of Thebracketarm (Gong).

The length of the gong minus the bottom length of the small dou (bearing block) gives the length of the gong's center part(xin chang). The data are listed in Table 5, measured in chi, and converted into small cun and fen, and then fitted as shown in Figures 6 and 7.

For the bracket set on columns, the length of both the inner and outer first jumps is 16 small cun, and the length of the second jump is also 16 small cun. The total length of the outer jumps is 32 small cun, which is equivalent to 80 fen.

The length of the center part(xin chang) of the nidao-gong (axial bracket arm) in the exterior eave bracketing is 32 small cun, which is the same as the length of the center part of the first-layer hua gong.

The length of the xin chang of the nidaomang-gong(The second-layer axial bracket arm) in the exterior eave bracketed construction is 66 small cun, which is equivalent to 165 fen. This gong is the longest horizontally. Although it is incised(yin ke), it is related to the spacing between the bracket set (puzuo) and is a major parameter.

As shown in Tables 5-1 and 5, the width of the nidaomang-gong, which represents the width of the bracket set, is set according to the distance between the outer ends of the two small dou on it. The distance between the outer ends of the two dou of the nidaomang-gong is 76 small cun, which is exactly 19 times 4 small cun. This is set using the modular unit of 4 small cun. As for the other gongs in Table 5, they are all multiples of 0.4 small cun but rarely multiples of 4 small cun. This is because the construction of the bracket sets needs to take into account structural relationships and proportional relationships, so it cannot be set as multiples of 4 small cun.

4.4. The Height of the Exterior Eave Bracket Set(Puzuo)

As shown in Table 6 and Figures 4, 5, 6, and 7, the sizes of the various levels of timbers are clearly defined. The distance from the pua-pai-fang to the liao-yan-tuan(eave purlin) is 56 small cun, which is a multiple of 4 small cun.

Table 6. Height of Bracket Set.

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Table 6. Height of Bracket Set

The chi is 299.39mm

bracket set on columns	original numbers			Fitting number			Similarity rate	Remarks
	mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun		
Diameter of purlin	210	7.014	8.417	7	8.4	21	99.80%	(SXZDGJ 2019,102) First floor Dang cai198.8mm(Lü, Zheng, and Jiang 2017.113)
cantilever block(Ti Mu) of ridged purlin	130	4.342	5.211	3.333	4	10	76.77%	
dou and regular arm	280	9.352	11.223	9.333	11.2	28	99.80%	
Second floor Zu cai	280	9.352	11.223	9.333	11.2	28	99.80%	
First floor qi	90	3.006	3.607	3.000	3.6	9	99.80%	
First floor Dang cai	198.8	6.640	7.968	6.667	8	20	100.40%	
cap block	120	4.008	4.810	4	4.8	12	99.80%	
pua-pai-fang	120	4.008	4.810	4	4.8	12	99.80%	
The distance from the pua-pai-fang to the liao-yan-Tuan	1420	47.430	56.916	46.667	**56**	140	98.39%	

bracket set on hypostyle column	original numbers			Fitting number			Similarity rate	Remarks
	mm	Convert to cun	Convert to small cun	cun	small cun	0.4 times the small cun		
Second floor Zu cai	290	9.686	11.624	9.667	11.6	29	99.80%	(SXZDGJ 2019,101)
First floor Zu cai	295	9.853	11.824	9.667	11.6	29	98.11%	
cap block	160	5.344	6.413	5.333	6.4	16	99.80%	
合计	745	24.884	29.861	24.667	29.6	74	99.13%	

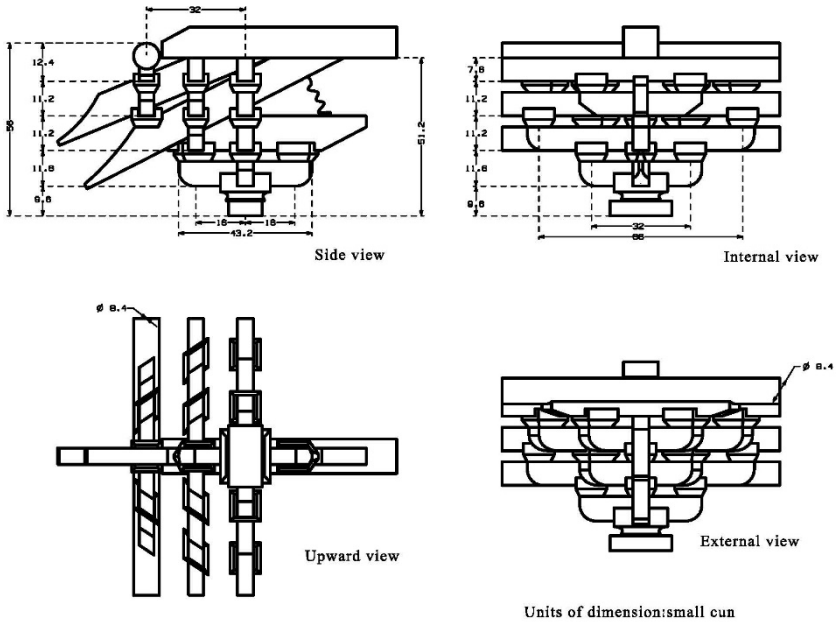

Figure 6. Schematic diagram of the column head bracket set on the front eave

Figure 6. Schematic diagram of the column head bracket set on the front eave.

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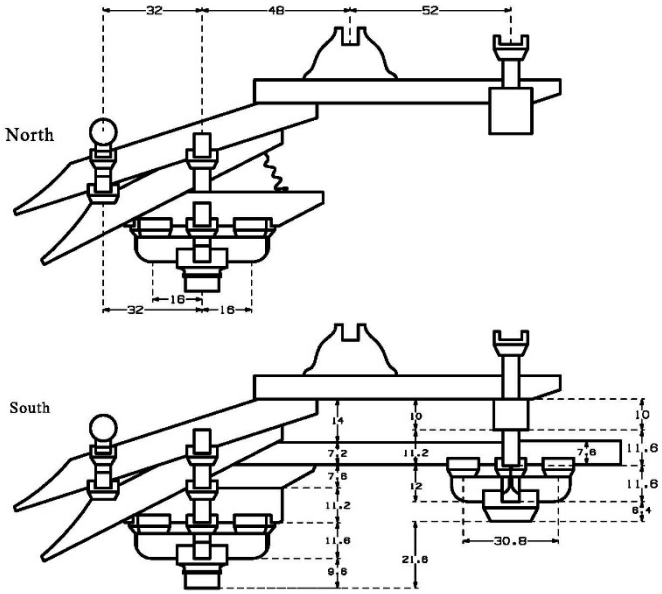

Units of dimension:small cun

Figure 7. Schematic diagram of the bracket sets on the gable side and inner columns

Figure 7. Schematic diagram of the bracket sets on the gable side and inner columns.

4.5. Arrangement of Bracket Set Parameters and Distances

The main parameters of the bracket set are as follows: the Length of the out-jump is 32 small cun. the width, measured from the outer ends of the two small dou on the gong , is 76 small cun.The height of the bracket set is 56 small cun. For large-scale timber framing, the bracket set is a distinctive feature, and the bay width is the key to the structure. The bay width, the length of the xin chang of the nidaomang-gong(The second-layer axial bracket arm),and the length of the out-jump of the bracket set are a set of related data.

There are three types of bay widths in this hall: 124 small cun, 100 small cun, and 64 small cun. The lengths of the gongs are shown in Table 5, and their arrangements are illustrated in Figures 8, 9, and 10. This layout is logical and practical. The underlying design concept is to prioritize ensuring the large framework and large dimensions, while small components are adjusted according to the structure and requirements. It is not the case that the width of the bracket set is specified first, and then the distance between the bracket sets and the bay width are coordinated.

Table 5. length of the heart (assembly node) and length of the bracket set .

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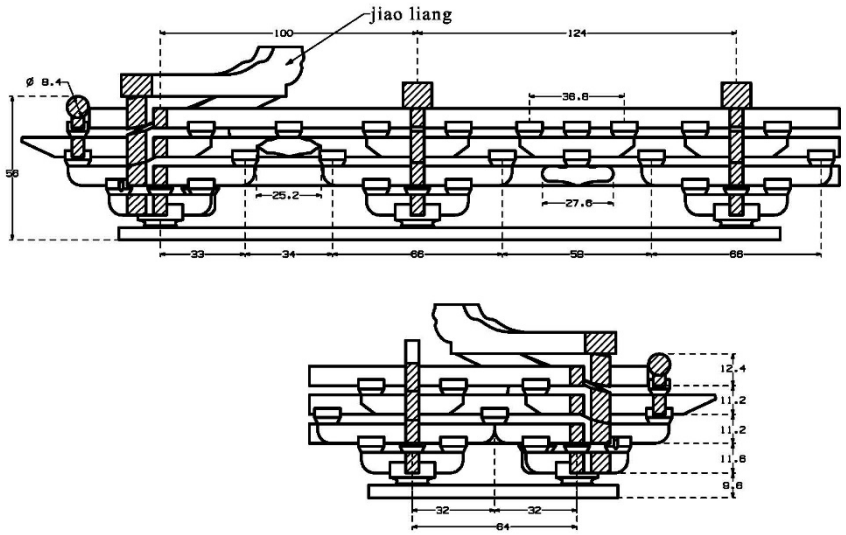
Table 5. length of the heart (assembly node) and length of the bracket set

The chi is 299.39mm

		original			Fitting number				拟合栱心长				备注
		mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun	Similarity rate	Width of the dou bottom	small cun	Multiples of 0.4 small cun	cun	
axial bracket arm	Length of gong	990	33.067	39.681	**33**	39.6	99	99.797%	7.6	32	80	66.667	(SXZDGJ 2019, 102)
Second axial bracket arm		1840	61.458	73.750	61.333	73.6	184	99.797%	7.6	66	165	137.5	
flower arm		1077	35.973	43.168	36	43.2	108	100.075%	11.2	32	80	66.667	
the length of outer first jumps		400	13.360	16.033	13.333	16	40	99.797%					(SXZDGJ 2019, 102)
the length of outer second jumps		400	13.360	16.033	13.333	16	40	99.797%					
Total outer jump length		800	26.721	32.065	26.667	32	80	99.797%					
the length of inner first jumps		400	13.360	16.033	13.333	16	40	99.797%					
axial bracket arm of hypostyle column	Length of gong	960	32.065	38.478	32	38.4	96	99.797%	7.6	30.8	77	25.667	(SXZDGJ 2019, 101)
flower arm of hypostyle column		1040	34.737	41.685	34.667	41.6	104	99.797%	11.2	30.4	76	25.333	



Units of dimension:small cun

Figure 8. Schematic diagram of the layout of bracket sets

Figure 8. Schematic diagram of the layout of bracket sets.

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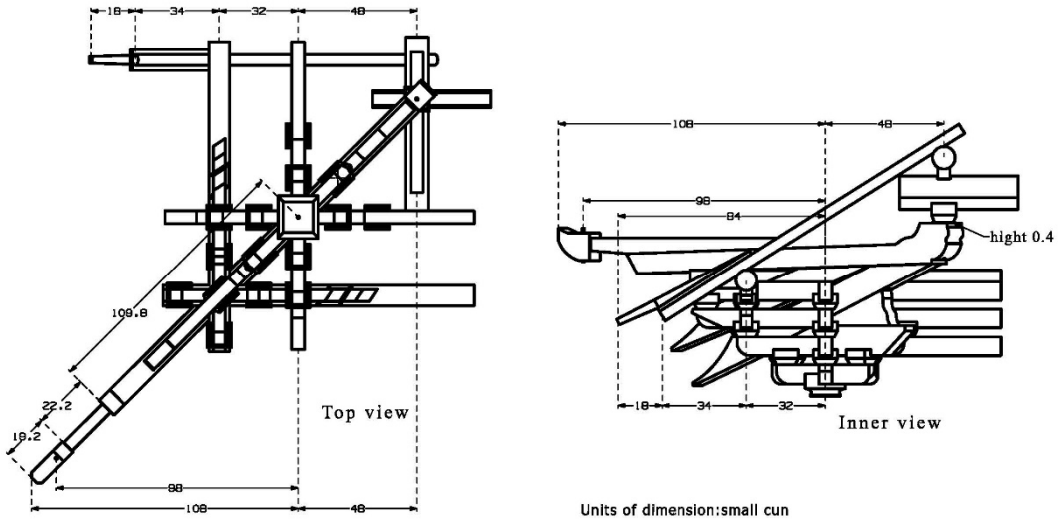

Figure 9. Schematic diagram of the corner bracket set

Figure 9. Schematic diagram of the corner bracket set.

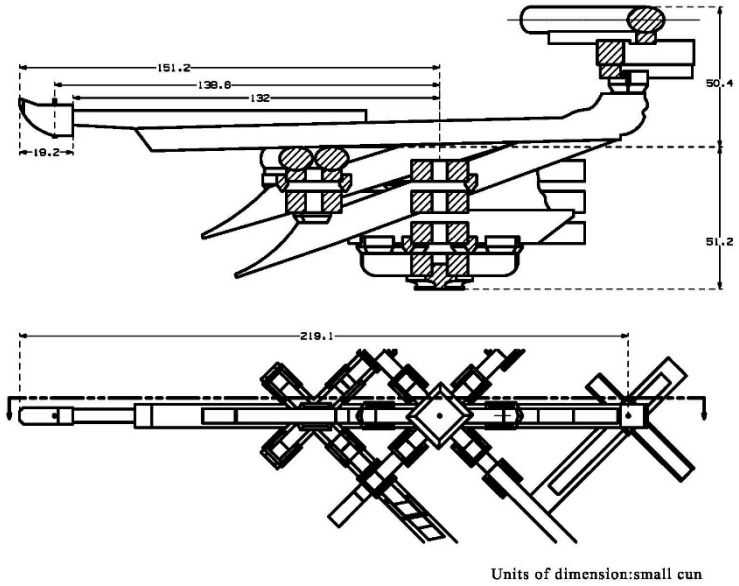

Figure 10. Schematic diagram of the 45-degree sectional view of the corner bracket set

Figure 10. Schematic diagram of the 45-degree sectional view of the corner bracket set.

5. Beam Frame(shang jia)

5.1. Adjustment of the Jia Dao(Horizontal Spacing Between Purlins)

As shown in Figure 11.A prominent feature of this hall is that the horizontal beams (3-purlin beam) cantilever and jump outwards. and the intermediate purlin is not aligned with the gable

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column.This technique is similar to that of Nanchan Temple. The difference is that in Nanchan Temple, the horizontal beam (3-purlin beam) does not project outward; instead, the position of the camel-hump shaped support (tuofeng) is adjusted.This adjustment is made to make the jia dao uniform.

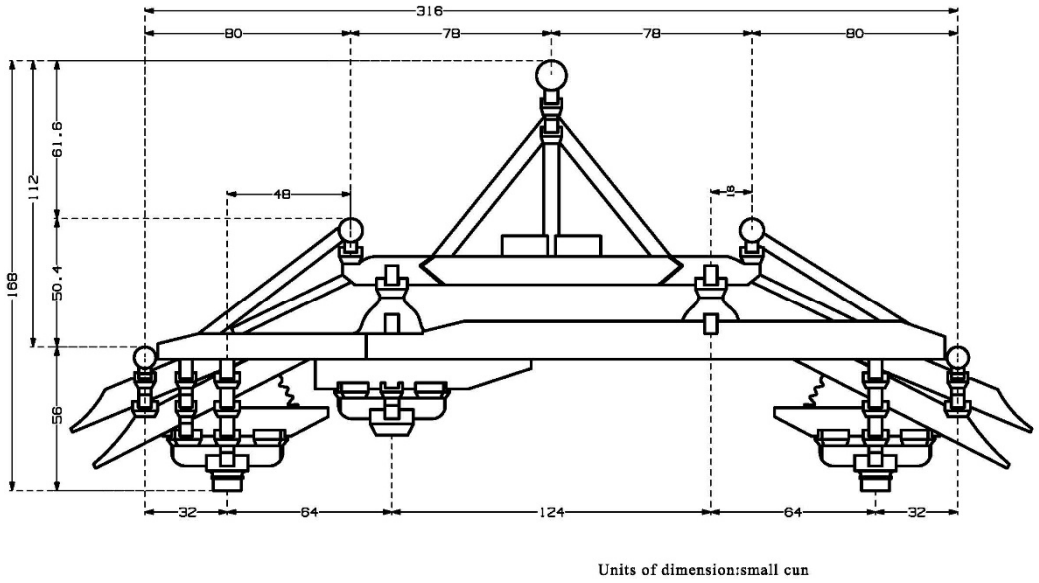

Figure 11. Schematic diagram of the upper structure.

Figure 11. Schematic diagram of the upper structure.

5.2. Raising the Purlin(Ju Zhe)

As shown in Table 8 and Figures 3, 4 and 12.The total lift is 112 small cun. Taking 8/9 of the total lift and connecting it to the upper surface of the eaves purlin, the lift height of the intermediate purlin can be known as 50.4 small cun. The essence of this algorithm is proportional distribution.

Table 8. raising the purlin(ju zhe).

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Table 8 raising the purlin(ju zhe)

The chi is 299.39mm

	original numbers			Fitting number			Similarity rate	slope
	mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun		
horizontal spacing between eave purlin and intermediate purlin(Yan bu)	2010	67.137	80.564	66.667	80	200	99.30%	0.63
Vertical spacing between eave purlin and intermediate purlin	1250	41.752	50.102	42	50.4	126	100.60%	
horizontal spacing between ridged purlin and intermediate purlin(Ji bu)	1910	63.796	76.556	65	78	195	101.89%	0.7897
Vertical spacing between ridged purlin and intermediate purlin	1560	52.106	62.527	51.333	61.6	154	98.52%	
Total length	3920	130.933	157.119	131.667	158	395	100.56%	0.7089
Total height	2810	93.858	112.629	93.333	112	280	99.44%	

(SXZDGJ 2019,101)

5.3. side Beam Frame(Xitou Fu)

the Xitou fu is associated with the 3-purlin beam and the hip rafer(jiao liang)。As shown in Figures 3, 4, 9 and 10. As listed in Table 7.Based on the original data, the fitted distance between the Xitou fu and the 3-purlin beam is 52 small cun.The principal ridge is based on two Xitou fu,The distance between the left and right Xitou fu is 228 small cun.The ratio of this number to the overall width of the Damuzuo is 19:27.

6. Parameters of Building Appearance

Eave rafter, flying rafters, small corner beams(zi jiao liang), animal-shaped ornaments on the eaves corners(Tao shou), chiwen (ornamental ridge-end tiles), tile, etc. are located at the outermost part of the building. Exposed to the wind and rain, they are extremely vulnerable to damage and were very likely to be repaired or replaced throughout history. SXZDGJ(2019,24) speculates that the two chiwen should be relics from the Ming Dynasty, while the drawings reflect the current state since modern times and may not necessarily be the original components from the initial construction. However, there must be a basis for every repair of these components. When replacing old ones, craftsmen would always find a similar-sized substitute. Even if it was simply sawed short, it was an adaptation to local conditions, embodying the restoration methods of different periods and under various circumstances. These components represent the appearance of the building, are the image presented to the public, and are the key parameters in design and construction. It would be a pity not to explore these parameters. Fortunately, ancient Chinese buildings are exquisitely shaped, and the ancients must have paid attention to proportional and structural relationships. Taking the current state as a reference, this article will analyze and discuss from the aspects of proportion and integral dimensions, so as to fathom the thinking of the ancients.

6.1. Parameters of Building Appearance

As shown in Table 9 and Figure 9, the rafter cantilevers 34 small cun, the flying rafter cantilevers 18 small cun, the bracket set cantilevers 32 small cun, and the head of the flying rafter cantilevers 84 small cun from the center of the eaves column, which is exactly 7 chi. As shown in Figures 3 and 4,

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the distance between the east and west flying rafter heads is 492 small cun, equivalent to 41 chi. The distance between the north and south flying rafter heads is 420 small cun, equivalent to 35 chi.

Table 9. Eaves and tile ridges.

Table 9. Eaves and tile ridges

				The chi is 299.39mm			
	original numbers			Fitting number			Similarity rate
	mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun	
horizontal projection of the rafter	860	28.725	34.470	28.333	34	85	98.64%
horizontal projection of the flying rafter	450	15.031	18.037	15	18	45	99.80%
horizontal projection of the flying rafter head from the center of the eaves column	2110	70.477	84.572	70	84	210	99.32%
distance between the east and west flying rafter heads	12320	411.503	493.804	**410**	**492**	1230	99.63%
distance between the north and south flying rafter heads	10460	349.377	419.252	**350**	**420**	1050	100.18%
length of the Taoshou	480	16.033	19.239	16	19.2	48	99.80%
horizontal spacing between center of the column and Taoshou(45-degree angle)	3752	125.321	150.386	126	151.2	378	100.54%
horizontal spacing between center of the column and Taoshou	2653.065	88.616	106.339	90	108	270	101.56%
the distance between the east and west Taoshou	13396.129	447.447	536.937	**450**	**540**	1350	100.57%
the distance between the north and south Taoshou	11545.129	385.622	462.746	**390**	**468**	1170	101.14%
The distance from the bottom of the eaves column to the upper surface of the ridge purlin	7235	241.658	289.990	**240**	**288**	720	99.31%
From the upper surface of the ridge purlin to the bottom of the ridge tile	525	17.536	21.043	18.333	22	55	104.55%
The height of the chiwen (ornamental ridge-end beast)	1790	59.788	71.746	60	72	180	100.35%
Taigong Lou (decoration in the center of the roof ridge)	2130	71.145	85.374	71.667	86	215	100.73%
The distance from the ridge purlin to the Taigong Lou	2655	88.680	106.416	90	108	270	101.49%
The distance from the bottom of the eaves column to the Taigong Lou	9890	330.338	396.406	**330**	**396**	990	99.90%
The distance from the bottom of the eaves column to the chiwen (ornamental ridge-end beast)	9550	318.982	382.778	317.5	381	952.5	99.54%
Taiming				30	36	90	假设
From the bottom of the Taiming to the upper surface of the Taigong Lou				**360**	**432**	1080	

(SXZDGJ 2019,93-105)

6.2. Animal-Shaped Ornaments on the Eaves Corners(Tao Shou)

As shown in Table 9 and Figure 9, the horizontal length from the center of the column to the front and side of the taoshou is 108 small cun, which is equal to 9 chi. The dimensions of the building's four boundaries are crucial parameters, as they are related to the floor area occupied by a single building, the planning and layout of the temple, and may also involve land donations, grants, or transactions. Therefore, designers must prioritize these data. As shown in Figures 3,4, and 12, and Table 9, the distance between the east and west Tao shou is 540 small cun, equivalent to 45 chi, and the distance between the north and south ones is 468 small cun, equivalent to 39 chi. These are the four boundaries of the building.

6.3. Overhanging Eaves(chu ji) and Main Ridge

As shown in Table 7, the overhang eaves(chu ji), which measures 1150 millimeters, is converted to 46 small cun. Excluding the tile, taking the outer surface of the gable fascia board as the boundary, the length of the main ridge (between the overhangs) is 320 small cun. When including the tile components, the estimated length of the main ridge is 332 small cun. As shown in Figure 3, the distance between the east and west taoshou (animal-shaped ornaments at the eaves) is 540 small

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inches. The ratio of the length of the main ridge to this distance is 0.61111, which meets the golden ratio.

Table 7. Adjustment of the beam frame(shang jia).

Table 7. Adjustment of the beam frame(shang jia)							
				The chi is 299.39mm			
	original numbers			Fitting number			Similarity rate
	mm	Convert to cun	Convert to small cun	cun	small cun	Multiples of 0.4 small cun	
Distance between the north and south eave-supporting purlins	7840	261.866	314.239	263.333	316	790	100.56%
Distance between the north and south eave-supporting purlins	9690	323.658	388.390	323.333	388	970	99.90%
(3-purlin beam) projects outward	365	12.191	14.630	13.333	**16**	40	109.37%
The distance between the Xitou fu and the 3-purlin beam	1300	43.422	52.106	43.333	**52**	130	99.80%
horizontal spacing between eave purlin and intermediate purlin(Yan bu)	2010	67.137	80.564	66.667	80	200	99.30%
Yan bu of gable side	2005	66.970	80.363	66.667	80	200	99.55%
horizontal spacing between ridged purlin and intermediate purlin(Ji bu)	1910	63.796	76.556	65	78	195	101.89%
the overhang(chu ji)	1150	38.411	46.094	38.333	46	115	99.80%
main ridge(Not including roof tiles)	7980	266.542	319.850	266.667	**320**	800	100.05%
main ridge(estimate)				276.667	**332**	830	estimate
	(SXZDGJ 2019,101)						

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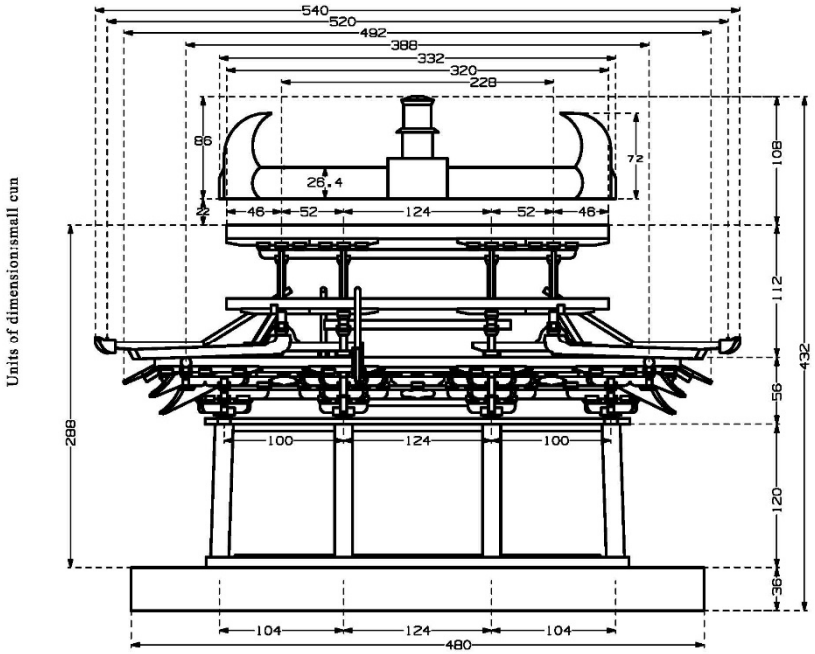

Figure 3. Front view schematic diagram

Figure 3. Front view schematic diagram.

6.4. Height

As shown in Table 9, Figures 3 and 4. The distance from the bottom of the eaves column to the upper surface of the ridge purlin is 288 small cun, and the distance from the upper surface of the ridge purlin to the upper surface of the Taigonglou(The decorative tile pieces in the middle of the roof ridge) is 108 small cun. The overall height, including the terrace, is 432 small cun, which is equivalent to 36 chi.

The sum of the column and the bracket set is 176 small cun. The height from the bottom of the column to the upper surface of the ridge purlin is 288 small cun. The ratio between the two is 0.611111, which conforms to the golden ratio. The height from the base of the hall to the upper surface of the eaves purlin is 212 small cun, and the total height is 432 small cun. The ratio between the two is 0.49074, close to 1:2.

7. Architectural Modulus

Review Tables 1 to 10 and Figures 1 to 12. The measurement units used for this hall include cun, small cun, and 0.4 small cun. The Building module exists in modern architecture(MOHURD 2013). It may be advisable to sort things out with modern concepts.

The main external shape of this hall can be constrained by integer chi, with the basic module being 1 chi.

For the Damuzuo, the ratio of width, depth, and height is 270:210:240, which simplifies to 9:7:8. The common divisor is 30 cun, which is equivalent to 36 small cun The width of the building is 450 cun, the depth is 390 cun, and the overall height is 360 cun. These dimensions also form simple ratios, with a common divisor of 30 cun. Here, 30 cun is three times the basic module of 1 chi, and this serves as an multi-module for the main frame and the exterior.

The widths of each bay, the length of the main ridge, the horizontal lengths of the purlin intervals, the height of the eaves columns, the height and width parameters of the bracket sets, and the total pitch of the roof can all be expressed as integral multiples of 4 small cun. Since 4 small cun is one-third of 1 chi, 4 small cun is a sub-module of the basic module of 1 chi.

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For components such as cai, dou, gong, and bracket sets, the unit of measurement is 0.4 small cun, which is one thirtieth of the basic module. This is also a sub-module.

Table 10. Building appearance parameters.

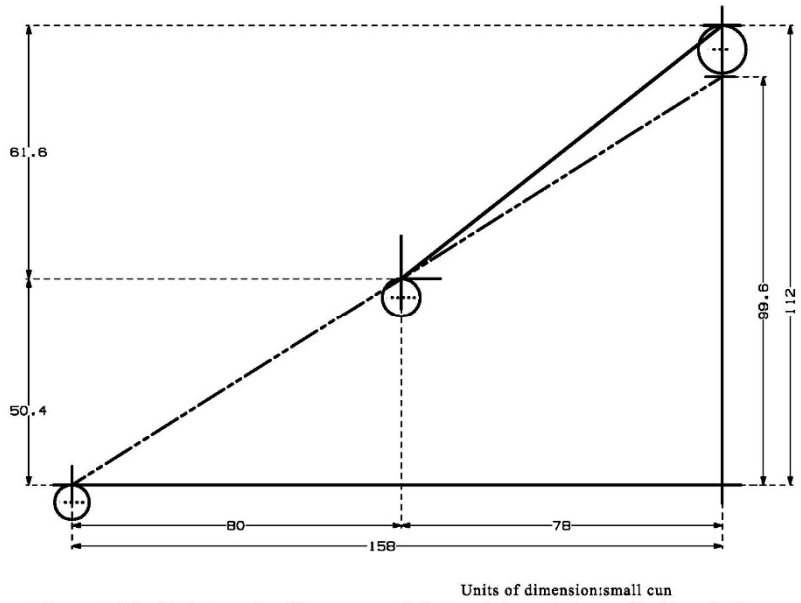

Figure 12. Schematic diagram of the raising the purlin(ju zhe)

Figure 12. Schematic diagram of the raising the purlin(ju zhe).

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Table 10. Building appearance parameters

	cun	small cun	Multiples of 1 chi	Multiples of 3 chi	Multiples of 4 small cun	Multiples of 0.4 small cun
Overall width	**270**	**324**	***27***	***9***	***81***	***810***
Overall depth	**210**	**252**	***21***	*7*	***63***	***630***
Height of the damuzuo	**240**	**288**	***24***	***8***	***72***	***720***
Height of the building	360	432	***36***	***12***	***108***	***1080***
the distance between the east and west Taoshou	450	540	***45***	***15***	***135***	***1350***
the distance between the north and south Taoshou	390	468	***39***	***13***	***117***	***1170***
eave column	100	120	***10***	3.333	***30***	***300***
height of the liao yan tuan (a type of purlin related to the eaves)	146.667	176	14.667	4.889	***44***	***440***
raising the purlin(Ju Wu)	93.333	112	9.333	3.111	***28***	***280***
main ridge(estimate)	276.667	332	27.667	9.222	***83***	***830***
The width of the central bay	103.333	124	10.333	3.444	***31***	***310***
The width of the central bay	83.333	100	8.333	2.778	***25***	***250***
width of the secondary bay in depth	103.333	124	10.333	3.444	***31***	***310***
width of the central bay in depth	53.333	64	5.333	1.778	***16***	***160***
Width of the bracket set	63.333	76	6.333	2.111	***19***	***190***
Height of the bracket set	46.667	56	4.667	1.556	***14***	***140***
Protrusion of the bracket set	26.667	32	2.667	0.889	***8***	***80***
Width of the common cai	4.333	5.2	0.433	0.144	1.3	***13***
Height of the common cai	6.333	7.6	0.633	0.211	1.9	***19***
qi	3	3.6	0.300	0.100	0.9	***9***
Common zu cai	9.333	11.2	0.933	0.311	2.8	***28***

8. Summary

the original construction rule is calculated to be29.939centimetres long.It conforms to the long and short ruler system since the Tang and Song dynasties,Each Ruler length is 10 cun[寸], which is 12 small cun.

the construction module was used. The basic modulus is 1 chi. 4 small cun is the infra module, which is 1/3 of the basic modulus. 0.4 small cun is also a infra module, which is 1/30 of the basic modulus. 30 cun is the multi-module, which is three times the basic modulus of 1 chi. This module is very similar to modern building modules.

The architecture follows proportional relationships under the constraint of integer dimensions. The ratio between the length of the main ridge and the distance to the east and west ornamental beast heads (taoshou) is approximately the golden ratio. The height from the bottom of the columns to the upper surface of the liao yan bo is 176 small cun, and the overall height of the large wooden structure is 288 small cun. The ratio between the two is 0.6111, very close to the golden ratio.

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