

26 Today's CAAD In China

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The research and application of CAAD in China was in about the 1980's. Though a lot of success has been achieved in these ten years or so, the improvement is still relatively minor when compared with some other specialty. In fact there are only very few architects who are really making use of CAAD. In this paper, I would like to analyze the present situation and countermeasure CAAD in China.

1.0 THE SUPERIOR WIN, THE INFERIOR LOSE

Things in the world all follow such rule to live and improve. That is "the superior win, the inferior lose". Take structure specialty for example, the use of computer in structure specialty is only five years earlier than that of architecture specialty, but it is developed quickly and used widely, we may say now that relationship between structure specialty and computer is just like fish and water. The reason why computer have been brought into such full play is that they can solve problems that are impossible or too difficult for man. We can solve a three-elements or four-elements linear equation group, but sometimes, in practice, we run into linear equation group with tens or even up to one hundred elements, then we can only turn to simplified to do approximate calculation if not give up with sighs. In such a case, computers can do things which people can not. Thus the calculating-ruler died out.

Taking drawing tools for another example. In 1960's architects use duck mouth pen to draw ink line drawing paper. In 1970's needle tube pen showed up. It had the advance of fast lining, neat drawing and easy applying. Duck mouth pen was never its opponent, so needle tube pen took the place of mouth pen and was widely used by most architects.

Essentially CAAD is a kind of general subsidiary drawing tools. Its spread and application, can be comprehended as an contest with traditional pen and paper. Who will win the game? Now it's not easy to give out an answer.

2.0 CAAD AND ARCHITECT

Try to analyze the two questions below before we start to think of the countermeasure.

2.1 Virtues and defects of CAAD

CAAD has three merits

- *Predictability* - Once the three-dimensional feature is set up, the out looking of buildings can be fully demonstrated, audio-visual, fast and accurate. This is hard to do only by hands. Because drawing by hands is not able to set up a three dimensional feature, but analyzing the material object can give a even better effect. The demerit of a material object is that the scale is too small and cannot produce the exact watching effect. So on the point of predictability, CAAD can be combined with material object to satisfy the need. As to middle and small construction, only CAAD is enough.
- *Alterability* - To alter the CAAD is much a easy than to alter handicraft and material object. Alteration by hand is possible only to two-dimension, white alteration material object will take a lot of work.
- *Repeatability* - This can be described, concerned with the computer method, as recurrence relation.

It is best shown when mechanization takes the place of manual work. CAAD can give full play to its incomparable advantages when you bump into a great deal of repeating work.

CAAD has two demerits

- *Unconsciousness* - The computer, with its two elements constructive principle, has the ability to show many objective things, just like the Chinese yin and yang fashion which can include every things in the world. But there is a demerit, in spite of its many merits, that the computer can hardly have any positive artificial thinking. On the other hand, architecture just has the trait of both art and engineering. So it is rather impossible to include all architectural designs only by CAAD by now.
- *Inconvenient input method* - This is another main reason for CAAD's slow progress. Those many orders and memorial manipulation seem to be more complicated than only a pen and a piece of paper. People think about several kinds of methods such as nested menu and digitizer menu to solve this problem, but since the architects are not at all accustomed to these methods, they refuse to accept them.

2.2 The main procedure of which the architect complete an building design:

- To get familiar with the environment this includes investigation the site, finding out relevant custom, collecting details etc.
- To think of the appearance of the building this process takes a varied period of time. Sometimes it is completed in a flash, sometimes it can only be completed step by step with the reference books. Plan diagram scheme may be formed simultaneously. Apparently, this is a positive artistic and engineering process. For CAAD, to simulate it is a most difficult job, but this is just what interests the architects most. Some architects even have a prejudice in favor of it, so all later

jobs are done only to prove his thinking. Here the present CAAD has little to do.

- To compare several schemes together. This happens shortly after above or sometimes at the same time with that. It includes architectural composition, plane checkerize, scale and dimension determination of architectural feature, color coordination etc.
- Because the research problem has been quantity by now, CAAD can do a lot here. Essentially speaking. This period of work just has much to do with the merits of the computer. Most of the work is to deal with the data and compare them. Most software used at home and abroad belong to this level. They are confirming the architects' tentative plan or helping them to analyze the buildings broadly, scientifically and auto-visually. For example, the targets may be prospected from different directions and heights before being adjusted, plan composition may be analyzed technically.
- To harmonize different types of work in production. In this period the architect has elaborate jobs to do. He has to bring overall coordination to structure specialty and service specialty etc. CAAD is almost in a state of waiting during this process.
- To deal with the working drawing. This period of work is repeating and mechanical, so the architect will feel quite dull. But this can let us see the great advantages of CAAD. CAAD has a gift of doing those monotonous and repeating jobs. It takes great advantage over human on this point.
- As mentioned above, the author believes that CAAD is a system which is in very strong accordance with its target. Though it can hardly take the place of men's artistic thinking, it really takes apparent advantages over manpower.
- Whether we can combine these two aspects together properly is an important standard to appraise a CAAD. Although it's no doubt that the competent intention will reflect in the architect's thoughts, people do not need to worry that the architects will reject the CAAD for his own benefit.

3.0 COUNTERMEASURE

Now the author would like to offer his countermeasure as below.

- To organize a group of people to research the artistic and the input methods of CAAD in some high-level science and technology units, thus will keep the effect in China.
- To perfect and improve the simplified input method of some appropriate software. Several stronger functional appropriate software have appeared abroad, people find that, in practice, the complex of their operating methods are still the main reason to effect their popularity. The nested menu spread out on the screen or on the digitizer, as to the CAAD of micro-computer, is not easy for architects to accept.

- To use the original supporting software. Why architects are so in favor of the primitive tools as pen and paper is that they don't have to think when they are using them. They can use them to express whatever they are thinking about, thus to keep their brain efficient throughout all the process. From current practice we can see that the exploit of software means, in fact, the arrangement and application of its supporting software (called original software here), so we can try to use the original software as CAAD directly. Some steps of architectural design are not in direct relationship with the fact whether the drawing tools are good or bad. We may be able to reduce some interim links and simplify the operation by using the supporting software originally. The author knows the above points from his own experiences. Using the fundamental supporting software is not just an expedient measure. When an appropriate software is dependent on its original supporting software, it is even difficult to popularize it, because the architect should not only master the appropriate software but also have a thorough understand of the original software before using the appropriate software. In this case, using the supporting software achieves very good results.
- Strengthen the teaching of CAAD. To strengthen the teaching of CAAD is a valuable and the convenient way to help the architects master CAAD. So far, although CAAD has come to be taught in many universities across China, the trend has always been haunted by the lack of money and available equipment take the department of architecture of Tianjin University for example, which I'm in now, CAAD is taught in the senior year, to about 90 undergraduates. They all practice in the computing center of our university due to the lack of equipment, every class only 30 students can get the opportunity to put their knowledge about computer on the line every time that's why it's critical to put more computers to use, and to use the computers more efficiently. When it comes to some small scale universities, the problem may be even more serious. The teacher's attitude toward CAAD has a great influence on the students. Nowadays, some architecture majors don't pay heed to CAAD. They concentrate on the hand-drawn pictures, and ignore the importance of CAAD. This phenomenon has a most of whom are aged. Even some young teachers don't know the basic know-how of computer, let alone guide students to study CAAD.

To solve the above-mentioned problem won't be a snap. It's a long term process, which I reckon will take at least five years.