



CROSS CULTURAL WORKSHOP WITH WOODEN CONSTRUCTION

国际木构工作坊

赵辰 主编

中国建筑工业出版社

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南京大学建筑学院研究生教学中的建构研究, 近年来在木构建造方面有显著的发展。本书记录了由南大建筑学院和挪威奥斯陆建筑与设计学院共同合作的“国际木构工作营”的工作过程: 在南京由挪威学生与中国学生及相关教师完成了两个木构筑物; 随后在挪威的特维德斯特兰德的“挪威森林”中建造了五个木构筑物。从理论研究加模型制作探讨发展到了在真实场景之中的建造, 全过程都在教师以及木工师傅指导下由两校学生共同参与完成。本书可供高等学校建筑学、城市规划、风景园林、艺术设计等专业的师生教学、研究之用, 也可作为广大专业人士学术交流和工程实践的参考用书。

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CROSS CULTURAL WORKSHOP WITH
WOODEN CONSTRUCTION

国际木构工作营

赵辰 主编

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2007. 1, 南京

赵辰

南京大学建筑学院教授

006

南京大学建筑学院研究生教学中的建构研究,近年来在木构建造方面有显著的发展。从理论研究加模型制作探讨发展到了在真实场景之中的建造,全过程都有学生和教师参与。2006年,在原有的木构建造教学的基础上,整个教学程序又发展到新的阶段。由南大建筑学院和挪威奥斯陆建筑与设计学院共同合作的“国际木构工作营”被成功地运作了。“工作营”由两个阶段组成:第一阶段,于2006年9月在南京,十七名挪威学生与两位教师来到南京大学,与十二名中国学生及相关教师汇合,在一个星期之内,完成了两个木构物的现场重新安装。它们是坐落在南大浦口校园的“桥”和“亭”,作为景观建筑基本概念的“移动”(Moving)、“停留”(Staying)之体现;在11月,我们再次在挪威的小镇特维德斯特兰德聚合,开始第二阶段的工作营。在当地业主的协助下,在所谓“挪威森林”中建造了五个木构筑物:“攀爬架”、“迷宫”、“观星台”、“树屋”和“地表延展”,它们是为小镇的小孩运动公园提供各种场所。

工作营带给我们许多重要的建筑教学与研究方面的经验,基本可以分为以下几个概念:“建造”、“木材”以及“国际工作营”。

关于建造

由于今天建筑设计的社会定义已经被多数人接受,我们几乎忘却了在建筑(Architecture)成为一种社会分工和学术科目之前,建造在建筑中是一切的一切。设计原本也包含在建造之中。在当代的建筑生产程序中,建造依然是复杂的设计过程之终结者。作为建筑的作品,必然将由建造来最终传达。因此,在建筑研究和教学中考虑建造总是极为重要的,尽管大多数情况下建筑学院中的设计停留在纸和屏

幕上。

1920年代的德国包豪斯,开始在现代建筑教育中融入建造,其理念是将工艺传统在实用艺术中实现。其中典型的事例是,由格罗皮乌斯(Walter Gropius, 1883-1969)主持的学生工作营在柏林成功地建造了萨默菲尔德别墅(1920-1921),那是一次传统式样的木构建造。作为一极其重要的建构意义上的建筑学理解,建造活动已经在今天世界建筑学院中成为相当普遍的方式。但是,有时会被研究模型,尤其是一比一的足尺模型所混淆。我们应该将教学中的建造明确定义为两个基本条件:一是“真实的尺度”;二是“真实的材料”。这意味着教学中的建造,需要同时满足真实人体尺度和真实建筑材料这两个条件。以此,建筑学的研究将真诚地关注:对材料的感知,光感、色彩以及节点的象征与触觉意义。

关于木材

从理论上讲,建筑用材料是无限制的。人类自古以来运用任意材料来建造;只是今天的建筑工业体系中的常用建筑材料是有一定限制的。在现实的建筑教学之中,我们知道被运用的是少数的几种建筑材料:例如砖、石材、混凝土,还有木材。很显然,木材在学生的工作中是更合理和理想的建造材料。由于在模型材料中,木材已经显示其优点:不仅在于便于操作、加工,以及购买与运输方便;同时木材也在建造活动中充分地显示出材料的真实感。在我们的案例中,木材帮助我们理解真实的木构并且是所有细部的连接。木材再次向我们展示了其建造的优点;以其加工、运输的方便,更以对体系化的设计和建造之影响,并有可能在全过程中装配与重新装配。

关于国际工作营



国际间的工作营常常在世界上的建筑学院受到欢迎：首先，这意味着双方学生的学习热情容易被激发，正是由于对对方文化的兴趣；其次，将大大鼓励设计与建造过程中的探索性，由于给予不同文化背景的观点和观念产生了交流和共享。在这次的木构工作营中，不论是在南京还是在特维德斯特兰德，中国学生和挪威学生各自以其不同的文化背景，互相交流了他们的设计概念、建造方式，以及生活经验。不可避免地有大量的聚会、讨论、争辩，以及幽默和笑声。他们非常成功地在工作中发展了合作对象，在生活中成了朋友。在南京工作营，挪威学生得到了中国学生的大力协助而充分了解了南京城以及中国文化。而在宁静的挪威小镇特维德斯特兰德，中国学生在对方的帮助下，学会了在欧洲的生活和相关的文化。可以肯定地是，这种人生经历将深刻地影响他们未来的工作和生活。

几乎在工作营的第一天，中国学生已经发现他们的挪威合作者在木建造方面要明显更具有能力和经验，在后来的工作过程中挪威学生的作用得到了积极的发挥，而中国学生的努力和勤奋使他们的木构工艺与对建造的理解都有极大的提高。很显然，这种跨文化的工作营，学生们能够从中得到的建筑与设计之知识与体验，是完全不可能在普通的工作室和课堂中得到的。

尽管在建造活动中学生们遇到的困难是不断的，为此，他们必须为之花费巨大，几乎可以以“损失”来形容。但是，以建造工作营是典型的“实践中学习”之教学方法，也同时必然印证另一句名言：“有得必有失”。

Nan Jing, January, 2007
Zhao Chen
Professor SA

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Under the existing framework of tectonic studies in the post-graduate program, the School of Architecture in Nanjing University has developed construction work, especially with wood, in recent years. It moved from theoretical research with exploring model making to the realistic construction in site, whole process is involved by students and teachers. In 2006, based upon the experience of wood construction in studio of last year, the program has been successfully developed to a new stage, an international student workshop lunched with the cooperation between the School of Architecture, Nanjing University and the School of Architecture and Design in Oslo (AHO) in Norway. The workshop formed by actually two phases, the first one acted in September 2006, Nanjing, 17 Norwegian students headed by two teachers from AHO, together with 12 students and some teachers from NJU, within one week, we resembled two objects of wooden construction, a "Bridge" and a "Pavilion" corresponded to concepts of "Moving" and "Staying", at the Pukou Campus of NJU. Then, in November, we gathered again at Tvedestrand, Norway, to run the workshop in second phase, with local client to construct five objects of "Climbing", "In and Out", "Stargazing", "Tree House" and "Play Ground" in the Tvedestrand Aktivetpark of "Norwegian woods".

The workshop brings to us crucial experience in architectural teaching and study, which can be represented as three concepts of "Construction"; "Wood" and "Cross Cultural Workshop" as following:

On Construction

Since today's social definition of architecture design is accepted by the most people, we almost forget the fact of that construction had been everything in building process, before the architecture became a kind of academic discipline in school and a profession in society. Design should be included in the process of construction. Even in contemporary produce program of architecture, construction would be the terminator of complicated design process. As a works of architecture, should be at last delivered by construction. Therefore, it should be always important to consider about the construction in architectural studies and teaching, however in most cases architectural school spend more time in design with paper or screen.

Bauhaus in 1920's, started to merge construction into the modern architecture education, just in meaning of to realize the craftsman tradition in applied arts. Typically, Walter Gropius (1883-1969) conducted a student workshop to build Sommerfeld House (1920-1921) in Berlin, which was a wooden construction in traditional style. Construction, as the important process for students to understand architecture concerned with tectonic meaning, becomes pretty popular way to be developed in today's architectural schools in the World. However, it would be sometime confused with modeling, especially when the models with real size of one to one scale. We shall define construction in studio with both elements of "real size" and "real material", which



means construction in studio should be realistically related to human scale and building materials. With it, architectural study would be authentically concerned in the sensuous qualities of materials, light, and color, and in the symbolic, tactile significance of the joint.

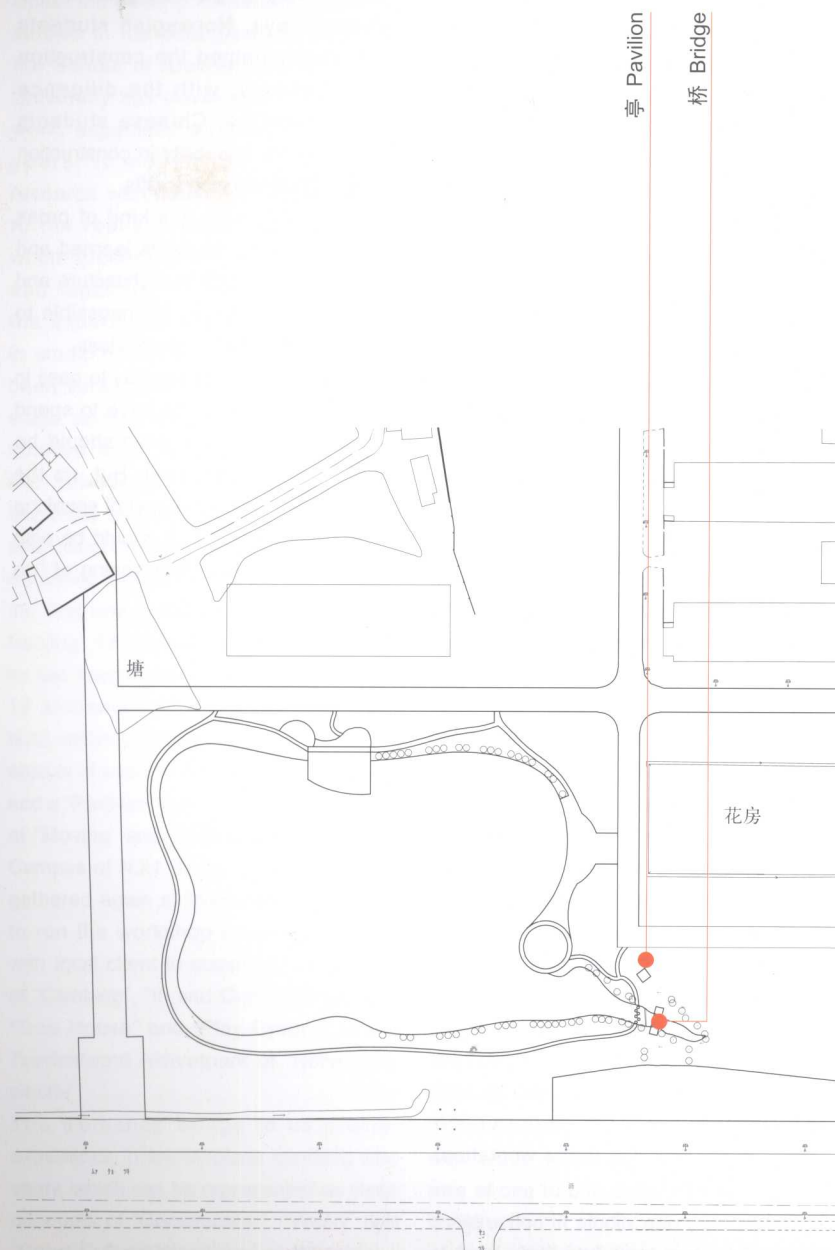
On Wood

Theoretically, building materials are unrestricted. Human happened to utilize any different material in construction historically; however there is certain limitation of popular materials in today's building industry. To be realistically in architectural study, there are basically existed few kinds of building materials one can see: they are bricks, stone, concrete as well as wood. Nevertheless, we find wood should be more than reasonable and ideal material to be applied in studio for students work. Since wood as the model material already shows the advantages of easy taking and working, cheap to have and for transport, but also shows real material feeling. In our case, the wood material helped us to understand exact wooden construction in very detailed joints. Wood shows again even advantage and quality in the construction practice; because of the convenience in manufacturing, transporting, further more with the systematic design and construction, it is possible to assemble and disassemble within the whole process.

On Cross Cultural Workshop

Cross cultural workshop has been often welcome by many architectural schools in the World: The first of all, it would motivate the passion of students from both sides, since curious of other cultures; Secondly, it would encourage the exploring in the process of design and construction, since different views be exchanging and sharing. With this wooden construction workshop, in Nanjing or in Tvedestrand, Chinese and Norwegian students exchanged each other with design concepts, construction ways, also the life experience, certainly based upon their culture backgrounds. There were inevitable meetings, discussions, arguments, and humors, laughing; they developed very well their team-mates in working, and friends in their life. When the workshop in Nanjing, students from Norway were helped by Chinese students to know the city and Chinese culture very detailed. While in Tvedestrand, a quite and small town at the south coast of Norway, with helps of locals, students from Nanjing learned to life and understand the European culture. It is sure that, those experiences will influence very much them for their life and profession in the future. Chinese students found their Norwegian cooperators are much capable and experienced in wooden construction almost at the first day of the workshop,

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whatever boy or girl. So that on the following days, Norwegian students continuously helped the construction work positively; with the diligence and hardworking, Chinese students developed their capability in construction and specifically on woodcrafts. It is clear that, with this kind of cross cultural workshop, students learned and experienced so much in architecture and design, which certainly is impossible to be gained in normal studio or class. However, there is no easy way to pass in construction, so students have to spend a lot in the workshop, even should be "pain" in certain meaning. But, as the construction workshop is sort of speaking as "learning by doing", it should be also demonstrated as another saying of "no pain, no gain".





南京

NANJING

2006.03-2006.09

2007.7, 南京
周凌
南京大学建筑学院副教授

012

南京大学建筑学院与奥斯陆建筑学院国际联合木构工作营,于2006年9月开始,至2006年11月底结束。活动分为两个阶段:第一阶段工作营地点在南京,奥斯陆建筑学院一行29名同学与南京大学12名研究生在南京大学浦口校区搭建一个木结构亭子和一座木结构桥;第二阶段南大学生前往挪威,在挪威南部风景优美的小镇特维德斯特兰德(Tvedestrand),与挪威学生一同在紧靠峡湾的公园内设计建造五个木结构建筑:“树屋”(Tree house),“攀爬架”(Climbing),“迷宫”(In and out),“地表延展”(Playground),“观星台”(Stargazing)。

第一阶段(南京阶段)的活动是南京大学建筑学院“材料与建造”课的延续,这个课程每年春季开课,对象是一年级硕士研究生,目的是训练学生动手能力与建构思维。针对国内建筑教育重视图面而轻视建造的现象,课程关注重点是材料、结构、构造、节点、建造等技术性问题。这些问题不仅影响建筑的实际使用,也影响形式,是最终形式的重要组成部分。2006年建构课由冯金龙教授与周凌副教授共同担任,课程前期进行四个真实比例的公园小品设计建造。其中一个候车廊、一个休息平台、一个亭子和一座木拱桥。另外一门重要的课程是赵辰教授开设的“中国木建构文化研究”,课程中不仅有关于中国传统木构文化的理论研究,也包括一些木工基础训练,如做木凳,制作“六木同根”等,通过亲身体验,对木构开始有所理解。在两门课三个老师共同指导下,完成了最后的1:1真实木构建造。在本校建构课结束后,南大建筑学院选派12个同学,与奥斯陆建筑学院的同学组成联合工作营,于2006年9月,用一周时间在南京大学浦口校区搭建两个木构建筑——木亭与木桥。

第二阶段(挪威阶段)的活动是在挪

威的公园中建造木构小品,中方学生一行12人于2006年10月飞往挪威,开始为期两周的建造活动。两国学生为小镇的开放式公园工作,公园三面环山,一面是海,五个建筑小品就是为当地的孩子和残疾人设计的。峡湾(fjord)是挪威举世闻名的地貌,海水深入陆地,两侧是犬牙交错陡峭山崖,特维德斯特兰德小镇正是因其峡湾而得名。中方带队老师周凌副教授、程云杉博士与工作营同学一道,每天从小镇步行到峡湾公园山顶工地,配合同学并解决一些技术问题。这次活动的赞助商有两个:一个是小镇的镇委会,一个是小镇上的一家大型轮船设备制造企业。碰巧的是,这家企业在中国的分厂正好设在南京,产品一部分提供亚洲市场。镇委会的几个工作人员每天到现场积极配合施工。最终完成的五个小品各具特色。

进入公园,第一个看到的便是由陈永乐、柳巍等人和挪威学生建造的“树屋”——在橡树林中选择3棵大树当支撑柱,平台和房子就搭在离坡地7m高左右的空中。由于是悬空操作,未知因素很多,两国学生在设计上只花了一天时间。中国学生与挪威学生设计理念差异很大,中国学生认为需要再加些支撑柱,保证“树屋”的稳定,但挪威学生却反对任何添加,他们觉得“树屋”随着树一起晃动,甚至随着树的生长慢慢长高才是最贴近自然的。“树屋”里还专门加了床,学生们认为睡在里面听鸟叫的感觉一定很美。在具体的建造中,安装平台所需要的3根木梁居然花费了整整3天时间。在去挪威之前学生们从未想过要在树上工作,由于没有大型施工机械,自己做了梯子,测定距离的办法是爬到梯子顶端拉起绳子量,为了把沉重的木梁拉上去,他们还专门制作了简易滑轮。“树屋”的对面是“攀爬架”。“攀爬架”的构思是,几个3m见方的立方体空中叠加,每层平台向不同方向出挑,像一个有



动感的向上生长的构筑物。这个小品实施相比之下最顺利，立柱搭好，再搭每层平台楼板，之后重复叠加就行。技术难度不大，主要依靠数量累积取得效果。

“攀爬架”旁边的缓坡地便是“迷宫”的基地。“迷宫”的构思是，森林中相对平缓的坡地上，建造一组可以旋转的木板墙体，形成一个内外空间可以相互转换的活动场地，孩子们通过旋转木板来自组合空间，他们会发现一个有趣的现象，经过旋转，一些外部空间突然会变成内部空间。建造最初构思旋转依靠轴承实现，后来因为加工、维护等原因，改为比较简单的双层套管旋转构造。“地表延展”位于“迷宫”旁边的陡峭坡地。“地表延展”的构思是，在森林陡峭的坡地上顺应起坡方向，制作一组起伏的地板，像自然地形起伏一样，孩子们可以在上面走动、游玩、休息。在搭建细节中，两国学生充分考虑到了儿童和残疾人的需要，比如地面木条间的缝隙宽度，不能太窄——落叶卡在缝隙中结霜会使孩子滑倒，不能太宽——不至于让轮椅的轮胎卡在缝隙中，要让它们顺利通过。

“观象台”位于整个基地的最高山头，是建造难度最大，也是最特殊的一个基地。“观象台”风景最美，视野开阔，引人入胜。当初学生们的考虑是在山顶建造标志性建筑，但在一起商讨后认为，“观星台”建造的的目的是为了防止昂贵的天文望远镜被淋湿、被盗，有一个覆盖物就可以了，设计简化到最后，就是一个一人高的木盒子，加上一块 $4\text{m} \times 8\text{m}$ 的木平台。设计时，考虑到观测者休息的需要，特意在木盒中安排了一个人的座椅。实际上，木盒子本身既是望远镜的遮蔽物，又是一只带顶的大椅子。更巧妙的是，为了满足更多观测者的参与，这只木盒可以在平台上移动，人多的时候把盒子挪开，人们就能很方便地在望远镜旁围观。

经过两周工作，五个建筑小品完成了主要结构部分，其中观象台、旋转迷宫、攀爬架、游戏场全部完工，已经可以投入使用。树屋因为建造难度过大以及其他一些技术原因没有完成上部结构，镇委会的工作人员表示他们将继续完成。建造活动结束后，当地的小孩子们已经成为第一批使用者，他们在攀爬架、地表延展上快乐地玩耍，好奇地旋转着木屏风。挪威虽然是一个十分发达、现代化的国家，但人们的传统家庭观念很强，多数家庭都有一两个孩子。由于人们都喜欢小孩，便自然都关注这些大型“玩具”，家长们常常背着孩子来工地，参观建造活动，了解进度。当地一些报纸也进行了报道，甚至有一些其他小镇的家长也因为看到报道专程带孩子来参观建造活动。联合工作营顺利完成了主要木建筑的建造，完成了建造活动，两方同学的工作，得到了当地镇委会的大力赞赏。尤其是中方同学，刚开始对木工工具与技术都不熟练，但他们勤奋学习，最终得到了镇委会工作人员的再三肯定和褒奖，当地人十分感谢这些来自远方国度的勤奋而聪明的青年们。

更有意义的是，通过亲身建造体验，学生们充分体会到了材料特性、材料构造方式及其表现形式以及尺度等问题，体验到了材料的重量，理解了重力对于建筑学的意义，不是纸上画画就能成为建筑师。木材作为主要的建筑用材之一，其特殊的材料性能、构造和结构方式体现了丰富的意义和内涵。材料是建筑的物质基础，材料的合理选择和使用是一个基本问题，此次建构教学基于对材料基本的物理力学性能、使用特性、连接方式以及建造技术特点等，通过实际建造的过程，帮助学生们思考由材料、结构和构造方式所形成的木构造的逻辑关系，理解形式产生的物质与技术基础。

Nan Jing, July, 2007
Zhou Ling
Associate Professor SA

014 The International Workshop for Wooden Construction of School of Architecture of Nanjing University(SA NJU) and Oslo School of Architecture began in Sept., 2006 and ended at the end of Nov., 2006, of which the activities included two parts: in part 1, all the activities were conducted in Nanjing, where 29 students of the Oslo School of Architecture and 12 overgraduates of Nanjing University built a wooden gloriette and a bridge in the Pukou campus of Nanjing University. In part 2, the students of Nanjing University came to Norway, together with the Norwegian students, designed and built five wooden buildings in the park close to the fjord of Tvedestrand, a small town in Southern Norway with very beautiful landscaping, namely Tree house, climbing, In and Out, Playground and Stargazing.

The activities in the first stage (Nanjing Stage) were the continuation of the course on Material and Construction held by the School of Architecture of Nanjing University. Such course, targeting grade one overgraduates, begins in the spring of each year for the purpose of training the manipulation capacity and new concept building of students. As the domestic architectural education thinks much of the architectural drawing and makes light of the construction, such course focuses on the technical issues relating to materials, structure, construction, joint and building. These issues relating to the influence upon both the practical utilization and the form of the building serve as the key part of the final form. In 2006, Professor Feng Jinlong

and Associate Professor Zhou Ling were assigned to teach the architectural construction course jointly. During the whole course, the prophase was related to the design and construction of the four works in a park (in real size), including one waiting room, one resting platform, one gloriette and one wooden arch bridge. Another important course is the Study on the Culture of the Wooden Architectural Construction in China and Professor Zhao Chen is assigned to teach this course. Such course not only covers the theoretical research on the culture of the traditional wooden construction in China but also includes some fundamental architectural training (i.e. making wooden stool and building Liu mu tong geng, etc.). Through practical experience, the students may have a basic understanding to the construction course. As for these two courses, all the participants completed the final true wooden construction with a scale of 1:1, under the instruction of three teachers.

At the completion of the architectural construction course, 12 students of SA NJU were selected and constituted a joint workshop in cooperation with the students of Oslo School of Architecture. In Sept., 2006, the joint workshop built two wooden architectural buildings in the Pukou campus: a wooden gloriette and a wooden bridge.

The activities in the second stage (Norway Stage) were to build wooden construction works in a park in Norway. In Oct., 2006, a dozen Chinese students flew to Norway and commenced the construction that lasted two weeks. The students from both

nations worked for the open park of the town named Tvedestrand. This park is surrounded on three sides by mountains and one side by sea, in which five buildings are designed for local children and the disabled. The fjord is a worldwide well-known scenic spot in Norway, where the seawater penetrates into the continent and the cragged cliffs are interlocking on both sides. The fjord alone makes the small town of Tvedestrand famous. Professor Zhao Chen and Assistant Professor Zhou Ling, the leading teachers of the China Party, and Doctor Cheng Yunshan, together with the students of the workshop, came to the Fjord Park on foot every day and helped the students solve some technical issues. There were two sponsors of this activity, one was the town committee of the town Tvedestrand and another was the large size ship equipment manufacturer located in the small town. It was unplanned that the branch factory of this manufacturer was situated in Nanjing, of which the products it manufactured were supplied for the Nanjing and Asian markets. Every day, several employees of the town committee came to the site and assisted in the construction actively. In the fjord park, all the five works were featured with specific characteristics.

Entering the park, the first object that came into sight was the tree house built by Chen Yongle, Liu Wei and some others together with Norwegian students. They selected three oak trees as the supporting column for the platform and house about seven meters high from the ground. As every operation

was conducted in the open air, there were many unknown elements. The students from both nations took one day in design, where they differed from each other greatly with respect to the design concept. The Chinese students thought to add more supporting columns for the assurance of the stability of the tree house, but the Norwegian students opposed any additions. In mind of the Norwegian students, it was approached mostly to the naturality that the tree house swung with the trees, even grew up with the trees. In the tree house, a bed was designed and purposely built, as the students considered it might be charming to sleep in the tree house while listening to bird's sing. During the process of practical construction, it took three full days in mounting three wooden beams necessary for the platform. It never occurred to the Chinese students that they needed to work on the trees before going to Norway. On the construction site, there was no large size mechanical construction equipment, so they had to make a ladder. In measuring the distance, they had to climb to the top of the ladder and use a rope for the measurement. In order to lift the heavy wooden beam, they specifically made a simplified chain wheel. The climbing was opposite to the tree house, of which the concept was to pile up several three steres cubed in the air, where the platform at each floor protruded in different directions like a dynamic building growing up. Overall, the construction of the tree house went well. Setting up the columns, putting up the platforms and then piling repeatedly, all

016 of these were not technically difficult, but the effects mainly relied on the workload cumulation.

The sloping field near the climbing served as the base for the rotating In and Out. Consideration of the rotating support meant that where a group of rotatable wooden plate walls was built on the comparably sloped field, a playground where the internal space and external space could be interchanged was formed. It could be a place for children where they could combine their own spaces with the rotating wooden plates and discover an interesting phenomenon: through rotating, some external spaces all of a sudden became internal spaces. At the beginning, based on consideration, the realization of the rotation depended on the bearing. But as a result of causes due to processing and maintenance, the relatively simpler double-deck sleeve rotating construction was utilized instead. The playground was located at the sloped field near the rotating In and Out. Consideration of the playground meant that where a group of fluctuating floors were built on the cliffy field along the direction of the sloping field, children could run, play and have a rest. In aspect of the details in construction, the students from both nations took full consideration upon the demands of the children and the disabled. For example, the spacing of the wooden strips of the floor should neither be too narrow, otherwise children might slip as a result of falling leaves that were frosted in the spacing, nor too wide, otherwise the tyre of a wheel chair might be blocked. As a minimum, both the

children and the disabled might pass by safely.

The stargazing was located at the top of the mountain. It was the most special base with the most difficulties in construction. The stargazing allowed for beautiful scenery with a wide view of the field and fascinating landscape. In the beginning, the students considered constructing a landmark building on top of the mountain. But after discussions, they realized that the stargazing was built for the purpose of preventing the expensive astronomical telescope from being wetted and stolen so just a covering might work well. As a result, the design of the stargazing was simplified to building a person high wooden box and a 4m×8m wooden platform. While in design, in consideration of the demands of rest for the observer, a chair for only one person sitting was purposely arranged in the wooden box. As a matter of fact, the wooden box played a role of both covering the telescope and as a big chair with a cap. Skillfully, for meeting the requirements of more observers, this wooden box could move on the platform. When it was crowded, people might move the chair away and surround the telescope for convenient viewing.

Two weeks later, the main construction of the five architectural works had been completed. Wherein, the stargazing, rotating In and Out, climbing and playground had finished construction and put into use. As for the tree house, due to the difficulties in construction and some other technical causes, the upper part had not been completed.