Study on Utilizing Timber Resources of University's Research Forest

- Case Study of Timber Building System using Cedar Thinnings -

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1. INTRODUCTION

The wooden institution was constructed at main campus of Kyoto University, in May 2006, using cedar from the university's research forest in Wakayama. The structure used for this building was 'j.pod system (below 'this timber building system')' which enables the use of cedar forest thinnings. The background of this building project is that forestry industry in Japan is slumping. In this atmosphere, the price of cedar has dropped drastically, and there is a large resource which is currently unused. It is important these resource to be used in order to protect public interest of forest. This paper records of wood use in this project, analyzing the wood manufacturing costs and identifying points for improvement.

2. WAKAYAMA RESEARCH FOREST

Wakayama research forest was established as fundamental property of University. In period of economic growth, extensive forestry was operated. Along with the recent decline in profitability, the role of the forest has transferred to research and education. Size of deforestation is very small, and harvesting area is only near forest road because of low cost. Utilizing timber recourses of here is very difficult as well as the situation in Japan.

3. PROJECT CONCIDARATON

(1) Timber manufacturing cost of rib-frame (Rib-frame is constructional material of this timber building system)

	Assumption cost of This timber building system	This project's record		Improvementation (Utilizing Shimizu-cho Timber mill)
		Cost	Reason of cost	
1) Raw Material Value	¥10,000	¥0	It was 0 yen, because of use inside University.	Aftertime setting 10,000¥/㎥. Wakayama Research Forest is profit-sharing forest this cost may enable to pay profit to forest owner.
2) Felling Cost	¥10,000	¥11,817	It was almost same cost with estimation of Wakayama Research Forest.	Aftertime, according to need, felling would be done at place far from forest load in Wakayama Research Forest.
3) Logs Transport Cost	¥0	¥5,000	Logs were carried over long distance (about 100km), because there were no timber mill which could accept 63㎥ logs near Wakayama Research Forest.	After felling logs, it could be omited 1 time of loading and uploading by directly transportation to shimizu-cho timber mill. Wakayama Research Forest → Timber mill: 15km, 30min.
Intermidiate Total (Logs Cost)	¥20,000	¥16,817		
The amount of usable timber per log (%)	50%	60.88%	It was 60.88%. Calculation: ¥16,817÷60.88%=¥27,623	From the aspects of both 'high %' and 'time efficiency' logs; 24～28cm or over 28cm, would be suitable for rib-frames. Sawing small members other than rib-frames would not be done, because it would be much costly.
	¥40,000	¥27,623		
4) Sawing Cost	¥10,000	¥30,465	It was very costly. Reasons: Small members other than rib-frame were sawed from mill end. There were not similarity sized logs.	To utilizing 「Shimizu-cho timber mill」 where is newly established in April 2006 near from Wakayama Research Forest.
5) Artificial Drying Cost	¥9,000	¥9,000	Same to assumption cost, because this process was done by member of this timber building system.	Natural drying could be considered with long-term planning of felling. Shimizu-cho timber mill has wide wood yard.
6) Planer Cost	¥6,000	¥0	It was 0 yen, because it was done by one of member of this timber building system.	Shimizu-cho timber mill has ample facilities: planer, and other many machines, so it has possibility of process till manufacturing or rib-frames makeup.
Total (Timber Manufacturing Cost)	¥65,000	¥67,088		

(2) Improvement planning

1) Integrated planning: Forest and Designers contacting closely make effective thinning & sawing plan, and take required intermediate manufacturing & transportation.

2) Localization: About logs transportation, essential policies are 'lighten and shorten' and 'utilization of timber mills or manufacturing plants near the mountain'.

3) Timber dealing bases: Coordinating with the basis which has function of 'manufacturing', 'cycling', 'saving (drying)', 'transporting', and wood use goes smoothly. For research forest, 'Shimizu-cho timber mill' correspond.

⇒It could be said that there are sufficient possibility of utilizing timber resources of University's Research Forest.