

Concept Design for Measurement against Large Fire Spreading based on Building Database of a Folk Culture Village

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ABSTRACT

This study aims to develop a current building condition database of an important folk culture village of South Korea considering their fire spread risk. We have selected a folk cultural village, and conducted field survey to reveal structure of buildings, materials of building wall, and roof style which make us understand current vulnerability of the village to fire spread. As a result, we made a current building condition database with map, which showed that the village had mixture of reinforced concrete and wood. Besides, we proposed a conceptual idea to prevent from large fire accident in the village.

Keywords : folk culture village, fireproof, fire spread, current building condition.

1. Introduction

Korea has a lot of traditional towns where residents are living in wooden buildings stand along narrow streets, and they have vulnerabilities to fire disasters as well as the other Asian countries like Japan. The Korean traditional towns each, however, have unique characteristics as preconstitution of buildings, e.g., assembly of houses, fence wall, and so on. These characteristics are very important elements for us to protect as landmark architecture, also it is necessary to make a plan for protecting buildings and saving lives of residents. To make such a plan, we basically need to grasp current situation of the area. Thus, this study aims at designing a current building condition database of folk culture villages in Korea to analyze the area viewing from fireproof.

2. Methodology

The study areas we have conducted surveys are three folk culture villages, Andong Hanok Village protected as a world heritage by UNESCO (Hereafter, A.H. village), Asan Oeom Folk Village (Hereafter, A.O.F. village), and Jeju Hanok Village (Hereafter, J.H. village), to design the current building condition database of folk culture villages. The reason why we chosen the three villages is to know the different condition caused from location of villages such as in the city or in the suburb, and also caused from protection system of historic environment. A. H. village and A.O.F. village are located in the suburb of each city, and J.H. village is located in the city. J.H.

village is now being restored by budget of national government for encouragement of its tourism.

We conducted field surveys to grasp current situations of the study area as from August 28 to September 6, 2014, using maps we prepared beforehand to check age of buildings, constitution of buildings and walls, and the other elements.

Hereafter, we mention the concept design for measurement against large fire spreading focusing on a village among the three, A.O.F. We make a database considering classification of buildings with structure of building, kind of roof, and so on (Table 1). These data clarify the following things. We convert data that obtained in fieldwork into CAD data (Fig. 1).

Through the analysis, we propose a concept of measurement against large fire spreading.

3. Current condition of the surveyed villages

Using database and maps, we can understand the current building condition of three villages viewing from fireproof, as follows:

- 1) In A.O.F. and A.H. villages, most of the buildings are wooden with Shinkabe wall.
- 2) In A.O.F. and A.H. villages, most of the houses have high walls along the border of the site.
- 3) In A.O.F. village and A. H. village, the space with the house neighboring than a Jeonju Hanok village is large.
- 4) In A.O.F. village, thatched roof and tiled roof are half-and-half intermingled. Tiled roofs, however, concentrated in the center of the village.

4. Discussion

We surveyed three villages to understand the current fireproof condition of them. Using to the result of the surveys, we could make a database of their current building condition viewing from fireproof. Then, we could marginally recognize the current fireproof condition of the villages.

This village has two possibilities of fire spread from the center of the crowded buildings and thatched walls. Besides, table 1 and Fig. 1 show the weakest part against fire spread in this village. It is a part of the crowded buildings of thatched roof.

5. Proposal

- 1) Concept of fire spread a deterrent: When large fire spreading, we should be the fire spread a deterrent against thatched roofs and thatched wall of flammable material. Besides, we should be stop the fire spread within a narrow range.
- 2) Fire spreading prevention: Should be installed

sprinklers in the place where only a fire hydrant or a fire extinguisher are equipped. And were pair buildings in fireproof structure in the center of the crowded area both of wooden buildings and of the attached buildings as mentioned above.

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Table 1. Database of folk culture villages viewing from fireproof (a part).

Category	Building						Attached building				
	Structure			Wall finish		Roof		Wall		Width of front road	
	Wood	Steel	RC	Shinkabe	Okabe	Thatch	Tile	Grass wall	Tiled wall		Stone wall
Number of the building	No,1	1			1		1			1	---
	No,2	1			1		1			1	---
	No,3	1			1		1			1	---
	No,4	1			1		1			1	---
	No,5	1			1		1			1	---
	No,6	1			1			1		1	---
	No,7	1			1			1		1	---
	No,8	1			1			1		1	---
J.H. village	316	0	71	251	65	0	366	0	0	0	---
A.O.F. village	204	1	0	204	0	129	76	0	11	173	---
A.H. village	346	0	0	346	0	224	118	0	240	57	---
Total	866	1	71	801	65	353	560	0	251	230	---

Shinkabe [Japanese] : A traditional construction method of fireproof wall made of lime plaster. Wood column is not covered.
 Okabe [Japanese] : A traditional construction method of quasi-fireproof wall made of lime plaster. Wood column is covered.



Fig. 1. AsanOeam Folk Village.