# Simulation Study on the Fire Safety of AsanOeam Folk and JeonjuHanok Village

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ABSTRACT

Our research group, which was organized by the South Korean and Japanese researchers, have carried out research about natural disaster in our regional heritage villages derived from the concept of ICT(information communication technology)-based DPD(disaster prevention design). In this research, we performed simulation analysis on the fire safety diagnosis in Asan-Oeam folk and JeonjuHanok village for developing our research of ICT-based PBD. In order to do this, we used fire simulation program which was developed by BRI(Building Research Institute) of Japan. Based on the results of fire simulation of Asan-Oeam folk and JeonjuHanokvillage, we can demonstrated that the fire which broken out inregional heritage folk village will be easily expanded to adjacenthouses, because the house which are built with wood structure.

Keywords : Fire Safety, Fire Simulation, Asan-Oeam Folk Village, JeonjuHanok Village

## 1. INTRODUCTION

Our research group that consist of Korean and Japanese professors performed research about natural disaster in our regional heritage villages derived from the concept of ICT(information communication technology)-based DPD(disaster prevention design). We visited 3 folk villages of Korea and investigate their facilities for fire prevention in August ~September, 2014 andwe researched regulations of fire extinguishment facilities in foreign countries with Korean strategy in order to analyze and propose an adequate countermeasure against earthquake and its secondary effects focused on fire disaster in these folk villages1). Further to this study, we investigate whether Asan-Oeam folk and JeonjuHanok village are safety or not using fire simulation program of BRI.

## 2. Methodology

### 2.1 2.1 Simulation area[1)]

Overviews of AsanOeam and JeonjuHanok Village are shown in Photo1, 2. AsanOeam is geographically located in ChungcheongNam-Do, and it is generally known to have been established about 500 years ago. Total area of the village is about 198,194m$^2$, and more than 150 residents are living in the village. There are totally 78 old style buildings and most of them are constructed by timber structure.JeonjuHanok Village is located in Kyo-Dong and Pungnam-Dong, Wansan-Ku, Jeonju City, JeolaBuk-Do. It has been started to establish since the era of Chosun Dynasty, present formation is from 1930s. It was nominated as a 'Hanok Conservation Area' in 1977. Total area of the village is about 0.25km$^2$, and there are more than 700 Hanok houses in the village.

Photo 1. Overview of AsanOeam Folk Village[1)]

Photo 2. Overview of JeonjuHanok Village[1)]

### 2.2 Simulation Program of BRI

To investigate fire safety of AsanOeam and JeonjuHanok Village, we used fire simulation program which was developed by BRI(Building Research Institute) of Japan.This fire simulation is comprised of following expression calculation.

$$V=2.385-4.729+0.2022U \quad (1)$$

$$F=R_0 + (1- R_0)c' \quad (2)$$

Here, V is burning rate(m/min), F is ratio of noncombustible area, $R_0$ isopen spade ratio.

## 3. Simulation Result

In this study, we make outa results that the fire which broken out inregional heritage folk village will be easily expanded to adjacent houses and we needs to come up with some proper countermeasures.

## 4. Acknowledgements

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## References

[1] Sun-gyu Park, et al., “Countermeasure against Fire Disaster in Regional Heritage Villages on the Concept of ICT-Based Disaster Prevention Design”, International Journal of Contents, Vol.11, No.1, 2015, pp.62-6

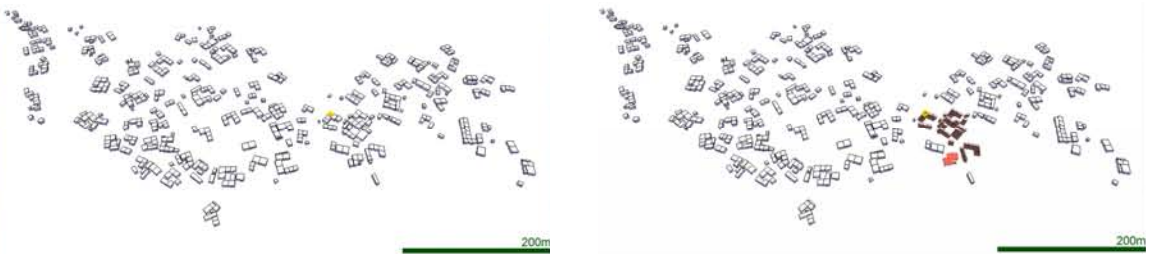


Fig.1 Fire Simulation Result of AsanOeam Folk Village(0min -> 140min)


Figure 2. Fire Simulation Result of JeonjuHanokVillage(0min -> 180min)