

REALIZATION OF TIMBER VEHICLE BRIDGE IN KOREA

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SUMMARY

The first timber bridge for vehicles in Korea, a single-span, arched truss bridge 30m in length, was constructed in 2012. The bridge was designed and constructed as a part of national research projects for the development large timber structures funded by the Korea Forest Research Institute. This paper introduces the development process of the timber structures in Korea as well as design, construction of the first vehicular timber bridge. In-situ truck load tests are performed along with multiple-year monitoring project for performance assessment. Both loading tests and long-term monitoring data show that the construction of the bridge agrees with initial baseline model and it still holds a solid soundness until 6 years after its birth.

Keywords: *Timber vehicle bridge, Truss arch, Field loading test, Real-time Monitoring, Korean timber structures*

1. INTRODUCTION

Pursuing green construction, the use of a timber has been growing worldwide as environmentally friendly building material. Timber's strength, light weight, and eco-friendly properties furnish features that are desirable for bridge construction, and they also present a natural and aesthetically pleasing appearance, particularly in natural surroundings. Due to these superior characteristics of timber as a bridge material, they have been used as main members of vehicular bridges in Europe and United States. Recently some research on timber structures has been implemented in terms of real structures in Korea. In 2012 the Hanareum Bridge was constructed as the first timber vehicle bridge in the recreational forest in Korea. This is a part of national research projects for the development large timber structures funded by the Korea Forest Research Institute. As the first timber vehicle bridge in Korea, a series of experimental tests were performed along with a numerical analysis to build a reference model for the future timber bridges. Prior to the construction, full scale testing on members, joints and the entire bridge system was performed in the laboratory in 2011. And the first field testing including static and dynamic loads was done in 2013, then it was performed again in 2014 and 2018. An overall approach adopted for the realization of the first timber vehicle bridge is described in Fig. 1. This paper starts with the development process of timber structures in Korea and then the research activities from conceptual design to construction of the vehicle bridge follows. Especially the long-term monitoring data have been analysed with the results from the lab test and in-site loading tests.