ROOF SYSTEMS: LIGHT FRAME TRUSS SYSTEM ANALYSIS

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This paper summarizes basis research being conducted to lay the foundation for future development of design models for wood structural assemblies. The problem of using a structural wood component in repetitive member systems was analyzed. The first part of the analysis include utilization of SAWFT (Structural Analysis of Wood Frames and Trusses) [1]. a nonlinear finite element program for analysis of metal plate connected wood trusses. The second part deals with comparing the results with ***the other*** *computer program that is able to perform a dynamic analysis to. As the metal plate connected trusses are becoming important structural components in the region of Kosova, which is in the high seismic zone: a dynamic analysis was performed in four-story light wood frame structure. The multi-modal response spectrum analysis was performed according to Eurocode-8.*

1. INTRODUCTION

Metal plate connected wood trusses have become tremendously important structural components In the and low and medium-rise residential and commercial building industry, primarily due to their low fabrication and erection costs. This is a new market opportunity. This study intends to give a solution for developing system models capable of evaluating load distribution in simulated assemblies and assessing system performance with a prespecified level of confidence. Computer analogs includes also adjustment for system redundancy such as combination of material properties, probability distribution, structural interaction mechanisms and fabrication as well as construction variability. Seismic performance of medium-rise light frame wood building is a part of the on-going research program, which will show the feasibility of building this kind of structural systems, in high seismic areas such is Kosova. The future work anticipates scale modeling and the limitations of scale modeling, full scale tests of wood systems and simulation analysis.

2. ANALYSIS AND DISCUTION

Semi-rigid and nonlinear behavior of plated joints Is well-documented [5], and several researches have developed truss analysis models that include the complex behavior of the wood-plate interface as well as eccentricity of member centerlines.

Current industry "design model" allows web-chord joints to be modeled as pins and plates to be sized based only on the axial force at compressive joints, with the remaining force assumed to generated through wood-to-wood contact. The SAWFT truss analysis program developed By Cramer [1] and others at the University of Wisconsin, Madison predicts truss deflections, member axial forces, and member bending moments more accurately than the industry's design model. In this part of the study link and parallel chord

truss system analogs were analyzed (fig. 1), and the results were compared with thus given by Industry's design model. Comparing the results between SAWFT and other programs, it was shown that the difference in the axial forces is not significant, but combined axial and bending stresses were in average 30 to 40% lower with SAWFT. This is due to the model used in SAWFT, which takes in account non-linearity of plate behavior. The multi-modal spectrum analysis was performed in a four-story light frame wood truss structural system with irregular shape. The first 6 modes of vibration were considered. Soil profile A and corresponding viscous damping of 5% given in Eurocode-8 [2], [3], [4] was used for design spectrum. Structures were adopted with medium dissipation of energy: q=2 was adopted. The multi-modal spectrum analysis was performed utilizing the computer program TABS+ by "Radimpex" [6]. The structure was analyzed in 3D with assumption that the floor structure was with the same weight in all 4 stories. The seismic action was taken in 2 orthogonal directions. A design peak ground acceleration A_g=*0.40g* was considered as in the high seismic area.

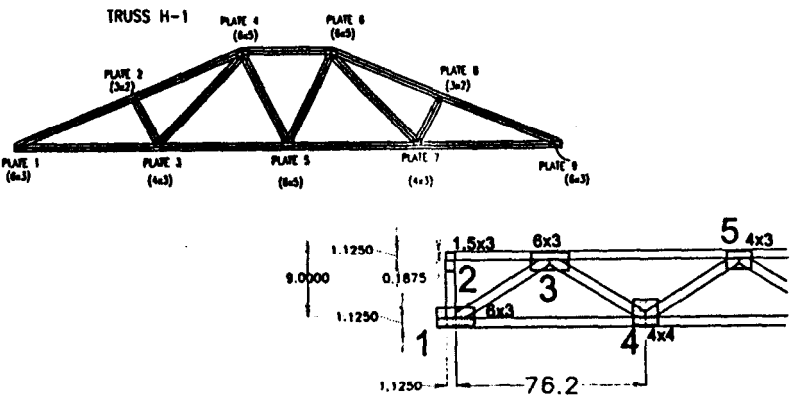

Figure 1 Analyzed truss system analogs: modified link and parallel chord

3. REFERENCE

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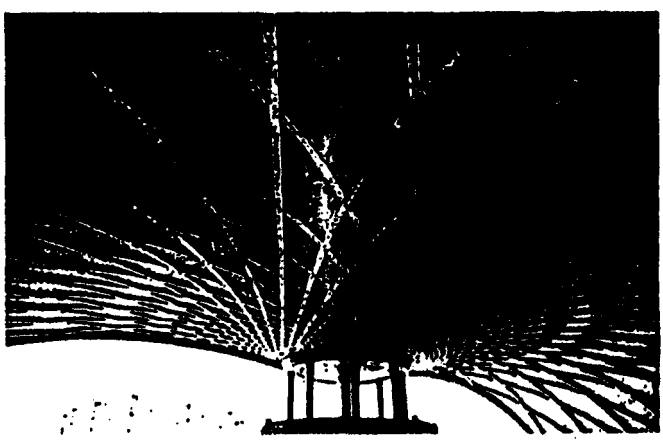

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