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DEPARTMENT OF ARCHITECTURE AND BUILDING
DEPARTMENT OF STRUCTURAL ENGINEERING

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ABSTRACTS

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ABSTRAKTI

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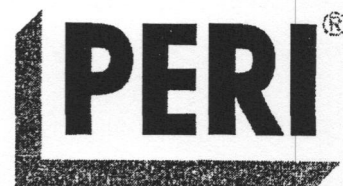
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TIME DEPENDING SERVICE LOAD INFLUENCE ON STEEL TOWER VIBRATIONS

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Usually typical steel towers are mainly subject to wind loads. In the case of sightseeing towers with lattice steel structure core and low natural frequency of the structure human and structure interaction could play a role in the tower design. This paper analyses the response of the tower structure to excitation caused by a human movement to assure safe exploitation and acceptable human comfort levels during the exploitation. There are adopted different levels of the structure and human behavior synchronization and its effect on the structure. This phenomenon (synchronization) should be taken into account because people respond naturally to a structure oscillation when structure has a frequency close to people natural movement frequency. In this paper there are analyzed possible mode shapes of the existing 34m high steel core sightseeing tower structure and evaluated potential to change natural frequency of the tower by making amendments to the structure itself. Paper gives recommendation of the maximum number of people allowed on the existing structure to ensure safe tower exploitation. The dynamic performance is established through finite element modeling of the tower structure.