

Influence of the Vibration Caused by Bus Circulation on the Built Heritage in the Center of Ponta Grossa – Brazil

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Abstract:

Ponta Grossa is a Brazilian medium city where the dynamics of urban development has always been conditioned to its privileged geographic location. The implantation of the railroad system has transformed the town completely. Among with the rapid development subsequent to the railroad arrival, on the early 20th century, the architecture in Ponta Grossa has also advanced. Thus, many of the buildings that are heritage protected today are from this period, especially eclectic style palaces. The nuisance caused by the vibration of heavy vehicles in the surroundings of historical buildings is one of many quotidian urban issues that are accentuated with time passing. Not only does such vibration impact on life quality of citizens, but it also may occasion structural damage to heritage architecture. The main goal of this paper is to analyze how susceptible the local historical architecture is to pathology caused by the vibration of heavy vehicles, mainly buses, in Ponta Grossa, Brazil. Seven buildings have been analyzed, all of them protected due to their historical importance. The list of protected buildings, additional information from the local municipality and the transportation department have been used for this analysis, as well as data from the local mobility plan. Heat maps have been produced, illustrating the number of daily trips on each bus line. Additionally, professionals that operate on the field of building restoration have been interviewed, as to obtain information related to the susceptibility degree of diverse elements and constructive methods, for the lack of specific legislation on the matter. With use of the information obtained, analysis methods have been developed by the authors as to identify the susceptibility of the buildings based on their characteristics. The methods made possible to identify the fragilized spots on historical buildings related to bus circulation in their surroundings. The results indicate high susceptibility of traditional building methods to vibration and significant impact on buildings near to intense traffic.

Keywords:

Urban vibration; Traffic-induced effect; Ponta Grossa – Brazil; Damage to historical heritage; Susceptibility of historic buildings.