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Vibration Damping of Structures

Amortissement de vibrations dans les structures

Dämpfung von Vibrationen an Tragwerken

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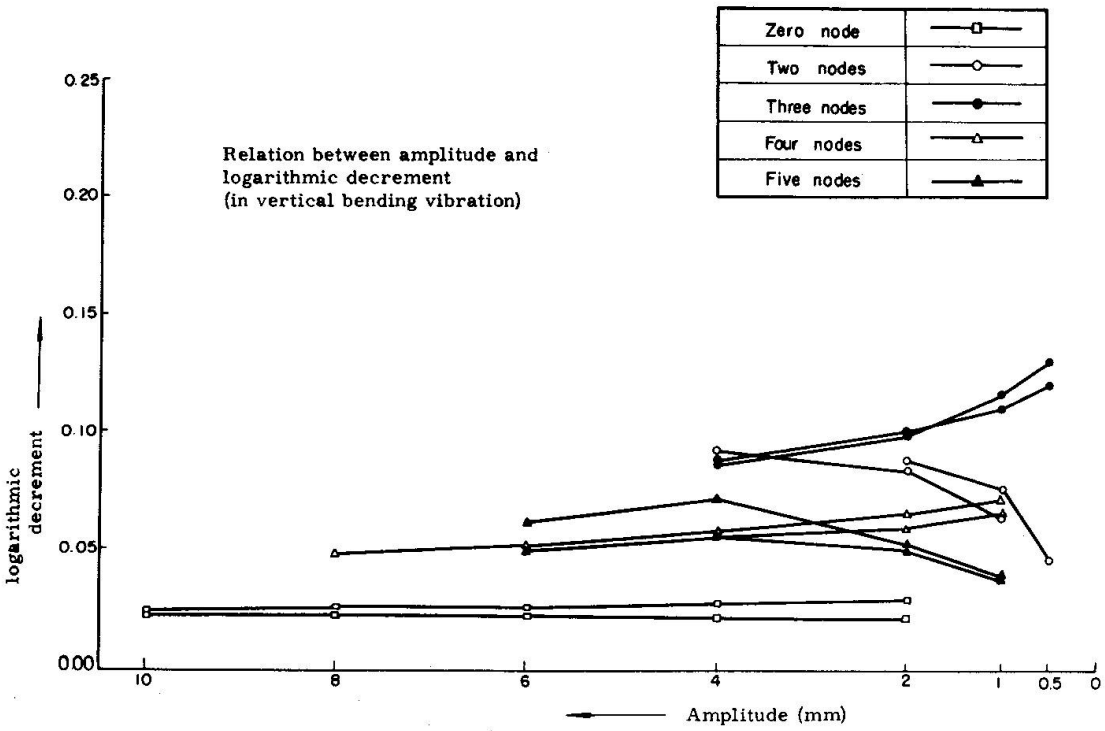
In their contributions in the Preliminary Report, Y. Yamada[1] and S. Mentel[2] reported that the damping constant increased with the increase of initial amplitude.

However, it should be noted that the above tendency reveals itself when the initial amplitude exceeds a certain critical value, beyond which friction damping or hysteretic damping seem to come into effect. An example[3] in the figure below and Figs. 5 to 7 in the paper by Mentel[2] show that the logarithmic decrement is almost independent on the initial amplitude when the amplitude is not large. But the general estimation of the critical initial-amplitude mentioned above is not



Relation between damping and initial amplitude
A truss-stiffened suspension bridge with a span length of 180 m. Data after Okubo and Narita, 1969.

clarified at the present stage.

Next, the writer should like to make a short supplemental comment on his contribution in the preliminary report. The logarithmic decrement is not always constant even in a particular oscillograph record of the free vibration test, and therefore, the values of logarithmic decrement referred in his contribution are the average value from many subsequent, usually ten to fifty, waves. In the range of small amplitude, the global value of logarithmic decrement seemed to be approximately constant, that is, the nature of damping was considered as viscous one.

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