Abridged version

KAWASAKI STEEL TECHNICAL REPORT
No.35 (November 1996)
Steel Structure, and Continuous Casting of Steel

Vertical Gust Response Prediction of Cable-Stayed Bridges in Yawed Wind

Shozo Nakamura, Ken Nagamachi, Yutaka Kawai, Kichiro Kimura, Yozo Fujino, Hiroshi Tanaka

Synopsis :
A vertical gust response in yawed wind of two cable-stayed bridges under construction was predicted by applying a modified gust analysis method. Two effective wind velocities, i.e. the velocity component normal to the bridge axis and the component normal to the free end of the girder, were considered separately. Some aerodynamic coefficients of the deck were estimated from the aerodynamic characteristics of the flat plates with same aspect ratio. Comparison was made between the analytical and experimental results, and on the whole, the results agreed in both bridges. Consequently, validity of the approximation was confirmed and applicability of the analysis method was shown.

(c)JFE Steel Corporation, 2003

The body can be viewed from the next page.

KAWASAKI STEEL TECHNICAL REPORT No. 35 November 1996

Vertical Gust Response Prediction of Cable-Stayed Bridges in Yawed Wind*

Synopsis:

section which can be applied to large view angle cases by

where $C_{L\alpha 2D}$ is the slope of the lift coefficient with the section model test and AR is an aspect ratio that is l/B for the cosine case and B/l for the sine case.

force of the r-th mode on the entire bridge deck can be obtained by the following equations.

For the cosine case,

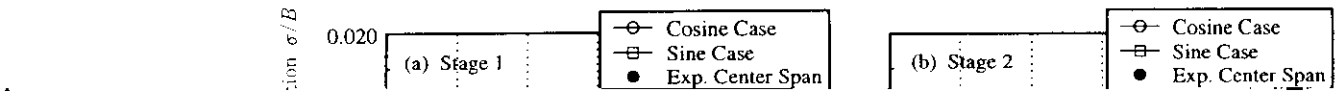
the power spectrum of the generalized buffeting lift force on the whole bridge deck obtained by Eq. (9) or (10)

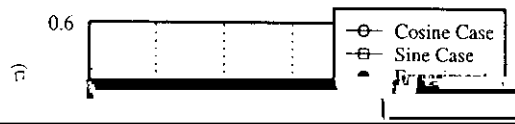
analytical procedure described above was applied for both stages. Stage 1 corresponds to the longest balanced cantilever spans where cantilever spans of 180 m long

w-component and the lift force for flat plates, which has

and Stage 2 corresponds to the half bridge condition

[redacted]


tion σ/B
0.020
(a) Stage 1
Cosine Case
Sine Case
Exp. Center Span
(b) Stage 2
Cosine Case
Sine Case
Exp. Center Span



cosine and sine cases in this study, and these cases correspond to only $\beta = 0°$ and $90°$ in the strict sense. Hence, the contribution from each case to the overall