Table 1. Material Properties

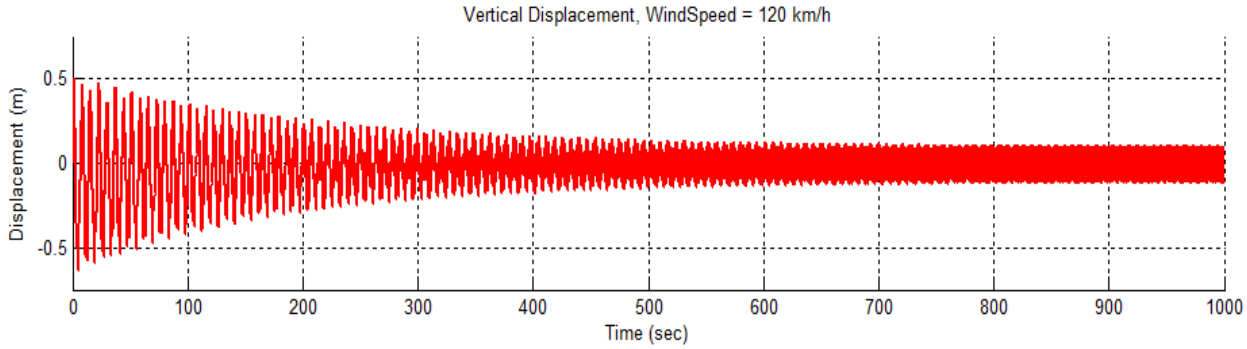
	Concrete (*fck* = 35 MPa)	Steel (SM490)
Elastic Modulus	2.88E4 N/mm^2	2.05E5 N/mm^2
Poisson's ratio	0.18	0.3
Unit Weight	2.45E-5 N/mm^3	7.70E-5 N/mm^3

Table 2. Section properties

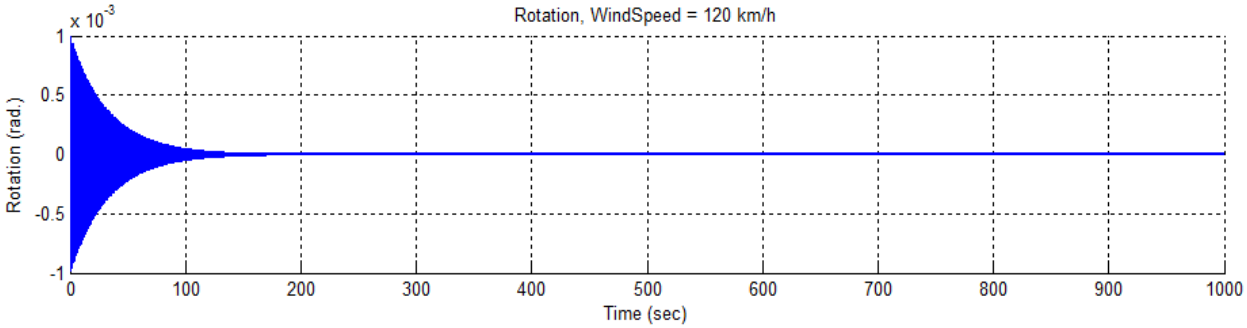
Section Property	Value
m	3.20E5 kg
K	3.52E7 N/m
K_T	4.62E12 N/rad
l	12 m

Analysis results for vertical/rotational displacement presented in Fig. 8 (a) and (b). The vertical displacement converged within amplitude 0.3 m. The rotational displacement converged nearly 0.

In this study, wind speed was deterministic value. However, all terms could be constant value or variable. With this methodology, the bridge design engineer could find bridge response in various conditions what the bridge would be faced. For example, conducting frequency analysis, determining hanger cable stiffness, and revising suspension bridge cross section properties were possible with this methodology. Especially, bridge engineer consider hanger cable nonlinearity easily.



a) Time-vertical displacement



b) Time-vertical displacement

Fig. 8, Analysis results

4. CONCLUSIONS

In this study, CFD-2D coupled analysis for suspension bridges were conducted. Previous study had limitation due to uncertain external force term. To apply in bridge design process, proposed methodology that CFD-2D coupled analysis. External force terms were calculated with CFD analysis and all section/material properties were calculated with assumed cross section. With this methodology, bridge design engineers easily figure out bridge response faced various conditions. Especially, this methodology has advantage that considering hanger cable nonlinearity. We are expected that this methodology would be applied in real design process of suspension bridge.

Acknowledge

This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology(NRF-2012R1A1A044378)

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