



Concept:

Among the simpler and traditional explanations of this famous disaster is the following. Vortex shedding at the leeward side of the bridge created vertical forcing of the I-beam roadway. The natural frequency of oscillations in the vertical mode was, unfortunately, very nearly equal to the natural frequency of torsional oscillation. Once the bridge began bouncing vertically, it soon started to twist as well. Thus energy coupled very efficiently from vertical oscillations to torsional, and the bridge was literally, torn apart. Bridge engineers have since learned to avoid designing bridges with any closeness between vertical, horizontal, and torsional natural frequencies. This explanation has been supplanted recently by a different hypothesis described in Note 2 below.

Equipment:

- Twin Views of the Tacoma Narrows Bridge Collapse DVD

Procedure:

1. Play DVD in DVD player.

Notes and Extras:

1. This disc contains two video segments:
 - A. **Tacoma Narrows Bridge Collapse** by Franklin Miller, Jr. (1963). Taken and narrated from the original 8mm silent film loop by Franklin Miller, Jr. Runtime is 3:20.
 - B. **The Puzzle of the Tacoma Narrows Bridge Collapse** by R.G. Fuller, D.A. Zollman & T.C. Campbell (1979). Taken from the 1979 videodisc by Fuller, Zollman and Campbell. It contains an audio track with people reading parts from the official reports and newspaper accounts of the bridge collapse. Runtime is 7:40.
2. [Bernard J. Feldman, Phys. Teach. 41, 92 \(2003\). DOI:10.1119/1.1542045](https://doi.org/10.1119/1.1542045)