Name: _____ Date: _____

Structural FAILURE

Case Study 1

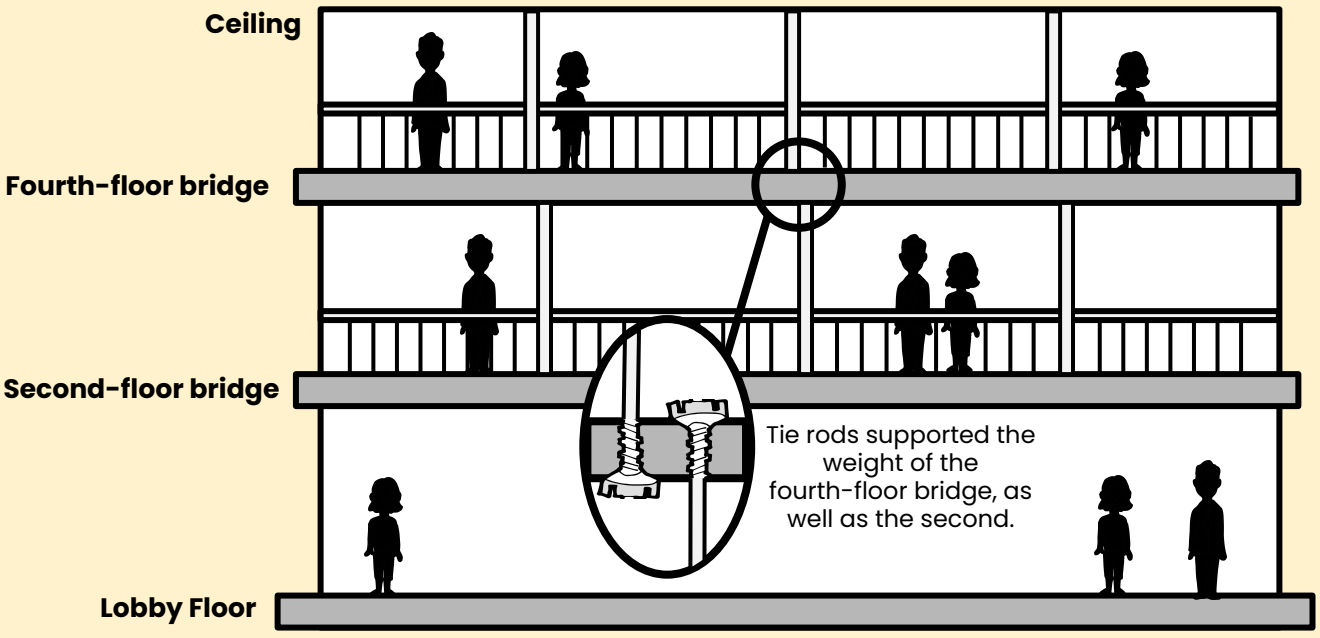
Hyatt Regency Walkway Collapse

On July 17, 1981, around 1600 people gathered at the Hyatt Regency hotel in Kansas City, Missouri for a Friday night dance. Many people stood on the two suspended walkway bridges that overlooked the main lobby of the hotel. The second-floor bridge was suspended under the fourth-floor bridge. The third-floor walkway was located elsewhere.

With the added weight of all the people, the fourth-floor bridge suddenly gave out, collapsing onto the second-floor bridge and into the lobby. Victims became trapped under layers upon layers of debris. Water flooded the lobby because the falling bridges ruptured the hotel's sprinkler system. This put the survivors who were trapped under debris at risk of drowning. The incident killed 114 and injured 216. It is the deadliest non-deliberate structural failure ever in the United States.

Investigation after the incident found that the collapse was due to the **tie rods** (a bar used to connect part of a structure to something else). The tie rods were used for the fourth-floor bridge to support not only its own weight, but also the weight of the second-floor bridge. The added weight of the people on the bridges, combined with faulty engineering that did not foresee the issue, caused a fatal tragedy.

Diagram of the Hyatt Regency Hotel walkway:



Name: _____ Date: _____

Structural FAILURE

Case Study 2

"Galloping Gertie" Bridge

The Tacoma Narrows Bridge was a suspension bridge in Washington, United States. It opened to traffic on July 1, 1940, and collapsed on November 7 the same year.

Construction on the bridge began in September 1938. As soon as the deck of the bridge, which is the flat part that is driven on, was built, construction workers nicknamed the bridge "Galloping Gertie." The bridge deck would jump and twist whenever it was windy. Although there were some attempts to fix the motion of the bridge, it continued to be affected by winds even after opening to the public.

The bridge finally collapsed in 64 km/hour winds. The deck of the bridge twisted back and forth until it tore. Leonard Coatsworth was the last person to drive on the bridge before it collapsed. Although his car plunged into the waters below when the bridge collapsed, he was not hurt in the incident.

The exact cause of the bridge's failure remains a mystery. The external force of the wind was a contributing factor, as well as a new design that was used in this bridge that caused wind to flow below and above the structure, rather than through the beams.

The Tacoma Narrows Bridge on opening day, July 1, 1940.

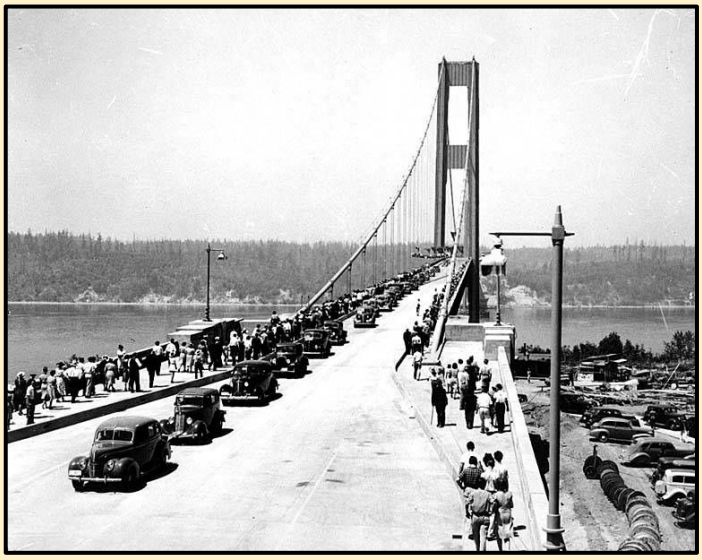
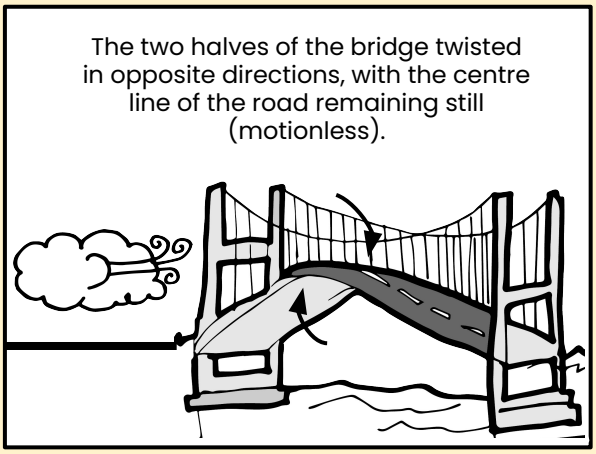


Diagram of Tacoma Narrows Bridge:



There are many videos online that show "The Collapse of Galloping Gertie" and the bridge swaying in the wind.

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