



Figure 1.6.17: High-strain event occurrence count over 24 hours

One method of estimating dynamic amplification involves comparing raw responses to estimated static responses. The static responses are estimated by filtering out content associated with the bridge's vibration. This method can easily over-estimate amplification, especially when the data is too aggressively filtered, and if the loading is occurring at a frequency above the pass-band upper limit. Therefore, the pass-band upper limit should be chosen below the structure's lowest natural frequency.

A study was performed to assess the effectiveness of this method. In this study a vehicle crossing over the 3D FE model of the spans 7 and 8 was simulated at 960 in/sec (24.4 m/s) as well as at a crawl speed of 5 in/sec (0.13 m/s) to obtain the (quasi) static response. The dynamic response was filtered according to the method described above. A low-pass elliptic filter was applied with an upper pass-band limit of 1.5 Hz, a pass-band ripple of 0.5 decibels, and 40 decibels of stop-band attenuation. The upper pass-band limit was chosen such that it was less than the first natural frequency of 2 Hz. The frequency response of the resulting filter can be seen in the following figure.