

## Investigating Fatigue Life in Bolted Flange Connection in Wind Turbine Towers

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**Abstract :** This paper investigates how fatigue life is influenced by increasing the number and size of bolts under several wind speed averages. The study determined that increasing the size or number of bolts can notably improve the fatigue life of bolted flange connections. Additionally, the curves derived from the assessment data demonstrated a steeper slope for a greater number of bolts, indicating that the percentage increase of adding bolts is not consistent for each additional bolt. Instead, the percentage increment rises exponentially when increasing the number of bolts. However, selecting the most suitable design improvement strategy depends on the specific circumstances. In the majority of cases, the study observed that increasing the number of bolts resulted in significant improvements in fatigue life, regardless of the size of the bolts used.

**Keywords :** wind turbine tower, flanged connection, number of bolts, size of bolts, fatigue life

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