

# Pre-fatigue damage on the mechanical properties of Q690D steel

Liang ZONG<sup>1</sup>, Heng Liu<sup>1</sup>, Qi Si<sup>1</sup>, and Kwai-Fai Chung<sup>2</sup>

<sup>1</sup>Tianjin University Department of Civil Engineering

<sup>2</sup>The Hong Kong Polytechnic University

February 21, 2023

## Abstract

This article aims to analyze the influence of high cycle fatigue damage on the mechanical properties and low cycle fatigue performance of Q690D. Monotonic tensile and cyclic loading tests were performed on Q690D specimens with different degrees of high cycle fatigue damage. Degradation models were established to describe the declining trending of mechanical properties with the increase of pre-fatigue damage. Manson-Coffin models for Q690D steels of different pre-damage levels were established. Besides, a comparison was presented between Q690D and Q355B. The research work in this article provides a fundamental reference for the appropriate assessment of the mechanical performance of Q690D high-strength steel structures after long-term alternating loading.

## Hosted file

Manuscript.doc available at <https://authorea.com/users/588513/articles/625673-pre-fatigue-damage-on-the-mechanical-properties-of-q690d-steel>