

HYSTERETIC BEHAVIOUR OF Q235 AND Q690 STRUCTURAL STEEL MATERIALS

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ABSTRACT

This paper presents an investigation into hysteresis behaviour of both Q235 and Q690 steel materials. Differences on a number of low-cycle high strain testing methods were highlighted, and a standardized testing procedure was proposed. Four reference tensile tests were conducted to confirm the basic mechanical properties of the steel materials. A total of six low-cycle high strain cyclic tests were then conducted according to the proposed testing method to examine their hysteretic behavior. The test results indicated that both Q235 and Q690 steel materials are able to sustain their 0.2% proof strengths up to 2.5% of strain of both tension and compression deformations. Hence, the proposed testing method will facilitate assessment on the hysteretic behavior of various structural steel materials with different delivery conditions, and engineers can make an informed choice on these steel materials during advanced performance-based seismic engineering design.

Keywords: Hysteretic behaviour, loading protocols, low-cycle high strain cyclic test, structural steel materials.