



鋼材溶接継手を対象とした継手剛性のSN比と疲労寿命のSN比の関係に関する基礎検討

Relationship between S/N Ratios of Joint Stiffness and Fatigue Life of Steel Welded Joints

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A functional evaluation experiment was carried out in a basic study aimed at evaluating fatigue life without fatigue testing in CO₂ arc welded butt joints. Specifically, the S/N ratio of the load and deformation obtained in a tension test and the S/N ratio of the fatigue life obtained from a fatigue test were calculated and compared. The results showed good agreement between the two ratios. In the process of calculating the S/N ratio of the joint stiffness, the appropriate range of signal factors when fatigue strength was the target characteristic was also investigated. In addition, the method of setting the standard condition when the standardized S/N ratio is used was studied, and a proposal was made concerning the method of calculating the S/N ratio of fatigue life in the high-cycle region.

Key words : gas metal arc welding, steel welded joint, fatigue strength, joint stiffness, functional evaluation, Taguchi methods, quality engineering, S/N ratio

1. 緒 言

1.1 研究背景

部材に繰返し力が負荷されると、静的負荷の場合に比べはるかに低い力で部材に亀裂が生じ破壊に至る。このような現象を疲労と呼び、機械・構造物の破壊原因の7割～8割に疲労が関わっているとされている¹⁾。特に船舶や橋梁^{きょうりょう}に代表される大型溶接構造物の社会インフラでは、溶接継手部において比較的容易に疲労亀裂が発生することが知られてい

る²⁾。Fig.1³⁾とFig.2⁴⁾に、疲労破壊が原因となった損傷事例を示すが、社会インフラに破壊が生じると人的・経済的被害が甚大となるため、疲労破壊の

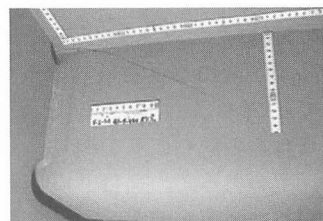


Fig.1 An Example of fatigue crack occurred at a welded joint³⁾

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