

SPECIMEN LENGTH AND PROPAGATION PHASE IN PRESTRESSED WIRE FATIGUE

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The use of 7 mm ϕ prestressing wire in prestressed concrete or as constituting element of parallel wire tendons in suspension bridges and similar structures has rendered it the subject of intensive fatigue study over the last decade. In general, all such studies have been designed and carried out according to the traditional Wöhler curve methodology. However, the use of Fracture Mechanics as a mean of analysing fatigue properties in prestressed wire has been observed in recent studies. Fewer test specimens and shorter and cheaper test periods were two of the pretended advantages to be derived from this methodology. The application of Fracture Mechanics implies solving two problems already satisfactorily solved by the traditional methodology, namely the probability of failure in order to set the single crack capable of provoking specimen failure in order to set the relationships between probability of crack existence and failure probability. The study is based on experimental fatigue test results for different specimen lengths and over a wide range. Finally, the wide range of stress variation and the nucleation phase in short specimens are also the subject of discussion.