

## Fatigue partial factors for bridges

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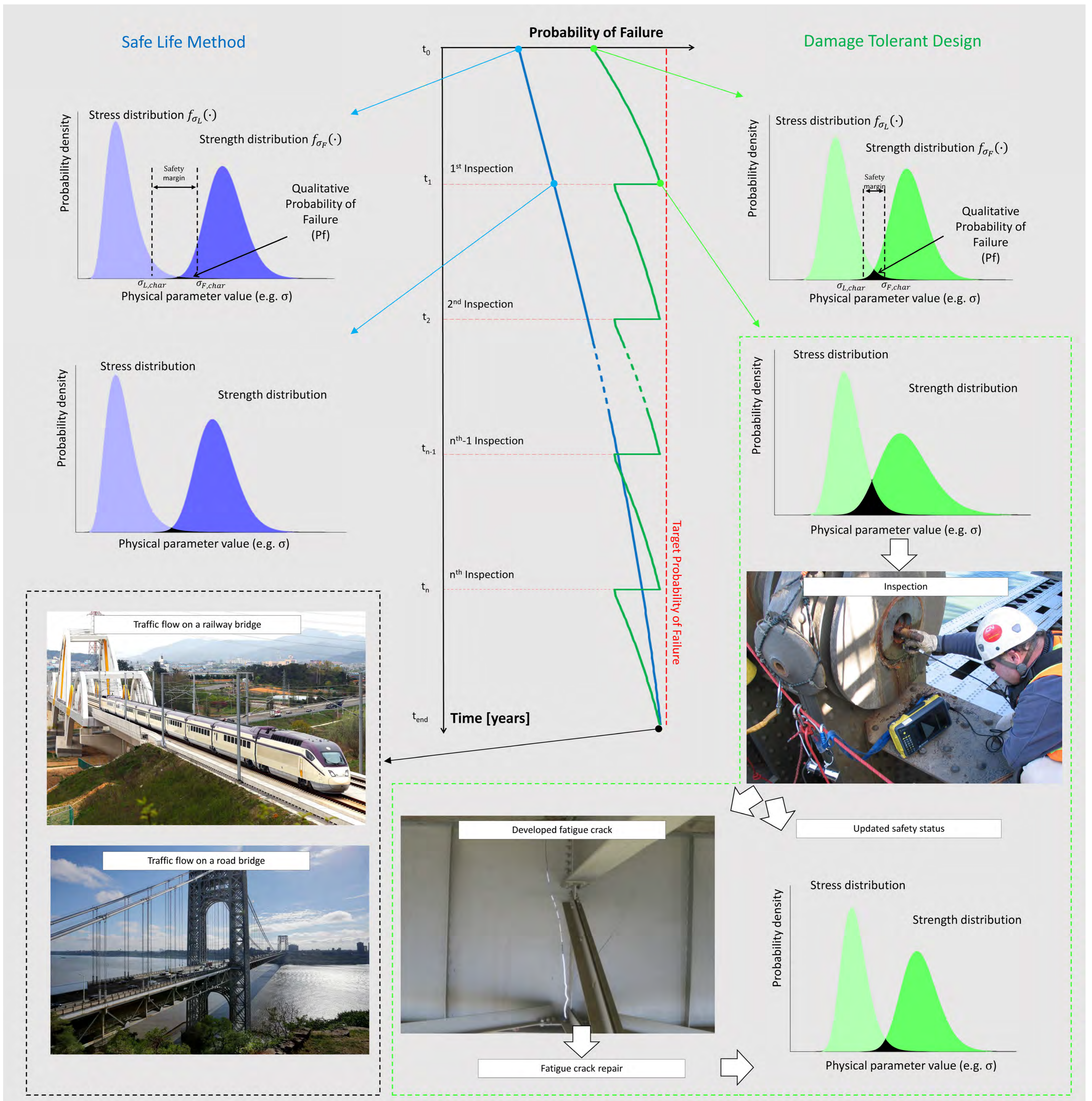
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# FATIGUE PARTIAL FACTORS FOR BRIDGES

OPTIMISING EXSITING DESIGN METHODOLOGIES



Fatigue – crack initiation and growth due to repetitive loading – is one of the main failure modes of steel bridges. To ensure the bridge safety during its lifetime, partial factors should be used on both load effects and material resistance to keep the probability of failure less than its target value, set by considering failure consequences.

The current standards suggest two design methodologies. First, by using partial factors to prevent failure probability to reach its target value at the end of the life, which results in an expensive design. Second, using smaller partial factors and letting the failure probability get close to its target value but prevent failure by performing regular inspection and damage repair. While in the first method it is possible to use not large

enough partial factors, in the second one, the lack of knowledge in (long) crack behavior, critical crack length and inspection interval are the main issues.

The goal of this research is to solve these issues to assure fatigue safety in an economical way by making the best use of inspection techniques. Therefore, a sound physical and probabilistic approach will be followed considering the stochastic nature of involved parameters. Several possible inspection categories will be defined and for each one of them, an optimal partial factor will be set and required inspection interval and procedure will be regulated.

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