Different approaches to determine the acceptance criteria for fatigue induced failure of structural systems and components are discussed and compared. The considered approaches take basis in either optimization (societal cost-benefit analysis) or are derived from past and actual practice or codes (revealed preferences). The system acceptance criteria are expressed in terms of the maximal acceptable annual probability of collapse due to fatigue failure. Acceptance criteria for the individual fatigue failure modes are then derived using a simplified system reliability model. The consequence of fatigue failure of the individual joints is related to the overall system by evaluating the change in system reliability given fatigue failure. This is facilitated by the use of a simple indicator, the Residual Influence Factor. The acceptance criteria is thus formulated as a function of the system redundancy and complexity. In addition, the effect of dependencies in the structure on the acceptance criteria are investigated. Finally an example is presented where the optimal allocation of the risk to different welded joints in a jacket structure is performed by consideration of the necessary maintenance efforts.

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