

DETERMINATION OF FATIGUE CURVES OF THE BRIDGES WITH MEMBER DECKS

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1. Introduction

When fatigue lifetime evaluation is determined through cumulative damage theory [1], important material characteristics, given by so called Wöhler's fatigue curve (or S-N curve), are taken into account. In simple cases of structural details and simple types of loads could be these material characteristics given by codes [2]. Using codes for fatigue curves determination (*Fig. 1*) of complicated structural details is questionable by reason of simplifications, which has to be accepted (use of interpolations, approximations).

Other way of fatigue curve determination leads to use of empirical equations [3.4]. This approach allows determination on the base of general material characteristics (ultimate strength, yield strength), on the type of structure (welded, bolted, riveted), on the geometry shape (geometry breaks, notches).

The last and the best approach of fatigue curve determination of complicated structures is through experimental fatigue tests of their critical structural details (Fig.2). However, also in this case are final results only assessments. The reason consist in simplifications of tested specimens, which has to be applied (more or less) during their fabrication, fixation to testing stand or by mode of loads. Experimental determination is expensive and time-consuming. In spite of that, experimental determination of fatigue curve is the best way to achieve qualitatively best results (exactness).

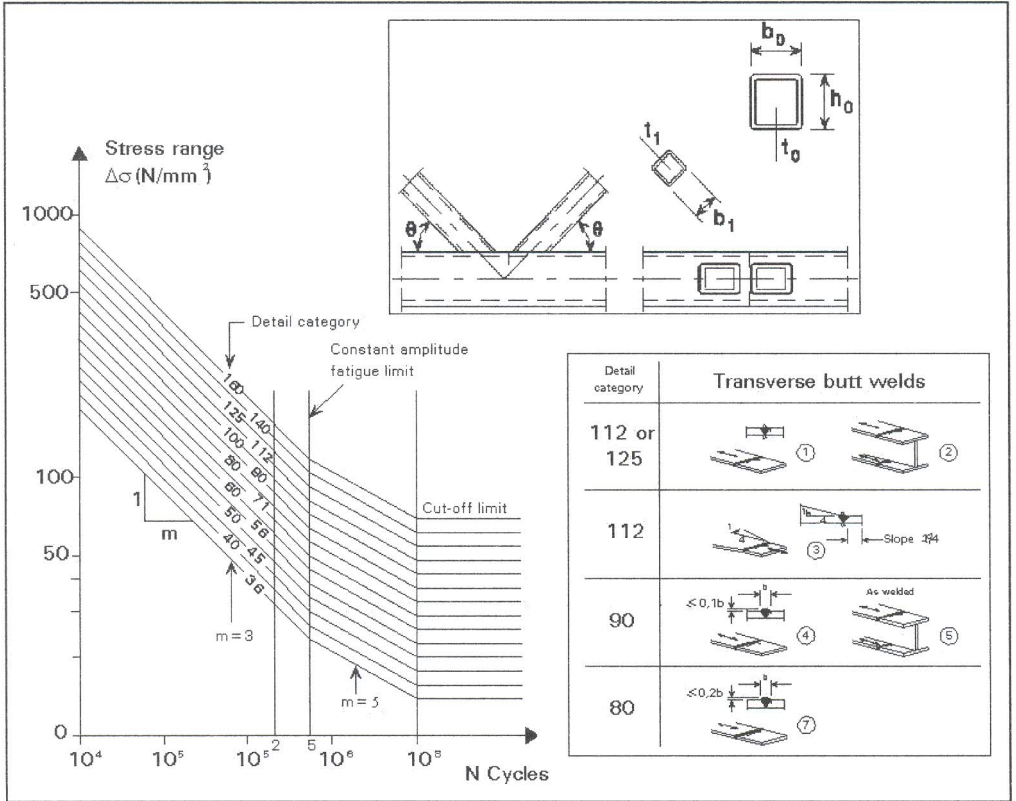


Fig. 1 Example of S-N detail categories (Euro codes)

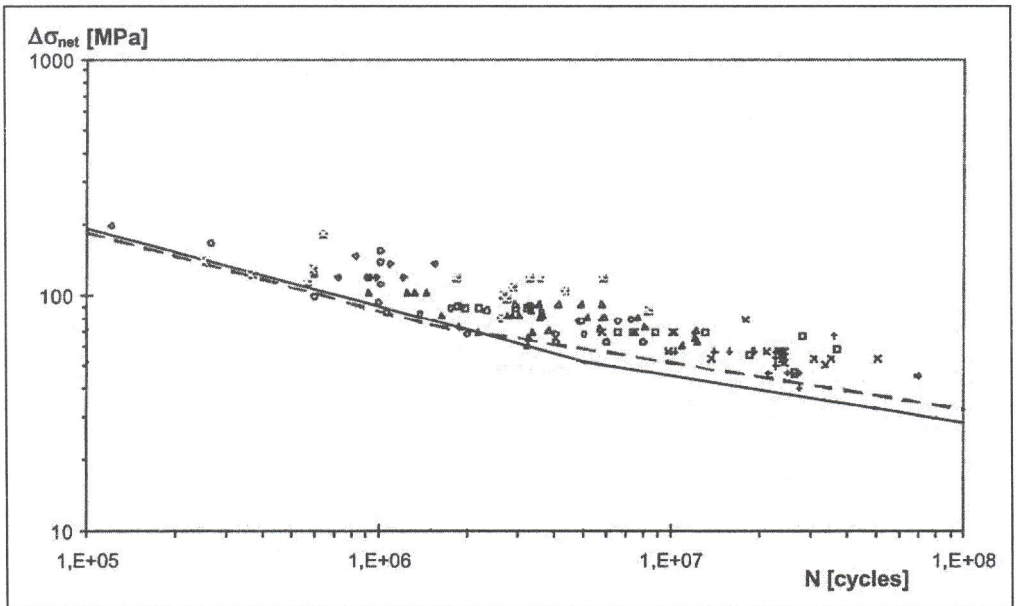


Fig. 2 Experimental determination of S-N curve

