# Imprecise Reliability Of Engineering Structures

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**Abstract**
It has been recognized for some time that for the realistic analysis of engineering systems it is necessary to introduce uncertainties.
Usual, deterministic analysis of structures utilizes the notion of 'safety factors' that postulates that once the engineering analysis is conducted and the structural dimensions are determined one has to multiply the dimensions by the required fudge factor that must exceed unity. Engineering profession recognizes that the safety factor is introduced because of the scatter in the loadings, material properties and dimensions. Many refer to the safety factor as the factor of ignorance.

On the other hand the structural reliability allows to interpret the safety factors in the direct manner. Indeed so called central safety factor is obtained as a direct by-product of the reliability analysis.

It was shown by several investigators that the purely probabilistic approach lacks exactness and is prone to the high sensitivity if one deviates even slightly from the adopted assumptions. In these circumstances the 'guaranteed' approach based on scarce data has been advocated by several researchers in recent years. Thus the interval or convex, ellipsoidal analyses have been actively under development.

Imprecise reliability analysis is based upon combination of both probabilistic and interval/ellipsoidal modeling. We argue that this approach is parallel to the Demsper-Shafer theory and represents the natural way of processing the available information.

Additional analysis is presented for the fuzzy safety factors, pioneered recently.

**References**

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