

Z.P. Bažant's Remarks upon Conferral of ASME Medal, Tampa, Nov. 6, 2017

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President Wise, Ladies and Gentlemen:

At this exalted moment, I wish to thank the ASME, my students, my university, my sponsors and my wife. Without their help and generosity I would not be here today. I feel **humbled** by joining the ranks of famous previous recipients, including von Karman, Weibull, Mindlin, Achenbach, Rice, and others.

The ASME citation not only recognizes my work but also testifies to the importance of probabilistic mechanics of **materials**. But what I want to emphasize is the **modern quasibrittle materials**, such as fiber composites, concretes and tough ceramics. Most previous studies of their

strength dealt with uncertainty of the loads. But material uncertainty matters, too.

For safe design of aircraft, bridges and other structures, we require the failure risk to be lower than **1 in a million** (which is 10,000-times lower than the risk of dying in a car accident). Such an extreme cannot be established by experiments. It requires a **theory**, rooted in randomness of microstructural failure processes and scale effects.

Material scientists strive to maximize the strength of new materials, but usually just the **mean** strength. Its extrapolation to the 1-in-a-million margin is a **big** problem that has not received proper attention. Bestowing on me this Medal, ASME also acknowledges the importance of this **underappreciated** research direction. Thank you!