

Lessons from Excessive Long-Time Deflections and Collapse of Record-Span Segmental Box Girder Bridge in Palau

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Built in 1977, the Koror-Babeldaob Bridge in Palau had the world-record span of 241 m. The design 100-year sag and deflection were 0.3 m and 0.6 m, respectively, but after 18 years the mid-span sag reached 1.47 m, and 3 months after remedial prestressing the bridge collapsed. After legal litigation, all the data were sealed in perpetuity, but an ethics resolution of the 3rd Structural Engineers World Congress proposed by Bažant led to data release. Their analysis yields surprises. While the current ACI and CEB-fib practices match the erroneous design predictions, model B3 (with three-dimensional finite elements, non-uniform drying and step-by-step time integration) can match the observations, including a 49% prestress loss measured before retrofit.



With a PhD in Prague (1963), Zdeněk P. Bažant joined Northwestern (1969), where he holds simultaneously the Murphy and McCormick distinguished professorial chairs. Member: US National Academy of Science, National Academy of Engineering, American Academy of Arts & Sciences and six European national academies. Received: six honorary doctorates, many medals (von Karman, Nadai, Prager, Warner, Newmark, Croes, Exner, L'Hermite, Torroja, Šolín, Stodola) and other honors. Published six books. With over 9300 citations and h-index=43, he is among 100 most cited engineering researchers worldwide. Research focus: fracture, probabilistic mechanics, nano-mechanics, composites, stability, concrete creep, hygrothermal effects, forensics.

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