

ABSTRACT:

Conventional brittle fracture theory (or statistical strength theory) has been developed on the basis of the weakest link concept proposed by Pierce, who studied cotton yarns, and Tucker, who studied concrete [1]. Major developments of the theory were made by Weibull [2], who verified his results with tests on many different brittle materials, but apparently not timber. Weibull showed how the strength of a weakest link system can be explained by a cumulative distribution of the exponential type, and how the strength depends on the volume of the test specimen for uniform or varying distributions of stress within the specimen. The first study in which the Weibull brittle fracture theory was applied to timber was reported by Bohannon [3]. He studied clear timber beams and found that for geometrically similar beams the strength was proportional to the depth of the beam to the power $1/9$, this being the result of a depth effect and a length effect of equal importance. He found that strength was not affected by beam breadth.