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Influence of Secondary Crack Growth in Continuing Damage Cases



U.S. AIR FORCE

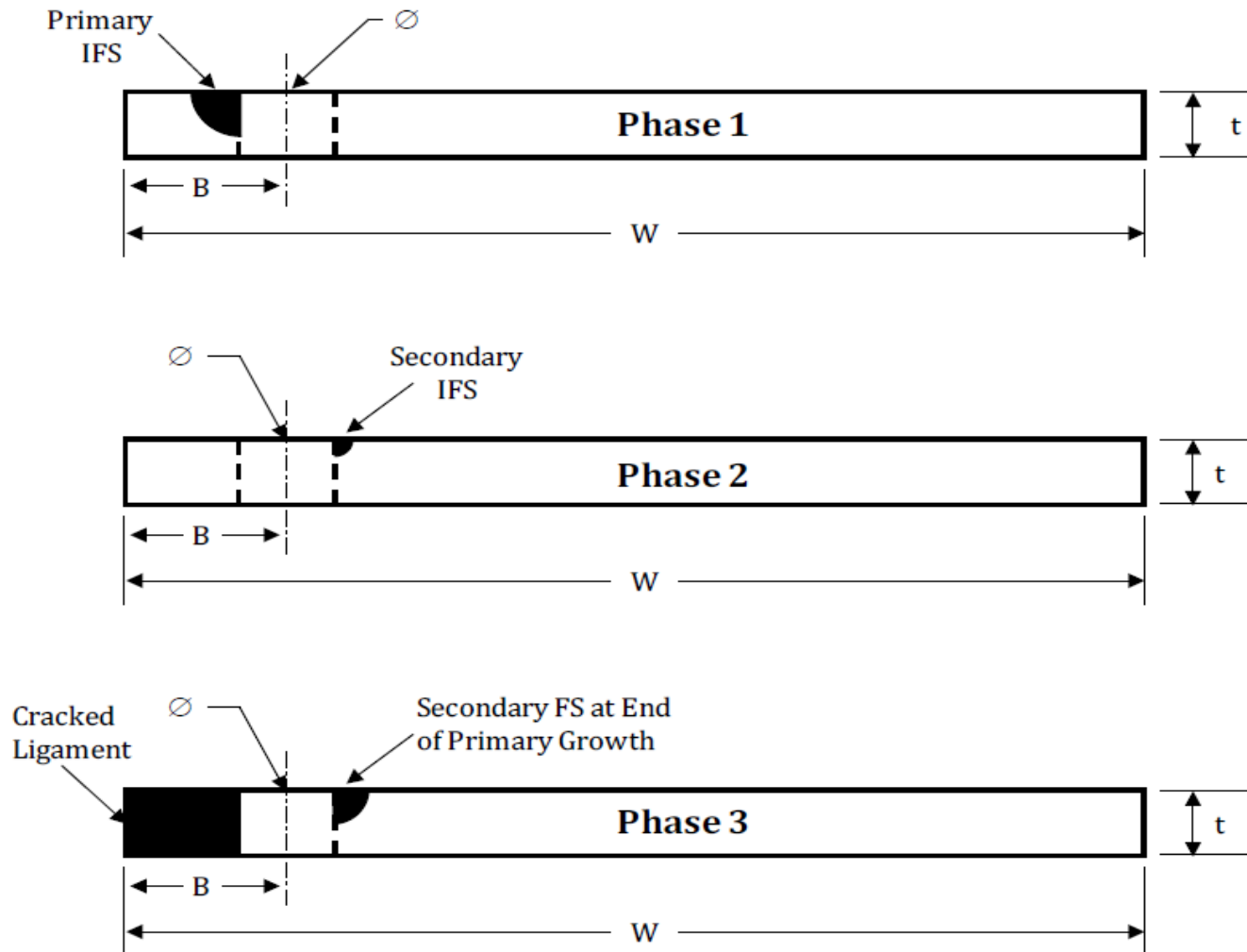
Luke J. Hanks
T-38 Structural Integrity
and Analysis Group



3-Phase Approach



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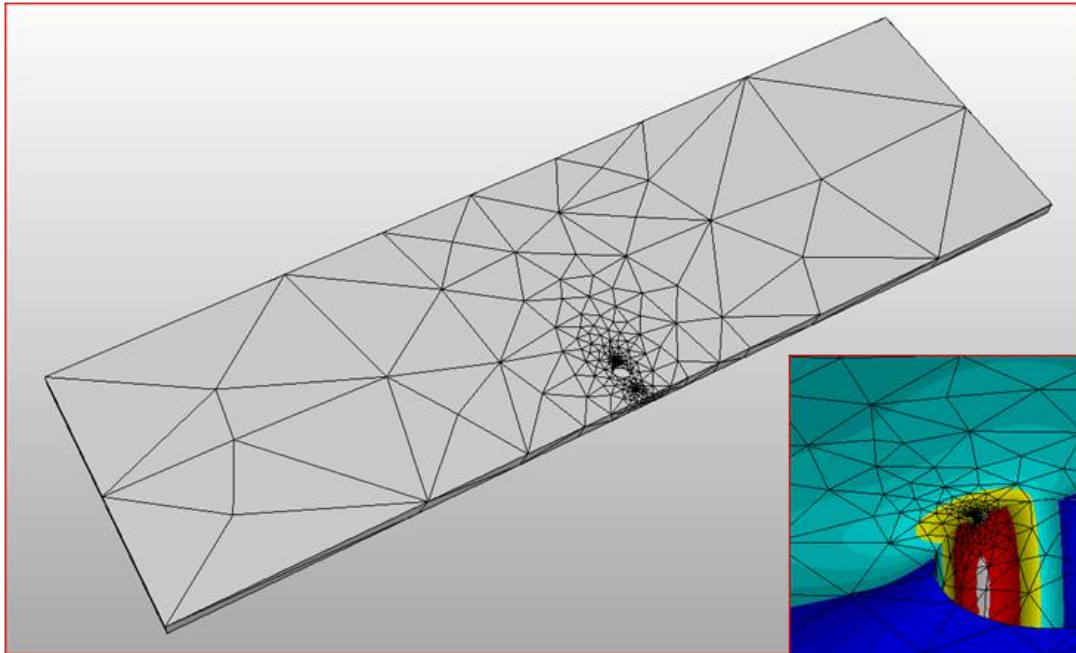




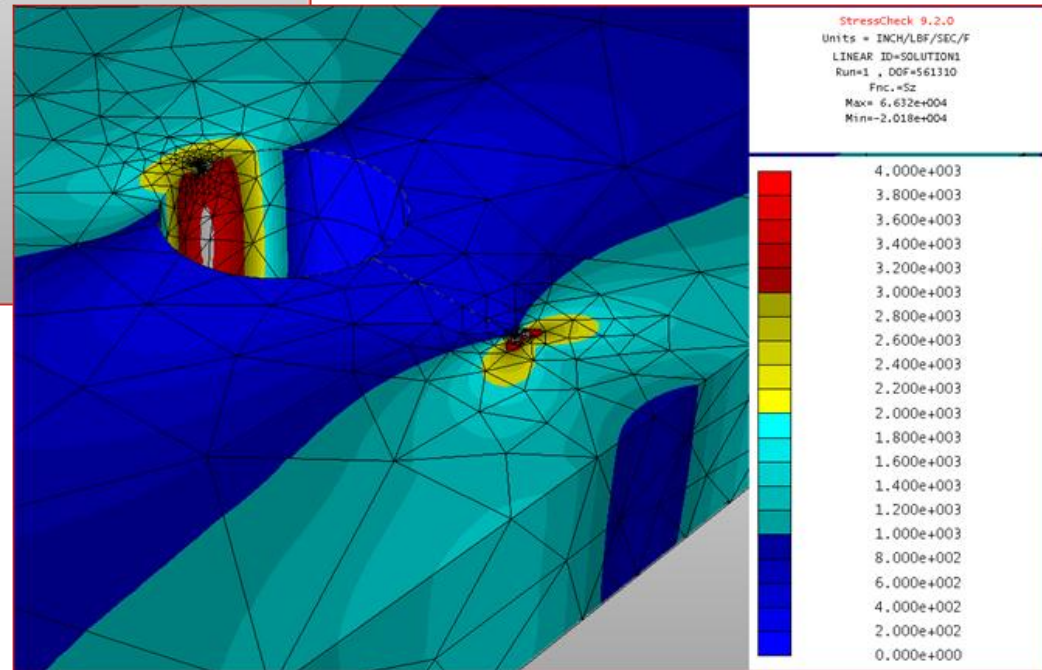
Two-Crack FEM Models



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- FCL B-12 (tension only)
- FCL A-22 (tension/bearing)

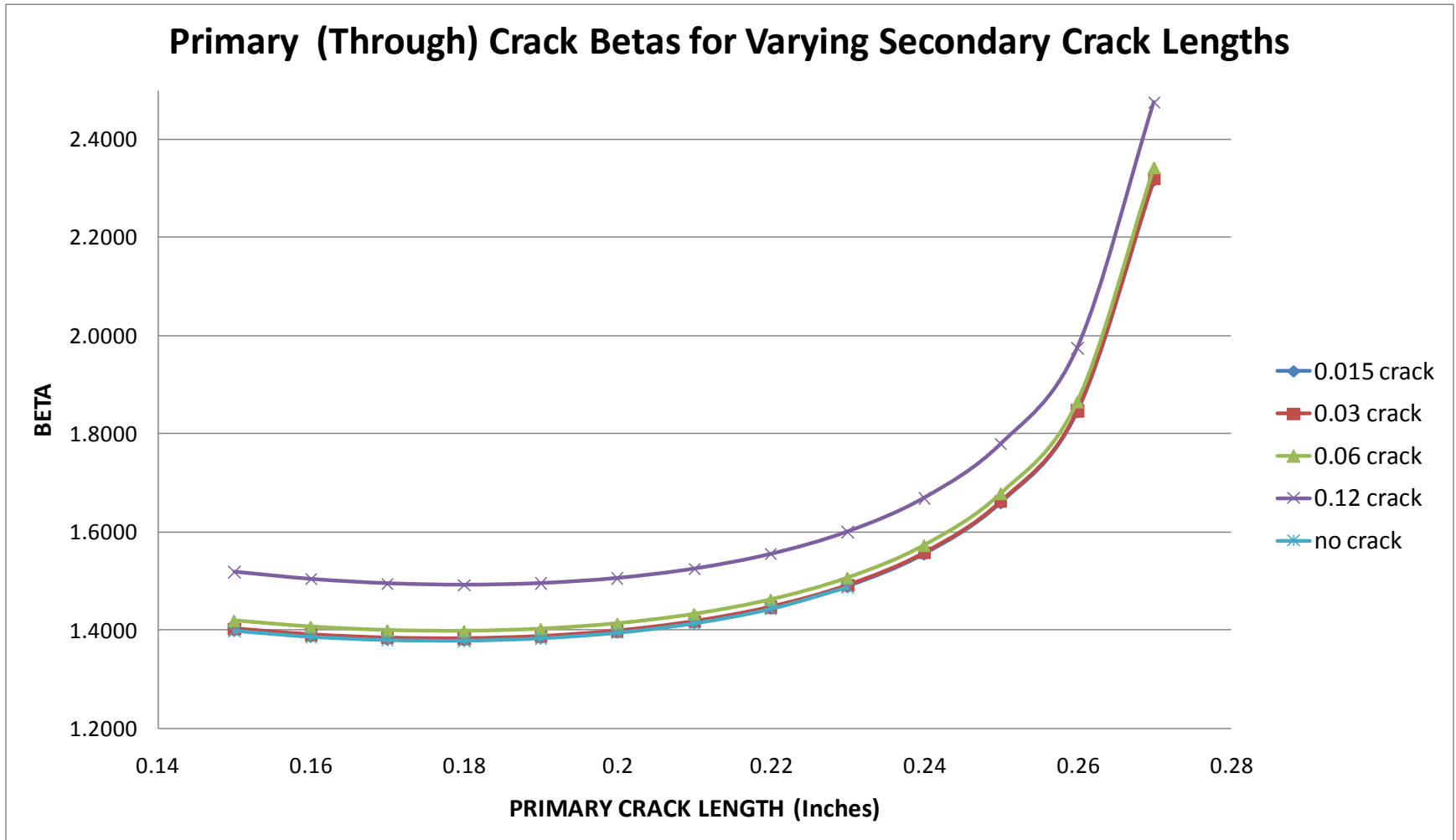




Beta Comparison (B-12)



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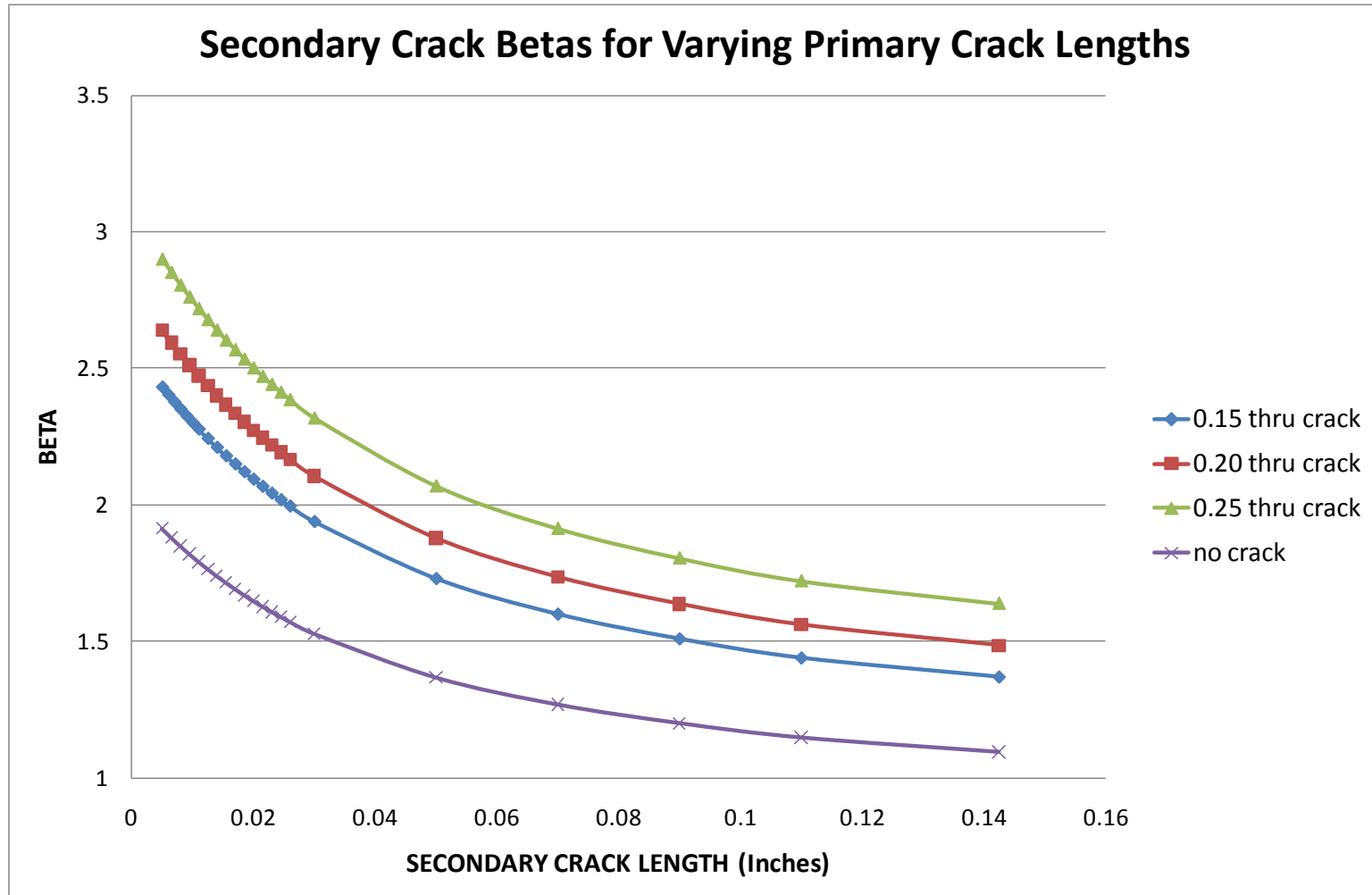




Beta Comparison (B-12)



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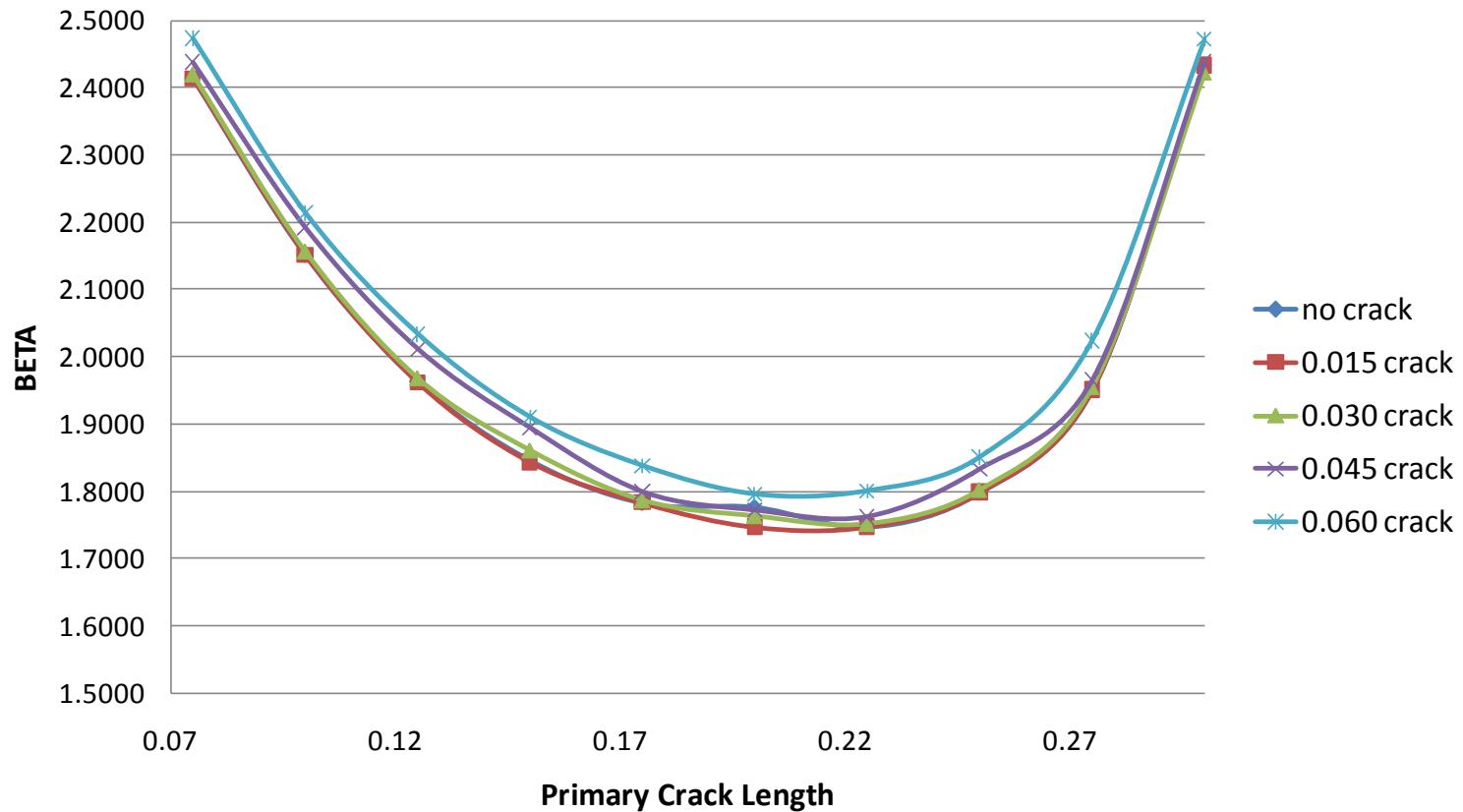


Beta Comparison (A-22)



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Primary (Through) Crack Betas for Varying Secondary Crack Lengths

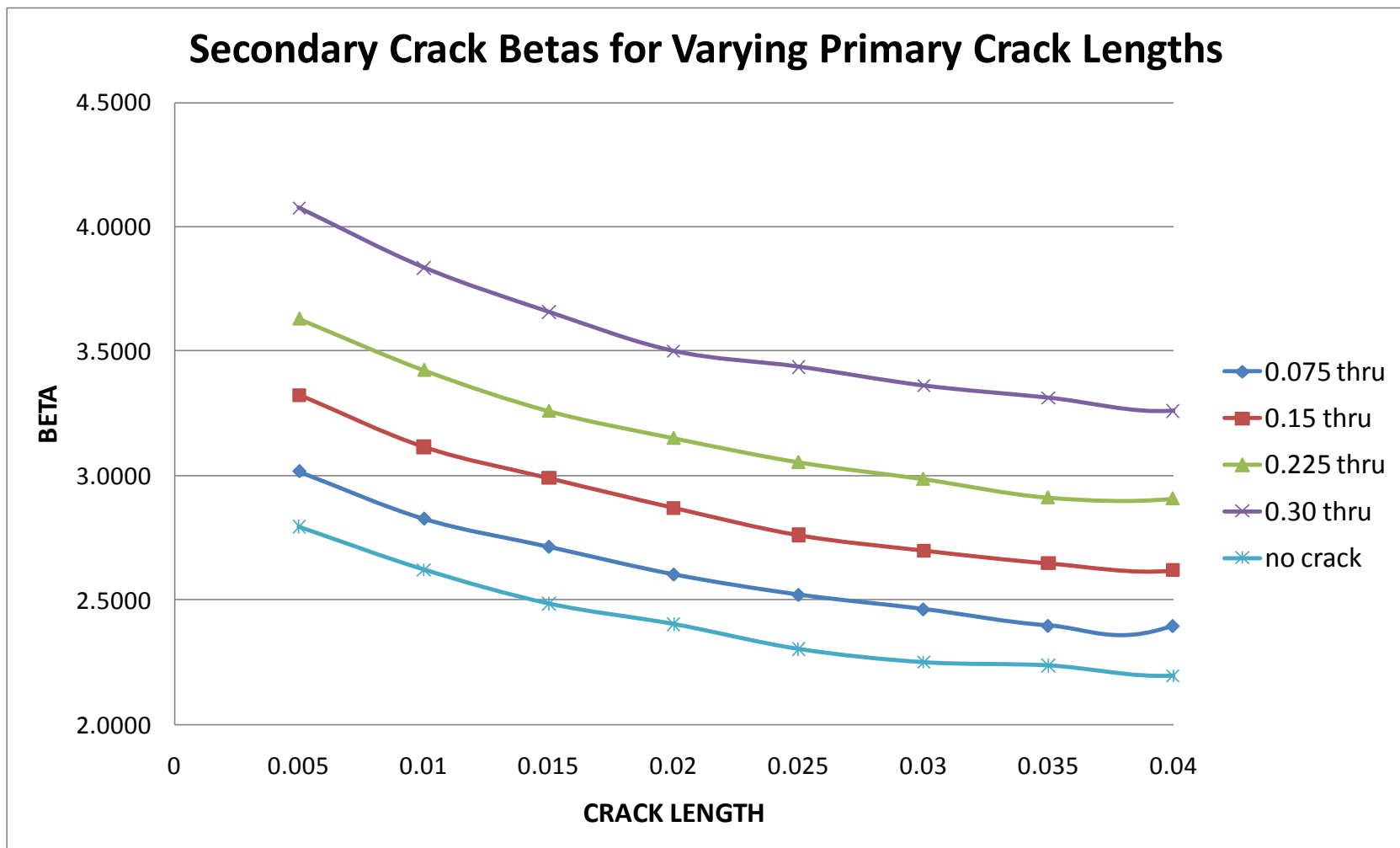




Beta Comparison (A-22)



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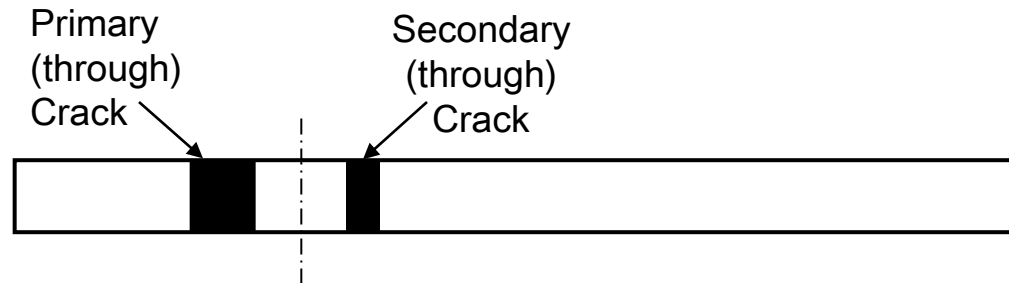
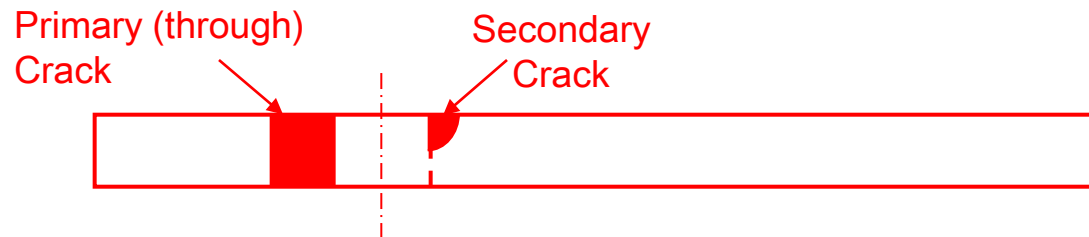
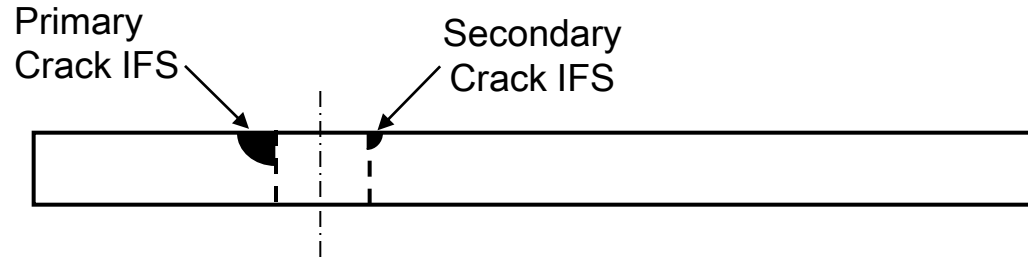




AFGROW Advanced Model



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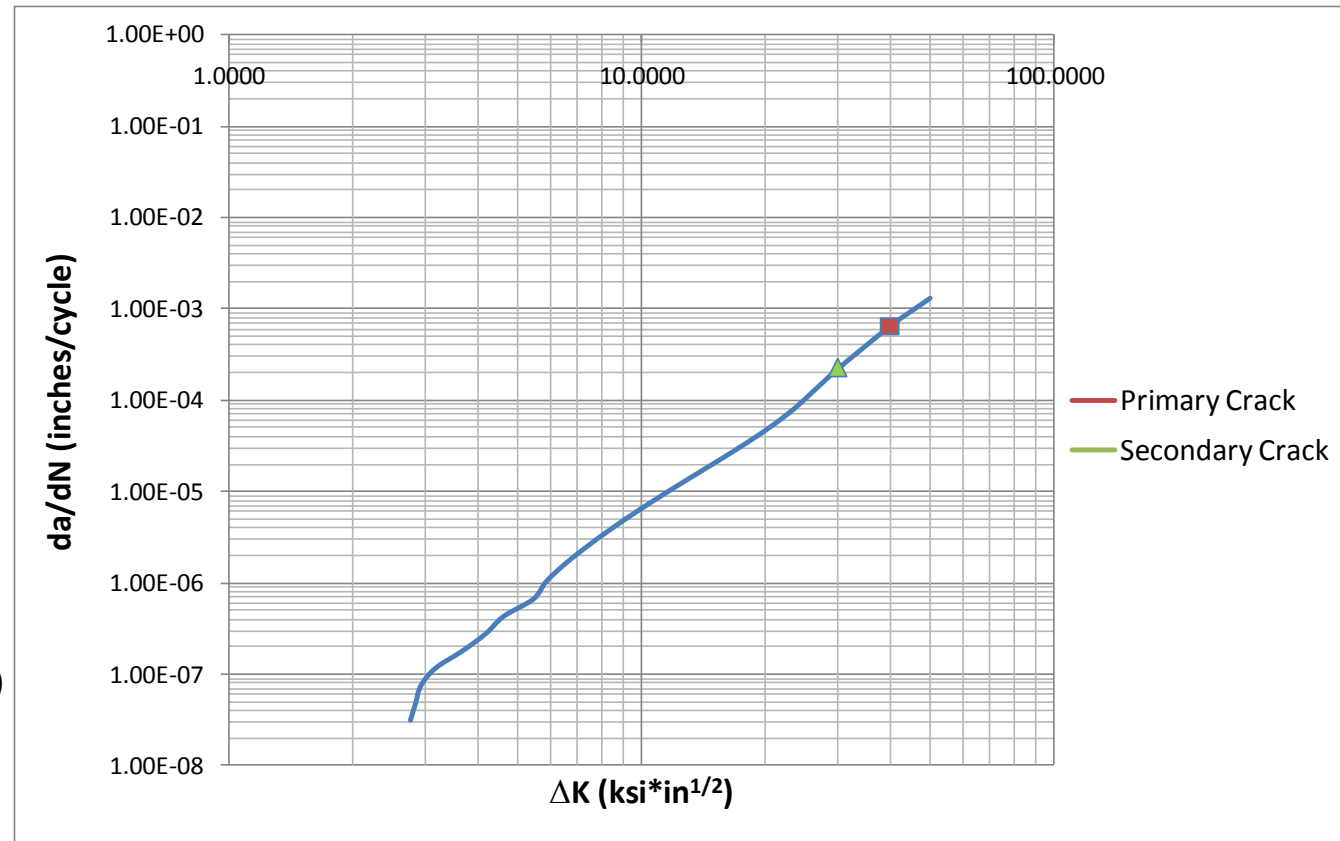


Cottam/Wieland Shuffle



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- 1) Betas for both cracks from StressCheck
- 2) $\Delta K_{c,i} = \Delta\sigma \times \beta_{c,i} \times \sqrt{\pi \times c_i}$
 $\Delta\sigma = (1 - R)\sigma_{\max}$
- 3) Choose growth increment (da_1) for primary crack
- 4) Solve for # of cycles (dN) using $\Delta K_{c,1}$
- 5) Calculate relative growth increment (da_2) of secondary crack using $\Delta K_{c,2}$ and dN

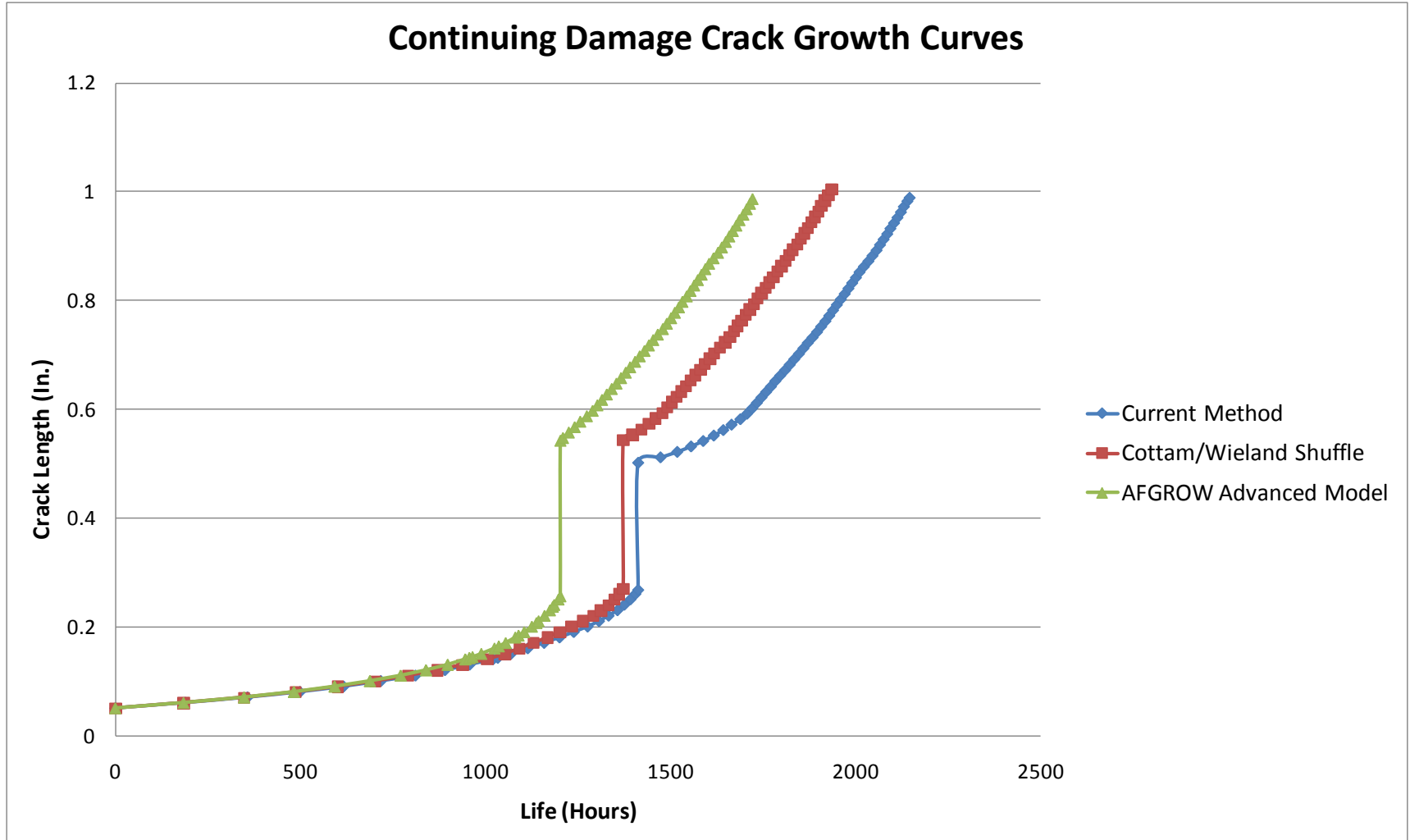




Three Methods (B-12)



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BE AMERICA'S BEST



Discussion



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QUESTIONS?