

List of Questions Discussed in Discussion Session – I

EFM-Lecture 24

Q1. In relaxation analogy, why do we take triangular region while evaluating strain energy?

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Q2. We know that energy release rate is energy required for unit extension of crack, whereas R is resistance to fracture, but how G and R are equal in stable fracture?

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Q3. Resistance R and fracture toughness are they same?

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Q4. SCF is defined as a stress raiser at Geometric discontinuities. Likewise how SIF can be defined theoretically?

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Q5. When you shown the photo elastic fringes nearer to the crack tip, fringes nearer to the tip are not forward tilted, but fringes away from the crack tip are forward tilted.

a) Whether the forward tilting indicates the crack advancing direction?



b) Why the nearest fringes are not tilted? Any logical reason behind this? Please provide us a little more improved understanding of the fringe pattern.

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Q6. When you explained the Westergaard solution, you mentioned that it is applicable only for biaxial state of stress and not for uniaxial. However, it is used to represent stress field in uniaxial too. Can you explain it again?

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Q7. Why Westergaard solution of displacement (biaxial) $u_y = \frac{4\sigma}{E}(\sqrt{a^2 - x^2})$ is being used for uniaxial superimposition problem of calculating energy release rate.

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Q8. For deriving the parameters like energy release rate, stress intensity factor, we have assumed the crack as through crack, but in most of the engineering applications one encounters embedded cracks. Whether the parameters derived assuming through cracks holds good for embedded cracks also?

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