

# Three Stages of Fatigue Failure

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- ❖ Crack Initiation

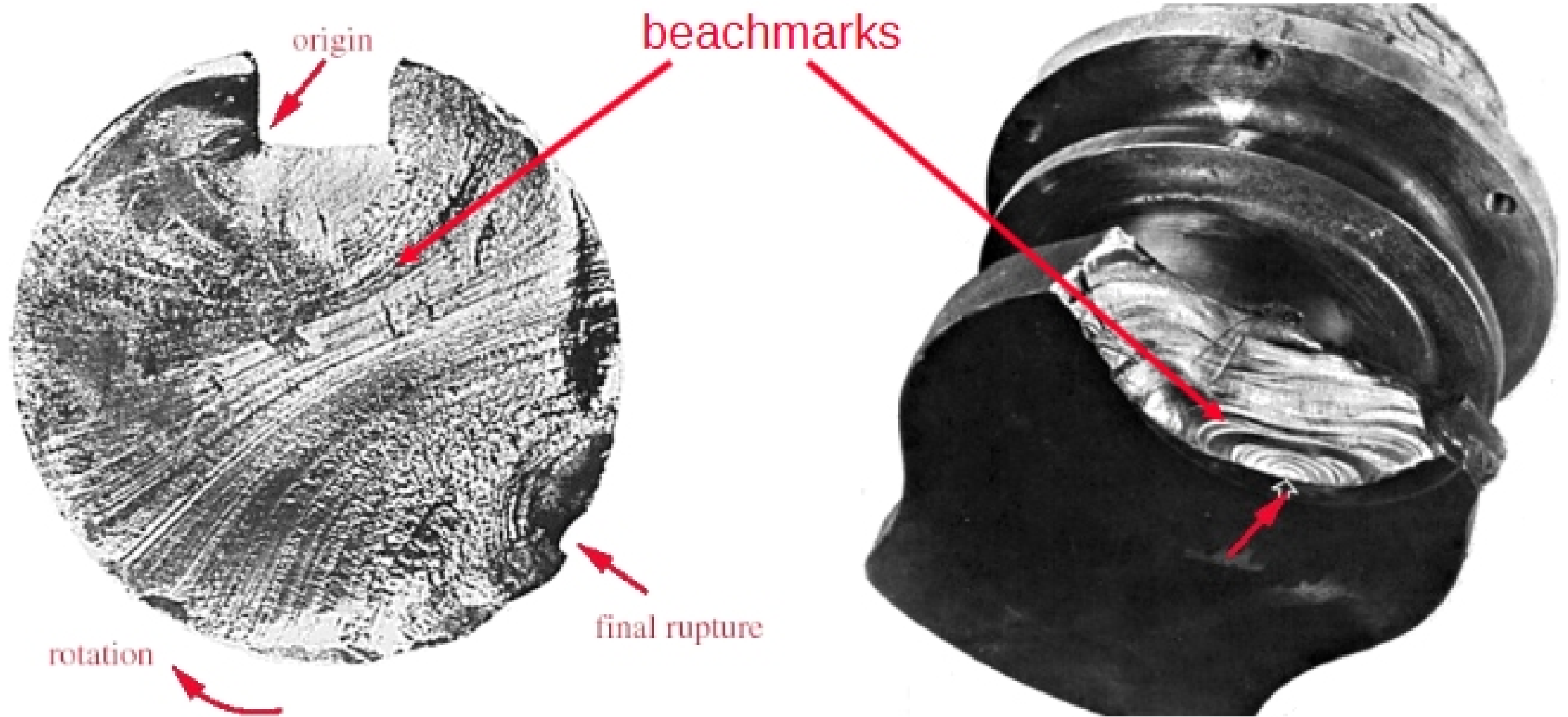
- ❖ Crack Propagation

- oscillating stress... crack grows, stops growing, grows, stops growing... with crack growth due to tensile stresses

- ❖ Fracture

- sudden, brittle-like failure

# Identifying Fatigue Fractures



# Three Theories

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## Stress-Life

stress-based, for high-cycle fatigue, aims to prevent crack initiation

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## Strain-Life

useful when yielding begins (i.e., during crack initiation), for low-cycle fatigue

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## LEFM (Fracture Mechanics)

best model of crack propagation, for low-cycle fatigue