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#### Focus on Failure Mechanisms







# What are your favorite mechanism?

#### Examples of Failure Mechanism







## Electical Examples

Electromigration

Dielectric breakdown

Solder joint fatigue

diffusion

corrosion

etc.



#### Mechanical

#### Examples

Wear

Fatigue

Cracking

diffusion

corrosion

etc.



#### Manufacturing

Examples

Wrong part

Wrong orientation

Damaged parts

corrosion

diffusion

etc.



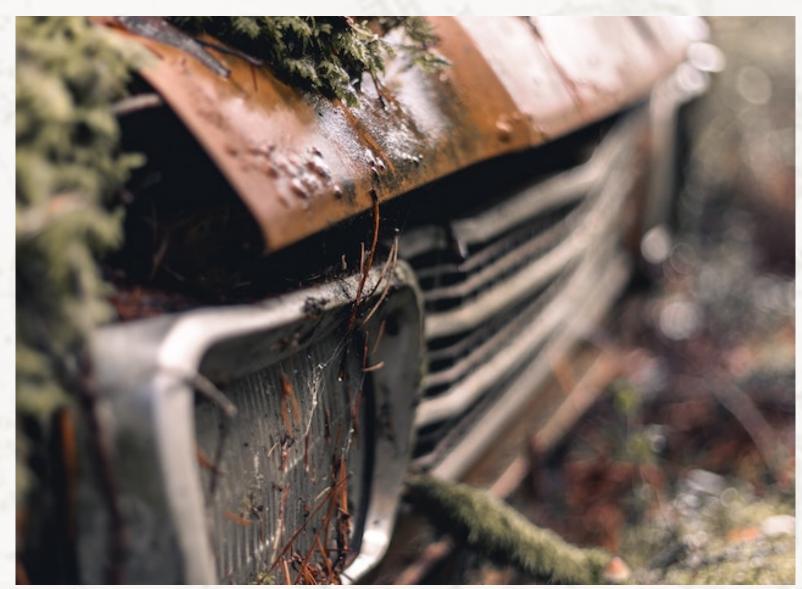
## How many ways can

# something fail?

#### Finding Failure Mechanisms





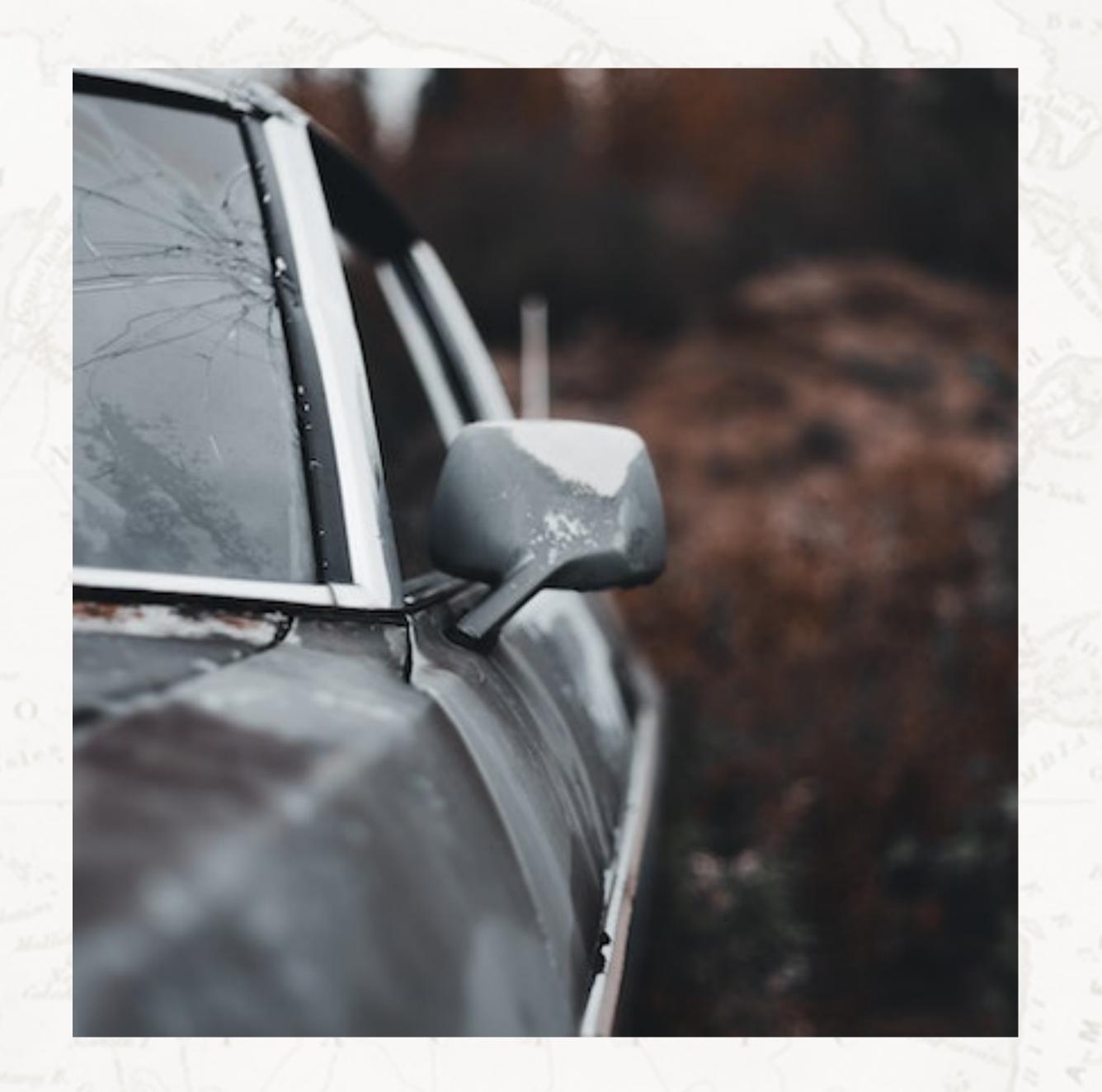


## 5 Why's Finding

Be curious

Be prepared to be surprised

Ask why again, and again, etc



## Root Cause Analysis Finding

Fixing what is actually causing the failure - works

Plenty of methods out there - 8D

Check assumptions and conclusions



## Observation/Research Finding

Use all your senses to get started

Regularly research mechanisms

Build a network

material scientists

failure analysts

engineers

vendors



## Is there a good reference for

### failure mechanisms?

#### Uses of Failure Mechanisms







#### Design & Manufacturing

Uses

Design out mechanisms

Mitigate unavoidable mechanisms

Monitor stability to notice mechanisms

Sense known mechanisms



### Accelerated Life Testing Uses

Different mechanisms respond to stress differently

Acceleration models are specific to mechanisms

(use HALT to find them, use ALT to measure them.)



#### Modelling

Uses

by subsystem/components or by dominate mechanisms

physics of failure modeling

Monte Carlo modelling



## Other ways to use

# mechanism knowledge?

# Additional Comments and Questions

## Thanks

see more at AccendoReliability.com