

Rail Flaw Detection

Surface Crack Measurement: Where Technology is Heading

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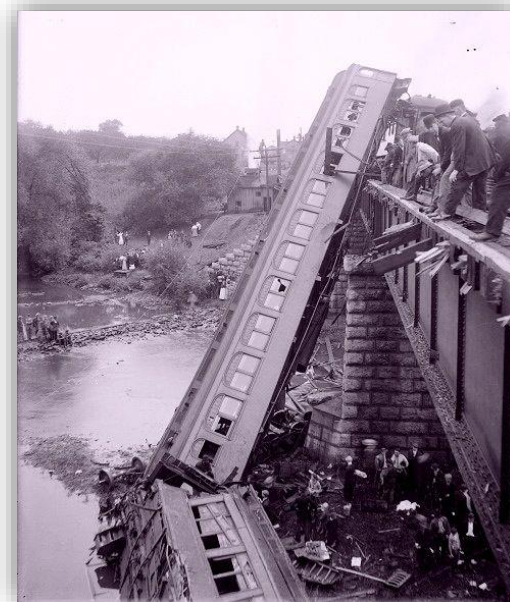
ASNT Level III Instructor



Importance of Rail Inspections

Better inspections

- Improve safety
- Avoid costly derailments
- Maintain operations



Manchester, New York - 1911



Inspection Type

Visual

- Track inspectors
- Non-volumetric

Induction

- Magnetic principles
- Partially volumetric

Ultrasound

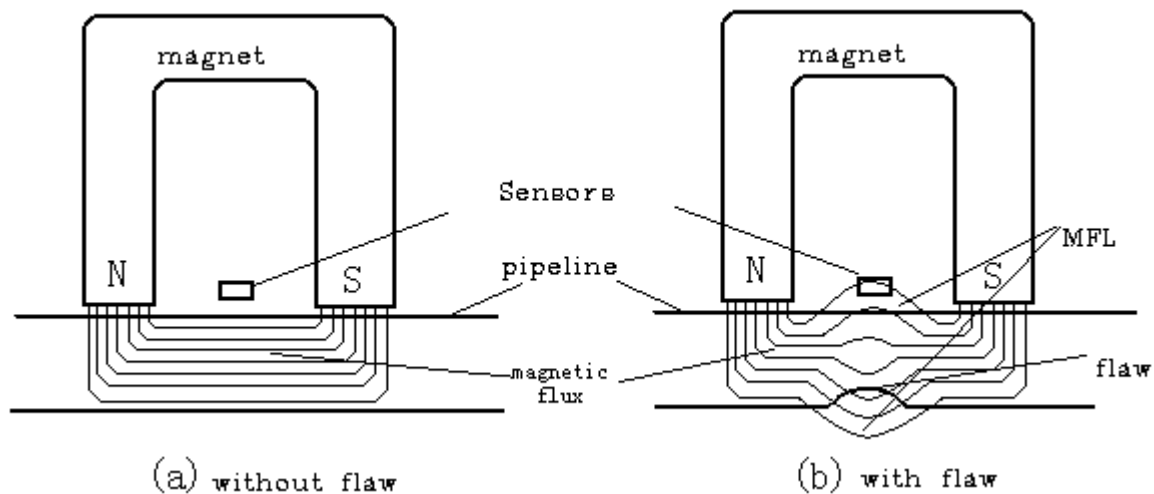
- Mechanical sound energy
- Mostly volumetric



Inspection Type

Induction

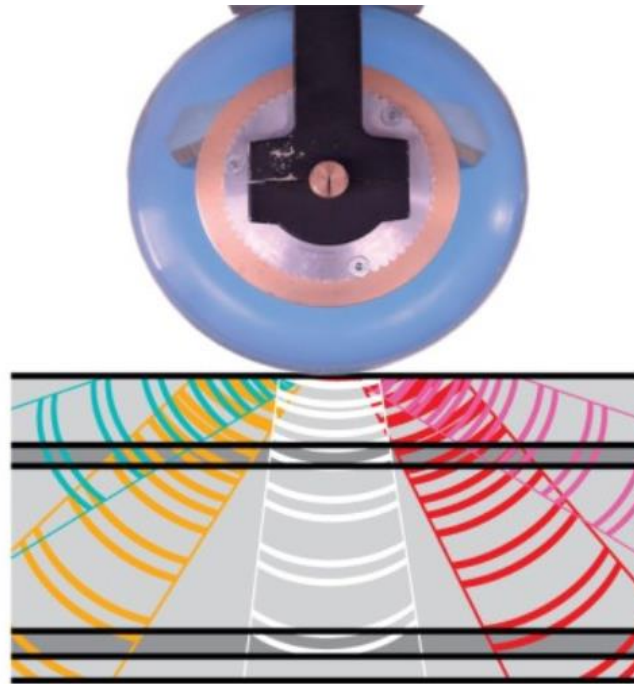
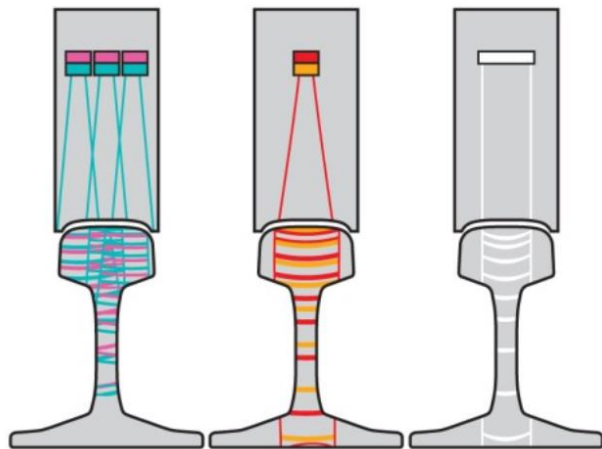
- Magnetic principles
- Partially volumetric



Inspection Type

Ultrasound

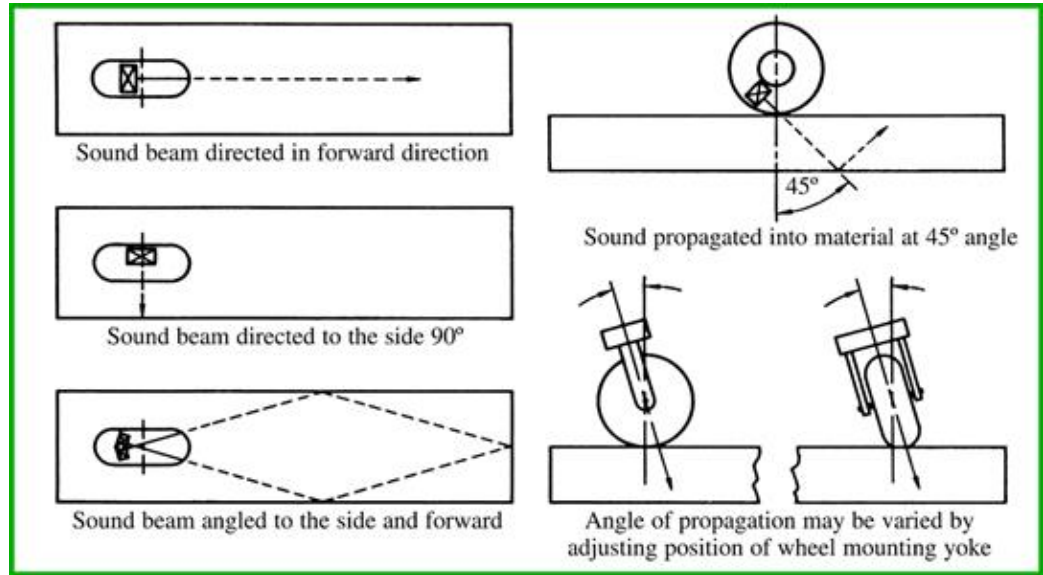
- Mechanical sound energy
- Mostly volumetric



Conventional Ultrasound



Roller search unit (RSU)



Fixed probe locations



Current Application of Probes



Pushcart



Utility Type Vehicle



Handheld



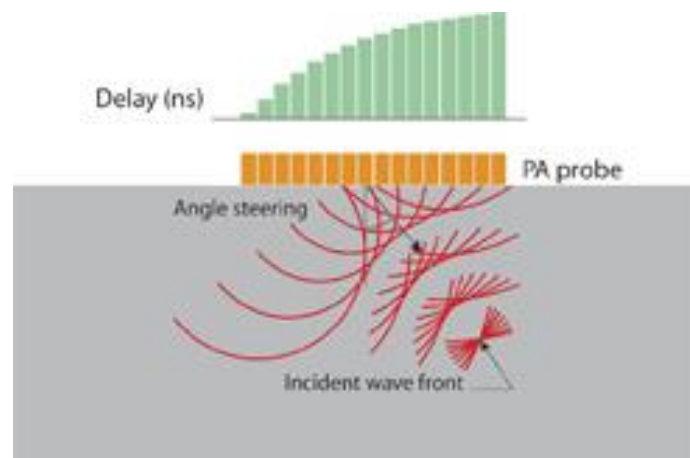
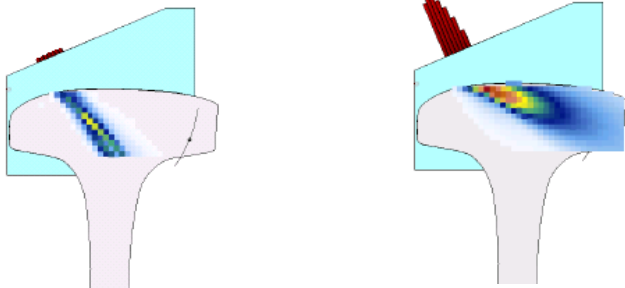
Current Application of Probes



Recent Ultrasonic Developments

Phased Array

- Roller search unit (RSU)
- Electronic steering of sound beam



Rolling Contact Fatigue (RCF)

Caused by cold rolling (work hardened)

- Difficult to measure
- Can grow into more serious defects



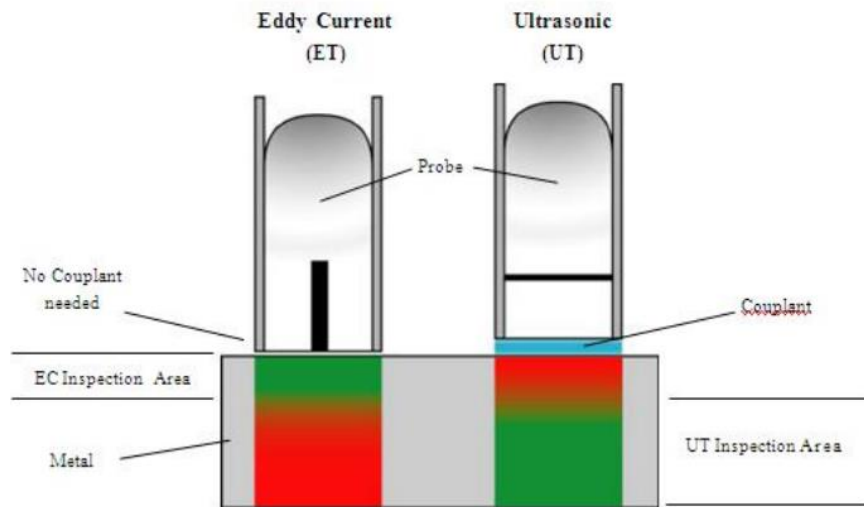
Rolling Contact Fatigue (RCF)

Eddy Current

- Measures crack length
- Assumed crack depth

Visual

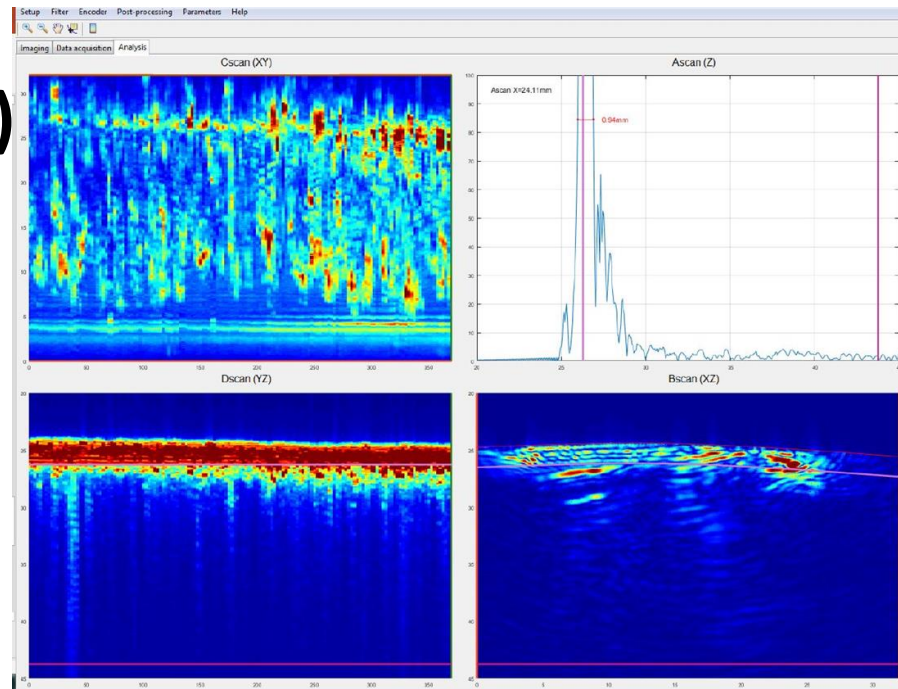
- Crack density



Rolling Contact Fatigue (RCF)

Full Matrix Capture (FMC)
Total Focusing Method(TFM)

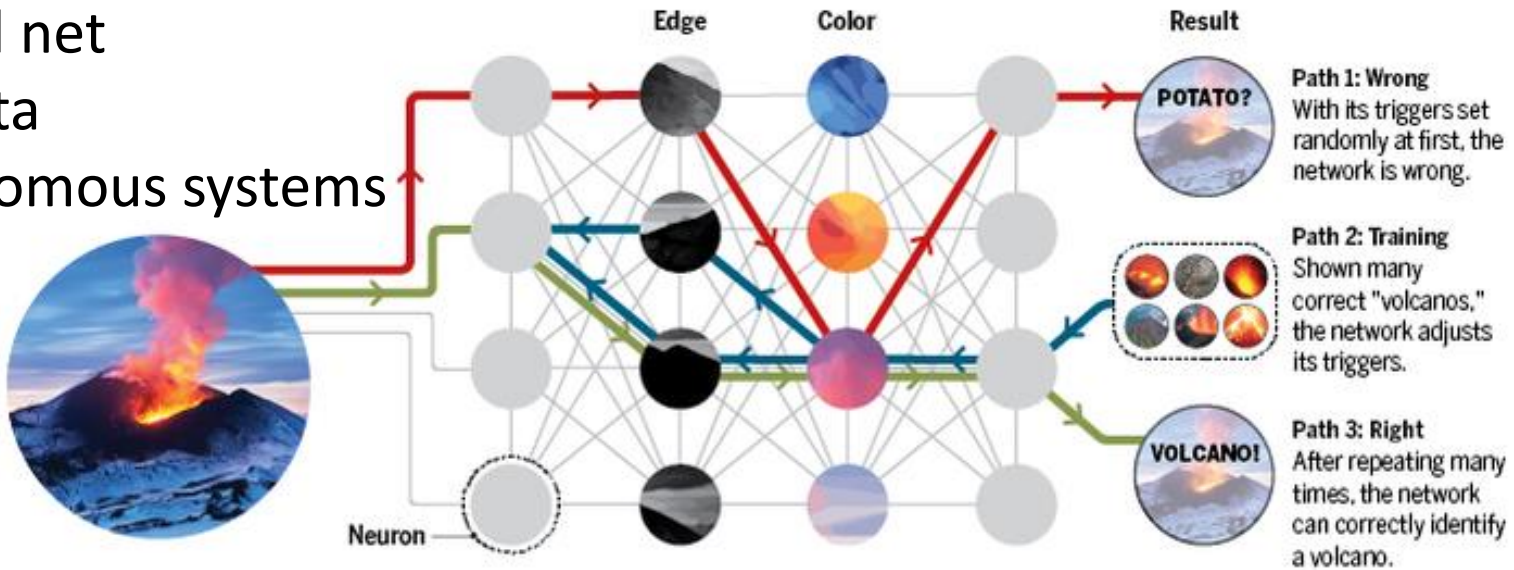
- TBD



Future of rail testing

“Smart” Systems

- Artificial intelligence
- Neural net
- Big data
- Autonomous systems



Future of Rail Testing

Non-contact test systems

- Laser-induced ultrasonic testing
- EMATS

Multiple inspection services

- Ultrasonic
- Eddy Current
- Vision
- Geometry



Thank you!
Q&A

