Eddy Current Inspection Application

Material Thickness Measurement

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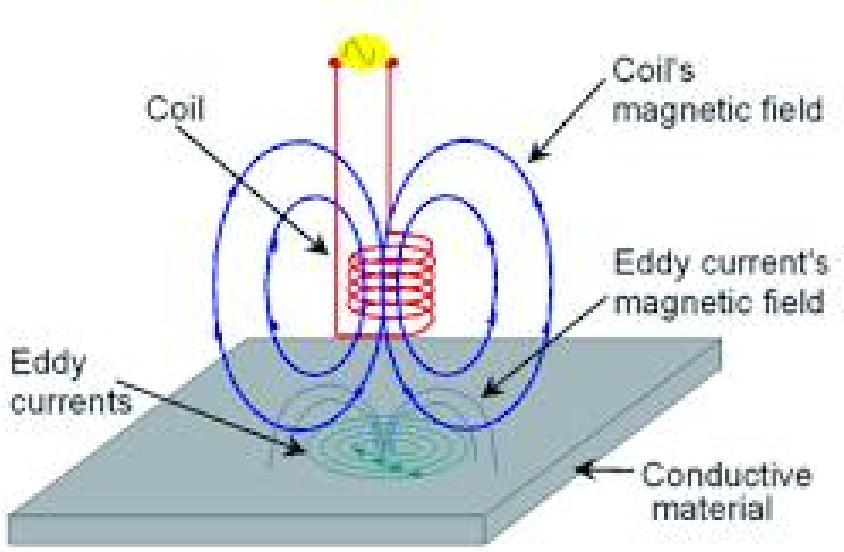
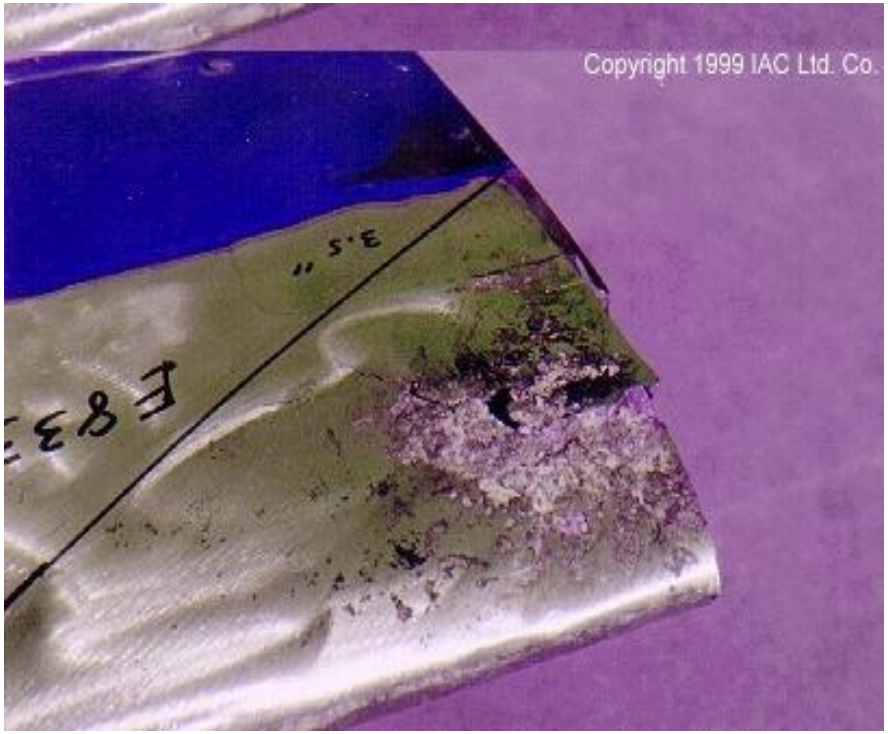
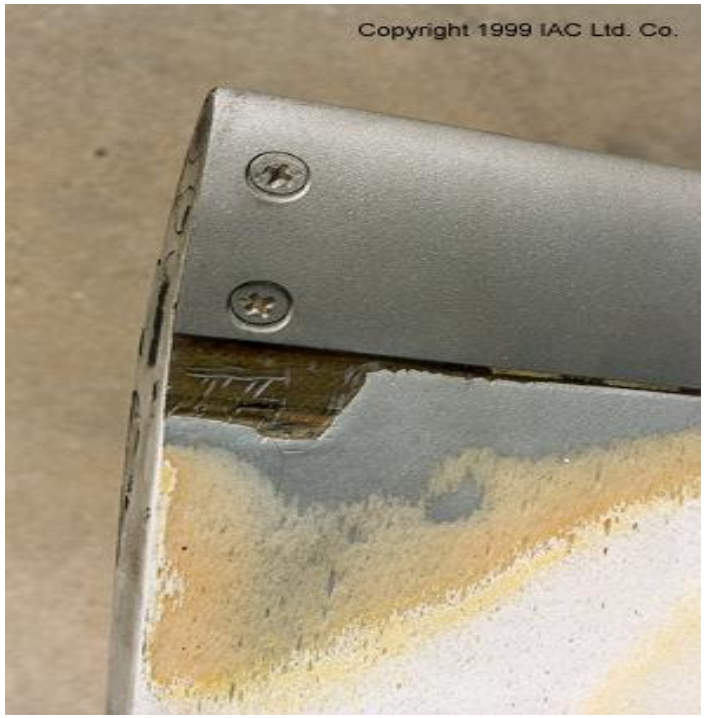


Why measuring thickness?

- Defective coating lead to **rust**
- Determine **coating thickness**
- Measuring **corrosion thinning** in aircraft
- Measurement of **Thin Conductive Sheet, Strip and Foil**
- **Cross-sectional Dimensions** of Cylindrical Tubes and Rods





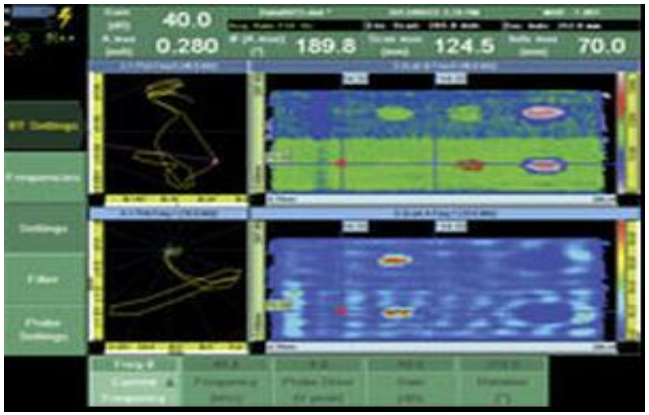
Example of flaw on the surface of aircraft's wing

Measuring Material Thickness

1. **Selection of the probe** (surface probes, pencil probes, sliding probes) depends on type of material inspect
2. **Switch on instrument** and **select** suitable **frequencies**
3. **Reference calibration standard** which composition and geometry are the same with material inspect
4. **Place** the **inspection probe** at the **surface** of **specimen** to be inspected and **scan** the **probe over the surface** of specimen
5. **Monitor** the **signal** to **detect** the **amount** of **impedance changes**
6. **Material thickness determined** by the **impedance change** in the form of digital reading.

Select probe

Select frequency

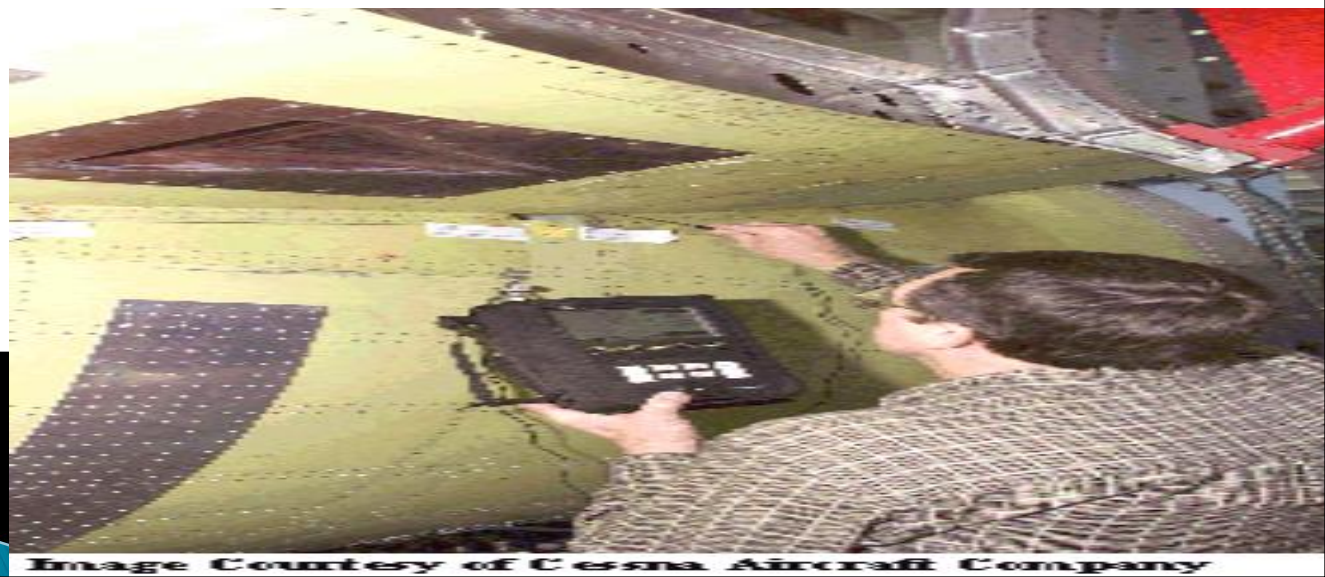


Record the result

Place the probe at the surface of specimen

Application in Corrosion Thinning of Aircraft Skins

- Used to do **spot check**
- Scanner used to **inspect small areas**
- Determine if **corrosion thinning** is present in buried layers **for multi-layered** areas
- Determine **thickness changes** down to about three percent of the skin thickness



Thickness Measurement of Thin Conductive Sheet, Strip and Foil.

- To **measure thickness of hot** sheet, strip and foil in rolling mills
- To measure the amount of **metal thinning due to corrosion** on fuselage skins of aircraft
- **Thickness variations** exhibit the **same type of current signal response** as a subsurface defects
- Depth of penetration of the eddy current must **cover the entire range** of thickness
- Measuring thickness of very thin protective coatings of ferromagnetic metals on ferromagnetic metal bases
- Measurement can be made using a **single-coil probe**, **transformer probe** or **preferable reflection type**

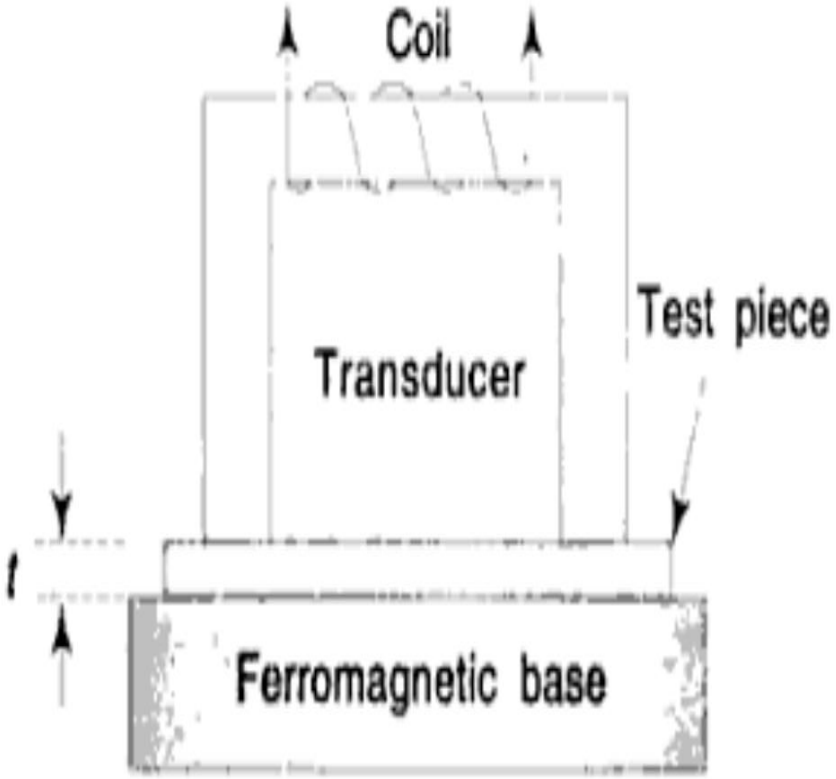
Measurement of Cross-sectional Dimensions of Cylindrical Tubes and Rods

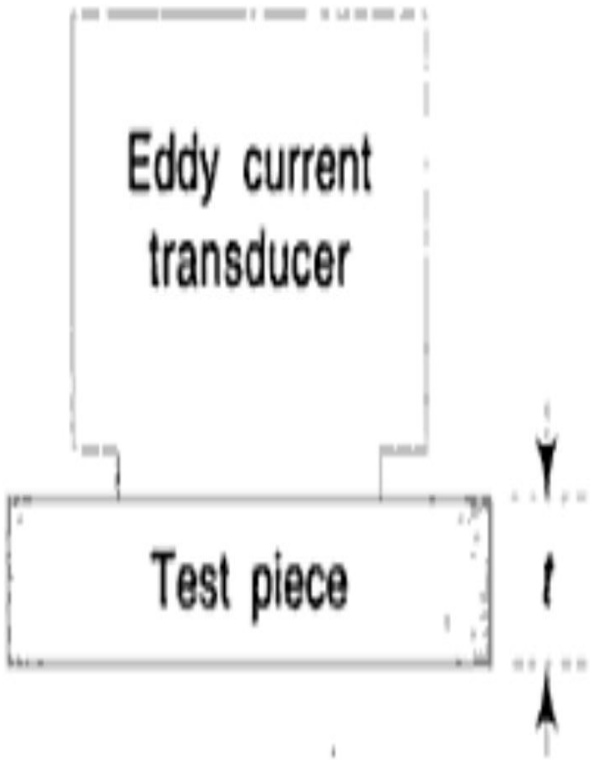
- **Measure** with **OD coils** or **internal axial coils**
- **Measuring eccentricities** of the **diameters of tubes** and **rods** and **thickness of tube walls**
- **Detection** and **assessment of corrosion** for external and internal

Cylindrical Tubes and Rods Video

Type Of Material

- Conducting Material
- Non-Conducting Material





Conducting Material

- The coil **wounded on an insulated core** excited by an alternating current supply
- The **alternating field produced** as a results generates eddy current in the test piece
- The **opposition created** by the **magnetic field of eddy current** against the **magnetic field of coil**, reduces the inductance of the coil
- So, **higher the thickness** of the test piece, **higher will be the eddy current**, **lower would be the inductance** of the coil.

Non Conducting Material

- Thickness measurement is done by **depositing it on a metal backing**
- If the **thickness of the test piece is large, the eddy current transducer head** and **the metal backing are separated by a larger distance** and therefore the eddy currents are small and consequently the inductance of the coil is large

Video