Worldwide Pollution Control Association

FirstEnergy ESP Seminar

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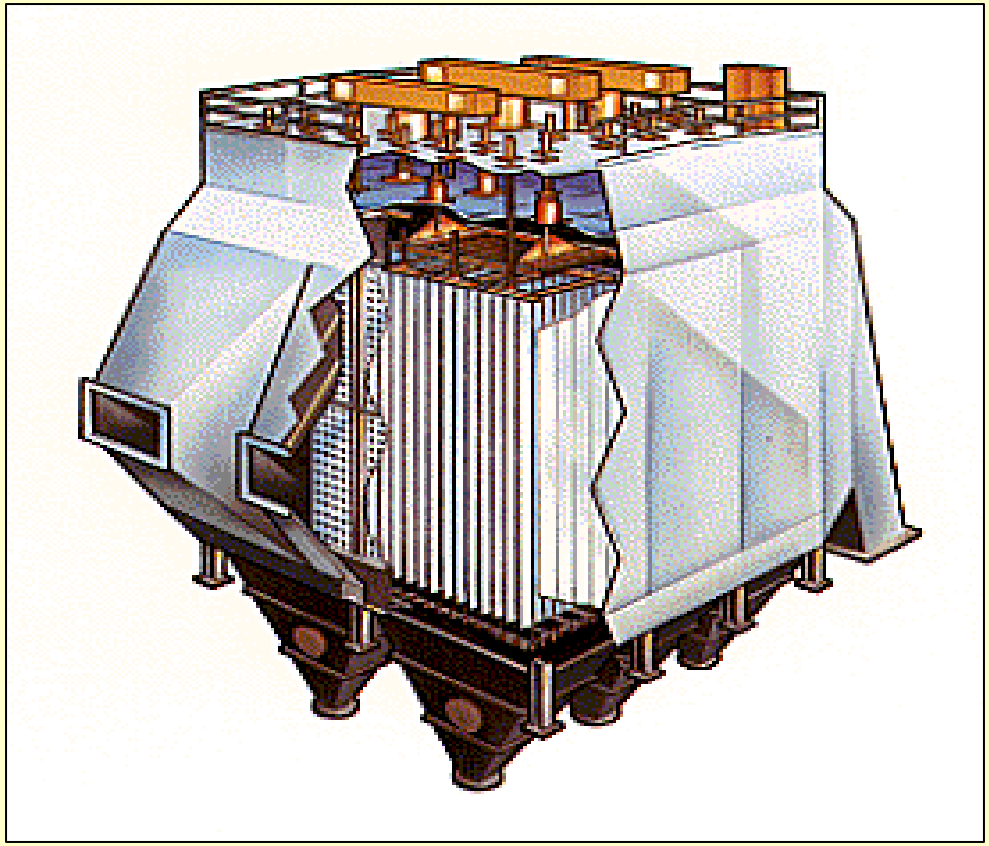
Precipitator Maintenance and Operations

By Scott Williams



External Dust Collection Concerns

Preheater Basket
Material Can
Ground Out
Precipitators

Carbon Loss on Ignition Decreases Collection Capability

Carbon Loss on Ignition Increases Emissions and Opacity

Proper Gas Flow is Critical

Ash Build-up on Turning Vanes in the Duct Causes Poor Gas Flow

Ash Build-up at Precipitator Inlet

Ash Buildup at Access Door

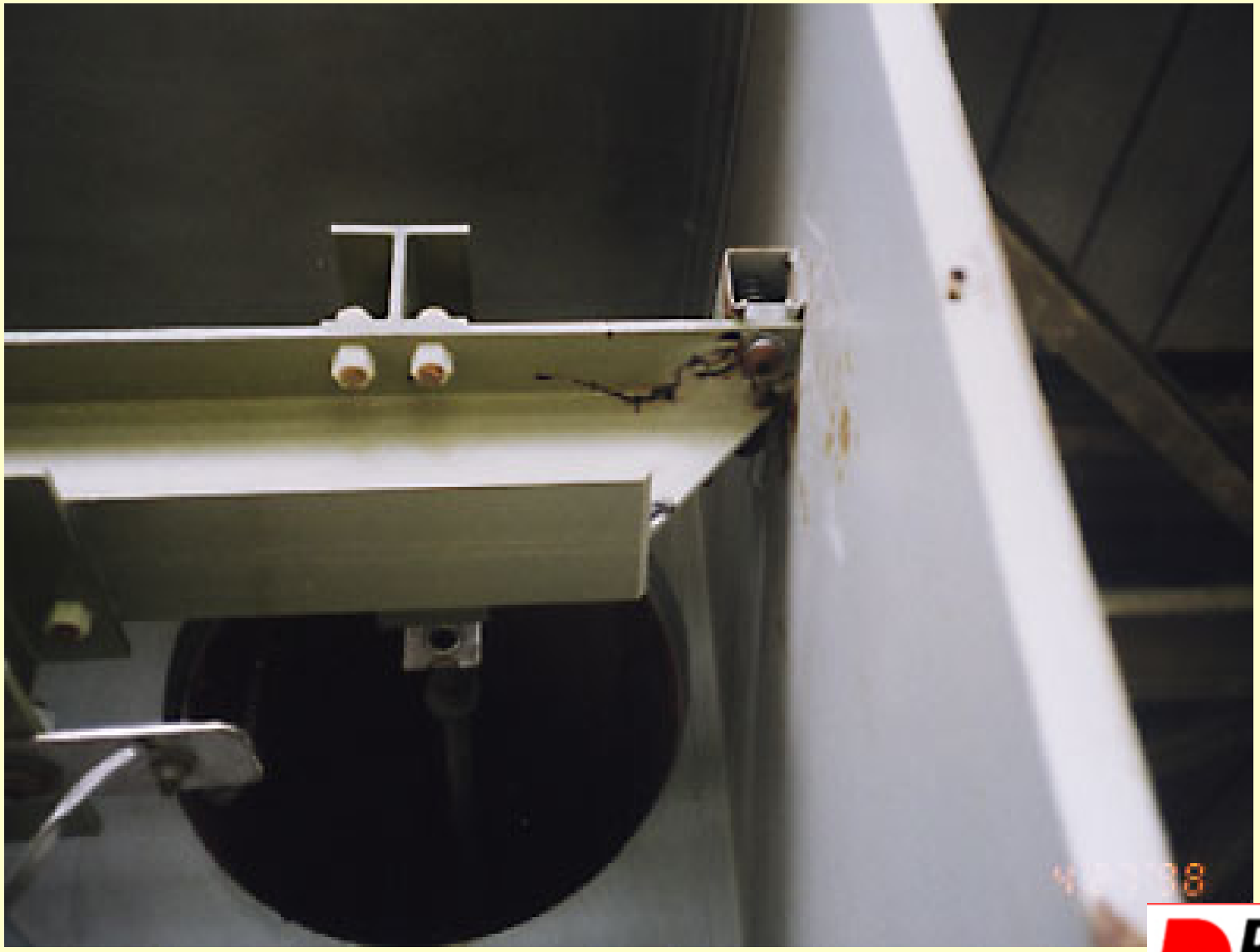
High Voltage Arcing and Tracking Causes Component Failures

Knife Blade Switch Arcing and High Voltage Cable Failure

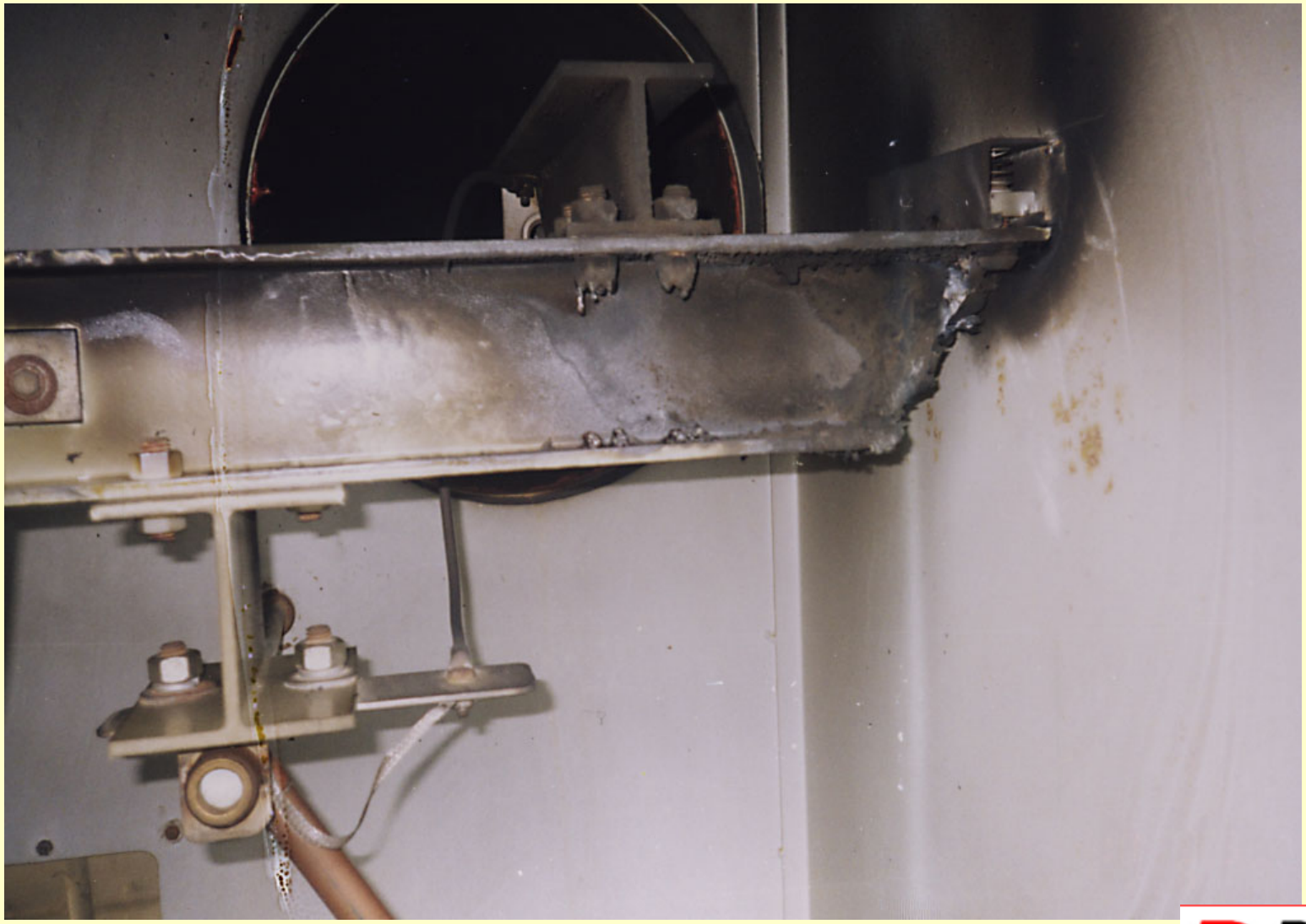
Power Path High Voltage Failure

Broken High Voltage Insulator

Tracked Post Insulator Inside a T/R Set



Support Insulator inside T/R - Tracking



High Voltage Insulator Tracking

Water/Air Leakage is a Major Concern

A Hole in the Precipitator Hot Roof due to Thermal Stress/Corrosion

Holes in the Side of the Precipitator Due to Corrosion

Water Leaks From Ductwork

High Voltage Guard Air Leakage

Corrosion of High Voltage Guard Due to Air Leakage

Water Leakage Around Rapper Boot Seal

Water Pouring From Precipitator Hopper

Ash Buildup in Hopper

Water Leakage Through the Precipitator Roof

Roof Corrosion Due to Water Standing for a Long Period of Time

Corrosion Around Access Door

Thermal Stress Concerns

Structural Component Bowing due to Thermal Stress

Plate Bowing Due to Thermal Fatigue

Thermal Stress Crack in Casing

Center Wall Cracking

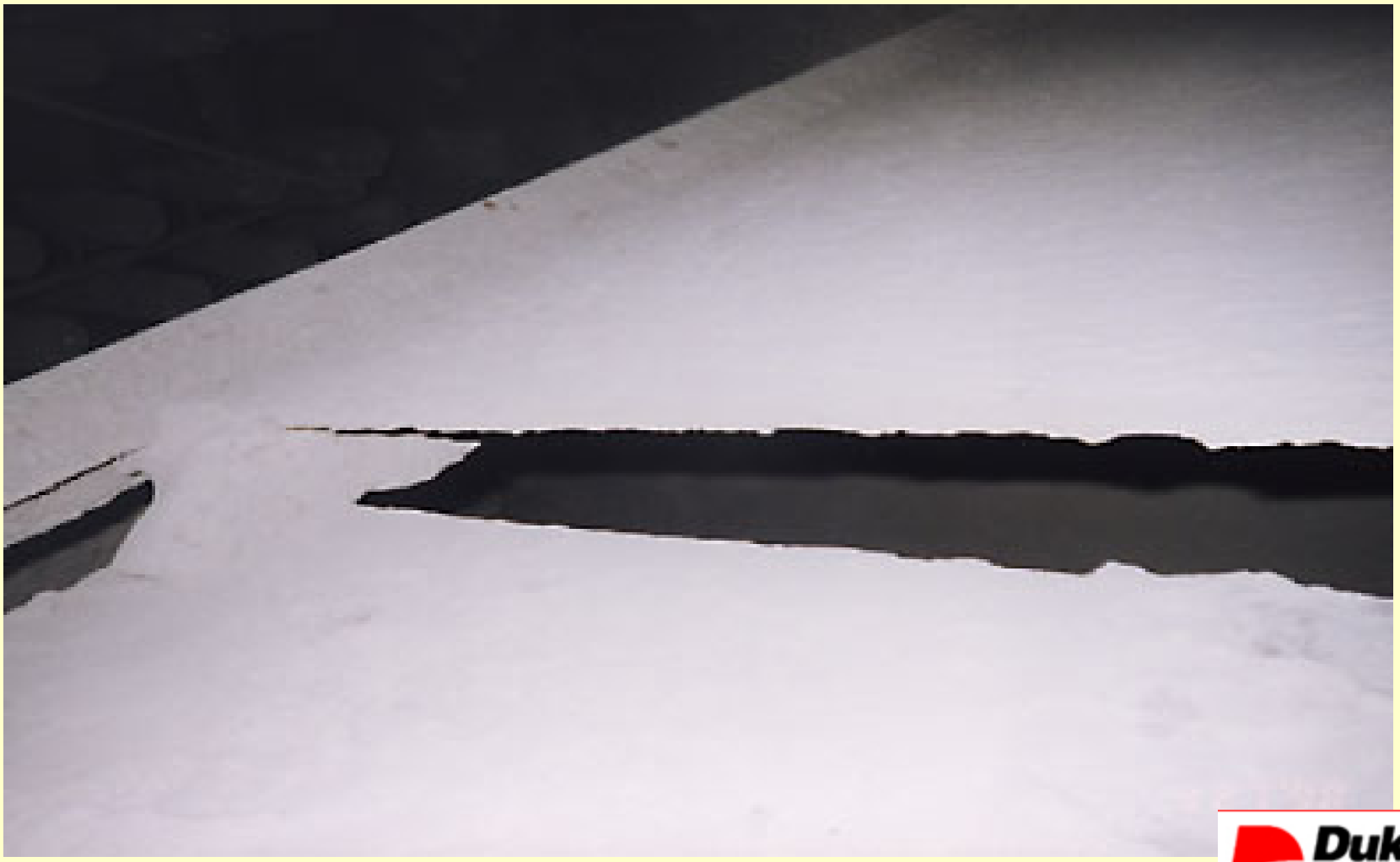
Thermal Fatigue Cracking At Turning Vane Support

Mechanical Component Failures

Hopper Baffle Door- This causes increased opacity

Bent Structural Cross Brasing

Baffle Component Failure- Gas will bypass the baffle



Cracked Plate- Mechanical Stress

Crack Plate

Crack Plate Swords

Cracked Plate on top

Plate Repairs

Weld Failure At Top of Plate

Channel Cracking at Top of Plate

Insulation Problems

Poor Insulation Can Promote Corrosion

Plate to Wire Clearances are Important

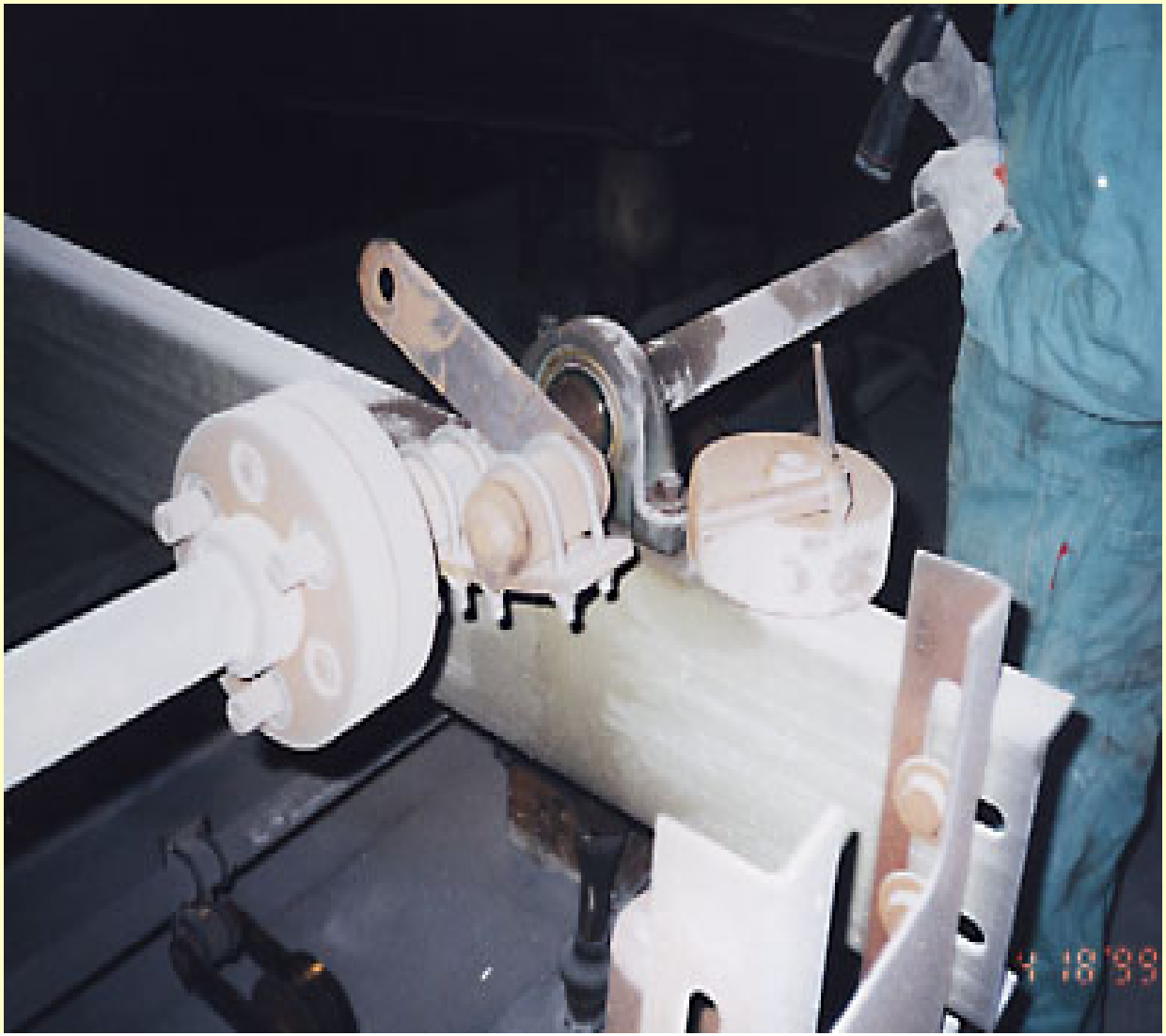
The Wire/Electrode Carries the Charge
The Plate Collects the Ash
Plate to Wire Clearance is Critical

Rapper Failures

Rapper Shaft Cracked at Anvil Beam- Shaft has fell down

Broken Rapper Shaft- In the Penthouse

Broken Tumbling Hammer



Chain of Tumbling Hammer Sprocket

Vibrator Shaft Broken

Operational Problems

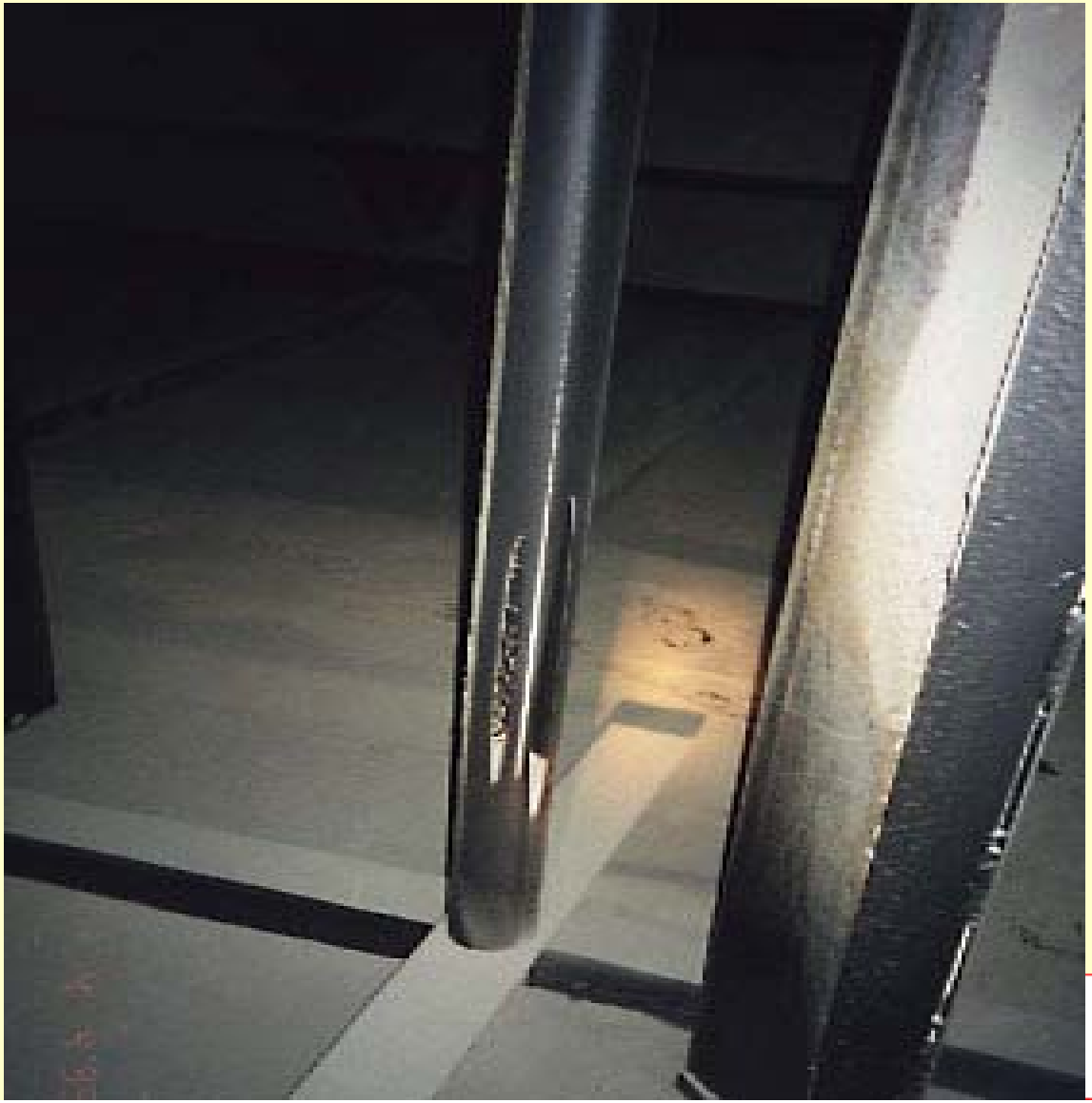
Ammonia System Ash Buildup

Ash Hopper Overfilled

Ash Buildup on Electrodes- Opacity Can Increase

Structural Erosion

Erosion Due to Ash if Flue Gas on Structural Support



T/R Set Oil Leakage

Start Up Procedure

- Back section should be energized first at start of first mill operation.
- Sections added as needed.
- Start SO_3 injection at 125^{o}C.
- Start NH_4 injection when SO_3 effects are evident (usually the next day).