# A HIGH POWER LOW VOLTAGE SWITCHBOARD FAILURE

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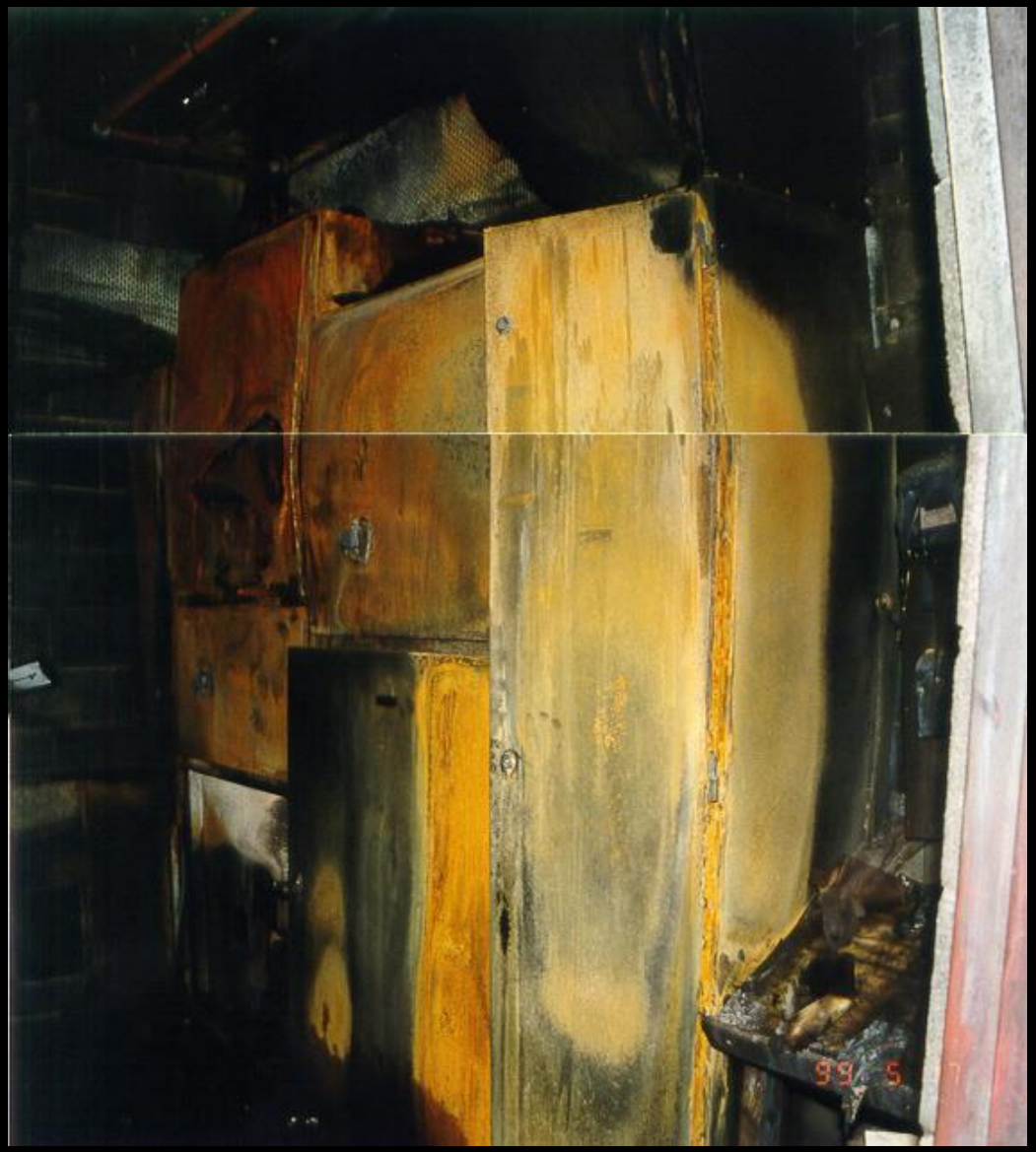
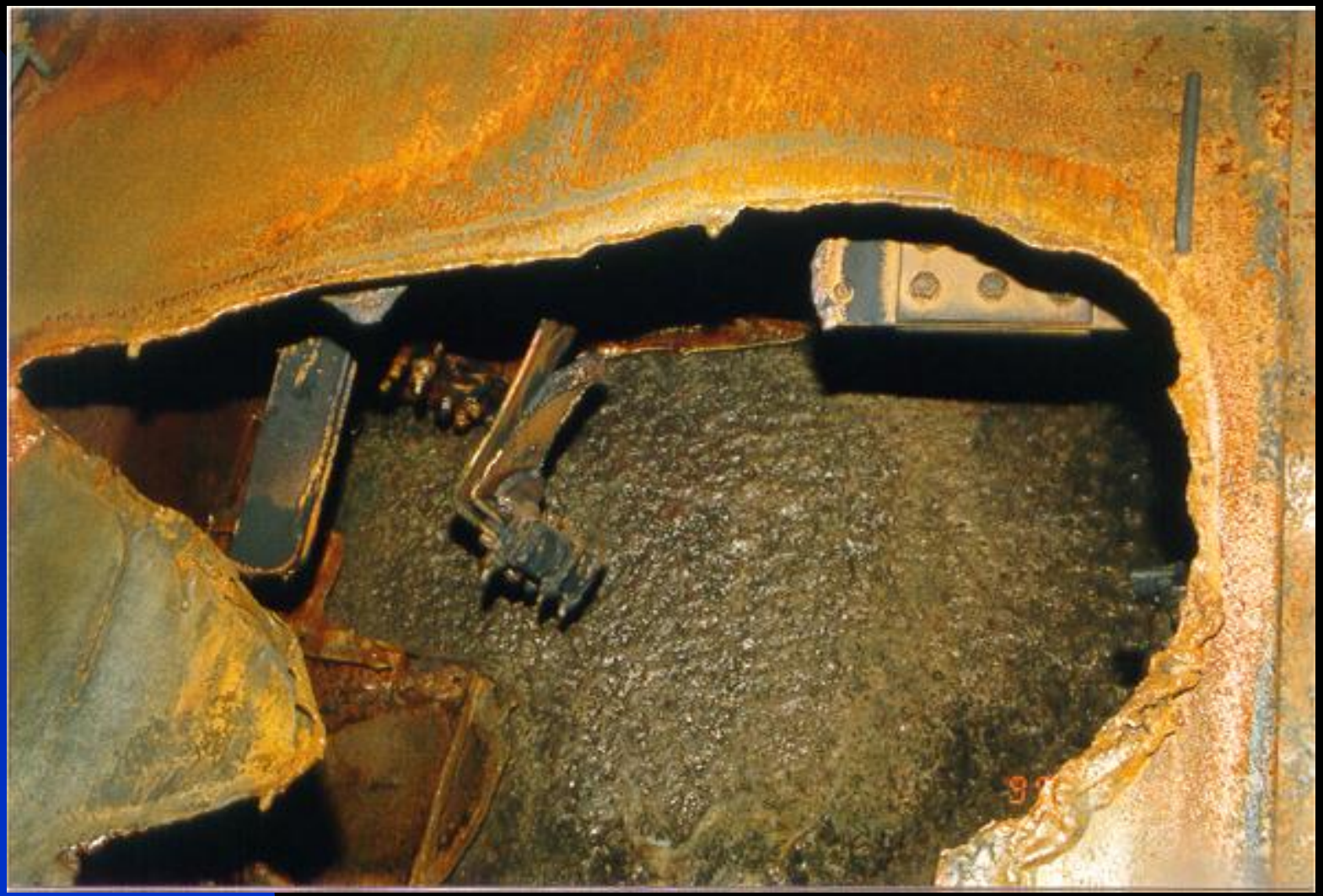
# Introduction

- This short presentation discusses the failure of a Main Switchboard which was connected to a supply authority transformer without upstream low voltage protection. The switchroom could not be entered for some hours after the event occurred due to the high temperatures generated by the arcing faults.

# The Switchroom



# Arc Penetrations of the Enclosure. Metering Panel

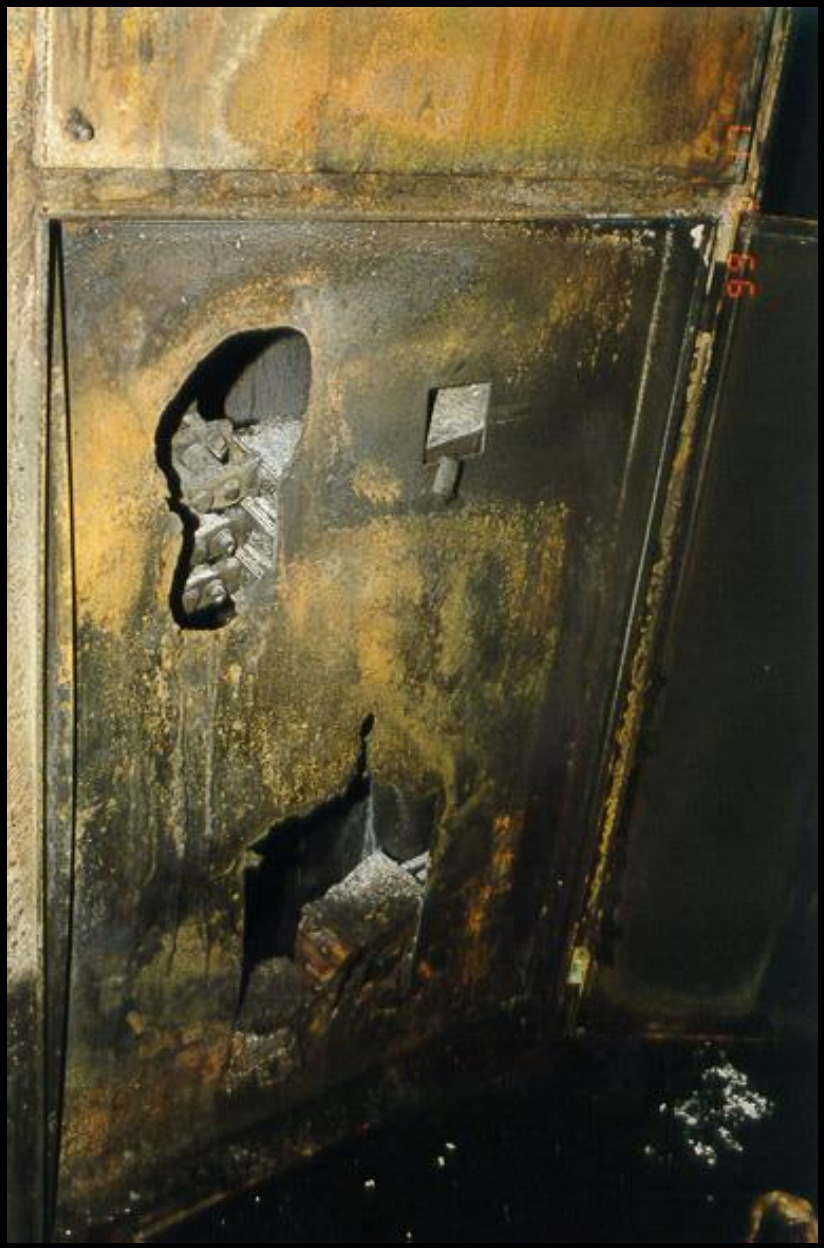


# FACTORS

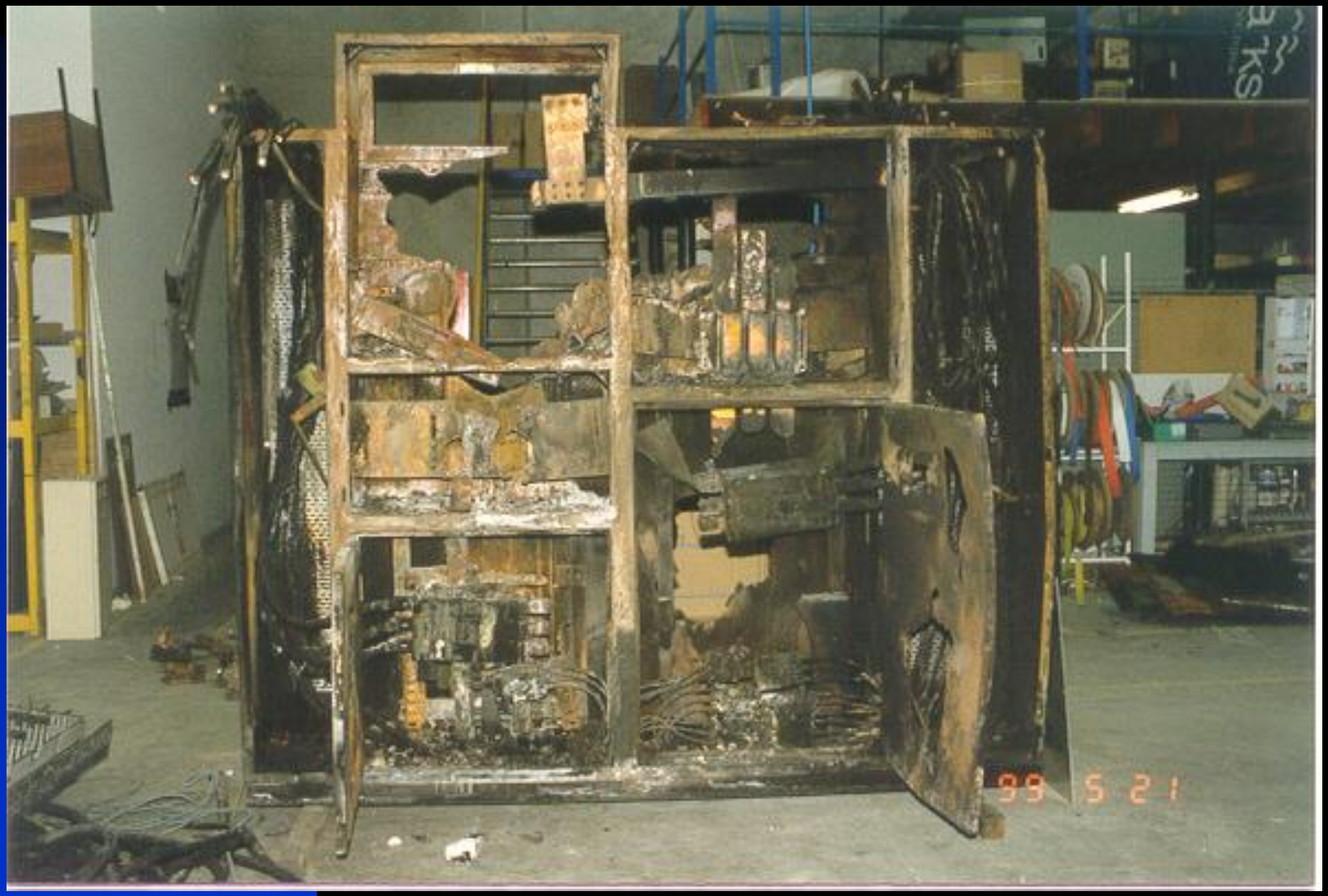
- The arcing events penetrated the metal enclosure front and back.
- A person standing in front of the switchboard would suffer serious burns.
- Other apparatus in the room would suffer serious heat attack, and contamination by copper and iron oxides, and chlorine compounds from the combustion of plastics.
- The power supply was off for many hours.  The new switchboard took days.  Standby power was used during the interim.

# Arc Penetrations of the Enclosure. Metering Panel

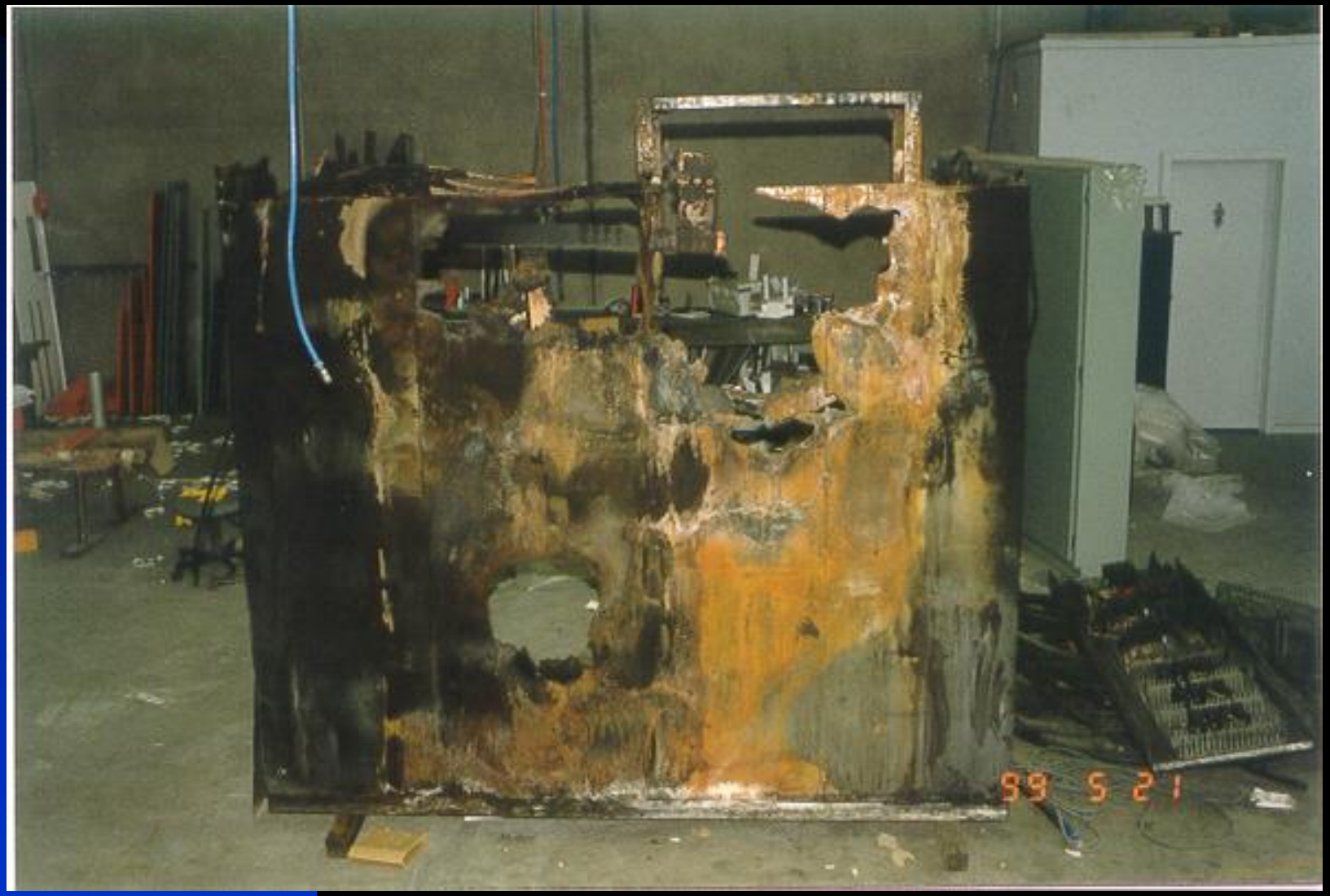
# Secondary Arc Penetrations



# The front of the Swbd exposed



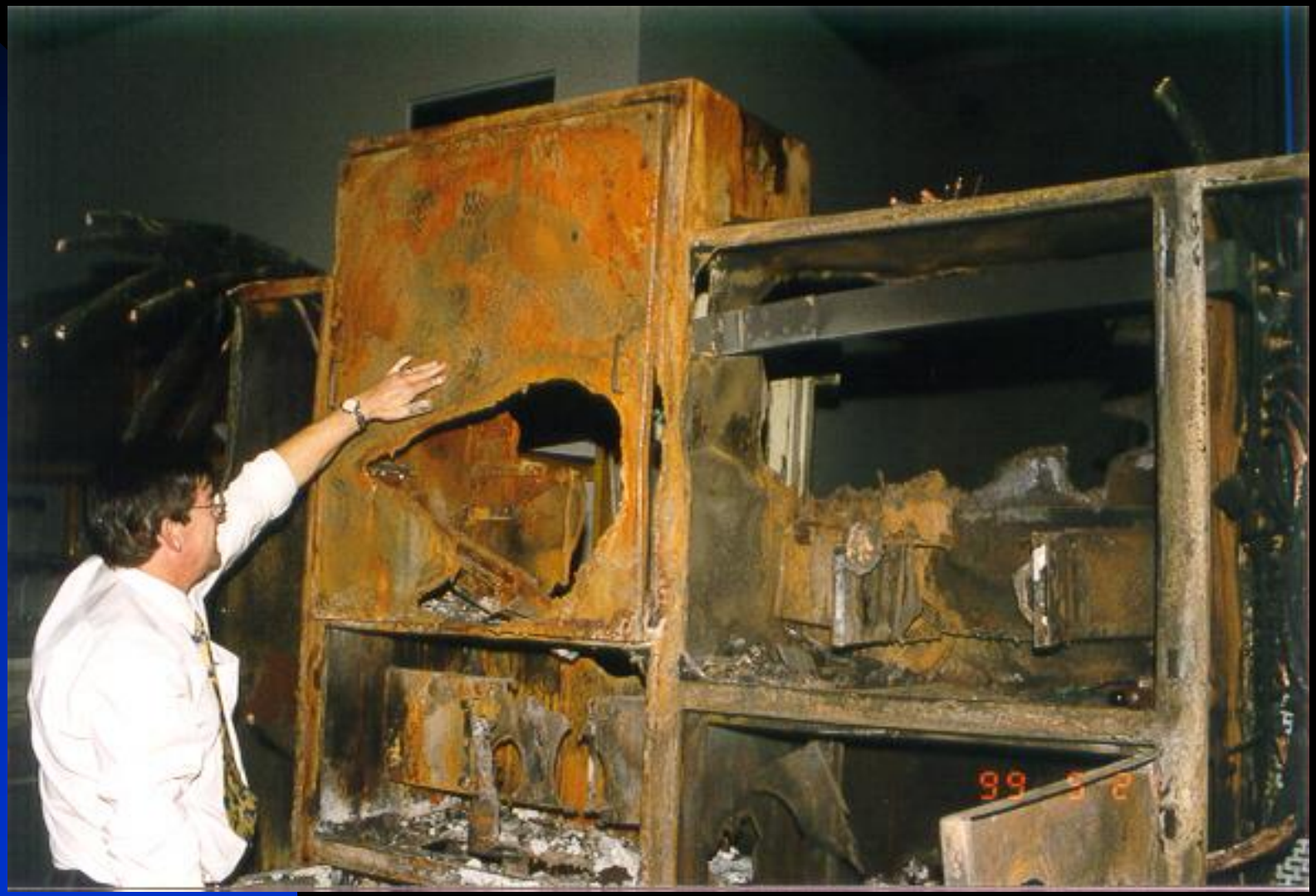
# The rear of the Swbd exposed



# FACTORS

- The switchboard was subdivided into compartments.
- There was no fault containment between compartments.
- The electrical upstream protection was on the high voltage side of the supplying transformer, and was set to protect the transformer only.  Not the switchboard.
- The arcing faults burnt for some seconds, and were impedance limited.

# Locating the Origin of Failure

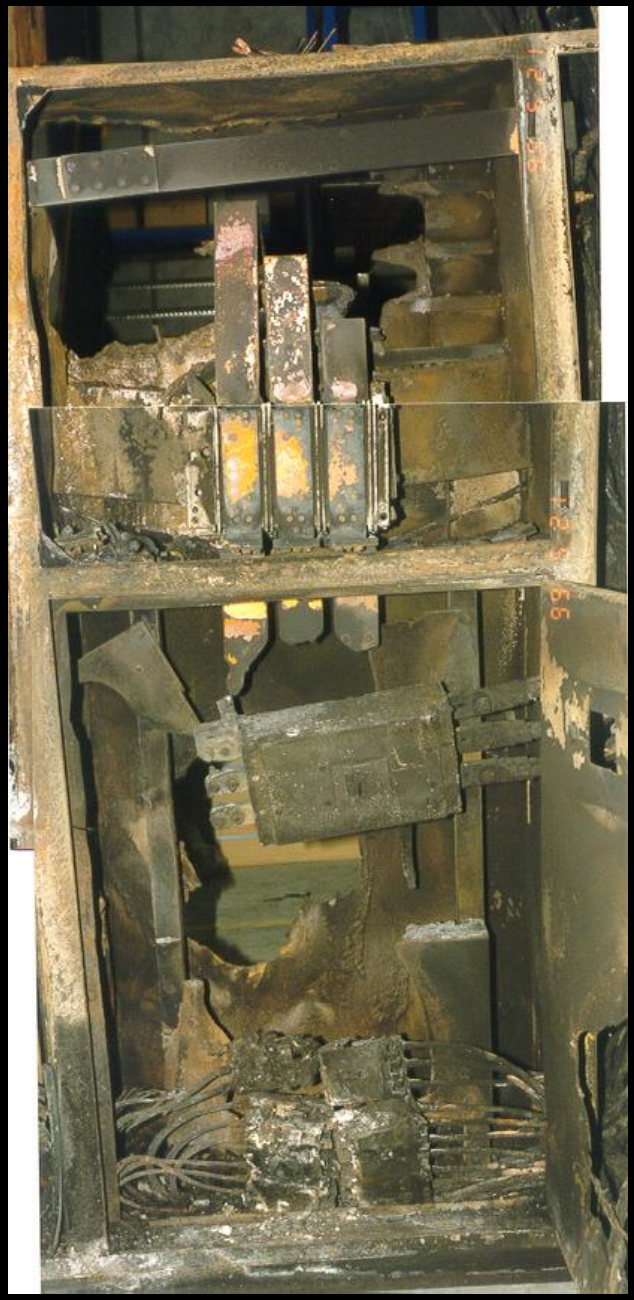


# The Origin of Failure

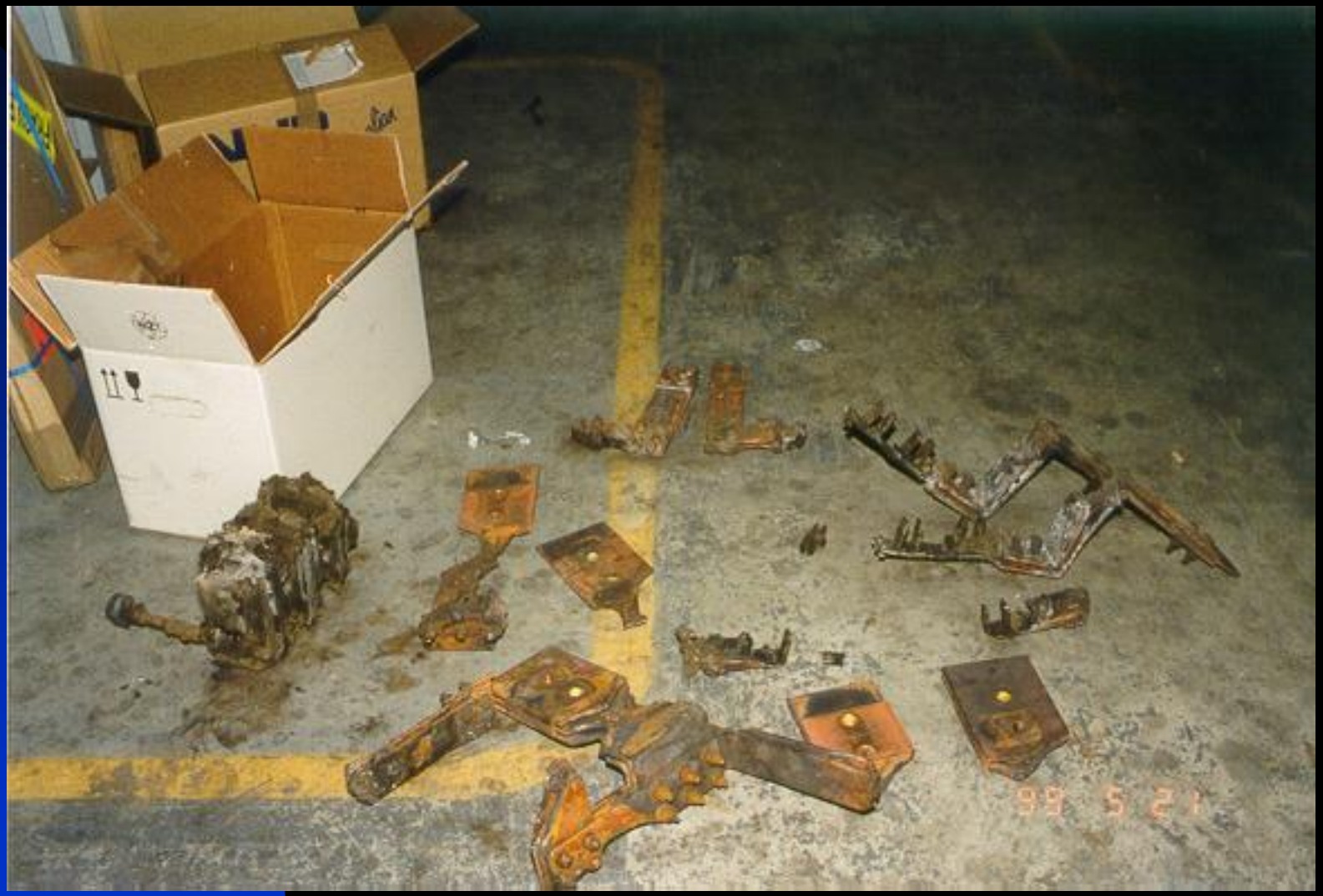
# FACTORS

- The initial failure was due to the collapse of a current transformer metering the incoming supply.
- The initial fault was reflected by the insulating panel supporting busbars immediately below the position of the current transformers.
- The fault was deflected sideways to penetrate the adjoining compartment which was connected to supply above the current transformers

# The Secondary Damage



# Erosion of Busbars



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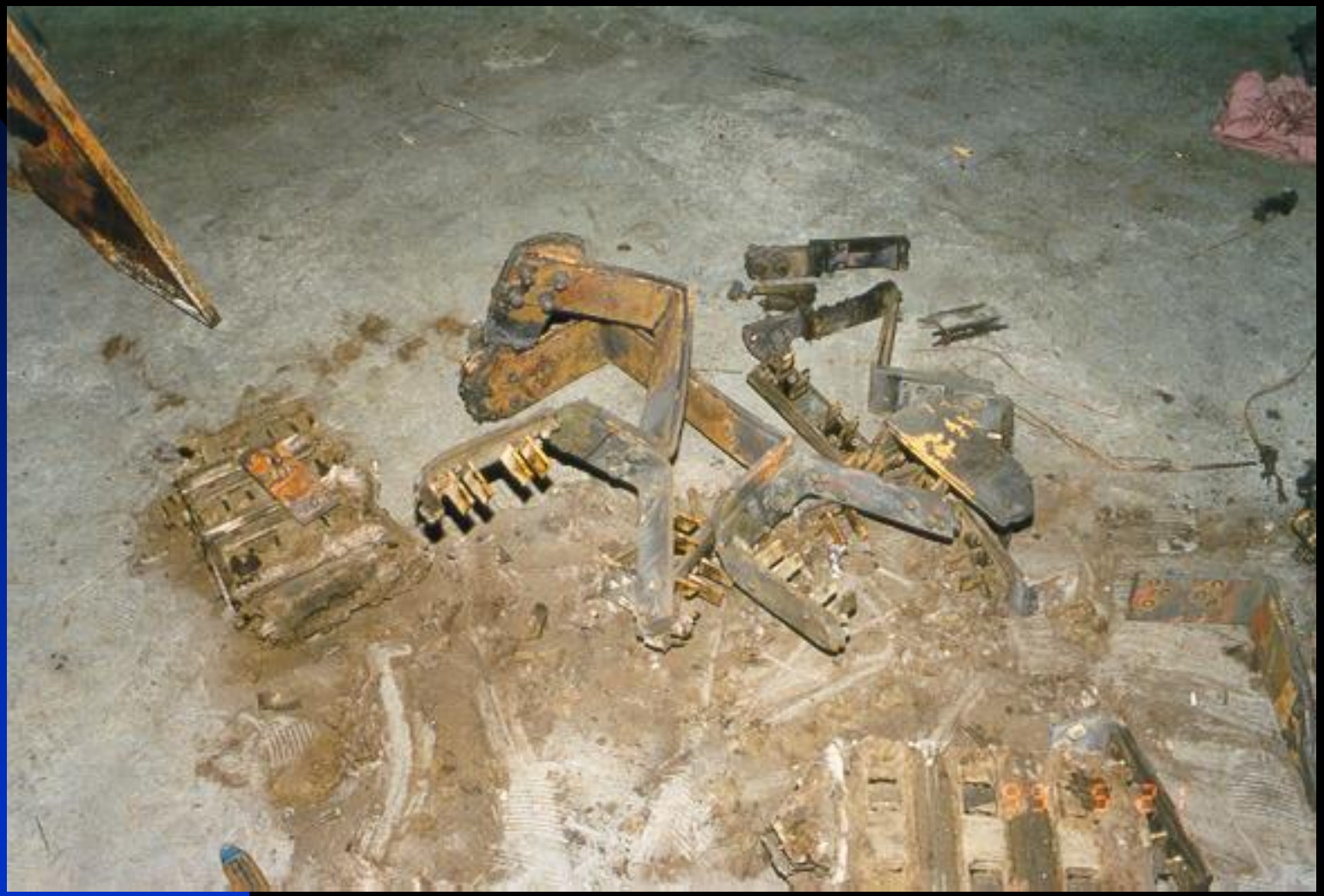
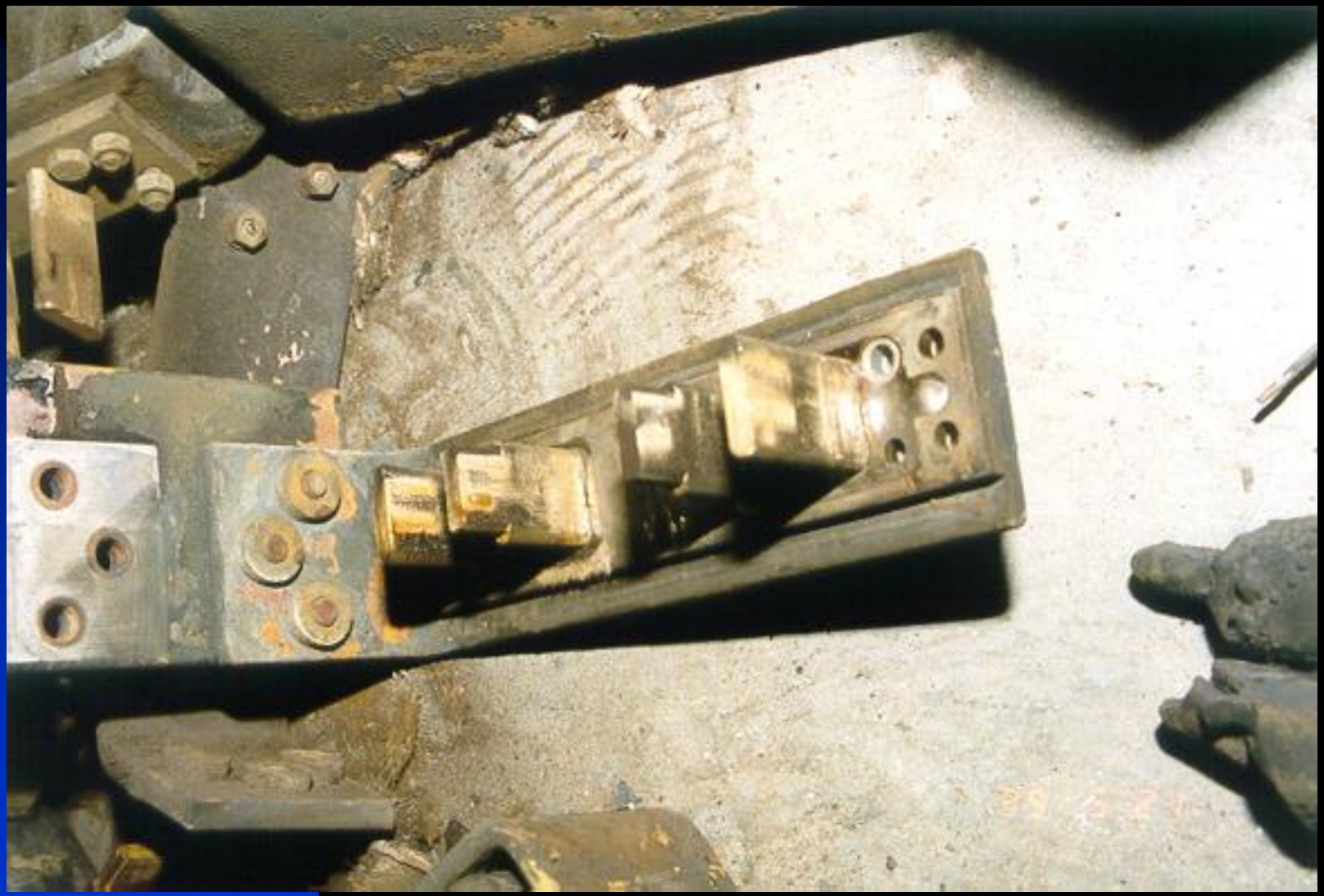


# Main Switch Contacts undamaged



# Sub Circuit Breaker opened on Secondary Fault

# Circuit Breaker Arc Chute