TWA FLIGHT 800 MID-AIR BREAKUP

Problem
What
When
Problem(s)
Explosion, in-air breakup of plane
Date
July 17, 1996
Time
8:31 p.m.
Where
Flight delayed for several hours
Physical Location
Offshore at East Montauk, New York
Impact to the Goals
Safety
230 people killed (all onboard)
Property
Plane destroyed
Frenquency
Rare

Analysis
Basic Level Cause Map - Start with simple Why questions.

1. Problem
   - Safety Goal
     - Impacted: 230 people killed
   - Property Goal
     - Impacted: Airplane destroyed

2. Analysis
   - More Detailed Cause-and-Effect
     - Four things are necessary for an explosion:
       1. Fuel: A flammable fuel/air mix was created when fuel that remained in the "empty" tank (which contained air as it was not refueled) was heated. The heating, from running the air conditioning on the ground during a 2 1/2 hour flight delay, increased the flammability of the fuel.
       2. Oxygen: Because there was no inerting process used, oxygen was present in the fuel tank.
       3. Ignition: It is believed that arcing from bare wires or silver-sulfide deposits, combined with a voltage surge, ignited the flammable mix. (The wires were destroyed, so it was impossible to determine the actual cause.)
       4. Confinement: The other three elements of an explosion were confined within the fuel tank, setting the stage for disaster.

3. Solutions
   - Possible Solutions: Use inerting process
     - Possible Solutions: Prevent ignition sources
     - Possible Solutions: Remove silver-sulfide deposits
     - Possible Solutions: Do not allow bare wires
     - Possible Solutions: Install surge protectors
     - Possible Solutions: Replace wires at end of design life

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