## Contents

# Hazards

Consider Hazards in **Planning** and Operation!

- Inflammable Liquids and Gases → **Fire Hazard**
- Toxic Gases → **Intoxication Hazard**
- Rotating Parts and Prototype Engines
  → **Pinching, Flying Debris**
- High Electrical Power → **Fire Hazard**
- Liquids (Fuel) → **Spill**
- “Standard” Hazards, e. g. Electrical Shock, Stumbling,
  Manipulation of Heavy Parts …

## Fire Detection

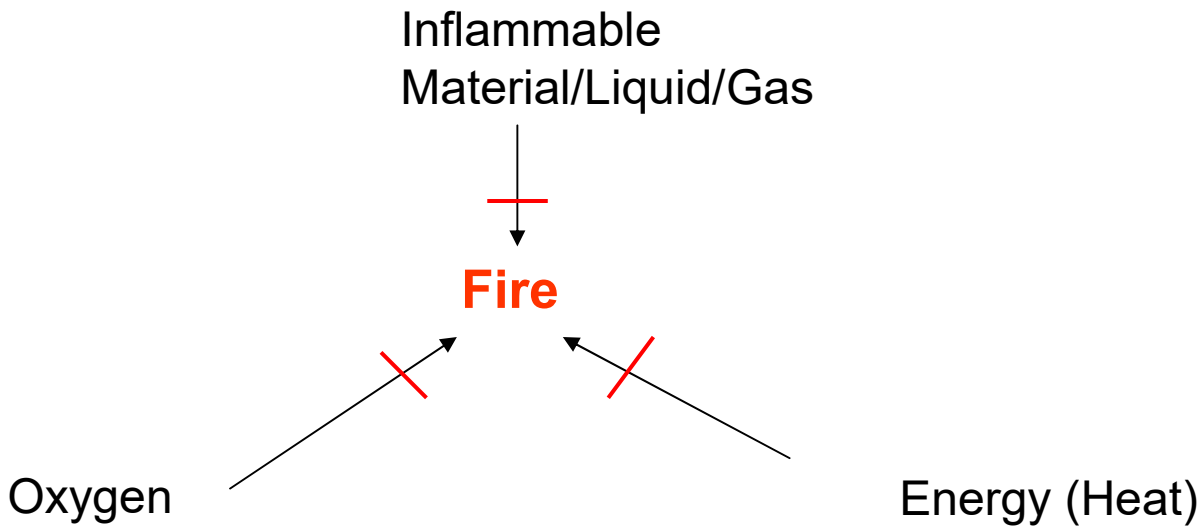
Contradiction: Fast Response ↔ No False Alarms

Particle Detection (Misdetection e.g. of dust)

Heat/Infrared Detection (Low Misdetection Risk,
but Late Fire Discovery)

Light Detection (Misdetection e.g. of photographic flashes)

# Fire Hazard



## Fire Extinction

Contradiction: Fast Extinction ↔ Hazard to People (asphyxiation)
Hazard to Equipment (e.g. Electronic Systems)

Halon (Reliable, Not Dangerous to Materials, Less Dangerous to People than $CO_2$, but Prohibited as Green House Gases)

$CO_2$ (kills Fire and People!)

Water Mist

…

Source:
Fogtech

## Inflammable/Explosive Gases

Hydrogen $\Rightarrow$ Explosive in Wide Concentration Range

Calibration Gas: ...

Oxygen $\Rightarrow$ Strongly Supporting Fire

# Intoxication Hazard

## Toxic Gases

Carbon Monoxide (CO) $\Rightarrow$ In High Concentrations Immediate Death
In Lower Concentrations Headache

Calibration Gas: Nitric Oxide (NO) $\Rightarrow$ similar CO, but weaker
$\Rightarrow$ converts quickly to $NO_2$

Calibration Gas: Nitrogen Dioxide ($NO_2$) $\Rightarrow$ Lung Edema

Calibration Gas: ...

# Spill Prevention

## Tank Installations