

**Calgary**



**City of Calgary  
Waste & Recycling Services**

Bowtie Risk Analysis on Entry into a  
Collection Truck Hopper

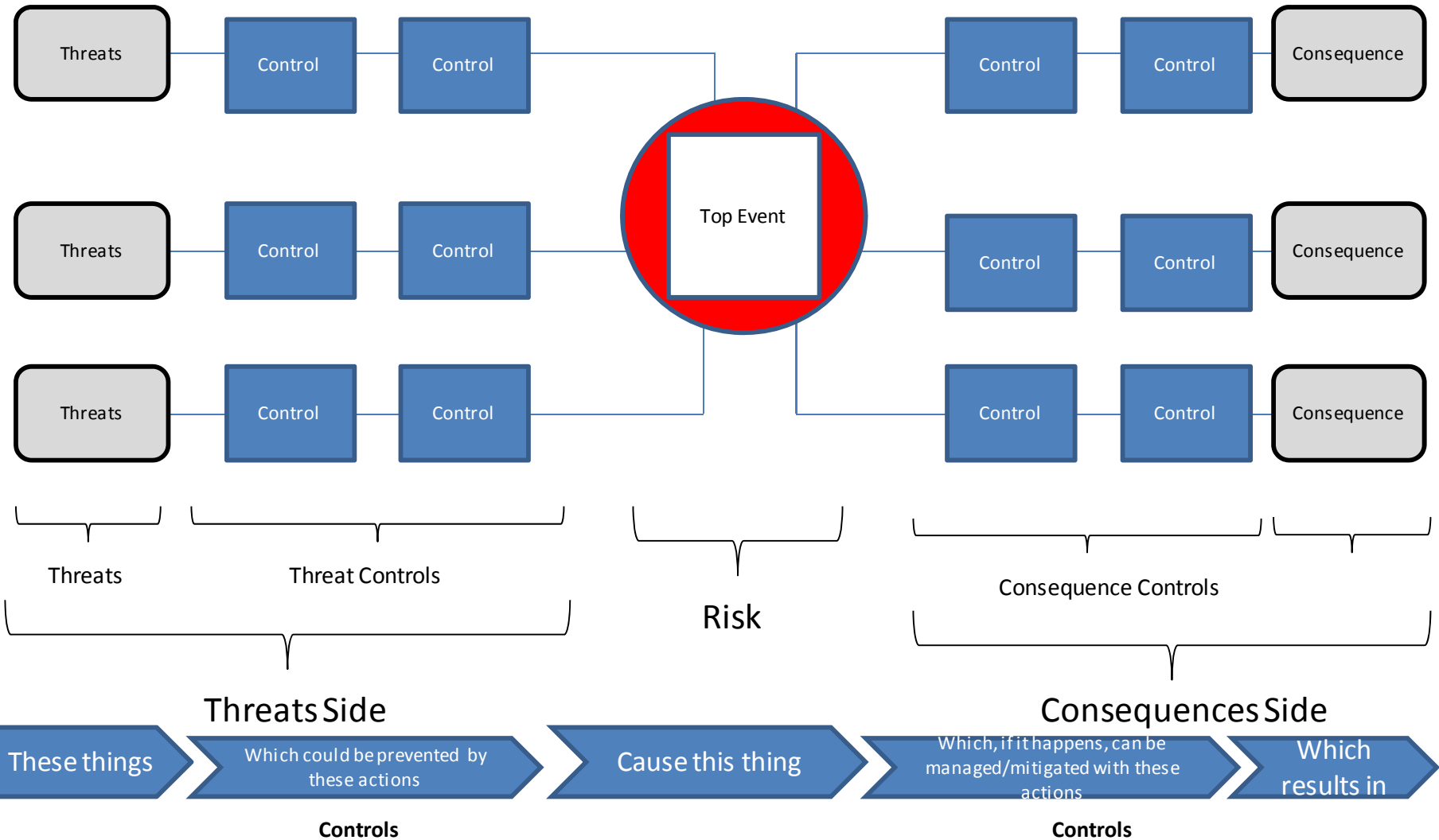
Sonia More & Brent Stutsky  
May 12, 2016



- I. Introductions
- II. What is a Bowtie?
- III. Collections Background
- IV. Bowtie: Entry into Hopper
- V. Next Steps
- VI. Questions



# What is a bowtie?





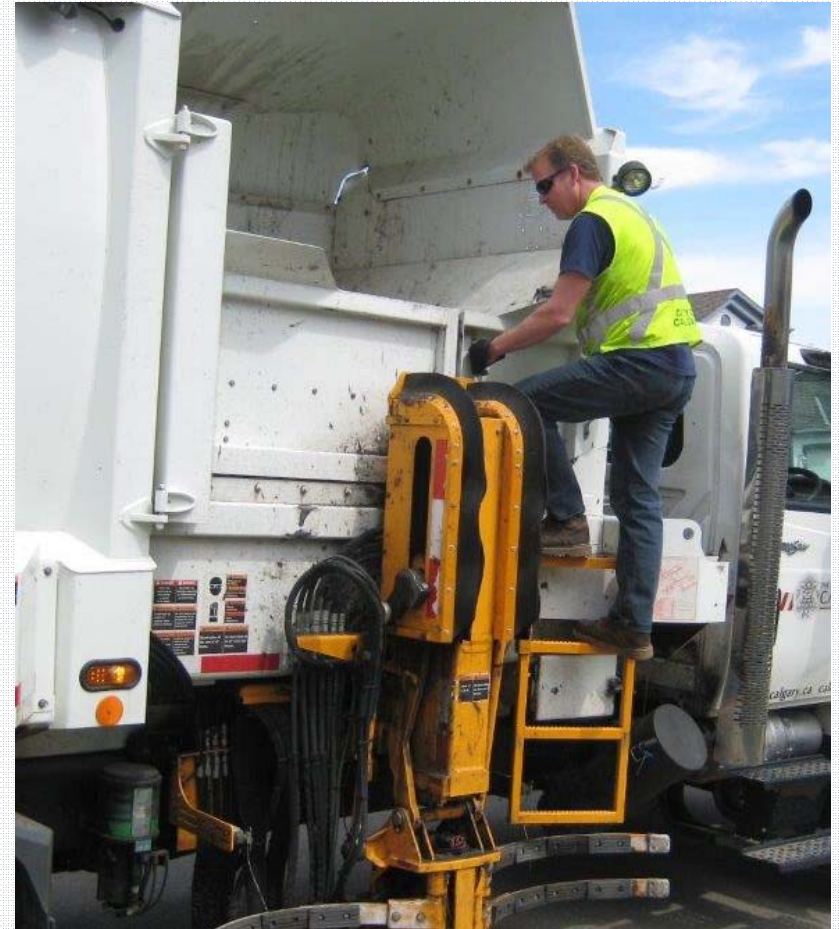
## Collection Process Background

- Materials are dumped into the hopper.
- Compressed by a hydraulic powered packer blade.
- Perform maintenance, clear out jammed material, or remove contaminated material.





## Collection Vehicles





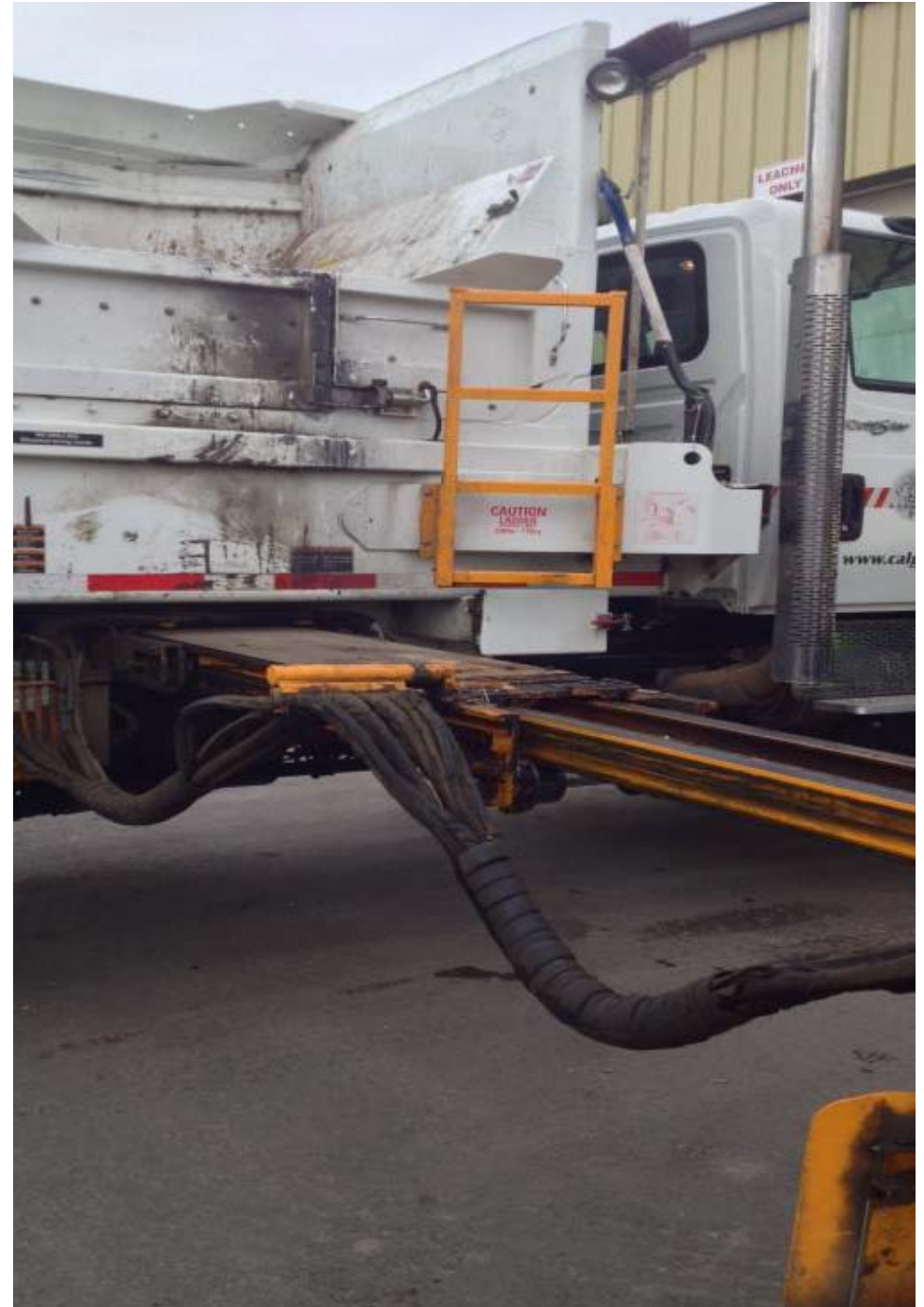
## Collection Vehicles



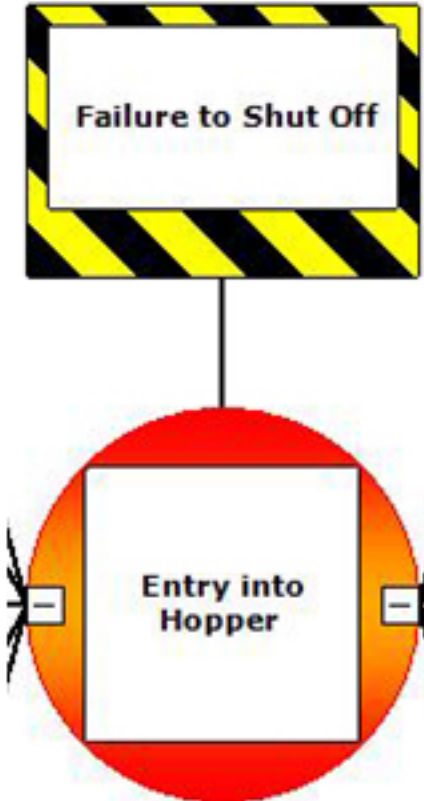


## Recent Hopper Incidents

- October 22, 2013
- December 6, 2013
- September 23, 2015

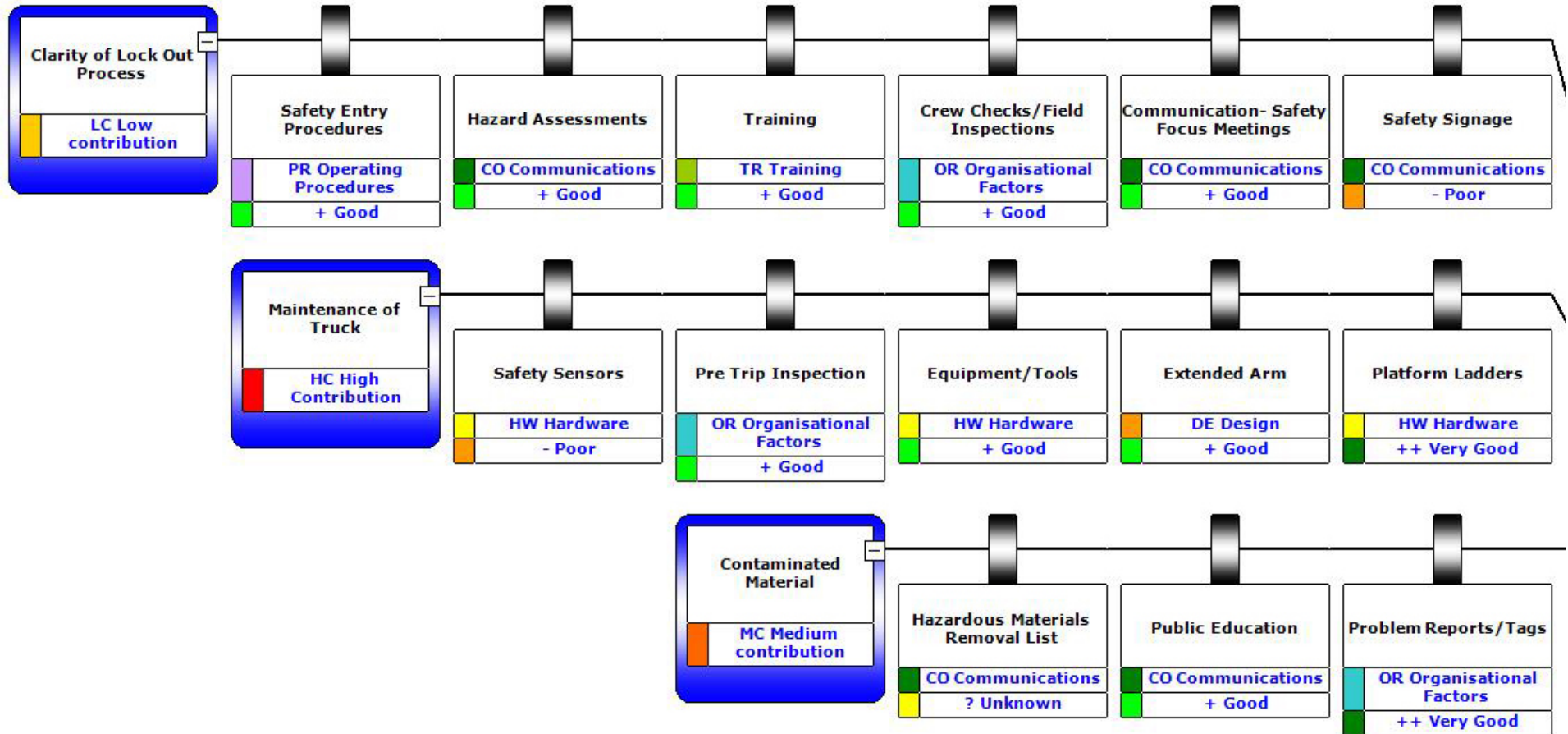


# TOP EVENT



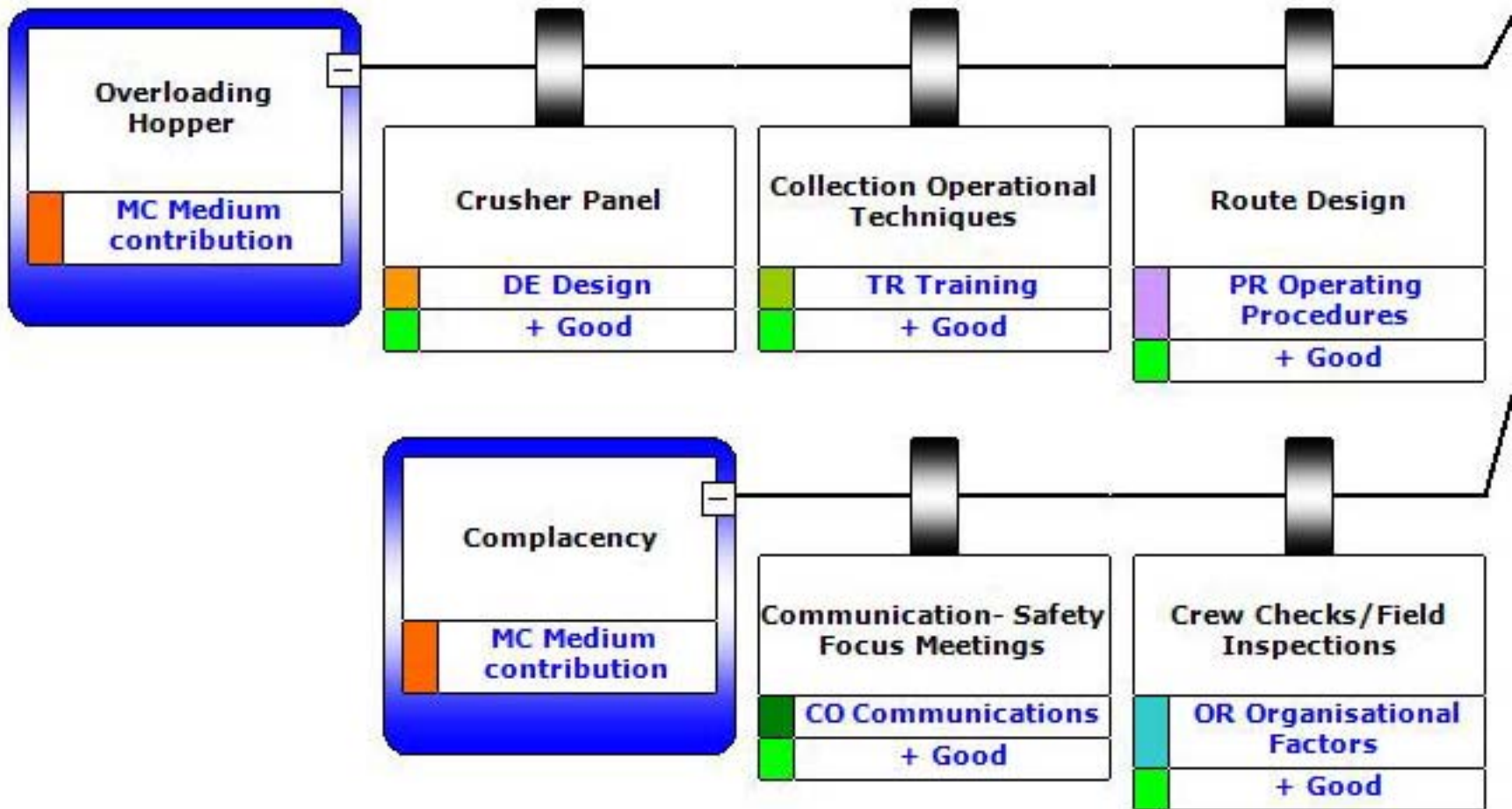
# THREATS

# BARRIERS



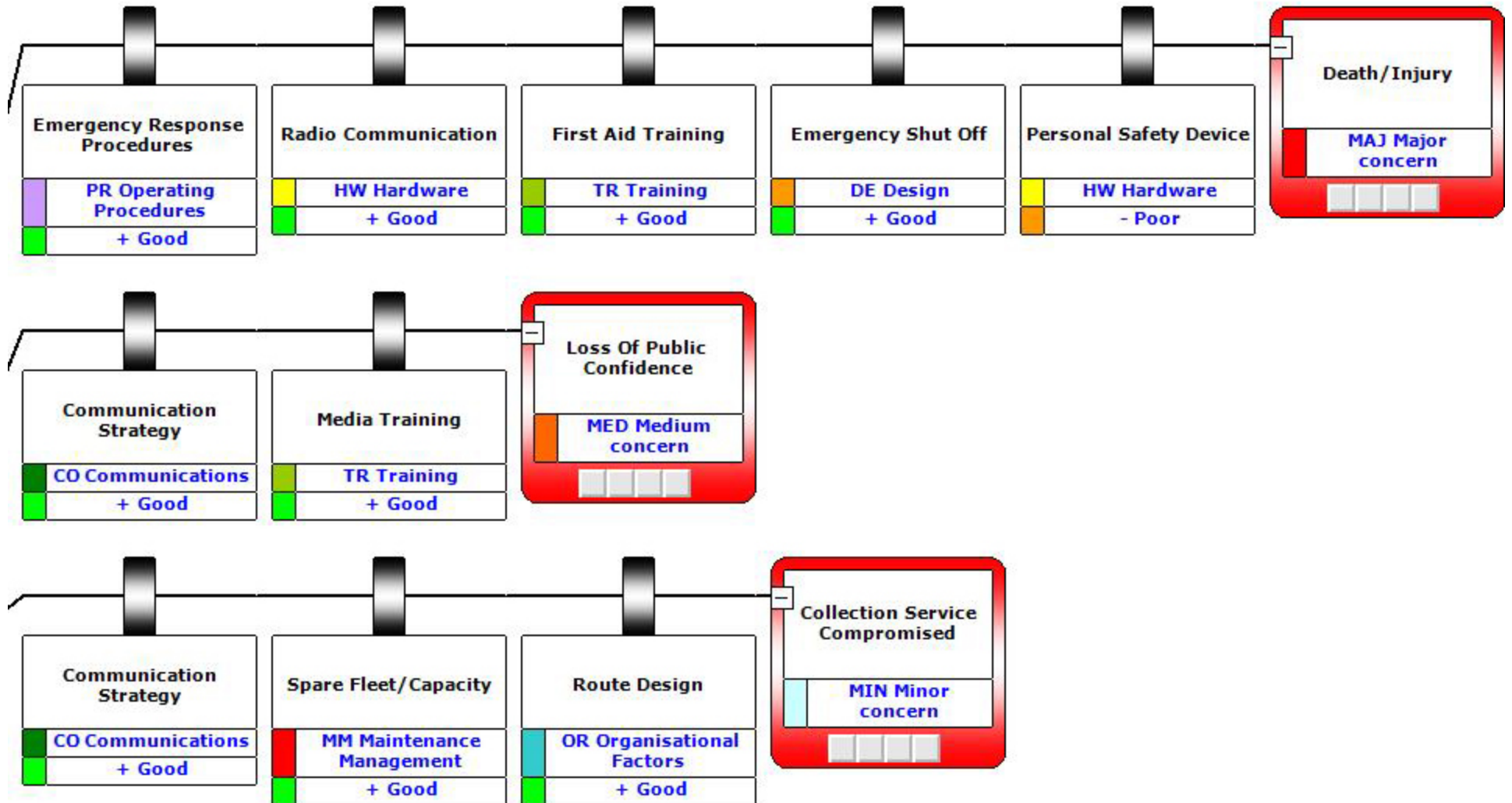
# THREATS

# BARRIERS



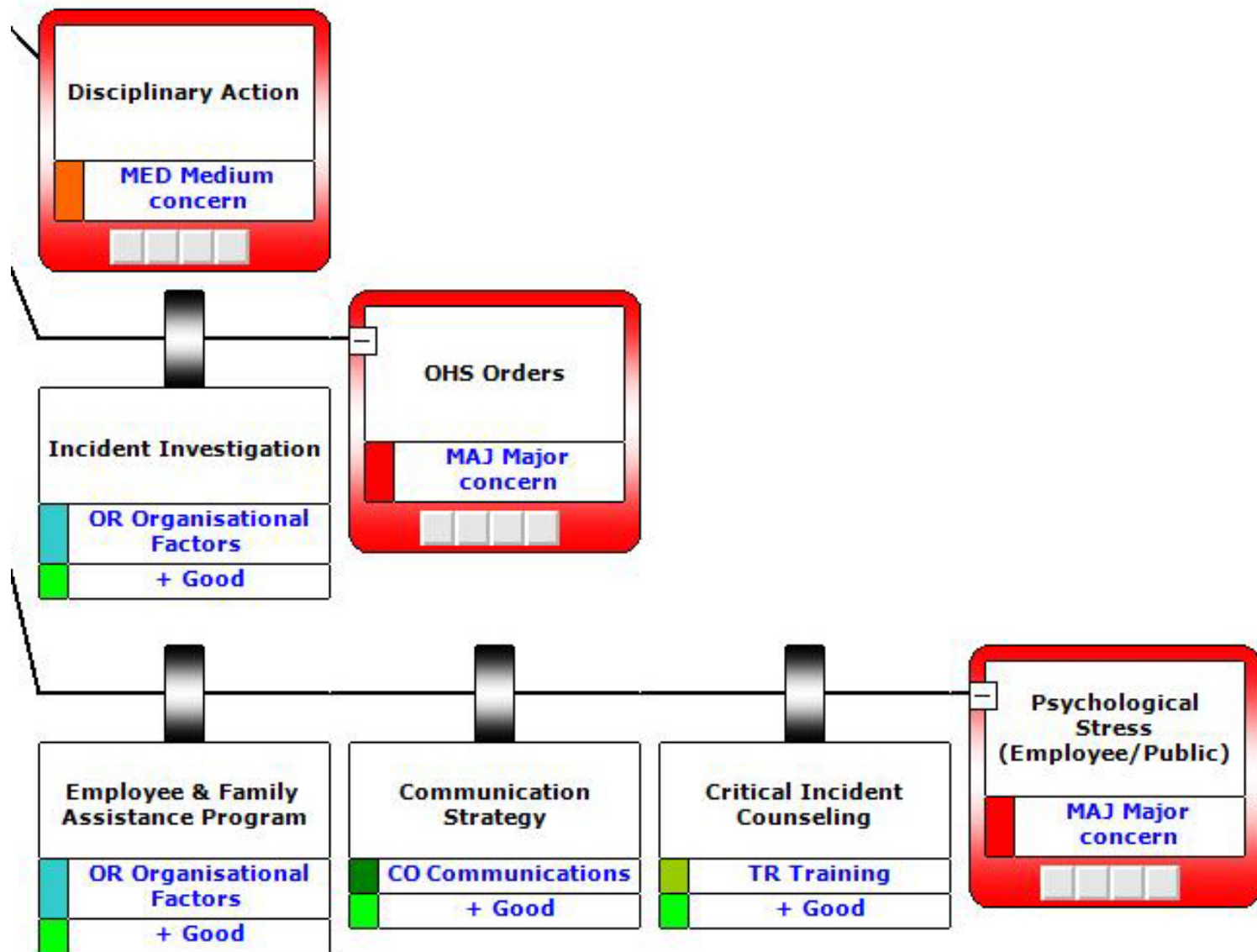
# MITIGATIONS

# CONSEQUENCES



# MITIGATIONS

# CONSEQUENCES



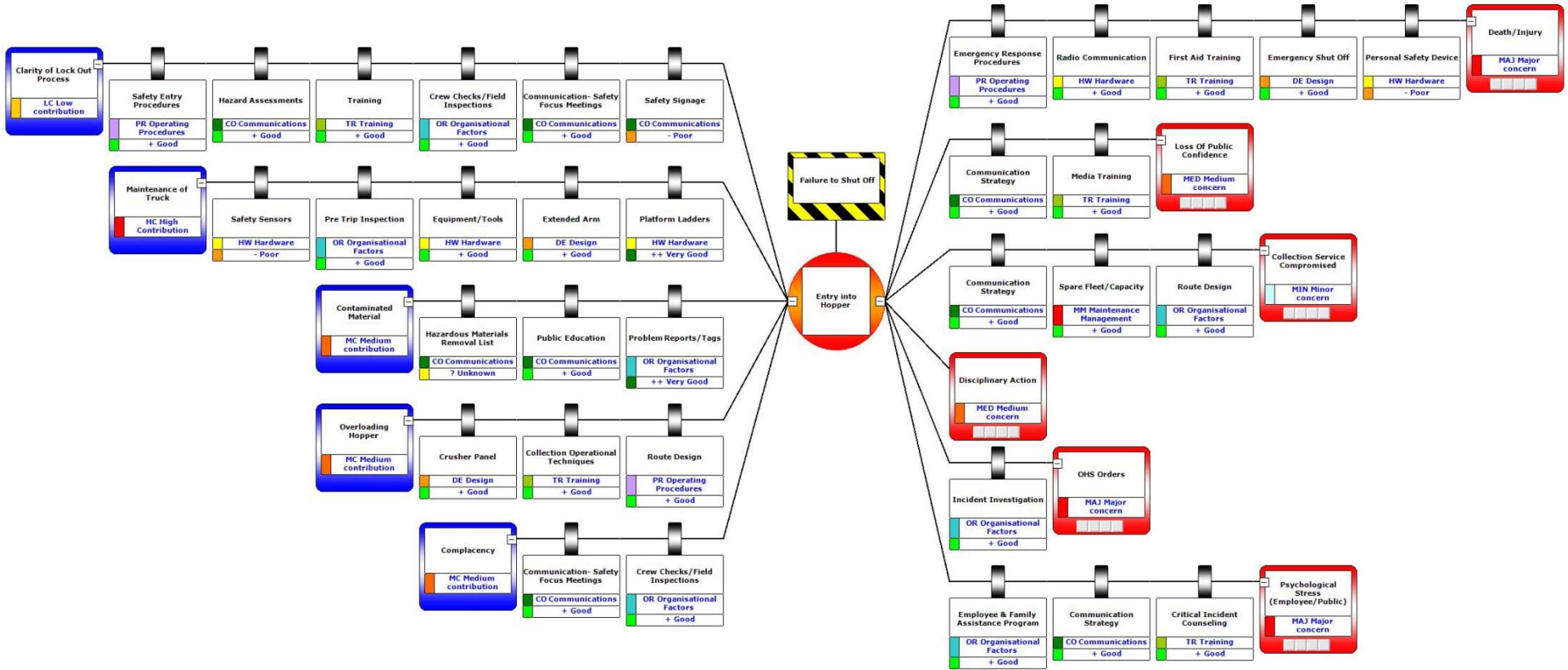
**THREATS**

**BARRIERS**

**TOP EVENT**

**MITIGATIONS**

**CONSEQUENCES**





## Next Steps

- **Safety Signage**
  - Determine if additional safety signage is required and what the messages would be.
- **Safety Sensors**
  - Determine if the safety sensors are appropriate based on current location and style and if communication is required around the locations.
- **Hazardous Material Removal List**
  - Currently developed internal messaging regarding hopper contamination.
- **Personal Safety Device**
  - Determine if employees should carry a personal safety device in the event of an emergency when working alone.



QUESTIONS?