

Yellow Iron vs everything



How others are working to reduce the chances of pedestrian and vehicle collisions

Training and Experience

- Let's not discount the need for constant training, retraining, and experience while operating equipment/vehicles.
- Nothing can remove the skill and responsibility of the operators and drivers from the equation.
- Even high tech systems can be over-ridden by an idiot.



- Can you do everything here? No
- Can you afford everything here? No
- Will it all work for you at your operation? No
- Is it foolproof, idiot-proof, and completely undefeatable? No



Throw some Tech at it

- Hi-Tech

- Cameras, Proximity systems, Geo-Fencing



- Medium Tech

- Radios, Barriers/gates, lights



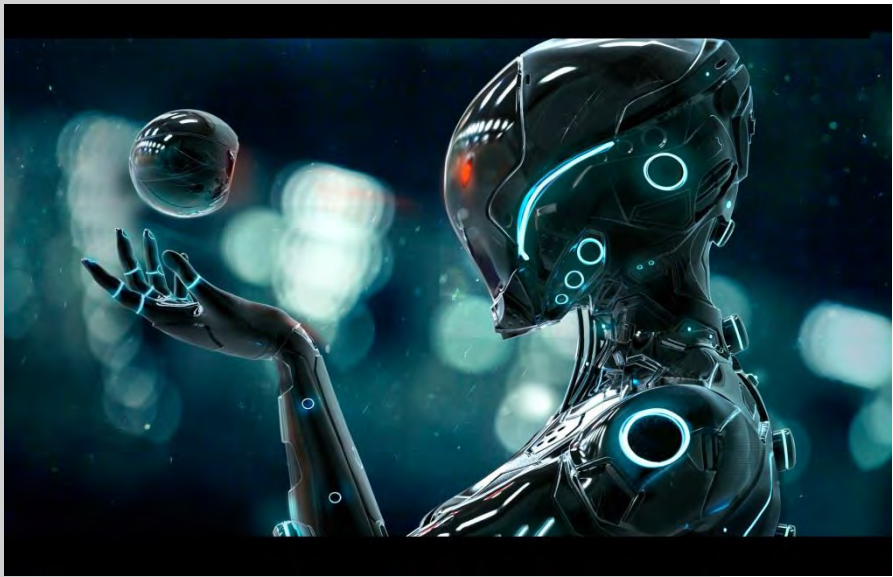
- Low Tech

- People, gear, signs





High Tech



Remove at least one pedestrian



Back Up camera



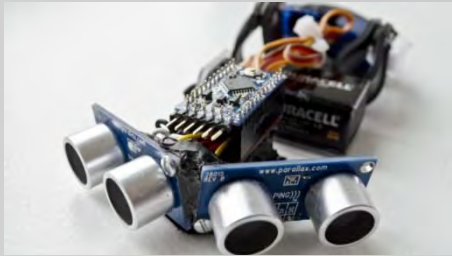
Use of in cab cameras (not just back up cameras)



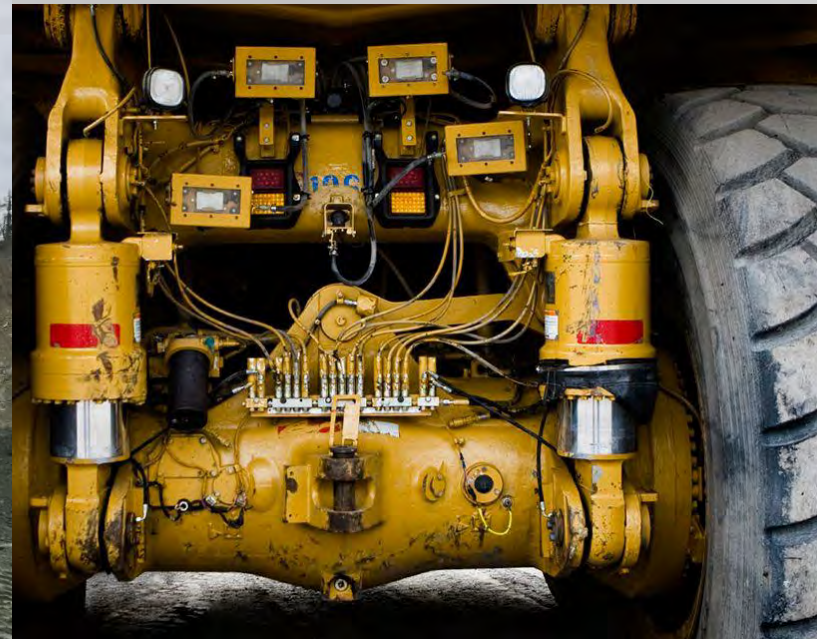
988H Color Camera/Flat Screen View on Left: View out of back cab window on Right



Use of Sonar, IR or other prox detection



- RADAR
- LIDAR
- Ultrasound
- IR



Use Both

- “When we went to cameras w/ sonar the backing incidents/collisions pretty much stopped. “



CAT 988H Loader equipped with rear vision camera, rear detection sensor (Precor) and Dual Strobes.





The whole shebang!

-   Backup Camera
-   Side Cameras
-   Rear View Monitor
-   Dash Camera
-   Backup Sensors
-   Blind Spot Sensors
-   Mobile DVR
-   Driver Fatigue System
-   360° Surround View Camera System



Collision Warning/Avoidance

- Collision Warning: devices that sound an alarm or light, to warn of high risk situation
 - Personal car, tailgate beep
 - GPS/Geo-fencing
- Collision Avoidance: system that actually takes control of equipment.
 - Electromagnetic
 - RFID

If you need to exit your truck the following safety equipment **MUST BE WORN**



hi-vis



safety footwear



hard hat



safety glasses

NOTICE



Long sleeves must be worn.



Trucks must have a flashing light fitted

UHF 20

UHF 10

EXIT

Crushed Rock Yard

Aggregate Yard

HME Parking

Truck parking

EXIT

Visitor Parking Stop and Sign-in

Weigh-Bridge Office

Tip-off Point

Light Vehicle Road

Truck Access Road to Sales Yard, In and Out.

Wait here, Loader driver will call you when it's your turn.

STOP

Bin 10

Bin Sets

-Once at the bottom of the haul road, switch radio channel to "UHF CH10."

Trucks must give way to heavy vehicles.

-Ask for the control room.

The control room operator will either ask you to come to the binsets, (straight ahead)

Or

to bin 10, (to the right) where you will see a stop sign.

Wait at the stop sign for the loader operators instructions.



Proximity Detection for Vehicles



Proximity Detectors for Pedestrians



- RFID
- Radar
- Electromagnets

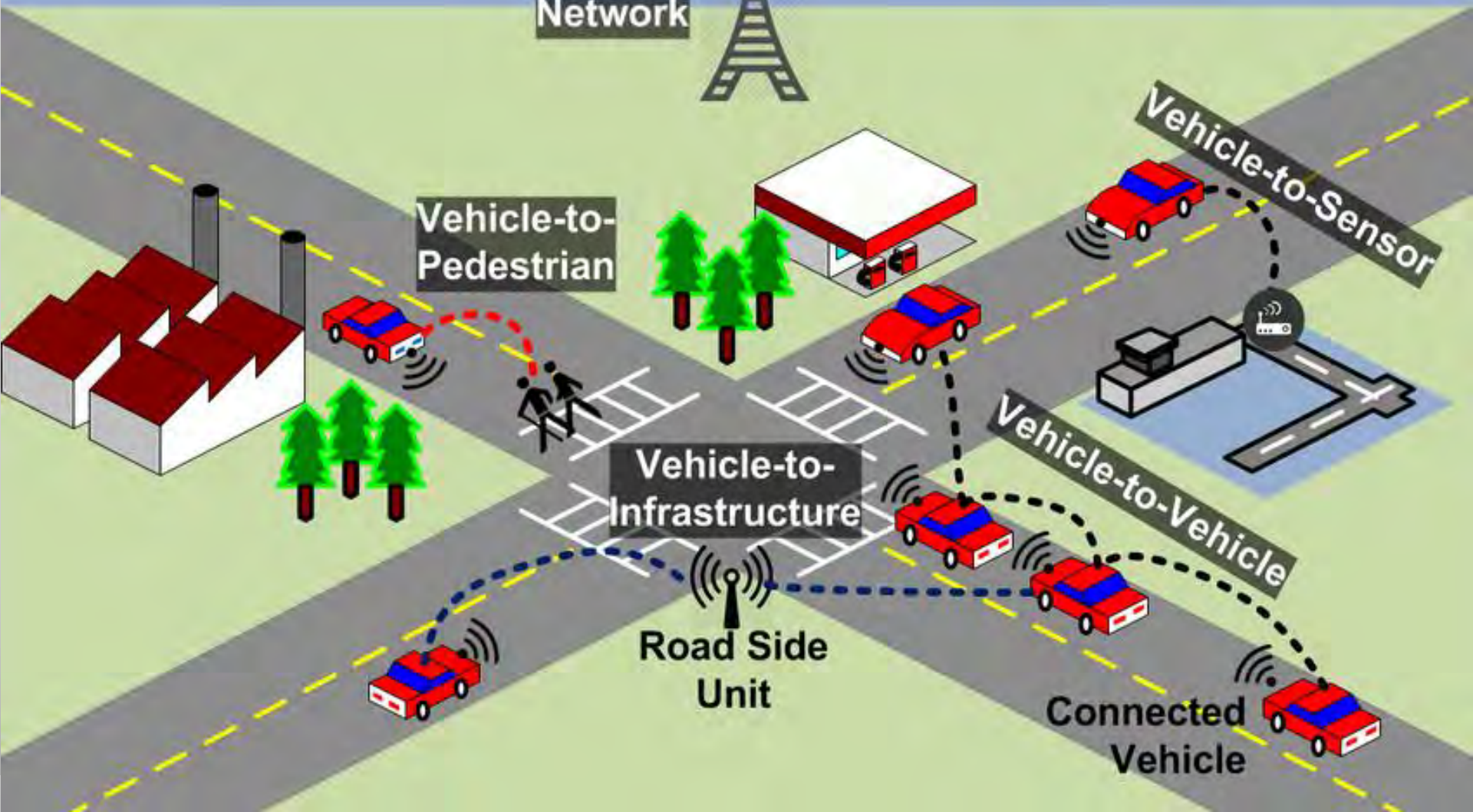


**Global Positioning
System (GPS)**

**IoV Cloud
Infrastructures**



**Mobile
Network**



**Vehicle-to-
Pedestrian**

**Vehicle-to-
Infrastructure**

Vehicle-to-Sensor

Vehicle-to-Vehicle

**Road Side
Unit**

**Connected
Vehicle**



Medium Tech



Remote Operation





Radio/Communicate

- Make sure there is excellent radio communication. Every operator should have radios and use them.
- “Our plants that use these have NO issues. They are very diligent about communicating when a vehicle is entering areas where heavy equipment works. This is a cultural thing that must be worked on, but it is very effective and low cost.”



Station/Route signs



Improve traffic patterns

- Lights, markers, signage to designate hazards and risks
- Widen roads/benches/work areas
- Remove blind corners
- One way traffic
- Designated areas



Better Ground Control

- Barriers and gates





Blind spots and tight turns



Whip Flags/Light sticks



LED lighting





Delineation



Low Tech

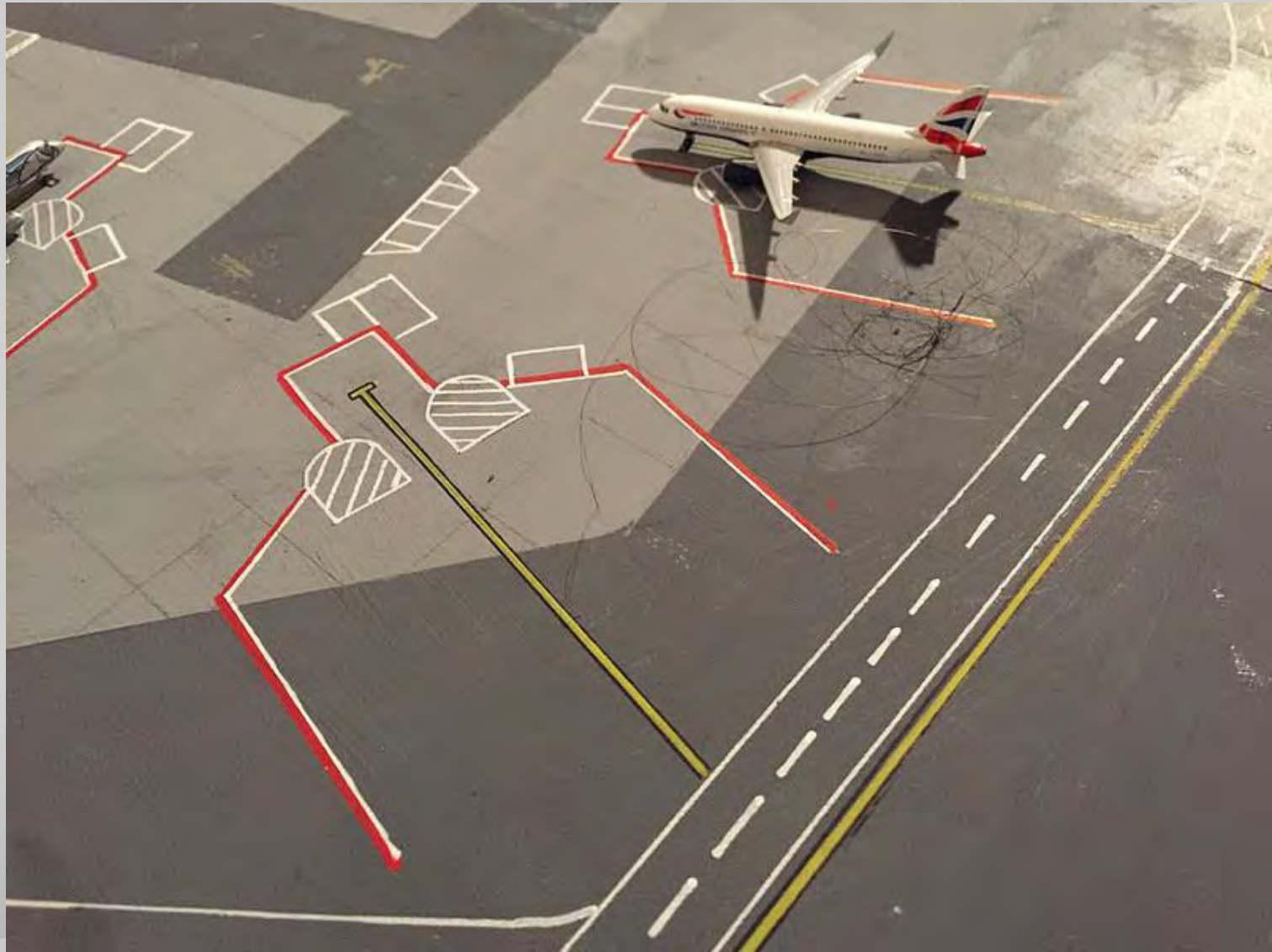


Better Ground Control

- Clearly marked areas of operation, for pedestrians, vehicles, repair trucks/lube, and Iron
- Delineated paths, working areas, etc.
- Better/easier signage
- Delineated/separated parking and pathways
 - Don't park/walk near the big iron.



A place for everything...




More/Bigger Mirrors





More Windows

Vehicle ID

- 
- Every vehicle (HME and light Vehicles) have a clear number visible from every angle –
 - Then every radio communication begins on protocol of each vehicle positively identifying themselves prior to any task or direction – intended to eliminate (or at least reduce) confusion on who is talking to whom.



Hi Vis Reflectors







Mechanic Safety

- Portable signs to warn of workers
- Magnetic, for use on parked vehicles/barrier

Hi Vis for Pedestrians



Spotters/Directors

- Use of visible/dedicated spotters for helping equipment get into and out of tight areas
- Use of Traffic Directors for same





Traffic Kit



