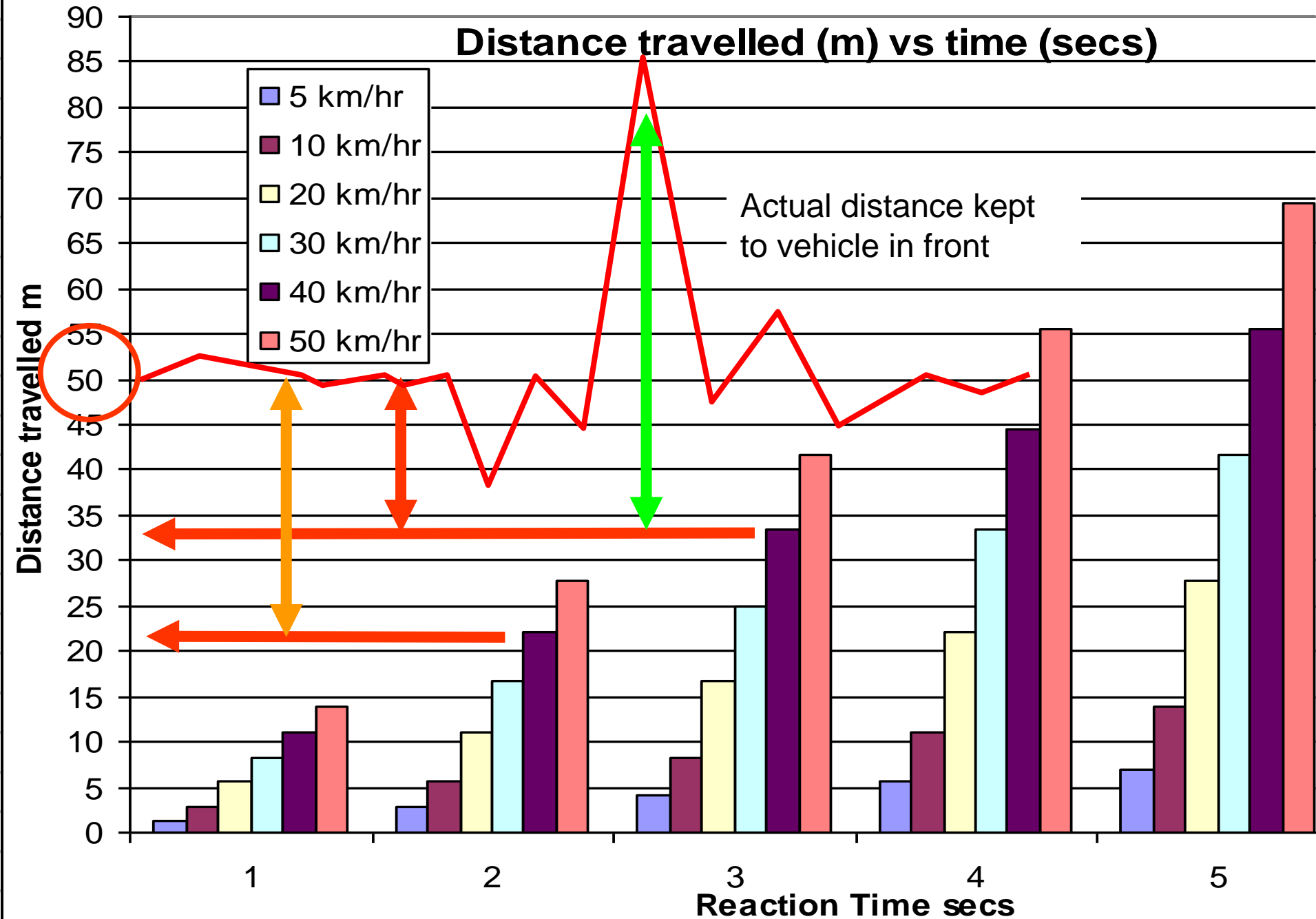
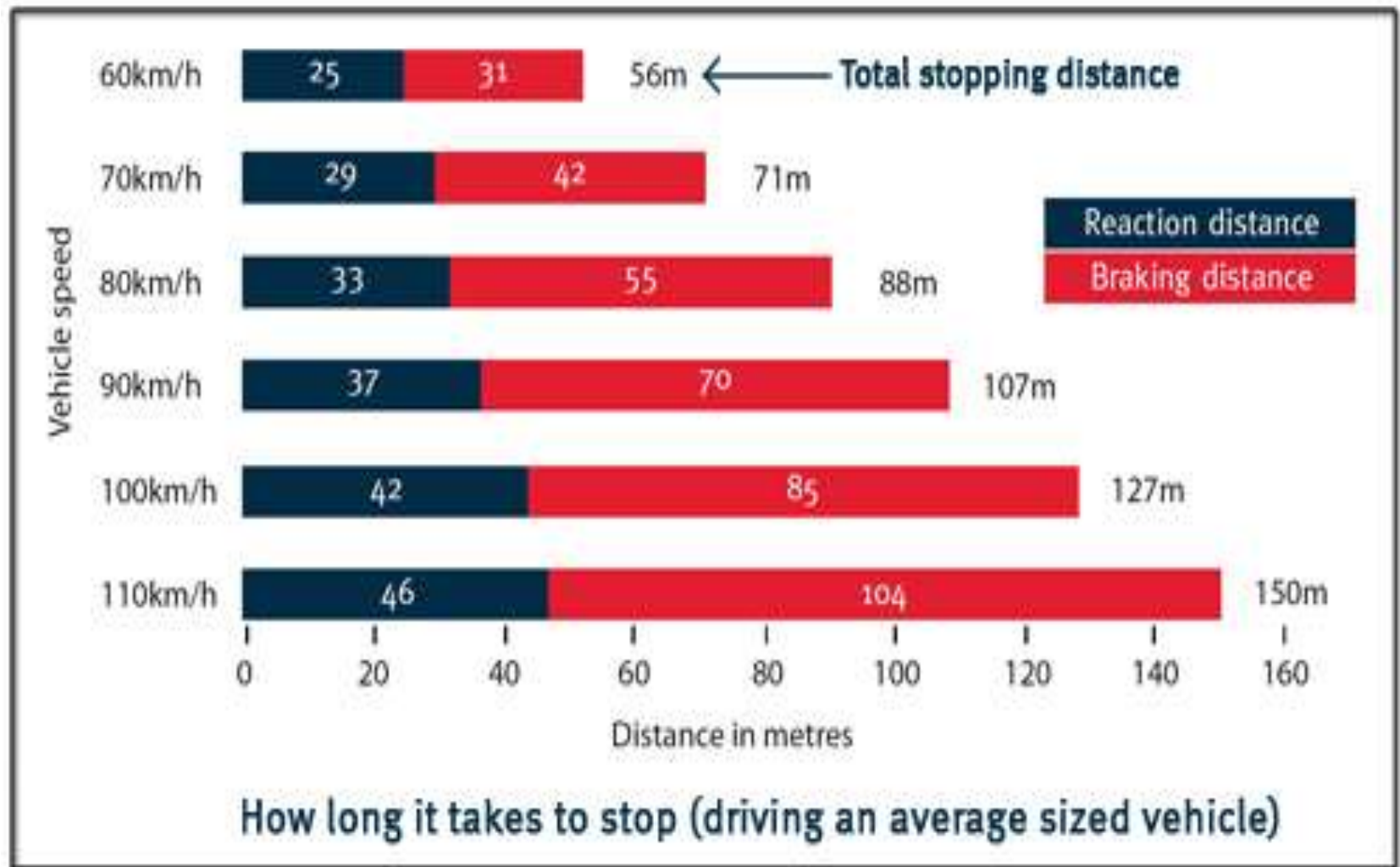


Distance travelled (m) vs time (secs)





<http://www.tmr.qld.gov.au/Safety/Driver-guide/Speeding/Stopping-distances.aspx>

No such data available for mining equipment

Stopping distance

Acknowledged braking capability

Behavioural expectation





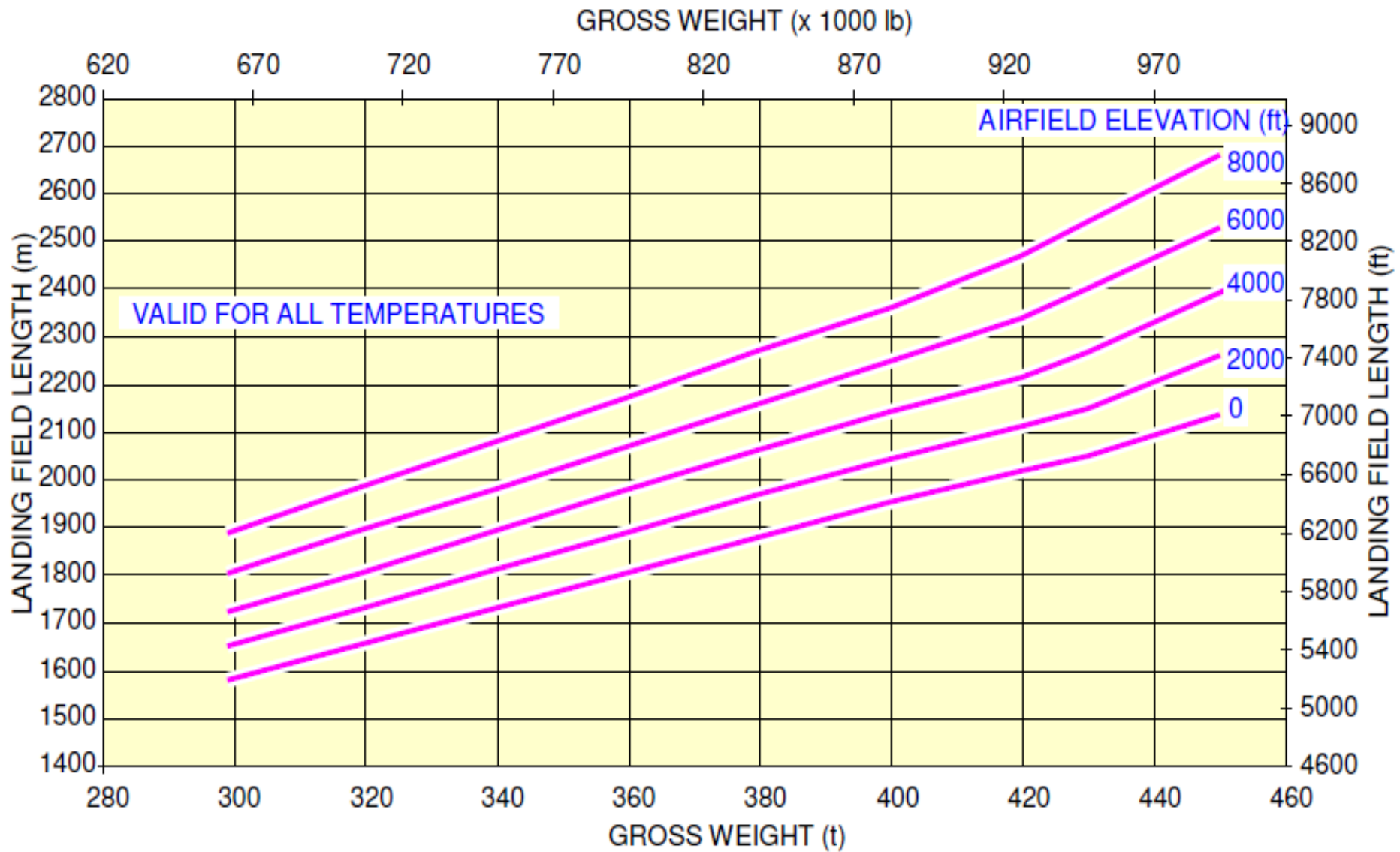
CAT 797F - GVM 623 tons

Airbus A380 - max landing weight 386 tons

Truck 1.7 * heavier than aircraft!

Which is heavier???





Airbus A380 – length of runway (landing field)

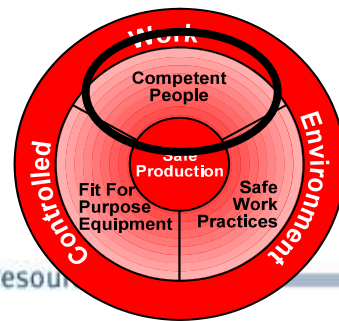
Competent People

Site champions - effective acceptance and utilisation of proximity detection systems – link between site – operations and maintenance and the proximity detection manufacturer

Dedicated maintenance personnel - successful commissioning and implementation of the system

Who is going to maintain proximity detection and automation systems – **specialised skill**

Proximity detection - **simulator training?**



Safe Work Practises

Review and update relevant site procedures incl. prestart checks - ensure proximity detection systems and their importance as a safety control is recognised.

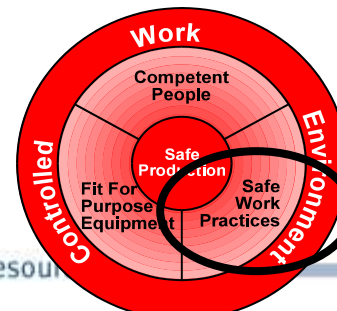
Explain what the system can do and what it cannot do.

‘Nuisance’ alarms or conditions may be in fact real alarms due to the systems design and capabilities (physics)

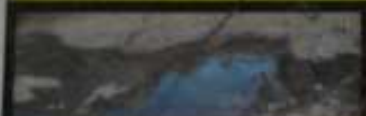


Review ‘Operations rules’ - if prox systems deemed safety critical, then operational procedures must ensure consistency of approach

Proximity detection system requirements for contractor vehicles at different sites. Commonality of approach & rule-set?

Design/roll out a comprehensive training program that outlines how to use the system effectively.



Note: Collision Avoidance system defects only rank #2 priority on this truck prestart checklist

Truck Pre-Start Checklist			
Priority #1 : Defined as a task that must be done now do not operate.			
NOTIFY DISPATCH.			
Steering. Services Brakes. Warning System. Fire Extinguisher. Seat. Seat belt. Fuel Tank major damage.	Emergency Steering. Park Brakes. Fire Suppression. ROPs / FOPs. Brake System Leaks. Major Tyre Damage. Major coolant leaks.	Horn. Head Lights. Tail Lights. Fluid levels Eng / Hyd. Radiator Sight Glass (LvL) Pins / Retainers auxiliary gear. Major Oil Leaks.	Rock ejector bent & in tyre. Mirrors missing. Wheel Nuts missing <3. Hoist Rams / Pins bent missing Wipers / Washers missing Access step missing.
Priority # 2 : Defined as a task that does not have to be done now, however it should be done before next service and or repaired with-in 24 to 48 hours notify Dispatch.			
Two way radio. (get Hand held) Fuel leaks. Main Access loss.	Grease Lines. Mirrors loose. Water leaks. Gauges.	Oil leaks. Pin retainers. Tyres- Cuts & damage. Air con	Collision avoidance. Rock ejector bent.
Priority # 3 : Defined as a task that is to be done next service notify Dispatch.			
Priority # 4 : Defined as a task that can be done at or after next service notify Dispatch.			
{AN INFORMATION TAG MUST BE PLACED ON THE EQUIPMENT}			
Minor oil leaks.* Wipers / Washers loos.	Damage reported. Other ladders / rails loose.	Small Air leaks.	
What an Oil leaks classification reporting rating would look like			
	Level 1 Major Oil Leaks On Equipment		Level 2 Running Oil small leak.
			Level 3,4 Dripping Oil leak

10 Stickers !



No Stickers !

HondaJet's Garmin® G3000

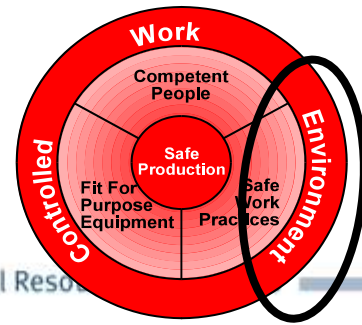
A cockpit built for pilots features the new all-glass Garmin® G3000.

Controlled Working Environment

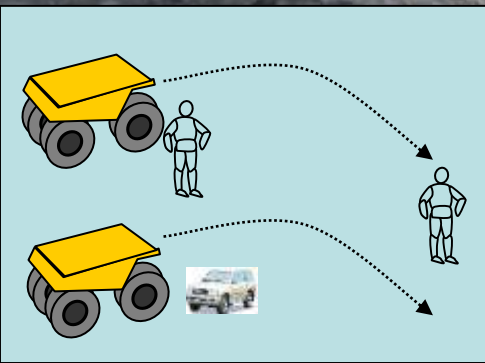
Proximity detection equipment must not be considered as the primary solution to mitigate collision risks.

Must also consider pit design & layout – intersection, haulroad, dump designs, road separation, human behaviours, speed, gear selection etc.

Inherently safer operating environment (**design**)

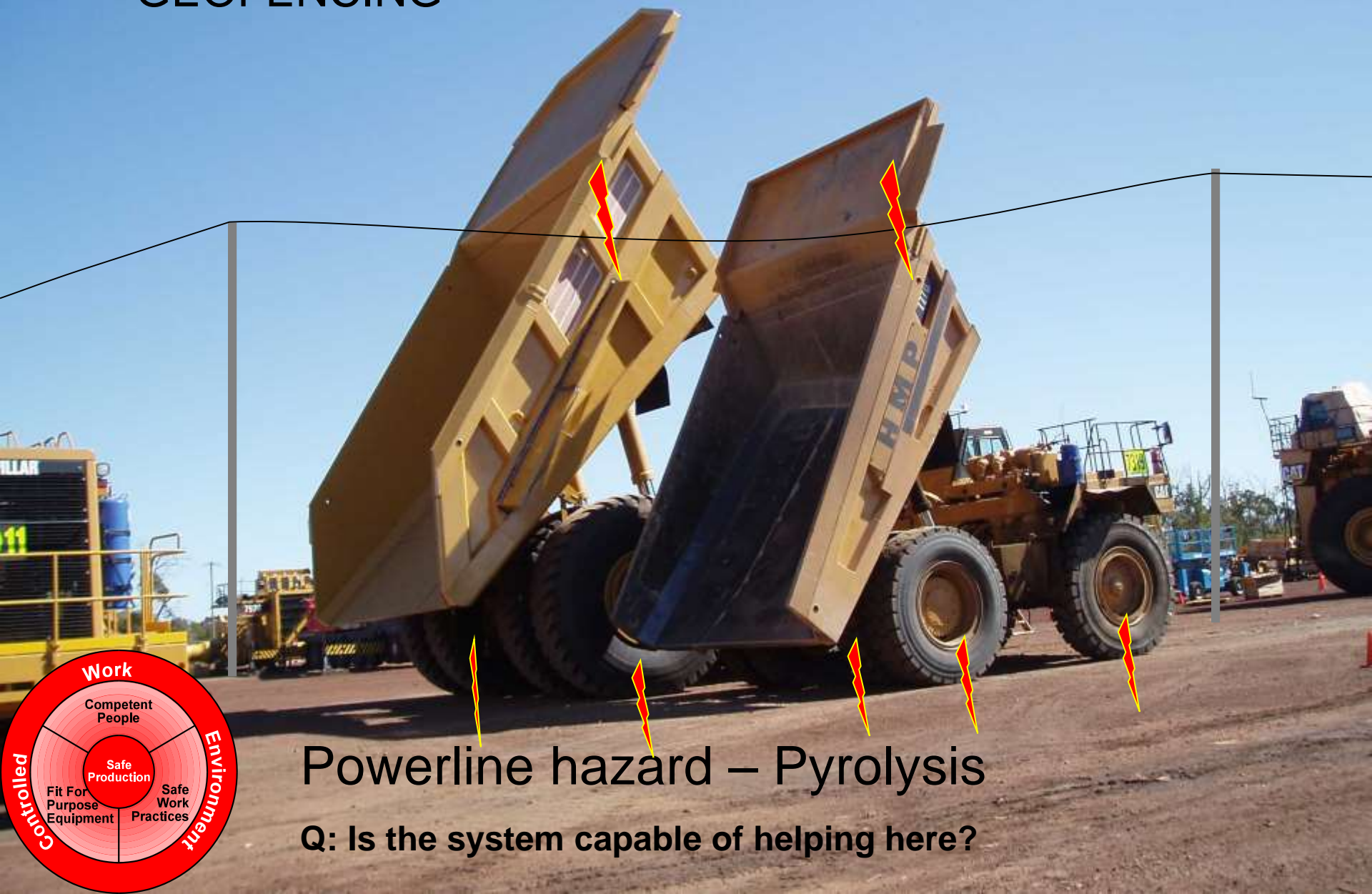


Example of a well delineated and well designed 'walkway' to the truck 'go line'



'Isolation' – hard barriers

What can it do? Other uses – detection of fixed hazards
- GEOFENCING



Powerline hazard – Pyrolysis

Q: Is the system capable of helping here?

Some CAS Technologies

RFID – tags and readers

Radar

‘Magnetic bubble’

Laser scanning

GPS – surface only

Cameras

Combination of the above

Tagging of people???

**Careful selection of
technology(ies)
critical for effective
control of collision
hazards and
resultant risks**

Market Place

Collaboration - several prox detection OEMs integrating their systems into 'one'

GPS (high speed) plus radar (slow speed) – opencut

'Magnetic bubble' plus ... - underground

– ability to create non-detection envelopes (e.g. inside manbaskets, on bolter-miners)

Some machinery OEMs are looking to allow prox system to 'manage' some machine functions – eg. braking

Some OEMs looking at detection of persons

In Summary

Proximity detection systems are not the complete answer but are an essential part of the solution

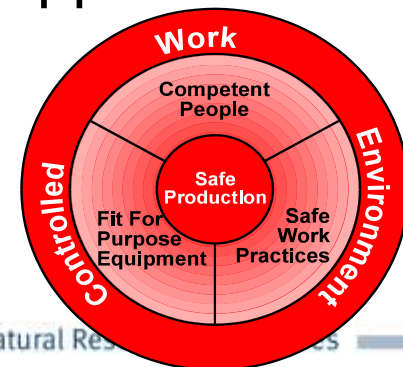
Must also look at human factors – interface

Proximity detection technology is available or rapidly becoming available

- Opencut and Underground metalliferous - available now
- Underground Coal – 2 systems certified for QLD

Need a side by side integrated combination of approaches

Must be embraced – life saving technology



“Safety is not an intellectual exercise to keep us in work. It is a matter of life and death. It is the sum of our contributions to safety management that determines whether the people we work with live or die”.

Sir Brian Appleton – Piper Alpha assessor

**Every miner home safe and
healthy every day**



Questions?