



COLLISION AVOIDANCE SYSTEM (CAS)

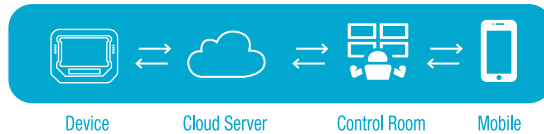
COLLISION AVOIDANCE SYSTEM (CAS)



CAS system observes, detects and gives warnings to machine operators, equipped pedestrians and sends notification to field managers as well as control centers of existing problems.

The size and inherent blind spots of most of mining vehicles make it impossible for operators to be aware of pedestrians, machines and vehicles.

CAS provides substantial enhancement of the level of driver's awareness by predictive detection system and gives visual and audible warning.





COLLISION AVOIDANCE SYSTEM (CAS)

Considered ergonomic factors within CAS for level 7-8-9

- ▶ Awareness (seeing the hazard with the aid of CAS)
- ▶ Comprehension (understanding the hazard, assisted by the CAS),
- ▶ Prediction of the hazard (prediction of the likely ways the hazard could change),
- ▶ Decision on course of action (e.g. change curve, path, slow down, stop, be still)
- ▶ Warning (e.g. down-shift gear, apply service brakes, maintain current path)



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Level 7

- ▶ Visual Warning
- ▶ Audio Warning

Level 8

- ▶ Visual Warning
- ▶ Audio Warning
- ▶ Voice Instruction to The Operator

Level 9

- ▶ Visual Warning
- ▶ Audio Warning
- ▶ Voice Instruction
- ▶ Auto Braking/Stopping

Radar

Radar system can be used both underground and surface applications. It could be implemented to the existing level 9 for opencast mining fields. The system will now be more sensitive to all objects but not limited to machines, vehicles and pedestrians.

All the above-mentioned levels are modular and expandable with customized hardware and software options, newer technologies can be implemented in order to be kept updated. This allows mines to be more flexible and free to consider implementing changes at the mine field.



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