



Brigade

You're safer with us

Safety Systems
**Quarry and
Mining**

2024

A large mining truck with a massive tire and a tracked vehicle in a quarry setting. The truck is white and yellow, and the tracked vehicle is black and white. The background shows a quarry with a cloudy sky.

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Safety in the Quarry & Mining Industry

Vehicle and site worker safety on mining and quarry sites is a challenging yet necessary task. These industries operate in tough environments and large mobile plants can pose a danger to site workers if safety measures and precautions are not adhered to.

Operator visibility can be limited due to blind spots around large machines and this is often made worse by the harsh working environment; terrain, weather or low light, for example. 40% of fatal accidents on quarry sites are caused by moving vehicles and 70% of collisions occur at low speed because of poor visibility.



Collisions with other vehicles or site workers due to rear, front and rear side blind spots



Beeping reversing alarms being ignored by site workers



Collisions due to poor visibility (rain, fog, mist, dust etc...)



Long hours and monotonous tasks can lead to operator fatigue and reduced concentration



Ear defenders reducing site workers' ability to clearly hear approaching vehicles

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How Brigade can help you

By working in partnership to understand your safety concerns, Brigade's team of engineers strive to bring innovative answers to the marketplace. Apart from meeting health and safety requirements and strengthening a company's reputation, by making a small investment in Brigade's safety solutions you can achieve clearly defined and measurable benefits as shown below:

- All round vehicle visibility for safer, more efficient operation
- Reduced incidents
- Reduced incidents due to all round visibility of the vehicle
- Reduced vehicle downtime due to accidents
- Meet health and safety requirements
- Peace of mind for management and workers
- Strengthen your company's reputation

Why Brigade?

- Pioneers in Vehicle Safety since 1976
- Brigade is a partner with OEMs specialising in Plant Machinery
- Brigade equipment is in use across quarry and mining industries around the world
- Rigorous and comprehensive testing ensure Brigade products are fit for purpose
- 2,3,5 and lifetime warranties on Brigade products

1 Radar 77ghz



2 AI Pedestrian Detection Camera



3 AI360



4 Elite AHD Monitor



5 Warning Alarms



6 Mobile Digital Recording





Radar Obstacle Detection

Operating mobile equipment can be complex and demanding with many places for the operator to view at one time. This is made more challenging in harsh terrains and with reduced visibility due to dazzling or poor light, rain, smoke and dust.

Backsense® heavy duty radar systems are designed for vehicle and asset detection in blind spots which significantly reduces the chance of a collision. They detect stationary and moving objects, providing the driver with in-cab visual and audible warnings – alerting the operator whose attention cannot be focused on all areas at once.

Linked together on the same CAN network, the sensors can be positioned to provide 360 degree detection. With specialist software, the alert zones become dynamic, adjusted larger or smaller with speed, ensuring adequate warning and minimising false alarms.



FMCW Technology

Transmits a continuous varying radar frequency signal with unique time stamps to each instance of the wave.



Configurable

Spread and length of the beam can be set to suit the application. Option of three pre-set models, on-screen display or fully configurable options are available.



IP Rated

IP69K Rated radar sensor.



Accurate Detection

Accurate detection distance of up to 60 metres.

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BS-8100 77GHz Programmable Detection Range

Part Number: 7135

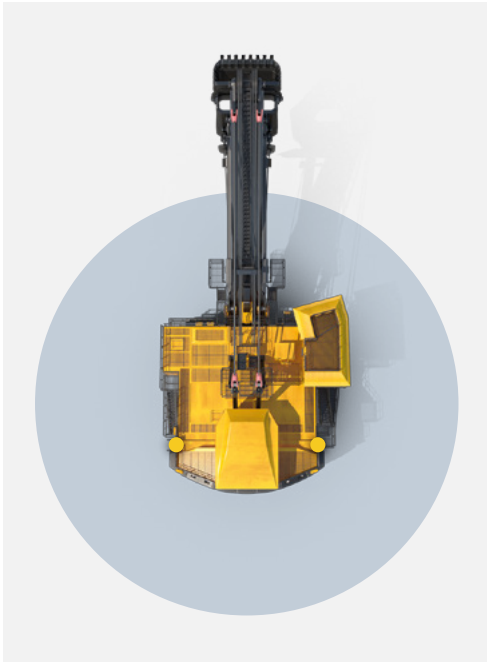
- Quick reaction time
- 1 activation input and 1 trigger output
- 140° horizontal detection angle
- Sensor resistant to water, moisture, dust, vibration, heat, cold, mud and glare



BS-9100 Backsense® 77GHz CAN object detection radar

Part Number: 6351

- Network up to eight sensors
- Communication via CAN Gateway
- Extremely rugged design for severe weather conditions and all terrains
- Complies with CAN2.0A Base Frame Format



AI Intelligent Detection

AI Cameras are a new generation of active blind-spot detection systems.

Using Artificial Intelligence, the cameras detect and recognise the human form within the pre-defined detection zone and reliably warn the driver visually and/or audibly before a possible collision occurs. Image processing is built-in to the camera, meaning no other hardware is required.



Pedestrian Detection

Uses AI to recognise and alert the driver to vulnerable road users all around the vehicle. (Only 360 AI)



1080p

High-Definition Image

The 1080p camera delivers clear and sharp images, improving driver visibility.



Brigade Compatible

Interfaces with all Brigade HD monitors and MDR recorders.



Efficient Alerts

Instant audible and visual alerts via the monitor when a site worker is detected.

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VBV-2220C AI-D04 Front-facing AI Camera – normal view

Part Number: 7321

- High Definition AHD 1080p
- Recognises and alerts the driver to people in the front blind-spot
- Front on road: Maximum 1.4m(L) x 3.3m(W)
- Zero seconds boot time when using Brigade adaptor cable

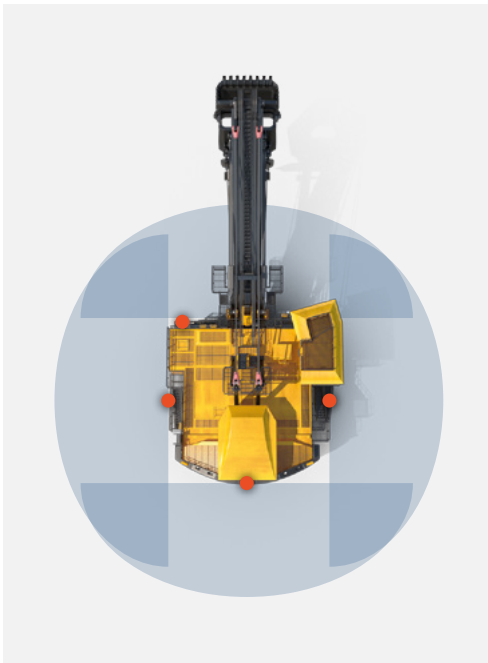
B



VBV-360-1000 High Definition Backeye® system with Artificial Intelligence

Part Number: 7524

- 4 camera 360° system
- Automatic Calibration
- High-Definition AHD 1080P
- Bespoke vehicle overlays for on screen customisation



Camera Monitor Systems

Camera systems are a vast improvement on the many mirrors needed to view blind spots when operating plant machinery. Mirrors themselves create further blind spots and 'information overload' for drivers who don't know where to look first. This is particularly difficult for mobile operators as they need to be always alert and aware of their surroundings, especially when operating in noisy, low visibility environments.

Cameras provide a wider angle of view than mirrors and are less likely to be changed, while built in LEDs offer superior visibility in low light conditions.

Vehicle CCTV systems are used in a wide range of on and off-road applications to meet a host of health and safety legislative requirements. They can eliminate blind spots to prevent costly vehicle damage and more importantly, save lives.



Eliminate Blind Spots

Calibrated cameras capture all areas including the blind spots.



Real-time Views

Live pictures shown on the monitor without time lag.



Wide Angle Views

Provides a wider angle of view than mirrors and are less likely to be damaged.



Recordable

Record individual camera feeds in high definition to a mobile recorder.

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BE-870HM Elite AHD Monitor

Part Number: 6380

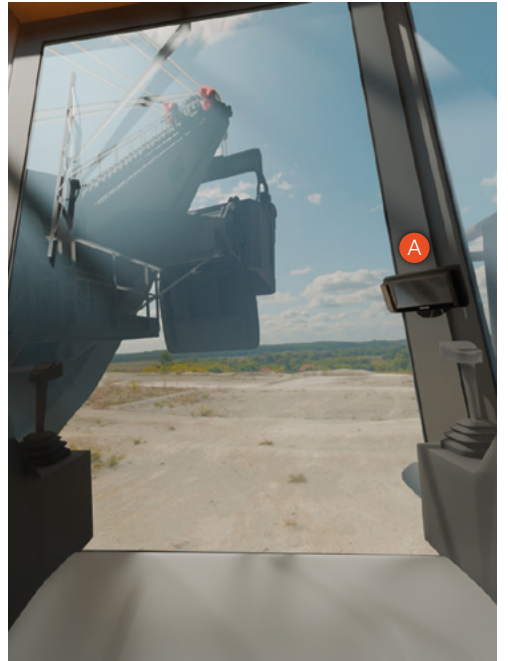
- AHD and CVBS compatible
- Two camera inputs
- Low reflection for easier viewing in all lighting conditions
- Keypad disable



BE-8100C Elite AHD Camera

Part Number: 6408

- High definition picture quality with 1080p AHD 2.0 video signal output
- Day/night sensor
- Four infrared LEDs for ultra-low light performance
- Mirror/ normal view



Reversing and Warning Alarms

Bbs-tek® multi-frequency back up alarms use a wide range of frequencies known as White Sound®. This enables the listener to instantly locate where and what direction the sound is coming from. The broadband sound also gives workers wearing hearing protection devices in loud environments such as quarry and mining sites, a better chance of hearing the alarm.

For many mining operations they are mandatory, not only because of the safety benefits but Quiet Mark and BBS White Sound® disappears into the environment quicker meaning that the sound is only heard where needed. This is beneficial when minimizing noise nuisance to neighbours surrounding quarry and mining sites.



Danger Zone

Sound quickly subsides outside of danger zone eliminating noise nuisance from local communities.



Five Decibels Quieter

Smart Alarms auto adjust to suit the ambient noise level.



Lifetime Guarantee

All bbs-tek® White Sound alarms are guaranteed for life.

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SA-BBS-107 – heavy-duty 87-107 Decibels

Part Number: 0899

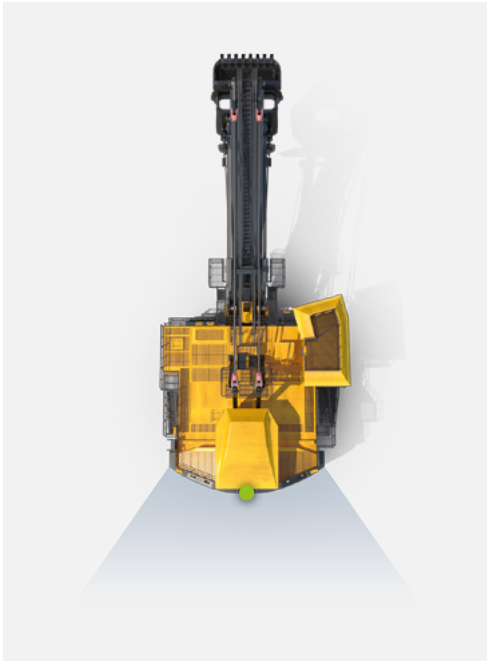
- Sound confined to danger area
- Instantly locatable sound
- Multi-frequency broadband sound
- Alarm continually adjusts to 5-10dB above ambient



SA-BBS-97 – Self Adjusting – Medium Duty. 77-97 Decibels

Part Number: 1399

- Sound confined to danger area
- Instantly locatable sound
- Multi-frequency broadband sound
- Alarm continually adjusts to 5-10dB above ambient



Mobile Recording

Mobile Digital Recorders (MDR) enable quick and indisputable reviews of near misses. They also provide a good deterrent for theft and vandalism, giving operators peace of mind about the security of the vehicle. As well as this, alerts can be sent to site managers to help manage the risk and assist with training. Meta data such as location, speed, G-Force and machine performance can be sent to the dashboard for alerts and can be managed as a part of the routine safety procedures.

Already used widely in mining Brigade's MDR-600 series models are robust devices capable of recording video from up to 12 analogue AHD and 1080P IP cameras, with 4G or wifi connectivity. With 4G connectivity, live video or recordings can be accessed, along with its location.



Record Multiple Cameras

Records from up to twelve cameras simultaneously.



Location and Speed

Offers built-in GPS so that you can track a vehicle's speed and location.



G-Sensors

G-sensor provides impact data and accelerating and breaking.



AHD and Recordable

AHD Compatible with Backeye®360 Recordable.



4G Connectivity

View live video, recordings and other data while the vehicle is on the road.

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MDR-641G-1-SSD Mobile Digital Recorder

Part Number: 7074

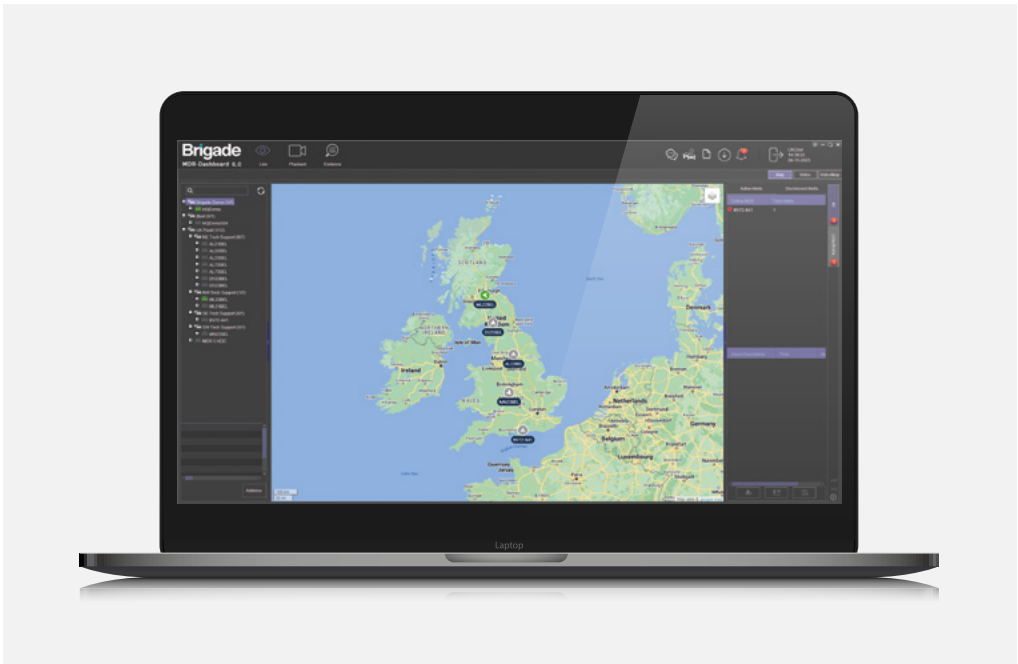
- Recordings protected by non-visible watermark
- Can connect up to 4 analogue and 1 IP camera
- Compatible with Brigade's camera monitor systems
- 1 TB hard drive



MDR-644G-1-CMR Mobile Digital Recorder

Part Number: 6571

- Records from up to 12 cameras simultaneously using external PON Switch
- Can connect up to 4 analogue and 4 IP cameras
- Mirror recording onto SD Card
- Built-in buzzer
- Anti-vibration mounting allows for installation at any angle





ELITE

HEAVY DUTY
VEHICLE SAFETY
SYSTEMS

Brigade's top of the range systems are ideal for vehicles and machines that require exceptional quality and consistent performance in the harshest conditions, including desert dust and wintery conditions. Rigorously tested to higher standards, the superior components and build quality are reflected in their 3 year, 5 year and lifetime warranties. Ideal for heavy duty applications.

BACKEYE® ELITE Range Monitors

Brigade's camera monitor systems enable drivers and operators to manoeuvre and drive safely. Vehicle mounted cameras can help the driver to see blind spots by delivering a live feed to the in-cab monitor.

- 7" Monitor & 4 camera inputs
- Screen viewing options including split, quad and picture-in-picture
- 5 Auto triggers

Bbs-tek® White Sound® Reversing Alarms

Vital safety devices needed to warn workers that a vehicle is manoeuvring. White sound alarms are the safest in the world due to their instantly locatable and directional sound.

- Multi-frequency broadband sound
- 102 decibel, 107 decibel or self-adjusting 87-107 decibel models
- Self-adjusting models continually adjust sound to above ambient
- Sound confined to danger area
- Eliminates noise nuisance

BACKEYE® ELITE Range Cameras

Brigade's camera monitor systems enable drivers and operators to manoeuvre and drive safely. Used on a wide range of on and off-road applications to meet a host of health and safety and legislative requirements.

The size of commercial vehicles and machines mean vehicle blind spots are a major factor in collisions across all industries. Operator positions, bodywork, absent rear windows and bulkheads create further restrictions and can greatly limit driver visibility, making collisions even more likely.

- Mirror/normal view
- Wide dynamic range for improved details in shadows and highlights
- 5 infrared LEDs for ultra-low light performance
- IP69K waterproof and dustproof

Backsense® Heavy-Duty Radar

Backsense® heavy-duty radar sensor systems detects people and stationary or moving objects in vehicle blind spots. Industries such as mining, quarrying, agriculture and construction use machines and plant equipment, which by their very nature pose a danger if they are not managed safely. Blind spots tend to be much larger on these vehicles and include not only the rear and nearside but also the front, especially with elevated driver positions. Terrains are harsh, vehicles are exposed to the elements more aggressively whilst thick dust and darkness decrease visibility further.



Mining Safety in India

Davesmen Distributor Case Study

Founded in 1974, Davesmen have over four decades of history in supplying the automotive market and have extensive knowledge of mining safety in India. Today, the company supports mines throughout India by supplying and fitting Brigade's range of vehicle safety solutions on to HEMM (Heavy Earth Moving Machines) as a national distributor.



India's steel and iron export market was worth as much as \$10 billion in the year 2018, a large contributor and driver for the Indian economy. At its roots, mines across India operate to extract minerals and ores to produce the metals we see used across multiple industries around the world. The vehicles putting in the miles throughout these mines are typically dump trucks, hauling raw materials at a capacity in the range of 40 short tons (36 t) to 496 short tons (450 t), a gargantuan feat.

However, with such enormous vehicles operating, mining is not without its challenges, especially where health and safety is concerned. Davesmen have noted that many of the accidents that do occur in a mine are fatal and are on a mission to change that. Over 1,000 recorded fatalities at Indian coal operations were reported in 2017 which does not take in to account the many other types of mines across India.

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