

The background features a series of concentric circles, some solid and some dashed, radiating from the center. A large, red, speech-bubble-like shape is positioned in the upper right quadrant, containing the main title and author information. A thick, dark grey curved line sweeps across the bottom left, partially overlapping the red shape and the 'BANSHEE' text.

# EXPLOSION PROOF BEACONS, SIRENS AND SOUNDERS

By Rouane Herselman

**BANSHEE**

Your Presenter:



**Rouane  
Herselman**



# Techniques Used

- Flameproof – Ex d
- Dust Ignition Proof – Ex tD
- Intrinsically Safe – Ex i
- Encapsulation – Ex m
- Increase Safety – Ex e
- **Special – Ex s**
- Double and Triple protection techniques are used in some occasions to approve a product fit for use in a certain zone/s.

# BANSHEE

## A brief history of sirens

- Some time before 1799 the siren was invented by the Scottish natural philosopher [John Robison](#). Robison's sirens were used as musical instruments; specifically, they powered some of the pipes in an organ. Robison's siren consisted of a [stopcock](#) that opened and closed a pneumatic tube. The stopcock was driven by the rotation of a wheel.

# A brief history of sirens

- In 1819, an improved siren was developed and named by [Baron Charles Cagniard de la Tour](#). De la Tour's siren consisted of two perforated disks that were mounted coaxially at the outlet of a pneumatic tube. One disk was stationary, while the other disk rotated. The rotating disk periodically interrupted the flow of air through the fixed disk, producing a tone.

# Modern sirens

- The modern motor driven siren, consists of a rotating disk with holes in it (called a chopper, impellor, siren disk or rotor), such that the material between the holes interrupts a flow of air from fixed holes on the outside of the unit (called a stator). As the holes in the rotating disk alternately prevent and allow air to flow it results in sound.



Sirens

VS

Sounders

# Sirens

- Sirens are low frequency devices usually continuous rated and are electric motor driven.
- Air is pulled in through a multi bladed impeller and pushed out through radial vents.
- The combination of motor speed and the number of impeller blades, with the number and spacing of the radial outlets determine the frequency.
- The siren is used extensively, in hazardous environments, for disaster warning but also has many other applications.
- These include, process notification, conveyor belt start-ups, evacuations and all clear, gas detection, as well as time and attendance.
- Most individual requirements are covered by sirens rated from 100 W to 7.5 KW, which have sound outputs from 95 dB to 145 dB at 1 metre distances and giving an audible signal over a range of 100 to 15000 metres.





▶ **BANSHEE EX DUPLO**

1km sound distance

123dB(A) @ 1m

Ex d I/IIC T6 Mb Gb

Ex tb III C T85 °C IP65 Db

-20°C to 45°C

**BANSHEE**



▶ **BANSHEE EX 26S**

1.5 km sound distance

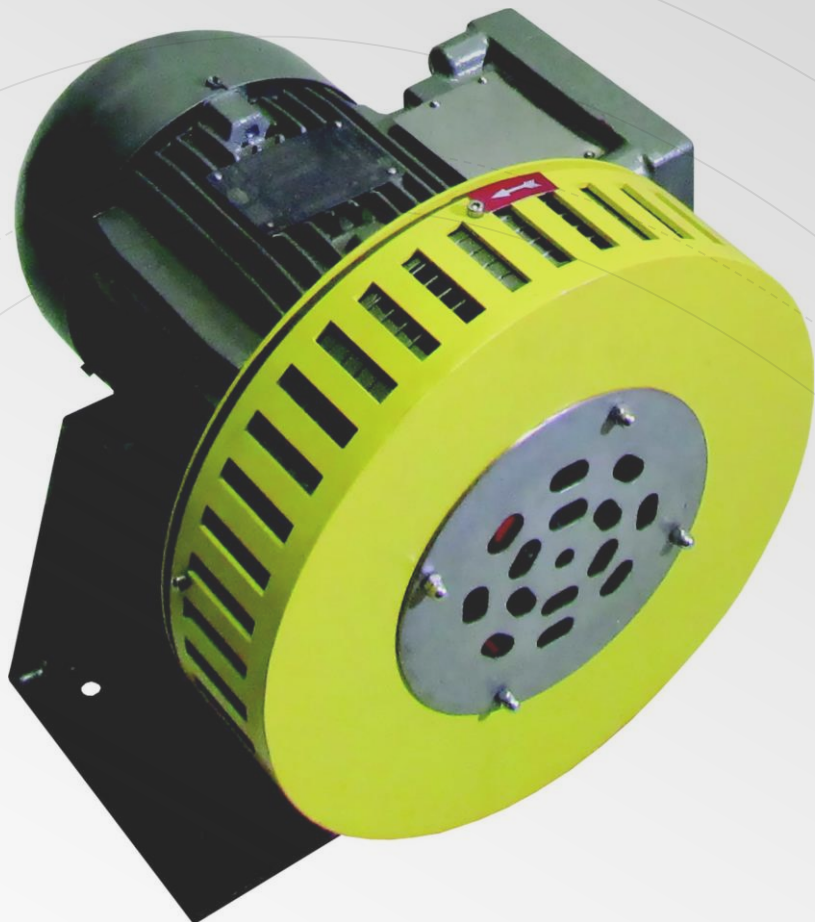
125dB(A) @ 1m

Ex d I/IIC T6 Mb Gb

Ex tb III C T85 °C IP65 Db

-20°C to 45°C

**BANSHEE**



▶ **BANSHEE EX 3LF**

3km sound distance

125dB(A) @ 1m

Ex d I/IIB T4

**BANSHEE**



▶ **BANSHEE EX H200**

2km sound distance

114dB(A) @ 1m

Hand Operated

Ex s I/II T6 Gb Db

**BANSHEE**

# Sounders

- The electronic sounder is by far the most versatile device available and has many distinct advantages as far as the design engineer and contractor is concerned.
- Not least of these is the low current consumption and relatively high sound output, which make the electronic sounder ideal for use in conjunction with battery powered systems.
- Consequently, this type of sounder is also used extensively for process notification, CM and SC's reverse alarm, time and attendance, evacuations and all clear, and more recently, power outage notifications.

## **Banshee Ex Sounder S3**

600m sound distance

110dB(A) @ 1m

Ex d [ia] I/IIB + H2 150°C Mb Gb



## **Banshee Ex Multisounder**

600m sound distance

110dB(A) @ 1m

Ex d[ia][e] I/IIC T6 Ma Ga  
Ex tb III C T85 °C IP65 Da  
-20°C to 45°C



## **E2s Ex12 Sounder**

1000m sound distance

126 dB(A) @ 1m

Ex d IIB or IIC Gb

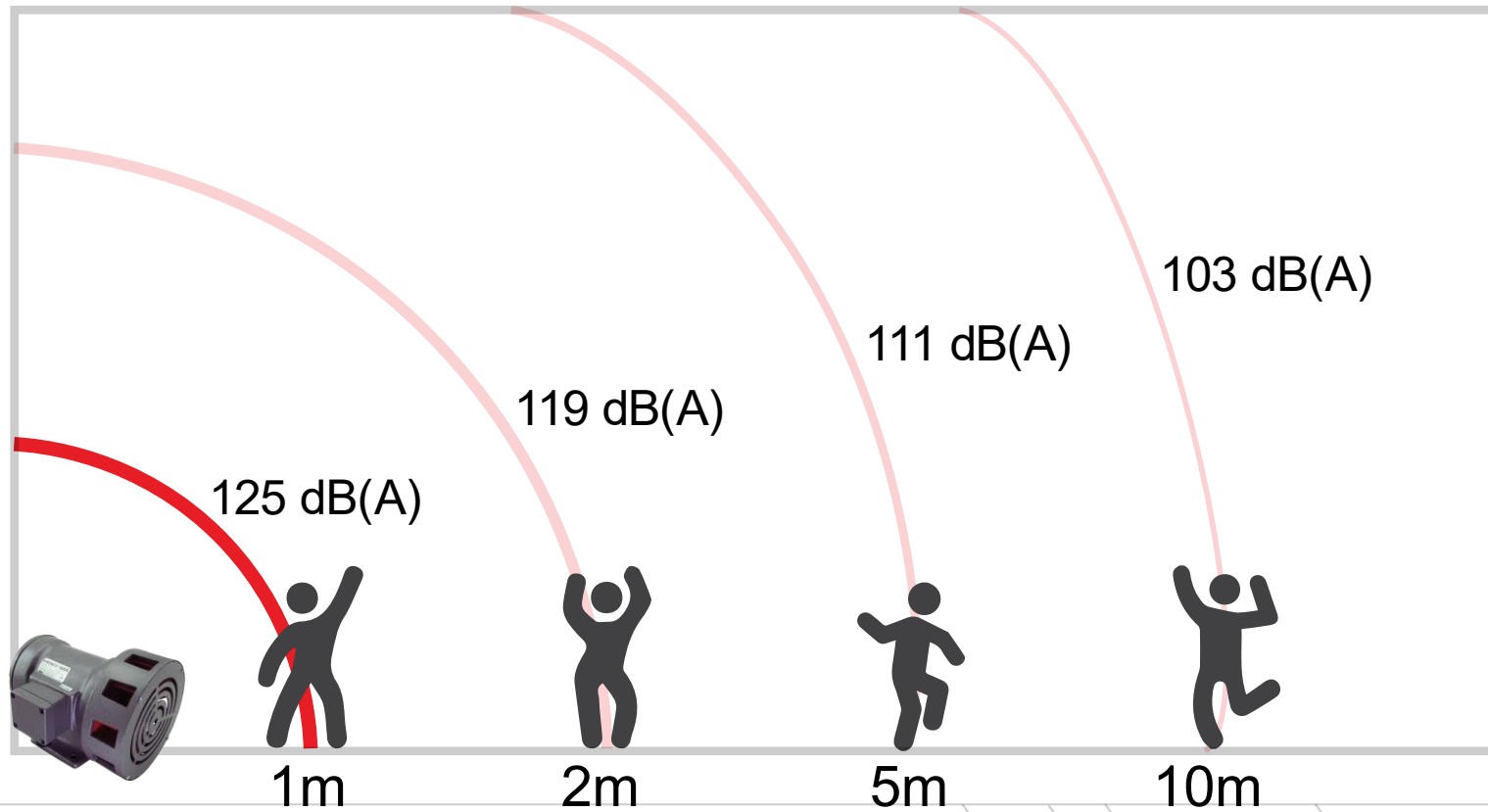
Ex tb IIIC T100°C or T115 °C Db

Ambient Temperature

Dependant







# Sound Distance



What aspects  
has an effect on  
sound distance?

- Temperature
- Humidity
- Wind
- Obstacles
- Ambient noise
- Mounting
- Output direction

**When selecting a siren, a careful study of the specific project is required, the following points be considered:**

**Positioning**

# Positioning

1. The nature of the proposed warning signals, including sequences, duration of blasts, intervals and length of signal. Each type of hazard should be given its own code to ensure the correct response. On-site warning signals must not be confused with off-site warning signals.
2. Area and range of audibility to be covered by the system. The signal must be clearly audible to all persons, inside and outside the plant likely to be affected.
3. The nature of the terrain and construction and heights of the buildings and structures on the site. Uneven ground and enclosed or noisy areas must be taken into account.

# Positioning

4. The type of system to be installed. Plants with high levels of machine noise – or covering large areas – may be better covered by a series of smaller sirens than by one large unit.
5. Local meteorological conditions. For example, temperature, fog, mist, wind, snow or rainfall must also be taken into account.
6. The nature of other signals in the area. Hazard signals must not conflict with emergency services or civil defence signals.

# Positioning

7. Test facilities. Siren motors, shutter and signal sequences should be regularly tested to ensure that they are still functioning properly.
8. Availability of an adequate power supply, or a power back-up system.
9. The positioning of sirens. The ideal height above ground level for a siren depends on the individual type and sound output of the instrument. Sirens should not be mounted too high above ground level: 4 m to 6 m are usually recommended. \*

\*Installing sirens on top of high buildings often has the effect of deflecting the sound wave upward because of negative temperature gradients. Sirens should not be located close to tall buildings. There should be adequate clearance around each instrument to allow sound distribution.

## A brief history of lights

- The story of the light bulb begins long before Edison patented the first commercially successful bulb in 1879. In 1800, Italian inventor Alessandro Volta developed the first practical method of generating electricity, the voltaic pile.
- Not long after Volta presented his discovery of a continuous source of electricity to the Royal Society in London, Humphry Davy, an English chemist and inventor, produced the world's first electric lamp by connecting voltaic piles to charcoal electrodes. Davy's 1802 invention was known as an electric arc lamp, named for the bright arc of light emitted between its two carbon rods.



# Lights

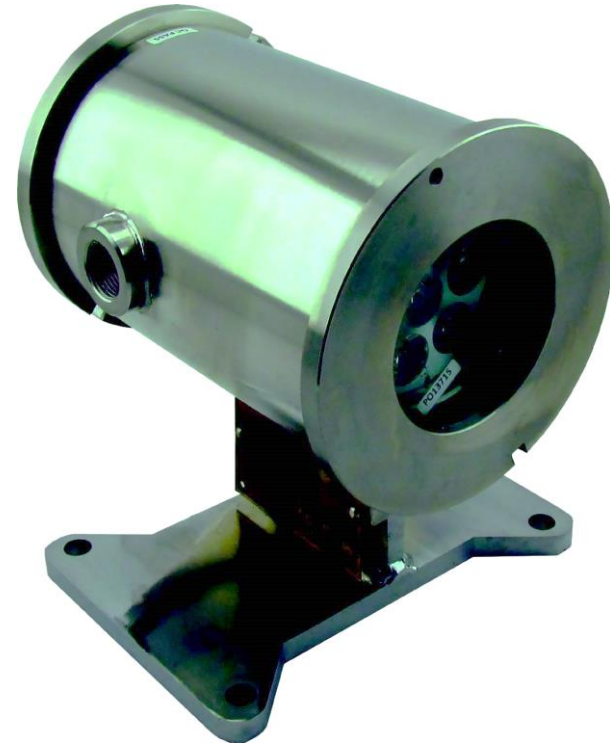
- Lights are usually static in nature.
- Mainly used for illuminating a wide area, or a specific section of area, or even focused.
- Some specific uses for lights are;
  - Illuminating medicine powder inside a ceramic tank;
  - Illuminating aluminium powder for ease of detection thought camera systems;
  - Coal Bunkers;
  - CM and SC's driver lights.

# **Banshee Ex Light**

High Bright LED's

49 Lux @ 5m

Ex d I 150°C / Ex d IIC T4 Gb



## **Banshee Ex Vehicle Light**

3 High-Bright White LED's,  
3 Red LED's,  
1 Flashing Amber or Static Green  
12° Beam Angle @ 20m

11 Watt (100Lux @10m, 25 Lux @ 20m)

Ex d I/IIB + H2 150°C Mb Gb



# Beacons

- Beacons have a multitude of settings and programmable functions.
- Mainly used for indicating a development in an area.
- Some specific uses for beacons are;
  - Gas detection;
  - Evacuation and All Clear;
  - Process Notification;
  - CM and SC's status lights.

## **Banshee Ex Beacon**

24 High Bright LED's

10W

Ex d I 150°C Mb / Ex d IIC T4 Gb



**BANSHEE**

## **Banshee Ex Vertical Beacon S3**

9W LED - 40 SMD 360°

70 Lux Rotating  
100 Lux Flashing  
70 Lux Static

Ex d b I Mb





Questions?

[www.kama.co.za](http://www.kama.co.za)