

## Effective stunning of SHEEP & GOATS

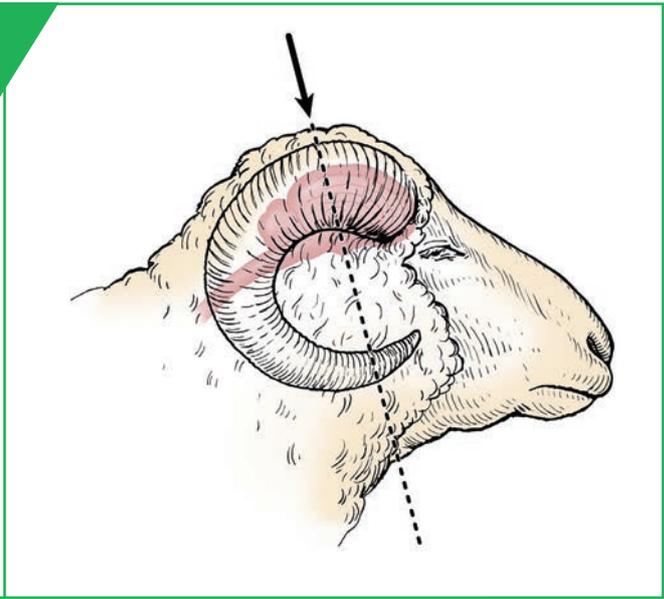
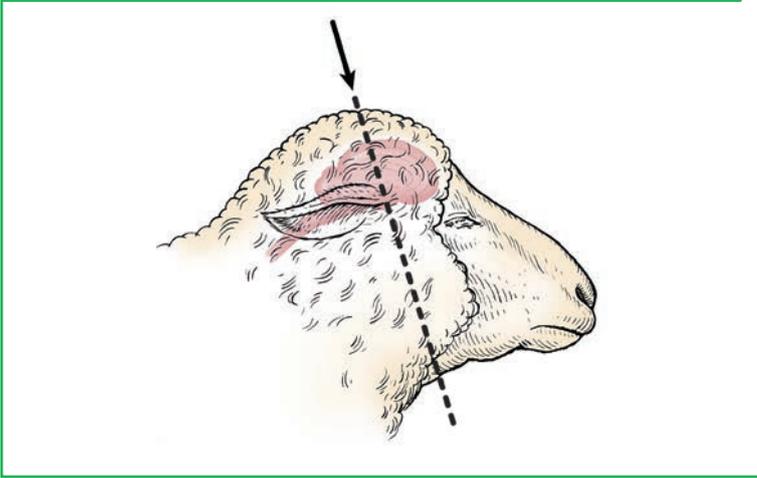


Illustration courtesy of J. K. Shearer, Iowa State University

### Signs of an effective stun

- Complete collapse
- Lack of rhythmic breathing
- Loss of corneal reflex
- Relaxed jaw
- Loose tongue

### Good practice

- Always ensure that your **CASH**<sup>®</sup> stunning tool is in good working order
- Clean and maintain the stunning tools after each use
- Replace worn components in accordance with user manual
- The stunning tool will require higher maintenance if used with a stronger than necessary cartridge
- Only use genuine Frontmatec Accles & Shelvoke **CASH**<sup>®</sup> branded cartridges

### Suggested **CASH**<sup>®</sup> Stunning Tools and Cartridges

	.22" range			.25" range			
	<b>CASH</b> <sup>®</sup> Special Concussion	<b>CASH</b> <sup>®</sup> Special	<b>CASH</b> <sup>®</sup> Magnum	<b>CASH</b> <sup>®</sup> Special Concussion	<b>CASH</b> <sup>®</sup> Special	<b>CASH</b> <sup>®</sup> Magnum	<b>CASH</b> <sup>®</sup> Magnum Concussion
For small lambs and kids	 Brown	 Brown	 Brown	 Pink	 Pink	 Pink	 Pink
For other lambs and kids	Pink	Pink	Pink	Pink/Yellow	Pink	Pink	Pink
For ewes	Pink/Purple	Pink	Pink/Purple	Pink/Yellow	Pink/Yellow	Pink/Yellow	Pink/Yellow
For rams	Purple	Purple	Purple	Yellow	Yellow	Yellow	Yellow
For goats	Purple	Purple	Purple	Yellow	Yellow	Yellow	Yellow



# How captive bolt stunning works

The following sections explain the mechanism and science behind the process of stunning animals using cartridge powered captive bolt.

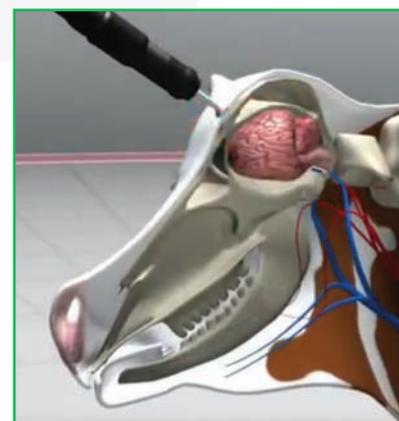
## Mechanism of the cartridge powered captive bolt

- A blank cartridge contains chemical energy in the form of an explosive propellant. This is the energy source for a cartridge powered stunning tool. The propellant is ignited when a firing pin strikes the rim of the cartridge
- The propellant burns within the cartridge which creates expanding gases to push the captive bolt forward at high speed
- The performance of a captive bolt stunning tool is measured by calculating the amount of energy transferred to the moving bolt, the formula for which is -  $E_k = \frac{1}{2} mv^2$  (where  $E_k$  is the kinetic energy carried by the bolt,  $m$  is its mass and  $v$  is its velocity)



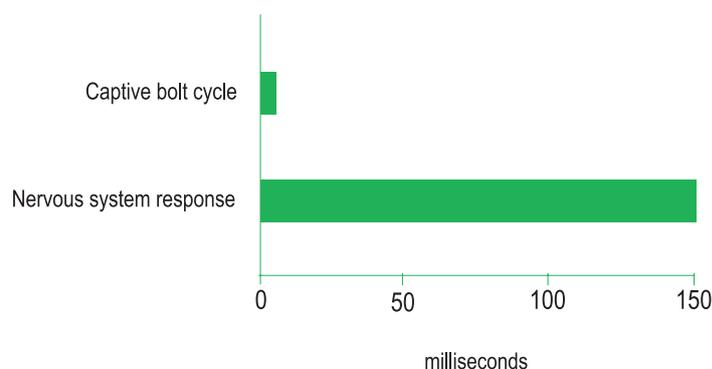
## The effect of the impact of the captive bolt on the animal

- The fast moving bolt impacts the skull.
- The skull is accelerated and the brain, which is floating in fluid, responds fractionally later
- The rapid variations in pressure cause shearing forces in the brain and causes massive disruption of brain activity
- This disruption concusses the brain and causes a stunned state
- Both penetrating and non-penetrating bolts are equally effective for stunning an animal



## Effectiveness of captive bolt stunning

- It takes approximately 150 ms (milliseconds) between a painful stimulus and perception of pain by the brain
- The full cycle of a captive bolt takes approximately 1.2–1.5 ms
- The concussion by a captive bolt takes place significantly faster than the time taken by the brain to feel the application
- The animal is stunned before it can realise that it has been subjected to a stunning procedure



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