RESTRAINT PRIOR STUNNING AND MECHANICAL STUNNING OF CATTLE
RESTRAINT OF CATTLE
METHODS OF RESTRAINT

• Simplest methods are
  - use of head collar
  - halter
  - neck yoke
  - cradle (calves)

• Restraint box

• Forbidden methods are specified in OIE Chapter 7.5
FUNCTION OF RESTRRAINING BOX

Minimise poor slaughtering and protect welfare:

• Prevent an animal from moving
  - forward and backward
  - to sides

• expose head and stabilise for stunning procedure

• In some cases block the visual stimuli

• Keep stress level to a minimum

• Protects operator
MOVING TO THE RESTRAINING BOX

- Entrance to the restraining box – critical point in terms of handling of cattle
- Important in audits
- Has to be very well designed
- Experienced handlers
- In the best practices - animal must enter the box willingly
- However at many large throughput plants active handling is needed
SUGGEST WHY MOVING CATTLE TO THE RESTRAINING BOX IS POTENTIALLY MORE DIFFICULT THAN HANDLING ELSEWHERE

It's QUESTION TIME!!
KEY PROBLEMS

Usually it is a break point between:

- outdoor and indoor area
- quiet and noisy environment
- bright and dark
- area where cattle are still in the group and area where one animal is forced to enter alone
- different floor structures
- Sometimes looks like dead end
HOW TO MAKE SITUATION TO CATTLE EASIER

• by keeping noise around the box area to the minimum
• designing stunning box way that creates an impression of “passing through” area
• installing diffuse light above the stunning box
• putting false floor (same as floor in the box) cca 1,5 m before the entrance to the box
DESIGN BOX WAY THAT CREATES AN IMPRESSION OF “PASSING THROUGH” AREA
APPROPRIATE LEVEL OF DIFFUSE LIGHTING IS AN ESSENTIAL
CATTLE HESITANT TO ENTER THE BOX
CATTLE ENTERS BOX
BOX DESIGNS

• Simple box
• Simple box with passive restraint
• Simple box with part-passive restraint
• Box with active restraint of head (and other parts)
SIMPLE BOX
VIDEO – RESTRAINT IN THE SIMPLE BOX
RESTRAINING BOX WITH FIXED AND MOVABLE SHELVES

A – Fixed slope positions body
B – Fixed shelf to prevent head going down
C – Moving part of neck yoke
D – Fixed part of neck yoke
RESTRAINING BOX WITH PART PASSIVE RESTRAINT – MOVABLE SHELVES OF THE NECK YOKE
BOX WITH AN ACTIVE RESTRAINT OF HEAD AND BODY
BOX WITH AN ACTIVE RESTRAINT OF HEAD AND BODY
RESTRAINING PRACTICE

- Animal must only be moved into the restraining box if operator is immediately ready to stun it and bleed it.
- Stunning only to be performed when an operator is ready to bleed the animal immediately.
- Restraining is highly stressful therefore animal must never be left in the restraining box waiting.
VIDEO – RESTRAINT IN THE SIMPLE BOX
UNACCEPTABLE PRACTICES
UNACCEPTABLE PRACTICES
VIDEO - RESTRAINT OF CATTLE
DEFINITION OF STUNNING

- Stunning is any intentionally induced process which causes loss of consciousness and sensibility without pain.
- Mechanical stunning equipment delivers blow to the head of an animal at 60-75 m/sec, stuns animal within 5-8 ms-1 (and makes nerves dysfunctional).
- Speed for sensory pathways to brain is 50 - 80ms.
HOW DOES MECHANICAL STUNNING WORK?

Work on road accident trauma shows that sudden head impact causes unconsciousness by:

1. immediately making long nerve fibres incapable of sending signals, which
2. disrupts complex neural relays sending signals between parts of the brain.

PURPOSE OF MECHANICAL STUNNING

• To render animal unconscious so it does not feel any pain (‘insensible’)
• To enable further safe and prompt killing of an animal while it is unconscious.
• Unconsciousness means animal cannot be aware of any peripheral stimuli, including pain
MECHANICAL STUNNING

• Mechanical stunning requires a delivery of energy to brain in order to affect immediate (temporary or permanent) dysfunction of the brain and so render insensibility
  – Delivery of that energy inside skull due to propagation of compression-rarefaction wave in cerebral fluid

• Sources of energy when mechanical stunning is used
  - gun powder or other explosives
  - compressed air pressure
  - compressed hydraulic pressure
TWO KEY ELEMENTS

• ENERGY OR ENOUGH POWER
  - Energy = kinetic energy that hits the brain

• CORRECT POSITION
  - Position where maximum impact can be expected
1. SUFICIENT KINETIC ENERGY

EC = \frac{1}{2} m V^2  \quad 120 \text{ KJ}

EC = \text{Kinetic energy (J)}

M = \text{Mass (g)}

V = \text{Velocity(m/s)}

1- Ec ?  \quad 2- Ec ?  \quad 3- Ec?

m=150 \text{ g} \quad m=150\text{g} \quad m=75\text{g}

v= 60\text{m/s} \quad v=30\text{m/s} \quad v=60\text{m/s}

270 \text{ KJ} \quad 67,5 \text{ KJ} \quad 135 \text{ KJ}
CORRECT STUNNING POSITION

PENETRATIVE STUNNING

NON-PENETRATIVE STUNNING
POSITION OF PENETRATIVE STUNNING GUN
POSITION OF CONCUSSIVE STUNNING GUN
CORRECT ANGLE
CAPTIVE BOLT STUNNING - PRINCIPLES
CAPTIVE BOLT STUNNING - PRACTICE
CAPTIVE BOLT - ATTRIBUTES OF CORRECT STUNNING

• Correct position of gun
• Correct angle
• Proper triggering followed by hit
• Animal collapses immediately
• Absent peripheral sensitivity
• Eyes straight ahead, no corneal reflex
• Body tremor, front legs tensed straight (extended) hind legs tucked up
• Animal then relaxes - no jaw tone and tongue lolling

!!!!! NO RHYTHMIC BREATHING!!!!
MONITORING OF UNCONSCIOUSNESS

IF IN DOUBT – RE-STUN IMMEDIATELY
CAPTIVE BOLT STUNNING – INCORRECT STUNNING

• Incorrect position of stunner on skull
• Stunning device misfires or insufficient velocity:
  – Wrong cartridge
  – Poor gun maintenance
  – Damp powder
• Animal does not collapse
• Eyes are rolled out
• Nystagmus – shaking of eyes !!!
• Standing kicking or escape behaviour

!!!!! RHYTHMIC BREATHING!!!!
BACK UP STUNNING
VIDEO – BACKUP STUNNING
CAPTIVE BOLT STUNNERS

Cartridge powered  Air powered

Penetrative  Concussive
CARTRIDGE POWERED STUNNERS
COMPRESSED AIR POWERED STUNNER

CONCUSSIVE STUNNER
160 – 240 psi
VIDEO – CAPTIVE BOLT STUNNING - PRACTICE
MAINTENANCE

• DAILY CLEANING
  - Clean barrel from inside and outside
  - Clean bolt
  - Clean recuperative sleeves and washers

• WEEKLY MAINTENANCE
  - Clean expansion chamber (carbon buildup)

• REGULAR SERVICING
  - replace sleeves, washers etc. before efficiency is reduced
THANK YOU FOR YOUR ATTENTION

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