

Stray Electricity

- Occurs as small voltage differences between
 - structure and the floor
 - structure and installed equipment
 - floor and equipment
 - or through liquids
- Voltage difference - current will flow
- Generally less than 10 volts

Cattle Responses

- Unexplained production drops
- Increased evidence of mastitis
- Elevated somatic cell counts
- Longer milking times
- Incomplete milk let down
- Nervousness while in the parlour
- Rapid exit from the parlour
- Reluctance to use water bowls or metallic feeders
- Altered drinking habits

Confusing Factors

- Mistreatment
- Uncomfortable stalls
- Milking machine problems
- Slippery floors
- Disease
- Sanitation
- Nutritional disorders

Body Resistance

- Cows more susceptible than humans
- Their bodies are better conductors of electricity
- 4 legs, spaced apart, wet conditions and no insulation
- The ease at which current can flow through a cow's body depends on which path it takes

Body Resistance

- Different individuals, either cows or humans, react differently to voltage differences due to their physiological makeup.
- Human resistance - 30 times that of COWS.

Causes

- Poor electrical connections
- Corrosion of switches
- Defective wiring
- Frayed insulation
- Faulty equipment
- Heavily loaded power lines
- Imported
 - from other buildings
 - or from other users

Causes

- Induction voltage
 - Unwanted/extra electrical cable wrapped in a coil around metal piping

Understanding the Problem

- Finding the cause is generally not simple
- different sources may act together and at different times
- on-farm and off-farm sources may act together and at different times.

Understanding the Problem

- Main earth wire and neutral connected at ESB's main fuse
- Therefore neutral is connected to the main earth and any bonding earth beside the parlour
- Neutral is also connected to earth at the transformer and at certain ESB poles

Understanding the Problem

- A voltage difference can occur between the ends and various parts of the neutral along its path between the milking shed and the transformer
- The voltage difference becomes distributed over the ground surfaces around the transformer and around the milking shed
- Resulting in voltage differences between different parts of the shed.

Voltage Drop

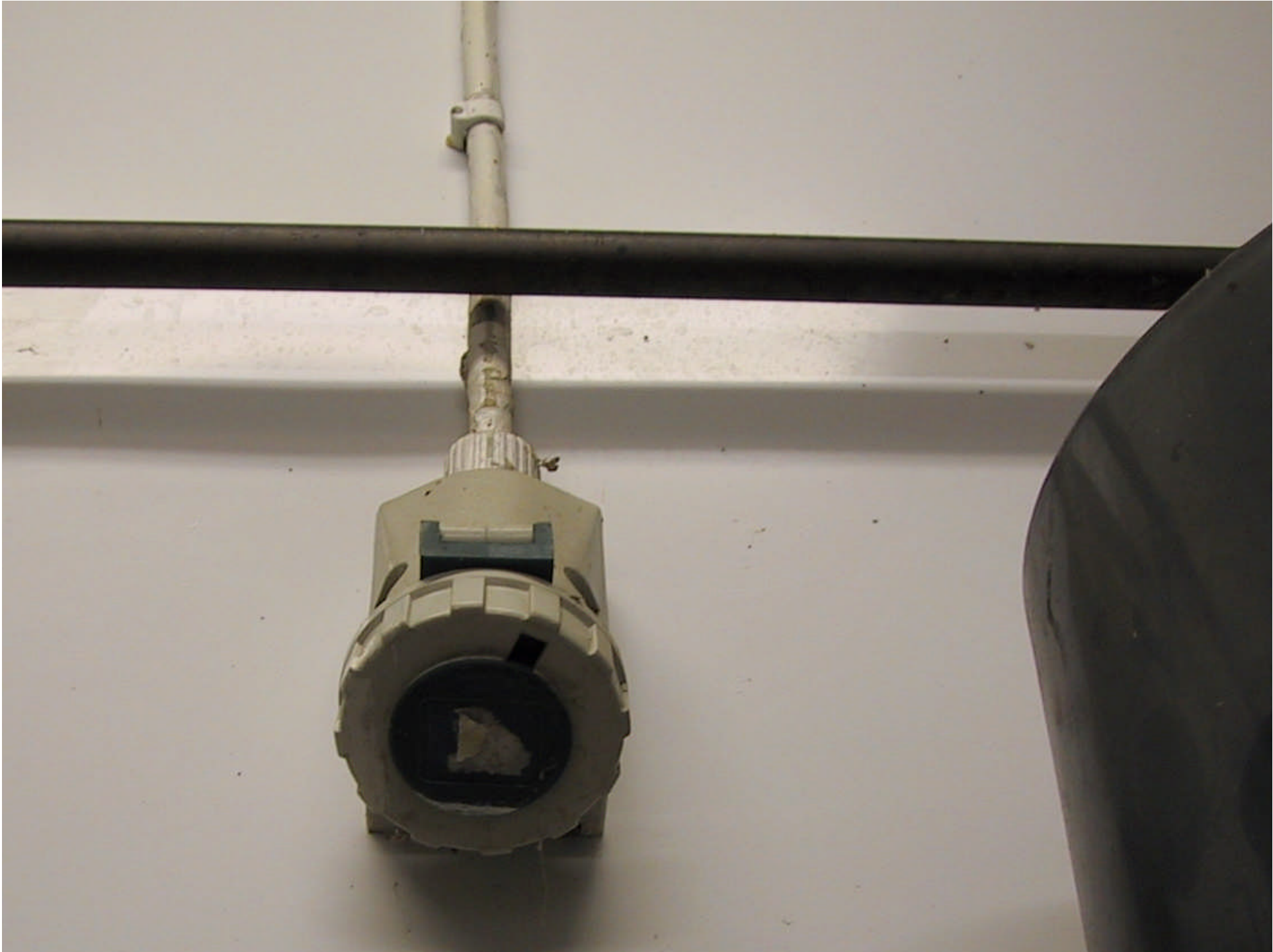
- Voltage drops when the electrical load is heavy
- About 5% is acceptable - above 10% is not
- Causes
 - load on transformer too much
 - cables too small
 - or transformer too far away from the parlour

Voltage Drop

- Shortens the life of electric motors
- Can lead to stray electricity - because
 - various items of electrical equipment with different loads gives rise to different voltage drops in the cables supplying
 - This causes neutral to earth voltages leading to stray electricity.

Preventing or minimising Stray Electricity

- A high standard of electrical installation
- Comply with the ETCI rules
- Engage an electrical contractor - RECI approved
- ESB booklet “Farm Well...Farm Safely” and information pack
- Maintenance
- No temporary makeshift repairs





vynckier FIX-O-RAIL IP55-6



	1	2	3	4	5	6	7	8	9	10	11	12
1					5				9	F	Mik / Dulsator	
2					6				10	L	Rino	
3					7				11	C	+ Sockel	
4					8				12	B		

Equipotential Bonding

- Connect all metallic cow and milker contact objects in the parlour and the dairy together to form an equipotential cage
- Independently connect each major object to a bonding busbar
- Use “4 square” (4mm² cross-sectional area) earth wire (green/yellow PVC coated)

Equipotential Bonding

- Use special non-corroding bonding straps
- loop the wire from item to item
- Connect busbar back to the earth in the distribution board
- Bonding is only as good as the soundness of the electrical connections
- Dirty metal or corrosion will not allow small currents to pass through the connection

Equipotential Bonding

- 10mm² earth wire from busbar to earth rod
- Earth rod with a non-corroding secure attachment
- Metal grid in standings and pit
 - Use A142 mesh - within 40-50mm of the surface
 - Extend the mesh as far as possible into the yard
 - Turn mesh down into the ground at 45⁰

Equipotential Bonding

- ETCI - supplement to section 705
- New installations
- Existing installations
 - new floor screed
 - copper wires in slots in floor

Electric fence controllers

- No electric fence controller in or near a dairy, milking parlour or any livestock buildings
- Separate earth at least 10m away from ESB poles, the parlour earth and the main earth
- Never locate the fencer earth between protective earths

Electric fence controllers

- Using a number of earth rods and locate them in damp ground
- Fix up any shorts around the farm
- A short may bring a high voltage to the fencer earth
- If the fencer earth is inadequate or is too near other earths, this voltage may end up in the parlour

Detection Procedures

- Wet floor
- Switch on all electrical equipment
- Measure AC voltage between wet floor and rump rail, pipeline, feeders and other conductible metal objects
- Measure AC voltage between a neutral wire and an earth wire
- Voltage greater than 0.75 V AC indicates a possible problem

Detection Procedures

- Switch off each item of equipment to see if the voltage is reduced
- Disconnect the live by removing each fuse or switching off each MCB in turn to see if the voltage is reduced
- If voltage remains ask the E.S.B. or your electrical contractor to investigate the problem further
- Loop impedance test