

# FENCING HANDBOOK



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Traditional Fencing

Steps to constructing a conventional fence:

1. Plan your fence
2. Erect strainer assemblies
3. Lay out and install line posts
4. Run out and strain the wire
5. Attach the wire to posts

1.1 Fence Plan/Design

As there are a number of different options, planning your fence will allow you to decide what materials are required and what quantity.

The first step is to measure the length of the fence so the quantity of materials can be calculated. When deciding upon materials take into account contour of the land, erosion and soil type, fire risk and coastal exposure, livestock, life span required and budget.

Key fence components are strainer assemblies, line or intermediate posts and droppers, wire (prefabricated, plain or barbed) and gates.

The proposed fence line should be cleared of any obstructions prior to any fence construction.

1.2 Strainer Assemblies

Strainer assemblies also known as “end assemblies” are the most important part of the fence as they take the tension of the wire and eliminate any fence movement. Strainers are required at the end of each fence line, gateways, corners and changes in fence direction, at the crest or hills and bottom of gullies.

Strainer assemblies may also need to be included at intervals in long fences over flat ground. Strainer posts must be stayed for each fence line it is connected to, so that the fence does not pull the post over.

Strainer assemblies can be wooden, steel or concrete.

**WOOD** – select timber, preferably local, that is durable in the ground. Treated timber is light and easy to cut to length and is resistant to rot and termites.

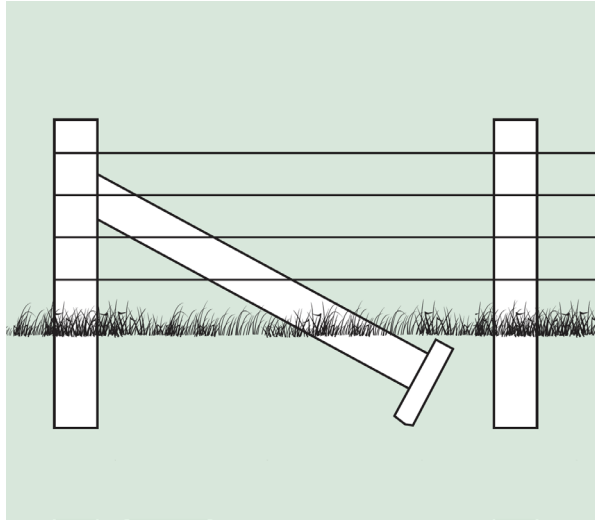
**STEEL** – suitable for high fire risk areas, susceptible to rust and corrosion particularly in coastal areas and acidic soils. However galvanised options are available and will extend the life of the post and are becoming increasingly popular.

**CONCRETE** – usually more expensive but are strong and durable. Care needs to be taken as they can crack when overstrained.

Hint

Planning the design and layout of your fence is the key action prior to beginning construction.

The two main strainer assembly designs are the angle/diagonal stay and the box/horizontal assembly.

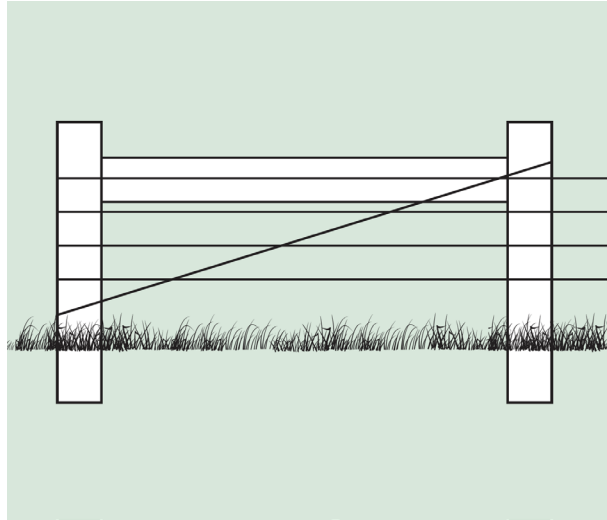


#### Angle Stay

Suitable for firm soil and high tension straining.

Consists of a strainer post, stay and stay block.

The top end of the stay is connected to the strainer post. The bottom end is inserted into the ground onto a stay block to prevent sinking



#### Box Assembly

Suitable for soft ground and high strains.

Consists of a strainer post, stay post, horizontal post and diagonal wire brace.

The wire brace goes from the bottom of the end post to the top of the stay post.

#### Hint

As strainer assemblies are like the foundations of a house they need to be spot on.

### 1.3 Posts and Droppers

Line posts are set at regular intervals between strainer assemblies and are used to guide the line of wires and to provide additional support. Like the strainer assemblies, line posts can also be wooden, steel or concrete. The type of line post selected will depend on what you are trying to fence in and what life span you require from the fence. Different materials can be used in combination if suitable.

The number of posts required is determined by the fence length (distance between strain assemblies) divided by the interval between line posts. Post intervals will be dependent on livestock type and stock pressure.

A suspension fence can be used as an alternative to using close interval posts and is best suited to flat country. This is where the line posts are set further apart and droppers are used in between line posts to maintain fence integrity and help spread stock pressure from a single wire, to all wires in the fence, reducing the risk of overloading and subsequent wire breakage

Droppers are made from wood, steel, fibreglass or plastic.

#### Installing Posts

To ensure the fence is as straight as possible it is recommended a sight wire be strained close to the ground between the end assemblies. Using this sight wire as a guide lay line post at predetermined intervals along the fence line.

Wooden or concrete posts will need holes to be dug or a mechanical driver can be used. Steel Y shaped posts can be driven direct into the ground using a post driver.

#### Hint

If using steel Y shaped post ensure the sides with holes are all facing the same way making it easier to attach the wire.

## 1.4 Wire

There are three types of wire that are commonly used and again are dependent on what you are trying to fence in. These wires also have different variants within their type.

- Plain
- Barbed
- Prefabricated

### Plain Wire

Standard galvanised wire is suitable for most fences and has a single coating.

Heavy galvanised wire with its thicker coating is more resistant to corrosion and should be considered in higher rainfall and coastal areas.

Low tensile wire (soft wire) is used in most conventional fences with close spaced posts. Thicker wire should be used in higher pressure situations.

High tensile wire has a higher breaking strain providing more strength to the fence and suitable for high pressure situations, longer fence strains and wider post spacing's.

High tensile requires more accurate straining and are more difficult to handle and knot than soft wire.

#### Hint

The thickness (gauge) and tensile strength of the wire required is dependent on the pressure situation on the fence.

### Barbed Wire

As with plain wire, barbed wire can be standard or heavy galvanised, low or high tensile.

High tensile barbed wire is made from high tensile wire in a reverse-twist pattern providing optimum strength and tensioning.



Low tensile barbed wire is made from low tensile wire in a continuous twist pattern. It is easier to handle than high tensile with greater fire resistance making it suitable for fire prone areas.



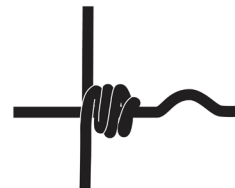
### Prefabricated Wire

Prefabricated wire consists of picket (vertical) wires attached to line (horizontal) wires. The picket wire acts as a dropper providing support and strength to the fence.

Ringlock uses single, continuous picket wires attached to the line wires by steel rings. Resists high stock pressure and suitable for long spans and suspension fence designs.



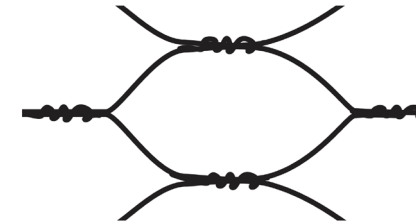
HINGEJOINT - individual picket wires are wrapped around the line wires. Resists high stock pressure and suitable for long spans and use over undulating country and through gullies.



#### Hint

Using Pre-Fabricated wire will reduce the amount of time it takes to erect a fence therefore is a very cost effective option.

NETTING - soft wires are woven into a hexagonal mesh. Suited to lower pressure applications or for use as an apron at the bottom of a fence for a barrier in feral animal control.



Prefabricated wire comes in various sizes. Ringlock and hingejoint wire size is indicated as e.g. 7/90/30 – 7 line wires;

90cm fence height; 30cm picket spacing's.

Netting wire size is indicated as e.g. 90/4/1.4 – 90cm fence height; 4cm mesh spacing; 1.4 wire diameter.



### Straining Wire

Once end strainer assemblies and line posts have been installed, the wires can be rolled out, strained and attached.

1. Tie off the wire to the strainer assembly and roll out the wire to the next strainer assembly.
2. Using wire strainers to attach the wire to the second strainer assembly. Two options are available. Firstly you can secure the wire to both strainer posts leaving enough slack to cut the wire and strain it away from one of the strainer posts then rejoin the wire with an appropriate knot. Alternatively you can strain the wire directly off a strainer post using a separate short length of straining wire with the knot being tied close to the strainer.

Wire should be strained to the tension recommended by the manufacture. Under or over strained wire will reduce the fences potential life span and increase ongoing maintenance requirements. A tension measuring tool should be used to ensure wires are strained to the recommended tension.

### Joining Wire

Various knots can be used to secure wire. Two common knots are the figure eight and the double loop (pictures).

*Figure eight – join plain wires of the same gauge*



#### Hint

The most effective way to join wires is to use a Gripple – this will take away the need to use a knot and will give the fence greater strength.

*Double loop – joining barbed wire and quick repairs.*



However the safest, best and most professional way to join wires is to use gripple fasteners. Wires are fed from opposite ends through the gripple and then secured using a gripple tensioning tool. Use of a gripple will allow restraining at a later date if required. Gripples are not recommended for use with barbed wire.



### Attach to Posts

Once the wire has been strained it can be attached to the line posts.

To attach the wire to wood posts use barbed staples. For steel posts use tie wire or post clips put through the hole in post and twist around wire. Threading the wire through the holes on the post should be avoided as this can remove the galvanised coating on the wire making it more susceptible to corrosion.

Fence droppers can now be installed where required using the recommended clips.

### 1.5 Gates

Gates allow livestock, vehicles, machinery and people to move in and out of paddocks, leaving the paddock secure once the gate is closed. When planning your fence and installing your strainer posts ensure sufficient room is allowed for the gate and allowance on either side.

#### Swinging a gate

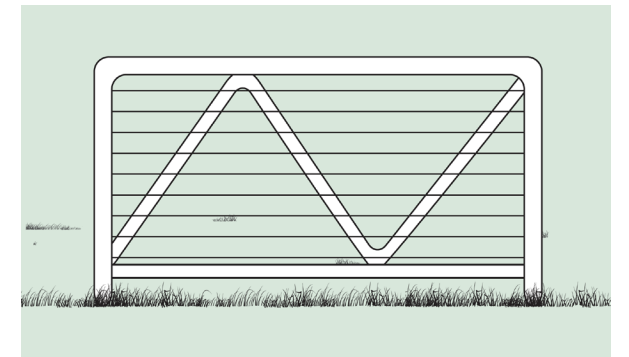
1. Place the gate on a set of blocks evenly between the two strainer posts. Temporarily secure with wire.
2. Attach gate hinges to the strainer post and gate.
3. Attach gate fastener to opposite post to allow gate to be secured when shut.

Numerous options of gate hardware are available to suit varying requirements.

Gaps between the gate and post should be sufficient enough for the gate to swing smoothly but prevent small livestock from getting through. A gate should not drag on the ground and ideally open both ways.

#### Hint

The size of the gate is dependent on your requirements, but a good measure is it should be wide enough to fit through your widest bit of machinery.



# Electric Fencing

## Why use electric fencing?

Electric fencing provides a number of benefits. It is:

- Effective in animal control and pasture management
- Cost Effective
- Easily constructed and maintained
- Easily modified to suit requirements
- Light weight and easy to construct
- Long-lasting due to low physical contact from animal leaning on fence

## How electric fencing works

Electric energy from an energiser is pulsed along a fence wire. When an animal touches the electrified wire it completes the circuit resulting in an electric shock to the animal. This shock is memorable so that the electric fence becomes more of a psychological barrier rather than a physical barrier.

## Types of fencing

There are two types of electric fences, permanent and portable.

Unless a temporary or removable fence is required a permanent electric fence is recommended. Permanent fences are economical, easy to install and operate.

Portable fences are suitable for short term animal control and rotational or cell grazing.

### Hint

When comparing energisers, use output energy as the basis for your comparison.

## 1.1 Energisers

### Types of energisers

Selecting the right energiser for your fence is the key ingredient to achieving the best performance. When choosing your energiser you need to consider the fence length, area to be fenced, number of wires and vegetation load.

There are 3 types of energisers to choose from:

1. Mains energisers are connected to a mains power supply. Most costeffective and reliable.
2. Battery energisers are usually powered by a 9 or 12V battery. Suitable for portable fence and when mains power is not available.
3. Solar powered energisers use a solar panel to convert light into electricity which is stored in a battery used to power the fence. Suitable for permanent or portable fences in remote areas where mains power is not available.

Energisers will have 2 energy determinants – stored and output energy.

**STORED ENERGY** - the amount of energy stored in the energiser. The higher the stored energy the more powerful the energiser.

**OUTPUT ENERGY** – the amount of energy that is delivered to the fence from the energiser.

## 1.2 Earthing

The earth is half of an electric circuit. The type of earthing system selected will be dependent on the soil conductivity and fence location. Location for an earthing system:

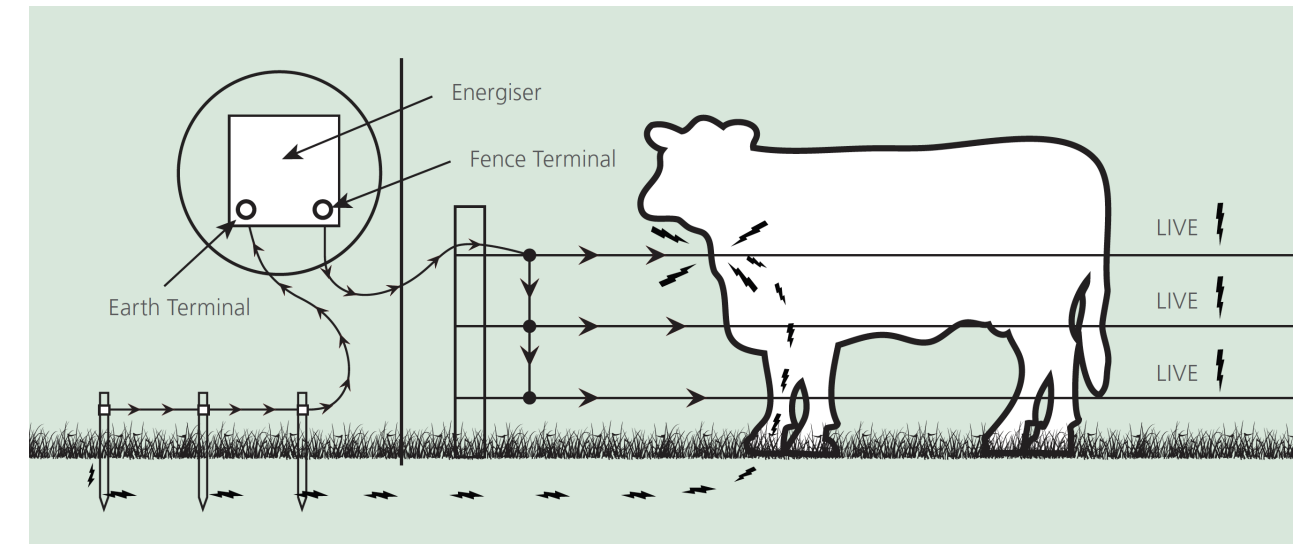
- Located in damp, high mineral soil
- At least 10m away from any other earth system (telephone, house mains power)
- Protected from livestock or machinery damage
- Accessible for maintenance

High powered energisers and dry soil will require more stakes compared to low powered energisers and wet soil.

Information supplied with your energisers will provide the correct number of earth stakes to use. Earth stakes should be 2m in length, 3-4 meters apart and connected by one insulated cable.

**All Live System** – suited for moist soil that is conductive.

When an animal standing on the ground touches the fence the circuit is completed and the animal gets a shock.

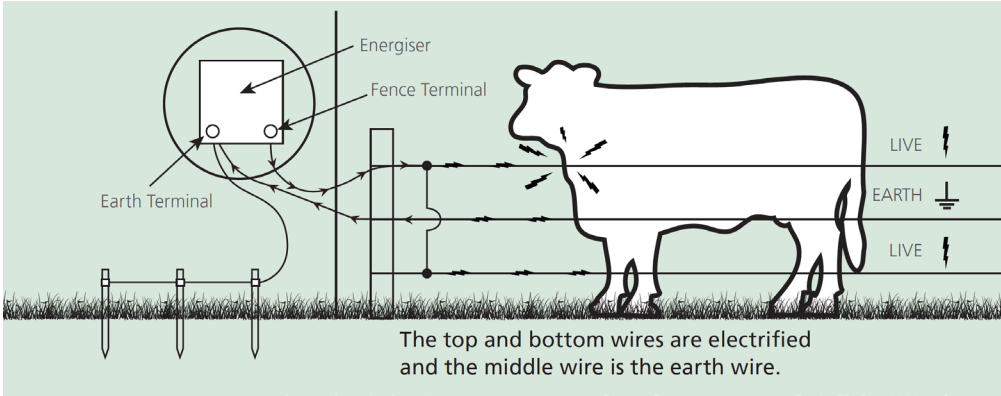


### Hint

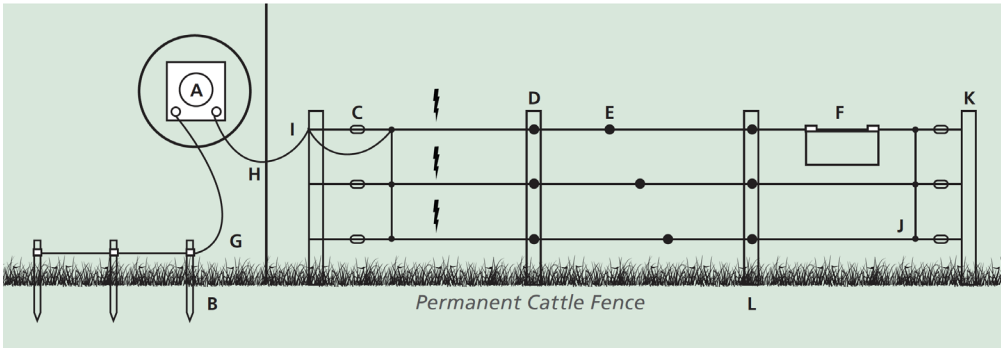
The number of earth stakes required for your earthing system will be dependent on the power of the energiser and soil type.

**Earth Wire Return System** - suited for dry or sandy soils that is not conductive.

The fence contains both electrified and earth wire. When an animal touches both a live and earth wire at the same time the circuit is completed and the animal will receive a shock.



1.3 Permanent Electric Fence



- |                    |                  |                  |                |
|--------------------|------------------|------------------|----------------|
| A Energiser        | D Post insulator | G Green          | J Joint clamps |
| B Earth stake      | E Wire tightener | H Lead Out       | K Strain post  |
| C Strain insulator | F Warning sign   | I Cut out switch | L Line post    |

Hint

4,3,2,1 Earthing rule – earthing stakes 4 metres apart, at least 3 stakes, 2 metres long and connected by 1 continuous wire.

Leadout

The leadout wire/cable connects the energiser to the fence and can be installed either underground or overhead. A leadout should have as little resistance as possible to maintain the voltage between the energiser and the fence. The length and the diameter of the leadout will affect the resistance. Longer distance and thinner wire are more resistant.

Strainer Assembly

Angle stay and box assemblies outlined on page 4 can be used for a permanent electric fence. Wooden strainer posts are the most suitable for an electric fence. Choose the strainer assembly that will best suit your ground conditions and fence type.

**Angle stays** are suitable for multiple wire fences, firm ground, medium/high tension fences and gates.

**Box assemblies** are suitable for multiple wires, soft ground, high tension straining and gates.

Posts and Droppers

Line posts are set at regular intervals between strainer assemblies and are used to guide the line of wires and provide additional support. The number of posts required is determined by the fence length divided by the interval between line posts. Post intervals will be dependent on amount of wires and wire type.

Wood, steel and fibreglass post are all suitable for permanent electric fences.

Wood and steel posts are strong, rigid, highly visible and easy to insulate. Fibreglass posts are lightweight and flexible and require no further insulation.

Hint

Electric fencing systems invariably grow over time to meet changing conditions, so select an energiser that will power the final system.

Droppers for electric fences can be wood, plastic or fibreglass and are used to maintain wire spacing between posts that a spaced further apart.

Wire

High tensile wire is best suited for permanent electric fences. It retains tension for longer reducing sag and potential faults. Barbed wire should not be electrified.

Fence Connections

**Cut out switches** are used to isolate sections of electric fence. A cut out switch should be installed at gateways or junctions where fence lines can be turned off.

**End strain insulators** are used to connect wire to the strainer assembly.

**In-line wire strainer** used to strain the fence wire and maintain tension.

**Post insulators** connect wire to line posts. Plastic and porcelain insulators with various connection options are available for wood and steel posts.

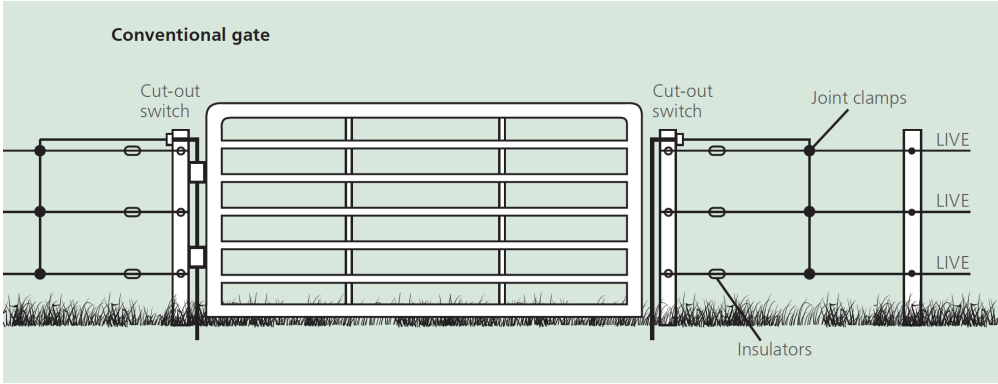
**Joint clamps** are used to make permanent connections between wires. Used to interconnect all wire lines at the beginning of the fence and join to the cut out switch/leadout wire.

**Flexible connectors** used on bottom wires allow easy disconnection from live wires when vegetation growth is high.

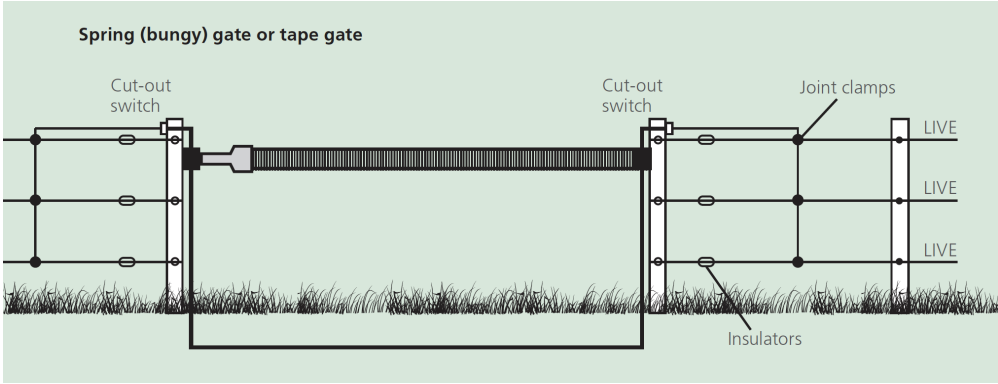
**Offsets** connected to the existing fence and a live wire is used. Allows existing conventional fences can be electrified to protect the fence from pressure of livestock and extend the life of the fence. Numerous offsets are available with options that connect to post or wire.

Gates

**Conventional gates** use double insulated cable to transfer power (and earth return if applicable) underground by-passing the gateway. Use cut out switches and joint clamps to connect wire at each side of the gate.



**Electrified gate** various electrified gates kits are available including spring, tape and bungy with all components necessary to construct a gate included.

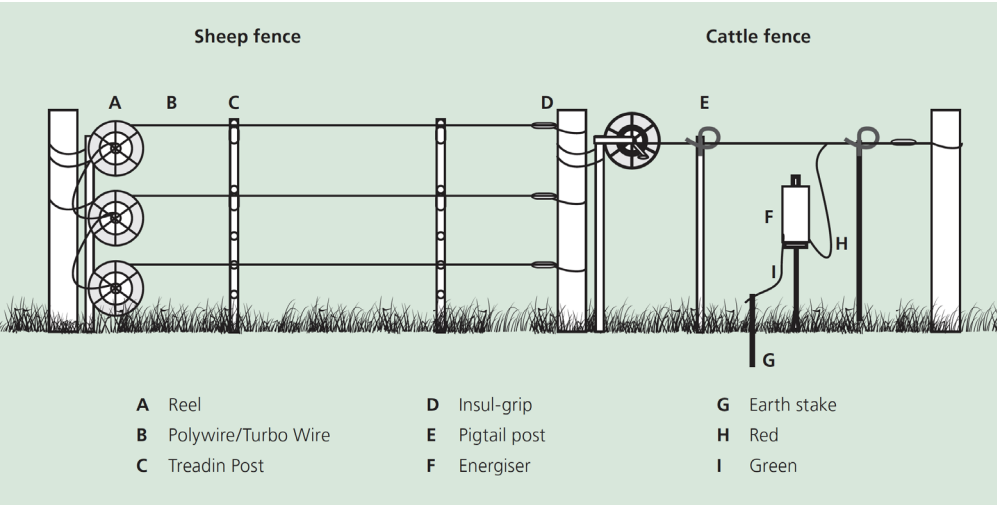


Hint

In main traffic areas add a high visibility flag to bungy gates for oncoming traffic.

1.3 Portable Fence System

Temporary or portable electric fence systems are easy to construct, versatile and suitable for creating temporary paddocks for short term animal control and used for rotational grazing.



Energisers are usually battery or solar powered allowing setup if a mains power source is not available. The energiser will need to be connected to an earth stake inserted in the ground.

When temporary fencing for cattle, use a single wire and pigtail treadins to mount the wire between end posts. Temporary fencing for sheep will require multiple lines of wire/tape and use plastic treadin posts.

A range of polywire, tape, braid and rope are available with different widths and conductivity to suit your fence requirements.

Reels are used to dispense wire and lock tension. They can be connected to a stand or existing fence line. Insulated hooks are used to secure the wire to an anchor point and the end of the fence.

Hint

Check fence voltage using a digital volt meter.



## Repair and Maintenance Tips

Fences can be damaged by a range of factors including, flood, fire, corrosion, rot, termites, machinery, livestock, falling branches/trees. When damage does occur, repairs should be completed as soon as possible to ensure fence integrity.

Common repairs include:

**Broken wires** – should be rejoined using a suitable gripple or knot and then restrained.

**Damage to wooden posts** – can be completely replaced with new treated timber post or a steel post can be used to support the wooden post.

Damage to steel posts – if effected by corrosion the post should be replaced with a galvanised post to improve life span.

**Strainer post movement due to failure of stay** - If the strainer post is still sound a new stay can be installed and the fence wires restrained.

## Electric Fence Fault finding

Faults in an electric fence can reduce its effectiveness and may be caused by:

- Vegetation touching the wires
- Broken wires or insulators
- Poor earthing
- Poor connections
- Poor insulation

Faults can be detected by using a digital fault finder or a digital voltmeter.

A fault will show up as an abnormally high reading or a sudden reduction in current between one point and the next indicates a fault between two points. Move backwards in the direction of the lowest reading to locate the fault.

Space to plan traditional fence.

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## Space to plan electric fence

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## Notes

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