

PRACTICE NOTE

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INTRODUCTION

Forestry Commission Bulletin 102 *Forest fencing* provides deer fence specifications together with guidance on fence construction and maintenance. The specifications given in *Forest fencing* are also to be found in British Standard 1722 Part 2.

Well maintained fences, constructed to the recommended specifications, provide an effective barrier to deer. However, the costs of these fences can be high. The components of a fence, the netting, line wires and posts together account for approximately 50% of the initial establishment cost of a fence. The cost of each component is related to the amount of raw material used in its manufacture. For example, with wire netting the larger the mesh size and the thinner the wire used, the cheaper the cost per roll.

Recent research work, largely funded by MAFF, has been aimed at reducing costs without compromising efficiency. The minimum requirements for the criteria of height, wire spacing (mesh size), strength and durability were determined separately for fallow, roe and muntjac deer. The effect of adding repetitive high voltage electric pulses along a fence was also investigated. At the same time, the opportunity was taken to investigate, and where practical, develop new materials. The recommendations resulting from this work are given in this Note.

DEER BEHAVIOUR AT FENCES

The expected behaviour of deer when meeting a fence varies by species and determines the type of fence structure required. Roe and fallow deer approach a fence in a consistent and measured way. Bucks will walk up to the fence, measure the height by eye and, if able, jump over. They do not attempt to push through. Females (does) of those species will, again at walking pace, test a fence by prodding and pushing with their head to seek a way through or under. Only if they are unable to pass through or under will they attempt to jump over.

Muntjac of both sexes will search for a way under a fence before attempting to push through. If they fail they will attempt to jump over. Muntjac have been observed jumping 1.2 m over a fence from a fast walking pace.

NEW MATERIALS

Netting

Two new patterns of wire netting, a 1.5 m high tensile hinged joint deer netting (code A 15/1550/150, Figure 1), and a lightweight hexagonal mesh netting (Figure 2) have recently become available. High tensile plastic mesh netting (Figure 3) is also available for fencing, and offers a number of potential advantages:

- It can be made in a range of mesh sizes, strengths and colours.
- It is lightweight, 100 m of 1.5 m wide netting weighing 12.5 kg (*vis-à-vis* 126 kg for 1.5 m wide high tensile wire netting) but is strong enough to be tensioned.
- It can be re-rolled after initial erection and offers the possibility of recovery and reuse. In consequence, it has potential where there is a *short-term protection* requirement, for example, on some restock and coppice sites.



Figure 1 Staplelok post and light HT wire mesh



Figure 2 Lightweight hexagonal mesh netting

Line wires

Both hexagonal mesh wire netting and high tensile plastic mesh require supporting line wires, but as both are relatively lightweight a 2 mm diameter wire can be used instead of the standard 2.64 mm diameter spring steel fencing wire. Fencing wire of 2 mm diameter (zinc-coated to BS EN 10244-2) is currently available only in high tensile steel but may be manufactured as spring steel fencing wire in the future.

The 2 mm diameter wires can be joined by knotting or twisting, but this reduces the strength of the wire by at least one third. A crimped sleeve wire joiner (Figure 4) will join two ends without reducing the overall tensile strength; in fact, the actual join is stronger than the wire.

Posts

The recommendations in *Forest fencing* and the British Standard require that straining post assemblies and corner posts be permanent structures and thus do not lend

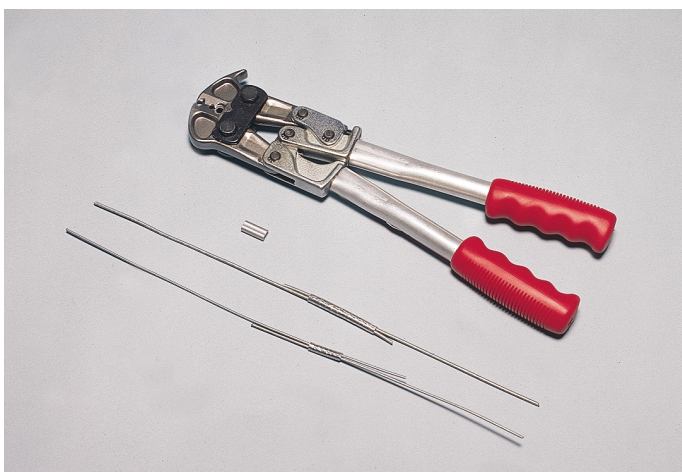


Figure 4 Hayes Crimp Sleeve HC2 and H550 crimping tool



Figure 3 High tensile plastic mesh netting

themselves to being recovered and reused at a reasonable cost. Accordingly we have designed and tested two new support systems using metal posts. One is based on the box strainer principle (Figures 5 & 6) and the other on the more conventional strutted post (Figure 6). These designs offer straining post assemblies that can be erected in less than 30 minutes without the need to dig holes. The only tools required are a hand-held post driver, wire cutters and spanners. All the materials for a straining post assembly together weigh less than 20 kg, and are easily carried. In addition, a straining post can be dismantled for reuse in less than 20 minutes.

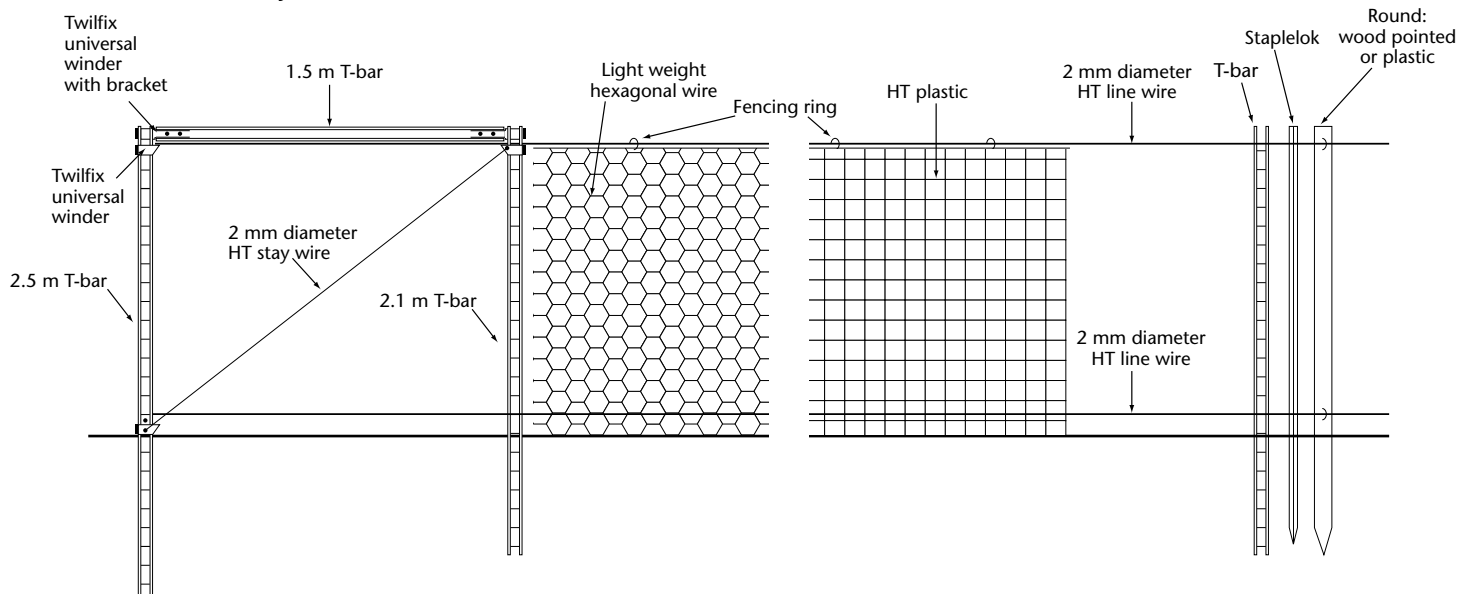
Intermediate posts/stakes may be of wood, pointed, with or without preservative treatment, or made of metal (Figure 6); all may be driven using a hand-held post driver. Both treated wooden stakes and metal stakes are easily recovered for reuse. An alternative design of stake using recycled plastic is currently being developed.



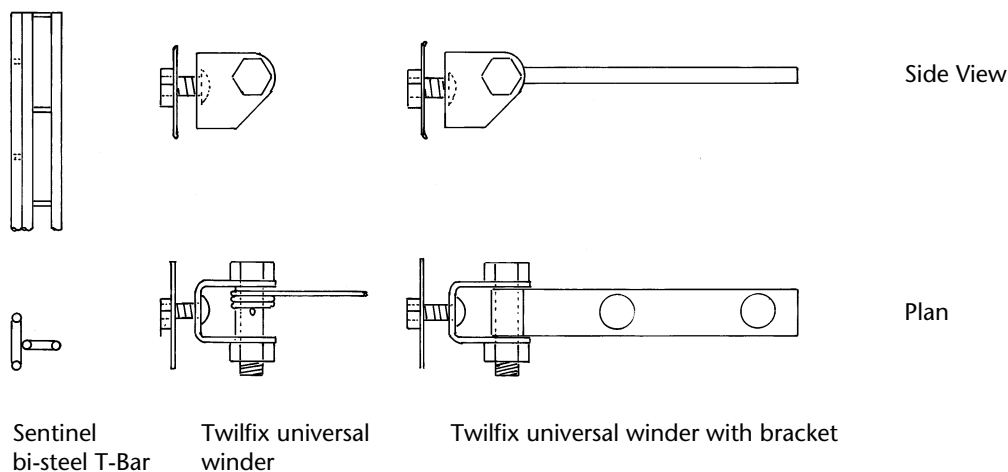
Figure 5 T-bar box section

Figure 6 Fence components (not to scale)

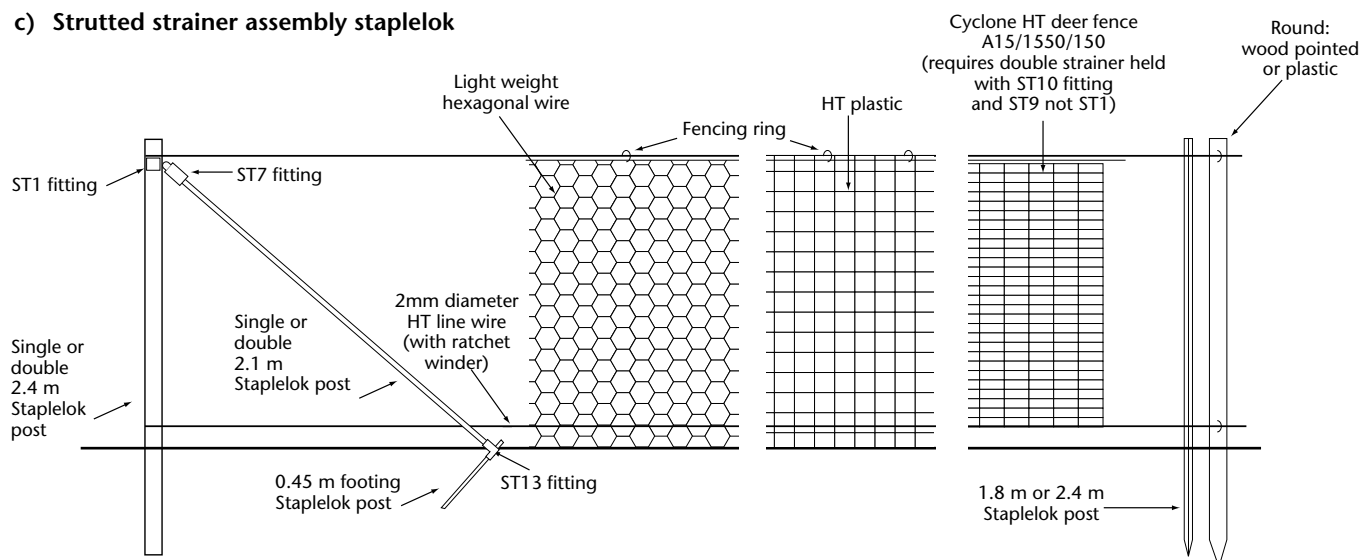
a. Box Strainer Assembly T-bar



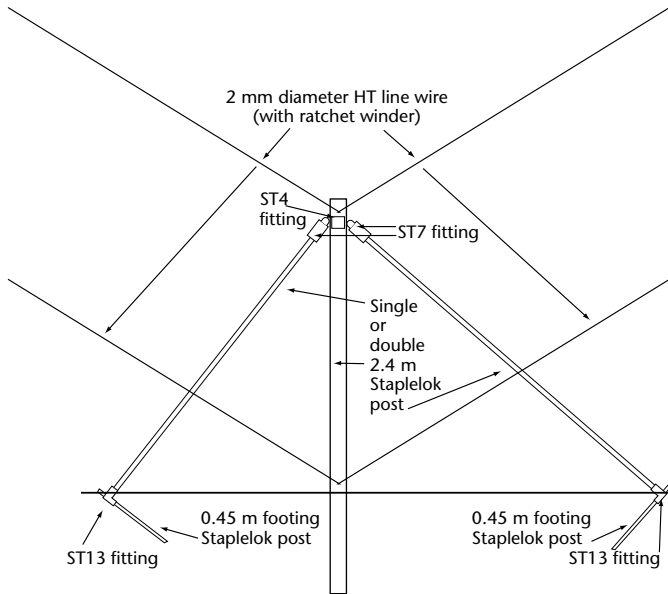
b) Box strainer assembly components



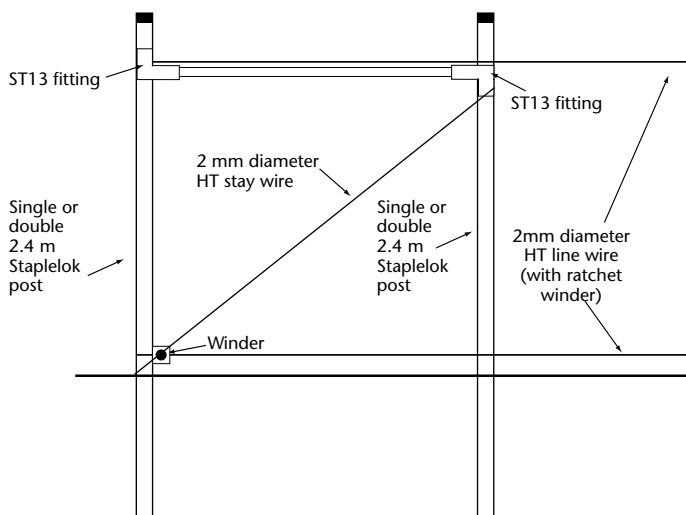
c) Strutted strainer assembly staplelok



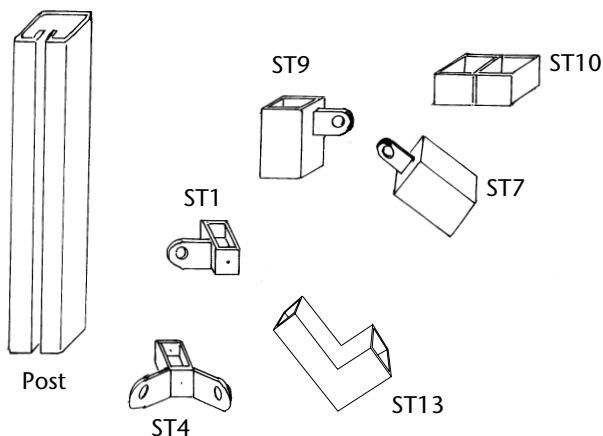
d) Corner post assembly



e) Box strainer assembly



f) Strainer assembly components (Staplelok)



Anchors

Metal disc ground anchors which are used to hold fences down into dips and gullies have been unavailable for a number of years. However, there is now a small anchor on the market (Figure 7) which is ideally suited to securing fences of these lightweight materials.



Figure 7 Ground anchor and tool

Gates

Gates using T-bars and welded rolled-top security fence panels have been designed into the fence (Figure 8). Such gates can be made in a range of sizes to allow pedestrian or vehicle access.



Figure 8 Rolled-top gate hung on T-bars

AMENDMENTS TO CURRENT SPECIFICATIONS

The following recommendations for fallow, roe and muntjac fencing are made to supplement those in Bulletin 102:

- Fences with mesh netting make the most effective barrier provided the mesh sizes given in Table 1 are not exceeded.
- When fencing against muntjac the netting should be lapped 150 mm on the ground and pegged or turfed, as for rabbit fencing.
- Line wire fences (without mesh netting) are not fully effective even with tensioned spring steel wires at 150 mm spacing.
- The addition of an electric pulse adds little to the barrier effect of a line wire fence.
- The height of a fence should be determined by the height the deer can be expected to jump and by their need to be on the other side (Table 2).

Table 1 Maximum mesh sizes of fence netting

Species	Mesh size (mm)
Fallow	220 x 200
Roe	200 x 150
Muntjac	100 x 100 but 75 x 75 preferred for humane reasons*

* The head of an adult muntjac will pass through a 100 m x 100 m mesh but not the body. When the head is withdrawn there is a danger of the antlers becoming snagged.

Table 3 Component choice

Straining assemblies	Intermediate/stakes	Line wire	Netting
T-bar box or Staplelok strutted or Staplelok box or Wood post strutted	T-bar or Staplelok or round wood, pointed, treated or untreated	2mm high tensile 2.65 mm spring steel	Hexagonal mesh wire or A15/1550/150 or plastic mesh

Choose any one from each column. Note that A15/1550/150 can only be used in conjunction with a double Staplelok strutted straining post assembly and requires no line wires, and 2.65 mm spring steel wire can only be used with standard wood post and strut assemblies.

NEW FENCE SPECIFICATION FOR TEMPORARY AND REUSABLE FENCING AGAINST ROE AND MUNTJAC DEER

The new lightweight fence materials described offer the potential for specifying *temporary* and *reusable* fencing as well as permanent fencing. As a result they may be considered as an alternative to chestnut pale fencing and dead hedging (Technical Note 5/95).

Fences may be built to individual specifications, which can be drawn up using different combinations of components chosen from the range of materials listed in Table 3 and illustrated in Figure 6.

Practical experience of these new materials and fence specifications is limited to a few trial sites and therefore their performance in other woodland situations, particularly in the uplands, is untried. For this reason it is not possible to quote costs for these fences at this stage. However, it is expected that savings of 25–30% will be attainable, compared to the cost of more traditional post and wire fences.

Table 2 Minimum fence height

Species	Height (m)
Fallow	1.5
Roe	1.2 (for areas less than 2.5 ha)* 1.5 (for areas greater than 2.5 ha)*
Muntjac	1.5

* A general recommendation based on the need to jump over the fence and the ease to walk around the fenced area.

SUPPLIERS AND ASSOCIATED PRODUCTS

Cheshire Adhesives Tapes

New Road, Winsford, Cheshire CW7 2NN

- Fencetool model 110 and green plastic coated fencing rings (for attaching high tensile plastic mesh to line wires)

T.H.E Consultants Ltd

11 New Street, Lymington, Hampshire SO41 9BH

- Recycled plastic stakes

Centrewire Ltd

PO Box 11, Wymondham, Norfolk NR18 OXD

- Lightweight high tensile black plastic netting (55 m x 75 mm mesh)
- 2 mm diameter high tensile fencing wire

McArthur Group Ltd

Kelvin Way, West Bromwich, West Midlands B70 7LF

- Staplelok high tensile steel posts
- Staplelok staples.
- Staplelok fittings: ST7, ST9 & ST13.
- Cyclone deer fence A15/1550/150.
- Hayes crimp sleeve HC2 and H550 crimping tool.
- Ground anchors and tool.

Netlon Ltd

New Wellington Street, Blackburn, Lancashire BB2 4PJ

- Heavy weight high tensile black plastic netting (85 mm x 85 mm mesh)

Tornado Wire Ltd

Muthill Road, Crieff, Perthshire PH7 4HQ

- 2 mm diameter high tensile steel fencing wire

Twil Fencing Products

PO Box 119, Shepook Lane, Sheffield S9 1TY

- Roll-top fencing panel
- T-bars, Sentinel bi-steel
- Twilfix universal winder
- Twilfix universal brackets
- Hexanet hexagonal mesh wire netting

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BS EN 10244-2

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