

# Fencing FACTSHEET

## ELK EXCLUSION USING ELECTRIC FENCING

This factsheet outlines the use of electric fencing to exclude elk in low to medium pressure areas such as crop land. Refer to [Factsheet 307.252-1](#) for information on using woven-wire fencing to exclude elk in high pressure areas.

Thanks to East Kootenay ranchers Harlan Bradford, Jordy Thibeault and Bob Marcer for sharing their electric elk fence designs and experiences and demonstrating that electric fencing is effective in fencing elk out of hay fields.

### INTRODUCTION

Elk damage to crop land and feed storage yards is a very serious problem in BC, especially in areas such as the Peace River, East Kootenays and recently the McBride valley. Two basic fence types can be used.

### WOVEN WIRE ELK FENCE

This is a physical barrier that can be very effective but is the more expensive option. It is best suited to high-pressure areas such as feed storage yards.

### ELECTRIC ELK FENCE

This is a psychological barrier which is low cost but may not be 100% effective in high elk pressure areas such as feed storage yards.

Electric fences have proven successful around large areas such as crop fields. There are definite cost advantages when fencing large areas that usually have low to medium elk pressure.

### FENCE HEIGHT EXTENSIONS

Height extensions can be used on existing fence posts or on new fences to reduce post costs.

Extensions may be used successfully if :

- extensions are adequately sized
- connection to the existing post is adequate
- existing posts have been set deep enough (up to 1/3 of new fence height in ground); depth may be insufficient for an extended height fence

### TYPICAL ELECTRIC ELK FENCE DESIGN

A typical electric fence design for elk exclusion using high tensile smooth wire (htsw) is described as follows.

#### 6 FOOT ELECTRIC ELK FENCE

Total Height:	6 feet
No of Strands:	10 (optional 8 to 11), spaced at 5 / 5 / 5 / 5 / 6 / <b>6</b> / 10 / <b>10</b> / 10 / 10
Electrified:	lines # 2, 4, 6, 8 (in bold above)
Line Posts:	minimum: 3 to 4 inch by 8 feet optional: 4 to 5 inch by 8 feet spaced at an average 40 feet
Brace Design:	single span; horizontal rail (H brace) spaced maximum of 1320 feet apart
Braces Posts:	1 @ 4 to 5 inch by 10 feet 1 @ 4 to 5 inch by 7 feet
Brace Rail:	1 @ 4 to 5 inch by 10 feet

### FENCE EFFECTIVENESS

Fencing out elk driven by hunger is quite different from fencing commercial livestock. The other options the elk may have for food, such as unfenced neighbouring fields, will affect how they will pressure a fence. For locations with high elk pressure (such as feed storage yards) consider using woven wire fences. Refer to [Factsheet 307.252-1](#).

## INSTALLING HTSW

The following points are important when installing high tensile smooth wire:

- place the wires on the elk side of the line posts
- join htsw wire using a knot or splice according to [Factsheet 307.131-1](#)
- tension htsw to approximately 150 pounds tension.
- **DO NOT** drive the staples “home” on the grounded wires on line posts - the wire should be free to move
- for maximum pull-out resistance, rotate staples so as to cross the grain of the post (reducing post splitting) and to ensure the two legs of the staple spread out and away from each other.

## FENCE LINE POSTS

The following is recommended:

**Line Post** - minimum 3 to 4 inch by 8 feet long  
- optional 4 to 5 inch by 8 feet long

- "3 to 4 inch" means the post diameter range
- use pressure treated posts
- set line posts in ground 2 feet minimum
- space according to the terrain: up to 40 feet apart average; up to 50 feet apart in level terrain



Figure 1 Typical Elk Line Fence Showing Line Post, Wire and Insulators

## FENCE BRACE ASSEMBLIES

Braces are the foundation and anchor of a good fence - using good construction methods will ensure a long life fence. Figure 3 is a drawing showing a 'modified 'H' end brace. Note that:

- set brace posts in ground 3 to 3 1/2 feet minimum
- the horizontal rail is not notched into the driven posts, but is connected using 3/8 inch rebar into pre-drilled holes
- rail height is approximately 3/4 of fence height
- braces are set at a maximum of 1320 feet apart
- use inline braces if no corners are needed

**End Braces:** tie post, 4 to 5 inch by 10 feet long; brace post, 4 to 5 inch by 7 feet long; both set 3 to 3 1/2 feet; horizontal rail, 4 to 5 inch by 10 feet long.

This modified 'H' brace is sufficient for most conditions for the low tension of electric wires. In poor soils (sandy, wet, etc.), use a double-span brace assembly: three driven posts and two rails with the wire tie-off on the centre post.

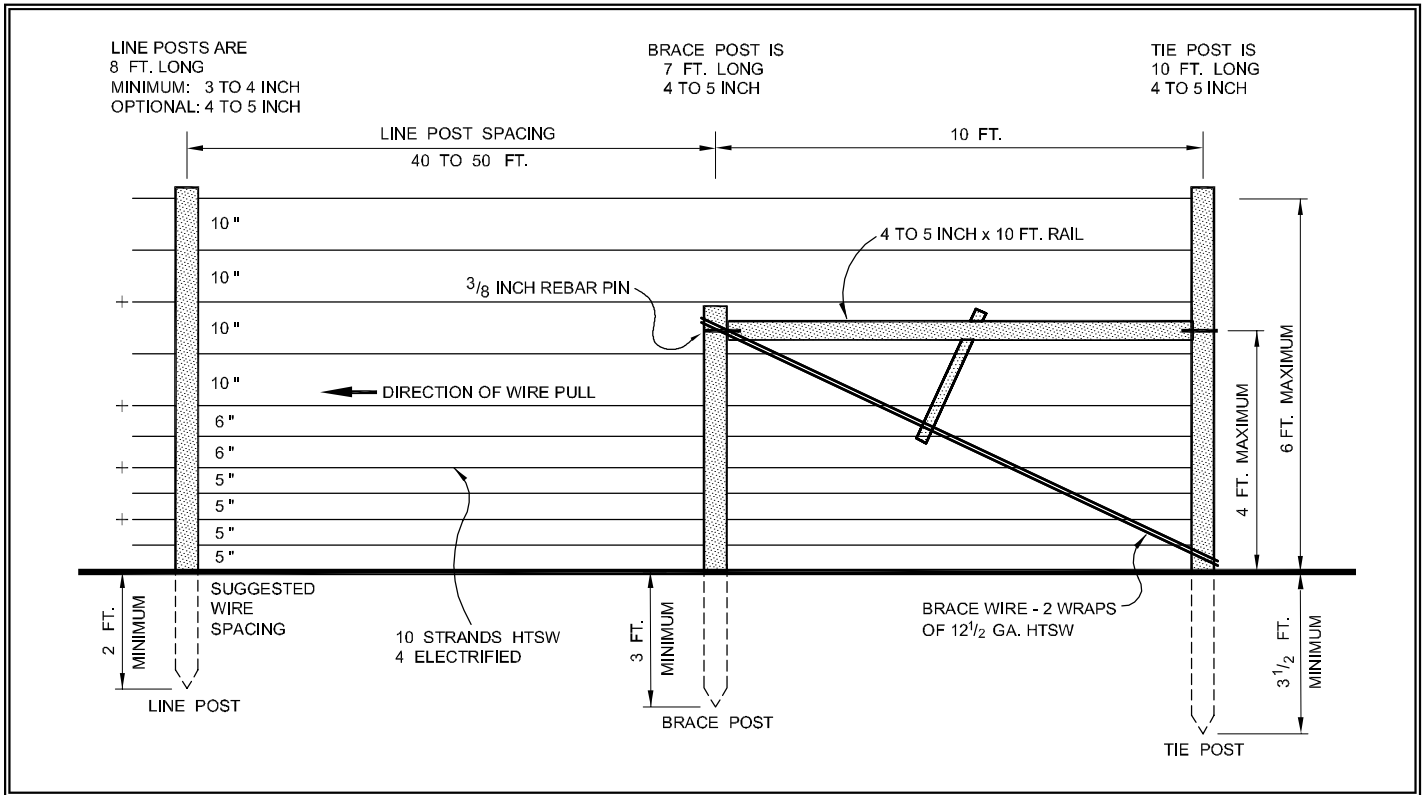
**Inline Braces:** Use an end brace (for runs greater than 1320 feet) with brace wires in both directions.

**Corner Braces:** For 90° corners, use a brace of three driven posts and two rails. (Optional if the wires are being tied off – build two separate end braces of 4 driven posts and 2 rails).



Figure 2 Typical 'Modified H' End Brace for Electric Elk Fence





**Figure 3** Typical Line Fence and 'Modified H' End Brace Design for Electric Elk Fence



**Figure 4** New Cropland with New Electric Elk Fence in East Kootenays

### FENCE COSTS

The following Tables 1 to 5, pages 4 to 6, outline material and labour costs estimates. An example is shown on page 6. A worksheet for material costs is filled out on page 7, with a blank copy on page 8.

### FENCE ENERGIZERS

Refer to Factsheet [307.310-1](#) for details on energizers (electric fence controllers).

<b>Table 1 MATERIAL COSTS FOR ELECTRIC ELK FENCE</b> ( LINE FENCE: WIRE, LINE POSTS, INSULATORS, STAPLES )	
<b>WIRE</b> 6 foot electric fence design (see page 1) <ul style="list-style-type: none"> <li>10 strands of high tensile smooth wire at \$0.02/foot per strand \$ 0.20 foot</li> </ul>	<b>\$ 0.20 / foot</b>
<b>LINE POSTS</b> <ul style="list-style-type: none"> <li>3 to 4 inch top x 10 ft (in a bundle of 100 posts)</li> <li>4 to 5 inch top x 10 ft (in a bundle of 75 posts)</li> </ul>	<b>\$ 5.00 each</b> <b>\$ 7.30 each</b>
<b>INSULATORS</b> <ul style="list-style-type: none"> <li>nail on; sturdy construction; good wire-from-post separation \$ .40 each</li> </ul>	<b>\$ 0.40 each</b>
<b>ENERGIZER AND GROUNDING SYSTEM</b> <ul style="list-style-type: none"> <li>select an energizer appropriate to the length of fence \$ will vary</li> <li>construct an adequate grounding system \$ will vary</li> </ul>	<b>assume</b> <b>\$500 to \$750</b>
<b>STAPLES</b> <ul style="list-style-type: none"> <li>minimum 2 inch long, slash point, galvanized</li> <li>consider barbed staples for superior pullout resistance</li> </ul>	<b>\$ 0.015 each</b>

<b>Table 2 MATERIAL COSTS PER FOOT FOR ELECTRIC LINE FENCE</b>						
<b>LINE FENCE MATERIAL COST PER FOOT ( posts at 40 feet )</b>					<b>MATERIAL COST PER 40 FEET</b> ( wire, line posts, staples, insulators )	<b>MATERIAL COST PER FT</b> ( for line fence only )
	<b>wire</b> (10 strands @ 40 feet)	<b>1 post</b>	<b>6 staples</b>	<b>4 insulators</b>		
<b>minimum</b> using 3inch/4inch post	<b>\$ 8.00</b>	<b>\$ 5.00</b>	<b>\$ 0.09</b>	<b>\$ 1.60</b>	<b>\$ 14.69</b>	<b>\$ 0.37/foot</b>
<b>optional</b> using 4inch/5inch post	<b>\$ 8.00</b>	<b>\$ 7.30</b>	<b>\$ 0.09</b>	<b>\$ 1.60</b>	<b>\$ 16.99</b>	<b>\$ 0.43/foot</b>

**Table 3 BRACE & GATE MATERIAL COSTS FOR ELECTRIC ELK FENCE**

**END BRACE MATERIAL COST** – A standard end brace consists of two vertical posts (set a min of 3 1/2 ft into the ground) and one horizontal rail (located up from the ground 2/3 to 3/4 of the fence height). The rail is pinned to the two posts and a wire is tightened diagonally. An inline brace is the same but with the second brace wire.

- |                                 |                            |         |            |
|---------------------------------|----------------------------|---------|------------|
| • 1 tie post 4 to 5 in x 10 ft  | \$ 7.30 ea. (bundle price) | \$ 7.30 | } \$ 21.42 |
| • 1 brace post 4 to 5 in x 7 ft | \$ 4.50 ea. (bundle price) | \$ 4.50 |            |
| • 1 rail 4 to 5 inch x 10 ft    | \$ 7.30 ea. (bundle price) | \$ 7.30 |            |
| • 2 – 3/8 rebar pins            | 0.16 ea.                   | \$ 0.32 |            |
| • 50 ft of 12 1/2 ga. htsw      | 0.02/ft                    | \$ 1.00 |            |
| • 4 ft of 2 x 2 (twist stick)   | 0.14/ft                    | \$ 0.56 |            |
| • 5 + 24 staples                | 0.015 ea.                  | \$ 0.44 |            |

**\$ 22 each end brace**

**CORNER BRACE MATERIAL COST** – A standard corner brace consists of two end braces that share a corner post (i.e.: there are three driven posts and two horizontal rails). As the materials for a corner brace include that of two end braces less one post, the material costs are:

- two end braces at \$ 22 (minus one tie post at \$ 7.30) **\$ 37 ea.**

**\$ 37 each corner brace**

**GATES** – Gates will vary from home built wooden to purchased metal frames, covered with energized wire. Gate size is 16 feet wide by 8 feet high.

**\$ 250 each gate**

**Table 4 ESTIMATING LABOUR COSTS FOR ELECTRIC ELK FENCE**

( Labour cost may vary widely depending on the terrain, soil conditions, the amount of fence being constructed, access, etc. As this is cropland, no right-of-way preparation costs are assumed. )

**LABOUR FOR LINE FENCE CONSTRUCTION**

- Assume labour is between 40% to 60% of the total installed cost.
- Using an average of 50%, labour cost is the same as material cost. (at 40%, labour cost is material cost x 2/3; at 60%, labour cost is material cost x 3/2)
- For every \$1000 of materials, labour could vary from \$666 to \$1500, with \$1000 as an average

**Estimate at 50%  
( labour is equal to materials )**

**LABOUR FOR BRACE CONSTRUCTION**

- End brace and Corner brace labour estimate equal to material cost

**Estimate at 50%  
( labour is equal to materials )**

**LABOUR FOR GATE INSTALLATION**

- Hinges installed and gate hung estimate

**Estimate \$ 100 each gate**

**Table 5 ESTIMATING ELECTRIC ELK FENCE INSTALLED COSTS**

Use this table if the amount of line fence, the number of braces, gates, etc are known. It uses information from Tables 2, 3 and 4. Refer to Example 1, page 8.

**INSTALLED LINE FENCE (using the optional design)**

	<u>Posts at 40 feet</u>	
• Materials (from Table 2)	\$ 0.43/foot	<b>\$ 0.86 per foot ( 'optional' line fence installed )</b>
• Labour (from Table 4)	\$ <u>0.43/foot</u>	
	<b>\$ 0.86/foot</b>	

**INSTALLED BRACES**

• End brace materials (from Table 3)	\$ 22 each	<b>\$ 44 each end brace installed</b>
• End brace labour (from Table 4)	\$ <u>22 each</u>	
	<b>\$ 44 each</b>	
• Corner brace materials (from Table 3)	\$ 37 each	<b>\$ 74 each corner brace installed</b>
• Corner brace labour (from Table 4)	\$ <u>37 each</u>	
	<b>\$ 74 each</b>	

**EXAMPLE ESTIMATING ELECTRIC ELK FENCE INSTALLED COSTS**

This is an example cost estimate using the information from the first five tables. A worksheet on page 7 shows how material costs can be tabulated for this example. A blank worksheet is provided on page 8 to be used for your fence estimation.

The following example is for installation of an elk fence (high elk pressure, as in a feed storage yard) when the entire fence layout is known.

This is for an **Optional Design** fence with **40 foot post spacing**.

Assume a hay field with the fence line measured and laid out:  
10,000 feet of line fence, 10 corner braces, 4 end braces for 2 gates.

**USING TABLE 5**

<b>LINE FENCE:</b>	materials and labour is \$ 0.86 per foot x 10,000 feet	<b>\$ 8600</b>
<b>ENERGIZE / GROUND:</b>	assume minimum \$500	<b>\$ 500</b>
<b>CORNER BRACES:</b>	materials and labour is \$ 74 each x 10 corner braces	<b>\$ 740</b>
<b>END BRACES:</b>	materials and labour is \$ 44 each x 4 end braces	<b>\$ 176</b>
<b>GATE:</b>	materials and labour is \$ 250 + \$ 100 per gate x 2 gates	<b>\$ <u>700</u></b>
	<b>TOTAL:</b>	<b>\$ 10716</b>
	<b>COST PER FOOT :</b>	<b>\$ <u>1.07 per foot</u></b>

# WORKSHEET FOR ELECTRIC ELK FENCE - MATERIAL COSTS ONLY

( USING EXAMPLE FENCE COST ESTIMATION, BOTTOM OF PAGE 6 )

WIRE	Wire Type	Size	Feet of Wire	Feet per Roll	Number of Rolls	\$ Each Roll	Total Wire Cost		
	htsw	12.5 ga	100,000	3750	27	\$ 75	\$ 2025		
LINE POSTS	Wood Post Type	Post Size	Feet of Fence	Post Spacing	Line Posts	\$ Each Line Post	Total Line Post Cost		
	<input checked="" type="checkbox"/> treated <input checked="" type="checkbox"/> pointed <input checked="" type="checkbox"/> domed	4/5 x 10 ft	10,000	40 feet	250	\$ 7.30	\$ 1825		
BRACE POSTS	Wood Post Type	Post Size	Number of Post	Total Posts	\$ Each Brace Post	Total Brace Post Cost			
	<input checked="" type="checkbox"/> treated <input checked="" type="checkbox"/> pointed <input checked="" type="checkbox"/> domed	4/5 x 10 ft tie post	4 corner (4) 10 end (10)	14	\$ 7.30	\$ 102			
		4/5 x 7 ft brace post	4 corner (8) 10 end (10)	18	\$ 4.50	\$ 81			
						\$ 183			
BRACE RAILS	Wood Rail Type	Rail Size	Number of Rails	Total Rails	\$ Each Rail	Total Rail Cost			
	<input checked="" type="checkbox"/> treated <input type="checkbox"/> untreated	4/5 x 10 ft	4 corners (8) 10 ends (10)	18	\$ 7.30	\$ 131			
INSULATORS	Type	Number Per Post	Number of Posts	Number of Insulators	\$ Each Insulator	Total Staple Cost			
	nail on	4	250	1000	\$ 0.40	\$ 400			
STAPLES	Size & Type	Number Per Post	Number of Posts	Number of Staples	\$ Each Staple	Total Staple Cost			
	2 in slash point	6	250	1500	\$ 0.015	\$ 23			
GATES	Size	Type	Number	\$ Each Gate	Gate Cost				
	16 ft x 8 ft	Prefab steel	2	\$ 250	\$ 500				
ENERGIZER & GROUND	Energizer Type	\$ Energizer	Ground	\$ Ground	Total Cost				
		\$		\$	* \$ 500				
TOTAL MATERIAL COSTS	Wire	Line Posts	Brace Posts	Brace Rails	Insulators	Staple	E & G	Gates	Total Material Cost
	\$ 2025	\$ 1825	\$ 183	\$ 131	\$ 400	\$ 23	*\$ 500	\$ 500	\$ 5587

\* The energizer and ground system cost is estimated only; energizer cost will vary with the length of fence.

# WORKSHEET FOR ELECTRIC ELK FENCE - MATERIAL COSTS ONLY

( USING EXAMPLE FENCE COST ESTIMATION, BOTTOM OF PAGE 6 )

<b>WIRE</b>	Wire Type	Size	Feet of Wire	Feet per Roll	Number of Rolls	\$ Each Roll	Total Wire Cost		
	htsw	12.5 ga		3750		\$	\$		
<b>LINE POSTS</b>	Wood Post Type	Post Size	Feet of Fence	Post Spacing	Line Posts	\$ Each Line Post	Total Line Post Cost		
	<input type="checkbox"/> treated <input type="checkbox"/> pointed <input type="checkbox"/> domed					\$	\$		
<b>BRACE POSTS</b>	Wood Post Type	Post Size	Number of Post	Total Posts	\$ Each Brace Post	Total Brace Post Cost			
	<input type="checkbox"/> treated <input type="checkbox"/> pointed <input type="checkbox"/> domed	4/5 x 10 ft tie post  4/5 x 7 ft brace post			\$	\$			
<b>BRACE RAILS</b>	Wood Rail Type	Rail Size	Number of Rails	Total Rails	\$ Each Rail	Total Rail Cost			
	<input type="checkbox"/> treated <input type="checkbox"/> untreated	4/5 x 10 ft			\$	\$			
<b>INSULATORS</b>	Type	Number Per Post	Number of Posts	Number of Insulators	\$ Each Insulator	Total Staple Cost			
	nail on	4			\$	\$			
<b>STAPLES</b>	Size & Type	Number Per Post	Number of Posts	Number of Staples	\$ Each Staple	Total Staple Cost			
	2 in slash point	6			\$ 0.015	\$			
<b>GATES</b>	Size	Type	Number	\$ Each Gate	Gate Cost				
	16 ft x 8 ft			\$	\$				
<b>ENERGIZER &amp; GROUND</b>	Energizer Type	\$ Energizer	Ground	\$ Ground	Total Cost				
		\$		\$	\$				
<b>TOTAL MATERIAL COSTS</b>	Wire	Line Posts	Brace Posts	Brace Rails	Insulators	Staple	E & G	Gates	Total Material Cost
	\$	\$	\$	\$	\$	\$	\$	\$	\$

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