

## Internal Tunnel

The Oamaru design nest box has an external tunnel and a relatively large nesting chamber. This internal tunnel design moves the access tunnel into the interior of the box. This reduces the floor area of the nesting chamber but has been readily accepted by the penguins with subsequent successful breeding.

The outside dimensions are the same for this design as the Oamaru design. A piece of wood is nailed to the inside of the front wall (at a right angle next to the entrance) and the front half of the roof (Figure 5) ensuring that the entrance stays wide enough to accommodate a pre-moult adult. The back half of the roof can be opened (unsecured) or can be made tamper proof with a removable lid (see tamper-proof design). There is no difference in accessibility of the nesting chamber for monitoring (using the wand to read microchips and checking nest contents) with the front or the back half of the roof opened. The removal of adults and/chicks for microchipping or weighing is easier when the back half of the roof is opened, and more difficult but not impossible when the front half of the roof is opened.



*Figure 5: Internal tunnel design with the back half of the roof removed (left); and the same design accepted readily by this penguin with the back half of the roof open for monitoring.*

### Good points

1. The internal tunnel makes it impossible for the public to see (and thus disturb) the penguins inside the box.
2. With no external tunnel, this box is easily carried and placed in penguin colonies.
3. The tight angle from the "corridor" into the nesting chamber may deter cats.
4. If a stoat or ferret that are nimbler than cats come to visit they are confronted by an adult that is positioned between the predator and the eggs or chicks and likely able to defend them better than in a bigger nesting chamber (of boxes with external tunnels).
5. Less complex to make compared to boxes with external tunnels.
6. Less wood required.
7. Can be modified to install solar powered automatic transponder readers in the entrance.
8. Existing Oamaru designed boxes can be modified by removing the external tunnel and putting in place the one piece of wood that creates in the internal tunnel.

### Less good points

1. Nothing comes to mind.

## Tamper proof design

Many nest boxes for little penguins/Korora are in public spaces resulting in the public opening boxes and disturbing the penguins. This nest box design is tamper-proof while can still be accessed for monitoring. The Oamaru design can be retrofitted by adding the removable nail to the lid as illustrated in the photos below. In addition, the model presented here has a much longer access tunnel into the box to prevent the public from reaching into the box and extract adults or chicks.

The overall dimensions of this box design are about same as for the Oamaru design. The tunnel in the example in Figure 6 was constructed with spare pieces of wood and the tunnel length can be adjusted to suit what timber is available. The box in Figure 6 is also taller than the Oamaru design. This was another artifact of the available timber and illustrates that the dimensions provided by Houston (1999) do not have to be followed to the letter (except for the dimensions of the entry that have to accommodate a pre-moult adult penguin). A taller box like this can be dug into the ground more to reduce the ceiling height of the nesting chamber.



*Figure 6: Tamper proof nest box design with a closed lid (left); with the lid open (middle) showing the extra piece of wood on the inside of the lid that holds the nail in place; and detail of the nail fitted to the front of the box to hold the lid in place (right).*

### Good points

1. The long external tunnel prevents humans from reaching in and pulling out adults or chicks.
2. The nail is easily and quickly removed with a magnet to open the box for monitoring.

### Less good points

1. This design is more complex to construct.
2. The box is cumbersome to move due to the long tunnel.