

## A quick review of the 'tunnel test'

The Carnegie Museum's Powdermill Avian Research Center is a permanent bird banding station in Rector, Pennsylvania. It is part of the Carnegie Museum and is in a large nature reserve. In a typical year, more than 11,000 birds of 114 species are mist netted, banded, measured, visually sexed and weighed at the station. The majority are migratory individuals netted during spring and fall migration. This provides large sample sizes of species that are frequent victims of collisions, during relatively short periods of time.

The 'tunnel' itself is about 24 feet (eight meters) long, constructed of plywood and particle board over a steel frame. At one end, the tunnel is open, and about 18" in front of the opening a mounting apparatus holds two panels of glass (or other material) side by side: a plain glass control and the test sample.



## Bird Handling and Testing



All personnel handling birds for this project are experienced bird handlers under the supervision of a licensed Master Bander. Birds mist-netted on trails near the banding station are released from the nets by Powdermill banding technicians, placed in cloth bags and taken to the station for banding and measuring.

Birds to be tested are then replaced in a bag and brought to the tunnel.

A bird is removed from the bag by the tunnel testing technician and evaluated. Any bird that appears stressed is simply released. Otherwise, the band number is read and recorded and the bird is released into the tunnel by hand, through a sleeve set into the end panel. Any bird that does not fly after 30 seconds is withdrawn from the tunnel and released.



Birds are observed as they fly down the dark tunnel towards the light and presumably attempt to exit either via the invisible control glass, or a test panel. A mist net without purses prevents birds from actually hitting the glass. Flight type is recorded, as well as destination -- to the control side or test side of the net, or side, floor or ceiling of the tunnel. Data is recorded on a notebook computer, or on paper, if weather dictates (although netting stops when it rains). All trials are video recorded as well as observed. Each bird is released immediately after one flight by opening a door next to the net.

## Tunnel Operation



The tunnel is mounted on a pivot and is rotated every five minutes to keep a constant orientation with the sun -- directly behind the operator. Mirrors at the sides of the tunnel reflect ambient light onto the front surfaces (the 'bird approach side' of the glass, and some natural light falls on the back surface. Test materials are presented in random order and in equal frequency on the left and right side. At regular intervals, trials using

two clear panes or no glass are run as a control. Equal numbers of flights to left and right

indicate that the tunnel itself is not influencing the choice made by the birds. We score at least 80 trials per material to account for environmental variation and species mix. ABC defines the 'Material Threat Factor (TF)' for a pattern or material as the percentage of birds tested that flies towards that material. So, if 20 of 80 birds flies towards the tested glass,  $20/80=25\%$  and the TF=25.

Not all birds banded at PARC are tested and not all tested birds produce a score. Species like Kinglets, Nuthatches and Chickadees are not tested because instead of flying in the tunnel they tend to cling to the walls. Some birds fly part way down the tunnel and land on the wall, floor or ceiling. Heavy species, like Wood Thrush, could fly through the net.