

Power to the birds

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The Cape Vulture

THE CAPE VULTURE IS A LARGE HIGHLY GREGARIOUS, CARRION FEEDING BIRD, WITH A WINGSPAN OF 2.5 METRES.

Steady decline in the numbers of the Cape Vulture, *Gyps coprotheres*, over the last decade has been experienced in South Africa. This is due to reduced breeding success, indiscriminate use of poison (mainly strychnine) and electrocution on powerlines, specifically as a result of roosting above insulators within power line tower structures.



The Project

ESKOM POWER UTILITY IN SOUTH AFRICA, INITIATED A PROGRAM FOCUSING ON ENGINEERING DESIGN INNOVATION TO DEVELOP MITIGATION STRATEGIES TO PREVENT VULTURE MORTALITIES, THEREBY ENHANCING THE QUALITY OF SUPPLY.

The problem of negative interactions between wildlife and electricity structures is an international one and has been the focus of a vast amount of research. Up to 1996, the focus in South Africa was mainly on the impact of power lines on species that may be biologically significantly affected and engineering solutions to the problem. However, by 1996 it became clear that cooperative management was the only way to tackle the problem effectively. Eskom recognised that without a proper, integrated management system, incorporating biological, engineering and economical perspectives, any large-scale effort to reduce or eliminate negative interactions between wildlife and electricity structures was bound to run into difficulties sooner or later.

The 1996 strategic partnership between Eskom and the Endangered Wildlife Trust (EWT) evolved into a global leader in the field of co-operative environmental management, and serves as a role model to utilities and environmental groups worldwide. As a result, a total of 657 investigations of wildlife mortality have been performed on Eskom lines since August 1996, mostly by EWT volunteers. Following recommendations from the EWT, sections of power line and identified high risk localities were modified to eliminate further bird mortality.

Collisions are the biggest single threat posed by transmission lines to birds in southern Africa. Most heavily impacted are heavy-bodied birds with limited manoeuvrability, which make it difficult for them to take the necessary evasive action to avoid colliding with power lines. Unfortunately, many of these species are threatened in southern Africa.

In response to this problem, Eskom, with the help of the Endangered Wildlife Trust, launched a national bird guard programme in an attempt to eliminate streamer related short circuits and collisions on a large proportion of affected transmission lines. The program entailed the design, trialling and fitting of anti-perching devices (bird guards) on transmission towers to physically prevent birds from perching in high risk areas. The program has proven to be a great success with suspected bird related outages dropping consistently each year as more bird guards are fitted.



The Results

THIS FINAL DESIGN NOT ONLY ADDRESSED THE DESIRED OUTCOMES OF THE POWER UTILITY BY ENHANCING THE QUALITY OF SUPPLY AND REDUCING MAINTENANCE COSTS, BUT ALSO BENEFITED THE CAPE VULTURE BY REDUCING THE NUMBER OF VULTURE ELECTROCUTIONS.

Results as November 2006 indicated that lines fitted with bird guards have resulted in an average of 80% reduction in bird induced faults, and some lines have had a 100% reduction. It is important to note that bird guards are not an ultimate solution under all circumstances. Isolated instances have been recorded where birds have managed to wedge themselves between the bird guards, especially in instances associated with extreme bird densities.

The Problem

Birds are not only killed by powerlines, but they also materially affected the quality of electricity supply through bird streamers. Bird streamers are long streams of conductive excreta which cause short circuits on high voltage lines. In 2000 a research team from Eskom found that up to 20% of all annual short circuits on the national Eskom high voltage transmission network were potentially caused by bird streamers (pollution) and bird electrocutions. Electrocuted birds were also the cause of numerous bushfires. It was therefore in the interest of Eskom to develop a preventative strategy through engineering design. Similar issues with low voltage power lines have been experienced in Australia.

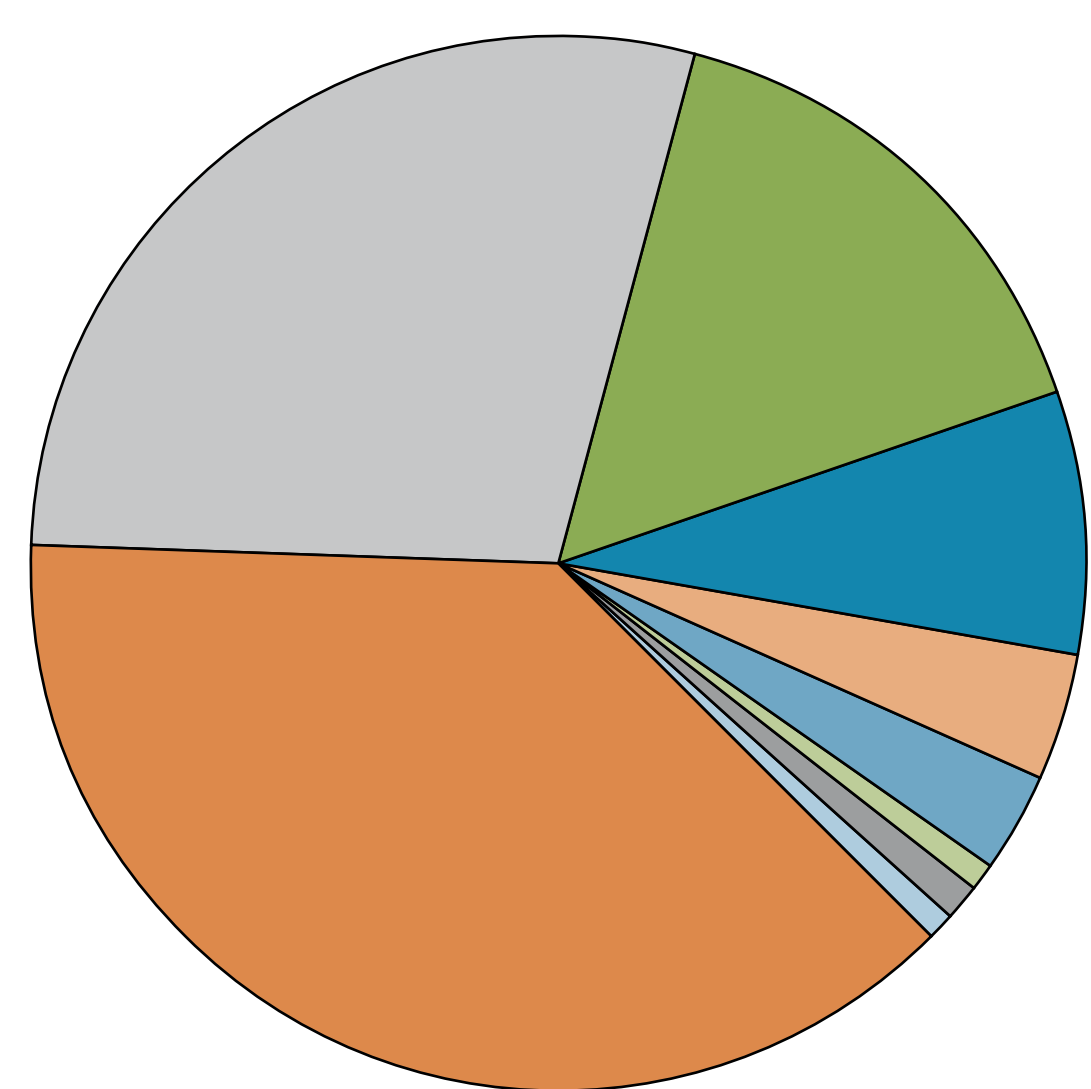


Figure 1: Summary of Transmission line faults for the period 1993-1999

Unknown 38.2%	Birds 8.1%	Hardware failure 0.9%
Storm 28.8%	Sugar cane fires 3.7%	Line faults 0.9%
Grass fires 15.6%	Pollution 3.2%	Tree contact 0.8%

The Design

A RANGE OF ENGINEERING DESIGN SOLUTIONS WERE TRIALLED OVER A PERIOD OF APPROXIMATELY 4 YEARS.

The first option attempted was a simple wind driven revolving disk referred to as a 'whirly bird' made from shiny metal. Not only did this cause flicker effect, but it largely proved ineffective and birds soon habituated to the design. Maintenance of the bearings also proved problematic.

This evolved into the second anti-perching devices which were metal revolving perching platforms. While these were partially effective they resulted in some bird injuries and were discontinued shortly after the trial period. See Image 1.

These were replaced by the first spike like designs, similar to 'pigeon spikes'. The first spikes to be trialled were made from 10–12mm galvanised steel. While they proved to be successful, they unfortunately resulted in some isolated instances of bird impaling.

The metal spikes evolved into a more eco-friendly design constructed from DOW High Density Poly Ethylene (HDPE). It was found that vertical rods should be 500mm high with a spacing of between 125mm and 190mm and an outside diameter of no less than 20mm. Base dimensions should be no less than 40mm x 40mm. The general length was 1000mm which can be cut to suit application. See Image 2.

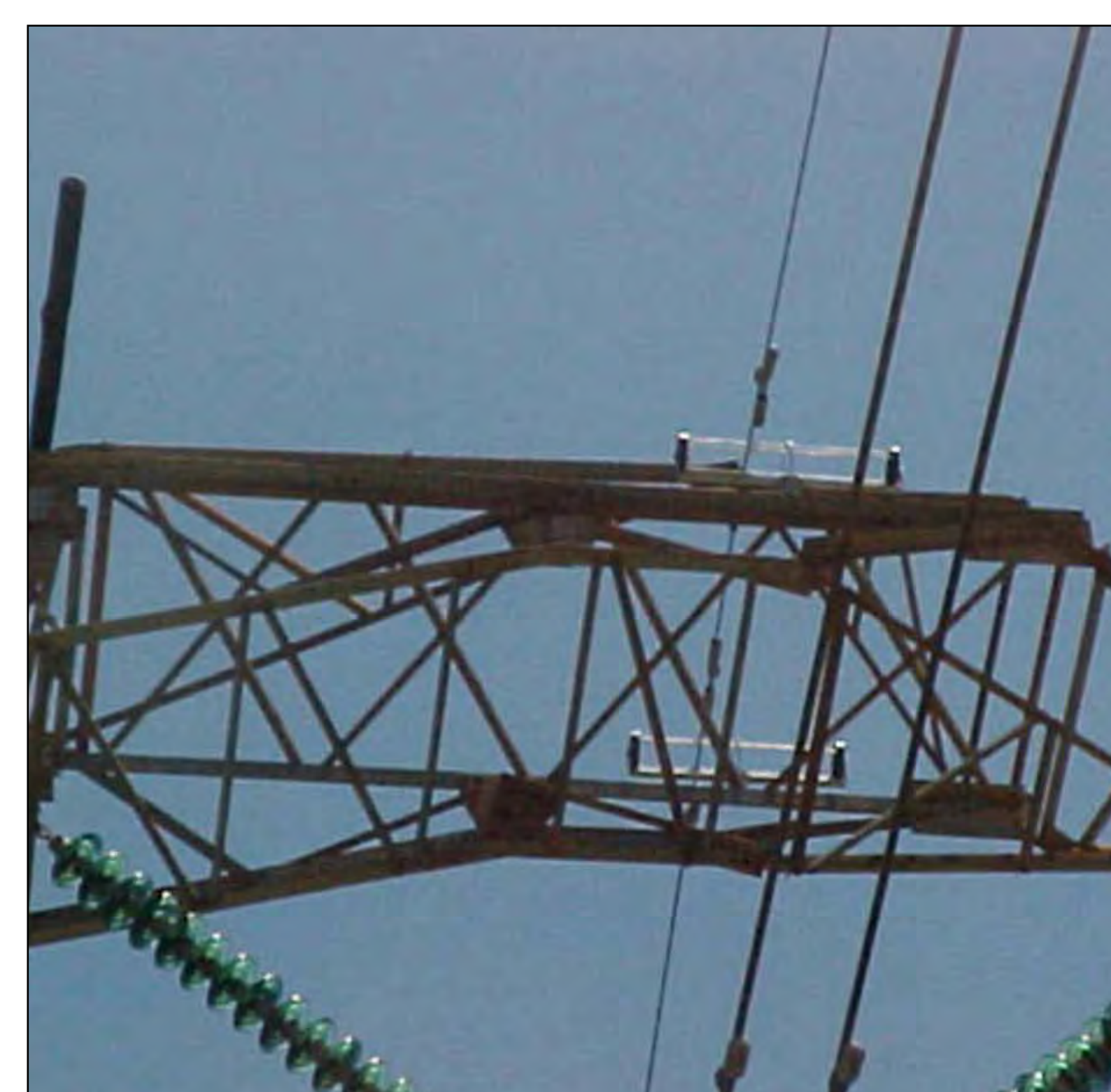


Image 1: Revolving perching platforms - discontinued



Image 2 top left: Final bird guard design

