STEEL DISTRIBUTION POLES
and
RAPTOR PROTECTION

Collisions and electrocution of raptors with power lines have been recorded as far back as the early 1900's. These occurrences have also been recorded globally with action considered by European and South African utilities. Obviously, the threat to raptors by electric power lines is not a new development or one introduced by the use of steel poles for distribution line support structures. As the demand for electric power has increased, so has the electrocution of birds. Bird electrocution has most often been caused by the simultaneous contact of an energized conductor and a ground or a second energized conductor. This contact produces a completed circuit and electrocution.

Electrocutions can often be quite violent and cause major outages of power service and starting prairie and forest fires. Generally, the electric lines involved in these events are not the transmission lines involving tall structures seemingly marching across the landscape, but instead the everyday distribution structures carrying less than 34,500 volts that are familiar along the sides of roads and along backyards. The history of this problem of electrocutions of raptors and other large birds has been built on these line systems, which have been largely built with wood poles structures. In areas where raptors are prone to be present and likely to use line structures for perches, the problem has been the design of the line and the transformers, arrestors, and switches attached to them.

As a result of continuing large numbers of electrocutions, the U.S. Fish and Wildlife Service (USFWS) has increased enforcement of the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Endangered Species Act. The USFWS has even begun levying fines and, in at least one case, court action against electric utilities found to be negligent in taking action to prevent continued endangerment of raptors.

Distribution poles are just another perch or nesting spot to a raptor, being a bird of prey and the top of the food chain. The placement of poles has opened up areas of previously unexploited raptor habitat. The poles provide perches for low energy foraging. Their long wingspan, however, makes them susceptible to touching two energized conductors at once or an energized conductor and a ground. Many factors contribute to raptor electrocutions. Habit is a primary key. How, when and what they hunt, where they nest and the general geography of the region must all be evaluated. Raptors in forested regions with many natural perches will suffer fewer electrocutions than their counterparts in open regions such as prairies where the pole becomes the best perch in the area. It is estimated that 95 percent of raptor electrocutions occur on two percent of the utility poles. Therefore, a major part of the solution requires the identification of problem pole locations and taking remedial action. Reporting records from maintenance activity can identify not only problem poles and pole configurations, but also regions of special concern along lines. With this information, crews can retrofit with raptor protection devices or rebuild poles to raptor-safe configurations. New construction standards can also be adapted to reflect raptor-safe configurations.

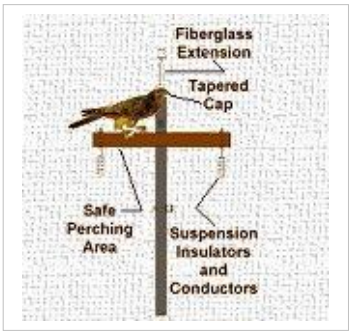
The most complete and up-to-date document on raptor protection is *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*, published by the Avian Power Line Interaction committee, the Edison Electric Institute, and the Raptor Research Foundation.

Existing methods and published modifications are designed for use on wood poles and wood crossarms. Because of environmental and maintenance consideration and cost impact considerations, steel poles are becoming increasingly popular in distribution line construction. Advantages include recyclability, high strength to weight ratio, consistent reliability in design and product, resistance to insect, animal, and bird damage, and steel poles do not require treatments with chemical preservatives damaging to the environment. However, because steel is conductive and the pole itself is often used as the ground for the pole construction, traditional detailing can result in reduced phase to ground clearances which can be particularly lethal to raptors.

The Rural Utilities Service currently advocates the use of a minimum 300 kV BIL on tangent poles and deadend structures to minimize flashover. This requirement is sometimes met with the use of a pole top pin mounted on a fiberglass rod to increase the phase-phase and phase-ground distance. This also eliminates the possibility of electrocutions unless the bird now rests on the pole top under the middle phase. This can be avoided by the use of tapered pole caps or anti-perching irons attached to the pole top to keep birds from resting.

The *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* recommends the use of 60 inches of phase-phase separation. In wood pole construction this can be accomplished with the use of 10-foot wood crossarms and lowering the crossarm on the pole to produce the desired 60-inch separation between phases with the middle phase on a pole top pin. The same detail use a steel pole reduces the clearance of the outside phases to the steel pole (ground) to somewhat less than the recommended 60 inches (the phase arm pin is located approximately 6 to 7 inches from the end of the wood arm).

This reduced phase-ground clearance can be compensated for with the use of a thermoplastic polymer membrane. These membranes are available with pressure sensitive adhesive. Alternatively, a spray applied coating can be applied at the factory similar to the application at groundline to protect the pole surface from corrosion. Additionally, perch guards can be mounted to the crossarm to keep raptors from landing on the crossarm. In this way the insulating coating or membrane can be eliminated as long as the 300 kV BIL is satisfied.



Constructing lines in a manner that allows safer perching by the raptor can be accomplished by suspending the phases below the crossarm instead of supporting them on the arm. This detail allows the birds to safely perch on the crossarm without coming into contact with the energized phases. In addition to meeting the BIL requirements, this detail can allow shorter crossarms and still maintaining the 60-inch phase-phase recommended spacing.

Fabricated products are also available for providing insulation covering to prevent phase-phase and phase-ground contacts. These products can be applied at locations identified as problems as retrofit measures. One such manufacturer is Kaddas Enterprises with products such as the Bird Guard™ and

Vernal Triangle™ for phase protection and anti-perching devices, respectively. They also provide the Ceramic Arrester Cap™ for protection at transformers, reclosers, and surge arresters mounted on poles.

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