



Together for birds and people

**Position Statement on Birds and Power Lines**  
**On the risks to birds from electricity transmission facilities**  
**and how to minimise any such adverse effects**

*adopted by the BirdLife Birds and Habitats Directive Task Force on 10 May 2007*

*This BirdLife Position Statement includes references to relevant legislative instruments of the EU, but it could be applied in all countries that are signatories to the Bern Convention and the Bonn Convention too, as the underlying principles are just as relevant. Therefore, BirdLife Partners in the respective countries are invited to adopt this position.*

The transport and distribution of electricity from power plants to users mainly occurs via above-ground power lines. They have continued to increase in number and area covered often at the expense of wild animals. Depending on the type of construction used, power poles and power lines may cause fatal injuries to birds, because of both electrocution and collision. They affect especially large birds such as storks and raptors. There is a strong need to agree on standards in construction and design of electricity transmission facilities to minimise any such adverse effects, largely excluding the risk of bird deaths.

With this aim in mind, the Conference of the Parties of the Bonn Convention<sup>1</sup> adopted Resolution 7.4 on Electrocution of Migratory Birds (Seventh Meeting, Bonn, 18-24 September 2002) and the Bern Convention on the Conservation of European Wildlife and Natural Habitats, adopted Recommendation No. 110 (2004) on minimising adverse effects of above-ground electricity transmission facilities (power lines) on birds<sup>2</sup>. The latter, was based on a BirdLife International report<sup>3</sup> that forms the basis of the following text.

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<sup>1</sup>Convention on the Conservation of Migratory Species of Wild Animals (*Bonn Convention*)

<sup>2</sup><https://wcd.coe.int/ViewDoc.jsp?id=847305&BackColorInternet=9999CC&BackColorIntranet=FFBB55&BackColorLogg ed=FFAC75>

<sup>3</sup>T-PVS / Inf (2003) 15 *Protecting birds from power lines: a practical guide to minimising the risks to birds from electricity transmission facilities*. D Haas, M Nipkow, G Fiedler, R Schneider, W Haas, B Schürenberg, 2003.

[http://www.coe.int/t/e/Cultural\\_Co-operation/Environment/Nature\\_and\\_biological\\_diversity/Nature\\_protection/sc23\\_inf15e.pdf?L=E](http://www.coe.int/t/e/Cultural_Co-operation/Environment/Nature_and_biological_diversity/Nature_protection/sc23_inf15e.pdf?L=E) and published under Nature and environment, No. 140, Council of Europe Publishing, March 2005 (including 31 figures).

The report reviews the negative impacts on many species of wild birds (including migratory species) across Europe and the world from overhead electricity transmission lines, conductors, poles and towers (including those associated with railway infrastructure) through increased mortality due to electrocution, collision and also through reduction in availability of staging, wintering and breeding areas, especially when power lines cross open landscapes. The report provides explicit guidance on current technical standards.

## **A. Impact assessment**

1. There is a strong consensus that the risk posed to birds depends on the technical construction type and detailed design of power facilities. In particular, electrocution risk is high with “badly engineered” medium voltage power poles (“killer poles”)<sup>4</sup>. For numerous medium-sized and large birds, such as storks and raptors, that perch, roost or nest on such power poles, such electrocutions can cause population declines. Even smaller birds down to the size of a starling can be affected depending on detailed construction features.
2. Collisions with some types of aerial wire or cable, including power lines of all voltage ranges as well as telephone lines, can affect any flying bird. High losses (sometimes in excess of 500 casualties per kilometre of power line per year) are reported from lines with multi-level arrangements, and with thin and low-hanging wires in sensitive areas: bustards, rails, waders/shorebirds, cranes, waterfowl and sandgrouses. Migrating birds flying at heights of 20m to 50m are at considerable risk of collision, especially at night, when flying in flocks, and for large and heavy birds of limited manoeuvrability.
3. Above-ground power lines can lead to the loss of useable feeding areas in staging and wintering habitats. For example feeding arctic-breeding geese have been observed to avoid the close vicinity of power lines in their wintering areas, and entire leks of great bustards are known to have almost disappeared after continuous collision of males during the years following the installation of power lines in their leks.

## **B. Position of BirdLife International**

1. It is of utmost urgency to address and minimize the on-going worldwide threat to birds from electrocution, collision and loss of habitat availability due to electricity transmission facilities.
2. Technical design guidelines for bird protection from electrocution exist in Information Document 7.21 of the Bonn Convention, a brochure currently available in five languages

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<sup>4</sup> Those medium voltage power poles (1 kV to 60 kV) are constructed with close spacing between the pole, its cross arm and its wires or other energized parts such that birds can be electrocuted by completing an electric circuit between two conductors which literally executes them. Deaths by ground-faults are even more frequent than short-circuits and occur when spanning the gap between a wire and a grounded power pole. Close spacing and high humidity increase the risk of electric sparks (“electric arc”). Generally, hazardous power poles are those with upright insulators, with power lines spaced less than 140 cm apart, with power lines mounted on the cross arm respectively the pole top with distribution insulators or suspended insulators (with gaps less than 60 cm; this applies to all other energized parts), with switch towers if when open the bird can bridge the gap.

(English, German, Russian, Spanish, and Portuguese)<sup>5</sup>. Guidelines for all three main types of risk to birds from above-ground power lines (electrocution, collision, negative impacts on staging and wintering areas) are published under the Bern Convention<sup>6</sup>. They shall be improved in the light of new research.

3. Following these guidelines, existing power poles and technical structures should be retrofitted to the extent that the protection of birds from electrocution and collision is guaranteed.
4. To protect birds from electrocution, all new power poles and technical structures on medium voltage power poles should have a safe design for birds. BirdLife strongly recommends a ban on upright insulators on new poles.
5. Where possible, transmission cables should be laid underground as the safest means of avoiding bird losses. Where not possible, existing power poles of dangerous types should be replaced by low risk power poles with suspended insulators. Otherwise dangerous types of power poles should be retrofitted following the guidelines added to this document as an Annex.
6. The responsibility of the electric utility companies to observe bird safety is in the public interest and is also a matter of ethics. However, satisfactory implementation of state-of-the-art bird safety provisions depends on clear and unambiguous legislative action. BirdLife International therefore strongly recommends that all states introduce: agreed technical standards for the construction of new medium voltage power poles; compulsory retrofitting of existing killer power poles; and legislation covering protection of birds from power lines. National technical standards should refer to the guidelines given by the Bonn and Bern Convention as a minimum, although BirdLife strongly recommends those indicated in the Annex.
7. Power lines should be diverted from areas where large numbers of birds regularly fly through at a low altitude (coastlines, topographical bottlenecks, wetlands, breeding colonies), and also from IBAs/SPAs that contain species highly susceptible of suffer from electrocution and collision against cables. Prior to the planning of any new power lines, investigations are needed and must cover bird migration by day and night and other seasonal phenomena.
8. All plans and projects regarding the construction of power lines should comply with the Directives on Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA). (Strategic) Appropriate Assessments (AA), in accordance with the requirements of Article 6 of the EU Habitats Directive must be carried out for all power

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<sup>5</sup> *Caution Electrocution – Suggested Practices for Bird Protection on Power Lines*. D Haas & M Nipkow. NABU, Birdlife Partner Germany (Ed.), Bonn, 2002.  
[http://www.nabu.de/m05/m05\\_03/05166.html](http://www.nabu.de/m05/m05_03/05166.html)

<sup>6</sup> See annotation No. 2. For more information see also: [www.birdsandpowerlines.org](http://www.birdsandpowerlines.org)

line construction plans or projects if it cannot be excluded, on the basis of objective information, that the plan or project will have a significant effect<sup>7</sup> on a Natura 2000 site.

9. Conservationists, ornithologists, energy companies and politicians should cooperate to effectively reduce the threat of bird electrocution, collision and habitat losses caused by power lines.

### **C. Further research and monitoring**

1. Independent research and monitoring should be implemented, funded by national governments and electric utility companies, in consultation with relevant experts, to improve our understanding of the impacts of electricity transmission facilities on biodiversity, especially on the population dynamics of the main affected species.
2. At regional and local level, a large need exists for ornithological investigations prior to or during the planning phase of new power lines. One year of ornithological studies are needed in order to characterise local and regional bird migration patterns and other bird movements, as input to the routing and construction of the power line.
3. The durability of bird-protection armatures must be significantly improved. Materials used must withstand all weather conditions and UV light for decades. Markers on high-voltage cables must be compatible with high electric fields and high heat input.
4. Further investigations are needed to determine how to do without the neutral cable high above the conductor cables, which even when properly marked, still cause significant mortality, most frequently during bad weather conditions (fog, strong winds, etc.).
5. Special research should be undertaken on the risk of collision, and on how collision with wires can be avoided (e.g. through intelligent design like proven vertical markers that enable birds to better recognize and to better judge the distance to the wires, or via ground cables where frequented flight corridors are crossed).
6. The results of research should be published in international scientific journals, including a summary, preferably in English, to ensure wider dissemination. The European Commission/Council of Europe should ensure easy access to the results, e.g. through a website.

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<sup>7</sup> The meaning of „significant effect“ is clarified in the Judgement C-127/02 (“Wadden Sea ruling”, European Commission vs. The Netherlands) as an effect that is likely to undermine the site’s conservation objectives.

## BirdLife BHDTF Position Statement on Birds and Power Lines - ANNEX

The following describes the most widely used types of medium-voltage power poles worldwide, their potential risk and suggestions towards mitigation. Recommendations are made for power poles made of concrete, steel, composite steel and wood. The guidelines are based on standards carried out by the NABU National Working Group on Electrocutation. These guidelines shall be improved in the light of further research and its results.

BirdLife is aware that transmission cables are to be laid underground as the safest means of avoiding bird losses. Where not possible, existing power poles of dangerous types are preferably to be replaced by low risk power poles with suspended insulators. Otherwise dangerous types of power poles are to be retrofitted following these guidelines.

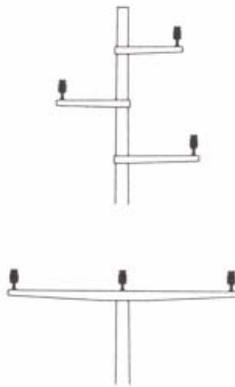
The safety of the installations depends primarily on

- how insulators are attached to the poles and
- the actual space between the power cables and other energized and grounded parts. Distances between conductors (140 cm), and between perch sites and energised elements (60 cm), have to be larger, where species of large birds are present (eagles, vultures, storks, etc.). In this case, BirdLife strongly recommends distances of 150 cm and 75 cm respectively.

### A) POWER POLES WITH UPRIGHT INSULATORS

*Risk: high*

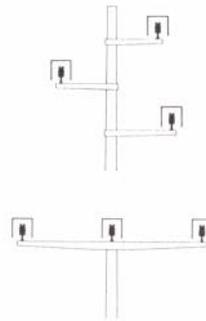
**Power poles, constructed on prestressed concrete or metal with upright insulators**, are widely used and rank as the most dangerous of all types. The gap between the cables and the crossarm is small.



#### Suggested Practices:

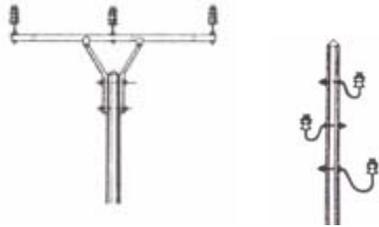
Mitigating electrocution effectively is possible either by treating poles **(a) with insulating caps** made of plastic for outdoor use 130 cm in length or **(b) insulating powerlines with tubing 130 cm in length**. The conductors have to be spaced at a distance of at least 140 cm. If this is not possible, they should be insulated with tubing.

#### (a) Insulated caps

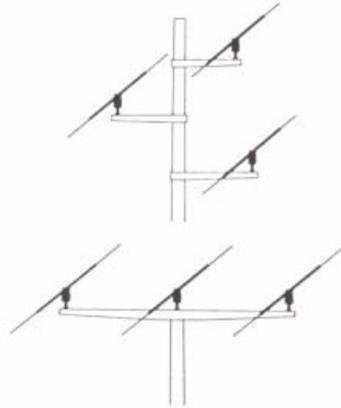




In wet weather **wooden poles** with upright insulators can be a hazard as well as poles that are grounded. For mitigation, the top of armless poles has to be well above the uppermost wire (right).



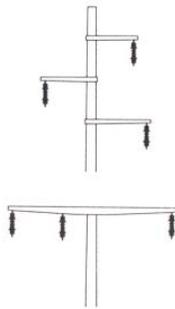
(b) Tubing



### B) POWER POLES WITH SUSPENDED INSULATORS

*Risk: low*

**Poles with suspended insulators** are fairly safe provided the distance between a likely perch (crossarm) to the energized parts (conductors) is at least 60 cm. Conductors should be spaced at least 140 cm apart. Hardware that is used to prevent arcing (“St. Elmo’s fire” on both sides of the insulators) should not be used.



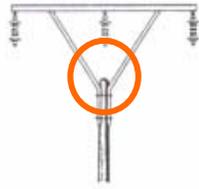
**Risk: high**

**Poles with the middle suspended insulator in a triangle- or vault-shaped frame** offer a dangerous perching site below to the middle conductor. In particular, when the poles are made of metal or concrete, these poles are of high risk for birds.

**Suggested practices:**

Insulation of the middle conductor over a total length of 200 cm is recommended.

New power poles should avoid the triangle construction type at all. Otherwise the design has to provide for a distance of 100 cm between the top column and the middle

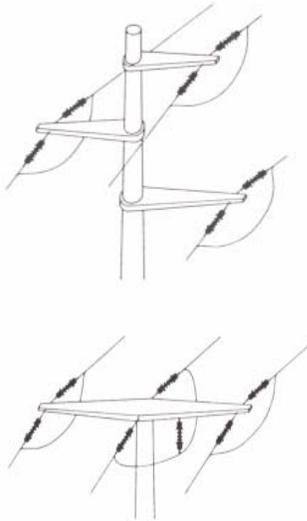


conductor.

## C) STRAIN POLES

C 1.) Strain poles with powerlines  
below the crossarm

**Risk: low, if the insulators are long enough (at least 60 cm).**



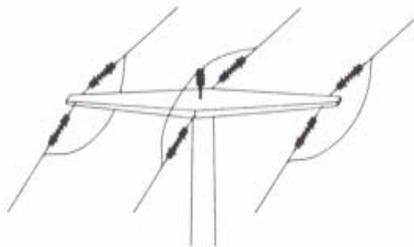
### Suggested practices:

Bird-safe strain poles require insulating chains at least 60 cm in length.

Hazardous constructions can be mitigated by lengthening the chains.

C 2.) Strain poles with one conductor  
above the crossarm

**Risk: high**

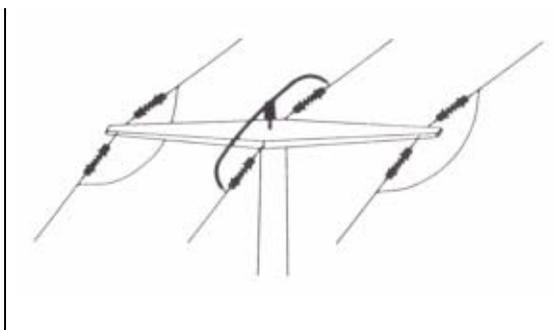
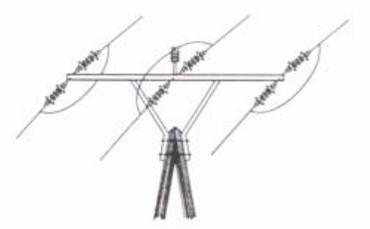


### Suggested practices:

One possibility is to eliminate the conductor above the crossarm by installing a suspended insulator (see above).

Otherwise, **insulated caps** or **insulated tubing** should be used, in instances where the conductors run above or too close to the crossarm. Junction power poles should be treated in the same way (insulation of conductors which come too near to a perching site – closer than 60 cm).

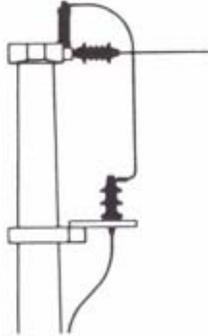
Tubing:



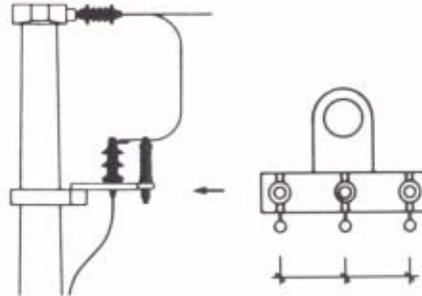
## D) TERMINAL POLES AND TOWER STATIONS

### Terminal pole

Risk: high



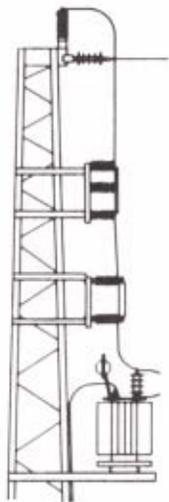
### Suggested practices:



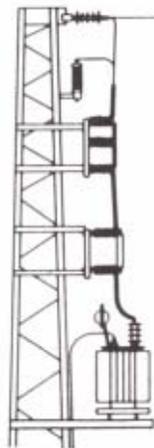
Frequently over voltage reactors extend above the tops of terminal poles and tower stations. This hazard for birds can be avoided if the over voltage reactor is attached below the crossarm and all down leading wires are insulated with tubing.

### Tower station

Risk: high



### Suggested practices:



On tower stations all contacts directly above the switch as well as between the switch and transformer should be treated likewise. Hardware used to

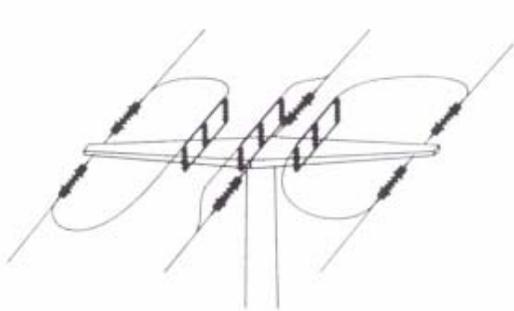
prevent electrical arcs should not be used (mitigation measure : dismantle).

## E) SWITCH TOWERS

The safest switch towers have their switches attached below the crossarm. Otherwise, mitigation measures are more complicated and do not provide the same high degree of safety for birds. As hooding is usually not possible, various techniques have been tested.

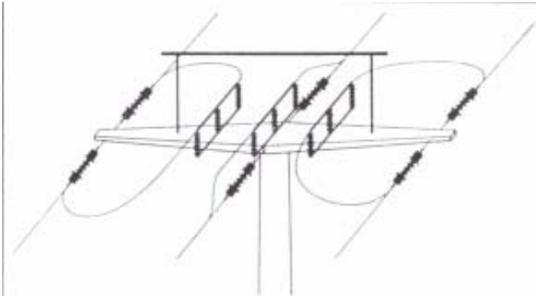
*Switch tower*

**Risk: high**

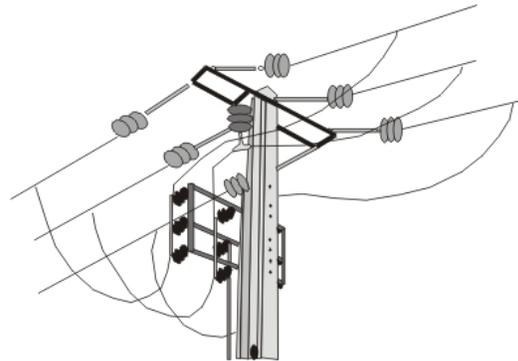


### Suggested practices:

Provisional mitigation measure: Insulated perch sites lengthwise to the crossarm keep birds from perching on the poles. They should have a rough texture.



Recommended measure: Switches should be attached below the crossarm, and the wires insulated.



### References:

These guidelines are derived from

T-PVS / Inf (2003) 15 Protecting birds from power lines: a practical guide to minimising the risks to birds from electricity transmission facilities. D Haas, M Nipkow, G Fiedler, R Schneider, W Haas, B Schürenberg, 2003 and published under Nature and environment, No. 140, Council of Europe Publishing, March 2005

Haas D & M Nipkow (2005): Vorsicht: Stromschlag! Empfehlungen zum Vogelschutz an Energiefreileitungen. NABU, Birdlife Partner Germany (Hrsg.), 2. Aufl., Bonn.