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KARNATAKA POWER TRANSMISSION CORPORATION LIMITED

Corporate Identity Number (CIN) : U40109KA1999SGC025521

Regd. Office of the Company : Corporate Office, Kaveri Bhavan, K.G.Road, Bengaluru-560009.

Date 08-AUG-2018

KPTCL/B9/85285/18-19

CIRCULAR

Sub:- Adopting eco-friendly measures to mitigate impacts of linear infrastructure on wildlife due to electrocution.

Ref:- CEA/PSE&TD/501/2018/782 dated 04/07/2018.

Director, Power System Engineering and Technology Development Division, Central Electricity Authority, MOP, GOI, has reported that wildlife animals are getting killed due to electrocution from the transmission and distribution lines passing through the protected areas and other wildlife rich areas, despite a lot of mitigation measures taken by Ministry of Environment, Forest and Climate change (MoEF&CC). He has stated that Wildlife Institute of India (WII) in consultation with MoEF&CC, National Highway Authority of India, National Tiger Conservation Authority and World Bank Group has come out with guidelines named **"Eco- friendly Measures to Mitigate Impacts of Linear Infrastructure on Wildlife"** in order to mitigate this serious issue. The Director has requested to adopt the said guidelines while designing transmission and distribution lines through protected areas and wildlife areas.

In this regard, it is directed that the said guidelines shall be followed while designing transmission and distribution lines through protected areas and wildlife areas. The relevant pages of the guidelines are annexed to this circular for further needful action.

Deputy General Manager (Tech)
KPTCL, Bengaluru.

Copy to:-

1. The Managing Director, BESCOM / MESCOM/ HESCOM / GESCOM / CESC.
2. The Director (Technical), BESCOM / MESCOM/ HESCOM / GESCOM / CESC.
3. All Chief Engineers (Ele), KPTCL.
4. All Superintending Engineer (Ele), KPTCL.
5. The Superintending Engineer (Ele), (IT &MIS) to publish the circular along with annexure in KPTCL web-site.
6. All Executive Engineers (Ele), KPTCL.

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग
Power System Engineering & Technology Development Division
Room No. 334, Sewa Bhawan, R.K. Puram
New Delhi – 66, Telefax: 26170541 Telephone: 26732342

सं. CEA/PSE&TD/501/2018/ 782 Date: 04-07-2018

सेवा में,

As per attached list

विषय: **Adopting eco-friendly measures to mitigate impacts of linear infrastructure on wildlife due to electrocution - reg.**

महोदय,

As you may be aware wild life animals are getting killed due to electrocution from the transmission & distribution lines passing through the protected Areas and other wildlife rich areas despite a lot of mitigation measure taken by Ministry of Environment, Forest & Climate Change (MoEF&CC). Wildlife Institute of India (WII) in consultation with MoEF&CC, National Highway Authority of India, National Tiger Conversation Authority, and World Bank Group has come out with guidelines named "Eco-friendly Measures to Mitigate Impacts of Linear Infrastructure on Wild Life" in order to mitigate this serious issue.

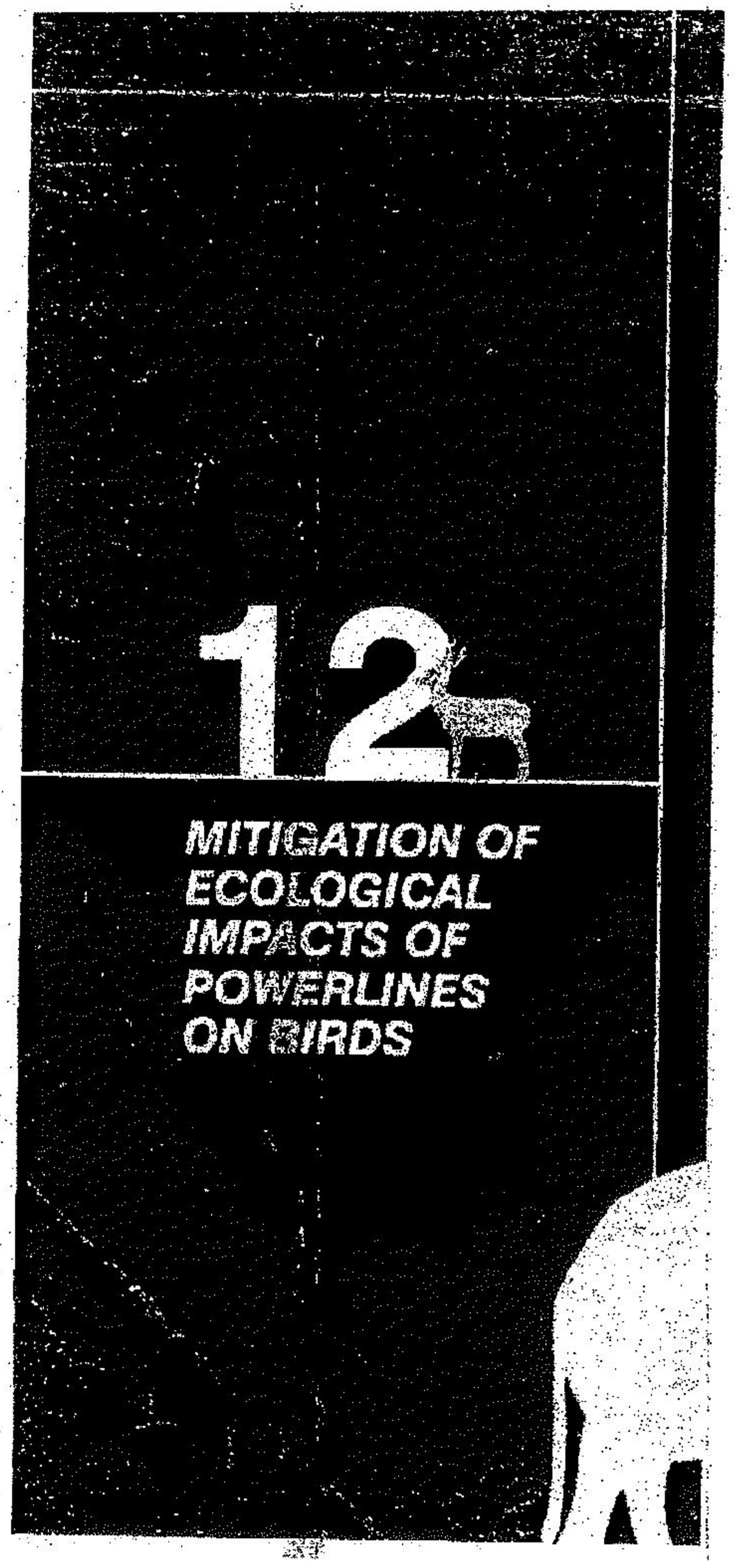
In this regard it is requested that above guidelines may be followed while designing transmission and distribution lines through protected areas and wild life areas. Relevant pages of the guidelines are attached.

भवदीय,

7/7/18

योगेन्द्र कुमार स्वर्णकार/ Y.K.Swarnkar
निदेशक/Director


ECO-FRIENDLY
MEASURES TO MITIGATE IMPACTS OF
LINEAR INFRASTRUCTURE ON
wildlife



Electrocution of birds, and their collision with powerlines, is not only a topic of conservation concern but also an issue of serious economic and financial costs. Appropriate routing and structure of powerlines is said to reduce the risks of bird collision and electrocution by 50% or more (Prinsen et al. 2011).

Several guidelines have been suggested by different experts and agencies to minimise the impacts of powerlines on birds (Haas et al. 2005; APLIC 2006; Tucker & Treweek 2008; Prinsen et al. 2012). Based on these guidelines, the following steps are recommended:

PLEASE NOTE

Transmission lines are out of the purview of the list of projects requiring environmental clearance under the EIA Notification, 2006, and have been categorised as Category B2 projects. However, considering the magnitude of impacts of these structures on the environment and wildlife, particularly avifauna, they require environmental clearance if located within close proximity of / or within the 10 km boundary of Protected Areas, habitats for migratory birds and other sensitive sites (see Chapter 3).

1. Early planning and rigorous Environmental Impact Assessment (EIA) are two core requirements for reducing bird mortality due to powerlines, as well as minimising the risks of costly power outages. A nationwide strategy should be developed and supported to undertake the long-term planning of electricity grid networks as a priority. Planning should include the use of state-of-the-art bird protection equipment, and burying low-to medium-voltage powerlines below ground where feasible. In the Netherlands, burying these lines effectively removes the problem of bird electrocution. This prevention measure is also utilised in other European countries such as Belgium, United Kingdom, Germany, Denmark and Norway. EIA is an invaluable tool to inform decision making, helping to ensure that powerlines are appropriately routed and designed.
2. Decisions on the routing of powerlines and shifting of transmission structures should be done collaboratively, involving the electricity supplier company, government bodies, conservation agencies, land owners and other interested and affected parties, culminating in one or more memoranda of understanding. In South Africa, for example, this practice has

been done by cooperation between the single utility company, Eskom, and a conservation NGO, the Endangered Wildlife Trust, and has helped resolve problems of bird electrocution and collisions, which was most effective (Prinsen et al. 2012).

3. As far as possible, bird collisions should be minimised by locating new transmission lines within existing power transmission corridors rather than by creating new corridors within prime bird habitats and across their migratory routes.
4. A database should be prepared that includes relevant information which must be taken into account in planning powerline corridors: location of protected area networks; important bird and wildlife habitat; presence of threatened bird species that are particularly vulnerable to collisions or electrocution, their flight routes between feeding, breeding and resting habitats; as well as information on migratory corridors.
5. A list of key conservation areas and species should be identified from this database to identify priorities for mitigation along different stretches of the powerline corridor: the routing of new powerlines should strive to avoid key areas and structures should incorporate the latest technology. Existing sections of powerline should be retrofitted with state-of-the-art technology or be re-routed away from key areas to reduce the risks of electrocution and collision.
6. A post-construction monitoring programme should be developed to check the efficiency of mitigation measures and enable further improvement.
7. Management of facilities and sites near powerlines that are known to attract birds—especially raptors, such as carcass and garbage dumps, can help minimise bird mortalities.

I. MODIFICATIONS TO POWERLINES TO MINIMIZE BIRD ELECTROCUTIONS

Measures to prevent bird electrocution are of paramount importance and are easier to achieve than measures to prevent collisions. Retrofitting existing powerlines is considered to be best practice to prevent bird electrocutions (APLIC 2006; Prinsen et al. 2012). The following measures should be used:

1. A power pole configuration should be designed to minimize avian electrocution risk by providing a separation between energized conductors or phases and grounded hardware larger than the wrist-to-wrist or head-to-foot distance of a bird (Figure 12.1).

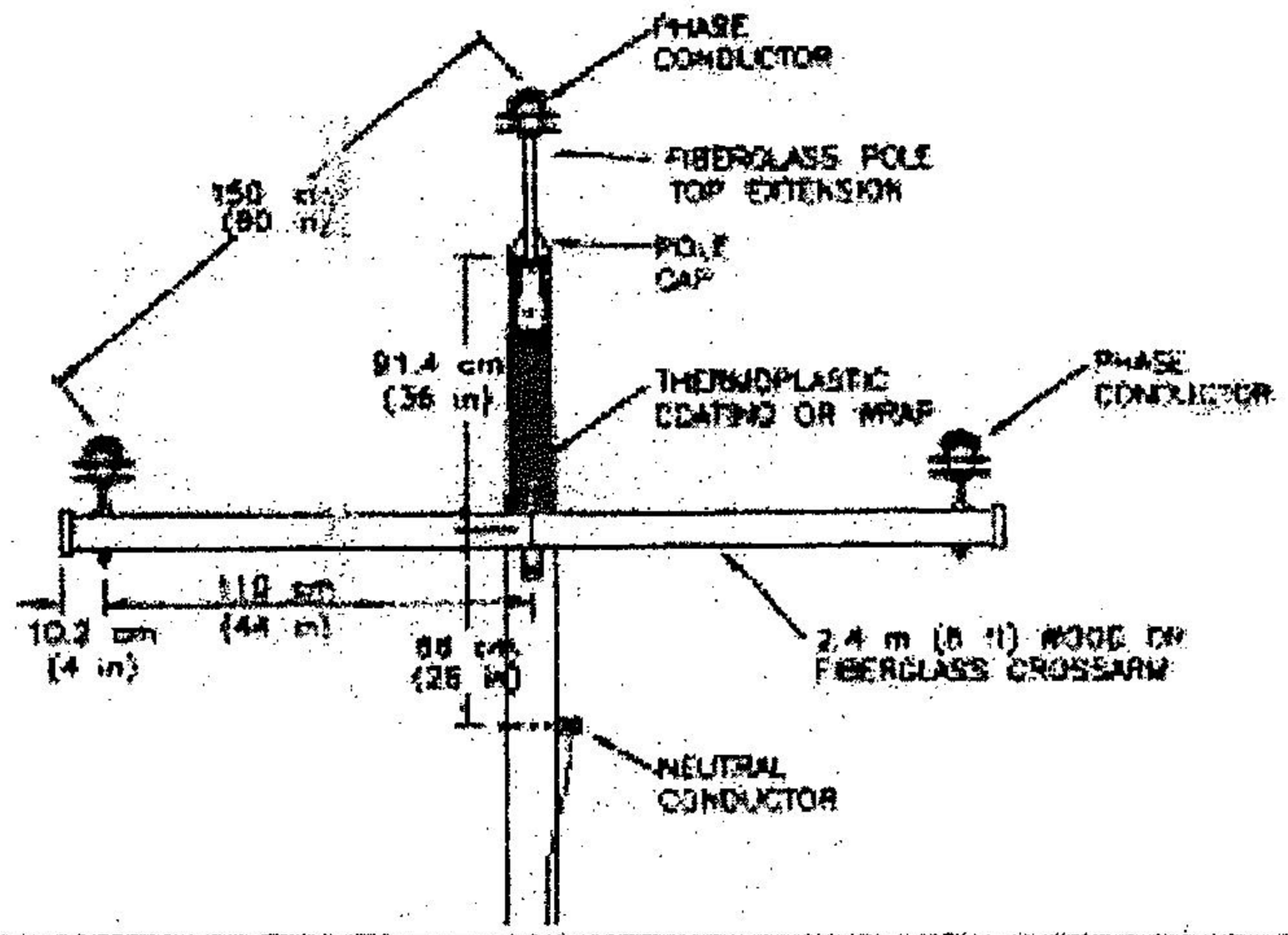


Figure 12.1. To prevent avian electrocutions, a minimum of 150 cm separation of phase wires horizontally and 110 cm between phase and grounded equipment on the cross-arms has been recommended.
Source: APLIC 2006.

2. Places where such separations are not possible, bare parts of poles like phase wire, insulators, jumper wires should be covered by a non-conductor insulated material (Figure 12.2).

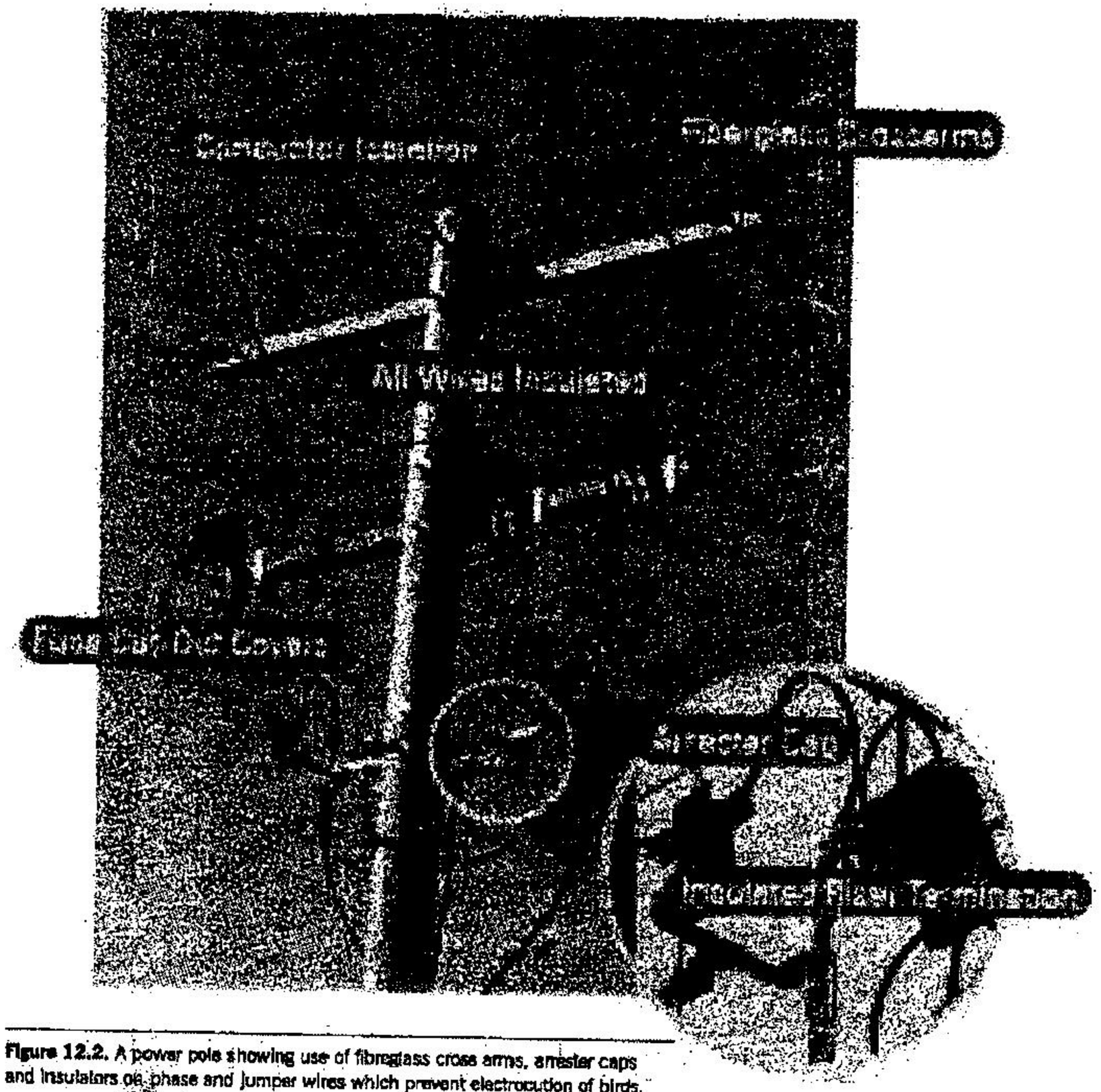


Figure 12.2. A power pole showing use of fibreglass cross arms, arrester caps and insulators on phase and jumper wires which prevent electrocution of birds.
Source: http://www.anadarko.com.

3. In the case when insulation of distribution lines is not possible, perch deterrent can be placed on the pole to prevent a bird from perching on it (Figure 12.3).

Figure 12.3. Perch deterrents are known to be effective in reducing raptor electrocutions in the USA.
Source: Slater & Smith 2010.

4. Installation of phase wires below the cross arms, using suspension insulators, can reduce electrocution risk.
5. Artificial bird perches or nesting platforms can be provided on the top of the power poles for birds in habitats that lack perching and nesting sites, thereby helping to prevent electrocution.

II. DESIGN AND CONFIGURATION OF POWERLINES TO MINIMISE BIRD COLLISIONS

Measures to prevent or reduce bird collisions with powerlines are difficult. However, the risk of collisions can be minimised by re-routing powerlines away from key bird areas, attaching bird diverters to lines and burying the power cables underground in areas used intensively by birds (APLIC 2006; Prinsen et al. 2012).

1. Powerlines should not be located in Important Bird Areas (IBAs) such as water bodies and forested areas where large numbers of birds congregate. Where powerlines have already been erected in IBAs, re-routing or shifting those lines or by retrofitting mitigation measures can reduce bird collisions.
2. Potential collision risk can be reduced by keeping all key bird areas on the same side of the powerline corridor, providing a safe 'flyway' by minimising the need for birds to cross that corridor; i.e. where a bird's feeding, resting and/ or nesting sites are in close proximity, powerlines should avoid bisecting those areas (Figure 12.4).

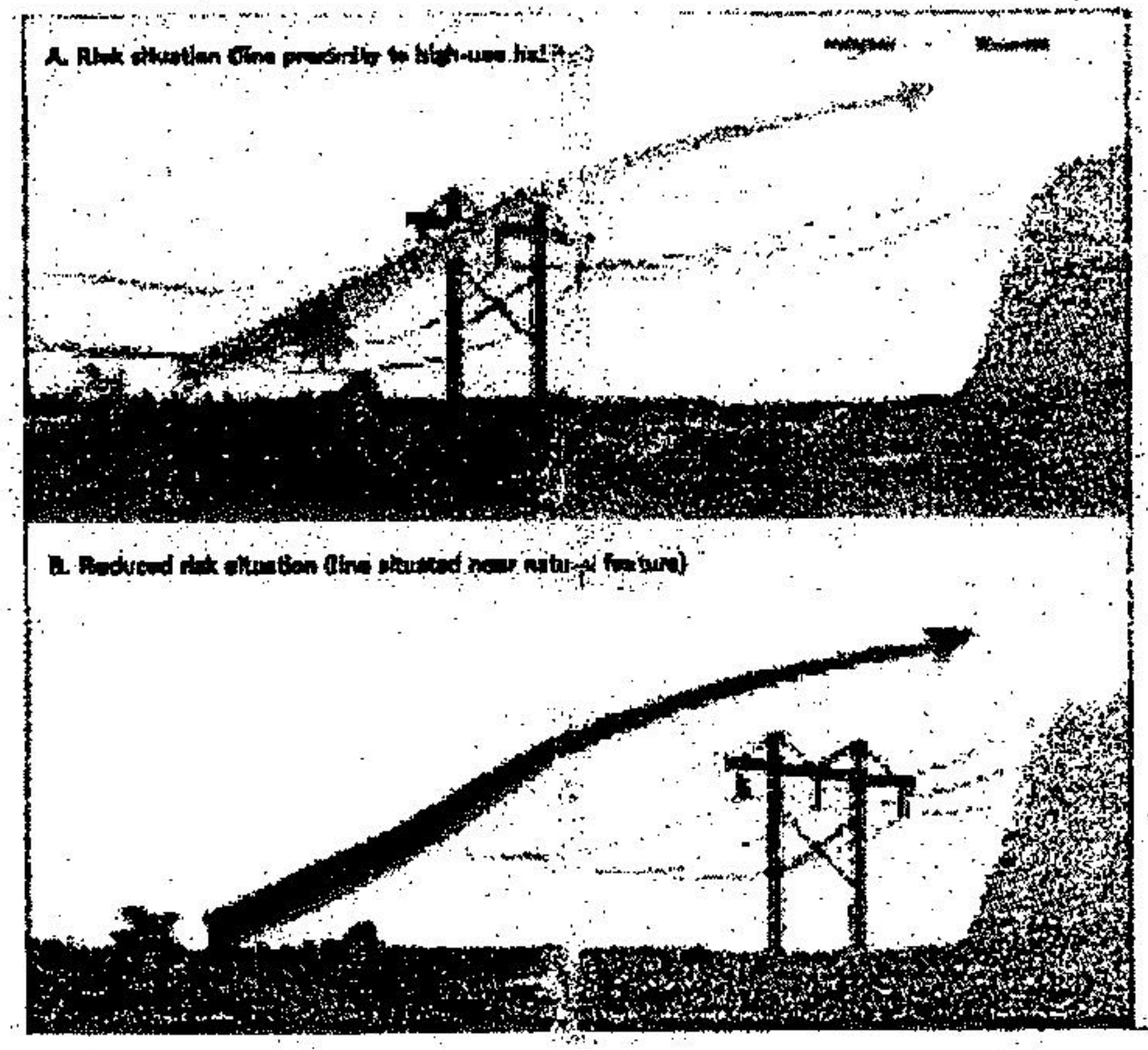


Figure 12.4. Image showing (A) the placement of power line corridors that are a threat to birds and (B) the placement that will reduce the risk of bird collision (after Thompson 1978).

Source: *APLIC 2012*

3 Placement of multiple, vertical layers of conductor wires should be minimised. Alternatively, the conductor wires should be placed closer together, vertically, so as to enhance the visibility of an obstruction to birds.

4. New powerline corridors should be placed close to an existing corridor where feasible, so that birds already accustomed to the presence of powerlines in the area will be able to see the collective obstacle as well as have a better chance of avoiding the second powerline if it is of the same, or lower, height (Figure 12.5).

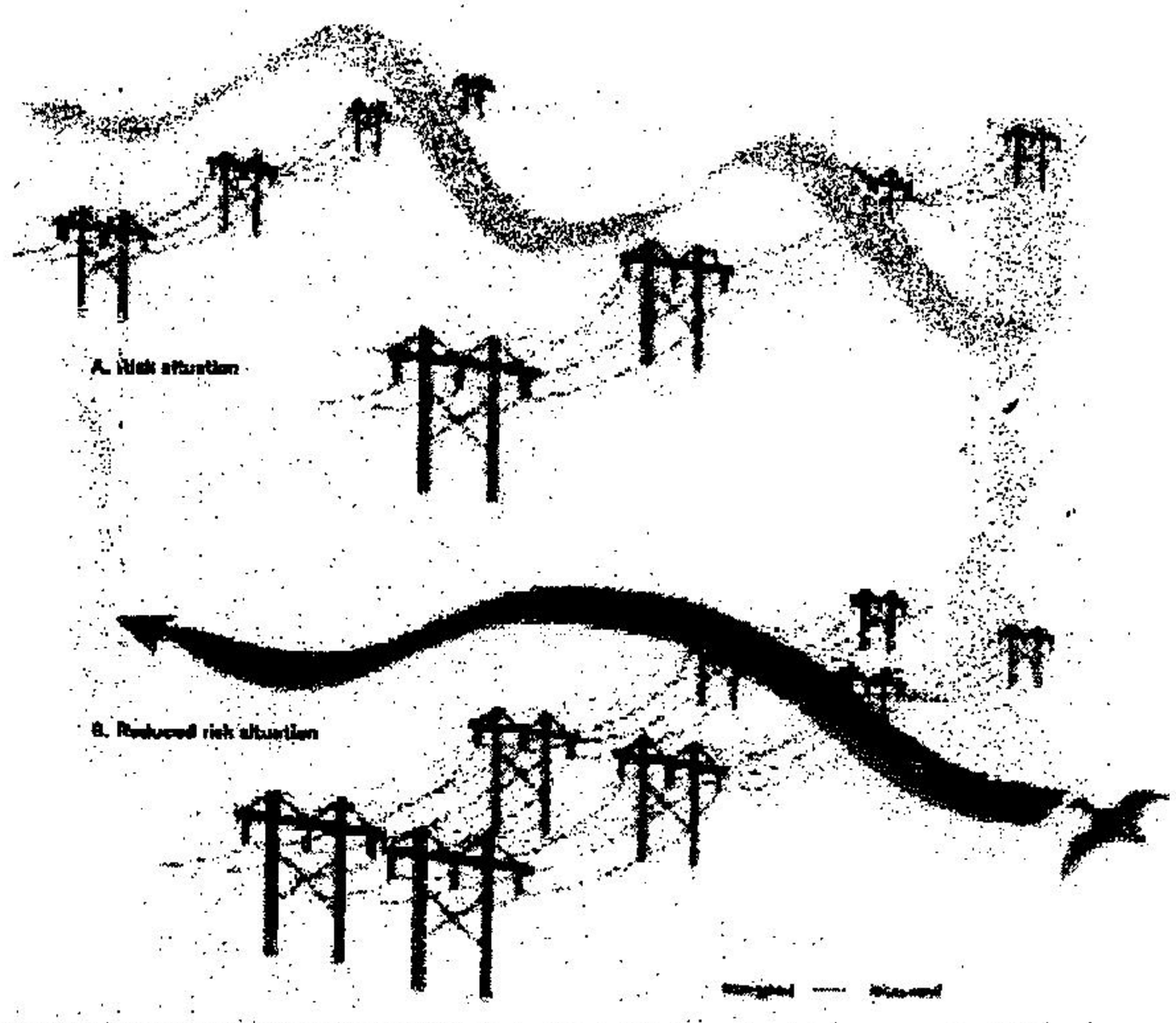


Figure 12.5. Recommended placement of multiple powerline corridors that will reduce the risk of bird collisions (after Thompson 1978).

Source: APLIC 2012.

4. Birds frequently collide with the earth wires installed at the top of transmission lines, as it is less visible and smaller in diameter (Figure 12.6). Removal of the earth wire has been reported to reduce bird collisions (Beaufaurier 1981; Brown et al. 1987). However this is rarely a viable option since the earth wires protect the powerline installation from lightning strikes. This is only possible in areas where there is very low lightning and to a limited extent (APLIC 2012).

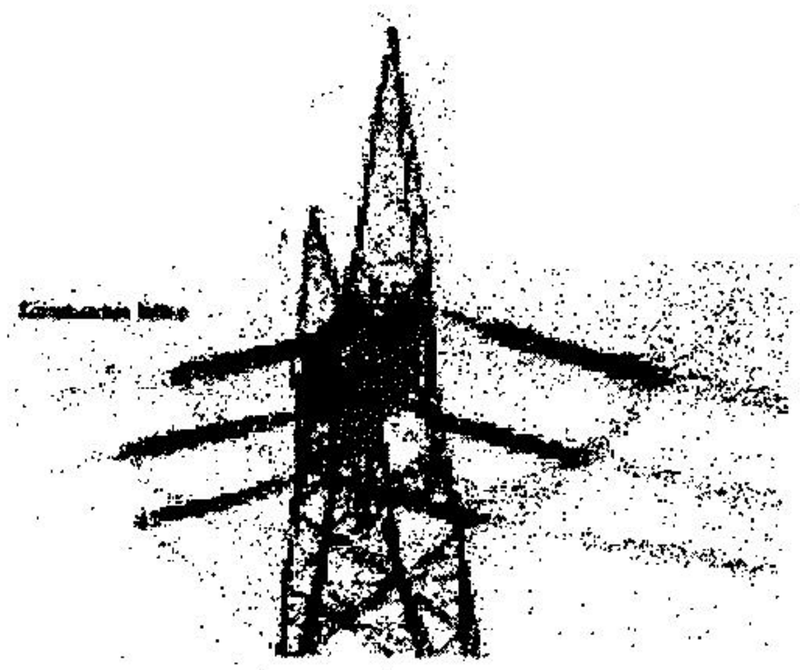


Figure 12.6. A high voltage transmission line showing the conductor wire and the partially visible earth wire that birds frequently collide with.

5. Where the earth wires cannot be removed, using line marker devices should increase their visibility. Marker devices are available in several colours and are visible to birds from a long distance. Many types of marker devices are available, such as spheres, swinging plates, spiral vibration dampers, strips, flight diverters, bird flappers, ribbons, tapes, flags, and crossed bands (Figure 12.7).

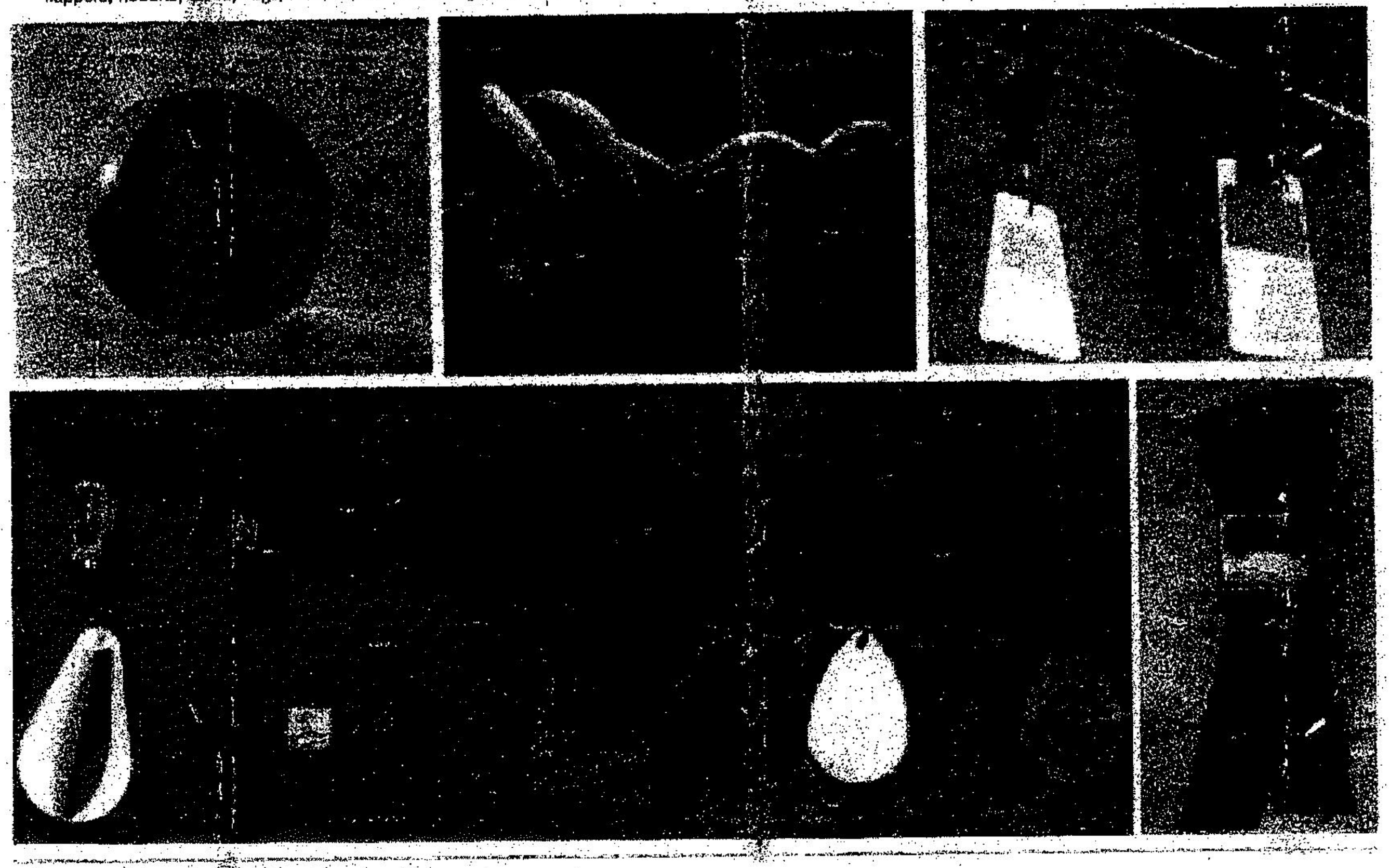


Figure 12.7. Range of marker devices used on wires to improve their visibility to birds.
Source: PR Tech website; http://pr-tech.com/shop/birdaway-bird-diverters/.

6. Line markers should be as large as possible. The spacing between them should not be more than 5 to 10 m. Marker devices should be chosen to contrast as much as possible with the background colours (Figure 12.8), and, importantly, should be visible at night: most bird collisions are said to occur at night.

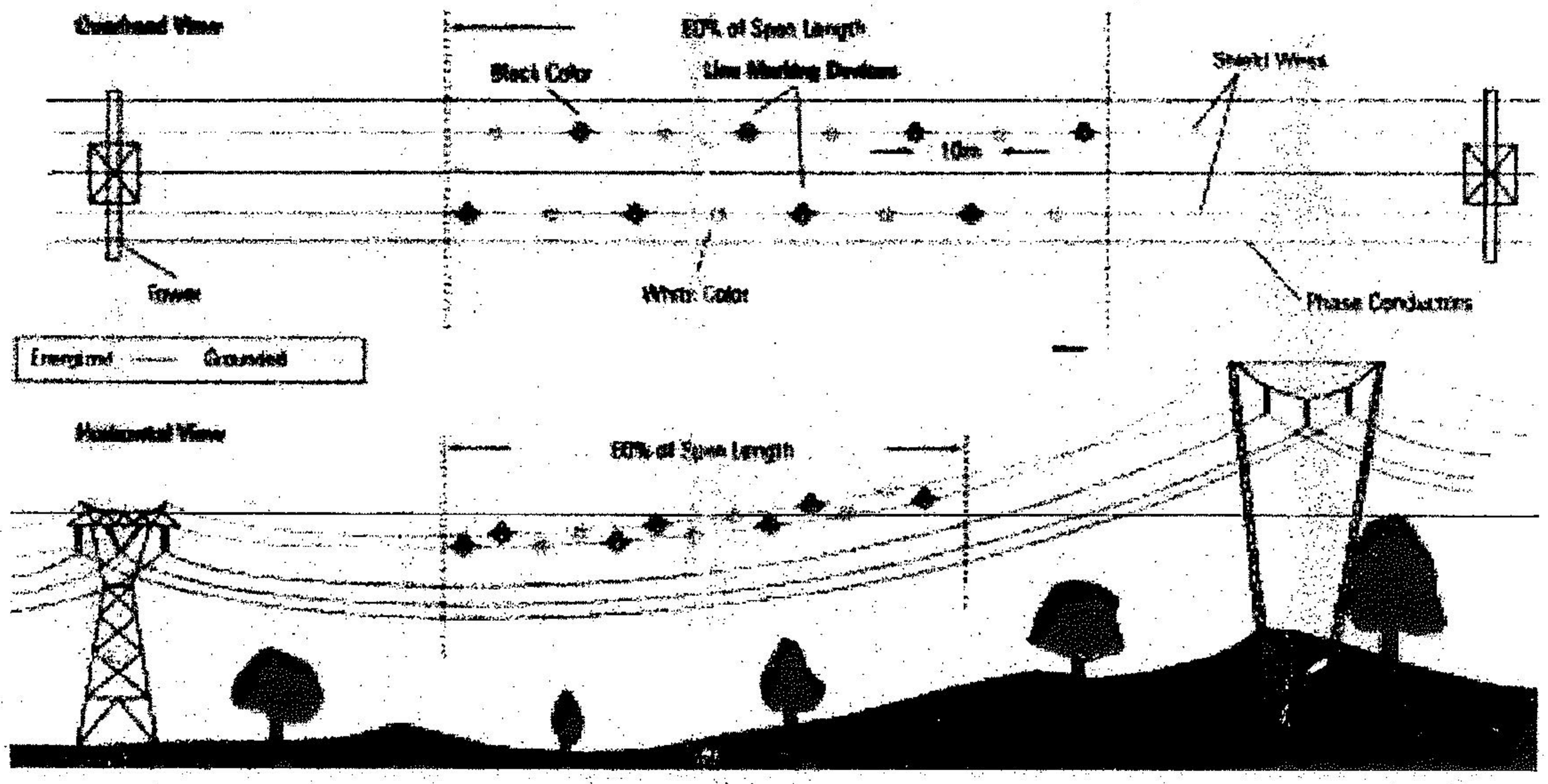


Figure 12.8. Design and configuration of markers to reduce bird collisions (after Eskom Transmission (South Africa) 2009).
Source: *APLIC 2012.*