

“OVERHEAD POWER LINES AND BIRDLIFE”

Évora, 2 June 2016

EDP DISTRIBUIÇÃO (EDPD) and the Birds Protection

EDP Distribuição (EDPD) is a regulated company and is the distribution system operator in Portugal, which holds the concession for the operation of the National Distribution Network (NDN) Electric Power Medium Voltage (MV) and High Voltage (HV) and municipal contracts electricity distribution in Low Voltage (LV).

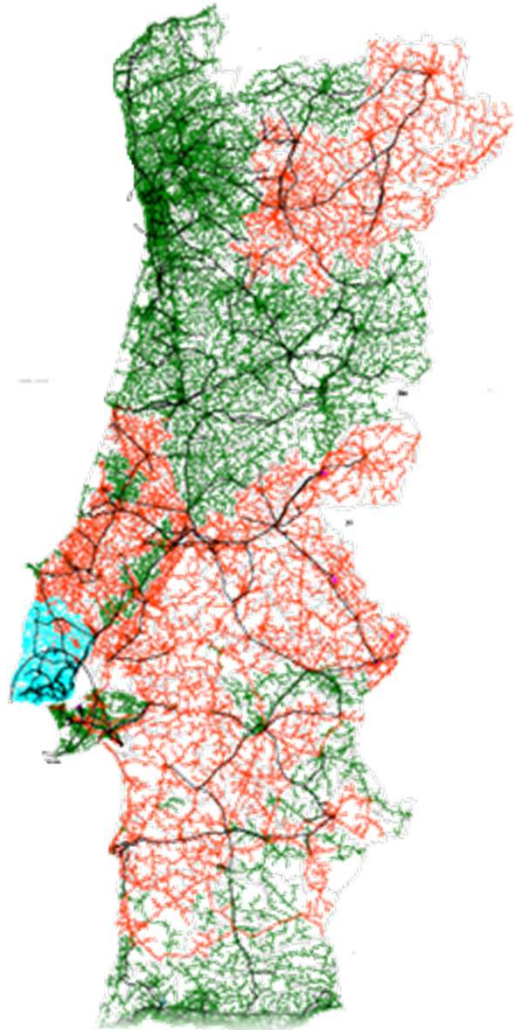
The construction of distribution lines (medium and high voltage) don't require an Environmental Impact Assessment process (EIA). This circumstance did not promote the existence of regular or systematic sources of information about birds electrocution and collision related with the distribution network. Only since 2000 began to be required prior opinion of the current Institute for Nature Conservation and Forests (ICNF) in distribution lines built in Classified Areas.

It is in this context that the EDPD has been integrated in the design phase and on a voluntary basis into the existing lines, procedures and technical solutions that minimize the potential of bird mortality.

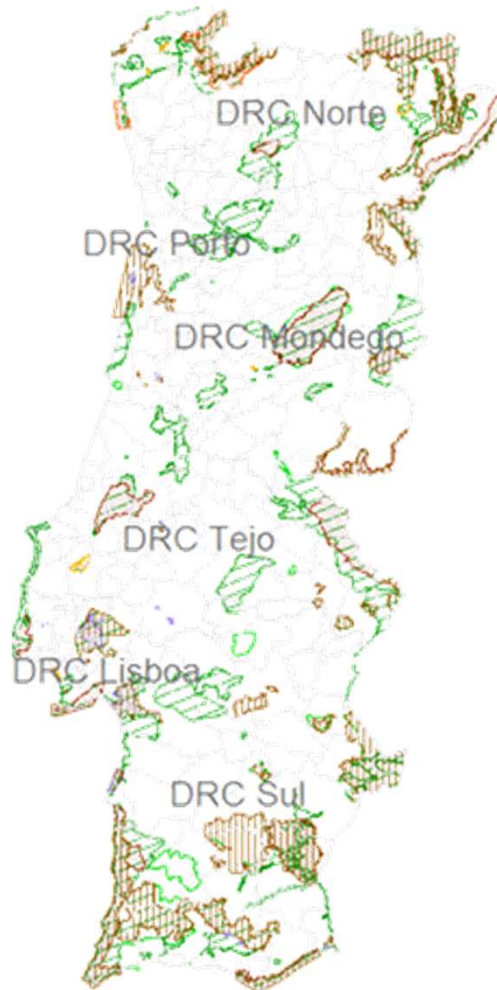
BIRDS PROTECTION

Distribution Network / Classified Areas

Distribution Network HV/MV



Nacional System of Classified Areas



Nacional System of Classified Areas (NSCA):

National Network of Protected Areas 2000; (Ramsar and Biogenetic reserves); Important áreas for birds (IBAs) of Continental Portugal.

Electrical grid located within the classified area (NSCA).

HV - 932 km.

MV- 8 140 km. (SIT 2015)

BIRDS PROTECTION

Path taken

Information sharing

Strategy

Work groups

1999-
2015

- ❖ Analysis of national and international studies, submitted by NGOs (Quercus, SPEA) and ICNF, warning of the resulting problem of the interaction of birds with overhead power lines.
- ❖ Typology analysis and configuration of our network / classified Areas
- ❖ Involvement of the Company to solve this issue in line with its biodiversity protection policy and promoting a good dialogue among all stakeholders.
- ❖ Working Group of Wild Birds (GTAS); Several Technical Directions of EDPD.
- ❖ Commission technique monitoring of overhead power Lines Birds (CTALEA); EDPD; NGOs (Quercus, SPEA, LPN) and ICNF.

Quercus - National Association for Nature Conservation; SPEA – Portuguese Society for the Study of Birds;
LPN – League for the Protection of Nature and ICNF - Institute for Nature Conservation and Forests .

BIRDS PROTECTION

Protocols

The “Avifauna Protocols” are the consequence of the strategy adopted by the working groups of the “Overhead power lines and bird life” in 1999 (GTAS and CTALEA), from which emerged the need to develop and implement a set of concerted actions that have been key to mark the company's intervention on this area.

Main actions developed

- Identification of the most important overhead power lines for birds protection (prospecting studies).
- Risk maps elaboration for target species (Imperial Eagle, Black Vulture, Golden Eagle, Bustard ...).

- Lines correction resulting from prospecting studies and risk maps, approved by the CTALEA.
- Correction of overhead power lines integrating community projects, (Interreg; Life).
- New Technology (test).

- Monitoring of fixed lines:
 - Equipment of effectiveness
 - Application processes.
 - Lifetime rating of the equipment applied.

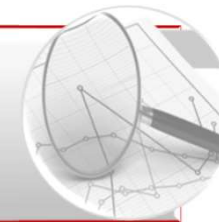
Prospective studies



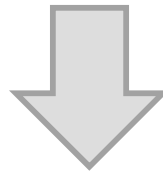
Power lines correction



Monitoring studies



TECHNOLOGIES APPLIED ON CORRECTION OF OVERHEAD POWER LINES (HV and MV)

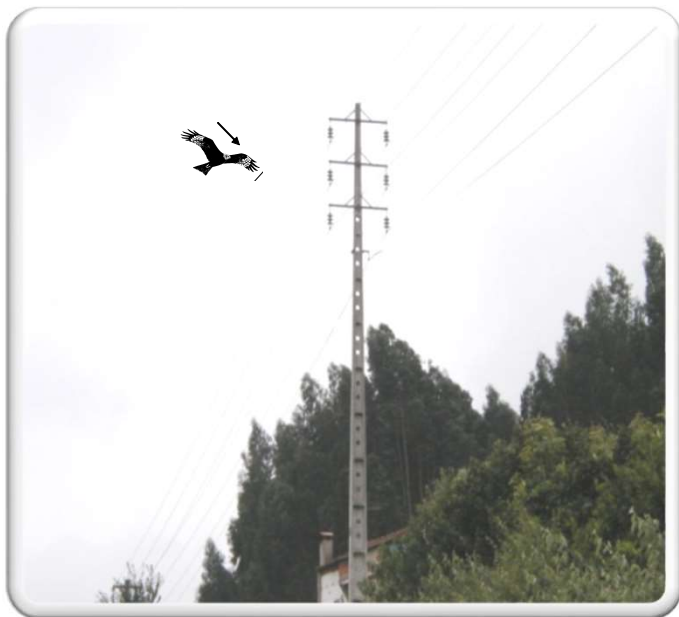


- 1** *ANTI-COLLISION EQUIPMENT*
- 2** *ANTI-ELECTROCUTION EQUIPMENT*

BIRDS PROTECTION

COLLISION

PROBLEM



Collision

Interaction of birds in flight with overhead power lines.

Occurs when birds:

- ✓ are not able to distinguish the overhead power lines;
- ✓ visualize too late the overhead power lines, so they can't avoid the collision.

- The birds with lower flight ability (juvenile or less adapted to the flight) and those who fly in flock and / or at night, are exposed to a greater risk of collision;
- Adverse weather conditions such as rain, wind or fog also increase the risk of collision.

Impacts

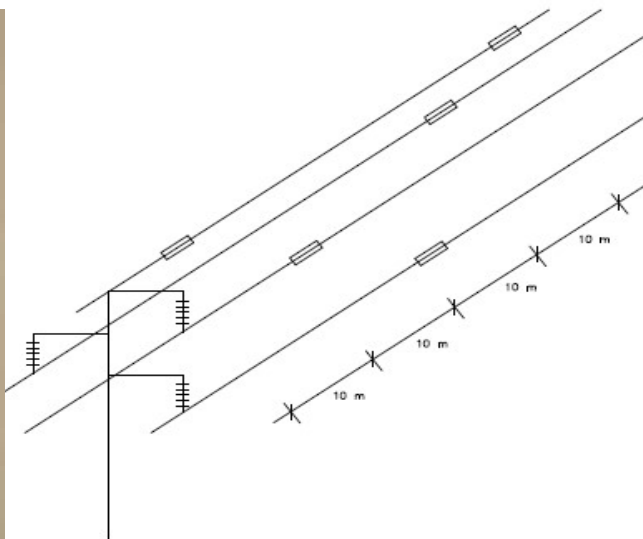
May cause injury or death to the birds.

BIRDS PROTECTION

1 Anti-collision Solution

The spiral signaling device is applied to overhead power lines in bare phase conductors and guard cables.

**Simple spiral PVC
colors (white and red)**



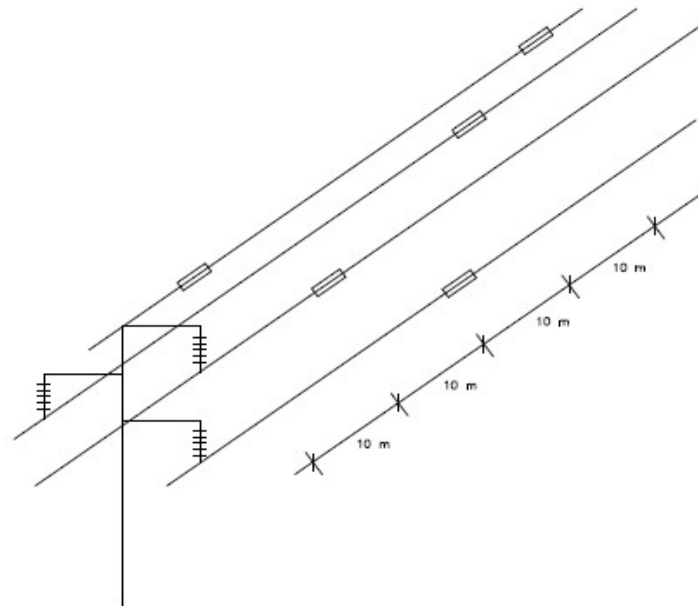
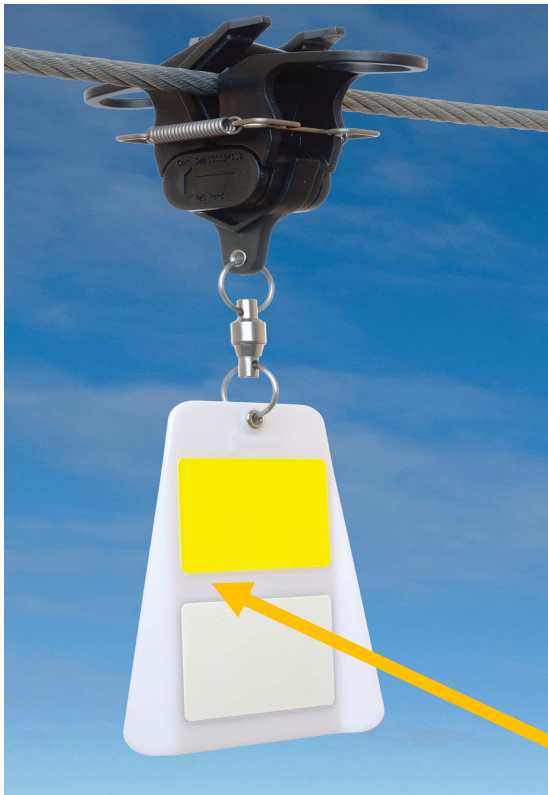
**Double spiral PVC
colors (white; red and yellow)**

BIRDS PROTECTION

1 Anti-collision Solution (New Technology)

Signaling devices, FBF / D (Firefly Bird Flapper / Diverter) are applied overhead power lines (HV and MV) in bare phase conductors and guard cables.

FIREFLY "ROTARY"



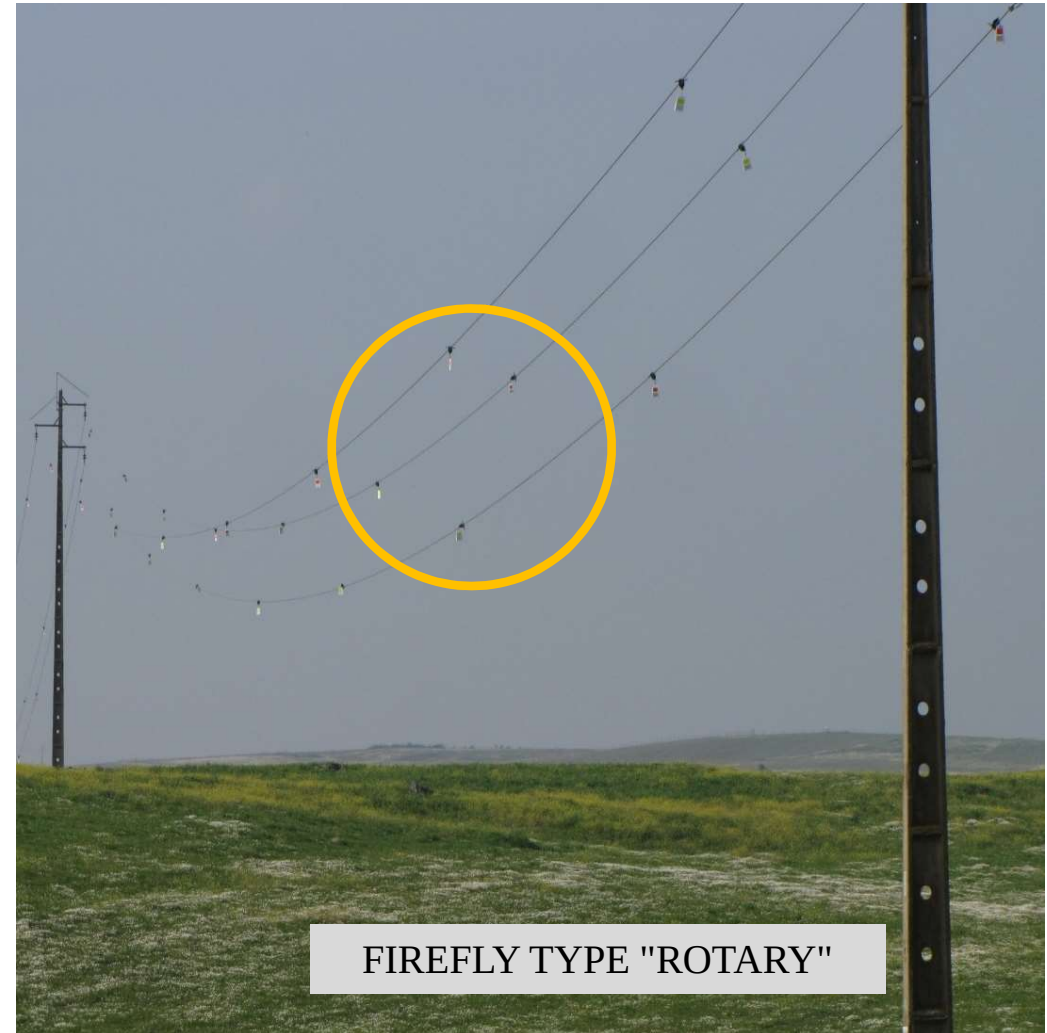
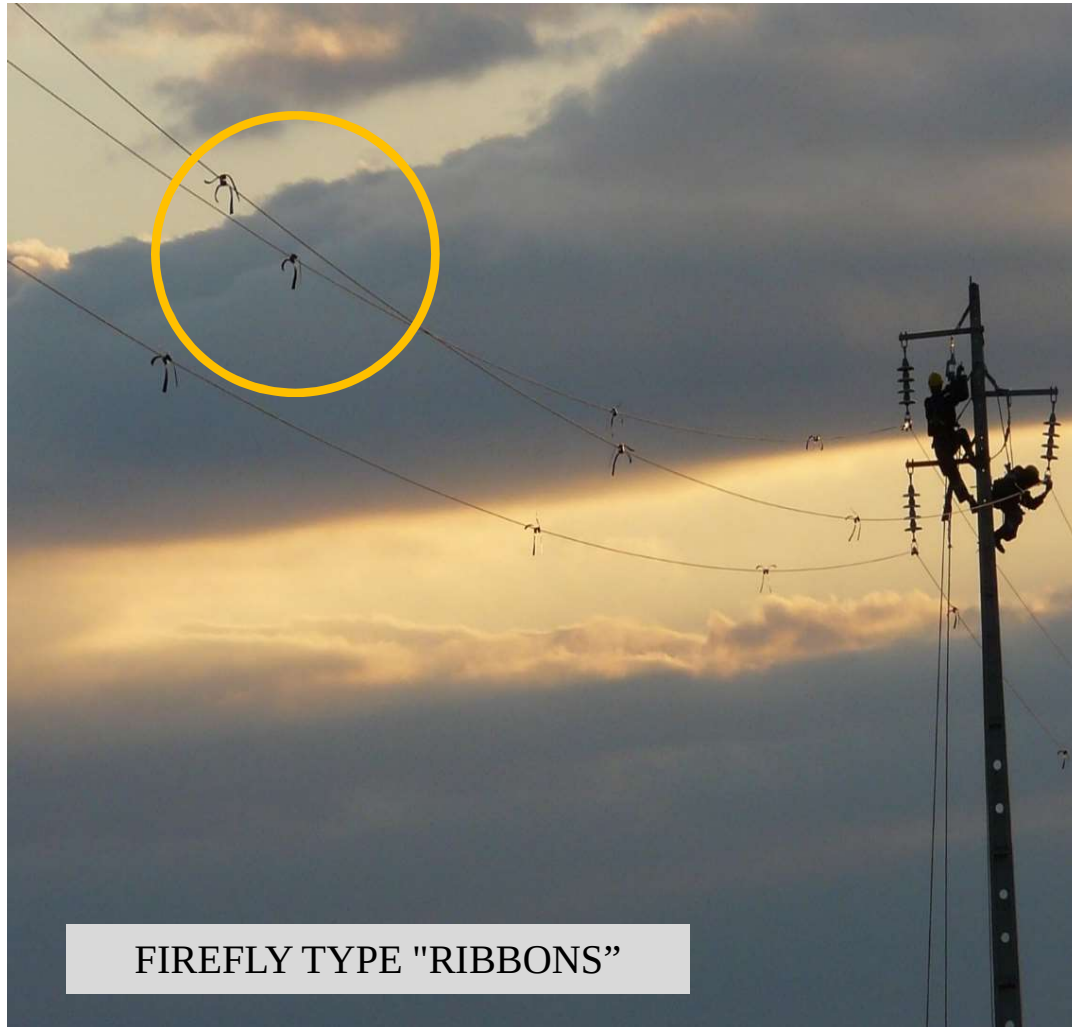
Photoluminescent and
reflective plates

FIREFLY "RIBBONS"



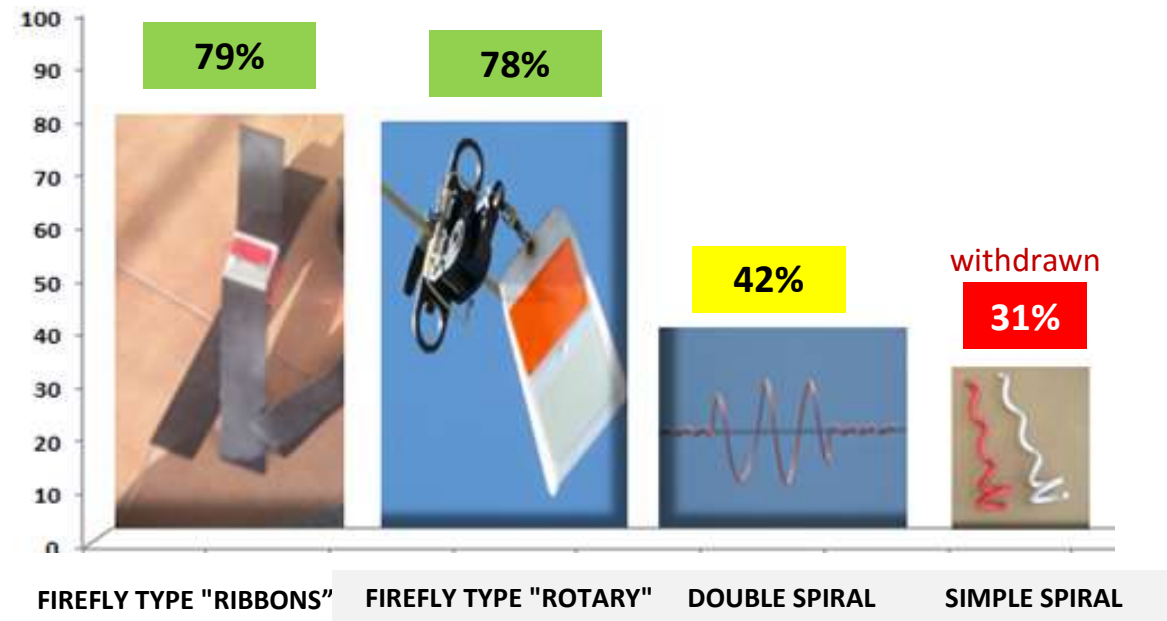
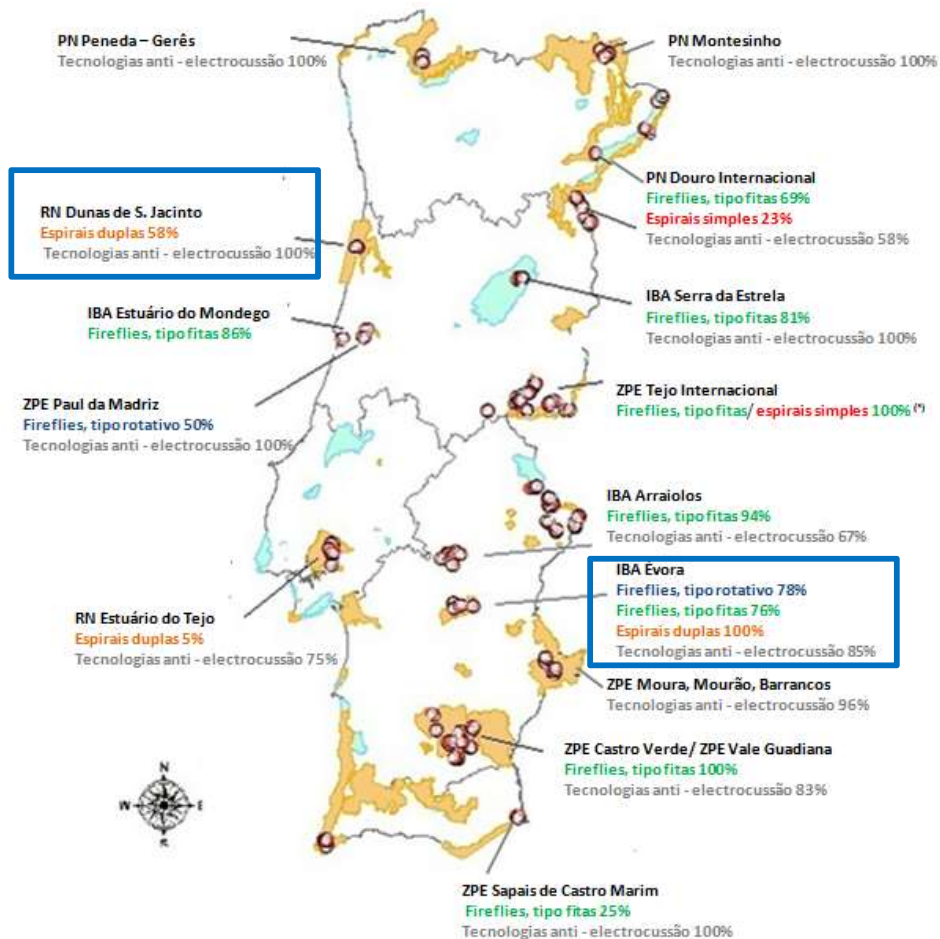
BIRDS PROTECTION

1 Anti-collision Solution (New Technology)



BIRDS PROTECTION

EFFECTIVENESS OF APPLIED TECHNOLOGIES

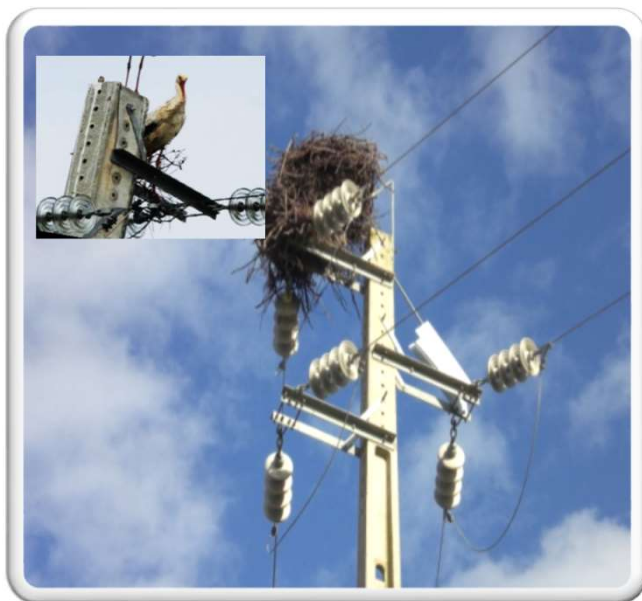


These results show the average efficiency of each of the equipment at a national level. However, the reality may change for different habitats and different species.

BIRDS PROTECTION

ELECTROCUTION

PROBLEM



Interaction of birds with unprotected electric parts of electric poles .

Occurs when birds touch:

- ✓ simultaneously in the two conductive phases in tension;
- ✓ a phase and a non-conductive structure of electrical equipment connected to the ground (cable guard or support).



impacts

May cause injury to the birds or death.

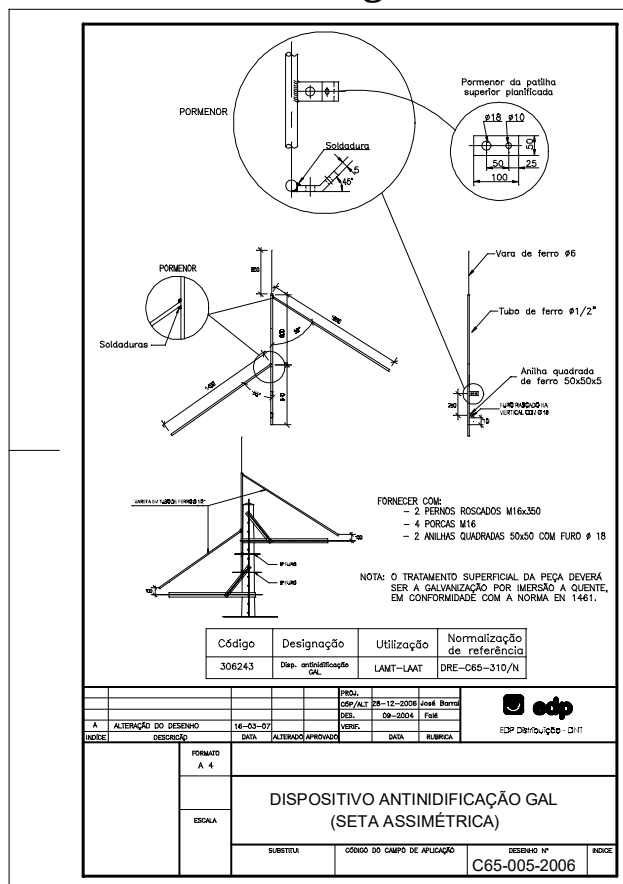
- It affects the large birds that lands at the power lines supports located in its hunt territory;
- The white stork species are affected when uses the electric poles to nest.

BIRDS PROTECTION

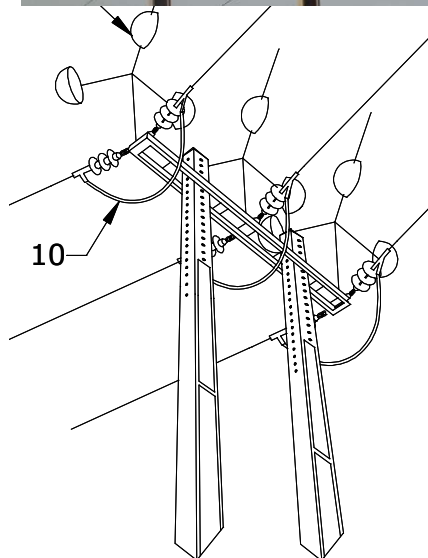
2 Anti-electrocution Solution

Deterrents of nesting (DDNS) and anti perch devices, are applied in MV and HV network poles, to avoid the large bird perching and the white stork nesting:

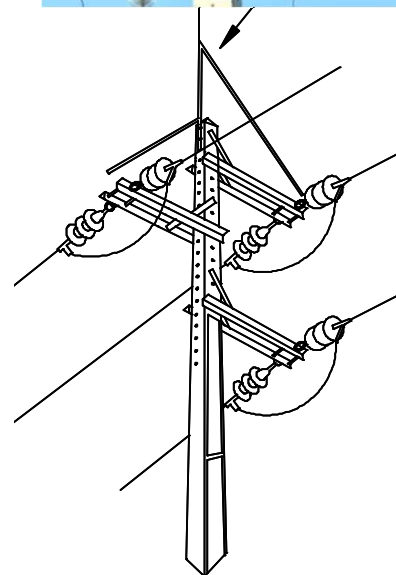
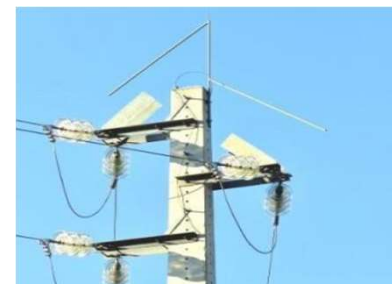
Technical guide



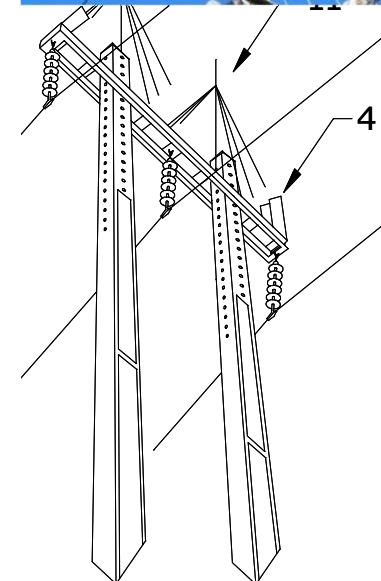
Turbine



Asymmetric arrow



umbrella



BIRDS PROTECTION

2 Anti-electrocution Solution

These protective devices are applied to some electric parts, contiguous to the electric poles. These devices provides large bird protection.



naked conductor
protector
(model 2)



Lashing clamp
protector

Hard isolator protector

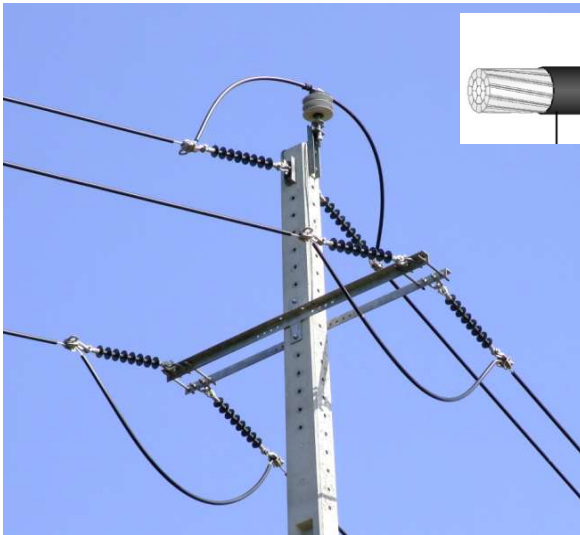


- **These devices have shown efficacy on average close to 100%, relative reduction of electrocution.**
- **However their application has led to a growing number of micro-cuts in the electrical grid that are related with the configuration of the equipment.**
- **For this reason, the company decided to promote the application of new technical solutions in order to maintain a good efficiency, reasonable costs while maintaining normal grid operation.**

BIRDS PROTECTION

Anti-electrocution and Anti-collision Solution (New Technology)

Line with covered cable TREE WIRE.



Line with covered cable SPACER CABLE.



Line with standard cable covered



Systems developed by US company HENDRIX.

NEW TECHNOLOGY - applied at the construction of new overhead power lines.

- Overhead power Lines built in covered cable, have a good effectiveness in terms of protection of birds, but high costs;
- EDPD tested other solutions.

BIRDS PROTECTION

2 Anti-electrocution Solution (solution in test)

Primary coating



Mastique tape
self vulcanizing

Secondary coating



Silicone tape self
vulcanizing

Coverage / Mechanical fixing



Flexible cover protective
conductor



Guard lashing
clamp

Different material applications.

- 1st - Isolate the live parts by applying protection tape.
- 2nd - Reinforce the insulation through the usage of protective coverage and guard lashing clamp.

"Combined solution"
(in test)

BIRDS PROTECTION

2 Anti-electrocution Solution (solution in test)



"Combined solution" applied in lashings typology

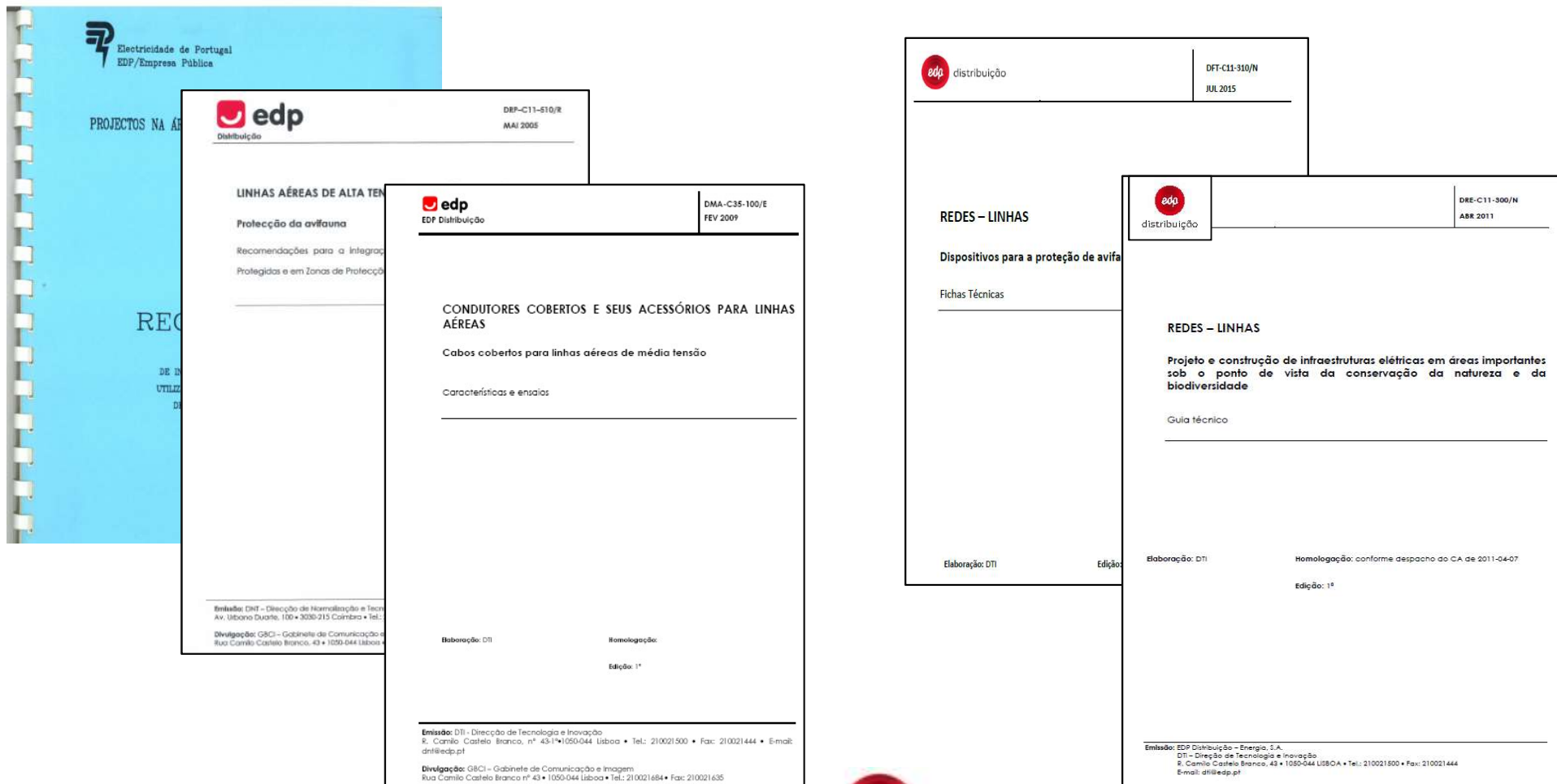


"Combined solution" applied in isolator

BIRDS PROTECTION

Procedures and Normative

Internal documents that defines the company intervention for the birds protection (eg. Recommendations, Fact Sheets and Procedures).



BIRDS PROTECTION

Future...

- ✓ **Continue to invest in the development of innovative and sustainable technical solutions through internal and / or external synergies;**
- ✓ **Strengthen the partnership with external organizations inside CTALEA, in order to promote effectively the birds protection but guarantying the Regular Energy Distribution to our society;**
- ✓ **Involvement in and national and international projects and forums that objectively promote the biodiversity protection in its different aspects.**

I now invite you to watch a short movie, that shows you how we do what I've just finished to present.

Thank you [Évora.](#)