



Effectiveness of a new type of wire markers on high tension power lines to mitigate nocturnal bird collisions



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Birds and power lines

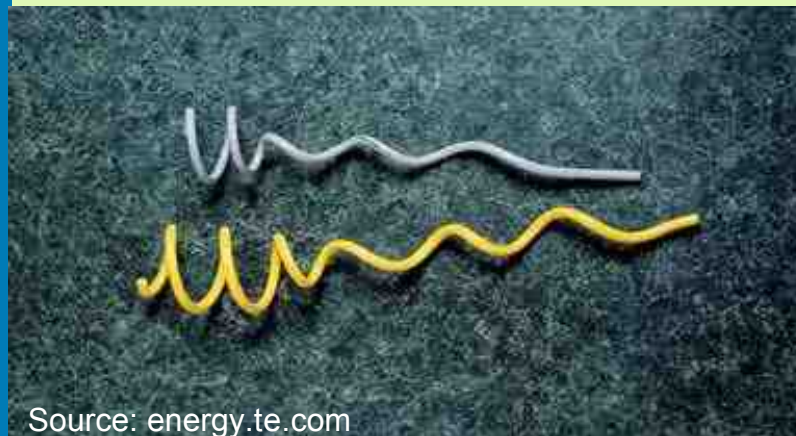
- Annually millions of birds are killed
- Electrocution
- Collision



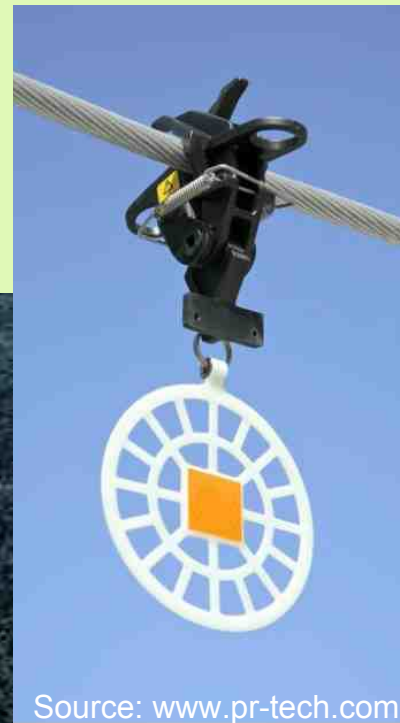


Mitigating bird collisions

- Underground cabling
- Efficient network planning / Line routing
- Line modifications / Wire marking
 - Improve visibility
 - Earth or shield wire



Source: energy.te.com



Source: www.pr-tech.com

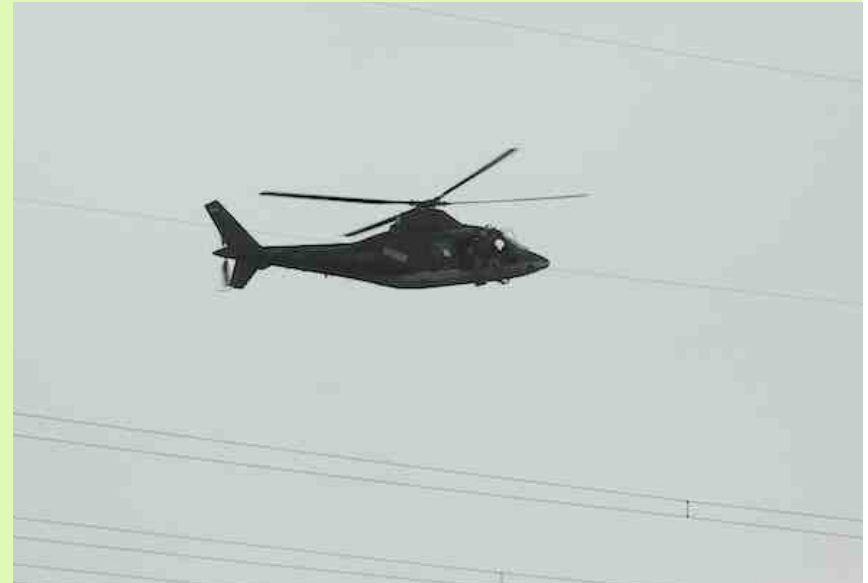


Source: www.pr-tech.com



Mitigating bird collisions at night

- Efficiency widely used markers at night not proven
- New type of wire markers tested
- High contrast
- Incorporate movement / noise
- Large







Research questions

1. Reduction yes/no
2. Size of reduction
3. Efficiency at night
4. Effect on behaviour





Study area

- the Netherlands
- Transmission line (150 kV)
- Near Natura 2000 site
 - Bewick's Swan and Eurasian Wigeon
- Wet open peat meadows
- Rich in wintering birds





Methods: collision victim searches

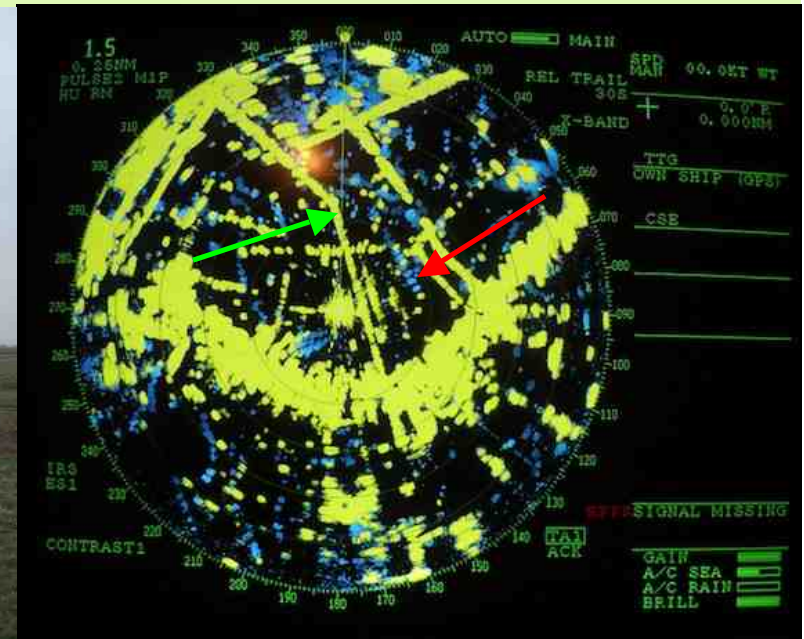
- **Before-After-Control-Impact design (BACI)**
- 2 winters (B and A)
- 9 sections, 4 km length
- 5 sections unmarked (C), 4 marked (I)
- Twice weekly, 40m both sides
- dGPS
- Search efficiency & disappearance rate





Methods: flight movements at night

- Radar observations
- Flight paths (Hor.)
- Passage frequency (Ver.)
- Altitude (Ver.)





Methods: behaviour at day

- Observations at dusk and dawn
- Flight height
- Passage position relative to wires
- Reaction





Results: collision victims

	Number of victims	Number of species	Months
Before marking	250	33	3
After marking	320	34	5

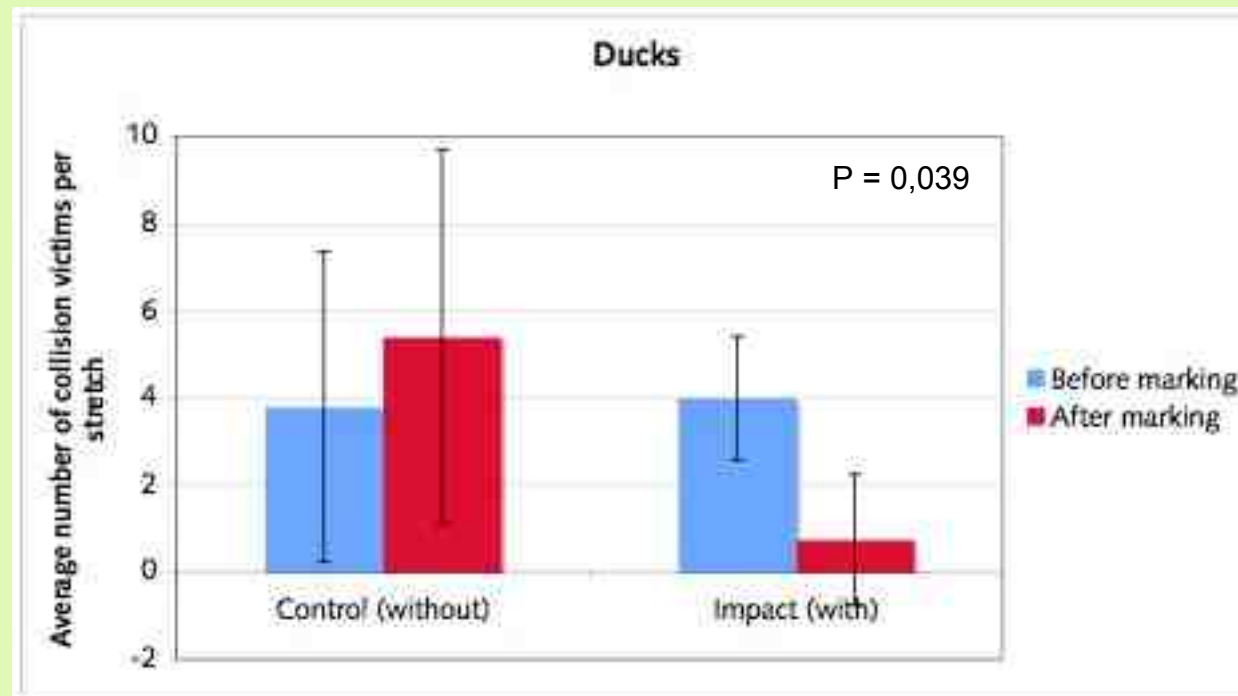
- Most found: Common Coot, Eurasian Wigeon, Lapwing, Mallard





Results: reduction of collision victims

Species (group)	Reduction	Significant
Diurnal species (gulls, geese, pigeons etc.)	67%	yes
Nocturnal species - Ducks	80%	yes
Nocturnal species - Common Coot	No	-





Results: behaviour

- **Night:** no difference in passage frequency (ducks)
- **Day:** birds adjust flight height (geese, gulls and corvids).
 - Larger distance from the earth wire (above or below)
 - Adjustment made at an early stage





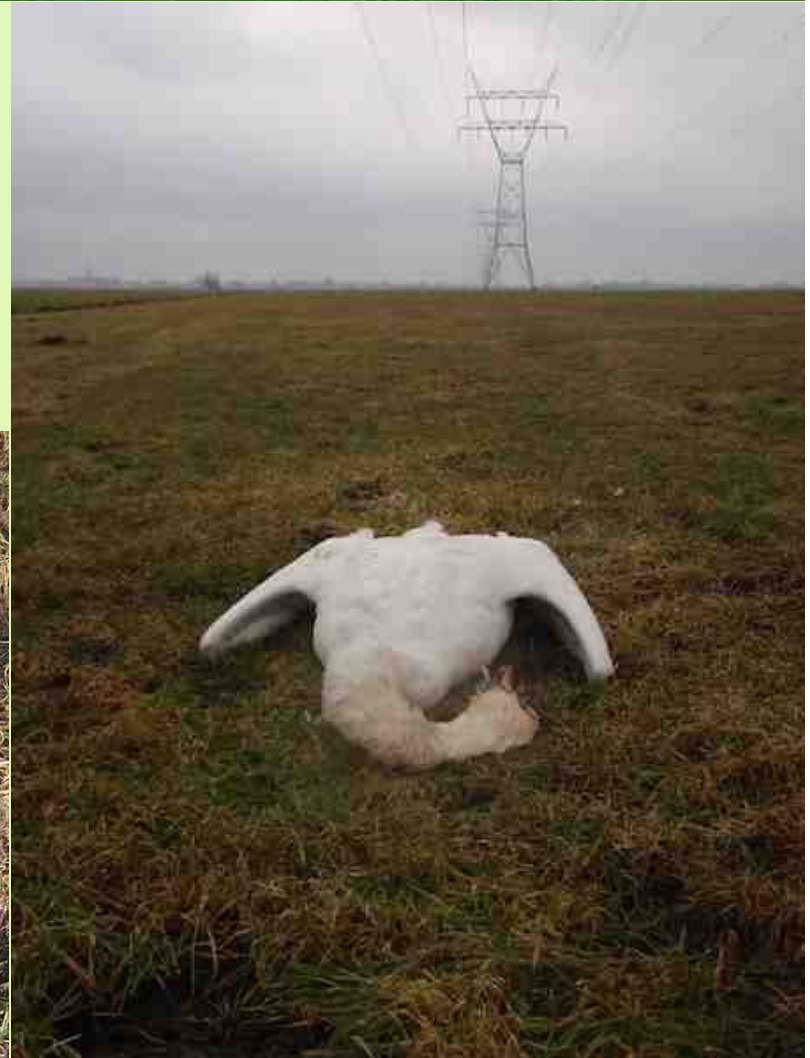
Conclusions

- Markers are effective
- Also for some nocturnal species!
- Compared to other markers:
 - Efficiency at day comparable
 - Efficiency at night is new finding





Thanks for your
attention



With thanks to:



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