

**Problem :** with an average recurrence period of 10 years very cold air coming from eastern Europe reaches de western Mediterranean coast

The result is a snow blizzard like the one showed in the picture





Fig 01: satellite image of the area affected by the snowstorm of March 2010



# And the consequences are like that

# All the yellow lines on the map collapsed during the blizzard









- Copper has always been the best material for power transport and distribution.
- Cx3 (Coating Copper Conductor), technology to improve conductor properties.
- Cx3 is a cable technology that comes from railway electrification

Coating: dielectric & hydrophobic properties









The site is situated at a height of 580m on an isolated, exposed hill top near the Scottish/English border.





CAC



#### Properties of the **Conductors** installed

3 conductors erected:

CAC-95 with anti-icing coating (eq. resistance / 2x ampacity ACSR 180)

- CAC-150 with anti-icing coating (eq. conductor section Cu vs AI) •
- ACSR-180 control conductor ٠

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Installation EDS

19% UTS CAC-95 & CAC-150 25% UTS

ACSR LA-180

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		CAC-IIEC 55	CAC-ILO 150	ACON EA-100
	Material type	copper	copper	aluminium + steel
	Conductor greased weight (kg/Km)	846	1335	676
and the second second	Conductor diameter (mm)	12,6	15,9	17,5
	Conductor strand size (mm diameter)	2,5	2,25	2,5 (Al) and 2,5 (Steel)
	Number of strands	19	37	30 (AI) and 7 (steel)
	Coefficient of linear expansion (10-6/degree °C)	16,8	16,8	18,6
	Modulus of elasticity (kN/mm <sup>2</sup> )	50	50	75
	UTS (kN)	47,5	75	63,9



#### **Results** Anti-icing test on CAC









Excess tension loads added for each incident:

- CAC-HLS-95 21.40kN
- CAC-HLS-150 22.83kN
- ACSR LA-180 43.46kN

#### **Results** ageing test on CAC coating



## **Conclusions Anti-icing test on CAC**

- The tension increases because ice accretion on the coated copper cables CAC were about 50% of those on the ACSR one.
- The ageing test shows that the coating withstands the UV,  $O_3$  and salt spray test OK. Regarding the thermal cycle test it shows sensitivity after 50 cycles ; the number of twist turns before the coating is destroyed decreases significantly
- There are indications that the coating performs better (accretes less ice load) in wet snow than in rime ice conditions.