Analysis of the installation of an OPPC cable in Red Eléctrica de España

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RED ELÉCTRICA DE ESPAÑA

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A quick overview to the paper

CONSEIL INTERNATIONAL DES GRANDS RESEAUX ELECTRIQUES
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ANALYSIS OF THE INSTALLATION OF AN OPPC CABLE IN RED ELÉCTRICA DE ESPAÑA

by

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SUMMARY

Communications in electrical companies are becoming more and more bandwidth-demanding. For many years, fibre optics (FO) have proved to be an excellent medium in terms of bandwidth and electric immunity. Consequently, many electrical companies have opted to install thousands of kilometres of FO in their lines, by means of using different technologies such as OPGW (OPtical Ground Wire), ADSS (All-Dielectric Self Supporting cables), OPPC (OPtical Phase Conductor), and so on.

This paper specifically focuses on OPPC cables, which are one of the less common solutions in Spain to deploy fibre in overhead lines. Although Red Eléctrica de España recently published a paper dealing with a similar topic [1] (it introduces the know-how which the company has acquired with OPPC technology), the present paper aims to perform a deeper analysis of the installation features on a specific overhead line. The installation novelties, singularities and also its setbacks are described in order to share the experience of Red Eléctrica in this particular field.

The case-study line is Cuesta de la Villa – Los Realejos – Icod de los Vinos, which is located in Tenerife (Canary Islands, Spain). The fact that this line is installed on an island makes the installation even more unique.

The paper commences with a quick overview of the line and its project, including the main highlights of its route and its distinctive features. This will be followed by a detailed description of the installation characteristics, drawing special attention to the different

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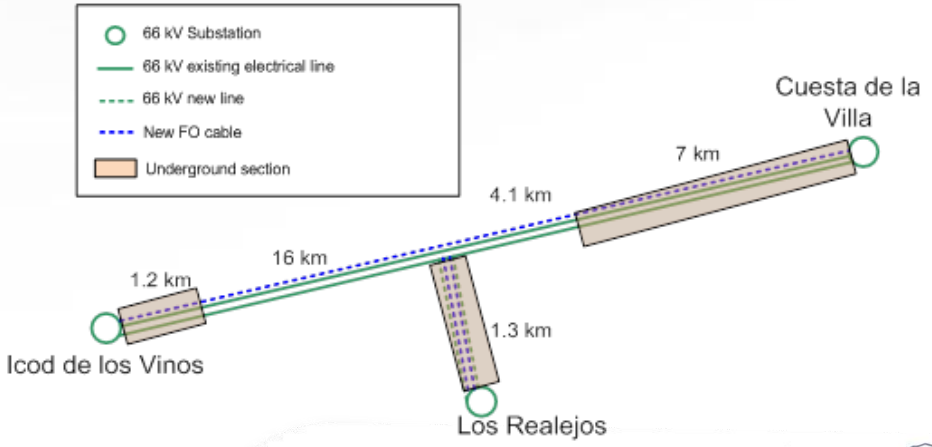
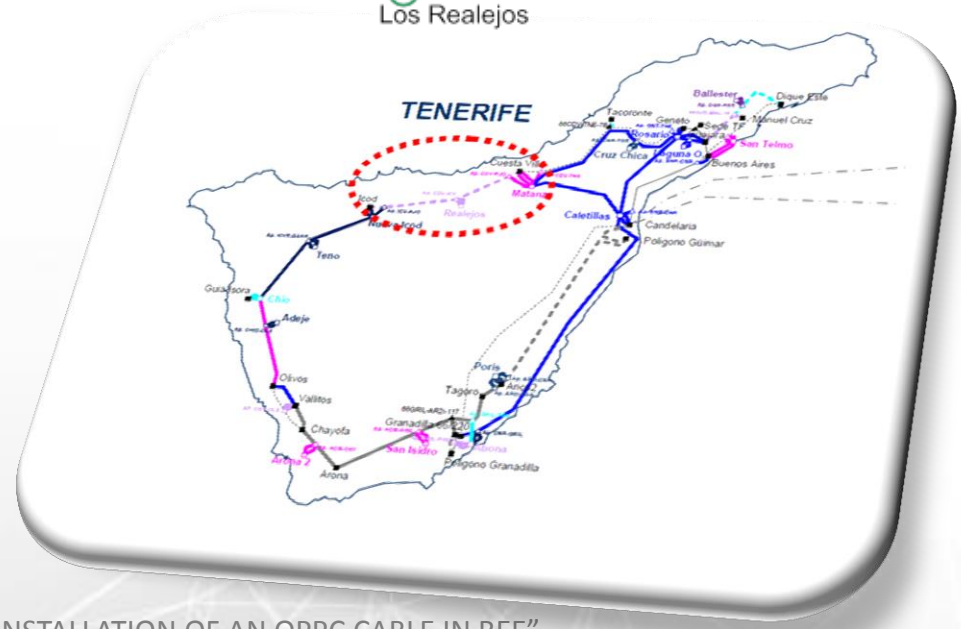
A quick overview to the paper

Introducing the line

- Cuesta de la Villa – Icod de los vinos
  - Tenerife Island.
  - Double 66 kV circuit
  - New substation (Los Realejos)
- Optical fibre:
  - To close the ring
  - Connect Los Realejos to the network





A quick overview to the paper

Design & Project (I)

No OPGW / ADSS POSSIBLE ⇨ OPPC

- OPPC Design Requirements

Based on existing LARL-HAWK	48 Fibres	<929 Kg/km
	wires >3mm	Cannot increase Ø (wind)

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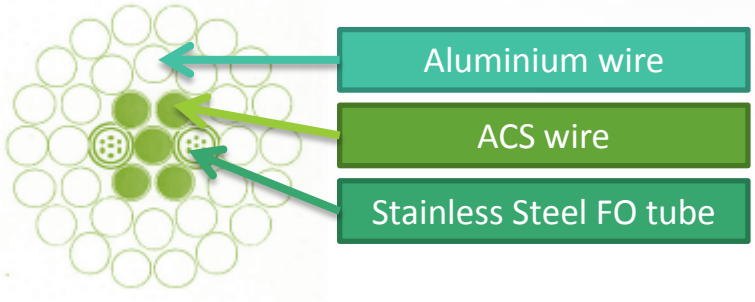
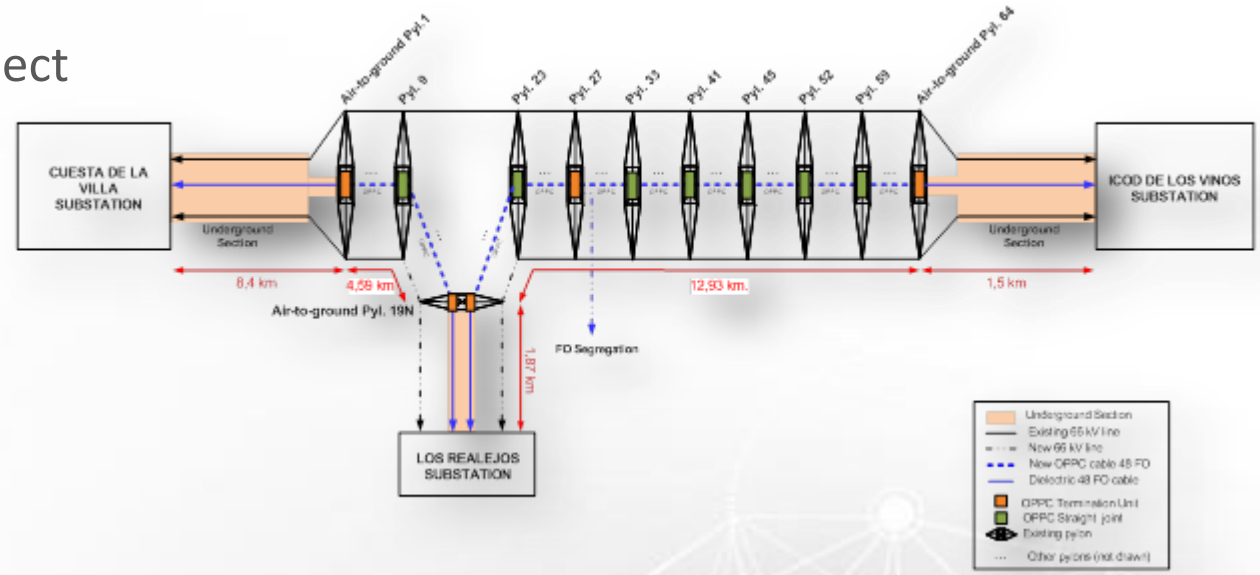
Design & Project (II)

- Cable design



- Accessories

- The project



A quick overview to the paper

Installation Challenges (I)

- General Challenges

ISLAND

- Isolated electrical Network
- Limited Human & Material Resources
- Shipping

European Outermost Region

CUSTOMS

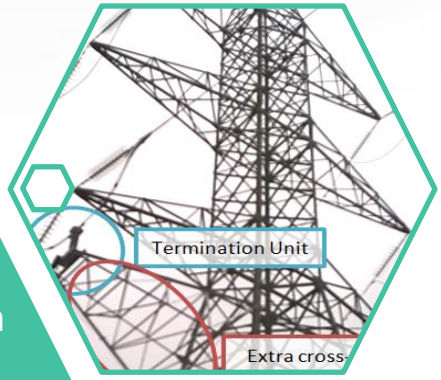
Works in the vicinty of energized parts

Specific courses for installation & splicing teams!

A quick overview to the paper

Installation Challenges (II)

- Major challenges



Installation of an extra cross-arrm for the termination unit

Splicing at a height

Use of scaffoldings and cranes

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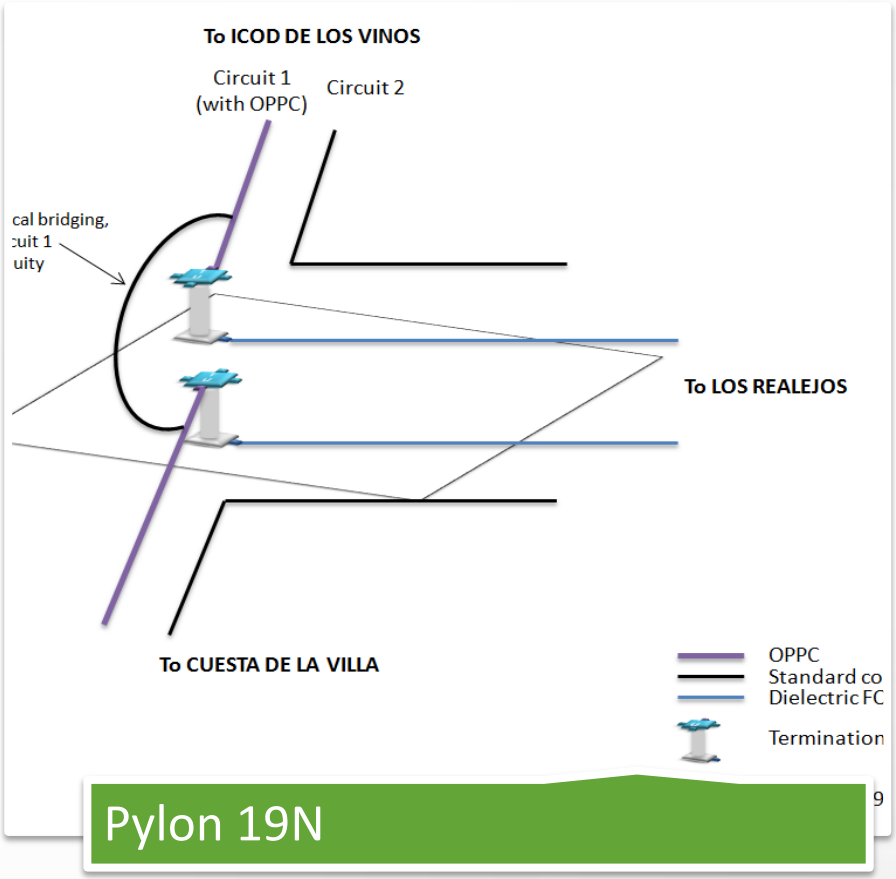
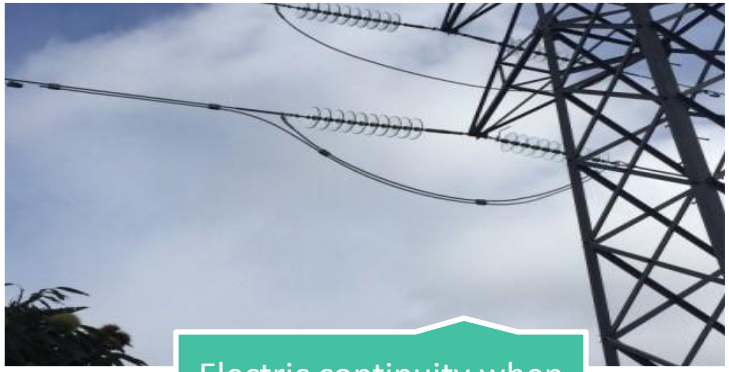
Other installation Facts



Pylon 19N

- Deviation to Los Realejos



Electric continuity when line repowering required

Extra electric bridge in Straight Joints

Question 1 (Q1-7)

Compared to OPGW, what is your experience in using and managing the OPPC infrastructure?

Question 1 (Q1-7)

Experience using and managing the OPPC infrastructure

Maria - Fuendetodos

- **220 kV – 30 Km**
- **2012**
- **Near Zaragoza**
- OPPC for Thermal Sensing (DTS)
- R&D project (TWENTIES)
- Telecom for future use?

C. Villa – L. R. - Icod

- **66 kV**
- **2015**
- OPPC for Telecommunication purposes.
- Other cables not feasible
- Cable sensing future use?

Question 1 (Q1-7)

Experience using and managing the OPPC infrastructure

OPPC

- Line outage for splices.
- Splices must be done at a height.
- Specific accessories: TERMINATION UNITS & STRAIGHT JOINTS.
- Similar maintenance as conductors

OPGW

- Normally splices can be done with live lines.
- Splices can be done on ground.
- Standard Accessories
- Similar maintenance as ground wire

Question 2 (Q1-8)

Could you give us your expectations concearning the posible use of OPPC within the EPUs in the future?

Question 2 (Q1-8)

Expectations: Use of OPPC in EPUs in the furure

Advantages

- Solution when no ground wire (normally at lower voltages)
- Solution for line motorization with DTS

Challenges

- Cost
- Installation
- Maintainance

Yes, but only in certain circumstances!

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Thank you for your attention!

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