

NEW COMPOSITE POLES FOR ELECTRICAL LIGHTING, TRANSPORT AND DISTRIBUTION

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SUMMARY

The manufacture, geometrical and mechanical design of new composite poles made from glass fibre reinforced thermosetting and thermoplastic matrix composites (GRP) were studied and validated in according to the major national and international standards through advanced computational methods (FEM) and mechanical tests.

Keywords: composite poles, GRP, filament winding, pultrusion, thermoplastic matrix

INTRODUCTION

GRP poles (Figure 1) may replace with advantage conventional wooden, steel and concrete electrical lighting, transmission and distribution poles. In fact, they have not only excellent mechanical strength, corrosion resistance and long-term behaviour but are also lightweight, non-conductive and present much more safety in terms of road accidents because of their higher shock absorber characteristics.

In spite of those advantages, composite poles were almost only applied in North America until now and there are very few known applications trough Europe and rest of the world [1, 2].

THE NEW COMPOSITE POLES

The present work concerns the development of new cost-effective composite poles for electrical applications manufactured by filament winding and pultrusion. The geometrical and mechanical design carried out in order to ensure the accomplishment the major requirements of Portuguese and International standards is presented and discussed in the paper.

The proposed manufacturing and laminate set-up will be presented. The ecological and manufacturing advantages of using of thermoplastics instead of conventional thermosetting resins in composite pole matrix are also discussed.

Advanced computational methods (FEM) and mechanical testing were used to validate the flexural strength and maximum allowable deflection in the composite prototype poles manufactured for certification. The composite pole failure as well as the major application restrictions criteria and also the relationship between bending moments and ovalization are also presented and discussed in the paper [1, 3].



a) lighting composite poles



b) Composite pole installation

Figure 1. Composite poles

References

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