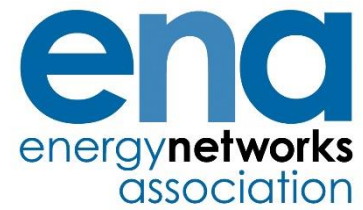


PRODUCED BY THE OPERATIONS DIRECTORATE OF ENERGY NETWORKS ASSOCIATION



Engineering Report 135

Issue 1 2015

Performance review of vacuum interrupters in
UK distribution networks

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First published, September, 2015

Amendments since publication

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Foreword

This Engineering Report (EREP) is published by the Energy Networks Association (ENA) and comes into effect from September 2015. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “EREP 135”.

This is the first issue and does not cancel or replace any other document.

This EREP has been developed in conjunction with the ENA Working Group on Vacuum Interrupters and includes all relevant findings from work carried out by the Working Group. The Working Group would like to acknowledge the contributions to this review provided by BEAMA, Eaton Electrical and Schneider Electric.

The intention is for this document to be used by ENA member companies to inform the development of maintenance and testing policies/procedures for distribution switchgear, which incorporates vacuum interrupters.

Where the term “shall” or “must” is used in this document it means the provision is mandatory. Where the term “should” is used in this document it means the provision is a recommendation. The term “may” is used to express permission.

NOTE: Commentary, explanation and general informative material is presented in smaller type, and does not constitute a normative element.

Introduction

At the meeting of the Energy Networks Futures Group (ENFG) - formally known as the Assessment and Specifications Group (ASG), held on 18th May 2006, it was agreed that an ENA Working Group would be established to consider the performance of vacuum interrupter circuit breakers installed in UK Distribution Network Operator (DNO) distribution networks. The performance review would be based on experience to date and consider all currently available knowledge of interrupter performance.

Subsequent to the ENFG meeting, the Health & Safety Executive (HSE) approached ENA regarding this issue, and a commitment has been given by ENA to liaise with HSE at appropriate intervals.

The ENA Working Group was convened under the chairmanship of Mr C Holdsworth of Northern Powergrid plc. A list of ENA Working Group members is provided in Annex C.

The terms of reference for the Working Group included investigations into known failure rates of VIs within the industry and gaining an understanding of the monitoring regimes associated with VCB switchgear practiced by DNOs.

Eaton Electrical provided a technical report on behalf of the Working Group titled: *Status Check of 25yr old VIL Type V803 Vacuum Interrupters*. This review draws on information and data provided in that report. The decision to undertake this review was, in part, driven by a presentation given by the Sterling Power Group of a paper [1] stating that vacuum interrupters (VIs) utilised within DNO vacuum circuit breaker (VCB) switchgear have a design life of only 20 years. This performance review examines the performance of VIs within the UK DNO population, in light of the potential failure issues identified in the paper [1], and considers whether the performance of in-service VCBs within DNOs exceeding a design life of 20 years should be a cause for concern and what in-service testing regime, if any, should be considered.

1 Scope

This report documents the findings and recommendations from the performance review of VIs in UK distribution networks. The risk of failure in VIs that have been in-service for greater than 20 years is explored based on a review of failure rates and the adequacy of existing test methods.

Recommendations are made on appropriate operational testing and maintenance regimes, based upon DNO in-service experience and knowledge of the performance of VIs obtained from this review.

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) apply.

Standards publications

IEC 60050, *International Electrotechnical Vocabulary*

IEC 62271-1, *High-voltage VCB switchgear and controlgear – Part 1: Common Specifications*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.