



Safety Advice 11-2003 (NZ)

REYROLLE PACIFIC / VA-TECH TYPE LM OIL CIRCUIT BREAKER HAZARD WARNING

BACKGROUND

The Hazard Warning below was issued in the UK for VA Tech / Reyrolle Pacific type LM23T, LM36T and LMI circuit breakers concerning dash pot washers. Mine Managers should note that the problem outlined can lead to the circuit breaker failing to correctly remove power when a fault occurs, which can be a danger to anyone in the vicinity of the switchgear. Manufacturers (or persons competent to carry out the necessary modifications) should be contacted without undue delay by any mine where this type of switchgear is in use.

SUMMARY

The type of dashpot washer used in these breakers is prone to hardening in oil over time. It may become brittle, break, and the pieces could jam the CB leading to CB failure. This was discovered through a web search, and VA Tech / Reyrolle Pacific were subsequently contacted. The company, for the sum of \$11,534, sent a technician with specialist equipment to replace the washers with ones not prone to hardening in oil on ten 11kV panels (33 years old) at the Kaikohe substation. Other contracting staff were replacing oil and conducting other CB overhaul work - replacing turbulator and contact parts as required - at the same time. The Reyrolle technician completed speed curve tests using a specialist test rig to ensure the mechanism and timing, disturbed with the washer replacement work, was left within tolerance. The technician also completed insulation resistance and contact resistance tests. The operation on ten panels took five days during normal working hours.

The removed washers were all significantly hardened - one to the point that it had cracked and broken cleanly - but still in one piece. Two had moved on their seats. It is not believed that normal maintenance would have discovered these failure-prone components.

APPARENT CAUSE

SOP 206 was raised following an internal fault on a LM23T circuit breaker manufactured in 1974. Investigation has revealed this was probably due to the opening spring dashpot piston seizing within the cylinder, resulting in incomplete travel of the main contacts.

The dashpot contains a PVC buffer washer which is immersed in oil and over a long period of time, the plasticizer in the PVC can migrate into the oil, in some cases causing shrinkage and hardening of the washer. Subsequently, the washer could become loose and displaced and due to the impact of the piston, it could disintegrate.

IDENTIFICATION



LM23T/LM36T/LMI Circuit breakers were manufactured between 1960 and 1976 and can be easily identified from the data label by the article number 861A ----- and/or a constructional number X2 to X22.

LMT2 Circuit breakers NOT AFFECTED were manufactured between 1973 and 1997 and can be identified from the data label by an article number 971A ----- and/or a constructional number X30, X31, X32 or X33.

RECOMMENDATIONS

Although the incident rate is low (second recorded incident), the consequences could be severe, therefore all buffer washers over 12 years old should be replaced. This affects LM23T, LM36T and LMI Switchgear, which all use the same type buffer washer. A replacement buffer washer is now available of a superior material which will have a life of at least 20 years.

For further information, please contact:

Reyrolle Switchgear

Telephone 0191 4015494 / Facsimile 0191 4015573

For remedial washer replacement work:

Paul Priebee

Telephone 021 611 815 / Email paul.priebee@reyrollepacific.co.nz

For sales of vacuum retrofit trucks:

Peter Hall

Telephone 025 831 834 / Email peter.hall@reyrollepacific.co.nz