

Study Committee A3

Transmission and Distribution Equipment

Paper 10866_2022

Advanced High Voltage Disconnecter Condition Monitoring

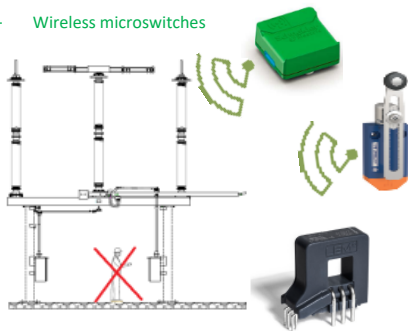
Motivation



- HV Disconnector → **not connected devices**
- Design a new maintenance strategy for a connected HV Disconnector

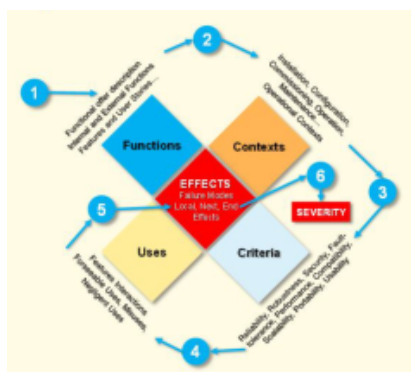
Method/Approach

- Temperature and humidity sensors
- Wireless microswitches



- DC electronic current sensors

Experimental setup & test results



Failure Mode and Effect Analysis (main outcomes)

- Reliable CLOSED position
- Effort to OPEN and CLOSE → Motor consumption
- Temperature of main contact
- Operation time

Test	Report Nr.	Observations
Salt fog	190513-V-101	672h
	200625-V-101	1600h
	200608-V-101	1500h - protecting tape 1
Mechanical Endurance	190619-M-101	Sensors mechanical withstand for SP-245/2000
	191205-M-101	Sensors mechanism withstand for SG3C-245/2000
	190625-M-101	Sensors mechanical withstand for SG3C-420/3150
Signal Reception	200702-V-201	Different distances and environments
Zigbee connectivity / substation environment	19G178	ZigBee wireless sensor communication in substation environment
Failure mode verifications SG3C-245/2000	181105-V-201	Normal conditions, bad closed, bad closed & dirty contacts
Failure mode verifications SG3C-420/3150	181112-V-201	Normal conditions, bad closed, bad closed & dirty contacts

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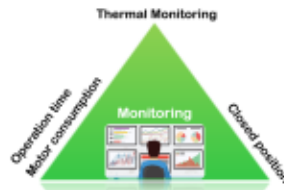
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Objects of investigation

- Two pilot installations running since 2019
- New maintenance strategy has been implemented:
 - Thermography will be abandoned
 - Local operations are not any more needed
 - Maintenance cycles will be done based on the data received and not on time basis (6 – 9 years)

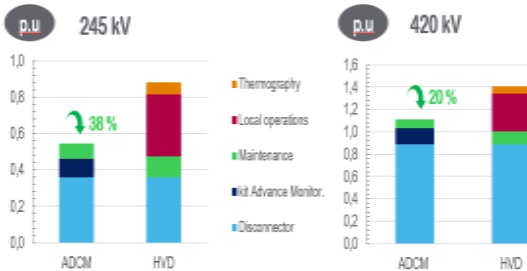
Discussion



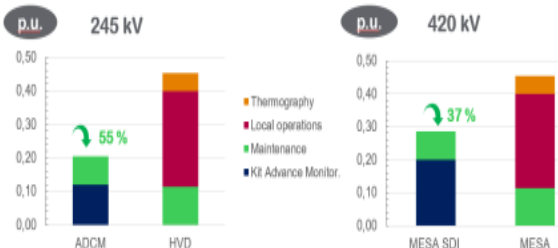
- How much condition monitoring could impact maintenance strategy?
- Which are the benefits?
- Associated business case

Conclusion

- New Installations



- Installed base



- Technical solution is available
- Total cost ownership will be reduced up to 55% depending on the voltage and type of installations (greenfield or brownfield)