Catastrophic events happen, right?

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Question: When will these events happen?

1.....**Ground faults**
2.....**Arc Flash** events
3.....**Voltage fluctuation & imbalances**
4.....**Transients & Flash-overs**
5.....**Single phase Voltage Sags**

Could the answer be?

At the worst possible time!

Problem: Circuit Breaker catastrophic failures. *This picture shows the damage caused by arcing ground faults on a Work Boat. 8 Arc Flash events in 2 years, cause ABS to ground this vessel.*

This circuit breaker is but one of many catastrophic failures & 8 Arc Flash events on this new Pipe Laying Work Boat, equipped with all of the latest protection systems, including *High Resistance Ground system *Ground Fault detection system *Harmonic Filters *TVSS *Phase Voltage imbalance relays *Zig-Zag transformers *Reactors *And others

- **500 amp Molded Case Circuit Breaker, destroyed by arc flash.**
- **As a result of this event, two electricians were sent to a hospital for treatment.**

Phaseback VSGR was installed, which allowed the ship to sail!
There have been no Arc Flash events since!

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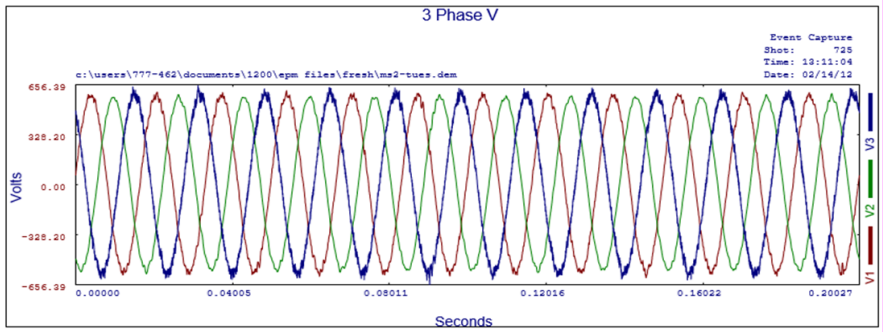
The Phaseback VSGR has been successfully implemented on seafaring vessels as a long-standing means of protecting the large, ungrounded voltage systems found on these ships.

The following case history comes from actual tests performed on a Deep Water Pipelayer Vessel after installing Phaseback VSGR. In the below case, the vessel's source transformer was a 5.5 MVA, 690 volt, three phase, ungrounded system. This transformer had an electrostatic shield in place.
A momentary, self-clearing ground fault occurred on a 910 volt, 375 kW, DC powered dynamic braking resistor, thus biasing the transformer core to -910VDC.

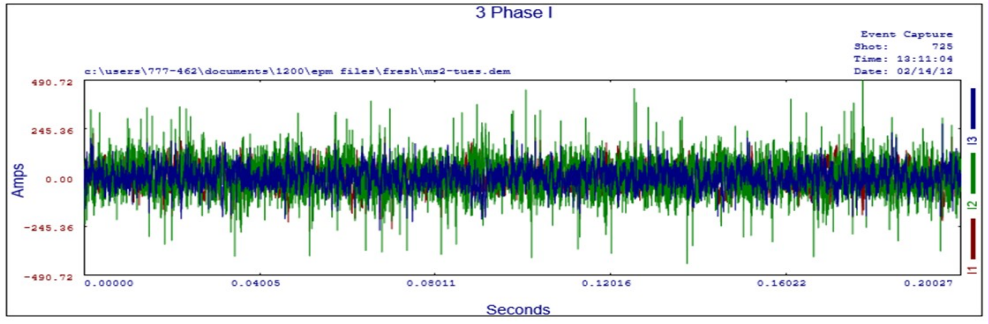
You can see the Voltages & Currents during the fault. With VSGR, it is a non-event!

VSD DC LINK BUS FAILURE CASE HISTORY **Pre-Fault –below**

AC Voltage Waveform: Pre-Fault



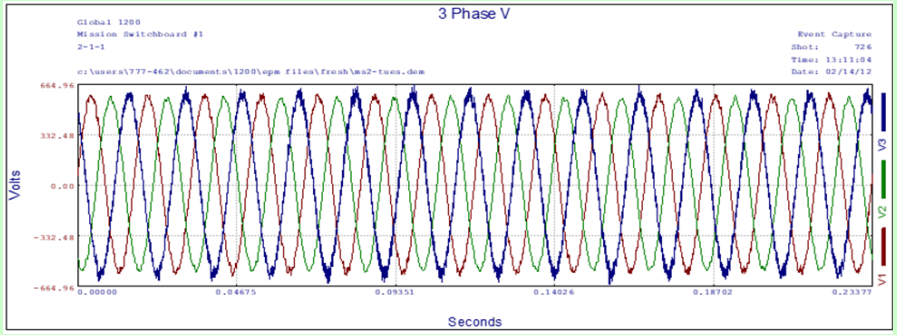
Current Waveform: Pre-Fault



RMS CURRENTS: A = **53A**, B = **79A**, C = **51A**. With no load

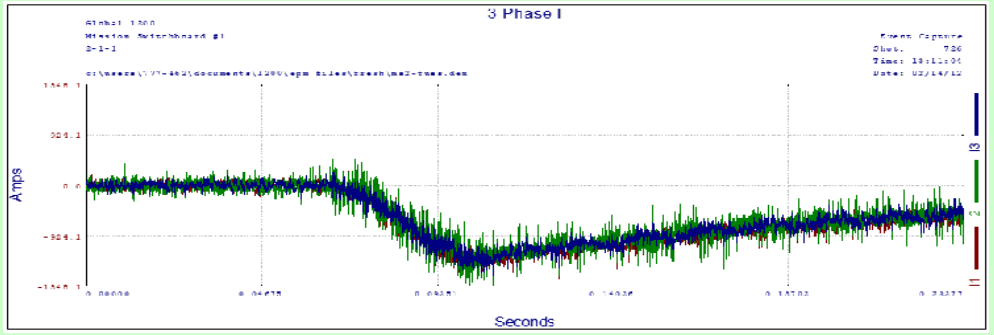
VSD DC LINK BUS FAILURE CASE HISTORY **During Fault –below**

AC Voltage Waveform: Fault



No change in Voltage

Current Waveform: Fault



RMS LOAD CURRENTS: A = **1,350A**, B = **1,280A**, C = **1,300A**

With VSGR, Voltages don't change, as the Drive is faulting. VSGR alarm1 advises the fault condition. The Hoist operator can put down his load, and locate the problem. The Alarm2, Trip threshold is avoided.
With a 3phase Fault condition, the catastrophc event is avoided.

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