



Switching transients study

Category:

Study and Design

Segment:

Data Center

Project Start-End:

June - August, 2009

Project Value:

\$140,000

Results:

Custom switching transient protection successfully designed and implemented.

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Background

Eaton Electrical Services & Systems conducted a switching transients study for a new "mega" data center that wanted to protect their six cast coil transformers against possible damaging switching transients caused by the switching of primary vacuum circuit breakers.

The project began with on-site verification of equipment data and drawings.

The switching transient analysis was then performed using the EMTP software.

Challenges

The switching transient study evaluated all possible switching surge scenarios to identify the worst-case transient voltages. Comparison of predicted voltage transients to the transformer insulation characteristics revealed the need for additional surge suppression equipment.

Further evaluation revealed that a snubber circuit installed at the primary of each cast coil transformer would provide the optimum surge protection.

Solution

Snubber components were custom designed to meet space requirements and to satisfy the protection requirements of the client.

Basic snubber components were enhanced by protective features including voltage indication (glow tubes), continuity verification (current sensors) and fusing with blown fuse indicators. The snubbers were built and installed by

Eaton field service engineers. Following installation, measurements were conducted to verify snubber operation.

Results

- Eaton proactively addressed prevention of winding failures on six cast coil transformers for this LEED certified Data Center.

- EMTP switching transient study was conducted to evaluate switching surges and specify snubber components.

- Custom-designed snubbers were built and installed at the 15kV primary of six cast coil transformers.

- Following snubber installation, field measurements were conducted to verify snubbers successfully mitigated the transients.

Project Highlights

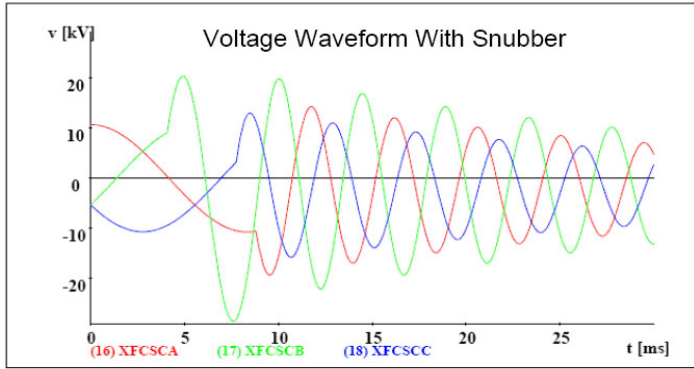
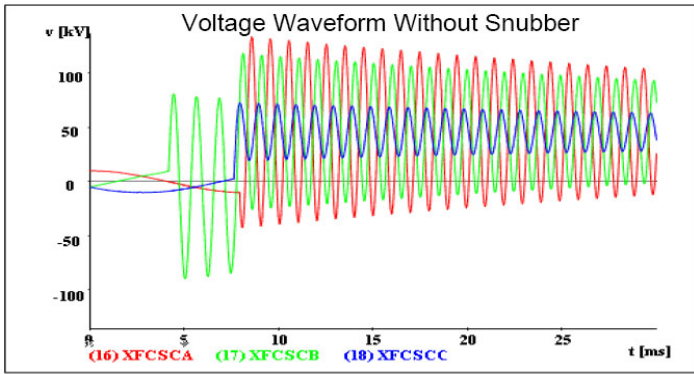
- Large data center
- Switching Transient study
- Custom Snubber design
- Manufactured and field-installed
- Performance measurements

Identifying Snubber Applications

- Short distance between breaker and transformer (200 feet or less)
- Dry-type or cast coil transformer (oil filled not immune) and low BIL
- Inductive load switching (transformer, motor, etc.)
- Vacuum or SF-6 Breaker

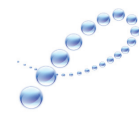


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