

# Why Your Capacitor Bank Should be Left Ungrounded

#### Introduction

Should medium voltage capacitor banks on industrial and commercial power systems be grounded? This question often arises, and the answer is usually no for the following reasons:

- Grounded capacitor banks can interfere with a facilities ground fault protection system and cause the entire facility to lose power (main breaker trip).
- Harmonic currents in the ground path can cause harmonic interference with control and communication systems.
- Capacitor discharge currents may damage nearby surge arresters.

Interference with a facilities ground fault protection system is the primary reason for not grounding a capacitor bank or harmonic filter bank. Although this interference can be reduced or eliminated through system modification, it may require protective coordination analysis, relay changes and/or grounding resistor changes. This adds cost and complexity to the installation and may degrade the sensitivity of the existing ground fault protection system. This bulletin describes how a grounded capacitor bank can interfere with a facilities ground fault protection system and suggest that all banks applied on industrial and commercial power systems be left ungrounded.

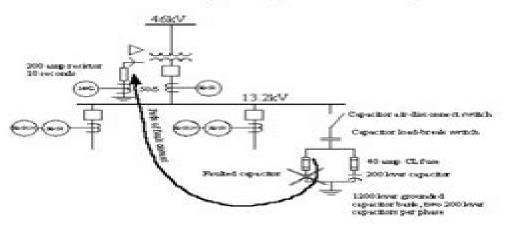


Figure 1 - Typical industrial facility showing ground fault profection system, failed capacitor, and fault current path for a failed capacitor.

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**Jin-Ying Zhang** 

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Power Engineering ,1971 Power Plant Engineering ,1958 **Electrical World** .1975 Electric Club Journal Electric Light and Power ,1970 The Electrical Workers' Journal ,1951 Effect of Induction on Capacitor ,1931 Bank Protection Schemes Nima Hejazi, 2010-09 Overall capacitors have many applications in power systems they can be used in series to compensate the inductance of transmission lines to transmit more power They can also be used as surge capacitors starting motors and SVC Capacitor banks installed in power substations are vital in the sense that they provide the reactive power needed for the power system which in turn improves the voltage profile of the system There is always the option of grounding the banks or leaving them ungrounded Each of the above configurations has its own advantages and disadvantages to name a few ungrounded banks are slightly more expensive compared to grounded banks as the neutral point needs to be insulated up to system basic insulation level whilst grounded banks are prone to inject high frequency transients into the ground mat This study is intended to address the recent incident in a high voltage substation which led to the explosion of a capacitor bank The study goes on to suggest grounding as a method to prevent such incidents Furthermore the effects of grounding and induction on control signal cables as well as protecting relays are investigated **Switching of** Large Ungrounded Capacitor Banks on the Ontario Hydro System C. C. Erven, A. Narang, 1985

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