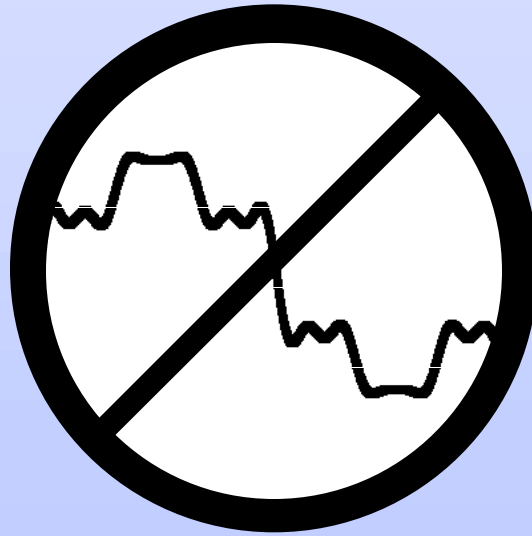


# Investigating Power System Disturbances



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**I have an electrical system problem**

What Should I do First?



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## Determine if problem is caused by:

- System overload
- Low or high voltage
- Momentary voltage dips or spikes
- Line notching
- Harmonics

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## What Are System **Overload** Symptoms?

- Equipment overheating
- ....Usually known by plant personnel
- ....Relatively easy to check

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## What Are **Low Voltage** Symptoms?

- Lights dim
- Motors overheat / draw excess amps
- Electric heaters are slow
- ....Simple to check
- ....Utility to check at service
- ....Check at load

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## What Are **High Voltage** Symptoms?

- Lights burn out
- Equipment failures
- ....May go unnoticed
- ....Simple to check
- ....Utility to check at service
- ....Check at load

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## What Are **Momentary Voltage Dips or Sag** Symptoms?

- Lights blink
- Motors/Contactor drop out
- Computers malfunction
- ....Disturbance analyzer req'd

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## What Are **Momentary Voltage Spikes or Swell** Symptoms?

- Equipment “Blows Up”
- MOV arresters fail
- ....Disturbance analyzer req'd

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## What Are **Line Notching** Symptoms?

- DC drives trip out
- AC drive malfunctions(SCR type)
- Proc. controller malfunctions
- ....Special disturbance analyzer req'd

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## What Are **Harmonic** Symptoms?

- Transformers overheat
- Capacitors swell or blow-out
- ....Utility regulates per IEEE-519
- ....Requires harmonic monitor

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## If Your Problem Is...

- System overload
- Steady low voltage
- Steady high voltage
- Momentary voltage dips or sags
- Momentary voltage surges or swells
- then.....

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## The solution can be obtained using conventional means

- ....Providing you do not add capacitors

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## If Your Problem Is **Line Notching**

- Increase system capacity
- Add reactors or isolation xfmr's
- DO NOT add P.F. capacitors
- Filters may be used for P.F. correction

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## If Your Problem Is **Harmonic Distortion**

- Increase system capacity
- DO NOT add P.F. capacitors
- Filters may be used for P.F. correction
- First accurately assess the extent of the problem

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