

The Cost of Poor Motor Control

presented by

Power Control Products

Motor Starting: Understanding Motor Behaviour

- starting characteristics are VERY different from the running characteristics!
 - high starting currents (500-1000%)
 - high starting torques (120-250%)

Motor Starting: Traditional Starting Methods

- Full Voltage Starting
 - DOL
- Reduced Voltage Starting
 - Star Delta
 - Auto Transformer
 - Primary Resistance

Motor Starting: Results of Poor Motor Starting

- Mechanically
 - Transmission
 - stretched or broken chains
 - sheared sprocket teeth
 - stripped gears
 - excessive belt and pulley wear
 - damaged shafts or shear pins

Motor Starting: Results of Poor Motor Starting

- Mechanically
 - Motor
 - cracked rotor
 - chewed out keyways
 - broken mounting feet
 - front bearing collapse

Motor Starting: Results of Poor Motor Starting

- Mechanically

- Other

- belt squeal and smoke
 - burst pipes, elbows & fittings
 - machine and frame distortion
 - product damage or spillage

Motor Starting: Results of Poor Motor Starting

- Electrically
 - nuisance fuse or breaker trips
 - voltage dips affecting other equipment
 - lighting
 - computers, PLCs, weighers, etc
 - disruption to other users
 - peak demand charges
 - visits from the Supply Authority!

Motor Starting: Soft Starters

- What are they?
 - electronic reduced voltage starters
- How do they work?
 - like three phase lamp dimmer on ‘auto-pilot’
- How can they help?
 - adjustable smooth and jerk free motor starting
- Why are they better?
 - reduce & control starting current & torque

Motor Starting: Summary

- Full voltage starting causes damaging levels of current and torque
- Reduced voltage starting lessens the mechanical and electrical impact
- Traditional starting methods are only partially successful
- Soft starting provides adjustable smooth and jerk free starting, saving money

Motor Speed Control

- Why vary motor speed?
 - to match machine speed with the process
- Results of Poor Motor Speed Control
 - reduced production capacity or quality
 - frequent cycling at fixed speed

Motor Speed Control

- AC motor speed controllers
 - provide an adjustable frequency supply
 - work with ordinary AC induction motors
 - control direction and speed
 - need no mechanical modifications
 - give infinitely adjustable speed control
 - can be remotely controlled
 - provide total speed control flexibility

Motor Speed Control

- Other advantages of speed control
 - more frequent motor starting (& less heating)
 - creep speed for maintenance or inspection
 - rapid braking of high inertia loads
 - reversing contactors not needed
 - motors can be run over-speed
 - replaces high maintenance mechanical speed control devices (eg variators)

Motor Speed Control: Energy Savings

Fans and pumps offer *enormous* potential for energy saving at reduced speeds

Motor Speed Control: Energy Savings

As little as 20% speed reduction can save you
half of your energy cost!

Motor Speed Control: Energy Savings

AC speed controllers allow easy and automatic control of motor speed to achieve energy savings as process demand changes

Summary

- Poor motor control costs you money!
- Electronic control of motor starting or motor speed can overcome many long term 'unsolvable' motor control problems
- If you suffer from any of the problems described today, you could benefit from improved motor control

Zener Electric

- 100% Australian owned manufacturer
 - factories in Sydney and Newcastle
- Electronic motor control specialists
 - soft starters
 - AC motor speed controllers
- Export nearly a half of total output
 - including Asia, Europe and the US

Power Control Products

- Locally based specialist reseller of **Zener** electronic motor controller
- Stock, spares and service personnel in Perth
- Phone 08 9317 4322, fax 08 9317 4465