

METALS SECTOR NOT AWARE OF ITS POWER QUALITY LOSSES

Metals manufacturing plants have a high demand for electrical power, are electric motor intense, have high raw material costs and rely heavily on sophisticated automation and on a skilled labour force. Common to these characteristics is that they all lead to significant operating losses when the electric power is interrupted. The European Copper Institute (ECI) Power Quality Survey has identified that the metals sector loses over 10% per cent of its net bottom line due to Power Quality operating issues.

The domino effect of production stoppages

Manufacturing plants in the metals sector make generally intense use of electric motors of different ratings and specifications, often integrated in one controlled system. A loss of control of one motor caused by an unexpected and sudden power interruption or power dip can upset the general control and **bring the whole production system to a complete standstill**. Such an event can, in turn, result in a wide range of financial losses:

- **Both manufacturing and administrative staff will be made idle** when “the lights go out”, often for several hours.
- Irregularities in power supply can **shorten the useful operating life of expensive high-tech machinery** or even permanently damage them, resulting in high maintenance and equipment replacement costs.
- **Raw material** that was being processed at the moment of the event can be **irrecoverably wasted**, or if not **will require additional reprocessing** to make it again fit for purpose.
- Unexpected stoppages play havoc with production planning, resulting in **delivery delays**, loss of reputation for reliability and consequently loss of business.

Different cost centres blur the reality

The cumulative financial losses caused by power interruptions **tend not to be assessed as a totality**, relating as they do to different cost centres and occurring at different moments in time.

This might explain why, despite those high potential losses, metal manufacturing sites **are on the average not as immune to poor power quality as might be expected**. In many of the cases, the total financial waste caused by these interruptions was equivalent to the organisations' annual electricity bill.



This industry loses the equivalent of over 50% of its annual electricity bill due to Power Quality losses.

ECI's PQ Survey demonstrates that the majority of the PQ problems faced by the metals sector could be avoided by a more appropriate design of the factory's own electrical installations.

Understanding the problems – designing the solutions

ECI's PQ Survey demonstrates that the majority of the PQ problems faced by the metals sector could be avoided by a more appropriate design of the factory's own electrical installations. The solutions therefore lie very much in the industry's own hands. Electrical design engineers involved in this survey recommend a holistic approach to review all the issues at hand, based on three operational pillars:

- ➊ **Correct measurement**, to assess the full impact of power quality events, and why they are happening
- ➋ **Appropriate design** for the electric installations, ensuring reliability and resilience
- ➌ **Considered investment** justified by assessing system renovation cost set against the accumulated losses.

A HIGH PRICE FOR AN UNDER-DESIGNED PROCESS SYSTEM

Because of an inadequate power system design, this metals company was being crippled by power interruptions and sudden power reductions causing machinery to fail. In many cases, the precise power quality issue that led to such a breakdown was not known due to a lack of monitoring equipment. The power quality events resulted in production stoppages of 2 hours on average, causing about 300 production staff to be idle. The cost of poor power quality for this company was further exacerbated by raw materials wastage, equipment damage, reduction of operating life time of heavier equipment and the additional maintenance required to get production up and running again.

A PRODUCTIVITY LOSS OF OVER €10 MILLION ANNUALLY

This company's R&D staff suffered from a significant productivity reduction as a result of unscheduled power interruptions. With each event they were forced to take a break and much of any unbacked-up work they were involved in was lost. The waste caused by downtime was valued at just over €3 million annually, the work that had to be redone at about €8 million. Moreover, working conditions were adversely affected by "flicker", a power quality phenomenon resulting in flickering lights. The debate on this is still ongoing, but common sense suggests that flicker makes people feel out of sorts and irritable, which is likely to reduce their productivity. Some sources propose as much as a 10% reduction. The total financial loss due to inadequate power supply for this company mounted up to €10 million annually.

3.4 % OF COMPANY'S ANNUAL TURNOVER BEING WASTED

Each time the lamination process in this company was interrupted due to power quality problems, it resulted in high financial losses, consisting mainly of wasted raw materials, lost revenues, and staff downtime. Those losses were calculated as equivalent to 3.4% of this company's annual turnover and to 30% of their net profit.

PROFITABLE INVESTMENT OPPORTUNITIES

The metals sector suffers unnecessary financial losses caused by their own electrical power systems that often cannot cope with a variable electric power supply. ECI's Survey has identified many losses and wastages due to poor PQ throughout the industry's different process centres. It has demonstrated that PQ solutions often cost less than the financial losses they resolve. Current investment into power quality solutions in this sector is under 2% per cent of turnover, or less than 40% of the losses and wastage experienced annually.

Do you know what PQ is costing your organisation?

Your engineering management can contact us at <http://contact.leonardo-energy.org> to find out how the issues raised here may be affecting your company.