



Power Consulting

> Case History

Shanthala Spherocast Pvt. Ltd., Karnataka

Our energy working for you.™



Where:

Shanthala Spherocast Pvt. Ltd., Shimoga, Karnataka

What:

Installed a balanced real time Reactive Power Compensation cum Harmonic Filtration System of 630 kVAr rating for 415 V/ 50 Hz 3-wire delta network

Purpose:

The system boosts efficiency, filters harmonic distortions and corrects power factor precisely

Primary choice factors:

Cummins' ability to optimize equipment performance by using the existing back-up power supply

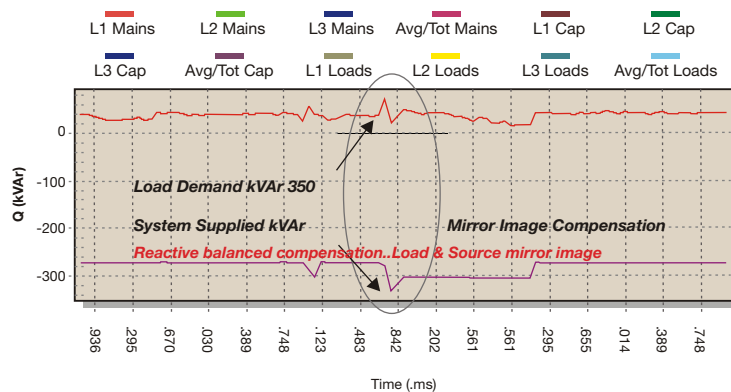
Shanthala Spherocast Pvt. Ltd. has implemented power quality analysis findings and solution given by Cummins to their existing back-up power supply to improve energy efficiencies.

KARNATAKA, INDIA - A well equipped foundry was started in 1985 by a set of qualified and experienced metallurgists and engineers to provide complete solutions for iron casting and component requirements to the engineering industry of Shimoga in central Karnataka. The 5-acre facility at Shimoga houses state-of-the-art testing facility, machining facility, huge electric arc furnaces and an in-house power generation plant that meet the 2000 kW high power demand of the plant. The three huge electric arc furnaces (550kW/575V and 250kW/415V of medium frequency and 399kW/660V of main frequency) in which iron scraps are melted, release massive spikes of electrical energy causing flickers in voltage and harmonics and disturbances to the power system.

Each furnace is isolated from the 433V bus with an individual transformer. All equipment is power backed with gensets of 2.7 MVA capacities (two 1000 kVA and one 380 kVA and 320 kVA respectively) and 2 MVA, 11KV/433V transformer. The four gensets and transformer are connected to the 433V double busbar to form a point of common coupling (PCC).

At the plant, the reactive power requirement was causing the PCC's voltage to dip to 390V levels. Escalation in current was giving rise to energy losses, which was reflecting in the billing. A reactive power compensation

**630 kVAR balanced RTPFC system
Pre-post analysis load kVAR & system kVAR**



The graph depicts mirror image compensation on induction furnace loads

system with a capacity to deliver dynamic compensation became imperative to plummet the kVA value and avoid genset tripping resulting from rapid load changes.

Many questions. One answer.

Shanthala Spherocast soon discovered that Cummins Power Consulting had the solution. Jointly, along with Shanthala Spherocast, the Power Consulting team got down to the necessary testing. Having completed detailed analysis of the power quality findings conducted at the Company's Shimoga plant, the challenge ahead was to optimize equipment performance by using the existing back-up power supply. **Cii national award-winning RTPFC system developed by Cummins Power Consulting came to the fore.**

The team designed and installed a balanced real time Reactive Power Compensation cum Harmonic Filtration System of 630 kVAR rating for 415 V/ 50 Hz 3-wire delta network, connected at the PCC by taking both grid and genset CT feedback, making RTPFC operate on an adjustable individual PF to keep the gensets running under permissible current limits. Necessary in comer and protection were added to make the solution compatible with both EB and genset loads. As Thyristor front end of the furnace produces considerable amount of harmonics, suitable (7%) detuned filters were offered to ensure safety against resonance.

As RTPFC supplies dynamic reactive power compensation, genset tripping was completely eradicated thus eliminating the possibilities of production losses. Voltage restoration and improved power factor reduced energy losses and electric billing charges.

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Cummins Power Generation's RTPFC system is the recipient of the prestigious CII national award

Reduction in current and kVA relieved the stress on the transformer and lessened usage of genset capacity during power cuts, confirming better resource utilization. Harmonic filtration to the extent of 50% was also achieved.

Power demand is down by 150 kVA at Shanthala Spherocast and cost savings are up, helping the Company accomplish its target.

Electrical parameter readings before and after RTPFC

| | Before | After |
|---------------------|--------|-------|
| Voltage | 400 | 415 |
| PF | 0.91 | .996 |
| kVA | 1593 | 1455 |
| Line Current | 2216 | 2025 |
| THD I% | 14% | 8% |
| THD V% | 6% | 3.3% |

About RTPFC

Cummins' RTPFC is a thyristor-based dynamic reactive power compensator which provides compensation on cycle-to-cycle basis by switching the capacitors in 20ms at zero cross over resulting in smooth compensation.

For further information, kindly contact Power Consulting at atul.tare@cummins.com or on (0)9850563569.

The Cummins advantage

Unmatched product design using Cummins' state-of-the-art technology, coupled with the largest customer support network in the Country, ensures SINGLE SOURCE POWER ASSURANCE to our customers. Little wonder then, that for over four decades Cummins has been a leading player in power generation technology in India.

