India's Largest Cement Plant

ULTRATECH CEMENT LIMITED, RAJASHREE CEMENT WORKS
Malkhed, Karnataka, India
(125MW Generation Capacity)

ULTRATECH CEMENT LIMITED with an annual capacity of 63 million is the largest cement company in India and amongst the leading producers of cement globally. Ultratech is also the largest manufacturer of white cement and ready mix concrete (RMC) in India.

Ultratech provides a range of products that cater to the needs of various aspects of construction, ranging from foundation to finish. This includes Ordinary Portland Cement, Portland Blast Furnace Slag Cement, Portland Pozzalana Cement, White Cement, Ready Mix Concrete, Building Products and a host of other building solutions. Ultratech Cement is also India's largest exporter of cement and clinker reaching out to meet demand in countries around the Indian Ocean and the Middle East.

Power Management Project

Type of Plant
Cement Plant

Location
Malkhed, Karnataka, India

Turbine Size

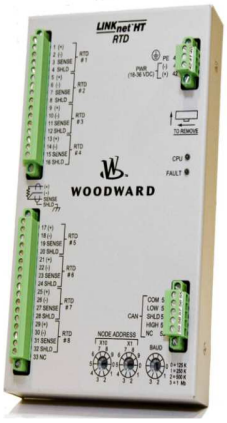
TG-1	18.5MW	BHEL
TG-2	20MW	SKODA
TG-3	20MW	HTC
TG-4	27.5MW	HTC
TG-5	27.5MW	HTC
TG-6	12MW	HTC

Woodward Equipment per Application

- DSLC-II
- MSLC-II
- ATLAS-II
- HT Linknet Modules
- ATLAS-II Software
- CAN-FO Converters

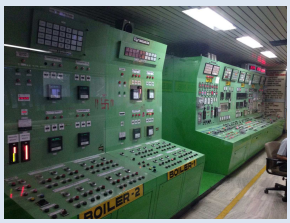
Today the company has 12 integrated plants, 1 white cement plant, 2 wall care putty plants and 1 clinkerisation plant, which is based in the UAE. Furthermore, Ultratech has 16 grinding units across the world: 12 in India, 2 in UAE and 1 each in Bahrain and Bangladesh. It also has 7 bulk terminals (6 in India and 1 in Sri lanka). Ultratech has 101 concrete plants across 35 locations in India.

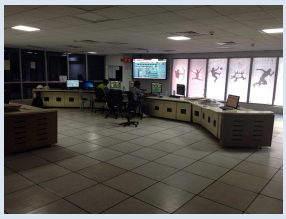
DSLC-2 / MSLC-2



HT LINKNET

ATLAS-II





Woodward's Power Management System - The Control of Choice

Woodward performed detailed site surveys and studies to analyze the existing situations while consulting UTCL Rajashree Cement Works on the necessary technical requirements. Follow-up meetings were conducted to ensure that project milestones were met on time.
Woodward's Power management controllers including DSLC-II & MSLC-II along with ATLS-II were chosen for UTCL Rajashree Cement works for controlling Power of 125MW generation capacity Plant as it met all of UTCL's performance and reliability requirements as well as it allowed Generator Breaker Auto Synchronizing of all the 6 no.'s of Turbines and run them in Load Sharing, Fixed Load, Import/Export Mode as well as took care of Load Shedding also.
This type of integrated Power Management system simplified Turbine loading and its Operation and reduced the overall system's complexity. Also it saved the Plant from unnecessary Blackouts during Grid Islanding Operation.
Since reliability was key to the long term success, UTCL chose the Woodward's Power Management controller's field proven hardware platform. The ATLAS-II platform with HT Linknets modules on Woodward's customized GAP software allowed engineers to validate different breaker combinations, Load shedding logic conditions frequency based & priority based changes before putting the software program into actual operation.

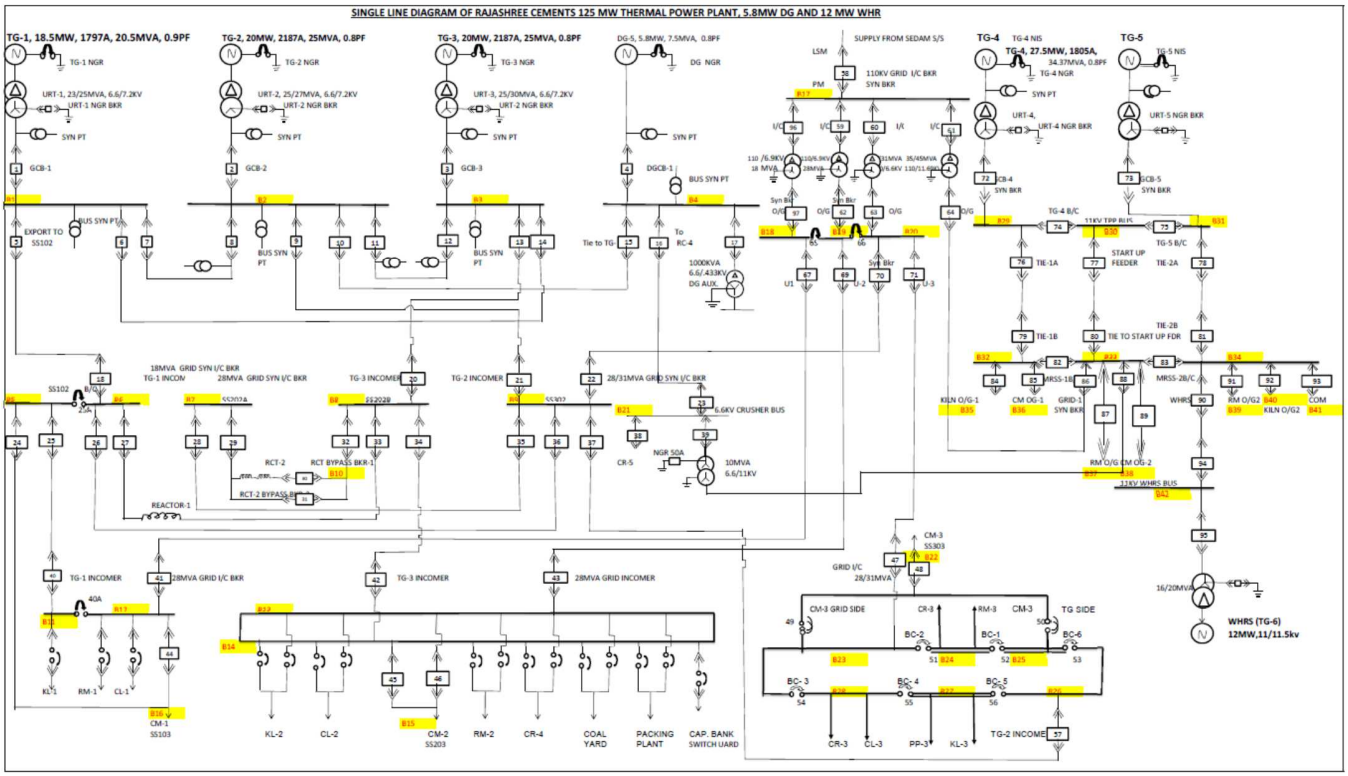
System Description & Application Challenges

UTCL Rajashree Cement Works consists of RC 123 unit having STG-1, 2, & 3, SS102 Unit, SS202 Unit, SS302 Unit, RC-4 Unit having STG-4 & 5, WHRS Unit having STG-6, DG house having Grid & Bus Couplers and MRSS Unit joining RC4 with Grid Incomer. Woodward Controllers were installed at each location depending on the number of Synchronizing & shedding breakers.

Distance between RC123 & DG house was 1.5 KM.
Distance between DG house & SS302 was 400 M.
Distance between DG house & MRSS was 2.3 KM.
Distance between MRSS & RC-4 was 800 M.
Distance between MRSS & WHRS was 500 M.

Woodward supplied 6 no. of cabinets located at each location communicating over Fibre Optic media which was around 9.6 km in total with 4 no. of HMI's at different locations. This includes Load Sharing signals, Load Shedding signals and Breaker combination signals of 52 paths of Plant SLD having more than 100 breakers. Atlas-II along with HT Linknet modules took care of breaker combination & Load Shedding part and DSLC-II / MSLC-II system for Generator Breaker Auto synchronizing & Load Sharing part.

PLANT SLD



Grid Breaker Synchronization: - Smooth Synchronizing of Grid breaker with 6 no.'s of STG sets which were running in Load Sharing Control mode.

Load Sharing: - Island Operation when all the 6 no.'s of Turbines running in Load sharing mode sharing all the plant Load (Real & Reactive) in proportion to their rated capacity at 50Hz & rated Voltage.

Fixed Load: - This is the Base Load Mode which means fixing the load on Turbine when connected with Grid or any other STG as per the given Load setpoint.

Import/Export Control: - Controlling Import/Export power at Grid breaker as per the preset Setpoint. During Import/Export control, STG load floats to maintain the Import/Export Setpoint.

Taking all the STG sets in Load Sharing at the same time from different locations was a big task & Woodward system was able to fulfill that requirement.
As the cement plant was in full operation during the implementation phase, only one STG was available To the commissioning team at a time. While working on one STG, five STG were providing power to the Plant. Careful studies and measures were undertaken to make sure all required I/O signals were identified And the commissioning would not pose any upset to the online critical units.

Project/System/Plant Result

Auto synchronizing at each of the STG breaker, Bus-couplers & Grid Breaker was done successfully. During islanding actual Grid from plant at 25MW Export, all the Six STG sets come in Load Sharing and shares the plant Load in proportion to their Rated Capacity (MW) at 50Hz and Rated Voltage.
Even after commissioning plant got islanded from Grid at more 30MW Export condition & every time plant got saved from any tripping by Sharing the Plant Load through Woodward's Power Management System.

The new Power Management System was able to handle Import/Export when tied to utility and Load Sharing when system is in island mode. These experiences confirm PMS as a total solution provider for Power Generation and are capable of providing quality and reliable support to our client, UTCL.

Woodward Equipment Installed

Woodward supplied the following controls for Power Management System:

- **DSLC-II, MSLC-II controls**
- **ATLAS-II & HT Linknet Modules**
- **Core ATLAS-II software program**
- **Six bay cabinet package**
- **Engineering workstation with HMI**
- **Wiring & installation assistance**
- **Factory Assistance Test**
- **Operator Training**

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