CMMS Software and Predictive Maintenance Instruments/Software:

CMMS software:
- PCL & SCADA control system for plant operations from Central Control Room (CCR)
- Distributed control system (DCS) for plant operation from Central Control Room (CCR)
- PI (Process Interaction) Software for monitoring the real time plant operations
- Real Time Monitoring and analysis from PI in excel
- FUZZY Logic system for simultaneous setting and control of multiple specifications.
- Optima Blending Control System for maintaining the raw material quality and consistency.
- XRF system for product quality analysis.
- Cross Belt Analyzer for maintaining the raw material quality.
- Kiln Shell Scanner for Temperature monitoring and control.
- SAP PM, PT, CM, CMS, FGC, and MM Modules for overall asset management.

Predictive maintenance instruments and software:
- Digital Vibration Data Collector & Analyzer Two Channel with optimized software (Vibtest, Vibtest, Schenk Aven).
- Easy Laser Alignment Kit (D-279, Damalki).
- Thermal Imager (Fluke Ti30).
- Fast Align (Manure, FCK, SH).
- Ultrasense: Thickness Gauge (Eikon-1M).
- Ultrasonic Flaw detector (Einstein 4 TFT, Modoric).
- Stratoscope (Nova strobe DB Plus, Monarch).
- Integrated Hardness Tester (TH 130, Time-Group Inc).
- Vibration Pen (SKF).
- Bearing Pen (SKF SEE).
- Ultrasonic Thickness Gauge (Einstein).
- Polylot Hardness test (Metal Spot Engineers, Nannur).
- 14. AC Current Clamp (Fluke 400).
- Laser Alignment (Damalki All).
- Vibration Meter (80-D-30).
- 17. Shock Pulse Analyzer (OPM A201).
- Insulation Multimeter (Fluke 1587).
- Velocity Meter (Visage).
- Electric Discharge Detector (TKD-1).

Equipment Evaluation:
Cement manufacturing process consists of handling of huge quantity of material & grinding of various materials (In million tons), as raw materials are highly abrasive, hence during process, all equipments undergo major wear & tear so reliable maintenance is important factor for maintaining availability of equipments such as Lime Stone Crusher, Mills, Kiln, Packers, Material Handling equipments, Compressors etc.

Equipment logs are maintained and categorized in the SAP module to access their rank of failures. This is used in equipment wise failure analysis and spares management and maintenance notifications. Planned maintenance supports self maintenance by monitoring basic conditions through condition monitoring. Analysis of MTTR, MTBF & OEE and relevant improvement initiatives are resulting in to the downtime reduction.

Equipment PerformanceEnhancement:
We implement RCM projects on identified equipments to enhance their reliability. Equipment breakdowns are closely analyzed by using tools such as why & why, C&E analysis and further analyzed focusing FMEA review to understand the current status of our assets. All the breakdowns are captured along with why & why analysis in SAP. Hence, we ensure no breakdown is left without analysis and repetition of breakdowns is prohibited. Our maintenance teams are trained to use problem solving tools. Accelerated deterioration including ageing, wear pattern, fatigue is monitored and life is increased by proactive solutions to prolong the service life.

Standardization:
Routine maintenance jobs are identified and scheduled for preventive maintenance of equipments. There is a system to monitor preventive maintenance through daily evaluating PM check list in SAP and reviewed on weekly basis. Standard maintenance procedures for periodic maintenance have been prepared and Maintenance Protocols are in practice to track the deviation of the operaional procedures. RCM recommendations are incorporated in developing draft maintenance procedure to align with standard maintenance procedures. PM Audit is being conducted and actionable points are identified on quarterly basis to meet PM objectives. Structured system of preventive maintenance both time based as well as condition based which covers all critical equipments and has been established. Our Predictive Maintenance is designed based on the criticality of the equipment. Predictive Maintenance is widely used in our industry as heavy machineries need to run without any stoppage. In predictive maintenance various tools, latest instruments & techniques are used by team of engineers from maintenance specially identified for predictive maintenance.

Results:
The level of attainment of Planned Maintenance overall performance as per external bi-annual assessment improved from 55-60 (2009) to 75-80 (2011).