

# Thinking big

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**India**

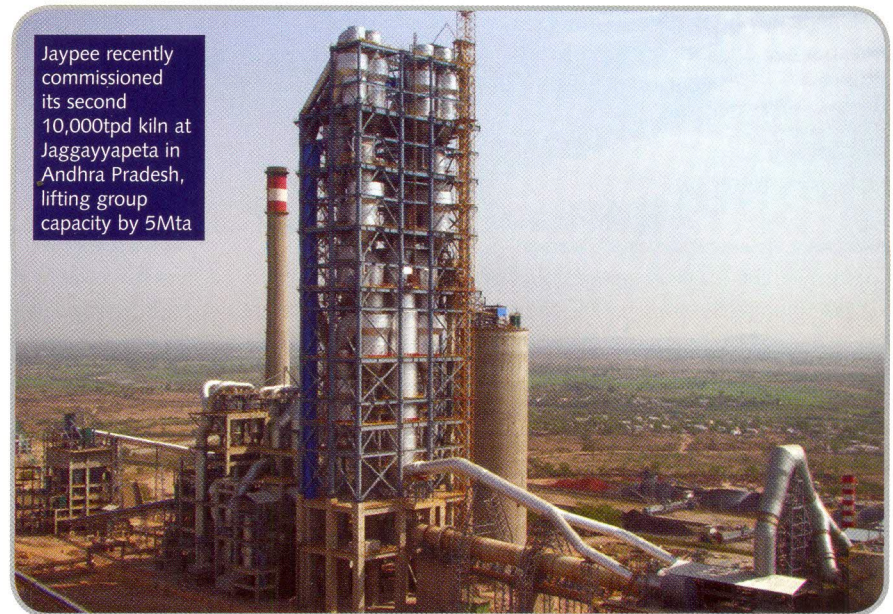
*India's strong cement demand has provided the local cement industry with opportunities to upgrade and expand its production capacity. Jaypee recently commissioned its second 10,000tpd kiln at Jaggayyapeta in Andhra Pradesh, lifting group capacity by 5Mta. The cement producer entrusted Holtec Consulting to take the project successfully from start to finish.*

Despite the global economic recession, there are places where it is not a dream to install a >10,000tpd kiln and reap the benefits of economy of scale. One such place is Jaggayyapeta Village in Andhra Pradesh's Krishna district. Jaiprakash Associates Ltd (JAL), part of the Jaypee Group, has recently commissioned its second 10,000tpd kiln – the Jaypee Balaji Cement Project, which has raised the group's capacity by 5Mta.

## The project

The Jaypee Balaji Cement Project can broadly be divided into the following sections:

- captive mining
- cement plant
- captive thermal power plant (CPP) of 35MW with 8x2500kVa emergency DG station, which supplements state grid-supplied power to meet the 61MW power needs of the plant
- necessary infrastructure facilities:



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system to receive power from the grid, emergency DG sets, railway siding, water supply from the Paleru and Krishna rivers, staff housing, etc.

Specifications for the main machinery

and key storage equipment are shown in Tables 1 and 2, respectively. The project features a number of key highlights:

- the limestone crushing and screening plant is connected to main plant by belt conveyor in a tunnel, below a public road and railway siding
- 8000t RCC silo installed for petcoke
- the preheater tower is of steel construction between 33-170m
- Gebr Pfeiffer's biggest vertical roller mill (VRM), with a multi-drive design, is installed for cement grinding
- the plant has unique distinction of having VRM, ball mill, roller press in conjunction with ball mill and a fly ash classification and blending system, for cement manufacturing
- it has one of the largest process controller systems, consisting of 19 process controllers from Siemens comprising 30,000 I/Os
- Balaji has one of the biggest power distribution system, consisting of seven HT switchboards, nine LT switchboards and 35 MCC's.



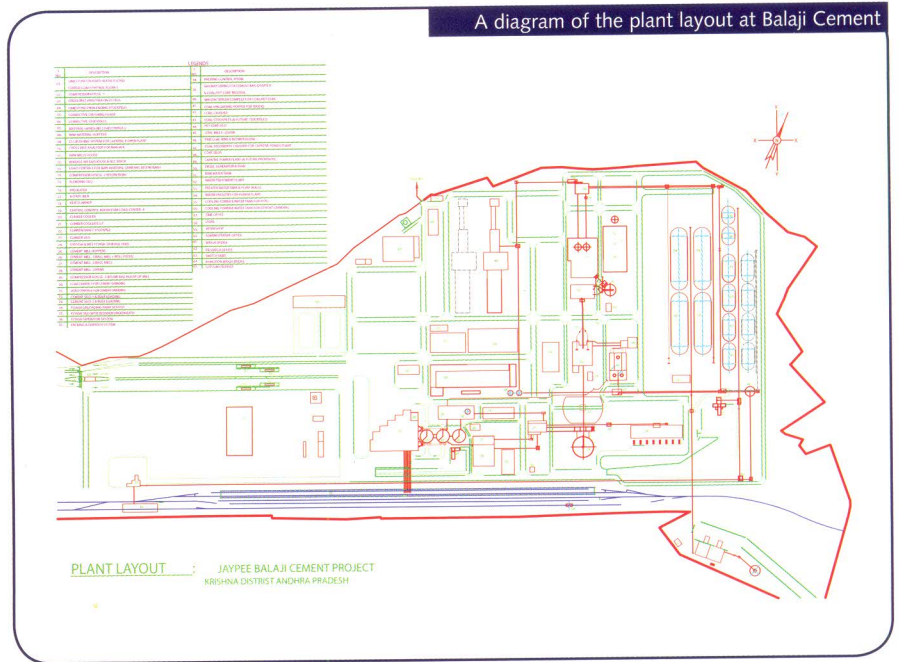
Holtec was contracted as the engineering consultant for the project

### Enter Holtec Consulting

To bring the project to a successful completion, JAL contracted the services of Holtec Consulting Pvt Ltd, an Indian firm catering primarily to the cement, CPP and mineral-based industries. Since its foundation in 1967 as an engineering consultant, Holtec has grown to become a fully-fledged engineering and management consulting firm, delivering integrated services in over 3400 assignments to its 700 clients in 83 countries.

Holtec's ISO 9001 certification, its infrastructure and independence from any manufacturing companies, equipment suppliers and EPC contractors, sharply sets the company apart from competitors and allows it to deliver cost-effective, high-value and impartial services to discerning customers. Its exemplary track record boasts over 150 major greenfield and expansion projects, including 11 clinker lines with a >10,000tpd capacity in India and overseas.

Holtec has been involved with the project right from the concept stage, and rendered the following services for its successful execution:



- preparation of the techno-economic feasibility report for project financing
- assistance in dealing with financial institutions and project progress reporting on a periodic basis
- preparation of the Statutory Mine Plan, computer-aided deposit evaluation and the Progressive Mine Closure Plan
- assistance in statutory clearances for the plant, etc
- procurement engineering and assistance in contracting for supplies and services
- project engineering services for the cement plant
- feasibility study and project engineering services for the thermal CPP
- project engineering services for installation of standby DG sets
- procurement assistance and project engineering of various systems to integrate the railway siding with the cement plant
- project planning and control of all project work
- site supervision services.

The project led to the generation of around 70 mechanical and 35 E&I packages for the cement plant, 50 mechanical and erection and installation packages for the CPP as well as 2200 mechanical and fabrication, 4000 E&I and 1500 civil drawings. Project consulting work also included a feasibility report for the cement plant, a computer-aided deposit evaluation, a mining plan and a quarterly progress report to the bankers.

### Teamwork

Throughout the project, Holtec staff worked as part of a team that included not only Jaypee Venture Ltd (civil engineering) and JAL's Fabrication and Construction department, but also the following companies:

- Buildmet India: civil contractor for cement grinding section

**Table 1: main equipment sizing and supplies**

No.	Package/equipment	Specifications	Supplier
1	Limestone crushing & screening (tph)	2 x 900	Larsen & Toubro
2	Cross belt analyser	For LS and raw mix	Thermo Fisher
3	Coal crusher (tph)	800	MMD
4	Stackers – LS & coal/corrective (tph)	1800 & 800	JAL
5	Reclaimer – LS & coal/corrective (tph)	2 x 550 & 300	JAL
6	Raw mills (tph)	2 x 450	Gebr Pfeiffer
7	Coal mills (tph)	2 x 50	Gebr Pfeiffer
8	Pyroprocessing (tpd)	10,000	FLSmidth
9	RA baghouse – raw mill/kiln (lac m <sup>3</sup> /h)	24	Alstom
10	Cement grinding – BM + R-press (tph)	285	FLSmidth
11	Cement grinding – ball mill (tph)	150	FLSmidth
12	Cement grinding – VRM (tph)	320	Gebr Pfeiffer
13	Flyash and cement silos (m <sup>3</sup> )	3 x 20,000	EEL INDIA
14	Blender (tph)	300	WAM
15	Flyash separator-with-dryer (tph)	125	LV-Technology
16	Packing plant (tph)	5 x 240	EEL INDIA
17	Truck loaders (tph)	15 x 120	EEL INDIA
18	Wagon loading system (tph)	12 x 120	EEL INDIA
19	Wagon tippler (tph)	800	Metso Mineral
20	Locomotive (hp)	1400	SAN ENGG
21	Captive power plant (MW)	35	Boiler-TKIL Turbine-Siemens ACC-GEI

- Asia (Chennai) Engineering Co Pvt Ltd India: civil contractor for raw material grinding and township
- Sathiapal Engineers Pvt Ltd India: civil contractor for CF silo, chimney, clinker transport tower and petcoke silo
- Hajee AP Bava & Co Construction Pvt Ltd and Petron Eng Construction Ltd: fabrication and erection contractors for cement plant
- Ayoki Fabrication Pvt Ltd: CPP fabrication and erection contractor
- Nawa Engineers: fabrication for preheater structure and belt conveyors system
- KVR Infra P Ltd: consultant for railway siding and lead line
- Kafer Punj: contractor for refractory installation
- Lyods & Kafer Punj: contractors for insulation installation
- Chadalwada & Bhawani Electrical: construction for 19km, 132kV line
- IOT Ltd: electrical contractor (cement plant)

The 10,000tpd pyroprocessing section at the Jaypee Balaji Cement works was delivered by FLSmidth

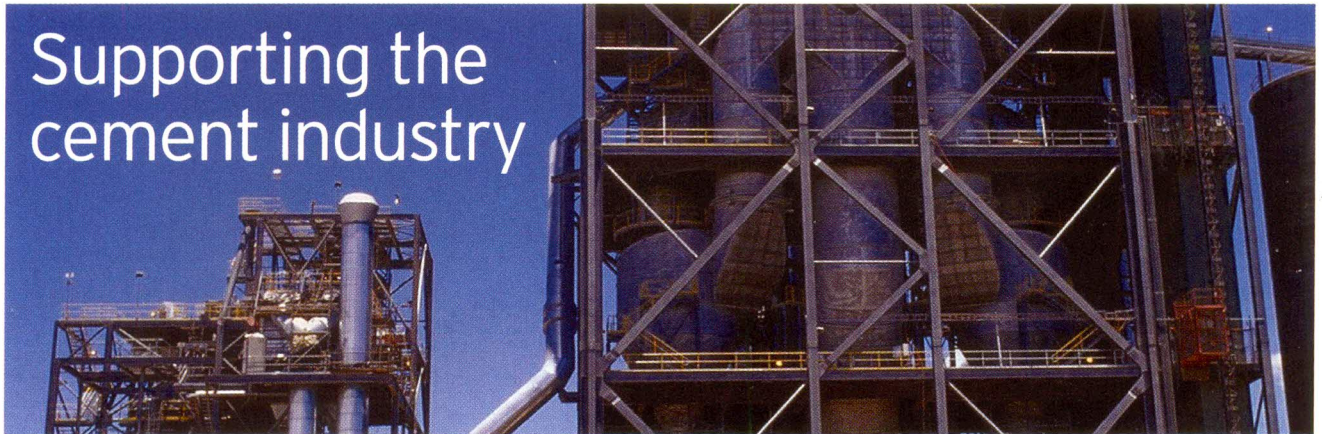


- FLSmidth Automation: instrumentation installation
- Ideas Engineers: electrical contractor (CPP)

**Milestones**

The project was conceived in July 2008 and after completing all pre-project formalities in a short period of four

# Supporting the cement industry



- Construction
- Data & telecommunications
- Defence
- Energy
- Government
- International development assistance
- Manufacturing
- Property
- Resources
- Transport
- Water

Aurecon provides engineering, management and specialist technical services for public and private sector clients around the world.

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handles all aspects of project delivery including front end studies, engineering design, supervision of construction, commissioning and operations support.

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**Table 2: main storage areas and equipment**

No.	Description	Specifications	Remarks
1	Limestone stockpiles (t)	4 x 30,000	linear/uncovered
2	Coal stockpiles (t)	4 x 4000	linear /uncovered
3	Petcoke silo (t)	1 x 8000	RCC/ 20m
4	Correctives stockpiles (t)	2 x 3500	linear /uncovered
5	Raw meal CF silo (t)	1 x 24,000	RCC/22.4m
6	Clinker silo (t)	1 x 75,000	RCC/40m
7	Clinker stockpile (t)	30,000	circular/covered
8	Gypsum storage yard (t)	2500	linear/covered
9	Wet FA storage yard (t)	2500	linear/covered
10	Flyash silo (m <sup>3</sup> )	1 x 20,000	three-compartment silo
11	Cement silos (m <sup>3</sup> )	2 x 20,000	three-compartment silo
12	Fine coal silo – for CPP (t)	2 x 600	steel

Governmental delay in clearing the limestone mining lease meant the project was commissioned in March 2012.

**Major project milestones**

- start of land acquisition: July 2008
- main machinery order (revalidated): July 2008
- start of excavation: November 2008
- start of erection: September 2009
- CPP commissioning: May 2011
- first cement with purchased clinker: November 2011
- first clinker: March 2012
- first cement with own clinker: March 2012
- completion of PG tests: yet to be carried out.

**Conclusion**

Through its long association with JAL, Holtec has gained extensive insight into the company's working style and methodology, its expectations and requirements, which have undergone a sea change since both companies started working together in 1983. As a result of such perfect teamwork between the owner, consultant, suppliers and contractors, a challenging project was completed to mutual benefit and satisfaction.

## About Jaypee Group

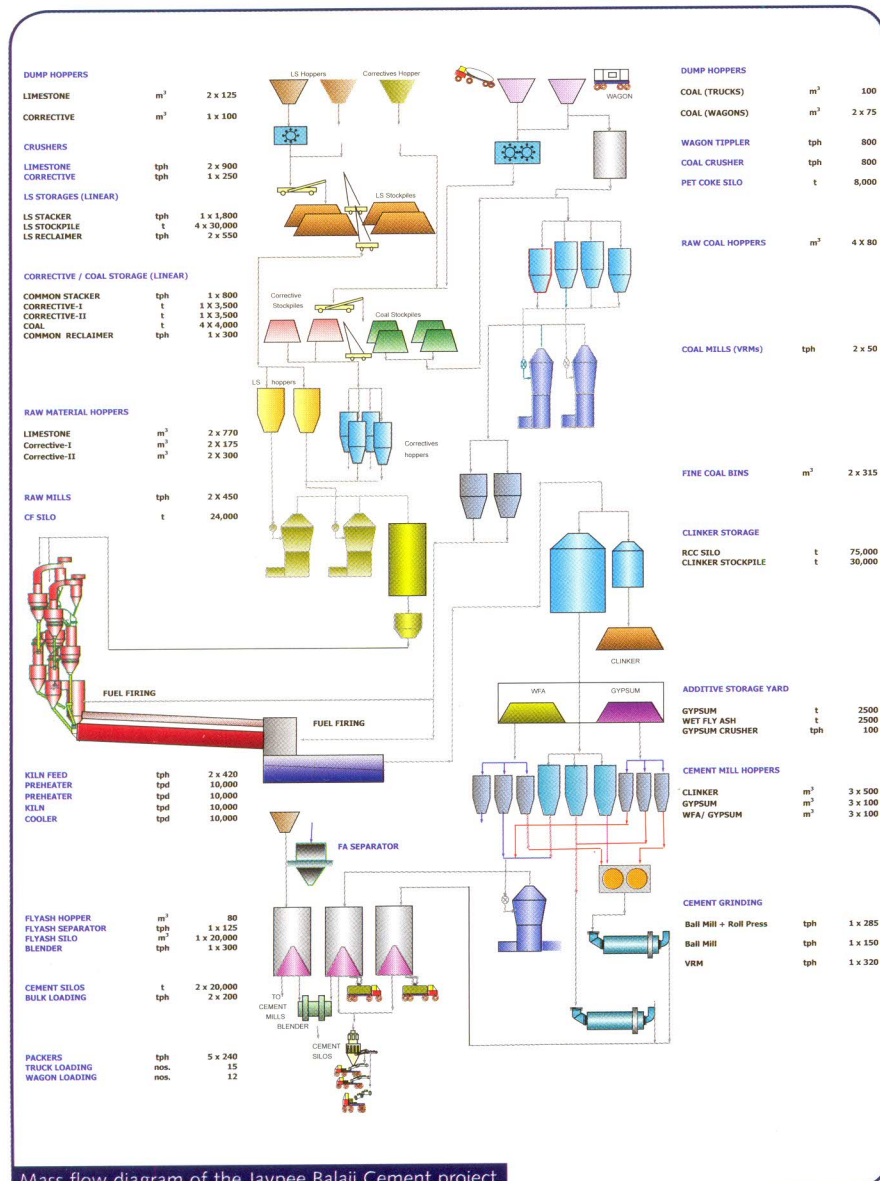
The Jaypee Group is the third-largest cement producer in India, closely following Holcim India (ACC/Ambuja Cement) and UltraTech (Aditya Birla Group and UltraTech Cement).

The group's 28Mta modern, computerised process-controlled cement facilities are located across India in the states of Madhya Pradesh, Gujarat, Himachal Pradesh, Uttar Pradesh, Andhra Pradesh, Karnataka, Chattisgarh, Jharkhand, Uttarakhand and Haryana.

The company is in the midst of capacity expansion of its cement business in various parts of the country, and is slated to have 35.9Mta of cement production and 672MW captive thermal power plant capacity operational by FY13.

months, the execution work started in November 2008. However, due to certain government obstacles, work

had to be stopped for nearly four months. Thereafter, the project was ready for commissioning by June 2011,



Mass flow diagram of the Jaypee Balaji Cement project