

SOUFIAN CEMENT COMPANY, TABRIZ, IRAN

UPGRADATION PROJECT

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Introduction

The Iranian cement industry has been in significant expansion and modernisation mode during the recent years.

The Soufian Cement Company (SCC) is operating a cement plant at km 32 off Tabriz-Marand Road, Metropolitan City, North-West of Iran. SCC has four kiln lines in operation. All the four kiln lines have been supplied by FLS.

In line with the trend in Iranian cement industry, SCC is also in the process of upgrading of their cement plant along with expansion of the production capacity. SCC has appointed Holtec Consulting Pvt. Ltd. (Holtec) as the project consultants.

The paper in hand attempts to briefly describe the upgradation project and the concept thereof.

Present Plant Configuration

The present plant system is as follows:

Kiln 1: 600 tpd capacity, long dry kiln with satellite cooler.

Kiln 2: 1000 tpd capacity, long dry kiln with satellite cooler.

Kiln 3: 1000 tpd capacity, long dry kiln with satellite cooler.

Kiln 4: 2000 tpd capacity, dry process kiln with 4 stage preheater and satellite cooler.

Two limestone crushers have been installed for kiln 1, 2 and 3 whereas a separate crusher is installed to meet the requirements of kiln 4.

All the kiln lines have independent ball mills for raw material drying and grinding and also cement grinding.

All the kiln lines are equipped with satellite coolers and the kiln burners are suitable for oil firing only.

Kiln and cooler de-dusting is by means of electrostatic precipitator (ESP).

Clinker storage is in covered crane gantry hall for kiln 1, 2 and 3 whereas for kiln 4 the clinker is stored in a covered storage yard.

The electrical and control system for kiln 1, 2 and 3 is based on decentralized relay logic while kiln 4 is centralized relay logic.

Objective of Upgradation

The main objective of upgrading is as follows:

- Increase in Production Capacity.
- Replacement of Obsolete Equipment with State-of-the-Art Facilities.
- Optimization of Energy Consumption, both electric and thermal energy.
- Environment Protection
- Installation of Modern Electrical and Control Systems

The above objective is envisaged to be achieved by the following:

- Stop operation of kiln 1.
- Upgrade kiln 3, which is the latest amongst the kilns 1, 2 and 3.
- Provide facility to operate kiln 2 in the event of shutdown of kiln 3
- Upgrade kiln 4.

Methodology and Approach

A detailed feasibility report was prepared based on which SCC decided to pursue the project based on the above mentioned concept.

Following the decision of SCC, tender document for main machinery was issued and the order for main machinery was placed in December '2003 for both kiln 3 and kiln 4.

Upgraded Plant Configuration

The upgraded system shall be as follows:

- Kiln 1: 0 tpd, Shutdown
- Kiln 2: 0 tpd, Shutdown. To be operated in the event of shutdown of kiln 3.
- Kiln 3: 3000 tpd capacity, dry process kiln with 5 stage preheater, precalciner and cross bar cooler.
- Kiln 4: 4000 tpd capacity, dry process kiln with 2-string, 4 stage preheater, precalciner and cross bar cooler.

Upgradation and Modernization Concept

The upgradation / modernization would involve various departments across the plant. The major concepts are as follows:

Kiln 3

Installation of new raw material hoppers (Limestone – 1500 t; RCC, Red Soil – 400 t; Steel, Iron Ore – 100 t; RCC) to receive crushed material from the common storage facilities being installed along with upgradation of kiln 4

Use existing raw mills of kiln 1, 2 and 3 for the upgraded kiln 3.

Use existing raw meal storage system of kiln 3 for upgraded kiln 3 also.

Installation of new 200 tph capacity kiln dosing and feeding system

Installation of new 5 stage preheater of 3000 tpd capacity with precalciner over the kiln.

Use existing kiln 2 and kiln 3 ESP for the upgraded kiln 3 exhaust de-dusting with new gas conditioning tower (GCT)

Modify the existing long dry kiln to suit the new system configuration and capacity of 3,000 tpd. The 5 support kiln shall be reduced to 3 support kiln. The kiln length shall be reduced from 162 m to 88 m.

Installation of new generation cross bar cooler of 3,000 tpd capacity in place of satellite cooler.

Replacement of old burner with new multi-channel burner.

Installation of new clinker cooler ESP.

Installation of new clinker transport system for feeding the existing crane gantry hall.

Use of existing cements mills (of kiln 1, 2 and 3), cement silos and packing plant for the upgraded kiln 3.

Installation of new compressed air system for the upgraded facilities.

Installation of latest power distribution equipment and modern PLC based control system for the upgraded section.

Kiln 4

Installation of new double rotor limestone crusher of 1000 tpd capacity. The crusher shall be provided with two dump hoppers and variable speed apron feeders for crushing limestone and marl simultaneously. The new limestone crusher along with the existing crusher of kiln 4 shall meet the total requirement of upgraded kiln 3 and kiln 4.

Installation of on line bulk material analyser for controlling the mix ratio between limestone and marl.

Installation of new mix preblending longitudinal stockpile for limestone and marl. This stockpile shall feed material to both kiln 3 and 4. The capacity of stockpile shall be 2 x 40,000 t.

Installation of new two stage red soil crusher of 300 tph capacity. The crusher shall also be used for crushing iron ore and gypsum.

Installation of new linear stockpile for red soil, iron ore and gypsum which shall be suitable for supplying material to both kiln 3 and 4. Capacity of stockpile shall be 26000 t for red soil, 2200 t for iron ore and 2000 t for Gypsum.

Installation of new roller press grinding system of 360 tph capacity to operate in conjunction with existing ball mill system for raw material grinding.

Installation of new raw meal handling and kiln feeding system of 260 tph capacity.

Installation of new 4 stage preheater with precalciner to operate in conjunction with existing 4 stage preheater resulting in preheater capacity of 4000 tpd capacity.

Installation of new ESP for handling gases from new preheater in conjunction with a new gas conditioning tower.

Modification of existing rotary kiln to suit new system configuration and capacity of 4,000 tpd.

Installation of new generation cross bar cooler of 4,000 tpd capacity in place of satellite cooler.

Replacement of old burner with new multi-channel burner.

Installation of new clinker cooler ESP.

Installation of new clinker transport system.

Installation of new close circuit cement grinding system of 150 tph capacity in order to increase cement grinding capacity.

Installation of new transport system consisting of air slide and bucket elevator for transporting cement from new cement mill to existing silos.

Installation of new compressed air system for the upgraded facilities.

Installation of latest power distribution equipment and modern PLC based control system for the upgraded section

Technology for Upgradation

The main machinery for the upgradation is being supplied by well known and reputed suppliers of the cement industry.

| <u>Equipment</u> | <u>Supplier</u> |
|--|--------------------|
| Pyroprocessing for kiln 3 and 4 | FLS |
| Limestone and Red Soil Crushing Plants | Hazemag |
| Limestone and Red Soil Preblending Stockpiles | Weser |
| Raw Mill upgrade with Roller Press | KHD |
| Close Circuit Ball Mill System for Cement Grinding | KHD |
| Clinker transport for kiln 3 and 4 | Aumund |
| ESP's and GCT's for Process Dedusting | Griin/Elex |
| Power, Control, Instrumentation and Automation | CES/FLS Automation |

Expected Plant Performance :

Plant performance guarantees after upgradation are expected as following:

Kiln 3:

Heat energy consumption – 740 kCal/kg Clinker

Power consumption for clinker production – 22.9 kWh/t clinker

Pollution Control – less than 50 mg/Nm3

Kiln 4:

Heat energy consumption – 750 kCal/kg Clinker

Power consumption for clinker production – 16 kWh/t clinker

Raw mill power consumption – 19.9 kWh/t of raw meal

Cement mill power consumption – 37.8 kWh/t of cement (OPC basis)

Pollution Control – less than 50 mg/Nm3

Project Progress

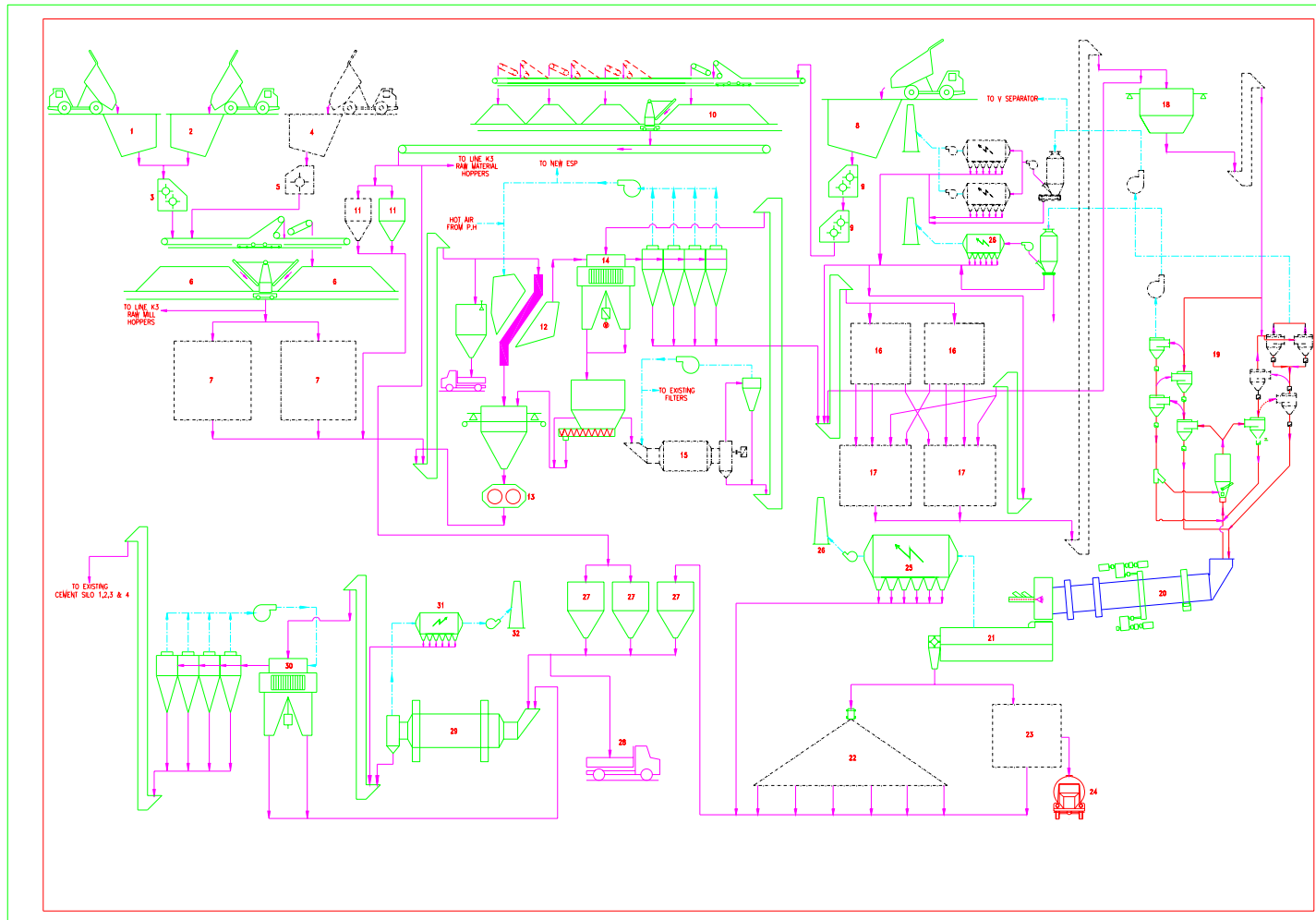
The main machinery has been delivered to the plant site. Civil construction work is in progress.

The upgradation project is scheduled to be commissioned by end of '2007.

Investment

The total investment for the upgradation project for kiln 3 and 4 works out to around EUR 100 million.

Kiln Line 4



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|-----------------------------|-------------------------------------|-------------------------------|--------------------------|------------------------------|
| 1. Limestone Dump Hopper | 7. Limestone Silo | 13. Roll Press | 19. Preheater | 25. Clinker Cooler ESP |
| 2. Marl Dump Hopper | 8. Red Soil Dump Hopper | 14. High Efficiency Separator | 20. Rotary Kiln | 26. Raw Mill / Kiln ESP |
| 3. Limestone / Marl Crusher | 9. Red Soil Crushers | 15. Raw Mill (Ball Mill) | 21. Clinker Cooler | 27. Cement Mill Hoppers |
| 4. Limestone Dump Hopper | 10. Corrective / Additive Stockpile | 16. Raw Meal Blending Silo | 22. Clinker Stockpile | 28. Calibration of Feed Belt |
| 5. Limestone Crusher | 11. Red Soil / Iron Ore Hopper | 17. Raw Meal Storage Silo | 23. Clinker Silo | 29. Cement Mill |
| 6. Mix Bed Stockpile | 12. V-Separator | 18. Kiln Feed Bin | 24. Clinker Bulk Loading | 30. High Eff. Separator |