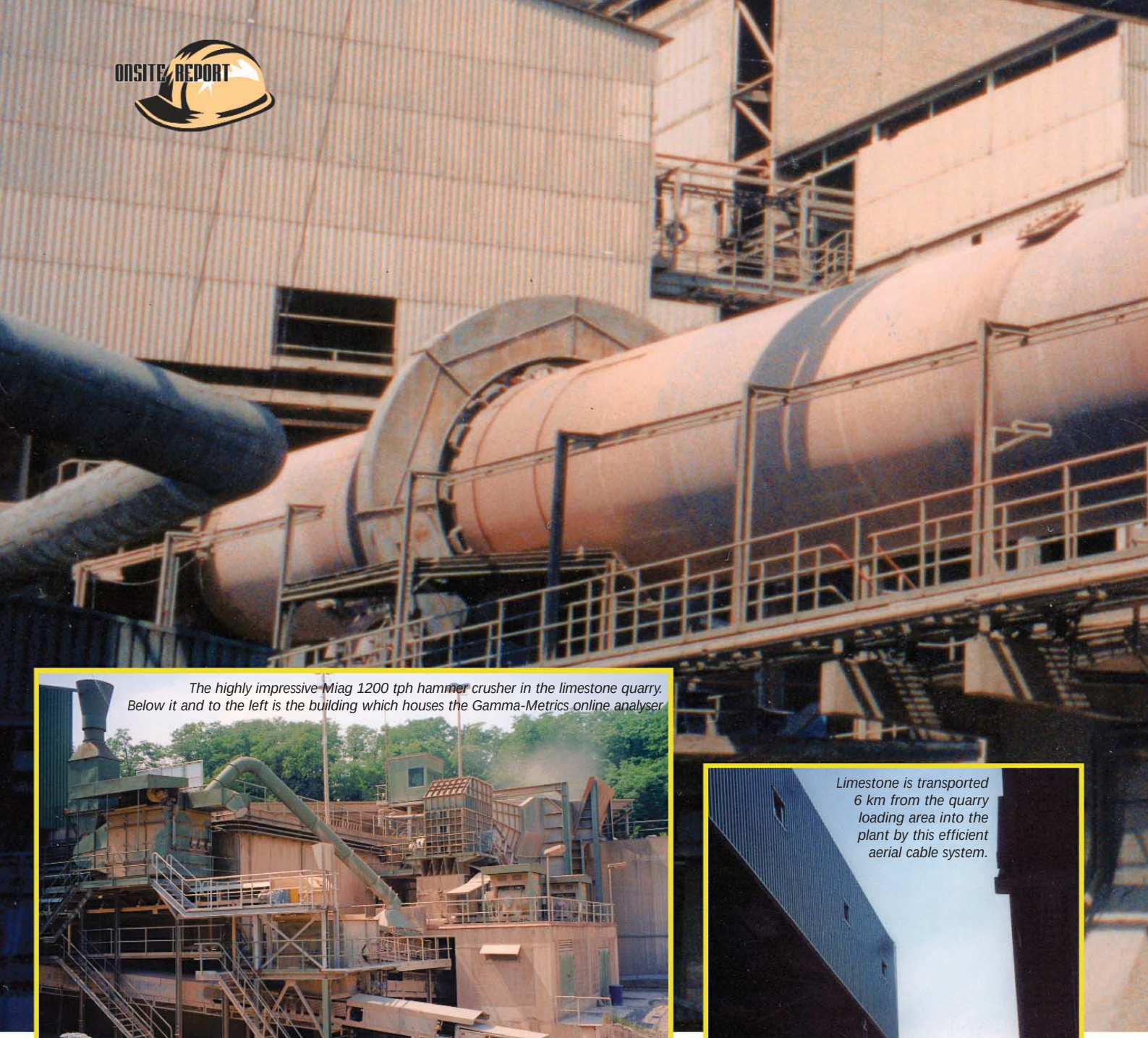
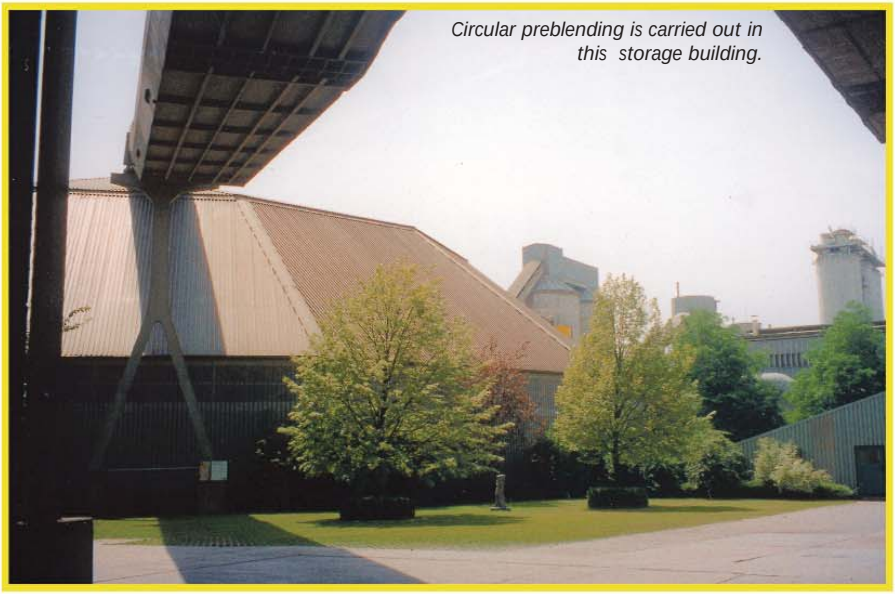


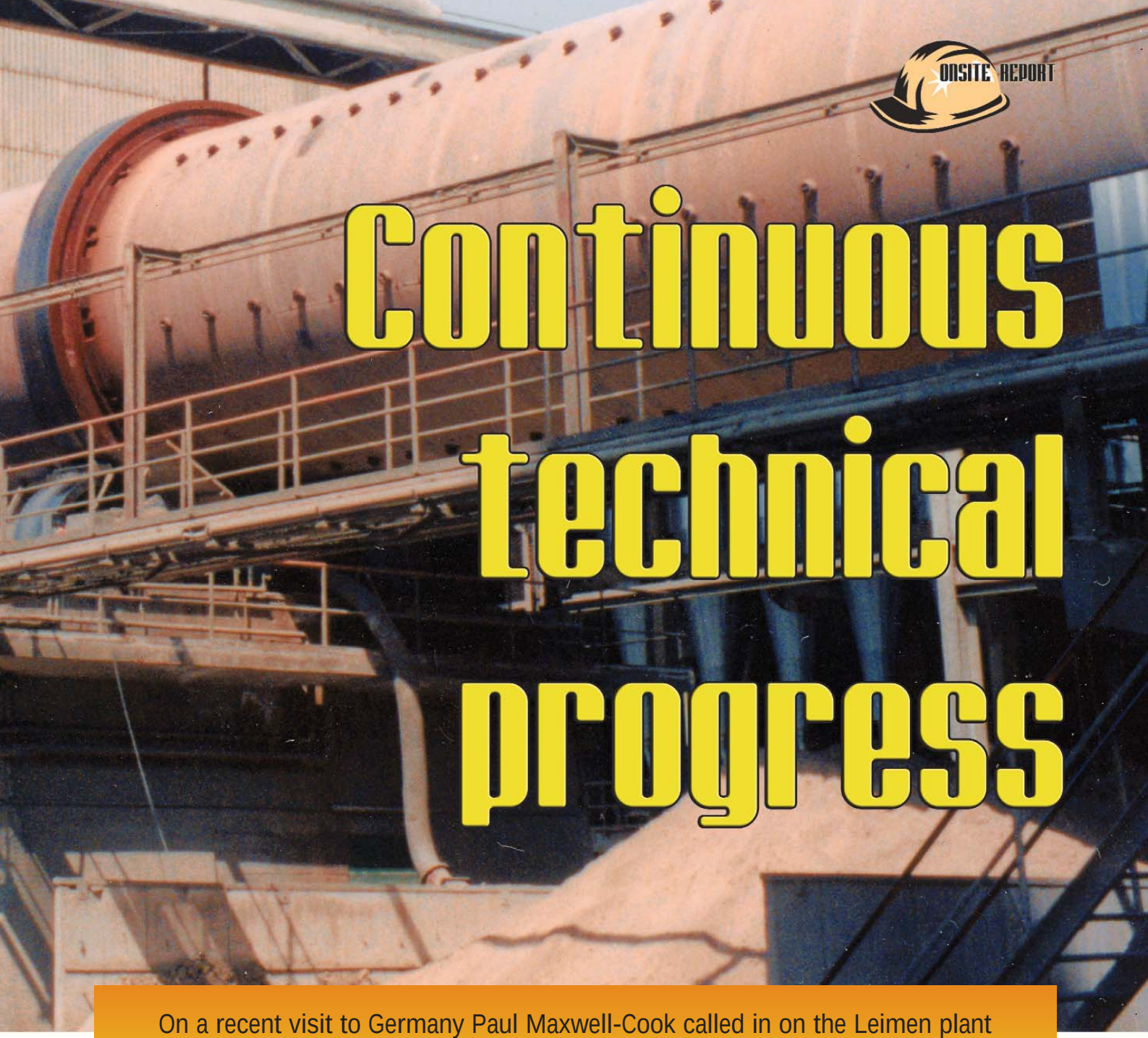


*The highly impressive Miag 1200 tph hammer crusher in the limestone quarry. Below it and to the left is the building which houses the Gamma-Metrics online analyser*

*Limestone is transported 6 km from the quarry loading area into the plant by this efficient aerial cable system.*



*Circular preblending is carried out in this storage building.*



# Continuous technical progress

On a recent visit to Germany Paul Maxwell-Cook called in on the Leimen plant just outside the historic city of Heidelberg, and was given a tour of this famous plant by HeidelbergCement Director, Peter Lucas.

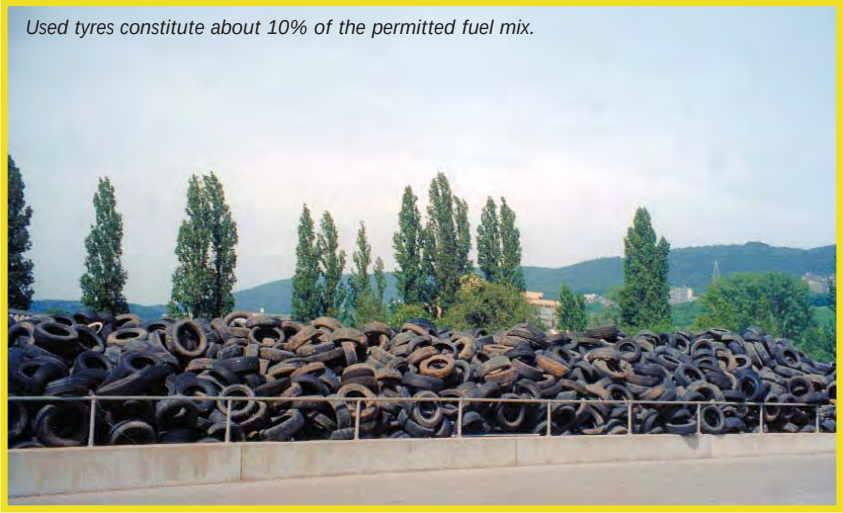
## Introduction

HeidelbergerCement's Leimen plant located just outside Heidelberg in South West Germany, has been associated with this historic city for more than 100 years. In fact the very first plant was built in the city itself before it was destroyed by fire in 1899.

The Leimen plant, which in actual fact is the only plant that has been founded by the company, has undergone many changes over the years and the only remaining parts of the original works are the famous festival hall and the administrative building.

## Continous development

The 2500 tpd plant is served by the company's two quarries at Nussloch and Radlader which supply limestone, loess and high-grade limestone. After the limestone has been blasted from the quarry face a hydraulic shovel loads 3 x 80 t trucks which transport the material to the stationary Miag 1200 tph hammer crusher which is located within the quarry. Imported limestone is also broken down in this primary crusher. From here the crushed limestone is carried by a conveyor belt for 3 km to the 3 x 3000 t loading silos for the 6 km long aerial cable way which silently transports the material into the plant. The cable way serves as a major environmental plus in that the alternative would see over 120 daily truck trips from the quarry to the plant with all the consequent problems of noise, dust and traffic problems for the local residents. Other raw materials used are iron and sand. In



*Used tyres constitute about 10% of the permitted fuel mix.*

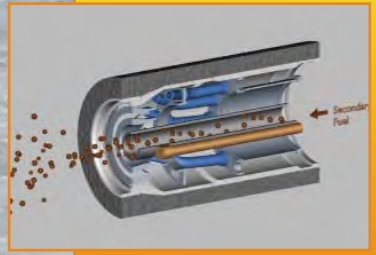
*On route to the kiln.*

1999 a Gamma–Metrics CB 1000L online PGNA analyser was installed within the quarry complex to provide non-stop analysis of the composition of the raw materials.

The Leimen plant operates a circular preblending bed which on the one hand serves as a material buffer between the quarry and the raw mill, and on the other as the mixing bed for prehomogenisation. The preblended material is then fed to the Gebr. Pfeiffer raw mill which, incidentally, has been in continuous operation since 1973. During that time, the mill's output has been raised from the original 135 tph to the current 170 tph at a fineness of 14 – 15% R90. The raw materials are dried by the hot kiln gases. Once crushed the raw meal is conveyed to 3 x 5000 t continuous flow IBAU-designed modified CPAG batch blending silos.

The total rated capacity of the two Lepol kilns, known as kilns 2 and 3 is 2500 tpd. Kiln 2, at 960 tpd, was installed in the early 1960s, and kiln 3 at 1460 tpd was commissioned in 1973. There are fired with a mixture of conventional and secondary fuels. Lignite, pet coke and imported coal comprise the conventional fuels (40%), while the secondary fuels (making up not more than 60%) are

## The Pneumo Swirler®



The pneumo swirler was developed to improve the combustion behaviour of hard burnable solid secondary fuels. It was recognised that the compact stream of solid secondary fuel produces sometimes reduced oxygen conditions within the flame. This influences the clinker quality.

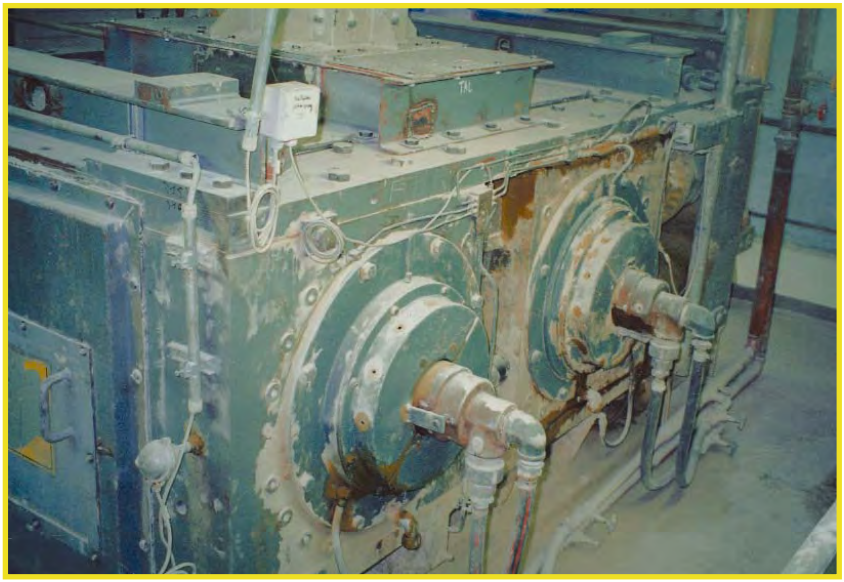
This device is able to create a pneumatic swirl for the secondary solid fuels to be better dispersed (interfered) inside the flame. This invention improves the burn-out and has the ability to maintain the sintering zone as well as flame control. The degree of pneumo swirler effect can be adjusted by the pneumatic pressure which is taken from the primary air.

used car tyres, shredded plastic derived from industrial processing and known as Profuel and recycled liquid fuel (RLF). Present permits allow the use of a fuel mix of 10% tyres and 20% Profuel. Another secondary fuel gaining in popularity is animal meal and the plant has successfully carried out tests on this 'new' fuel. Kiln 3's main burner can accommodate coal RLFs and Profuel. Used tyres are fed whole into both kilns and Profuel is also fired into kiln 2 but through a separate burner. The Austrian company Unitherm-Cemcon recently supplied its famous M.A.S. burner which includes a Pneumo Swirler® for kiln 3.

One of the most recent projects undertaken at the plant was a complete overhaul and replacement of the shell of the coal mill. This mill is an air-swept ball mill which works with a static KHD classifier. Gases from the Lepol grate are drawn through it to dry the coal. It is interesting to note that the only company that was able to confirm that it could replace the coal mill shell without removing the girth gear was the German company Teutrine. It is hoped to publish a separate article about this project in a future issue.

The grate coolers were originally supplied by Claudius Peters and the exit temperatures are in the range of 70 – 90° above ambient. Earlier this year, the grate chains were replaced. Dedusting is effected by three electrostatic precipitators, i.e. one for each kiln and one for the coolerr exhaust gases. Initial crushing of the clinker is carried out by a hammer crusher at the cooler exit.

Aumund pan and bucket conveyors transport the clinker from the crusher to the 100 000 t clinker hall and the 2 x 10 000 t and 1 x 3000 t concrete silos. Three closed circuit ball mills and a Polysius roller press carry out the final cement milling process. It is interesting to note that the development of the roller press for material bed comminution was pioneered by process technicians from HeidelbergCement, and that the first industrial use of the roller press worldwide was achieved in this plant.



*A pioneer: the first roller press to be installed into a cement plant was at Leimen.*

*Early stages in the operation to replace the shell of the old coal mill.*

*The old mill shell, to the right, was replaced by Teutrine with the new shell (left) supplied by PSP.*

Over 90% of the cement produced at Leimen leaves the plant in bulk road tankers, with the balance being distributed locally in bags. The palletising machine, which was supplied by Masch. Möllers, is capable of churning out 4000 bags per hour. The company's distribution network extends to around 100 km from the plant.

Leimen produces CEM I, II, III and IV cements to external quality control standards stipulated by VDZ. Internal control is maintained on all raw materials, intermediate products, finished products and on all fossil and secondary fuels (with the help of external laboratories). In the plant's own laboratories automatic preparation of all samples is effected by the POLAB system from Polysius. Chemical analysis by XRF and the measurement of free lime by XRD are prepared through equipment supplied by Siemens.

*The GammaMetrics CB 1000L on-line PGNA analyser as installed in the quarry.*

The Leimen plant technically has come a long way during its 103 year history, as indeed has the Heidelberg Group. When the first plant was built in Heidelberg all those years ago it could not have been envisaged that the Heidelberg Group would have grown into becoming one of the world's top cement majors.

**Enquiry no:**

*Left: Architectural masterpiece. This concrete structure houses three individual chimneys and its construction represented a major piece of investment for environmental protection. The emission situation around the plant was significently improved, while its purposeful form represents quite an advertisement for the use of concrete in an industrial environment.*

| **Main equipment suppliers** | |
|---|---|
| Hammer crusher | Miag |
| On-Line analyser | Thermo Gamma-Metrics |
| Stacker/reclaimer | Koch |
| Blending silos | IBAU design (modified CPAG batch blending unit) |
| Raw mill | Gebr Pfeiffer |
| Coal mill (refurbishment) | Teutrine |
| Replacement parts for coal mill | PSP |
| Kilns | Polysius |
| Kiln burners | Unitherm-Cemcon |
| Grate coolers | Claudius Peters |
| Electrostatic precipitators | Lurgi |
| Conveyors | Fredenhagen/Beumer |
| Conveyors (pan and bucket elevators) | Aumund |
| Roller press | Polysius |
| Separator | Chr. Pfeiffer |
| Laboatory systems | Polysius/ Siemens |
| Bag packing | Masch Möllers/ Haver & Boecker |