

# ASH RESOURCES

## MATERIALS FOR TODAY AND THE FUTURE

**Currently one of the largest warehouse projects in Gauteng, construction of Nestlé's new distribution center is proceeding at an impressive rate. Work began on 16 September last year and the facilities are expected to be in use during June this year.**

To improve efficiency, Nestlé decided to consolidate three distribution points in the Pretoria and Johannesburg region into one new center. Located at the Longmeadow Business Park alongside the N3 at Modderfontein, the project comprises a 33 000m<sup>2</sup> warehouse and a separate office block of 4 500m<sup>2</sup>. The construction contract was awarded to joint venture between WBHO and Neil Muller Construction (WBHO/NMC). Architects and principal Agents are Osmond Lange Architects. Consulting Engineers, are Arup Industrial Projects.

Although essential a standard design, Osmond Lange included features that would enhance floor space utilization, reduce fire insurance and give the client a low-maintenance, long-life facility. The design concept involves splitting the warehouse into three 11 000m<sup>2</sup> fire-containment compartments separated by 16m high x 200mm thick, free-standing, fire walls. With a four-hour fire rating, the walls have twice the usual fire resistance. The other special feature is FM2 floor flatness specification to enable forklifts to operate a high-level pallet rack storage system efficiently.

In terms of understanding the behaviour of concrete in the context of durability and the influence of fly ash on durability performance, there could have been no better guest speaker at the seminars than Robin Summers. Specialising for over twenty years in the field of materials durability, from which has evolved the concept of ultra-durable concrete, Summers is a civil engineer from North Carolina State University in the USA. He achieved recognition for his work in the States to the extent of being listed in the prestigious 'Who's Who in America'. He is currently Head of Materials Testing, Advisory Services and Research at the Ministry of Works in Bahrain. The presence that Ash Resources and its sister company Sphere-Fill have established in the Arabian Gulf over the last four years has led to an association and mutual respect between them and Summers' department. The products Dura-Pozz<sup>®</sup> and the superfine form, Super-Pozz are incorporated in Summers' research programme.

Using a 70/30 OPC/Fly Ash blend throughout, the project will require approximately 20 000m<sup>3</sup> of concrete. The cement contract was awarded to Lafarge South Africa and the 2 000t of fly ash required is Ash Resources' high quality Dura-Pozz<sup>®</sup>, supplied by their Lethabo plant near Sasolburg. "We needed a low shrinkage concrete," comments Project Engineer, Geoff Green of Arup Industrial Projects. "In this respect, the fly ash mix proposals put forward by WBHO/NMC achieved the required results. Combined with a good aggregate, the Dura-Pozz<sup>®</sup> mix is performing extremely well and gives excellent off-shutter finishes. In addition to enhancing final strength, virtually all concrete characteristics are improved as a result of the reduced water demand and subsequent cement reduction made possible by Dura-Pozz<sup>®</sup>."

"We are proud of the exceptional quality of the concrete that we are achieving," says WBHO's Contracts Manager, Neil Erwin. "The selection of raw materials has contributed to this quality. We are using dolomitic aggregates from Mooiplaas and washed sand from Vereening. We also have a great deal of experience using Dura-Pozz<sup>®</sup>."

Concerned in particular about the risk of prolonged summer rains, the contractors, in conjunction with Arup, opted for in-situ construction of the large fire walls rather than other alternatives such as tilt-up systems or precast component. All pours are being done by crane placement. WBHO/NMC poured the 16cm columns in two stages (1,5m kicker and a single lift for the 14,5m column including hammer head). Similarly, the 19m columns were done in two lifts, with excellent results every time. "Although not the original intention, WBHO/NMC's cast in-situ approach has worked well," comments Arup's Geoff Green. "I have seen other contractors attempting to cast shorter columns in one lift and finishing up with a column riddle with honeycombing. All credit must go to WBHO's concrete know-how and choice of sophisticated shutters."

The contractor is using two pan mixer batch plants: an Alcon and a Liebherr, each producing 25m<sup>3</sup>/h. They are feeding five tower cranes supported by two mobile cranes. Work on the floor slabs is progressing well. As the floor is a FM2 flatness specification, casting of floors could only begin once the roof was in place, together with temporary side screening to give full weather and sun protection. "To achieve the tolerance required, we have manufactured a sophisticated leveling side-form", says Erwin.

To date, there have been no problems with shrinkage cracking of the floor panels and the finish is superb. "With using a Portland cement/Dura-Pozz<sup>®</sup> mix we didn't anticipate any problems," states WBHO's Contracts Director, Piet van Heerden. "We have used it extensively over many years and Believe that in terms of strength and quality of concrete, it is the right blend to use. Apart from being cost-effective and easy to work with, the reduction in water demand of a Dura-Pozz<sup>®</sup> mix is the key to achieving strength, durability and avoiding shrinkage problems."