

Innovation for Construction Industry

LG Chem Leads in Developing Highly Workable Concrete

- Plant in Yeosu Chemical Complex has Annual Production Capacity of 10,000 tons -

By Hong Hyun-swoo



Recently, industrial facilities and architectural structures have demonstrated a tendency to be larger in both size and scale. It is really a reflection of society itself undergoing drastic changes in both form and appearance, thanks to rapid economic development and growth. Moreover, it is a driving force in the trend toward facilities and architectural structures that are more environmentally-friendly.

Concrete, a fundamental material for civil engineering and the construction industry, has been undergoing changes in line with the trends of the industry it serves. Quality control is now monitored more vigilantly, while production is being carried out on a much larger scale.

Extensive lines of standards are set for concrete, depending on the purpose, method and conditions of its application. Concrete admixture has been the basis for solving what is required for the variety of its applications.

A major hurdle to be overcome in production has always been to mix concrete that has excellent workability, without segregation or bleeding. Water has traditionally been used at construction sites for the purpose of

workability. But there was a trade-off in that strength and durability were reduced.

Recent developments have not only improved the workability of concrete, but upgraded its quality and the admixture of the concrete has been the key to that. In the international concrete industry, "superplasticizer" has been in the spotlight. At the core of this recent trend in concrete is the polycarboxylic copolymer, which makes superplasticizer highly workable, economical and efficient.

Use of highly workable concrete allows workers to overcome an assortment of difficulties in adverse working conditions. Most of all, this more advanced cement can be conveniently poured into structures that contain the heavy reinforced steel bars required to earthquake-proof the structure.

Currently, global demand for aqueous polymers of polycarboxylate, which is a key raw material for superplasticizer, is calculated at 160,000 tons. Polycarboxylic copolymers are suitable for the construction of high-rises, bridges and specialized structures, which require durability, long working hours, excellent workability, clean interior air, etc. It is

also suitable for setting up residential buildings.

The workability of more conventional types of concrete is generally only one hour, but this new type has a workability time-frame that generally exceeds two hours. That is what makes it attractive for construction projects in congested urban areas or on off-shore and marine structures.

The industry has high hopes that superplasticizer will reverse the decrease in concrete quality that has been experienced in recent years on account of the severe drainage of river sand that has been dogging the construction sector of some nations. Moreover, this vital raw material will expand the technological possibilities for concrete, thanks to the larger number of qualitative characteristics.

The interiors of apartment houses are often contaminated by the noxious odors discharged from materials used in construction, human movement, inadequate cleaning and sweeping, substandard maintenance and management, improper ventilation, air contamination, etc. Of these, harmful materials released from construction materials are the most serious in terms

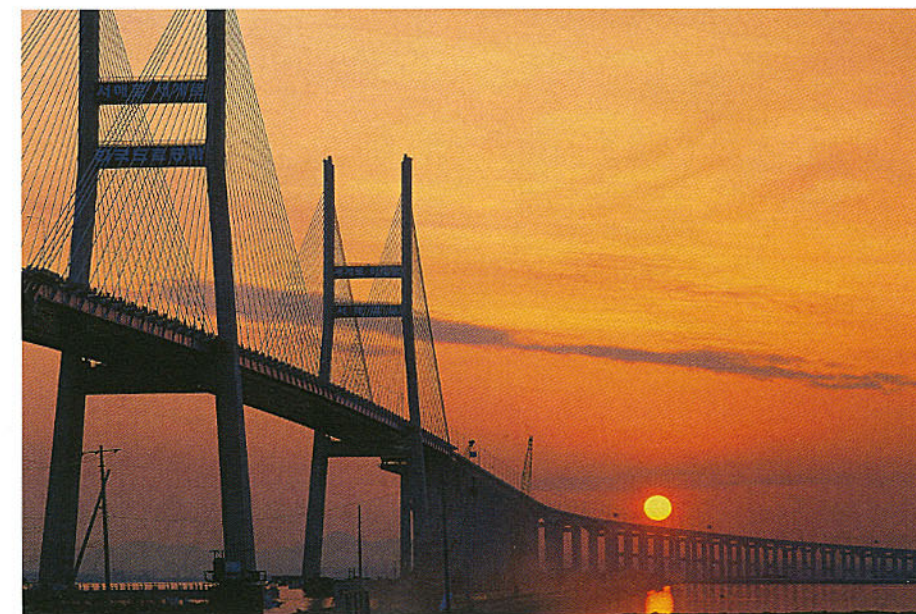
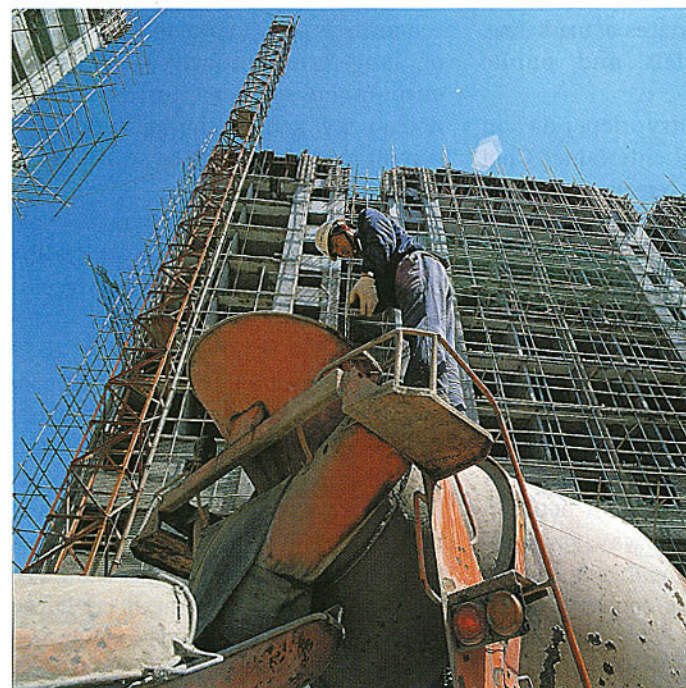
of harming the health of residents by causing what is known as "sick building syndrome" for residents who spend more than 90 percent of their daily life indoors.

Formaldehyde, a carcinogenic substance, is believed to be discharged, piecemeal, from the conventional concrete admixture. However, the aqueous polymer of polycarboxylate contains no formaldehyde.

The number of high rises and specialized structures is expected to continue to grow for the foreseeable future. Their durability is determined mostly by the quality of concrete used in construction.

In addition, the demand for applicable concrete admixtures appears to be drastically increasing at the same time solutions are needed for the shortage of construction workers at high-rise construction sites, which is attributed to the dangerous nature of the work.

Quality has been getting a greater emphasis than price in construction markets around the world. Therefore, the use of highly-efficient superplasticizer is likely to grow broadly and rapidly in the near future. As well, the growing demand for environmentally-friendly residential space is causing an explosive increase in the demand for superplasticizer.



LG Chem, the largest chemical company in Korea, began manufacturing polycarboxylic copolymer in January 2003, following two and a half years of research and development and a year of factory construction and test-operation. The company's factory is ultramodern, equipped with the most advanced multi-purpose facilities, in the Yeosu Chemical Industrial Complex on the south coast of the Korean peninsula.

Its annual production capacity stands at 10,000 tons.

A high number of specialists in both civil engineering and the construction industry are paying more attention to the aqueous polymers of polycarboxylate and the possibility of the new product fully adapting itself to the rapid changes in construction markets and the ever-growing demand.

"In the wake of such an uphill effort, we can

begin manufacturing aqueous polymers of polycarboxylate, the first in South Korea to do so," says a senior LG Chem executive. "Our production of this new material will exceed our customers' expectations, thanks to the advanced technology and innovative solutions."

"This also makes it possible for our company to earn the trust of our shareholders," he adds.

Currently, the polycarboxylic copolymers manufactured by LG Chem compete fiercely against imports in the domestic market. Small- and medium-size concrete admixture companies manufacture polycarboxylic copolymer, piecemeal, from the raw elements.

According to available forecasts, global demand for aqueous polymers of polycarboxylate is expected to grow five percent per year. LG Chem produces this new and important material based on expected demand from southeast Asia, as well as China and Japan.

Domestic sales of concrete admixtures are conservatively estimated at 3 billion won in 2003.

"We will redouble our efforts to manufacture the world's top-quality polycarboxylic copolymer with sophisticated technology and innovative solutions well into the future," claims the exec.

LG Chem has its own patent for the polycarboxylic copolymer. **E2**