

Development of Super High Strength, Advanced Performance Concrete

There are increasing needs for high-rise reinforced concrete buildings to be not only taller but also to have large and comfortable spaces with enhanced safety. Though higher strength concrete is required to satisfy these needs, conventional high-strength concrete has greatly difficulty in achieving both super high-strength and high fluidity. Also, the higher the strength of concrete increases, the more brittle and the weaker concrete becomes against seismic and fire force. These were critical problems to realize super high strength concrete.

The new super high strength, advanced performance concrete was developed to solve all of these requirements. This new concrete achieved specified strength of 200 N/mm^2 in structural members. In addition, this new concrete has greater resistance to fires, higher ductility against seismic force and higher fluidity than conventional high-strength concrete.

The key technologies to realize this concrete are combination of original developments as follows.

- 1) Development of material and production technology to improve strength of more than 200 N/mm^2 for structural concrete.
- 2) Development of new superplasticizer with excellent cement dispersing property to improve fluidity of extremely low water/ cement concrete.
- 3) Development of new technology using hybrid type fiber to improve fire resistance and toughness of super high-strength concrete.

This new concrete was applied for actual high-rise buildings, proving the performance, and is expected to realize new structural system as well as super high-rise buildings in the future.