



THE PORT AUTHORITY OF NY & NJ

March 7, 2007

Hon. Fatma M. Amer, P. E.
Deputy Commissioner Technical Affairs & Chief Code Engineer
NYC Department of Buildings
280 Broadway, 7th Floor
New York, NY 10007

Re: World Trade Center – Freedom Tower – 97 ksi Reinforcing Steel in Concrete
Shear Walls

Dear Commissioner Amer:

Thank you for the meeting on February 16, 2007. As discussed at the meeting, the Port Authority has received a request from WSP Cantor Seinuk, the structural engineer for the Freedom Tower, for permission to use 97 ksi reinforcing steel in concrete shear walls. Dr. Ahmad Rahimian from WSP Cantor Seinuk and Dr. S. K. Ghosh, who is a member of the ACI 318 committee and is well known for his contributions in concrete research, presented to you at the meeting the details of the research and testing done on high strength reinforcement and explained that current ACI 318 has not yet caught up with the recent research and limits the maximum yield strength of reinforcing bars to 80 ksi. In the interim, a number of jurisdictions including City of Miami, Los Angeles, and Las Vegas have approved the use of higher strength bars for high-rise buildings.

The following documents that provide the technical background are enclosed:

- WSP cantor Seinuk Letter dated, January 17, 2007
- S. K. Ghosh Associates Inc. letter dated January 4, 2007
- S. K. Ghosh Associates Report – High strength Threaded Bars as Reinforcing Steel in Building Applications – April 2005
- NC State University Technical Report - Bond Tests of high strength Treaded Bars-September 2006
- CTL Group Report – Testing of Mechanical Connectors – December 2005



THE PORT AUTHORITY OF NY & NJ

- Information on 2 projects in Miami where 97 ksi reinforcing bars are used
- Sample calculations and details for the area of intended use
- Correspondence (copy of e-mail) from the steel producer regarding the standards governing material properties and the names of other projects where 97ksi reinforcing steel has been approved.

The Port Authority has reviewed the technical background and is of the opinion that the use of 97 ksi reinforcing bars will relieve the congestion in the heavily reinforced shear walls and improve the workability of concrete pouring as well as quality of construction. It is also worth noting that IBC 2003 Section 104.11 permits use of alternate materials. The Building Code of the City of New York also has similar provision in Section 27-133.

The Port Authority would like to allow 97 ksi reinforcing bars in the concrete shear walls, if the Department of Buildings concurs. I would appreciate your signing and returning a copy of this letter to me, if you concur.

Very truly yours,

Saroj Bhol, P. E.
Manager, Design Standards

Concurred:

Fatma M. Amer, P. E.
Deputy Commissioner
Technical Affairs & Chief Code Engineer

cc:

Constadino "Gus" Sirakis, PE, SECB
Project Engineer
New York City Department of Buildings - Technical Affairs Division