

Awarded Contracts for External Experts to Support the NIST World Trade Center (WTC) Disaster Investigation

Contract No.	Awarded to	Date Awarded
SB1341-03-W-0313	Wiss, Janney, Elstner Associates, Inc.	6/9/2003

DOCUMENT AND EVALUATE THE STEEL RECOVERED FROM THE WTC TOWERS

Under solicitation number SB1341-03-Q-0155, a firm fixed price purchase order has been awarded to WISS, JANNEY, ELSTNER ASSOCIATES, INC. (WJE) of Chicago, Illinois:

WJE is an engineering firm that provides technical solutions to structural, architectural, and materials problems. They specialize in investigations, analysis, and design for contemporary and historic buildings, bridges, and other structures. WJE is well qualified to document the failure mechanisms and damage based on visual observations of steel recovered from the WTC. Specific examples of their past investigations include:

- Damage to One Meridien Plaza Bank due to the multi floor fire
- Assessment survey of 1993 bomb damage to the WTC
- Structural evaluation of fire damage to MacFrugal Center
- Analysis of the Husky Stadium grandstand collapse
- Investigation of the Cedar Rapids communication tower collapse
- Reconstruction of TWA Flight 800 Boeing 747 for failure analysis
- In addition, a member of their staff carried out some of the first studies on the load-bearing capacity of the composite truss system used to support the floors of the WTC towers.

The specific tasks that WJE will perform include:

1. Survey all WTC structural steel at NIST and identify those remnants or portion of remnants that may provide important information needed for the furtherance of tasks in Project 3 of the WTC Investigation
2. Provide NIST with detailed photographs of all remnants or portion of remnants identified above
3. Conduct detailed failure analyses of component parts selected for specific structural and metallurgical reasons
4. Provide NIST with a detailed report describing the results of WJE's survey of the steel, identification of important remnants, and failure analyses of how each selected part behaved during the impact, fire, or beginning of the collapse
5. Provide NIST with a technical review of NIST's Draft Project 3 Report

The team from WJE consists of two Principal Investigators that are both licensed structural engineers with relevant failure investigation backgrounds and appropriate knowledge of structural steel metallurgy. The team also includes another investigator who is a licensed structural engineer with significant experience in the structural design of highrise buildings, and with conducting structural failure investigations. Select experience of these key project personnel is summarized below:

Dr. Raymond H. R. Tide has over 35 years of structural engineering experience involving steel structures and has been a member of the AISC Specifications Committee for over 20 years. At the time of the design of the WTC complex, he was involved in research concerning composite behavior of open-web steel joists as used in the WTC towers. Later he was involved in the development of column buckling studies including compression members comprised of angles. Subsequent to the 1994 Northridge, California earthquake, he was involved in numerous AWS- and FEMA-sponsored investigations on performance of steel structures and their connections. His experience includes evaluation of numerous fire-damaged steel structures and the evaluation of fractures in structural steel. He has authored numerous technical papers in these areas.

Mr. Conrad Paulson has over 25 years experience in laboratory testing, research and failure investigation of structures, structural components and structural materials. He has been involved in structural analysis and design review of many highrise buildings, including wind load and gravity load analysis of the 84-story AON Center (formerly Amoco, and originally Standard Oil) building in Chicago. As consultant to the U.S. Department of State, he has performed post-earthquake reconnaissance and seismic structural analysis of highrise and lowrise buildings. He has participated in several major failure investigations, including the collapse of the New York State Thruway bridge over Schoharie Creek, and an analytical evaluation of a fire-damaged 38-story highrise structural steel building. His research and testing background includes studies for the National Cooperative Highway Research Program and others on elastic fatigue, inelastic fatigue, tensile properties and fracture of reinforcing steels.

Mr. James J. Hauck has significant experience in the structural analysis, design, detailing, and construction of midrise and highrise building structures. The analysis work has included extensive use of finite element analysis for strength and stability evaluation of multi-story frames, slab systems, and thin-shell domes. Mr. Hauck has investigated failures and problems in numerous buildings and other structures, including the evaluation of steel structures damaged by fire.

The key project personnel will also have available to them other experienced WJE structural engineers for consulting and discussion purposes.