

October 14, 2013

An Important note from the Principal Investigator Abolhassan ASTANEH-ASL, on the document that follows:

Following is the invitation I received from NIST to participate in a NIST Workshop. I accepted the invitation and participated in the workshop. My acceptance and answers to questions in the invitation are in italic blue letters on the last page.

Respectfully,

Abolhassan ASTANEH-ASL, Ph.D., P.E.

Professor and P.I. for the NSF Funded UC Berkeley WTC Project



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-8660

January 15, 2002

Dear Colleague:

The destruction that occurred on September 11, 2001, has been indelibly burned into all our minds. As we begin to come to grips with the enormity of the loss of life and the economic impact of this disaster, we in the scientific and engineering community have a responsibility to come to grips with the technical issues associated with the buildings that collapsed that day. The Twin Towers withstood the physical impact of the aircraft, as designed, but succumbed to the thermal impact of the ensuing fire. Building 7, with unknown, but significantly less, structural damage collapsed hours later, apparently due to the fire that was allowed to burn unchecked, which would make it the first instance of a building of such a design to ever "burn to the ground." The relative amount of damage to the Pentagon due to the initial impact and due to the subsequent fire is unclear, but is important to discern if we are to learn the right lessons from the observed building performance, occupant behavior, and fire fighter response.

Central to all these events is the fire resistance of the structure. No one did a calculation ahead of time to predict how resistant to heat these buildings were in the event of an extreme fire. Why?

Consider the following reasons:

- There was no code requirement to include the extreme fire scenario.
- A plane crash into a high-rise building followed by severe fire had never occurred (outside of war).
- Although the accidental impact of an airplane had been considered by the WTC designers, a large fire following the event had not.
- The structural elements were protected with a fire resistant coating following the best practices of the day, based upon ASTM E119.
- No engineering tools were available when the buildings were designed to predict the performance of structural connections and assemblies in an actual large fire setting.
- The prevailing mindset at the time the Towers were designed was "the engineer designs the structure and the architect specifies the fire resistance/protection."

As the national laboratory responsible for research into building fires, the National Institute of Standards and Technology's (NIST's) Building and Fire Research Laboratory (BFRL) has initiated a program, in response to these catastrophic building collapses, to improve structural fire protection. A workshop is being organized to identify the fundamental research needed to underpin meaningful test and predictive methods for use in evaluating the performance of structures subject to actual fires. The expertise of materials science and engineering, fire science,

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and structural dynamics must be blended to be successful in reaching our ultimate goal. Success is defined both as cost-effective, assured structural integrity for high probability large fires, and as predictability of time to structural failure in the case of extreme events or failures of suppression activities. A strategy is needed specifically for incorporating modern measurement and analytical methods into science-based fire resistant coating tests, and for modernizing related building codes and construction practice. Knowledge gained will lead, in general, to verified predictive tools and performance criteria to evaluate overall structural fire performance in real fires.

The workshop is scheduled for February 19 and 20, 2002, and will be held at the National Institute of Standards and Technology, Gaithersburg, MD. A general outline of the workshop is included. You are invited to participate and to help shape the fundamental research agenda. If you are interested, please fill out the information on the attached sheet. We particularly would appreciate your opinion on the specific scientific issues that you feel are critical to examine, and names of experts (including yourself) who would be able and willing to brief the issue at the workshop. This information would be useful even if you are unable to participate.

You may respond by fax (301-975-4052), email (william.grosshandler@nist.gov) or phone me personally at 301-975-2310. Information on how to get to Gaithersburg and on local accommodations is available on the NIST web site (<http://www.nist.gov/>).

Sincerely,

William L. Grosshandler
Chief, Fire Research Division

cc: W. Pitts
S. Sunder
J. Snell
E. Garboczi
J. Gross

**RESEARCH NEEDS FOR FIRE RESISTANCE DETERMINATION AND PERFORMANCE
PREDICTION**

DRAFT AGENDA

February 19-20, 2002
NIST Gaithersburg
Building 101, Lecture Room B

February 19	February 20
8:30 am Welcome and Introduction: W. Grosshandler, chair	Breakout sessions (4 session leaders)
break	break
Seminar on Fire Dynamics: Bill Pitts, chair	Breakout sessions (4 session leaders)
lunch	lunch
Seminar on Material Behavior: Ed Garboczi, chair	Report out recommendations (4 session leaders)
break	Action Assignments (W. Grosshandler)
Seminar on Structural Behavior: John Gross, chair	4:00 pm adjourn
dinner session	

**RESEARCH NEEDS FOR FIRE RESISTANCE DETERMINATION AND PERFORMANCE
PREDICTION**

February 19-20, 2002
National Institute of Standards and Technology
Gaithersburg, MD 20899
Building 101, Lecture Room B

Name: *Abolhassan Astaneh-Asl*

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Mailing Address: *Dept of Civil and Env. Engineering, 781 Davis Hall, Univ. of Calif., Berkeley, CA
94720-1710*

Do you plan to attend? *Yes*

If unable to attend, would you be interested in the outcome?

Do you need assistance with travel? *I need my travel expenses be paid by NIST as suggested.*

General disciplinary area:

Structural Engineering

Specific area of expertise:

*Behavior and Design of Steel Structures, Earthquake Engineering, Protection of Steel Structures
Against Blast, Impact and Ensuing Fires (due to car bombs, rockets and plane attacks)*

Would you be willing to address workshop on your area of expertise?

Yes

Other topics you would like workshop to discuss (and suggested experts):

**Please return by January 30, 2002, to William Grosshandler
william.grosshandler@nist.gov
FAX 301-975-4052, tel. 301-975-2310**