EXAMINING METALLURGICAL FAILURE AT THE WORLD TRADE CENTER: ONE YOUNG LEADER’S STORY

Stephen Banovic was a National Research Council postdoctoral associate at the U.S. National Institute of Standards and Technology (NIST) when the World Trade Center buildings collapsed on September 11, 2001. The NIST National Construction Safety Team, an interdisciplinary group that investigates building performance where large-scale loss of life or significant potential for loss of life is involved, was called in to evaluate the disaster, and Banovic found his unique skill set was needed.

“In my graduate days, I had conducted a fair amount of failure analysis work on the side,” said Banovic. This background, plus his knowledge of ferrous metallurgy, helped him to secure a full-time position at NIST. Banovic also suspects his age may have been a factor. “Being young, I was willing to go out in all temperature and humidity extremes to collect steel samples,” he joked.

Banovic is now a materials research engineer in the Metallurgy Division of the Materials Science and Engineering Laboratory at NIST and worked with the organization’s National Construction Safety Team to study the collapse of the World Trade Center. Different portions of this investigation were handled by different divisions throughout NIST. Banovic was one of several people from the Metallurgy and Materials Reliability divisions charged with determining the material properties of the steel used in the World Trade Center buildings.

Unlike more recently constructed buildings, which typically use one or two types of steel that meet ASTM standards, the World Trade Center buildings used 12 different grades of steel, the majority of which were proprietary Japanese steels, for which little information was available in the open literature. To determine the properties of these steels, the group collected and analyzed representative samples from various parts of the buildings: the exterior walls, core columns, flooring systems, etc. (Pictured are some of the steel samples housed at NIST.) Determining the materials’ properties was essential for the creation of a model of the buildings as they were before impact and for assessing their performance during the extreme loading events of that day (e.g., aircraft impact and subsequent fires). Results from the damage assessment of the recovered steel were also incorporated.

Banovic will discuss his work in the presentation “A Metallurgist’s Role in the Federal Building and Fire Safety Investigation of the World Trade Center Disaster,” which will serve as the Young Leader Tutorial Luncheon lecture at Materials Science & Technology 2006 (MS&T ’06). His presentation will provide an overview of how the buildings were constructed, the investigation of the materials, and a look at how the towers failed. The event will be held at noon on October 17. The lecture is free, and attendees may order an optional box lunch for $25.

YOUNG LEADER PROFILE

Subhadarshi Nayak
Senior Packaging Engineer
Intel Corporation

Q. What kind of work do you do?
A. In February, I started work as a senior packaging engineer at Intel Corporation. We carry out both fundamental and applied research aligned to Intel’s product roadmap. My specific research deals with second-level interconnects for CPU applications.

Q. How did you end up in your current position?
A. After getting a Ph.D., I was working as a post-doctoral research associate on coatings at the University of Tennessee, Knoxville. However, the funds for this research were running out quickly, so I was looking for opportunities. After struggling for a few months, all of a sudden I had 11 offers from industry and academia. I chose Intel because I was convinced that that is the best vehicle to apply my technical knowledge to benefit society, as well as to broaden my knowledge.

Q. How long have you been involved with TMS and how has this involvement helped your career?
A. I have been a member since 2000, right after I joined the Ph.D. program at the University of Tennessee, Knoxville. My advisor, Narendra Dahotre, strongly encouraged me to become active with TMS.

Through TMS, I came to know many great people in the field and learned of many opportunities through communicating with them. For example, I could get many leads from people whom I knew only through TMS. Several of these leads actually resulted in job offers. Also, a couple of TMS members had offered me jobs directly. I also got a lot of motivation from TMS to gain credentials. I learned about the professional registration program, and my advisor, a TMS member, encouraged me to get my Professional Engineering (PE) license. I got my PE license in the state of Arizona.

Through TMS Young Leader activities, I came to know many budding professionals and have developed great friendships.

Q. What advice would you offer to other young professionals?
A. TMS is a great source of information, networking, and career advancement. By getting involved in TMS you can get tremendous help and motivation for professional growth. This is a typical example of a “more you give, more you get” relationship.

THE YOUNG LEADER

A Young Leader is any TMS professional member in good standing age 35 and under. The goals of the TMS Young Leaders Committee are to recognize young professionals, develop in them an appreciation and awareness for TMS activities, provide services specifically tailored to young members, and encourage networking with TMS leaders and prominent society members. For more on TMS Young Leader activities, visit www.tms.org/YoungLeaders/YoungLeaders.html.
At the 2006 TMS Annual Meeting, the society established a new award specifically for early-career professionals working in the academic sector. The Early Career Faculty Fellow Award serves the dual purpose of recognizing excellence in an assistant professor and providing support for that professional to participate in TMS meetings.

The Early Career Faculty Fellow will be required to attend two TMS Annual Meetings. At the first, he or she will present the Young Leader Tutorial Luncheon lecture. For the second, the award winner will organize a symposium on a topic of their choice. TMS will cover travel and registration costs for the Young Career Faculty Fellow to attend both conferences.

The first winner of this award, Ryan K. Roeder, was selected on an accelerated time frame, with applications submitted in May and the winner announced in July. Roeder will begin his two-year fellowship at the 2007 TMS Annual Meeting in Orlando, Florida. There, he will present a lecture on materials research in multidisciplinary, application-driven technology. At the 2008 TMS Annual Meeting in New Orleans, Louisiana, he plans to organize a multidisciplinary symposium on biomaterials.

For 2008, the award process will settle into a more routine time frame. Applications for the 2008 award must be submitted no later than October 31, 2006. Applications will be reviewed at the TMS Annual Meeting, and winners will be notified in July 2007. To apply, visit www.tms.org/Society/honors.html. Information can be found under “Society-Level Awards.” The award is not limited to those under the age of 35, but is open to any professional who holds the title of assistant professor (or equivalent) at an academic institution.

Since the 1950s, TMS has recognized professionals who show exceptional promise for a successful career in the broad fields of metallurgy and materials science through the Robert Lansing Hardy award.

Last year’s award winner, Mark Hersam, was recently honored by U.S. President George W. Bush with a 2005 Presidential Early Career Award for Scientists and Engineers. Hersam, an assistant professor in the Materials Science and Engineering Department at Northwestern University in Illinois, was cited for outstanding research, teaching, and outreach. Other previous winners have gone on to become leaders of major corporations and presidents of TMS, among other things. To view past award winners, go to www.tms.org/Society/Honors/Hardy.html.

The award includes a $500 stipend from the Ford Motor Company and open exclusively to TMS members under the age of 35 (as of December 31). Deadline for nominations for the 2008 award is October 31. The award winner will be notified in July 2007 and will receive the award at the 2008 TMS Annual Meeting in New Orleans, Louisiana.

To nominate a colleague, visit www.tms.org/Society/honors.html and fill out a nomination form. More information on the Robert Lansing Hardy award in particular can be found under “Society-Level Awards.”

In December, TMS will select the first recipients of the TMS Young Leaders Professional Development Award, a revamped version of the TMS Young Leader Intern award. The program’s new name more accurately reflects the competitive process through which young professionals are accepted into the program, and a key aspect of the new program will be an increased focus on mentoring relationships between young professionals and established members of TMS. Under the program, up to ten awardees will be selected, two from each of the five TMS technical divisions.

The award offers young professional members opportunities to network with leaders in the society, provides access to high-level meetings of society leadership, and gives them a behind-the-scenes look at the inner workings of the society. In addition, the program provides awardees with one year of free TMS membership and covers travel and registration costs to attend two TMS meetings. For winners of the 2007 award, these meetings will be the 2007 TMS Annual Meeting in February and the Materials Science and Technology 2007 conference in September.

Applications for the 2007 award will be accepted through October 15, and winners will be presented in the February issue of The Young Leader. For more information, visit www.tms.org/YoungLeaders/yl-internship.html.

Want to become involved with TMS Young Leader activities? Then plan to attend the Young Leaders Business Meeting on October 18, which will be held at the Materials Science & Technology 2006 conference in Cincinnati, Ohio.

The meeting is open to any young professional under the age of 35. A key focus of this meeting will be on developing new Young Leader events for the future. In particular, the committee will discuss ideas for additional Young Leader activities at TMS Annual Meetings and will look at ways to better coordinate activities with student affairs.

During the meeting, Young Leader Committee Chair Aladar Csontos will share his experiences from a complementary program for young professionals in the oil and gas industry. In May, Csontos attended the Next Wave program for the TMS Young Leaders Committee. This one-day program for young professionals was held in conjunction with the Offshore Technology Conference.

The Young Leaders Business Meeting will begin at noon in the Millennium Hotel, Pavilion B. Come armed with ideas for programming and activities for young professional members of TMS. If you cannot attend the meeting, you can express your interest in the TMS Young Leader program by filling out an on-line participation form at www.tms.org/YoungLeaders/yparticipation.form.html.

TMS Young Leader Committee Officers
Aladar A. Csontos, Chair
Ellen K. Cerreta, Vice Chair
Subhadarshi Nayak, Secretary
Raj Vaidyanathan, Past Chair
To send a message to the committee chair, write to TMSCommitteeChair_ylc@tms.org.

Upcoming Events and Deadlines

October 15: Deadline to submit applications for the Young Leaders Professional Development Award (formerly the Young Leader Intern Program).


October 18: TMS Young Leaders Business Meeting to be held in Cincinnati, Ohio, in conjunction with MS&T ‘06.

October 31: Deadline to submit applications for the Early Career Faculty Fellow and Robert Lansing Hardy Awards.

December 15: TMS Young Leaders Professional Development Award winners announced.