



May 2002

David Shapiro, Co-Editor
David Smith, Co-Editor

ASME Hudson-Mohawk Section

Newsletter

ANNUAL AWARDS BANQUET

Edison Country Club
Rexford, NY

Featured Speaker: Prof. Jacob Fish (RPI)

Topic: Multiscale Modeling of Materials
And Structures

Thursday, May 23, 2002

6:00 PM – 9:00 PM

Cocktails: 6:00 PM – 7:00 PM
Dinner: 7:00 PM – 8:00 PM
Awards: 8:00 PM – 8:15 PM
Speaker: 8:15 PM – 9:00 PM

Cost: Members \$15
Non-Members \$20
Students \$10

HONORS & AWARDS DINNER

The Hudson Mohawk Section Annual Honors and Awards Dinner will be held at the Edison Country Club in Rexford, New York, on Thursday, May 23 at 6 PM.

About the Speaker: After five years in industry and twelve years in academia, Dr. Fish has built a research program in the areas of advanced materials, high performance computing and structural integrity. Dr. Fish has published over one hundred journal articles and book chapters. Two of his papers, one on development of multilevel solution techniques for large scale systems presented at the 1995 ASME International Computers in Engineering Conference and the second one, on fatigue crack growth in aging aircraft presented at the 1993 Structures, Structural Dynamics, and Materials Conference have won the Best Paper Awards. Dr. Fish has been named a **Fellow** of the [United States Association for Computational Mechanics](#). He is the Editor-in-Chief of the [International Journal for Computational Civil and Structural Engineering](#), Associate Editor of [Journal of Engineering Mechanics](#), Editorial Board Member of [International Journal for Numerical Methods in Engineering](#), and the past Editor of the Bulletin of [United States Association for Computational Mechanics](#). He is the Vice-President and President-elect of [United States Association for Computational Mechanics](#), chairs ASCE Computational Mechanics committee and member of the National Research Council for the Air and Ground Vehicle Technology. Dr. Fish received an NSF Young Investigator Award, NASA Langley research grant related to High Speed Civil Transport (HSCT),

contracts from Lockheed Missiles & Space Company, Sikorski, ALCOA, Northrop-Grumman, GE and Allison Engines on various aspects of structural integrity, AFOSR, ONR, SANDIA and DARPA grants for development of multiscale computational techniques for advanced materials and structures. He delivered over fifty invited talks in US, Europe, South America and Japan, presented several international keynote lectures and taught short courses on advanced materials and structural integrity in US and Europe. Dr. Fish served as a consultant to NY Department of Law, GE CRD, Lockheed Missiles & Space Company, ANSYS, SDRC and EMRC software houses.

About the Topic: “Multiscale Modeling of Materials and Structures”: An adaptive multiscale-multiphysics based design framework aimed at predicting the behavior of structural systems with strong spatial-temporal scale mixing and significant interaction of physical processes. The term multiscale-multiphysics based design framework is coined to emphasize that the behavior of the structure is assessed from the first principles, which are operative at smaller scales than currently resolved in simulations. A number of important applications fall into this category including: 3D woven architectures in aircraft engines, advanced airframes, tires, micro-electronic devices, and porous engineering materials such as honeycombs and truss-like materials. In these structures the size of the microstructure is comparable to that of structural details or to the wavelength of a traveling signal often leading to strong dispersion effects. This is further complicated by the fact that various physical processes, such as deformation, heat conduction, oxidation, stress corrosion, fatigue and fracture are operating at different spatial and temporal scales. The technical challenge is to use modern computing to develop new design concepts where material and structure are viewed as a single system.

Honorees: 50 Years: John Peters, Sumner Shapiro
25 Years: Russell Galgana, Timothy Kemp, George Moses, Michael Davi, Roger Farrell, Ralph Ender, Warren Behrens, Glen Pfeleiderer, John Tichy, Hsin Pang Wang, Paul Roediger, Carmen Terranova, Edward Baranowski, Alfred Stahl

Dinner Choices: Chicken Marsala, Sliced Sirloin of Beef Au Jus, or Baked Scrod Fillet w/Lemon Wine Sauce (Vegetarian available)
Dinner Includes: Bread & Butter, Coffee or Tea, House Salad, Roasted Red Potatoes, Glazed Carrots, Strawberry Shortcake

Reservations: Number of people and dinner selection to: Paul Kehoe (paul.kehoe@ps.ge.com) 518-475-5174 by 5/17. Checks payable to ASME and will be accepted at the door.

Directions: From I-87: exit 9 Clifton Park: 146 West to Rexford bearing left @ traffic light. Left @ 1st light onto Riverview Road. Edison Club on left. From Rt. 7: Turn onto 146 (Balltown Rd. going north). Cross Rexford Bridge. Right @ 2nd light onto Riverview.

The Plant is operated using pneumatic controls

ALBANY STEAM STATION TOUR

On April 4, about 20 people from ASME and ASNT were given a tour of the Albany Steam Power Plant located on Route 32 just south of Albany. For those that attended this event, they were treated to a look at history. This station has been part of the Niagra Mohawk system since 1952. It was originally deigned for a 35-year useful life and this year celebrates its 50th year in operation. However, plans are in the works to replace this station with a modern plant. This plant will be eliminated in June, 2004.



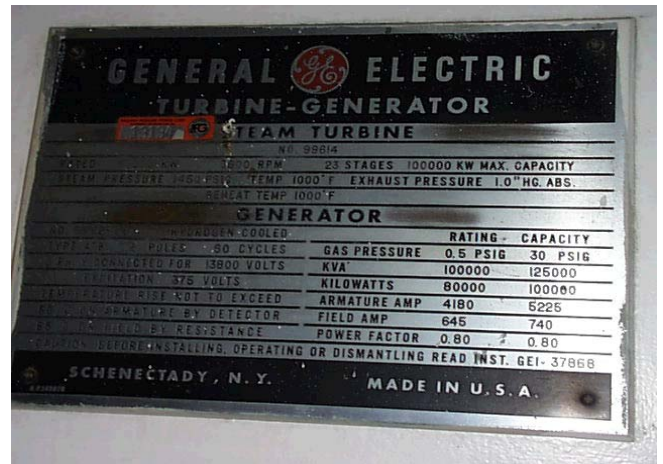
Arial view of the Steam Plant looking North to Albany

How many of you have been in a power plant where the control room still had pneumatic controls? This was an excellent laboratory for engineers and students to learn how power plants were built and operated. But like all good things, this will go the way of the dinosaur.

The station is capable of producing 400,000 kw of electric power, enough to serve nearly 500,000 people.



Originally, coal was used as its primary fuel. In the late 60's, the station was converted to use #6 heavy fuel oil. The conversion was completed in 1970 when oil sold for \$1.67 per barrel. By 1980, with the price of oil about \$32 per barrel, the plant was converted to burn natural gas in 1981. The plant has dual fuel capability.



Plaque mounted to the turbine-generator set

Here are some interesting data about Albany Steam Units 1-4:

- Each unit can generate 100,000 kilowatts
- Each of the four boilers is 90 feet tall, weighs 3,000,000 pounds and holds 30,000 gallons
- The total height to the stacks is 337 feet
- Each of the turbine/generators produces 140,000 horsepower
- The pumps and motors in the building require 16,000 kw of power, enough to light Amsterdam, NY
- Every hour, Albany Steam can burn enough fuel to heat an average house for 30 years
- Since 1952, Albany Steam has generated more than 75 billion kilowatt-hours of electricity
- Since 1952, the station's boilers have consumed more than 15 million tons of coal, 1.7 billion gallons of oil, and 85 billion cubic feet of natural gas.

Albany Steam has also been proactive in environmental issues. There is monitoring of the stacks for air pollutants and river water to insure that water discharge temperature is within allowable limits. A wastewater treatment plant collects all sources of water from the station and processes it to meet strict environmental standards before it is discharged into the Hudson.

It was a very entertaining and informative tour lasting about an hour. Those in attendance expressed their

interest during a question and answer period. Thanks to PSEG for the opportunity to tour this plant.

WINDMILL FARM TOUR

**Madison Wind Farm
Madison County, NY**

Saturday, May 4, 2002

9:00 AM – 3:30 PM

Cost: \$10 for members
\$15 for non-members

We will leave by chartered bus from Schenectady CCC

WINDMILL FARM TOUR REMINDER

We will tour a windmill farm on Route 20, in Madison County, NY. The windmills, owned by PG&E, were made and are maintained by the Danish firm Vestas. Power is supplied to a NYSEG 115kV line that runs near the site.

There are seven 1.65 MW units on the site, all fully controlled and remotely monitored via computer. These are the largest windmills installed in the US. Each blade is 12 feet wide by 110 feet long and rotates up to 20 RPM.

The property owners, Carl and Bonnie Strong will give the tour and presentation. They took the original wind data at the site and documented the entire installation, such as the concrete pours for the base and erection of the towers. They will open up a tower.

Instructions:

We'll meet at Schenectady County Community College on Saturday morning, May 4, at 8:30 AM. We've hired a motor coach to take us to the windmill farm. After the tour, we'll re-board the coach for a short trip to a nearby restaurant for lunch. We'll return to SCCC after lunch, with an estimated arrival time of 3:30 PM. The coach capacity is 47, so reserve your spot early.

New York has as much wind energy potential as California. Wind energy is the fastest growing energy technology in the world. Electricity production from wind power is clean, quiet and efficient and reduces acid rain, mercury, smog and climate change pollutants. (However, the windmills are visible from great distances and change the landscape.) Wind

energy development is an excellent economic growth strategy for upstate NY, delivering construction jobs, expanding the tax base for municipalities and producing income for farmers and landowners.

The Madison County plant is New York's first commercial wind farm, and highlights the growing attractiveness of wind energy as a source of electricity in the northeastern U.S. A 6.6-MW wind project is also nearing completion in Wethersfield, Wyoming County, New York. Vermont is home to the region's first wind plant, a 6.05-MW project installed in 1996, and a 10.4-MW wind facility began operating earlier this year in Somerset County, Pa. In addition, construction is scheduled to begin soon on a second and slightly larger (12-MW) wind project in Madison County, in the town of Fenner.

Contact: Please RSVP by May 2 to Fred Willett at FWillett@pti-gt.com. (518-347-0271) Send checks to: Fred Willett, PTI, PO Box 232, Rexford, NY 12148. Turkey, Ham, or Roast Beef boxed lunches will be provided. Please let Fred know your choice.

ASME International Hudson-Mohawk Section Officers

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SECTION WEB PAGE

Section members Govind Rengarajan and Sami Aslam are the Webmasters for this section's website. For those receiving this newsletter as a hard copy, please consider receiving this by e-mail. You will receive the newsletter and event announcements quicker. It also helps decrease mailing cost. Our goal is to have 100% e-mail.

Please send your comments to:
Govind Rengarajan rengarajan@crd.ge.com or
Sami Aslam sami.aslam@ps.ge.com.

UNION COLLEGE SWEEPS

The Union College Dept. of Mechanical Engineering swept the awards at the ASME Regional Student Conference held at Rowan University from April 12-14, 2002. This conference is sponsored by ASME Region III and includes about 45 engineering colleges and universities in the mid Atlantic states. Here is the list of winners:

- [David Chapin](#) (1st place Old Guard Oral Presentation) – Applications of Marine Animal Locomotion to the Propulsion of Man-Made Vessels.
- [Ben Gauthier](#) (2nd place Old Guard Oral Presentation, 1st place best technical content) – Enhanced Aerogel Fabrication.
- [Jeremy Losaw](#) (1st place Technical Poster Competition) – aerodynamic Characterization of a 1/12 Scale Radio Controlled Car with a NASCAR Body.
- [Matthew Grant](#) (Outstanding Student Chapter President)

Congratulations to Frank Wicks for Services in Advancing the Engineering Profession. In addition, congratulations to Ann Anderson (Mechanical Engineering Chair) and all the other faculty contributors to this outstanding effort.

PAPER AVAILABLE

“Vibration and Stability of 3000 HP Titanium Construction Chemical Process Blower”. Mark Carbo of No Bull Engineering co-authored this paper with Les Gutzwiller, the President of Robinson Industries and reprints are available. In the paper, Les and Mark explain how we used a rather unconventional rotordynamics analysis to pinpoint the cause of a long-term vibration problem that plagued two motor-driven overhung blowers that participate in a critical process at a large chemical plant in the southern United States.

Although previous analyses had failed to find any problems with the system, we used our unconventional model to show that the problem, frequent bearing failures due to high blower synchronous vibrations, was due to the extreme angular rigidity of the unit's disk coupling causing the blower's inboard bearing to operate almost completely unloaded. This condition resulted in the original bearing, a fixed-pad design, providing almost no support to the shaft, which made the rotor extremely susceptible to unbalance-generated vibrations. The rotordynamics model was then used to guide the change to a gear coupling and the design of replacement tilting-pad bearings. The unit was retrofitted with the new coupling and bearings and extensive testing subsequently showed that the modifications had eliminated this vibration problem.

This paper should be of interest if you:

- Work with overhung machines
- Are interested in rotordynamics
- Are interested in learning about tilting-pad bearings
- Are interested in learning about impact of coupling type on rotordynamics behavior

For a copy, contact Mark Carbo at 518-439-2214 (markatnobull@earthlink.net)

MESSAGE FROM THE CHAIR

Is there Life After Chair? It is with great anticipation that I write this last Chair's message. I am excited about being relieved as Chair after two years. We are grateful that Fred Willett has agreed to take on the Chair's responsibilities for the upcoming 2002 - 2003 Program year. Fred has served in virtually all Executive Committee roles except Chair, and knows the workings of the Section well. For this reason, he is uniquely qualified to carry out the responsibilities of Section Chair. I plan to give the same support to Fred as many other Past Chair's have done for me: Lewis Stitt, MJ Shaw, Sami Aslam and Seena Drapala have all continued on, making valuable contributions after serving their terms as Chair. So, yes, there is life as a locally active Section member after Chair!

We have continued to grow our initiatives: the Section Web Page, student support at both the high school and college level, and interacting & collaborating with other local professional societies, particularly the Vibration Institute and the AIAA. One thing that we still need to add to our Web page is links to these other local society chapters. Maintaining links to the local student Sections at Union and RPI continues to be a challenge, mainly due to the turnover in Student leadership, and more recently, and to a lesser degree, the movement of Student Section advisors. We look to the upcoming Program year to be one of increased stability, compared to the current year. The September 11 tragedy and the status of the economy caused the cancellation or postponement of several planned events. We have tried to compensate by adding additional events this Spring. Better late than never.

Thanks for all of your support for the past years. I look forward to continued involvement in the Section. Take the time to attend one or both of our two great events for May. I hope to see you there!

Paul Kehoe

TIRE CONVERSION TOUR

A tour of the Tire Conversion Technologies (TCT) facility was conducted on April 11. Our host at TCT was Rachael Kjellaard, the National Sales Manager for the company. She assisted Tom Reynold, the Operation Manager, with the tour of the manufacturing facility.

Tom demonstrated the step-by-step process of manufacturing DuraBoard. DuraBoard is a rubber material made from scrap automotive tires. The scrap tires are first sorted by tread width since this will

determine the size of the finished material. The tread section is then cut from the tire and machined to remove the tread pattern. Multiple sections are then bonded together to make the DuraBoard. Since Tire Conversion Technologies is recycling the scrap tires, they actually receive a payment for each tire they use.



Rachael Kjellaard addresses the attendees

After the tour of the manufacturing facility, Rachael and Milt Evans, the Vice President of Planning and Development, discussed the company's products and future plans. One of the major products manufactured from DuraBoard is snow plow cutting edges. DuraBoard stands up better than competitive products due to the steel reinforcement from the original tire construction. Other products made from the company's materials include retaining walls, wall bumpers, landscape edging and landscape mulch.

Milt discussed some of the issues relating to the operation of a small startup enterprise. The company is trying to break into new markets for their products. One of the problems that they run into is the need for material property data for many different uses of their product. Some of this information may concern abrasion resistance for snow plow operation or long term stability under load for construction applications. The company is looking for inexpensive methods to get this type of information. The company is also looking for ways to improve the manufacturing process



efficiency of their facility.

Part of the Tire Conversion Plant

After a two way discussion of possible improvements to the manufacturing of the product and possible new market opportunities, the attendees received a complementary hat and literature from the company.

MESSAGE FROM THE EDITOR

We are now approaching the end of the events calendar culminating with the honors and awards banquet on May 23. The officers have done an amazing job lining up events ever since the 9/11 tragedy. Our membership is now at about 830 of which about 73% have email addresses. This saves the section a lot of mailing costs because our membership can see the entire newsletter on the section website. Thank you for supplying me with your email addresses. For those that don't have an email address on record, I urge you to get one if you have computer access. Please send me any comments you may have regarding the newsletter and how it can be made better.

For those of you that have not participated in any of the section's activities, I encourage you to get involved. For the student members, this is a great way to network. I also encourage the student advisors and student leaders to submit articles for publishing in this newsletter. Thank you for your support. Submissions can be made to: David Shapiro (david.shapiro@ps.ge.com)

MENTORS NEEDED

Shenendehowa's CEIP (Career Exploration Internship Program) coordinators are looking for mentors for high school seniors interested in pursuing mechanical engineering for a career. These internships are non-paid. Volunteers would require approximately a 30-hour commitment.

If interested please contact Nancy VanEvera at 881-0310, ext.61767. We are looking forward to hearing from you.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS
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