

SAE ARIZONA • NEVADA SECTION

November 2007

MEETING: NOV 8

Section Web Site: www.saearizona.org - Sign up for your newsletter on our website.

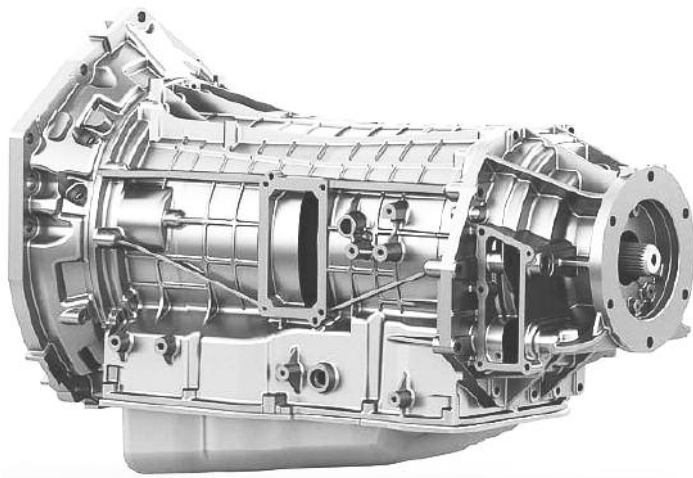
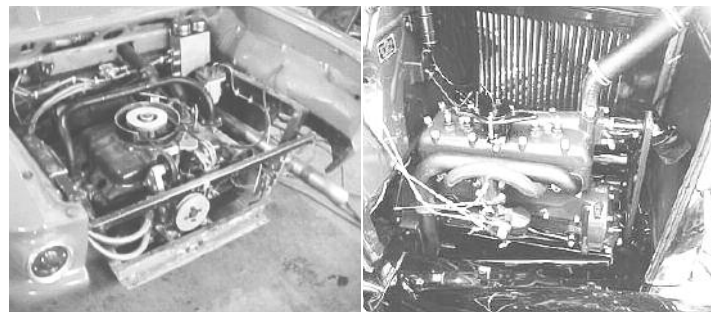
HIGHLIGHTS...



- Abstract Evolutionary Trends in Powertrain Technology
- Coffee Talk
- Message from Chair
- Recap of October Meeting
- 2007/2008 SAE Board Members
- Maps for Meeting Location

Dinner Presentation... **Abstract Evolutionary Trends in Powertrain Technology** by Richard O. Schaum

Drawing upon 40 years of experience in the automotive industry, SAE International President Richard O. Schaum will present “Evolutionary Trends in Powertrain Technology”. The presentation celebrates 40 years of creativity and ingenuity by engineers throughout the world. Through charts, graphs and video, the presentation highlights the outstanding improvements that have been made in emissions, safety, fuel efficiency, performance, and alternative fuels development. The presentation provides an overview of the technologies supporting the historical trends as well as insight into developing technologies, with an emphasis on alternative fuel/propulsion systems.



RICHARD O. SCHAUM
2007 PRESIDENT, SAE INTERNATIONAL
GENERAL MANAGER, 3RD HORIZON ASSOCIATES LLC
EXECUTIVE VICE PRESIDENT, PRODUCT DEVELOPMENT,
DAIMLERCHRYSLER (RETIRED)

Mr. Schaum is a 40 year veteran of the automotive industry, having risen through the ranks at DaimlerChrysler Corporation to the position of Executive Vice President, Product Development and Quality, a position he held from 1999 to 2003. He was responsible for all matters pertaining to Engineering, Regulatory Affairs, Product Planning, and Quality. Other past professional activities include the Partnership for a New Generation of Vehicles (PNGV), the National Research Council Workshop on Fuel Economy, and the Auto/Oil Air Quality Research Planning Task Force.



Mr. Schaum currently serves on the Board of Directors of BorgWarner Inc., the Board of Directors of the Society of Automotive Engineers, and the Advisory Board for the SAE Automotive Resources Institute. In addition, he works as an automotive consultant as General Manager, 3rd Horizon Associates LLC, a company involved in technology assessment and development.

Mr. Schaum received a B.S. degree in Mechanical Engineering from Drexel University in 1969, a M.S. in Mechanical Engineering from the University of Michigan in 1971, and completed the Executive Program – University of California at Berkeley in 1989.

DATE	TIME	LOCATION	COST With Dinner	Presentation Only
Nov 8	Social	- 6:00 pm	Members - \$22	\$10
	Dinner	- 6:30 pm	Guests - \$27	\$10
	Presentation	- 7:30 pm	Students - \$10	no charge
RSVP by 10:00am Tuesday Nov. 6			Call Sam Bethune: 602.364.7456	

COFFEE TALK - SAE@NAU

By John T. Tester

NAU's student chapter of SAE has developed several competitive vehicles including Mini Baja, Aero Design and SuperMileage. On November 8, NAU students will be presenting their work on their SuperMileage vehicle. This will include a discussion on the challenges and the achievements for their vehicle. This vehicle is supported by the recent addition of a new 1600 sq ft student project for general project construction along with a newly expanded mechanical shop, and Dr. John Tester's RAPIDLab (Realization of Advanced Products in Design). This new facility became a reality in large part due to the steady, visible and continued presence of the SAE chapter (now a branch!) at NAU.

Message from the Chair

Our October meeting provided our members a chance to enjoy presentations for both aerospace and automotive. Thanks to Hal Heule's efforts, Robert Kay and Joe McDonald from Sprit Aerosystems presented the new innovative process by which the new 787 airplane will be built. Interestingly, suppliers from around the globe build main portions of the aircraft, which are then flown to Seattle for final assembly. Final assembly is similar to assembling a model airplane. An excellent coffee talk presentation was made by LinkWest as they discussed the major considerations for brake design. Thank you Derek Logan for arranging this speaker.



Jarod Duncan (L) and Derek Logan (R)

As we began our dinner, Don Robins, presented a video on the A World in Motion (AWIM) project and discussed the local Phoenix projects. This excellent program reaches out to junior high school age students to generate an early interest in engineering. There is a general decline in engineering college enrollment. A factor in this is the lack of understanding by secondary school students of the engineering profession. I applaud the many people in the SAE organization who are delivering this message. I would ask our members to consider volunteering. Please contact Don Robins at drobins1137@msn.com for more information.

For our November meeting, please note, we will be meeting on Thursday, November 8th, the second Thursday of the month instead of the third. The reason for this change is



Bill Gest, Section Chair

to accommodate Richard Schaum – President of SAE International – visit to our section. Rich will be our dinner speaker for the evening of November 8th and will be giving his presentation on “Evolutionary Trends in Powertrains”. He will present the dynamic changes in powertrains over the last 40 years and his thoughts on the future. Rich is coming in to Phoenix the night before and we have a full day planned for him. We will be visiting a local Phoenix school along with AWIM volunteers to learn first hand the impact of the AWIM on the students of this low income inter-city school. We will then be doing a tour of the Phoenix airport thanks to Hal Heule including the control center and US Airways maintenance center. In the afternoon, Steve Trimble and Bradley Rogers have arranged a tour to both the ASU Tempe and Polytechnic campus. ASU Polytechnic has a very large program in automotive technology.

If you have any suggestions for future programs and/or improvements to our section, please contact me at bgest@esgeng.com. I look forward to seeing you at our November 8th meeting.

Bill Gest, Section Chair

Recap of October Meeting

by Joshua Rudin

AWIM-Don Robins

Don's presentation of A World in Motion (AWIM) began with a movie that had a unique quote. "When I was in school, working in teams meant you were cheating." But, as we all know, as engineers we work



Don Robins (L) and Douglas Culy (R)

that way to maximize our brainpower and productivity. Don's presentation on AWIM also contained the following facts:

- AWIM is sponsored by SAE. GM is a major sponsor
- 3.5 million students have participated in the program nationally
- 282 students from the Phoenix area participated last year
- Two local schools, Western Peaks in Surprise and Sierra Vista in Phoenix, are participating in the program
- Volunteers work 2 hours per week for a 7-week period during the school year plus one 2-4 hour training session
- The 8th grade project is building a glider (we also have some volunteers from Luke AFB)
- The 7th grade project is a motorized toy. Don showed an example where the 'body' of the toy was a floating pool a rubber duckie. This is truly “outside the box”.
- They hope to add more schools and more grades to the AWIM in AZ program this year.

For more information contact www.awim.org or Don Robins at drobins1137@msn.com.

Coffee Talk: Link Engineering-Jarod Duncan

Brake Design: Friction Material Considerations

Friction tests are performed on a Chase machine. The μ is measured as a function of temperature Fahrenheit. The focus is on achieving a safe stopping distance under:

- High Speed
- Different Failure Modes
- Parking Brake Usage
- Fade / Recovery

Perceived brake "roughness" was defined as a non-quantifiable variable, albeit very important to the consumer.

Testing is categorized under 3 basic types as follows:

- Sample Test (most cost effective)
- Dynamometer test
- Vehicle test (most expensive)

These tests are PC-based and measure torque, pressure, sensitivity, deceleration, pedal force, velocity and frequency.

Spirit Aerosystems: Bob Kay and John Martin

This discussion was about a major aerospace supplier and about the advancement of composites as used in fuselage components. Spirit Aerosystems was founded in June 2005 as an offshoot of Boeing. Since then they have acquired BAE Systems in Prestwick, Scotland. Today it is the #1 supplier of both Boeing and Airbus and has locations in North America and Europe. There are now 13K employees, 12M square feet of factory space and over 75 years experience in the industry.

Spirit Aerosystems specializes in composite fuselages, flight controls, wing components, and engine pylons. The fuselages are large assemblies including "Section 41," the front section of the plane that includes the cockpit and avionics systems.



(L to R) Bob Kay, Hal Heule, and John Martin

Their manufacturing includes advancements in composites. It was suggested that composites contributed to a 30% improvement in assembly time within 5 years. Composites consist of the carbon/epoxy framework which replaces existing metallic parts for greater strength, reduced weight, operating and fuel costs. Other advantages are:

- Higher specific tensile strength & modulus of elasticity
- Lower coefficient of thermal expansion
- Higher fatigue resistance
- Conducive to a larger, more integrated structure

Spirit Aerosystems uses a modified Boeing 747 to transport its large parts. It uses more automation and advanced processes than ever before and possesses the largest autoclave in the world to cure its composites.

These composites use a resin impregnation technology which manipulate fiber content with porosity to achieve the desired results. Minimization of foreign materials is an important design consideration. From an industrial engineering point of view, ergonomic factors are utilized to simulate machine/human interactions.

With respect to Quality Assurance, a non-destructive inspection is employed as follows:

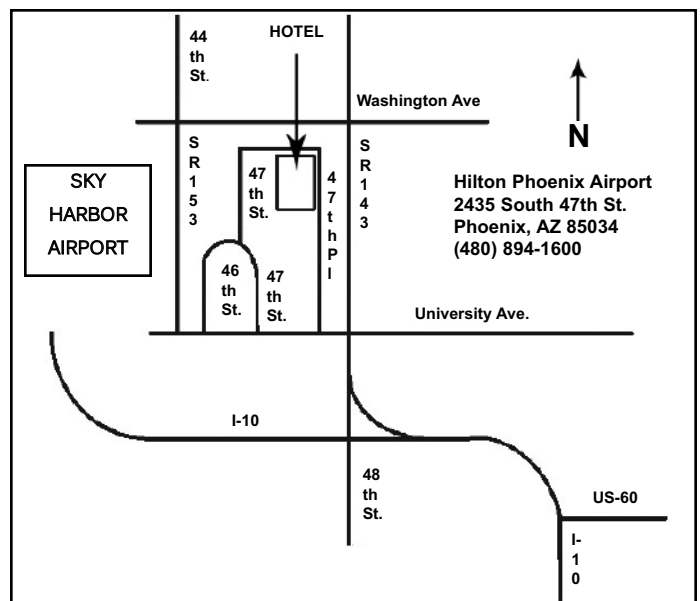
- Visual inspection
- Ultrasound inspection
- Thermography
- Tomography
- Radiography

In the field, when the plane is bumped, the Remote Acoustic Impact Doppler (RAID) analysis is used to assess damage. Spirit Aerosystems believes composites are here to stay, especially for large aircraft and will continue to revolutionize the field with its unique material properties.

2007-2008 SAE AZ Board Members

Allan W. Watts	Bill Gest
Bob Riley	Bradley Rogers
Bruce Blocksom	Cathleen Gary
Dave Vasquez	Dave Marsh
Derek Logan	Don Robins
Douglas G. Culy	Hal M. Heule
Howard Daudet	Jeff Brown
John Tester	John Lester
Joshua Rudin	Kenneth Huebner
Kevin Willson	Larry Wilson
Max Rombaugh	Michael Kremer
Paul Curry	Parvig Nikraush
Steve Trimble	Todd Zuercher

*** Meeting Location ***



THE UNIVERSITY OF ARIZONA ANNOUNCES:

The 45th Reliability Engineering and Management Institute provides all engineers, particularly Reliability Managers and Engineers, Product Assurance Managers and Engineers in government and Industry, with a working knowledge of Reliability Engineering Theory and Practice, Mechanical Reliability Prediction, Reliability Testing and Demonstration, and more. Dr. Dimitri B. Kececioğlu and 10 speakers from 15 sponsoring industries will take part in expertly covering the subject matter of this Institute. For more information, please see the contact information below.

The 34th Annual Reliability Testing Institute provides coverage of how to implement and manage the Design-for-Reliability process through testing, to implement an integrated Reliability & Maintainability Engineering management strategy, learn a practical approach to attain the high Reliability goals demanded nowadays, to improve our worldwide competitive posture by creating more Reliable products through thorough testing, to determine the useful life of our products, and more. Dr. Dimitri B. Kececioğlu and 10 speakers from 10 sponsoring industries will take part in expertly covering the subject matter of this Institute. For more information, please see the contact information below.

THE 45th ANNUAL RELIABILITY ENGINEERING
AND MANAGEMENT INSTITUTE
November 12-15, 2007

THE 34th ANNUAL APPLIED RELIABILITY TESTING INSTITUTE
May 5-8, 2008

Clarion Hotel, Tucson Airport
6801 S. Tucson Blvd.
Tucson, Arizona 85706
520-746-3932 or 800-526-0550

Registration Fee: \$1500 Proceedings Cost: \$50

For Details and Technical Information, please write to:
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The University of Arizona
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P.O. Box 210119, Tucson, AZ 85721-0119
You can also Call: 520-621-6120, Fax: 520-621-8191,
Or Email: dimitri@u.arizona.edu
Please see his website at: <http://www.u.arizona.edu/~dimitri>



ESG Engineering (WWW.ESGENG.COM) is a full service mechanical engineering consulting company located in Tempe, Arizona. We provide Industrial Design, CAD Design and Engineering Analysis including linear and non-linear Stress, Dynamics, Fluids, Thermal and Tolerance. We also sell the Z Corp rapid prototyping machines and scanners; SensAble design software and the full line of Altair HyperWorks analysis software. How can we help you? Contact Bill Gest at 602-618-1304.

ESG Engineering is growing, contact Mike Kremer at MKremer@esgeng.com for career opportunities.

ARIZONA-NEVADA SECTION: Meeting Schedule

Nov 8	- Evolutionary Trends in Powertrain Technology
Jan 17	- GM Tahoe Hybrid
Feb 21	- General Dynamics

Bill Gest Chair bgest@esgeng.com
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Joshua Rudin Vice Chair 602-369-6487
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Mike Kremer Secretary MKremer@esgeng.com
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Larry Wilson Treasurer wilson.lawrence@orbital.com

Robert Riley Newsletter Editor 623-872-8010



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