Alumni Respond to Foreman's Article

Several alumni responded to the last edition of the newsletter.

John Frye, BSME '60, has an unusual job. His specialty is pyro-shock loads and response. This is part of his work on dynamic analysis of space craft for both launch and on-orbit loads. He is part of the Space and Electronic Group at Redondo, CA. Adding to our vignette of George Forman, he adds, “I remember Professor Forman very well. He taught me advanced machine design in my senior year. He was a good teacher who encouraged students to think for themselves. More than anything else this was probably his most valuable lesson.” It sounds like John learned well—you can find him listed in the 1996-1997 edition of Who’s Who in Science and Engineering.

Larry Howard, BSME '67, adds, “My most memorable experience came during my senior year at KU in 1967 in Professor Forman’s Systems Analysis & Design Class (mechanical not software). He gave us a problem for the semester and told us to create a workbook in which we could keep a log of our design ideas and thought processes as we arrived at our final solution. The problem he posed was this: “You have a source of water at 70 p.s.i. Build an engine which is able to produce a usable energy source.” That’s all he said. We all began to work intensely on this problem because it would determine much of our grade in the class. I filled my notebook with all kinds of ideas and finally settled on an engine modeled much after the first steam engine. I had a huge fold out model with specifications for every part and was really proud of my work; my 100 page notebook was full of most of the formulas I had learned in my machine design courses and a few I had learned in Heat Transfer from Professor Burmeister. I turned the book in at the end of the semester knowing I had ‘nailed this one.’

“Just prior to finals week, we got our notebooks back. I got a B- and was in a state of shock. My classmate and good friend, Ed Hand, was there and he showed me his A+. I asked to see his work. He had, at the most, five pages filled out in his notebook and had as his solution a sketch of a waterwheel. This drove me straight to Prof. Forman’s office to protest. It is at this moment I learned one of those great lessons in life one is never ready for.

“He told me that, first of all Ed came in and asked him for his thoughts and ideas on the problem. George said “I gave him some possibilities to consider but nothing more” Ed’s solution did happen to be one of Prof. Foreman’s suggestions. The second point he made was that my design was very complicated and maybe impossible to manufacture—that hurt my grade significantly. He said that the only reason he gave me a B- was that he could see I worked very hard on the project and that was worth something. He also told me that when I got out in industry I would find
that employers would not have been so kind as to give me credit for effort, only for results.

"Thank you, Professor Forman, for the three lessons:

1. Understand the problem before launching into a solution,
2. Seek help, it's not cheating,

"I still have my design notebook around 30 years later—just as a reminder."

J.D. Holmberg, BSME '51, knew George before KU. After getting his degree at KU, he went to work at Marley, trained George and retired in 1987.

Ronald J. Wilson, BSME '59, is recently retired President and CEO of K-P Electric Co. in Little Rock, AR. He and his wife Beryl retired in 1994 and now travel in Europe, Africa, South America, the Caribbean and the U.S. Ronald knew George Forman when George was Manager of R&D for Butler, and before Ronald went to KU. George was "a super individual and motivating force" in Ronald's life. Ronald provided an interesting summary of his professional growth which perhaps we can describe in a later edition.

Hadley E. Wolfson, BSME '60, notes about George Forman, "I guess it was his bread and water style that makes him so unforgettable to the students, ME design students in particular." Hadley notes he retired from the Corps of Engineers, which was good and bad for his career.

George Hopkins, BSME '50, MSME '61, is a retired Plant Manager of Marley Co. Like everyone else we heard from he knew George also and liked the article reminding him of earlier years.

David A. Kipp, P.E., BSME '81, [rbel@primary.net] provides yet another interesting view of George Forman. "Your piece about George Forman was great fun, though it hardly constituted a mystery. Forman was possibly the last of a breed among the engineering profession, and using your first update of the newsletter to reconstitute his contributions is a fine up stroke. George Forman was obviously a practical engineer teaching engineering. I hope you get lots of notes like mine attesting to the long-term value of that fact. It has important implications for the profession and for the KU ME department.

"I had Professor Forman for several mechanical design-related courses. At the time, his demeanor and approach struck me as out of step with the prevailing rhythms. He had an odd willingness to consider alternatives with us (well, what about a ball bearing vs. a sleeve bearing?) and in so doing, taught. He was also alone in his application of engineering judgment to simplify and solve problems. Not every situation in Forman's world demanded an aggressively analytical response. He helped us understand when four-digit precision was warranted and when it wasn't. He helped us boil things down to basic constituents.

"What a marvelous contribution! As students, we naturally had only vague notions about how systems and products came into being. Out there, as we used to call it, things were hatched, analyzed, tested, failed, tried again—and again—built and used by people. This process, I later discovered, occurred much like George Forman taught it.

"And he could only pass along these insights because he was a teacher that blended science and practice. In practice, I even had an assignment at Hamilton Standard in Connecticut, extending the life of propellers and propeller
gearboxes. Professor Forman talked a lot about his propeller work with Hamilton Standard.

“I also lived next door to George Forman for two school years, on University Drive. Actually, my grandparents, with whom I boarded, lived next door. We all came to know a bit about Forman’s fascination with the Volkswagen. My grandfather, at the time also a lapsed ME professor, acquired a distaste for the cursed thing, likening its air-cooled sonority to a threshing machine. Granddad was a Cornhusker deep down, and a thermo man.

“P.S. There is another shadowy figure in the KU ME pantheon that might interest you. His name was Ivan Nemeczek and he taught throughout the ’50s, ’60s and ’70s. Thermodynamics, steam power and internal combustion engines. He was to thermodynamics what George Forman was to machine design. I caught him at the tail end of his career and he sparked my lifelong interest in the subject. His death was the occasion for my taking a class from my grandfather. But that’s another story.”

T. Michael Garrison, P.E., BSME ’62, wrote, “I graded papers for George in 1961-62 during my graduate year at KU. I would like to add to your profile that he worked my tail off. I had to work his very complex machine design problems and then grade his student’s solutions. George worked each summer in industry so he always kept reality in his curriculum. The solutions to his problems did not come out to round numbers and there were frequently multiple solutions. You can imagine the task at hand to grade these papers. When I would explain this dilemma to George he would respond with that long smile, but never changing the situation. I learned a lot from George both in and out of the classroom. An element that was not emphasized was his devotion to ASME. He virtually required students to join and become active. I was president of the student section my senior year and learned a lot from this affiliation. I have maintained this membership since college, and am still active in the local chapter. After his retirement George worked for ASME and I crossed paths with him in his second career.”

David Ellsworth Gray, BSME ’55, responded with, “I was in Professor Foreman’s first machine design class that he taught at KU (Fall semester ’55). His teaching technique should be the paradigm for all engineering courses. He would begin each session with a general case, then proceed to the specific application. A student always knew which ballpark he was playing in. At the end of each session, you knew you were ‘home’ because all parts of the mechanism under discussion failed simultaneously!

“I haven’t forgotten his first words on that first day of class. George Forman, as himself, gave us a homily about designing a bicycle. His point was that an engineer rarely starts a new design from scratch. Most likely, there is a precedent to use as a base for departure.

“There was a thing or two which Professor Forman didn’t prepare me for. While a design engineer with General Electric in the Large Jet Engine Department in Cincinnati, I was shocked to find one doesn’t crank in a safety factor in jet engine design, an ‘ignorance factor’ as my peers called it. The allowable stress is taken from the strength of material test data as the lower value of the 3-sigma deviation from the mean. One would be thrown out of his own design review if the allowable exceeded 1.15 times the calculated maximum stress. Once that point is passed, the prototype must pass the vibration scans so there are no resonant points within
the excitation frequency plus 20 percent. This isn’t a criticism of Professor Foreman’s teaching. He gave us the basics and let industry do the finishing as it saw fit.

“By a quirk of fate, our machine design class was held in my father’s old office, room 117, Marvin Hall. The office had been converted to a classroom under Dean Carr’s tenure. My father died in April, 1947, so Professor Foreman didn’t know my father once chaired the department. I felt more ‘at home’ in Professor Foreman’s class than in any other. Somehow, I never had a class under Professor Tate, my student advisor, but I miss him.

“I knew I wasn’t going to become chief engineer at GE and decided to go the management route. I took an MBA from Xavier University (Cincinnati) and eventually became a District Sales Manager for Janitrol Aero Division, Midland-Ross, at my office here in Fort Worth. From there, I did it on my own as a manufacturer’s representative (12 years) and retired at the end of 1991.

“I regret not climbing the hill during my trips to Lawrence to visit those now gone, especially Professors Jones, Nemecek, Parmerlee and Tate.

“Please pass this letter along to Professor Foreman since I am a delinquent visitor. He has my heartfelt thanks for imparting his wisdom and experience which benefited me in more ways than I know about.”

ME Alumni News

James L. Ross, BSME ’50, is retired after 40 years at Black and Veatch and has been registered in 22 states. (Is that a record? Registered in 22 states, that is.) He was responsible for design projects for the AEC, NASA and various military facilities. We would like to thank James and all the others who provided their bio. The ME department is always searching for interesting careers and many of these are truly testaments to engineering greatness.

Larry Goudie, Sverdrup Corp., BSME ’56, is managing the refurbishment of a large rocket engine test facility at the Air Force’s Phillips Lab at Edwards AFB. This work is in preparation for testing engines for the upcoming Evolved Expendable Launch Vehicle, the Air Force’s new space booster.

Andres Carvallo, BSME ’86, is President-Latin America for Digital Equipment Corp. Not only has an exciting job, he is the proud new owner of a baby boy born Oct. 1, 1996.

Andrew Koilpillah, BSME ’90/MSME ’92, is Project Manager for Electronic Data Systems working on CAE systems for GM accounts. “He adds, “Expecting first child July ‘97!” He’s excited.

Stephen Jenkins, BSME ’59, is President of KCT Power in Kansas City, MO.

Nick Sahhar, BSME ’93, is a computer network administrator for Griffin Wheels in Turner, KS. He notes it is a 24-hour a day job some days.
Robert L. Klamm, BSME '60, is President of Precision Nameplate in St. Charles, MO and provides nameplate and control panels for commercial and military markets from coast to coast.

J.D. Holmberg, BSME '51, summers in his Estes Park condo after retiring as Science Director in 1987 from Marley Cooling Tower Co. For relaxation he volunteers as a math tutor—this year working with the 6th grade. J.D. knew George before George came to KU. George was teaching at night school and J.D. was a fan designer at Marley reporting to George. You’ll find one of J.D.’s article on heat pumps in the 1950-1951 Engineering School magazine Kansas Engineer. (Bob Kipp was editor of the magazine and yes, that Kipp is related to one that you and I know.) What does a Science Director do at Marley? He supervises computer analysts, laboratories, budgets, and patent work.

Larry Rapagnani, BSME '67, [rapagnani.1@nd.edu] has his Ph.D. and is now Assistant Provost for Information Technologies at Notre Dame. He suggests that alumni include a URL for their Internet home pages. Send them! We will list them. Larry’s is at www.nd.edu:80/~rapagnani/. If you look at his web page there it will tell you more about some of his career.

Francis S. Boggess, BSME '50, [fboggess@dhol.com] retired from supervision of Body & Assembly, Mechanical Section Ford Motor in Dearborn MI. He adds, “Do not forget that many of us are still around who predate the last century. Could you include any additional information of the period of 1940 through 1955?” His three children Jay ’82, Jana ’76 and Trent ’79 did either undergraduate or graduate work at KU. He is “learning to be an e-mail nut.” Francis, does that mean you are almost 100 years old/young?

We would like to hear from those of you who graduated in the 40s or before. Please drop us a just a line. Actually, we would like to develop a more detailed history of the ME department and truly are searching for those in the 40s era and before to help us. We begin our first “old timers” session this spring. Snail mail or e-mail your interest to sledvina@mecheng.me.ukans.edu or to Sharon Ledvina at the address on the back page. Sharon is one of the standout secretaries in the department and actually does all the department’s work so that faculty can enjoy a leisurely life.

George VanTrump, Jr., BSME '58, retired from the U.S. Geological Survey in 1995. He volunteers teaching computers to seniors and assisting in developing historical projects in the Denver area.

James A. Nottingham, MSME '40, is retired from Sperry as VP and General Manager of Sperry Marine, a worldwide organization headquartered in Charlottesville, VA. He spent 43 years with Sperry.

William M. Swanberg, BSME '91, moved from being a Design Engineer at Boeing to KU Law and KU MBA and now is a consultant at Ernst & Young in Kansas City.

T. Michael Garrison, P.E., BSME '62, is currently the Director of Business Development and an Associate with George Butler Associates, Inc. (GBA), a 260-person, full-service Engineering and Architecture firm headquartered in Lenexa, Kansas. Major markets for GBA include transportation, environment, manufacturing and process, HVAC, industrial and business parks, instrumentation and control systems, and a wide range of mechanical systems. He is a past President of the Kansas Engineering Society, the Kansas City Chapter of the Society for Marketing Engineers, and the Society of Manufacturing Engineers.
Professional Services, and currently a Director of the Engineer’s Club of Kansas City.

His wife of 34 years, Roberta Johnson Garrison, graduated from the college in 1962. Son Steve is a graduate student at KU in Political Science and is currently a Teaching Assistant. Their daughter Suzy graduated from the American Music and Drama Academy in New York and is trying to make her mark in the live theater in New York. For the past 20 years our engineer has been an active flight instructor teaching single and multi-engine land and seaplane pilots and the instrument rating. He is also a NAUI Advanced level SCUBA diver and was diving at Cozumel in late 1996. He is looking forward to future issues of Vibrations.

Michael D. Peck, BSME ’92, recently graduated from the Kellogg Graduate School of Management at Northwestern University and is moving to San Francisco to join Andersen Consulting’s strategic management consulting group.

Yes, You Can Hire Some of These Solid Performers

We featured Kerri Graunke in our last issue as an example of excellence in today’s students. Pete Black, BSME ’65, Director of Mechanical Operations at AlliedSignal’s Kansas City Plant met Kerri about two weeks before she graduated. Before the evening was out Pete was saying, “LaRoux, we’ve got to hire her. She’s outstanding. She’s exactly what we need.” Pete was right (Directors are always right) but we were months too late. Kerri had accepted an outstanding job.

We mention that incident just to inform those of you who are looking for good, solid, hardworking, aggressive and capable graduates, that your chances are much better if you get involved with these students prior to their last semester. KU has a Co-op program and many of these excellent students use summer jobs to test out potential employment. Drop Terry Faddis a line [e-mail faddis@mecheng.me.ukans.edu] if you need one of these students, or want to meet some to see if there is a fit. You know some of the faculty, and the work ethic of the students from when you were on campus. Engineering students still have that work ethic. Visit the campus, come to Engineering Expo [February 27, 1998], attend the Mechanical Engineering Annual Awards banquet [April 24, 1998] and get to know these leaders of the future. Those whose names you see in this issue were just like the ones graduating today. Need a potential President or CEO? KU is the place to look.

Outstanding Faculty Award

Each year the students vote for the most outstanding faculty. This year there was a tie between Bob Umholtz and Bedru Yimer. Yes, Bob is still there providing some excellent leadership and teaching.
Lunch with Students

“There is still time to join the Formula Car Team,” said ME student Mark Johnson in April as he worked on his approach to soliciting last minute contributions for the ME department’s biggest student design project. Mark was describing the challenges of leading a team of 20 students in a year-long effort, and having two assigned fund-raising students drop by the wayside. He was picking up the reins of yet another project element.

“What do you go through to raise funds for a project like this?” this editor asked. “Well, in the fall we held a seminar on fund raising and last year’s chairman described what they learned from their effort. Lorie Walker, Development Director for the School of Engineering, helped provide one of our team members with ideas for phone calls. You will remember that we sent out solicitation letters to key alums and companies who we thought might have an interest, then we followed up with a phone call. Well, at least we followed up most of the letters, but some did not and now I need to finish the job. We leave for Detroit in a couple weeks, and there is still some hardware on order and we have a lot of travel expenses to raise yet.”

Later in the day some of the Mechanical Engineering Advisory Board members saw the breadth and detail of the senior project. The team leaders and project leader have nine months in which to design a Formula Car racer. They design the tubular frame, conduct stress analysis, build it in the ME shops, and design and build the mold from which the fiberglass body is made. They weigh all the components, modify the engine, put it together, do some preliminary driving to test its speed, acceleration, and handling (they beat the MU team in an early trial test). They tear it apart and check it for cracks, modify it as necessary, polish, fit, redesign and reassemble. This year they have a much faster car than last year’s and appear to be well ahead of other universities in the completion and testing. It is an eye-catching project, not because of the racing, but because of the total dedication and team spirit.

The students do the fabrication and a handful were in the shop working while we toured. They work through the night, 24 hours a day on the weekend, and around the clock to meet their deadline. It is not an all-night cram for a test, it is a real-life learning process of what a major project requires form engineers, a commitment to meet a deadline with excellence. The students learn how to lay up composites, fix an engine, calculate real-life stresses and breaking points. They did not have these skills and abilities when the project began, but when finished they have completed their first real-life engineering and production project. As we walked away, it was clear that these students were very capable engineers with experiences similar to those faced by those who grew up on the farm and lived with deadlines and equipment all their lives. Few of today’s students live on the farm, but this senior design project brings all their studies together and produces graduates you would be proud of. Drop in some day and ask some of the students to show you what they are working on and what they went through to get there. You will be impressed, too.

Did Mark Johnson raise all the money he needed for the project? I don’t know. He was walking off to make some phone calls when I saw him last. It’s not all fun, but he and his team and other teams have the spirit, commitment and direction. I’ll put my money on them.
Faculty from the Past

The following is purported to be a complete list of all KU regular faculty in ME from its inception. Adjunct Faculty from industry who were not full time faculty are not included, nor are visiting professors, of which we have had a few. This list is taken from *A History of the School of Engineering at the University of Kansas 1868-1988*, edited by James Maloney, published in 1989 by the School of Engineering. This book, of which the Dean’s office has a few left, provides a history of each department, and the Mechanical section is very interesting, but there are many events not listed because of space and lack of knowledge. If you believe you know a professor who has been overlooked please drop us a line with some details. We will check it out. Did you ever run across any *irregular* faculty? If so we would like to know about them also.

[Professorial and Long-term Instructor Staff (Names, years of service, and highest rank are given.)]
Those marked with an asterisk indicate updates to the original printing.

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
<th>Position</th>
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<tbody>
<tr>
<td>Walter K. Palmer</td>
<td>1897-1901</td>
<td>Associate Professor</td>
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<td>Howard D. Hess</td>
<td>1901-1905</td>
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<td>Hugo Diemer</td>
<td>1900-1903</td>
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<td>Perley E Walker</td>
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<td>Ralph S. Tait</td>
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<td>John A. King</td>
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<td>E.E. Ambrosius</td>
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<td>Ellsworth S. Gray</td>
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<td>Harry Daesch</td>
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<td>Fred Evaas</td>
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<td>Harold Kipp</td>
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<td>Ivan Nemecek</td>
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<td>Warren Snyder</td>
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<td>Theodore Gershun</td>
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<td>Edward J. McBride</td>
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<td>Charles Mischke</td>
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<td>George Forman</td>
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<td>Elmo Lindquist</td>
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<td>Robert C. Umholtz</td>
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<td>Russell Peterson</td>
<td>1958-1960</td>
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<tr>
<td>Bill G. Barr*</td>
<td>1962-1992</td>
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<td>Robert Gatts</td>
<td>1963-1974</td>
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William B. Reuland  
Assistant Professor  
1962-1967

Charles J. Baer  
Professor  
1965-1983

Albert S. Palmerlee  
Professor  
1965-1969

Dayle F. Bockhorst  
Instructor  
1965-1985

Ralph Ring  
Instructor  
1965-1968

Louis C. Burmeister  
Professor  
1966-present

Kenneth Rose  
Professor  
1968-1985

Maynard Bauleke  
Professor  
1968-1987

Robert Glick  
Associate Professor  
1969-1972

William Miller  
Instructor  
1968-1969

Fred Smithmeyer  
Instructor  
1968-1999

Paul Hausman  
Associate Professor  
1968-1974

Howard Rust  
Assistant Professor  
1968-1974

Grant Snyder  
Instructor  
1968-1978

Charles D. Reese  
Professor  
1969-present

Francis Winterburg  
Assistant Professor  
1970-1979

Robert Zerwekh*  
Professor  

John Crisp  
Professor  
1979-1983

Bedru Yimer  
Associate Professor  
1979-present

Hector M. Clark  
Associate Professor  
1981-present

Charles C. Groth  
Associate Professor  
1981-1982

Robert C. Voigt*  
Associate Professor  
1981-1990

Richard Johnson  
Assistant Professor  
1983-1987

Donald A. Gyorog  
Professor  
1984-present

Karan S. Surana  
Distinguished Professor  
1985-present

Diane Youngberg  
Instructor  
1985-1986

Terry Faddis*  
Professor  
1986-present

Kiyoharu Matsuoka*  
Assistant Professor  
1986-1993

Peter TenPas*  
Associate Professor  
1987-present

R. Bryan Greenway*  
Associate Professor  
1991-present

Jerry Swearingen*  
Assistant Professor  
1992-present

Wilthea Hibbard*  
Assistant Professor  
1993-1995

Robert Sorem*  
Assistant Professor  
1994-present

Robin Hibbard*  
Assistant Professor  
1995-1995

Carl Luchies*  
Assistant Professor  
1996-present

**Mechanical Engineering Department Chairman or Head:**

1906-1927  Perley F. Walker
1928-1944  Earl Hay
1944-1947  Ellsworth Gray
1947-1950  Harry Daasch
1950-1952  Warren Snyder
1952-1964  Edward McBride
1964-1973  Robert Gatts
1973-1979  George Forman
1979-1983  John Crisp
1984-1991  Donald Gyorog
1991-present  Terry Faddis

Visiting Professors included Joseph Datsko in the 1970-1980 era from the University of Michigan. He was an authority on manufacturing stress and strains.
ME Alumni Profile

Our Lives are a Little Safer Because of Him

Something goes wrong at 30,000 feet and a pilot has lots of worries. Is it serious? If it doesn’t fit the pattern of practiced events the pilot calls ground control and they patch in an airline engineer from the maintenance base at a control station. The anomaly is not covered. After explaining the issue, the pilot asks the ground control team to explain the cause and a solution. Engineer, mechanic and others work out a solution, explain it and the pilot delivers the passengers safely and with little hassle to their destination. The anomaly did not make the news. In fact, the event was probably not even noticed by the passengers. But it is a significant experience in the life of an airline maintenance base engineer. While not routine, such events do happen to most of these engineers at some time in their career. Their knowledge keeps us safe in a daily event we take for granted - flying on a commercial airliner.

David Kruse, BSME ‘67, is Vice President for Maintenance Operations for American Airlines. Stationed at the 270-acre American Airlines maintenance center at Tulsa’s International Airport he guides an operation involving 13,000 maintenance employees and plays a major role in the fortunes of 80,000 employees worldwide and the perception of airline safety in general. We interviewed David recently at his place of work and found a 53-year-old executive who clearly loves his work, is proud of his company and who has taken a company with maintenance problems 12 years ago to a world leader in airline and maintenance performance.

It’s not clear when the Leawood, KS native began his fascination with aircraft and flying, but he furthered it at KU by taking ground school as one of his electives and received his private pilot’s license then. David worked one summer at the Buick/Oldsmobile/Pontiac plant in Fairfax, KS, and another summer at General Motors’ Flint, Michigan Buick Assembly Division. There he worked with mechanical handling equipment for model changeover. During this time he also completed basic training as part of his Kansas National Guard duties.

Prior to graduation from KU, David signed on with TWA’s overhaul base at Kansas City’s International Airport. His father-in-law worked in airport operations and field service and suggested that David might like the challenge and variety of aircraft work in place of the automotive industry’s failure to utilize new technology. So David entered the Structural Engineering section at TWA in August 1967 doing modification and repair development.

After two years in structures, National Guard duty took David for two years to Redstone Arsenal at Huntsville, AL, where he worked in meteorology and launcher design. When it was time to return to TWA after his military commitment, his old job was already filled so he went into aircraft power plants, a place and move that produced the perfect match of abilities and needs. He engineered repairs (repair development) on engines, tested engines and their performance after overhaul, and developed testing procedures. Fuel consumption, gas temperatures and output thrust are some of biggest technical measures of maintenance success. Rebuilt engines never meet the performance of new engines, but there are big dollars at stake to get as close to original performance as possible.
Over the next five years, Dave rose through the ranks at TWA. His positions included manager of engine scheduling, director of power plant engineering, staff vice president of engine and component maintenance and ultimately all maintenance operations at TWA. In 1985, David took the job of Vice President for Maintenance Operations for American Airlines.

When many graduates were going into aerospace design, jet engines, explosives, research, design, and many other glamorous fields, David Kruse entered a field which lacked a general public reputation at all. What did he find so fascinating that kept him in the field for 30 years? It was the direct hands-on work, the continual need for better repair and maintenance practices. It was the detailed knowledge he gained about every aspect of the aircraft, the fact that many of the basics already had been written down in procedures, so you were not likely to make a big mistake, yet design innovation was still needed, cheaper ways had to be developed, and even better ways after those were developed. The engineers spend a great deal of time looking right at problems side by side with the repair mechanics [Dave points out that the mechanics and good systems engineering are the major reasons for such excellence in airline performance]. The engineer is right there with the problem in his face and the people who must fix it by his side. The risk of serious design problems is low because the aircraft design engineers and the FAA have spent so many hours certifying the aircraft and its systems. The mechanics resolve most routine maintenance issues, but the engineers and management develop a monitoring program for each component and system that optimizes maintenance costs and keeps planes in the air for the maximum time possible. It is a challenge to optimize performance when schedules, costs and availability must all be optimized at the same time.

Stress concentrations, corrosion, and fatigue are engineering issues readily visualized in this business, but so are knowing how to rebuild worn metal seals and blades. Rebuilding, inspecting, testing, making decisions on rebuilding vs. buying new planes, researching new manufacturing approaches and verifying that any new process does not affect the critical performance parameters, all of these provide a multitude of short and long term projects for engineers to work on. Something new every day in a fast-paced, precision industry.

Today the maintenance engineers download the original CAD drawings from databases provided by the aircraft producers. They design and build tools, large structures for the maintenance crews to crawl around on when they work on the outside. They completely rebuild skins of honeycomb graphite composites and other materials. They reproduce the original shapes, tolerances and loft lines.

Today the major airlines all have CAD systems, and several computer systems. David mentioned that their Saber reservation systems which sits underground on site at his facility has some 50,000 computer devices hanging off it [around the world] making literally millions of reservations and calculations a day. American Airlines has 6,470 aircraft with firm orders for 103 additional planes and options for still another 527 aircraft, which typically fly 8-14 hours a day. They perform routine maintenance daily, weekly, monthly and yearly on these aircraft. Tongue in cheek, all his operations have to do is to schedule each airplane in its off duty hours at the right city where maintenance can be performed, with the right parts, tools and procedures, with people in place and hangars or space for maintenance work.
American Airlines flies eight different types of aircraft and each has two to three different models. These will fly for up to 30 years each. Keeping spare parts is clearly a major issue for decades. David has a spare-parts inventory of a half-million items which must also be maintained while minimizing corporate inventory costs. Each of the 34 maintenance-capable cities has to be tied in to the plan as do all the staffs at each facility and the staff who schedule and move the airplanes. With four stations in Europe, four more in Central and South America and some capability in Tokyo, the operation is truly international. While most drawings and specifications are in English, the 35 Airbus A300-600 planes have some documentation in the language of the component builder, so they need translation.

David points out that the designer of today’s composites design for performance, weight and strength, but composites are not repair-friendly. American has a separate 125,000 square feet composites center. They have to address issues of moisture ingestion, and lack of tolerance to hydraulic fluids and petroleum products common in aviation. They use X-rays, ultrasonics and other non-destructive processes to verify composite integrity. They are at the cutting edge of technology for composites, but not a driver of the technology. Maintaining the original design is as challenging or more so than doing the original design. They research welding, bonding, and a host of other processes. They routinely work with the original equipment suppliers like Boeing, Douglas and Fokker, as well as each of the sub-component manufacturers. Their engineers are encouraged to be knowledgeable of the state of the art, to be leaders, to find more cost effective solutions and to develop new solutions, but publishing papers, general research and academic issues are not part of the life of the maintenance base.

It was a dress-down day when we met with Dave Kruse. He was relaxed in his knit shirt with his new Jayhawk pin on the lapel and his office was exceptionally quiet, not the beehive of activity implied by all his talk and the editor’s observation of repair facilities. Why? Dave is proud of his staff, six who directly report to him and some 20 others under them. He and his team have worked their way to be the best in this highly competitive business. They have the most reliable equipment, least downtime, most effective routine maintenance, and cost-per-available-seat mile. Dave and his staff have developed an organization which reduces much of the worry associated with many decisions which have to be made. They can concentrate to a greater extent on the future as they look at the strategic issues. They have a winning system in place.

American Airlines has large maintenance centers, one in Fort Worth with a hangar a quarter-mile long by 500 feet deep with no uprights inside the facility. The Ft. Worth facility is the first new maintenance facility since the war, and an example of excellence in design and functionality. These facilities are mammoth; hangar doors are 90 feet high and the scaffolding hangs from the ceiling. Structures which are six, seven, or eight stories high just hang from the roof to allow access to the plane’s exteriors.

They rely on automated storage and retrieval systems to dispense their 500,000 parts, from the lowly O-Rings which provide critical sealing to the 20-foot long flaps and gigantic wheels. Perhaps the biggest source of satisfaction is the logistics systems in itself which assures timely delivery of each of the four elements of maintenance - people, tools and equipment, spare parts and aircraft ground time at the right city.
David Kruse has built one of the most effective teams in the world for carrying out cost effectiveness, high quality, and most importantly keeping planes maintenance-safe for the traveler. The editor takes plane travel for granted, being jaded by hundreds of flights without incident. But Dave and his staff do not take travel that lightly. In fact, his day begins with the 7:15 a.m. System Briefing. There he and the other executives receive a review of the previous day’s problems. Weather problems in the various cities, diversions of any aircraft in their fleet, any air interruption, aborted takeoffs, all safety and security incidents, and a review of airline statistics. Every day, Dave’s looking at every incident for impact on safety, procedures, and costs.

Dave’s job does not stop with the events at American. Whenever any airline has a reported incident Dave and his staff review all the data to determine “Could it happen with our planes, our procedures, our people? It’s important to prevent any and all problems and those at other companies are potential indications of problems of all companies.” Dave knows the details of the Value Jet disaster and TWA Flight 800. It is serious business, a business which requires effective systems of people, equipment and procedures. And every day begins the same way and ends with the successful completion of 2300 flights.

He testifies before Congressional Aviation oversight committees, represents his company in industry wide meetings, and other corporate functions. As the leader of maintenance efforts he also has a personal role to play, a role he calls pivotal. He leads maintenance seminars and forums in which engineers, mechanics and others meet face to face. The concept here is dialogue. In these sessions mechanics describe the problems they face and what goes well and what doesn’t, so that everyone understands the problems and needs of the people who keep the planes flying. It is a major effort to assure that mechanics and engineers know each other on a first name basis, and continue ongoing daily discussions. Communication is a big issue. Lack of communication cannot be tolerated in this business, and American takes pride in assuring that engineering and the rest of the corporation talk. These are line to line, plane to plane, and cross cutting talks, as well as logical product line discussions. The company has to work like a sports team, every body understanding the why and what, and depending on the next person to deliver as needed. The challenge today is keeping the entire staff focused, a relentless, never-ending task. There are no isolated jobs in this business.

Dave speaks with commitment, pride and concern as he notes that he works in a unique industry and a unique job. It involves a team of 80,000 individuals who each must do his or her job well, a team on which every single person is important to the final product—a safe and timely journey at a cost and profit that all can enjoy. It takes each of those people to deliver one trip, to deliver 288,000,000 revenue/passenger air miles a day.

Safety is a topic spread throughout the interview and Dave and his company clearly take that aspect seriously. Not every engineer there takes the FAA tests to become a Designated Engineering Representative, authorizing them to act on behalf of the FAA, but procedures, planning and communication are clearly a major part of an engineer’s life at American Airlines.

What was life like at KU when Dave was there? He was there in the ’60s and had just walked into JRP Dormitory when he heard people saying that President Kennedy had
been shot. It was a terribly depressing day for him and many of us. He had to study hard to make just reasonable grades his first two years, but eventually his grades got better but it was always with hard work. The football team had a rather spotty record then, but basketball was in its glory and he attended many of those games in Allen Field House. Gale Sayers was there for a year or so while Dave was there. Most of Dave’s friends were in the business school, and he spent his time studying rather than participating in extracurricular activities. He remembers Professors Forman and Kipp as most inspirational. He did not spend any significant extra time with either of these two professors, but they made an impact in his life. Prof. Forman particularly provided encouragement and had a special style that set him apart and provided encouragement.

David remembers his good friend Steve Forsythe who went to GM’s Milford Proving Grounds one summer. He also recalls Bob Carnes, Ken Gorman, and Steven Sterns. While he didn’t say it, there was just a hint that Dave has a few stories and memories, like most of us have, that only the closest of friends hear. So maybe we’ll talk with Steve, Bob, Ken and the second Steve to get the rest of the story!

This fall David Kruse will join KU’s School of Engineering Advisory Board and renew his KU fellowship. He will probably drive up since Tulsa is so close, but others in that group will fly, and they will be a little or a lot safer because David Kruse built an exceptional system to keep all the flyers safe and deliver them on time. He chose a different career than most of us, but it was and is a career that makes a difference.

ME Grad Supports Recent Graduates Advisory Board

Megan O’Loughlin, BSME ’93, has served on the School of Engineering Recent Graduates Advisory Board since 1993. Megan was an active student while at KU and her on-campus involvement, love for KU, and strong support by her company make her an ideal choice to provide the Engineering School first-hand insight into the issues and needs of just-graduated and about-to-graduate students. The school’s Engineering Advisory Board members provide insight from key executives and employers of graduates, while the younger and newer group provides real time insight into the minds, assignments and activities of just hired graduates. Some seven to ten graduates currently serve on this board, with current studies looking at expanding it to include a greater variety of industries and graduation dates.

Megan is employed by Koch Industries, an energy company and leader in oil and gas processing. She began in conventional project work, but after two years switched from the engineering side to the business side of buying and selling power and electricity, working on the trading floor, learning futures contracts, puts, calls and risk management. She says she loves the excitement and activity of this work, and notes that her engineering background makes it easy to understand the impact of certain events in the world affecting oil availability and prices.

Megan’s rise to things new and different is no surprise to those who knew her at KU. She was Vice President of ASME as well as for her scholarship hall. She was active in
intramural sports, in the Society of Women Engineers, Tau Beta Pi, and Pi Tau Sigma and loved economics and thermodynamics. Her senior project involved the super mileage vehicle where she was the test driver, helped design the steering system, shell and frame. She was one of the leaders in the move to resurrect the defunct *Kansas Engineer* magazine. She fought for the right to get a class in technical writing, but the English Department controlled the limited number of people in the course, so she and others used experiences on the *Kansas Engineer* to provide their training in this field. She was a photographer, writer, and an associate editor, also a good student who was involved, and always sparkling or bubbling over in enthusiasm.

Megan’s move to the money side of business may not be common in the US but it is in Asia where the technical abilities provide a personal growth. Megan loves KU and the training she received in ME The KU traditions, friends, and great professors are a part of her life and the Recent Graduates Advisory Board helps keep them alive. She especially credits Professors Yimer and Reese for their teaching and support.

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**Mechanical Engineering Partnership Fund**

The 1994 vision of Terry Faddis to have a permanent funding source for Mechanical Engineering has been realized. The ME Advisory Board has endowed the Mechanical Engineering Partnership Fund to provide an enduring source of scholarship funds and funds for other departmental uses. Any KUME supporter can add to it. The interest from this fund will be used to provide financial needs not funded by the state of Kansas. All contributions will continue to build this endowment and to earn interest. All contributions to this fund are preserved as principal and none of the principal will be spent, so any contributions will build this fund in the years to come.

If you would like to help grow this fund or to set up a separate named fund to honor family, friends, a special person or your company, contact Lorie Walker at the KU Endowment Association 785/832-7351 or Dr. Terry Faddis at 785/864-3181. Terry can also be reached at faddis@mecheng.me.ukans.edu, and Lorie is at lwalker@vaxa.ca.ukans.edu.

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**Alumni Update**

We’re interested! Please let us know where you are and what you are doing. Simply fill out the form on the back page and mail it to the following address:

Department of Mechanical Engineering
The University of Kansas
3013 Learned Hall
Lawrence, KS 66045-2234
Or call or fax us at:
Voice: 785/864-3181
Fax: 785/864-5254
Or e-mail us at:
sledvina@mecheng.me.ukans.edu.
*We look forward to hearing from you!*

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**Great KU ME Web Page**

Look for a great web page at www.engr.ukans.edu/~kume. This page will get you parts of the entire campus. Faces, names, what’s happening, all in one convenient place in color and updated on a regular basis. Exceptional, we thought. Check it out.