(May 16, 2006) Congressman Lipinski Delivers Keynote Address ASME Early Education Forum

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"Engineers and America's Future Challenges"

WASHINGTON, DC - Congressman Lipinski delivered the keynote address this week at ASME's Early Career Forum in Washington, D.C. at the Loews L'Enfant Plaza Hotel. Below is the contect of the speech:

"I am often in a sea of lawyers and businessmen on the House floor. Occasionally, I am asked, "how does your training as an engineer help you?" Certainly it helps in understanding science and technology, math and science education, and transportation and manufacturing issues. But engineering is more than that. At its heart, engineering is problem solving. Today, possibly more than ever, our country needs its engineers to tackle the challenges of our future. It is now that America must decide if it wants to remain the leader in the global economy. With China and India bounding ahead in the marketplace, we must maintain our competitive edge to make sure jobs stay in America and we keep our economy strong.

We must address two of the most difficult challenges before us - economic competitiveness and energy independence. And education and research are the key to both. In my opinion, engineers will be vital in making it happen. For years, engineers have helped America become and remain the world leader, although most have remained unknown. For example, while the titans of industry like Bill Gates acquire almost celebrity status, the economy would not have been so strong in the 90s without the anonymous army of engineers who were making micro-chips smaller and run faster and computers more powerful.

But there is a growing concern that America is falling behind other countries in engineering. U.S. students continue to score below international averages on math and science tests. In 2004, China graduated more than six times the number of engineers that graduated in the U.S. The National Academy of Sciences recently released a report entitled Rising Above the Gathering Storm, that raised questions about America's future technological and, in turn, economic competitiveness. This report, echoed by the President in his State of the Union address, emphasized the need for government to take a number of actions, including addressing the potential shortage of good engineers. We must act quickly to take up this challenge. We cannot afford to let our economic future falter, and that future requires continuing technological innovation supplied by our nation's engineers.

So what can America do? We should not attempt to cut ourselves off from the rest of the world or accept a lower standard of living. Instead we must do what Americans have always done best - educate and innovate, finding creative new solutions for the problems facing our country and the world. And what should the federal government do?

First, we must improve and expand our education system, particularly for science, technology, engineering and math, often known by the acronym STEM. The National Academies report that I mentioned earlier has many recommendations for what we in Congress can do to help our country increase both the quantity and quality of our engineers. And there are some of us in Congress who have responded, with proposed new legislation and funding for important programs. Since

last year, I have been working with fellow members of the House Science Committee to push for implementation of many of the report's recommendations. In the Senate, Senators Alexander, Bingaman, Domenici, and others have lead the introduction of three bills that they call Protecting America's Competitive Edge. Each of these three bills has more than 60 co-sponsors, emphasizing how important this issue is across the country and between the parties.

In the House, I am a proud co-sponsor of several pieces of corresponding innovation legislation, including the "10,000 Teachers, 10 Million Minds" Science and Math Scholarship Act and the "Sowing the Seeds Through Science and Engineering Research Act." The bills address all levels of education. The first step is pre-K through 12 education. We need more teachers trained specifically to teach science and math, and we need federally funded scholarships that encourage math and science students to go into teaching. We have many great teachers in classrooms across the country right now that are working very hard, but often don't have the proper training to teach their subjects. Retraining programs for these teachers would help them learn about the latest technology, both in the scientific and teaching arenas, and bring it back into the classroom. More students should be encouraged and prepared to take Advanced Placement tests, which requires training teachers to teach these difficult subjects. We also need a better system to learn what curricular materials successful teachers are using and pass that information on to other teachers across the country.

Teachers are so important and I cannot emphasize this point enough. A teacher first inspired my interest in engineering. When I was a kid I was fascinated in learning how things work, as most children are. I remember Father Fergus who taught me physics at St Ignatius, taking this childhood fascination and tying it to engineering. His creativity and interest sparked MY interest in engineering, I give him the credit for inspiring me to study engineering.

And that is the next area that we must improve - training at the college and university level. We need more STEM-focused scholarships to encourage a more diverse base of scientists and engineers. The legislation I helped introduce will create 5,000 new graduate fellowships each year to be administered by NSF. I also strongly support the increases in the President's fiscal year 2007 budget for the research programs at NSF and the Department of Energy's Office of Science. This funding will help entice new engineers and scientists into the field, ensuring that we have a strong, qualified engineering force into the future. Furthermore, I am a co-sponsor of legislation that will create research grants targeted specifically at early career individuals - these grants will help prepare the next generation of experts.

We also need to reach for other ways to get kids interested in science, math, and engineering. The first piece of legislation that I wrote and got passed in the House was honoring National Engineers Week. This week is one way to raise the profile and interest in engineering. I am pleased to recognize ASME for their involvement, along with may other engineering groups and corporations across the country, in programs for children during National Engineers Week.

For example, the Future City Competition is a great example of how National Engineers Week has touched students across the country. The competition encourages 7th and 8th grade students to use problem solving skills, team-work, research and presentation skills, practical math and science applications, and computer skills to present their vision of a city of the future. These students had great opportunities to learn more about the many factors that go into building a city, and then they applied that knowledge to a real problem. Working with teachers and mentor engineers, they solved problems ranging from energy supply to waste removal to transportation needs. These students are the ones we will rely on in the coming years to help us address these challenges in the real world. Some of you may have even participated as a mentor or participant.

If we are to remain a leader in the world economy, we must make these changes NOW to our education and research institutions and processes. We are already in danger of losing our competitive edge in industries ranging from aerospace to manufacturing. Engineers have been instrumental to the development of these industries and will be continue to be

critical. But perhaps the greatest challenge that we face is changing our energy system.

The high cost of energy is something that all of us have had to face in recent times. Gas prices are going up, causing increases in everything from airplane tickets to food at the grocery, leaving no American untouched. And it looks like prices will continue to rise.

And we as a nation are paying an even higher cost than the price at the pump because of the impact that our fuel choices have on our national security, environment, and public health. Right now, too much of our time and resources go to dealing with situations caused by our dependence on oil we import from unstable regions of the world. This must change.

And it will change. An economy based on energy outside of fossil fuels is just over the horizon. There are many proposals being debated across the country to help relieve the pressure of energy prices. These range from short term solutions, such as conservation and increasing efficiency, to long term approaches like research in hydrogen fuel, biofuels, and other renewables. We do not know if one idea or program is going to solve all of our energy problems, but if we do not start to assemble the tools and build an energy model for the future, we will be no better off 20 years from now than we are today, and likely we will be much worse off.

We should take further action to address short term measures, primarily conservation and efficiency. For example, Illinois, using federal, state, and local funding, has created a great weatherization and heating assistance program. By teaching people how to use basic techniques, such as reducing heat loss by putting plastic up over windows, this country could save millions of gallons of fuel and working families could save thousands of dollars on heating bills. These are solutions we all think about as mechanical engineers. But these short term solutions will only go so far. We need long-term solutions as well, but many of these will require much research and development. The first long-term solution is to raise the fuel efficiency of our vehicles. Over time, as gas-guzzling cars are replaced with fuel sippers, our demand for gas will decline, bringing down the price at the pump. Using current technology that includes gas-electric hybrids and advanced materials, automakers can produce fleets with higher average mile per gallon standards.

Renewable fuels, such as solar and wind energy, are also very promising and are becoming more and more economically feasible. However, their efficiency still needs much work to be improved. And when new technologies are developed, there are additional challenges to commercialization. As a way to address this issue, I am supporting The Advanced Research Projects Agency - Energy (ARPA-E) Act, which will speed the commercialization of energy technologies to reduce U.S. dependence on foreign energy by 20% in the next 10 years. Focusing on high-risk, high-reward research that private companies will not fund by themselves, ARPA-E will help us make huge leaps in creating a cleaner, more stable energy economy.

But we must also start to think of new alternatives and one new source with great potential is hydrogen energy. Hydrogen holds great promise to meet many of our future energy needs, and it addresses national security, environmental, and economic concerns.

First and foremost, if we use hydrogen as a fuel source, we will no longer be dependent on foreign oil. Second, in terms of the environment, the only exhaust hydrogen engines produce is water. Last week I had the opportunity to drive a hydrogen-powered car built by Honda which runs on advanced fuel-cell technology. It did not drive much differently than a gas-powered car, except for the silence (which I'm used to with my Ford Escape hybrid).

When I drove the hydrogen car, the Honda representatives claimed the exhaust was clean enough to drink and if we had a glass, they could pour me one right now. Lucky for me, they didn't have glass.

Finally, a hydrogen economy can help our manufacturers get back on track. Japanese automakers are thriving as a result of quickly bringing hybrid cars to market. One way American automakers can return to prominence is by being the first to mass produce hydrogen cars. I am confident that engineers, perhaps some of you, will help to make the breakthroughs we need for this to happen.

And when these advances are made, hydrogen can fill critical energy needs beyond transportation. Hydrogen will also be used to provide heat and generate electricity. The future possibilities for this energy source are huge.

But there are significant problems that must still be worked out before we can put a hydrogen car in every garage. For example, the weight of the fuel cell and batteries must be brought down, the range per fill-up must be expanded, and the price must be lowered - drastically. The car I drove cost 1.5 million dollars. Clearly, several significant technological advances are necessary, but they are within our reach.

What role can the government fill to advance this goal? We certainly need to do more than stand up and give speeches. We need to find creative ways to encourage scientists, engineers and entrepreneurs to put us on the road to energy independence. This is why my colleague from South Carolina, Bob Inglis, and I introduced the H-Prize Act of 2006. This bill provides cash prizes for advances in hydrogen storage, production, and distribution, for new prototype hydrogen vehicles that meet certain goals, and a grand prize of $10 million prize over the next 10 years for a breakthrough or transformational technology. We were able to get this bill passed in the House just last week, and Senators Graham and Dorgan have introduced the bill in the Senate. We are hoping that the Senate will also act quickly on this legislation, especially since our bill passed the House by a vote of 416 to 6.

But perhaps the most important role of the H-prize may be to spur the imagination of our most valuable resource, our youth. In the 1970s there was great excitement about solar power as an alternative energy source. In my 8 Grade Science Fair project I examined solar energy, because I was excited by what I was reading and hearing about the possibilities. Unfortunately, our interest in alternative energy sources seemed to fall off. We cannot afford to let that happen again. Perhaps there is a student out there today whose imagination will be sparked by the H-prize, and that child may become an engineer and help develop the much-needed answers to today's energy problems. Perhaps one day we will look back on the H-prize as that catalyst that led to a better, cleaner, more secure America and world.

So what can engineers do? What can't engineers do - we are the problem-solvers of society, taking the knowledge and science that is scattered about and finding answers to humanity's questions. Engineering training helps teach the type of analytical and innovative thinking that has made America a world leader technologically, militarily, and economically.

We have great challenges ahead of us. But we have come so far over the course of our short history as a nation that I know we are up to the challenge. Our nation's future depends on finding solutions to these critical challenges. America has always been at the forefront of technological breakthroughs. We have responded to great challenges, perhaps most

famously President John F. Kennedy's challenge to land a man on the moon before the end of the 1960s.

We must take advantage of America's great resource - our ingenuity and creativity - to tackle the problems before us. We have some of the best and brightest minds in the world in the United States, as well as an economy that supports and encourages entrepreneurship. Now, we must focus this inventiveness to address the great challenges that face our country."