American Job Creators

By Thomas M.B. Brooks II, P.E.

The economic recovery has been a bumpy road over the past few years. The U.S. unemployment rate has been stuck at around 8 to 10% during this time. This has been the key factor hindering a full recovery. One practice that is driving this phenomenon is American businesses outsourcing and offshoring jobs to India and China. This is necessary for those companies to remain competitive in the rapidly expanding global economy. It is increasingly difficult for our citizens to keep pace with the low-wage, highly skilled workforce of the Eastern world. We need domestic job creators that provide new and better opportunities for our labor force.

For a five-year civil engineer with a BS degree, the average U.S. salary is $60,000 per year, compared to India at $8,000 per year. To compete and create jobs, the U.S. must pave the way for innovative technologies. Innovation comes from engineers. For innovation to increase, the U.S. must create more engineers, and the engineers of today must improve their skill sets. What can our country do to achieve this goal? How can we as engineers stay competitive with engineers overseas?

As a nation, we must ultimately educate our young people with a strong foundation in math and science. Reports estimate that India is graduating 120,000 engineers per year and China is graduating 517,000 per year. In the U.S., an estimated 170,000 engineers are receiving diplomas per year. We must improve our education system by increasing its funding to provide better incentives for teachers and students through grants and scholarships. This is no secret; many economists share this fundamental view of the proper long-term goal. However, what can we do right now to create jobs and grow our country?

For one thing, we must keep spending money on research and development (R&D) to spark innovation. As of 2011, the U.S. spends 2.7% of its GDP towards R&D. India spends only 0.9% of its GDP, while China spends just 1.4%. However, R&D growth for the U.S. is about 3.3% compared to 19% growth in China. The U.S. has spent a large sum of money towards R&D for decades now. In 1960, the U.S. spent 3% of its GDP on R&D. It is interesting to note that today about two-thirds of spending comes from industry, and the rest from government. These ratios were reversed in the 1960s. This suggests that more development is being done, and less research. Development has certainly spawned innovation and will continue to do so, but I believe that basic research is the most direct path.

A great example of what R&D can do for our country is the evolution of computers. The first modern computer was built in 1946. When it ran, the room temperature rose to 120 degrees. There was not a lot of interest in computers at the time without government backing. The U.S. government was the only entity in the world with enough resources to pursue the development of the computer. In 1964, R&D jointly funded by the U.S. government and IBM produced the revolutionary System 360 mainframe computer for practical business needs. This spawned many other new technologies on which the U.S. thrived, including the microprocessor and semiconductor industries. These innovations would not have been possible without ongoing R&D throughout the past 50 years.

R&D naturally results in patents. In 1990, the U.S. awarded 52,977 patents. In 2010, this number climbed to 121,179. In 1990, India received a mere 23 U.S. patents, while China received 199 patents. However, in 2010 India's patents jumped up to 1,137 and China's up to 4,020. These are very significant increases and will continue for years to come. To maintain our competitive edge and keep profits pouring into the U.S., we must continue to lead in R&D.

Finally, to help our country grow and create jobs, the engineers of today must increase their skill levels. A large amount of knowledge will be lost when the Baby Boomers retire, so let's focus on the younger engineers. They should be getting licensed to create a strong base in their respective industries. Each PE should specialize in a particular field. This is important for multiple reasons – such an engineer becomes more marketable to the world, has higher job security, tends to develop new technologies that spark innovation, and makes other engineers around him or her become better educated.

For example, an engineer who designs reinforced concrete structures can focus on concrete mixes. Perhaps he or she develops a stronger, cheaper mix that is more workable and environmentally friendly, therefore creating a worldwide demand. Or, look at the case of an engineer who works with hydraulic fracturing of petroleum and natural gas. Hydraulic fracturing has been a hot topic in the news lately due to environmental concerns. What if this engineer creates a better way of addressing those issues, subsequently leading the U.S. to become more energy-independent? Additionally, blast-resistant engineering specialists will be in high demand due to the increase in terrorist attacks over the last 20 years. The world will pay a substantial amount of money to these individuals for their knowledge about risk and security.

In conclusion, to create jobs and drive our nation's wealth, we must innovate. Funding must be provided to educate our people and create opportunities for this innovation. The engineers of today must increase their skill level to compete with the rest of the world. The backbone of America is its engineers, and it is up to us to pave the path to a brighter future.▪

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