



GOVERNOR'S COUNCIL FOR WORKFORCE
AND ECONOMIC DEVELOPMENT

Oklahoma's Aerospace Industry Workforce: 2007 Report

Oklahoma's Aerospace Industry

SOME OF THE KEY RESEARCH FINDINGS

Evidence strongly indicates the aerospace industry is at the beginning edge of a skills shift that will significantly impact the definition of basic skills within the industry. Oklahoma will likely experience shortages of approximately 200 Aerospace Engineers and 400 Electrical Engineers by 2014, with shortages of additional engineering specialties possible in that same time frame. Currently not quantifiable but potentially more significant than the shortage of engineers are pending skills gaps within Oklahoma's aerospace workforce. Those gaps stem from advances in aerospace technology and an increased reliance within the industry on newly developed composite materials.

OKLAHOMA IS ONE OF THE TOP SIX GLOBAL HUBS FOR MAINTENANCE, REPAIR AND OVERHAUL SERVICES.

Qualitative data indicates that employers prefer that new graduates from training programs for Welders and Airframe and Powerplant Mechanics receive their strongest education in the basic skills, which could include how to work with composite materials. Any training related to specific aircraft, tools, or parts is usually handled through employer based in-house programs.

OKLAHOMA'S AEROSPACE WAGES ARE TYPICALLY ABOVE THE STATE AVERAGE.

ECONOMIC DEVELOPMENT RECOMMENDATIONS

Oklahoma's economic development community and its partners must continue to promote the importance of the industry and monitor Oklahoma's aerospace workforce for adequate number of workers by:

- ▶ Helping the aerospace industry work collectively to give the Oklahoma Aerospace Alliance, Oklahoma Aeronautics Commission, Space Industry Development Authority, or some other similar entity the authority to function as the single voice of the industry, allowing for better coordination of data gathering, marketing, and policy development.
- ▶ Working through that entity to develop in-state and out-of-state marketing strategies that create a positive image of aviation and aerospace within the state while promoting a broader awareness of Oklahoma's position as a global leader in the aerospace industry.
- ▶ Providing coordinated aid under the leadership of that entity to Oklahoma companies wanting to obtain aerospace contract work through the Air Logistics Center at Tinker Air Force Base, the FAA Mike Monroney Aeronautical Center, and other federal installations throughout the state.
- ▶ Providing tangible support to efforts that promote commercially viable space based opportunities that involve Oklahoma companies.



A man with short dark hair and a beard, wearing a dark blue t-shirt, is focused on working on a large, curved metal component in a workshop. The component is highly reflective and has various mechanical parts attached. In the background, there is a computer monitor and other workshop equipment. The lighting is bright, highlighting the metallic surfaces.

WORKFORCE SUPPLY AND DEMAND

Aerospace is at the leading edge of the wave of employee retirements about to wash over the nation. In 2005, the US working population between 16 and 64 had a median age of 39.9, but the median age for the national aerospace workforce fell somewhere between 45 and 54. Shortages in key occupations like Airframe and Powerplant Mechanics, Aerospace Engineers, Electrical Engineers, and others are expected to become more pronounced as aerospace employers replace members of their workforce who have been working in the industry since humans first walked on the moon in 1969.

DIRECT AND INDIRECT GROSS OUTPUT FROM OKLAHOMA'S COMMERCIAL AVIATION INDUSTRY WAS ESTIMATED TO BE \$12.4 BILLION IN 2004. THIS REPRESENTS OVER 10% OF OKLAHOMA'S INDUSTRY OUTPUT.

Engineering shortages exist nationwide, and more than half of Oklahoma's engineers leave the state within five years after obtaining their degree. In April 2007, there were 4.4 million on-line advertisements for job vacancies in the US according to a report from The Conference Board, and of those ads 176,700 (or 4%) were for engineering positions. Some employers are also required by law to use only US citizens because of national security concerns. Meanwhile many aerospace workers are leaving the industry, discouraged by past instability. Others are being lured to other labor markets, attracted by higher wages.

THE AEROSPACE INDUSTRY WAS DIRECTLY RESPONSIBLE FOR 72,535 OKLAHOMA JOBS IN THE 1ST QUARTER OF 2006, OR 4.3% OF THE STATE'S TOTAL EMPLOYMENT.

Oklahoma's Aerospace Industry

EMPLOYMENT RECOMMENDATIONS

The Oklahoma aerospace industry and their government and educational partners must have a dual focus of both addressing systemic gaps for long term issues and building a service capability to find workers to address present needs by:

- ▶ Monitoring aerospace industry conditions and identifying those locations outside of Oklahoma where the state could most effectively use advertising in order to attract new workers capable of immediately addressing specific occupational and skill needs experienced by aerospace employers.
- ▶ Developing specific skills profiles of key aerospace industry occupations in order to better tailor entry level and continuing education programs so that they address newly developing technological skill requirements.
- ▶ Promoting continued workflow modernization through concepts like Lean Manufacturing and the application of Six Sigma, as well as other similar best practices within the industry, so that Oklahoma's aerospace industry can boost productivity, work more efficiently, and do so with the workforce at hand.

INDIRECT AND INDUCED EMPLOYMENT FIGURES ADDED ANOTHER 43,237 JOBS TO THE STATE TOTAL.

- ▶ Addressing workforce concerns about the cyclical history of the industry with a three pronged approach of:
 - ▶ Educating the existing and potential aerospace workforce about the root causes of those cycles.
 - ▶ Helping employers identify best practices to improve overall employee recruitment and retention.
 - ▶ Maintaining a flexible educational pipeline that is closely networked to leaders within the industry to quickly address any potential training or re-training needs.

- ▶ Reducing the out-migration of experienced and newly educated workers with technical and engineering skills by identifying and promoting strategies that will:
 - ▶ Encourage a competitive salary structure relative to neighboring markets.
 - ▶ Assist employers in the application of best practices for employee recruitment and retention.
 - ▶ Address potential incumbent worker concerns over rights associated with intellectual capital.
 - ▶ Aid in the knowledge transfer between exiting workers and new work entrants.
 - ▶ Allow incumbent workers to multi-skill across disciplines in order to keep up with new technologies and industry cycles.
 - ▶ Create competitive advantages and incentives that will encourage employers to bring workers with targeted skill groups to Oklahoma and will encourage workers with those targeted skills to come to or remain in the state.



THE EDUCATION PIPELINE

Oklahoma has increased scientific, technical, engineering, and mathematical (STEM) education requirements in high school, but no one yet knows if adequate safety nets are in place for those students who are at risk of dropping out. Additionally, existing shortages of certified science teachers in the state's public secondary schools mean that students who are now required to take science courses in order to graduate from high school are being placed at an extreme disadvantage.

OVER THE NEXT 20 YEARS, EXPERTS PREDICT THE WORLDWIDE FLEET OF AIRCRAFT WILL ADD 27,200 NEW PLANES. MOST OF THAT GROWTH IS EXPECTED TO COME FROM NEW DESIGNS FOR SMALL, PRIVATE JETS.

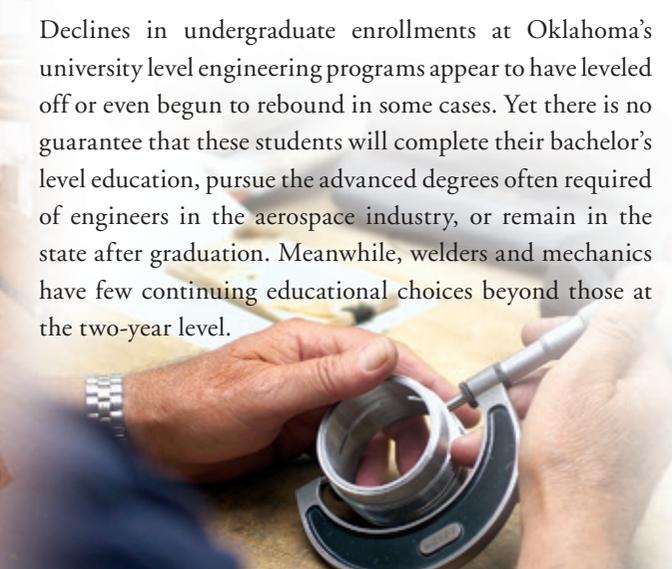
In 2006, there were 634,000 students from 1,851 school sites in 540 school districts in Oklahoma. These students sometimes moved between public and private schools, local school districts, and other states; some changed names because of parental marriage or divorce; some were adopted into new families. Transitions like these make it difficult to accurately measure the true scope of Oklahoma's dropout problem.

Declines in undergraduate enrollments at Oklahoma's university level engineering programs appear to have leveled off or even begun to rebound in some cases. Yet there is no guarantee that these students will complete their bachelor's level education, pursue the advanced degrees often required of engineers in the aerospace industry, or remain in the state after graduation. Meanwhile, welders and mechanics have few continuing educational choices beyond those at the two-year level.

EDUCATION RECOMMENDATIONS

Education and its aerospace industry partners must cooperatively work to increase the number of Oklahomans entering and completing an aerospace education program in key priority areas by:

- ▶ Identifying and supporting best practices for student retention at the K-12 level in order to bring Oklahoma's graduation rate to the highest possible level.
 - ▶ Supporting the development of a state-wide K-12 student database, with appropriate privacy safeguards, that would help Oklahoma better identify underlying trends in student drop-out rates.
 - ▶ Promoting the expansion and development of industry internships and job shadowing at all levels, including elementary, middle school, high school, technical school, and collegiate level, so that students are presented with more opportunities to gain a contextual understanding of how the things they are learning now can translate to future jobs in the industry.
- ▶ Increasing retention rates at Oklahoma CareerTech schools, colleges and universities through increased promotion of:
 - ▶ Financial support in the form of government and industry supported loans, internships, work-study programs, and other similar efforts that keep up with the increasing costs of such education.
 - ▶ Curriculum alignment between scientific, technical engineering and mathematical (STEM) programs at Oklahoma's institutions of higher learning and vocational training to streamline the production of graduates with the advanced levels of STEM knowledge required by the aerospace workforce.
 - ▶ Student support services such as guidance and career counseling that help students resolve other issues they may face while pursuing their education.
- ▶ Identifying opportunities to develop more bachelor degrees in technology that support the two-year to four-year degree transition.
- ▶ Encouraging more students within teacher education programs at Oklahoma's colleges and universities to consider a curriculum that would allow them to become certified science teachers.





GOVERNOR'S COUNCIL FOR WORKFORCE AND ECONOMIC DEVELOPMENT

EDUCATION. ECONOMIC DEVELOPMENT. EMPLOYMENT.

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The Governor's Council for Workforce and Economic Development

The goal of the Governor's Council for Workforce & Economic Development (GC-WED) is to integrate Oklahoma's workforce and economic development efforts in order to give Oklahoma a competitive advantage as a desirable place to work and live. One of the Council's five broad-based goals "is to ensure that Oklahoma has a labor pool that is competitive, advances the economic objectives of the state and local communities, and meets the employment interest of industry clusters and employer groups."

The full report can be accessed through the Oklahoma Department of Commerce at:
www.okcommerce.gov/workforce

or through the Oklahoma Aeronautics Commission at:
www.ok.gov/oac