

The background of the entire cover is a stylized American flag. The top half features a dark blue field with numerous white, five-pointed stars of varying sizes. The bottom half consists of horizontal stripes of red, white, and blue, which are wavy and flowing from left to right.

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Guest Editor Column

By Michael Crall



Our region has contributed to the success of a growing Nation from its inception to what we are today. The men and women of Western Pennsylvania served honorably in every conflict from the fields of Fort Necessity to the ridge-lines of Afghanistan. Pittsburgh's industrial- and technological- strength-fueled victory on the battlefield as well as innovations protecting those at home. Some may think that the "Arsenal of Democracy", a phrase coined by President Roosevelt describing our industrial might during World War II is encapsulated in history; I disagree. Our region continues to influence the success of our Nation on and off the battlefield. The active and reserve military units stationed in Pittsburgh play a significant role in ongoing national security operations but also have an enormous economic impact. Soldiers, sailors, airmen, marines, and coastguardsmen not only serve honorably but come home to enter into the regional work force bringing refined leadership and technical skills to the companies they join. Regional architecture and engineering (A/E) firms provide vital services to support military operations at home and abroad. Technology and manufacturing companies not only continue to provide solutions to enable military operations but also support veterans who have paid dearly to protect our way of life. This Spring 2016 edition of *Pittsburgh ENGINEER* highlights some of our regional military units as well as local companies supporting military operations. It also spotlights veterans in industry and those furthering their education.

When asked to "volunteer" to be the guest editor for this edition I was reminded of a previous job I held for 25 years as an active duty army officer. The word volunteer could have mortal consequences depending on the mission, enemy, terrain, or troops available. But after completing a risk assessment, the opportunity to participate in the team effort of putting together this edition far out weighed any consequences...definitely not mortal, so I pray. My perspective of the military and engineering in the region is a personal lens that is not codified in

procurement regulations or policies but in a place that my family has grown to love over the last nine years. The words that come to mind are: military-industry partnerships, community, patriotism, and support for veterans. I hope this edition re-enforces my perspective in your eyes.

My journey to Pittsburgh began in 2006 while on the commute home from the Pentagon where I served as an Army engineer staff officer. The phone conversation from an Army general officer at the time went like this: "congratulations you've been selected for early promotion to colonel and you're being assigned as the District Engineer U.S Army Corps of Engineers Pittsburgh." First of all, riding the metro-rail system home at rush hour is traumatic enough; this news was a little shocking. My reply was, "what country is Pittsburgh in, I'm hoping to go back to the airborne engineers at Fort Bragg or in Afghanistan." After 20+ years you'd think you would get a vote....not so much.

"As a civil engineer, I thought that was the coolest engineering job in the world...came with a few hazards but so does driving into town on the Parkway West."

The majority of my operational military career was spent as airborne combat engineer building roads, bridges, and airfields by parachuting bulldozers, graders, scrapers, dump trucks and soldiers from U.S. Air Force cargo aircraft into remote and sometime hostile regions around the globe with little or no notice...as a civil engineer, I thought that was the coolest engineering job in the world...came with a few hazards

but so does driving into town on the Parkway West. Our crisis response units could rapidly deploy and quickly set the conditions for operational success but the long term establishment of a military presence required a partnership with A/E firms, contractors, and vendors to further develop infrastructure to support operations. That partnership was not only important in the theater of operations but also as units returned home to military facilities in the Continental United States whose military installation infrastructure was in need of an upgrade. Modernizations to enhance the quality of life of military members and their families and to enhance the training readiness of our forces; military-industry partnerships drive innovation,



Crall during Operation Enduring Freedom – Afghanistan 2004

achieve cost savings, and speed project delivery. From barracks, to hospitals, to training complexes, to family housing, partnering with industry is essential to effective project outcomes.

To go from the operational Army to the U.S Army Corps of Engineers Pittsburgh was quite an eye opening experience. Yes, I was still a regular

army officer but instead of leading 1,000 paratroopers, I was leading 1,000 civilians overseeing the execution of the federal civil works mission in the Upper Ohio Valley; it was the best job in the Army I've ever had. Ultimately the job was about service to our region; livability; being a part of building a sustainable strong vibrant infrastructure that enhances public safety, stimulates economic development, and reduces risk to the environment but most importantly its about being part of shaping the future of our region. While at the Pittsburgh Corps of Engineers, I had the privilege of engaging intergovernmental/inter-agency teams at the federal, state, and local levels, the private sector, non-governmental entities, military units and academia to put together coalitions to positively impact the quality of life of the citizens of this region within the Corps Civil Works functions of navigation, flood control, environmental restoration, and emergency response. This assignment allowed me to understand the critical infrastructure needs of our region and work with the regional leadership in the Upper Ohio Valley to develop innovation solutions to these challenges that affected public safety given our fiscal constraints. But most importantly to this publication, this assignment highlighted the regional impact of the local military organizations as well as the partnerships at all levels of government to serve the community.

The patriotism and support for our veterans is unlike any community that I have lived in. While walking down a Pittsburgh street in uniform during the business day, I drew shouts of "thank you for your service;" those expressions of gratitude are genuine and much appreciated by our currently serving military and our veterans. But the real measure of a community's support is in the educational, medical, job placement, and vital support services to veterans, service members, and their families; our region boasts some of the best programs in the country. Veterans leveraging the Post 911 GI Bill can take advantage of our world class educational institutions which provide support services to help transition veterans from the battlefield to

the classroom training a new generation of leaders; some of whom enter into STEM related fields. Joint efforts between academic research institutions, healthcare providers and government are informing new ways to protect soldiers on the battlefield as well as improve the quality of life of veterans with disabilities. Job placement programs that match the skills and leadership abilities of our veterans provide employers with disciplined, mature men and woman that enhance the bottom line of the companies they work for.

Your take away from this edition of *ENGINEER* magazine: ESWP member organizations are providing vital services to the warfighter, their families, and to our veterans by delivering innovative infrastructure solutions along with supporting educational, job placement, and outreach programs. Once again, our members making a difference in the community.

About the Guest Editor...

Mike Crall serves as the operations manager in Pennsylvania, Ohio, and West Virginia for HDR, Inc; an employee owned, global architecture, engineering, consulting, and construction company. He is responsible for leading, management, profitability and direction of a multi-office, 300 person team that delivers innovative solutions within multiple transportation, water/waste water, federal, energy, environmental and resource management market sectors.



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Local Consulting Firm is Making a **BIG IMPACT** in the Military

The United States Military Academy's mission is to educate, train and inspire the Corps of Cadets so that each graduate is a commissioned leader of character committed to the values of Duty, Honor, Country and prepared for a career of professional excellence and service to the nation as an officer in the United States Army.

WEST POINT

Founded in 1802, West Point is entwined with the history of our nation. Less than 50 miles north of New York City, along the banks of the Hudson River, the state-of-the-art sports facilities and academic lecture halls of the academy provide a perfect juxtaposition for the terrain-rich environment used for cadet military training.

The academy develops cadets to live honorably, with uncompromising integrity, as U.S Army officers in service to the nation. West Point's purpose is to produce leaders of character who are prepared to provide selfless service to our Army and the nation. West Point provides a broad-based and balanced curriculum to ensure graduates acquire knowledge, skills, and attributes necessary for them to effectively address the complex and uncertain challenges they will face in their personal and professional lives. When students enter the United States Military Academy at West Point, they are beginning a profession.

While academic courses are the building blocks of most typical universities, career development at West Point is geared toward the cadet's goal of being an officer in the United States Army, so military discipline and training are paramount to their officer development. Cadets are immersed from day one in a military environment where they are organized in companies and serve in leadership positions within the Corps of Cadets.

The heart of the military training takes place during the summer. The basic Soldier skills of rifle marksmanship, land navigation, and close combat are but the underpinnings of each cadet's initial training the first summer; by graduation every cadet has participated in small-unit leadership training; attended military schools such as Airborne and Air Assault; served as senior leadership to junior cadets' summer training; and interned as an officer in active duty units across the globe. Each summer of training builds the leadership skills of the previous, so that by graduation each cadet is prepared to lead Soldiers and serve our nation. No matter what major course of study they choose, cadets graduate with the knowledge, confidence, and ability to be successful in their careers.

ACCELERATION AND PRIORITIZATION OF USMA CADET BARRACKS CONSTRUCTION

In 2011, with a diminishing MILCON program, the Army suggested that the revitalization of the existing Cadet Barracks compete in Army's Restoration and Modernization (RM) program (i.e., not MILCON). West Point engaged Installation Management Command Headquarters (IMCOM HQ) to assist in developing a phased program of comprehensive revitalization of the nine existing Cadet Barracks.

At the on-site visit (19-20 June 2012), the IMCOM staff toured the



Cadet Barracks with West



CRAWFORD, as a subconsultant to STV Inc., provided MCACES MII cost engineering and CPM scheduling for the bridging documents of the new barracks at the U.S. Military Academy. The 287,000-sf, six-story Davis Barracks will house five companies of cadets (a total of 650), with each company occupying a single contiguous floor.

STV's design for the barracks combines sensitivity to its context on a National Historic Landmark campus with extensive use of hand-set granite stone for the exterior facade and triple-glazed insulated windows to enhance cadet living and study quarters. The ground floor will house cadet storage lockers, battalion administrative facilities, and, a future chiller plant to serve neighboring barracks. The firm incorporated sustainable design features to meet the project's goal of LEED® Silver certification and used Building Information Modeling (BIM) software to create the bid documents and renderings.

Point's United States Corps of Cadets (USCC) and Department of Public Works (DPW) and together developed the Cadet Barracks Upgrade Program (CBUP). It was the IMCOM HQ team's assessment that the Cadet Barracks are in need of significant revitalization and modernization to meet the Army standard for Unaccompanied Personnel Housing and improve the overall living conditions of the Cadet Barracks. The barracks reflect significant deterioration of major building components and infrastructure that are 40 plus years old and have well surpassed their life expectancies. The CBUP will focus on life, health and safety requirements to improve the living conditions.

DAVIS BARRACKS MODERNIZATION

The Davis Barracks Modernization project is part of the Cadet Barracks Upgrade Program, which aims to improve all existing barracks facilities at West Point. The Secretary and CSA have approved a \$628.6 million CBUP. The CBUP is a 9-year OMA funded Restoration and Modernization plan to renovate / modernize the existing cadet barracks at the United States Military Academy. The program includes a robust synchronized relocation plan for moving Cadets during the renovation / modernization to eliminate the need for relocatables; reconfiguration of formation areas to allow for construction staging; and detailed coordination with other adjacent construction to include the FY13 MCA Cadet Barracks project.

"This new barracks, combined with the renovation of existing Cadet living spaces, are key to providing the best training, education and quality of life possible for the Army's future leaders," said New York District Commander Col. Paul Owen.

CRAWFORD's independent government estimate prepared for the USACE New York District was within 3% of the construction award to contractor Walsh Construction Company, Chicago, IL., for the design and construction of the New Cadet Barracks. The total estimated cost including contingencies and administrative costs is \$183 million.

The new cadet barracks being constructed among the fortress-like buildings of the U.S. Military Academy will be named for Benjamin O. Davis Jr. — a rare privilege previously granted to graduates with names like MacArthur and Eisenhower. Benjamin O. Davis Jr. entered West Point in 1932 as its only black cadet. Davis, who died in 2002 at age 89, has a history-soaked resume that includes commanding the all-black 332nd Fighter Group, known as the Red Tails, and becoming the first black general of the Air Force, which he joined in 1947. He retired as a three-star general in 1970 and was awarded a fourth star in 1998 by President Bill Clinton.

During construction CRAWFORD was tasked to perform

construction schedule analysis during Contract Administration services for the USMA Davis Barracks project. The look of the new structure will fit in well with the rest of the 200-year-old campus, will be energy efficient, and will save taxpayers approximately \$44,000 annually.

CRAWFORD'S SUPPORT TO USMA

Since 2008 CRAWFORD has worked at USMA with New York District on projects totaling \$460,000,000.

"The entire central campus is a national landmark and home to a number of historic sites, buildings, and monuments," said Mary Crawford, AVS, CPE, CCP, CCM, President of CRAWFORD. "The majority of the campus's buildings are constructed from gray and black granite which truly adds to the beauty of the campus."

West Point draws the attention of the large regional and national contractors due to its prestige and types of projects; yet the trade contractors tend to be local to Orange County and related counties; not showing a particular allegiance to any of these contractors.

"Our institutional knowledge of the northeast construction

industry means that as well as reporting market research findings, we are able to interpret these effectively and make sound construction recommendations to West Point," stated Crawford.

When the construction economics of a project are fully understood it provides clients less risk associated with funding future programs. Securing adequate and proper funding to meet agency operations is vital to the Corps mission. CRAWFORD has a proven track record with NYD understanding the unique construction practices to ensure appropriated funds are used on time in the specified period of availability, for the purpose established by Congress.

Of the \$460,000,000 CRAWFORD has estimated at USMA the aggregate delta totals less than 2% from construction award (1.36%).

About the author...

Crawford Consulting Services, Inc., a woman-owned small business located in Pittsburgh, PA has been providing pre-construction and construction phase services to the United States Military Academy campus at West Point, NY on complex projects, delivering innovative, unbiased, and responsive solutions since 2008.

"West Point draws the attention of the large regional and national contractors due to its prestige and types of projects"



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PUSHING THE SUSTAINABLE DESIGN ENVELOPE ON MILITARY HOUSING

A Case Study of the 13th CAB Barracks Complex at Fort Carson

View of the entire Ft. Carson campus

From day one, the Mortenson/HDR design-build team for the \$99.6 million Housing campus at Ft. Carson, Colorado has worked to achieve two key objectives – maximize building energy efficiency with a goal to adapt to net zero energy use, and create a lively and livable military residential community for the 13th Combat Aviation Brigade soldiers—a place to call home.

CAMPUS MASTER PLAN AND BUILDING CONFIGURATION

In order to accomplish these two overarching objectives, the design-build team understood that the first step is to break down this massive 370,156 gross square-foot, 1,000-soldier barracks program into a number of residential, community-setting complexes with required amenities being thoughtfully integrated into the overall campus master plan; then position each building with the best possible orientation to harvest free energy from Mother Nature. The team studied various building configurations, building orientations and site layouts, comparing pros and cons of each design and finally settled on a master plan comprised of three similar residential complexes. Each complex consists of a pair of four-story north-and south-facing barracks wings arranged in an offset H-shaped configuration and connected by a one-story link at the ground level. This design offers many benefits which other building configurations and orientations might not have been able to achieve:

All living units are north-south facing with a 15-degree tilt towards the northeast—the ideal orientation from a passive solar design perspective. The energy models predict that by orientating the building towards north-south, it can harvest solar energy 25 percent more than an east-west facing building. This is an absolutely must-have approach to maximize building energy efficiency.

The offset H-shaped housing configuration offers three distinct

spatial arrangements to form a livable residential community. One is a formal landscaped entrance courtyard in the pedestrian drop-off area, formed by the front of the offset H-shaped building wings. A circular, brick-paved plaza in the center of the entrance courtyard includes a distinct, abstract graphic depicting a helicopter rotary wing. This graphics feature reminds anyone who enters the building what the 13th Combat Aviation Brigade is all about. A sports courtyard is also formed by the back side of the offset H-shaped wings. With basketball, volleyball courts, picnic pavilions and other amenities, this sports courtyard is the social hub for the soldiers who call one of the three residential complexes home. Two informal landscaped



Bird's Eye View of one Complex – landscaped front entrance plaza and back sports courtyard are connected via a glazed one-story entrance lobby

zones planted with native plants in-between each complex turn the emergency access roads into pleasant jogging trails. These jogging trails are interconnected and form a continuous jogging path.

A highly articulated, glass-enclosed, and vaulted ceiling entrance lobby node is established for each housing complex. This entrance lobby offers soldiers a place to relax and

PUSHING THE SUSTAINABLE DESIGN ENVELOPE ON MILITARY HOUSING

interact with others without any impact on any living units. In the front and rear lobby full-height glass walls offer a visual connection between the front entrance plaza and the sports courtyard, to form a cohesive complex. Soldiers who often congregate in the sports courtyard and the lobby are also able to enjoy the stunning view of the mountains to the west via highly transparent, full-height lobby glass façades.

These different spatial arrangements within the campus encourage soldiers' social interaction and provide a variety of



Building south facade with hot water solar panels atop the mechanical room

spaces for small or large social gathering and activities. The building's exterior projects a traditional residential character and uses materials like brick scaled to human proportions. The colors chosen are similar to the warm tones one would expect to see in any high-quality residential neighborhood in America. Various spaces encouraging social interaction coupled with main-street residential aesthetics make this campus truly a lively and livable military residential community.

SUSTAINABLE FEATURES AND TECHNIQUES

The team for the 13th CAB campus is taking a holistic approach to sustainability. To that end, the team has committed itself to achieve LEED® Gold campus certification from the U.S. Green Building Council (USGBC)—not simply certification for one building or one complex.

The team thoroughly studied every single possible sustainable feature available to residential building types and implemented those with a reasonable financial payback. Some of these sustainable features are cutting-edge and energy saving techniques, and will surely become the sustainable showcase for the Ft. Carson installation.

MATERIAL SELECTIONS

It all starts with building material selections. The R-19 + R-30ci

exterior walls consist of insulated structural precast bearing walls clad with thin brick veneer inserts. These insulated precast panels are from a local manufacture meeting PCI quality standards and include recycled content to provide a durable, secure, and sustainable exterior—all in one system. Besides offering very high R value, another key reason to choose precast insulated bearing wall panels is the speed of construction. All four-story exterior wall panels of one complex were erected in a matter of weeks; concrete floors were poured and windows were installed to provide a weather-protective interior work environment to ensure that interior construction could begin.

To mitigate Colorado's harsh summer heat gain, all exterior windows on the south façades have three-foot deep, L-shaped aluminum sunshades. Together with a high-quality Class A, R50 standing seam metal roof and high performance windows, these exterior enclosure materials provide the benefit of a durable and high energy performance envelope suitable for the region and the facility.

Due to the repetitive nature of each living unit bathroom layout, the team explored many design and construction options to provide better quality products, as well as expedite the construction. In the end, the team selected the pre-manufactured "bathroom pod" approach. The 498-living unit bathroom pots were pre-assembled and finished in a climate-controlled factory, while other trades are working on the barracks floors. The bathrooms pods were then transported to the construction site and installed in the opening on the floor slabs. The result is higher quality finish in all bathrooms and faster construction.

BUILDING MEP SYSTEMS

In order to minimize energy consumption and maximize human comfort in the barracks, the design-build team utilizes a unique HVAC design: a radiant floor heating and cooling system. This system is the most energy efficient for a residential building type and the energy savings is in the range of 30 percent compared to conventional systems. Closed looped pipes with chilled or hot water circulating inside are embedded into the concrete slabs to heat the slab during the winter and cool the slab during the summer. Much of the energy savings is also attributed to the lower amount of energy required to pump water, as opposed to distributing air with fans. The system also has lower overall lifecycle costs compared to conventional systems. The team found that a floor-radiant system alone is extremely effective for heating however; to be effective for cooling, it has to be supplemented with an additional cooling

PUSHING THE SUSTAINABLE DESIGN ENVELOPE ON MILITARY HOUSING

source from the ceiling since the cool air flow downwards from the ceiling to the floor. For this reason a chilled beam system is designed within the overall HVAC system and incorporated into the gypsum wall board ceiling to deliver additional cooling.



Entry plaza to one of the three complexes

Another practical issue facing the design-build team which could have a profound negative impact on the energy savings is the issue of how to handle operable windows in all living units. For residential buildings, it is logical to have windows that are operable. However, the traditional HVAC system design assumes that all windows are sealed. If windows were opened, all conditioned air would escape outside; therefore it will waste energy by opening windows. Traditionally designers, contractors and facility owners have rarely considered the energy loss in this case, even thought it might be substantial. The design-build team is committed to deliver a high-energy-performance facility in a real world, and address this dilemma head-on and determine ways to solve it. The solution is to wire an automatic control sensor to each operable window of each living unit. So when a window is opened, the automatic control sensor shuts down the HVAC system in that room until the window is closed again. This approach has true sustainable value since about six months out of each year, the weather in Colorado Springs, Colorado, is mild enough so air conditioning is not necessary and the windows can be opened.

A CONSOLIDATED ENERGY PLANT AND RENEWAL ENERGY

Another item worth mentioning in the team's approach to sustainability is to provide a consolidated energy plant for the chillers and boilers that support the entire 13th CAB campus. A sustainable, consolidated energy plant not only maximizes

the energy efficiency for the entire campus, but also simplifies future maintenance and operational cost and therefore lowers the overall lifecycle cost of the systems.

Once the design-build team implemented all possible sustainable design strategies and cut the energy usage for the campus to the lowest possible point, while maintaining human conform, the next thing the team looked at is renewal energy. Solar hot water panels are designed and installed directly on the roof of each mechanical room to provide 30 percent domestic hot water consumption. Placement of additional solar hot water panels was studied in an effort to incorporate them seamlessly into the overall architectural design of the entrance plaza. Options include: #1. Solar panels and their support structure as an entrance plaza sculpture and shelter cover. #2. A shade structure for parking. #3. A covered walkway between the mechanical room and the main entrance. After detailed sun angle studies, the first two options were eliminated since the four-story south-facing barracks wing prevents direct sunlight on these solar panels for a good portion of the morning. Option #3 was selected. Solar hot water panels were designed and shade structures were incorporated into three vehicle parking lots adjacent to the mechanical rooms. Together these hot water panels will provide 30 percent of overall domestic hot water consumption for nearly 1000 soldiers.

The design-build team also incorporated solar PV arrays to offset 24.8 percent of the annual energy consumption of a baseline building. These PV arrays were originally designed and placed adjacent to each of the barracks complexes. However after discussion with Ft. Carson, there were maintenance and safety concerns, and issues with sunlight reflecting out of these PV panels directly into some living units. The PV panels were relocated to Ft. Carson PV farm which is not far from the site and directly connected to the electrical grid.

The 13th CAB campus is truly a sustainable showcase for the residential building type and pushes the envelope of sustainable design and construction.

About the author...

Junjian (J.J.) Tang, AIA, LEED AP is the lead architect on this project and a principal with HDR's federal programs. He is the recipient of 2016 Society of American Military Engineers (SAME) President's Medal, 2011 SAME national Urbahn Medal awarded to one SAME architect annually, the founder and chair of SAME national architectural Practice Committee.

Advanced Technology Helps Wounded, Injured and Ill Veterans Live More Fulfilling Lives

By Rory A. Cooper, PhD

Since the implementation of the “all volunteer force” there has been a growing divide between the general American population and those people serving in or who have served in the armed forces. Less than one percent of Americans are currently serving in the armed-services; and less than six percent of living Americans are veterans of the armed-services. While polls show that support for service-members is strong; there is a lack of understanding for the risks that service-members and their family members face.

Service in the United States Armed Forces is by definition a dangerous occupation. There is no more powerful illustration of the risks than the veterans who have returned home wounded, injured or ill. Since September 11, 2001, there have been nearly 2,000 service-members who have required major limb-amputations, and another approximately 1,500 have sustained spinal cord injuries. These numbers pale in comparison to the number of diagnosed and undiagnosed cases of traumatic brain injury. Military veterans are also more likely to be diagnosed with multiple sclerosis and amyotrophic lateral sclerosis.

It may be surprising to some, but engineering has and continues to play a critical role in the care, treatment, and successful re-integration of wounded, injured, and ill veterans. Pittsburgh has been at the forefront of engineering research, development and implementation for over 20 years. The Human Engineering Research Laboratories (HERL) is a joint effort of the U.S. Department of Veterans Affairs (VA), the University of Pittsburgh, and the UPMC Health System focused on creating, assessing, and deploying technologies to improve the mobility, function,

health, and quality of life of veterans with disabilities. HERL is a VA national center for rehabilitation research and development.

HERL has been and is a driving force for improving the mobility, function, and inclusion of people with severe disabilities (PwD), especially veterans, through advancing technology, and leading the effort for inclusive engineering/technology education. HERL’s innovations have received recognition from such prominent media outlets as TIME [1], and CNN [2]. Furthermore, HERL was featured at the Smithsonian Institute ADA 25th Anniversary

Celebration for its contributions to assistive technology (AT).

HERL’s Founding Director, Rory Cooper, has been recognized as one the world’s ten most influential people in history to have impacted lives of people with spinal cord injuries [3].

“Engineering has and continues to play a critical role in the care, treatment, and successful re-integration of wounded, injured, and ill veterans”

HERL that has trained over a thousand students (middle-school, high school, undergraduate, graduate, and post-doc) from across the USA and around the world; a large number people with disabilities. Many of whom have gone on to train others or to create important technologies and innovations. The people that HERL has trained have graduated to work for such companies as Amazon, Phillips, Permobil, Pride, Invacare, and NuMotion; they have created a wide range of technologies ranging from improved deep-brain stimulation, CPAP devices, and even technologies for digital music files. Others are innovators in government in such federal agencies as NASA, DoD, VA, and HHS; as well as at academic institutions such as Ohio State, Uniform Services University of Health Sciences, University of Connecticut, and Osaka Kawasaki Rehabilitation University. HERL has established a culture of innovation

and entrepreneurship leading to companies created by former students such as Advanced Biomechanics, ARTSCO, AT Sciences, ErgoJoystick, MaxMobility, Navity, Pathway Access Solutions, and Seating & Mobility India. HERL is the leading innovation organization for rehabilitation engineering in the USA, and is based in social entrepreneurship.

Wheelchair design & engineering innovations have and continue to transform the lives of people with disabilities (PwD). According to the World Health Organization (WHO) circa 100 million people are in need of a wheelchair. HERL's innovations have been the impetus for changing a wheelchair from being confining to being a liberating customized and expressive extensions of the user. These innovations are products of HERL's continuous refinement of participatory action engineering principles, which provide scientifically grounded blueprints for advancing wheelchair engineering, design, and development. HERL's innovations have been central to the transformation of wheelchairs that have affected the lives of PwD dramatically by increasing their mobility, function, and opportunities for full participation/employment, while reducing the incidence of injuries. Design-Inspired Innovation offered these words of praise for HERL's Director: "Cooper has dedicated his life and professional work to better wheelchair design. His ideal is that the wheelchair must be thought of as an extension of self and a means of self-expression" [4]. Utterback et al. further lauded Cooper's fundamental contributions in transforming the wheelchair to a design that integrates, rather than segregates, people. They concluded that Dr. Cooper's leadership in innovation is "broadening human possibilities through (his) designs, which speak a language of mobility."

Cooper's life changed forever when a truck struck him; resulting in life-threatening injuries, the worst of which was a spinal cord injury (SCI). Being an avid runner helped to save his life. His first wheelchair was a chrome behemoth weighing over 80 pounds that was nearly impossible to propel or load into a car with his hospital discharge weight at about 110 pounds (down from 165 when he was a Soldier just a few months earlier). This chair lasted only 6 weeks, as Cooper pushed himself over one mile daily to regain his strength and prepare to enter college. Cooper vowed to attain an engineering degree, to devote his career to optimizing assistive technology (AT), and to dedicate his life to serving other veterans with disabilities. He would eventually come to serve in many leadership roles, including President of the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA), a member of the WHO GATE Committee to improve global access to AT, and member of the Institute of Medicine Committee on the

Selected Assistive Devices in Eliminating or Reducing the Effects of Impairments.

HERL's work has contributed to providing increased mobility to veterans using manual wheelchairs. Not long ago, manual wheelchairs were made of mild steel and weighed in excess of 70 pounds. They had changed little since Harry Everest and Herbert Jennings had created the first steel cross-brace folding wheelchair in 1932. Motion Designs created the first commercially viable QUICKIE ultralight wheelchairs. Although these "sports chairs" were deemed "not medically necessary" for wheelchair users, they provided a platform for developments that would both improve sports performance and meet the broader daily needs of PwD. HERL led much of the research to secure coverage of ultralight wheelchairs for veterans by the VA, which later led to coverage by Medicare for the broader population of PwD.



Harry Everest & Herbert Jennings-designed steel cross-brace folding wheelchair

By the end of the 1980s, racing wheelchairs were completely transformed, allowing athletes to achieve times faster than Olympic runners at many distances – something beyond imagination a few years earlier. HERL's landmark contributions to racing wheelchairs include: use of composites, arm guards, road-crown compensation, and practical three-wheelers. During this period of rapid innovation, HERL, like most other organizations and individuals, did not apply for patents, but preferred to share innovations freely to advance the sport and the disability rights movement. The "ultralight" wheelchairs now used by millions of PwD have their roots in these sports innovations. HERL advocates for the needs of PwD, especially veterans, for example by espousing the benefits of adaptive sports technology through outlets such as NBC [5], ESPN [6], and USO's "On Patrol" [7].

HERL's inventions have contributed to establishing injury prevention as a goal in wheelchair design. Approximately

80% of manual wheelchair users develop a repetitive strain injury (RSI). Unfortunately, the available medical treatments are not very effective for wheelchair users, who need to regularly generate highly repetitive (about one push per second), large forces (peak forces often exceed 60N per stroke) to propel a manual wheelchair. HERL investigators recognized that applying ergonomic principles to wheelchair engineering could prevent many of these injuries. Based upon experience with wheelchair racing, HERL noted that racers often practiced over 100 miles/week, but did not have higher incidences of RSI than wheelchair users who did not race and who traveled only a fraction of the distance. HERL was the first to recognize that the interaction between the structure of a wheelchair and the user's propulsion technique had synergistic influences on risk of injury. This insight launched a new research direction that has transformed wheelchair prescription, fitting and training around the world, by integrating the user into wheelchair design.

In order to collect the data necessary to improve wheelchair biomechanics, HERL invented the SmartWheel, now available from Three Rivers Holdings, LLC (TRH). The SmartWheel is the most widely used research/clinical tool for wheelchair biomechanics/ergonomics. HERL collaborated with Yamaha to investigate pushrim activated power assist wheelchairs (PAPAW). PAPAW use a control system and small electric motors to reduce the forces applied to the pushrim and strain on the user's arms by augmenting actions of the user's muscles. HERL facilitated the introduction of the PAPAW to the US through Sunrise Medical Corporation. Sold as the QUICKIE Xtender, this improvement facilitated the broad introduction of design advances from specialty 'sports chairs' into wheelchairs for a larger group of PwD. Nearly a decade later, one of



Smart Wheel

“The world’s most sophisticated robots don’t assemble trucks or cruise around Mars. They’re designed to support our surging population of elderly and disabled citizens.”

HERL's former graduate students, M. Richter, extended this approach as the SmartDrive wheelchair propulsion augmentation device through his company, MaxMobility. HERL invented improved ergonomic pushrim

designs with the NaturalFit and Surge from TRH and distributed globally by major wheelchair companies. HERL's inventions and research contributions were fundamental drivers of the 2006 Consortium for SCI Medicine clinical practice guidelines for “Preservation of Upper Limb Function Following SCI”.

HERL has also focused its efforts on improving technologies and lowering costs for the over one million PwD in America who use or could use a powered mobility device (PMD). HERL studies on the driving patterns and usage of seating functions among PMD users provided the foundation for advances that include the introduction of new power technologies, interfaces and algorithms.

HERL has also introduced improved control systems, tools for screening for barriers to PMD independent driving and advances in robotics technology applied to mobility and manipulation challenges. For decades, PMD users have complained about the problems associated with batteries, especially lead-acid batteries. HERL in collaboration with the Fraunhofer Institut in Stuttgart, Germany began to explore use of compressed air as a power source for PMD. They recently completed a promising working prototype, which has the potential to greatly improve reliability, lower life-cycle cost, and possibly provide a practical powered mobility device for less-resourced countries and as an ADA accommodation in water-parks and at beaches where batteries are unsuitable.

The advanced technology R&D of HERL have produced the Virtual Seating Coach (VSC) from Permobil, Inc., Portable Assist Robotic Arm (PARA) or Strong-Arm from RE2, Inc., Personal Mobility and Manipulation Appliance (PerMMA), Hybrid Power Operated Vehicle (HyPoV), Mobility Enhancement Robotic Wheelchair (MeBot), and

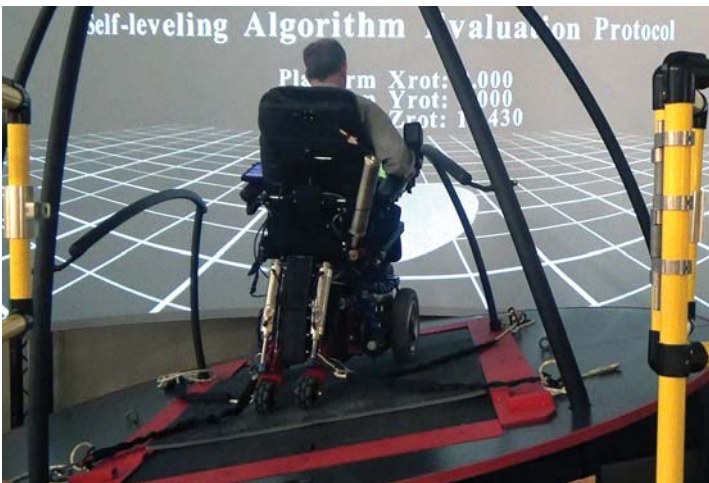


Portable Assist Robotic Arm (PARA) or Strong-Arm from RE2, Inc.



Personal Mobility and Manipulation Appliance

PneuChair with Fraunhofer. The PerMMA was the first robotic mobility device with bi-manual manipulators allowing PwD to operate effectively in real-world environments. PerMMA was highlighted in Popular Science [8]. Popular Science reported, "The world's most sophisticated robots don't assemble trucks or cruise around Mars. They're designed to support our surging population of elderly and disabled citizens."



The MeBot

The MeBot has the ability to climb 8-inch high curbs, to actively self-level the seat when driving over uneven terrain, and provide other features to greatly expand indoor and outdoor mobility. The HyPoV is a low-cost, highly mobile PMD, which is now available as a low-cost device in India. The VSC uses context awareness to create intelligent reminders to address the clinical and safety issues of PwD not following clinical guidance when using their seating functions. The VSC significantly increases compliance, resulting in the potential for dramatic reductions in the incidence of pressure ulcers (cost per incidence

can exceed \$30k to treat), pain, and lymphedema among PMD users, improving quality of life and potentially saving millions annually in healthcare costs. For PwD who need human and/or mechanical assistance with transfers to and from their wheelchair, the options are limited. During dependent transfers with a human assistant, there is a high risk of injury to both the PwD and assistant. The PARA provides a practical mobile robotic transfer-device.

HERL has collaborated with such luminaries as Dean Kamen as consultant on the iBot 3000, and Michael Graves on the Wounded Warrior Home Project. HERL has been a driving force to transform AT, rehabilitation and engineering education, adaptive sports and the lives of millions of PwD, especially veterans, and their families who have been enriched by HERL's accomplishments, and innovations.

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The Pittsburgh Engineers' Building is your "go-to" spot for your next meeting.



eswp.com/about/facilities

ENGINEERS IN THE MILITARY...

Kevin M. (Mike) Croud served in the Air Force for ten years from 1985 to 1995, and separated as a Staff Sergeant (E-5). "I had just been selected for promotion to Technical Sergeant (E-6) prior to separating, but I never 'sewed it on' because I was separating." Croud chose to separate under a Reduction in Force Program in order to receive GI Bill benefits and a fairly sizable separation bonus.

Initially, Croud was prompted to enter the military "to mature and learn individual responsibility and to gain hands-on technical experience." From there, he gained interest in pursuing an engineering degree during his military service, where he used very high tech electronic testing equipment including signal generators, spectrum analyzers, high voltage test probes, oscilloscopes, frequency counters, and others. "I was an Air Traffic Control Radar Maintenance Technician during my 10 years in the Air Force. I learned quite a bit about electronics theory and how to troubleshoot electrical problems during my Air Force career. This piqued my interest in electrical engineering, so I set my goal on earning an electrical engineering degree." Croud received a Bachelor of Science in Electrical Engineering in 1998 from the University

of Pittsburgh., and is currently a Senior Electrical Engineer III with RPA Engineering.

For those high school students considering pursuing an engineering career within the military, Croud advises to "discuss your ambitions with your military recruiter in order to try and get in a specialty that will promote your engineering goals. Also, try to get an assignment close to a college that has the program you are interested in. The Educational Leave of Absence program (previously called Bootstrap) is also a very good way to complete college courses while on active duty. This program will extend your enlistment obligation, but it may be a good choice for some individuals."

I found that the college courses that I needed to take were not readily available to fit my work schedule. This fact contributed to my decision to separate so that I could attend the school of my choice full time.



Kevin M. (Mike) Croud

ENGINEERS IN THE MILITARY...

Richard Waters is a former U.S. Marine with two years of honorable service. "Ricky" graduated from the U.S. Naval Academy with a B.S. in Ocean Engineering and is currently the Manager of Civil Design at RPA Engineering. Ricky was prompted to enter the military as he "felt a calling to serve my country. I was a senior in high school when the events of 9/11 happened, this reinforced my calling and desire to serve in the military." Ricky stated that engineering was tied to his military journey and career from the beginning. "I always wanted to build things which led me to pursue a degree in ocean engineering, the closest field of study to civil engineering, which is my current profession." Waters attended college full time, then commissioned as an officer in the U.S. Marine Corps upon graduation. He comes from a family with a tradition of military service. His grandfather served in the Army during the Korean War as part of the Corps of Engineers, and his father had a distinguished career in the US Navy as a lawyer in the JAG Corps (the Navy's legal team). Waters states "these two examples definitely played a huge role in my call to service."

Was your college education narrowly focused on engineering skills (math/science) or were you required to fulfill a broad distribution of studies courses (additional arts/humanities)?

My engineering degree was heavily focused on technical

aspects of engineering. That being said, another important part of that education was exposure to the humanities via elective course offerings, as well as developing leadership skills in the classroom and through peer leadership opportunities.

Waters would encourage others, including his own family, to consider joining the military and becoming an engineer. "I can't think of a better way to pursue an engineering career. The experience obtained while serving in the military is truly spectacular. There's a lot of exposure to different world cultures which fosters an appreciation for our country's engineering abilities and a new perspective on how to approach engineering related problems. The military is very focused on acquiring skill sets and has some of the best teachers to learn from. Another huge benefit is the ability to get help to pay for college and other vocational schools if the service member should so choose those paths. I believe the military is a great chance for people to experience true service to others, which translates wonderfully to an engineering career where we serve the greater good of our country and its citizens."



Richard Waters

ESWP Member News

More than 75 firms are represented in the Corporate Member program of the Engineers' Society of Western Pennsylvania (ESWP). Memberships are available at 3 levels: Gold, Silver and Bronze. Gold members are entitled to 14 memberships that can be exchanged by employees; Silver, 9; and Bronze, 5 — annual dues are \$2400, \$1700, and \$1000 respectively. In addition, ESWP Corporate Member Firms may add 2 additional individuals in our Under-35 age category at no additional cost. More information can be found at eswp.com. Please contact the ESWP Office (412-261-0710) for additional details.

NEW! For Government Employees (full-time), Individual Membership Rates are now \$50.00!

Membership in ESWP comes with a long list of benefits! From our continuing education opportunities earning you Professional Development Hours (PDHs), to the business networking events in our fine dining city club, there is something for everyone in your organization. Also, ESWP is helping the next generation of engineers with student outreach programs, giving you the opportunity to participate in many rewarding programs.

ESWP Gold Corporate Member Firms



ESWP Silver Corporate Member Firms



THIS YEAR, AT ESWP

Our Mission

Advance the engineering profession and position Western Pennsylvania as a Center for Engineering Excellence and Innovation

Objectives

Seek and prepare the next-generation of engineers

Offer professional development and networking opportunities

Collaborate on engineering matters of regional and civic importance

Highlight achievements from a diverse spectrum of engineering and related fields

Strategic Initiatives

PROMOTE ESWP AND POSITION THE SOCIETY FOR SUCCESS

- Raise awareness and grow membership
- Increase use of the Engineers' Club
- Develop and distribute exceptional publications

PROVIDE WORLD-CLASS PROFESSIONAL DEVELOPMENT

- Deploy exceptional conferences
- Offer educational and networking events; highlighting innovative technologies and industry best practices
- Provide professional outreach and services to affiliated technical societies

DEVELOP AND SUPPORT FUTURE ENGINEERS

- Mobilize and activate our young members
- Collaborate with local universities
- Promote and participate in STEM (Science, Technology, Engineering, and Mathematics) activities

Belonging to ESWP

Whether you're an individual or a business, an engineer, student or other professional – you'll enjoy a variety of benefits with our affordable annual memberships

Dining at the Engineers' Club

ESWP is located in the stately Pittsburgh Engineers Building, in the heart of downtown Pittsburgh. Our location and award-winning cuisine make it the perfect lunch club for professionals looking for both distinction and affordability.

The perfect facilities – available for your next lunch, banquet or meeting

THE EXECUTIVE DINING ROOM & THE VAULT

- Lunch Served M-F from 11:30AM-1:30PM
- Reservations not required, but appreciated (especially for larger parties)
- Can accommodate banquets & meetings: Breakfast, Lunch and Dinner
- Full audio visual capabilities with Wi-Fi enabled
- The vault serves as an intimate dining room for up to 12 guests

THE BOARD ROOM

One of our most popular rooms, the Board Room is traditionally set conference style and can accommodate 20 people comfortably. Natural lighting makes the room comfortable for meetings and conferences, along with the full range of AV services.

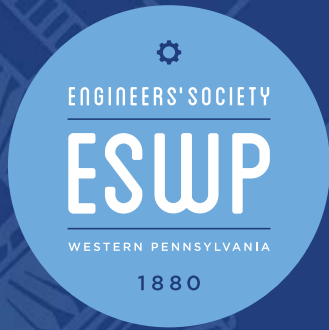
THE MAIN DINING ROOM

The Main Dining Room, our largest room, is located on the second floor of the Pittsburgh Engineers' Building. It can be set with different table configurations for meetings, conferences and social events, along with the full range of AV services. The room can accommodate 25-125 people.

Our Annual Awards Banquet

For more than 130 years, members and friends of the Engineers' Society of Western Pennsylvania have gathered to celebrate engineering, and recognize the best and brightest stars in the profession. Awards presented include:

- The Metcalf Award – Our Lifetime Achievement Award



- Project of the Year Awards – Presented for engineering excellence in categories of Transportation, Technology, Sustainability, & Commercial
- Engineer of the Year

STEM Outreach

ESWP is dedicated to encouraging the “next generation” of engineers, through innovative, enjoyable, and hands-on learning opportunities, and other activities, such as the Members College Scholarship.

Original programs such as our Design Lives Here program, the ACE Mentor Program, and the nationally renowned Future City Competition offer students the opportunity to learn by doing, alongside professional engineers, mentors, and teachers.

Pittsburgh ENGINEER Magazine

ESWP publishes the quarterly Pittsburgh ENGINEER magazine, covering interesting and timely topics on all engineering disciplines.

ESWP Sponsored Conferences

INTERNATIONAL WATER CONFERENCE® (LOGO)

The ESWP-sponsored International Water Conference® is the world’s leading technical conference on industrial water and waste water treatment. For more than 75 years, attendees from around the world have attended this international event.

INTERNATIONAL BRIDGE CONFERENCE® (LOGO)

Since 1983, ESWP’s International Bridge Conference® attracts a world-wide audience for technical presentations, tours, seminars and exhibits. Held in the City of Bridges, the IBC now attracts more than 1,500 attendees annually.

PA BROWNFIELDS CONFERENCE (LOGO)

Since 1995, ESWP has been committed to the cleanup of environmentally impaired industrial sites. Originally titled the ‘Industrial Site Recycling Conference’, this event preceded the term “brownfields”.

Who is part of ESWP?

ENGINEERS

A multi-disciplined community of more than 850 members and more than 400 different firms

NON-ENGINEERS

Associate members from healthcare, finance, law, insurance, government

AFFILIATES

Home to more than 30 different technical & professional organizations, providing administrative support services

Affiliated Technical Societies

In addition to calling ESWP “home”, Affiliated Societies enjoy many other membership benefits as described here. You can learn more about our affiliates by clicking on the link to their website, or contacting the officer currently listed with their respective association.

The following professional organizations are just some of the Affiliated Technical Society members of ESWP.

- ASCE – American Society of Civil Engineers
- PMI – Project Management Institute
- PSPE – PA Society of Professional Engineers
- SAME – Society of American Military Engineers
- SWE – Society of Women Engineers

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THE MILITARY PRESENCE IN WESTERN PENNSYLVANIA

You might be surprised at our Military Capability in the Pittsburgh Region and how important it is to our National Security!

By: The Military Affairs Council of Western, PA Board of Directors



From a strategic standpoint the military entities of Western Pennsylvania are in a uniquely ideal location. While the location is outside the radius of most potential disaster targets, it is within easy reach or quick response to much of the continental United States.

STRATEGIC IMPORTANCE

First, there is the geographic footprint of the region. Pittsburgh's three rivers make it the nation's second busiest inland port, fuel and supplies can travel to the area by way of rivers, the area boasts a system of four mainline interstate highways and the region is served by two class one railroads. The Greater Pittsburgh International Airport is located within a ninety minute flight of over seventy percent of the United States population and it is among the nation's airports least likely to shut down during weather or other emergencies. All of those attributes combine to provide swift, reliable access by land, water and air. In the case of a natural disaster or terrorist attack the Western Pennsylvania community has hospitals and medical facilities standing by to help. The area's hospital system is ranked first in the nation in beds available: 73 hospitals and 3,000 dedicated beds. The military joined forces with the civilian medical community for regular national disaster medical system drills such as one, staged recently at the Air Reserve Base in Moon Twp. In addition, the area contains two paratrooper drop zones; the unique combination

of easy access by land, water and air is unmatched at any other site. As you can imagine, Western Pennsylvania is a geographically ideal location designed by nature and built by man to provide the greatest support possible for the military bases and people who live, work and thrive here.

MILITARY ORGANIZATIONS

The Western Pennsylvania region has a long history of military excellence and an impressive list of military units. The 911th Airlift Wing is an Air Force Reserve base on

the grounds of the Greater Pittsburgh International Airport. Eight, C130 aircraft known as "Hercules" are assigned here. The 911th ranks in the top two air force reserve C130 units in total hours flown since 2010 and averages 800 parachute

air drops of supplies every year. The maintenance team at the 911th is known for its aircraft inspection process which reduces downtime in the hangar, allowing the C130s to be grounded for shorter periods, saving millions of dollars a year. Adjacent to the 911th is the 171st Air Refueling Wing of the Pennsylvania Air National Guard, with its 16- KC135s known

"The Military presence of Western Pennsylvania is a shining example of how a commitment to excellence innovation and civilian partnerships can combine to improve life in the greater community"

as Strato Tankers. The 171st team primarily provides in flight refueling but is also capable of cargo transport and medevac. Also stationed on the grounds of the 911th is the Navy Operational Support Center (NOSC) which opened in 2014 and is the headquarters for Navy reservists in the greater Pittsburgh area. The new facility



C130 from 911th AW at Pittsburgh International Airport

supports the training, readiness and medical needs of more than 300 Naval Reserve citizen sailors. The NOSC and the entire military complex here are in an excellent position to be formed into a joint reserve base with numerous shared facilities and services. This joint concept could tap the many military and civilian capabilities of the region, to position the area as a hub for many operations including homeland security and disaster response. The 316th Expeditionary Sustainment Command of the Army Reserve is located nearly adjacent, also on airport property. Its citizen soldiers provide support to active duty Army forces in any and all missions as well as support in domestic emergencies. The proximity of the 316th to the other military bases provides cost saving opportunities such as shared facilities and programs. Pittsburgh's three rivers have full Coast Guard support with a Coast Guard Marine Safety Unit with active duty and reserve personnel. The Marine Safety Unit works to keep the rivers safe and responds to spills and other emergencies. The Marine Reserve and Army National Guard in the area offer further dimensions to the military capabilities available in Western Pennsylvania. Western Pennsylvania is known for its vibrant and successful military recruiting, for example both the 911th and 171st have enjoyed an assigned strength of at least 100% for the past decade welcoming new generations of recruits to take their place in public/private partnership unique to Western Pennsylvania which is developed into a team second to none.

MILITARY UNITS & INSTALLATIONS IN WESTERN PA

- Air Force Reserve-911th Airlift Wing
- Air Force Recruiting Command
- Air Force ROTC
- Air National Guard-171st Air Refueling Wing
- Army Reserve-316th Sustainment Command
- Army Recruiting Command
- Army ROTC
- Navy Operations Support Center

- Navy Recruiting Command
- Navy ROTC at Carnegie Mellon University
- Navy Element Bettis Laboratories
- Army National Guard, 2nd Brigade Combat Team, 28 Infantry Division
- Army National Guard 128th Brigade Support Battalion
- Marine Corps Reserve, S. Western PA
- Marine Recruiting Command
- Coast Guard Marine Safety Unit
- USCG Cutter Osage
- US Army Corps of Engineers
- Pittsburgh Veterans Medical Center

ECONOMIC IMPACTS

The military bases of Western Pennsylvania are strong reliable economic drivers for the region. It is estimated that the 911th Airlift Wing generates more than \$110 million dollars for the area economy each year through a combination of its own payroll and expenses as well as through indirect jobs and thru businesses in the surrounding communities. The 911th has a payroll of more than \$53 million dollars for its 1200 air force reservist and 500 civilian workers all of whom live and spend money in the Western Pennsylvania region. In addition, the base generates more than 600 civilian jobs throughout the surrounding community. This includes employment at restaurants, stores, hotels, the universities, the airport, the service industry and with government agencies. The 911th is a vital and integral part of the economic health and success of the region. The 171st Air Refueling Wing of the Air National Guard brings to the community, an estimated \$197 million dollars a year, more than half of that is hard cash in salaries and contracts. The 171st generates as many as 644 jobs in the surrounding communities. As you can see the 911th and 171st are not isolated military islands cut off from the communities that cradle them, they are vibrant partners whose missions and personnel bring much needed business and money to the region and residents around them.

OVERALL EXCELLENCE

The Military presence of Western Pennsylvania is a shining example of how a commitment to excellence innovation and civilian partnerships can combine to improve life in the greater community. Executing both military and civil works support to the Upper Ohio Valley, the U.S. Army Corps of Engineers Pittsburgh District which employees more than 500 military and civilian personnel has an over \$200 million dollar annual impact to our regional economy. In June of 2014 brought the opening of the Navy operational support center, a twelve million dollar building located on the grounds of the 911th AW, where the military share numerous facilities. The Navy Reserves will use the building for training, readiness and medical support of it citizen sailors. The building has

received a leadership in energy and environmental design certification. It is a green building with a modest environmental foot print. The NOSC will serve about 300 navy reservists and is another step toward making the Moon Twp. site home

to the joint readiness center, a key component in an emergency response to natural disasters or terrorist attacks, fully utilizing Western Pennsylvania's civilian and military expertise and capabilities for serving this country in time of need. A joint readiness center would position

western Pennsylvania's reserve forces and medical community, as an east coast hub for homeland security and emergency response. The airport area location enjoys an unmatched synergy among the military entities that share the space, besides the 911th Airlift Wing and the Navy NOSC this includes the 171st Air Refueling Wing of the Air National Guard. The 316th Expeditionary Sustainment Command of the Army Reserves and the Pennsylvania Army National Guard the future inclusion of a Marine Reserve training center is in the planning stages. In addition, 911th hosts the Civil Air Patrol, and the Army Recruiting Command. The reservists and national guardsman go beyond their stated military goals to be of service to the greater Western Pennsylvania community. The 171st helps local police departments in canine training and supports local volunteer fire fighters in their training. And there is the 911th firing range, which is used by various military, government and civilian agencies for firearms training. A new commissary and exchange at the 316th, serves veterans and military families, giving them convenient local access to products and services. Its part of the family services program at the 316th which reaches out to families with a wide array of support. All serve in the spirit of the public/private partnerships that are part of the fabric of Western Pennsylvania.

AIRPORT CONNECTION – COOPERATION WITH GREATER PITTSBURGH AIRPORT

The greater Pittsburgh International Airport offers the military and its bases in western Pennsylvania a unique and unparalleled strategic and economic advantage. 911th airlift wing of the Air Force Reserve and 171st refueling wing of the Pennsylvania Air National Guard have use of all aspects and services at the airport including four very long runways, three parallel and one crosswinds. A typical military active duty

base have only one or two runways If the airfield and its runways need maintenance or repair or if snow and ice must be cleared the airport crews handle that with no additional costs to the military. Other benefits of the cooperation between the

airport and the military include control tower operations, fire department, emergency medical response and customs and border protection. All of these services are made available to the 911th airlift wing for only \$20,000.00 a year and not much more to the air national guard.



171st AW KC-135 Refueling Mission

The greater Pittsburgh International airport is able to accommodate any military or civilian aircraft no matter the size. Military and civilian flights can co exist here without significant impact on civilian air traffic even during major surge operations and the airport is open 24/7 every day of the year. It is estimated that because the military shares this airport and its many services, taxpayers save more than ten million dollars a year. It is a partnership that works, one that is mutually beneficial and financially sound for western Pennsylvania and the nation.

CIVILIAN/MILITARY PARTNERS

Western Pennsylvania and its military are partners in the truest sense of the word. Larger community depends upon the personnel and facilities of the military for all of the obvious secu-

urity reasons but also for the economic benefits the military brings to western Pennsylvania and in return the civilian communities contribute the skills and dedication of their residents to support the military mission both indirectly and in direct participation. An example of this partnerships; is the Honorary Commanders Association, a program developed by the military and the Airport Area Chamber of Commerce to help foster understanding between the two entities. The program has built a bridge between the military and civilian communities



Color Guard of the 316th Expeditionary Sustainment Command

strengthening the partnership so vital to the region, a region known for its support military especially reservists and national guardsman. In 2014, two area businesses were winners of the freedom award the department of defenses highest honor bestowed upon an employer for exceptional support of their guard and reserve employees. Military recruiting and retention in the area is robust among the best in the nation and there is a vast veteran population actively engaged in the

community. According to the 2013 census there are nearly a million veterans living in Pennsylvania with more than 93,000 in Allegheny County and the world class universities in the area have partnered with the military for research, training and development. Research dollars are flowing into institutions of higher learning including the robotics and software engineering institutes at Carnegie Mellon University. The concussions and diabetes programs at the University of Pittsburgh Medical Center and many University ROTC programs. The military entry processing facility in downtown Pittsburgh, known as the front door to freedom, serves as the intake point for new recruits and applicants. As you can see, the military and civilian communities are partners committed to each other and to the greater community, sharing their strengths and resources to enhance life for all of western Pennsylvania. Strength in partnership. United in mission.

CIVILIAN PARTNERS:

- Allegheny County Government Officials
- Beaver County Government Officials
- Pennsylvania State elected officials
- Members of United States Senate and House of Representatives
- Pittsburgh International Airport Authority

- Allegheny Conference on Community Development
- Pittsburgh Chamber of Commerce
- Airport Area Chamber of Commerce
- Carnegie Mellon University
- CMU Software Engineering Institute
- University of Pittsburgh
- Robert Morris University
- National Disaster Medical System
- University of Pittsburgh Medical System
- Veterans Administration
- Military Entry Processing System
- RAND Corporation

The purpose of the Military Affairs Council of Western Pennsylvania is to promote, participate and support the programs and presence of the military installations in Western Pennsylvania. Directors include: Chales Holsworth (Chairman), Gene Pash (1st Vice Chair), Polly Bozdech-Veater (Secretary), Ron Poropatich (Treasurer), George Huber (Past Chair), Lowery Bailey, Mike Crall, Jackie Erickson, Marcel Minutolo, Patrick Litzinger, William Pentecost, Dennis Rudd, H. Rochelle Stachel, Jack Wagner.





CALL FOR PRESENTATIONS

2016 ESWP Engineering Continuing Education Conference
September 7, 2016
Engineer's Society of Western Pennsylvania

ESWP is planning our inaugural Continuing Education Conference for September 7, 2016. The day-long conference will aim to provide timely and interesting technical sessions suitable for professional development hours (PDH's) for our members and affiliated groups. ESWP is an accredited professional development provider in Florida and New York.

Presentation topics in the following areas are invited:

- Ethics and Legal Issues for Engineers
- Transportation-related Design, Construction, and Maintenance
- Industrial Facility Construction, Commissioning, and Maintenance
- Water Resources (Treatment, Stormwater Management, Supply)
- Sustainability and Energy Management

Presentations should have a technical emphasis and not be product or service related. Presentation abstracts (100 words maximum) will be accepted through May 27, 2016 and should be submitted on-line at <https://eswp.com/about/engineering-continuing-ed-conference/>



Planning for the U.S. Army's Real-Property Assets in an Evolving Environment

By: David Schaarsmith, AICP, LEED AP BD+C, PMP

The U.S. Army is responsible for managing millions of acres of land and billions of dollars' worth of facilities and other infrastructure on its installations worldwide. According to a 2014 U.S. General Services Administration Federal Real Property Report, the U.S. Army owns more than 70,000 buildings totaling more than 800 million square feet. In addition to the owned facilities, the Army leases an additional 18 million square feet, with a total operating cost of more than \$2.6 billion annually for the combined assets.

Management of the Army facility portfolio in steady-state conditions requires thoughtful and thorough planning to ensure efficient use of these assets and minimize ongoing capital and operating expenses. Shifts in global power in Eastern Europe and the Pacific, as well as a continually changing climate in the Middle East and a reduction of the Army's active-duty force, all have significant impacts on the Army facility portfolio.

By the end of fiscal year 2016, the Army will have reduced its active-duty force from a war-time high of 570,000 to just 475,000 – a reduction of 95,000 soldiers resulting in unused Army infrastructure. Estimates of excess infrastructure in the Army are as high as 18 percent. As the size of the active-duty force decreases, the Army needs to right-size its infrastructure so that it may, instead, spend its limited funding on modernizing the infrastructure it needs.

The Installation Management Command (IMCOM) vision

for 2025 is to “Provide, operate, sustain and revitalize installation infrastructure in the most efficient manner, minimizing environmental impacts in support of the Army's dynamic mission globally, including both joint and expeditionary environments... Its infrastructure will be sustainable, efficient and be more flexible to the changing environment and dynamic nature of the Army.”

One useful tool for managing U.S. Army facilities is the Real Property Master Plan (RPMP). The RPMP is a portfolio of strategic improvement plans devel-

oped for an installation resulting from a comprehensive and collaborative planning process. The RPMP consists of five separate components:

1. Real Property Vision Plan
2. Installation Planning Standards
3. Long Range Component
4. Capital Investment Strategy
5. Plan Summary

On May 28, 2013, the Office of the Secretary of Defense issued a policy memorandum requiring that all installations develop or update their master plans in accordance with the Department of Defense Unified Facility Criteria no later than October 1, 2018. Since 2011, Michael Baker International, a leading global provider of engineering and consulting services, has been working directly with the IMCOM to achieve this goal.

The Real Property Vision Plan is the first step in creating

*“...the U.S. Army owns
more than 70,000
buildings totaling
more than 800 million
square feet”*

a consolidated master plan. The Vision Plan consists of a vision statement that provides a clear and concise description of a desired end state and a framework plan that identifies and prioritizes installation planning districts for more detailed future planning. A strong vision creates a mental picture of what the installation will look like once the plan is achieved.

In coordination with the Real Property Vision Plan, Installation Planning Standards (IPS) capture the installation's guidelines for the development of sustainable and efficient facilities, in keeping with the installation's vision and planning objectives. The IPS specifies building, landscape, and street standards, which are developed to accomplish the following: promote visual order; enhance the natural and man-made environments through consistent architectural themes and standards; and improve the functional aspects of the installation. The IPS also: provides common facility and infrastructure standards for the installation; offers guidance on cost-effective resource invest-

streamline their planning processes and more efficiently support their missions.

More detailed installation planning occurs during the development of the Long Range Component. This portion of the master plan consists of a group of Area Development Plans (ADPs) that focus on development within the ADP boundaries over a 20-year time period.

In accordance with IMCOM's campaign plan, ADPs focus



ments; ensures sustainability and efficiency of facilities; and improves the function and appearance of the installation, including exterior and interior planning parameters and landscaping.

Michael Baker has worked alongside its clients to guide the dialogue and develop Real Property Vision Plans and Installation Planning Standards at 30 installations around the world, including Korea, Japan and Germany. Through a hands-on charrette, a collaborative planning meeting, Michael Baker works with installation stakeholders to

on "enabl[ing] Army readiness with flexible infrastructure that supports current and future requirements through modernization, reutilization and new construction;" and "revitaliz[ing] infrastructure in a deliberate and efficient process which focuses limited resources on improving the quality of enduring facilities."

The ADP charrette process engages installation personnel in efforts to translate a holistic, sustainable planning vision and a set of planning principles to build a consensus set of actions that transform the implementation of 21st century planning principles to implementable ADPs.

Development of installation-specific planning principles ensures all construction and development considers the master planning strategies outlined in the Master Planning UFC, including sustainability, natural and cultural preservation, capacity planning, and defensible planning. The result of the process is a holistic development road map that is implemented either through the Military Construction or Real Estate Programs.

ADPs contain detailed action plans to achieve the instal-

lation's Real Property Vision. Actions are phased over the 20-year planning horizon and supported by rough order-of-magnitude costs. The ADP charrette also develops a regulating plan, similar to a zoning ordinance in local planning. The regulating plan ensures development in accordance with the installation Real Property Vision while maintaining flexibility to respond to changing priorities and funding levels.

ADP charrettes conducted by Michael Baker's experts have covered a wide range of installations – from airfields, research laboratories, and arsenals to traditional training installations - each with their own unique planning concerns, and provided tailored planning expertise to address those issues within the framework of the Department of Defense's planning guidance.

The RPMP provides an Installation Commander's strategy for meeting the challenges of operating under changing conditions, such as: anti-terrorism and force protection (AT/FP); Defense Critical Infrastructure Program (DCIP); reduced manpower and resources; natural and cultural resources management and constraints; executing base realignments and closures (BRAC); and shifting appropriate base operations (BASOPS) functions from the govern-

ment to the private sector.

The RPMP is the road map to ensure that real-property assets support long-term mission requirements. A well-prepared RPMP expresses a long-term commitment to provide a high-quality, sustainable, enduring installation. It covers a minimum 20-year planning horizon and provides the map to executing that commitment.

Michael Baker's goal for RPMP development is to leverage its full continuum of services, as well as its diverse global expertise and experience, to develop high-caliber solutions for installations and their stakeholders while being sufficiently flexible to permit installation expansion, reduction and changes in mission and ensure that installation assets can meet mission requirements. Michael

Baker's commitment to making a difference enables readiness for a globally responsive Army.



About the author...

David Schaarsmith, AICP, LEED AP BD+C, PMP is an Associate Vice President, Planning for Michael Baker International

ENGINEERS IN THE MILITARY...

Nick Nussdorfer attended college full time while in the military, at the United States Military Academy at West Point. "The Academy has a strong engineering tradition, where I became interested in Environmental Engineering. I graduated in May of 2006 with a B.S. in Environmental Engineering and I was commissioned as a second lieutenant into the Medical Service Corps that same day. My job is as an Environmental Science and Engineering Officer."

As an Environmental Science and Engineering Officer, Nick has been stationed in America, and overseas in Germany, Iraq and Afghanistan, providing him with diverse experience spanning from working at the Center For Health Promotion and Preventive Medicine, in the First Calvary Division, and 173rd Airborne Brigade Combat team. "The engineering discipline in the Army provides many additional challenges and working in austere conditions in foreign lands can be exciting. I like the opportunity to do my job at higher echelon institutions and on the ground in a more tactical role."

Nick was prompted enter the military because of the opportunity to serve his country combined with a sense of adventure, great tradition and broad career opportunities." He was the first class to enter West Point following September 11th, 2001.

The Army awarded a scholarship to Nick to go back and get a Masters Degree. He was accepted into Carnegie Mellon University in August 2014, expecting to graduate in May

with a Masters Degree in Civil and Environmental Engineering, "The Army Medical Service Corps is letting me study at CMU through the Long-Term Health and Education and Training (LTHET)." While Nick's college education was narrowly focused on engineering course in maths and sciences, Carnegie Mellon has allowed more autonomy where he has focused on Environmental Engineering, Sustainability, and Science (EESS) and water resources.

After graduation Nick plans to go to a year-long course in Fort Leavenworth, Kansas for officers of the rank of Major and then back to the mainstream Army. He plans to stay in the military for "as long as they let me, at least for 20 years. I will be in the same field my entire career. There are times I might have leadership positions and jobs outside the discipline but I will always be in the field."

"I like the problem solving skills that the engineering discipline cultivates. I also think sustainability is incredibly important and Environmental is a good blend of the two. Engineering and the Army are a perfect fit. They both serve the public and foster discipline and sound decision making, and provide a great deal of job satisfaction and a sense of accomplishment at the end of the day."



ENGINEERS IN THE MILITARY...

Michael J. Ford served for 29 years before retiring as a Captain 06 in the U.S. Navy.

After attending Cornell College, Ford taught high school chemistry and physiology in Minnesota for several years before joining the Navy through the Nuclear Propulsion Officer Candidate Program.

“While teaching in Minnesota, I decided that I wanted to travel and see the world a bit more. I also wanted to become more involved in a technical field, building my problem solving skills and ensuring that I would have the chance for increased responsibility and leadership. A friend recommended that I look at the Navy’s Nuclear Propulsion program. After taking some time to explore the program, including taking a recruiting trip to see what life aboard a ship would be like, I applied and was accepted to the program.”

Engineering and the military came simultaneously for Ford. While he had training in the hard sciences from college such as chemistry, biology, and physics, they lacked an engineering focus. However, after joining the Navy’s nuclear propulsion program, he immediately began training to be a navy nuclear engineer, after training to be commissioned as a Naval Officer.

Ford’s career has been a combined experience where engineering training and expertise was critical to service in the fleet as a surface warfare trained officer. “All my engineering experience and employment to date has related to service in the Navy where I was a certified nuclear operator for my entire career. I was also qualified on diesel generation systems and gas turbine generation and propulsion systems all as part of service on seven ships through my career. This training allowed Ford to lead a team of sailors in operating ships while serving as a Commanding Officer of a guided missile destroyer (USS MUSTIN DDG-89) and a guided missile cruiser (USS BUNKER HILL CG-52). “My engineering background was also critical in managing the operation of two small modular nuclear reactors as the senior nuclear engineer aboard an aircraft carrier (USS NIMITZ (CVN-68)).”

“One of the most important skills that I think any engineer can bring to the table is a systematic approach to problem solving that builds from a firm understanding of system performance and limitations. The most challenging problems that I faced as an engineer rarely fit within a ‘book answer’ format where initial conditions for a casualty exactly matched what was in the book. In fact, the goal of the Navy training program was

to prepare operators to understand the underlying theory and fundamental safety principles of the systems of our power plants so that when a casualty occurred, we would respond in a manner that placed the systems in a safe condition and one that would allow the most expeditious recovery, something that is critical for a warship.”



Michael J. Ford

Michael has served all over the world while in the Navy, stationed for almost ten years in southern Virginia (Norfolk) while serving aboard three different ships. He served for almost that same amount of time in San Diego, CA and did two command tours from that port. While stationed aboard ships, Michael was deployed multiple times to combat zones off Iraq and Afghanistan. He also had the pleasure of stopping in ports all around the world to include stops in Australia, India, Spain, Italy, Tahiti, Hong Kong and Malaysia to name but a few. “I was fortunate to live for two years in Yokosuka, Japan and, like many more senior officers, I have spent many years serving on military staffs at the Pentagon in Washington, DC.” Michael calls Washington home right now, since his wife—an active duty Navy lawyer—is stationed at the Pentagon. “I am currently attending Carnegie Mellon University in Pittsburgh, where I am pursuing my Ph.D. in Engineering and Public Policy. I am conducting research that examines energy (with a nuclear focus) and the environment. I am fortunate to be able to use the GI Bill for this degree effort. I am also thankful for the participation of Carnegie Mellon University in the Veteran’s Administration Yellow Ribbon Program which ensures that my out of pocket expenses for tuition are minimal.”

“The military offers an incredible opportunity to learn skills in some of the most cutting edge engineering fields in the world. Navy nuclear power, is considered one of the premier “high reliability engineering” organizations.”

Even if someone does not want to make it a career, Michael believes the Service provides the early background and leadership experience that any company would value. At the end of even a 3-5 year commitment, there is a GI Bill waiting that can be used to help round out your technical expertise and build a fine civilian engineering career.



Building Resilience Since KATRINA

By: Walter Baummy

In the 10 years since the tragedy of Hurricane Katrina, the emergence of resilience has led to profound changes in flood risk management and adaptation

“As resilience becomes a core climate adaptation concept, its meaning is expanding beyond flood resilience to include environmental, social and cultural resilience.”

While a decade has passed since Hurricane Katrina, the storm still exerts influence on the Louisiana coastline and beyond in the form of new science, new thinking and improved flood resilience standards. Hurricanes have always been a problem on our coastlines, but Katrina led to some important shifts in the ways engineers approach floods and storm surges around the globe. In many ways Katrina is both an emblem of the threat and the spark that led to profound changes in flood risk management and adaptation.

Katrina's greatest impact has been the emergence of “resilience” as a driving concept through which engineering, planning, sustainability and risk management come together. The disaster catalyzed new ideas and a new vision that goes beyond managing flood risk to one of developing thriving coastal cities.

NEW VISION, NEW GOAL

Katrina, Superstorm Sandy and other extreme weather events have sounded a wake-up call to the added risks brought on by climate change, including sea level rise, more intense storm surges, and flooding.

Worldwide, it is estimated that two-thirds of cities with populations exceeding 5 million

people are in coastal areas at risk of flooding from sea level rise. As climate change and urbanization magnify the scope of adapting to flood risk, leaders need to consider the potential implications for physical structures and for social and economic prosperity.

The immensity of the destruction caused by Katrina accelerated the completion of flood risk projects in New Orleans. Katrina created the political will to give the U.S. Army Corps of Engineers the funding and public support to deliver the Greater New Orleans Hurricane and Storm Damage Risk Reduction System on an expedited schedule. The infrastructure now in place is a major engineering feat—tested during Hurricane Isaac in 2012, proving able to mitigate intense storm surge and rainfall. Now, the focus in the delta is shifting from recovery to a broader framework that addresses how to manage the coast and city in a rapidly changing landscape.

Katrina and the storms that followed have demonstrated the importance of proactive planning and of finding new ways to adapt to a world of megastorms and sea level rise. As resilience and mitigation replace protection as a primary goal for cities drafting adaptation strategies, local leaders are becoming aware of what engineers have been telling them: There is no such thing as absolute protection from storm surge flooding. Yet planning with multiple lines of defense and integration with infrastructure for a systems approach to water management can make for more resilient cities.

“Because nature is an untamed force, emerging approaches are becoming about compromise, rather than attempts to control.”



The Greater New Orleans Hurricane and Storm Damage Risk Reduction System built after Hurricane Katrina was tested during Hurricane Isaac in 2012, proving able to mitigate intense storm surge and rainfall. Now, the focus in the delta is shifting from repair and recovery to a broader framework that addresses how to manage the coast and city in a rapidly changing landscape.

As resilience becomes a core climate adaptation concept, its meaning is expanding beyond flood resilience to include environmental, social and cultural resilience. This trend puts engineers in the epicenter of urban economic and cultural planning as never before.

For instance, climate adaptation teams in southern Louisiana, addressing a vanishing coastline, are considering the impact of future flood resilience efforts on neighborhoods, fishing, the economy and the unique way of life that defines the region.

NATURE AND TECHNOLOGY

Louisiana's iconic wetlands had been vanishing for years before Katrina, but the storm's destruction amplified their loss, dramatizing the importance of how all flood defenses work together.

Because nature is an untamed force, emerging approaches are becoming about compromise, rather than attempts to control. Efforts to address vanishing coastal wetlands have considered harnessing the natural flow of sediment from the Mississippi

River. A huge volume of sediment would be required to compete with sea level rise, erosion and subsidence, yet must be balanced with other needs, such as navigation and flood control. Technologically, computer models used immediately after Katrina were capable of simulating hundreds of theoretical hurricanes to help engineers understand risks needed to produce the specifications for the new Hurricane and Storm Damage Risk Reduction System. The decade since has seen leaps in computational power and science. This is enabling engineers to factor the complexities of sea level rise and storm surges into their calculations. Vastly improved systems will produce the thousands of simulations needed to develop the 2017 Coastal Master Plan, which will take Louisiana's coastal planning programs into the future. These models will evaluate the effect of changing landscapes, even as they vanish. Because the models show interactions among different flood protection projects, engineers can see how their individual efforts interact within a broader plan.

At the same time, new data is sharpening

“New York is now a model for resilient cities: setting community resilience and business continuity as top priorities.”

the view of how erosion, subsidence and sea level rise affect flood risk every day. The Louisiana Coastwide Reference Monitoring System produces a real-time look at the environmental and ecological status of southern Louisiana, making the coast a living laboratory that will provide insights to serve planning for years.

RISK-BASED PLANNING

Perhaps no storm after Katrina has had such a dramatic effect on hurricane and flood protection as Superstorm Sandy. The knock-out punch to a world city like New York accelerated the next level of storm surge science, which now forms the framework used for flood protection around the world.

New York City has taken a different approach to setting its resilience agenda. A new framework for “A Stronger, More Resilient New York” firmly includes climate change and sea level rise in resilience benchmarks. The city’s risk-based plan assigns extra investment and high priority to critical and vulnerable public assets like hospitals, transportation and telecommunications systems, and water and wastewater facilities. Short-term solutions aim to provide flood protection for individual buildings. The end goal is to reduce disruption to lives and businesses, and to provide a foundation for any needed recovery and rebuilding. New York is now a model for resilient cities: setting community resilience and business continuity as top priorities.

Most importantly, risk-based analyses and planning facilitate funding and help regulators understand the costs and benefits of resilience investment. Risk analysis can lead to insights that put planning on solid ground, while enabling leaders to present choices to investors and the public. Recognizing risk, and defining the level of tolerance for risk, produces a stronger business case, whether support is public or private. Showing how each of the multiple lines of defense contributes to the goals of a proactive resilience plan demonstrates both the impact of the investment and the potential “return” in the form of social and economic recovery.

ADAPTING TO CHANGE

The introduction of multi-functional and protective public spaces is enabling cities to literally build an identity on the foundation of their resilience engineering. In New York, Battery Park City in lower Manhattan serves as a line of flood defense, but its beautiful public spaces have become urban amenities that create

coveted real estate value. Leveraging resilience plans helps attract and retain business as part of a broader economic development program. Similarly, the Dutch city of Rotterdam aims to become completely climate resilient by



Superstorm Sandy's knock-out punch to New York accelerated the next level of storm surge science.

2025 by building multi-functional flood protection that also enhances livability. Even more progressive are the cities that apply resilience strategies to social planning. Communities and neighborhoods with strong social connections and leadership recover faster from disaster. This broader concept of resilience is part of a new, global initiative, 100 Resilient Cities, supported by the Rockefeller Foundation. The fast growing movement takes resilience far beyond flood risk reduction and helps cities frame strategies to consider physical, social and economic challenges.

Cities around the world, including New Orleans and New York, have evolved much in the 10 years since Katrina. Rather than flinching from the threat of storm and flood, they own their coastal position and brand themselves as Water Cities. They embrace the beauty and productivity of their waterfronts as places to live, work and play. These cities show that when done right, resilience brings economic advantages that landlocked cities dream of.

In adapting to change, resilient cities are the new spark for opportunity and growth.

About the author...

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Veterans Thrive with the Gas Industry at Range Resources

By: Alicia Schisler

Over the last fifteen years, close to four million veterans have returned from military service and resumed civilian life in the United States. Many have also sought to join, or re-join, the workforce – a transition that isn't always easy for many reasons, including, simply, it can be difficult to re-enter the workforce after an extended absence.

But according to military.com, hiring veterans is not only a good idea, it's good business – and employers can expect to reap the benefits that come with hiring workers who bring an accelerated learning curve, leadership skills and a genuine understanding of teamwork to the table.

Range Resources is fortunate to count veterans from the different armed services branches among its employees. Director of Corporate Communications and Public Affairs Matt Pitzarella characterizes it like this: "The natural gas industry relies on people with critical thinking skills, individuals who work well in teams, people who can adapt – and veterans meet those criteria. We've found that while there are many formal programs available to assist in the transition to civilian life, many of the veterans who work for Range discovered the opportunity through personal connections to people who worked for us or for our service companies."

While in the Army, Range's Director of Civil and Environmental Engineering Tony Gaudlip was a Cryptologic Voice Intercept Operator. "I sat on a radio and listened for enemy radio communication. If I heard something I was supposed to transcribe, translate and report the intercept or jam transmissions."

According to Tony, the training he received in the Army gave him the skills he needed to succeed at Range. "Primarily, the military breaks you down and teaches you how to become a good leader by learning first how to

follow or be led. My first leadership positions were in the military – it made the transition to management positions in the oilfield easy."

Prior to coming to Range, Tony worked for another oil and gas company and it was there that he and other managers realized just how well suited other veterans were for the types of jobs this industry has to offer.

"I was working in Rock Springs, Wyoming – and we had huge attrition rates. People quit for all kinds of reasons – too many hours, not enough hours, too cold, too hot, etc... So we really looked around at who the long-term employees were and noticed that they were for the most part veterans. We made a push to start recruiting veterans as they were transitioning out of active duty – we would give them a job and a moving package to

come work in the Wyoming oilfield and they loved it – it was very successful."

It's a trend Tony sees playing out at Range as well, even in a down cycle. "My experience is that the oilfield in general is a comfortable and familiar environment for veterans. Range has been very good about recognizing this."

And, Tony's favorite thing about working at Range? "Free coffee!"

Attorney Adrian Markocic is a Landman at Range. He left the Army in August 2010, and began working for Range less than a year later. Adrian credits his experience in the military with shaping his perspective on life – and work. "Think of the military as a school that gives you a degree in discipline, work ethic and goal-driven purpose. These building blocks are the fundamentals to success in any career and every veteran has had these virtues instilled in them."

"We really looked around at who the long-term employees were and noticed that they were for the most part veterans. We made a push to start recruiting veterans..."

Information Technology Support Supervisor Scott Holtkamp came to Range after serving in the West Virginia Army National Guard. Of his time in the service, Scott says this: "While in the Army I learned a great deal about troubleshooting. If an operator told me that something wasn't working right, it was up to us to determine what that was and how to get it back up and running so that our guys would be able to continue their mission. The same applies to the work I do at Range. When an end user calls up and says my computer is slow, it is up to our support team to determine what isn't working correctly and how do we get them back up and operational as quick as possible."

For Scott too, the military was a place where he developed his leadership skills. "A veteran, regardless of his or her rank in the military, is a leader. We perform under stress and are adept at learning new skills. I love working in a team environment, and here at Range, I really feel like we all have the same goal. Anything I can do to help my team succeed I will do."

Division Order Analyst Megan Johnson began working at Range after serving as an aviation search and rescue swimmer – AT2/Naval Aircrewman. "The high stress and ever changing missions of a rescue swimmer taught me to perform well under pressure and to understand how my actions fit into the big picture."

She wants other veterans to know that their skills can translate to a civilian career. "I think a lot of people, veterans included, can get caught up in the fine details of military training and don't realize how well our skills can translate into the civilian workforce. Regardless of what type of job you do in the military -- safety, adhering to policies and procedures, and teamwork are paramount."

Megan also appreciates the culture she found at Range. "The Navy's core values of Honor, Courage, and Commitment were instilled in me at a young age and those core values continue to guide me in all I do today. I believe those values are also an important part of the culture here at Range and that is one of many things that makes me proud to be part of this team."

In the U.S. Army Reserves, Range Landman Aaron Hubbard was in a Petroleum Quartermaster Unit, where his MOS (Military Occupational Specialty) was carpentry and masonry. As far as how his service prepared him for a career in the oil and gas industry, Aaron says for him, it was more about the intangibles. "I think a lot of it is attitude – improvise, adapt, overcome – get the job done, get it done right, get it done in its entirety." Aaron encourages other veterans to consider the industry as a place to find employment. "There's a job somewhere that's a

fit for you. When I was a crew chief, I was always willing to take more of a chance on hiring someone with military experience than without. You could generally count on them having the right attitude and work ethic."

Several Range veterans have been featured in the media as well. A recent piece in Washington County's Observer-Reporter profiled Water Resources Coordinator Jared Bowman, and Safety Operations Tech Daniel Waters.

Both Bowman and Waters credit the Army with helping them prepare for work in civilian life. Both mentioned the Army Career and Alumni Program which offers those either retiring or awaiting discharge help with preparing for work, including assistance with résumé writing and interview

techniques to listings of job opportunities with federal, state and local governments and civilian agencies.

"When you're transitioning out, you're kind of on your own," but are required to take classes to prepare for a career as well as to learn about veterans benefits that are available," Bowman said.

Waters added that the military employs consulting companies to help soldiers with job and career searches before discharge.

Both men described another parallel between their military experience and the work they do at Range: learning from others who have been on the job longer. (Observer-Reporter 12/27/15)

Air Force veteran and Range Operations Engineer Sean Rooney was featured in the Pittsburgh Post-Gazette, where he discussed how the skills he learned in the Air Force translated to the work he does now.

"Oil and gas has a lot of very complex logistic operations all geared towards achieving a result," he said. "We have to do a lot of work to be able to get something done in a precise manner." (Pittsburgh Post-Gazette 9/15/14)

Range Resources currently employs close to forty veterans from different branches of the U.S. Armed Forces. It's a group of men and women that includes highly decorated former military personnel. And according to Matt Pitzarella, the number of veterans employed by Range is likely to grow in the future. "We support veteran related nonprofits and I know quite a few people who eventually became employees by attending events and meeting people. However it is that those men and women find us – even in a downturn – we're committed to creating opportunities for local workers and that's especially true for our military veterans."

"a lot of people, veterans included, can get caught up in the fine details of military training and don't realize how well our skills can translate into the civilian workforce"

ENGINEERS IN THE MILITARY...

David Matelan was born and raised in Monroeville, Pennsylvania, and graduated from Gateway High School in 2008, when he had already enlisted in the Marine Corps. After graduation he promptly set off for Paris Island, South Carolina for recruit training. He then completed preliminary training in the Marine Corps and was awarded the military occupational specialty of 5831 Corrections Specialist, then received orders for Camp Hansen Okinawa, Japan where he spent nearly two years before volunteering for the special duty of Marine Security Guard. After returning to the United States to undergo selection and training, he then set off for the first of three Embassy posts beginning in Chisinau, Moldova. While in Moldova the Marine Corps presented opportunities to meet the President Obama and the First Lady, Vice President Joe Biden as well as Former President Jimmy Carter and his wife. David served just over 5 years active duty as a Sergeant, United States Marine Corps.

David enlisted in the Marine Corps, inspired by his uncle. "I've always been close with my Uncle. He taught me a lot of things growing up and he was active duty Marine Corps when he was younger. I suppose that is where the inspiration to enlist in the Marine Corps came from. I saw that he was hard working and dedicated and, looking back now, I guess that I associated these qualities with his Marine Corps background. Marines have a reputation and I wanted to see what it was

all about." At the end of his active service, David entered the Swanson School of Engineering at the University of Pittsburgh pursuing a bachelors in Civil Engineering, attending on the GI bill.

"I chose to pursue an engineering degree because I've always been interested in how and why things work the way they do. Marines at their core are idealist. They believe what they do truly helps to make the world a better place and I knew after my active service ended that I wanted to continue making the world a better place but in a different way, engineering.

"Engineering schools is one of the most difficult and demanding things I've ever done. But it is rewarding knowing that I'm accomplishing goals that I set for myself and that they knowing that they are not easy to complete makes it that much sweeter when you do complete them."



David Matelan, (Left) with President and Mrs. Obama and former service mates.

A promotional banner for the 77th Annual International Water Conference. The banner features a collage of images: a night view of a city skyline with a bridge, a historic stone building (the Alamo), and a riverboat filled with people. A large blue wave graphic sweeps across the middle. The text "The 77th Annual INTERNATIONAL WATER CONFERENCE®" is prominently displayed in white. Below it, the dates "NOVEMBER 6-10, 2016" and location "SAN ANTONIO, TX USA" are listed. The website "WWW.ESWP.COM/WATER" is at the bottom right.

The 77th Annual
**INTERNATIONAL
WATER CONFERENCE®**
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SAN ANTONIO, TX USA
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ENGINEERS IN THE MILITARY...

Danielle Danucalov's father is a Lieutenant colonel who is active duty in the Air Force, and has been in the military for 29 years, first in the Army and then the Air Force. Danielle herself is not in the military, though many of her family members are "My dad is in the military, my uncle, and my cousin, who is currently at the United States Air Force Academy." Danielle did consider entering the military, but was unsure if she "could handle both together," so she chose engineering. She is currently enrolled in the University of Pittsburgh's Bioengineering program and is working for the University of Pittsburgh Medical Center as a Clinical Research Associate.

"I am currently attending college on the GI Bill. It is very helpful in funding my college career."

"From my perspective of growing up with a parent who went to college and was in the military at the same time, I believe anyone who has the passion and hard-working attitude can be



Danielle Danucalov

successful doing both. I encourage any, whether it be family members or society members to become an engineer and/or go into the military. Both are very rewarding fields because of their impacts on society. I think the need for problem-solvers will always be vital to bettering the world, and therefore both jobs complement each other well."

"I believe those who work for what they want end up being the happiest in life. Never be afraid of having to work for any job, joining the military, or any other imposing task. Instead, ask questions, make mistakes and learn from them, and continue to work for a goal."



ENGINEERS IN THE MILITARY...

Paul Wozniak attended community college full-time for two years and Youngstown State University (YSU) for one semester before he joined the Pennsylvania Air National Guard. "I attended community college for piloting and YSU for business." After completing basic training and technical training Paul returned home and began attending the University of Pittsburgh Swanson School of Engineering in Civil Engineering with a certification in construction management, using the Post 9-11 GI Bill. Previously Paul used the Montgomery GI Bill.



Paul Wozniak

Paul is nearing his sixth year in the Pennsylvania Air National Guard, with the rank of Ssgt.

Prior to joining the military, Paul really "didn't have any real interest in engineering before my military experience. My grandfather was a marine in the pacific theatre during World War II. Beyond that no one in my family were engineers. The closest to an engineer was my uncle that was an architect."

Paul plans on only staying in the military only until graduation. "I believe that working as a project engineer on construction projects will be time consuming enough without the extra time requirement of the military."



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March of Dimes Announces Honorees for 6th Annual Transportation, Building & Constructions Awards

The West Penn Division March of Dimes is pleased to announce the honorees for the 2016 Transportation, Building & Construction Awards. This year marks the 6th anniversary of this annual event honoring the leaders and architecture from both public and private sectors of transportation, building and construction industries. Over the last five years, more than \$550,000 has been raised for the March of Dimes mission to improve the health of babies.

This year's honorees are:

- Labor Leader of the Year – Mr. Jack Shea, Allegheny County Labor Council, AFL-CIO
- Service to Humanity Award – Mr. John Weinstein, Allegheny County/ALCOSAN
- Transportation Project of the Year – Hulton Bridge Replacement Project, Pennsylvania Department of Transportation, District 11
- Projects of the Year – Expansion of the Pediatric Specialty Hospital, The Children's Home & Lemieux Family Center and The Tower at PNC Plaza, PNC Bank, National Association
- Special Projects Award – Pittsburgh International Airport Airside Terminal Terrazzo Floor – "The Sky Beneath Our Feet," Allegheny County Airport Authority, Collaborative partner: Pittsburgh Office of Public Art

The March of Dimes Transportation, Building & Construction Awards Luncheon will be held on Thursday, June 23rd at the Westin Convention Center with a reception at 11:30 a.m. and a luncheon at 12:30 p.m. The event is expected to draw over 500 attendees while raising important funds for the March of Dimes.

Leading the event is Chairperson Alex G. Sciulli, P.E., President and CEO of ALEM Consulting, LLC, along with an executive leadership team. "I am proud and honored to be this year's Chairman of the Transportation, Building, and Construction Awards Luncheon. The March of Dimes does so much for our community through their advocacy, education, and research programs." – Alex Sciulli

A committee of industry leaders selected the 2016 honorees to be recognized for their achievements and for their efforts to promote economic development within Western Pennsylvania.

Today, one in every ten U.S. infants is born preterm. Due to concerted efforts by the March of Dimes and our partners,

this number has gone down for the past eight consecutive years, but it is still too high. Preterm delivery can happen to any pregnant woman; in many cases, the cause of preterm birth is unknown. Preterm birth is the leading cause of neonatal death, and those babies who survive are more likely to suffer from intellectual and physical disabilities. In addition to its human, emotional, and financial impact on families, preterm birth places a tremendous economic burden on the nation.

Funds raised by the Transportation, Building and Construction Awards Luncheon help support prenatal wellness programs, research grants, neonatal intensive care unit (NICU) family support programs and advocacy efforts for stronger, healthier babies.

Currently, the March of Dimes is investing nearly \$3 million in research and programs in Pennsylvania alone. Funds raised by this event supports research at several of Pennsylvania's finest hospitals and institutions including The University of Pennsylvania, University of Pittsburgh, Pennsylvania State University, Magee- Women's Research Institute and Children's Hospital of Pittsburgh of UPMC.

Pennsylvania is also proud to be the home of one of five March of Dimes Prematurity Research Centers, a nationwide network bringing the best and brightest minds together to work and share information. The March of Dimes Prematurity Research Center at the University of Pennsylvania joins centers at Stanford University, the Ohio Collaborative, Washington University in St. Louis and the final center, a collaboration among the University of Chicago, Northwestern and Duke. These March of Dimes Centers are pioneering a brand new way of doing "team science," dedicated solely to examining, identifying and preventing the causes of preterm birth.

Sponsors of this year's Transportation, Building & Construction Luncheon include: AECOM, ALEM Consulting, Arcadis US Inc., CDM Smith, EMA Associates, Gateway Engineers, HDR, Highmark, Hill International, IBEW Local No. 5, Jacobs Engineering, Larson Group Design, Mascaro Construction, Michael Baker International, Operating Engineers Local 66, Pennoni, PJ Dick, Rhea Engineers & Consultants, SAI Consulting Engineers, United Steelworkers and UPMC Health Plan. KDKA-AM and Trib Total Media are the event's media partners.

Corporate tables are available at \$1500 or individual tickets at \$150. Visit the March of Dimes web site at marchof-dimes.org/pennsylvania to make reservations or for more additional information or phone 412-505-2200.

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