Air Force Civil Engineer
Vol. 22 No. 2
2014

Prime BEEF Celebrates Fifty Years

Air Force Civil Engineer
Vol. 22 No. 2
2014

Features


pg. 14


pg. 35

Sections

On the Cover

Airman 1st Class Demetrius Brown, 577th Expeditionary Prime BEEF Squadron, grinds down a drainage pipe in at Bagram Air Base, Afghanistan, May 17, 2014. (U.S. Air Force photo by Senior Airman Sandra Welch)

Air Force Civil Engineer is published quarterly by the Public Affairs staff at the Air Force Civil Engineer Center. This publication serves the Office of The Civil Engineer, HQ U.S. Air Force, Washington, D.C. Readers may submit articles, photographs, and artwork. Suggestions and criticisms are welcomed. All photos are U.S. Air Force, unless otherwise noted. Contents of *Air Force Civil Engineer* are not necessarily the official views of, or endorsed by, the U.S. government, the Department of Defense, or the Department of the Air Force. Editorial office: *Air Force Civil Engineer,* AFCEC/PA, 139 Barnes Drive, Suite 1, Tyndall AFB FL, 32403-5319, Telephone (850) 283-6242, DSN 523-6242, FAX (850) 283-6499, and e-mail: cemag@tyndall.af.mil. All submissions will be edited to conform to standards set forth in Air Force Instruction 35-101, The Associated Press Stylebook, and the magazine's internal style. *Air Force Civil Engineer* is accessible on the Internet from AFCEC's home page: http://www.afcec.af.mil. Individual subscriptions available via GPO (http://bookstore.gpo.gov).

Prime BEEF 50th Anniversary

This year we celebrate 50 years of Prime BEEF units and their support of expeditionary operations. Many of us in uniform today joined, or chose to stay in the Air Force, expressly to provide operational platforms and bases in deployed environments when our nation calls … essentially to continue the legacy of those first Prime BEEF units. As we celebrate the 50th anniversary of Prime BEEF, I'd like to take a moment to look back at the roots of its birth, and invite you to read Dr. Ronald Hartzer's article on page 4.

After the creation of the Air Force in 1947, contingency engineering responsibility was given to the Army. The Army forces designated for Air Force support were undermanned, poorly equipped and untrained when the Korean War broke out in 1950, and the Air Force realized something had to change for future conflicts.

In 1957, the Air Force was directed to develop a capability for emergency repair of bomb-damaged air bases using existing personnel, and began experimenting with a mobile team concept to respond to deployment requirements. On Oct. 1, 1964, 17 years after the creation of the Air Force, the Prime BEEF program was born from this effort.

The war in Vietnam served as a watershed moment for Prime BEEF, with the first deployments to Vietnam taking place in August 1965. Those initial Prime BEEF teams set a standard of excellence and paved the way for the RED HORSE squadrons that were activated in October 1965.

Between 1964 and 1975, 318 mobile Prime BEEF teams comprising 9,402 military personnel were deployed worldwide, and set patterns for future Prime BEEF employment. In the late 1960s, Prime BEEF began contingency skills training, setting the pattern for today's Silver Flag sites. Over the years, deployments in support of the Cold War, Operations Desert Shield and Desert Storm, the Balkans and post-9/11 operations in Southwest Asia have repeatedly validated the Prime BEEF concept. You can read about the innovative work they are doing today on pages 8-15.

I also want to recognize and thank our civilian Airmen who enable the Air Force's unique structure of military members being dual-tasked to support both home station and deployed operations. When I am asked how the Air Force can be so effective down range, my response is always the same. At home we are trained every day to operate an air base or installation by outstanding civilian teammates, from master craftsmen or master planners. I am sure all of you share my pride in the civilian contributions to Prime BEEF members.

I want to be clear that when I say "Airmen," I am referring to our Total Force: active duty, Guard and Reserve. Reserve and Guard Airmen engineers are absolutely vital to the success of our Prime BEEF mission. The expertise and capabilities they bring to the fight are without equal and have shined bright over the past 13 years since 9/11.

As we celebrate the last 50 years, there are nearly 1,400 Prime BEEF engineers deployed in harm's way, continuing the legacy. I am confident they will provide effective combat platforms to ensure continued mission success today and into the next 50 years.

Engineers lead the way!

Timothy S. Green
Brigadier General, USAF
Director of Civil Engineers

Fifty years ago, Air Force civil engineering became a full partner in providing direct combat support for the Air Force. In a 12-month period between 1964 and 1965, both the Prime BEEF and RED HORSE programs were established, significantly changing civil engineering by giving engineers a wartime/contingency mission.

Prime BEEF was established in October 1964. This special section of CE Magazine honors Prime BEEF Airmen, and a future issue will do the same for RED HORSE.

Since their first deployments in 1965, Prime BEEF members have carried on the tradition of excellence set by their predecessors and have been a part of every major conflict or contingency. Join us in celebrating their achievements.

PRIME BEEF Strikes Gold

Dr. Ronald B. Hartzer
AFCEC/CXH

This year the Air Force celebrates the 50th anniversary of Prime BEEF—1964 to 2014.

It was a different world in 1964: The Beatles first appeared on the Ed Sullivan Show; the first Ford Mustang was produced; Dr. Martin Luther King, Jr. was awarded the Nobel Peace Prize; and children everywhere were trying to pronounce Mary Poppins' "supercalifragilisticexpialidocious." For Air Force civil engineers, 1964 marked the birthday of Prime BEEF and a historic turning point for civil engineers' ability to support the Air Force's wartime mission.

Setting the Stage

The story of Prime BEEF's origins actually goes back to World War II. During that conflict, the Army Air Forces was supported by specially organized, trained and equipped Aviation Engineers. These units served around the world building and repairing air bases outside the continental United States. Numbering about 117,000, they performed some amazing feats in providing basing from Alaska to Australia, Guam to Germany, and Italy to India. When the Air Force was created as a separate service in 1947, its leaders proposed moving the Aviation Engineers to the new service. However, it was decided that the Army would retain control and support the Air Force during wartime. By 1956, everyone agreed that arrangement was not working, and the Air Force was left without a reliable wartime basing capability.

In 1957, Department of Defense Directive 1315.6 gave the Air Force responsibility for developing and maintaining a capability for the emergency repair of bomb-damaged air bases, but they had to do it with existing manpower resources. While Air Force leaders were determining how best to develop this capability, a series of international crises erupted that demonstrated the continued problems the Air Force faced in deploying and bedding down its units.

In 1958, President Dwight D. Eisenhower ordered forces to the area in and around Lebanon to quell unrest in that country. Things did not go smoothly and engineers within the U.S. Air Forces in Europe command began developing a new mobile team concept to support future deployments. They did not have long to wait.

In 1961, the Soviet Union began constructing a wall separating East and West Berlin. America responded with a

Col. William T. Meredith, the driving force behind the Prime BEEF program. (U.S. Air Force photo)

significant deployment of aircraft and people to Europe to prepare for the incoming units, and USAFE called upon its new Civil Engineer Mobile Teams. Brig. Gen. Oran O. Price was USAFE's deputy chief of staff for Civil Engineering, and monitored the teams' progress and lessons learned.

During the 1962 Cuban Missile Crisis, Air Force units deployed to southern Florida and Tactical Air Command assembled a team of in-house personnel and equipment to open Opalocka Naval Air Station near Miami. It was described as a "pick-up" game with little advanced planning. This experience was viewed up close by Civil Engineering leaders such as then Brig. Gen. Robert H. Curtin and Lt. Col. William T. Meredith on the Air Staff, who recognized that something had to be done.

Creating the Concept

In December 1963, Curtin established the Civil Engineering Manpower Study Group to "determine the distribution, alignment, reliability, credibility, and skills required in the Civil Engineering Manpower resource to perform essential Civil Engineer functions in support of the Air Force mission." Also involved in the group was Price, who had moved from USAFE to the Air Staff in 1963 to serve as deputy director.

In addition to the readiness issues, Curtin was concerned about a movement in Congress to contract or civilianize the nearly 50,000 military positions in Civil Engineering squadrons. He wanted to make sure that those Airmen had a wartime mission. Thus, the study group conducted what could be described as the first "Blue-Suit Review" of the career field. The study group combined the issues into one question: "Is the present Civil Engineer Force properly aligned and is the distribution of this resource adequate to perform the essential real property facility functions in support of the Air Force mission today and tomorrow?"

Members of Prime BEEF Team XII construct revetment for F-4C aircraft at Da Nang AB, Vietnam. (U.S. Air Force photo)

Members of Prime BEEF Team X cut lumber for the construction of barracks at Nha Trang AB, Vietnam. (U.S. Air Force photo)

The study group, working with Personnel representatives, spent months doing a thorough quantitative and qualitative review of virtually every military position in Civil Engineering. The study group analyzed and evaluated the requirements and resources at each base to identify the number of people and the right skill mix to meet various contingency missions. It was a lengthy and detailed process to go base-by-base and skill-by-skill to determine the correct skill mix.

Meredith, who eventually retired from the Air Force as a brigadier general, was the chairman of the study group and the driving force behind the effort. He was well-versed on the issues because he had written his 1961 Air War College paper on a related topic: "What Are the Quantitative and Qualitative Professional Civil Engineer Requirements of the USAF Through 1970." He and his team sat for days poring over manning documents to work the quantitative details of the program.

As part of the qualitative phase, the study group also did a top-to-bottom review of the entire career structure to ensure civil engineers would have the necessary skills to fulfill their new roles under Prime BEEF. As the group examined the enlisted career fields, they noted that several specialties were "dead-end" career fields with little possibility of rising above the 5-level. The members revised the career structure to establish four basic career areas and 21 career ladders that would all lead to 9-level superintendent positions. Much of the study group's final report was a description of the duties, responsibilities and qualifications of each Air Force specialty within Civil Engineering. Military personnel were directed to focus on improving their skills needed for direct combat support.

Based on Price's guidance, the study group adopted the mobile team concept from USAFE. They proposed four types of mobile teams: BEEF-R, Recovery Team; BEEF-C, Contingency Team; BEEF-F, Flyaway Team; and BEEF-M, Missile Team.

First Prime BEEF Teams

The Recovery Team was formed from military personnel stationed at each CONUS and overseas base. Recovery Teams ensured base maintenance and operations during, and immediately following, an attack, major emergency or natural disaster. Recovery teams implemented the base disaster recovery plan and provided essential services. Recovery teams, working in two shifts, were responsible for maintaining base operations for up to 36 hours.

Mobility combat support was provided by the other three teams. The Contingency Team was created to handle unanticipated exigencies and special wartime air operations to support Air Force missions worldwide. Contingency Teams were not assigned to specific air units. Flyaway Teams were attached to flying units, typically TAC or Military Air Transport Service and were responsible for supporting those units. Members of the Contingency and Flyaway teams deployed rapidly. As a result, the teams maintained ready kits that included tools, suitable clothing and personal records. The Missile Team was created to offer support to the missile maintenance organization, particularly in projects exceeding daily missile upkeep. The Missile Team also provided depot level support for real property.

This new program needed a name. Meredith recalled that story, "I said to General Price, 'We've got to come up with a name for this thing.' He said, 'I've been thinking about it.' And he's the man who named Prime BEEF. He said, 'Prime BEEF.' I said, 'Tell me what it stands for.' He said, 'Prime, meaning the first force, prima. And BEEF — base engineer emergency force.' And that's where it stuck."

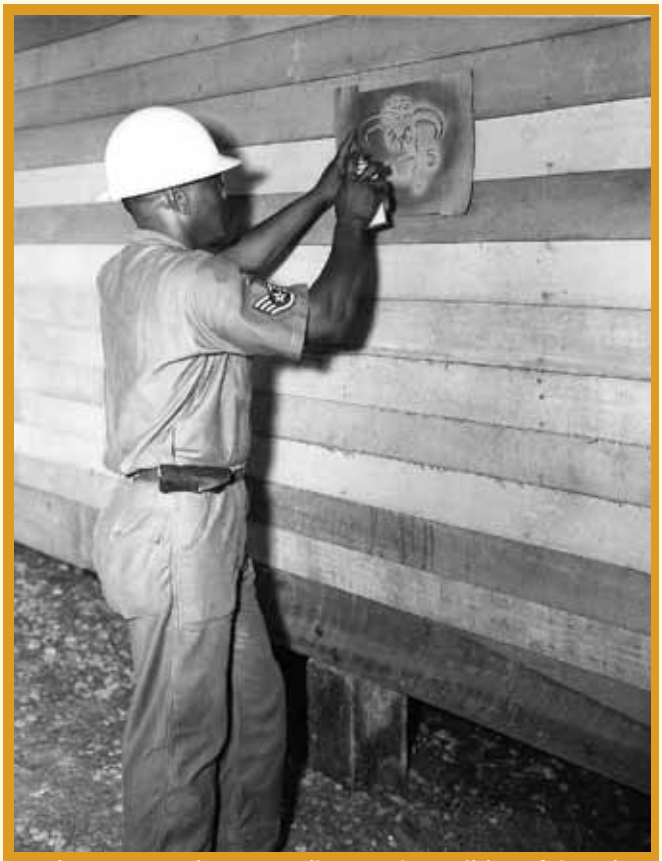
To adequately prepare the entire Civil Engineering military force with this new concept, a new training program was developed that included revised job training standards and revamped training courses at all technical training centers.

Meredith also had to travel throughout the Air Force to "sell" the concept. He and then Col. Jeanne Holm (the first woman appointed as brigadier general in the Air Force) teamed up to explain this new program to the Air Force and Congress. The recommendations in "Project Prime BEEF" were accepted and implemented in October 1964. Over the next few months, the Air Staff's Prime BEEF team visited each major command to assist in the program's implementation, which was projected to take approximately four years. However, world events forced an expedited schedule.

Proving the Prime BEEF Concept

In spring of 1965, the Dominican Republic was experiencing political unrest and President Lyndon Johnson sent 20,000 U.S. troops to intervene in the civil strife. Included in that group was the first-ever Prime BEEF team to deploy. On May 1, 1965, a nine-person team from Myrtle Beach, S.C., traveled to Santo Domingo to establish an

A Prime BEEF Airman, second from right, and several Seabees discuss plans to repair the bomb-damaged runway at an Iraqi airfield during Operation PROVIDE COMFORT, 1991. (U.S. Air Force photo)



A Prime BEEF engineer stencils an early rendition of the Prime BEEF Bull on the side of a photo lab constructed by his team. (U.S. Air Force photo)

expeditionary camp for the airlift fleet. The team was augmented with an additional 25 personnel a few weeks later. Three additional Prime BEEF teams on 60-day rotations supported the mission until February 1966.

At the same time, the American military presence in Vietnam was growing and bases were becoming overcrowded. On May 16, 1965, an explosion at the congested Bien Hoa Air Base in Vietnam killed and injured more than 100 Airmen and damaged dozens of aircraft sitting unprotected on an open ramp. The call went out for additional engineers to construct aircraft revetments at the bases. In August, three Prime BEEF teams from multiple commands quickly assembled for a 120-day deployment to Vietnam. The engineers constructed 12,000 linear feet of the new ARMCO revetment at Bien Hoa, Da Nang and Tan Son Nhut Air Bases to protect the vulnerable aircraft. The high quality and quantity of their work led Air Force leaders in Southeast Asia to request additional Prime BEEF teams to assist the over-tasked base civil engineers who were there on one-year tours. Between August 1965 and July 1966, a total of 25 Prime BEEF teams deployed to Southeast Asia to perform a variety of engineering work from designing water distribution systems to building maintenance facilities or barracks nicknamed "hootches."

By 1966, the Prime BEEF program was well established in the Air Force because of the thorough and farsighted plan set out by the Civil Engineering Manpower Study Group and the success of the early teams.

Along with wartime deployments, Prime BEEF teams also responded to natural disasters. In September 1965, Hurricane Betsy struck south Florida, causing major damage to Homestead AFB. Roofs on 150 facilities were destroyed, airfield lighting was damaged, overhead power distribution systems were downed and liquid fuel lines and pump stations were damaged. Within 36 hours, 91 Prime BEEF carpenter, electrical, liquid fuel, sheet metal and airfield lighting technicians were on site to assist base civil engineers. Power was completely restored in two days and roofless buildings were secured within three days. In August 1967, 152 Prime BEEF personnel from 23 bases responded to severe flooding in the Fairbanks, Alaska area, including Eielson AFB. These are just two early examples of the natural disaster recovery role Prime BEEF teams have fulfilled.

Over the past 50 years, Prime BEEF Airmen have been part of every major contingency, including Vietnam, Korea, Operation Desert Storm, Operation Provide Comfort, Bosnia, Kosovo, Operation Enduring Freedom, and Operation Iraqi Freedom. Each one is a separate story in and of itself, many of which have been told in previous history articles in this publication and are included in the new book, *Leading the Way: The History of Air Force Civil Engineers*, which will be distributed in November.

From an idea incubated in Europe and shaped around a Pentagon conference table to a mature worldwide contingency capability, Prime BEEF has become an iconic symbol of Air Force Civil Engineering's dedication to the mission, and synonymous with engineering excellence.

A Prime BEEF engineer helps construct a TEMPER Tent at a Gulf War site in 1990. Dozens of Prime BEEF teams deployed in support of Operation Desert Shield. (U.S. Air Force photo)

Prime BEEF: Transformers with a Mission

Teresa Hood
AFCEC/PA

Prime BEEF civil engineers are never around until you need them.

Well, actually they are. In fact, they're everywhere throughout the Air Force, just "regular" CEs working every day at home station in their own particular specialty.

Until a contingency calls — then they're transformed into a Prime BEEF team, a powerful force focused on a mission.

This transformation is what sets Prime BEEF CEs apart from military engineers in the other services, which contract out most of their installation engineering. In the Air Force, military CEs operate and maintain their home station bases, ready to deploy on short notice and "change" their title from installation engineer to Prime BEEF engineer.

Prime BEEF's mission, according to Air Force Doctrine Annex (AFDA) 3-34, Engineer Operations, is "rapidly responding worldwide to provide the full range of engineering expertise and emergency services needed to establish, sustain and recover bases for employing Air Force weapons systems or supporting joint, interagency or multinational operations." This mission includes response to natural disasters.

Their mission has stayed steady since the Prime BEEF concept was conceived and implemented 50 years ago (see article, p. 4).

"Prime BEEF is just as valid today as it was in the '60s," said Maj. Brandon Sokora, the Contingency Operations Program Manager in the office of the Director of Civil Engineers, Washington, D.C. "As long as the Air Force requires power projection platforms to deliver airpower, the Prime BEEF Airmen's mission will be paramount."

Military active duty, Guard and Reserve CE personnel are assigned by their unit or organization to either a Prime BEEF or a RED HORSE Unit Type Code. UTCs are Joint Chiefs of Staff-developed five-character codes that uniquely identify the types of units and equipment available for contingency missions. This system allows visibility of manpower and equipment capabilities all the way from top-level Joint and Air Force war and mobilization planners down to unit-level deployment managers.

Currently, there are 87 Prime BEEF UTCs, 43 for personnel and 44 for equipment, and 8,373 Prime BEEF postured for personnel and equipment, according to Nancy McHugh, the Prime BEEF program's publication analyst at the Air Force Civil Engineer Center, Detachment 1, Tyndall Air Force Base, Fla. The UTCs serve as "building blocks" to tailor a Prime BEEF team by size and capability to match a specific mission requirement.

"The 26-person Basic Engineer Beddown/Sustainment Team UTC (4FPET) is the foundation of the building block concept of employing Prime BEEF teams," according to the 2014 Civil Engineer Supplement to the War and Mobilization Plan-1. To meet specific mission requirements, additional engineer augmentation UTCs can be added to the mix, including those for emergency services personnel — Fire Emergency Services, Explosive Ordnance Disposal and Emergency Management.

While Prime BEEF's mission has remained relatively unchanged over the years, the size of the individual UTCs has "yo-yoed," said Greg Cummings, the Expeditionary Engineering lead at AFCEC.

"We have gone back and forth from small to large, from grouping small teams together to form a force module, and then said, 'nope,' let's roll it all up into one UTC that provides a lot of capabilities," said Cummings. "In 2008, we went back to smaller, modular UTCs, primarily to be more flexible in meeting joint combatant commanders' utility detachment type requirements. At the same time, we do have functional force modules of grouping UTCs together for some of the static beddown requirements — for example, for 1,100 personnel, or 2,200 or 3,300."

At the same time in 2008 that Prime BEEF UTCs became more modular, the personnel and equipment UTCs were separated.

"Equipment UTCs are still tied to personnel in the mission capability statement, or MISCAP, but can be deployed independently," said Larry Lomax, the Prime BEEF program

manager at AFCEC. "For example, the equipment may already be downrange, or vice versa, or we might pull equipment from one location and people from another. We've always had a separation of people and war reserve materiel — the BEAR UTCs."

Basic Expeditionary Airfield Resources, or BEAR, assets are WRM managed by the 49th Materiel Maintenance Group and are essential to the Prime BEEF mission, especially a bare base beddown. BEAR UTCs include items such as large generators, water purification systems, fuel bladders, environmental control units and a variety of shelter systems to house people and equipment. WRM is prepositioned at locations worldwide, ready to quickly meet up with a Prime BEEF team.

"We currently have more than 2,000 BEAR UTCs located at 15 or so sites," said Lt. Col. Frederick Berrien, a CE and the commander of the 49th Materiel Maintenance Squadron at Holloman AFB, N.M. "In 2008, we established the BEAR Order of Battle, or BOB, that broke our UTCs down into more modular and numerous UTCs. The 49th also has small teams that can deploy to quickly train a Prime BEEF unit on any needed specifics about a BEAR UTC."

Training is a continuous requirement for Prime BEEF CEs, and critical for how they transform into a deployed unit, said Lomax.

"Air Force CEs' technical ability is what sets them apart from the other services," he said. "It gives them the ability to expeditiously set up the beddown, to work together regardless of what base or component they came from. As they come together it quickly shows the level of expertise they bring to fight and why Air Force Prime BEEF is the combatant commanders' service of choice for beddown and sustainment."

"The difference in approach that the Air Force takes for engineers is more of a 'balanced portfolio' capability," said Cummings. "You have active duty CEs that in garrison do a peacetime mission that builds their technical skills. Air Reserve Component CEs have technical skills gained through tech schools, military training or their jobs in the private sector. So when we bring a CE to the fight they are able to think on their feet and utilize the standard tactics, techniques and procedures they've learned. The CE civilian workforce plays a vital role as well; working side-by-side with Prime BEEF Airmen at the installations, they enable both their training and their ability to deploy."

So what do the AFCEC Prime BEEF managers see in the program's future?

"I think we'll continue to meet the needs of the mission, but more efficiently," said Lomax. "We may even see some additional expansion into the areas of disaster relief and contingency support. I also see modernization playing a major role in many of the things we do."

"Our equipment will be modernized as we go along," said McHugh. "The new Airfield Damage Repair program is going to be huge when it's implemented."

"We are the service of choice when it comes to bed down forces of any type, of all services, and even in some of the combined environments," said Cummings. "I think we need to make sure we keep this balanced portfolio — it's how we build our technical capability, our Prime BEEF Airmen."

All three agree: Prime BEEF Airmen will continue to be transformers — changing from installation engineers at home station to ready expeditionary engineers at the call of a contingency, whenever, wherever.

Prime BEEF Airmen from the 436th Civil Engineer Squadron assemble a tent frame during a training deployment to Dover AFB, Del. (U.S. Air Force photo/Roland Balik)

Reserve Prime BEEF at the Ready

CMSgt Melanie Blankenship
AFRC/A7XO

Air Force Reserve Command, headquartered at Robins Air Force Base, Ga., has Prime BEEF squadrons, flights and staff augmentation teams postured at 34 different locations across the country, as well as individual mobilization augmentees embedded in active duty Prime BEEF squadrons. These include nine base operating support locations and 25 tenant locations. The AFRC Prime BEEF force structure comprises 3,784 engineers who are supported not only by the command, but also by three numbered air forces, one civil engineer group, the Contingency Equipment Management Facility, located at Grissom Air Reserve Base, Ind., and the Expeditionary Combat Support Training and Certification Center located at Dobbins ARB, Ga.

Implementation of the Air and Space Expeditionary Force Teaming construct has transformed how Air Force Reserve Command engineers are postured to meet combatant commander requirements. AFRC engineers have filled 1,295 deployment taskings since the beginning of fiscal 2012. The transition from tempo bands to a unit-based construct has enabled AFRC to adopt a "location-driven/best-fit" sourcing solution and AFRC engineers to meet a deployed installation's requirements. This ensures team cohesion and facilitates AFRC's ability to fill crucial leadership positions (e.g., commanders and first sergeants) for the first time. AEF Teaming also ensures the 531 Reserve engineers tapped to deploy in 2015-2016 exceed theater-level engineering services requirements.

The Contingency Equipment Management Facility serves as a force enabler for the Reserve engineers. A majority of all AFRC engineer equipment unit type codes, valued at over $50M, are stored and maintained at the CEMF by a team of professionals, enabling our engineers to focus limited hours on training and skill level proficiency. Additionally, AFRC has partnered with the Air Force Civil Engineer Center's Detachment 1, Tyndall AFB, Fla., for several total force equipment recapitalization efforts to guarantee engineers are properly equipped to meet any contingency requirements.

The ECS-TCC is the Reserve's organic Prime BEEF expeditionary and contingency training platform, offering hands-on skills training to a Total Force audience. The ECS-TCC is staffed with 18 Active Guard Reserve personnel and a civilian scheduler to cover every CE Air Force Specialty Code within the Prime BEEF program, with the exception of Pest Management. The ECS-TCC offers courses in the following areas: MEET — Mission Essential Equipment Training; initial and refresher crane operation; tractor trailer training; Joint Tactical Radio System; material acquisitions; variable incident preparation for EOD responders; driver-operator proficiency certification for firefighters; and special purpose vehicle training, as well as courses designed to provide skill-level upgrade and SORTS-reportable training.

In addition to a robust home station training program, AFRC Prime BEEF units use deployments for training, or DFTs, as vehicles to get necessary hands-on skills training during a Reservist's two-week annual tour. In 2014, Reserve engineers tackled several challenging projects, including beddown support for AFRC's largest joint service accredited exercise; instruction and mentorship at the United States Air Force Academy's Field Engineering and Readiness Laboratory Program; and the construction of a pre-engineered building at Dobbins Air Reserve Base, Ga.

In April and May of 2014, 138 Traditional Reserve and 13 active duty civil engineers deployed to Young Army Assault Strip at Ft. McCoy, Wis., in direct support of Exercise Patriot Warrior 2014 (see article on p. 20). Engineers provided real world support of incoming airlift assets and construction of a bare base overcoming torrential rains, strong winds and cold temperatures to receive 396 follow-on forces. In addition to accomplishing the exercise's mission requirements, members completed 90 percent of all home station training and many SORTS reportable requirements.

The Academy's FERL Program is a nationally recognized program which provides innovative hands-on education and construction experience. This year the program provided 62 cadets with a solid foundation in a variety of civil engineering topics. Over the program's 15-day period, AFRC members, in concert with active duty and Guard members, gave Cadets more than 1,400 man-hours of mentorship and hands-on training in the fields of engineering assistance, heavy equipment operations, utilities, structures, electrical, and power production. In addition to the FERL program, Reserve Airmen worked at Schriever AFB, Colo. alongside their active duty counterparts to complete a concrete pad for the Outdoor Recreation Office's vehicle parking lot. Airmen tackled a variety of smaller projects including pump replacement for fire suppression systems; water pump service; road sign replacement; office renovations; HVAC and electrical work orders; and other trouble tickets. Being able to work alongside a Total Force workforce to complete work orders, projects and complete real world training in lieu of computer-based training was extremely valuable.

At Dobbins ARB, Ga., the intense heat and humidity associated with Georgia summers did not hinder Reserve engineers in accomplishing a DFT project to construct a 50-by-100-foot open bay warehouse for the ECS-TCC. The project was a cooperative effort from base to major command levels with 113 Airmen directly participating in site development and construction of the pre-engineered building. Over a 12-week period, the project provided critical skills training for all the Prime BEEF operations personnel and encompassed cradle-to-grave management of design, site development, ground breaking and construction activities leading to the final ribbon cutting. More than 350 yards of select fill was utilized along with 285 yards of concrete poured to set the stage for building erection. For many of the Airmen it was their first deployment and first experience with the obstacles that occur during construction projects. Not only did the project provide skills training it also provided a platform for team building and Total Force integration.

The examples above illustrate the many ways that Reserve Prime BEEF civil engineers remain at the ready for whatever the mission calls for, whenever it calls. The Air Force Reserve Prime BEEF program remains a vital component of the Total Force team.

Chief Master Sgt. Blankenship is the Civil Engineer MAJCOM Functional Manager, HQ Air Force Reserve Command, Robins AFB, Ga.

(Facing page) Air Force Reservists with the 433rd Civil Engineer Squadron redo the siding, windows and doors of a Morale Welfare and Recreation building on the west side of Fort McCoy, Wisconsin May 3. The CE unit out of Joint Base San Antonio-Lackland arrived here April 26 to bed down a Forward Operating Base in support of Exercise Patriot Warrior. As the unit moves into the sustainment phase, Airmen helped out with real world projects for the Army. (U.S. Air Force photo by 1st Lt. Denise Haeussler)

(This page) Master Sgt. Timothy Harper, 911th Civil Engineer Squadron, waters the ground for a cement pad for a vehicle parking lot at Schriever AFB, Colo. (U.S. Air Force photo/Staff Sgt. Julius Delos Reyes)

ALL IN: The Guard's Prime BEEF Mission

Maj. Juan Marulanda
NGB/A7X

Whether a Prime BEEF civil engineer serving as an active duty or Air Reserve Component Airman, your fundamental mission, training and unit composition are basically the same. Guard Prime BEEF units are deploying and serving worldwide, side-by-side with their active and Reserve counterparts. The key factors that differentiate an ANG Prime BEEF citizen soldier is their activation by state leadership, experience during an emergency response, and knowledge and involvement within the community they serve.

In fiscal 2013, a total of 399 Prime BEEF personnel deployed. During fiscal 2014, 558 Prime BEEF Guardsmen (15 mobilizations and 529 manpower authorizations) deployed under the old Air and Space Expeditionary Force "banding" approach. The latest changes on AEF rotations reflect an even higher commitment for our deploying units as compared to previous rotational business rules. A proposed total of 280 personnel will deploy in fiscal 2015 and, in fiscal 2016, a total of 830 (all mobilizations). Fiscal 2015 is the first year for the ANG under the new AEF Teaming concept and many of the wings are being re-postured under this new cycle, thus a lower 280 personnel count.

ANG civil engineers will be tasked in supporting enduring missions around the world for fiscal 2016 and beyond. The National Guard is … "all in," according to a recent memo by Gen. Frank J. Grass, the National Guard Bureau chief. The ANG is committed to one period of mobilization to three periods of dwell time for unplanned operations and a one-to-five ratio for steady-state operations.

Along with AEF deployments, the Deployment for Training program plays an important part in keeping our civil engineers trained and ready. The DFT projects provide valuable training opportunities not normally available in home station scenarios and are essential for developing unit preparedness, flexibility, confidence, initiative and integrity. They provide the best possible exposure to challenges approximating real world missions.

Each year an average of 2,600 to 2,800 Guard CEs from approximately 60 units participate in AEF deployments and DFT projects (see Map for fiscal 2014 examples). We are actively supporting three combatant commands, two major commands, the U.S. Coast Guard, Navy and Army Guard, as well as NATO. In fiscal 2015, our Prime BEEF DFTs will visit seven CONUS locations with 15 rotations and nine OCONUS locations with 15 rotations.

Air National Guard civil engineers deployed to Australia tie rebar on a pedestal for a radar center at Holt Naval Communications Center. (U.S. Air Force photo)

Some Prime BEEF DFT deployments are not NGB-directed, but are instead driven by State Partnership Programs. An SSP is a bilateral relationship between a U.S. state (through the National Guard) and another country with the mission to "Enhance combatant commanders' ability to establish enduring civil-military relationships that improve long-term international security while building partnership capacity across all levels of society."

On a recent SPP deployment, a team from the 190 CES in Kansas, visited Darbas, Armenia, where they completed their assigned mission — renovation of three school classrooms, a teacher's lounge and a medical clinic and extra upgrades as well. Members from three ANG units— the 133 CES and 148 CES (Minn.) and the 219 RED HORSE Squadron (Mont.) — completed an SSP project in Ogulin, Croatia, demolishing or renovating six restrooms in a 100-year-old building on a Croatian Army installation.

The above deployments are only one side of the coin for a Guard CE unit. Our dual status and ability to quickly make our strength available to state leadership is an important "value-added" differentiation. During a localized crisis, governors can immediately reach out to our Air National Guard resources for support. During their state's floods last year, Colorado's 240th Civil Engineer Flight was activated to support the local authorities. They were quick to identify the requirements. Other guard units took their plans and made the needed repairs a month ahead of schedule. Even though it was not in the original plan, the engineers paved the road. "The professional work of our Airmen was lauded at every level," said Brig. Gen. Peter Byrne, Director of State,

Master Sgt. Joshua Graves (left) and Master Sgt. Jeremiah Graves, brothers deployed from the Guard's 148 Civil Engineer Squadron, work on runway repairs at Bagram Field, Afghanistan. (U.S. Air Force photo/Airman 1st Class Bobby Cummings)

Joint Force Headquarters-Colorado. "Their ability to bring civilian skills to bear for our communities is amazing…." Several of the Guard CEs were civilian employees of the state's department of transportation. This type of connection gives our Guard CEs a unique perspective or an "edge" during recovery efforts.

The Guard Prime BEEF CE's civilian community connection is also displayed through deployments such as the Innovative Readiness Training program. The IRT program allows military construction units to partner with non-profit organizations during military training projects in the United States. One of our larger IRT projects is a partnership between the Office of the Assistant Secretary of Defense and the Boy Scouts. Recently at Camp Hinds, N.H., Airmen from the 161th (Ariz.), 126th (Fla.), 127th (Mich.), 123rd (Ken.), 188th (Tenn.), and 141st (Wash)., joined Marines and Soldiers for annual training. They honed their construction trade skills by cutting a new road, constructing a parking lot, building cabins and preparing a site for a new dining facility. Work done by Missouri's 139th CES at the YMCA's Snow Mountain Ranch near Winter Park, Colo., building and improving parks, ball fields and other facilities provided an immediate return the community as well as valuable hands-on training to the CEs.

In summary, through a hardy deployment schedule and hands-on experience, when called upon, Prime BEEF Airmen have the capability to perform mission requirements in a moment's notice. Since the 1960s, they have continued to provide consistent response across components and areas of responsibility. The Air National Guard Prime BEEF Airman's responsiveness to state and federal leadership as well as their civilian experience and community involvement are unique qualities of today's units — hallmark differentiators of a true citizen soldier.

Maj. Marulanda is the Deployment Officer, Readiness Directorate, Air National Guard Readiness Center, JB Andrews, Md.

Examples of DFTs and units for FY14

Tarheel Challenge, N.C. — CEs from the 149th (Texas), 156th (Puerto Rico) & 159th (La.) helped the North Carolina ANG remodel an elementary school for the NC Youth Challenge Program

Kinloss Barracks, Scotland — CEs from the 140th (Colo.) provided support at troop training sites in an exchange program with the British Royal Army Engineers

Bagram, Afghanistan — CEs from the 142th (Ore.) completed main runway repairs at one of the AOR's busiest airfields

Clearwater Air Station, Fla. — CEs from the 103rd (Conn.), 186th (Miss.) & 157th (N.H.) completed several projects to make the station more energy efficient and safe, saving >$300K in labor expenses

Exmouth, Australia — CEs from the 151st (Utah), 138th (Okla.), 176th (Alaska) & 118th (Tenn.) relocated/upgraded a C-band radar from Antigua to Holt Naval Communications Station

577th Expeditionary Prime BEEF Squadron –

What Can We Do for You?

Capt TJ Gabrielson
577 EPBS/TC

Air Force Engineers are charged 24/7/365 with providing, operating and maintaining installations as weapon platforms. Air Force Engineer Operations Doctrine (Annex 3-34) postures civil engineers to be able to "operate from fixed bases, yet be mobile enough to project combat airpower worldwide." The 577th Expeditionary Prime BEEF Squadron can do this and more. The squadron is highly trained and flexible, tailoring teams to projects and locations.

History

In 2009, installation engineers in Afghanistan across all services were tasked beyond sourcing capacity. Many Air Force engineers were assigned to Facility Engineer Teams spread across 10 organizations and seven installations, with tactical command in the hands of battlespace commanders. In response to this misalignment of resources, U.S. Central Command established the Prime BEEF construct of Airmen leading Airmen. Today, the 577th EPBS, along with the 557th Expeditionary RED HORSE Squadron, is part of the 1st Expeditionary Civil Engineer Group and continues to provide a unique theater civil engineer capability.

Construct

The 577th EPBS is organized into three flights. The Special Capabilities flight, postured in Afghanistan, comprises more than 70 engineers divided among four teams: rubber removal; paint striping; tension fabric shelter J2; and configurable small maintenance and repair teams, or C-SMARTs. The Troop Construction flight has more than 50 assigned engineers and is responsible for light construction projects throughout the Combined Joint Operations Area-Afghanistan, or CJOA-A, and countries within the Gulf Coast Coalition — the GCC. Finally, the third flight is providing stop-gap base operating support-integration maintenance and upkeep for a base at an undisclosed location in Southwest Asia.

Special Capabilities Flight

Rubber Removal & Paint Teams

The 577th EPBS's rubber removal team is an essential asset to U.S. Air Forces Central Command. The team is a cost-effective and expedient solution to clear rubber deposits from runways throughout South West Asia. Team members utilize Avion® detergent and Toolcat Utility Work Machines® with an angle broom attachment to remove deposits on as much as 20,000 square feet per hour. In the past three months, the rubber removal team has cleared more than 1.1 million square feet of runway surface at eight airfields throughout the area of responsibility.

The paint striping team follows, marking the recently cleaned runway to ensure standardized flight safety for coalition aircrews. The team has painted more than 300,000 square feet of runways, taxiways, parking aprons, roads and parking lots throughout CJOA-A and GCC countries. The rubber removal and paint striping teams coordinate with each location's airfield operations and CE squadrons to minimize runway closure. As soon as the job is complete, the teams are off to the next airfield.

Tension Fabric Shelter Teams

The tension fabric shelter J2 teams work directly with the Theater Engineer Brigade, "Trailblazer," to align shelter deconstruction drawdown plans with U.S. Forces-Afghanistan. Led by subject matter experts from the 49th Materiel Maintenance Squadron, Holloman AFB, N.M., the teams can safely disassemble and reconstitute a TFS measuring over 42 feet high, covering 14,000 square of floor space, and valued at $350,000 in fewer than five days!

In the past six months, the TFS J2 teams deconstructed over 40 TFSs at more than 15 locations throughout CJOA-A, recapitalizing more than $14 million in War Reserve Materiel. With more than 50 TFSs left to deconstruct, the J2 team is in high demand. The Director of Joint Engineering, USF-A, recognized this potential planning shortfall and requested the J2 team train an Army platoon to meet the Dec. 31 deadline to close forward operating bases.

C-SMART

The EPBS dedicates about 20 personnel to the configurable small maintenance and repair teams. Based on the project size and type, teams of up to eight craftsmen travel to locations across CJOA-A fixing life, health and safety issues. For example, a team traveled to a FOB recently attacked by a vehicle-borne improvised explosive device and repaired the damaged facilities in less than two weeks. Another team installed 5 miles of fence and fixed 2,000 fence posts to improve force protection for personnel numbering in the tens of thousands. At yet another remote site, several thousand troops were without heating, ventilation and air conditioning for six months until a C-SMART helicoptered

in to repair the 80 HVAC systems. This is a token glance of the more than 360 work orders C-SMART completed in the last six months at more than 20 FOBs throughout CJOA-A.

Troop Construction Flight

The Troop Construction flight focuses its efforts on light construction projects at 12 sites spread across nine countries. The team recently renovated and added 700 square feet to an existing facility to provide the Office of Special Investigations detachment with its first dedicated interview room and operations center supporting outside-the-wire counter-intelligence and counter-terrorist operations.

A nine-person team from the flight also renovated a large dining facility by removing and replacing 2,500 square feet of deteriorated flooring and 175 linear feet of failed plumbing. The project was completed in 20 days, 6 days ahead of schedule.

Engineers are engaged in upgrading 18 facilities to prepare for the new Intrusion Detection System. Construction includes concrete masonry unit vestibules and installation of bulletproof doors and windows. The team is securing interior offices with reinforced walls and sound-dampening materials to protect sensitive information. This project will pave the way for AFCENT's $2-million IDS upgrade at three major installations.

The TC flight improved a 6-acre helicopter landing zone, grading 5,300 cubic yards of rock and assembling 166,000 square feet of AM-2 matting. This herculean effort allowed five FOBs to retrograde their equipment and close.

The TC flight saved the busiest airfield in the AOR from a potentially catastrophic foreign-object damage, or FOD, hazard. On the runways, the aircraft arresting system poly panel anchor bolts broke loose and vibrated to the surface. The TC engineers collaborated with AFCENT, the ECEG, the Air Force Civil Engineer Center, and the Air Expeditionary Wing to innovate an anchor bolt test and installation procedure. The team tested, replaced and verified 992 AAS anchor bolts on the airfield.

BOS-I Flight

A team of multi-craft engineers expanded a base in an undisclosed area from an exercise location to a fully operational base. In the past three months, craftsmen have completed more than 320 maintenance requests, supporting 181 facilities and a large number of personnel. They also constructed a $500,000, 11-acre 440,000-gallon fuel farm to enable 24/7 air operations. The flight installed and is operating a $2.3-million, 2.25-megawatt prime power plant and a 30,000-linear-foot distribution network to support base electrical demands.

577 EPBS was born out of the necessity to better utilize Air Force engineers to address AFCENT's top priorities, regardless of location. They continue to perform that unique mission today, constantly adapting to new environments to get the job done. The 577th's engineers are a "prime" example of how Air Force "Engineers Lead the Way!"

Capt. Gabrielson leads the Troop Construction Flight for the 577 EPBS.

The 577th Expeditionary Prime BEEF Squadron builds a Tactical Operation Center in Southwest Asia. (U.S. Air Force photo/Senior Airman Hannah Landeros)

Making the List

Approval of the first two-year Integrated Priority List caps a busy year for AFCEC P&I.

Capt Lindsey Maddox
AFCEC/CPAD

On June 25, the Civil Engineer Council approved the fiscal 2015-2016 Integrated Priority List, the first step in giving more than $1B in requirements authority to start preparing for execution. Approval of the fiscal 2015-2016 IPL was the culmination of a busy year for the Air Force Civil Engineer Center's Planning and Integration Directorate, and represented a quantum leap forward for managing the annual centralized program.

"It moved the asset management approach from theory into practical application," said Col. Jace Davey, who at the time was the Planning and Integration Director. "We can quantifiably demonstrate we are allocating resources to extend service life or invest in our most valuable assets to minimize impact to the mission."

AFCEC's P&I Directorate was given the task of merging centralized infrastructure investment programs (large sustainment, demolition, restoration and modernization, dorms, energy, and environmental) and developing the first two-year IPL, beginning with fiscal 2015 and 2016. The goal was to look into future years and become more proactive for better planning, design and contracting actions for long-lead projects, seamless execution of end-of-year funds and a smooth transition from one year to the next.

Historically, each centralized program was managed and prioritized according to its own set of rules and scoring model. The result was six separate lists, and while each program attempted to employ asset management principles, individual stovepipes prevented leaders from comparing requirements across all programs. This became increasingly clear as funding decreased and senior leadership needed to know which requirement was truly the Air Force's next-best investment of scarce resources.

The engineers in P&I set out to inform tough investment decisions by developing one set of rules and one scoring model to integrate all Operations and Maintenance programs, but it wasn't easy! How does an environmental permit compare to restoring flightline pavements or modernizing a critical command and control facility? The team looked to investment models used in the private sector and existing Air Force scoring models, and a common theme emerged: risk. What is the likelihood of something occurring and what is the impact or consequence if it does occur? It was simple and something leaders at every level and in every career field could understand — the foundation of operational risk management.

With the basic framework defined as Probability of Failure and Consequence of Failure, (see Figure 1), activity managers began working with subject matter experts and assembling working groups to determine how each type of infrastructure asset fit into the model.

CoF was fairly easy to define. Engineers have been using the Mission Dependency Index to define an asset's importance to the mission for years. It isn't perfect, but MDI serves as a good baseline for determining the criticality of an asset. Major command, installation and unit commander perspectives are also critical to providing "ground truth" regarding the impact of each requirement or project. Therefore, a requirement's CoF score is a combination of MDI and MAJCOM priority points.

Defining PoF was more difficult, but another survey of existing models provided a starting point. Whether scoring models used Q-rating, fire safety deficiency codes, risk assessment codes or other factors, each model considered the current condition of the asset. The factors used were generally subjective and not always precise or accurate, but the well-timed implementation of sustainment management systems helped address that. Using these systems, engineers at the installations were able to assess facilities, pavements and other assets, enter condition data into the SMS, and determine objective condition indices for each item. The lower the CI, the worse the condition, and the higher the probability that the asset will fail.

However, not every investment fits into a risk profile; some projects may simply be wise investments with the potential to gain efficiencies and save money. For that reason, extra points were made possible for requirements that demonstrated a positive savings-to-investment ratio. Projects with a high SIR would also be eligible for inclusion in savings "wedges" subjectively inserted in the IPL at the discretion of CE senior leaders.

Before releasing the new business rules and scoring model to the installations, P&I wanted to ensure the model and new procedures were vetted with the engineers in the field who would be performing the assessments and calculations. Test bases were selected for various aspects of the new guidance and model. Engineers at the installations provided key feedback to improve the process and make sure it would not overwhelm CE technicians and programmers.

The final fiscal 2015-2016 Business Rules and scoring model were published on January 7, 2014. After they were released, base-level engineers had roughly three months to complete asset inventories, collect condition data, program requirements in ACES-PM and prioritize projects through their facilities board processes. It was a tall order, but the installations made it happen! They even educated AFCEC as they did it, sharing best practices and offering to speak during training webinars.

Installation priorities were forwarded to respective MAJCOMs, who validated project programming and scoring and consolidated all requirements into MAJCOM prioritized lists. MAJCOM priorities were updated in ACES-PM and submitted to AFCEC by May 15.

The P&I team immediately got to work and pulled ACES-PM data to build the initial IPL draft incorporating all O&M requirements. More than 4,700 projects worth $3.6B were submitted for consideration in fiscal 2015 and 2016. All projects were prioritized based on total score, and multiple integration program group meetings were held to coordinate among MAJCOM programmers and ensure all projects were accurately represented. Remarkably, the prioritized

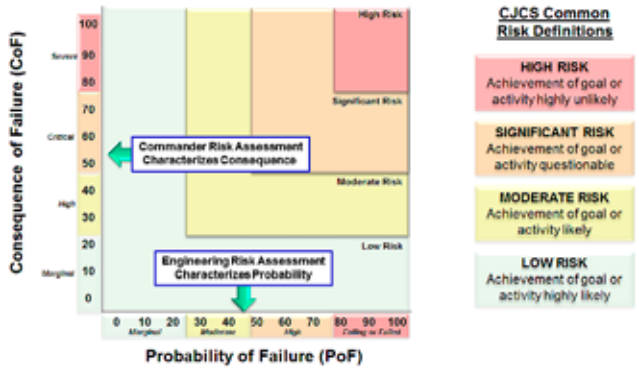


Figure 1. Framework for scoring model

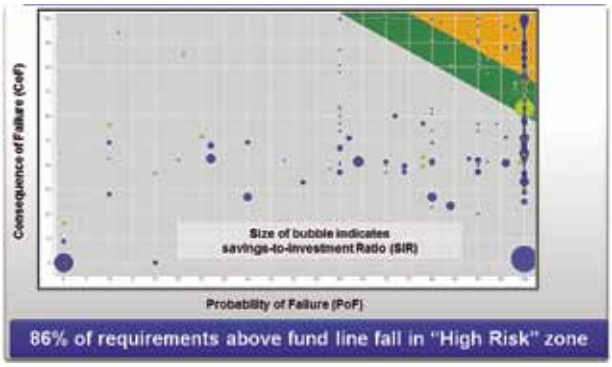


Figure 2. Actual requirements on FY15 IPL

list mirrored expectations. (see Figure 2.) Installations submitted their worst assets for consideration; therefore, a lot of projects had maximum PoF. Base-level programmers also proved that they could identify cost savings, whether it was energy savings or decreased O&M costs, for most requirements. Great news on both fronts!

While the approval of the fiscal 2015-2016 IPL warranted celebration, it hasn't been a reason for P&I to slow down. Now that project prioritization has been approved, focus has shifted to execution of the fiscal 2015 program and making improvements for the future.

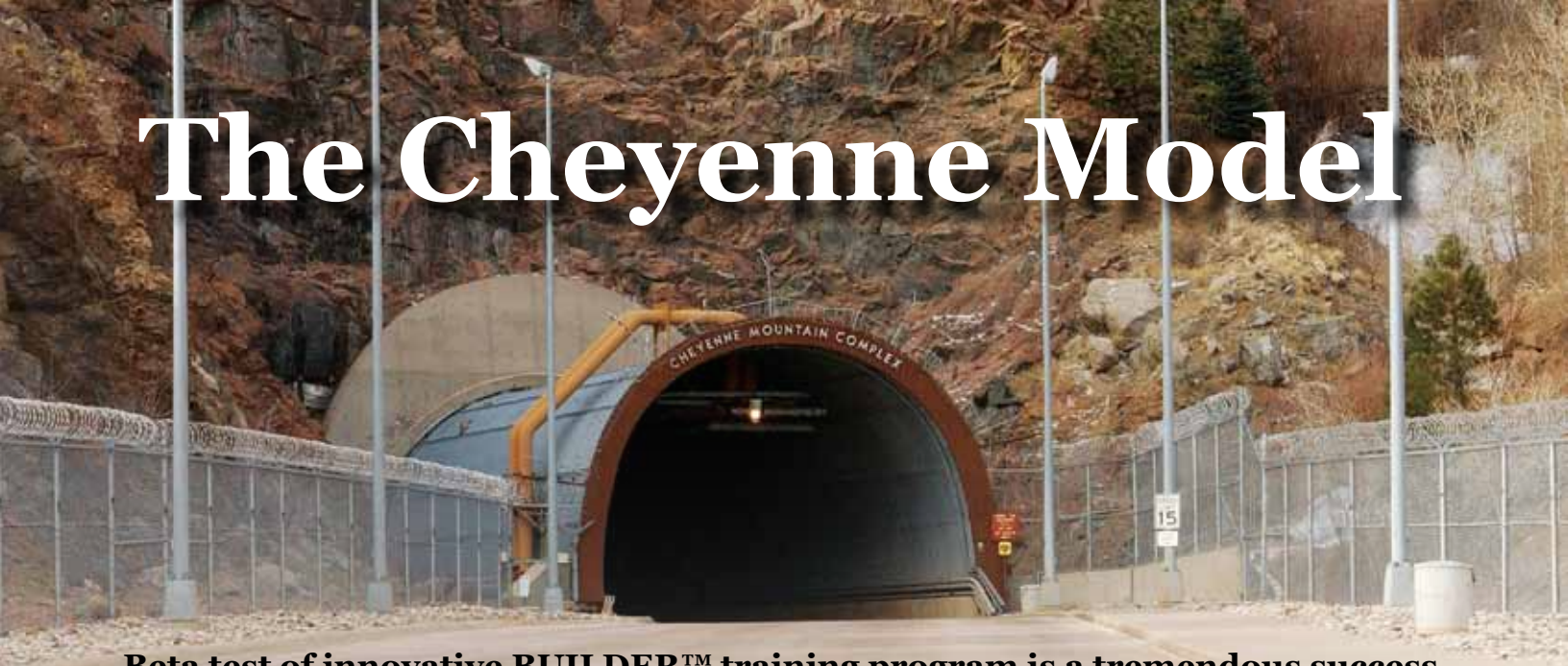
Since the approval of the IPL, AFCEC has issued authority to advertise for all projects above the funding line using the new Construction Tasking Order, a tool developed in conjunction with the Assistant Secretary of the Air Force offices for Acquisition and Financial Management to enable earlier awards and improve obligation rates.

In addition to getting projects on the street sooner than ever before, AFCEC is trying to help get ahead of the planning cycle by publishing business rules earlier. The fiscal 2016-2017 Business Rules were released on August 19, giving installations roughly five months to plan and program their requirements.

"The recent success of the IPL rollout is just the tip of the iceberg compared to what the future holds," said Col. Gregory Ottoman, chief of AFCEC's Activity Integration Division. "It is the first step toward proactive and strategic asset management. Now that our base civil engineers have embraced SMS, AFCEC will be able to effectively manage the entirety of the Air Force built and natural infrastructure portfolio, with the end goal of getting the maximum value out of each taxpayer dollar we spend."

Capt. Maddox is Chief, Installation Investment Programs in the Planning and Integration Directorate, AFCEC, JB San Antonio-Lackland, Texas.

The Cheyenne Model



Beta test of innovative BUILDER™ training program is a tremendous success.

Amy Ausley
AFCEC/PA

The Asset Visibility Team from the Air Force Civil Engineer Center recently partnered with the 721 CE Squadron at Cheyenne Mountain Air Force Station, Colo., for a beta test of a new training program on a sustainment management system, or SMS. The outcome was a win for both the students and the instructors.

The AVT from AFCEC's Detachment 1 at Tyndall AFB, Fla., designed the training program specifically to give installations the tools and experience needed to become proficient at BUILDER™ — an SMS developed by the U.S. Army Corps of Engineers for vertical facilities, such as buildings. SMS is basically looking at assets from a more holistic viewpoint, tracking the cost of ownership throughout the entire life cycle of the asset.

The practice of looking at assets through an entire life cycle is not new and is something CE squadrons have been doing for a very long time," said Bil Hawkins, manager of AFCEC's Sustainable Infrastructure Assessment program and the lead instructor for the BUILDER training program. "While the push to get facility information data into BUILDER is more recent, using it in the Air Force is not new either."

The Air Force adopted BUILDER in 2008 with a beta test of several installations, and began the full effort of collecting data in BUILDER using contractors in 2010 as part of the SIA program. A second SIA effort, again using contractors, is winding down now as the AFCEC's AVTs are fully operational.

The purpose of the AVTs is to provide SMS guidance for installations across the Air Force to provide standardization. The teams started going to installations in July 2013, covering gaps in SIA efforts and helping installations become familiar with the SMS process.

"The AFCEC AVT members have been able to provide the mechanics of BUILDER and relate the current CE practices to the methodology," said Hawkins. "We are getting the installations up to speed, and have had several requests for more hands-on training. As proof of the benefits of BUILDER, CMAFS' deputy mission support group commander, Steven Rose, recently told us 'AFCEC's short visit helped get us $8M.'"

The AVT worked with 15 of Cheyenne Mountain's staff members to inventory and assess nearly 400,000 square feet, or 98 percent, of the installation. With supervision of the AVT, the CMAFS staff went through every facility noting the condition according to predefined standards in BUILDER, as well as inventorying equipment and systems. The information was then entered into the BUILDER program.

"The most frequent comment we heard was that the CE staff is only called to a facility if something breaks," said Hawkins. "So, we found several equipment and system problems the tenants didn't even realize they had."

In only four days, the CMAFS team completed facility condition assessments on the entire installation, giving the CEs the required live data in BUILDER to assist them with programming and maintenance and with future funding as well.

"The basic principle of SMS is to be proactive and not chase down the condition of facilities by emergency service calls," said Hawkins. "The beta test at Cheyenne Mountain proved it works."

Effective Encroachment Management Foundations

Robert Rushing, AICP, LEED-AP
AFCEC/CP

Robert Kull
Marstel-Day

AFI 90-2001, Encroachment Management, signed by Ms. Kathleen Ferguson, Principal Deputy Assistant Secretary of the Air Force for Installations, Environment, and Energy, was published Sept. 3, 2014, finalizing a process that began in 2010.

AFI 90-2001 establishes the Air Force Encroachment Management Program, which identifies encroachment management roles and responsibilities at all levels of the Air Force and describes the process and need for encroachment studies. The AFI further expands on the definition of encroachment, including 13 encroachment and sustainment challenge areas:

- Airspace and Land Restrictions
- Airborne Noise
- Urban Growth
- Spectrum Encroachment
- Endangered Species and Critical Habitat
- Air
- Water
- Cultural Resources
- Unexploded Ordnance and Munitions
- Marine Resources
- Energy Compatibility and Availability
- Security/Safety
- Natural Factors and Climate Effects

The overall purpose of the AFEM Program is to preserve Air Force mission capability while maintaining compatibility with community resources. The new instruction implements Air Force Policy Directive 90-20 and employs cross-functional teams at multiple levels of the Air Force to address encroachment and sustainment challenges. While the challenge of encroachment has existed for decades, the new instruction deploys a standard approach to what some Air Force bases have been doing for years — protecting the mission from incompatible development.

How can base-level personnel find additional information about the AFEM Program? Each major command has an Encroachment Management Team, led by an executive director, who can provide major-command-specific AFEM information and guidance. In addition, the Comprehensive Planning Division at the Air Force Civil Engineer Center provides reach-back support to installations, MAJCOMs, and direct reporting units regarding all aspects of encroachment. For the past year, AFCEC/CPP has been preparing to support the AFEM Program across the enterprise. AFCEC/CPP can provide information on the development of an Installation Complex Encroachment Management Action Plan, or ICEMAP; possible management actions to address encroachment issues; legislative activities that impact installation missions; or potential incompatible development. Finally, information and guidance is available on the AFEM SharePoint site: https://afcec-portal.lackland.af.mil/cp/cpp/em/SitePages/Home.aspx.

Mr. Rushing is the chief of the Comprehensive Planning Division at the Air Force Civil Engineer Center, JB San-Antonio-Lackland, Texas, and Mr. Kull provides contract support to the division through Marstel-Day, LLC.

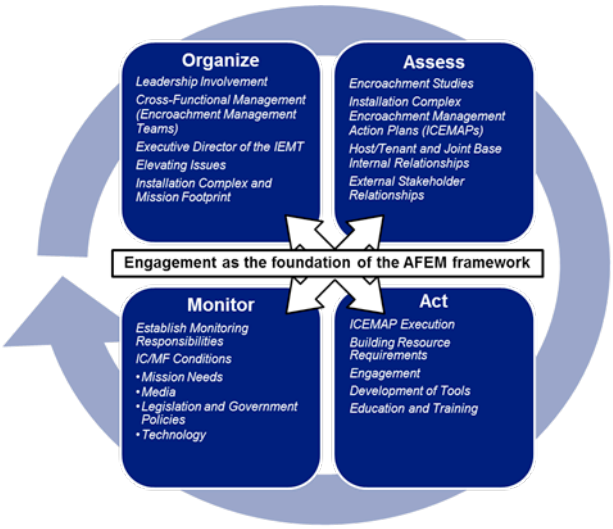


Figure. The four majors elements of the framework for a successful encroachment management program are interrelated.

AFRC CEs Support Patriot Warrior

For the first time, Prime BEEF and EOD CEs join firefighters in joint exercise.

Ralph Browning
AFRC/A7XE

Exercise Patriot Warrior, an accredited joint service exercise operation, is a premier Air Force Reserve Command deployment for training. It is a great opportunity for Air Force Reserve Command civil engineers to get hands-on experience, skills and training not available at home station. The exercise also stresses joint operations and interoperability with other Department of Defense components and international associates.

2014's Patriot Warrior took place from the end of April through mid-May with the U.S. Army regional training site at Ft. McCoy, Wis., as the primary location. In past years only Reserve firefighters participated in the exercise, but this year teams from CE Operations (3EO through 3E6 AFSCs) and Explosive Ordnance Disposal joined them to take care of bare base beddown, sustainment and redeployment activities.

"This exercise was Operation Global Medic, focused on moving injured warfighters out of a war zone to a higher echelon of care," said Chief Master Sgt. Timothy Pittman, Aeromedical Evacuation, Operations and Training superintendent at AFRC headquarters and the exercise's director. "It has been refocused to Exercise Patriot Warrior, an AFRC air component integration exercise to move equipment and supplies for all involved. We are supporting a 5,000 personnel Army force by establishing a full air base on a dirt air assault strip."

This is the first time AFRC CE Operations and EOD personnel have been able to participate in and support an exercise of this caliber. In the past, the U.S. Army provided base support, but wartime missions have exceeded soldier capability to support Air Force flying operations from a forward operating base.

AFRC's CEs not only got a valuable training opportunity, but they will also be able to receive major command Silver Flag credit for their efforts. Maj. David Jane, the chief of contingency training from the Air Force Civil Engineer Center was embedded with one of our deploying units, and through his observations, experiences and recommendations, validated that what AFRC's CEs do during Patriot Warrior meets or exceeds the required training for Silver Flag. This is a huge accomplishment for our CE units and their SORTS reporting.

AFRC Prime BEEF personnel, sourced by UTC, were some of the first on the ground, finding an empty dirt air assault field — a true bare base. Within 72 hours the Fire Emer-

gency Services and Operations CEs turned the empty field into an operational forward operating base to support 500 Air Force personnel who provided support to the Army as a force multiplier once the exercise kicked off on May 7.

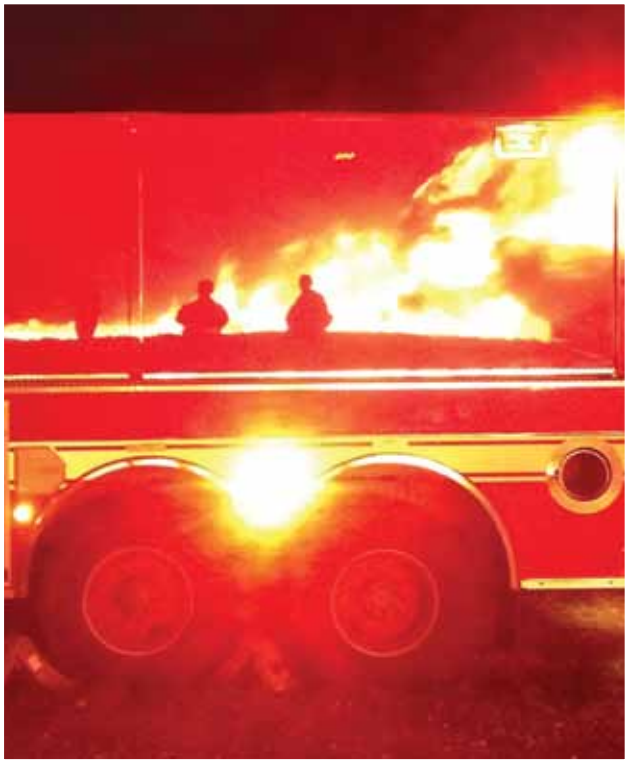
"The first few days were rough with cold, rainy weather, no heat, limited food and clean water," said Capt. David Shaw, who deployed from the 433 Civil Engineer Squadron as the Base Civil Engineer. "Our people got right to work, not only setting up the base camp for themselves to live comfortably and establishing fire protection capability, but also getting it ready for the main body of participants. They arrived to heated tents with power, hot food and warm showers. Morale was high throughout, and we could not be more proud of the work generated by these Airmen."

Once the beddown was complete, CEs moved into the sustainment phase, the upkeep and maintenance of the FOB, which provided them time to complete critical status of resources and training system, or SORTS, reportable training. The Prime BEEF Airmen were able to do upgrades as well as computer-based training modules, live fire training and weapons qualification. They installed boilers for hot water and set up laundry facilities. CEs set up a field kitchen allowing Services personnel to serve hot meals daily. Firefighters were able to do live firefighting training using JP-8 instead of propane, a definite plus since this type of training is not available at any of the Reserve home station locations.

AFRC is supporting the Army in real-world wartime missions and this exercise is as close to real world operations as it gets while providing a training platform not available at home station. The bare base beddown was a great success for the Reserve CEs: There was literally nothing there when they arrived and nothing there when they left. The Prime BEEF engineers built and sustained a contingency operating base for 500 personnel and then took it down when the exercise was over.

Next year's Exercise Patriot Warrior is planned to get even bigger and better for Air Force CEs. Reserve Emergency Management personnel should join Fire Emergency Services, CEO and EOD, making a total Prime BEEF package of AFRC participants.

Mr. Browning is the Air Force Reserve Command Prime BEEF Fire Emergency Services Fire Protection Specialist, Robins AFB, Ga. He was one of the 2014 Exercise Patriot Warrior deputy directors.



Air Force Reserve civil engineers in engineering and operations, fire emergency services and explosive ordnance disposal participated in Exercise Patriot Warrior at Ft. McCoy, Wis., in late April and early May.
Opposite and this page: During beddown, CEs battle the wind to erect a tent and a CE helps lay down a path to move equipment at Young Air Assault Strip.
Insets, this page: left, firefighting operations continued during the night and right, an EOD Airman prepares an explosive charge to detonate an IED. (U.S. Air Force photos)

The RED HORSE Way:

Training for Tomorrow by Making a Difference Today

Capt Thomas M. Synovec, P.E.
MSgt Ronald D. Weymer
823 RHS

Since 1965, RED HORSE engineers have continuously found a way to accomplish their mission in deployed environments. The large scale contingency construction and repair projects they accomplish require specialized skillsets and equipment not traditionally found in base-level civil engineer squadrons.

To ensure they are mission-ready and the combatant commander consistently receives a quality product, RED HORSE squadrons undertake troop training projects on a scale similar to those they are called to accomplish while deployed. As such, the 823rd RED HORSE Squadron has undertaken some of its largest and most complex troop training projects in recent years at Hurlburt Field, Duke Field, and Cape Canaveral Air Force Station, Fla.; Fletcher Field Airport in Clarksdale, Miss.; Shaw AFB, S.C.; and Andersen AFB, Guam. The projects at Shaw and Andersen were some of the largest horizontal and vertical RED HORSE projects, respectively, of this past fiscal year.

Shaw AFB

In April, 65 engineers deployed to Shaw AFB in South Carolina to repair and widen Patrol Road, the 3.2-mile arterial road that connects the main base to the Army Central Command Headquarters. More than 5,000 vehicles per day travel the road, including the vast majority of the installation's commercial traffic. To minimize disruption, the 823 RHS decided to work on the road in several phases — approximately half-mile, single-lane sections with temporary work zones established to protect the work crews.

Three crews worked 24-hour shifts, 7 days per week. All milling and paving work was conducted at night to alleviate as much impact on base traffic as possible. The project really tested the extent of RED HORSE capability. It involved constructing super-elevated and compound curves, working with the South Carolina Department of Health and Environmental Control and base environmental office on a new drainage plan and stormwater permitting as well as shifting the crown/centerline of the road using variable milling, widening intersections and adding dedicated turn lanes suitable for commercial traffic, mitigating pumping soil, demolishing large sections of the existing roads and installing culverts and guardrails.

Large portions of the Patrol Road work were atypical of contingency construction. However, the RED HORSE engineers on site rose to the occasion, leveraging the experience of the crew leads and the senior military and civilians at the 20th Civil Engineer Squadron at Shaw. The outcome was a superior product that significantly improved the mission and quality of life at Shaw AFB, while saving an estimated $900,000 through using troop labor in lieu of contracting.

The Patrol Road project was completed in early August, one month ahead of schedule, leaving the engineers on site the flexibility to accomplish three other projects on Shaw: 1) demolish an abandoned taxiway; 2) construct a 2.5-mile perimeter aggregate-surfaced road for anti-terrorism and force protection; and 3) repair and widen roads in

the munitions storage area while correcting site drainage to alleviate existing flooding issues. Each of these projects had unique challenges for site leadership to handle, but all were successfully completed ahead of schedule and under budget. The projects provided the 823 RHS CEs with well over 50,000 man-hours of vital pavements and heavy equipment training. Overall, it was a tremendous training opportunity for our "Dirt Boyz" as well as the four other career fields participating.

Andersen AFB

Several vertical trades also had the same type of opportunity at Andersen AFB, working on a $2.46 million project. In March, 67 engineers from the 823 RHS and 39 engineers from the 556 RHS, both from Hurlburt Field, deployed to Guam to construct three masonry buildings for the relocation of the Silver Flag site from Japan to the Pacific Air Forces Regional Training Center on Guam. Work included constructing facilities for expeditionary kitchen training, command and control training and a student shower and latrine. The more than 100,000 man-hours in construction and training were vital to preparing the Silver Flag site for the arrival of the first class, scheduled for October. The engineers on site faced some adversity, constructing facilities in a high wind and seismic prone area as they dodged two tropical storms, often had to wait on materials and equipment and worked on a TTP closely resembling a deployment with austere living conditions. Through it all, they remained resolved and committed to delivering a quality product.

Many of the skills learned over the past year will directly translate to 823 RHS requirements forecasted for the near future. For example, the techniques and lessons learned on Guam will directly translate to the squadron's deployment next year to build masonry schools and clinics in support of Exercise New Horizons in Honduras.

Troop Training Projects

For RED HORSE squadrons, it is a three-fold challenge each year to scrutinize the project list to select next year's TTPs. Each squadron must select projects that provide training for each of the trades to maintain all of required skillsets and capabilities. Squadron leadership must exercise judgment and strategic vision to prioritize the identified projects in order to provide, maintain or improve a capability needed or requested by combatant commanders. Leadership must balance all of the commitments placed on the squadron from various entities and projects with available resources.

Centralization of project selection and funding for TTPs has shifted to the Air Force Civil Engineer Center. Using the integrated priority list, or IPL, CE can now align a project's prioritization with value-added military labor training opportunities. This provides RED HORSE squadrons the opportunity for valuable training, while bases reap the benefits of reduced costs for quality work.

Regardless of the challenges ahead, the engineers of the RED HORSE squadrons remain committed and motivated to making a difference.

Capt. Synovec is the officer-in-charge, Design Team A and Master Sgt. Weymer is the Airfields, Flight-D Element foreman, 823 RHS, Hurlburt Field, Fla. Capt. Synovec was the project engineer/OIC for the Shaw AFB TTP.

Below and previous page: Civil engineers from the 823rd RED HORSE Squadron, Hurlburt Field, Fla., work on a road project at Shaw AFB, S.C., as part of a troop training project. (U.S. Air Force photos)

554 RED HORSE Builds a Better "Box" by Thinking Outside It

Capt Naseem Ghandour
554 RHS/DE

Constructing PACAF's new Regional Training Center, the 554 RHS used their "Can Do, Will Do" attitude to achieve mission success.

The 554th RED HORSE Squadron arrived home to Andersen Air Force Base, Guam, in April 2013 from a squadron-wide deployment to Operation Enduring Freedom to be met with a huge task — building the new Pacific Air Forces Regional Training Center. The Silver Flag training site was moving to a 2,000-acre compound on Northwest Field at Andersen from its former location at Kadena Air Base, Japan, as part of the "Rebalance the Pacific" strategy. After some well-deserved family time, the squadron reconstituted its tools and equipment and quickly got to work.

There was an extremely aggressive construction timeline. The 554 RHS had to complete 12 projects (10 vertical and two horizontal) in one fiscal year to achieve initial operating capability for the Silver Flag site. The timeline included the herculean task of constructing eight buildings simultaneously, six more than maximum capacity for the 554 RHS. Creative solutions for labor and construction techniques became a requirement for mission success.

Additional manpower came from total force Airmen, sister units and services, including project engineer teams from Andersen's 36 Civil Engineer Squadron and the 35 CES from Misawa AB, Japan. RED HORSE answered the call with teams from the Air National Guard's 254 RHS at Andersen and the 823 RHS (an active duty unit) at Hurlburt Field, Fla. Finally, the main joint partner was the 11th Naval Mobile Construction Battalion from Gulfport, Miss.

But, increasing manpower alone wasn't enough. The engineering team analyzed construction schedules, costs and material availability and determined new building methods also had to be considered.

The 554th's typical construction uses concrete, a material well suited to withstand the strength of Guam's typhoons and seismic activity, and a technique — unique to them — of precast concrete wall panel, tilt-up construction with steel trusses. Concrete wall panels are cast on the ground, then "tilted" up using a crane. Walls are temporarily braced until trusses are placed between them, and additional supports are placed under the roof until the steel and concrete is placed onto it. The average timeline to lift the walls, remove the temporary supports and start interior construction is three weeks.

The lead time for shipping structural steel from the mainland posed the biggest schedule challenge for using the 554 RHS's typical technique. The shipping adds 10-16 weeks to a project's schedule, unacceptable for completing the center's projects by the first quarter of fiscal year 2015. New building methods had to be considered. Key objectives of the new method were reducing the construction equipment and manpower required; producing a facility capable of withstanding the harsh environment; and ensuring the project remained on time and on budget. With designs flying off the printer for fast-turn execution,

the RED HORSE engineers had to find a new way of raising the roof. They did just that.

The 554 RHS turned to pre-cast/pre-stressed double tee beams, in which the reinforcing steel is placed under stress prior to casting in concrete. This allows the beams to span longer distances and carry a greater load. They can also be delivered within 3 weeks from on-island sources. There were other benefits as well: they provided natural corrosion resistance, met the strict seismic engineering requirements, and required less manpower and equipment to prepare and erect. Best of all, they cost less than a steel truss roof.

Top: **Reinforcing steel strands are stressed prior to casting the concrete beams.**
Middle: **A blanket is rolled over the beams to create a controlled curing environment.**
Bottom: **With no need for temporary supports, interior framing and final roof construction can occur simultaneously.**
(U.S. Air Force photos)

The concept of pre-stressed concrete beams has been in use for many years and in various kinds of structures, predominately highway bridges. The process is rooted in placing the reinforcing steel strands under tensile stress, according to the engineer's load calculations, before casting the concrete beam. Once cast and cured, the tension is released and the beams develop an upward deflection, which allows greater strength capacity to counteract the loads placed on the beam and therefore, smaller beams can be used.

Pre-stressed double tee beams consist of a section with two beams under stress and a 2-inch slab decking connecting them together. Sections are cast using 6,500-psi concrete and covered with a curing blanket to create a controlled environment that allows the beams to reach their 28-day strength, at 90 percent of ultimate strength, in just 3 days. The beam is then lifted out of its form using an overhead crane and placed in a staging yard.

With double tee beams the construction process from walls to finished roof is shortened from 3 weeks to 2 days, since the beams have a hardened concrete roof slab. This hardened concrete roof slab allows for construction to occur both on the roof, preparing for the reinforced 3-inch concrete topper, and inside the building, since the beams do not require temporary supports. The 554 RHS could go from exterior building shell into interior construction in record time.

Currently, six of the eight buildings have been erected using double tee beams, with the other two buildings using previously ordered steel trusses. The six projects that utilized double tee beams have estimated cost savings of $235,090 and construction time savings of 37 weeks.

The success of this pre-stressed/precast double tee beam system has made it the 554 RHS's method of choice for roof systems designed for the 2015 and 2016 facility construction program. For three new troop construction facility projects in fiscal year 2015, the system will result in an estimated cost savings of about $455,000.

Tasked to build PACAF's Regional Training Center support infrastructure on a compressed timeline, the 554th RED HORSE Squadron went outside the standard issue "box" and came up with a solution that is faster, uses less manpower and meets all engineering requirements. This effort was pivotal to achieving the project's timeline and mission success. The annual pipeline of 1,200 Pacific Air Forces' engineers and Force Support Airmen will commence training in October 2014 as scheduled.

Capt. Ghandour is the Engineering Flight Deputy Commander, 554 RHS, Andersen AFB, Guam.

Maps Prove Value for KC-46 Strategic Basing Effort

Andree Swanson
AMC/A7ZD

Groundbreaking for new facilities for the KC-46A Pegasus beddown at McConnell Air Force Base, Kansas, took place June 30. Two years ago, McConnell was one of many possible beddown sites and strategic basing planners were peering at electronic maps to get a real picture of the sites.

"As we made our way around to potential basing sites for KC-46, it was a huge help to see the infrastructure of the installations on a map," said Derek Strunk from the Strategic Plans, Requirements and Programs, Headquarters Air Mobility Command's, Scott Air Force Base, Ill.

Approval of environmental impact statements in April and May allowed McConnell to be officially approved as the active duty location for the KC-46A, Altus AFB, Okla., as the training unit location and Pease Air National Guard Base, N.H., as the first main operating base for the Guard.

The effort began years before with an initial "scrub" of the list of 50-plus potential bases. Answers to a questionnaire sent to all the bases quickly eliminated some airfields that didn't meet the basic criteria, such as having a 7,000-foot runway. Once the list was narrowed down, site survey teams visited bases under the umbrella of Air Force Instruction 10-503, *Strategic Basing*. It was the first time a major weapons system in AMC has been guided by the base selection process.

During detailed, on-the-ground-site surveys of each candidate base, the major commands evaluated the bases against operational and training requirements, potential impacts to existing missions, housing, infrastructure and manpower. The teams also developed beddown cost estimates for each base.

"We did a large part of the pre-site visit planning by looking at the base maps from our desks at AMC," said Rafael Gonzalez, AMC Installations and Mission Support Facilities Requirement program manager. "We couldn't talk to the bases, so we needed that situational awareness the maps provided."

The AMC Geo Integration Office, which maintains the electronic maps, played an important role. The maps include up-to-date imagery and trusted common installation picture data on base infrastructure on its CAC-enabled "AMC.maps" site. With engineering assistants standing by to measure and test ideas out, the maps served as the perfect visual tool prior to site visits.

"Everything we needed was on those maps or we could get it added," Gonzalez said. "In addition, everything we could see, everyone on the team, regardless of where they were, could see too."

AFI 10-503 made clear the team's mission regarding the aircraft's beddown: "As a minimum, the site survey team shall address costs and benefits of the proposed action and assess potential impacts to existing missions, housing, infrastructure, manpower, and any other applicable base operating support."

Getting to the final selection took a lot of analysis. The challenge of this task was clearly demonstrated through the requirement of how to fit the planes on the existing parking ramp. Gonzales and fellow program manager, Michael Flahive, had the task of determining whether the large aircraft would fit.

McConnell's KC-135s are oriented pointing east or west, according to Gonzalez and Flahive. But, the new aircraft will sit north and south to fit on the parking ramp. *(*see graphic above.) Because of this, the fuel pits need to be on a particular location on each parking spot to serve other aircraft besides the KC-46. Ultimately, they were able to show on a map how the fuel arrangement would work.

In addition to replacing and relocating the existing fuel pits and portions of fuel lines, new facilities will be built, including six hangars, three simulator training facilities, a new dormitory and a mobility storage addition. Eight facilities are scheduled for renovation.

Preserved and ready for the next round of beddowns, the AMC.maps website hosts a special map view called "KC-46 Beddown Plan." When additional sites are up for evaluations, the site view will be updated. In the meantime, strategic planners can view any airfield on the main map, the "General Purpose Viewer."

Even though AMC civil engineers have been through the basing process once, the KC-46 beddown is just beginning. "The first planes in production now have a home," explained Alex Karibian, chief of the Facility Requirements Program. "Future plans, though, call for up to 10 more bases that will have to be approved and fully vetted through the strategic basing process."

KC-46s will be the Air Force's tanker of choice for years to come, encouraging Air Force planners to use all resources to find the right location for the aircraft to call home. Online mapping will remain a cost and time-saving tool for future beddowns of all aircraft.

"The AMC Geo Integration Office, and perhaps all MAJCOM Geo Integration Offices, stand ready to support the operational mission with their mapping, visualization and analysis needs," said Rich Updike, AMC's Geo Integration program manager. "In 2003 to 2005 it was BRAC that we supported. Today, it's KC-46 beddown planning. Tomorrow … just call us."

Author's note: AMC.maps is located at https://amc.maps.us.af.mil.

Ms. Swanson provides contract support to Air Mobility Command as the Communications, Education and Training Manager in the Geo Integration Office, HQ AMC, Scott AFB, Ill.

Why McConnell?

The planners selected McConnell as the preferred alternative for the KC-46A main operating base for several reasons. Among them are because it has the lowest military construction costs, it is located in a region of high air refueling receiver demand and it already has more than 40 KC-135 Stratotanker refueling aircraft assigned. Replacing those aircraft with approximately the same number of KC-46As required the lowest manpower adjustments of the candidate installations. Even though the KC-46 doesn't require as long a runway as the Stratotanker, runway length was a consideration in basing.

The Air Force tanker fleet is aging, with KC-135s leading with birthdays around 50 years. The KC-46 is intended to begin replacing the KC-135. The aircraft is a multi-role tanker that can refuel U.S., allied and coalition military aircraft that meet international air refueling requirements. It can also carry passengers, cargo and patients. Its structure is based on a Boeing 767 and it will carry 30 percent more patients, up to twice as many passengers, and triple the cargo of the KC-135. The KC-46 is nearly 30 feet longer and wider, stands 10 feet taller and can weigh 50 tons more on takeoff than its predecessors. All these elements play a part in where the aircraft can call home, without requiring significant modifications and expense to the runway and base infrastructure.

Air Force GeoBase Program: More than a CE Map

Scott Ensign
AFCEC/CPAB
Richard Updike, P.E.
AMC/A7ZD

To an engineer, GeoBase provides standards and processes to manage and visualize infrastructure data, from manhole covers to building floor plans. For planners it is a tool provided by a platform that integrates and analyzes infrastructure, business and operational information. To an F-16 pilot concerned about flight obstructions on final approach or the C-17 flight crew who is equally concerned about the length of a deployed location's airfield, GeoBase is a flight safety planning resource. To a base commander, GeoBase is a common operating picture used to coordinate on-base emergency responses from first responders, security forces and public affairs. In the future, GeoBase could be a secure phone app employed by new airmen to get directions or find building numbers during in-processing.

More than a map, GeoBase continues to provide unique value to different people via standards, business processes and assorted products. A decision at the 2000 Fall CORONA established GeoBase. Substantial evidence continues to validate the program, including the comprehensive 2007 Rand study "Installation Mapping Enables Many Mission." The study corroborates that sharing installations and environment geospatial data between installation management, homeland defense, emergency response, environmental management and warfighting provides benefits such as significant costs savings and enhanced performance.

Program Leadership

When the question of who should lead the effort was posed to the 2000 CORONA assembly, four leaders raised their hands to champion the effort: Installations and Logistics; Security Forces; Communications; and Intelligence. These mission leaders each felt GeoBase was integral to their respective domains and they were all correct. Installations and Logistics, now known as Air Force A4/7, was awarded primary responsibility for GeoBase with the Civil Engineer assigned to lead the change agenda. Today, the Civil Engineer continues to lead this Air Force program that not only shares maps, but also integrates diverse mission data.

Air Force Information Integration

Capabilities that benefit multiple organizations need a single program element code associated with a single functional sponsor. The Air Force acquisition process naturally narrowed the scope of GeoBase implementation to Civil Engineer needs rather than the larger enterprise. Today GeoBase is largely associated with "One Base, One Map" and the Civil Engineer community. But joint efforts must continue to uncover Air Force, not just Civil Engineering, requirements where GeoBase may be applied to increase real returns for the Air Force. New mandates for asset accountability, such as financial investment and auditability readiness and the need to rightsize installation capacities, make the need for GeoBase today more compelling than ever. The Air Force GeoBase program managers and the Civil Engineer community share responsibility for inventorying and managing installations built and natural infrastructures to fulfill basing needs.

Conclusion

Any organization's culture is simply "the way things get done around here," and as evidence demonstrates, the GeoBase culture continues to expand to satisfy numerous needs of the Air Force. In many circles GeoBase has been defined as the common installation picture, or CIP, a limited tool providing a few layers on top of an electronic map. But documentation and experience shows it is not this simple. GeoBase is an Air Force program led by the CE community, supporting a broad spectrum of functional and operational mission requirements. It is a program comprising people, policy, procedures, processes data standards, business rules and tools enabling unity of effort. It is a culture of sharing information and a way of thinking steeped in information resource management principles. It is much more than a CE map.

As diminished budgets drive senior leaders to choose which mission capabilities contribute more value to the mission, the CE community may take pride in knowing the Air Force GeoBase program remains the most cost-effective means to providing situational awareness to all installation missions.

Mr. Ensign is the Geospatial Integration Officer, Air Force Civil Engineer Center, JB San Antonio, Texas, and Mr. Updike is the Geospatial Integration Officer, Headquarters Air Mobility Command, Scott AFB, Ill.

Customizing AutoCAD™ for S-File and Beyond

Randy N. Miller, PLS
75 CES/CENPL

The S-File space management utility is one of the primary tools developed to carry out the Air Force's goal of reducing facilities footprints 20 percent by 2020. The S-File relies on an accurate baseline for space use. GeoBase and other personnel at Hill Air Force Base, Utah, have developed a number of time-saving practices, computer-aided drafting automations, and geographic information systems processes to establish these space use baselines.

The S-File input process consists of four basic steps:

1. Review and update, or create existing CAD drawings of buildings

2. Align the drawing with prescribed CAD and layer standards

3. Interview the facility manager and tabulate space use and personnel assignments

4. Compile space objects and attributes in a GIS environment and export to a database consistent for use with the S-File utility

The main tools created are customized CAD commands (lisp routines) that arrange data needed for the S-File utility into a format within each building's AutoCAD drawing (.dwg). Automated GIS processes extract space-use data from the building floor plan drawing to create area shapes and associated attributes. These routines cut compilation time in half or more for larger buildings, increase quality, and more precisely tabulate cubicles and support spaces. Special scripts automatically compile the data into a spatial database engine GIS platform.

Alternatively, users operating within the AutoCAD Map 3D environment for GIS operations could easily read the attributes from within an existing drawing, use them to directly populate the established tables and relate them to individual space objects.

An AutoCAD .dwg file is very similar to a .dxf (drawing exchange file) format. When opened in a text editor, the elements in a.dxf file are parsed into separate rows more or less in a single column (i.e., it reads from top to bottom). For an AutoCAD Mtext object, properties exist within a .dwg file for such things as the insertion point, size, orientation and content. If all your space attributes exist within delimited text objects on a unique layer, it is possible to extract them for uses outside of CAD (e.g., like a related personnel table).

A comma makes a great delimiter. The software tool featured here extracts all of the comma-delimited Mtext contents of a drawing to a common .csv comma-delimited file that can be opened by Microsoft Excel™ or most text editing programs.

Safeguards are also in place for accidental transpositions and duplications. A separate dialog utility prompts the user to pick on a closed polyline, and then prompts the user to enter the room number, space type, organization, flight, number of workstations, number of personnel, and personnel type. The comma-separated label is created automatically with the SPACE_ID automatically incremented for the next space. The area is derived from the polyline area, and the MAJCOM field is populated in the label from the user value entered into a predefined variable. A Microsoft Excel macro alerts for duplicate spaces, or misspellings.

The S-File utility is a GIS based interim stepping stone for the asset management platform NexGenIT. The tools presented here just scratch the surface of possibilities for accelerating productivity in the gathering, compilation and publication of S-File space use data.

Mr. Miller is a cartographer with the 75th Civil Engineer Group, Hill AFB, Utah.

The Safe Jobsite

AFIT course provides engineers OSHA construction safety standards training.

Capt Justin Delorit, P.E., REP
Capt Adam Burwinkle
AFIT/CES

Building, maintaining and protecting sustainable Air Force facilities and infrastructure requires a blend of Civil Engineer skill sets or trades. Typically, as a project's scope of work increases, so does the number of trades required, and consequently the work complexity and risk become greater as well. This rise in complexity and risk affects, and potentially impacts, worker safety.

Like musicians in a symphony, each trade needs to know its instruments, how to use them, when to use them and what role they play as part of the larger whole. Safety training can provide these skills and knowledge, and contribute to increased worker welfare and project quality.

The Department of Labor's Bureau of Labor Statistics 2012 Census of Fatal Occupational Injuries found nearly 18 percent of all workplace fatalities occurred in the construction industry; no other single industry had more fatalities. The fatal injury rate for construction (9.9) is nearly three times that of the all-worker fatal injury rate (3.4). Interestingly, according to the BOL's report the fatal injury rate for those involved in heavy and civil engineering construction in government works was relatively low, with only 20 deaths in 2012.

Despite this lower fatality rate, there is still a need to educate military and civilian engineers to recognize, communicate and abate the safety risks associated with the work they perform. As the education branch of the CE career field, The Civil Engineer School at the Air Force Institute of Technology recognized this need, and in early 2014, obtained authorization from the DOL's Occupational Safety and Health Administration, or OSHA, to provide construction health and safety training.

The Air Force has long operated a comprehensive safety program managed by the Air Force Safety Center at Kirtland Air Force Base, N.M. Among other duties, AFSEC is responsible for the promulgation and enforcement of the 91-series of Air Force instructions (AFIs on safety). Chief among these is AFI 91-203, Air Force Consolidated Occupational Safety Instruction, a document that should be familiar to every Air Force CE.

The Air Force and OSHA agree that training is a major component in providing safe working conditions and executing a proactive managed health and safety program. OSHA has established standardized training programs for several key industries, including construction, and has developed curricula to support 10- and 30-hour courses to educate construction workers of their rights. Although OSHA cannot require employers, including the Air Force, to administer the 10- and 30-hour courses, many private employers consider their completion a prerequisite for either employment or work on a particular jobsite. OSHA considers employer commitment and employee involvement to be a "key element" in well managed safety programs, where training is a foundational component of fostering a mutually beneficial employer-employee relationship.

While most military engineers receive job specific safety training as part of technical school and career progression training there hasn't, until now, been training that has the

potential to reach every military and civilian engineer, no matter the grade, job or experience level.

As authorized by OSHA, the Civil Engineer School at Wright-Patterson AFB, Ohio, provides both 10- and 30-hour construction health and safety training courses. The school teaches the bodies of knowledge necessary to satisfy OSHA's strict program requirements, while tailoring additional lessons specifically to the needs of Air Force engineers. This blended approach to construction safety provides students the opportunity to obtain an OSHA 10- or 30-hour card while concentrating on career specific standards that apply to the work conducted around the Air Force.

The courses offered by The Civil Engineer School are more than just an immersion into the history and structure of OSHA, standards for construction safety and Air Force guidance. They are an opportunity to gather members of a unit in a week dedicated to discussing safety issues that CEs face at installation, command and Air Force levels. It is a chance to discuss how engineers can work together more safely, while partnering with wing safety and contracting, as well as non-government contractors to ensure all workers on an installation are performing their tasks safely.

The Civil Engineer School is currently engaged with units to provide week-long courses in OSHA construction standards for up to 40 military and civilian members. While all ranks and grades of both military and civilian members from any flight may apply, military E-5 to O-3 and civilian equivalents from squadron's operations and engineering flights will be considered as primary audience members. Craft-specific, unit, group, wing and MAJCOM safety representatives will also be considered primary audience as well. Squadrons interested in securing on-site course dates or obtaining additional information can contact The Civil Engineer School at http://www.afit.edu/CE/Course_Desc.cfm?p=WMSS%20500.

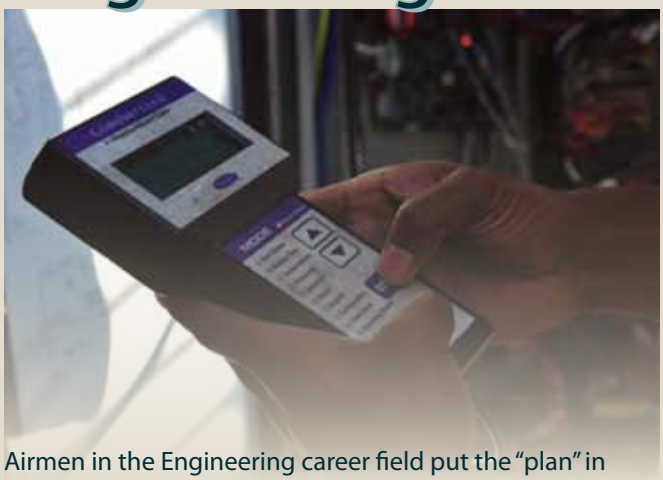
Capt. Delorit and Capt. Burwinkle are instructors at The Civil Engineer School, AFIT, Wright-Patterson AFB, Ohio. Both are OSHA Outreach Trainers, authorized to offer OSHA 10- and 30-hour courses in Construction Safety.

Following OSHA and Air Force guidance keeps safety in the forefront as civil engineers get the job done. (Courtesy Photo)

AFI 91-203

The 1,000-page AFI is inundated with safety standards that in many cases are taken directly from the Code of Federal Regulations (CFR, Title 29, Part 1926, Construction and Safety Health Regulations). This CFR was written by OSHA as dictated by the 1970 Occupational Safety and Health Act, a key document in U.S history. The act established the requirement (known as the General Duty Clause) for employers to provide their employees a workplace free from recognized safety hazards. Before The OSH Act and OSHA, no such protection was guaranteed to public and private workers in the United States.

3E5X1
Engineering



Airmen in the Engineering career field put the "plan" in "planning" for other CEs. They survey and collect data, then use highly technical computer-aided design programs to create the hardcopy and digital maps and blueprints essential to civil engineer's Air Force mission. They are experts in the two "Gs" – GIS, or geographic information systems, and GPS, global positioning systems.

3E5X1 CEs manage and produce installation maps connected through a GIS interface to the metadata (e.g., facility space, usage, location, condition, etc.) they also collect and maintain. At contingency locations Engineering Airmen perform reconnaissance and evaluate sites for bare base beddown, including staking temporary runway strips from existing runways, taxiways, aprons, highways, and roads; establishing new clear zones and safety zones, and determining location and elevation of runway lights, aircraft arresting systems and navigational aids.

They evaluate potential construction sites and perform field tests on soils, asphalt and concrete. In addition to designs, they prepare cost estimates, performance work statements and specifications for existing and proposed facilities. They coordinate, evaluate, monitor and document contract activities and progress, and serve as the liaison between design and construction and the end-user.

Basically, Engineering CEs are the bottom line, the place where almost everything begins in civil engineering. Most importantly, they always know where everything is, or where it will be!

A1C Ellen Underwood

Engineering Apprentice
188 CES, Ft. Smith, Ark.

Although Underwood is a college student studying emergency management, when she joined the Air National Guard in October 2012, she chose Engineering as her career field.

"I left for training in April 2013," she said. "I could have done what I do in school, but I wanted to challenge myself. I wanted to try Engineering because it was something that was hard for me. I actually like it a lot."

Participating in a Beyond the Horizons project in Central America gave her more experience and a broader look at what civil engineers do, said Underwood.

"I was part of the first rotation our unit sent to Guatemala for summer training. We went down to build a school, working with the Army. I wasn't able to work in my field, but I got to do other CE jobs — laying concrete, operating equipment. It was great."

Underwood said her time as an ANG Airmen has given her much more than practical knowledge.

"As an Air Force civil engineer, I've been taught to bring hard work, dedication and pride to my job. And, I love my job. I believe that we're not only here to protect our country, but to serve and help others."

3-level Apprentice

A1C Ellen Underwood, 3E5X1, 3-level
(U.S. Air Force photo)

Her goals include both finishing her EM degree as well as continuing in the Air Force, said Underwood.

"I want to stay in Guard or possibly go active duty," she said. "I want to retire as a chief."

SSgt Eric Carpenter

5-level Journeyman

Engineering Craftsman
99 CES, Nellis AFB, Nev.

Engineering was not Carpenter's first choice for a career field when he joined the Air Force in 2009. He actually wanted to be a loadmaster so he could travel more, said Carpenter.

"But, I'm absolutely satisfied with what I do. I figure I was picked for Engineering because of my applied science associate's degree that includes computer-aided drafting and 3-D. My being detail-oriented to the point of 'OCD' probably also helped," he laughed.

Carpenter said his favorite part of his job is what he's doing right now — building inspection.

"I really enjoy seeing how things are put together and making sure contractors are following the plans, and that it's built to Nellis' as well as Air Force standards."

On his 2012 deployment to Saudi Arabia, Carpenter "did what I do here at Nellis, but was more of a project manager," he said.

"We wrote up packages of what we needed done by our off-base contractors, and we also took care of the paint contract. We usually get to do project management only later in the career field; the first part is surveying, mapping and drafting. It was great experience."

SSgt Eric Carpenter (right), 3E5X1, 5-Level
(Courtesy Photo)

Carpenter will apply to officer training school after completing his bachelor's in project management, he said. But, if it doesn't work and the goal switches from OTS to retiring as a chief, he stills plans to stay in the Air Force."

"Either way I'll be okay, and will be an asset to the Air Force," he said. "I feel I'm a great mentor as well as a student. I have a knack for breaking it down and teaching others. That's a wonderful feeling."

MSgt Jason Balolong

7-level Craftsman

Engineering Craftsman
821 SPTS, Thule AB, Greenland

Balolong, who joined the Air Force in August 1998, arrived at Thule — a remote tour — in July of this year.

"I'm the contract officer representative for plans and program for the civil engineer flight. We provide government oversight for engineering services in support of the maintenance, revitalization and construction of facilities and infrastructure and provide technical support for third-party projects."

Thule is an important location for Air Force Space Command's mission, home to the sensors and satellites that are integral to detection, tracking and warning systems. Thule has a modern airfield with a 10,000-foot runway and more than 3,000 U.S. and international flights per year.

The Engineering career field was his first choice, said Balolong.

"I took drafting in high school and was interested in the job's technical drawing aspect, especially with a computer. I am very blessed and proud to be in the Air Force and especially in my career field. The opportunities have been wonderful."

A deployment to the 577th Expeditionary Prime BEEF Squadron in 2013 was a great experience," said Balolong.

MSgt Jason Balolong, 3E5X1, 7-Level
(Courtesy Photo)

"I definitely become more aware of the vital role CEs have in a deployed environment," he said. For me, I learned that what Engineering CEs do — the maps, managing construction projects, developing plans — can make huge impacts for senior leadership."

Balolong's goals are to get his bachelor's in operations and project management, and achieve as much rank as possible during his Air Force career, he said.

"I want to take in as much experience I can in managing projects, resources and people. The Air Force has already given me so much, but it's also important to give back. I think I'm good at taking care of fellow Airmen at home station or on a deployment. I value being a person someone could come to when they need advice or mentorship."

3E7X1
FES

FES Airmen play a primary role in protecting life and property and minimizing damage from fire that could seriously degrade mission capability.

At Air Force or Joint home stations or contingency locations, 3EX71 firefighters protect people, property and the environment from fires and other disasters. They are trained in firefighting, rescue and hazardous material responses involving aircraft and facilities and in managing and fighting wildland fires. Most Air Force fire departments have mutual aid agreements with local municipalities that expand their expertise and responsibilities "outside the fence" of their installations.

The first priority for FES Airmen is fire prevention, an important component to the risk management that all installation fire chiefs must do in balancing available resources (manpower and equipment) with the likelihood of an incident. If a fire, HAZMAT incident or other emergency does occur, response time, early intervention, teamwork and speed are paramount. So firefighters train, train and then train again. Otherwise, they're keeping their equipment — vehicles, hoses, and personal gear — in impeccable order.

Technologic improvements to fire suppression systems and firefighting protective gear, vehicles and tools may have made their jobs safer and more efficient, but not necessarily easier. Running toward a fire or another emergency, firefighters are always going "against the crowd."

A1C Michael Snipes

Firefighter
628 CES, JB Charleston, S.C.

A1C Michael Snipes, 3E7X1, 3-level
(U.S. Air Force photo/ Staff Sgt. William A. O'Brien)

Snipes entered the Air Force in May 2013 in another career field, but quickly switched to firefighting.

"I wanted to be a firefighter, so it worked out great," he said. "I think it's the best career field in the Air Force."

3-level Apprentice

JB Charleston is his first duty station, and the 628th his first squadron.

"It's everything I expected and more," said Snipes. "It's a great learning and people environment. The camaraderie as a team is phenomenal and I can go to anyone with a question because they make it easy to talk to them.

JB Charleston has seven different fire stations and a little more than 80 firefighters, said Snipes, with about 45 of them civilians and the rest military.

"Because it's a joint Navy-Air Force base, we do annual sub rescue training, which is pretty different for an Air Force firefighter," he said.

Snipes' current goals including finishing his career development courses (he's one CDC away from getting his 5-Level), getting his associate's degree in fire science from the Community College of the Air Force, and staying in the service until retirement.

"The Air Force has always been in the family. My dad was in the Navy, but my grandparents and everyone else was Air Force. So, it is kind of a thing I had to do. And, it's perfect for me. I'm very goal-oriented and willing to do whatever I need to, whether it's sweeping floors or crawling into a burning building. I will get it done and it will be done right."

SrA William Hill

5-level Journeyman

Firefighter, Driver/Operator
366 CES, Mountain Home AFB, Idaho

Hill was a wildland firefighter before he joined the Air Force in February 2009 with the intention of becoming an Air Force firefighter. Mountain Home is his first duty station.

"My prior training has been useful here," said Hill. "Although we haven't had any wildland fires this year, it's usually a lot of what we do here."

Hill has deployed as a firefighter twice to locations in Southwest Asia, including a NATO base.

"On my first deployment the base had a German fire department," Hill said. "It was cool to learn their techniques and teach them ours. Their trucks and gear are very different from ours, and so are their tech schools. Overall it was a great experience."

Back at home station, Hill credits the close working environment as a job incentive as well.

"I think I'll stay in," he said. "The Air Force has been good to me. I enjoy what I do, especially the camaraderie of the department. When you work 48 hours together at a time, you get real close to everyone."

SrA William Hill, 3E7X1, 5-level
(U.S. Air Force photo/Airman 1st Class Jessica Smith)

What advice would Hill give a new Air Force firefighter?

"Stay positive and motivated. You probably won't get a lot of fires right away, but you will. Early on, someone told me when I go on a call to remember the people — it's not our emergency, it's theirs, and we'll be their saving grace. It's advice I've taken to heart and try to pass on."

SSgt Kyle Dulan

7-level Craftsman

Fire Protection Crew Chief
100 CES, RAF Mildenhall, U.K.

Dulan joined the Air Force in September 2004 and recently re-enlisted in a unique way – while rappelling down Mildenhall's air traffic control tower.

"I'm in it for the long haul," said Dulan. "Initially I was going to use the Air Force as a stepping stone into civilian firefighting, but 10 years later, I'm here."

Dulan has deployed as an installation firefighter a total of five times, four times to Southwest Asia and once to Colombia.

"The likelihood of having a significant, large-scale incident is greater downrange," said Dulan. "On each of my deployments we averaged one or two. That's when it's good to have your home station training, because things move fast."

Dulan's mother is a health and HAZMAT specialist with the Los Angeles County fire department in California.

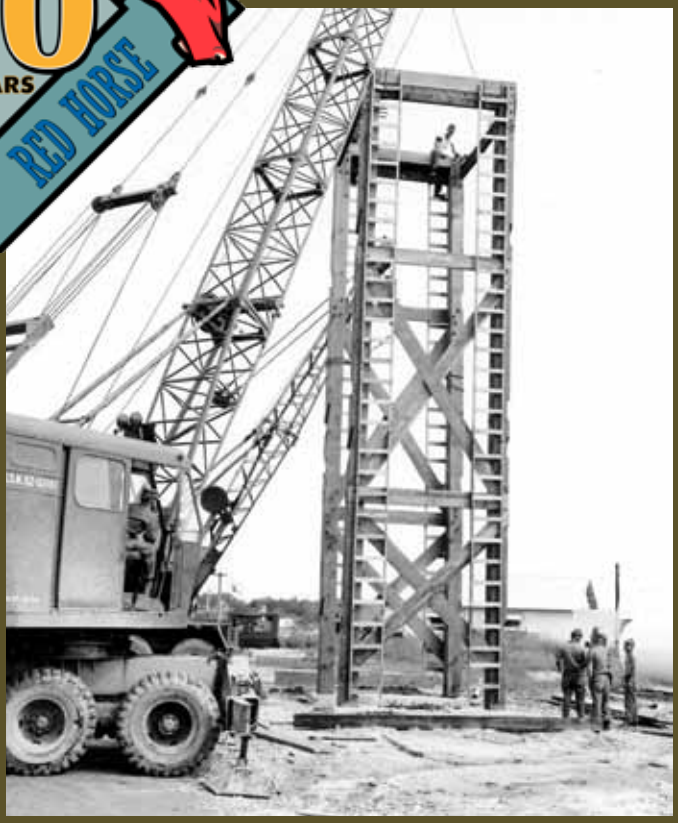
"When I was about 12 I got to do a ride-along on a fire truck and knew then it's exactly what I wanted to do," said Dulan. "When I entered the Air Force, I was going to get to be a firefighter or I wasn't going to join."

SSgt Kyle Dulan 3E7X1, 7-level
(U.S. Air Force photo/Karen Abeyasekere)

As a crew chief, Dulan is a supervisor and says he strives to be a mentor to new firefighters.

"The Air Force has given me a lot of unique experience and I try to pass on the things that I've learned," he said. "Looking back, one of the things I wish I had known more about was just how the Air Force works. New Airmen coming in have to have that good supervisor, but they also need that self-motivation to educate themselves."

Members of Prime BEEF Team I construct revetment at Tan Son Nhut AB, Vietnam, in 1965.



A Prime BEEF team constructs a water tower at Da Nang AB, Vietnam, November 1966.

Learn more about the first 50 years of Prime BEEF:

http://www.afcec.af.mil/news/50yearsofcandowilldo/index.asp

Prime BEEF history from the CE Magazine archives: selected articles at

http://www.afcec.af.mil/library/publications/airforcecivilengineermagazine/index.asp

Printed on recycled paper
(30% post-consumer waste)