Air Force
# CIVIL ENGINEER
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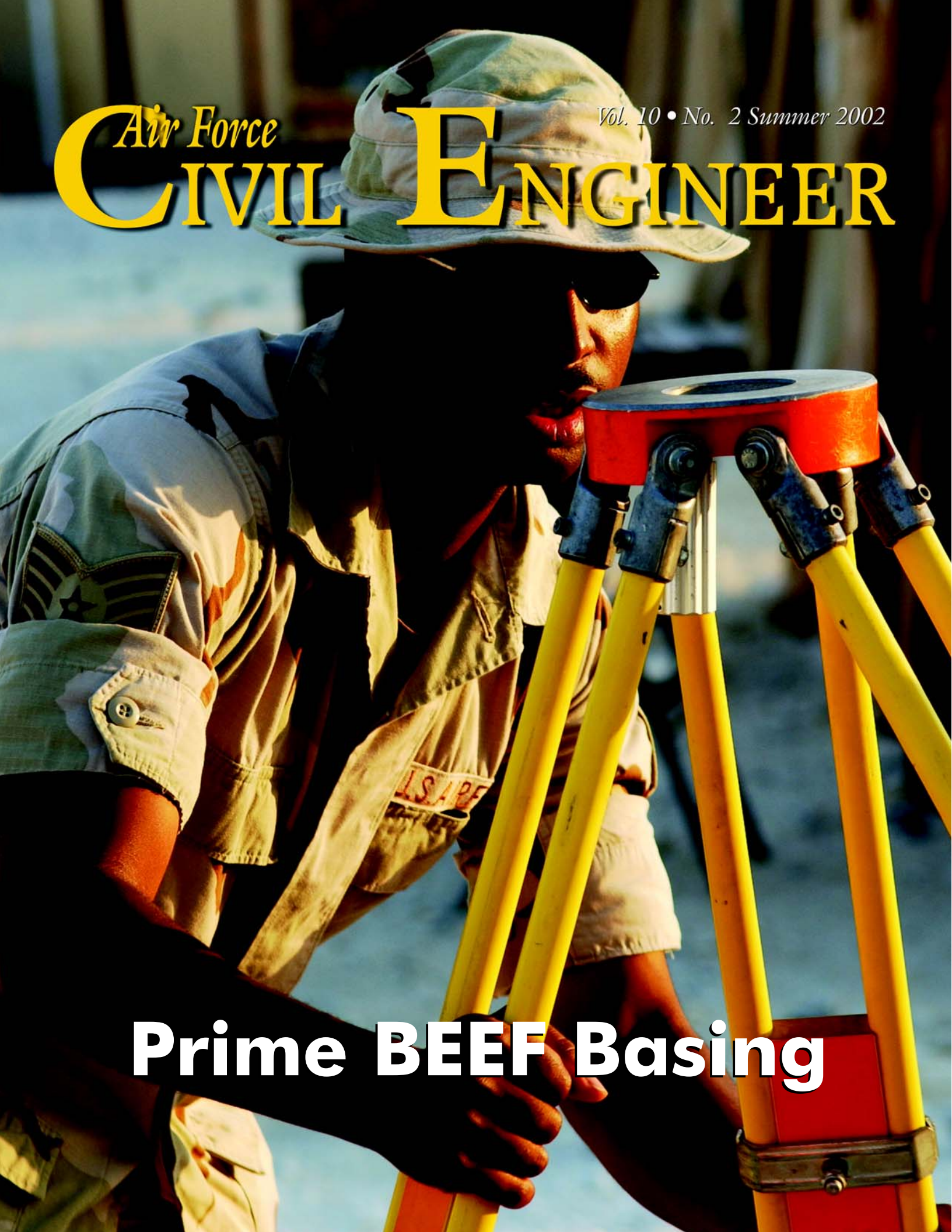

## Prime BEEF Basing

Photo by Keith Fred

Maj Gen Earnest O. Robbins II

# Training Like We Fight

The text will be coming shortly.

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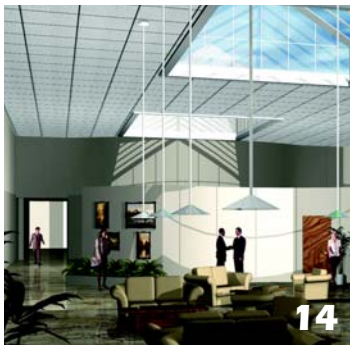

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**TSgt James Cobbs prepares to conduct a survey at a forward-deployed location while assigned to the 319th Air Expeditionary Group. Sergeant Cobbs is deployed in support of Operation Enduring Freedom. Additional photos of civil engineers deployed for the operation are on pages 8-9 and on the back cover. *(Photo by TSgt Mark Bucher)***

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Please send story ideas, articles, photos, comments and suggestions to **cemag@tyndall.af.mil**


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Col Tom Ryburn deployed to Southwest Asia in February as the Combined Forces Air Component Command C7, Director of Civil Engineering, on behalf of soon-to-be established U.S. Central Command Air Forces (CENTAF) A7 Installations. As he prepared to redeploy in July, Colonel Ryburn highlighted the accomplishments to date of deployed Prime BEEF teams in support of Operation Enduring Freedom. Basically, said the colonel,

# "No One Comes Close!"

**AFCE:** How many bases are Air Force civil engineers supporting in theater for Operation Enduring Freedom (OEF)?

**Col Ryburn:** Civil engineers are deployed in support of 13 main bases — 12 in the U.S. Central Command (CENTCOM) area of responsibility (AOR) plus Diego Garcia. In addition, Air Force firefighters are supporting two Combined Joint Task Force 180 resupply bases in Afghanistan and one in Uzbekistan.

All totaled, we currently have about 1,900 civil engineers sustaining bare base assets. That's down from about 2,700 engineers during the peak base build-up last fall. To give you a sense of the size of engineer operations in the AOR, we have more than 2.5 million square feet of tentage, 702,000 gallons of water production, and 140 megawatts of power production and distribution capability supporting more than 19,000 deployed Air Force personnel.

**AFCE:** Did most of these locations begin as bare bases or were they expansions on existing facilities?

**Col Ryburn:** Every base was unique and had its own challenges — some were "more bare" than others. In terms of classic bare bases, I'd say there were two sites that certainly qualify. Brig Gen (Patrick A.) Burns mentions them in his article in the last issue of the magazine (*AFCE*, Spring 2002). "Shooters" at both of those locations flowed in before the support, making the beddowns particularly challenging.

The outstanding Air National Guard Prime BEEF from Rickenbacker ANGB, OH, took over beddown at probably our toughest site while the population was living in an old hangar and sewage was running through the camp. They were certainly engineer heroes!

At another tough site, the 16th CES team from Hurlburt Field, FL, also got the unusual experience of erecting Army Force Provider assets along with Harvest Eagle kits from Europe at an old Soviet airfield bare base.

Almost as challenging were the beddowns at "semi-developed" locations, places like Al Udeid Air Base in Qatar, with the great Prime BEEF from Mountain Home, and Ganci AB in Kyrgyzstan, with the great BEEFers from Seymour Johnson. These sites tested and brought out the best in our deployed Prime BEEF personnel.

As for the "steady state" locations, they were anything but steady state during mission build-up beddown. While the deploying teams did fall in on existing infrastructure, deployed populations and operations tempo increased dramatically overnight. The four main steady state sites all had new engineer challenges as they grew to accept new missions.

As mentioned by Brig Gen Burns, GeoReach was a lifesaver. Our CE deployers took advantage of GeoReach to pre-survey the sites for initial beddown planning. In addition, our troops had great Silver Flag and Air Force Institute of Technology (AFIT) training to organize and execute the best tent cities in the AOR. Even at our toughest sites, there was no doubt that Prime BEEF was present. Nearly every wing or support group commander whom I spoke to made a point of telling me how proud they were of their engineers!

**AFCE:** In what types of one-time missions or special support are civil engineers involved?

**Col Ryburn:** Air Force civil engineers have been to every major deployment site in the AOR — and our specialized engineer and staff teams made valuable contributions.

One group of heroes was Lt Col Dave Nelson and his CENTAF team as they stood up the engineer cell in the Combined Air Operations Center at Prince Sultan AB. Those first engineers from CENTAF headquarters at Shaw AFB did the real "nuts and bolts" planning that got all our engineers started. Their early planning got the right equipment and materials to the first deployers. While the early days were chaotic and fast moving, Dave Nelson and his crew worked long hours to smooth the process of combining fast charging engineers with war reserve materiel (WRM) and equipment to make the beddowns happen as smoothly as possible.

Dave and the CENTAF Forward engineers at Prince Sultan relied a lot on the Air Combat Command (ACC) Civil Engineer Directorate's Contingency Readiness Center (CRC) for "reach back" planning support. There were many "heroes" from the ACC/CE staff as well as Air

Reserve Component IMAs and activated augmentees who provided the 24/7 coverage needed.

I also want to mention the Air Force Civil Engineer Support Agency (AFCESA) Airfield Pavements Evaluation Team. Maj Gen (Earnest O.) Robbins mentioned their contribution in his From the Top column in the Winter issue of *AFCE,* and there was an article about their work as well, but I want to say it again — the AFCESA guys are the best in DoD! They went everywhere — every country in the AOR. They came to be known by all the services as the experts in airfield pavements assessment. We gained instant credibility in the joint world with AFCESA's great reports and thorough work.

General Robbins also mentioned the 49th Materiel Maintenance Group from Holloman AFB in his column — those guys are also the best in DoD on bare base erection. The experience we gained in Desert Shield/Storm carried over for OEF. Bare base asset prepositioning, along with the experts from the 49th MMG, their logistics cousins in Southwest Asia, the Executive Coordinating Committee (CENTAF A4 WRM contract managers) and their on-site contractor, DynCorp, made it possible for the Air Force to quickly move assets to the beddown and fight.

The 49th MMG moved nearly four million pounds of bare base equipment and sent 146 personnel to support OEF. In some cases, the 49th "Bears" were the first engineers to get to our most challenging sites.

Staff Assistance Teams, or S-Teams as they are known, from the Air National Guard and the Air Force Reserve provided outstanding support in a variety of roles. The 235th Civil Engineer Squadron S-Team (Maryland ANG) took a special mission project from concept to execution. They have some very talented engineers that performed highly technical design work to support one of the Combined Force Air Component Commander's (CFACC) top construction priorities.

The 810th Civil Engineer Flight S-Team from Naval Air Station Joint Reserve Base Fort Worth, TX, was mobilized early in the war and provided leadership and augmentation at ACC and CENTAF headquarters and deployed forward at Prince Sultan. Their knowledge and technical abilities were instrumental in our success.

A lot has already been written about the RED HORSE contribution to OEF and this article is about the contributions of our other engineers. But, I need to say; the RED HORSE contribution was "eye watering!" Our RED HORSE squadrons were the envy of all the other services. The synergy achieved by combining the construction expertise of our RED HORSE squadrons and the beddown management expertise of our Prime BEEFers demonstrated Air Force "engineer supremacy." We dominated the other services as the best engineers in the AOR.

**AFCE:** What are fire, explosive ordnance disposal (EOD) and readiness personnel bringing to the fight?

**Col Ryburn:** Early in the war, almost one-third of the readiness career field was deployed. Our readiness folks in the Combined Air Operations Center stood up the first true U.S. Air Force and United Kingdom Royal Air Force Coalition NBC (nuclear, biological, chemical) cell. They also co-authored the Combined Joint Zone of Observation Control Center Concept of Operations with coalition signatures. Then they demonstrated coalition capability with an eight-country combined exercise, with participation of readiness flights from around the theater. The flights also saw plenty of local action — from cyclone preparation and recovery near the Arabian Sea to attack readiness exercises in the "-stans." Our readiness folks are doing outstanding work.

Our deployed fire protection flights are outstanding. Our fire troops at the Army resupply bases have endured the most austere living and working conditions in the theater almost since day one of operations inside Afghanistan. Air Mobility Command (AMC) brought in fire protection with Global Reach Laydown (GRL) as we first opened the Afghan bases. CENTAF scrambled to get fire equipment airlifted in to support the C-130s and C-17s that were bringing in combat units to press the war inside Afghanistan. During those operations, we found that the Air Force is really the only service that has a military firefighter force capable of deploying and operating in a contingency environment.

When AMC GRL troops redeployed, the firefighters stayed behind. The Air Force active, Reserve and Guard firefighters at Kandahar, Bagram and Karshi Khanabad have shown the Army, Marines and Special Ops how it's done. They are real professionals!

Our firefighters at the other sites can tell stories as well. At one site, the first seven deploying firefighters fought a brush fire started by C-130 flares that almost burned into the operations area. They had no fire truck! Our firefighters are responding to numerous in-flight emergencies for combat aircraft and keeping us safe while acting as first responders for many medical emergencies.

The EOD flights are getting some interesting work. From assisting accident investigation boards to disposing of a jettisoned joint direct attack munition (JDAM), they've been as close to the action as you can get. We are developing a Southwest Asia concept of operations (CONOPS) to get all the EOD flights involved and distribute the workload.

**AFCE:** Where has prior planning and forethought really paid off?

**Col Ryburn:** With our Silver Flag and AFIT training as well as GeoReach, which I mentioned earlier.

Several years ago, our visionary senior leaders understood the need and made the right investment to get

our troops contingency engineering education and training. Our programs at Tyndall and Wright-Patterson are "world class!" I saw the results everywhere I went in the AOR — well-planned, well-executed beddowns with smart utilities operations and good mission support.

In recent years, we have also made some major revisions to the way Prime BEEF is managed at home station. The establishment of readiness flights has really paid off. Our folks are "smarter" in the mobility business, and moving teams and equipment through the airlift process has improved as a result.

## Supporting FREEDOM

**Civil engineers have been deploying in support of Operation Enduring Freedom in force. Since Sept. 11, more than 7,500 CE requirements have been filled for OEF alone. Maj Peter Bahm, chief, Combat Support Branch, Aerospace Expeditionary Force Center, provided the following breakdown for *Air Force Civil Engineer* magazine. All numbers are rounded.**

| | |
|---|---|
| 375 | Readiness |
| 300 | Explosive Ordnance Disposal |
| 1,800 | Fire Protection |
| 500 | Power Production |
| 3,150 | Traditional CE (excluding power pro) |
| 1,400 | RED HORSE (including power pro) |
| More than 7,500 total OEF CE requirements | |

Again on GeoReach, having the ability to "reach out and map somewhere" remotely using imagery brought our CE beddown planning efforts to the forefront of technology. That really paid off as we worked beddown locations we'd never dreamed we'd be using, and easily overcame the difficult planning problems we had encountered in Desert Shield 10 years prior.

**AFCE:** Has the current Prime BEEF team size and structure been effective?

**Col Ryburn:** The Prime BEEF structure has always been a trade-off between teaming and flexibility. The Office of The Civil Engineer's Readiness & Installation Support Division and ACC worked Prime BEEF organization hard before the war. The current organizational structure fits the AEF construct. It gives us the quick, full response capability in building block pieces.

As we level out to steady state, we find some imbalances in skill requirements at specific locations, but the unit type codes are designed to get in and get the job done. The current size and structure has worked for OEF.

**AFCE:** How has use of the Air Force Contract Augmentation Program (AFCAP) matured during this operation?

**Col Ryburn:** For OEF we stuck to our "military first" philosophy right out of the AFCAP CONOPs. AFCAP doesn't replace troops during a contingency — it augments our capabilities. It gives commanders resource options and flexibility. And, it reduces our reliance on WRM while giving us quick access to commercial sources.

The AFCAP contractor, Readiness Management Support L.C., was engaged in Southwest Asia before the war. We were using AFCAP to provide engineer design and power production support at Operation Southern Watch bases.

After the war started, we married AFCAP logistics and Defense Contract Management Agency support with RED HORSE project execution. The results were outstanding — nothing but kudos from RED HORSE with projects finished on time and within budget.

Now that we are pushing into the sustainment phase, AFCAP is doing more to support the base engineers for design and construction. We have established a theater AFCAP cell with an AFCESA engineer and Tyndall 325th Contracting Squadron support here. This move is already paying dividends. We are getting engineer support throughout the theater for a variety of missions. AFCAP has provided more than $100 million in direct support to our engineers.

We've learned some lessons on how to best apply and manage AFCAP, and it's been a healthy and productive partnership with RMS. It's a little like SABER (Simplified Acquisition of Base Engineer Requirements) — another valuable tool in the toolbox for our commanders.

**AFCE:** What are you most proud of about the way Prime BEEF teams have performed?

**Col Ryburn:** I'm most proud of the leadership I witnessed. I was always convinced that we had the best-trained and motivated engineers in DoD. I believed that before OEF. Now I'm convinced we also have the best-led engineers in DoD. Our commanders, officers and senior NCOs know their stuff, and they know how to make things happen.

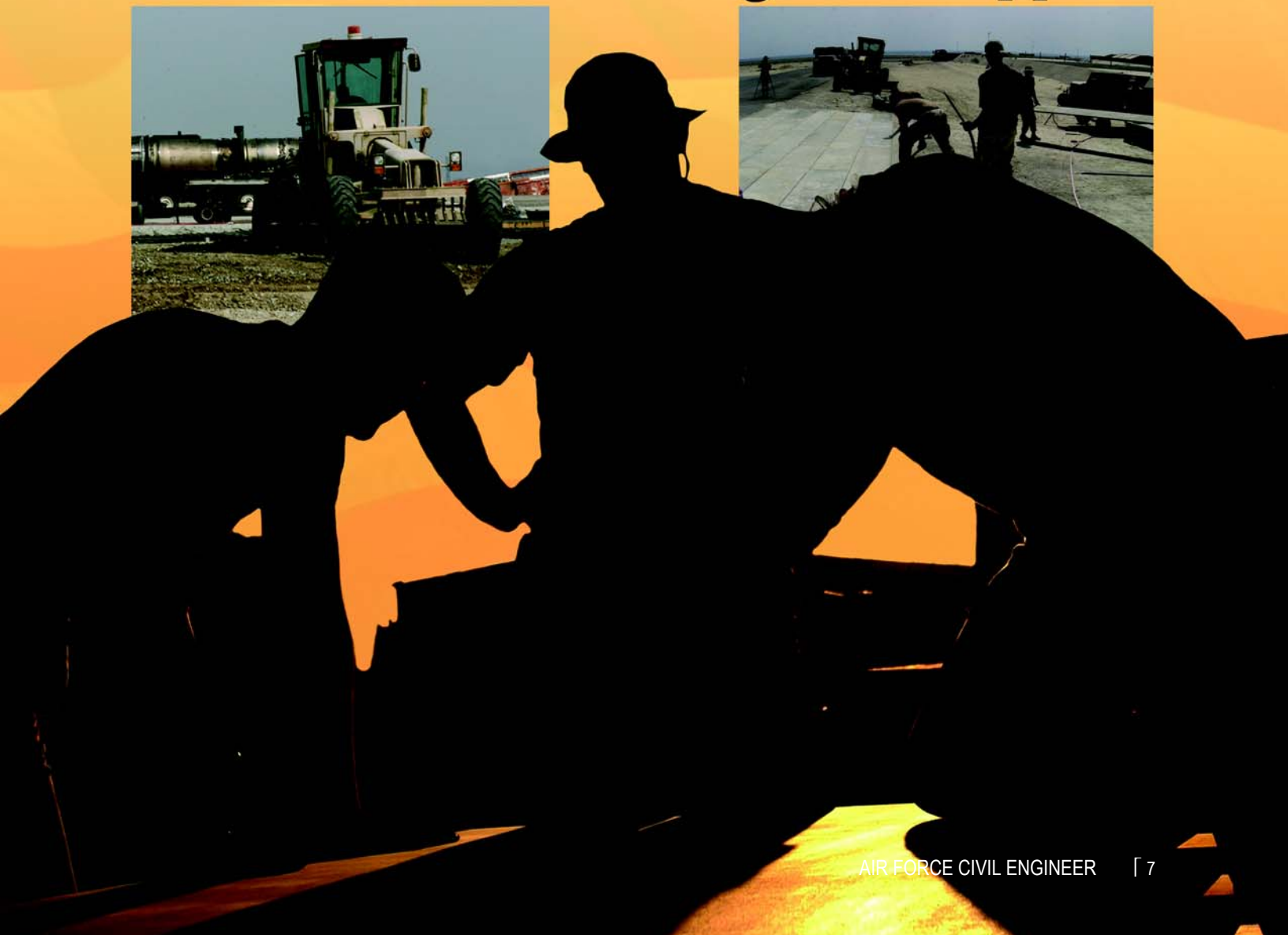
We had lots of slow downs for weather or equipment or materials — but we never failed for leadership. Every site had a "lean forward" group of confident engineers focused on mission support and led by smart, dedicated commanders, officers and NCOs.

All our engineers demonstrated leadership, training, motivation and ingenuity. The results we achieved were certainly satisfying to those of us who've watched the Air Force civil engineer business grow and develop. It was an honor to serve with all the great engineers of OEF. To sum it up, "No one comes close!"

*Editor's Note:* Col Tom Ryburn is now the Assistant Civil Engineer, Directorate of The Civil Engineer, Headquarters Air Combat Command, Langley Air Force Base, VA.

# ENDURING FREEDOM

## A Pictorial of Civil Engineer Support



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KYRGYZSTAN
WARNING

# One Team One Fight

*Air Reserve Component civil engineers build up an OEF Location*

by Maj George Runkle
*628th CEF*

When the Air Force Reserve assumed civil engineering responsibilities at a forward operating location in November 2000 as part of Aerospace Expeditionary Force Cycle 2, it was a small, peacetime desert operation. By the time the commitment ended in February 2002, the forward location had been transformed into a bustling wartime base near the front line in America's war on terrorism.

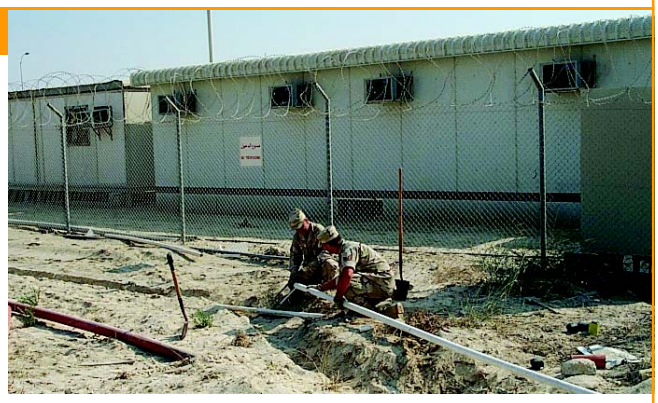
Sixteen Reserve units, along with units from the Air National Guard, provided CE services during that time. Together, they provided a complete base civil engineer organization, including fire protection, readiness, power production, engineering and operations.

## 9/11 Changed Everything

After Sept. 11 the mission at our location changed drastically, and more personnel were brought in. Higher demand for water, sewer and electricity strained the basic infrastructure of the camp as these additional people and their aircraft were bedded down.

A team from the 49th Civil Engineer Squadron, Holloman Air Force Base, NM, deployed in October to provide additional manpower. They stayed with the Reserve and Guard civil engineers through the remainder of the cycle, helping erect additional tents and construct the facilities needed for the new missions.

As the footprint of the camp expanded, host nation facilities, such as anti-aircraft artillery emplacements, were relocated. Many incoming personnel were accommodated in a new section of the camp, which required new tents and facilities such as latrines, showers and recreational areas. As more aircraft arrived, hangars loaned by the host nation were modified to provide temporary shops and offices. A complete power generation and distribution system was also installed.



**Reserve and Guard civil engineers worked to expand utility systems as the base grew to accommodate new missions and personnel following Sept. 11. *(Photos courtesy HQ AFRC)***

Since the base had fairly frequent water outages, additional water storage facilities were constructed to allow continued function when the outages occurred. Some of the sewage pump stations were not able to handle the additional loads. On New Year's Eve, plumbers found themselves standing in sewage working to fix a pump that went out at the worst possible time.

Extensive use was made of modular facilities in constructing additions to the main camp. In the Arabian peninsula, modular buildings have been used extensively in the oil camps and as temporary facilities for companies setting up in the area. Accordingly, there were several manufacturers available who could deliver, assemble and erect the buildings on site quickly. These companies had their own in-house engineers perform the detailed part of the design work, leaving military engineers available for other projects.

To our advantage, the host nation showed phenomenal cooperation. Our fire department typically trained with their base fire department, and in one rotation practiced together on live burns. The host nation also provided engineering input as additional facilities were planned. They helped with where to buy water for construction purposes, the best haul routes and other subjects where local knowledge was invaluable.

## Things are Different Here

The greatest challenge was to provide for a self-contained base in an environment that was not normal to the everyday Reserve and Guard experience. The Reserve and Guard engineers had to learn how to deal with local conditions and provide solutions with few of the resources available back home. The usual solutions employed at home wouldn't work at our forward location — everything was just a bit different here.

Unlike most bases, about half the power used was generated on base; therefore, generator maintenance was critical. Also, generators had to be rotated out as required for depot services. Since generators were the primary source of power for much of the installation, outages were unacceptable.

Most bases in the continental United States have architect-engineer contracts in place for design services. Our deployed CEs didn't have that luxury in most cases. Almost all design work was done in the engineering shop as a joint effort between civilian contract personnel with Readiness Management Support (the Air Force Contract Augmentation Program contractor) and deployed personnel. If the need arose, there was "reach back" capability for further design services in the United States. However, time was usually of such importance that almost all design work was done on base.

**Civil engineers found that the most efficient way to erect buildings in that area of the world was to purchase modular ones and have them delivered to the site.**

Because of the compact area we occupied and the large number of personnel in tents, any kind of fire in camp could cause serious damage. Firefighters put a lot of effort into prevention. They made sure smoke detectors were in each building and tent and that each detector was operable. They vigilantly ensured fire extinguishers were properly maintained and charged. Any kind of alarm brought an extremely quick response to keep situations from getting out of control.

Operations personnel maintained aging Harvest Falcon equipment that had been constantly hammered by the strong sun, high heat and dust in the desert environment. Tents were dry-rotting, environmental control units had to be constantly maintained and replaced, and the electrical distribution system needed constant monitoring.

Plumbers had an especially difficult job at times maintaining and repairing the base's water distribution and sewage systems. Materials were mostly in metric measurements, so workers had to think of pipe in millimeters, not inches. Also, lumber was imported (obviously) and was mostly hardwood — probably luan. This was difficult to work with because it was harder to nail and saw.

Finally, there were the usual difficulties of working in a desert environment. The team was careful to avoid heat injuries and dehydration. A certain amount of time was allowed for acclimation, and personnel worked during cooler periods of the day. In addition, the blowing dust and sand caused constant problems by getting into equipment, clogging filters and just being a general nuisance.

## Lessons Learned

The first lesson learned is also the most obvious one: the importance of Prime BEEF training cannot be overstated nor overemphasized. Deploying engineers must be extremely familiar with the Harvest Falcon equipment set. They must know what equipment is in the set and its capabilities and limitations. They must be able to set up the equipment without hesitation and be very proficient in its maintenance. A war zone or forward operating area is not the place to get hands-on training with bare base equipment for the first time.

Early feedback from AEF deployments convinced the Reserve Command civil engineer leadership that individual, "hands-on," contingency training with some key bare base assets was lacking throughout the command. Accordingly, they have worked diligently for the past year to consolidate three former Reserve Specialty Training Locations at Dobbins Air Reserve Base, GA, into a new Expeditionary Combat Support Training and Certification Center (TCC), which began operations this spring.

TCC bridges the gap between home station training and war zone requirements by ensuring civil engineers have opportunities to train on bare base assets not generally found at many stateside bases. Moreover, individual training at TCC will complement Silver Flag team training and provide the best Air Force in the world with the best civil engineers.

Other lessons learned: power production personnel need to be very well trained in the operation and maintenance of an array of generators, since commercial power often isn't available. Engineering personnel should be acquainted with the requirements for base layout, since even on an existing base additional personnel may be added with little notice.

Officers should be familiar with the Harvest Falcon kit; they should also be able to work outside their discipline. For example, a civil engineer needs to be at least familiar with power distribution. Electrical and mechanical engineers need to have a working knowledge of requirements for pavements and structures. Flexibility is extremely important.

Finally, Harvest Falcon material is often in short supply, and building on base can be time consuming because of the remoteness of the site and difficult entry procedures. It is best to use commercially available materials for most of the work on base, and the most efficient way to erect buildings in that area of the world is to purchase modular ones and have them delivered to the site.

## Total Force Success

Our experience shows that Air Force Reserve civil engineers and their counterparts in the Air National Guard are vital parts of the Total Force. It wasn't possible to distinguish between active duty, Reserve or Guard civil engineers at our location. They formed one team and took on one fight.

**As the footprint of the camp expanded, new facilities such as latrines, showers and recreational areas were needed to accommodate incoming personnel.**

*Maj George Runkle is the Engineering and Technical Services Officer at the 628th Civil Engineer Flight, Dobbins ARB, GA, and was the Base Civil Engineer and 380th Expeditionary Civil Engineer Squadron commander on this deployment.*

# success against the Odds

## New Horizons deployment becomes tale of survival

by Maj Rich Curry
507th ARW Public Affairs

*The campfire flickered, throwing hot ashes upward in a determined attempt to push away the darkness. The old sergeant leaned forward into the light, a grim look on his face. His crinkled face was like a roadmap — every line leading to a different destination, an untold destiny.*

*"You've told me your scary tales," he began speaking softly as the young airmen sitting next to him moved forward, straining to hear his voice.*

*"Let me tell you mine. It started in February of 2002. About 40 of us civil engineer folks headed down to Nicaragua for what was supposed to be a simple construction project … "*

**Barely visible in the mud, a metal sidewalk provided some walking access between billeting, dining and shower tents. *(Photos courtesy 507th CES)***

What could have turned into a horror story became a tale of struggle and success against the odds for members of the 507th Civil Engineer Squadron, Tinker Air Force Base, OK, during a two-week deployment to the Central American country under Joint Task Force Chontales.

JTF Chontales is part of the New Horizons series of joint training exercises taking place this year. The U.S. Southern Command-sponsored exercises are designed to complete civic assistance and humanitarian projects while providing military training opportunities. But before starting these projects, JTF Chontales personnel needed an organized base camp.

According to Capt Michael Ling, deployed troop commander for the 507th team, "Our objective was to assist Army engineers and construct hardback tent facilities for a base camp that would be used for future humanitarian building projects."

What the civil engineers didn't know before their departure was that this would involve a series of commercial airline flight overbookings, staggered arrival and departure times, and freak, unpredictable weather that would turn their simple project into a challenge against Nature itself.

Approximately 30 members of the team departed Oklahoma City Feb. 2, arriving at Nicaragua's capital city of Managua. The team cleared customs and received in-country briefings. They departed at 5 a.m. the next morning for the base camp, a 7 1/2-hour, 140-mile trip by bus. The balance of the CES force arrived in Managua Feb. 3, with little time to collect their luggage, endure customs and briefings, and wolf down an MRE (Meal, Ready-to-Eat) before boarding their bus for the long trip.

According to 507th CES commander, Lt Col Renee Lane, "Typically, this should have been the dry season for that part of Nicaragua." But that's not what awaited the 507th reservists.

"There were torrential rains the week prior to our arrival," said Ling. "What we found when we arrived was a cow pasture with thick mud up to mid-calf and floating animal waste everywhere. Our challenge was to turn this muddy, bare field into a sanitary, livable base camp."

Because of the recent rains, the civil engineers had additional challenges. "The rains left the previous rotation about one week behind schedule due to late equipment and material arrival," said Ling. "When the 507th engineers arrived for the second rotation, the Army command staff projected that we would only accomplish 50 percent of what was needed." Then again, the Army didn't count on the determination of dedicated Air Force reservists.

"There literally wasn't anything built when we arrived," said CMSgt Gary Bourisaw, Operations NCO for the deployment. "We were housed in tents staked out over the mud with some limited decking laid out for walkways. Because we couldn't anticipate the freak weather, no one had the type of wet weather gear we needed. Mud was everywhere, and septic infection and foot fungus were major medical concerns for our people. Even a simple cut could have proven very dangerous."

**Due to the muddy conditions, septic infection and foot fungus were major medical concerns for the team. Even a simple cut could have proven very dangerous.**

The team quickly came to anticipate the daily afternoon showers. "Just when you thought things were going to dry out, the rains came," said TSgt Jodie Zollo, a member of the deployed crew. "We'd get back out there to work and our feet kept churning up the mud like a big mixing bowl." However, Bourisaw added, "Bare base construction is what we're trained to do, and we set out to get the job done." During the deployment, Bourisaw said, virtually every piece of heavy equipment got stuck in the mud at least once, including the bulldozer.

During the next 12 days, the civil engineers completed construction of the hospital and mess and dining facilities; constructed and plumbed three latrines, changing room and shower facilities; and installed 22 medium tent pads for billeting, allowing all personnel to move out of the mud onto hard deck floors.

"After hardback billeting tents were finished, living conditions improved significantly," said Ling. "The hardback tents with their plywood floors were really appreciated by everyone," said Zollo. "We were able to finally have someplace to get out of the mud, and it helped keep the pigs out of our tents."

The team constructed tents for the commander's operations center, set up 30 poles and 49 lights, and laid approximately 10,000 feet of electrical cable. The team also instructed Army personnel on how to set up the hardback tent covers.

Because the rains made the roads virtually impassable, helicopters arrived daily delivering more construction materials for the crew. During the final few days on site, the team also laid 2,500 feet of water and wastewater distribution pipe, installed plumbing to the hospital and mess facilities, and set septic tanks and installed the aeration systems. Highlighting their deployment was the opening ceremony for the new facility, which was attended by the President of Nicaragua.

In all, this team of engineers exceeded the expectations of the command staff and completed all tasks assigned to them, including roughly 70 percent of the total vertical construction.

**With work nearly complete on one hardback tent shelter in the background, teams begin setting up another. More than 22 such tent pads were constructed during the team's two-week stay in addition to other infrastructure projects.**

*Only the glowing embers remained as the sergeant finally leaned back. A hushed, almost reverent silence hung in the air. "So," he finally drawled, "any of you pups want to tell me about YOUR annual tour?"*

*Editor's Note:* The 507th CES was part of the second JTF Chontales rotation, along with members of the 434th CES, Grissom Air Reserve Base, IN, and the Wisconsin Army National Guard's 829th Engineer Detachment.

**Relief at last. With only three days left in their two-week tour, billeting tents were finally completed to allow the team a bit of comfort.**

# RED HORSE

## Joins New Horizons – Jamaica

**by SrA Stephen Hudson**
***Florida National Guard Public Affairs***

The 202nd RED HORSE Squadron, Florida Air National Guard, deployed for two weeks this summer to assist in building a clinic for the people of Jamaica and barracks for the Jamaican Defense Force (JDF).

The 202nd RHS, based out of Camp Blanding, and members of other ANG RED HORSE units — the 200th RHS from Ohio, 201st RED HORSE Flight from Pennsylvania and 203rd RHF from Virginia — teamed up under Joint Task Force Blue Mountain to provide humanitarian assistance as part of U.S. Southern Command's New Horizons 2002 exercise.

These units joined a Marine construction unit from Marine Wing Support Squadron 272, New River Marine Corps Base, NC, to complete the projects.

For SrA Lee Buquo, 202nd RHS electrician, this was his second deployment with RED HORSE but his first humanitarian mission. "It's been a pretty good deployment," said Buquo, who studies electrical engineering in college. "It's meaningful work. We've put a lot of sweat into the project, but overall it's worth it."

Air Force electricians worked alongside their Marine counterparts to install lights and electrical outlets in each room at the clinic before moving on to the barracks.

According to CMSgt Richard Berry, 202nd RHS superintendent, JDF members were anxious to move into their new building since it offered vast improvements over their current living conditions. The building's design will help keep the interior temperature at 75 degrees year-round.

To show their hospitality to the visiting Americans, the JDF invited the construction crews to have lunch with them several times during their stay, which was a relief from the MREs (Meal, Ready-to-Eat), Berry joked.

"It's going real well. I feel good about the clinic job, because that's where the local people will be able to receive acute care and medical attention," said TSgt Billy Maule. "I know that once the job is done the clinic will benefit the people."

**SrA Crystal Register works to put on the roof at the Jamaican Defense Force Barracks at Up Park Camp in Kingston, Jamaica. *(Photo by SrA Stephen Hudson)***

# Communication is the Key

**Federal, state and private employees in different parts of the country work together to achieve consolidated, modern facilities at Rome Research Site.**

by Wade W. Brower
HQ AFMC

When Griffiss Air Force Base in Rome, NY, closed in 1995, the closure decision stated that the Rome Research Site (formerly known as Rome Laboratory) would remain in place at the new Griffiss Business and Technology Park — sparing the local community the loss of many high-paying, technical positions. However, several of the Lab's research facilities were in World War II era buildings that were expensive to maintain and not centrally located.

The Air Force initially planned a project estimated at $12 million that would renovate an older warehouse in the center of campus. However, with the help and cooperation of U.S. Rep. Sherwood Boehlert, the Griffiss Local Development Corporation (GLDC) and the New York State Department of Economic Development, matching New York State funds were provided, making it possible to demolish the old warehouse and build a completely new facility.

The new facility, which will be completely owned and built by the Air Force, allows consolidation and collocation of personnel and functional workloads from 15 buildings to five. Overall, the modernization plan reduces square footage by 27 percent, while cutting the Air Force's operational costs by more than 15 percent. From New York State's perspective, it provides a main focus and theme for the new business park.

"This project," said Rep. Boehlert during the Nov. 1, 2000, groundbreaking ceremony, "reflects years of work and enormous cooperation to forge the federal/state partnership that brings us to this historic moment."

## A Demolition Delayed

Headquarters Air Force Materiel Command Civil Engineering (AFMC/CE) developed the "Add to and Alter the Intelligence and Reconnaissance Laboratory" project, using Naval Facilities Engineering Command, Atlantic Division, as construction agent. The new facility was a fiscal year 2000 design-build project with a total cost of $24.8 million, including demolition and removal of the old warehouse.

MCC Construction Company was awarded the demolition portion of the project in September 2000. Unfortunately, the demolition schedule started slipping immediately when Upstate New York began receiving unusually heavy snowfall for that time of year. The first portion of the demolition, removal of asbestos-containing roof tiles, was delayed while the contractor shoveled 3 feet of snow and ice from the roof.

Next, there was more than 190,000 square feet of 4-foot-thick concrete slab to demolish and remove from the site. Among the unforeseen conditions encountered in the long concrete slabs were unusually heavy steel reinforcement and asbestos-coated steam pipes, which severely delayed the project. What started out as a 90-day demolition project was finally completed almost one year later.

"This facility was built in the 1940s," said Nathaniel Price, Atlantic Division engineering technician/project manager for the demolition. "The concrete and structural items used in those days — you can't find those any more. Also, from the way it was constructed and the workmanship that went into it, it was very obvious when they built these old warehouses, even though they were just warehouses, that they were proud of their work. It took a while to take that old building apart. But you could also tell from the water damage and rust in certain spots that it was time to take it down."

While the old warehouse was being demolished, Atlantic Division progressed with the selection process for the construction portion of the project. However, they could not proceed with the award until funds were transferred to their control. The potential showstopper — the Air Force had to accept the $12 million gift from New York State. A team of AFMC/CE, Atlantic Division, New York State and Rome Labs personnel resolved this by establishing an interest-earning escrow account and a Memorandum of Agreement with all parties. With this problem solved, all attention turned toward award and eventual design.

**Before construction could begin on the new facility, more than 190,000 square feet of 4-foot-thick concrete slab had to be demolished and removed from the site.** ***(Photos courtesy HQ AFMC)***

## A Flexible Design

Due to the nature of Rome Labs' workload, the branch and division office areas are always expanding or contracting, depending upon current mission requirements. This ever-changing workload meant the facility should be as flexible as possible, yet maintain the rigid infrastructure required for a research facility. The design-build portion of the project was awarded to Atkins Benham Constructors of Oklahoma City in September 2001. The award was based on Benham providing the best overall value for the government, although they were also the lowest bidder.

"The Atkins Benham proposal was the best answer to the question of how the design would respond to the overall program," said Ellen Fiorentino, project architect for Rome Labs and member of the evaluation team. "Their flexible design solution created an opportunity for interaction with all the different programs. We especially liked their creative use of 'attractor spaces' where people could gather and discuss projects."

This flexibility is especially evident in the Main Street area — an open lobby area with 20-foot-high ceilings, a technical library and cafeteria-style seating spaces — where the new facility will attach to the existing Building 3. "The Main Street solution was exactly what we were looking for," said Fiorentino. "People from the new facility and Building 3 will be able to meet, have informal and formal conferences, greet dignitaries and access the technical library without having to go outdoors."

A new "High Tech Auditorium," also located on Main Street, is a focal point of the design. This auditorium is a state-of-the-art presentation space that will showcase Rome Labs' innovations.

Adding to design complications, Rome Labs is no longer on a secured base. After the events of Sept. 11, force protection requirements and the safety of Rome Labs personnel were a major concern. The Atlantic Division, Rome Fire Department, Rome Labs Security Forces and Atkins Benham designers worked together to provide proper setbacks, access routes and operational methods to meet force protection requirements.

Currently, the design is at the 100 percent stage and construction has begun. The project is anticipated to be complete in the summer of 2003.

"We used a great amount of ingenuity and creativity to meet all of the Labs' requirements and stay within the budget allowed," said Bob Ross, Atkins Benham project manager. "We mainly accomplished this by utilizing our value engineering process, which is a normal part of our design-build process. It meant involving local New York subcontractors very early in the proposal preparation process and following up with them as the design progressed."

***Top, opposite page, and above,*** **are artist renderings of the new Rome Research Site facility.**

**Construction crews begin work on the new, consolidated facility. The project will be completed in 2003.**

## A Team Approach

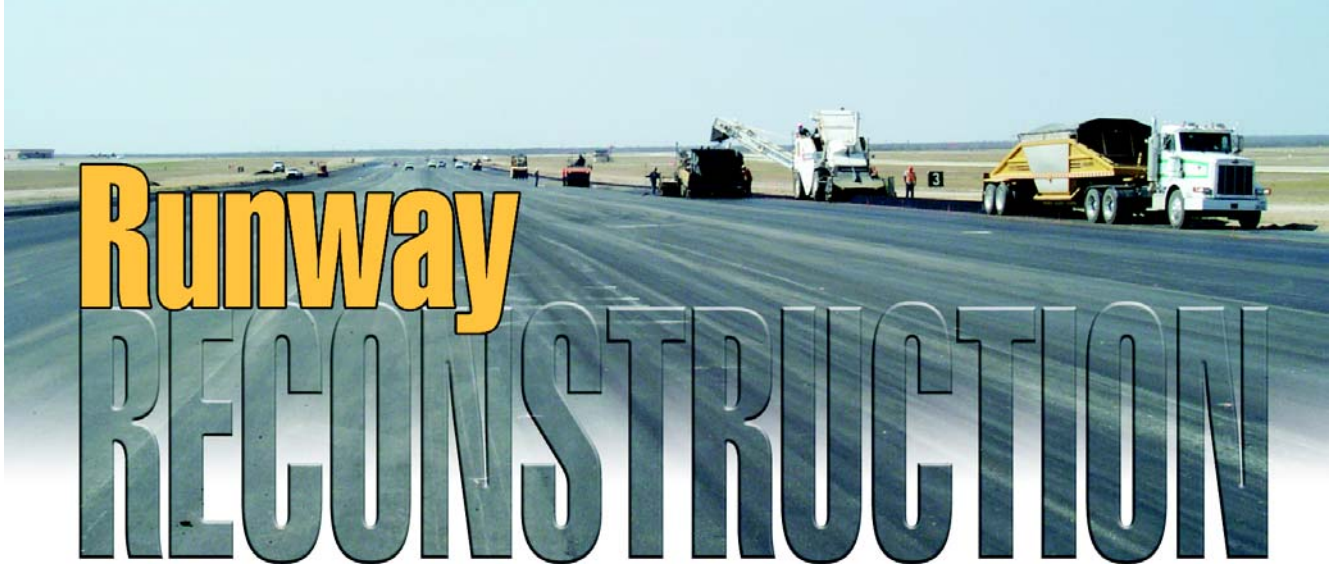
From an overall view, the greatest difficulty in proceeding with the project has been the multitude of different organizations that have had input. Besides the typical user organizational reviews with Rome Labs, Atkins Benham and Atlantic Division, the GLDC and New York State are briefed quarterly. New York State has requested and received unofficial inspection authority to review the project and document how their gift was allocated and expensed.

Since Rome Labs has no base fire department, the group commenting on the fire code aspect of the design is the Hanscom AFB Fire Department near Boston — more than 250 miles away. Additionally, since the facility is on a public road, the Rome City Planning Office was included in the design of the parking driveways and curbs.

While there is a diverse and multitalented group of people involved, the team approach is evident in every phase of the project. Since the team stretches halfway across the country, from Massachusetts to Oklahoma, communication is the key to a successful building.

When the project is completed, we will have shown that a multitude of federal, state and private employees can work together to achieve a common goal. At all times, we keep in mind that this project is for the workers of Rome Labs, but it may help spur the economic turnaround of the central New York area. And in this small town that has received so much bad news over the last seven years, this is really good news.

*Wade Brower is the MILCON Program Manager at Headquarters Air Force Materiel Command, CECC Division, Wright-Patterson AFB, OH.*



# Runway RECONSTRUCTION

by Eddie Larkan, P.E.
47th CES

*Civil engineers get the job done with minimal impact on the flying mission.*

The 47th Flying Training Wing at Laughlin Air Force Base, TX, conducts specialized undergraduate pilot training for close to 500 U.S. Air Force and allied pilots annually. The wing flies an average 300-350 sorties per day and manages and operates 248 aircraft, the largest fleet in Air Education and Training Command. So what happens when one of Laughlin's runways needs reconstruction? Civil engineers rise to the challenge and get the job done with minimal impact on the mission.

## Issues Raised, Solutions Found

The reconstruction project included adjusting taxiway and threshold lights to new elevations, laying new base material, milling the existing asphalt surface, putting down a final surface course of asphalt the full length and width of the runway, and adding runway markings to the new surface. It also required reconstruction of taxiway Echo. Poor drainage led to a design that raised the existing elevation of the taxiway an average 15 inches. After all was said and done, nearly 30,000 tons of hot-mix asphalt was placed during the runway closure period.

Good communication began early in the project design. The Runway Closure Working Group, consisting of pilots, airfield management, safety, environmental and communications personnel and others with an interest in the runway closure, expressed concerns and discussed options with base civil engineering planners. The group's decisions were forwarded to the U.S. Army Corps of Engineers (USACE) to incorporate into the design.

These meetings were critical to the success of this project. Several issues were raised and solutions designed. First, the closing of the runway was a major challenge to Laughlin's mission of training the world's best pilots.

"To accommodate the loss of a runway without losing sorties, special block times were established so that the wing's three aircraft types could share the two remaining runways," said Col John P Hunerwadel, 47th Operations Support Squadron. "Flying started before dawn and continued past dusk each day. Each of the flying squadrons increased the number of jets sent cross-country and made more efficient use of other military and commercial airfields. This allowed T-37s — the aircraft with the least range and highest student load — to continue operations at Laughlin and nearby Spofford Auxiliary Field almost uninterrupted."

The construction period was initially estimated to take four to five months, but it didn't take long to learn that would be an unacceptable burden to the pilots. Much consideration and pencil sharpening by USACE led to a 61-day maximum runway closure. Three separate phases of work were established to meet that timeline.

Another issue of concern — there was no way to access the work area without crossing an active taxiway. The initial design had the access route crossing at taxiway Alpha, where aircraft often bottleneck prior to take-off. Since there would be thousands of truck and equipment crossings, it was moved from a location that was convenient for the trucks to one that provided the least disruption to the aircraft.

The base entry point of the haul route was another issue. If the trucks came through the main gate, it would disrupt traffic arriving and leaving the base. Using the rear gate would be more convenient for the contractor, but the trucks would pass through base housing. The safety and comfort of base residents prevailed, and the trucks were routed through the main gate.

Taxiway Juliet was to be closed during the construction. The Working Group noted that if this taxiway could remain open, it would reduce congestion at the north end of the two remaining runways. Though there was no practical way to keep taxiway Juliet open throughout construction, a clause was added to the contract limiting closure of the taxiway to 14 days.

Work required at the intersection of taxiways Echo and Golf virtually eliminated the chance of using any of Laughlin's runways once the work commenced until completion. This issue was probably the most challenging faced during the design and construction. All aircraft must cross this intersection either taxiing for takeoff or returning to park, or special aircraft routing is required, including back taxiing on an active runway. If this intersection were closed, pilot training would also have to shut down. The solution required the contractor to work in this area when the airfield was closed for the Christmas through New Year's holiday. The dates were specified in the solicitation, but if the contract had not

been funded and awarded as planned in September 2001, it might have been impossible to do the work during the specified period. HQ AETC and USACE did what was necessary and the project was awarded on time.

The remaining concern was that weather might delay the work past the scheduled closure period. However, thanks in no small part to good luck, the intersection reopened as scheduled when pilot training resumed Jan. 2, 2002.

## A Commitment to Success

Like any major construction project there were day-to-day issues that had to be resolved, but the bottom line is Laughlin AFB's runway reopened after only 46 days of reconstruction — 15 days ahead of schedule.

The plan for this $4 million construction project allowed the contractor 61 days to complete the work before $12,185 per day in liquidated damages went into effect. It also had a bonus clause that allowed $10,000 per day for up to 15 days for early completion. The contractor established an aggressive schedule and completed the work 15 days prior to the deadline, collecting a $150,000 bonus for his efforts. The bonus was actually money well spent. The Air Force (and U.S. taxpayer) would have spent more money in direct cost if the runway had remained closed an equal number of days.

Several things contributed to the successful outcome of this project, including good communication, which led to good planning, good weather (though not perfect), and a total commitment to succeed.

"This project was a great success: a runway completely resurfaced in very short order with minimal loss to the wing's flying mission," said Lt Col Hunerwadel. "A large part of that success was due to the excellent working relationship between Laughlin's Operations Group, Support Group, and the Corps of Engineers. The working groups we established early on were immensely helpful, anticipating most of the problems we later encountered and allowing for a smooth transition between two- and three-runway operations."

Good communication continued once the project moved from design through award to construction. Four key teams of personnel monitored their special interests. USACE managed the technical aspects of the project, insuring the Air Force got a complete and usable facility. The Air Force project manager monitored the schedule and insured issues potentially delaying the reopening were resolved. Laughlin base operations kept an eye on safety issues including the haul route, foreign object damage control, airfield driver training and equipment movement within the active airfield. The contractor looked ahead to issues needing resolution, requesting information and clarification where needed.

Good weather played an important role as well. Though there were days it rained or was windy, it didn't occur at the most inopportune times, as is often the case. The Air Force, USACE and the contractor can't claim credit for the weather; however, it was discussed during the design. It was agreed to move the runway closure from January to March, anticipating more favorable weather for the work to be done. As it turns out, it was a wise move.

**Laughlin's runway 13R-31L reopened after only 46 days of reconstruction — 15 days ahead of schedule. Photo, *opposite page,* shows paving operations near completion. *Above,* An aerial view of Runway 13R-31L and Taxiway Echo shortly before completion. *Left,* paving operations on the first day of laying asphalt. *(Photos courtesy 47th CES)***

Finally, a total commitment to succeed from all parties involved capped the success. That included HQ AETC, Laughlin, USACE and the contractor and his subcontractors. Total commitment meant getting immediate response to questions and concerns, as well as providing the same when asked.

"The entire 47th FTW to include military, civil service and contractors alike knew how much this was going to impact training," said Billie Jo Williams, airfield manager. "From the many hours of pre-planning efforts, to the late nights spent for setup, through the long days and many weekends of construction and the final inspection, along with some last minute efforts to adjust things as required to support the mission, all involved started with and maintained their focus on the mission. This just shows how diverse the Laughlin community dedication is, which makes me proud to be a part of this flying mission."

*Eddie Larkan is a civil engineer with the 47th Civil Engineer Squadron, Laughlin AFB, TX.*

*Removing obstructions reduces flightline risks*

# Safer Airfields:

by Michael Ates
*HQ AFCESA*

In July 1998, a tragic mishap claimed the life of an Air Force pilot when his F–16 departed the runway overrun after an aborted takeoff at Misawa Air Base, Japan, and crashed into the approach lights and components of the instrument landing system (ILS). The lights and the ILS Farfield Monitor were mounted on non-frangible supports, meaning they were not designed to collapse easily on impact. The Safety Investigation Board (SIB) report and the ensuing Secretary of the Air Force (SAF) Inspector General (IG) Report of Review (ROR) identified the need to place increased emphasis on obstruction removal, improve airfield design standards and develop proficiency training for Air Force personnel responsible for maintaining the airfield environment.

**Photos above show two accidents involving airfield obstructions: the F-16 mishap at Misawa and a separate incident where a C-5 wing was broken by a tree near the taxiline at another air force base. Obstructions, including natural and man-made objects, close to a runway pose a greater risk to flight safety. *(AFCESA photos)***

## Identifying the problem

Upon completion of the SIB report, it became obvious there was much confusion in three important areas: the process for installing essential navigation aids on U.S. Air Force airfields, responsibility for the design of structures, and treatment of the two distinctly different areas of the clear zone. These issues surfaced because the structures the aircraft impacted at Misawa were considered essential to airfield operation and had been sited in accordance with standards. They were not, however, designed and constructed in a way that would allow them to collapse if struck by an aircraft or to allow an aircraft to pass over the foundation unimpeded. These facts prompted the SAF/IG ROR.

**While the probability of an obstruction causing a mishap is low, an obstruction will exacerbate the severity of a mishap. That is why the Air Force needs to make frangible, where possible, those items that must remain in close proximity to the airfield and remove those that are unneeded.**

After reviewing the report, Gen Michael E. Ryan (then Chief of Staff of the Air Force) directed the Deputy Chiefs of Staff for Installations and Logistics and for Communications and Information to evaluate the IG's recommendations and take corrective action where needed.

Maj Gen Earnest O. Robbins II, The Civil Engineer, took the lead on this effort by forming a cross-functional "Tiger Team" of experts from operations, civil engineering, communications and safety. Their mission was to validate the report or explain the apparent disparity, identify the magnitude of the problem, develop a funding strategy to mitigate existing airfield hazards, and make recommendations for improvement.

To validate the report findings, the team's lead, Lt Col Kurt Kaisler (then executive officer to The Civil Engineer), called a meeting of major command (MAJCOM) and Air Staff airfield experts. Their review and input confirmed the IG's findings. Gen Lester L. Lyles (then Vice Chief of Staff of the Air Force) sent a message to all MAJCOM vice commanders notifying them of the problem and soliciting their support.

At the same time, the Chief of Safety, the Deputy Chief of Staff for Air and Space Operations and The Civil Engineer sent a joint memorandum tasking the MAJCOM directors of safety, operations and civil engineering to identify all airfield obstructions and the associated costs for removal. The tasking was split into two phases. The first phase was to identify the magnitude of the problem. The second allowed more time to develop detailed cost estimates and prioritize requirements.

During the first phase of data collection, the MAJCOMS only reported the total number of obstructions by base using their annual waiver file. The second phase of the effort required much more detail. Each obstruction was described by facility or equipment type, its location with respect to runway centerline and threshold, and the imaginary surface the obstacle penetrated. Other information included the action and costs necessary to remove the object or correct the deficiency if removal was not possible. Hazards were ranked as extreme, high, medium, or low risk, using the principles of Operational Risk Management. Funding type and facilities infrastructure matrix ratings for each item were included in each base's report.

**Photos, *right,* show non-frangible approach lights, a semi-frangible instrument landing system (ILS) antenna array, and a frangible localizer ILS array.**

# Doing Our Part

The MAJCOMs reviewed and validated the data submitted by their bases, then forwarded the information to the Air Force Civil Engineer Support Agency. AFCESA personnel had developed a web-based database program to simplify and expedite the task of compiling and collating the results.

The results identified approximately 2,000 obstructions in the primary surface and clear zones that require Air Force attention. These include airfield lighting, air traffic control and landing systems (ATCALS) and other equipment essential for flight operations. Some are items that were installed when bases were constructed under less stringent standards. The rest are items the Air Force needs to examine closely to determine if they must be there at all and to address the risks they pose to flight safety.

The Tiger Team established a goal of eliminating all "critical-risk" obstructions Air Force-wide by 2010. Achieving that goal will require an investment of $10-15 million per year, starting in fiscal year 2004.

## Establishing Priorities

In May 2000, the Tiger Team hosted a working group meeting of 40 airfield experts from the MAJCOMS, field operating agencies and Air Staff to review the data collected as well as the policies and procedures related to the issue. Their primary tasks were to establish priority areas for obstruction removal, focusing attention on obstacles nearest the flight path; provide a realistic objective for funds advocacy at the Air Staff; and recommend changes to improve the overall situation.

The group produced numerous recommendations to promote education and proficiency in the field, enhance commander-level visibility of problem areas and foster better communication between the various offices and agencies involved in operating and maintaining airfields. These recommendations were documented in an Airfield Obstruction Reduction Initiative Report, which was coordinated and ultimately approved through the Vice Chief of Staff.

## Doing Our Part

Now that the preliminary work has been completed for this initiative, the real work begins. Base-level personnel need to ensure airfield-related structures are designed, constructed and sited properly, and that all existing obstructions are identified and programmed for removal or replacement. The Air Staff has added more than $42 million over the Future Years Defense Plan to assist the MAJCOMs and bases in funding removal of these obstructions.

The guidance and funding advocacy provided by this effort were all developed to improve safety. To complete the job and improve airfield safety at your base will require use of the training tools and guidance, implementation of the new requirements, and diligence in programming existing airfield obstructions for removal or replacement. With everyone doing their part we can significantly reduce the chance of another tragic accident.

*Mike Ates is the Airfield Criteria Program Manager at Headquarters Air Force Civil Engineer Support Agency, Tyndall AFB, FL.*

The Airfield Obstruction Reduction Initiative Report answered SAF/IG's five recommendations and identified eight additional findings and recommendations. In all, more than 20 specific actions were accomplished in an effort to aid personnel and bases in identifying and removing airfield obstructions. The primary products that were developed to aid in this effort are:

- A revised Engineering Technical Letter (ETL) 88-4, *Reliability and Maintainability Design Checklist*. Revisions include frangibility and coordination requirements for airfield facilities. It was re-published Oct. 11, 2001, as ETL 01-1, *Reliability and Maintainability (R&M) Design Checklist*.
- A revised AFMAN (I) 32-1123, *Airfield and Heliport Planning and Design.* Revisions removed ambiguity, improved waiver-processing guidelines and increased commander-level awareness. The document was re-published Nov. 1, 2001, as Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*.
- A new ETL on Standard Frangible Designs was developed. It cost $290,000 to validate International Civil Aviation Organization (ICAO) frangibility criteria, develop an approval process and develop standard frangible designs for common airfield structures. The product of the first phase of this effort, ETL 01-20, was published Nov. 29, 2001.
- A new computer-based Education and Training Package (ETP) on Airfield Criteria, Standards and Facilities for use by civil engineer, safety, aircraft operations and communications personnel was developed and distributed. This self-study course cost $85,000 through AFCESA's Scientific Engineering and Manpower Assistance Support contract to develop.

The AORI Report is located on the AFCESA web site at http://www.afcesa.af.mil/Directorate/CES/Civil/Airfield/AirfieldObstructionRpt.pdf

# Putting on the Brakes

*Hickam civil engineers undertake the first installation of a new textile brake aircraft arresting system for the Air Force*

by Creighton Lee
*15th CES*

Members of the 15th Civil Engineer Squadron recently installed textile brakes, the newest addition to the Air Force's aircraft arresting system (AAS) inventory, on the runway at Honolulu International Airport, HI. Textile brakes were recently selected for use on Air Force bases due to their flexibility and low maintenance costs, and due to the pending removal of the BAK-9, an obsolete rotary friction brake system, from the Air Force inventory.

## The BAK-9

The BAK (barrier, arresting kit) system was developed in the 1950s by the E.W. Bliss Company to safely stop any hook-equipped aircraft during an aborted takeoff or in-flight emergency. With an energy capacity of approximately 55 million foot-pounds, it was a big improvement over the conventional MA-1A or E-5 arresting gear previously used. Those systems employed ships' anchor chains and had only a 12 million foot-pound capacity to slow runaway planes.

Prior to June 2001, Hickam Air Force Base had a BAK-9 in place at Honolulu International Airport in the overrun area of the primary departure runway to accommodate emergency engagements for alert aircraft. The airport also has two BAK-12/14s on another runway, but the alert mission dictates the need to maintain emergency capability in the overrun.

The BAK-9 was installed in 1964, and for 36 years the system was never involved in an actual engagement, aborted takeoff or in-flight emergency. Meanwhile, the technical order that governs BAK-9 maintenance requires an annual certification engagement if no actual arrestment has been accomplished.

The certification process requires that a hook-equipped aircraft perform a roll-in engagement toward the midpoint of the runway at approximately 95 knots to test the integrity and reliability of the arresting system. However, due to the system's location in the overrun area, this was not possible. Instead, a third party was required to perform a visual inspection of the BAK-9 and all maintenance records each year.

**The 15th CES poured about 62 cubic yards of concrete for the textile brake foundation. The installed concrete pad allows for up to 12 module bags on each side of the runway. *(Photos courtesy 15th CES)***

Successful completion of this inspection allowed the 15th CES to keep the BAK-9 in service.

## BAK-9 versus BAK-12

In 1996, the 15th CES was informed that by 2003 the BAK-9 would no longer be logistically supportable. With the phase-out of BAK-9, replacement options were limited to BAK-12 or textile brake.

The BAK-12 is the standard Air Force operational aircraft arresting system, but because of sighting constraints, intersecting taxiways and limited space on the overrun area, using the BAK-12 was not a viable alternative.

In addition, a BAK-12 system costs about $500,000 to buy and install, and about $60,000 per year to maintain. By comparison, a textile brake can be purchased and installed for about $100,000, and costs $60,000 to re-rig after an emergency engagement.

## Replacing the BAK-9

In 1997, while attending a conference on barriers, a representative from the Headquarters Pacific Air Forces Civil Engineer Operations Division inquired about a textile brake system developed by a French company called Aerazur as a possible replacement for the BAK-9.

Personnel in the Air Force Civil Engineer Support Agency's Technical Support Directorate worked with the Air Armament Center at Eglin AFB to develop a plan and test the textile brake system for Air Force use.

"We used instruments that measured the loads on an aircraft's tail hook and high-speed photography to observe how the textile brake system tears apart to stop a plane," said Mike Ates, AFCESA's airfield criteria program manager. Seventeen tests were performed during two visits to the Navy's Lakehurst testing facility in New Jersey during May 1998 and November 1999.

Results from the tests met the aircraft weight/speed capabilities for overrun emergency engagements. Successful engagements of up to 145.6 knots were demonstrated, evaluated and validated for recommendation and acceptance by Air Armament Center Air

Base Operations at Eglin, then forwarded for final approval to the San Antonio Air Logistics Center, whose functions have since relocated to Robins AFB, GA.

## Why Textile?

The textile brake was chosen for installation at Hickam AFB/Honolulu International Airport due to its simplicity and minimal maintenance requirements and the site constraints.

The textile brake uses a tearing strap to absorb an aircraft's kinetic energy during an arrestment. Two tightly woven nylon straps are sewn together, and it is the longitudinal tearing or shearing of the two straps that provides the braking capability to safely stop the aircraft. It takes 15,000 pounds of force to tear one pair of straps.

The textile brake model (MB 60.10C) used at Hickam is comprised of a set of 10 modules (consisting of the tearing straps) housed in protective environmental covers positioned on each side of the runway. They are connected to a standard 1.25-inch hook cable that is supported every 5 feet by 6-inch rubber donuts. The hook cable is attached to a manually operated winch that allows operators to tension the cable.

The straps are sent to the Aerazur plant in Paris every two years to determine their reliability. With five testing straps on each side, the textile brakes have a 10-year installed life. Stored bags are tested every five years.

While the textile brake is designed as a one-time use device, the lifecycle cost is still less than half that of a BAK-9 or a BAK-12. Although the BAK-12 can sustain 500 arrestments without an overhaul, it has to be overhauled anyway after 10 years at a cost of $120,000. It costs half that to replace the nylon strap modules on the textile brake system when it begins to age.

Another advantage of the textile brake system is its portability during deployments. "Conventional gear would have to be airlifted on a C-130 transport plane for about $500,000," said Ates, "But the nylon can be installed in a mobile fashion at half the time and cost, and it would take just one pallet position on a C-130."

A disadvantage of the fabric brake is that once it has been engaged, a ground crew has to clean up the shredded nylon from the runway area, and the modules must be replaced. However, according to Ates, the entire Air Force only has about seven emergency arrestments on overruns per year.

## Installation

Several 15th CES craftsmen were involved in the successful installation of the new textile brake system.

Phase 1, which ran for 10 nights in August 2001, resulted in removal of the BAK-9 and all associated equipment and destruction of the underground barrier pit floor.

The compaction phase took place after the demolition of the BAK-9 floor, however, due to the events of Sept. 11, work was postponed until October.

Compaction was accomplished by completing 4-inch lifts over a period of 16 days for 100 percent density, followed by surveying and preparation for the installation of the forms for the concrete foundations. The team poured 26 cubic yards of concrete for each foundation. A second pair of triangle-shaped forms was poured using about 5 cubic yards of concrete each, totaling 62 cubic yards of concrete for the foundation.

More compaction of back fill and the final paving of the asphalt followed. The required slope of the foundation to the runway was met, and the foundations completed, in November.

Installation of the textile brake system components was completed in one day. The installation used 100-meter bags, 10 on each side of the runway. The new concrete pad allows for increasing the number of modules to 12 on each side.

Certification and acceptance was conducted and approved by Aerazur and the Air Armament Center, and, following full curing time for the concrete and a pull-test by CE on the installed J-hooks, the barrier was operational in early December. A NOTAM declaring the textile brake system fully operational was issued Dec. 8, 2001.

*Creighton Lee is the chief of infrastructure support for the 15th Civil Engineer Squadron, Hickam AFB, HI.*

*Editor's Note:* Civil engineers have since installed a textile brake system at MacDill AFB, FL, and will install two more systems at Andrews AFB, MD, in the near future.

**The textile brake uses a tearing strap to absorb the aircraft's kinetic energy during an arrestment. Since the textile brake is designed as a one-time use system, it was installed in a location shown to have a low probability of an actual arrestment.**

# Fighting Fire with Fire

*Air Force Research Laboratory personnel are starting fires and setting explosions at Tyndall Air Force Base — all in the name of providing innovative fire fighting technologies to the field.*

by Jennifer Spanich
*AFRL*

## FIRE

The countdown can be heard frequently on the test range at Tyndall Air Force Base, FL, where evaluating raging fires and explosions is all in a day's work for a small group of engineers, scientists and technicians whose mission is to find solutions to meet the needs of the wartime firefighter.

Air Force Research Laboratory's Fire Research Group conducts all aspects of fire research and development associated with aircraft and building fires, agent development, advanced fire detection and suppression, improved vehicle performance and individual firefighter capabilities.

These days, with the Air Force's transition to an expeditionary force and the current world situation driving new demands for fire fighting technology, they are busier than ever. The group's firefighters already extinguish more fires in one year on the test range than most would normally experience in a lifetime.

"Our goal," said Virgil Carr, team leader, "is to develop or identify improved suppression and mitigation agents and the specialized equipment and technologies required to counter new and evolving fire threats." This is no small task as developing weapons technology continues to increase in complexity, lethality and cost.

### Innovative Fire Fighting Technology

Currently, efforts are underway to develop fire fighting apparatus that is light and air transportable, and more efficient than existing vehicles such as the P-19 or P-23. The result is the Combined Agent Fire Fighting System (CAFFS).

CAFFS is a lightweight, skid-mounted, dual-agent system for fighting hydrocarbon fuel fires. Transportable on any commercially available 1½-ton pickup truck, it delivers the same knockdown capability as a large crash rescue vehicle, but with significantly less weight, volume and cost.

"The secret to the effectiveness of the system is the use of dual-agent turret and handline nozzles that control and extinguish both pool and three-dimensional running fuel fires," said Jennifer Kalberer, fire protection engineer. The nozzle configuration allows the foam to triple the throw range of the dry chemical, enabling the dry chemical to provide exceptional knockdown. This allows the foam to quickly seal the surface area for complete extinguishment in a fraction of the time of a single agent nozzle.

Field evaluations of this unit are currently underway at forward operating locations in cooperation with Headquarters Pacific Air Forces. Other potential applications include tent city fire protection, hot pit refueling and chemical/biological decontamination. Eventually, the system will be demonstrated for remote robotic operation.

Another of the group's projects involves improving aircraft cargo container safety aboard military and civil aircraft, which is essential for safely transporting hazardous materials. Testing flame-resistant materials, installing fire suppression systems and constructing a new generation of cargo container are all part of the group's effort to find a solution to a potentially disastrous problem. The project shows such promise that AFRL has been approached by a major overnight shipping corporation to conduct mutually beneficial experiments to the military and private industry.

AFRL was also funded by the Defense Ammunition Logistics Agency to develop an Advanced Fire Protection Deluge System (AFPDS) designed to save lives at Army munitions production plants. The AFPDS controls deflagrations (intense, rapidly burning fires) occurring in munitions manufacturing accidents.

**An AFRL firefighter tests equipment and agents in the fire pit (an outdoor live fire test facility) at Tyndall's Silver Flag Exercise Site. The Fire Research Group's firefighters extinguish more fires in one year on the test range than they would normally experience in a lifetime.**

**Firefighters test the Combined Agent Fire Fighting System, a lightweight, skid-mounted, dual-agent system for fighting hydrocarbon fuel fires. *(Photos courtesy AFRL)***

According to Steven Wells, project engineer, the AFPDS uses ultra-high speed detection and water suppression to detect and suppress a fire within 30 thousandths of a second. The system discharges cooling water at 180 feet per second, extinguishing the fire and leaving 98 percent of the munitions unburned while preventing human injury.

The success of this system has led to its installation in the commercial manufacturing world. Already, the AFPDS has saved personnel and equipment at a paint manufacturing plant when propane gas was ignited after leaking from an aerosol paint can. The facility was undamaged and able to continue normal operations.

Also under development is a new explosively driven extinguishing system for protection of large areas of munitions mixing operations and submunitions manufacturing. This system is designed to be more than twice as fast as the current AFPDS and represents a quantum leap forward in protection of munitions facilities.

Another recent innovation involved retrofitting some older generation fire trucks with an improved suspension system to decrease rollover potential. Loss of vehicle control and rollover has cost firefighters' lives, as well as lost time, injuries and hundreds of thousands of dollars in repair and replacement of vehicles. Working closely with industry leaders, Fire Research Group personnel designed, fabricated, installed and tested a compact, inexpensive suspension strut to augment current leaf spring suspension systems. This technical approach has proved successful and, in the future, may be specified in NFPA standards for installation on some new commercially available fire trucks.

Group personnel also perform fire fighting agent evaluations. Recently, the Environmental Protection Agency identified the key ingredient in one of DoD's most commonly used fire fighting agents, Aqueous Film Forming Foam (AFFF), as having a detrimental impact on the environment. The group's future efforts include a search for an extinguishing agent that is free of persistent, bioaccumulating and toxic chemicals, while maintaining the military specification for fire fighting performance.

## Leading the Way

Many technologies developed at Tyndall are now used by firefighters not only at DoD installations but also at major airports across the United States. The group's personnel serve as consultants to the Air Force major commands, the Air Force Civil Engineer Support Agency, base civil engineers and non-Air Force agencies.

The ability to meet mission needs with the full array of unique fire research facilities and the flexibility to meet customers' needs enables AFRL to keep DoD in the lead of national and international aircraft crash/rescue fire research.

*Jennifer Spanich is a chemist with Air Force Research Laboratory's Fire Research Group, Tyndall AFB, FL.*

## Remote Location, Unique Facilities

Tyndall AFB is on Florida's Gulf Coast, an ideal location for conducting year-round outdoor research. Located on an 18-mile-long peninsula, the base provides remote space and ideal geography for outside hydrocarbon fuel fires and experiments requiring explosives.

The Department of Defense/Federal Aviation Administration large-scale fire test facility at Test Range I boasts two outdoor 100-foot-diameter, Environmental Protection Agency-approved, closed-loop fire pits. This unique facility is the only one in the Air Force approved for *unrestricted* burning of hydrocarbon fuel. A 300-foot live fire burn pit is scheduled for installation next year.

Test Range II, known as Sky X (ten), hosts special facilities constructed for indoor fire and explosion testing. For example, the Energetic Materials Fire Building has a special hinged roof that allows explosive overpressure to escape outside, minimizing damage to inside equipment. This building also houses a 1,000-cubic-foot total flood facility for evaluation of highly toxic or potentially explosive fuels and oxidizers.

The Medium-Scale Fire Test Facility is an environmentally controlled hardened shelter for conducting up to 100-square-foot pool fire tests indoors, avoiding the effects of wind and rain. Tests conducted there include large-scale composite burn analysis of aircraft structural materials and evaluation of the Air Force $C_2$ CB (carbon dioxide chemical/biological) canister, which is part of the Joint Firefighter Integrated Response Ensemble (J-FIRE).

# Building with Tilt-Up

*Lessons learned from a recent RED HORSE project*

by Capt Peter P. Feng
*820th RHS*

"Tilt-up" concrete construction is a growing trend in civilian industry where functional, cost-effective structures that can be erected quickly are needed. The method may also turn out to be a viable contingency construction alternative for Air Force civil engineers.

Members of the 820th RED HORSE Squadron used it recently to construct a quarry maintenance facility at Nellis Air Force Base, NV, to validate tilt-up as a contingency construction method for airfield warehouses and maintenance buildings. The $278,000 facility includes an open maintenance bay, a secure tool storage area, administrative offices and restrooms — greatly enhancing the quality of quarry operations training.

## What is Tilt-Up?

Tilt-up construction is the process of casting wall panels horizontally on a building floor slab or separate casting slab(s) then lifting or "tilting" them into place. The erected panels are temporarily braced, and then the roof structure is attached to the wall panels.

**820th RHS members used the tilt-up method to construct a quarry maintenance facility on Nellis AFB. *(Photos courtesy 820th RHS)***

Tilt-up construction was first used in the early 1900s to construct warehouses, churches and factories. Today, tilt-up is used as a construction alternative to steel and wood frame, masonry and pre-engineered metal buildings. It is primarily used to build low-rise commercial and industrial buildings.

**The main *Advantages* of tilt-up construction are:**

- Economical construction
- Wide variety of exterior finishes
- Expandability
- Durability and low maintenance costs
- Splinter protection

**The main *Disadvantages* are:**

- Lack of qualified personnel and contractors
- Weight of panels on certain soils
- Available space to cast panels
- Availability of lifting equipment

## Design

The seven major design steps for the quarry maintenance facility were site layout, foundation requirements, panel thickness, panel reinforcing, panel connections, roof structure and crane requirements.

**Site layout:** Any tilt-up site must be large enough to allow movement of transit mixers during wall panel casting and large enough for a crane to work around when lifting panels. To meet this requirement, a 6,000-square foot area was chosen for the 30- by 60-foot building footprint, parking, storage and maneuverability of equipment during construction. In addition to the building footprint, three "auxiliary" casting slabs were needed because all 16 of the wall panels could not be cast on the building floor slab.

**Foundation requirements:** A soil bearing capacity calculation was performed to determine the width and depth of the foundation.

**Panel thickness:** The wall panels were designed to be 6 inches (nominal) thick. This was done to keep their weight to a minimum while leaving them thick enough for reinforcing bars (rebar).

**Panel reinforcing:** The design called for #4 rebar to be placed 12 inches center-to-center, horizontally and vertically.

**Panel connections:** Each panel would have splice plates placed at the upper sections. The splice plates tie the building together. A welded metal plate would secure the panels to each other.

**Roof structure:** A standard steel K joist was designed for the building. The design was subject to standard loads listed in American Society of Civil Engineers (ASCE) 7-98, *Minimum Design Loads for Buildings and Other Structures*. The roof was designed with a standard 1.5- by 12-inch slope. The joists were selected from the economy table in *Steel Joists and Joist Girders*, a manual by the New Columbia Joist Company.

**Crane requirements:** Crane size is based on the weight of the heaviest wall panel. At a minimum, the crane should be sized at twice the weight, in pounds, of the heaviest panel. This is a requirement because the panels must be lifted and set into place, which creates large moments on the crane. The heaviest wall panel for the quarry facility weighed 14,600 pounds. Thus, a 15-ton crane was needed. However, to account for the reach needed to lift wall panels from the floor slab and three auxiliary casting slabs at different positions around the site, a 65-ton crane was rented.

## Construction Procedure

The six major construction steps for the quarry maintenance facility were the foundation, floor slab, auxiliary casting slabs, formwork, tilt-up and roof structure.

**Foundation:** The building foundation was constructed using a 2-foot-wide by 2.5-foot-deep earthen footer. Six inches of Type II base course was placed at the bottom of the footer as a drainage layer. Then, Type IV Portland Cement concrete with a compression strength of 3,500 psi and at a 5-inch slump was placed into the forms. The concrete was then hand finished.

**Floor slab:** The floor slab is 6 inches thick with #4 rebar set in a 12-inch grid. The rebar was extended past the edges of the floor slab 24 inches to overlap with the wall reinforcement when the 3-foot closure strip was poured.

**Auxiliary casting slabs:** Three auxiliary slabs were built to cast eight panels. The auxiliary slabs are now used as parking space.

**Formwork/bond breaker:** The formwork for the wall panels must be as square as possible. Once the formwork is complete, a bond breaker is sprayed on the concrete floor slab. The bond breaker ensures the concrete wall panels do not adhere to the concrete floor or auxiliary casting slabs. After bond breaker was sprayed, rebar was placed around all door and window openings. Architectural reveals, pick points and brace points were also placed at this time. In addition, the splice plates and joist bearing plates were set in the formwork. The plates are an integral part of the concrete panels. Five-inch shear studs were connected to the plates and cast into the concrete panels.

**Tilt-Up:** The panels were laid out in the order of their erection. They were then lifted starting at one corner of the floor slab and working around the building until finished. As seen from the photos, the braces are quite congested in the middle. It was found that removing one of the braces from the corner panels facilitated lifting the panel. Once the panel was in place, the brace was reconnected.

**Roof:** Fourteen 20K4 joists with horizontal bridging were installed, using a crane to set them. G60 roof decking was then welded to the joists. A 1.5-inch-thick rigid insulation was placed on top of the decking, while 12-inch wide multi-rib panels completed the roof structure.

**A crane was used to set the steel joists for the roof in place.**

**Wall panels were cast horizontally then tilted into place. They were temporarily braced until the roof structure was in place.**

## Lessons Learned

**Pick points/brace points:** When placing the concrete for the wall panels, one person must watch the pick points to ensure alignment is not offset. This is extremely critical because the panels cannot be lifted without the pick points. This is also true for the brace points. Make sure the brace points are set correctly and that both pick and brace points are capped so they do not fill with concrete when pouring the concrete for the panels.

**Corner bracing:** Since the quarry facility is so small, the bracing at the corners was extremely congested. Therefore, to ease brace installation, the inside brace was removed before the panel was set into place. One brace was locked into place after the panel was set, and the second brace was set before the pick points were released.

**Reveals and bond breaker:** Reveals must be placed in the panel forms before the bond breaker is sprayed. If the reveals are not set properly, the mistakes will be reflected in the panel and adversely affect the aesthetics.

## Summary

Tilt-up construction is an economical and efficient way of constructing a facility. It offers a viable contingency construction alternative to masonry and pre-engineered buildings.

The 820th RHS is working on standard panels for buildings — a standard wall panel, a panel with window openings, a panel with door openings, and a panel with larger openings for vehicle maintenance. The standard panels will have a list of materials with brace and pick points already designed. From there, all that is required is to meet with the user to determine requirements. Once the overall requirements are known, the roof structure is designed and materials can be ordered. Then construction can begin.

*Capt Peter P. Feng, 820th RED HORSE Squadron, Nellis AFB, NV, was the officer-in-charge during this project.*

# Lighting the Way

*New technology uses half the energy*

by William B. Turner, PE
*92nd CES*

Effective hangar lighting is a critical safety factor for Air Force personnel. Proper illumination of the work area results in safe, timely and accurate job accomplishment, and lighting improvements that boost morale and save energy provide triple the benefit. At the same time, Executive Orders currently mandate energy consumption reductions at federal facilities.

Members of the 92nd Civil Engineer Squadron at Fairchild Air Force Base, WA, recently accomplished a retrofit that met both requirements — dramatically improving lighting in two aircraft hangars while reducing energy use. As an added benefit, the lighting retrofit was funded from future energy savings, requiring no conventional appropriated funding.

## Light Pipes

Fairchild civil engineers worked with the local electric utility, Bonneville Power Administration, and the prime contractor, Power City Electric, to install new lighting technology developed by 3M Company in the two hangars. Sixty-eight of the new lights, known as "light pipes," replaced 286 pendant light fixtures in each hangar.

About 90 percent of the existing pendant light fixtures held 400-watt bulbs, while the other 10 percent held 1,000-watt bulbs. By contrast, each light pipe contains a single 1,000-watt metal halide bulb. The replacement cut lighting energy use in the hangars in half.

A light pipe consists of a housing at one end that contains the ballast and the 1,000-watt metal halide bulb, tube sections that reflect and evenly distribute the light, and a mirror at the other end.

The housing unit allows easy changing of the metal halide bulb by removing an access plate and sliding the light out of one end. It has an ultraviolet light filter at the other end.

The tube sections are each 78.75-inch-long, 10-inch diameter polycarbonate with a rubber seal at each joint and locking tabs to ensure proper alignment and an airtight seal. A typical light pipe is made of six tube sections.

The polycarbonate tube sections are lined with an optical film to facilitate reflection of light down the full length of the light pipe at a variety of angles. The tube sections also have a reflective film on the top half of the section and are more transmissive on the bottom to send light down to the work surface. The reflective film tapers very slightly along the length of the light pipe to avoid transmitting light unevenly. Consequently, the light pipe sections must be installed in the proper order.

The mirrored end cap further increases the internal reflection of light at a variety of angles. The result is a very uniform distribution of light from one source over a wide area.

## Maintenance and Installation

Maintenance of the light pipes should be minimal. As noted previously, the metal halide bulb is easily replaced. Internal cleaning is not required as the light pipe is sealed by rubber seals and held in place by locking tabs and coupling clamps at each joint. The polycarbonate sections are flexible and impact resistant, but do require care in handling to avoid scratching. Also, the internal reflective surfaces should not be touched or allowed to become dirty.

At the same time the light pipes were installed, infrared radiant heat was installed in the hangars. This led to the concern that the light pipes might become overheated. Data from 3M showed the maximum allowable temperature for the polycarbonate light pipe sections is 200 degrees Fahrenheit. The heater manufacturer's analysis showed the maximum expected temperature would be less than 150 degrees. Infrared temperature measurements indicated that 114 degrees was the

maximum temperature encountered. In spite of this, six shields were installed per hangar to protect the polycarbonate sections.

## Let There Be Light

There is literally a "day and night" difference between the new and old light systems in the hangars. The two side-by-side hangars are housed under one roof with two additional hangars, offices and shops inside a 500,000-square-foot aircraft maintenance building that was built in the 1940s. The lighting that was replaced was the original lighting.

While comparing the completed installation in one hangar to the original lighting in the other, a visitor requested the not-yet-converted hangar's lights be turned on. The answer readily came back, "Sir, the lights are on." Subsequently, the decision was made to retrofit the remaining two hangars with light pipes.

The old pendant lights produced only 5 foot-candles of light, measured at 4 feet from the floor with a light meter pointed straight up at night. During daytime the old system was heavily supplemented by outdoor light. Thirty foot-candles came in through large glass areas in the hangar doors. But even with clean reflective paint on the hangar floor, only 2-4 foot-candles was available at 90 degrees to the hangar doors, and only 1-2 foot-candles was available 180 degrees from the hangar doors. These low levels of light posed a serious safety hazard to pedestrians in the hangar whenever vehicles drove through.

In contrast, the light pipes put out more than 50 foot-candles. Allowing for up to 30 percent degradation over time, the criteria of 40 foot-candles should be maintained in the long term.

**There is literally a "day and night" difference in the new and old lighting systems in the hangars. Photos show Hangar 1 *(above)* with light pipes installed and Hangar 4 *(left)* with the old pendant light fixtures. *(Photos courtesy 92nd CES)***

Foot-candles are only part of the story. With conventional pendant fixtures, maintenance personnel looking up at a work surface with a bright light behind it would experience eyestrain. With light pipes, the hangar ceiling receives some light so that it is not entirely dark. As the light is uniform, it is relatively free of shadowing, contrast and glare. Moreover, it provides accurate color rendition.

Lighting control was simplified considerably, as well. While each hangar is large enough to be wired into four separate panels, the new system is programmable and was set up to allow all the lights to be turned on or off from any one switch. Exempting any individual light from the program (to leave lights on as night lights, for instance) is as simple as pressing a pin for that individual light. It is possible to program lights to turn on or off at any desired time of day or week. If desired, the programming and monitoring can be accomplished from a remote computer, although this was not done at Fairchild.

## Costs and Savings

The installed cost for lighting both hangars was $1,186,784, including engineering design services. That comes to about $8,725 per light pipe, with the majority being the material cost of the light pipe itself. Much of the light pipe assembly is done by hand. Greater production volume may decrease the price and also result in the housing becoming a single piece casting.

Energy savings performance contracting allowed the light pipe project to be coupled with the installation of infrared radiant heating and other energy-saving measures. The overall payback from energy savings was required to occur in less than 10 years. Under the same agreement, it is not necessary to do all the work at the same time, so energy savings exist which may be used for other projects in the future, such as installation of light pipes in two more hangars.

The most exciting part of the project, however, is that the occupants of the facilities are working in a far safer, more uplifting, more time-efficient environment, which results in dramatic cost savings in worker productivity, morale and job satisfaction.

*William Turner is the energy manager for the 92nd Civil Engineer Squadron, Fairchild AFB, WA.*

# Maintenance Helps Gas Masks Remain Effective

by Richard Gutknecht
*HQ AFCESA*

When properly sized, fitted and maintained, the MCU-2 Series Protective Mask will protect your face, eyes and respiratory tract from chemical and biological warfare agents and radioactive dust particles. However, to remain effective, the mask requires regular maintenance, even when not in use.

According to Technical Order 14P4-15-1, *Operation and Maintenance Instructions for Chemical-Biological Mask Type MCU-2A/P*, masks must be cleaned and inspected when issued, every six months during peacetime, prior to deployment, and every seven days during contingencies. The TO provides details on maintaining the mask, but a few areas of special concern bear highlighting.

To clean the mask, immerse it and its components (excluding microphone) in a mild liquid detergent and warm water solution. Be sure to remove the filter canister and set it aside. The filter will be ruined if it gets wet.

Clean under the nose cup by gently pulling it away from the flange that holds it. Clean the nose cup and the area around the outlet valve assembly (inside the mask). A soft toothbrush can be used around the outlet valve assembly, and a soft, lint-free cloth may be helpful in removing dirt and haze, especially from the lens of the mask. Rinse the mask and components in warm water ensuring all detergent is removed.

To disinfect the mask, dip it in a solution of three tablespoons of liquid chlorine bleach and a gallon of water. The mask should only be soaked in the solution for five minutes. Afterward, rinse the mask twice in clear, warm, potable water for two or three minutes.

To disinfect the drinking tube system, fill a canteen with disinfecting solution and connect it to the drinking tube coupling. Squeeze the canteen to force the solution through the drinking tube system, then rinse the canteen twice with clean water.

After cleaning and disinfecting the mask, thoroughly dry it. Once the mask is dry, check the mask outlet valve assembly for disbonding and the drinking tube for cuts or cracks in the rubber.

When reassembling the mask, make sure the nose cup is reseated properly under the flange of the outlet valve assembly. Also, make sure the mask and components are completely dry before installing the filter.

Check lenses to ensure they have not separated from the face piece and that they have the proper configuration. Never dry-wipe the lens or use alcohol wipes. Masks with stained or scratched lenses that impair normal vision must be condemned.

Inspect the front and side voicemitters for tightness and correct installation (but do not attempt to loosen the front voicemitter retaining ring). Make sure the four pins in the center of the front and side voicemitters face outside the mask.

Finally, protect your mask from damage when it is being stored. Do not place heavy objects on it or keep it in areas where it might be exposed to extreme temperatures (like the trunk of a car). If storing the mask for more than 30 days, leave the head harness or skullcap in its normal position (head harness/skull cap toward the back and not pulled over the face piece front) with no tension applied to the mask or harness/skullcap. This ensures the shape of the face piece does not get distorted over time.

*Editor's note:* TO 14P4-15-1 can be ordered though your local technical order account manager.

*Richard Gutknecht is a readiness specialist at Headquarters Air Force Civil Engineer Support Agency, Tyndall Air Force Base, FL.*

## Protective Mask Assessment Team — Have Tester, Will Travel

**The Air Force**

After visiting 24 locations in 14 states and five foreign countries in 2001, the Air Force's Protective Mask Assessment Team (PMAT) has hit the road again in 2002. Currently in their second year of operation, PMAT's task is to assess the condition of nuclear, biological and chemical (NBC) protective masks issued to individual service members and report results to higher headquarters.

The team, the only one of its kind in the Air Force, is from Tyndall Air Force Base, FL, and is comprised of contract employees from Applied Research Associates, Inc. They report directly to Headquarters Air Force Civil Engineer Support Agency, the OPR for the Air Force Mask Assessment Program. The Air Staff selects which installations will be visited, about 20 this year, based on enemy threat and wing missions.

During the weeklong visit, the four-member team assesses the serviceability of randomly selected masks from each unit on base. They use the TDA-99M Respirator Function Tester, the Air Force's first portable, integrated respirator function tester, to test the reliability of every functional component of the mask. Each mask that fails a leakage test is tested at least two more times on different machines and with different operators, according to test protocols, to make absolutely sure it is unserviceable before condemning it.

Although PMAT is not an inspection team, the results it compiles are reported to the wing's senior leadership and up the chain of command to the Air Staff to determine possible trends in user maintenance, adequacy of training and inputs to technical manuals and for configuration management purposes. *(Mike Serach, PMAT Chief)*

# Marines Land at Silver Flag for Training

Three U.S. Marines from 9th Engineer Support Battalion, 3rd Force Service Support Group, participated in the normally all-Air Force Silver Flag training at Kadena Air Base, Japan, in May.

The one-week course helped cross-train the two services in water purification, nuclear, biological and chemical procedures and contamination control. However, their main focus was rapid runway repair. The students learned to repair and turn a runway into a large-scale facility within a hostile field environment. This is the first time Marines have participated there.

"This was an awesome experience," said Cpl David Davies, combat engineer, Company A, 9th ESB. "The fact that I am a Marine didn't affect anything. We focused on the mission and worked as a team."

Davies was part of the mat team, which was responsible for laying down the fiberglass material used to repair holes in the original runway. During the week, the mat team set a new site record for laying down the material in the fastest time.

Sgt Justin Ice, also a combat engineer with Company A, 9th ESB, made his mark by having one of the highest scores on the initial written test.

The instructors were impressed with the Marines and their hard work. "It says a lot about the Marines when two of the three that went through the course set a new record and had one of the highest scores on the initial test," said Air Force TSgt Corey Prentice, heavy equipment operator, Detachment 1, Pacific Air Forces. "I really hope training with Marines becomes a regular thing." *(Marine Corps News Service story by Cpl. Denyelle D. Spillane)*

**Silver Flag students secure fiberglass matting used to cover holes on the runway. The team, which included three Marines, set a site record for laying down matting the fastest. *(USMC photo by Cpl. Denyelle D. Spillane)***

# Neighbor CE Squadrons Make Training Work

Two Wyoming civil engineer units applied the "total force" concept to help each other out during the war on terrorism this summer.

With 64 active-duty members deployed overseas or preparing to deploy, the 90th Civil Engineer Squadron at F.E. Warren Air Force Base was a little short-handed. Some sections were down to a 20-percent productivity rate.

"The deployed people are still assigned here and carried on our books but aren't physically here to do the work," said Pat Baird, 90th CES utility systems operator.

Meanwhile, the Wyoming Air National Guard's 153rd CES had just canceled its annual two weeks of contingency training in Arkansas that was to be held during the last two weeks of May. So many of their own members were deployed, the unit couldn't come up with the numbers needed to justify an airlift.

The solution to both of their dilemmas came when Maj Doug Nichols, 153rd CES commander, asked if Warren could use some help for the two weeks. He saw the work that needed to be done at Warren as a valuable training opportunity for the 153rd members.

Warren accepted the offer and, from May 13-24, 20 Wyoming Guardsmen applied a variety of technical and management skills to help clear the 90th CES's work backlog.

"Their people helped us to keep our pace up and keep from getting swamped," said SMSgt Dennis Doughty, 90th CES chief of operations management. "So far we've kept our work rate up only through better planning, harder work and longer hours. The Guard helped us maintain the status quo for our customers."

The Guardsmen tackled a safety problem at the firehouse that otherwise would have taken two months to fix; installed air compressors, steam heaters and air conditioners; graded roads, patched asphalt and replaced miles of fencing and gates.

**SMSgt Charles Anderson (on ladder), 153rd CES, and another member of the 153rd repair a fence on Warren AFB. *(Photo by MSgt John Sandness)***

They also took on the tasks of surveying several miles of Warren for a new base perimeter fence and conducting a topographical survey for upcoming contract work.

Three of the Guardsmen didn't even have to alter their daily commute — they're employed full-time with the 90th CES in their civilian life. *(Air Force Space Command News Service story by MSgt John Sandness)*

# Continuing Education

## AFIT
### Civil Engineer and Services School

### Wright-Patterson AFB, OH

| Course No. | Title | Off | Start Dates | Grad Dates |
|---|---|---|---|---|
| MGT 412 | Financial Management Course | 03A | 15-Oct-02 | 25-Oct-02 |
| ENV 220 (S) | Unit Environmental Coordinator | 03A | 21-Oct-02 | 25-Oct-02 |
| MGT 101 | Intro. to Base Civil Engineer Organization | 03A | 21-Oct-02 | 14-Dec-02 |
| ENV 418 | Environmental Contracting | 03A | 28-Oct-02 | 08-Nov-02 |
| ENV 531 | Air Quality Management | 03A | 04-Nov-02 | 08-Nov-02 |
| ENV 020 (S) | Environmental Compliance Assessment | 03A | 18-Nov-02 | 20-Nov-02 |
| ENV 419 | Env. Planning, Programming & Budgeting | 03A | 19-Nov-02 | 21-Nov-02 |
| Seminar (S) | Energy Savings Performance Contract | 03A | 19-Nov-02 | 19-Nov-02 |
| Seminar (S) | ECAMP Seminar | 03A | 21-Nov-02 | 21-Nov-02 |
| ENV 222 (S) | Hazardous Material Management Program | 03A | 03-Dec-02 | 05-Dec-02 |
| Seminar (S) | Hzds. Waste Accum. Site/Initial Point Mgmt. | 03A | 05-Dec-02 | 05-Dec-02 |
| ENG 464 | Energy Management Technology | 03A | 09-Dec-02 | 13-Dec-02 |
| ENV 022 (S) | Pollution Prevention Program Op. & Mgmt. | 03A | 09-Dec-02 | 13-Dec-02 |
| ENG 466 | Energy Management Policy | 03A | 16-Dec-02 | 20-Dec-02 |
| MGT 585 | Contingency Engineer Command | 03A | 16-Dec-02 | 20-Dec-02 |

Registration for resident courses, which are offered at Wright-Patterson AFB, OH, begins approximately 90 days in advance. Applications must go through the student's MAJCOM Training Manager. Registration for the satellite offerings, marked with an (S), closes 40 days before broadcast. For satellite registration, course information, or a current list of class dates, visit the CESS website at: http://cess.afit.edu.

## 366 Training Squadron

### Sheppard AFB, TX

| Course No. | Title | Start Dates | Grad Dates |
|---|---|---|---|
| J3AZR3E051-003 | Cathodic Protection | 15-Oct/31-Oct/29-Nov | 28-Oct/14-Nov/12-Dec |
| J3AZR3E051-007 | Airfield Lighting | 01-Oct/23-Oct/05-Nov | 10-Oct/01-Nov/15-Nov |
| J3AZR3E051-008 | Electrical Distribution Sys. Maint. | 10-Oct/13-Nov | 07-Nov/11-Dec |
| J3AZR3E051-012 | Fire Alarm Systems | 01-Oct/26-Nov | 25-Oct/20-Dec |
| J3AZR3E051-013 | Intrusion Detection Systems (IDS) | 03-Oct/25-Oct | 23-Oct/14-Nov |
| J3AZR3E071-001 | CE Adv. Elec. Troubleshooting | 01-Oct/30-Oct/29-Nov | 29-Oct/27-Nov/06-Jan |
| J3AZR3E472-000 | Liq. Fuels Storage Tank Entry Spvsr. | 01-Oct | 11-Oct |
| J3AZR3E451-004 | Fire Suppression Systems Maint. | 01-Oct/23-Oct/02-Dec | 22-Oct/13-Nov/20-Dec |
| J3AZR3E471-101 | Bare Base Water Purification and Distribution Systems | 02-Oct/16-Oct/06-Nov | 11-Oct/25-Oct/18-Nov |
| J3AZR3E453-003 | Pest Management Certification | 14-Nov | 12-Dec |
| J3ARR3E453-002 | Pest Management Re-Certification | 07-Oct/04-Nov/09-Dec | 11-Oct/08-Nov/13-Dec |
| J3AZR3E052-013 | CE Advanced Electronics | 17-Oct | 14-Nov |
| J3AZR3E072-002 | Troubleshoot. Elec. Power Gen. Eq. | 16-Oct | 06-Nov |
| J3AZR2F051-001 | Fuels Quality Control | 16-Oct/02-Dec | 05-Nov/20-Dec |
| J3AZR2F051-005 | Cryotainer Maint. & Support Equip. | 01-Oct/21-Oct/02-Dec | 15-Oct/01-Nov/13-Dec |
| J3AZR2F051-006 | Cryogenics Production | 16-Oct | 17-Dec |
| J3AZR2F091-001 | Petroleum Logistics Management | 22-Oct/03-Dec | 07-Nov/19-Dec |
| J3AZR3E151-013 | HVAC/R Controls Systems | 04-Nov | 10-Dec |
| J3AZR3E151-015 | Indirect Expansion Systems | 04-Nov/03-Dec | 22-Nov/20-Dec |

### Ft. Leonard Wood, MO

| Course No. | Title | Start Dates | Grad Dates |
|---|---|---|---|
| J3AZP3E571-003 | Engineering Design | 21-Oct/02-Dec | 01-Nov/13-Dec |
| J3AZP3E571-005 | Construction Materials Testing | 07-Oct/12-Nov | 18-Oct/22-Nov |
| J3AZP3E971-003 | Advanced Readiness | 18-Nov | 22-Nov |
| J3AZP3E971-005 | NBC Cell Operations | 21-Oct/02-Dec | 25-Oct/06-Dec |

### Indian Head, MD

| Course No. | Title | Start Dates | Grad Dates |
|---|---|---|---|
| J5AZN3E871-001 | Adv. Access and Disablement | 07-Oct/28-Oct/02-Dec | 21-Oct/08-Nov/13-Dec |
| J5AZN3E871-002 | Advanced EOD Course | 28-Oct/02-Dec | 08-Nov/13-Dec |

### Gulfport, MS

| Course No. | Title | Start Dates | Grad Dates |
|---|---|---|---|
| J3AZP3E351-001 | Low Slope Maint. & Repair | 21-Oct/12-Nov/02-Dec | 31-Oct/02-Nov/12-Dec |
| J3AZP3E351-002 | Fabrication Welded Pipe Joints | 21-Oct/02-Dec | 01-Nov/13-Dec |
| J3AZP3E351-003 | Metals Layout Fab. & Welding | 07-Oct/04-Nov | 25-Oct/22-Nov |

Additional course information is available on the 366th TRS web site at https://webm.sheppard.af.mil/366trs/default.htm. Students may enroll on a space-available basis up until the class' start date by contacting their unit training manager.

# Andersen's Amphibious Responders

Twenty-four hours a day, seven days a week, Air Force firefighters are ready, willing and able to respond to a wide range of emergencies. Already known worldwide as experts in aircraft crash and fire rescue, they quickly adapt to the special needs of each installation. Andersen Air Force Base, Guam, is no exception. Located on a small island in the middle of the Pacific Ocean, it is the only base in the Air Force that has a water rescue team.

Military members on the island partake of a variety of water sports that offer discovery, excitement and danger. That is where the men and women of the 36th Civil Engineer Squadron Fire Protection Flight play a critical role.

**Joey Tajalle and Philip Guerrero, 36th CES Fire Protection Flight, simulate rescuing a swimmer at a local beach. Andersen AFB's water rescue team trains throughout the year on water rescue techniques.** ***(Photo by SSgt Crispin Pacificar)***

Each shift, firefighters are designated as members of the water rescue team. This one-of-a-kind capability has been used several times to rescue swimmers off the northern tip of the island. Having two jet skis and extractor boards staged at the water's edge, it doesn't take long for them to spring into action. Two, two-person firefighter teams ride the rescue skis and a fifth firefighter serves as a safety officer during all operations. A senior fire officer coordinates rescue operations from shore with other responding agencies such as the Coast Guard, a naval helicopter assigned to Andersen's Helicopter Combat Support Squadron FIVE (HC-5), security forces and medical personnel.

"It's exciting and kind of scary at the same time," said A1C Patrick Stanfield, a water rescue team member. "Both shifts practice at least once a month to ensure we are ready and to qualify new team members."

"The concept of using jet skis came about several years ago when swimmers were out beyond the reef. At the time all we could do was throw life preservers to them. Now we go get them in a safe and coordinated manner," said Marvin Tuncap, one of the rescue team instructors.

Special emphasis is placed on pilot training so the jet skis are operated safely in protected and open water. Rescuers ride to the victim on the back of the jet ski and slide back onto the extraction board. Approaching from the right, the pilot deftly reaches out and grabs the victim, transferring him or her to the rescuer on the extractor board. Cradled in protective arms, the victim is swiftly taken to shore for medical attention.

"During the hours of darkness, HC-5 can illuminate our route through the reef and guide us to the victims, which really helps," said Tuncap. "It's never a good idea to get out beyond the reef, but if you do get caught out there the water rescue team at Andersen AFB is ready to help."

In addition to having access to clear water teeming with aquatic life, much of the island is covered with thick vegetation known as "boonies." In the dry season, from April to August, the boonies can readily burn, placing U.S. assets and private property at risk. Due to the thickness of the boonies and the rough terrain, getting firefighters into position to control and extinguish these fires can be nearly impossible.

Last year, when a fire threatened an off-base radar site, firefighters requested the assistance of HC-5 to airdrop water onto the fire. The CH-46 is capable of lifting a bucket with 500 gallons of water and dropping it precisely where the senior fire officer needs it. Efforts are currently underway to improve communications, determine pre-approved fill points to minimize the impact on the flying mission, and develop a comprehensive training program. HC-5 has been in the business of airborne firefighting for years and trains regularly to conduct these types of operations.

MSgt Marshall Hadley, Assistant Chief for Fire Prevention, got to see first-hand the capabilities of the helicopter and bucket. "It's amazing to see the helicopter fill the bucket and drop that amount of water so accurately. Having this capability available will surely help us combat wildland fires more efficiently in the future." During last year's dry season it wasn't uncommon to have a firefighter spend at least some of his or her 24-hour shift combating wildland fires.

This dual role of firefighter and water rescuer is what sets the fire protection flight at Andersen apart from those on other Air Force bases. In the jungle or in the water, Andersen AFB firefighters operate in extremes. *(SMSgt Mark Ledford, 36th Air Base Wing Public Affairs)*

# CE Teams Aid Andersen Typhoon Recovery

**Andersen AFB's gas station was one of several agencies crippled by the effects of Typhoon Chata'an on Guam in July. *(Photo by A1C Joshua Strang)***

Twenty members of the 15th Civil Engineer Squadron from Hickam Air Force Base, HI, and six members of the 3rd CES from Elmendorf AFB, AK, arrived in Guam July 12 with generators, ice machines and supplies to boost Andersen AFB's ability to return to normal operations in the wake of Typhoon Chata'an, which struck there July 5.

The Hickam and Elmendorf civil engineers were in Guam to augment Andersen's 36th CES. "They expanded our work force, and we've been able to get more done in the same amount of time," said Lt Col Bruce Arnold, 36th CES commander. "This is a total team effort — one team all the way."

The deployed CEs brought extra equipment and supplies, such as eight additional generators, seven portable air conditioning units, 10 ice machines and electrical wire.

Two personnel from Headquarters Pacific Air Forces at Hickam and one from the Civil Engineer Maintenance Inspection and Repair Team (CEMIRT) at Travis AFB, CA, traveled to Guam to help, as well.

"There is a lot of interest in this from Headquarters PACAF and beyond," said Stan Wakumoto, a PACAF electrical engineer. "The base has so many things to do already they can't be distracted. I'm glad we are here and are helping."

The typhoon hit the island with winds of more than 100 miles per hour, knocking out power across the island and damaging various buildings, including some at Andersen. A second typhoon, Halong, with winds of up to 212 miles per hour, barely missed Guam July 10, skirting just past the island.

"The first and foremost thing was we wanted to make sure all family dwellings were up on power," said MSgt Jeffrey May, 36th CES electrical systems superintendent.

The electricians' work began to pay off when base housing experienced the beginning of restored power July 12. Though they were closer to the goal, the electricians noticed a problem: the phase was wrong, causing the sewage lift station pumps in housing to run backward. The electricians fixed the phase problem and restored power the next day, but had to deal with another phase problem that caused an unscheduled temporary outage July 15.

Transformers around base were damaged by typhoon winds, and several switch boxes in housing shorted out from the increased moisture — moisture that later penetrated the base's substation and started a fire. As quickly and safely as they could, said Sergeant May, they bypassed the switches. Then with part of the substation out of commission, electricians rerouted the electrical feed through the industrial portions of the base, then back to tie feeders into the housing areas.

"That really made it difficult just to get power back over to the housing area," said Sergeant May. "We've kind of re-configured our circuits to accommodate the living quarters on base."

With housing power restored, Andersen's 24 electricians were able to slow down to 12-hour shifts. And while the housing electricity was difficult to fix, Sergeant May said the biggest hurdle was yet to come.

"Our biggest challenge will be when the power does come back [completely]," he said. "The typhoon placed a lot of stress on wires, connections and circuits around the base, and when power returns, these stresses will become more evident."*(Compiled from Pacific Air Forces News stories)*

# A-Grams Go Electronic

Effective April 1, 2002, AFCESA converted to publishing A-Grams in electronic format only. They are available on the AFCESA public website at http://www.afcesa.af.mil under Library/Publications. Below is a list of A-Grams that have been published since the effective date.

- Industrial Water Treatment CD-ROM
- Computer-Based Training Course—Civil Engineer Material Acquisition System (CEMAS)
- Air Force Qualification Training Package (AFQTP)—M-272 Water Testing Kit, Chemical Agents 3E4X1 and 3E9X1
- USAF CONUS Response Task Force (RTF) Video Pin # 614118
- Automated Civil Engineer System—Fire Department (ACES-FD)
- Air Force Qualification Training Package (AFQTP)—Revetments, Version 2, 3E3X1, 3E2X1, 3E5X1
- Backflow Prevention For Fire Protection Systems
- Hazardous Materials (HAZMAT) Incident Commander Interactive Multimedia Course
- First Aid/First Responder Multimedia Training Course
- CE Readiness and Exercise Evaluation Team Unexploded Ordnance (UXO) Training Kit
- Air Force Water Conservation Guidebook
- The Unified Facility Criteria (UFC) Program
- Air Force Qualification Training Package (AFQTP) Remote Area Lighting System (RALS)
- Defense Logistics Agency Maintenance, Repair, And Operations (MRO) Services Program

# Key CE Personnel Changes

Two civil engineer general officers and former Command Civil Engineers have retired from the Air Force this year. Both entered the service in 1968. Maj Gen Todd I. Stewart, Director, Plans and Programs, Headquarters Air Force Materiel Command, Wright-Patterson Air Force Base, OH, retired April 1. He is now the director of Ohio State University's Program for International and Homeland Security.

Maj Gen Robert J. Courter Jr., Director, Defense Commissary Agency, Fort Lee, VA, retired July 1. The general was instrumental in launching DeCA's "Scholarships for Military Children" program, which awarded nearly 400 scholarships in 2001 and more than 500 this year.

At Headquarters U.S. Air Force, Pentagon, Col Faith H. Fadok is the new mobilization assistant to The Civil Engineer. She succeeds Col Donald L. Ritenour, who retired from the Air Force Reserve and is currently Director, Design and Construction, at the Air Force Center for Environmental Excellence, Brooks AFB, TX.

Col David F. Bird Jr. succeeds Col Russell L. (Rusty) Gilbert as the Air Education and Training Command Civil Engineer, Randolph AFB, TX. Colonel Bird is formerly the 96th Air Base Wing commander, Eglin AFB, FL. Colonel Gilbert retired in May.

Col Jon D. Verlinde, formerly the Air Force Reserve Command Civil Engineer, Robins AFB, GA, succeeds Col Glenn R. Haggstrom as the U.S. Air Forces in Europe Civil Engineer, Ramstein Air Base, Germany. Col Haggstrom retired in July.

Col David A. Sweat, formerly the Assistant Civil Engineer, Headquarters Air Combat Command, Langley AFB, VA, succeeds Col Verlinde as the Air Force Reserve Command Civil Engineer.

# Charleston Civil Engineer Among Air Force's Most Outstanding

SSgt Brian Sharman, 437th Civil Engineer Squadron Explosive Ordnance Disposal Flight, Charleston Air Force Base, SC, is one of the 12 Outstanding Airmen of the Year for 2001.

**SSgt Brian Sharman demonstrates use of an MK 29 Vallon to locate buried ordnance. *(Photo by SSgt Jennie Ivey)***

Sergeant Sharman will wear the Outstanding Airman badge for the next year, after being selected by a board that included the Chief Master Sergeant of the Air Force and the command chief master sergeants from each major command. The award, which is sponsored by the Air Force Association, recognizes 12 outstanding enlisted members for superior leadership, job performance, community involvement and personal achievements.

Sergeant Sharman said he was really excited to receive the award, and he thinks a big part of his success this year is due to the fact that he worked at two different bases — Hickam AFB, HI, and Charleston — with two very different missions.

"At Hickam, we directly supported many small islands throughout the South Pacific with large amounts of unexploded World War II ordnance, so that's a lot of what we did there, whereas here, the main focus is presidential and Secret Service support," he said. Sergeant Sharman attributes much of his success to the people around him who helped along the way.

"A big reason I made it is because CMSgt (Harvey) Hampton (437th Airlift Wing command chief master sergeant) and some other chiefs and senior NCOs on base ran me through mock boards to prepare me for the AMC level of competition," he said. "The AMC board members told me that made a huge difference." Charleston AFB's senior NCOs weren't the only ones to help. "My flight really helped me prepare, too," he said.

As far as advice to other airmen, Sergeant Sharman offered some of the things he's learned on the path to becoming one of the 12 OAY.

"Have a good attitude," he said. "When presented opportunities, capitalize on them. Instead of turning down the TDY no one else wants, take it. Jump in and do your best."

Sergeant Sharman also highlighted the importance of having footsteps to follow in. "Find a good mentor, somebody who's sharp, and learn from them," he said.

The AFA honors the 12 OAY at its annual convention in Washington, DC. In addition to wearing the Outstanding Airman badge for one year, the 12 OAY are awarded the Outstanding Airman ribbon with the bronze service star device. They also serve on the AFA Enlisted Council for one year. *(437th Airlift Wing Public Affairs)*

## 2002 Major-Selects

The following Air Force civil engineer officers have been selected for promotion to major. Congratulations to all on their dedication and achievement.

Matthew W. Allinson
David J. Anason
John P. Baker
Andrew J. Bates
Theodore B. Bloomer
Eric J. Bollinger
Patrick R. Breaux
Christopher W. Burelli
David B. Chisenhall Jr.
James F. Downs
Erik S. Fegenbush
Michael A. Geer
Arthur L. Gepner Jr.
James C. Greene
Monte S. Harner
Rodney C. Harris
James P. Hickman
Dean T. Hitchcock
Craig P. Johnson
Laura M. Johnson
David M. Jurk
James K. Kossler
Charles D. Kuhl
Grant E. Lang
Billy J. Lawson Jr.
Byron K. Love
Mark W. Madaus
Richard S. Mathews
Scott B. Matthews
Alberto Mezarina
Karla K. Mika
Steven W. Moore
Ana M. Morrongiello
Charles D. Perham
George E. Petty
Christopher L. Pewterbaugh
Ronald L. Pieri
Dwayne M. Robison
Mark A. Russo
David C. Scharf
Derek M. Scott
Ronald B. Shankland Jr.
Francisco O. Simas
Douglas H. Swift
Edward D. Treanor V.
Eric S. Turner
John R. Underhill
Todd S. Waldvogel
Keith A. Welch
David P. Wilder
Walter K. Yazzie

## Civil Engineers Win "Closing the Circle" Awards

Air Force civil engineers have won two of this year's White House Closing the Circle Awards. The 66th Civil Engineer Squadron Environmental Flight, Hanscom Air Force Base, MA, won for its environmental preferability initiatives, and William R. Meinerding, 88th Air Base Wing Environmental Management Office, Wright-Patterson AFB, OH, won for his outstanding leadership of the base's solid waste and recycling program.

Hanscom's environmental preferability projects focused on enhancing human health and the environment while reducing federal costs, said Chris Simpson, 66th CES Environmental Flight. One of the projects involved recycling the base's wood telephone poles, which were being torn down and replaced with underground conduit.

"We delivered more than 100 tons of utility poles to the City of Salem's Conservation Commission, and they are now being used as borders for new trails," Simpson said. "Also, more than 131 tons of poles were recycled as mulch and energy at a Maine bio-fuel recycling plant."

William Meinerding's award came in the individual category in military recycling. "I was very surprised to find I'd won the award," he said, adding that the real winners are the base employees because they make Wright-Patterson's award-winning recycling program work.

"Through his exceptional leadership and management, the solid waste and recycling program diverts nearly 9 million pounds away from landfill disposal annually," said Ron Lester, 88th ABW Environmental Management Office director. Since 1995, Meinerding's efforts have saved the base more than $2 million in landfill disposal costs.

The Closing the Circle Award winners were recognized in a ceremony at the Eisenhower Executive Office Building in Washington DC on June 4. *(Compiled from Air Force Materiel Command News Service and Aeronautical Systems Center Public Affairs articles.)*

## CEs Join Bataan Memorial March

**Members of the 314th CES march along the 26-mile Bataan Memorial Death March route at White Sands Missile Range, NM. *(Photo by MSgt Doug Grimm)***

Eleven members of the 314th Civil Engineer Squadron from Little Rock Air Force Base, AR, participated in the Bataan Memorial Death March April 14 at White Sands Missile Range, NM, to honor service members who defended the Philippine Islands during World War II.

The 314th CES team joined more than 4,000 military and civilian marchers from across the United States and several foreign countries at the annual 26.2-mile march. This year's event commemorated the 60th anniversary of the original march of prisoners of war that took place April 9, 1942. *(Air Education and Training Command News Service)*

# 16th Civil Engineer Squadron

**Unique Requirements:** The 16th CES provides essential civil engineer support for the only active duty Special Operations Wing in the Air Force, supporting fixed and rotary wing aircraft such as the AC-130 Gunship, MC-130 Combat Talon and MH-53 helicopters. The squadron executes almost $17 million in maintenance and repair work annually for the 6,600-acre base, which includes 4,600 acres of wetlands, 680 homes, 4 million square feet of real property and 5 million square feet of pavements. They are also responsible for the hardening and recovery of all base facilities in the event of a threatening hurricane or tropical storm — most recently Tropical Storm Barry.

**Parent Unit:** 16th Special Operations Wing (Air Force Special Operations Command)

**Location:** Hurlburt Field, FL

**Commander:** Lt Col Jeffrey L. Pitchford

**Assigned Personnel:** 277 military, 100 civilians and 9 contractors

**Mission:** Provide combat-ready "Commando Engineers" for real-world and joint exercise taskings while maintaining, repairing, constructing and operating all Hurlburt Field facilities and providing housing, fire protection, disaster recovery, explosive ordnance disposal and environmental compliance for more than 7,500 military personnel.

**Recent Accomplishments:** 16th CES members are managing an unprecedented growth in infrastructure at Hurlburt, where facility square footage has more than doubled in the past 10 years. Recently completed MILCON and/or O&M projects include the complete replacement of the base's main asphalt runway with a new concrete one in only 90 days; a new airfield control tower; a new command post for the wing; a third 1+1 dorm; and a complete renovation of the base operations facility. Construction of a new unaccompanied housing complex is well underway, and the unit will soon break ground on an "Air Force first," combined dining/fitness center and a fourth new dorm. The 16th CES received rare "MILCON design agent" authority from Air Staff to design the new dorm, which will incorporate the new Air Force modular dorm standard, featuring four-person modules with private bedrooms and baths and organized common rooms with kitchenettes and washer/dryers.

For Operation Enduring Freedom, the Commando Engineers, together with follow-on teams from Eglin and Minot AFBs, built a bare base from the ground up near Afghanistan, bedding down more than 4,000 multi-national and multi-service special operators. The team resealed more than 20,000 linear feet of the host nation's runway surface, ensuring uninterrupted flight operations and positive relations with the host nation. In all, the 16th CES team built more than 350 TEMPER tents and three 9-1 kitchens, designed and oversaw construction of a wastewater treatment and collection facility, and expanded existing aircraft parking aprons. Additionally, essential base and airfield surveys were completed down range only days after being secured by friendly forces from Taliban and al Qaeda control.

**Recent Awards:** The 16th CES' recent awards include Air Force-level finalist, 2001 Installation Excellence Award (the only CONUS base finalist); 2000 Air Force runner-up, Maj Gen Robert C. Thompson Award for most outstanding Civil Engineer Resources Flight; Tree City designation by the National Arbor Day Foundation, seven consecutive years; Tree City Growth Award by the National Arbor Day Foundation, five consecutive years; and international recognition with the Groundwater Guardian Award, four consecutive years, as one of only four bases out of 159 communities worldwide having a viable groundwater protection program.

# Unit Spotlight

# Civil Engineers in Support of Operation ENDURING FREEDOM

See pictorial tribute beginning on page 7