Air Force Civil Engineer
Vol. 17
No. 3
2009

also inside...

Interview with Brig Gen Byers

CEs in Afghanistan

Dover Gets a New Runway

CRATR Updates Rapid Airfield Repair

Air Force Civil Engineer
Vol. 17
No. 3
2009

Features

Sections

On the Cover

During one of the Critical Runway Assessment and Repair (CRATR) Joint Capability Technology Demonstrations at Avon Park, Fla., an F-15 performs "touch and goes" to test a hot mix asphalt–capped runway repair. (U.S. Army Corps of Engineers photo by Mr. Oscar Reihsmann)

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Build to Last…Lead the Change

I recently returned from visiting our Airmen in the theater and witnessing firsthand the difference they are making. Senior leaders everywhere told us how much they appreciate our engineers and asked if we could send more.

Our group included Brig Gen Dave Howe, Col Theresa Carter, and CMSgt Pat Abbott, and at every stop we spent time with Airmen, listening to their stories and learning what they contribute to the mission. At FOB Dwyer, RED HORSE helped the Marines construct an expeditionary landing strip for C-130s, and I saw the work in progress on the new C-17 runway. This area is so remote that when the Marines first arrived, water and fuel had to be airdropped in to their location. RED HORSE installed several wells and even set up an on-site quarry to ensure that they had quality materials. After a day at Kandahar, I can honestly say that I've never seen more AM-2 matting in one spot. Civil engineers helped in this massive project that enables helicopter operations in support of the Army and other coalition forces.

As I met with our fellow engineers, I was reminded of our proud heritage that we recognize in October. This year we celebrate Prime BEEF's 45th anniversary and RED HORSE's 44th anniversary. These two enduring programs, begun during the Vietnam War, epitomize the highest quality of people and work and have become two of the most widely recognized symbols in the Air Force because of the tradition of excellence they represent.

Our Airmen are making great sacrifices to accomplish their mission. I spoke to some who came under enemy fire and lost one of their fellow Airmen. I met an EOD Airman injured in an RPG attack at point-blank range. I was honored to be at the presentation of the Purple Heart to one of our own Airmen. I am humbled by their heroism and tremendously proud of each of them. Although there were no complaints, I know the high operations tempo is on everyone's mind, both in the AOR and back home. I want you to know that I hear your concerns, and that we are working on a number of initiatives to alleviate some of the stress and provide better visibility on our taskings and joint requirements.

When we think of the effect of the high operations tempo on our Airmen, we must always think of their families as well. It is fitting that the Air Force has declared this the "Year of the Air Force Family." For us Civil Engineers, that means two things. We must support and take care of our own families and, because we are charged with installation management, we must do the same for all Airmen. We need to do all we can to provide responsive customer service and the best housing, dorms, fitness centers, CDCs, youth centers, community centers, and parks possible. Civil Engineers at all levels must contribute to make the "Year of the Air Force Family" a success.

In the coming years we will do great things. We are faced with many challenges, such as an elevated operations tempo, fiscal constraints, and the evolution of our transformation. I need each and every one of you to help us meet those challenges, and lead us through this change. We must "Build to Last…Lead the Change" in everything we do.

Timothy A. Byers
Brigadier General, USAF
The Air Force Civil Engineer

In June 2009, Brig Gen Timothy A. Byers

In this interview, he talks about why it's essential that today's CEs be…

Brilliant at the Basics

AFCE: As the new Air Force Civil Engineer, what do you see as your biggest challenges and what goals have you set for yourself and for Civil Engineering?

Brig Gen Byers: I think of one our biggest challenges is to capture all of the lessons learned, transformational changes, and improvements that we've made in Civil Engineering so we build ready engineers, build great leaders, and build sustainable installations. This focus will enable us to meet our responsibilities of providing world class expeditionary and contingency response capabilities for current and future Air Force and combatant commander requirements, while we continue to provide outstanding installation support worldwide. Our current high ops tempo, being postured at a 1:1 dwell, and the continuous requests for more engineers in the AOR are driving some real concerns with retention. Our engineers are doing and have done an outstanding job, supporting the warfighters inside and outside the wire. We're working a lot of initiatives to reduce the ops tempo and get us back to a 1:2 dwell. Not only do we need to ensure that we organize, train and equip our engineers efficiently and effectively, but we have to recruit, develop, and retain our military and civilians. We need to be more personally engaged with our people to ensure that we're doing the right things to develop them. We have to make sure we have motivated engineers who want to lead at all levels. We need to build great leaders.

We're going to need great leaders and innovators to aggressively work on one of our other challenges, building sustainable installations. Building sustainable installations to last encompasses so many things, including keeping momentum on all the transformational issues that we've just completed, such as institutionalizing our business processes to enable us to complete the 20/20 by 2020 goal and fielding our NexGen IT. We need to focus on everything from our energy initiatives to environmental sustainability from construction, operations, and maintenance to the divesting of all our facilities and infrastructure. Finally, I think we need to be "brilliant at the basics." We need to be compliant with all the regulatory and safety requirements, and only then can we continue to improve and continue on this transformation journey that we started a few years ago.

AFCE: You've touched a little on transformation. Civil Engineering has experienced an enormous amount of change. What progress has been made and where will you lead it in the future?

Brig Gen Byers: First, I want to make sure everyone understands that we are continuing the transformation journey we began years ago. When General Dean Fox was The Civil Engineer, General Del Eulberg was at AMC and I was at ACC, we looked at 69 initiatives. As The Civil Engineer, General Eulberg led the CE transformation execution, from our reorganization efforts, the CE fire transformation efforts, the centralization of capital investment accounts to AFCEE, and the restructuring of AFMC's CE Groups, to our implementing Asset Management. All of these efforts are either complete or well underway and have provided us with a great foundation to build upon. As the current Civil Engineer, I'm excited to now be leading this effort.

We have made tremendous progress so far, but we still have a lot of work to do. It's going to take all of us to be engaged to lead us during this journey.

became The Air Force Civil Engineer.

Asset management will greatly enhance our visibility into our facilities and drive efficiencies that we've never been able to achieve before. We will be able to improve our decision-making processes and become smarter and more efficient about our built and natural infrastructure operations, maintenance, and construction. It's going to help us build sustainable installations; it's going to help us build to last.

Information needed at installation, MAJCOM, and Air Staff levels will be collected and available to our AMP, or Asset Management Plan, process. This real-time information will be visible on dashboards and transferred to our next IT system, which we have to get completed in the next year. It will help us advocate for and allocate resources and make decisions on, among other things, our daily operations as well as how and where to maintain and repair or to bed down weapons systems.

We'll continue to standardize our processes and build the playbooks our Airmen will use to do their jobs. I think this is critical, because once we have standard processes in place along with the playbooks, change can happen fairly quickly. Our new governance structure will allow someone with a good idea to easily identify it for approval Air Force-wide, so that we can all share in the improved process. We need to continue focusing on strategic sourcing initiatives, under our new CE Commodity Council and working closely with our contracting professionals, to leverage our size and our dollars to acquire materials and equipment at the best value for the Air Force.

"Every Airman must look around for opportunities to not just be a part of the change, but to lead it in his or her way."

My vision of transformation is so much broader than specific initiatives. It involves linkages with the 2009 CE Strategic Plan and the associated goals we are committed to. This vision requires every one of our Airmen to think about how they can contribute. Every Airman must look around for opportunities to not just be a part of the change, but to lead it in his or her way.

AFCE: What is Civil Engineering's strategy to align with and support the Air Force's top priorities?

Brig Gen Byers: When I became The Civil Engineer, one of the first things I did was meet with our Division Chiefs and the Field Operating Agency commanders to go over the draft of CE's new strategic plan, which updates the 2008 plan, and look at where we wanted to go in the next few years. One key goal was to ensure that we were linked to Air Force and A4/7 priorities. We have integral roles in everything that the CSAF and the SECAF laid out under their five priorities, and now have a map, if you will, of how we're linked.

Under the first priority, "reinvigorate our nuclear enterprise," we're going to construct and maintain those facilities and infrastructure required, make sure they're operational 24/7 and provide the support (electrical, environmental, EOD, emergency management) needed. As we migrate missions on bases from Space Command and ACC into the Global Strike Command, we're going to continue to improve what we've done in the past and still be better at meeting the nuclear mission. Again, it goes back to being brilliant at the basics and ready to respond. In this particular area, it's critical.

When they talk about "partnering with joint and coalition teams to win today's fight," it's important to note that 53 percent of our engineers are in joint expeditionary taskings or JETs. We're also on FETs, FEDs, and PRTs, we're training firefighters at the National Fire Academy in Baghdad, and we're educating engineers at the Afghan version of our Academy. AFCEE is reconstructing and rebuilding all around the AOR, so we're globally engaged in the joint mission, performing stability operations and building partnerships. We are directly contributing to supporting the Air Force and our sister services and our host nations.

The priority, "develop and care for Airmen and their families," is very close to civil engineering. We are an integral part of the "Year of the Air Force Family" initiative providing quality facilities where Airmen work, live and play. We are working closely with Air Force Services and A1 to support world-class facilities and infrastructure such as CDCs, youth centers, or fitness centers.

"Modernizing our air and space inventories" – believe it or not we do have a part in that. As we put more resources into recapitalizing our aging weapons systems, the Air Force will continue to sustain risk in infrastructure as less money is available for our installations. That means, as civil engineers, we have to be more efficient, we have to do things smarter, faster, better, and cheaper to help the Secretary and the Chief modernize our air and space inventories. That's what CE transformation and creating an asset management culture is all about; that's what that 20/20 by 2020 is all about.

The last priority is "restore acquisition excellence." We continue to look for better ways to acquire supplies, equipment, and parts. We are aggressively pursuing strategic sourcing opportunities and must continue to look for ways to leverage the economies of scale, freeing up more of our Airmen's time for actual work.

AFCE: Sir, you've adopted the phrase, "Build to Last … Lead the Change" for your time as the Air Force Civil Engineer. What's the background on that and what are some of the principles and philosophies embedded in that maxim?

Brig Gen Byers: As I was preparing to take over as The Civil Engineer, I started thinking, "What are we going through right now and how do we carry the message to everybody, not just to Civil Engineering, but to the Air Force as a whole?" I think this mantra captures our entire philosophy in just a few words. As engineers, our fundamental intent is to build something of quality, something that lasts, whether we're talking about facilities or infrastructure or services we provide. What we do should last through all kinds of changes — budgetary, environmental, or energy, to name just a few. Our installations should grow and change with the needs of the Air Force, our mission, our Airmen, and our communities. Even our Civil Engineering enterprise should be able to adjust and change when our strategic priorities, our deployments, our budgets change. It's part of our transformation. As to "leading the change," I think we are a flexible force committed to change, and if every Airman is committed to the change, then Airmen must take responsibility for the change. They must look for opportunities within their area of responsibility and lead others in the implementation. The only way we can be a force that builds to last, is to build a force full of ready engineers that can lead the change.

AFCE: Let's talk about the readiness mission. It's been about eight years since 9/11. How has Civil Engineering's contingency mission changed since then and what changes do you see in the upcoming years as the focus shifts from Iraq to Afghanistan?

Brig Gen Byers: I was the CE Readiness Division chief on the Air Staff on 9/11, so I've been involved in our efforts from day one. I think the overall mission of civil engineers – what we bring to the fight – remains unchanged. We've

always been a critical enabler to all types of combat operations, expeditionary engineering, and construction, and emergency response capabilities to support the warfighter anywhere in the world. However, the nature of the operations has consistently evolved since 9/11. We're now truly engaged in a joint fight more than ever; 53 percent of our current taskings are JET taskings. Air Force engineers are the most highly sought after engineers by commanders in the field; when I travel in the AOR, I'm constantly asked, "Where do you get these Airmen?" It's really encouraging to see how our engineers have stepped up and are leading the way.

What do I see in the upcoming years, as the focus shifts from Iraq to Afghanistan? I think our engineers in the field will continue to do in Afghanistan what we've done so well in both Iraq and other areas in the AOR to date. One of the biggest changes will come in centralizing our engineering assets in Afghanistan under a Joint Force engineer commander on the U.S. Forces Afghanistan staff. I think this is huge.

Along with this new Joint Forces Engineering Command, we have also worked with AFCENT and CENTCOM to get an organizational construct change that allows us to manage all of our in-theater Prime BEEF forces outside the wire as a theater-wide asset. This new expeditionary Prime BEEF group is led by a 365-day CE Colonel with two 179-day CE Lt Col Prime BEEF squadron commanders. This gives us a unity of effort and a unity of command unprecedented in recent years. We'll be able to pool all of our resources together to meet all the requirements; we're going to be able to support that warfighter with less Airmen, and then we're going to make sure we match engineering requirements to the missions and have better visibility on the types of engineers that are needed. We'll be able to deploy a base CE squadron commander and his or her people as a team using a "hub and spoke" concept to meet warfighter requirements. As RED HORSE assets have moved from Iraq to Afghanistan, we've also been able to move them from underneath Army control back under the AFCENT commander — again a significant change. And, they've been doing incredible things in Afghanistan, providing the airfield pavements and facilities required to bring in the Army and the Marines. I think we're going to be looking at deploying more Civil Engineering civilians as well. We have civilians who want to deploy and hopefully we're going to be able to offer them some opportunities; we're working through those details now.

AFCE: Has predeployment training changed or will it change, based on these things you were just talking about?

Brig Gen Byers: One of the things we need to do and do right is make sure that we train our people effectively, so we are continuously looking at how we improve our training. We've been under a two-year review of all of our engineering training, getting into everything we're doing at our tech schools and at our Silver Flag sites and with combat skills training with Army at their platforms. We'll be making some changes and we want to do more than we currently do today, just like we did with EOD recently with CoBRA at Silver Flag, and do that with our Prime BEEF training. How do I now take those valuable combat skills that we're learning from the Army and put them into Silver Flag and be sure that before they go to the AOR, they get the combat and functional skills they need to do their jobs? We've changed our level of expeditionary warrior mindset and now we need to raise the bar at our Silver Flag sites, so we have a lot of work to do there.

AFCE: General Byers, you've talked about sustainability. How will the Air Force ensure the sustainability of its bases?

Brig Gen Byers: That's kind of the $243B question, which is the current value of our real property. We have a lot of property out there to manage and I think it's no secret that we're being asked to manage that property with

fewer funds than ever before. In real dollars, our budget for managing our real property has decreased by about 27 percent since the 2005-2006 timeframe. The BRAC process did not reduce the number of bases we have, so we have to shrink from within, consolidate and demo so we can manage the same space with less money. But, I'm excited about this and welcome the challenge; I think it pushes us to be creative and innovative, to find those smarter, faster, better, cheaper ways to do our business. So, how do we do it? I think we start by optimizing our space. We're in the process of cataloging everything we have within our built and natural infrastructure. This information — the facilities space, the cost to maintain it, the cost to heat and cool it — will be centralized and then its usage analyzed and reviewed, so we can optimize the space that's most valuable and supportive of the mission. We want to renovate the "keepers" and divest or demo those other facilities, land, or utilities systems that are costly to operate or unsupportive of the mission. That's the only way we can make smart decisions and ensure that we have the right facilities at the right time. It's really what asset management is all about and how we'll get to sustainable installations.

"I just want to thank all of our Air Force civil engineers for their unselfish and dedicated professional service."

Beyond that, I think we can do more. We can be more creative partnering with private industry, we look for opportunities to use our property — air, water, land — that has less value for us, but may have more for someone else. We should look at privatization where it makes sense and is economically feasible. Housing privatization is doing some great things for us today that we never could have done before and we're also working with utilities privatization. I think enhanced use leases, where it makes sense, are also good business decisions for Air Force.

AFCE: Within the federal government, the Air Force is a recognized leader in saving energy, which is a current concern for everyone. What challenges will the Air Force encounter as we face more stringent goals in energy reduction?

Brig Gen Byers: I recently had the opportunity to speak on Air Force day at the GovEnergy conference and it was exciting. Not too long ago we had maybe 20 or 30 people show up for these events, but there were almost 300 interested folks there on Air Force day. Some of the things that I highlighted to them were that we've met every energy conservation goal since 1975, which is something we're incredibly proud of and they should be as well. Now we have a goal of reducing facility energy intensity by 30 percent between 2005 and 2015, and we think, "Wow, how will we do that?" But you have to remember that we meet the first challenging goal: in 2005, we were using 30 percent less energy than in 1985. It may seem — in fact it is — a lot to ask to save another 30 percent in half that time, but since 2005, we've already saved 16.8 percent so we're already over halfway there. I challenged our folks, that as dedicated and innovative as they are, we have a lot more work to do. We won't see that significant of savings unless we really work as a team, and we foster a culture of energy awareness and conservation throughout the Air Force.

AFCE: The Air Force has made great strides in providing quality housing for its Airmen and their families through MILCON and privatization. Will the Air Force be able to eliminate inadequate military family housing during your time as The Civil Engineer?

Brig Gen Byers: Yes. As you know the CSAF and SECAF declared this July 2009 to July 2010 as the Year of the Air Force Family. The Chief and Secretary want to rekindle

that unique sense of community that we traditionally have on our Air Force installations. One of the four pillars of the Year of the Air Force Family is "Airman and Family Housing," which addresses all of our housing, whether government-owned, leased, or privatized and includes unaccompanied housing for our younger Airmen, as well. We are working a number of initiatives to ensure we provide quality housing, thriving communities, and responsive customer service for our families. All inadequate housing will be eliminated and we will privatize 100 percent of our housing by the end of FY2010. To date, we have privatized 71 percent of our CONUS housing and we're on track to award the remainder of the projects that are in concept development. We're hopeful that our country will recover from the recent financial crisis and housing collapse and allow us to finalize our housing privatization initiatives. As far as inadequate housing in the overseas environment, we're using MILCON to replace, improve, or demo, and we're on track to complete that by September 2011. We programmed about $120M in FY10 and 11 to renovate and sustain those overseas housing areas which, as far as we know today, covers the requirements to make everything adequate. Some people forget that over time homes will become inadequate from damage caused by weather and age, and from changes in codes and regulations. So regardless of how many S/R&M dollars are programmed, investments will reach a point of diminishing return. We'll watch and stay on top of it so that our adequate homes don't become inadequate, and we'll continue to provide the best housing possible for our Air Force families.

AFCE: If your son or daughter came to you today and said they wanted to become an Air Force civil engineer, what advice would you give to them?

Brig Gen Byers: I would start off by saying that if you want to be part of a great team and a great organization that cares about and for their people, a team with a can-do attitude that finds innovative ways to achieve great results to meet mission requirements; if you want to make a difference, make it better; if you want to build ready engineers and great leaders, if you want to build sustainable installations; if you want to build to last and lead the change; and you want to have fun, then be an Air Force civil engineer. Obviously there's some more I could and would tell them, but for the most part that captures it.

In my opinion, there's no other functional in our Air Force who are as tight-knit as Air Force civil engineers. We work hard, we play hard, and we take care of our folks. If you want to have a career like that, then this is the best place to be. It was my choice and I have no regrets whatsoever. I was initially going to get out after my four years, but then I found myself at Spangdahlem AB and it wasn't too bad. My wife, Linda, and I have said when it stops being fun, we'll get out. And here we are, Linda and I, 28 years later and it's still fun.

AFCE: Is there anything else you would like to add?

Brig Gen Byers: I just want to thank all of our Air Force civil engineers for their unselfish and dedicated professional service to our Air Force and country, especially over the last several years. It says a lot about our Airmen who sign up, enlist, and take the oath when we're at war. I want to reach out to all of our engineers and seek their support as we meet warfighter taskings while simultaneously providing the outstanding installation support that they do every day. I want and need their feedback and their engaged leadership to continue to improve and take us to the next level on our journey to be the best engineers in the world. I certainly can't do it by myself. Together I think we can have fun, work hard, and make our installations a better place to work, live, and play. I want to thank them and encourage them to stay in for the long haul, to continue to make a difference, and make it better.

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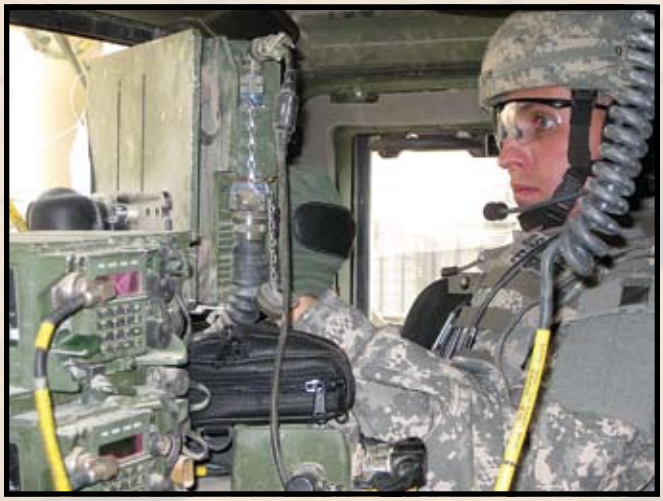
Maj Christoff Gaub, HQ USAF/A5XC-INT

Talk to any Soldier, Marine, or Sailor in Afghanistan and they will speak very highly of the capabilities, training, skills, and attitude that Air Force civil engineers bring to any task they're assigned. During a deployment from September 2008 to March 2009, civil engineers of the Kabul Facility Engineer Detachment (FED) brought these elements to Combined Joint Task Force – Phoenix (CJFT-P), making significant improvements to the J7 office. The FED led the way for the CJFT-P J7 in developing and executing provisional construction programs for the beddown of Afghan National Security Forces (ANSF) personnel, as well as Title 10 construction for U.S. and Coalition supporting forces.

Headquartered outside Kabul, the CJTF-P has responsibility through the Combined Security Transition Command-Afghanistan (CSTC-A) for training and mentoring the ANSF (a combination of Afghan army and police personnel). The FED fills the majority of the Army-led J7 Engineer Staff on CJTF-P and for the last few years, has been manned by an 18-member multi-skilled, multi-grade civil engineer team augmented by a 10-person power production team.



Capt Ray Kerr, a member of the Kabul FED, commands one of the FED's frequent convoys. (photo by author)

As members of the FED, we arrived in Kabul with one primary goal: to use our Air Force civil engineer expertise to help the CJTF-P J7 be a more capable and effective team. Fortunately, we arrived as a trained and cohesive unit with high morale. Before deploying, the FED's senior noncommissioned officer-in-charge, SMSgt Rich Williamson, and I spent three weeks of combat skills training at Fort Lewis, Wash., with the 18 Airmen from 12 different bases, building them into a strong team.

The Kabul FED, possessing virtually all the expertise in facility engineering and installation management (IM) within the Afghanistan-wide task force, was in a unique position to make improvements and utilize more effective existing contracting mechanisms for construction execution. FED leaders also held key J7 positions: as the officer-in-charge (OIC), I was appointed the J7 Deputy (normally filled by an Army Major) and SMSgt Williamson filled the J7 SNCOIC position on the Joint Manning Document. As a result, we had more visibility, frequently meeting with senior staff, and had some latitude to make significant changes. During turnover, the previous FED shared lessons learned, which were used as jumping off points for changing the J7 organizational structure and improving the way they did business.

Project Management

We instituted our first major change while still barely on the ground, reorganizing the J7 Program Management (PM) section from a staff "stovepiped" by programs, with only the J7 and Deputy J7 having an overall view, to one organized by regions. Now there is one program manager — and one person to call — per region and every manager knows all the programs and can provide backup support. This organizational change proved to be extremely effective, with many saying "we should have always done it this way."

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Installation Management

The FED leadership also laid out a plan to reorganize the J7 and establish an IM branch with an operational focus that could better leverage contractors to inspect and perform maintenance across Afghanistan. The J7 was constructing millions of dollars in temporary facilities that were often required for more than two years, which drove a significant operations and maintenance (O&M) requirement. However, the facility repair program consisted of only "repair by replacement" and virtually no facility maintenance, which in some cases resulted in substandard living conditions.

Contracts were also being awarded to relatively small projects worth less than $3M (often less than $100K), making efficient program management impossible. The new IM branch will be able to develop a Common Operating Picture (database) of all locations and facilities and their capacities and conditions, and use it to spearhead and manage new task force-wide indefinite-delivery, indefinite-quantity-type contract vehicles worth several hundred million dollars to execute a construction, operations, maintenance, and repair program at sites not eligible for the Logistics Contract Augmentation Program (LOGCAP).

The IM branch also incorporated the J7 LOGCAP manager (the FED's Air Force master sergeant), streamlining his or her duties to concentrate on LOGCAP management and, most importantly, lead an Afghanistan-wide program to activate LOGCAP on additional task force locations. The construction workload is crushing (1,200 theater-wide projects and growing), so leveraging LOGCAP beyond its coverage of only a small portion of eligible locations can provide O&M coverage of more facilities. Included in the IM vision is the eventual establishment of an environmental program, an area currently accomplished "ad hoc."

Mentoring Afghan Engineers

The IM branch will go a long way towards providing the U.S. and Afghan forces with better facilities; however, it does not build the Afghans' capability to construct and maintain their own facilities. The Air Force enlisted engineers that were deployed to make this happen were being incorrectly utilized. They were managing a large Class IV and VII yard (construction materials and equipment), a mission typically performed by logistics troops, while their skills as "dirt boys," structures Airmen, and HVAC technicians weren't being utilized to perform their primary mission: mentoring ANSF engineers.

The FED tackled both of these issues. With strong enlisted leadership, by the end of their deployment the team had virtually emptied the "yard" of hundreds of pieces of equipment, such as water and fuel tanks, latrine-shower-shave units, and generators. They delivered these construction materials downrange, staging them at secure areas closer to their project sites and accelerating construction timelines. Most importantly, the FED's enlisted engineers could refocus on mentoring.

Under the leadership of Maj Lance Clark, the first mentoring missions were underway by tour's end. SSgt Zack Long led development of a program to train Afghanistan Army

The Kabul FED's responsibilities frequently took them "outside the wire." Here members convoy through Kabul. (photo by author)

engineers in the operation and maintenance of earth graders, even having the Air Force's training manual translated into Pashtun. Capt Ray Kerr led the effort to design an Afghan-friendly version of the bare base kit, popularly known as a "base-in-a-box" (BIAB) for 1,200 personnel. The FED would train both Afghan contractors and ANSF personnel to set up this tent-based modular BIAB, providing the ANSF their first organic beddown capability.

UPDATE FROM THE FIELD

Regional PM Structure: This is working very well and the regional engineers are appreciative of the "one-stop-shop" customer service.

Installation Management Branch: Now led by an Army major, the IM branch is thriving, and although fully manned as envisioned, it is already so busy that additional personnel are required. The IM branch is initially focusing on providing O&M to additional task force sites by leveraging LOGCAP.

Mentoring: The current FED is taking mentoring to new heights, creating an electrical school which has already graduated its first class (seven Afghan soldiers) and a Repair, Mentoring Engineer Team to provide on-the-job-training to Afghan soldiers and contractors. They recently mentored a contractor in installing utilities for a BIAB kit at FOB Lightning and for concrete-block living facilities on Camp Phoenix.

RFF 937: Due to new mission guidance and the restructuring of U.S. Forces-Afghanistan (USFOR-A), the RFF has been overcome by events. However, as designed and advocated for by the Kabul FED, the RFF has been invaluable in highlighting major organizational and manning deficiencies to high-level decision makers, including CSTC-A, USFOR-A, CENTCOM, and the Air Staff.

BIAB: Although envisioned for the ANA, it is also turning out to be a key asset in the beddown of the additional 4,000 U.S. soldiers sent to Afghanistan this summer to serve as mentors and trainers.

Standard Design IDIQ: On schedule to be awarded in November, this will be a huge force multiplier for engineers and contracting personnel assigned to CJTF-P, as well as create much quicker construction timelines in support of Task Force Phoenix's mission.

Maj Nichole Scott
ANSF Provisional Construction Chief

Request for Forces

While establishing the mentoring mission, IM section, and PM restructure were all huge steps forward, the J7 and its regional staffs did not have adequate manpower to sustain the roles and responsibilities. The only way to fix this was via a redesigned Request for Forces (RFF), a task lead by Maj Clark and Capt Kerr. When filled as designed, RFF 937 would provide twice the engineer capability with half the manpower by sourcing the right number of facility engineers, with the right skill sets for not only the entire task force, but also its higher headquarters CSTC-A CJENG office. RFF 937 could also significantly minimize a source of frustration CJTF-P faces almost daily: prioritizing for two bosses. Its task force leadership (and immediate "boss") is understandably focused primarily on Title 10 construction in support of its U.S. and Coalition forces, while the higher headquarters, CSTC-A, is focused on construction in support of strategic ANSF beddown. The RFF sources a PM section to both CSTC-A CJENG and CJTF-P J7, resulting in more efficient coordination of resources and scheduling.

Other Successes

The previously listed accomplishments are but a few of the successful changes instituted by the Kabul FED's Air Force CEs. The team also planned the multimillion dollar facility beddown for 4,000 additional U.S. Army mentors and trainers assigned to CJTF-P during the summer of 2009, and sent two small teams that successfully built and repaired facilities at Khyar Khot Castle (KKC) and at Bala Murghab, which CEs helped defend from enemy fire (see article on p. 14). These two downrange locations in the "hinterlands" of Afghanistan were in dire need of improved living conditions and Army and Coalition members at both locations gave the Air Force CEs rave reviews. Three members at Bala Murghab were submitted for Combat Action Medals and the KKC Army contingent submitted the team members for Army Achievement Medals.

The Air Force team's overall initiatives were well recognized by both their Army and Air Force leadership. Enlisted teammates won two Air Force Detachment awards and the team's Company Grade Officers (CGOs), including a four-year captain, one first lieutenant, and three second lieutenants, were singled out from 140 CGOs across Afghanistan to earn Air Force Detachment CGO-of-the-month awards each of the six months they were deployed. The team's decorations included four Bronze Star medals and two Meritorious Service Medals. Most importantly, with some members participating in down-range missions and serving on over seventy outside-the-wire convoys as commanders, troop commanders, drivers, and passengers, everyone returned home safely to their families and friends.

Maj Gaub is Chief, Logistics Integration Branch, HQ USAF, the Pentagon, Washington, D.C. From September 2008 to March 2009, he was Deputy J7, CJTF-Phoenix, Afghanistan.

Engineering from a PRT Perspective

Capt Shawn Kreuzberger
4 CES/CECP

The Afghanistan Provincial Reconstruction Teams (PRTs) are charged with the redevelopment of Afghanistan to support the strengthening of the Government of the Islamic Republic of Afghanistan (GIRoA). Potential projects are identified by Civil Affairs personnel and vetted through the Afghanistan government channels, before the engineers get involved to develop cost estimates and statements of work. Once funded, PRT engineers conduct a source selection board with Afghan government officials to hire a local contractor, and are then responsible for the quality assurance (QA) portion of the execution. Our team of three engineers for the PRT in the Paktya province had oversight of approximately 90 construction projects in various stages of execution worth approximately $100M from November 2008 to July 2009.

One of our main focuses was the development of roads within the province. When we arrived in November, Paktya had two small road projects within the provincial capital, Gardez, as well as two major roads under construction by the United States Agency for International Development (USAID). The major road connecting Kabul to Gardez is complete; the other one, connecting Gardez to the Khost province's capital, is still under construction. During our deployment, we contracted the construction of 92 km of improved roads worth $27.5M, and were in the process of getting final funding for another 122 km of improved roads. Other entities such as USAID, the Army Corps of Engineers, and United Nations Operations, were also constructing roads within the province for a total of 465 km of improved roads worth $290M when complete. When finished, Paktya will have a main artery system connecting all its districts, allowing the provincial government to travel to remote districts that historically have been disconnected. In addition to strengthening GIRoA in our area, the improved ease of movement within the province will bolster the economy and security. Currently a trip of 35 km (22 miles) takes three hours. Once these roads are paved that same trip will take one hour at most for slower moving vehicles.

Other of our construction focuses were central governmental facilities for each provincial district, hybrid power grids utilizing mostly solar energy, and 20 schools. Typically, an eight-room school with security wall, well, and latrine, costs approximately $200K in safer areas and as much as $320K in unsafe areas because of increased transportation and security service costs.

All of our projects presented different challenges — security, terrain, contractor quality, or sheer number of projects. One of our biggest adjustments was accepting the fact that overall, the Afghan understanding and execution of engineering projects is very different from ours. Finding quality contractors was difficult (our email distribution list numbered over 300), and the most basic of tasks, such as bricklaying and proper concrete mixture, were problematic for many of them.

During quality assurance trips to remote sites, the Patkya PRT engineers often encountered construction challenges that required "do-overs" by the contractors, such as rebar constructed on unlevel foundation. (photo by author)

Another challenge was the PRT's limited movement within the province. Many of these projects needed daily oversight, but some sites, especially those in remote areas, could only be visited twice a month at most. When QA visits were conducted, we had to look at the work differently than we would in the United States: The codes and regulations we usually apply don't exist in Afghanistan, and while we tried, for the most part, to enforce our codes and regulations, we had to be able to look at things in many shades of gray. Location must be considered. Contractors are required to hire local villagers that have no construction skills and materials are difficult to transport. In the remote areas where all materials, including water, must be brought in by pack mule, I allowed concrete work that I would never pass in the States or in the easily accessible areas of the province. But, the following type of reasoning must be employed: As long as the quality is enough to be safe then it can be allowed.

All of these factors have contributed to a challenging and sometimes frustrating, but always rewarding experience, giving us a unique perspective to carry back to our "regular" jobs.

Capt Kreuzberger was an engineer and the project purchasing officer for PRT Paktya, FOB Gardez, Afghanistan. He was deployed from the 4 CES, Seymour Johnson AFB, N.C., where he is a programmer.

Facilities Engineering

1Lt Christopher Smith
354 CES/CEX

The main goal of Combined Joint Task Force-Phoenix (CJTF-P) is to aid the government of Afghanistan in establishing their national security forces. In order to gain control of all areas, CJTF-P's engineering section, comprising Air Force civil engineers and Army combat engineers, started constructing small bases along the ring road and major travel points. CJTF-P's only method to build these bases came from contracting efforts to local construction companies, which was another way to help stimulate their economy with money and work.

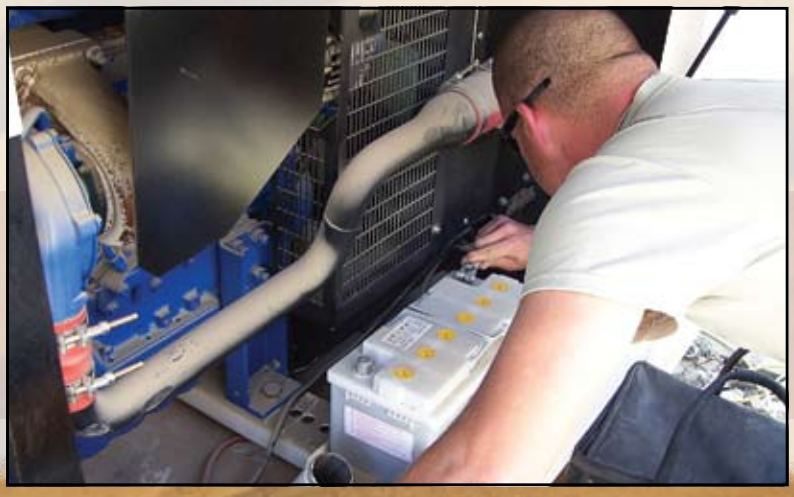
One base was to be built near an abandoned cotton factory and courtyard on the outskirts of a small river valley town, Bala Murghab, near the Turkmenistan border, where drug trafficking is often suspected. Unfortunately, this "quiet" spot was not so tranquil. After two contractors were run off the site by local militants, a new method had to be devised to gain a security foothold in the local area. The CJTF-P would push a large company of Afghan National Army soldiers into the location with a small handful of U.S. Army mentors, and once there, they would provide the stability needed for contractors to come back and begin work on facilities.

But, it was clear to the leadership that this position could not be held through the harsh mountain winter without facilities reinforcement. The road to Bala Murghab was closed off by local militias to anyone who wasn't in an up-armored vehicle, a limiting effect on all Afghan contractors. Only a small amount of materials had made it to the site from the original build attempts and the site could only be supplied by repeated air drops from Air Force C-17s and C-130s. Conditions were less than ideal as the troops were living off of MREs, with no running water, a small, maxed-out generator, and homemade latrines.

My team and I were the "facilities reinforcement" for Forward Operating Base (FOB) Bala Murghab and began the process of getting ourselves and the materials we needed to the site. Logistics with Afghan contractors are never easy, and combined with the extremely high threat area that surrounded the base, proved almost impossible. The first sign of trouble came after the "first" set of twenty trucks was loaded. The drivers found out the destination they quit their jobs on the spot. Our yard manager, SSgt Zach Long, had to unload and reload the materials twice in two days. They finally headed out — a week ahead of us — but as our two Chinooks made their final approach outside of the FOB, it was immediately evident that the convoy had not arrived.

We drug our gear from the helicopters and through the maze of rusted out cotton gins that were being used as an entrance control point and knew we had a lot of work ahead of us. At least some materials from the original construction attempts were on site to use to construct the perimeter walls the base would need for defense. With only force protection materials and some assorted electrical cable, we got to work. The electricians tore through the used electrical materials to salvage what could be used, while power pro immediately started working on the two generators that would be the heart of our electrical production. Because the site was not as expected, the entire plan was reworked on the spot to ensure that we could provide the utilities and housing required.

After a week of MREs and baby wipes "showers," the first trucks carrying materials from Camp Phoenix were spotted coming in. As the convoy made its way towards the base entrance, RPGs and gunfire erupted around it, but escort gun trucks pushed back the attackers and all the trucks made it in with materials somewhat intact. Only after the trucks were offloaded and sent back out the entry control



on the Front Line

point, did we realize that only half the materials were on site; the original convoy had been split halfway through its journey. Army MSG O'Leary, an electrician from the 33rd Brigade Combat Team and SSgt Erik Soto, an electrician from the 355th CES at Davis-Monthan AFB, immediately went to work with the distribution panels and cable that had arrived, while SSgt Celso Lujan, A1C Jason Oulette, and several augmenters went to work setting up a position for the three latrine, shower, shave units. They also dug out the heat pumps that had made it and wired them directly to the earth bunkers where everyone slept. Periodically, work would stop as word would come of the arrival of C17 airdrops of construction materials, along with diesel, JP8, MREs, and water. Everyone on the post would help out to provide crucial drop-zone security and help recover the assets before locals could pillage them.

Early one morning in the third week, word came in that the rest of the convoy was approaching. Work was halted, and the handful of soldiers prepared defense fighting positions to repel any attacks on the vital convoy. The show of force worked and every truck made it without a shot fired for the first time since the push into the valley. Materials were now available to complete the electrical systems. A pop-up shelter was set up in the courtyard to be a new medical clinic. The bathroom CONEX boxes were set up on blocks and plumbing started. Afghan construction workers often have little experience with heavy equipment, so their work is not an exact science. For example, after an 80-foot run for a leach field, the final depth was over 14 feet below grade.

Hand signals became a second language as crane operators were oftentimes called to move materials around without interpreters. Although helpful whenever we needed assistance, visiting forces had a knack for drawing attention to our location. One afternoon, work was quickly dismissed and everyone grabbed their rifle to provide support when gunfire was heard right outside the wall and bullets passed overhead. A visiting team was cut off from their HUMVEEs and engaged by armed militants in a small house one field over from our wall. Construction took a back seat to spotting enemy muzzle flash and directing fire support via the embedded training team's MK-19. After two A-10s chased off the bad guys, our team went to work clearing the entry control point and helping with the wounded. Bagram's hospital was six hours away and the evening was spent waiting for medevac helicopters to arrive. The attitudes were now different but the focus was never clearer: A strong and stable security presence in this region was crucial.

Time was short and the job was almost complete when we realized that we were still missing pipe. It was early November and the seasonal rains and snow were rapidly approaching. A C-17 made one last drop for us, providing the PVC pipe that we needed. "Improvise" became the word of the day as no elbows were delivered with the pipe. Unused fuel hose had to be converted to make the bends in the pipe to direct water flow into the large holding tank just outside of the latrines. With the flip of a switch, over a month's worth of work became a reality. The latrines came to life. The power grid was running under new generators that actually used breakers and appropriately sized wire. All tasks were accomplished and the mission was finally complete. The first of the winter rains came almost on cue as we waited on the Chinooks for the long flight back to Camp Phoenix.

1Lt Smith is the Expeditionary Engineering OIC for the 354 CES, Eielson AFB, Alaska. He was the Afghan Regional Security Integration Command North and West Program Manager for the CJTF-Phoenix J7 at Camp Phoenix, Afghanistan.

(Photo far left) An Air Force CE and Army soldier stand by airdropped diesel fuel waiting for pickup and transport to the FOB. (Photo left) SSgt Brian Rockwell set up a new 120-kW generator for the FOB, replacing the grossly overloaded 35-kW generator. (Photo right) SSgt Celso Lujan leads the pipefitting and shovel team running a black water line to the improvised leach field. Because of the team's quick efforts, the FOB's perimeter was exposed for less than a day. (U.S. Air Force photos)

ASSAULT

Capt Vincent A. Rea, 819 RHS/DEE

The 819th Expeditionary RED HORSE Squadron has accomplished a task in Afghanistan that no previous RED HORSE unit ever has. As members of the Air Force's premier airfield construction team, they've repaired or expanded assault strips throughout the world during both training exercises and deployments. However, this is the first time that they have moved a semi-prepared surface from the design table, through construction, and directly into operational use.

When the morning sun has fully breached the horizon on Forward Operating Base (FOB) Dwyer, it is already 115 degrees Fahrenheit. The small, formerly British, post in southern Afghanistan hosts a team of 53 Airmen as they labor in the barren desert landscape. Winds howl at 35 kilometers per hour across the open acres of land where a $911,000 air strip has been constructed. Dust devils whip about the work sites acting like mini dust funnels, clogging filters and nostrils. It's not abnormal for visibility to be less than 50 feet on the new 4,300-foot flightline. When C-130s began landing this month, they were forced to contend with these same conditions.

To get the 645,000-square-foot surface area to initial grade, 16 vertical inches of sub-base material was reshaped to form the runway and its shoulders. Blistering heat and heavy winds made water a scarce commodity, which created the most difficult obstacle towards achieving proper soil compaction. To solve the problem, the Airmen created catch basins to collect rainwater, and obtained over 150,000 gallons before the remaining precipitation evaporated. They got nearly the same amount by using the camp's chlorine-treated gray water.

After weeks of training at Kandahar Airfield, a 12-person well drilling team led by MSgt Albert Robin mobilized on site to provide three wells with the capacity for camp life support and construction needs. At over 700-feet deep, the initial water supply can produce roughly 40 gallons per minute and stopped shortages from being an issue during air strip construction. "It takes a lot of water to make water, so we know what the guys on the airfield are going through," said MSgt Robin who hails from the 819th RED

A1C David M. Smith secures a ladder for SrA Joseph Van Berkum as they stabilize the laser grading receiver. (photo by MSgt Gerald D. Haight)

HORSE Squadron at Malmstrom AFB, Mont. By the time drilling was completed, their efforts had produced nearly three million gallons of non-potable water.

Once the team prepared the subgrade, the design called for placing nine inches of aggregate base course to bring the assault strip to final grade. Unfortunately technological, economic, and security conditions in the surrounding villages made local contractors incapable of producing the quantity or quality of material required. This presented an enormous challenge in the face of an extremely tight mission related deadline. As a result, RED HORSE joined forces with 371st Marine Wing Support Squadron (MWSS) out of Yuma, Ariz., to get the job done.

A team of 12 U.S. Marines came together on FOB Dwyer to design and produce an AM-2 matted surface that could support cargo aircraft weighing in excess of 84 tons. It was a herculean effort requiring nearly 40,000 individual pieces of aluminum matting to cover the entire operating surface. RED HORSE, Seabees, Marines, and local contractors each loaned equipment and labor to the project to mitigate a multitude of logistical and equipment shortfalls.

"It was truly a team effort. This airstrip simply wouldn't have happened if every unit didn't pitch in," said Captain Alexander Lugo-Velazquez, Detachment OIC for 371 MWSS. By project completion, members of the Air Force and Marine Corps had moved and placed nearly 15,000 cubic yards of local soil.

The assault strip at Dwyer is just the first of several that RED HORSE will construct to help sustain the influx of troops into Afghanistan over the next several months. The active assault strip assists beddown efforts of U.S. Marines and support contractors joining the overall International Security Assistance Force endeavor to push the Taliban out of their former strongholds and assure security for greater Southern Afghanistan and its people.

Capt Rea is currently the OIC for 819 ERHS Operations at FOB Dwyer. While at home station Malmstrom AFB, Mont., he serves as the Engineering Flight Commander for 819 RHS.

Photo left: *Local Contractors deliver hundreds of loads of aggregate material by tractor, the only means available to them.* ***Photo middle:*** *TSgt Kendall Long tightens down the rotating laser transmitter. (photos by MSgt Gerald D. Haight)* ***Photo above:*** *The newly constructed airstrip at FOB Dwyer, Afghanistan, welcomes its first fixed wing aircraft, a C-130 that successfully landed on the AM-2 matting surface on Aug. 27, 2009. (photo by TSgt Robert N. Cullison)*

Alternative Sources

On June 25, 2009 the Scientific Advisory Board formally presented the results of its study concerning alternative sources of energy for Air Force bases.

Maj Brian Hughes
AFCEE/TDNQ

The Air Force Scientific Advisory Board (SAB) has a major influence on U.S. Air Force scientific research and development programs. Each year it conducts studies and reviews, providing independent recommendations on key issues to Air Force senior leadership.

The SAB's Alternative Base Energy (ABE) study, one of three conducted in 2009, looked at how the Air Force could provide electricity to bases in a way that reduces reliance on fossil fuels and the overall energy bill; improves the environment; and meets federal and local mandates and Air Force policy. Underlying these drivers is the Defense Science Board's 2008 report on the Department of Defense Energy Strategy, which highlighted the importance of military bases having sufficient generation, storage, and contingency plans to operate if external sources of electricity become unavailable for a long time.

The current study looked at over a dozen electric storage technologies, an extensive number of energy generation technologies, including geothermal, wind, solar (photovoltaics, solar thermal, "sunshine to petrol," and space-based solar), nuclear (small and large fission, and fusion), biofuels, ocean/wave, waste to energy, landfill gas, and hydroelectric.

"The ABE study has a number of very important findings. It is critical for our bases to be able to operate when the grid goes down," said Professor Ann Karagozian, the SAB's vice chair. "Its recommendations provide insights into our ability to take advantage of what's unique about an Air Force base, that is, its aviation fuel supply, and to provide greater energy security through on-base generation."

Summary of Findings

- Implementing alternative energy sources requires a more concerted systems approach.
- Security of energy sources and distribution elements for air bases is needed.
- Energy storage technologies are required to achieve full utilization of renewable sources.
- Nuclear energy is an important component for energy security and independent operation.

A Systems Approach: Taking a comprehensive view of on-and off-base generation capability, on-base storage, and the distribution system, would account for multiple factors including economics; policy and regulations; compatibility with base operations; and environmental issues. An essential component would be a local on-base "micro grid," with technologies to provide resiliency that eliminates single-node failures and automatically balances loads and sources. A broader definition of "system" should include people and processes. The bases should train for maintaining operations during short or extensive power outages. Each base has different needs, conditions, and constraints that require customization of the appropriate systems solutions, but tools and processes can be shared across many bases, from CONUS to expeditionary bases.

Required Storage for Off-Grid Renewables: Since wind and solar energy are intermittent renewable sources, they require storage mechanisms to reliably supply a large fraction of base energy. If these sources are to be depended upon to any large degree, the Air Force would have to add significant local storage capacity to meet operational requirements when the grid goes down. Some storage technologies are mature, while many others are under development to meet the needs of different commercial applications. The Air Force can benefit by monitoring commercial developments and adopting new products that offer better performance or lower costs.

Other Storage: Hydrocarbons are significantly more energy dense than all other forms of energy storage, except nuclear. Many bases keep large quantities of aviation fuel so it makes sense to have generators that are ready to convert these supplies to electricity. Some bases have diesel generators that are capable of running on aviation fuel. Hydrocarbon-based fuel cells and microturbines can provide clean power far more efficiently than conventional generators. Solid waste is another form of hydrocarbon energy storage as well as a significant burden in deployed settings. Clean technologies to convert waste water and bio waste to energy can play an important role.

Small Nuclear Reactors: In response to the need for non-fossil fuel energy (with negligible greenhouse gas emissions) and because of the difficulty of building large nuclear power plants, many countries are deliberately developing small nuclear power reactors. These smaller reactors (100MW class) are economical, small enough to be buried for greater security, may not require cooling water, and are capable of making bases independent from, or a supplier to, the local commercial energy grid. The SAB recommends that the Air Force include these emerging smaller nuclear power systems in its energy planning.

# of Energy

Customizing by Base

Since local conditions such as the cost of energy and the availability of wind, solar radiation, geothermal reserves, and regulations vary for each Air Force base, the best mix of energy technologies differs for different bases. With the help of analytical tools developed by the Department of Energy's National Renewable Energy Laboratory, the SAB was able to analyze the optimal mix of energy generation sources for a number of different bases, such as Nellis AFB in Nevada (see Figure). Note that since base energy projects are likely executed by a public/private partnership of some kind, most or all the tax and depreciation incentives shown in the figure apply.

Final Report

"I think one of the biggest findings of the ABE study is that the Air Force is already making substantial gains in developing alternative energy sources, but what we are seeing is the need to include energy security in the supply of electricity to Air Force bases," said Dr. John Betz, the board's chair. "Choosing a type and source of energy is not solely an economic decision, but rather one that is necessitated by the fact that military bases performing warfighting operations constantly require electricity, especially in crisis situations."

For more information concerning the final report, please contact the Air Force Scientific Advisory Board at af.sb@pentagon.mil or (301) 981-9985. For more information on serving as a volunteer exec, please email the author at (brian.hughes@shaw.af.mil)

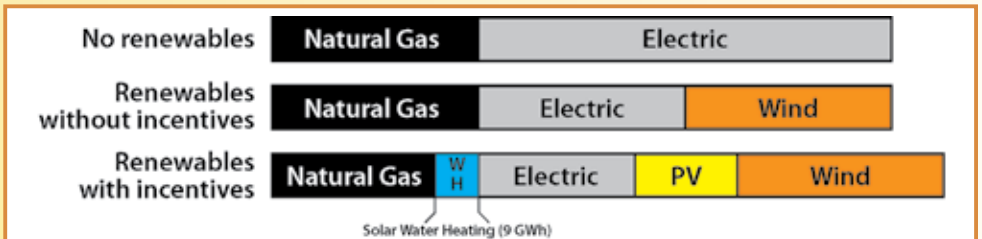
Maj Hughes was a drinking water consultant, Air Force Center for Engineering and the Environment, Brooks City-Base, Texas. He is now the Bioenvironmental Engineering Flight commander, 20 Aerospace Medical Squadron, Shaw AFB, S.C.

SAB Volunteer Exec — A Unique Special Duty

I volunteered for the special duty of Scientific Advisory Board (SAB) executive officer because the topic appealed to me as an engineer and as a student of decision theory. Along the way I found out how rewarding it is to serve alongside some of our nation's best scientific minds and the outstanding Airmen who were part of the volunteer execs team. Overall, the experience was as exciting as my six months in Baghdad, but without all the rockets.

When the request for volunteers came out in October, one study topic was particularly interesting to me. So, with the endorsements from my chain of command I submitted a package. A few weeks before Christmas, I was notified of my selection and booked my first of several trips to our nation's capital.

The meeting process stood out as an exemplar for how well a group can analyze a subject from all meaningful angles, identify the data gaps, adjust course, revise again and again, and finally produce a valuable product. Certainly the long history of making such studies has matured the process. The members of the study were not only exceptional in their knowledge but also in their skill at group work. If studies were a professional sport these guys were the major leaguers, and I had a seat on the bench. I will long remember this opportunity and may someday serve the Air Force better for the knowledge gained from it. (B.H.)



	Photovoltaic Size (MW)	Wind Size (MW)	Solar Water Heating (MW)	Energy Savings (GWhr/yr)	Energy from Renewables (%)	Total Initial Cost (M$)	Rate of Return (%)	Payback Period (yrs)
Without Incentives	0.0	10.6	0.0	44	30	21	12.5	7.4
With Incentives	14.0	10.8	3.6	78	51	63	6.5	12.6

Figure: An example of optimization of energy sources with cost as the driver. Tax, rebate, depreciation, and other incentives that apply when the Air Force partners with industry can turn something that is not cost-effective into something barely cost-effective, which is why the rate of return goes down, rather than up with incentives (i.e., the investment and energy savings both go up but rate of return is lower). With incentives it becomes optimal to sell electricity back to the grid when sunlight and wind permit. (Analysis provided to the SAB by Dr. Andy Walker, National Renewable Energy Laboratory)

HPW spells "Big" for BRAC 2005 and for the Air Force

The Human Performance Wing facility at Wright-Patterson is expected to achieve a LEED® Certified rating.

Mr. Kevin Hill, R.A., 88 ABW/CECW
Ms. Barbara O'Brien, 88 ABW/CEC-2

Construction of the 711th Human Performance Wing (HPW) facilities at Wright-Patterson AFB, Ohio, is the largest Base Realignment and Closure military construction project at an Air Force installation. The project also marks the largest total design and construction effort at Wright-Patterson since World War II.

The 711 HPW is a new organization created by the closure of Brooks City-Base, Texas and the Mesa Research Site, Mesa, Ariz., along with the relocation of the Naval Aerospace Medical Research Laboratory, Pensacola, Fla., under the Base Realignment and Closure (BRAC) 2005 Act. Required by BRAC 2005 to have completed mission beddown by Sept. 15, 2011, the project brings together five existing organizations:

1. U.S. Air Force School of Aerospace Medicine (USAFSAM), presently located at Brooks City-Base
2. Air Force Institute for Operational Health (AFIOH), presently located at Brooks City-Base
3. Performance Enhancement (311th HSW/PE), presently located at Brooks City-Base
4. Air Force Research Laboratory/Human Effectiveness (AFRL/HE), presently located at Wright-Patterson AFB, Brooks City-Base, and Mesa, Ariz.
5. Navy Aerospace Medical Research Laboratory (NAMRL), currently in Pensacola, Fla.

The new HPW will combine many of the existing missions' related and interwoven functions and capabilities into one campus-style setting and create a collaborative atmosphere for ideas, processes, and methods, for an Air Force Center of Excellence for Aeromedical Research, Education, and Training.

The $194M HPW design/build contract was awarded to a joint venture on April 16, 2008, and is managed by the Army Corps of Engineers-Louisville District. It is the largest military construction effort awarded within the Louisville District's geographic boundary based on current year dollars. The total project amount for this effort, including construction, furniture, artwork, equipment, and unique device/equipment dollars, is roughly $300M.

The contract includes finalization of design and construction of the HPW complex facilities: two main campus buildings and five out-structures and sites totaling approximately 679,000 square feet of diverse space types, such as research laboratories, medical clinic space, administration areas, classrooms, training areas, and dining services areas. Adding to the project's complexity are several unique user-provided equipment suites housed on the North Campus, such as high-resolution display flight simulator test beds, a Navy disorientation research device, two USAFSAM training altitude chambers, an Air Force research altitude chamber suite, and finally a high-G onset centrifuge — the first centrifuge to be procured by the Air Force in over 30 years. Several aircraft mock-up trainers, existing and new, will be housed in one of the South Campus's high-bay areas.

Beginning at the project's inception in late winter 2007, a number of challenges and complexities had to be proactively addressed, including dealing with mission elements spread across different time zones; designing for some pieces of large unique equipment not procured or fully developed; and using an outdated program funds costing model. Beginning a cradle-to-grave effort with a firm end

The retaining wall system of the future Air Force Centrifuge hall is composed of H-piles and underpinning, the utility access tunnel, and foundation pit personnel net, which is a safety feature to prevent construction workers from inadvertently falling into the 25-foot deep excavation. (photo by Mr. Kevin Hill)

date in mind, the project delivery team soon discovered the BRAC program was funded based on outdated cost estimates and models developed prior to natural disasters, such as Hurricane Katrina, and unprecedented cost escalation. One cost-saving option the team put to use was developing a construction "free zone," made possible because of the project's location on Wright-Patterson in Wright Field. By temporarily redefining the installation perimeter, construction access to the site is permitted without prior truck gate inspections and associated delays.

Acting as the intermediary between the end users and the Corps of Engineers, the team worked hard to minimize and manage risk to assure no delay or negative impact to a critical BRAC timeline for overall project development. They collaborated with the Corps of Engineers to document and address user requirements and programmatic concerns and develop well researched design solutions and alternatives. Data gathering and action item resolution was handled in weekly teleconference calls with users and then tracked. An up-front agreement with users that all parties designate a point of contact — present at all meetings with the appropriate authority — meant little to no reach-back was required. The end result was satisfied customers and a highly responsive design solution within scope and cost. The MILCON RFP developed from the weekly interface and site surveys was concise and highly biddable.

An ongoing project challenge is scoping efforts for the user-provided large equipment, including the Navy's disorientation device and the Air Force's centrifuge and research/training chambers. These items are rarely purchased, and little procurement experience exists in the using agencies. They will be procured after the facility construction is well underway, but require close integration with building structure and utility systems. Equipment requirements have been ill-defined, continually fluctuating, and sometimes in conflict. Integration problems had to be anticipated, and the team's civil engineers wanted to ensure that equipment vendors were fully aware — through the procurement and using agencies — of facility constraint. This resulted in a series of government requests for information to device vendors as well as a face-to-face industry day and technical exchange. For all the equipment purchases, the team's civil engineers developed a "MILCON Facility Integration Requirements" document for inclusion in respective equipment requests for proposal that provides clear and concise guidance to prospective offerors on facility configuration, restraints, and integration control.

The Human Performance Wing MILCON is off to a fast start. As of August 2009, the project is 52 percent complete, which is seven percent ahead of the baseline schedule. "The project's firm completion date is a stake in the ground that has really challenged the government and contactor team. As partners, we are all committed to see this project continue to be a first-class, award-winning facility meeting multiple user needs that is built on time," remarked Mr. Mike Tibbs, co-program manager for the project.

Mr. Hill is co-program manager of the Human Performance Wing MILCON project and a member of the Wright Field Facilities Team, Wright-Patterson AFB, Ohio. Ms. O'Brien is Deputy, Engineering Division, 88 ABW, Wright-Patterson AFB, Ohio.

Southwest aerial view of the HPW construction through August 2009. (photo courtesy of Metroflyer, LLC)

In one of AMC's largest airfield upgrades,

Dover's Runway Undergoes "Reconstructive Surgery"

Col Mark Ruse, HQ AMC/A7O
Mr. Mark Dent, P.G., HQ AFCESA/CEKS

Air Mobility Command's (AMC's) pavement engineer, Mr. Ken Hevner, has developed an aggressive long-range program for upgrading airfields throughout the command. The latest and largest of these projects is the reconstructed runway at Dover AFB, Del. This project represents many lessons learned and a strong partnership between AMC, the 436th Civil Engineer Squadron at Dover, the Air Force Civil Engineer Support Agency, Air Force Subject Matter Experts, designers, and the construction contractor.

Background

Dover's runway designated 14/32 was originally constructed in 1943. Over the last sixty plus years, the runway has supported a multitude of military and contracted aircraft for peacetime and war operations, serving as the stepping off point for U.S. troops and supplies from the time of Operation Overlord in World War II to the current actions for Operations Iraqi Freedom and Enduring Freedom. Recently, reconstruction of this critical runway became imperative as it became a victim of alkali-silica reaction (a chemical reaction between the aggregate and the Portland cement) and was severely deteriorated.

Contracting Strategy

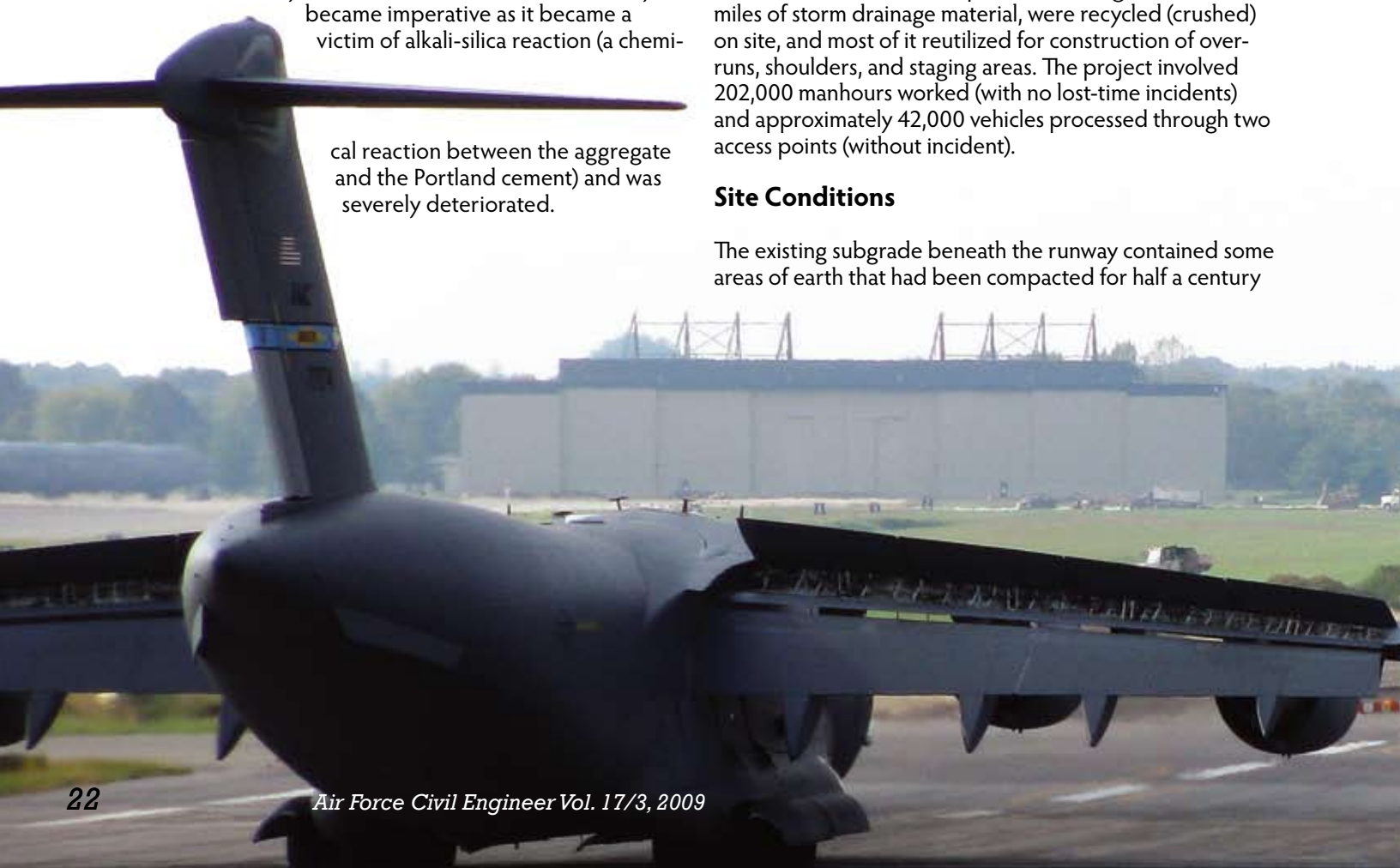
The contract for design of the reconstructed runway was awarded in 2005 and a request for proposal (RFP) for a firm-fixed-price (FFP) construction contract went out at the end of FY06. However, because of funding constraints, the FY06 RFP was shelved, and then re-issued in June 2007 with one notable change. To mitigate cost risks caused by volatility of oil prices, the 2007 solicitation established hot mix asphalt (HMA) as a cost plus fixed-fee line item, with the remainder of the project on a FFP basis.

Scope

The size of the project – in costs and scope – was significant. Awarded in September 2007 at a cost of $53M, the project's final cost was $54.8M, an approximate three-percent cost growth, during a time of notable fluctuations in asphalt costs. In total, the project encompassed an area roughly the size of 60 football fields: 382,037 square yards of subgrade material underwent preparation after approximately 472,989 square yards of pavement were removed. Almost 70,000 tons of this pavement, along with three miles of storm drainage material, were recycled (crushed) on site, and most of it reutilized for construction of overruns, shoulders, and staging areas. The project involved 202,000 manhours worked (with no lost-time incidents) and approximately 42,000 vehicles processed through two access points (without incident).

Site Conditions

The existing subgrade beneath the runway contained some areas of earth that had been compacted for half a century



and were optimal for the reconstruction effort. However, there were significant areas of unsuitable material and unanticipated subgrade utilities, such as communication duct banks, fuel lines, power cables, and drainage structures, including a 36-inch steel culvert with an intact headwall located directly beneath the runway. There were also other geotechnical conditions to deal with, the most troublesome being a former lake, according to historic aerial photographs.

Innovative Engineering

During earthwork operations, the electrical contractor removed existing lighting, conduit, and wiring, prepared for new installation, and then installed new "home run" cables from the 14/32 runway back to the lighting vault. To expedite the activation of pavement areas disturbed by electrical crossings, the contractor installed "flowable fill" material (i.e., 750 psi concrete), dyed red to indicate electrical cables were present below. In all, 111 miles of new electrical wire, 22 miles of new duct bank, and 464 signs and lights were installed. Another notable construction technique was the use of two-piece lighting cans. Every light location was surveyed and the upper lighting can portion removed, so that operators paved over them rather than having to work around them. After resurveying each light can location, the material over the can was cored (using 14-inch diameter or larger barrels), and the new top extension was installed and grouted in place. The process resulted in quicker paving operations, with a better final product.

Finished Product

The ends of the runway were paved with 90,235 square yards of 16-inch thick Portland cement concrete (PCC) with the daily production runs at, or exceeding, 2,400 linear feet of 20-foot wide lanes. The total paving distance was 47.2 lane miles, with 4.6 lane miles of PCC. The high quality PCC paving operation was the result of good mix design, an onsite batch plant for control of materials and quantities, and having knowledgeable, experienced personnel operating the equipment. The interior portions of the runway and overrun were paved with 128,078 tons of HMA.

Lessons Learned

The use of Title II Construction Inspection with qualified construction inspectors and their own surveyors and QA lab is crucial to providing proper oversight on a project of this magnitude.

Although it is not always possible to account for all utilities on older bases and runways, extra effort in locating them during the design effort will save significant time and funding during construction.

Using a cost plus fixed-fee contract line item number for HMA is useful to obtaining bids that are in line with current market values; however, future efforts should include just the liquid asphalt binder portion, and not the entire HMA costs.

The design contractor should use previous reports (e.g., pavement condition index and pavement classification number) and data to provide estimates of areas and volumes of unusable subgrade materials, rather than assume that, once removed, all materials will, or can be made to, meet specifications. The design engineer needs to make an educated decision on the quantity of materials that will need to be removed or stabilized to meet the airfield specifications.

Conclusion

The newly reconstructed Dover 14/32 runway opened the first week June 2009, ready to sustain U.S. military operations for the next half century, supporting our troops, our allies, and people in need around the world at a moment's notice.

Col Ruse is the Chief, Operations Division, HQ AMC/A7O, Scott AFB, Ill. and Mr. Dent, a registered professional geologist, is a contractor providing S/R&M project management support, HQ AFCESA, Tyndall AFB, Fla.

C-17 SPRO EXPANDS THE U.S. FORCE

Dr. Craig Rutland, P.E., HQ AFCESA/CEOA
Mr. Jeb S. Tingle, ERDC-GSL-MS
Mr. James Wolff, 516 AESG/SYCA

In late 2008 at Edwards AFB, Calif., the C-17 SPRO Test Program completed its final semi-prepared runway operations (SPRO) flight tests on Rogers Dry Lakebed, and three years of testing came to a conclusion. The program was designed to expand the operational capability of the C-17 aircraft when operating on remote semi-prepared airfields around the world.

The C-17 provides both strategic and tactical airlift in support of missions, particularly rapid force deployment scenarios. The aircraft were designed to transport oversized cargo long distances with direct delivery to small, austere airfields. This capability allows the C-17 to directly transport cargo to forward, in-theater areas, eliminating the need for multiple C-130 aircraft and cargo transfers at several staging airfields. The C-17 can handle a wide range of cargo, from paratroops, M1A1 Abrams, AH-64 Apaches, and HMMWVs to bulk air-drop pallets.

However, the C-17's SPRO takeoff and landing performance capability is highly dependent on the composition and condition of the runway. The C-17 aircraft's SPRO performance was initially tested in the United States on soils in the deserts of the Southwest and on a cement-stabilized runway in the East. Because these initial test sites had similarities in soil types and climatic regions, they represented only a small percentage of worldwide soil-climate combinations. To account for untested soil-climate conditions, especially under wet conditions, the C-17 aircraft's released SPRO capability was conservative. To improve the aircraft's released capability and learn more about its capabilities worldwide, more aircraft performance data, including on semi-prepared runways with specific soil types and climates, was needed.

To support the C-17 SPRO Test Program, four unsurfaced landing zones were designed and constructed in California at Edwards AFB and Fort Hunter Liggett and at Fort McCoy, Wis. and Fort Chaffee, Ark. The Air Force's C-17 Systems Group, based at Wright-Patterson AFB, Ohio, developed the program to expand their C-17 semi-prepared runway performance database from 6% to 65% of world soil-climate conditions. Test objectives were to produce consistent data for takeoffs and landings on semi-prepared

TESTING PROTECTION CAPABILITY

fields under both dry and wet surface conditions, and to compare and assess runway condition and aircraft performance in varying degrees of moisture. The data are being used by the Air Force to better plan for the construction of semi-prepared airfields in theater, accurately assess how the C-17 aircraft performs on different semi-prepared runways around the world, and develop criteria to dramatically expand the released operational capability of the aircraft system.

The C-17 SPRO test team brought together experts in aircraft performance and geotechnical and pavements engineering from a diverse group of organizations. The 418th Flight Test Squadron from Edwards AFB operated the test aircraft and worked with Boeing engineers to document the performance of the aircraft system. Experts from the U.S. Army Engineer Research and Development Center, Vicksburg, Miss. served as the lead technical agency for constructing and monitoring the performance of the landing zones. They worked in conjunction with Air Force Research Laboratory and NASA personnel to gather aircraft-soil interaction data and produce models for predicting aircraft performance, landing zone deterioration, and aircraft roughness. Technical oversight for the ground team was provided by the U.S. Air Force Civil Engineer Support Agency.

Many of the lessons learned and performance data have already been released to the fleet to expand the current capability. One of the changes already implemented as a result of testing was to increase the maximum allowable gross load on these types of fields from 447,000 pounds to 486,000 pounds. This represents a 9 percent increase in the gross load but is a 22 percent increase in the net cargo/fuel carrying capacity. Some airfields may require additional restriction below the maximum allowable gross load due to air density, weather, field length, or runway maintenance. Over the next several months, additional criteria changes are being developed and adopted that will expand the C-17's released capability in both dry and wet conditions for all soil types. This new capability will enable warfighters to consider new mission scenarios that were previously unachievable and expand the U.S. military's ability to support rapid force deployments as well as urgent humanitarian aid missions.

Dr. Rutland is the Air Force pavements subject matter expert, HQ AFCESA, Tyndall AFB, Fla. Mr. Tingle is the project manager of the C-17 Program at the U.S. Army Engineer Research and Development Center, Vicksburg, Miss. Mr. Wolff is the production operations lead for the C-17 Systems Group, Wright-Patterson AFB, Ohio.

Photos from left to right: *C-17 takeoff at Rattlesnake Landing Zone, Fort Chaffee, Ark. (photo by Mr. Jeb Tingle)*

AFRL and NASA engineers perform runway friction testing at Young Landing Zone, Fort McCoy, Wis. (photo by Mr. Jeb Tingle)

Landing zone rut depth measurements at Young Landing Zone, Fort McCoy, Wis. (photo courtesy of ERDC)

The New Face of Rapid Airfield Repair

Mr. R. Craig Mellerski,
AFRL/RXQD

Dr. Craig A. Rutland, P.E.,
HQ AFCESA/CEOA

Experience in Southwest Asia has shown that engineers responsible for airfield damage repair (ADR) need to focus on more than base recovery after attack or rapid runway repair. The full spectrum of ADR encompasses airfield maintenance, repair, and construction to support opening the base; establishing, expanding, or sustaining the mission; and rapidly recovering the airfield.

To identify key deficiencies in the current ADR practices and develop the ways and means to handle these various phases of ADR operations, the Air Force Civil Engineer Support Agency (AFCESA) at Tyndall AFB, Fla., established an ADR working group, bringing together experts from the Air Force, Army, Navy, and Marines in the United States, as well as allied nations. While the focus of this article is on recovery after attack, it should be noted that technologies were investigated, chosen, or developed with an eye on their potential use in other phases of ADR.

The group is working with AFCESA and DOD laboratories, such as the Air Force Research Laboratory (AFRL), Army Research Laboratory, the Army's Engineering Research and Development Center (ERDC), Navy Facilities Engineering Service Center, and Naval Air Systems Command, as well as field units to develop ADR equipment and techniques, tactics, and procedures to be delivered to units over the next five years.

Rapid Airfield Repair Then & Now

Rapid airfield repair has been done the same way for years: get on the runway, find the holes, fix them using large, slow equipment, bolt down a huge, heavy mat over the repair, and pray that it lasts for a hundred sorties. If heavies and fighters have to land on the same repair you have a problem. The last real demonstration and testing of techniques that had any real impact on how we do business was SALTY DEMO in 1985.

The Air Force's preferred repair method is now a thin, folded fiberglass mat or just crushed stone rather than AM-2 matting. AFRL has been leading the technology development for new materials and working on better ways to remove rubber, assess airfields, and anchor matting, as well as searching for AM-2's replacement. ERDC has improved fiber reinforced panels and anchor systems and integrated new runway construction methods, materials, and equipment. Industry continues to develop materials that are more stable, more predictable, and less sensitive to sub-optimal construction conditions, and smaller yet fast and powerful equipment with rapidly interchangeable attachments for versatility.

CRATR Opens Up New Capabilities

In January 2008, the Office of the Secretary of Defense directed the Air Force and U.S. Pacific Command to plan and execute a Joint Capability Technology Demonstration (JCTD) to address issues associated with rapid airfield repair. (JCTDs provide a means to improve turnaround time from operational problem identification to fielding of capability.) Called the Critical Runway Assessment and Repair, or CRATR, this ongoing JCTD will improve the capability of combatant commands to recover air operations during periods of conflict.

The objectives of the CRATR JCTD are to demonstrate and transition to the joint warfighter a capability to rapidly 1) assess airfield damage and select a minimum airfield operating strip (MAOS), and 2) repair numerous small craters to support both fighter and heavy aircraft traffic for days rather than hours

CRATR only addresses the rapid airfield repair tasks of damage assessment, locating unexploded ordnance (UXO), MAOS selection, and crater repair; it does not address UXO clearing, MAOS sweeping and marking, or airfield arresting system and lighting installation.

Airfield Assessment is currently done by a five-member airfield damage and assessment team in a vehicle on the airfield, which puts them in harm's way. Multiple teams are needed for large installations or fast (< two hours) repairs. The CRATR JCTD is demonstrating technologies that take Airmen off the airfield during the assessment phase and speed up MAOS selection. By using remote sensors on the Rapid Airfield Damage Assessment System that identify craters, spalls, and UXO and plot the information onto a digital map of the runway, the MAOS can be selected in less than 45 minutes.

After the MAOS is selected and UXO cleared, crater repair begins, a process that includes seven essential steps: debris clearing, crater marking, cutting, upheaval removal, backfilling, capping, and material curing/cooling.

The initial debris clearing is essential for rapid crater marking and convoy movement. Some current equipment will still be used, but newer smaller, faster, and more maneuverable models will be employed in and around the craters. One key piece of equipment is a multi-terrain loader (MTL)

with a bucket attachment. Its ability to move quickly and turn 180 degrees on a dime significantly reduces debris removal time.

The MTL has an equal or more important role in removing the upheaval. After the upheaval is identified and marked, an MTL with a wheel saw (rock saw) can quickly cut through 18" of concrete, leaving clean edges for quicker and better (more uniform and longer lasting) repairs. After a wheeled excavator with quick-connect hydraulic attachments removes the pavement, the MTL with the bucket takes it away.

Several options for backfilling the crater are being compared as part of the JCTD. Crushed stone is still the cheapest and can usually be placed pretty quickly, and the MTL has a great steel vibratory roller that can get down into the crater. However, when compared to newer materials and methods, placing crushed stone is slow and strenuous. ERDC has been researching quick-setting flowable fill, a controlled low-strength concrete that is a mixture of rapid-setting cement and sand. ERDC has also developed a high-density foam that, when capped with nine inches of rapid-set concrete, will support a fully loaded C-17. The foam expands up to eight times its original volume and can fill even the largest craters in a few minutes. All of these methods have been researched and tested and have demonstrated sufficient strength to hold the crater cap and a fully loaded C-17 or F-15E.

1Lt Andrew Kopeikin (top photo), AFRL researcher, with sensor-equipped T-16 UAV provided by Idaho National Laboratories. MTLs with attached rock saws (middle photo) cut away upheaval while an excavator waits to remove it. Members of 823 RHS (bottom photo) place rapid setting concrete over high density foam using a new continuous mixer. (photos courtesy of ERDC)

Capping the crater requires a flush repair and new repairs must last at least a week (thousands of sorties) without failure or major maintenance effort with all types of aircraft traffic. To meet these requirements, two capping materials have been developed and tested, one consisting of hot mix asphalt (HMA) and the other of rapid-setting concrete.

AFRL has led the development of pelletized asphalt for HMA. Pelletized asphalt can be stored in super sacks and mixed with large aggregates in a batch plant to produce airfield quality asphalt; a mobile asphalt recycler can produce about five tons of HMA every 30 minutes. When paired with the rapid setting flowable fill this becomes a formidable repair technique.

ERDC has also been developing rapid-setting cement technologies for capping, and has partnered with industry to develop a simplified volumetric mixer. A prime advantage of pairing rapid-setting cement materials with a volumetric mixer are that the cap requires no vibration and minimal handwork and finishing. The material has little to no slump and is ready for traffic in about two hours.

The CRATR JCTD has had three demonstrations (August 2008, April 2009, and August 2009), during which all of the repair materials, equipment, and methods have been employed by Airmen to create repairs that have successfully supported thousands of passes of load carts used to simulate the traffic loads of F-15 and C-17 aircraft. The last demonstration for the rapid airfield damage assessment portion of the JCTD is anticipated for early CY10.

Once all the final results have been coordinated, evaluated, and sanctioned, what has been described in this article will be incorporated in a new concept of operations and new/updated equipment sets, for which funding has been set aside. Within the next five years these materials, equipment, and TTPs will be a part of the new ADR capability.

Mr. Mellerski is the Airfield Operating Surfaces Research Team Senior Engineer, AFRL, Tyndall AFB, Fla., and Dr. Rutland is the Pavements Subject Matter Expert, HQ AFCESA, Tyndall AFB.

Forging the Iraqi Air Force's Fire Service

SMSgt John P. Smith III
HQ AFCESA/CEXF

As the newly independent and free Iraq continues to grow, creating a modern Iraqi Air Force (IqAF) is crucial to providing for the nation's security. In late November 2008, the Coalition Air Forces Transition Team (CAFTT), whose mission is to guide the IqAF in developing self-sustaining air power went to work on improving a key ingredient —the IqAF fire services.

Firefighting experts at the Air Force Civil Engineer Support Agency, Tyndall AFB, Fla., were given the tasking, and in January 2009, CMSgt Joe Rivera and I departed for Baghdad. CMSgt Rivera, with extensive experience in rebuilding the Iraqi Civil Fire Service in 2004, led the effort. During the first two weeks, accompanied by CMSgt Mark Campbell, AFCENT/A7XF, we performed fire service capability assessments at four of the five Iraqi Air Bases: New Al Muthana, Basra, Al Hurriya (Kirkuk), and Taji.

After returning to CAFFT headquarters for briefings and planning, the team looked at all levels of existing capabilities and created three possible options. Capability Level II, which would allow the fire service to conduct basic interior and exterior firefighting, aircraft rescue firefighting, rescue, first aid and fire prevention, was chosen as the best option. In late January the team met with Iraqi Air Staff members, who agreed with the need to organize, train and equip their firefighters to the level two capability. CMSgt Rivera departed Iraq in February, leaving me in place to lead the initiative.

TSgts Brian Partido (left) and Jay Wingfield, 821st Basic Technical Training Squadron Coalition Air Force Transition Team fire rescue advisors, show students at the Iraqi Joint Fire Academy how to extinguish a burning vehicle. (photo by SrA Jacqueline Romero)

The first step in the process was creating and getting approval of an IqAF fire service concept of operations (CONOPS) to use in building fire service capabilities. This document covers all aspects of organizing, training, and equipping for fire protection and serves as the IqAF instruction for firefighting, identifying duties and responsibilities — from air staff to installation levels — as well as acceptable levels of risk. The CONOPs is based on the National Fire Protection Association's (NFPA) standards, even though the IqAF has not adopted them. Current Iraqi air base infrastructure does not fully support total NFPA compliance for structural operations, but the IqAF fire service has the means to reach the capabilities needed for full aircraft rescue firefighting, or ARFF, in the near future.

Prior to our arrival, TSgt Brian Partido, the lead instructor at the Iraqi Civil Defense Directorate (ICDD) Fire Academy, had combined the IqAF Fire School with the academy in Baghdad, a move that increased the output of IqAF firefighters through the basic course by 500 percent. TSgt Partido, academy instructor TSgt Jay Wingfield, and I developed additional courses — incident command, driver operator, and advanced fire rescue training — to add to the academy's curriculum. The first fire manager course graduated eight IqAF fire officers and eight ICDD fire officers, equivalent to the Air Force Fire Officer II. To date, the academy has graduated over 60 airport firefighters for the IqAF. Other courses scheduled to be implemented by summer 2010 include Rescue I, Driver Operator, Aircraft Rescue Firefighting, and Water Tanker.

To ensure consistent service-wide training standards and qualifications, I worked with the IqAF training directorate to create an IqAF Fire Service Career Field Education and Training Plan and a Master Annual Training Plan. I also aided the IqAF leadership in defining current and future equipment requirements. The goal of CAFTT is to guide the IqAF in procuring required resources as it also develops its logistical avenues for sustainment.

Currently there are 113 firefighters in the IqAF, which is five percent of the total IqAF personnel and only 63 personnel short of the total personnel needed to reach a 100-percent manned status. The forecast is to have all firefighters trained and on board the end of calendar year 2010. This fall I will return to meet with the air staff and base fire chiefs during a second IqAF Fire Chiefs conference, to provide a status report and continue CAFTT's mission of building a trained and ready IqAF fire service.

SMSgt Smith is program manager for Fire Emergency Services, HQ AFCESA, Tyndall AFB, Fla., and serves as the fire services advisor to the Iraqi Air Force.

ANG CEs Join Canadian Engineers on "Road to High Readiness" Exercise

MSgt Jon Dyer, 142nd FW/PA

Members of the Oregon Air National Guard's 142nd Civil Engineer Squadron, based in Portland, Ore., became the first Americans to participate in Exercise Tropical Hammer, a multi-national construction training exercise, in Kingston, Jamaica, March 21-30, 2009. The exercise was hosted by the Canadian military in cooperation with the Jamaican Defense Force (JDF).

During the exercise, civil engineers from the 142nd worked on a $2.1M project converting metal storage pods known as "conex boxes" into two classrooms, a trade school and a counter-terrorism school, to be utilized by the JDF. The exercise afforded members of the 142 CES an opportunity for a deployment for training event, according to CMSgt Jeff Roy, deployment superintendent.

The unit's challenges went beyond the mission tasking. "We were operating and living in tents in one of the poorest nations in the western hemisphere," said Maj Frank Page, Deployment Commander and member of the 142nd Security Forces Squadron. "It was very tough, long days in a hot muggy environment with inferior tools and a shortage of supplies. But, our men and women performed superbly"

Because participants used the exercise to prepare for deployments, mentorship and teaching were a priority. Everyone used the opportunity to learn techniques from craftsman with years of experience, and worked with new tools.

Electricians, carpenters, heavy equipment operators, HVAC, power pro, as well as firefighters, security forces, public affairs, and even the commanding officer, all combined to complete the necessary jobs at hand. From framing and furring, to electrical wiring, concrete pouring and floating, all the participants contributed to the success of the mission.

The Oregonians were joined by airmen and soldiers from multiple Canadian units, in addition to several members of the 558th Specialist Team of Engineers, from Nottingham, England. In all, four countries were represented throughout the two weeks.

"It started as a cooperative effort between the Canadians and the Jamaicans, but including Americans and Britons has added a whole new dimension," said Major Ron Carriere, the Canadian exercise commander.

Organizers said that construction projects in a multinational training exercise such as Tropical Hammer provide military members with valuable knowledge and experience. This training in turn helps them succeed in joint military theaters like Iraq or Afghanistan.

"We call it the 'Road to High Readiness,'" Major Carriere said. "It allows not only our troops to hone their technical skills, but our officers to perfect their project management skills as well."

Most agreed that Oregon's civil engineers exceeded expectations both in construction and integration with the international forces.

"It went by too quickly," Major Carriere lamented. "It was a seamless integration, a high degree of interoperability. (The Americans) molded very well into the Canadian construct, rolled in flawlessly."

"What you had was four countries united in a single mission," CMSgt Roy said. "In the end, we produced a quality product."

SrA Samantha Orem of the 142 CES floats concrete for a stair step during the squadron's participation in Exercise Tropical Hammer in Kingston, Jamaica. (photo by author)

Optimizing Combustion Efficiency for Energy Savings

Mr. Thomas A. Adams, P.E.
HQ AFCESA/CENE

Technology

In FY2008, Air Force main-base facilities consumed over 31 million MMBTUs of carbon-based fuels for facility heating, potable hot water, and industrial applications, primarily in boilers of various designs and capacities. Since this amount constitutes 52 percent of the total Air Force main base facility energy consumption, it's not surprising that bases are targeting boiler systems for efficiency improvements.

A facility boiler has three main sub-systems (Figure 1):

1. steam or hot water generator (combustion box, controls, heat exchanger, and pressure vessel),
2. distribution system (piping, valves, pumps, de-aerator, connected supply heat exchangers, and steam traps, if applicable)
3. boiler envelope (insulating material on all exterior conductive surfaces)

While sources of the greatest energy losses are generally within the distribution system (water and steam leaks due to corrosion or failed valves and traps) or the system envelope (wet, damaged, or missing insulation), these problems are easily identified from the make-up water reports or visual and thermographic surveys.

However, another source of boiler energy loss is due to incomplete fuel combustion and inadequate heat transfer through the heat exchanger. This combustion process can be measured and is defined by the metric known as "combustion efficiency." If the average combustion efficiency of Air Force boilers could be improved by a mere 5 percent, we would reduce our total energy consumption by 2.5 percent and about $20M.

This article is intended to help engineers accurately assess combustion efficiency and determine the benefits of retrofits designed to improve it, especially in cases where inefficiency is caused by burning fuel with an improper air-fuel ratio (AFR).

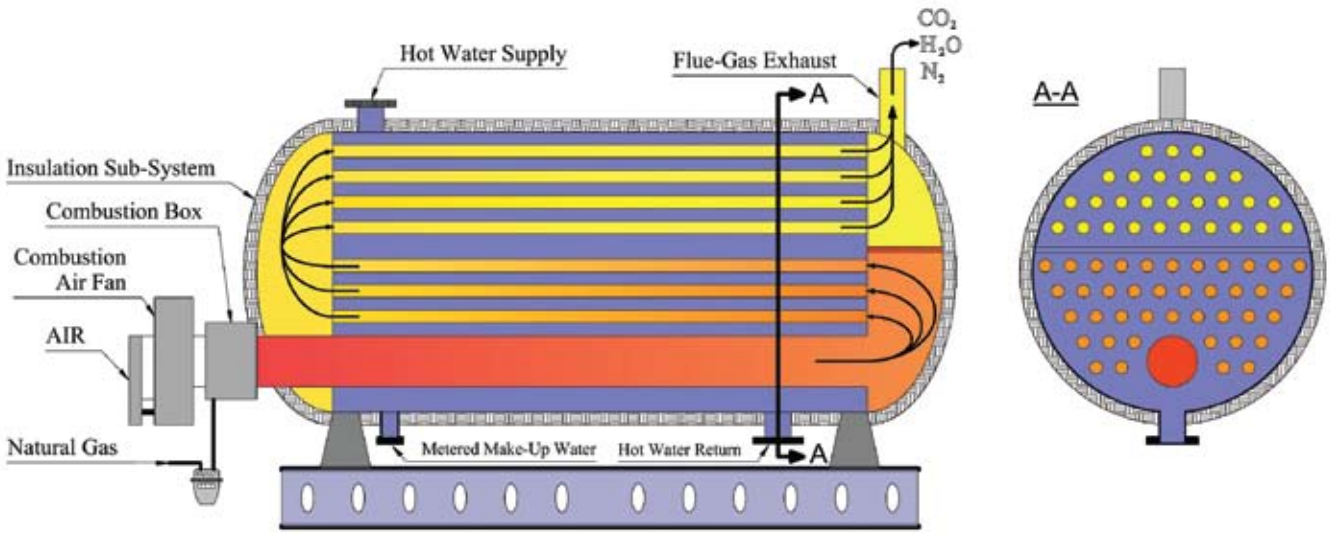


Figure 1. Example of boiler.

Combustion Efficiency

Combustion efficiency is a measure of how well the chemical energy stored in the fuel is transferred into the working fluid (i.e., hot water or steam). The physical process begins as air mixes with fuel in the combustion box and ignites in the burner. The combustion process converts the air-fuel mixture to the primary products of carbon dioxide and water.

Each fuel has a unique amount of energy that can be released from its molecules. This chemical energy, Q_{HHV}, or higher heating value of the fuel, is the amount of energy that is released when it is completely converted to carbon dioxide and water. The value of Q_{HHV} is usually provided by the commodity supplier. From the first law of thermodynamics, conservation of energy, the amount of energy transferred to the working fluid, plus the amount of energy lost, must equal Q_{HHV}.

Eq. 1

$$\underbrace{Q_{HHV}}_{\text{(Energy available)}} = \underbrace{(AFR+1)\cdot c_p\cdot(T_c-T_{ex})}_{\text{(Energy transferred to water)}} + \underbrace{(AFR+1)\cdot c_p\cdot(T_{ex}-T_a)}_{\text{(Energy lost in exhaust gases)}}$$

Where,

AFR = air-fuel ratio

c_p = specific heat capacity of the flue gas

T_c = combustion flame temperature

T_{ex} = flue-gas exhaust temperature

T_a = ambient air temperature

Using the definition of efficiency, the ratio of usable to available energy, an expression for calculating combustion efficiency is obtained.

Eq. 2

$$\eta_c = \frac{(AFR+1)\cdot c_p\cdot(T_c-T_{ex})}{Q_{HHV}}$$

It should be noted that AFR, T_{ex}, and Q_{HHV} are measured values while c_p and T_c are calculated values.

Relevance

The Air Force wants all facility boilers operating at the highest possible efficiency to minimize energy consumption. Knowing how the parameters affect combustion efficiency helps determine proper corrective action to improve it. For example, because efficiency will increase as T_{ex} decreases, one way of improving efficiency would be to reduce the flue-gas exhaust temperature, perhaps by cleaning the fire-tubes, or adding a flue-gas economizer.

However, caution should be exercised before reducing T_{ex} below 300°F. As the flue gases rise inside the flue stack they cool. When the temperature cools to between 120–140°F they condense. If this condensation occurs inside the flue stack, it will corrode and damage the inside of non-condensing boilers.

To eliminate this possibility, replace your old boiler with a condensing model, which offers the highest possible combustion efficiency. The heat exchangers are designed to intentionally condense the flue-gas water vapor and transfer the latent heat of condensation into the hot water supply. Non-condensing boilers cannot capture this energy. Although these systems require corrosion-resistant materials and are more expensive, they can deliver combustion efficiencies above 90 percent if your return water temperature is about 120°F or less.

Another important — but more complex — control parameter is the air-fuel ratio, AFR. The heat capacity (c_p), the combustion flame temperature (T_c), and the flue-gas exhaust temperature (T_{ex}) are all functions of AFR and change at different rates and in different directions, making it difficult to use Equation 2 to assess the impact of AFR. Figure 2, which represents the theoretical maximum, better illustrates the effect AFR has on combustion efficiency.

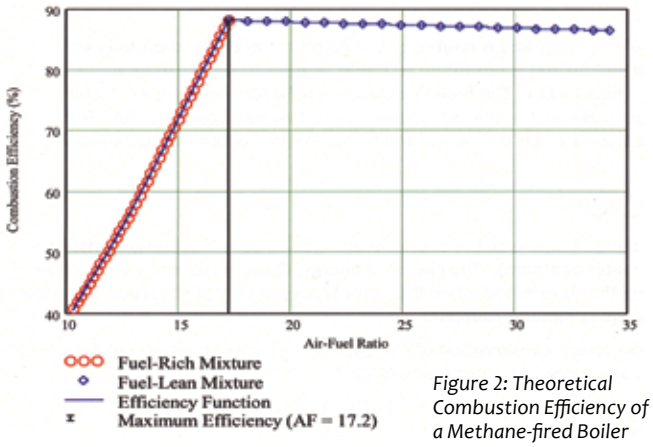


Figure 2: Theoretical Combustion Efficiency of a Methane-fired Boiler

Figure 2 was generated under the assumption that the air and fuel are thoroughly mixed and completely burned in the combustion box and burner unit. A well-designed and maintained combustion box and burner are essential for the highest possible combustion efficiency.

In Figure 2, we note two distinct curves. In the fuel-rich region (red line), the composition of the flue-gases is carbon monoxide, hydrogen gas, some water, and some carbon dioxide. Carbon monoxide and hydrogen gas have lower mass and specific heat capacities and therefore have less ability to transfer the chemical energy of the fuel into the working fluid. This is one of the reasons why the combustion efficiency falls off in this region. Also, unburned carbon will bond to the heat transfer surfaces as soot and create long-term inefficiency problems. More importantly,

the flue-gases in this region are poisonous and combustible. Boilers should never be operated in the fuel-rich region of the efficiency curve.

The optimal point of operation occurs in the fuel-lean region. Here, excess oxygen is available to minimize the amount of unburned fuel that escapes into the flue-gases. This environment generates a higher flame temperature (T_c) and a higher flue-gas specific heat (c_p) resulting in higher combustion efficiencies.

The point of theoretical maximum efficiency corresponds to the AFR at which there is exactly enough air to convert the fuel completely into carbon dioxide and water, commonly referred to as the stoichiometric AFR (AFR_s). Each fuel has its own unique AFR_s. In actual combustion, however, the AFR corresponding to maximum efficiency will be slightly higher than at AFR_s due to incomplete fuel-air mixing.

Boiler Operating Point

To determine the actual operating point of a boiler, a combustion efficiency analyzer is typically used. This device measures the composition and temperature of the flue-gases. Combined with ambient air temperature and fuel type (or Q_{HHV}), enough information is available to determine combustion efficiency.

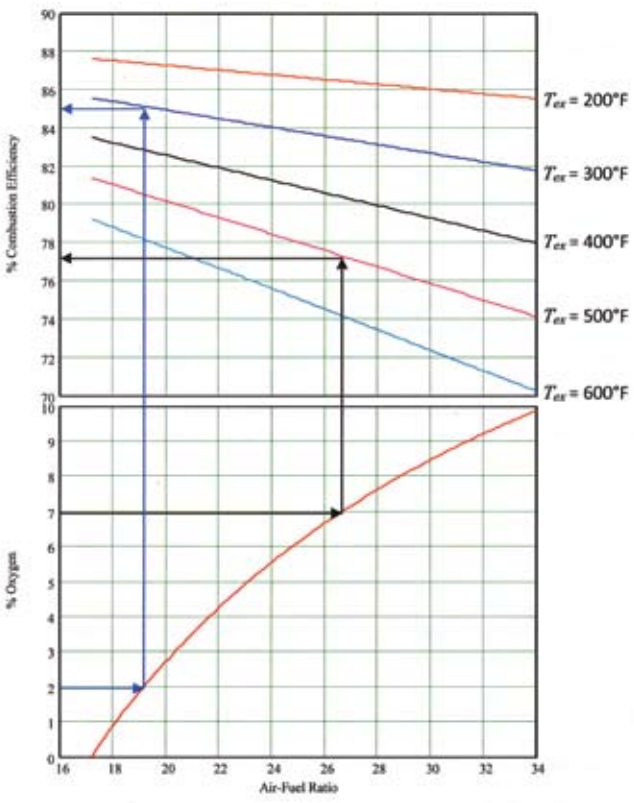


Figure 3: Methane Boiler Efficiency Assessment

The combustion efficiency analyzer measures the percent O_2 (for fuel-lean operation) or the percent CO (for fuel-rich operation) in the flue gas to determine the air-fuel mixture. Then using the known efficiency curve preprogrammed in the device, the operating point is found. Figure 3 illustrates this process.

Another method would be to measure the ambient air temperature (T_a), the flue-gas exhaust temperature, (T_{ex}), and the excess oxygen and find the operating point on a graph for the particular fuel (see Figure 3). Most boiler plants have installed oxygen and temperature gauges to provide this information.

Practical Application

Knowing the effects that the air-fuel ratio and flue-gas exhaust temperature have on combustion efficiency allows the facility engineer to correctly assess the benefits of a particular retrofit. Suppose we have a natural gas-fired boiler operating with a flue-gas oxygen content of seven percent and temperature of 500°F. We intend to install combustion controls to drop the oxygen to two percent and a flue-gas economizer to drop the temperature to 300°F. What is the efficiency improvement?

Using Figure 3, the initial combustion efficiency is found to be ~75.3 percent (black arrows). The projected improvement from the retrofit is found to ~83.7 percent (an 8.4% improvement). To find energy savings, note that energy consumption is the heating load ÷ efficiency. Therefore, percent energy savings is

Eq. 3

$$\frac{\frac{Load}{.753}-\frac{Load}{.837}}{\frac{Load}{.753}}=1-\frac{\frac{Load}{.837}}{\frac{Load}{.753}}=1-\frac{.753}{.837}=10\%$$

In summary, Air Force facility engineers should analyze their installation's boiler systems before submitting a retrofit project. New combustion controls, for example, will not save much energy if the existing controls are regulating AFR properly. Conversely, the boilers could be wasting significant amounts of energy if operating outside optimal bounds. Benefits must be weighed carefully.

To help, AFCESA has posted a combustion efficiency calculator on the Air Force Energy CoP that covers most typical fuels. You are invited to use this tool to estimate potential savings and submit energy projects with good economic and energy savings potential. If you have any questions or need assistance, please call us at DSN 523-6479. We stand ready to help you meet your energy conservation goals.

Mr. Adams provides contract support as an engineer to the Air Force Facility Energy Center, HQ AFCESA, Tyndall AFB, Fla.

Partnering for Higher Education

Capt Lorraine Burke, 19 CES/CEX
Capt Joshua Bass, 19 CES/CEOS

The relationship between a military base and its host city is vital to mission accomplishment. The close relationship between Little Rock AFB, Ark., and the city of Jacksonville became even closer as they combined funding for a Joint Education Center to provide higher education for local residents and the base populace. Scheduled to be completed in 2011, the center will be located outside of the base's main gates, and will provide classroom and office space for several colleges who offer classes in a variety of degree programs.

The education center was the brainchild of Jacksonville's Mayor, Mr. Tommy Swaim, and Col David Scott, who was the 314th Airlift Wing commander. The center's groundbreaking represented the culmination of years of hard work and coordination between the city and the base, beginning in 2001. After 9/11, local civilians could no longer take college classes on base because of increased security. This heightened the need for an off-base education center and created an opportunity to improve the number and quality of classes offered for the local community and the military.

"This opens up a lot of doors to a higher education for people, to be able to provide for themselves and their families with higher paying jobs," said Col (ret) Nancy Shefflette, director of Arkansas State University-Beebe's LRAFB program. "I think it will be an economic boon for the area."

The 19th Civil Engineering Squadron already had a project planned to replace the on-base education center, but without additional funding, construction could not begin. Local colleges did a feasibility study, complete with demographic data, to determine the extent of the city's participation. As the project moved up the wing commander's priority list for construction, civilian steering committees worked with congressional offices to get the project inserted into the congressional budget, and it began to move forward.

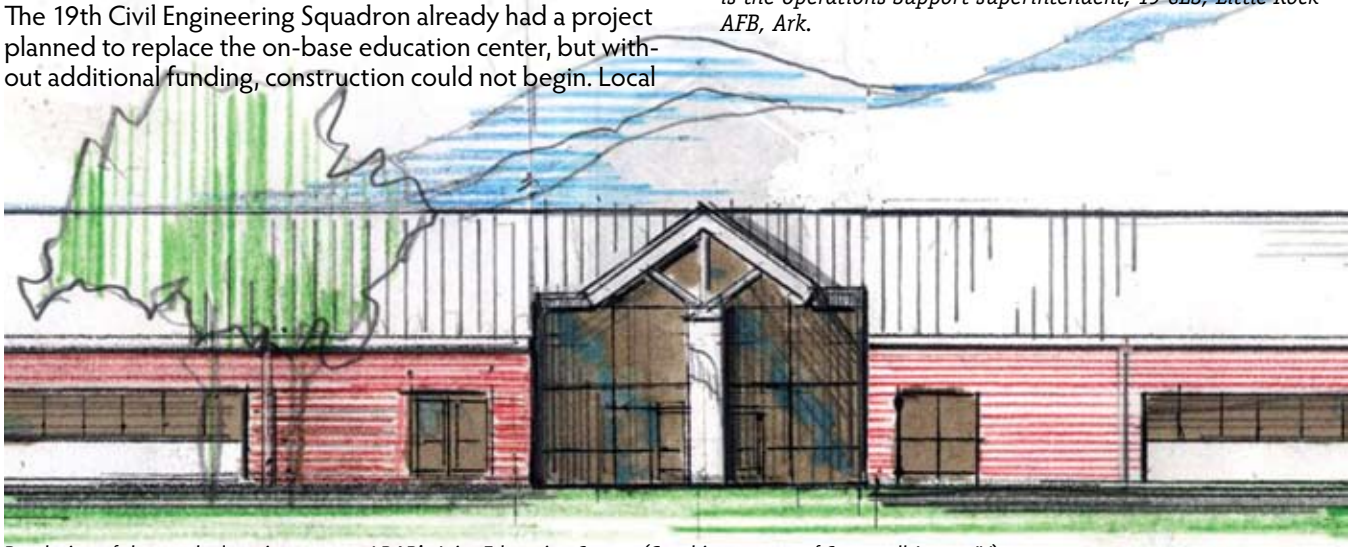
In the fall of 2003, local voters in the town of 31,000 passed a sales tax bond issue to provide up to a $5M gift towards the joint education facility. "The City of Jacksonville raised a ton of money to buy the original land the base sits on and I feel that the residents felt like it was time again," said Mr. Mike Wilson, a member of Jacksonville's city council. Interestingly, the Joint Education Center will be located on a tract of land donated in the 1950s by his family to the Air Force to build Little Rock AFB.

To receive funding from the Air Force, the project had to be under $10M. After numerous design revisions and coordination with higher headquarters, the project was picked up for funding in FY07 with a cost of $9.8M. The $5M that the city raised and donated allowed for an expansion in scope. "…the design for the $10M was 22,000 square feet; once the city money was approved, the final design was adjusted to 44,000 square feet," said Mr. John Chavis, deputy base civil engineer.

After much administrative legwork by Air Force members, local citizens, and congressional offices, the Air Force was able to accept the donation from the city and the project was awarded in June 2009. Construction began in August 2009, with an expected completion date of January 2011.

"The City of Jacksonville has always had an excellent working relationship with Little Rock AFB, but this project solidifies the relationship in a way that others could not," said Mayor Swaim.

Capt Burke is the Readiness Flight commander and Capt Bass is the Operations Support superintendent, 19 CES, Little Rock AFB, Ark.



Rendering of the south elevation entry at LRAB's Joint Education Center. (Graphic courtesy of Cromwell-Jarver JV)

ANG CEs Raise the Bar on Training

Kentucky's 123 CES lives up to their motto, 'Don't worry about it, we can do it!'

SrA Jason Ketterer
123 AW/PA

The Kentucky Air National Guard's 123rd Civil Engineer Squadron has a reputation for overcoming any challenge, and its deployment to Volk Field, Wis., in July for the PATRIOT '09 joint training exercise only served to underscore that point.

The unit was tasked with setting up a disaster relief beddown set so that more than 150 follow-on forces would have quarters during the exercise, a combat simulation involving hundreds of Army and Air National Guard forces, active duty troops, and foreign allies deployed to a simulated forward operating base.

The beddown set, recently developed to support the Department of Homeland Security's disaster response efforts, encountered a two-day delay on its first trip from its Fargo, N.D. storage site. Despite the delay, the squadron was still able to plan the beddown site, inventory the set, and complete construction on schedule. Sixteen billeting tents — enough to house 168 CBRNE Consequence Management Force personnel — were completed, powered, and air-conditioned within 14 hours.

"It was amazing watching what they did in the last day and a half," said PATRIOT director, Lt Col Time Maguire. "I think they could've done it in their sleep."

Assembly of tents for a Disaster Relief Beddown Set is almost complete at Volk Field, Wis. The tents were erected by members of the Kentucky Air Guard's 123rd Civil Engineer Squadron in about 14 hours as part of PATRIOT '09. (photo by A1C Max Rechel).

In recent years, teams and individuals from the 123 CES have been sent to nearly every continent and contingency mission supported by the U.S. military, including deployments to Iraq for Operation IRAQI FREEDOM and Arizona for American border defense. The unit began four-day bivouac training long before it was required by Air Force regulations and continues to push the training envelope with PATRIOT and a long list of other events, all designed to bolster the unit's combat skills and prepare it for an Operational Readiness Inspection in 2010, followed by an anticipated overseas deployment.

Training events in 2009 have included multiple mobility exercises held during regular drill weekends, as well as a six-day deployed homeland-security exercise called ARDENT SENTRY in June. Annual bivouac training was completed at the Badin, N.C., Combat Readiness Training Center in October, and in May, combat-skills training was conducted by the Kentucky Army National Guard's Pre-Mobility Training Assistance Element, a group of experienced Army combat veterans who test and evaluate Guard units before overseas deployments. They combined Air Force training requirements and lesson plans with their real-world experience to give the 123rd a level of combat preparedness that far exceeds typical CE training, said Lt Col John Cassel, squadron deputy commander.

Units within the squadron also attended or conducted numerous training events in 2009. The Emergency Management Flight participated in joint HAZMAT training and helped prepare the entire wing for a deployed operational readiness exercise. The Fire Protection Flight provided instruction for other firefighters, as well as emergency management and EOD Airmen, bringing them up to the HAZMAT technician and operations levels.

The squadron has also engaged in real-world contingencies at home. When a historic ice storm crippled Kentucky in January, leaving more than 700,000 people without heat or power for days, Airmen from the 123 CES joined other Air and Army Guardsmen who deployed across the state to open roadways, clear debris, distribute food and water, and conduct door-to-door wellness checks. The squadron's Explosive Ordnance Disposal Flight routinely provides local support for events or visits by the U.S. president and vice president. The EM Flight helped federal health officials respond to the danger posed by the H1N1 Swine Flu epidemic this spring.

The 123 CES was able to achieve this depth of training by carefully scheduling drill periods and augmenting with annual training days, said the squadron commander, Lt Col Phil Howard.

"The Kentucky Air Guard is one of the premier Air Guard units in the country because of dedicated Airmen like ours," said Lt Col Howard. "In the months and years ahead, the 123 CES will continue looking for new and innovative ways to complete our missions."

EOD Team Member Killed in Afghanistan

On Saturday, Sept. 19, throughout the state of South Dakota, U.S. flags were flown at half-staff to honor SSgt Bryan David Berky, an Ellsworth AFB civil engineer who was killed in combat in Afghanistan on Sept. 12, 2009.

SSgt Berky, 25, an explosive ordnance technician with the 28th Civil Engineer Squadron (CES) at Ellsworth, was on his third deployment. He died of wounds sustained from enemy fire when his unit was ambushed near Bala Baluk, Afghanistan. Two other U.S. military members and seven Afghan soldiers were also killed in the attack.

Before joining the EOD unit at Ellsworth, SSgt Berky served with the 18 CES at Kadena AB, Japan, where he was a key framer of his wing's first-ever combat skills training course that made training possible for 215 Airmen. He also led a joint service range decontamination mission on the Fifth Air Force's live gunnery target, clearing a record 6,697 items.

During his career in the Air Force, SSgt Berky earned numerous awards, including a Bronze Star Medal, a Purple Heart Medal, and a NATO Medal.

Born in Tampa, SSgt Berky grew up in Melrose, Fla., and enlisted in the Air Force soon after graduating from high school. He leaves behind his wife, Erin, also from Melrose, and their son, Harrison, 9 months, as well as his parents, Bill and Sonya Berky, and a brother, Jeremy.

SSgt Berky was escorted home by his EOD team leader, TSgt Jennifer Burch. His funeral, with military honors, was on Saturday, Sept. 19, in Gainesville, Fla.

This article was compiled from several Air Force News articles and sources within the EOD community.

During a 2007 deployment to Afghanistan, then SrA Bryan Berky gets ready to leave on an IED detection operation in Afghanistan, as a member of the 755th EMSG, EOD Company Bravo. (U.S. Air Force photo/courtesy photo)

On June 6, 2007, then SrA Bryan Berky, SSgt Dennis Guay, and TSgt John Carrol, respond to an unexploded ordnance call in the Kandahar Province, Afghanistan (U.S. Air Force photo/courtesy photo)

AFIMS Full Operational Capability Is In Sight

Mr. John Bender
Mr. David Lewis
HQ AFCESA/CEXR

The Air Force is again leading the way, this time with their incident management system. Full operational capability (FOC) under the Air Force Incident Management System (AFIMS) is just over the horizon.

Federal policy directs that all federal agencies adopt and use the National Incident Management System (NIMS). Air Force emergency management personnel took the initiative with the NIMS policy and created an Air Force version, the Air Force Incident Management System, or AFIMS. On Jan. 10, 2007, the Air Force Chief of Staff mandated the use of AFIMS by December 2009.

Two of the basic objectives of AFIMS are to have a system that operates the same in wartime as it does in peacetime and to enhance the Air Force emergency response and efficiently integrate military responders with neighboring civilian communities during shared emergencies. By one of numerous accounts, it appears to be working.

"They had the right equipment and were well trained," said Mr. Tom Smith, Emergency Preparedness director for Berkeley S.C., after a successful unknown substance joint response with Charleston AFB. "It only took them a few minutes where other agencies would've taken hours and still wouldn't be able to determine what the substance was."

Initial guidance was provided in AFI 10-2501 and further guidance will be provided in Air Force Manual 10-2502, "Air Force Incident Management System Framework," the first of its kind among the armed services and one of the final steps toward achieving AFIMS FOC.

Airmen assigned to the North Dakota Air National Guard 119th Wing practice their decision-making processes in the emergency operations center on Hector IAP, Fargo, N.D., during an operational readiness exercise. (photo by SMSgt David H. Lipp)

The implementation has been a teaming effort between members of the Readiness and Emergency Management Division in the Office of the Air Force Civil Engineer (AF/A7CX) and the Readiness Division at the Air Force Civil Engineer Support Agency (AFCESA/CEXR). They've worked together to develop informational briefings and seminars, as well as the AFIMS Senior Leaders' Guide. The overwhelming success of the AFIMS Senior Leaders' Guide has been the pathfinder for many through the introduction of AFIMS into the Air Force's skill set.

Experts from AFCESA/CEXR worked with the National Integration Center to develop Air Force training that would meet their requirements. This partnership resulted in combining four required courses (IS 100,200,700 and 800) into the Emergency Response Operations and Bridge Course, which decreases the training burden on Air Force responders. They also worked together to develop ICS 300 and 400 train-the-trainer courses, which yielded over 600 Emergency Management and Fire and Emergency Services instructors, both active and reserve.

What actions are still required to complete FOC?

Installations have five FOC tasks to complete. Assess your installation's progress toward AFIMS FOC using this checklist:

1. ID and document incident commanders
2. Review CEMP 10-2, ensuring it covers the installation's requirements
3. Tabletop exercise with local community involvement
4. Field exercise (completed or scheduled) with community involvement
5. Revalidate completion of ERO training for disaster response force (DRF) members

The implementation of AFIMS has integrated our Air Force responders as well as our civilian counterparts through common operating procedures and terminology. The Air Force leads the services in achieving a fully operational incident management system, but we must sustain our leadership through exercises and regular disaster response force member training.

Mr. Bender is the publications manager and Mr. Lewis is a contractor providing support as a technical writer for the Emergency Management Branch, HQ AFCESA, Tyndall AFB, Fla.

CE's First STRT

Ops Management career field leads the way with first CE Specialty Training Requirements Team

MSgt Edward Quinn
HQ AFCESA/CEOOF

In April, the 3E6X1, Operations Management, Specialty Training Requirements Team (STRT), met for their inaugural meeting. The team, the first for a civil engineering career field, was established under the new U.S. Air Force Utilization and Training Workshop (U&TW) process. The STRT process allows crucial information, such as feedback from the field, schoolhouse, Air Force Occupation and Measurements Flight, and 3E6X1 Subject Matter Experts (SMEs) to be compiled and vetted through the Career Field Manager (CFM). In turn, CFMs and SMEs utilize the information to survey their personnel in the field for feedback on perceived requirements or other issues, which is then used in the next STRT. This process ensures that future Airmen receive the right training in the Apprentice Course and determines if additional training venues are needed. It also identifies training and competencies that all 3E6X1 Airmen should have or qualify for based on position or skill level.

The first STRT was a very productive event, with concurrence on several new five- and seven-level core tasks and the upgrade of training requirements to include recurring work program, in-service work plan, and possibly the Air Force Institute of Technology's Logistics Management Course, WMGT 438. The MAJCOM 3E6X1 voting members agreed to add new tasks into the Specialty Training Standard (STS) to include some of those we now do while deployed.

Under the CE reorganization, Operations Management personnel within the Operations Support Element will take on more responsibilities, including quality assurance evaluator and warranty program requirements, as well as CE Material Acquisitions. As part of the Logistics career field restructuring, positions and responsibilities for class IV type material handling is moving to Civil Engineering. A new section in the STS created during the STRT includes CE Material Acquisition 3 and 5 Level tasks. Once the U&TW committee meets, the MAJCOM functional managers will validate and approve a new course resource estimate for the training requirements. Core competencies of our civilian workforce counterparts that correspond with our duties include productivity, operational strategies, the effective use of resources, and managing processes to ensure quality and efficiencies. The additional competencies added to the STS will give our career field additional training opportunities and expand our technical capabilities.

The Operations Management CFM and MAJCOM 3E6 SMEs attending the STRT advocate that every Airman become a member of their respective community of practice (CoP). The CoPs help Airmen broaden their knowledge of current initiatives, share ideas, and facilitate interaction among the commands and personnel worldwide. One key aspect of the 3E6X1 CoP is that it allows members to upload and download benchmarked work products. For further information contact the author at Edward.Quinn@tyndall.af.mil.

MSgt Quinn is the Operations Management Career Field Manager, HQ AFCESA, Tyndall AFB, Fla.

SSgt Jesse Bullock, 786 CES Operations Flight, Ramstein AB, Germany, checks in the Civil Engineer Material Acquisition System to see if material needed by a customer is in stock. (U.S. Air Force photo)

First U.S. Air Force Officer Takes Command of Gulf Region Division South District

Ms. Alicia Embrey
Gulf Region South Public Affairs

The Gulf Region Division, U.S. Army Corps of Engineers (USACE) in Iraq made history July 9 when Col Jeffry D. Knippel became the first U.S. Air Force officer to command a USACE District. Col Jack Drolet relinquished command of the district during a one-hour ceremony in Tallil, Iraq. Gulf Region Division (GRD) Commanding General Maj Gen Michael R. Eyre presided.

GRD Commander Maj Gen Michael Eyre (left) passes the flag to GRS Commander Col Jeffry Knippel during the historic July 9 change-of-command ceremony while the outgoing commander, Army Col John Drolet looks on. Col Knippel is the first Air Force officer to command a USACE district. (photo courtesy of GRD)

Col Knippel is the 7th South district commander and is responsible for providing engineering and construction management services for the GRD's largest geographic area. The district currently manages 146 construction projects totaling $688M throughout the nine southern provinces of Iraq (64,000 square miles).

"Napoleon declared that 'nothing is so important in war as an undivided command.' I believe there is an incredible opportunity here for us to strengthen the bonds within our joint command and I am confident that this outstanding leader from one of our sister services is the person for the job," said Maj Gen Eyre. "Colonel Knippel is one of the Air Force's finest engineer officers and it is our great fortune that he is joining us."

As he accepted command of Gulf Region South (GRS), Knippel said, "I pledge to uphold the strongest traditions of the military engineer that are indicative of both of our services. GRS will continue to live up to the proud traditions of the United States Army Corps of Engineers."

Knippel comes to Gulf Region South District from the Air Force Center for Engineering and the Environment (AFCEE), Brooks-City Base, Texas, where he served as the chief, Contingency Construction Division. During his tenure with AFCEE, he was responsible for construction management of the Air Force's $700M military construction program and for construction execution of a $1.8B joint and host nation construction program, both in the U.S. Central Command area of responsibility.

"By the level of talent, dedication, and loyalty that I have witnessed during my orientation, I have no doubt that GRS will continue to live up to the proud traditions of the United States Army Corps of Engineers and the mark of commitment that is embodied in its motto, 'Let us try, '" said Col Knippel.

Graduate Degree Opportunities for Active Duty Officers

Col Barry S. Mines, Ph.D., P.E.
AFIT/TCES

The Air Force has various programs for 32E, civil engineer officers (electrical, mechanical, civil engineers, etc.) to further their education and obtain a Masters degree from the time they are commissioned throughout their career.

Some of the top U.S. Air Force Academy (USAFA) cadets can compete for a few graduate programs directly out of the Academy. For example, a recent USAFA graduate went directly to the University of Colorado and obtained a Masters degree in environmental engineering before going to her first duty station. Opportunities for this highly competitive program vary significantly from year to year. Under a program covered by AFI 36-2009, Delay in Active Duty for AFROTC Graduates, an ROTC graduate can get an educational delay before coming into the Air Force. The member is not paid any salary nor does the Air Force pay any tuition.

One option for obtaining a graduate degree while on active duty is through the tuition assistance program. The Air Force will pay up to $250 per semester credit hour on courses towards a graduate degree. It can be difficult obtaining a Masters degree around a "normal" active duty work load, but some officers do choose this option. There are several accredited engineering schools that offer distance learning masters programs. The web site www.geteducated.com puts out a ranking (from lowest to highest tuition) of the "Top 28 Ranked Best Buys for On-line Graduate Degrees-Engineering." Many schools will give military members in-state tuition rates whether they are actually state residents or not, so be sure to ask any candidate schools about actual costs. It is also paramount to visit your local education office to work out all the details of obtaining tuition assistance.

One of the best opportunities to obtain a Masters degree while on active duty is through the Air Force Institute of Technology (AFIT) at Wright-Patterson AFB. Each year, several 32E, civil engineer officers, compete to enter AFIT's in-residence graduate engineering management (GEM) program for a Master's in Engineering Management. As resident students, they can focus on their degree while drawing their normal salary, but must commit to three years of additional service after obtaining the degree. In October 2009, the Civil Engineer Working Development team will select approximately 21 officers for the GEM program beginning in 2010. Interested individuals should send their Graduate Record Exam scores to the AFIT registrar early in the process. Applications for the GEM program are due to the Civil Engineer functional at the Air Force Personnel Center (AFPC) by the end of June for the program beginning in the following year (i.e., by June 30, 2009 for the 2010 program).

Both AFIT and the USAFA's Civil and Environmental Engineering department sponsor several officers each year to obtain a Masters degree. Again, the individual will owe the Air Force additional service time, typically three years of teaching at the respective school. These programs are normally advertised on the AFIT and USAFA web sites as well as under the 32E, civil engineer, portion on the AFPC web site, and have June 30 deadlines each year.

Another opportunity for a Masters degree is to apply for an AFIT Civilian Institute slot. Few in number and highly competitive, these slots are typically for a Soils/Pavements Masters degree or a construction management degree to fill a future position such as a RED HORSE officer or pavement evaluation team chief at the Air Force Civil Engineer Support Agency.

Another option is to look into the different possibilities under the new GI Bill program. The program is still evolving so it is vital to stay up with it as it matures. Frequently asked questions are answered on two helpful web sites: http://www.afpc.randolph.af.mil/library/gibill/faq.asp and http://www.gibill.va.gov/.

There are numerous reasons why a Master's degree is important for an officer's professional development — to teach others, to expertly run a pavement evaluation team, to be a more productive officer, or to be competitive for promotion as well. At higher level promotion boards, especially those for lieutenant colonel, it is basically a requirement to have a Masters degree. Licensing is another factor. In 2006, the National Council of Examiners for Engineering and Surveying (NCEES) passed a motion to draft a model law language requiring either a master's degree or 30 semester hours beyond the bachelor's degree for licensure. This has not been enacted yet but may in the future.

It is never too early to start thinking about obtaining a Masters degree and what type would best fit yours and the Air Force's needs.

Col Mines is the Dean, The Civil Engineer School, AFIT, Wright-Patterson AFB, Ohio.

Mission-Ready

The Air National Guard's federal mission is to maintain well-trained units available for prompt mobilization during war. During combat skills training at the Wendell H. Ford Regional Training Center in Kentucky, members of the Kentucky ANG's 123 CES count off their pacing before a land navigation course. The training event was only one of a long list designed to prepare the unit for a 2010 Operational Readiness Inspection and an anticipated overseas deployment. (photo by TSgt Dennis Flora)

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