



New coin will honor safety achievements

Article by Bernard Tate
Headquarters
Photo by Bill Johnson
Portland District

The U.S. Army Corps of Engineers has a new safety coin, and the employee who designed it is \$250 richer.

"The coin is both a reminder and a recognition," said Vickie Siebert, Safety and Occupational Health (SOH) Manager at Headquarters. "By giving the SOH coin to people, we show them that their efforts to work safely have been noticed."

Carol Hastings of Portland District designed the coin, which was one of 243 entries in a Corps-wide design contest that ran in March.

"Actually, I don't usually enter contests due to lack of time in my schedule," said Hastings, a visual information specialist. "But I was challenged to design this coin when I saw the example of the Korean Coin that was sent in the e-mail announcing the contest. I wanted to do a design that would be simple, with clean lines, which would represent the safety office needs."

"I'm very honored to have won the contest," Hastings added. "It was a complete surprise, and I enjoyed getting the phone call from Lt. Gen. Flowers, who took time out of his busy schedule to congratulate me."

The entries were judged by a three-person panel — one member with a safety background, one with an engineering background, and one with a graphics design background.

"I can't emphasize enough the enthusiasm and commitment that the entries showed," said Siebert, who managed the contest. "Some of the entries just touched our hearts. They were all excellent entries, and it was very tough to pick just one."

Clean design. "The panel selected Carol's design because it worked well as a coin, both in its clean design and its message," Siebert continued. "The phrase 'Safety First For Life' gets the point across without being too long, and the well-balanced design is one we can be proud of for a long time."

The coins, a little more than 1.5-inch in diameter, are cast in bronze and finished in simulated antique gold. "We felt this handling would have a simple elegance, making it suitable for formal or informal presentation," said Siebert. "It's not too glitzy to present at a field site, but we can still give it to a commander at a formal event. No matter who it is in the chain of command, with this coin we can recognize their outstanding safety efforts."

For winning, Hastings received a \$250 on-the-spot cash award, a certificate, a plaque, and the first safety coin. She also received a personal congratulations phone call from Lt. Gen. Robert Flowers, the Chief of Engineers.



Carol Hastings at her computer. Her safety coin design is on the screen.

The Corps' top NCO, Command Sgt. Maj. Robert Dils, also had a one-inch lapel pin designed, modeled after the safety coin. That pin is now worn on the earplug cases of all soldiers in the 249th Engineer Battalion (Prime Power).

Command push. The push to create a safety coin also came from both Flowers and Dils.

"The Chief and the command sergeant major had good results with safety coins in their previous commands at Fort Leonard Wood," said Siebert. "They came to us and said, 'Please look into this, and if it will enhance Safety and Occupational Health awareness here in the Corps, do it.'"

"So we talked to others who had a safety coin, and decided to go for it," Siebert continued. "And there was a need for it as well. The field safety offices wanted a safety coin from Headquarters that could be used USACE-wide to recognize special SOH achievement, or at retirements for outstanding SOH support."

The first safety coins and lapel pins will be distributed during the Senior Leaders Conference later this month. Each district and division commander will receive a bag with 10 coins and lapel pins.

"The safety offices in the field can order all the coins and lapel pins they want through the company that made this first batch," said Siebert. "They won't be charged for the mold, because USACE has already paid the first-time mold fee."

"We encourage commanders and supervisors to use the Safety and Occupational Health coin and pin to recognize those who have contributed to SOH awareness, or those who have accomplished a special SOH achievement," Siebert concluded.

(Heidi Helwig of Portland District contributed to this article.)



Jan Holsomback, Planning and Response Team mission manager, watches Sgt. Dennis Diaz and Sgt. Ed Dawe of the 249th Engineer Battalion (Prime Power) set up a mobile substation to provide power for the mobile medical labs in the background. (Photo by Peter Navesky, Tulsa District)

Corps provides Allison relief

By Scott Saunders
Headquarters

Areas of Houston received nearly three feet of rain in early June during Tropical Storm Allison. At the request of the Federal Emergency Management Agency (FEMA), the U.S. Army Corps of Engineers activated Emergency Support Function 3 (Public Works and Engineering) in the FEMA Regional Operations Center in Denton, Texas.

In early July, at the peak of the recovery, the Corps had 112 personnel directly supporting relief efforts. Teams deployed from throughout the Corps to supply emergency power, temporary housing, debris removal, dewatering, and debris monitoring.

There was also an unusual \$1.1 million Direct Federal Assistance mission to supply power at the Texas Medical Center in Houston.

During the flooding, Southwestern Division distributed about 100,000 sandbags to combat flooding.



Sgt. Ron Moyer (left) and Sgt. Jackie Vourinen of the 249th Engineer Battalion (Prime Power) point out the high-water mark at Baylor Medical College. Water was about 20 feet deep in the flooded sub-basements. (Photo by Sgt. Ed Dawe, 249th Engineer Battalion)

Insights

Everyone could use a little synergy

By Col. Lowell Moore
Chaplain, U. S. Army Corps of Engineers

Synergy.

Now there's a word worth contemplating. This word has been tossed around the Corps of Engineers' Headquarters a lot lately, and Lt. Gen. Bob Flowers, the Chief of Engineers, uses this word as if everyone should know what he's talking about.

Not wanting to appear less intelligent than the rest of his staff, I always try to smile and nod confidently as if I understand, but inside I'm praying feverishly that the Chief won't expose my ignorance by asking me to actually define synergy.

Afraid that my prayers won't hold out forever, I decided I'd better learn something about synergy. I learned that an often-used definition is, "the whole is greater than the sum of its parts."

Now, at first that seemed like a ludicrous definition. How could two plus three ever add up to more than five?

However, as I contemplated the word *synergy* in light of this concept, it began to make sense. In fact, I should have been the first to comprehend the concept of the whole being greater than the sum of its parts. I've spent seven years in college and seminary studying the church, and the church is a shining example of synergy.

Synergy is not a theological term, but what good is a building without a congregation? Or what good are potential pastors without a seminary to train them? Or what good is a Sunday school without a publishing house to produce literature? But add all the parts together and *presto*, you have **synergy**, and good things happen.

Synergy is not a biological term either, but it applies to the body, too. For example, what good is an eye to see a luscious apple pie if there's no mouth to eat it? Or what good is a mouth if there's no hand to transport the pie from the plate to the mouth? But add all the parts together

and *presto*, you have **synergy**, and the pie is history.

Synergy is not a business term either, but it also applies to organizations. For example, what good is design without construction to turn the lines on paper into a structure? Or what good is construction without contracting to hire the people necessary to make it happen? Or what good is counsel without a cause to defend? But add all the parts together and *presto*, you have **synergy**, and the Everglades start getting cleaned up.

Synergy happens in the Corps of Engineers, and it can happen at every level. It can happen between co-workers in neighboring cubicles, between sections within a district, between districts within a division, between the divisions and the labs, and so on.

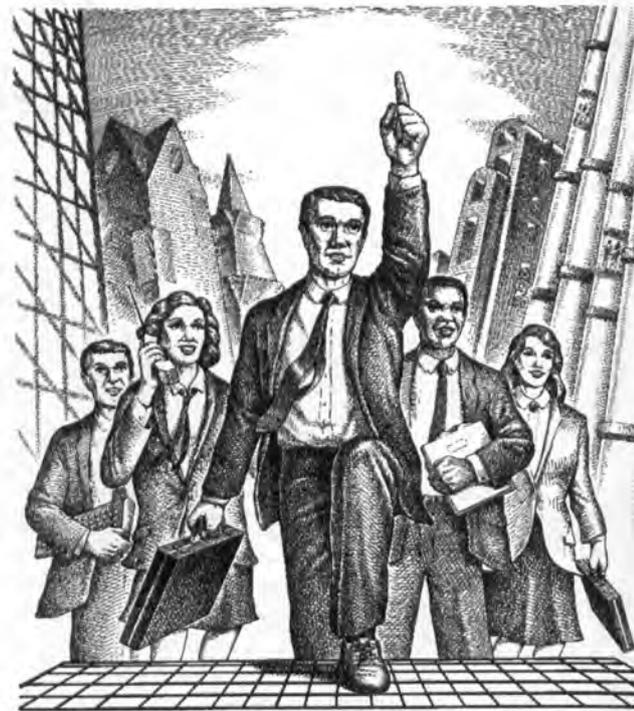
Ah, synergy is a beautiful thing to watch – *most* of the time.

So I must add that *not all* synergy is good. Recently, I went to a local store where I stood at the counter for more than 10 minutes. Not seeing a clerk, I began wandering around the store looking for someone to wait on me. In the back of the store, I found three clerks talking and laughing about something that happened the night before.

When I asked them if they could help me, they seemed irritated that I had interrupted their conversation and they would have to wait on me. I thought to myself, "They should fire two of them and maybe the third one would get back to work." This is proof that the whole can equal less than the sum of its parts. In this case, the whole equaled less than even *one* part. I guess we could call it *anti-synergy*.

We have anti-synergy when church members spend so much time bickering between themselves that good things don't happen, and sometimes they actually cause more harm than good.

Anti-synergy happens when a part of the body isn't functioning right. When the stomach is sick, it will reject the pie no matter how luscious it may appear to the eye.



Anti-synergy occurs in organizations when individuals withhold information from co-workers to make them look bad, or when managers make decisions to advance their personal career instead of promoting the organization.

Lt. Gen. Flowers likes Stephen Covey's definition of synergy. "*Synergy is the fruit of thinking win-win and seeking first to understand... It's not compromise... It's the creation of third alternatives that are genuinely better than solutions individuals could ever come up with on their own.*" With this intentional communication for the good of a common goal, synergy is bound to happen.

I encourage everyone in the Corps of Engineers to help stamp out anti-synergy. Let's pull together, communicate, support, and encourage each other. If we all do this, we'll lift the Corps to a new level of synergy (let's call it *super-synergy*) and then we can all take pride in watching good things happen.

But, having said all this, I'm *still* praying that Lt. Gen. Flowers doesn't ask me to define synergy!

(The views expressed in this article are those of the author and do not reflect the official policy or position of the U.S. Army Corps of Engineers, the Department of Army, the Department of Defense, or the U.S. Government.)

District hosts emergency exercise

Article by Ann Marie Harvie
Photos by C.J. Allen
New England District

Disaster strikes near the New Bedford Harbor Superfund site in New Bedford, Mass.

At the Waste Water Treatment Facility on Sawyer St., personnel are moving two 30-gallon drums full of sulfuric acid when the drums drop, dislodging both bungs. The acid leaks mixes with the concrete and another chemical, causing an acid gas cloud. The workers experience throat and eye irritation.

They try to upright the drums, but the acid splashes on their legs and feet. A third worker, performing electrical work in the facility, is overcome by the vapors and falls from a ladder to the concrete floor. Two co-workers try to help the fallen employ-

ees, but are also overcome by the vapors.

Meanwhile, in the material lay down area, two employees are moving and stacking large concrete blocks when a hydraulic line to the backhoe ruptures. An employee near the machine is sprayed in the face with hot hydraulic oil. The second employee tries to assist the injured worker, but collapses with hydraulic oil burns and contamination from the leaking hydraulic line.

The two incidents leave three victims seriously injured and two in critical condition. All victims need to be transported to St. Luke's hospital for treatment.

This was the scenario for New Bedford's emergency response drill at the New Bedford Harbor Superfund site on June 20. When the city wanted to test the responsiveness of their emergency services, they



The New Bedford Resident Office created a realistic emergency at the New Bedford Superfund site for local emergency personnel.

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Commander, USACE.....Lt. Gen. Robert B. Flowers
Acting Chief, Public Affairs.....Lt. Col. Eugene Pawlik, Jr.
Chief, Command Information.....George E. Halford
Editor.....Bernard W. Tate



Corps builds training bases in Israel

Article and Photo
By Torrie McAllister
Europe District

What do Israel's elite paratroops look for when building a new military base? Like Americans, they put quality training and quality of life at the top of their list.

Europe District and the Israeli Ministry of Defense laid the cornerstone for a new U.S.-financed basic training base in the northern Negev Desert in Israel on May 15. Israeli defense officials said the location in the Judean hills is particularly suitable for paratrooper infantry training and state-of-the-art support facilities for the Israeli Defense Forces (IDF).

Recruits can look forward to air conditioning and other modern amenities in new barracks, dining halls, and recreation facilities. Their families are happy because it will be safer to visit their loved ones on weekends once their training bases are relocated from the West Bank into Israel.

The \$45 million Southern Infantry Training Base is being funded by the U.S. to support the Wye River Memorandum that Israeli and Palestinian leaders signed in 1998 during summit talks hosted by former President Bill Clinton. The U.S. is funding base construction and infrastructure costs so the IDF can move out of the West Bank to free-up land for possible transfer to the Palestinians.

The IDF and the 35th Infantry Training Brigade celebrated the start of construction with a traditional Israeli stone-laying ceremony, where a scroll is buried to commemorate the new beginning.

"What we're doing here lays the cornerstone for a secure Israel, at peace with her neighbors," said U.S. ambassador Martin Indyke, who participated in the Wye River negotiations and came to sign and help bury the scroll. "It's highly symbolic of the United States' iron-clad commitment to Israeli security, and serves as a foundation for reaching a comprehensive peace."

"This is the first of many construction projects brought about by Wye River which will assist with the redeployment of Israeli troops in the West Bank," Indyke



Brig. Gen. Stephen Rhoades, North Atlantic Division commander, passes a ceremonial shovel to Maj. Gen. Aharon Zeevi, the Israeli Ministry of Defense's Director of Logistics, during the groundbreaking ceremony.

added. "It's an important step toward building a spirit of trust with your Palestinian neighbors."

During the next four years the Corps will manage construction of an estimated \$280 million in military facilities for Israel. The Corps is soliciting, awarding, and managing the construction contracts.

Near-term construction consists of three new mili-

tary bases:

- The Southern Infantry Training Base, now underway, which was awarded to the Israeli joint venture firm Solel-Boneh and Minrav Holdings Ltd.

- The Northern Infantry Training Base, which is scheduled for construction next fall. Proposals are being solicited.

- The Nachshonim Storage Base, a \$138 million storage and maintenance facility, which will break ground in August. The contract was awarded in June to the U.S./Israel joint venture firm of ABB SUSA, A. Arenson, and Baran Group.

Amos Yaron, Israeli Director General of the Minister of Defense, told young soldiers who gathered to see the new site, "It gives me particular personal pleasure to look back on my days in the 35th Infantry and see how well this fits the new needs of this old brigade as we begin a new century."

"Thank you for continuing to stand by us in these difficult days," Yaron told Indyke. "We're working with the U.S. Army Corps of Engineers to build 40,000 square meters of built-up areas to the highest tactical and quality of life standards, standards befitting the responsibilities of such an elite unit. This is a moment in which we celebrate U.S. and Israeli cooperation. That spirit of cooperation is reflected in the partnership of our design and construction engineers."

Wye River implementation offers the Corps another opportunity to assist Israel. The first was more than 20 years ago, after the Camp David Accords were signed and Israel gave up airbases in the Sinai to make peace with Egypt. From spring 1979 to summer 1982 the Corps helped build the Ovda and Ramon Air bases, a \$1.6 billion initiative that helped defend Israel and keep the peace into a new millennium.

"The Corps of Engineers is proud to be your partner," said Brig. Gen. Steven Rhoades, North Atlantic Division commander. "A superb team effort brought us this far. Our 35,000 soldiers and civilians from across the U.S. and Europe offer our hopes and prayers that the Corps efforts here will help secure a lasting peace in the Middle East, and a better world for our children."

Emergency

Continued from previous page

asked New England District (NED) to simulate an accident at the Superfund site. The New Bedford Resident Office agreed to host the drill and to provide simulated victims for the responders.

Victims

"Victims were asked to lie on the floor or ground and await rescue by the fire department and the Emergency Medical Service (EMS)," said Patricia Sumner, a district industrial hygienist. "Victims were decontaminated at the site, if possible, then transported to the hospital via ambulance."

But the simulated victim toll went up when, as part of the drill, eight responders became exposed and injured, requiring on-site assessment by EMS and treatment at the hospital. The drill continued after the victims were transported to the hospital.

Treatment

"The local emergency technicians performed their duties in a professional manner in a difficult scenario with lots of serious injuries and several minor ones," said Karen Schofield of Engineering/Planning, one of the "victims."

Once the "victims" arrived at the hospital, they were evaluated and "treated" by hospital personnel.

"While we were definitely amateur actors, the emergency personnel were all professionals and take a lot of pride in what they do," said Rosemarie Schmidt of Engineering/Planning. "They seemed very interested in test-

ing their systems, and finding out how they can become better prepared for a large-scale accident, especially one involving hazardous materials."

Dozens of city medical personnel and 15 victims (five of them NED volunteers) participated. Environmental Protection Agency (EPA) personnel were also on hand. The drill helped St. Luke's meet its Joint Commission on Accreditation of Health Care Organizations requirements. It also helped the U.S. Army Corps of Engineers meet part of its annual emergency training requirement.

Planning

Planning the drill started as March when NED employees met with people from the local fire department, EMS, and hospital. Training classes in hazardous material conducted by NED were held at the hospital for fire, police, EMS and hospital personnel before the drill.

"The accident scenarios were well scripted," said victim Mike Walsh of Engineering/Planning. "A smoke machine created the 'hazardous atmosphere' associated with a chemical spill in the water treatment plant."

Concerns

According to Sumner, the drill revealed some areas of concern by the response teams at all levels to a hazardous materials incident involving multiple injuries.

"The drill was unusual for the responders since (at the hospital's request) they required 15 victims with a variety of injuries to tax their systems," Sumner said. "As a result, it was evident that the drill ran at the extreme for the re-

sponders as well. However, it clearly showed the weakness in their emergency response systems and areas where improvements are necessary."

NED team members also learned much from the drill.

"From the USACE perspective, we learned there is a need to evaluate the training of our on-site personnel so that we are better prepared to assist responders during a hazardous materials incident," said Sumner. "Typically, our personnel and subcontractors are trained in hazardous materials, but not in emergency response. Since most municipalities have limited resources in hazardous materials, having personnel on site who are capable of assisting the responders would have improved the response."

Education

"It was an interesting and educational experience," said Schofield. "It helped me appreciate the effort and people involved in a large-scale accident response. It was rewarding to be involved in a drill that helped train fire, police, EMS, and the hospital in this type of an emergency. I think the experience and the lessons learned will benefit those involved and the surrounding communities."

"This exercise made me realize just how many people are involved — fire department, ambulance emergency medical services, hospital, and police," said Schmidt. "It's a tough job to coordinate and communicate everything when so much is going on. I give them all a lot of credit."

"The main thing I learned from the exercise is the importance of prevention," said Walsh. "Believe me, nobody wants to go through an accident like that for real. It's frightening for victims and rescuers alike."

Bomb squad

Rock Island team supports ordnance and explosives clean-up

By Eric Aubrey
Rock Island District

Tucked away in the basement of a Rock Island Arsenal building is a unique Rock Island District team. Part of the district's Engineering Division, it's officially known as the Ordnance and Explosives (OE) Engineering Section, but it is commonly called the "bomb squad."

The primary mission of the bomb squad is providing ordnance and explosives clean-up support. The majority of the support is for the Army, but support is also provided to the Navy, Air Force, Marine Corps, National Guard bureaus, and other Corps districts. This explosive safety mission falls under the scope of the Defense Environmental Restoration Program—Formerly Used Defense Sites, which is vested in the U.S. Army Engineering and Support Center, Huntsville.

Some people may wonder, "Why would anyone want to look for old bombs, artillery shells, mortars, mines, grenades, missiles, and rockets?" Others may think a career on the bomb squad would eventually mean needing both hands to count to five. That's a slim possibility but, so far, all fingers are still accounted for by all members of the OE team because they follow strict safety rules to minimize the hazard.

Preparing Archive Search Reports (ASR) is a key mission for the OE team. The ASR is the written document of an in-depth records search and interviews and includes physically searching the ordnance site in question to determine whether cleanup is required to properly dispose of any existing hazards.

It often requires the detective skills of



Nick Heleg-Garza checks out the condition of an unearthened old-style general purpose bomb. (Photo courtesy of Rock Island District)

Sherlock Holmes to discover a key clue—finding existing documentation related to a site, reviewing hundreds of documents to find OE-related data, interpreting photos, interviewing witnesses, or making on-site observations. The process can be described as trying to solve a jigsaw puzzle with only half the pieces.

The district OE team has investigated hundreds of sites from Alaska to Puerto Rico and everywhere in between. Most sites are former military bases, camps, airfields, training areas, and ranges that may or may not still be under government control. Age is not a factor. Sites investigated have ranged from the Revolutionary War to bases still in use today. The oldest explosive munitions found so far have been

from the Civil War.

George Ofslager, a quality assurance specialist (ammunition surveillance), performed one of his first site investigations at a former camp that is currently part of the Cape Cod National Seashore.

"I couldn't believe my eyes when I discovered lifeguards gathering bazooka rockets that had washed up on a beach and stacking them around their lifeguard towers," said Ofslager. "This was an accident waiting to happen."

He put a stop to this practice and, through his ASR, had a high-priority cleanup done at the site to prevent a potential beach-goer injury or fatality.

Another big mission for the bomb squad is to provide safety and quality assurance

oversight of contractors working on sites that are undergoing cleanup/restoration. District OE safety specialists who are former military explosive ordnance disposal technicians help identify recovered ordnance and ensure that the contractors adhere to safety procedures. Some of the most recent OE sites that Rock Island District has supported include Massachusetts Military Reservation, Fort Ritchie, Md., and the Iowa Army Ammunition Plant in Middletown, Iowa.

Extensive travel and temporary duty play a major part in the OE team's success. All team members enjoy the opportunity to see different and interesting places, but it frequently creates the challenges of being away from home.

It takes efficient, self-motivated, and well-organized individuals to complete good ASRs in a timely fashion, while still providing the manpower for other missions requiring field support, not to mention finding the time for training, workshops, meetings, and personal leave.

The OE section initially started in 1991 with seven individuals and has grown to a highly technical team of more than 20 specialists. Of the original seven, only Chris Churney, a chemical engineer, is still with the team.

Most of the OE personnel have extensive ammunition training and explosive safety experience, most of it gained from previous work with the military. This knowledge, coupled with the expertise and skills of the other team members, gives a level of professionalism in OE support and products that is virtually unmatched in the Corps. (St. Louis is the only other district with a similar mission). To date, the district has completed more than 360 ASRs.

Program provides 'window' to Corps

By Ivan Damaso
New York District

The Oakwood Beach area had flooding problems.

After a heavy rainfall, the Staten Island, N.Y., community would be flooded. And even during normal high tides (depending on wind conditions), Oakwood Beach also experienced flooding. After decades of shoreline erosion and deterioration of protective works, such as a wooden floodwall and a stone riprap revetment, the small community became highly vulnerable to storm damages.

When officials and residents of Oakwood Beach presented their situation to the U.S. Army Corps of Engineers, New York District conducted a study in the problem area. Under the Continuing Authorities Program, the district evaluated plans for reducing the effects of shoreline erosion and flooding in the community.

Every district of the Corps is authorized by Congress to undertake any number of projects under the Continuing Authorities Program. Popularly known as CAP projects, the activities include emergency streambank and shoreline protection (also called a Section 14 project), hurricane and storm damage reduction (Section 103), flood control (Section 205), aquatic ecosystem restoration (Section 206), and project modifications for improvement of the environment (Section 1135).

The sections point to provisions embodied in different laws, such as the various Water Resources Develop-



A Corps engineer inspects work at Oakwood Beach. (Photo courtesy of New York District)

ment Acts, the Rivers and Harbors Act of 1962, the Flood Control Act of 1946, and others.

"CAP is essentially a window to the Corps of Engineers," said Cynthia Jester, New York District's CAP coordinator. "A lot of our varied expertise, from traditional authorities-flood control to newer authorities-environmental restoration, can be found in one program—CAP."

For each type of CAP project, Congress delegated its

authority to the Corps to approve certain activities up to a certain dollar amount, subject to availability of funds. The amounts range from a maximum of \$1 million for emergency streambank and shoreline restoration, to a maximum of \$7 million for flood damage reduction, based on a cost-sharing agreement between the federal government and the non-federal co-sponsor (the community).

New York District initiated the Oakwood Beach project under Section 103 of the Rivers and Harbors Act of 1962, as amended. According to Frank Verga, the district's project planner, "The challenge was coordinating this project through numerous New York City and state agencies, all of which had to approve and permit the project's construction."

Once the paperwork was done, the project delivery team went to work. They designed and built a levee, a tide gate, and raised portions of streets in the area. Then the Oakwood Beach project was officially turned over to New York for operation and maintenance.

"I'm very pleased with the project," said Jackie Nielson, an Oakwood Beach community leader. She added that the people of the community had waited for a solution for a long time, and now appreciate not having to experience the nuisance of flooding problems.

"The goal of every Corps' project is to solve problems," said Verga. "The Corps of Engineers did an excellent job of coordinating the completion of the Oakwood Beach project."

Technical group is U.S. 'one voice' in negotiations with Japan government

Article by Maureen Ramsey
Photos by Doyal Dunn
Japan Engineer District

To share the burden of stationing U.S. forces in Japan, the Government of Japan (GoJ) voluntarily instituted the Japan Facilities Improvement Program (JFIP) in 1979. Three things are unique to the program:

- It is not bound by any formal agreement or treaty.
- The GoJ determines the funding levels (current construction value is about \$ 750 million annually). Everything is negotiated, from each project built through the program to the equipment the GoJ provides.

- And there is one catch. The GoJ will only build to one standard. Hence, the creation of the Technical Working Group (TWG).

According to Donald Kaneshige, design chief of Japan Engineer District (JED), the TWG was established in 1984. The JED commander is the chairman of the TWG, and the Design Branch chief acts as the secretary. Facilitating the TWG meetings rotates annually among the Design Section chiefs. JED's Mechanical Section chief, Ken Hiratsuka, is the current facilitator.

The group currently meets every two months. Its mission is to examine at the overall host nation-funded construction program from a technical perspective.

Synergy. "Membership consists of representatives from each service headquarters, U.S. Forces Japan headquarters, and Japan Engineer District," said Kaneshige. "It's a collateral duty for the members, most of whom work the criteria requirements for their service's projects. Their main objective as a group is to hammer out differences among the services and to come to a single agreement on various concerns. This way the U.S. speaks with one voice when it negotiates projects with their technical requirements and issues with the Government of Japan.

"This is synergy at its best," Kaneshige added. "Each member articulates his service's position on an issue and, after discussion, the majority rules on it. The majority decision then becomes the U.S. position on that particular issue."

Since membership on the TWG is a collateral duty for its members, the TWG doesn't "cost" the services. Its work, however, affects the JFIP. The JFIP program functions with a minimum of Army Military Construction, Army Planning and Design "Host Nation Support" funding — about \$ 16-19 million annually. JED uses it to prepare the essential criteria packages and to oversee the design and construction stages of the projects, thus ensuring critical U.S. requirements and standards are met.

Challenges. The TWG addresses many challenges to produce standard designs and procedures. These range from typical design and construction issues, to a geographic region stretching from the southern islands of Okinawa to the northern tip of mainland Japan, to addressing service-specific and often conflicting requirements. The group's success comes from its ability to work within the confines of two vastly different cultures.

Due to the GoJ's requirement for one standard or design to meet the needs of all four services, the services must compromise on service-specific standards. Through open, honest communication, the TWG members make acceptable compromises. The most significant results are consensus designs for facilities like family housing, bachelor quarters, child care centers, and physical fitness centers. As a result, you'll find facilities the same no matter whether you visit an Army, Navy, Marine, or Air Force installation in Japan.

"The TWG is a prime example of how services can surrender parochial interests, work as a single entity, and come out winners," Kaneshige said.



New townhouses at Misawa Air Base in Japan will give servicemembers and their families comfortable, modern living quarters.

The TWG also addresses the differences between military construction in JFIP compared to MILCON in the U.S. For example, with U.S. MILCON, the U.S. Government usually awards contracts to a single prime contractor. In Japan, the GoJ awards multiple separate contracts for each project (one for each design discipline or construction trade) with no prime contractor. Therefore, TWG members must have a working knowledge of both U.S. and Japanese building codes. This way, as members come to agreement, they ensure U.S. requirements as well as minimum Japanese, U.S., and DoD standards are met. They also ensure the Japanese materials and products used in construction meet U.S. standards.

Other key accomplishments come in the technical standards and procedures arena. They include a "Terms of Reference" guide, a standard finish schedule, a standard equipment schedule, parking structure standards, and gross area calculation standards.

Improvements. Quality of life improvements include central air conditioning for townhouses, thermostat control of an air conditioning system, a sprinkler system for all mid-rise and high-rise apartment towers — items not normally found in Japanese civilian communities.

The TWG's efforts have also led to a ban on lead paint and PCBs. But the influence of the TWG does not stop at the installations' fences. Indirect beneficiaries include the Japanese government, which has incorporated TWG improvements in design and construction standards in its own Self-Defense Forces' facilities, and the nations throughout Northeast Asia who enjoy the stability of the region.

Could the TWG work in other districts?

The Department of Defense could apply the TWG concept throughout DoD to achieve uniform construction requirements and standards throughout the armed forces and especially in Korea and Europe, according to Kaneshige.

"The key to the TWG's success is the willingness of the services to work together and to agree on facilities to which standard designs can be applied," he said. "The key obstacle to its success in being adopted DoD-wide is



Sgt. Frank Strother works out in the new Yano Fitness Center at Camp Zama.

a lack of an impetus such as Japanese government's desire to standardize."

The TWG has brought the efficient execution of a host-nation-funded program. As a result of this cooperative effort among the services in the TWG, during the past two decades, the U.S. estimates the GoJ has contributed more than \$17 billion in quality of life and operational facilities. These new facilities are comfortable and safe to live and work in, and energy efficient.

Through the TWG's efforts, the host nation-funded facilities program has greatly improved the quality of life for the 112,000 soldiers, sailors, Marines, airmen, DoD civilians, and family members stationed in Japan. From nine-story apartment towers and townhouses, to operations facilities, hangars, and warehouses, these enduring facilities are the hallmark of the U.S. presence in Japan.

Flood projects protect Kentucky towns

By Dave Treadway
Nashville District

Residents of Harlan, Loyall, and Rio Vista, all in Kentucky, can finally feel secure. A network of tunnels, walls, and river diversions built by the U.S. Army Corps of Engineers is protecting their homes and businesses from floods.

The rugged Appalachian Mountains have always attracted rugged, independent people. Early settlers sought its rich river bottoms for farming, and its wooded slopes for logging and abundant wild game. Miners later came to remove its coal. All built their towns on the only flat land available, the narrow mountain valleys.

Harlan's location at the confluence of the three major headwater tributaries of the Cumberland River made the town particularly vulnerable to sudden rises in water, and every major storm that passed over the Cumberland Mountains left misery in its wake.

Heavy rains in April 1977 caused flooding that left four dead, more than \$30 million in property damage, and awakened the nation to the plight of the area. That flood moved Congress to pass legislation directing the Corps to find a solution.

The flood problem was so widespread and complex and called for so many innovative design elements, that the solution ultimately cost more than \$180 million and required 12 years to complete.

To manage the design, acquisition, and construction along the nine-mile reach of the project area, the effort was divided into three phases. River diversion tunnels are a key element of the first phase. A floodwall and pump station are key elements of the second phase. An open-cut river diversion, floodwalls, and levees are key elements of the third phase. All three phases required extensive relocations of transportation and utilities.

Phase one

Phase one contains one of the largest tunnel diversions of a river ever built. It has a series of four parallel, 2,000-foot-long tunnels, each 34 feet wide by 32 feet high, and capable of carrying the full volume of the river exceeding a 500-year flood. Although an unusual choice for a river diversion, tunnels afford several significant advantages over a conventional open cut. Excavation was reduced by 1.2 million cubic yards, minimized impact on the community and environment, and reduced the energy requirement for disposal. Less surface disruption preserves landforms and neighborhoods, and slightly improves water quality by the cooling effect of passing through the tunnels.

The unique design of the tunnel entrance, with nosings shaped to optimize flow and shed debris, is the result of a physical model study. A rock core is preserved in the center of each nosing to conserve concrete during construction. The center nosing also serves as a support for the upstream highway bridge's center pier.

Downstream bridge piers, also specially designed to shed debris, are a striking architectural element. The double curvature bridge deck follows a graceful line that parallels the adjacent natural river channel.

Several other environmental or cost-saving initiatives were incorporated into phase one. The specified construction method using machine excavation of rock reduced the disruption caused by blasting. An upstream dam diverts the river into the tunnels and is built of rock excavated from the tunnels. Other tunnel excavation material was used to elevate high school property above the floodplain. The length of bypassed river channel downstream of the tunnel entrance now provides an interior ponding area and a green space for future development.

Phase two

Further downstream, phase two involved building a floodwall 24 feet high to protect Harlan's central business district from another tributary. Major rail, highway and utility corridors were impacted by the construction, but close coordination with officials minimized disruption.

The floodwalls were sited next to the main highway bypass to minimize the sense of confinement and reduce



A freight train passes through the floodwall designed to protect Harlan Ky., from a 100-year flood event. Massive closure structures, the largest spanning 84 feet, are required by the railroads and highways entering the protected area. (Photo courtesy of Nashville District)

impact to land resources. Texturing the concrete surface added variation and interest to the wall.

Massive closure structures, the largest spanning 84 feet, were required by the railroad and highway systems entering the protected area. In combination with the steel gates, these dramatic entrances are notable for their bold geometric form. Landscaping was used to soften and blend the closure entrances. Operational manuals for the closures were developed in coordination with officials of the railway, highway, and local emergency response organizations. The Corps sponsored and facilitated emergency training exercises to assure that local residents were thoroughly familiar with flood warning and evacuation procedures.

When the system is closed for a storm, rainfall inside the protected area is collected in the abandoned channel and pumped over the wall through a large pump house equipped with three pumps capable of removing 178,000 gallons per minute.

Phase three

Three miles further downstream, the phase three cornerstone is a 2.5 million cubic-yard open-cut diversion through the mountain to redirect the flow of the river around Loyall and Rio Vista. The channel alignment was optimized to preserve homes, provide smooth hydraulic flow, and keep excavation to a minimum — all while preventing negative flood impacts upstream or downstream. The rock cut is 120 feet wide at the bottom and 320 feet high at its deepest point.

Several creative mitigation efforts are noteworthy. At low flow, some water continues to pass through culverts in the diversion dams to maintain the ecosystems in the natural river channel. As water rises, the culverts can be closed to provide interior ponding, much the same as for the phase one reach of river, and the storm water is diverted through the new channel. The bottom of the new channel has been modified so that minimal flows are contained in a meandering channel. Stone piles to attract fish were placed in the new channel to provide habitat. Upland disposal sites have been reclaimed by seeding and plantings to mitigate environmental losses.

The bridge at the upstream end of the cut is an important aesthetic component and a significant engineering accomplishment because of its double curvature. A pedestrian crossing on the downstream bridge was an important consideration provided for the community.

Protection for the downstream communities is completed by a system of floodwalls, closure structures, and levees. Disruption of borrow lands was minimized by building the levees of specially selected rock from the diversion excavation. A zoned-fill cross section and heavy duty compaction equipment assured the levee is watertight despite using rock for construction.



A man is dwarfed by a tunnel that carries the Cumberland River through Cumberland Mountain. Each of the four tunnels is 34 feet high, 32 feet wide, and 2,000 feet long. (Photo courtesy of Nashville District)

Throughout the project, restrictive site conditions led to creative approaches. At the upstream limits of phase three, an automobile road and a railroad share the same narrow riverbank. Adding a floodwall required a steeper bank than is possible without special measures. Here the Corps used a Key Stone wall, which also provides a pleasing textural variation.

Phase three also involved creative decisions to facilitate building a regional sewage treatment plant by the local sponsor. Acting in concert with local officials, the Corps placed excavation from the cut on the project owner's site, elevating it above flood stage and making it suitable for the regional plant. A commitment by the Corps to provide hookups and sewer lines to the new site, within the limits that would have been otherwise required, sealed the deal.



Support to the Army, Quality of Life

Improving Life for Soldiers and Their Families

Soldiers in Bosnia get much better wastewater treatment facilities

Article by Alicia Gregory
Photo by Daphne Ross
Europe District

Most people don't think about the millions of gallons of wastewater Americans flush down their toilets every day. Soldiers in the Balkans think even less about it because they've got more immediate problems, like staying alive and keeping warring factions from killing each other.

But someone *must* think about it when more than 4,500 soldiers are producing great quantities of wastewater in a country whose sewage system is in disarray after several years of civil war.

That someone was U.S. Army Europe. And USAREUR tasked Europe District, who did much more than just think about it. The district was the construction agency in charge of completing two wastewater treatment plants in Tuzla, Bosnia, at Task Force Eagle Base and Camp Comanche.

The wastewater treatment plants have improved the environmental health of military bases in the Tuzla area since their completion last year. The original wastewater treatment plant at Task Force Eagle Base was a smelly 40-year-old Yugoslavian facility.

Old facilities. "USAREUR, as European Command's designated executive agent for environmental matters in the Balkans, periodically reviewed environmental issues associated with the operation," said William Nicholls, former Environmental Officer for USAREUR during the project's life cycle from 1999 to 2000. "From the initial deployment we knew that the wastewater treatment facility at the Task Force Eagle Base was insufficient to handle the load, and Comanche had no plant at all (waste was trucked daily to the Eagle plant, further overloading the facility). We did some studies, through the Corps, validated the requirement, then designed the correct fix."

'Reactor.' The fix had to be effective, economical, and flexible to deal with changing troop concentrations. They decided to build a new million-dollar wastewater treatment facility at Task Force Eagle Base to replace the 40-year-old Yugoslavian one, and another almost-million-dollar facility at Camp Comanche to reduce the amount of waste trucked to the Task Force Eagle Base.



The wastewater plants' modular construction allowed for ease of construction.

Creating this fix posed some challenges — a lack of local commercial competition, a high-risk area, and force protection requirements.

The district team, led by Daphne Ross, the project manager, researched the types of treatment plants that would fit the criteria. That research led to selecting a sequencing batch reactor (SRB) system manufactured by Farmatic in Nortorf, Germany. The plant was designed by Buchart-Horn, Inc., in York, Penn.

In this case, "reactor" refers to chemical reactions, not nuclear. The SRB system processes the waste in one container, which reduced the plant's cost, and its modular structure allowed for ease of construction.

"This basically old technology was rediscovered in the late 1980s in North America and Europe, and is now using microchips to computerize the timing of the process," said Pat Brady, engineering technical advisor. "SBRs are ideal for small communities or installations."

Advantages. The advantage of this technology is the low installation cost, and low maintenance and operations.

"We also couldn't have a permanent structure due to requirements from USAREUR, NATO, and the Dayton Peace Accords, so this product fit the bill," said Ross. "Although the foundation and piping of the plants are stationary, components of the treatment plants are not. They're bolted together. Technically, the major components could be disassembled and moved, thus fulfilling the peace accords that state NATO forces are to remove all equipment upon leaving.

"There are two reactors at each site,"

Ross continued. "While one is digesting the waste, the other is filling up. This allows waste to be processed in a minimal amount of space, and offers the capacity of handling peak loads."

Excellent efficiency.

"The efficiency of treatment is excellent because you have all of the major phases of treatment in one place," said Brady. "In any standard process, microbes do the work. They eat the bad stuff, grow, and then die off as sludge. The oxygen transfer, which is needed to help the microbes do their job, is maximized in this process because it's not flow dependent."

The waste solids are composted off-site and blended as a conditioner for remediated soil at an off-site facility, according to Andy Jantzer, Buchart-Horn's chief designer on the project.

After the treatment is done, what's left is just clear water. Although it is not legally drinkable, it is well within the limits to be safely discharged in the Spreca River.

"The old treatment facility was in disarray," said Ross. "It was an open-air facility that reduced waste through a baffle process. It was built to facilitate probably 500 people, but during contingency operations almost 10 times that number of personnel were at Task Force Eagle.

Overwhelmed. "The system, which was structurally in poor condition anyway, was overwhelmed and black (untreated) water was flowing to the Spreca River," said Ross. "There were also plans to build a medical facility nearby, which would have been unsanitary with the old facility in use."

It took about one year to finish the fa-

ilities, completed in February 2000. The construction and operations phases were coordinated by three offices — Europe District for primary contracting, logistics, and technical issues. The Corps' Base Camp Coordinating Agency's project engineer handled on-site inspection and field coordination. The contractor, Buchart-Horn, handled technical issues such as shop drawings, design changes, plant process issues, and inspections.

Industry leader. "We're an industry leader in wastewater treatment facility design and operation," said Jantzer. "We've conducted environmental pollution prevention and wastewater treatment plant projects throughout the Corps area of operation, including Germany, Italy, Greece, Turkey, Benelux, and Ukraine. Our downrange experience includes several Task Force Eagle projects, starting with significant subcontracted field work and co-authorship in the 'You Spill, You Dig' handbook, followed by five Europe District prime contract assignments in Task Force Eagle Base."

Besides completing the design of the wastewater treatment plants, Buchart-Horn also received a technical assistance contract. This contract covered Buchart-Horn's involvement in both the construction and operations phases of the Task Force Eagle projects. Under this same contract, Buchart-Horn developed a comprehensive operations and management manual for each plant.

"The projects were necessary to protect our troops from contamination and diseases associated with improperly treated sewage," said Nicholls. "Further, installation of modern treatment facilities reduced adverse exposure to the local populace and demonstrated our commitment to environmental stewardship.

Value. "We got reasonable value for the money," Nicholls continued. "The projects were essentially on time, and functioning well when I departed Europe. A concept that came out of this effort is the 'Zero Footprint Base Camp,' which is getting attention in the Pentagon."

The Zero Footprint Base Camp is essentially self-contained environmentally. All solid waste is burned for energy; wastewater is treated and reused for irrigation, dust control, and fire protection. Hazardous waste is minimized or eliminated through careful material control.



Photo courtesy of Tulsa District



Photo courtesy of Transatlantic Programs Center

The Protective Design Center in Omaha District will help protect U.S. servicemembers and employees from terrorism, whether in the U.S. (left, the Murrah Building in Oklahoma City), or overseas (right, Khobar Towers in Saudi Arabia.)

Design center will counter terrorism

By Sheri Hronek
Omaha District

USS Cole
Khobar Towers
Beirut barracks
World Trade Center
Oklahoma City
Kenya and Tanzania

The names are familiar, and they pack the same emotional wallop for younger generations that Pearl Harbor did for their grandparents. But these were a different type of infamy. These were not acts of open war, one government against another. These were individuals and private groups declaring a private war, using terror attacks against the unsuspecting for political gain.

The U.S. government is responding to the terrorism threat, and Omaha District is in the forefront of those efforts. The district's Protective Design Center (PDC) is the U.S. Army Corps of Engineers' Center of Expertise for anti-terrorism and force protection engineering support.

PDC works in two mission areas — security engineering and hardened structures. The first deals with criminal and terrorist threats, the second with military weapons. The district's sister office in Huntsville handles electronic security systems.

"Ours is the brick and mortar side of engineering," said Dan Sommer, PDC chief. The same physics of explosives apply whether the bomb comes from a terrorist or an aircraft. "The hardened structure is a wartime mission, and the force protection is our peacetime mission."

"We write the manuals here for both worlds, so we can coordinate both," said Curt Betts, who does threat and vulnerability assessments and site surveys.

Hardened construction is usually massive concrete. In the past, such structures had no windows, only one door, and may have been underground.

"After Desert Storm, we know a target can be hit from anywhere," said Patrick Lindsey, Chief of Hardened Structures Section. "So we're looking at the effects of smaller conventional weapons on structures."

For the last two years, most of the need has been in anti-terrorism force protection, especially for existing conventional buildings like offices and barracks. That need is predicted to increase in the next 10 years, but it does not detract from another PDC specialty — expeditionary temporary structures for troops deployed to places like Bosnia and Kosovo.

To accomplish its tasks, PDC includes all building disciplines — structural, mechanical, electrical, civil, and architectural. "But in security engineering, a lot of times those disciplines seem to disappear because security is an overarching application," Sommer said. "The hardened

structure side is obviously pretty serious structural engineering. When you get into anti-terrorism design for, say, car bombs, the two work hand-in-hand. You have security engineers who look at the standoff distances and how to protect windows from shattering. They work closely with structural engineers who look at the building to harden it against blast pressures from explosions."

Standoff distance is how near vehicles or individuals are allowed to come to a building. "In installations in the U.S., there's usually some standoff distance," said Betts. "The problems escalate outside the U.S. In Germany, for example, there isn't a lot of land, so often there's little standoff." Standoff is also a problem in densely populated areas like Japan and Korea.

Because DoD has an immense inventory of structures throughout the world, much of PDC's work is retrofitting existing buildings. "In response to a presidential directive, we're in a three-year program to survey all DoD installations," Sommer said. "In that program, there's about 200 surveys. We have one year under our belt, but we haven't done a third of the surveys yet because many of the requests came during the first year."

New construction

PDC expertise is also applied to new construction. A Joint Chiefs of Staff committee developed criteria, like standoff distances, for a new DoD construction standard for anti-terrorism force protection. (Betts is co-chair.) An interim version has been in effect for a year; the final version will be released later this year. The new standards address new construction, existing construction, and expeditionary structures.

Those criteria impact the cost of construction. For example, decreasing standoff distance increases cost. "If there's a bomb really close, it's hard to make that building stand up," Betts said. "Move the bomb away, and the effect is less severe. That's when we talk about minimum standoff. Keep that bomb a minimum distance away, and you can design the building with minimal cost increase."

PDC also works with manufacturers to ensure materials meet criteria. "We're always looking for things that are proven. Anything off the shelf is attractive if it's been tested," Betts said. "Unfortunately, a lot of times a manufacturer claims something works, but they have no real proof. Until it's actually been proven using standard testing techniques, we can't take it seriously. But that's part

of what our testing program is doing. They're taking a lot of commercial products and testing them on structures to see how they work." Much of that work is done at the Engineering Research and Development Center labs.

Glass is a major hazard in any blast, and PDC works with research and development organizations to make office buildings perform better. "If a blast occurs, the majority of injuries (not deaths) occur because of glass," said Ed Conrath, who specializes in blast resistance. "If we can put in better glass and anchor it better at a nominal cost increase, we've gone a long way toward solving the injury problem."

Conrath spent a couple months in Israel testing glass. "They built a full-scale test structure out in the desert. We'd set up the different part of the test in this structure, whether we were testing a wall or a window or a column or whatever. I gathered data after the tests."

Technology transfer

Technology transfer is another major part of PDC's mission. PDC staff consults with all services and private firms that contract with the military. Betts estimated that about a quarter of each day is spent answering questions by phone or e-mail.

To aid technology transfer, PDC is creating tools to help users understand information. "The complexity is so high, the average engineer just can't stay up with it all," Betts said. "So part of our process is boiling it down to a simple tool (a computer program, or a look-up chart, or something) that helps them make their decisions quickly and get on with the design."

"Our 14-pound manual for designing conventional systems is much nicer on a CD," Lindsey said. PDC has also put standard information into computer programs. Using an autodesigner, an engineer can select different explosives, weights, and types of munitions, then get an analysis that can be applied to a structure. (This product is still in progress.)

To also help DoD designers, PDC has set up a Web site for the Blast Mitigation Action Group. The Web site has commercial products that have been tested, with links to the manufacturers' Web sites.

Tele-engineering is another new PDC tool. "Anybody in the field can talk to us by video conference rather than us jumping on a plane to go there," Betts said. "We try to be responsive in as many different ways as possible, but we're stretched. So if we can do that without going there, it saves us time and reduces our customer's cost."

Interest in this information waned a little after the Beirut bombing in 1985, but the destruction of the Khobar Towers barracks created new priorities. "Since 1996,

Continued on next page

Support to the Army



Quality of Life

'Ideal classroom' built at Fort Campbell

By Carol Baternik
Louisville District

Imagine being a teacher and schooling your pupils in the ideal classroom. A classroom where the ratio of teacher to pupil is, say, 1-to-18, where small group instruction becomes more efficient and students learn to read faster.

The Department of Defense supports the lower teacher-to-pupil ratio at its schools, and is pursuing it for grades one through three by building new classrooms for this learning-conducive environment. The U.S. Army Corps of Engineers recently completed the design and construction of four PTR (Pupil Teacher Ratio) classrooms in Lincoln Elementary School at Fort Campbell, Ky., under a tight schedule. These classrooms are generally smaller than the average classroom with more effective use of space.

In the early fall of 2000, the major players stepped forward with their calendars. There were less than 10 months to complete the project. The "Welcome Back to School" sign at Lincoln Elementary had to be out by Aug. 11, 2001.

"We can do a project, but we normally have to bid on 100 percent design drawings," said Gary Shanklin, project engineer.

The design on Lincoln School was only 35 percent complete.

John Briggs, Fort Campbell senior resident engineer; Linda Scott, Fort Campbell schools budget officer; Steve Butler, Corps construction representative; and Fort Worth District, who supplied the project design, worked together quickly. The contractor, Brown and Root, was approached based on the 35 percent drawings to develop a proposal. Brown and Root in turn went out to subcontractor Lusk Mechanical who said "Yes, we can still do it on schedule."

Brown and Root and Lusk Mechanical put together a

Support to the Army



Quality of Life



Lincoln Elementary School at Fort Campbell, Ky., is a new design that fosters a better pupil-to-teacher ratio in the classroom. (Photo courtesy of Louisville District)

specification of materials they would use relying on the 35 percent drawings. The subcontractor selected the building materials such as windows, type flooring, roof, and ceiling. The design engineer then completed the plans based on the subcontractor's materials submittal.

"It's a reverse approach," said Shanklin. "Normally, design specifications are at 100 percent, and then you go for a proposal and award the contract. It's like a design-build without a marriage between the architectural engineering firm and contractor."

In this case, the design and construction were awarded at the same time. The contractor completes the design as construction progresses, according to Briggs.

On Feb. 1 work began and, like school children watching the clock wind down the school day, project managers remained vigilant overseeing progress.

They watched the clock while clutching their pocket-books, too. All new construction add-ons carry a \$500,000 spending cap, and the smaller of two total square footage plans ended up just under budget. Mill work, cabinetry, sidewalks, cable connections, and fire alarms were originally deleted due to budget limitations, but thor-

ough planning and meticulous cost control enabled Lincoln School to get them after all, using the five percent contingency funds.

The time constraint was the biggest challenge, according to Briggs. "We had six months to get the classrooms on the ground before school started," he said. In addition, the design writing was complicated. "We had to come up with a project that was biddable, evaluate what the contractor would give us, then take the concept to design and reality."

At Lincoln School the finishing touches are in place. The lawn has been seeded and the last screw turned. "I think the classrooms look exceptional," said James Walker, assistant principal. Walker noted the open communication from contractors, Corps people, and his maintenance staff. "That's something they've done consistently, like keeping us posted on the location of wiring and outlets."

The Fort Campbell students may wish for more summer vacation, but the teachers who have new PTR classrooms are excited. "They can't wait to move in," said Walker.

Terrorism

Continued from previous page

we've seen a lot more awareness and a lot more things done that weren't done before," Sommer said. "Structures are being built to standards even as we speak."

Training

Interest has also grown in security engineering training. "We've taught this class since 1987," said Doug Wehring, Chief of the Security Engineering Section. "Before '96 we tried to have a mix of engineers and security people, but we had a problem getting engineering interest." But since 1996, engineering interest has grown. "We've had installation master planners, and other Army and DoD engineering interests. There's a huge interest, primarily because of top-down emphasis that force protection has received since Khobar Towers."

The minimum construction standards have also increased emphasis on learning about force protection. Four years ago, PDC taught six to eight classes a year. In 2000, there were 21 classes. Two to four classes are taught at Fort Belvoir, Va.; the rest were taught throughout the world. Contractors are included because they must incorporate the standards into their designs.

Teamwork

"The success of all this is the teamwork between the different players in a project, including engineers, security people, and many others," Betts said. "That's why we teach our classes the way we do. It's imperative for Corps people to understand that they can never work in a

vacuum. They have to consult with security people and other installation people."

Assessment

That teamwork includes assessment. Installation personnel are part of the planning team to help PDC engineers understand their particular requirements. "We don't set the threat environment," Wehring said. "We approach it from the engineering perspective. They need to know what their threats are and what they want to protect. Do they have to worry about car bombs? We don't know; they have to tell us."

"Doug can help that local commander identify where money needs to be spent to improve force protection," Sommer said. "With that understanding, requirements can be set for projects, and money designated for them."

In the field

"One unique responsibility we have that other government agencies don't is the expeditionary requirement," Betts said. Compounds are sometimes in the middle of a field in places like Bosnia or Kosovo. "When we build a structure in Nebraska, the design is protective just in case someone attacks us. In Kosovo, you're potentially taking fire every night. One of the highest parts of our mission is to support troops in the field."

"Historically, the Corps' mission has been building fixed facilities, and it's only recently that we started to emphasize troop deployment," Betts said. "We determine what we think the threat will be and how we can

mitigate it. One thing we looked at in Kosovo was mortars. We used the same basic principles we'd use for a fixed facility, but we use a lot more improvisation. We use things like timber and sandbags and soil. Things you wouldn't use in an office building, but it works perfectly well in the middle of a wheat field."

Getting involved early helps identify issues early. Wehring received the Kosovo call at 4 a.m.; Betts found out when he walked in the office at 9 a.m. He was on a plane by 3 p.m. "Curt was standing in front of the task force commander less than 24 hours after they asked us to be there," Wehring said. "That's what it took for us to be effective; get there early and have an opportunity to affect the basic layout."

The time to get there may be minimal, but time spent in-country can be for extended periods. "We were supposed to be in Kosovo six days; we were there six weeks," Betts said. Betts also spent two months in Bosnia. Conrath spent three weeks in Bosnia and Croatia and a month in Albania. Other PDC team members have similar stories.

On-site work is a broad topic. The Bureau of Alcohol, Tobacco, and Firearms hired PDC to collect data after the Oklahoma City bombing. Conrath was on the UN inspector team in Iraq, and spent three months in Kuwait after the Gulf War to help with rebuilding.

Video teleconferencing will minimize some travel, and increase PDC availability to the other services. But there are times when the team must be on-site. They will continue to work throughout the world.

For more information on the PDC, check out its web site, <http://pdcunx.mro.usace.army.mil>.

(Sheri Hronek is a contract writer for Omaha District.)

Reggio Amelia

New child development center respects children and their world

Article by Alicia Gregory
Photos by Robert Stewart
Europe District

It may take a village to raise a child, but it took a team effort from several organizations including the U.S. Army Corps of Engineers, U.S. Army Europe (USAREUR), and the Supreme Headquarters Allied Powers Europe (SHAPE) to raise the SHAPE Child Development Center (CDC) in Chievres, Belgium.

The \$5.5 million modern facility opened last February. The original concept was based on an Army standard design that was modified in Italy and finished in Belgium, said Robert Stewart, project engineer. Many of the requested modifications on this project followed the philosophy of "Reggio Amelia."

SHAPE's CDC Director, Ingrid Ruffo, explains that "Reggio Amelia" is a unique philosophy from Northern Italy. "This is a very respectful way of treating children," said Ruffo. "The child and their environment are treated as a whole." This involves much observation and bringing the outside world (nature) to the child.

The result is a facility that met all standards and requirements, and gave the users the features they needed to make facility a second home to the children they serve. Some of these features in the new center include seven rooms that are divided into 14 different modular childcare areas, a fully equipped kitchen, a fenced playground area that both the new CDC and the School Age Services facility will use, and a video surveillance system.

The video surveillance system provides line-of-sight for staff throughout the interior of the center, and into the playgrounds. It is provided for parents who want to see their children without the disruption of the child seeing them. And everything the camera sees is taped.

Floor-to-ceiling windows in the rooms provide visual access to the play area outside, to the hallway, and between the rooms, and allows the caregivers to pay attention to their busy young charges at all times.

Another nice feature in the center is the atrium, according to Patricia Johnson, Child and Youth Services Facilities Chief for USAREUR. "Because it rains so often in Belgium, this allows the children to have a large area to play indoors. It also doubles as an expanded reception area for parents."

"It was important to our customer that the center have a very home-like feel," said Stewart. "And we've succeeded in providing just that. You have to be in the building to appreciate its warmth. From the rounded corners and wood accents everywhere, to the colors chosen for the paint, cabinetry, and floors, it all works together to make the facility a very comfortable environment."

The new 19,000-square-foot center has a capacity for 198 children, which is almost double the amount of its predecessor.

"The area needed a new child development center for two reasons," said Johnson. "They had outgrown the existing facility and desperately needed space because of the number of children serviced, and the existing facility was not suited for the younger children — infants and toddlers. This facility was specifically designed for the



Floor-to-ceiling windows allow caretakers to keep constant watch on the children.



Air Commodore A.J. Willems, commander of International Support Command, SHAPE (left), and Ingrid Ruffo, director of the Child Development Center, SHAPE, plus some of the children, and an unidentified teacher, open the new SHAPE Child Development Center in Chievres, Belgium.

younger, infant to pre-school children. It also gives the staff more choices for specific activities and programs."

The teamwork evident throughout the project extends beyond completion of the building. "Although this is an Army project, SHAPE will maintain the facility, and anyone assigned at SHAPE can use it," said Stewart.

The SHAPE CDC is an international child development center, and as such services not only the children of U.S. military sponsors assigned to SHAPE and the 80th Area Support Group, but also the 16 allied nations, and 28 Partnership for Peace personnel stationed in the SHAPE and NATO community.

*Support to the Army,
Quality of Life*

Improving Life for Soldiers and Their Families



Partnerships help restore ecosystems

By Pamela Bailey
Huntington District

Restoring damaged ecosystems to their natural state is an important environmental mission of the U.S. Army Corps of Engineers.

"The goal of ecosystem restoration is to manage, protect, and restore the nation's water and land resources within watersheds and coastal zones through an integrated application of Corps programs and authorities that balance human needs with those of nature," said Maj. Gen. Hans Van Winkle, Deputy Commander of USACE and former Director of Civil Works.

Van Winkle suggested the Corps could achieve these goals by:

- Promoting regional and national partnerships and ways of doing business.
- Emphasize multi-purpose, multi-agency projects.

Objectives

The Corps has made real headway in this area. The objectives of the mitigation and restoration process include:

- Using nature as a template.
- Maintaining species biodiversity.
- Using native trees and other plants.
- Coordinating with other state and federal agencies.

Surveying

One method of achieving these objectives is to survey the existing plant community before disturbance. I discovered that Corps survey methodology is compatible with that used by the Association for Biodiversity Information (ABI). This non-profit group of scientists recently split from the Nature Conservancy to oversee the biodiversity database. ABI collects and develops authoritative data about plants, animals, and ecological communities in the western hemisphere.

Surveying plant communities before



The Corps' partnerships with other agencies helps preserve natural beauty like this. (Photo courtesy of Huntington District)

mitigation and restoration projects gives a scientific basis for developing appropriate mitigation plans, and for monitoring plans. The U.S. Fish and Wildlife Service (USF&WS) and state agencies responsible for natural resources will review the mitigation plans as required by the Fish and Wildlife Coordination Act Agreement.

Maintaining diversity

In mitigation plans, the natural biodiversity should be replicated as closely as possible. Restoring the dominant plant species and maintaining a similar diversity helps ensure successful habitat development.

Maintaining genetic diversity is also important, because the health of a population relies on having a large genetic "pool." We can achieve genetic diversity, and maintain genetic integrity, by using existing plant populations. One way is to partner with the Natural Resource Conservation Service (NRCS) to transplant existing plants from a site, grow them at Plant Material Centers

(PMCs), then re-introduce the plants back into the mitigated areas. There are 26 NRCS PMCs in the U.S. which the Corps could partner with for native plants in all regional ecosystems.

This method has already worked at the Marmet Lock Replacement Project in Huntington District, which includes a wetland system, bottomland hardwood, and old-growth field communities. The plans include about 120 native trees, shrubs, herbaceous plants, and seed mixes, some not commercially available. Under a memorandum of agreement signed last February, the NRCS will transplant six plant species from the existing site and grow them for six years at their PMC in Alderson, W.Va.

When the construction site is ready for planting, the plants will be reintroduced. The plans were coordinated between the NRCS, the prime contractor of the project, the USF&WS, and the West Virginia Department of Natural Resources, which were impressed with the idea.

Another benefit of partnering with the NRCS is developing seed mixes which the

Corps will allow NRCS to grow on our properties. This is an equal exchange, and the contract is written to allow beneficial collaboration between agencies. At Marmet, the NRCS will plant a seed mix of native shrubs found along the Kanawha River drainage, and establish experimental plots.

There are several advantages of working with the NRCS. They provide a cost-effective planting alternative, allow reintroduction of original genetic biodiversity instead of buying cloned stock from a single parent source at a nursery, and make plant species available which may not be available commercially.

Native plant rescues

Another effective conservation method before construction is native plant rescues. This is done when valuable plant resources will be destroyed during a project. The plants are harvested from the site under Corps guidance by volunteers from such organizations as the West Virginia Native Plant Society, the West Virginia Herb Associations, or Canaan Valley Institute. These rescues require a license agreement.

The rescued plants are re-planted at other locations. This ensures the survival of hundreds of plant species.

There are many groups in communities that can use these plants. Plant rescues offer a chance for good public relations, education, and protection of natural resources at little cost to the Corps.

Everyone knows plants are beautiful, and a vital part of ecosystems. But we have just begun to look at them as valuable resources. Corps properties contain many plant species that can be harvested and transplanted to correct erosion and stabilize slopes. Plants are also valuable for remediation projects, plant septic systems, ecosystem restoration, and mitigation projects.

(Pamela Bailey is a landscape architect and botanist with Huntington District.)

Radiation clean-up dates to gaslight era

By George Hanley
Kansas City District

The trail of hazardous waste projects in Kansas City District is invariably convoluted, but few trails have extended to the gaslight era.

The Welsbach and General Gas Mantle Factories Superfund site is located under the Walt Whitman Bridge, the main link between Camden, N.J., and Philadelphia. Welsbach, which required a leading-edge solution using innovative technology, is a classic story of how a turn-of-the-century necessity became a modern hazard.

Thorium, an element that emits gamma radiation, was mined, refined, and used in making small sock-like devices called mantles for gaslights. Mantles glow brighter when impregnated with thorium. That discovery by Austrian chemist Dr. Carl von Welsbach spawned a worldwide industrial empire.

This particular factory covered 12 acres, had half-a-million feet of buildings, employed 2,600 people, and produced 220,000 mantles.

The waste products contain thorium and radium, both radioactive elements. It is believed these wastes were used as fill materials in this area. In the early 1990s, investigations by New Jersey culminated in the Environ-

mental Protection Agency (EPA) placing this site on the Superfund list.

But contamination was only one problem. With a project in Philadelphia, a contractor (Malcolm Pirnie, Inc.) in a northern suburb of New York City, the project manager in Kansas City, and the customer agency (EPA Region II), in lower Manhattan, it was necessary to find a faster, more efficient way of managing the project.

The solution requested by EPA Region II for information access and speed was a Web-based GIS (Geographic Information System)/Data Management System to handle the information generated by the extensive field investigations. The field data is placed in data cells keyed to a geographic point, building, or area, whichever the user selects.

Accessing that geographic area rather than a title is the key to finding the information needed. All the information collected is just a click away, instantly.

According to Tom Laffin, the Kansas City District GIS specialist who shepherds the operation "This project encompasses all of GIS at its best. When it comes time for data review meetings, many different agencies attend. The ability to view a property and answer questions about properties next door are now possible."

Field data collection is entered into the web and both

client and project teams can access all information instantly. Mapping and data compilation can take minutes instead of months. No special proprietary equipment or software is required.

Amazingly, it can all be done on a notebook computer, eliminating even handwritten notes. Every phase of project management from property access agreements to access orders to quality assurance and quality control is handled.

As for security, it has several levels of authorization, including special access for the analytical laboratories to upload sample results to the central database. The Web-server is accessed, and only it can cross the firewall and access the data server. Like a bank vault, there is only one way in and one way out.

Adding to the versatility is the fact that it is a component-based open system that can be re-used for other projects. It was developed for and owned by the EPA. Any project with extensive geographical work could benefit from this system.

Barbara Moore, the long-term project manager, says "It will enable us to reduce our investigation time of these sites by at least two years. This time savings will allow remediation to begin sooner and save 30 percent of the total project costs."

Bioremediation cleans up explosives

By Rich Buckley
Omaha District

Bioremediation, using bacteria in soil to consume contamination, is taking a bite out of cleanup costs at Badger Army Ammunition Plant (AAP), in Baraboo, Wis.

"We're excited about our bioremediation system at Badger AAP," said Deb Kobler, project manager. "This story has everything — improving the environment, moving scientific discovery from the lab to the real world, and saving taxpayer dollars."

Last March, Omaha District and its contractor, Stone & Webster, with support from Olin Corporation, installed a bioremediation system at one of three former disposal pits at the Propellant Burning Ground (PBG) to determine if bioremediation could clean up explosives in the soil.

When Badger was an active plant, the PBG burned unwanted explosives and solvents. As a result, leftover solvents and an explosive called dinitrotoluene (DNT) are found in both groundwater and soil at the PBG.

In 1996, the Corps installed a pump and treat system to contain and clean up the affected groundwater. But cleaning the soil posed a daunting and expensive challenge.

Quit studying. "The regulatory agencies and the community wanted the Army to quit studying the site and start cleaning it up," said Kobler. "We knew we'd have to team with experts across many agencies to come up with the best treatment."

The affected soil extends about 110 feet deep in all three waste pits. The Army faced a \$75 million clean up bill for the three waste pits. Originally, the Army planned to dig up the soil and treat it using soil washing and composting, but laboratory tests of soil washing showed the process would not meet the cleanup goals. This meant all of the soil would have to be either composted or incinerated.

Big holes. Composting also uses bacteria for cleanup. But for composting the soil must be dug up first. The digging would result in three holes in the ground 11 stories deep!

Besides holes 110 feet deep, it was uncertain that composting could meet the cleanup goals. At the time, the only other alternative for treating the soil was incineration. Incineration would destroy the DNT, but the \$75 million price tag was prohibitive.

So in 1995 and 1996, the Army started exploring bioremediation. The work was funded by the DoD Environmental Security Technology Program and managed by Army staff at Picatinny Arsenal. Under this program, the



These tanks and pumps add nutrients to the soil and heat the water.

University of Wisconsin, with Olin Corporation and RMT, conducted lab tests of soil obtained from Badger AAP. Early tests showed that bioremediation of DNT using native bacteria might solve some problems at Badger AAP.

Ideal conditions. In a continuing effort to find a workable solution for the PBG, Omaha District funded research conducted by Dr. Jim Spain of the Air Force Research Laboratory (AFRL) at Tyndall Air Force Base, Fla. Bioremediation experts at AFRL examined and tested the soil from the PBG to see if the bacteria could consume DNT. They also learned the conditions under which the bacteria flourish.

This is important information because if the bacteria have what they need, they grow and multiply. The more bacteria in the soil, the faster the cleanup will occur.

The AFRL experts determined that the right bacteria are present in the PBG. They also found the bacteria favor wet, warm conditions, ample oxygen, and some specific nutrients. Under the right circumstances, the bacteria consumed nearly all the DNT in the lab samples. Then it was

up to Omaha District and Stone & Webster to achieve in the field what the scientists accomplished in the lab.

"Dave Fordham, the Badger AAP installation commander's representative, and the regulatory agencies were supportive in developing an innovative approach," said Kobler. "We jointly decided that an applied study of the effectiveness of bioremediation was the next step."

Using the research information, Stone & Webster designed a pilot bioremediation system for the PBG. The design included pumping groundwater from beneath the PBG site, adding nutrients to the water, heating it to room temperature, and re-injecting it on top of a disposal pit. The re-injected water trickles down, delivering the warmth, moisture, and nutrients needed for bioremediation.

When DNT biodegrades, the products are nitrites and nitrates. These compounds are likely to enter the groundwater under the disposal pit. Stone & Webster designed and installed a system a short distance away from the test disposal pit to manage the nitrites and nitrates.

That system also uses biodegradation to convert the nitrites and nitrates to nitrogen gas and water. Carbohydrates are injected into the groundwater to promote the growth of the bacteria that consume nitrites and nitrates.

More innovation. The new bioremediation system is not the first innovative technology at the PBG. Stone & Webster designed and built a soil vapor extraction system to remove solvents from the PBG waste pit soils.

This system removed more than 1,600 pounds of solvents from all three waste pits by applying a vacuum to the soil. It included vents placed vertically in the soil column under each waste pit.

These same vents are used in the bioremediation system. But instead of using them to vacuum solvents from the soil, the Army is using them to push air into the ground, giving the bacteria the oxygen for bioremediation.

The bioremediation system has operated successfully since late March. Bioremediation of the DNT has been documented in samples obtained from groundwater beneath the PBG. The district and Stone & Webster have built and are starting up the bioremediation systems for the other two disposal pits.

The results? Remember that \$75 million estimate for incinerating PBG soil? Designing, building, and operating the full-scale bioremediation system is estimated at less than \$10 million, plus a faster transition of Badger AAP to future use.

For more information about this project, contact Jane Kobler of Omaha District at (402) 221-7761, or Pat Lafferty of Stone & Webster at (303) 741-7370.

Training, environment mix in Hawaii

By Beth Miura
Honolulu Engineer District

Training is essential for military readiness, but available land in Hawaii is scarce. That makes the Army's remote Pohakuloa Training Area on the Big Island of Hawaii vitally important. Support from Honolulu Engineer District's (HED) Environmental Branch ensures Pohakuloa complies with environmental regulations and stays open so that soldiers and other service members can train.

Important mission. "During a typical year we have 15,000-18,000 soldiers, Marines, airmen, and sailors training here," said former Pohakuloa commander Lt. Col. Dennis Owen. "Our biggest customers are the Army's 25th Infantry Division and the 3rd Marine Regiment at Kaneohe, but all the other services and reserve components, and even local law enforcement units train here, too."

The 108,000-acre installation is the U.S. Army Garrison, Hawaii's largest live fire range and training complex. It provides a combat training area for full-scale live

fire and field-training exercises. The Air Force, Marines, and Navy also use the impact area for bombing practice.

Pohakuloa has three areas — cantonment, airfield, and training (which includes about 54,000 acres of impact area). Within the training area, there are 22 live-fire ranges, seven airborne drop zones, 113 field artillery and mortar firing points, and 19,000 acres of maneuver area where platoon to brigade-sized units conduct combat training.

Despite its remote location, which presents difficult transportation and logistical challenges, units come to Pohakuloa virtually year 'round for something they can't get anywhere else in Hawaii — room to train. Pohakuloa is the only military facility in Hawaii where units of 2,000-3,000 troops can train together at one time.

Environment. A key factor in keeping Pohakuloa available for training is ensuring that the installation complies with environmental regulations. That responsibility lies with the Environmental Division of the Directorate of Public Works (DPW) in U.S. Army Garrison, Hawaii. DPW partners with HED's Environmental Branch. According to Alvin Char, chief of DPW's

Environmental Division, the Army takes seriously its responsibility to be good environmental stewards and minimize any damage to the land caused by soldiers, weapons, and equipment.

Federal environmental compliance requirements are strict. If the Army doesn't comply, training can be stopped until corrective measures are taken. Should that happen, the impact on readiness could be disastrous.

Unique location. Pohakuloa's location makes environment a major concern. It is in the plateau area between Mauna Kea and Mauna Loa, the state's two tallest mountains, both more than 13,500 feet high. At an elevation between 6,000 - 8,650 feet above sea level, Pohakuloa is in the middle of two different climate zones. A complex mosaic of plant communities has developed in this harsh climate. To date, there are 11 endangered and one threatened plant species in Pohakuloa. Of those 12, three are found only at Pohakuloa.

Pohakuloa is not only rich in flora but also fauna. Five federally listed birds and one listed mammal species (the

Continued on next page

Taekwondo

Engineer has world fame in martial art

By Patrick Forrest
Far East District

Don't mess with Mr. Kim, Hwa-Ryong, an engineer technician in the Far East District (FED) Design Branch. His 22 years at FED are a brief spell compared to his experience with taekwondo (Korean karate), which he has practiced since he was 11 years old. He is a seventh dan. (Seventh degree black belt. There are nine dans in taekwondo.)

Kim is also a world-renowned referee, making two or three trips a year around the world. From Feb. 28 to March 4, he was in Las Vegas to judge the U.S. Open Taekwondo Championships, and was one of only two officials who won the Referees' Award. Last year, he refereed the World Cup in Lyon, France. In July, Kim will travel to Ho Chi Minh City (formerly Saigon) for the International Vietnam Championships.

Taekwondo means literally, "way of defending with hands and feet." Kim says that taekwondo is 70 percent foot techniques and 30 percent hand techniques.

Gregg London, an American with a black belt in taekwondo, writes that after World War II, when Korea became independent, several kwans [martial arts forms] developed. In early 1957, several Korean martial arts masters combined their skills to create taekwondo. South Korean Gen. Choi Hong-hi required the South Korean army to train in taekwondo, making the first taekwondo students Korean soldiers.

Kim said he stumbled across the martial art as a boy looking for a gym.

"My mother approved, which was good," Kim said. "Korean mothers are usually against their children getting hurt."

Most Korean kids today encounter at least a little taekwondo. But in Kim's youth, practice was rare for kids. He competed for years, winning numerous high school championships in the 1970s. After years of competition, a friend suggested he test and train to become a referee. That was more than 15 years ago.



Kim, Hwa-Ryong holds the Outstanding Referee Award from the 2001 U.S. Open Taekwondo Championship. (Photo courtesy of Far East District)

Taekwondo is not just a sport. "Do" means "way of life," compared to "jutsu" (as in jujitsu) which means "fighting method." Thus, taekwondo is a way of life. Students make the following oath:

- I shall observe the principles of taekwondo.

- I shall respect the instructor and all senior ranks.
- I shall never misuse taekwondo.
- I shall be a champion of freedom and justice.
- I shall build a more peaceful world.

In light of such promises, are referees even needed? Of course!

"Two years ago a Danish competitor died here in Korea," said Kim. But Kim said he has only seen true "dirty play" about three times. Infractions include grabbing, pushing, and punching the face. Punching an opponent's face is not allowed, surprisingly. Taekwondo is characterized by fast, high, spinning kicks much more than by punches. The only weapons are bare feet and hands. The sport is strenuous to take part in and and spectacular to watch.

Kim believes taking the Olympic referees' course was a big catalyst to his popularity as a referee. In February 2000, he refereed at the International Taekwondo Championships in Honolulu. Kim is also Chief of the International Relations Department of the Technical Committee of the Korea Taekwondo Association (KTA). The sport's main American governing bodies are the U.S. Taekwondo Union and the Pan American Taekwondo Union. The World Taekwondo Federation (WTF) is the principal international governing body.

Kim has worked tirelessly for acceptance of his sport, which was first awarded Olympic medals at the Sydney games in 2000. For more than 20 years, Kim has donated his time as a coach and mentor to athletes competing in Korea. A few prestigious matches he has refereed include the 13th World Championships and 6th Women's World Championships, November 1997 in Hong Kong; the 6th Annual Pan-American Open (Junior and Senior) Championships, August 1998 in Irvine, Calif., where he won the Presidential Sports Award; and the 8th International U.S. Open Championships, January 1999 in Anaheim, Calif.

Kim assures us that taekwondo's American and Korean versions are the same. Although he does not teach anymore, he says that with about five sessions per week, you can earn a basic black belt in about two years.

Hawaii

Continued from previous page

Hawaiian hoary bat) unique to Hawaii are found there.

In 1995, DPW's Environmental Division developed a proactive ecosystem management program to enable military training to continue. Environmental Division requested HED's support to implement the ecosystem management because of the district's experience and expertise.

During the past six years HED has awarded and managed more than \$10 million in contracts to protect threatened and endangered species at Army training areas in Oahu and Pohakuloa.

"Working with HED Environmental provides us with a multiplier effect with regards to natural resources and endangered species issues," said Char. "HED has excellent contracting expertise and contacts in the scientific community, and provides us with specialized and highly technical expertise that enhances the skills and abilities of our own in-house workforce."

HED also provides technical advice and has developed partnerships and contractual agreements with environmental groups, universities, and private contractors, plus interagency agreements to ensure environmental services can be provided quickly.

Contracts. HED awarded contracts to companies such as Brewer Environmental Services, for plant control, Donaldson Enterprises for surveys of unexploded ordnance, and Rana Productions/Reggie David for endangered bird and bat surveys. The district also has contracts with non-profit organizations and universities such as The Nature Conservancy, Center for Ecological Management of Military Lands (Colorado State University),

and the Research Corporation, University of Hawaii (RCUH) to perform flora and fauna surveys.

Though an interagency agreement, the U.S. National Park Service fenced 6,513 acres to keep out feral goats, sheep, and pigs to protect native habitat and listed species. As part of the fence construction, the U.S. Department of Agriculture, Wildlife Services staff removes the feral animals from the fenced areas.

Safety considerations are a key element of this work, since portions of the enclosed areas contain unexploded ordnance. Explosive ordnance disposal specialists from the 25th Infantry Division assist in clearance efforts.

Other agencies. Though another interagency agreement, the U.S. Geological Survey, Biological Resources Division (USGS-BRD) conducts studies on the biology and habitat needs of an endangered honeycreeper, insect surveys, and monitoring to document distribution of alien insects, their effect on native insects, and insect-rare plant interactions. An USGS-BRD and RCUH monitoring program addresses status and changes in plant species and communities that result from ecosystem management actions.

"We rely on the DPW-HED team for National Environmental Policy Act work, and they really help us," said Owen. "A recent example of this was an infantry unit that wanted to train in a training area we seldom use. We needed to get good cultural and plant surveys done quickly, and in a week DPW and HED employees and contractors completed the field work and determined the unit would have no detrimental impact on the environment. The infantry training went off without a hitch, and all the unit's training objectives were met."



Contractors place fences to keep feral animals out of the Pohakuloa Training Area.

Bridge kit interests future engineers

Article and Photos
By Jim Pogue
Memphis District

Most kids don't know what engineers do, but Neal Newman is on a personal crusade to do something about that, using one of the world's coolest visual aids.

When Newman, a civil engineer in Cost Engineering and Design Reports Branch, asks elementary school children what firemen, doctors, or police officers do, they quickly respond with correct answers.

But when he asks what engineers do, "The number one answer is 'They drive trains,'" Newman said. "The number two answer is 'They fix things.'" He says his own children sometimes have trouble describing what their Dad does. "Engineers do so much, but no one knows what they do."

Because he believes in the importance of engineering, Newman is working to educate elementary school children about the field of engineering, and encourage them to consider it as a career. He is bridging the gap between today's engineers and the children who may take their places tomorrow.

And he uses a real bridge to do it.

"Engineering has been good to me; it's a good field," Newman said. "I see how many roads engineering has opened up for me and others. I wanted to pay back in some way the good engineering has done for me. To do that, I needed something that would grab kids' interest."

While working in Little Rock District 1992-99, Newman read an article about a large scale-model truss bridge used in schools. The article explained how the model demonstrated several practical aspects of engineering, especially tension and compression, and helped students better understand what engineers do.

"I found that Dr. Douglas Carroll, an engineering professor at the University of Missouri-Rolla, built and sold the bridge kits as educational tools," Newman said. "After I acquired a bridge kit myself, I talked to the district engineer in Little Rock and he agreed to have the Corps purchase two kits for their community relations program."

Newman developed and refined his bridge demonstration while in Little Rock District, and created both an instruction manual for others and a video. While in



Neal Newman demonstrates the strength of the model bridge as first grader Kimberley Hendrix feels the tension in the chain support.



Kiara Smith, a first grader at Bragg Elementary School, prepares to crawl across the bridge model.

Little Rock he made presentations to more than 20 groups of children.

When Newman transferred to Memphis District in 1999, he brought his own bridge kit with him. Each kit is made of aluminum angle iron held together with bolts and wing nuts. The finished bridge is about six feet long, two feet wide, and two feet tall. A plywood deck completes the 55-piece bridge model.

"I let the kids put the bridge together under my supervision," Newman said. "We usually place it on four chairs so it's a few feet above the floor. When they finish, I ask them if they think it will hold the weight of a toy truck. Then I ask them if they think it will hold a person. I invite each student to crawl across the bridge, and sometimes the teacher, too."

Besides the fun aspects of the construction project, Newman also uses the bridge as a teaching tool. He removes a compression member of the bridge and replaces it with a length of chain, and the bridge becomes very unstable. But when he removes a tension member and

replaces it with the chain, the bridge remains strong.

Newman also shows the students (usually kindergarten through sixth grade) photos of different types of bridges, and incorporates practical math and science concepts into his demonstrations.

Since coming to Memphis District, Newman has demonstrated his bridge model to seven different school groups, and has several more groups lined up.

Ronda Jacques, a third grade teacher at Bartlett Elementary School, said, "My class loved your presentation! You did a great job getting down on their level. I learned a few things myself!"

"I enjoy doing this because when I leave I think kids understand more about engineering," Newman said. "They remember what they learned, and teachers tell me that the students often come back the next day still talking about the bridge project."

Newman said that if anyone has questions about the bridge kit or the demonstrations, they can call him at (901) 544-0890.

HR Corner

PMBP curriculum under development

By John Bramblett
Headquarters

"Times of significant change in our nation and throughout the world require that we develop and maintain corporate agility, the flexibility to do what it takes to get the job done," said Lt. Gen. Robert Flowers, Chief of Engineers, in a recent video. "This is critical for us to remain a relevant and vital part of today's transitioning Army, to sustain our reputation of excellence and dedication to public service."

"To develop corporate agility, we have adopted the Project Management Business Process (PMBP) as our way of doing business," Flowers continued. "We call it the USACE Business Process. To create and sustain this process requires us to reexamine how all of us do our work—changes in our beliefs, role relationships, behaviors, and attitudes."

The PMBP curriculum supports creating this client-focused, team-based learning organization. The curriculum facilitates a fine-tuned understanding of the interrelationship among client, sponsors, partner success, and the development of Corps personnel.

The PMBP curriculum initiative involves the design, development, and delivery of learning events to support the PMBP business process, plus the quick and economical implementation of this curriculum throughout the

workforce.

A number of learning and support methods will be used. Methods include self-paced learning via CD-ROM and the Internet, small-group discussions, mentoring and coaching, classroom training, or a combination of these methods.

Self-study — A series of stand-alone modules on CD-ROM and Internet that deal with fundamental information (pertinent background, concepts, definitions, and related regulations and policies), and specific issues or events. The material will be designed as stand-alone pieces to give employees information about the PMBP as needed. The first modules are scheduled to arrive this fall.

Small group discussions — Small group discussions are the backbone of the PMBP curriculum implementation. Team dialogues will reinforce key learning points of the self-study. Small group discussion guides will help facilitators guide these discussions. Facilitators will be trained in basic facilitation skills later this year. The orientation program will give them specific techniques to support implementation of the PMBP.

Mentoring and coaching — Mentoring and coach-

ing by managers, supervisors, more experienced team members, and others is a continual and critical form of support throughout PMBP implementation. Mentoring and coaching gives teams and individual members insight about expectations and success criteria, plus immediate expert assistance with a problem or situation. Mentors representing all divisions in the Corps will complete a formal mentoring training program that focuses on the mentoring process. An orientation program for mentors will provide specifics on supporting PMBP.

Formal training program —

Formal training is being identified from several sources to support and enhance the self-study component, in accordance with individual development plans. Formal training recommended to date is included in the FY02 "Purple Book of

Training Opportunities." Prerequisites for some courses may require completing designated self-study modules before enrollment. Additional formal training will be identified during development of individual self-study components.

For more information, visit the Web site at <http://pdsc.usace.army.mil/pmbp.htm>.



Around the Corps

Korea hospital

On June 27, Far East District (FED) awarded a construction contract to renovate the 121st General Hospital on Yongsan Garrison in Seoul, Korea.

"This is the largest construction contract ever awarded by Far East District," said Harry Kim, Chief of FED's Contracting Division. "In fact, our construction division has activated a resident office dedicated solely to this project during the life of the contract."

The \$33 million contract will include demolishing an existing single-story hospital wing and other facilities (about 90,000 square feet), and building a new single/two-story hospital facility (about 129,000 square feet) including a medical gas system, kitchen/dining area, surgical suite, central material supply area, four elevators, and related facilities.

Also included in the new construction work will be an addition at the front of the hospital which will include ambulatory outpatient clinics. Asbestos and lead paint abatement work, demolition, and building a new central utility plant will also be part of the hospital renovation.

"We're excited about this project and delighted to see it moving forward," said Col. William Nichols, deputy commander of 18th Medical Command.

"Our commitment is to have no degradation in hospital operations and quality of services during the renovation," said Lt. Col. Jane DeNio, Transition Officer for the hospital. The seven-phase contract is scheduled for completion May 1, 2004.

Silver deFleury Medal

The silver deFleury Medal was awarded to Calvin Curington, an engineer with the Intergovernmental Superfund and Support Branch. He received the award for 35 years of service as a soldier and civilian.

Curington has held a variety of responsible positions with the Corps. In the early 1990s, when the Corps began building its Hazardous, Toxic and Radiological (HTRW) contracting expertise, Curington was a principle architect of the Corps' support for other federal agencies with HTRW remediation missions.

In 1994, he developed the national strategy for the original series of Task Order Remediation Contracts. Without them, there would be no Corps HTRW remediation program.

Since 1997, Curington has led the Corps' nationwide execution team for the Environmental Protection Agency's Superfund program, which has done almost \$3 billion in environmental remediation work.

Since 1989, the Engineer Regiment has awarded the deFluery Medal to individuals who demonstrate the highest standards of the regiment's values. There are three award levels of deFluery Medal. The silver medal is awarded to those who render outstanding and significant service to the Engineer Regiment.



Calvin Curington with his silver DeFleury Medal.

Architect, interior design awards

The 2001 USACE Architect of the Year is Carmelo Senatra, supervisory architect of Design Branch in Rock Island District. Senatra was selected for introducing architectural refinements that added aesthetic value to the district's civil works while remaining sensitive to the facilities' historical integrity and cultural character.

The 2001 USACE Interior Designer of the Year is Kimberly Fortenberry, interior designer in the Project Design and Review Section of Mobile District. Fortenberry was selected because her worldwide projects are of the highest quality and result in attractive, functional, and enduring facilities for her client, the U.S.

Army Medical Command.

The 2001 USACE Landscape Architect of the Year is David Rieger, lead landscape architect in the Natural & Cultural Resources Section of Pittsburgh District. Rieger was selected for the numerous roles he has played in completing many important and complex assignments in Pittsburgh District.

Grand Trunk Trail

The Department of the Interior has designated the Grand Trunk Trail, which runs through New England District's Westville Lake, as a National Recreation Trail. The honor includes the Grand Trunk Trail as part of the National Trails System and recognizes its value in conservation.

In addition to the designation, a footbridge for the trail will be built over the Quinebaug River to connect the trail from Southbridge, Mass., to Sturbridge, Mass. The six-foot-wide, 80-foot-long bridge will be built about 800 feet upstream from the original Grand Trunk Railroad crossing.

"The trail and bridge will finally link trail sections and recreational lands managed by the two towns and by the Corps," said Bob Hanacek, Basin Manager. "This has been a hugely successful combination of talent and energy, and I'm proud of the way our people have pulled everyone together."

The trail is managed and maintained by Westville Lake park rangers with the help of local volunteers. It begins in Southbridge and follows the old Grand Trunk Railroad bed. When the footbridge is complete, the five-mile trail will connect to historic Old Sturbridge Village via a bicycle trail along the Quinebaug River.

Corrections

Claude Strauser works for St. Louis District, not Louisville District as reported in the July *Engineer Update*.

The name of Robert Andersen, Corps' chief Counsel, was misspelled in the July *Engineer Update*.

Construction Agent of the Year

The Air Force has selected Alaska District as their Construction Agent of the Year for 2001. The award was presented Aug. 9 in the Sheraton Crystal City Hotel in Arlington, Va. Gregory Smith, the Corps' program manager for Air Force construction in Alaska, accepted the award.

The district was rewarded for managing 12 military construction projects at Eielson and Elmendorf Air Force Bases, and Alaska remote radar sites. The 12 projects had a total value of \$120 million. The average cost growth for the 12 projects was only 0.05 percent, well below the Air Force's five percent goal. Six of the 12 projects were completed on schedule, and three ahead of schedule. Six of the 12 projects were completed below the programmed amount (PA), five were within 10 percent of the PA, one was at the PA, and only the smallest, least expensive project was more than 10 percent above the PA.

Wrangell seminar

State and federal wetlands permitting representatives recently met in Wrangell, Alaska, for a one-day wetlands permitting seminar. The afternoon portion included presentations by Alaska District, the Alaska Department of Environmental Conservation, the Alaska Division of Governmental Coordination, and the Alaska Department of Fish and Game.

Wrangell recently received a number of fill violation actions from the Corps, so the permitting seminar was timely. The was plenty of time for group question-and-answer, plus one-on-one assistance for folks with permitting questions. The multi-agency format gave applicants one-stop permitting assistance, and enhanced state-federal networking.

Architect service

Lawrence Delaney, the Corps' chief architect, is serving on two prestigious architect organizations.

He is the 2002 Vice-Chair of the American Institute of Architects (AIA) Public Architects Professional Interest Area (PIA). The Public Architects PIA promotes public architects as an essential element in planning, designing, building, and managing public facilities.

Delaney also represents the Corps on the Board of Directors for the Architecture, Construction, and Engineering (ACE) Mentor Program of Greater Washington. The ACE is a non-profit corporation that educates and motivates students toward architecture, construction, engineering, and related careers; and provides mentoring and scholarship opportunities.



The Unaccompanied Officers Quarters are as comfortable and well-equipped as a modern apartment.

Unaccompanied officers' quarters

Recycling isn't necessarily limited to paper and soda cans. Witness the newly renovated unaccompanied officers' quarters at Schofield Barracks. Honolulu District managed the project.

The temptation was strong to demolish Bldgs. 784, 786, and 788 and start over, but they were sound enough for renovation, and it was significantly cheaper to do so.

The 39 dark, damp old rooms have been transformed into modern apartments. The \$3.75 million renovations included new roofs, windows, doors, keyless entry locks, cable TV, and air conditioning. The units were rewired, have new plumbing, full carpets, and a kitchen. Each building has its own laundry room, and the quarters are walking distance to the post exchange and commissary.

The one-bedroom apartments are for single officers on short- or long-term tours of duty. There are a few larger apartments with a second bedroom set up as an office for geographical bachelors — soldiers who are separated from their families while on temporary duty in Hawaii.

Legends award

Douglas Blount, who recently retired as Assistant Operations Manager of the Tennessee-Tombigbee Waterway, has received the Legends Awards from the American Recreation Coalition (ARC). The awards recognize outstanding federal employees who enhance the nation's outdoor recreation opportunities and resources.

Blount was recognized for planning and laying out most of the 40 recreation facilities on the Tenn-Tom Waterway. As a result, the Tenn-Tom is one of the Corps' top five projects in collection of special recreation use funds and the number of volunteer hours.

Bottles preserve nature's wonders

Article and Photo
By Bill Peoples
Nashville District

He's an avid outdoorsman, a fisherman, hunter, and hiker. For almost 30 years, Mike Patterson, the resource manager at Cheatham Lake, has combined his creative talent and love of nature to preserve one of the most delicate creatures, the butterfly, in beautiful dry arrangements mounted in wine bottles.

"I've been a lifelong fisherman, but years ago when I was working at Lake Cumberland, the fishing was not too good, so I had to come up with a new hobby," said Patterson. "Lake Cumberland is blessed with an abundance of both butterflies and driftwood. Hiking around the lake, I started collecting driftwood, acorns, hickory nuts, moss, as well as catching butterflies, and I began experimenting with all this. A friend had a glasscutter, so I put a couple of bottles together and gave them to family and close friends. And the word got out."

Patterson's hobby turned into a part-time business, which he worked as time allowed between his Corps jobs and other hobbies. When he moved to Cheatham Lake in 1984, he continued building his "Butterfly Bottles," as he calls them.

"I've kind of cranked it back up recently," said Patterson. "I might make five a year or 15 a year, depends on the supply and demand. It takes quite a few hours to put one together."

The first step in making Patterson's creations is catching the butterflies, which he does primarily in the spring and summer.

"I'll catch them, freeze them, then spread them on a spreading board, and put them in a box a friend made for me," said Patterson. "You have to be careful that bugs don't get to them."

During his hunting and fishing trips, he keeps an eye out for interesting-looking driftwood, nuts, and moss to use. He puts most of the bottles together in the winter months.

"The most time-consuming part of the process is finding a suitable piece of wood," said Patterson. "I go to Lake Cumberland every year and spend the better part of a day walking the shoreline up there, because it's the best place I've found to look for driftwood."

Next, he finds the bottles he uses. Most of the bottles



Mike Patterson includes 12-to-14 species of butterflies in each butterfly bottle that he makes.

come from friends, but he has embarrassed his family more than once searching through a garbage Dumpster for just the right bottle.

"I prefer to use the large-sized light green glass wine bottles," said Patterson. "Winemakers use the green glass because it filters out the ultraviolet rays, which helps preserve the wine. It does the same for butterflies. Clear bottles work, but the butterflies fade, especially if left in a place exposed to direct sunlight. I get bottles from friends and relatives. I look for uniquely shaped bottles. Sometimes the shape of the bottle will be the first thing that catches someone's eye."

Patterson begins the actual process by cutting the bottle in two and gluing the driftwood in place. He positions the

driftwood carefully, turning it many different times before deciding on the right angle.

"I glue in the driftwood and leave it overnight, then I place the other amenities in there and leave them overnight," said Patterson. "I then place the butterflies, which is the most tedious part and usually takes about an hour. You have to make sure that the butterflies' wings will fit within the bottle. When I'm done placing everything, I seal the bottle and put a piece of rope around it. I let it sit about 24 hours more, and it's done."

"Overall, I probably spend four to six hours per bottle by the time you gather up everything, dry it out and get everything organized," he added. "It takes some planning."

Patterson says a bottle should last at least 10 years if it is taken care of. "I've had some bottles since Lake Cumberland and that was 17 years ago, but I figure one should last you 12-15 years if you take care of it."

Patterson says the key to making long-lasting bottles is keeping the moisture out. "Everything has to be extremely dry, and I'll dry things for maybe a month or longer," he said. "The moss I might dry up to a year."

Patterson said the design of each bottle just falls into place. He tries to create a scene in each bottle. He puts at least 12 butterflies in each one using a variety of colors and positioning to catch the eye.

"I'll study the wood once I get it in the bottle and get an idea of how I need to put the butterflies in," he said. "I'll lay out all the butterflies I'm going to put in there. I usually use about 12 to 14 varieties in a bottle and try to contrast them. No two bottles are a like. Each one is unique."

Patterson has made about 100 "Butterfly Bottles" during the past 25 years. During the years, the demand for the bottles has brought his price up to \$35 per bottle.

"I'll do a custom order, but most people leave it up to me," said Patterson. "I've done them when someone wanted all yellow or all swallowtails or something like that, but most people like the variety."

Some people may look on Patterson's hobby as cruelty to butterflies, but he sees it a different way.

"The way I look at it, butterflies usually live less than a year, and I'm preserving them for 10 to 15 years so that people can enjoy them, particularly people whom for whatever reason don't get into the outdoors much," Patterson said.

New methods revolutionize grouting

By Tim Flaherty
Louisville District

Nestled away out of sight on a hilltop, off a country back road at Patoka Lake in southern Indiana, Louisville District has completed a revolution in grouting (the process where cement and water are pumped into crevices or voids to stabilize or strengthen the dam.) The Patoka Lake Seepage Remediation Project, a benchmark project in grouting technology, has received rave reviews, and other districts in the U.S. Army Corps of Engineers are copying the "Louisville Model."

Patoka Lake is part of an area-wide flood control project for Louisville District. The project underwent a program to limit seepage through a limestone ridge which serves as the left abutment for the dam.

Louisville District used both innovative and state-of-the-art grouting methods to solve the problem. They used several ingredients for their grout mixtures, placed the grout with new methods, and monitored the process with computers.

The Corps used negotiated procurement methods when contracting due to the unknowns in available technology and to maximize the best value for the project.

During construction, Louisville District hosted a two-day Corps-wide grouting workshop at the site with representatives from more than a dozen other Corps districts.

"The best result from the Patoka grouting program is



A contractor uses real-time computer information during the grouting at Patoka Lake. (Photo courtesy of Louisville District)

re-establishing the industry leadership the Corps of Engineers has traditionally held in grouting technology," said Steve Hornbeck, a geologist in Louisville District.

This project marked the first time the Corps successfully used a blend of cement, water, and additives to formulate a balanced stabilized grout, and the first real-time computer monitoring of grouting on a large-scale Corps

grouting project.

The benefits of balanced stabilized grouts include greater strength, less seepage, better cohesion, easier use, and increased durability.

With real-time computer-aided data collection and analysis, higher pressures could be confidently employed when placing the grout, and any errors or problems could be immediately seen and corrected. Other advantages included lower inspection costs, and superior records related to contract payment.

The superiority of these grouting methods was demonstrated by significant, measurable reduction of the leakage pathways. Permeabilities in the area grouted were reduced by at least three orders of magnitude.

These new grouting methods provide confidence that grouting can be both technically effective and cost effective compared to concrete cut-off wall methods.

The project was a "win-win" for both the contractor, Advance Construction Techniques Ltd., Maple, Ontario, and the Corps. The project was completed ahead of schedule, within budget, with no accidents or claims, and exceeded the technical goals. All refinements to the drilling and grouting program were accomplished in the field through the "total team approach" of partnering, without any negative contract impacts.

For more information regarding the technical and contracting aspects of Patoka, contact Steve Hornbeck, Geologist, Louisville District, (502) 315-6442.