Uncle Sam Wants You

To Be Safe!

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Marine Corps Center for Lessons Learned Safety Corner

The Safety Corner

From the Marine Corps Center for Lessons Learned

July 18, 2008

This Issue of the Safety Corner Highlights Electrical Safety.

From the Director: Electricity kills hundreds and injures thousands of people each year, and deployed Marines and Sailors are especially vulnerable. In the rugged operating environment of Iraq and Afghanistan, Marines and Sailors often come in contact with low hanging power lines and occupy workspaces and billeting areas with antiquated wiring not designed for their current use.

These hazards pose a serious threat to Marines, Sailors, and their equipment. Some of these accidents can be avoided by simply following proper safety precautions and being alert and aware of your surroundings. An emphasis on safety is equally or even more important in combat than in peacetime. A Marine or Sailor injured or killed in a mishap is a loss to the unit when the unit can least afford it. Never become complacent when working with or near electricity. Unfortunately, hazards are often ignored until someone is severely injured or killed.

Remember; always follow safety regulations, stay alert and be aware of the environment around you. You are welcome to pass on and post this newsletter for widest dissemination. Log on the www.mccll.usmc.mil <file://www.mccll.usmc.mil> website to download previous editions of the Marine Corps Center for Lessons Learned Safety Corner as well as our Monthly Newsletters.

I look forward to your comments so we can raise awareness, reduce risk and maintain a high level of readiness.

Semper Fidelis,

Col Monte Dunard, Director MCCLL

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Inside this issue:

What kinds of injuries result from electrical currents?

There are four main types of injuries: electrocution (fatal), electric shock, burns, and falls. These injuries can happen in various ways:

- Direct contact with the electrical energy.
- When the electricity arcs (jumps) through a gas (such as air) to a person who is grounded.
- Thermal burns, including flash burns from heat generated by an electric arc, and flame burns from materials that catch on fire from heating or ignition by electrical currents.
- High voltage contact burns can burn internal tissues while leaving only very small injuries on the outside of the skin.

Did you know…

- An average of one worker is electrocuted on the job everyday.
- Some type of electrical failure or malfunction was cited as factor contributing to ignition for 73% of electrical distribution or lighting equipment home structure fires.

Daily Check List

The following is a list of items supervisors can check in their daily walkthroughs of work sections or billeting areas:

- Inspect tools, power cords, and electrical fittings for damage or wear prior to each use. Repair or replace damaged equipment immediately.
- Tape cords to walls or floors when necessary. Nails and staples can damage cords causing fire and shock hazards.
- Be aware that unusually warm or hot outlets may be a sign that unsafe wiring conditions exist. Unplug any cords to these outlets and do not use until a qualified electrician has checked the wiring.
- Risk of electric shock is greater in areas that are wet or damp.
- Make sure that exposed receptacle boxes are made of non-conductive materials.
- Know where the breakers and boxes are located in case of an emergency.
- Do not touch a person or electrical apparatus involved in an electrical accident. Always disconnect the current first.
- Do not use outlets or cords that have exposed wiring.
- Ensure all electrical equipment has the Underwriters Laboratory approval sticker.
- Ensure only trained and authorized personnel work on electrical equipment
- Clearly label and rope off all electrical hazards as needed to prevent personnel from touching or walking into circuit panels and wiring.

Electric Shock First Aid

The severity of electric shock is dependant on the amount of electric current which passes through the body. This current is based upon the voltage and the resistance of the path it follows through the body. Other factors include the person's overall health and how quickly the person is treated.

Call 911 (or your local emergency number) immediately if any of these signs or symptoms occur:

- Cardiac arrest
- Heart rhythm problems
- Respiratory failure
- Muscle pain and contractions
- Seizures
- Numbness and tingling

While waiting for medical help, follow these steps:

1. Look first. Don't touch.
The person may still be in contact with the electrical source. Touching the person may pass the current through you.

2. Turn off the source of electricity if possible.
If not, move the source away from you and the affected person, using a non conducting object made of cardboard, plastic or wood.

3. Check for signs of circulation (breathing, coughing or movement).
If absent, begin CPR immediately.

4. Prevent shock.
Lay the person down and, if possible, position the head slightly lower than the trunk, with the legs elevated.

Caution

- Don't touch the person with your bare hands if he or she is still in contact with the electrical current.
- Don't get near high-voltage wires until the power is turned off. Stay at least 20 feet away, much farther if wires are jumping and sparking.
- Don't move a person with an electrical injury unless the person is in immediate danger.

FACT SHEET

Working Safely Around Downed Electrical Wires

Electrical hazards exist in some form in nearly all occupations. However, those hazards multiply for workers involved in cleanup and recovery efforts following major disasters and weather emergencies. Particular life-threatening dangers exist around downed and low-hanging electrical wires.

Electrical Fires

Electrical fires can be caused by a variety of conditions, including overloaded circuits or outlets, frayed wires, faulty appliances, or overtaxed cords. In the event of an electrical fire:

- **Call the fire department**, and notify them that it's an electrical fire.
- **Never use water to put out the flames**, as that may cause serious shock. Use only an approved fire extinguisher, or leave the premises.
- If possible, shut off the main breaker.
- Be prepared for fires by installing smoke detectors, acquiring fire extinguishers, updating and correcting any electrical problems, and holding fire drills periodically.

Electrical Safety In the Home

Cords, plugs and overloaded appliances plugs, or electrical outlets can cause electrical fires. Unplug small appliances when not in use, before cleaning, and never dip them into water. Frayed/damaged cords can cause electric shock or electrocution and avoid running them under throw rugs or carpeting. Buy National Recognized Testing Laboratory (NRTL) appliances as they meet NRTL safety standards and are OSHA accepted. The following are some basic but important safety tips:

- Do not use an electrical appliance in a damp or wet area. Use Ground Fault Circuit Interrupters (GFCI) at outlets near water. They prevent electrocution by shutting off the current to a circuit when there is a short.
- Never allow children to play with outlets. Place "child proof" devices on all outlets.
- Don't overload electrical outlets. If you must use an extension cord temporarily, match the amperage and wattage limits of the cord and appliance, and do not use damaged cords.
- Keep household appliances in good working order. Never carry appliances by the cords, and remove cords from outlets by pulling on the plug head. Don't run cords under rugs or furniture; they could become damaged or overheated.
- Don't overload electric outlets with too many plugs.
- Avoid using extension cords to connect a light or appliance permanently.
- Check the amperage rating for an extension cord to make sure it is greater than, or equal to, the tool or appliance you will be using.
- Routinely inspect cords for broken or frayed insulation. Immediately repair or replace unsafe cords.

- **Do NOT** assume that a downed conductor is safe simply because it is on the ground or is not sparking.
- **Do NOT** assume that all coated, weatherproof or insulated wire is just telephone, television or fiber-optic cable.
- Low-hanging wires still have voltage potential even if they are not touching the ground. So, “don’t touch them.” Everything is energized until tested to be de-energized.
- Never go near a downed or fallen electric power line. Always assume that it is energized. Touching it could be fatal.
- Electricity can spread outward through the ground in a circular shape from the point of contact. As you move away from the center, large differences in voltages can be created.
- Never drive over downed power lines. Assume that they are energized, and even if they are not, downed lines can become entangled in your equipment or vehicle.
- If contact is made with an energized power line while you are in a vehicle, remain calm and do not get out unless the vehicle is on fire. If possible, call for help.
- If you must exit any equipment because of fire or other safety reasons, try to jump completely clear, making sure that you do not touch the equipment and the ground at the same time. Land with both feet together and shuffle away in small steps to minimize the path of electric current and avoid electrical shock. Be careful to maintain your balance.

Safety First

Above all else, always consider all equipment, lines and conductors to be energized. Be cautious and if you notice downed wires or damaged electrical equipment, contact appropriate utility personnel. Remember that circuits do not always turn off when a power line falls into a tree or onto the ground. Even if they are not sparking or humming, fallen power lines can kill you if you touch them or even the ground nearby.

Energy

Downed wires can energize other objects, including fences, water pipes, bushes and trees, buildings, telephone/CATV/fiber optic cables and other electric utilities. Even manhole castings and reinforcement bars (re/bar) in pavement can become energized by downed wires. During storms, wind-blown objects such as canopies, aluminum roofs, siding, sheds, etc., can also be energized by downed wires.

Backfeed

When electrical conductors are inadvertently energized by other energy sources, backfeed occurs. **Some of those sources include:**

-Circuit ties/switch points -Lightning -Generators -Downstream events

Simply testing for energy sources is not sufficient, since hazardous electrical events can happen without warning. Ensure that proper lockout/tagout procedures are always followed.

Despite Alert, Flawed Wiring Still Kills G.I.'s

Source: New York Times

WASHINGTON — In October 2004, the United States Army issued an urgent bulletin to commanders across Iraq, warning them of a deadly new threat to American soldiers. Because of flawed electrical work by contractors, the bulletin stated, soldiers at American bases in Iraq had received severe electrical shocks, and some had even been electrocuted.

The bulletin, with the headline "The Unexpected Killer," was issued after the horrific deaths of two soldiers who were caught in water — one in a shower, the other in a swimming pool — that was suddenly electrified after poorly grounded wiring short-circuited.

"We've had several shocks in showers and near misses here in Baghdad, as well as in other parts of the country," Frank Trent, an expert with the Army Corps of Engineers, wrote in the bulletin. "As we install temporary and permanent power on our projects, we must ensure that we require contractors to properly ground electrical systems."

Since that warning, at least two more American soldiers have been electrocuted in similar circumstances. In all, at least a dozen American military personnel have been electrocuted in Iraq, according to the Pentagon and Congressional investigators.

While several deaths have been attributed to inadvertent contact with power lines under battlefield conditions, the Army bulletin said that five deaths over the preceding year had apparently been caused by faulty grounding, and the circumstances of others have not been fully explained by the Army. Many more soldiers have been injured by shocks, Pentagon officials and soldiers say.

The accidental deaths and close calls, which are being investigated by Congress and the Defense Department's inspector general, raise new questions about the oversight of contractors in the war zone, where unjustified killings by security guards, shoddy reconstruction projects and fraud involving military supplies have spurred previous inquiries.

American electricians who worked for KBR, the Houston-based defense contractor that is responsible for maintaining American bases in Iraq and Afghanistan, said they repeatedly warned company managers and military officials about unsafe electrical work, which was often performed by poorly trained Iraqis and Afghans paid just a few dollars a day.

One electrician warned his KBR bosses in his 2005 letter of resignation that unsafe electrical work was "a disaster waiting to happen." Another said he witnessed an American soldier in Afghanistan receiving a potentially lethal shock. A third provided e-mail messages and other documents showing that he had complained to KBR and the government that logs were created to make it appear that nonexistent electrical safety systems were properly functioning.

KBR itself told the Pentagon in early 2007 about unsafe electrical wiring at a base near the Baghdad airport, but no repairs were made. Less than a year later, a soldier was electrocuted in a shower there.

"I don't feel like they did their job," Carmen Nolasco Duran of La Puente, Calif., said of Pentagon officials. Her brother, Specialist Marcos O. Nolasco, was electrocuted at a base in Baiji in May 2004 while showering. "They hired these contractors and yet they didn't go and double-check that the work was fine."

The Defense Contract Management Agency, which is responsible for supervising maintenance work by contractors at American bases in Iraq, defended its performance. In a written statement, the agency said it had no information that staff members "were aware" of the Army alert or "failed to take appropriate action in response to unsafe conditions brought to our attention."

Keith Ernst, who stepped down Wednesday as the agency's director, said, though, that the agency was "stretched too thin" in Iraq and that the small number of contract officers did not have expertise in dealing with so-called life support contracts, like that awarded to KBR to provide food, shelter and building maintenance. "We don't have the technical capability for overseeing life support systems," he said.

For its part, KBR, which until last year was known as Kellogg, Brown and Root and was a subsidiary of Halliburton, denied that any lapses by the company had led to the electrocutions of American soldiers. "KBR's commitment to employee safety and the safety of those the company serves is unwavering," said a spokeswoman, Heather Browne. "KBR has found no evidence of a link between the work it has been tasked to perform and the reported electrocutions." Ms. Browne declined to respond to the specific accounts of former KBR electricians.

Those electricians have a ready response to anyone who suggests that poor electrical work might be considered an unavoidable cost of war. "The excuse KBR always used was, 'This is a war zone — what do you expect?' " recalled Jeffrey Bliss, an Ohio electrician who worked for the company in Afghanistan in 2005 and 2006. "But if you are going to do the work, you have got to do it safe."

Since the United States invaded Iraq in 2003, tens of thousands of American troops have been housed in pre-existing Iraqi government buildings, some of

(continued)

them dangerously dilapidated. As part of its $30 billion contract with the Pentagon in Iraq, KBR was required to repair and upgrade many of the buildings, including their electrical systems. The company handles maintenance for 4,000 structures and 35,000 containerized housing units in the war zone, the Pentagon said.

Lawmakers and government investigators say it is now clear that the Bush administration outsourced so much work to KBR and other contractors in Iraq that the agencies charged with oversight have been overwhelmed. The Defense Contracting Management Agency has more than 9,000 employees, but it has only 60 contract officers in Iraq and 30 in Afghanistan to supervise nearly 18,000 KBR employees in Iraq and 4,400 in Afghanistan handling base maintenance.

"All the contract officers can do is check the paperwork," said one agency official, who asked not to be identified.

While about 600 military officers supplement the contract officers, Mr. Ernst said, the soldiers are not adequately trained for the task.

The Army has provided little detailed information about the electrocutions, other than to say late Friday that 10 soldiers had been electrocuted in Iraq. A House panel has also reported that two marines died similarly.

In the civilian work force, about 250 workers died from electrocution in the United States in 2006, according to the Bureau of Labor Statistics.

According to the Army warning bulletin, two deaths occurred 10 days apart in May 2004 at different bases in northern Iraq.

Staff Sgt. Christopher L. Everett, 23, of the Texas National Guard was electrocuted in September 2005 while powerwashing a Humvee at Camp Taqaddum, in central Iraq near Falluja. His mother, Larraine McGee said Army officials had told her that the equipment he was using was connected to a generator that was not properly grounded, and that soldiers had previously complained of shocks.

"We were told that as a result of his death all the generators were being repaired and that it wouldn't happen again," Ms. McGee said. "But if it is still going on, something's not right."

The most recent fatality occurred on Jan. 2 in Baghdad, when Staff Sgt. Ryan D. Maseth, a Green Beret, died in a shower after an improperly grounded water pump short-circuited.

Nearly a year earlier, KBR issued a technical report to the contracting agency citing safety concerns related to the grounding and wiring in the building in the Radwaniyah Palace Complex, where Sergeant Maseth's unit, the Army Fifth Special Forces Group, was housed.

Another soldier said in an interview that he was repeatedly shocked in the shower in December 2007 and submitted requests for repairs. But nothing was done until the day after Sergeant Maseth's death, when the defense agency ordered KBR to correct the problem, according to Pentagon documents.

Cheryl Harris, Sergeant Maseth's mother, said in an interview that the Army initially told her that her son had taken an electrical appliance into the shower with him. Later, she said, officials told her that investigators had found electrical wires hanging down around the shower. She said she had been skeptical of both accounts and learned the truth only after repeatedly questioning Army officials.

Her family has filed a wrongful death lawsuit against KBR, the only such claim brought in any of the electrical deaths.

"I knew Ryan would not get into a shower with an electrical appliance, and having wires hanging overhead didn't make sense," said Ms. Harris, of Cranberry Township, Pa. "My biggest question is really, why would KBR do a safety inspection, know about the electrical problems and not alert the troops?"

Long before Sergeant Maseth's death, KBR electricians were complaining about the dangers of unsafe electrical work at bases.

In 2006, John McLain was working as a KBR electrician at the United States regional embassy compound in Hilla, south of Baghdad, when he made a disturbing discovery. A KBR quality control inspector had recently cited employees there for failing to file quarterly ground resistance testing logs — reports on whether the wiring in the upgraded embassy building was properly grounded and safe.

Mr. McLain soon realized that the testing was not being conducted, because the building had never been grounded, though KBR and at least one Iraqi subcontractor were supposed to install proper safeguards during a renovation the previous year. Mr. McLain said he had sent a series of increasingly blunt memos and e-mail warnings about the safety hazards to KBR officials.

Mr. McLain said other KBR electricians later created logs that incorrectly made it appear that the grounding system existed. KBR fired him in 2007 after he told a visiting defense contracting agency official about his concerns. His candor proved useless, however. Mr. McLain said that the contracting agency official showed no interest. "He said, 'I'm not an electrician; I don't know what you are talking about,' "Mr. McLain recalled.

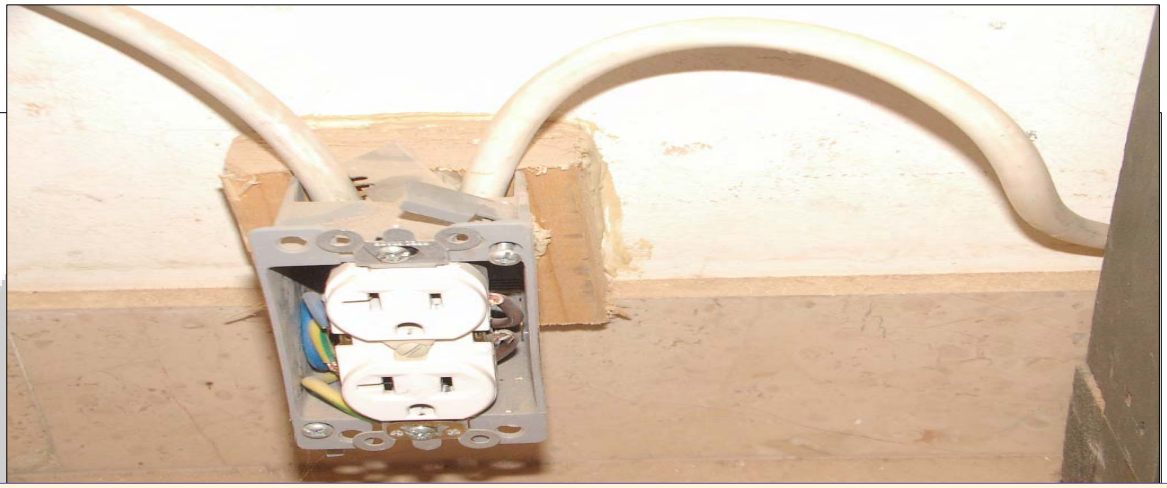
Noris Rogers, who worked for KBR in Afghanistan in 2005, said he repeatedly complained to his supervisors that electrical work at Camp Eggers, the American military's command base in Kabul, Afghanistan, did not meet the requirements of the company's Pentagon contract.

Mr. Bliss, who saw a soldier in Qalat, Afghanistan, get a severe shock from an electrical box that was not supposed to be charged, said his KBR bosses mocked him for raising safety issues. They were "not giving the Army what it needed," he said, "and not giving the soldiers what they deserved."

Problem 1: Faceplate missing, box not wall mounted, exposed electrical wiring.

Problem 2: Live wiring near water source, exposed electrical wiring, no GFCI protection.

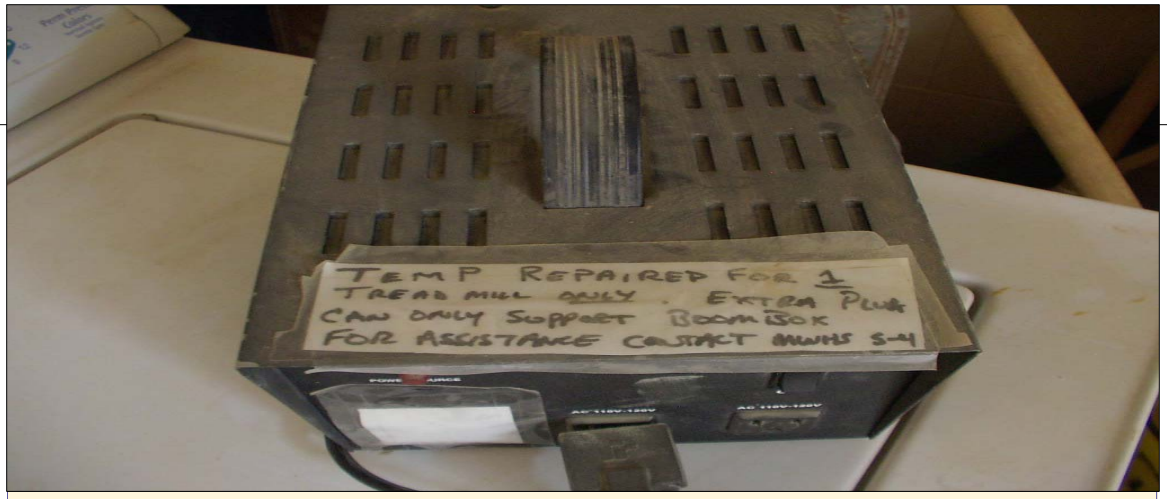
Problem 3: Exposed electrical wires, wires bunched together causes fires.



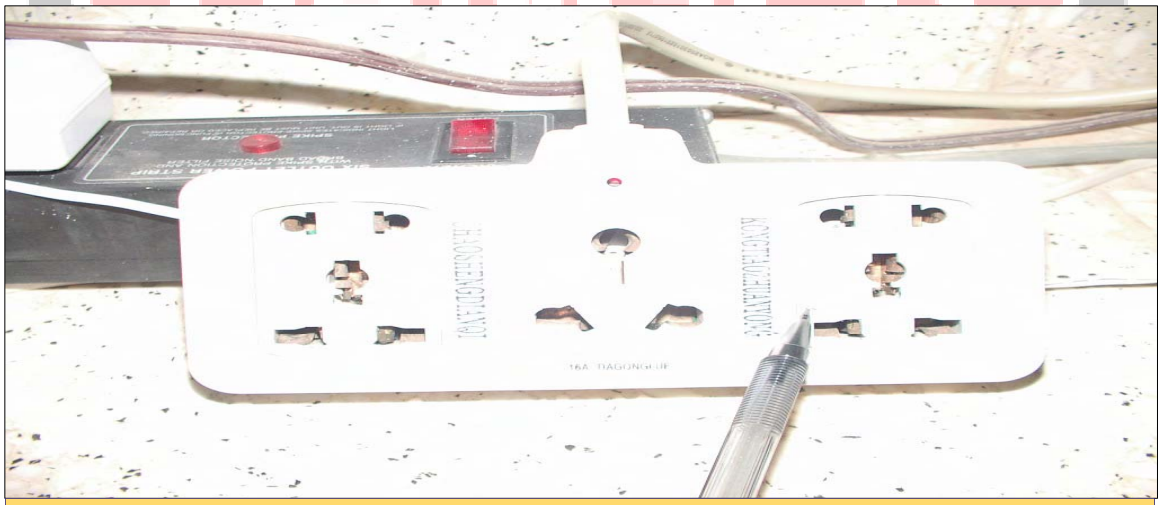
Problem 4: Exposed electrical wires, faceplate missing, box improperly mounted, inside of wall vs. outside of wall.

Problem 5: Exposed electrical wiring, faceplate missing, illegal adaptor being used.

Problem 6: Chinese-made, non-UL or European Certified equipment being used.



Problem 7: Chinese-made, non-UL or European Certified equipment being used.



Problem 8: Chinese-made, non-UL or European Certified equipment being used.

Problem 9: Foreign made, non-UL or European Certified equipment being used.

Critical Days of Summer Fatalities July 08

The door to safety swings on the hinges of common sense.

Author Unknown