

ARMY GROUND-ACCIDENT REPORT COUNTERMEASURE

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It's more than
skin deep . . .

Today's high-tech Army uses bigger, better, faster equipment that brings with it many new materials—and many different chemicals that must be risk managed to lessen the chance of injuring soldiers and other workers.

The right chemistry

Education and training are essential to safe use of chemicals

A soldier reporting to work at the motor pool found his coworker in severe pain. The worker had sprayed himself in the eyes with dry-cleaning solvent, and he couldn't see to get help. The soldier laid his coworker on the ground and gently flushed his eyes with water from a hose. The victim suffered painful corneal burns, which fortunately, healed with no permanent damage to his vision.

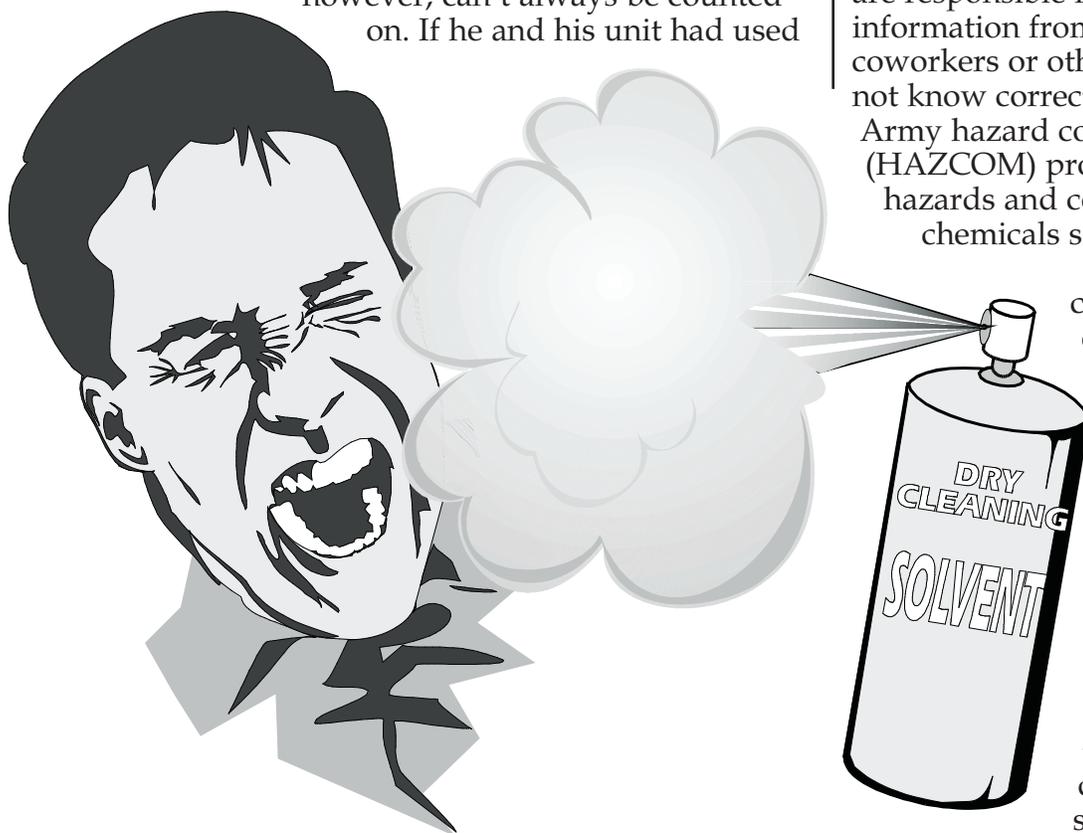
That soldier courted disaster by working alone with a potentially hazardous chemical. He was lucky his injuries were no worse. Luck, however, can't always be counted on. If he and his unit had used

the risk-management process properly, he wouldn't have had to depend on luck when he reported to work each morning. Risk management would have identified system inadequacies that were building up to an accident with possible severe consequences.

Each chemical has its own properties and characteristics. It's important that leaders understand the chemicals their soldiers use, the potential hazards, and how to protect soldiers in the event of an emergency.

Leaders are responsible for getting this information to soldiers. Soldiers are responsible for getting this information from leaders—not from coworkers or others who may or may not know correct procedures. The Army hazard communications (HAZCOM) program outlines hazards and controls for using chemicals safely.

Detailed information concerning potential chemical hazards appears on the material safety data sheet (MSDS). Federal law requires chemical manufacturers or importers to provide an MSDS to accompany the chemical product through the distribution chain. All soldiers must read the



applicable MSDS before using chemicals. The MSDS contains eight specific pieces of information –

- Name of the chemical. This must match the information on the label.
- Hazardous ingredients and all other substances that make up the material.
- Physical and chemical characteristics such as appearance, odor, boiling point, vapor pressure, density, solubility (ability to mix in water), melting point, and evaporation rate.
- Fire and explosive hazards and the conditions under which the chemical might catch fire or explode.
- Reactivity of the chemical (ability to burn or explode when exposed to air or water or when mixed with other substances).
- Health-hazard information (how the chemical can cause harm, symptoms of exposure, the body organ primarily targeted by the

chemical, and emergency first-aid procedures).

- Safe handling procedures (how to store, move, and use the chemical).
- Control measures (protective clothing and equipment, safe work practices, cleanup procedures).

Leaders must ensure soldiers understand and comply with procedures for chemical use and associated hazards. Technical assistance is available from installation safety offices and the occupational health section of medical treatment facilities.

SOPs should provide the guidance soldiers and other workers need to keep them working safely. The Army HAZCOM program provides training on chemical hazards and controls, including safe handling procedures. ♦

POC: MSG Eugenia Ulman, Chemical NCO, DSN 558-2919 (334-255-2919)

The ABCs of PPE wear

Little things can have a big impact

A worker was injured as he transported a toxic chemical to the disposal area. He was carrying the load improperly, and even though he had worn the proper personal protective equipment (PPE), he had not taped the small grommets at the top of his toxicological agent protective (TAP) boots. Sulfur mustard leaked through the small holes at the top of the boots and through his coveralls to burn his legs. He spent 3 days in the hospital and another 7 on restricted duty.

Many chemicals can burn or be absorbed through the skin. Though this is less likely than inhalation, a greater

effort is needed to protect workers. Soldiers and other workers who handle contaminants must use gloves, coveralls, goggles, or other appropriate PPE, and it must be used and maintained correctly if it's going to offer complete protection.

Personal protective equipment can't help if it isn't used correctly. Soldiers should always –

- Wear the proper PPE at the appropriate time and place for each task.
- Inspect PPE for serviceability before using.
- Ensure PPE fits properly.
- Use only approved substitutes.
- Keep PPE clean and store properly. ♦

SOP: Road map to safe hazmat handling

According to the Environmental Protection Agency, about 250 million tons of hazardous wastes are generated annually in the U.S. The

Army contributes used oil and antifreeze; batteries; paint, paint-related wastes, and solvents; nuclear, biological, and chemical wastes;

radiological wastes; household hazardous wastes; and POL-contaminated soil.

Army installations must comply with federal and state standards for military use of hazardous products. Non-compliance is a safety issue: It can kill or injure soldiers and other workers.

The route to keeping installations uncontaminated and soldiers at work is through the road map provided by standing operating procedures. SOPs — like equipment — must be managed, meaning a soldier should be assigned to review and update each SOP annually, at the least.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) publishes Technical Guide No.

176: *How to Write and Manage Standing Operating Procedures*.

It is available from CHPPM's

Information

Services Branch,
DSN 584-4408

(410-671-4408) or

e-mail [mchbcsis](mailto:mchbcsis@aeha1.apgea.army.mil)

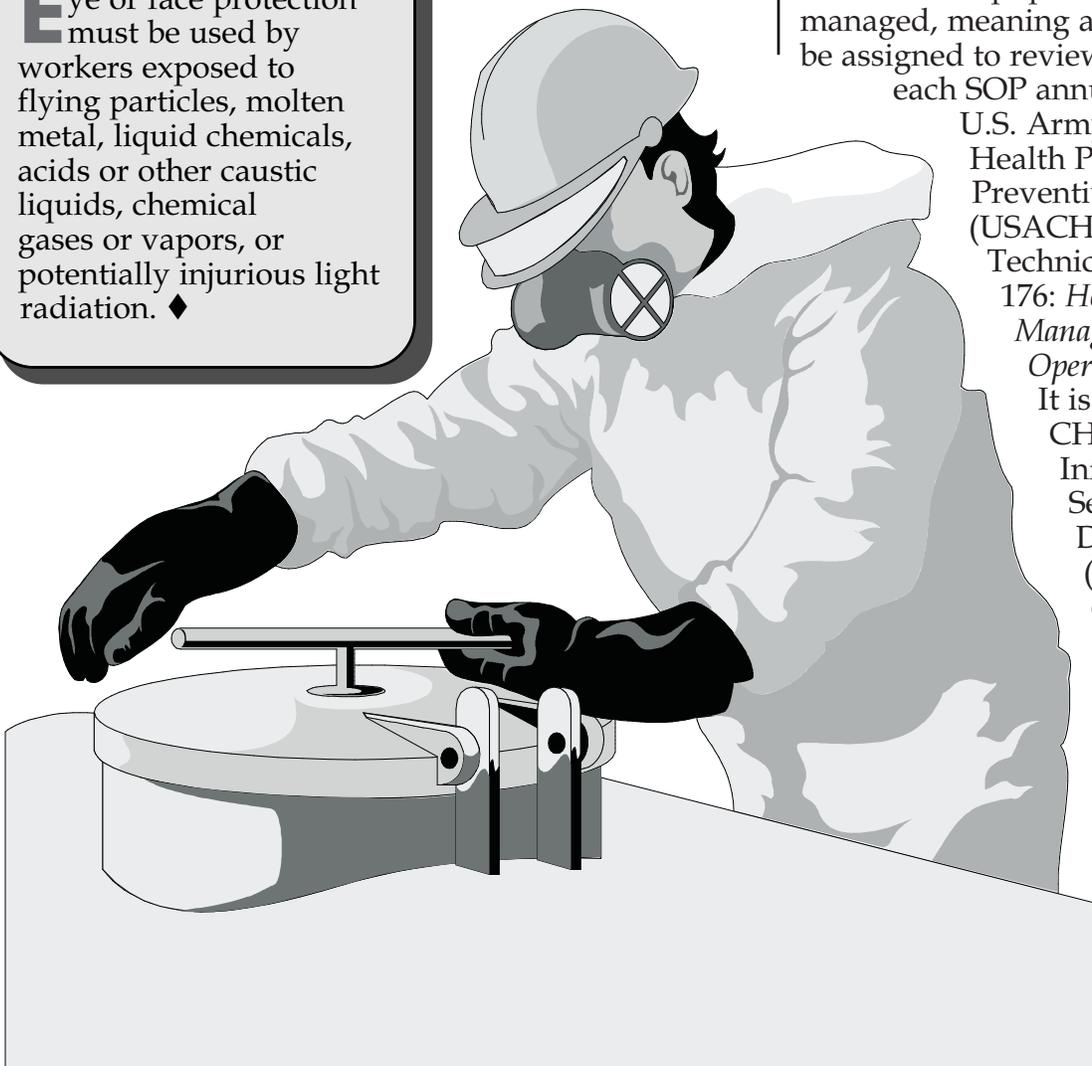
@aeha1.apgea.army.mil.

SOPs should have risk management written into operations,

using by-the-book standards as controls to lessen or eliminate

Risk-management pointer:

Eye or face protection must be used by workers exposed to flying particles, molten metal, liquid chemicals, acids or other caustic liquids, chemical gases or vapors, or potentially injurious light radiation. ♦



hazards. The SOP should be coordinated with the installation Directorate of Public Works (DPW) or its equivalent. Guidance on subjects that should be covered in the SOP can be

found in 29 CFR 1910. Some of those topics include—

- Hazardous materials.
- Permissible exposure limits.
- Personal protective equipment (PPE), including eye and face protection.

● Hazardous waste operations and emergency response such as: cleanup operations, corrective

actions, voluntary cleanup operations at uncontrolled hazardous waste sites, operations involving hazardous wastes, and emergency response.

- Occupational exposure to

hazardous chemicals in laboratories.

● Hazard communications standard.

● Hazard communications program.

● Container labeling.

● Material safety data sheets

Soldiers and other workers must be informed on possible chemical hazards and side effects.

- Training. ♦

**POC: MSG Eugenia Ulman,
Chemical NCO, DSN 558-2919 (334-255-2919)**

Respirator rules

If a respirator is required for a particular chemical, that information is on the material safety data sheet (MSDS). The MSDS provides guidelines on respirator type and ventilation requirements, as well.

Beyond that, however, the respirator must fit properly and be in good condition. Monthly inspections are required. If the chemical can be smelled, the soldier should probably be using a respirator. If the chemical can be smelled while using the respirator, the mask may not fit properly or the filters need to be replaced; the soldier may need to be medically evaluated.

Before a soldier can be assigned to work with a respirator and chemical tools, he or she must have a pulmonary function screening and cardiovascular and respiratory test. Not all soldiers can

use respirators. Certain conditions prohibit a soldier from using a respirator: diabetes, epilepsy, or alcoholism; certain medications; punctured ear drum; skin sensitivities; impaired or nonexistent sense of smell; emphysema; chronic pulmonary obstructive disease; bronchial asthma; coronary artery disease or cerebral blood vessel disease; severe or progressive hypertension; pernicious anemia; claustrophobia or difficulty breathing when wearing a respirator. Respirator users must be medically evaluated and enrolled in the Respiratory Protection Program. Respirators should never be altered or modified. According to AR 11-34: *Army Respirator Protection*, respirators should be—

- Used only in well-ventilated areas.
- Properly fitted with no leaks.
- Cleaned after each day's use. ♦

Right face!

New mask may mean different size

NBC NCOs should be aware that the M40/42/43 protective mask is sized differently than the M17/24/25. The new mask is made of a silicon rubber, and it feels different than the old one. You can't assume that, just because a soldier wore a size medium in the old mask, he or she will wear that same size new one. In addition, old methods of checking fit won't necessarily put the right size mask on the right face.

The M41 protection assessment test system (PATS) is the scientific method of testing fit and should help fit the mask correctly. PATS continuously samples and counts individual particles and measures the concentration of particles both inside and outside the mask. From this, it

calculates a protection factor, thereby verifying that the mask's fit to the soldier's face is acceptable and that there are no critical leaks in the mask system.

PATS can also detect unserviceable masks, determine if PMCS has been conducted properly on critical components, and help in training soldiers on proper wear. Further

fitting criteria is provided in TC 3-41:

Protection Assessment Test System (PATS), Nov 94.

Masks are in plentiful supply. If, after cross-leveling, you don't have enough of the right size masks, requisition more through the Armament Chemical Acquisition Logistical Activity (ACALA) National Inventory Control Point. Masks being exchanged for different sizes may be retained until the requisitioned masks have been received. Excess serviceable masks will be turned in using standard report-of-excess procedures.

Requisitions should include the quantity needed by size. Use project code "DJZ" to indicate that masks are being exchanged for different sizes. Guidance is in AR 725-50 and 710-2. Requirements code two-zero (20) must go in columns 55 and 56. This code is extremely important; its absence can get a requisition rejected.

If doing a bulk requisition, the document identifier code is AOE or AO5. "Bulk requisition" should be written in the remarks block; this will assure special handling and prevent automatic cancellation. Unit-level or single UIC users will not use bulk requisitions.

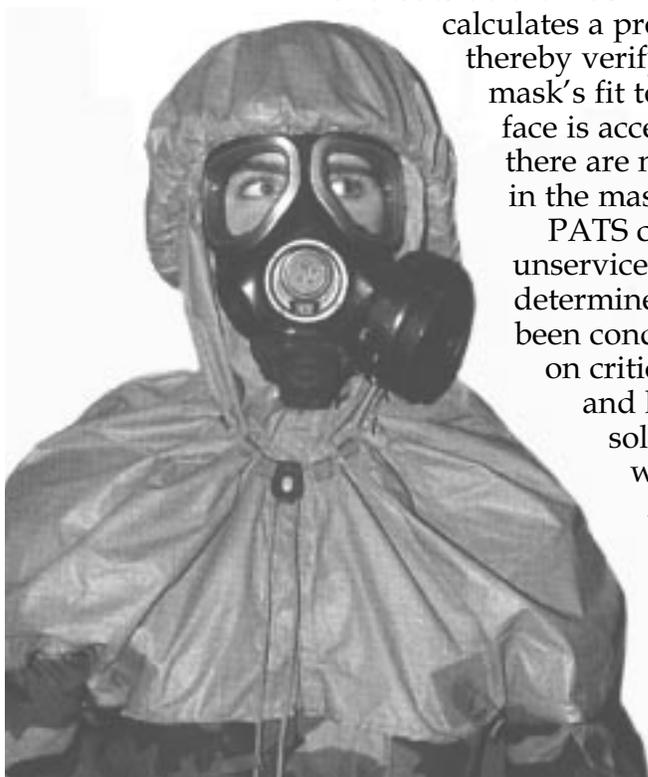
POCs at the National Inventory Control Point are –

M40/M17 masks Mr. Fuoto, DSN 793-4285 or (309) 782-4285; e-mail ffuoto@ria-emh2.army.mil

M42/M25 masks Ms. Wright, DSN 793-5757 or (309) 782-5757; e-mail rwright@ria-emh2.army.mil

M43/M24 masks Ms. Viren, DSN 793-7545 or (309) 782-7545; e-mail dviren@ria-emh2.army.mil ♦

POC: MSG Eugenia Ulman, Chemical NCO, DSN 558-2919 (334-255-2919)



Low down on the cover up

If it moves, feed it; if it doesn't, paint it. This old Army axiom has kept soldiers covering equipment with paint for decades. Chemical agent resistant coating (CARC) is the standard paint for Army tactical equipment. It lasts four times longer than ordinary paints and doesn't soak up chemical agents. CARC—and other paints—have their hazards: They're flammable. Paint solvents can be inhaled or absorbed through the skin. They can irritate eyes and skin and cause headaches, dizziness, and intoxication. Large doses can lead to unconsciousness and death. Continual overexposure can permanently damage vital organs.

Spray painting is more hazardous than rolling or brushing. Solvent exposures are higher, and paint mists usually contain toxic chemicals. Isocyanates—found in CARC and some other paint mists—irritate eyes, throat, and lungs and can produce an extreme allergy. Airless spray guns can inject paint under the skin, delaying poisoning and injury.

Material safety data sheets (MSDS) list the hazards and controls for each paint or solvent, as well as disposal instructions. Ensure soldiers are implementing the controls listed on the MSDS as well as those in SOPs and TMs. Under most conditions, CARC users will need a respirator, but it must be used carefully. (See related article, page 5.) If soldiers are having difficulty breathing, become dizzy, or "taste" the paint, work should be stopped, and the area

evacuated. If symptoms persist or become more severe even after evacuation, the worker should be taken immediately for medical evaluation and treatment.

To ensure paint work is safe work, leaders should consult the local safety office and Preventive Medicine Activity and get them involved before initial CARC painting. In addition, leaders should cover the following—

- **Flammability.** Don't allow soldiers to paint near flame, heat, or spark producers such as electrical components, heaters, and running motors.

- **Ventilation.** Paint should be handled only in well-ventilated areas or outdoors. Leaders should ensure soldiers use spray booths and ventilation systems designed for paints, but painting operations must be kept away from other ventilation systems and air intakes. Vehicles should be parked away from painting structures to ensure vapors aren't trapped.

- **PPE.** Make sure soldiers wear eye splash protection, clothing that fully covers the skin, and the appropriate gloves. Soldiers should also shower after work to avoid taking toxic chemicals home.

- **Disposal.** Paint and paint products and supplies must be disposed of in accordance with local policy. ♦

POC: MAJ Robert Wallace, Installation Branch, DSN 558-1122 (334-255-1122) or Mr. Geoffrey Braybrooke, USACHPPM, Industrial Hygiene Field Services Program, DSN 584-7391 (410-671-3118)

Welding CARC-painted surfaces

In a word, don't. Don't ever weld, burn, or cut CARC-painted material. It releases toxic gases, vapors, and metal fumes. Grind or sand off CARC paint out to at least 4 inches from the area

to be heated before applying heat. If the other side of the metal is painted, remove that paint also. In addition, soldiers doing the sanding must use high-efficiency respirators. ♦

HC smoke—managing the risks

A soldier died after inhaling hexachloroethane (HC) smoke for only a couple of minutes. His platoon was conducting a mortar ARTEP, and a friendly artillery smoke screen would cover their movement across an open field. One soldier drove the HMMWV providing the smoke screen while another threw HC smoke grenades from the back of the vehicle. He wore no protective mask. One of the grenades ignited in the back of the HMMWV, but the two soldiers kept the smoke screen moving. The HMMWV was spewing so much smoke it looked like it was on fire, and the driver was afraid to stop for fear of being run over from behind by tracks following them.

The soldier in the HMMWV's rear

endured the smoke for the 2 minutes or so it took to get to a stopping place. He was immediately evacuated for treatment, but no one told emergency room personnel that he had been exposed to HC smoke; "white smoke" was all the information given. Trips to three different medical facilities couldn't save him. He died almost a month after the incident. The tragedy is that the soldier had a protective mask in the back of the truck, but he never put it on. As this accident shows, HC smoke can be deadly.

Safety-of-use messages on the hazards of HC smoke have been sent to field units. Commanders and other leaders should ensure that soldiers are briefed and trained on its hazards and use before they go



to the field. Soldier awareness is crucial because of the delayed effects of zinc chloride, the major toxic ingredient in HC smoke. A soldier could be in real trouble and not know it well before he or she has trouble breathing.

Identifying the hazards

Corrosive zinc chloride fumes in HC smoke are deadly. In high concentrations, these fumes destroy lung tissue and cause dry-land drowning. Victims “drown” as their lungs fill with fluid.

The sneaky nature of HC-smoke injury lulls both doctors and victims into a false sense of security. A symptom-free period of days, or even weeks, may follow overexposure, or a sick soldier may seem to be responding. The victim can then be hit suddenly with severe respiratory distress. Soldiers won’t realize they’ve inhaled too much until hours, or even days, after the exposure. By this time, the critical designator “HC” may not be mentioned in connection with “smoke,” making the injury much harder to treat.

Assessing the risks

When planning smoke operations, leaders must consider weather, wind conditions, and potential wind drift. Observation and communication, as well as control measures, must be established to

prevent exposure of unprotected personnel. HC smoke must not, under any circumstances, be used in an enclosed space, and it should not be deployed from a moving vehicle.

Controlling the risk

Precautions on the use of HC smoke are listed on a card found in each box of smoke grenades. Leaders should ensure the following precautions are taken—

- Store and transport grenades in their fiber containers.
- Inspect the fuse safety pin before removing the grenade from its container. If the pin is missing, soldiers should not remove the grenade.

In addition, personnel will carry their protective masks when participating in exercises that include the use of smoke. Soldiers will mask—

Checking for Fit

(NBC NCO) With soldier standing, check for proper fit according to following order of importance:

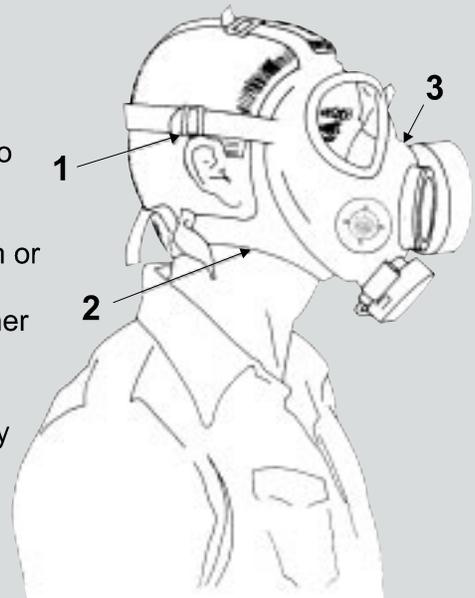
- Edge of facepiece comes up on forehead but not into hairline and within 1 inch (2.5 cm) of ear.
- Temple straps (1) and cheek straps (2) do not cut into ears.
- Eye pupils are centered.
- Facepiece does not press flesh so eyes are partly closed.
- Bottom of facepiece does not cut into throat.
- Skin in front of ear is not wrinkled.
- Nosecup (3) does not obscure vision or press into nose.
- If facepiece is difficult to fit, try another size mask.

WARNING

Soldier's safety depends on properly fitting face-piece.

NOTE

FOLLOW-ON MAINTENANCE:
Check the facepiece for leaks (para 2-8).



- Before exposure to any concentration of smoke produced by AN-M8 HC white smoke grenades, smoke pots, or metallic powder obscurants. TRADOC requires masking whether or not the release is for chemical warfare training.

- When passing through or operating in dense smoke such as smoke blankets and smoke curtains. Dense smoke is that in which visibility is less than 50 meters.

- When operating in or passing through a smoke haze and the duration of exposure will exceed 4 hours. A smoke haze is that in which visibility is greater than 50 meters.

- Anytime exposure to smoke produces breathing difficulty, eye irritation, or discomfort for even one soldier. At that time, all similarly exposed personnel will mask.

In addition, soldiers will mask when HC smoke is used in MOUT training and other enclosed areas. Smoke-generator personnel will mask when it is impossible to stay upwind and clear of smoke. Other precautions for MOUT training include having soldiers –

- Reduce skin exposure by rolling down sleeves.

- Shower and launder clothing immediately following the exercises to eliminate the risk of skin irritation following smoke exposure.

SOPs should provide clear guidance for issuing, storing,

handling, employing, and accounting for HC smoke grenades. Excellent information on HC smoke and its health effects are in FM 3-101-1: *Smoke Squad/Platoon Operations*.

Further, SOPs should address HAZCOM with health-care providers since victims may not be able to communicate with caregivers. Leaders should work with their health-care providers to develop automatic referral and followup for soldiers exposed to any concentration of HC smoke. ♦

Ten 'hut!

SGM is looking for good-news stories to share with the rest of the Army. Being the Safety Center, we get plenty of bad-news stories – unfortunately. But the accident that didn't happen doesn't get reported. We want to hear about NCOs and soldiers who identified hazards, assessed risk, developed controls in the decision-making process, implemented those controls, supervised, completed their missions without incident, and evaluated the process afterwards. Fax your articles to SGM McCann at DSN 558-9136 (334-255-9136). You can reach him by e-mail at mccann@rucker-safety.army.mil. ♦

Hazard alert:

Soldiers with smoke-injury symptoms should be evacuated along with the expended pyrotechnic to the nearest hospital. Medical personnel should be advised immediately of possible HC-smoke injury.

Victims should be admitted for at least 48 hours for inhalation treatment and observation for delayed symptoms. In no case should a soldier be discharged or returned to duty during the observation period. ♦

Safety Center SGM speaks out on POV accidents

I want the word to reach to all soldiers and NCOs that our philosophy is to protect the force through risk management to enhance warfighting. The risk-management process is a proven effective method of doing business. It works in planning and executing military training and operations, and it works in our off-duty lives as well. Right now, more soldiers are dying on streets, roads, and highways than anywhere else.

Preventable training accidents still happen, even though less frequently than in the past. Key leaders – the ones in positions to change the ways soldiers work and play – are the small unit leaders. They have the big job of influencing soldiers' behavior. NCOs know soldiers. They live and train with them and can identify their high-risk behaviors. It is critical that these first-line

leaders have our support. We must give them risk-management training, ensure that they know the standards and are prepared to enforce them, and support them at all levels of the chain of command.

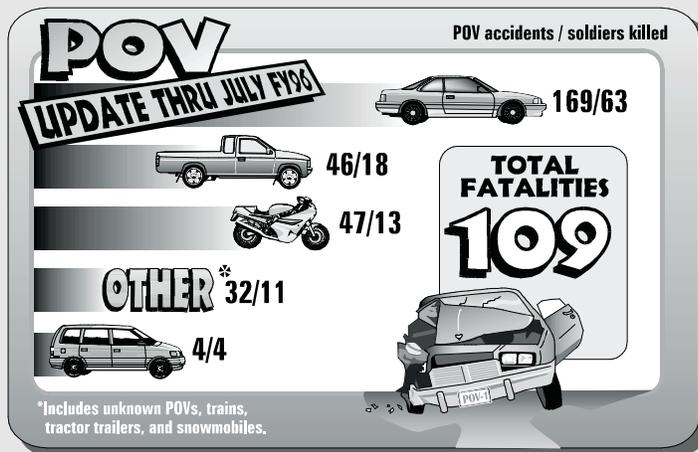
The Safety Center can help commanders and other leaders with training. We have exportable safety courses, and we provide

risk-management publications such as *Countermeasure*. We're also working with Training and Doctrine Command to institutionalize the risk-management philosophy as one

“Forty percent of the force—our young, junior-grade soldiers—is having 60 percent of the POV fatalities.”

step of integrating risk-management into all Army operations. We must change the way the Army thinks. That's a tall order. Is it worth it? If it saves a soldier's life, you bet! ♦

—SGM Greg McCann, USASC SGM, DSN 558-3575 (334-255-3575)



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THOMAS J. KONITZER
Brigadier General, USA
Commanding

MURPHY'S FLAWS

WHAT CAN WE DO FOR TODAY'S SAFETY BRIEFING?

IT'S GOT TO BE EXCITING?

HEY! HOW ABOUT A P.E.? THAT WILL GET 'EM EXCITED!



YEAH! WE CAN TELL THEM NEVER TO DO THIS--ESPECIALLY INSIDE A BUILDING. HEH! HEH!

COUGH! COUGH! YA' THINK THIS SMOKE WILL HURT US?

HACK! HACK! NAH! A LITTLE WHITE SMOKE WON'T HURT REAL SOLDIERS



I WONDER WHY THEY DIDN'T JUST MASK OR LEAVE THE BUILDING?

YA' SEE ANY REAL SOLDIERS AROUND HERE?

