



Maryland EMS NEWS

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A fire (simulated by smoke from the main deck) and personal injuries aboard the *Cape Decision* brought fire and EMS units from the Baltimore City Fire Department to the docks near Ft. McHenry.

Disaster Drill Focuses On Hazardous Materials

As smoke billowed from the main deck of the *Cape Decision*, fire trucks and EMS vehicles sped to the dock at the Ft. McHenry shipyard in south Baltimore. Thus began the November 4th drill of the Baltimore City Hazardous Materials Action Plan, which was sponsored by the Mayor's Hazardous Materials Advisory Council (HMAC) and the Southern Baltimore Industrial Mutual Aid Plan (SBIMAP). The exercise planning encompassed three facets of emergency response: fire suppression was coordinated by the Baltimore City Fire Department (Chief Joseph Spadaro); the hazmat incident was coordinated by the Baltimore County Fire Department (Deputy Chief James Judge); and the medical response at Ft. McHenry was coordinated by MIEMSS (William E. Clark, director of EMS field operations).

The scenario called for fire suppression units to extinguish a fire in the ship's engine room, where two crew members lay burned and injured. The fire, caused by a power surge to the engine control room, resulted in an electrical shock injury to one crew member and multiple

traumatic injuries to a second.

At the sounding of the general alarm (the ship's emergency warning message), a fork lift operator drove his vehicle down the ship's ramp and onto the dock. In the confusion of the evacuation, the fork lift, carrying barrels of sodium sulfate, collided with a tank truck containing sulfuric acid and ruptured the tank. The acid leaked onto the spilled dry compound, generating an invisible toxic cloud that moved east over Ft. McHenry. Forty-six visitors at the historic site were affected by the fumes and needed medical attention.

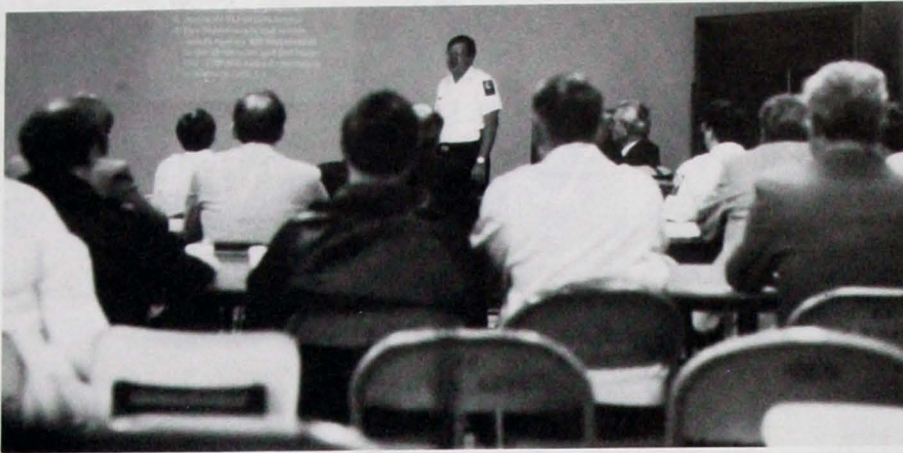
This was the third annual exercise conducted by HMAC and SBIMAP. The HMAC is composed of government and private groups that would be involved in the response to a hazardous materials (hazmat) incident in the industrial and shipping areas near Baltimore. The members of SBIMAP, a mutual aid organization, are primarily chemical and oil companies pledged to providing resources, materials, and expertise in the event of a hazmat incident. These organizations



The mock multiple trauma victim near the ship's cranes is rescued by EMS personnel.

set out distinct objectives for their periodic drills: to test the Hazardous Materials Action Plan and the mutual aid plan, to promote jurisdictional cooperation, to assess the reaction in the affected community, and to identify areas needing improvement.

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Before the drill, administrators from the participating agencies, reporters, and other observers were briefed on the day's events. Here, William E. Clark, director of EMS field operations, describes the structure of MIEMSS, which coordinated the medical response at Ft. McHenry.



Battalion Chief Charles Mueller of the Baltimore City Fire Department was the on-scene commander for fire suppression units.

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The background for this drill was the Cape Decision, a 600-foot vessel of the National Defense Reserve Fleet, a component of the U.S. Department of Transportation Maritime Administration. As part of the country's Ready Reserve Force, it is maintained by the Maritime Administration and can be loaded with fuel, supplies, cargo, and a 40-member crew within 5 days. The ship was loaned by that agency to the organizers of the November 4th drill. Battalion Chief Charles Chaney of the Baltimore City Fire Department explained to observers that fire fighters view a ship the size of the Cape Decision as a five- or six-story building turned upside down. The multiple decks, small passages, and narrow stairways in these vessels necessitate creative and intricate approaches by rescue workers responding to an emergency aboard ship.

A simulated call to 911 alerted the emergency response system to the fire on the ship and the injured crew members below deck. Although the drill was conducted at the Key Highway Corporation Yard next to the U.S. Naval Reserve



From the ship's engine room, a "victim" in a Stokes basket is lifted three levels onto an upper deck.

Center at Ft. McHenry, the incident was assumed to be at the Dundalk Marine Terminal, on the border of Baltimore City and Baltimore County; therefore, both jurisdictions were involved in the response.

The Baltimore City Fire Department, in charge of fire suppression for this drill, first sent a fire truck and a paramedic unit to the dock. As additional units arrived, they were prestaged approximately four blocks away from the incident site and then called to service by the incident commander, Chief Spadaro. In the early phases of the drill, the incident command post was located in the vicinity of the pier.

After the fire suppression crew extinguished the fire in the engine room, EMS personnel entered the ship to extricate the injured. Two man-sized dummies

had been positioned near the ship's crankcases and the control room switchboard by Ken Young and George Smith from the MIEMSS Office of Prehospital Care. These "victims" were strapped into Stokes baskets by rescuers and raised three levels through the ship with a block and tackle attached to an overhead beam.

Medical treatment was administered to the victims in a safe zone on the dock, away from the fire suppression area. A "Trauma Team" from the MIEMSS Shock Trauma Center had been summoned by Battalion Chief Michael Jachelski, the medical commander for the drill. Trauma surgeon Brad Cushing, MD, and trauma nurse Paula Kelly, RN, were brought to the scene in a Maryland State Police Med-Evac helicopter.

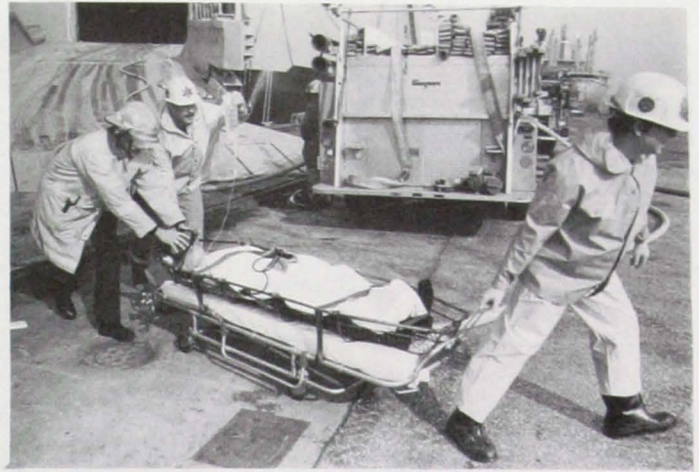
While the fire and rescue teams
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Total containment suits allow HazMat Unit personnel to enter the "hot zone."



EMS personnel from the Baltimore City Fire Department bring a mock patient from the Cape Decision's engine room.



A "victim" from the ship's engine room is prepared for transport to a medical facility.



In a safe area on the dock, medical personnel assess and stabilize a mock victim's injuries.



HazMat Unit members demonstrate procedures for containing hazardous chemicals.

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worked inside the ship, the Baltimore County Fire Department's HazMat Unit arrived at the pier to contain and control the spilled chemicals that were reacting and producing a cloud. Members of the team prepared to enter the "hot zone" in total-containment protective suits. Others cordoned off the contaminated site by placing red and green cones to indicate contaminated and uncontaminated areas, respectively.

The commanding officers needed to determine the exact composition of the spilled materials as well as the products of their reaction. The battalion chief obtained the ship's manifest to see what cargo had been aboard. A local manufacturer, who works with these chemicals daily, was called for information; this company is one of seven chemical plants (the Chemical Hazards Advisory Team) that, through SBIMAP, have established a hot line to facilitate emergency communications during a crisis such as por-



The HazMat Unit had to neutralize the spilled chemicals that had already mixed and prevent additional reaction between the compounds.

trayed in this drill. Personnel in the command post contacted the Maryland Poison Center and requested information from TOXNET, a computerized information system on chemical substances, which is operated by the National Library of Medicine in Bethesda.

From these sources, the commanders ascertained that the chemicals were

sodium sulfide (a solid) and sulfuric acid (a liquid). The gaseous product of their interaction is hydrogen sulfide, which suppresses breathing, and thus is potentially lethal, and is flammable even in low concentrations. The toxic cloud would affect people in its path as well as anyone who came to their aid. The hazmat team

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could have ignited the cloud of hydrogen sulfide if it could not be contained; sulfur dioxide, a substance less toxic than hydrogen sulfide, would have resulted from the combustion. However, hydrogen sulfide reacts with water in the lungs to produce sulfurous acid within the body. Further internal reaction could create the most damaging product of this chain—sulfuric acid.

The immediate goal of the hazmat team was to prevent the solid and liquid compounds from contacting each other. Diking with sand or dirt was used to keep them apart. After the chemical spill was controlled, the residue was placed into containers for proper disposal.

The Baltimore County Fire Department sent teams downwind to take air samples and track the movement of the toxic cloud. The Maryland Environmental Response Team of the Waste Management Division was also called to the site. A public alert message was broadcast by WBAL to notify the community that a drill was in progress. In a real incident, the Emergency Broadcast Network would have been used to tell people in the area to go indoors, close their windows, and await further instructions about evacuation if that was deemed necessary by emergency personnel.

As the scope of the incident broadened, the command post was moved from the pier area to a nearby Maryland Port Administration building. Such relocation of the command post is a normal procedure in incident management protocols to provide increased security for the operations and shelter for the personnel in the post.

When the toxic cloud passed over Ft. McHenry, visitors at the site experienced eye irritation and respiratory prob-

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An EMS provider using self-contained breathing apparatus begins to organize some of the 46 "victims" of the toxic cloud.



EMS personnel assist a "victim" from the contaminated area.



"Patients" are organized for transport from the area affected by the toxic cloud.



Decontamination areas were defined by EMS personnel as part of the triage and treatment processes.

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lems. The first medic unit to arrive at the scene of a mass casualty incident is typically overwhelmed by frightened victims demanding immediate care. As described to observers by John Donohue, MIEMSS Region III administrator, that first unit needs to set up a command post, assess the hazards for EMS personnel in the affected area, and establish a plan of action for the triage and transport of patients.

Before entering the contaminated area, prehospital care providers donned self-contained breathing apparatus to protect them from the hazardous airborne

chemicals. Triage tags were attached to the victims in the field near Ft. McHenry to indicate severity of injury and relative urgency of transport. Patients walked or were moved to a decontamination area, where they were decontaminated and a secondary triage was performed. Those in need of immediate gross decontamination (for example, eye washes or body rinses) were taken to an area designated for that purpose.

The patient transport area was established in a parking lot adjoining the triage areas. A bed status report from nearby hospitals had been obtained by EMRC, one of the state's EMS communi-

cations centers. Lt. Art Gordon of the Baltimore City Fire Department made transportation assignments based on patient needs and available resources. Patient information was relayed to Gerry Gavin, assistant administrator of MIEMSS Region III, who entered the data into a portable computer, generating a comprehensive list of patients and their destinations. That information was given to members of the American Red Cross to enable them to answer the calls from family members and friends concerned about the well-being of people they knew in the disaster area. Patient data obtained

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Ambulances line the patient transport area near Ft. McHenry.



Trauma surgeon Brad Cushing, MD, and trauma nurse Paula Kelly, RN, treat a "patient" overcome by toxic fumes at Ft. McHenry.



The patient transport area was established away from the fields affected by the toxic cloud.

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in the transportation sector were also transmitted to receiving hospitals to prepare their staffs for the types of injuries incurred by the patients who would be arriving at their facility.

The following hospitals received 46 patients from the exercise: Francis Scott Key Medical Center, Mercy Hospital, South Baltimore General Hospital, and University Hospital. The two manikins from the ship were flown to the MIEMSS Shock Trauma Center on a Maryland State Police Med-Evac helicopter. In addition, 25 "paper patients" symbolizing a busload of injured children were "received" by the Johns Hopkins Hospital. In a totally unannounced drill at that facility, administrators presented emergency room personnel with a set of file cards describing those victims. Information about the children had been

processed through the portable computers at the disaster site, so they were tracked through the entire triage and treatment process.

At the completion of the drill, participants gathered to assess the events of the morning. The comments of "umpires" who had observed the fire and rescue operations were presented to the group and discussed; the following issues will receive further consideration.

The privately owned hydrant that was to supply water for fighting the fire in the ship's engine room in this drill was not compatible with the hoses of the Baltimore City Fire Department. A survey will be conducted to determine if this is the only hydrant in the dock area with this limitation or if others need to be modified.

The problems associated with the limited number of radio channels assigned to EMS and fire communications, which have been identified in previous emer-



A portable computer terminal, important for tracking patients during mass casualty situations, is used by Gerry Gavin, assistant administrator in MIEMSS Region III, in the patient transport area.



"Victims" of the toxic cloud that passed over Ft. McHenry await ambulance transport to a hospital.

gency situations, surfaced again in this drill. Because so many messages need to be relayed in an event of this magnitude, the airways become jammed and some transmissions are delayed. Battalion Chief Dennis McMahon, communications officer of the Baltimore City Fire Department, reported that the Baltimore Regional Fire Chiefs Council has been studying this problem and is seeking solutions. He explained that, even if additional channels are designated for EMS by the Federal Communications Commission, saturation

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A toxic cloud "victim" is carried onto a paramedic unit for transport to a hospital.

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of those channels can still occur. The solution to this persistent problem is not simple, but genuine efforts are being made toward its resolution.

Several observers of this drill recognized the need to strengthen the system for staging vehicles within the immediate vicinity of the incident. The drivers of response vehicles need to recognize access and exit routes to the scene so they do not block them. Dangerous zones, such as areas contaminated with toxic compounds or fumes, must be designated clearly by rescue personnel at the scene so that other workers entering or leaving the area do not move through those areas. This identification of "hot zones" is also important for the protection of support agencies and news media personnel at the periphery of the site.

Participants in the assessment agreed that the drill progressed smoothly and offered experience to the rescue workers involved. It also led to the identification of problems that now can be rectified by appropriate agencies and thus better prepare the EMS system to respond to actual emergencies.

—Linda Kesselring



Medical personnel move a patient to the waiting Med-Evac helicopter on the grounds of Ft. McHenry.



A Maryland State Police Med-Evac helicopter, which had brought the Trauma Team from the MIEMSS Shock Trauma Center, transported one of the fire victims from the incident scene.



Clinicians in the receiving area of South Baltimore General Hospital assess the status of a "patient" overcome by the toxic fumes that passed over Ft. McHenry.


ATTs Becoming Paramedics

As proposed by MIEMSS and mandated by the Joint Legislative Committee on the Med-Evac Program, Maryland's aviation trauma technicians (ATTs) are increasing their training to become emergency medical technician-paramedics (EMT-Ps).

There are now 35 ATTs; by special arrangement with Essex Community College, the first four finished their course in mid-July. The next group of six ATTs began the 10-week course in the fall. The remaining ATTs will take the EMT-P course later so as to achieve full EMT-P staffing for Maryland State Police Med-Evac missions.

As of July 1, 1987, there were 164 EMT-Ps registered in Maryland.

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Manufacturer's Warnings About Ohio Hope II Resuscitator

Safety alerts regarding the use and sterilization of the Ohio Hope II resuscitator have been issued by Ohmeda, the manufacturer of the hand-held portable device that is used to provide emergency breathing assistance. Users of this device are instructed to ensure the integrity of their equipment; special attention must also be given to sterilization procedures.

A ball valve component in units made before May 1981 is susceptible to separation (cracking) if it is not maintained properly. This component, an opaque black ball, is located in the ball valve assembly and is designed to cover and uncover the breathing passage to facilitate forced breathing of a patient. If this component is damaged, the unit will malfunction, preventing patient exhalation and possibly leading to pneumothorax, serious injury, and even death.

The ball valve was redesigned in 1981 to eliminate the potential for separation. The new ball is translucent and smoke colored. Medical personnel who use this resuscitator should ensure that their equipment contains this newer ball model. Careful investigation of the equipment is mandatory, because a black ball may sound as though it is working properly even if it is broken. If a black ball is found, it should be discarded and replaced with a translucent ball, available without charge from Ohmeda.

The company has prepared detailed instructions for the disassembly and inspection of the resuscitator. To obtain that information or to request a replacement ball, call 1-800-255-0596 between 9 am and 5 pm (EST) or write to Hope II Alert, Ohmeda Divisional Product Assurance Department, Ohmeda Drive, P.O. Box 7550, Madison, WI 53707-7550.

Production of the Hope II resuscitator was stopped in 1986, but Ohmeda will maintain replacement parts for it until mid-1990. Users of the Hope II are advised to replace this device by that year.

The Hope III, introduced in 1985, uses a silicone valve instead of a ball and thus is not affected by the safety alert. The two resuscitator models are easily distinguishable: the Hope II has an opaque black rubber bag and the Hope III has a translucent white silicon bag.

The company has also modified its instructions for sterilizing the Hope II resuscitator's ball and valve body. Ohmeda recently has been notified by the manufacturer of Cidex sterilizing compounds that Cidex 7 and Cidex Plus are not compatible with parts of the Hope II unit, specifically the ball and ball valve components (which are made of Lexan). Those solutions will cause Lexan to crack. For cold sterilization of the device, a cold germicidal solution of Cidex Activated Dialdehyde (or an equivalent that is com-

patible with Lexan) must be used. Additional sterilization instructions (for cold procedures as well as other methods) are being distributed by Ohmeda and can be obtained by contacting the company at the phone number and address mentioned previously.

Infection Control Workshop

"Infection Control and Emergency Medical Services," a one-day workshop conducted by Nancy Hoyt, MA, CIC, infection control officer at MIEMSS, will be offered March 16 at Peninsula General Hospital and April 27 at Memorial Hospital in Cumberland. The workshop is sponsored by the MIEMSS Field Nursing program.

The workshop will focus on guidelines for maintaining high quality patient care while maximizing protection of the EMS staff during both prehospital and in-hospital situations. Diseases to be discussed include AIDS, hepatitis B, herpes, meningitis, pediculosis, tuberculosis, rabies, malaria and mononucleosis.

Continuing education credits for nurses and prehospital care providers can be granted.