Combined Joint Task Force-Horn of Africa
Heat Stress Research -- After Action Report
CDR Shake
31 July- 3 September 2005

Tasking: Provide assistance in assessment and recommendations on prevention, management, and mitigation of heat stress effects. The assessment should include the use of the automated heat stress system, evaluating the field heat tolerance test plan, the new ship/shore heat stress automated meter and the ice vest for wear by Marine Corps sentries.

Accomplishments:

Briefed the following groups/individuals:

- Chief of Staff
- Provisional Security Company (PSC) 4th Marine Guard Division
- Expeditionary Medical Facility (EMF) (San Diego and Bethesda Crew)
- Meteorological and Oceanography Command (METOC)
- COL Ricks J3 Operations
- 26 Marine Expeditionary Unit
- Heavy Marine Helicopters (HMH) 464
- 79th Rescue Squadron Maintenance Crew
- Air Component Coordination Element (ACCE)
- Arrival Departure Aircrew Coordinating Group (ADACG)
- C-130 Crew (25th Aug)
- Camp Bilate US Army Crew

Ice Vest Evaluation conducted the following groups:

- Provisional Security Company (PSC) 4th Marine Guard Division
- 26 Marine Expeditionary Unit
- Heavy Marine Helicopters (HMH) 464, Crew and Maintainers
- 79th Rescue Squadron Maintenance Crew
- Arrival Departure Aircrew Coordinating Group (ADACG) Maintenance Crew
- C-130 Crew (25th Aug)

Results of various tests/evaluations:

1. Evaluation of Ice Vests: Extremely positive review from all volunteers who used ice vests. Recommendations made and reports provided.
2. Evaluation of Polar Heart Rate Watch: Works well within Camp. Does not transmit when in use during flight operations.
3. Evaluation of Vital Sense core/skin temperature: Work well within Camp Lemonier. Transmits when in use during flight operations.
4. Evaluation of AHHS: EMU evaluation conducted. EMU plan to order the device and install for daily use and historical data collection.
5. Evaluation of PHHS: EMF evaluation conducted. They plan to order the device and use for environmental evaluation.

Observations:

Environmental Heat Stress:
High environmental temperatures noted daily.
Personnel at most risk for heat stress and injury:
1. **HMH 464 pilots and flight crew (armor, life vests, helmets).**
2. **PSC Marine Guards (Flak jackets/helmets/guns (weighted ~ 50lbs).**
3. **Maintenance and loading crews on flight line.**

High Noise Environment:
- Hearing protection was not widely used on the tarmac when aircraft were coming and going.
- Marine Guards did not use hearing protection on flight line during guard shift.
- Hearing protection did not appear to be used during live fire training.

Equipment:
- Flak jackets are exceptionally short in the back thus providing no protection for the lower back/waist area.
- Flak jackets and sappy plates that were provided to the Marine Guards were not always the correct size. For example some wearing a small jacket had medium sappy plates. Some men who were large were wearing medium Flak jacket-hence the side straps were extended to the maximum resulting in full exposure down their sides and greater exposure in the back.
- Marine Corps desert uniforms are turning bluish when worn repeatedly under flak jackets following profuse sweating. This may be a concern for USMC.

Quarters:
- Tents: toilets should be located close for ease of use during the night and to facilitate hydration during the day. Awaking several times per night to use the toilet interrupts sleep pattern. Dehydrating oneself in order to not have to use the toilet at night defeats the goal of staying hydrated to avoid heat injury.
- The CLU's solve this problem for some.

Sanitation:
- Bob Hope Food Hall very good.
- Gym, operators should be sanitizing equipment more regularly.
- Tent areas could be kept cleaner and free of fire hazards (inspections did take place).
- Toilet and shower areas appeared clean and well kept.

Recommendations:

Environmental Heat Stress:

- **Highly recommend use of ice vest for use during operational missions/training.**
- **Physical Performance is enhanced/improved when the ice vest is worn in high temperature and humidity environments**. The body core temperature and heart rate are lowered when ice vest is worn. Use of ice vest will allow longer physical performance in high heat conditions and/or allow higher level of physical performance during missions. In addition, cooling decreases sweating, reduces heat rashes and lowers exertion rate allowing for quicker recovery from exhausting missions.
- Acclimatization will take place to some degree within the first 3-4 weeks. Everyone is different (BSA, gender, fitness level, body percent fat, age) and some individuals will take much longer to accomplish some acclimatization. No one will ever completely acclimatize. The heat and humidity will always be an issue even for the youngest and fittest personnel.
- New personnel should be provided at least three weeks to become accustomed to the environment. Their supervisors should not challenge them with arduous/heat exposure duties.
- Remain vigilant regarding heat stress awareness and training. It is extremely important for everyone and especially important for short time visitors and newly assigned individuals.
- Recommend more in-depth INDOC training regarding heat stress and provide details about how to identify someone who is experiencing heat stress.
- Maintain Postings in all toilet areas that outline color of urine and actions to take. These should be large, easy to read/colored/laminated and posted in toilet stalls and outhouse dwellings.
- Steele Ice Vests left behind with HMH 464 at their request.
- Expeditionary Medical Facility order and install Automated Heat Stress System and Portable Heat Stress System.

Hearing Protection:

- Loss of hearing during ones career is one of the most costly medical expenditures during active duty and especially in the VA. Hearing protection education, training and should be provided and strongly endorsed among the troops.

Follow up research:

- Field Heat Tolerance Test.
- Coordinating with Steele Company, Office of Naval Research and USMC to determine if follow on R&D would be warranted with respect to designing Flak-ice vest pockets.

Time on ground with operational forces is invaluable.
How can we continue to assist you?