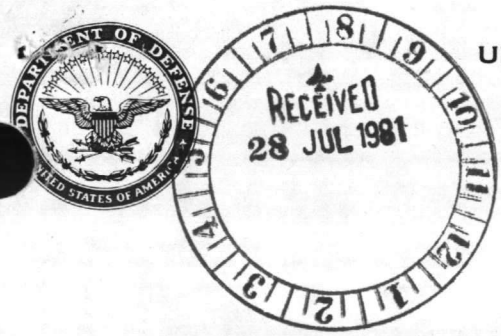
S-3



UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
(HELICOPTER)
NEW RIVER, JACKSONVILLE
NORTH CAROLINA 28545

AS(H)O 6200.1A
222:MEW:mla
22 July 1981

AIR STATION (HELICOPTER) ORDER 6200.1A

From: Commanding Officer
To: Distribution List

Subj: Operation of Wet Bulb-Globe Temperature Index Station, 1 May through 30 September

Ref: (a) MCO 6200.1C
(b) ABO 6200.2

* Encl: (1) Causes, Symptoms and Treatment of Heat Casualties
(2) How to Avoid Becoming a Heat Casualty
(3) Controlling Heat Casualties

1. Purpose. To establish Standard Operating Procedures for the manning and reading of the Wet Bulb-Globe Temperature (WBGT) Index Station, and to establish a system of reporting temperature changes of WBGT to Marine Corps Air Station (Helicopter) (MCAS(H)), New River units.

2. Cancellation. Air Station (Helicopter) Order 6200.1. ✓

3. Background. References (a) and (b) provide information and instructions necessary to regulate training to minimize heat casualties and loss of training time. Additionally, reference (b) provides for the establishment, operation and maintenance of the WBGT station.

4. Information

a. The WBGT Index. This index combines shade air temperature, radiation, humidity and wind into a single value to be used as a guide for controlling training. It is obtained by reading three instruments and multiplying each reading by a known factor. The results are then totaled to obtain the index. Training programs in warm weather should be planned provisionally on the basis of the WBGT index.

b. Use of the index

(1) When the WBGT index exceeds 80° F, heavy exercises for unacclimatized personnel should be conducted with caution and under constant supervision.

(2) When the WBGT index exceeds 85° F, strenuous exercises, such as marching at standard cadence, should be suspended for unacclimatized troops during their first two or three weeks of living and working in the area. Outdoor classes in the sun are to be avoided.

(3) When the WBGT index exceeds 88° F, all physical training should be halted for those troops who have not become thoroughly acclimatized by at least 12 weeks of living and working in the area. Those troops who are thoroughly acclimatized may carry on limited activity not to exceed six hours per day.

(4) When the WBGT index exceeds 90° F, all strenuous activity should be halted for all troops.

c. Dissemination of high WBGT readings

(1) 80° F on the WBGT index will constitute a caution period. This condition will cause a green flag to be flown from the small flag pole in front of AS-820.

(2) 85° to 87° F on the WBGT index will constitute a high caution period. This condition will cause a yellow flag to be flown from the small flag pole in front of AS-820.

(3) 88° to 89° F on the WBGT index will constitute a low danger period. This condition will cause a red flag to be flown in front of AS-820.

(4) When the WBGT index exceeds 90° F, a full danger period will be in effect. This condition will cause a black flag to be flown in front of AS-820.

5. Action

a. Unit Commanders

(1) Disseminate information contained in enclosures (1) and (2) to all Marines engaged in training during hot weather.

(2) Comply with instructions contained in enclosure (3) in planning training during the Heat Casualty Danger Period.

(3) Obtain the WBGT index reading prior to the actual conduct of training during the Heat Casualty Danger Period.

b. Station Weather

(1) Establish, operate and maintain the WBGT program in accordance with the references.

(2) Record hourly WBGT index reading from 0800-1700, during normal work day, 1 May through 30 September when the free air temperature is 80° F or greater.

(3) Notify the below listed organizations when the WBGT meets or exceeds reportable values.

(a) Station Adjutant

(b) Headquarters and Headquarters Squadron, Training Officer

(c) Marine Aircraft Group-26, S-3

(d) Marine Aircraft Group-29, S-3

(e) Marine Wing Support Group-27, Detachment "A", Operations Officer.

(f) Marine Air Traffic Control Squadron-28

* (g) Marine Wing Communications Squadron-28, Detachment "A"

* (h) Station Medical Department, NRMC

c. The Station Adjutant will assume responsibility for custody and changing of heat conditions flags during normal working hours.

d. All Marines should determine heat conditions before undertaking individual outside activity.

5. Change Notation. Significant changes contained in this revision are denoted by asterisks (*) shown in the outer left margin.

6. Concurrence. The Commanding Officers of Marine Aircraft Group-26; Marine Aircraft Group-29; Marine Air Traffic Control Squadron-28; Marine Wing Support Group-27, Detachment "A"; and Marine Wing Communications Squadron-28; Detachment "A", concur in this Order as it pertains to members of their command.

J. W. MARVEL

DISTRIBUTION: A

CAUSES, SYMPTOMS AND TREATMENT OF HEAT CASUALTIES

1. General

a. The human body uses energy in its vital processes and in doing work. This energy becomes heat, which at ordinary temperatures, is radiated from the body to the environment. When the environment becomes as warm as the skin, this is no longer possible. When the temperature of the environment is higher than that of the skin, then the process is reversed and the body gains heat.

b. When the body cannot lose heat to the surrounding environment, it begins sweating. The sweat evaporates, transferring heat from the body to the surrounding air. This process cools the body.

c. Sweating causes loss of body water and salt. This loss upsets the heat regulating mechanisms of the body. Lack of proper heat regulation in the body may cause it to become a heat casualty.

2. Types, Causes, Symptoms and First Aid

a. There are two common types of heat casualties which are known as heat exhaustion and heat stroke. Heat exhaustion may progress into heat stroke. Heat stroke is the more serious of the two conditions, and unless promptly treated, will result in death or permanent brain damage.

b. The symptoms of each condition are different and easy to recognize. The major differences are in the condition of the skin. In heat exhaustion the skin is sweaty, cool, and pale. In heat stroke the skin is dry, hot and flushed.

c. Set forth below are the types, causes, symptoms and first aid treatment for the two common types of heat casualties.

(1) Heat Exhaustion

CAUSE	SYMPTOMS	FIRST AID
Exposure to high temperatures and humidities. Solar heat is also an important factor. Prolonged work, recent arrival in a hot climate and too much clothing.	Shortness of breath, feeling of illness, headache, weakness, dizziness, blurred vision, nausea and muscle cramps may occur. After onset, casualty will have a pale, cool, wet skin.	1. Send for medical aid. 2. Place casualty in cool shady place with circulating air. 3. Lay casualty down with head level with feet. 4. Loosen clothing and equipment. 5. If casualty is conscious, give liberal amounts of water, Gatorade, or similar drink if available.

ENCLOSURE (1)

(2) Heat Stroke

CAUSE	SYMPTOMS	FIRST AID
Exposure to high temperatures and humidities coupled with loss of ability to sweat. Solar heat is also an important contributing factor. When sweating stops, the temperature of the body rapidly and increasingly builds up to dangerous levels.	Lack of sweating, weakness, headache, dizziness, loss of appetite, nausea, shortage of breath faintness or even collapse may occur before onset. ONSET IS SUDDEN, and will be recognized by convulsion, delerium, or loss of consciousness. The skin will be flushed, hot and dry. DEATH WILL OCCUR IF BODY TEMPERATURE IS NOT LOWERED.	1. Send for medical aid. 2. THE PRIMARY ITEM IS TO LOWER BODY TEMPERATURE AS QUICKLY AS POSSIBLE. 3. Move casualty to a cool shady place with circulating air. DO NOT attempt to make him drink. 4. Loosen clothing and equipment. 5. Apply cool water or ice water to entire body. Be careful to avoid the nose and mouth. 6. Fan patient constantly to promote cooling of body by evaporation of applied water.

HOW TO AVOID BECOMING A HEAT CASUALTY

1. General

a. The human body contains a great deal of water and considerable salt. Sweating causes the body to lose these items and they must be replaced. The body cannot be "weaned" away from water or trained to do without salt.

b. Food, to the body, is like fuel to a fire. Consequently there is less need for food in hot weather than in cooler times.

2. Prevention. Here are a few simple rules to avoid heat exhaustion and heat stroke during hot weather.

a. Your leaders will encourage you to drink water frequently and to drink as much as you need. When working on your own, drink water when you need it and drink all you need. You may need from two quarts to three gallons a day. Remember that a "desire" for water may not necessarily be a "need" and that an intemperate intake of water may overload the stomach and cause stomach cramps.

b. Stay away from "cold drinks" while still sweating.

c. Use extra salt on food at regular meal times; DO NOT TAKE SALT TABLETS.

d. Keep your headgear on in the sun and remember that a little clothing will actually keep out the sun's heat.

e. If you feel sick or dizzy when heated, take it easy for awhile. DON'T OVERDO YOURSELF.

f. If you stop sweating - GET PROMPT MEDICAL AID.

g. Eat lightly in hot weather and especially eat fewer sweets.

ENCLOSURE (2)

CONTROLLING HEAT CASUALTIES

1. Acclimatization

a. Personnel who are not accustomed to physical activity under conditions of high temperature are particularly susceptible to heat injury. This is especially true of individuals who are ten pounds or more overweight, or in whom a circulatory or sweating deficiency is noted. Conditions of high humidity and solar heat increase the possibility of heat injury.

b. Training programs for personnel who are climatically and/or physically deficient should be limited in intensity and time. A breaking-in period of from two to three weeks with progressive degrees of physical exertion and heat exposure will usually suffice for achieving acclimatization. During this period, the workload should be increased gradually but not to the point where personnel will be unduly fatigued the following day. Until acclimatized, personnel will lose greater than normal quantities of water and salt. These losses must be replaced.

c. While acclimatization increases tolerance for heat, it does not make an individual immune to becoming a heat casualty. Overexertion can lead to heat illness even in mild weather.

d. Special provisions must be made for individuals who are overweight or deficient in sweating and/or blood circulation.

2. Control of Physical Activity

a. The Wet-Bulb Globe Temperature Index (WBGT Index). This index combines shade air temperature, radiation, humidity and wind into a single value to be used as a guide for controlling training. It is obtained by reading three simple instruments and multiplying each reading by a known factor. The results are then totaled to obtain the index. In warm weather, training programs should be planned provisionally on the basis of the WBGT Index.

b. Instruments

(1) The Shade Dry-Bulb Thermometer. This is an ordinary thermometer which measures air tempertaure.

(2) The Wet-Bulb Thermometer. This is an ordinary thermometer with a moist wick surrounding the bulb. The bulb reading will be the same as the corresponding dry-bulb reading only when the relative humidity is 100 percent. At any relative humidity less than 100 percent, the wet-bulb thermometer will read less than the dry-bulb thermometer because of evaporative cooling of the bulb by the surrounding wick. The difference between the readings of the two thermometers becomes greater as humidity becomes less.

(3) The Globe Thermometer. This is an ordinary thermometer inserted through an airtight stopper into a hollow copper ball, six inches in diameter. The outside of the ball is painted matte black. The stem of the thermometer is exposed for reading. The black surface of the ball absorbs heat from the sun and from other surfaces that may exceed the globe in temperature. The

ball loses heat to the cooler air by convection and cooler surfaces by radiation. In an unshaded outdoor position, the globe thermometer reading is normally above the dry-bulb thermometer reading. Daytime readings of 20° Fahrenheit or more above air temperature are observed under calm, sunny conditions. Either a decrease in radiant heat or an increase in wind velocity (or both) will lower the globe reading. Therefore, the globe thermometer reading is a balance between heat gained by radiation and heat lost to convection. The reading can be said to include air temperature, air movement and radiation.

(4) Results. It can readily be seen that the three instruments described above take into account all four variables of the thermal environment: Temperature, humidity, radiation and air circulation.

c. Formula. The WBGT Index is calculated as follows:

Dry-Bulb temperature X 0.1
Wet Bulb temperature X 0.7
Black Globe temperature X 0.2

TOTAL - WBGT Index

The formula applies to environments that are warm enough to cause sweating and to the type of hot weather clothing now worn by Marines. The factors in the formula should be measured at the actual locale of training.

d. Use of WBGT Index

(1) When the WBGT Index exceeds 80° Fahrenheit, heavy exercises for unacclimatized personnel should be conducted with caution and under constant supervision.

(2) When the WBGT Index exceeds 85° Fahrenheit, strenuous exercises, such as marching at standard cadence, should be suspended for unacclimatized troops in their first two or three weeks. Outdoor classes in the sun are to be avoided.

(3) When the WBGT Index exceeds 88° Fahrenheit, all physical training should be halted for those troops who have not become thoroughly acclimatized by at least 12 weeks of living and working in the area. Those troops who are thoroughly acclimztized may carry on limited activity not to exceed six hours per day. When the WBGT Index exceeds 90° F.

(4) When the WBGT Index exceeds 90° Fahrenheit, all strenuous activity should be halted for all troops.

3. Salt Water Intake

a. Water intake must be sufficient to replace that lost by sweating. During field exercises in hot weather, this will require allowance of up to one quart of water per man per hour if heat exhaustion is to be avoided. Men should be encouraged to drink water in frequent small amounts. Infrequent large intakes may lead to stomach distention, vomiting or cardiac embarrassment.

b. Salt replacement for acclimatized troops is normally automatic in their regular meals, unless eating is curtailed. Supplementary salt intake for unacclimatized troops, or for seasoned troops doing heavy work is best provided by using extra salt on food at regular meal times. There is no need to supplement diet with salt tablets.

c. If water is not available, Gatorade or a similar drink is recommended. Salt in concentrated form should not be taken when fluid intake is limited. Salt in unconcentrated form is not absorbed into the system readily and may cause gastric irritation and nausea.

4. Rest, Sleep and Recreation During Acclimatization Periods

a. Schedules should call for a ten minute break every hour. The hour immediately after noon and evening meals should be devoted to relaxation or nonstrenuous training. Seven hours of sleep per 24-hour period is the minimum required for maximum efficiency among the majority of personnel.

b. Sleeping, messing and recreation quarters should be screened and well ventilated by either natural or mechanical means. A WBGT Index of more than 80° Fahrenheit during the night calls for artificial cooling if possible.

5. Treatment Stations. Field dispensaries should be especially prepared to treat cases of heat stress. Artificial cooling devices should be employed at treatment stations and in ambulances, whenever possible.

6. Previous and Intercurrent Illness. Susceptibility to heat injury is greatly enhanced by illness, infections or any febrile condition, including reaction to immunizing inoculations. A previous history of heat stroke, vascular disease or skin trauma, such as heat rash, acute sunburn, or any condition affecting sweat secretion or evaporation, increases the risk of heat injury. These call for special consideration by a medical officer.

7. Clothing

a. Clothing and equipment should be worn in such way as to provide maximum skin ventilation without necessary exposure to bright sunlight.

b. In adjusting clothing and equipment, care should be taken to avoid restriction of blood circulation.

8. Instruction. All Marines should receive periodic instruction from the medical officer concerning the prevention, recognition and emergency treatment of heat casualties.