

M502: THERMAL ENVIRONMENT

STUDENT EXERCISE 1 – ANSWERS

When evaluating this situation there are a number of points which should be considered. Those considered by the group investigating this situation include:

1. RISK ASSESSMENT

The AIOH Basic Thermal Risk Assessment form indicated that the heat stress would be excessive (>60); therefore immediate controls should be put in place.

2. HEAT STRESS MONITORING

Area

It was not possible to use environmental instrumentation as the extreme heat would melt or distort the plastic parts of the device, rendering it useless.

Personal

The selection of what to monitor is very difficult and while core temperature provides the best indication of heat strain, the use of measurement devices was not practical in this situation due to worker acceptance and equipment limitations.

Given this, there was a need to rely on heart rate using the recovery approach of Brouha, skin temperature and body mass loss.

A Questemp QT 111 instrument was programmed for age and the amount of clothing worn. This device logged heart rate and skin temperature.

Frequent alarms occurred but it was difficult to decide if it was for heart rate or skin temperature (or both). The skin temperature sensor is located under the armpit and the job requirements of lifting, stretching, reaching etc, meant the sensor was often directly and closely exposed to radiant heat.

The data from the heart rate monitor indicated one 25 year old with a rate of 212 bpm. The data also showed that there was insufficient recovery time before re-entry for a number of workers.

Given the difficulty in obtaining data and the extreme conditions obviously present, it is appropriate to focus on controlling the workers' exposure.

3. CONTROLS

Some points considered:

1. Can the job be done from outside?
2. Can they use cool or refrigerated air to lessen the temperature in the oven?
 - Heat shields quickly equilibrate to oven temperatures – ineffective for long periods.
3. Medical screening and surveillance.
 - Medical questionnaire prior to each campaign re general state of health, any medications, flu, feeling unwell etc.
4. Training and education.
5. Increase in number of workers from 8 to 10 for demolition work to reduce exposure time.
6. Limit entry time.
 - Increase time between entry for better recovery.
7. Work practices.
 - Modify “rip and bust” work practices
 - Cease work if feeling dizzy, nauseous, unwell etc
 - Buddy system – watch your mate for signs of distress etc

8. Supervision

- Lifestyle issues – alcohol, social drugs, smoking, physical, fitness, caffeine, sports drinks need to be managed appropriately.
- Increase fluid intake of approved drinks and have these located at job site.
- Defined rest and recovery area required – needs to be close to job but away from heat

9. PPE

Can they use

- * Ice / cool vests?

“Ice or cool” vests tried - too uncomfortable, have to put on and off too often, previous “reports” of skin irritation from punctured vests, don’t like them restrict our movement.

- * Air cooled suits?

Vortex tube.

Could combine with “head top” to obtain both cooling and respiratory protection.

Issues:

Plant compressed air not suitable for breathing – breathing quality air compressor.

Trailing hoses – red hot bricks – platform, restricted work areas.

Existing helmet was hard to use in oven space easily.

Reluctance to change culture with workers.

- * Refrigerated air?

Concern for brickwork – overcome.

Location of portable unit / plant access concerns.

“Hanging” of delivery tubing.

Reluctance to change culture.