SANITATION AND SAFETY

"Wastewater workers are exposed to about every type of occupational hazard except nuclear radiation.” – OSHA Training Manual

I. Three main hazard categories for OMP personnel
   A. Biological
   B. Chemical
   C. Physical

II. You’re the professional, protect
   A. Yourself
   B. Your workers
   C. Occupants

III. Biological
   A. Bacteria
      1. Diseases
         a. Cholera
         b. Typhoid
         c. Salmonella
         d. E. coli
         e. Shigella
      2. Viruses
         a. Hepatitis A
         b. Norwalk & Norwalk type
         c. Polio
      3. Protozoa
         a. Cryptosporidium
         b. Toxoplasmosis
      4. Helminths (roundworms)
   B. Precautions
      1. Hand washing
         a. Disinfectant soap
         b. Clean water
         c. 30 seconds minimum
      2. Avoidance of skin contact
         a. Protective clothing
         b. Gloves
            1. disposable
            2. heavy, re-usable
      3. Avoid sewage aerosols
         a. Consider a mask
         b. Avoid creating dust plumes in dry bed areas

IV. Chemical hazards
   A. Explosions
      1. Explosive gasses produced by sewage
         a. Methane (natural gas)
b. Carbon monoxide  
c. Hydrogen sulfide  

2. Chlorine tablets  
a. Calcium hypochlorite  
b. Powerful oxidizer  
c. Burns or explodes if exposed to:  
   1. petroleum products  
   2. many other organic compounds  
d. Always store:  
   1. in original, marked container  
   2. away from petroleum products  
e. Fire extinguisher  
f. Always handle with gloves  

B. Confined spaces  
1. What is a confined space?  
a. Areas with:  
   1. poor ventilation  
   2. restricted air movement  
b. Enclosed areas with limited entry  
c. Examples:  
   1. deep pits with open tops  
   2. storage tanks  
   3. pump tanks  
   4. manholes  

2. Dangers include:  
a. Explosion  
b. Poisoning  
   1. Hydrogen sulfide  
      - smell like rotten eggs  
      - more toxic than cyanide gas  
      - dulls sense of smell  
      - kills in seconds  

2. Carbon monoxide  
   - bonds with hemoglobin  
   - blood can’t carry oxygen  
   - Face & body turn red  
   - death can occur in minutes  

c. Asphyxiation  
1. Oxygen & air not the same  
   a. air is ~ 21% oxygen  
   b. can be reduced confined space  
2. Asphyxiation symptoms
a. at 17% oxygen
   - increased breathing rate
   - accelerated heart rate
b. 14-16% oxygen
   - increased breathing rate
   - accelerated heart rate
   - poor muscle control
   - rapid fatigue
   - intermittent breathing
c. 6-10% oxygen
   - nausea
   - vomiting
   - inability to perform
   - unconsciousness
d. >6% oxygen
   - spasmatic breathing
   - convulsive movements
   - death in minutes

3. Precautions
   a. ventilate
      - before entry
      - twenty minutes
   b. don’t work alone
   c. have a rescue plan
   d. DON’T GO IN

V. Physical hazards

A. Heavy objects

1. Crush hands & feet
2. Break bones
3. Precautions
   a. Vehicles
      1. routinely use emergency brakes
      2. block wheels
      3. turn engine off unless you need it
      4. maintain equipment & vehicles
   b. Heavy objects
      1. get help
      2. use mechanical aids
         a. jacks
         b. hoists
         c. cranes
      3. DON’T TRUST IT
         a. use blocks for support
         b. don’t get under it
B. Sharp objects
   1. Cut skin
   2. Puncture wounds
   3. Portal for disease organisms
   4. Precautions
      a. Wear gloves
      b. Remove sharp edges
      c. Cover sharp edges and points
C. Electrical shock
   1. Water and electricity don’t mix
   2. Control panel should be in sight of work area
   3. Disconnect power before beginning work
   4. Don’t run extension cords through standing water