4  Handling of Materials
Improper handling of materials (solids, liquids and gases) is the cause of many accidents. Most of these are preventable if you take a little time to plan ahead and know what hazards may exist.

4.1  Safety Rules for Handling of Materials
SR 4.1.1 Before working with any unfamiliar materials, especially those containing chemicals, read the label for safety instructions. If in doubt, consult your supervisor.

SR 4.1.2 Wear specifically provided individual protective equipment when handling materials that present health hazards such as acids, corrosive liquids or powders, etc.

SR 4.1.3 Store materials in approved containers and locations.

SR 4.1.4 Use chemicals only for approved purposes. Mix chemicals only under controlled conditions using approved procedures.

SR 4.1.5 Use proper tools such as special wrenches, hooks, pry-bars or special handling tools to lift heavy covers, operate heavy valves, etc.

SR 4.1.6 Do not exceed the rated capacity of a hoist or lifting device.

4.2  Safety Procedures to Reduce Accidents
4.2.1 Inspect materials for slivers, jagged edges, burrs, rough or slippery surfaces before handling. 4.2.2 When adjusting or changing grip, set the object down.

4.2.3 Never carry glass under your arm as a fall may sever an artery.

4.2.4 Never carry a load you cannot see over or around.

4.2.5 Carry long objects such as pipe or lumber over the shoulder with the front end as high as possible to avoid striking other employees. When going around comers, call out "Look out! Equipment coming through."

4.2.6 When opening bales or boxes bound with wire or steel bands, take special care to prevent ends of bindings from flying loose and striking the face or body.

4.2.7 When exerting leverage on large wrenches or prying tools, pull rather than push, whenever possible.

4.2.8 Test the weight of the object first and get help if it is too heavy to handle alone.

4.2.9 When several persons are handling heavy materials, one should give voice signals to ensure that all move together and thus receive an equal share of the load.
4.2.10 When two or more persons are carrying materials, all should face forward whenever possible. If a person must walk backward, others should be especially alert to slipping, tripping or bumping hazards and issue appropriate verbal directions.

4.2.11 Avoid getting hands or other body parts pinched between the load and other objects around or near it.

4.3 Proper Lifting Method
Improper lifting of heavy loads causes many injuries.

4.3.1 Get ready:
   a. Size up the load. If it is too heavy or bulky, play it smart -- get help.
   b. Check the load and remove protruding nails, splinters, sharp edges, oil, grease or moisture.
   c. If the surface is rough -- wear gloves.
   d. Know where the load is going and where you are going to put.
   e. Be sure the path you take is clear of obstacles.

4.3.2 Pick it up:
   a. Get a firm footing and good balance; have feet about shoulder-width apart.
   b. If the load is below waist level, bend your knees to get into position. Keep your back as straight as possible.
   c. Grip the load firmly.
   d. Lift the object to carrying position, keeping it close to the body. Let the leg and arm muscles do the work.

4.3.3 Carry it carefully:
   a. If the receiving surface is about waist high, use the edge to take part of the load; then push it forward.
   b. If you lower the load to the floor, bend your knees, keep your back as straight as possible and the load close to your body.

4.3.4 And if you:
   a. Are underweight or overweight,
   b. Have deformation of the spine,
c. Are arthritic,

d. Have had previous injuries to joints,

e. Have special medical problems of any kind (i.e. weak heart, high blood pressure, lung disease, etc.), Be extra careful. Moving heavy objects can be especially dangerous to you.

### 4.4 Hand Trucks

#### 4.4.1 Use the right type of hand truck for the material you are using. If there is a special truck, for example a drum or drawbar truck, it should be used.

#### 4.4.2 When moving materials on hand trucks or dollies, push rather than pull, whenever possible.

#### 4.4.3 Four-wheel hand trucks with swivel axles and tongue are to be pulled.

#### 4.4.4 Watch where you are going when pushing or pulling a hand truck, and slow down at corners.

#### 4.4.5 Allow clearance for your hands when moving through doorways or past other objects. Use truck handles.

#### 4.4.6 Secure help in getting hand trucks up or down inclines to prevent them from getting away from you.

#### 4.4.7 When using trucks, stop at all blind intersections before passing the area.

#### 4.4.8 Always park hand trucks at a spot where people will not stumble over them; leave handles in a vertical position.

#### 4.4.9 Report hand trucks with broken wheels, splintered handles and other defects to your supervisor.

#### 4.4.10 Hand-truck operators are strongly advised to wear foot protection when moving unusually heavy loads/objects.

#### 4.4.11 When using hand trucks, be sure to watch the floor ahead to avoid bumps, cracks, uneven surfaces, etc.

#### 4.4.12 Pile loads evenly. An unbalanced load may shift, causing the hand truck to overturn.

### 4.5 Power Trucks (Forklifts)

#### 4.5.1 Power trucks should not travel with loads above six inches from the floor. Loads should never be lifted or lowered while traveling.

#### 4.5.2 Power trucks (forklifts) must be handled only by properly trained and authorized employees.

#### 4.5.3 Power trucks (forklifts) fitted with an approved safety cage is to be used to lift personnel. Use stationary scaffolding whenever possible.

### 4.6 Hoisting Equipment

#### 4.6.1 All hoists are to have a rated load capacity posted on the exterior of the hoist. Employees are not to exceed the specific limit.
4.6.2 Hoists shall be inspected visually each time the hoist is used. Defects shall be reported and repaired/replaced before further use.

4.7 Storage
Material storage can involve both hazardous and non-hazardous supplies. Minimum safety requirements for handling and storage of hazardous materials include:

4.7.1 Storage racks shall not be loaded in excess of their rated capacities.

4.7.2 Paints, acids, caustics, and solvents shall be stored only in approved locations. In areas not approved for such storage, only working amounts shall be brought into the area for a specific job.

4.7.3 Flammable liquids shall only be stored in safe, closed containers and shall be handled in approved safety cans. Bonding wires or straps shall be connected between the drum and safety can during dispensing operations. Drums shall be connected to grounding straps.

4.7.4 Material shall be stored in a safe and orderly manner on a level surface. Top-heavy, lopsided tiers shall be avoided. Cross-tie and step back high piles.

4.7.5 Heavy objects shall be stored as low as is practical.

4.7.6 Special caution shall be used when materials are stored above waist level. No object shall be thrown or pushed to attain height.

4.7.7 At least 18 inches shall be maintained between fire sprinkler systems and stored material.

4.7.8 Materials containing sharp protrusions shall be stored so they will not constitute a hazard.

4.8 Handling Gas Cylinders
4.8.1 The protective cap over the valve should be kept on when the cylinder is not in use. Tanks not having protective cap must be equipped with protective collar or secured in an upright position.

4.8.2 Never wear greasy gloves or have grease or oil on hands when handling cylinders, especially oxygen cylinders. 4.8.3 Move cylinders with a cylinder dolly and have tanks secured to dolly.

4.8.4 Keep cylinders on end. Strap or chain them securely so that they cannot fall.

4.8.5 Store cylinders away from salt, acids, films or other corrosive substances and away from direct sources of heat.

4.8.6 Use an approved combination cylinder wrench or a crescent wrench not to exceed 10 inches in length to work on a gas cylinder.

4.8.7 After connecting a gas cylinder, test cylinder connection with soapy water to be certain no gas is escaping.
4.9 Hazardous Materials
The use of hazardous or potentially hazardous materials is becoming more commonplace. These can present hazards not only to the user, but to others in the immediate work area if adequate safety measures are not known (refer to UM Campus Safety Manual, Chapter 16 Hazardous Materials Management Plan or see at EHRM website at http://www.umt.edu/research/Eh/materials/hazmat.aspx.

4.9.1 Chemicals
All chemical containers shall be properly identified to avoid misuse and to prevent mixture of incompatible chemicals. Incompatible materials shall not be mixed during disposal operations. Always use original manufacturer's container.

If hazardous chemicals are spilled on clothing, the clothing should be removed immediately; personnel involved should then promptly clean the area of the body contaminated with fresh water. In most cases, decontamination would involve a full-body shower. All chemical burns should be washed with fresh water, then treated as any burn would be treated.

Hazardous liquids shall never be siphoned from a container by mouth.

4.9.2 Solvents/Flammable Liquids
Solvents are solutions used to clean, degrease or dissolve unwanted materials from tools, equipment, etc. Common solvents include naphtha, kerosene, stoddard solvent, trichloroethylene, acetone and alcohol.

Most solvents are toxic to some degree and must be used with adequate ventilation and possible respiratory protection. All solvents, even those considered harmless, can be potentially harmful to the skin if used excessively over an extended period of time.

Protective gloves and clothing shall be worn to prevent extended contact of solvents with the skin. Protective creams or other appropriate measures shall be used where there is a possibility of skin contact. Washing with soap and water shall be done to prevent harmful effects if accidental skin contact is experienced.

Some liquids encountered in Campus and Facilities Services operations are flammable. The flash point of a liquid is the lowest temperature at which it gives off enough vapor to form an ignitable mixture with air and produce a flame when a source of ignition is present.

The use, storage and degree of hazard associated with flammable liquids is dependent upon the temperature and flash point of the liquid.

In case of emergency, please call the following telephone number for hazardous waste information or advice:

    Environmental Health Officer 243-2881

    Office of Public Safety 243-6131
4.9.3 Asbestos

A short excerpt from the January 23, 2009 update of the UM Asbestos O&M Plan can be found in Chapter 17, Asbestos Safety. The complete plan can be found on the Facilities Services website at http://www.umt.edu/facilities/BuildingMaintenance/Asbestos%20Information.aspx