

BP OIL -- TOLEDO REFINERY

Certified	Refinery Wide	Procedure No.: SAF 051
Effective Date: September 1, 2009	Safe Manual Handling of Material	Rev. No.: 2 MOC: M2009701-001
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SCOPE	This procedure describes how to properly perform manual lifting.
HEALTH Special PPE & Special Hazards	Excessive Weight Odd Shapes
SAFETY	Normal PPE
REFERENCE DOCUMENTS	N/A
SPECIAL MATERIALS & EQUIPMENT	N/A
QUALITY	N/A
ENVIRONMENTAL	N/A

OVERVIEW

Improper manual handling of materials cause more injuries such as strains, sprains, fractures, bruises, abrasions and cuts than other work activities. Since manual handling involves much lifting and carrying, these tasks cause most of the injuries. Incorrect lifting alone is the number one cause of back injuries and also accounts for many hand and foot injuries.

Incorrect lifting results from a habit formed during childhood when bending the back to lift was needed to maintain balance. As a person grows older, a back injury is certain to occur if the habit is not broken. To lift properly, it pays to understand how the back functions, to know and practice correct lifting actions and to think before acting.

- 1.0 The Human Lifting Machine
- The back, the legs and the arms make up the body's lifting machine. These parts act in much the same manner as a mobile crane. The backbone or spine which encases the spinal cord acts as a flexible boom. It consists of 26 bones (vertebrae), each separated by discs of cartilage, and all tied together as a unit by ligaments, tendons and muscles. The spine is supported by the pelvic bone that spans the hips, and the whole body from the hips upward is supported by the high strength muscles of the thighs and legs. The back muscle's main function is to control movement of the spinal boom while the leg and arm muscles are designed to take most of the lifting stress.
 - Like a crane's boom, the back is designed to do heavy work within reasonable safe limits, and it is subject to similar lifting stresses. Like cranes, backs differ in their load capacities and when these load limits are exceeded, damage is liable to result. A typical 10-ton crane with its boom 10° from vertical can safely lift 20,000 pounds. But when its boom is 50°, it can safely lift only 5,300 pounds. In this case, a large overload could buckle the boom. In a like manner, when a person keeps his back straight to lift a 70-pound load, the pressure on the base of his spine is 220 pounds. But if he bends over at a 90° angle to lift the same load, the spinal base pressure is 1050 pounds. In this case, his back is liable to severe damage.
 - Overloading the back is likely to produce painful injuries which are slow healing. Heavy strains can stretch or tear ligaments, tendons and muscles. When these are injured, they swell and tend to pull the spine out of vertical. Sometimes they remain weakened and are more readily injured by future work. In some cases, the discs that separate the vertebrae are "squeezed" out of place and require surgery to restore normal function. In some cases, back damage remains for life, a source of much misery.
- 2.0 Safe Lifting Techniques
- Size up the load. But first, are you wearing safety shoes and good gloves? Does the load's shape or bulk make it too risky for one man to handle? Can it be grasped securely? Does it have slivers, projections or sharp edges that can injure the hand or other body parts? Does it contain harmful materials that can splash or spill on the body? Does the load's shape or bulk make it necessary to secure manual or mechanical help?
 - Size up the lift situation. What body position is required by the load's resting level? Can it be safely lifted at its location or will it need to be moved? How high must it be lifted? How far must it be carried? Will there

be safe clearances to life and carry the load?

- Size up the carry route. Where is the load to be placed? What is the best carry route? What footing hazards exist in this route? Can they be removed or is a detour necessary? Are steps, stairs or ramps involved?
- Put on a pair of dry gloves, free of grease or oil and “test lift” the load using the “crouch lift”. Remove any grease or oil that could cause the grip to slip. Can you lift the load without unusual straining? If not, secure help.
- Crouch as close to the load as possible. To do this, set your feet solidly far enough apart to provide secure balance. One foot should be slightly ahead of the other. Keep the back straight and crouch low enough to bend the legs at about a 90° angle to the knees. In some cases, lifting is easier if one knee is lowered nearly to foot level while the other is bent at a 90° angle.
- Keep the back as straight as possible. It may be far forward of the vertical plane but it should not be curved. With the back kept straight, leg muscles are in tension while the back muscles are locked to hold the back rigid.
- Get a firm grip on the load. If necessary slide or pull it away from adjacent objects to avoid hand pinch points. Tip or roll, or raise on side or end of the load enough to slip a hand under it but be wary of pinching if the load is heavy. Be sure you can maintain a firm grip while lifting.
- To lift, straighten the legs and at the same time swing your back to the vertical position. Do not twist the body while lifting, holding or carrying the load. Do not shift or adjust the grip after lifting the load to carrying position. If a change of grip is needed, rest one end or side of the load on a support to do so.
- If the load must be lifted to shoulder level or higher, first raise it to waist level and rest one end of it on a solid object. Then shift the position of the hands as needed to raise the load to the higher level. Bend the knees then straighten them to complete the lift.
- To change direction while carrying the load, turn the whole body, including the feet. If the carry distance strains the arms or hands too much, set the load down, rest and relift. In carrying long loads like pipe, keep the front end raised above head level to avoid striking someone, especially at blind corners.
- To lower the load to foot level, keep the back straight, not necessarily vertical, bend the knees to a crouch position. To avoid pinching the hands, first set one corner or edge of the load down. Remove one hand from the bottom of the load to hold it at a side while the other hand is removed. To place a load in a tight space, lower it to foot level in a clear spot then slide it into place.
- To stack a load, or to place it on a bench or table, first place it on an edge then push it forward enough to safely relocate the hands. Be sure to set a load so it will not fall, tip over or roll off when the hands are removed.

- When two or more people lift the same load, all should be similar in size and strength. One should act as leader to coordinate the “crouch lift”, the carry, and to lower or place the load. All should act together when predetermined signals are given by the leader. When two men carry long objects, they should carry them on the same side and walk in step. It is unsafe to lift and carry some pipe sections by inserting the hand inside the open ends -- sharp unbeveled edges can cut through gloves.
- When moving object, person(s) performing the movement shall avoid throwing or dropping items not designed to be thrown or dropped. Throwing object not designed to be moved in such a manner may produce undue strain on the body, or potentially result in a pinch point injury.

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