

Nebraska Transportation Center Employee Safety Handbook

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Information in this manual relative to the activities of individuals working for the Nebraska Transportation Center has been duplicated from the Nebraska Department of Transportation Safety Manual.

Nebraska Transportation Center Safety Handbook

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Primary Emergency Number: 911

If that number doesn't work try

***55 on a cellular phone or 1-800-525-5555 which is the
EMERGENCY HIGHWAY HELP LINE**

Remote areas of Nebraska may require calling the County Sheriff's numbers shown below.

Plate #'s	County	Emergency #'s	Plate #'s	County	Emergency #'s
14	Adams	402-461-7181	68	Keith	(308) 284-3641
26	Antelope	(402)887-4148	82	Keya Paha	(402)497-3201
91	Arthur	-	71	Kimball	(308)235-3615
85	Banner	(308)436-5271	12	Knox	(402)288-4261
86	Blaine	(308)547-2222	-	Lancaster	(402) 441-6500
23	Boone	(402) 395-2144	15	Lincoln	(308)534-4350
65	Box Butte	(308)762-6464	87	Logan	-
63	Boyd	-	88	Loup	(308)942-3435
75	Brown	-	7	Madison	(402) 454-2110
9	Buffalo	(308) 236-8555	90	McPherson	-
31	Burt	(402)374-2900	46	Merrick	(308) 946-2345
25	Butler	(402)367-7400	64	Morrill	(308) 262-0408
20	Cass	402-296-9370	58	Nance	(308)536-2452
13	Cedar	(402)254-6884	44	Nemaha	(402)274-3139
72	Chase	(308)882-4748	42	Nuckolls	(402) 225-2831
66	Cherry	(402)376-1890	11	Otoe	(402)873-9560
39	Cheyenne	(308) 254-2922	54	Pawnee	(402)852-2969
30	Clay	(402) 762-3528	74	Perkins	(308)352-4564
43	Colfax	(402)352-8526	37	Phelps	(308) 995 5692
24	Cuming	(402)372-6019	40	Pierce	(402)329-6346
4	Custer	308-872-6418	10	Platte	402-564-3229
70	Dakota	(402) 494-7555	41	Polk	(402) 747-2231
69	Dawes	(308)432-0113	48	Red Willow	(308)345-1850
18	Dawson	308-324-3011	19	Richardson	(402)245-2479
78	Deuel	(308)874-3305	81	Rock	-
35	Dixon	(402)755-5608	22	Saline	(402)821-2111
5	Dodge	(402)727-2702	-	Sarpy	-
-	Douglas	-	6	Saunders	(402)443-8142
76	Dundy	(308)423-2393	21	Scotts Bluff	-
34	Fillmore	-	16	Seward	(402) 643-3002
50	Franklin	-	61	Sheridan	-
60	Frontier	(308)367-4411	56	Sherman	(308)745-1511
38	Furnas	-	80	Sioux	(308)247-9280
3	Gage	(402)223-1382			(308)668-2418
77	Garden	(308)772-3540	53	Stanton	(402) 439-2212
83	Garfield	(308)346-5150	32	Thayer	(402)768-6139
73	Gosper	(308)785-2420	89	Thomas	-
92	Grant	-	55	Thurston	-
62	Greeley	-	47	Valley	(308)728-3906
8	Hall	(308) 385-5200	29	Washington	(402)426-6866
28	Hamilton	(402)694-6936	27	Wayne	402-375-1911
51	Harlan	-	45	Webster	(402)746-2722
79	Hayes	(308)286-3364	84	Wheeler	-
67	Hitchcock	(308)334-5444	17	York	(402)362-4927
36	Holt	(402)336-2850	Emergency Highway Help Line		
93	Hooker	(308)546-2290	1-800-525-5555 (star 55 on cellular)		
49	Howard	(308) 754-5433	911	As Primary Emergency #	
33	Jefferson	(402)729-2284			
57	Johnson	(402)335-3307			
52	Kearney	(308)832-2805			

INTRODUCTION

Purpose

This handbook is designed to give the employees of the Nebraska Transportation Center (NTC) an understanding of the priority of protecting its employees from job related injuries or illnesses and to inform and educate employees in areas of preventive safety and health.

The following pages contain highlights of the Safety and Health guidelines for general industry and construction under NTC. It is not intended as a complete manual on safety and health, but is a guide to the prevention of the more common hazards that individuals may encounter during job-related activities with NTC.

Objectives of the Safety Program

Be informed of NTC safety policies and procedures and receive a copy of the Nebraska Transportation Center's "*Safety Handbook*" and consider it as the minimum standard for operations.

Objectives of the safety program are to ensure employees understand procedures to:

- Prevent accidents, which might result in injury or harm.
- Recognize when a medical emergency occurs and provide first aid until advanced medical treatment arrives.
- Prevent damage to facilities and equipment.
- Report job-related illnesses, property and equipment damage to your supervisor.
- Report hazardous conditions to your supervisor.
- Take appropriate action when imminent danger exists.
- Provide a safe and healthy work environment.
- Identify and recognize specific hazards associated with your duties.
- Comply with all warning devices and use equipment safeguards when operating tools, electrical devices, and equipment.
- Comply with all federal, state, and local laws and regulations pertaining to safety.
- Utilize proper "Personal Protective Equipment" when required for your job.

Employees may be disciplined for negligence and failure to follow appropriate procedures and safe work practices.

CHAPTER 1 EMERGENCIES

EMERGENCY WEATHER ACTIONS

- During lightning and thunderstorms, stay indoors or in your vehicle. If outside, stay away from tall trees and metal objects and avoid high ground.
- Follow your local site plans for shelter during a tornado. If on the road seek a safe shelter or as instructed by local emergency management or supervisory personnel.

MEDICAL EMERGENCIES: Recognize the signs and call 911 or the appropriate emergency number for the location in Nebraska (see last page of manual, page 34).

Heart Attack:

- Pressure or pain in the chest lasting for more than two minutes
- Uncomfortable feeling, ache or pain to the left shoulder, shoulders, or radiating down the arm or arms
- Ache or pain in the jaw
- Indigestion, heartburn, or flu-like symptoms
- Sweating profusely
- Shortness of breath

Stroke:

- Difficulty with speech, vision, or walking
- Side of face, arm, or leg paralyzed
- Confusion or loss of short-term memory
- Dilation of eyes
- Trouble breathing
- Severe headache

Allergic Reactions and Poisonings:

- Confusion or dizziness
- Trouble breathing
- Coughing
- Back pain
- Abnormal pulse rate
- Sweating

Seizure: Prevent the victim from injuring him/herself by clearing the area.

- Confusion or dizziness
- Disorientation

- Trouble breathing
- Abnormal pulse rate
- Body may stiffen
- Convulsions
- After convulsion stops: Relaxed state, tired and confused, headache

Diabetic Reaction:

- Confusion or dizziness
- Disorientation
- Deep or rapid breathing
- Abnormal pulse rate
- Convulsions
- If victim is conscious, give some form of sugar. If there is no improvement within 15 minutes or if the victim is unconscious, call 911 or the appropriate emergency number for the location in Nebraska (see the last page of the manual).

Other Serious Injuries include:

- Head injuries or body trauma
- Severe bleeding
- Broken bones, severe strains, and sprains
- Possible neck or back injuries
- Heat-related injuries
- Cold-related injuries

CHAPTER 2

FIRST AID

FIRST-AID

Before treating a victim:

- Check the scene to see that it is safe.
- Identify yourself and ask permission to help the victim.
- Use rubber gloves.
- After first-aid treatment, the injured person should seek medical treatment.

Burns:

- Flush away all traces of chemicals.
- Cool the burn by immediately immersing it in cool (not ice) water or placing under gently running cool water for at least 10 minutes. A clean, cold, wet towel will reduce pain.
- Pat area dry with a clean/sterile cloth.
- Cover burn area with a dry, sterile, non-adhesive dressing to prevent contamination, infection, and keep out air, to reduce pain.
- Seek medical treatment.
- With severe burns, do not attempt to clean. Simply cover with a clean cloth and seek medical treatment.

External Bleeding:

- Locate the source of bleeding.
- Using a sterile dressing or clean cloth, apply direct pressure to the wound.
- Raise the bleeding part above the level of the victim's heart if you do not suspect a fracture and it does not cause more pain.
- If bleeding does not stop or if you need to free your hands, apply a pressure bandage.
- If bleeding still does not stop, apply pressure to the pressure point.

Fractures/Broken Bones:

- If you cannot completely immobilize the injury at the scene by yourself, call EMS.
- Do not move the victim unless the injured area is totally immobilized.

Protecting Yourself Against Infection:

- Hand washing may prevent contamination.
- Use of gloves, glasses, goggles, and face shields (CPR ventilation masks) aprons act as barriers located in the blood borne kit.
- Do not eat, drink, smoke, apply cosmetics or lip balms, or handle contact lenses where you may be exposed to blood or bodily fluids.
- Clean all equipment, tools, and working surfaces.
- Use tongs if picking up broken glass.

- Deposit blood and contaminated materials in an approved container.
- If you have been exposed to blood or bodily fluids, notify your supervisor.
- Seek medical treatment or evaluation if you suspect you have been exposed.

Heat Related Injuries:

Heat Related Injuries

Did you know the heat wave of 1980 killed more than 1700 people in Texas and middle America alone. In the 40 years from 1936-1975, nearly 20,000 people have died of the effects of excessive heat. **There are 6,600 deaths a year related to Heat Stress. If that is not enough to scare you....** The only other weather-related phenomenon that kills more people than Heat Stress is Lightning believe it or not.

The health problems that result from heat stress can be serious and deadly. Heat Stroke, which is by far the most serious.

The mortality rate where individuals do not know how to handle this medical emergency is upwards of 60% - this is serious and frightening.

- **Heat Syncope**, which is fainting from exposure to heat.
- **Heat Edema** is the result of the body not able to dump the salt and water it is ingesting, and usually shows up as ankle swelling.
- **Heat Cramps** is another problem, which is a result of not enough salt.
- **Heat Exhaustion** is another major health problem. In this case there is no sensation of thirst usually because they have been drinking water already, but not enough. The person exhibits headaches, nausea, vomiting, weakness, and anxiety.

Working in the heat: Exercising muscles require more blood, and, when you exercise, your muscles heat the blood. The heated blood reaches the brain and tells the hypothalamus to cause skin vessel dilation and sweating. Heat loss then happens through the mechanisms of direct convection heat transfer from the body to the environment and from the evaporation of moisture from the skin.

The average individual may lose one to two liters of fluid without much decrease in performance. When you become more dehydrated, however, your blood volume decreases and you cannot get rid of the heat load fast enough. You just don't have enough blood volume to supply the skin vessels for sweat production. As a result, the body temperature begins to rise disproportionately as you become more dehydrated. **To handle a lot of heat requires the intake of a lot of fluids.**

When the Heat is On, Exercise Caution!

- **Heat cramps, or muscle cramps**, are due to a loss of fluid and essential minerals needed for proper muscle function. For relief of a painful cramp, squeeze and stretch the muscle. Also, rest in a cool area and drink water or a sports drink.
- **Heat exhaustion** comes on gradually and is due to a decreasing level of fluids in the body. Symptoms may include weakness, vague discomfort, faintness, cold and clammy skin, and a rapid, weak pulse. Rest and fluid replacement are essential for recovery.
- **Heatstroke** is a serious and potentially fatal condition in which the core body temperature rises. Initial symptoms include blurred vision, dizziness and nausea. Untreated, heatstroke progresses to a very high temperature and hot, dry skin. The person becomes irritable or delirious; pulse rate and blood pressure increase. Finally, loss of consciousness may occur. Heatstroke is a medical emergency, so phone for help. In the meantime, keep the person in a cool area, fan the person's body and douse him or her with water. If the person is conscious, give fluids.

PHYSICAL AGENTS

Noise – Temporary loss or “ringing in the ears” is a sign of over exposure. Be aware and recognize noise levels where protection is needed on and off the job. A loss of hearing may be permanent. Examples of noise hazards include:

- Shop operations such as welding, pounding, grinding, cutting, and/or working in the vicinity of these.
- Drilling, concrete and asphalt breaking, sampling, and testing in the field or lab.
- *Rule of Thumb: If you can't hear someone next to you talking in a normal voice and you will be there most of the day, hearing protection is probably needed. How long you are exposed is the key. If you are standing next to, or running a jackhammer, 15 minutes of exposure might create an overexposure without hearing protection.*

Poisonous Plants

Knowing how to recognize poison ivy, oak, and sumac:

- The poison ivy vine or shrub has three leaves and has a dark green glossy waxy appearance.
- The color of the leaves change to a red or orange in the fall.
- Small clusters of flowers grow on the plants. They are white with a greenish tint.
- If the plant bears fruit, it is in clusters, white or ivory with a green tinge, about the size of a pea.
- Unless sensitive, being close will not affect you but burning smoke might cause serious effects.
- Exposure to the plant usually results from contact with the plant or tools such as machetes. The symptoms include a rash within a few hours to a couple of days. The skin turns red, blisters appear and usually itching may be followed by swelling and fever.

Poisonous Insects

Bees, wasps, hornets, ticks, mosquitoes, scorpions, spiders, and fleas can cause pain and spread disease. Check for bites that could cause complications and seek first aid or medical treatment when needed.

Animals

Dogs, cats, poisonous snakes, birds, bats, rats, and other wildlife are encountered on and off the roads both dead and alive.

Insects and animals may carry many diseases such as: Rabies, Lyme disease, West Nile Virus, Rocky Mountain spotted fever, yellow fever, malaria, chronic wasting disease, as well as others.

Wear boots or leg protectors where a high concentration of snakes is known to exist.

Look before stepping and listen for rattler sounds. If heard, stop, identify the snake's location, and slowly back away.

Watch for snakes when climbing, cutting and trimming trees.

Moving rocks or other objects on the ground may cause a snake to strike if it is using the object for cover.

CHAPTER 3

PERSONAL PROTECTIVE EQUIPMENT (PPE)

OVERVIEW:

This chapter provides information about specific items and/or categories of personal protective equipment used to protect and shield you from injury or illness.

GENERAL GUIDELINES

You will be provided with personal protective equipment to use whenever there is a possibility of exposure or injury.

NTC provides the following equipment:

- Hardhat
- Traffic safety vests
- Disposable ear plugs
- Safety goggles
- NTC will furnish additional items or personal protective equipment as necessary.

Your responsibilities:

If your job requires, you must wear safety toe shoes beginning on the first day of work.

- Obtain PPE from your supervisor.
- Wear personal protective equipment when you are involved in a work activity that could cause injury, illness, or exposure.
- Properly maintain your safety equipment.
- Report all defective PPE to your supervisor.

Only PPE conforming to recognized standards (ANSI, MSHA, NIOSH) will be selected and used. Do not substitute other PPE or supply your own. Your supervisors may purchase special PPE for a particular hazard at their own discretion or at your request.

- PPE is a temporary measure. If possible, correct hazards through design, engineering, or other methods.
- When you are issued equipment for the first time or when new devices are introduced, your supervisors will provide training as to how and why the equipment should be used.

PROTECTIVE EYEWARE

You are responsible to wear safety goggles during any work activity that may expose you to an eye injury.

When to wear protective eyewear:

- Near flying particles, chips or dust, splashing liquids (including bodily fluids); bright flashes, glare, and heat.
- While driving any motorized equipment that is not equipped with an enclosure or cab.
- Eye protection will conform to ANSIZ87.1-1986 (R-1998) or most recent edition.

HEARING PROTECTION

Hearing protection shall be used as required to protect you from noise when engineering controls cannot reduce the noise to acceptable levels. Protections against the effects of noise exposure shall be immediately available in those instances where the sound level exceeds 85 decibels.

When your work areas or specific job tasks have been designated as those requiring hearing protection, you must wear approved protective equipment. Personal stereos and headphones are not considered approved hearing protection. Your supervisor is responsible for identifying hearing protection, as well as providing training on the proper use of hearing protection equipment.

Disposable earplugs are the most common type and should be readily available.

Certain work areas or tasks may be designated as requiring additional protective measures. If you have questions about high noise levels in your work area, you should ask your supervisor.

The **NOISE LEVEL** is an exposure to an 8 hour “Time Weighted Average” (TWA) of 85 decibels (dBA). Where controls are not feasible and the noise level exceeds 85 decibels (dBA), wear an approved form of hearing protection. Activities that require hearing protection include operating air tools, power chiseling, and hammering.

HARDHATS

It is your responsibility to wear the NTC provided hardhat while working on or off the highway right of way when there is danger of head injury. Your supervisor may provide additional examples of when to wear a hardhat.

You are responsible for wearing hardhats during any work activity that may expose you to a head injury such as cutting or trimming trees, installing or repairing traffic signals,

and storm damage cleanup. Hardhats will be immediately available for use so that as work conditions change protection is available.

Specific activities, which are exempt from hardhat requirements include:

- When you or your passengers are inside vehicle cabs or under a vehicle/equipment canopy.
- When you are physically operating the instrument on survey crews.

While working on the railroad right of way, you may wear orange or yellow/green hardhats.

Head protection will conform to ANSI Z89.1-1989.

SAFETY VESTS

It is mandatory that a Type II or III orange or yellow green safety vest be worn by all employees on an open or closed roadway, right of way (including railroad), or in close proximity to traffic.

FOOTWEAR

- **Safety toe boots/shoes** are required to protect you when working in areas where there is a danger of foot injuries due to falling or rolling objects, exposure to piercing the sole, or protection against electrical or chemical hazards. If the job requires foot protection, safety toe boots/shoes shall be worn.

New employees who are required to wear safety toe boots/shoes will be required to do so on their first day of employment. This includes all types of employees, probationary, temporary and permanent, part time or full time.

CHAPTER 4

SURVEYING AND SAFETY

SURVEYING OPERATION – GENERAL PRECAUTIONS:

- Before starting work, determine potential hazards from the natural environment, the public, and the contractor's operations. Plan accordingly.
- During:
 - Be extremely cautious around heavy and fast moving equipment, especially on haul roads and around equipment with limited driver visibility. Do not rely on operator's visibility, judgment, or ability. Make eye contact with the operator before walking in front of or behind any piece of equipment. Use lookouts as conditions dictate.
 - Display and use safety devices and gear as required and as needed.
 - Notify the project manager of any unsafe operation or condition on the project.
 - Do not ride in or on contractor's construction equipment unless required by your job and the equipment is designed for.
 - Do not walk girders or along edges of raised platforms without guardrails, safety nets, or fall protection personal gear used.

Transportation and Traffic Ground Surveying Work:

- No matter how short the duration, work must not be performed on or adjacent to the traveled way without proper protection. This includes attire, signs, flaggers, "lookouts," and/or lane closures, as required by the current edition of the "Manual on Uniform Traffic Control Devices."
- Wear seatbelts when being transferred from one location to another.
- Do not ride on the fender of a vehicle and equipment or store loose items in vehicles that can become hazards.
- Protection is needed between supplies, tools, and passengers in vehicles.

Parking:

- Vehicles shall be legally parked, back from the edge of traffic lane, and preferably off the shoulder in rural areas, at a distance of 30 feet from the traveled way, if possible.
- Directional flashing lights, flashing beacons, and warning signs shall be used as prescribed in MUTCD.

Traffic Hazards:

- When using survey instruments, "set-up" in the roadway only when absolutely necessary.
- Instruments should be erected or taken down clear of traffic lanes. An instrument shall not be left unguarded and shall be protected with cones.

- Use offset lines for cross-sections and topography where traffic is above slow speed.
- Flag all sighting poles when setting inside shoulder lines.
- Avoid letting nails protrude above ground where vehicles travel.
- Do not permit vehicles to run over chains or tapes.

The need for lookouts can depend on one or more factors for a given survey operation or a particular observation.

- Common factors which influence use of lookouts are:
 - Location of instrument setups
 - Type of highway
 - Vertical alignment
 - Horizontal alignment
 - Traffic volume
 - Prevailing speeds
 - Type of survey
 - Traffic controls used
 - Construction activity
 - Proximity to actively used railroad tracks.
 - Vegetation, relief, roadway geometrics, and other conditions that restrict sight distance

Survey work shall not begin until required lookouts are in place. Lookouts can be necessary when working within lane and shoulder closures as well as street intersections and on construction projects. In these instances, a lone surveyor cannot physically perform an observation and continue to “watch” all possible moving hazards.

Personnel who could otherwise lookout for others would be prevented from doing so by restricted sight distance. Three conditions, which often severely restrict sight distance, are:

- Cut banks and vegetation along horizontal curves.
- Sharp crest vertical curves.
- Blind curves.

Sight Distances – Personnel or their lookouts must be able to see approaching traffic at minimum distances from the location of a surveying operation or observation.

Always remove the plumb bob when carrying an instrument and do not attempt to climb a fence or other obstruction with the instrument over your shoulder or in your arms.

Working Near High-Tension Wire:

- Extreme caution shall be taken to prevent contact with any survey equipment.
- Nonconductive rods shall be used whenever possible.

- A survey steel tape shall not be thrown on or placed where wind or other conditions may move it into contact with electrical wires or constitute a hazard to traffic or other workers.
- Where there is any question of the danger involved in measuring heights of wires, consider using the trigonometric method.
- Power line elevations – Do not make a “direct” measurement of the height of a power line, even with a fiberglass rod. Triangulate these vertical distances.
- When a contractor is guying his leads near power lines, you may need to warn them.

Boots or high-top safety shoes should be worn for the following reasons.

- Added strength to ankles.
- Better protection from axes, chain saws, corn knives, etc.
- Snake bites.
- Tick bites.

Do not drive nails or benchmarks or ties into telephone or power poles at a distance greater than one foot above the ground level.

Laser Operations:

Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.

Employees wear proper eye protection where there is a potential exposure to laser light greater than 0.005 watts (5 milliwatts).

Beam shutters or caps used, or the laser turned off, when laser transmission is not actually required. Turn off the laser when unattached for a substantial period of time, such as during a lunch break, overnight, or at a change of shifts.

Areas in which lasers are used shall be posted with standard laser warning placards.

Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.

The laser beam shall not be directed at employees.

When it is raining, snowing or when there is dust or fog in the air, the operation of laser systems shall be prohibited where practical. In any event, you shall be kept out of range of the area of the source and target during such weather conditions or have PPE that will protect for the specific wavelength of the laser and be of optical density (O.D.) adequate for the energy involved.

Laser equipment shall bear a label to indicate maximum output.

You shall not be exposed to light intensities above:

- Direct staring: 1 micro-watt per square centimeter;
- Incidental observing: 1 milliwatt per square centimeter;
- Diffused reflected light: watts per square centimeter.

Laser unit in operation should be set up above the heads of the employees when possible.

CHAPTER 5 WORK ZONE TRAFFIC CONTROL

NOTE: IT IS HIGHLY RECOMMENDED THAT NTC STAFF MEMBERS DO NOT PERFORM FLAGGING OPERATIONS FOR RESEARCH PROJECTS. CONTACT LOCAL AUTHORITIES FOR ASSISTANCE WHEN FLAGGING IS REQUIRED.

WORK AREA TRAFFIC CONTROL – FLAGGER:

When you are flagging traffic in a work zone, you are responsible for the safety of the workers, traveling public and pedestrians. You will guide them safely through the work area.

- Only Certified Flaggers will be used to control traffic. You must complete the ATSSA approved NDOT flagging module.
- You will be monitored periodically to ensure you are using safe and proper practices in traffic control.
- You will have in your possession while you are flagging a copy of the “NDOT Flaggers Handbook”

Rules of conduct:

The image you project can affect the public’s attitude toward the whole project and your organization.

- Be neat in appearance.
- Do not leave your position to talk to the work crew, motorists, or pedestrians.
- Be friendly and polite to the public.
- Never argue with the occupants of a vehicle. Be courteous, but brief and factual in your conversation with them.
- If a driver refuses to obey instructions, report the following information to your supervisor as soon as possible without deserting your post.
 - General description of car and driver.
 - Vehicle license number.
 - Circumstances involved in the incident.
- Be alert to the needs of emergency vehicles. They should be given priority of passage but only when their safety will not be compromised.

Clothing:

- Shirt with sleeves, trousers, but not shorts or cutoffs. Do not wear sandals.
- ANSI/ISEA Class 2 orange or yellow-green vest with reflective material.
- An orange or yellow-green cap or hardhat.

Tools you will be equipped with:

- A standard combination “STOP/SLOW” pole-type paddle sign described below.
 - Size: Minimum 18” x 18” octagon sign with a 5’ ridged handle.
 - Color: STOP sign- Red background with white letters (6” series C) and border, fully reflectorized SLOW sign – Orange diamond shaded background with letters (6” series B) and black border outside of diamond shape.
- Nighttime flagging requires proper illumination of flagger and equipment.
- In emergency situations where the standard sign is not available, you may use a red flag, lantern or flashlight (if appropriate) in accordance with instructions for nighttime flagging.

Flagger’s Position:

- General Guidelines:
 - Be alert at all times. Do not be distracted by the work operation.
 - Be on your feet facing oncoming traffic.
 - Stand where you are highly visible at all times. Do not stand in the shadows or near parked vehicles or equipment that might hide you from approaching drivers.
- Your flagging station should be located about 200-300 feet in advance of the worksite. Factors such as visibility, speed and volume of traffic, condition of the road, and the work being done should be considered in determining your proper location
- In urban areas with reduced speed zones, the flagging station should be 50-500 feet from the worksite.
- A single flagger may be used for minor pavement repair, guard installation, or other work where the length of work area is less than 100 feet, the traffic approaching the open lane shall be allowed to flow freely. You, the flagger, will stop the first vehicle in the closed lane, then cross the traffic lane to stop other vehicles.
- With two flaggers (one on either end of the work area), you should always be able to see each other or use two-way radios to communicate to each other. In such cases, one flagger is always in charge; the other flagger coordinates their activities accordingly.

Flagging to Stop Traffic:

- Hold the stop sign erect and away from your body. *Never wave the sign.*
- Look directly at the approaching driver.
- Raise your free arm with the palm of your exposed hand to the driver.
- Bring the vehicle to a full stop.
- After the first vehicle has stopped, move to a spot (near the centerline) where you can be seen by other approaching vehicles.
- Stop all remaining vehicles, following the above instructions.
- CAUTION – Never turn your back on traffic.

- Remain in this position with the “STOP” sign facing traffic until you can permit travel through the work area.

To Stop Traffic During the Day:

- Stand in a safe position on the shoulder facing traffic.
- Extend the flag into the traffic lane.
- Look directly at the approaching driver.
- Raise your free arm with the palm of your hand exposed to the driver and bring the vehicle to a stop.
- After the first vehicle has been stopped, move to a spot where you can be seen by approaching vehicles, preferably near the centerline of the roadway.
- Stop all approaching vehicles, preferably near the centerline of the roadway.
- Remain in this position with the flag extended until you can permit the traffic through the work area

To Slow Traffic During the Day:

- Stand in a safe position on the shoulder.
- Slowly wave the flag in a sweeping motion from the 6 o’clock position to the 9 o’clock position and back again. Do not raise your arm above the horizontal position.

To Release Traffic During the Day:

- Move to a safe position on the shoulder, keeping the flag in a 9 o’clock position.
- Lower the arm to a 6 o’clock position. With your free-hand arm, signal the drivers to proceed.

Flagging to Release Traffic:

To release traffic into the left lane:

- Remain standing near the centerline, turn the “SLOW” side of the sign to face stopped vehicles.
- With your free arm, signal drivers to proceed in the left lane. *Never wave the sign.*
- After all vehicles have passed, return to your original position on the shoulder to await the next vehicle.

To release traffic into the right lane (two-way traffic):

- When releasing traffic on a two-lane highway where traffic is stopped temporarily in only one lane, (such as for loading or unloading operations), care must be taken not to confuse continuous traffic traveling the opposite direction.
- Turn the sign so that motorists approaching from either direction cannot read the “STOP” or “SLOW” sign. The legend “STOP” should face the flagger.

Flagging to Slow Traffic on Multilane Roads:

When slowing traffic follow these directions:

- Use a STOP/SLOW paddle (octagon shape).
- Stand in the lane adjacent to the traveled roadway 0-50 feet in advance to the work activity.
- For an emergency, a red flag may be used to slow traffic on a multilane road only until a STOP/SLOW paddle becomes available.

Flagging at Haul Road Intersections:

- Generally, traffic control procedures are the same for haul road intersections as for other work areas.
- When trucks are making a right turn onto the highway, only one flagger is required.
- When trucks have the right-of-way and are crossing the highway or making a left turn, two flaggers are required to control traffic, one in each direction.

Flagging for Pilot Car Operation:

- Work is often performed over a long section of highway. When the flagger at the opposite end is not visible to you, a pilot car may be used to escort vehicles through the work area. Use the following directions when a pilot car is being used:
 - Stop the vehicles in the approved manner.
 - Detain all vehicles until the pilot car arrives from the opposite direction.
 - Be alert to prevent vehicles from pulling out of line and trying to pass other waiting vehicles.
 - After the pilot car arrives and pulls into position at the head of your column of vehicles and the opposing traffic has cleared, step back onto the shoulder.
 - With the "SLOW" sign facing traffic, motion the pilot car driver and others to proceed.

Nighttime Flagging:

Clothing and Equipment

- Effective nighttime flagging requires a well-lighted flagging station and the following items:
 - Reflectorized STOP/SLOW paddles and advanced signs.
 - A vest with reflectorized strips.
 - An orange or yellow-green cap or hard hat.

When flagging to stop traffic at night:

- Stand in a safe position on the shoulder facing traffic.

- After the first vehicle has stopped, move to a position near the centerline so that drivers approaching from the rear may see your signal.
- Request the first driver to activate their hazard flashers.

Flagging to Release Traffic at night:

- Follow the procedure for daytime flagging.
- Using the red lantern or flashlight, motion the drivers to proceed.

EMERGENCIES:

- In emergency cases, immediate action to protect the safety of the public is required. Therefore, full compliance with these procedures listed may not be immediately provided. Nothing in this section shall be interpreted as requiring a person or agency to delay immediate action. Proper traffic control shall be provided as soon as possible.
- Where the STOP/SLOW paddle is not available, a red flag (preferably having dimensions of 24" x 24") shall be used in regulating traffic in emergency situations.
- If an emergency vehicle, such as an ambulance, approaches with its lights and siren operating, immediately contact the flagger at the opposite end of the work area and advise that an emergency vehicle is in the area.
- Determine how many vehicles have been released and are now coming through the area from the opposite direction.
- Inform the motorists that are stopped they must remain stopped until you release them. Tell them not to follow the emergency vehicle.
- Advise the emergency vehicle driver of the number of vehicles still coming and that you will release the vehicles immediately after it is safe to do so.
- If possible, have our workers in the work zone expedite the motorist coming from the opposite direction through the area.

CHAPTER 6

MATERIAL HANDLING AND STORAGE

Manual Material handling is a leading cause of injury. **Overexertion** is the single most critical factor in employee injuries. To minimize overexertion:

- Allow the use of mechanical assists.
- Improve your grip, keeping your hands/wrists in the bowling grip position and your arms in a non extended position during the lift. *The power zone is the vertical arc swing of the forearm and hand with the elbow at the side.*
- Avoid bending, twisting, and reaching while lifting, pulling, or standing.

Training and Safe Lifting:

Musculoskeletal disorders (**MSD's**) also affect fingers, hands, and shoulders. The most effective means of minimizing these is to:

- Recognize the symptoms.
- Identify which jobs have the most potential for injury.
- Know or learn how to control these, such as going from a 100 to 50 lb. bag of concrete, etc.

BEFORE YOU LIFT

- Always warm up before you lift any load to prevent muscle strains and pulls.
- Stretch your back with upward reaches and continue to loosen tight muscles with simple side and back bends.

LIFTING SAFELY

- Use mechanical assistance whenever possible.
- Roll, push, or pull the object to its destination.
- Redesign the task to eliminate the lift.
- Let your abdomen, legs, and buttocks do the work.
- Get close to the load. Grab the load safely with your hands placed under the object.
- Bend your knees, with feet slightly spread, for balance and stability.
- Keep your head, shoulders, and hips in a straight line as you lift.
- Do not twist.
- Reverse these steps when you set a load down. Move slowly and smoothly without twisting
- Do not twist to change direction. Turn your entire body, including your feet.
- Never lift from a sitting position. Sitting puts more pressure on the spine. Stand before you lift.
- Push rather than pull a load.

- When the object is too heavy for one person to lift, admit it, then get help.

KEEP THE PATH CLEAR

- Before you lift, clear the path you plan to follow.
- If you can't see over the load, don't carry it.
- Use mechanical help (pushcart, hand-truck, wheelbarrow) if the load is heavy or bulky.
- Know where the load/item is to be placed.

Special Note about Back Belts: Back belts shall not be purchased as personal protective equipment. NDOT does not recommend the use of back belts to prevent injuries to uninjured workers and does not consider back belts to be personal protective equipment. There is insufficient evidence to support that back belts prevent injury. NTC follows NDOT's opinion.

You may use a back belt only if your doctor's prescription has specifically indicated that you should use a back belt for specific work activities.

Evaluate container sizes and weight to maximize the "weight to lift frequency ratio." Smaller weights handled with a higher frequency are not always better. Weight guidelines are available (NIOSH) but many variables may make them difficult to calculate. Anything over 75 pounds may require two people to lift. In addition:

- Consider rotating employees in and out of activities that require a significant amount of lifting.
- Encourage employees to participate in activities that stretch and straighten the muscle groups used during lifting.

Housekeeping is essential in maintaining safe working conditions. It is essential to have a place for everything in place, including organizing materials, tools and equipment used in your work. You can make a difference, and your actions can affect others on your work team.

Guidelines in Maintaining Safe Working Conditions:

- Keep your work area clean and material properly stored; keep walkways and floor areas clear of slip, trip, and fall hazards.
- Place all waste and debris in designated containers for proper disposal.
- Clean up all spills.
- Store oily waste rags and other flammable waste in approved safety containers with lids.
- Maintain three (3) feet clearance from all electrical panels. Do not store materials in or near switch boxes, switchboards, mechanical equipment rooms, attics or next to telephone switchgear.
- Do not obstruct access to fixed ladders, stairways, electrical switches, fire fighting, rescue or any emergency equipment.

- Keep tools stored neatly in designated area and materials securely racked or stored.
- Do not block or obstruct exit routes.

Racking and shelving are common ways of storing parts and equipment. Items should be stored based upon weight and frequency of use. Items needed frequently should be placed at knee to shoulder height. Cantilever shelving may be used to store blades, steel, or other type supports for sanders not being used. Pallets are frequently used for materials in our yards. Pallets should be stacked properly to prevent tipping.

CHAPTER 7 OFFICE SAFETY

Office environments are more hazardous than commonly assumed. Many accidents occur due to office routines. When office hazards exist that cannot be eliminated, consider engineering and administrative procedures to control the hazards.

This chapter applies to everyone, but its primary focus is on the individual who works in an office setting. Office work areas are subject to several safety and health regulations contained in the National Fire Protection Association (NFPA) Codes, American National Standards Institute (ANSI), and the National Electrical Safety Codes (NESC). Additionally, state offices are also subject to the requirements of the Uniform Building Code (UBC).

General Guidelines:

Supervisors are responsible to insure a safe and healthy work environment. To fulfill these responsibilities, supervisors are required to conduct routine safety inspections, safety meetings, and to discuss safety and health issues. These responsibilities apply to your office and when you are directed to leave your office, walk to another near-by office, or drive a motor vehicle to another location.

Know the emergency plan for your work area. Request a copy of the Emergency Response and Evacuation Plan from your supervisor.

Spills should be quickly and adequately cleaned, especially when oil and grease are involved. Serious falls can result when spills are not adequately cleaned up.

Broken glass, light bulbs, or other sharp objects should not be discarded in wastebaskets that are used for disposal of other materials. Sharp material should be discarded in a cardboard box and be marked "broken glass."

You will promptly (by the end of the work shift) report all injuries, illness, or unsafe conditions to your supervisor.

Ergonomic Programs:

"Ergonomics" programs aim to reduce musculoskeletal disorders (**MSD**), often caused by repetitive motion. This is one of the largest occupational safety and health problems in the office and all employee work environments.

Administrative Controls – Includes changes in work assignments, work schedules, and work duties. It also includes limiting your working exposure, measuring performance, training, housekeeping, and maintenance.

Musculoskeletal Disorders (MSD) – Any physical disorder that develops from or is aggravated by cumulative stress to tissues and joints.

MSD Risk – The presence of work activity factors that contribute to MSD:

- *Frequency*: The rate at which specific physical motions or exertions are repeated.
- *Force*: Physical exertion by or pressure applied to any part of the body.
- *Posture*: The position of a body part during work activity.
- *Exposure*: Exposure to environmental factors (cold, vibration) and other stress factors.

Engineering Controls - Includes devices such as adjustable workstations, tables, chairs, equipment, keyboard, and tools; or physical modifications to workstations, equipment, tools and production processes.

Visual Display Terminal (VDT) - Any devices or set of devices used with keyboard and cathode ray tube or other electronic devices used for entry or display of data, words, numbers, and symbols.

Work Areas:

Work areas should be based on body dimensions using the following principles:

Head height:	allow for tallest worker and natural posture.
Elbow height:	adjust normal work surface to just below elbow height.
Arm reach:	allow for shortest co-worker when reaching up or out; allow for tallest worker when reaching down.
Leg length:	allow for long legs; provide chair adjustment for footrests for shorter legs, or a footrest.
Body bulk:	allow for largest sizes; remember to consider varying girth and clothing bulk.

The most favorable working height for handwork, while standing, is 2 to 4 inches below elbow level. On average, working heights of 37 to 39 inches are most convenient for men and 35 to 37 inches for women. You must also allow for the nature of the work:

- For delicate work, such as drawing, it is desirable to support the elbow.
- For standing work, if it involves much effort, and makes use of the upper part of the body, such as mailing/file handling, the working surface needs to be lowered 6 to 16 inches below elbow height.

Glare is the reflection on your VDT screen that makes it hard to see the screen clearly. Glare can be caused by sunlight on your screen, or by inside light, such as overhead and task lamps. Simple lighting adjustments can help minimize and reduce eyestrain headaches caused by glare.

- Position the screen so that it is at a right angle to the window producing the glare.

- Close shades, curtains or blinds, if necessary, as light changes during the day.
- Tilt the VDT screen down slightly to avoid overhead light from producing glare.
- Sit with ceiling lights at sides rather than directly overhead.
- If you use a task lamp, position it to aim the light at your document instead of your screen.
- Periodically clean your screen to maximize clarity. Front characters on the screen should be clear and stable.
- Consider attaching a glare shield to the VDT screen if you are unable to eliminate the glare by other means.
- Keep the VDT screens clean.

Proper VDT use, including proper posture and workstation adjustments with careful attention to muscle and eye fatigue, will help prevent musculoskeletal and visual problems.

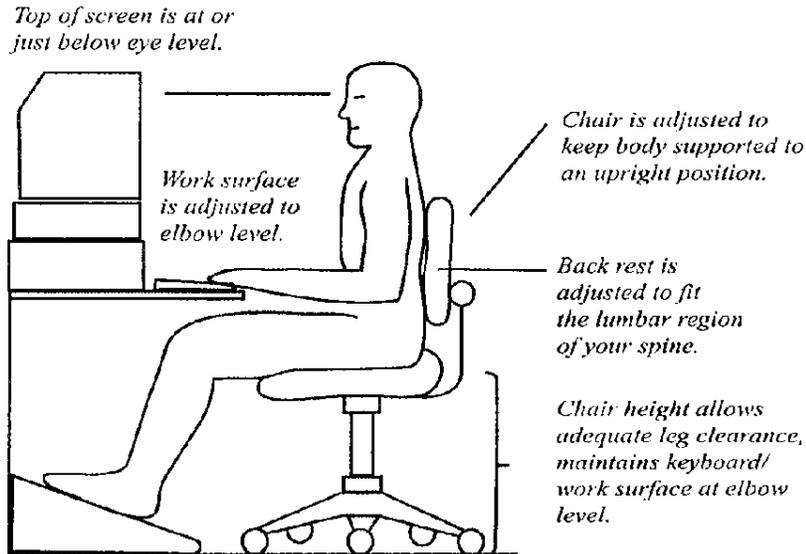
Adjusting Your Chair and Workstation:

- Adjust lumbar (lower back) support by moving the back rest up or down to match the inward curve of your spine.
- Adjust the tilt of the back rest and/or seat to keep your body supported in an upright position.
- Adjust the seat height for adequate leg clearance under the workstation and keep the keyboard at approximately elbow level.
- Adjust your monitor so that the top of the screen is at or just below eye level and is a viewing distance of between 18" and 24".
- Use a document holder that places the documents at the same height as the monitor.

Proper Body Posture:

- Keep your head in line with your shoulders and hips.
- Keep elbows close to your body.
- Keep wrists in a neutral position; bent no more than 10 degrees up or down.
- Keep your knees at the same level as your hips or slightly higher.
- Keep feet flat on the floor or supported by a foot rest.
- A keyboard and padded wrist rests can be used to support the wrists in a neutral position.
- Keep fingers in a relaxed position when working.
- Avoid extreme finger extensions.
- Reassess your workstation periodically.

The following illustration represents guidelines that promote safe workstations.



Filing Cabinets:

- Drawers should be closed except when in immediate use.
- Always load from the bottom up, and to prevent cabinets from tipping over, never have more than one drawer of the same file cabinet open at a time.
- Avoid overloading top drawers.
- Close drawers gently using the drawer handles to prevent pinching of fingers.
- If a drawer is solidly stuck, contact those responsible for Facility Maintenance.

Material/Office Supply Storage:

- Storage of office supplies should be done in appropriate areas set aside for that purpose and not where they will contribute to injury.
- Only items, which can be solidly stacked on top of cabinets, are permitted.
- Store heavy or breakable items on lower shelves and in front.
- Do not over load cabinets.

Do not:

- Store materials on top of modular furniture overheads or cabinets.
- Store materials above the level of your shoulders.
- Place objects such as flower pots and vases on window sills or ledges.
- Place card index files, dictionaries, or other heavy objects on top of file cabinets greater than 5' tall.
- Use storage boxes (cardboard boxes) as room dividers.

- Use walkways, hallways, stairwells, and landings for storage. Walkways and hallways should be maintained free of all obstructions or impediments for use in case of an emergency.

NOTE: If materials (office supplies or records) have to be stored in cardboard boxes, they must be piled, stacked, or racked in a manner designed to prevent them from tipping, falling, collapsing, rolling, or spreading.

Cutting and Attaching Equipment:

- Paper cutters must be equipped with safety bars. The blade spring tension must be adjusted so that the blade will not fall on its own weight. The blade must be stored in the down and locked position when not in use.
- Do not attempt to forcefully discharge jammed staplers with the paper-rest opened.
- Razor blades, Exacto blades and other pointed objects are to be boxed and stored separately. Never reach blindly for such items.

Office Furniture and Equipment:

- You shall be provided with furniture and equipment that meet state standards.
- All legs of a chair will rest on the floor. Do not tilt back to the extent that a chair leg comes off the floor. This could cause a personal injury.
- You will check chairs monthly for loose screws, defective welds, and broken springs.
- Your chair should comfortably support your lower back, should not brush against your inner calves, and should allow your feet to rest on the floor. If your chair is not adjustable, a pillow behind your back and/or a phone book under your feet can help provide additional support.
- You will not stand on chairs, desks, trash receptacles, or bookcases. Stepladders, properly extended, or approved lockable stands will be used for extending one's reach.
- Desk drawers should not be left in an open position.
- Glass desktops should be free from cracks, sharp edges or corners, and chipped or broken edges.
- Defective, broken, splintered or cracked surfaces of any office furniture should be reported to building maintenance personnel for immediate repair.
- If you are required to move such office furniture or equipment, when the weight or size of the items exceeds your physical capabilities, additional personnel will be used.

Electrical Equipment and Cords:

- Office work areas are subject to the National Electrical Safety Codes (NESC) in the State of Nebraska. The following represents some of the pertinent electrical safety standards.
- Electrical power cords for computers, printers, or other devices shall not be placed on the floor unprotected or where they may create a tripping hazard. Such cords if placed in areas where you must walk must be covered with a protective strip to prevent tripping.
- Only UL approved electrical cords will be used.
- Only those responsible for Building Maintenance will repair any electrical cords.
- All equipment should be grounded.
- Electrical extension cords are permitted, but shall not be used as a substitute for fixed wiring. New electrical outlets should be installed to eliminate the need to have an excess of appliances on a single circuit.
- Portable heaters are discouraged. If used, these must be equipped with an automatic shutoff and comply with NTC policies.

Machine and General Office:

- Office machines will be turned off and unplugged prior to being serviced or when adjustments must be made to the mechanical or electrical enclosed portion. Only qualified personnel will service or make adjustments to office machines.
- Report to your supervisor electrical hazards such as frayed or bare wires, overloaded outlets, or improperly grounded wires. Provide a report to those responsible for building maintenance.
- Wear gloves when using toner or other chemicals used in office machines. Wash hands immediately after use.
- Do not add flammable liquids to energized equipment. Turn equipment off prior to adding these liquids.
- The document cover should be down during copying to avoid blinding.
- Rings, bracelet, neckties, long strands of hair, and other loose personal materials could be hazardous around exposed moving parts of office equipment. Please exercise caution to prevent accidents.

SPACE REQUIREMENTS:

The minimum space requirements for aisles and hallways are based on the Nebraska State Fire Marshal, Life Safety Code of the National Fire Protection Code (NFPA) and the construction standards contained in the Uniformed Building Code (UBC). The minimum requirements for office areas are:

OFFICE/WORK STATIONS. It requires unobstructed walking space between and around desks, chairs, bookcases, file cabinets, credenzas, and other general office furniture or equipment, and/or wall partitions. The wall partitions may be portable or permanent.

HALLWAYS/WORKING/COMMON WORK AREAS. Both the NFPA and UBC have established a 44-inch minimum width for routes of travel by persons with disabilities. The 44-inch standard applies to all types of hallways and walkways, e.g, used as exits to work areas or offices. Designated hallways and walkways may be wider than 44 inches, but must have at least 44 inches of unobstructed walking space.

Stairways shall be clear of tripping hazards and in good repair. All stair tread surfaces shall be slip-resistant. Stairways shall have handrails on at least one side.

Exit signs and /or directional signs shall be provided at every exit door, at the intersection of corridors, at exit stairways or ramps, and at other locations as necessary to inform occupants of the means of exit. Exit signs will be maintained in a working condition.

Door openings should be kept clear. Doors marked as “Fire Door, Do Not Block,” or other special notice should not be changed or altered. Solid doors (without windows) can present hazards because they can be approached from both sides at the same time. You should be warned of this hazard and instructed to:

- a) approach solid doors slowly,
- b) stay out of the path of an opening door, and/or,
- c) reach for the doorknob to avoid contact with the body and arms.

CHAPTER 8: NEAR MISSES/CLOSE CALLS

All emergencies, work-related injuries, and damages to equipment/property must be reported to an NTC supervisor immediately. Maintaining a safe work environment requires employees to take precautions and report any situations or environments that have the potential to cause harm or damage. Employees should report any misses/close calls to a supervisor so that contributing factors can be identified and abated before they result in personal injury/illness or property damage. A near miss/close call is an incident where no property was damaged and no personal injury sustained, but where, given a slight shift in time or position, damage and/or injury or illness easily could have occurred. There is no risk of repercussions for reporting an incident or potentially hazardous situation.

In addition to remedying near miss/close call situations, supervisors are encouraged to officially report any near misses/close calls to UNL by calling 402-472-4925 or completing the form at: <https://ehs.unl.edu/near-missclose-call-incident-reporting-form>.

CHAPTER 9: GENERAL EMERGENCY PREPAREDNESS PROCEDURES FOR PROJECT STUDY WORK

The following emergency information card will be with the employee at all times when performing work outside the office for NTC related projects (see example).

Example:

Name and Position:

Employer: University of Nebraska-Lincoln Civil Engineering (CE)

Work Address: Nebraska Transportation Center (NTC)

Prem S. Paul Research Center at Whittier School

2200 Vine Street

Lincoln, NE 68583-0851

Emergency Work Contact Numbers:

Larissa Sazama, 402-472-1926

Personal Emergency Contact 1 Name and Phone:

Personal Emergency Contact 2 Name and Phone:

When an employee is scheduled for work outside the office (with the exception of standard travel to meetings, etc), it is his/her responsibility to research the necessary resources to find the appropriate emergency phone number for assistance along their proposed route and at the work site. The general 911 number will not work in some remote areas of Nebraska. The county sheriff's office or state patrol may be the closest source of assistance (see handbook directory for office personnel and emergency numbers on page 34).

It is the employee's responsibility to have at least one fully charged cell phone available and to check service when arriving at a study site. If cell service is not available, the employee is responsible for being familiar with the route to the closest town or other phone resource (Quik Shop, etc).

It is the employee's responsibility to assure that the first aid kit is taken in the vehicle and that it is fully stocked with safety equipment upon departure.

DO NOT text, talk on the phone, or engage in any other distracted driving behaviors when traveling to and from a work site.

One copy of the safety handbook should be taken along on each work mission and kept in the vehicle.

