

OUCH!

First Aid & Trauma Care for The Land Surveyor

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Trauma Services



Disclosures

- *No conflicts of interest*
- *No financial disclosures*



Trauma: The Basics

Trauma Facts & Figures

- The leading cause of death for all humans, age 0 – 45 years
- Fourth leading cause of death overall for all ages
 - *Estimated 79,000 deaths annually in the U.S. from trauma*
 - *An American dies every 3 ½ minutes from traumatic injury*
- 41 million Emergency Department visits each year in the U.S.



Injuries in Pennsylvania

2021 Data:

- Published November 2023
 - [Injury County Profiles 2021.pdf \(pa.gov\)](#)
- Total Injured: 137,492
 - Males (all ages): 67,548
 - Females (all ages): 69,927
- Mechanism
 - Falls: 79,482
 - Motor Vehicle Collisions: 6,350
 - Firearm: 2,326



Surveyors' Injuries – The DATA



Two Types of Trauma: Blunt & Penetrating

Types of Trauma: Blunt & Penetrating

Blunt:

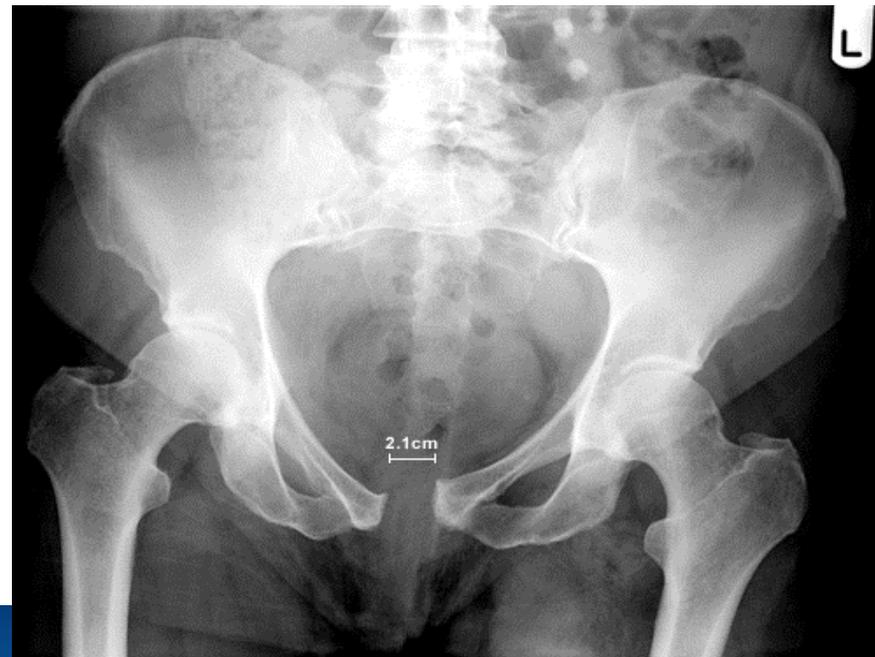
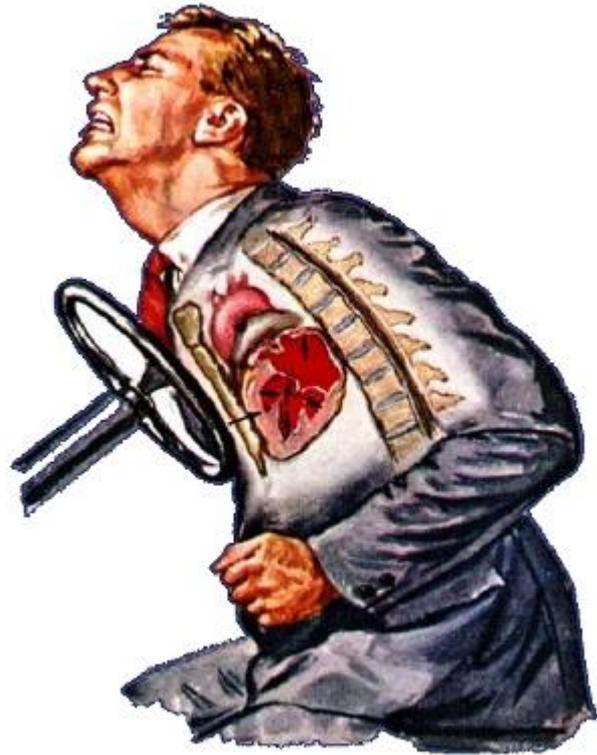
- “An injury to the body caused by forceful impact, injury, or physical attack with a dull object or surface”
 - *Ex: Fall out a second story window, landing on sidewalk below.*
 - *Ex: Motor vehicle collision, head on – driver hits the steering wheel*

Penetrating:

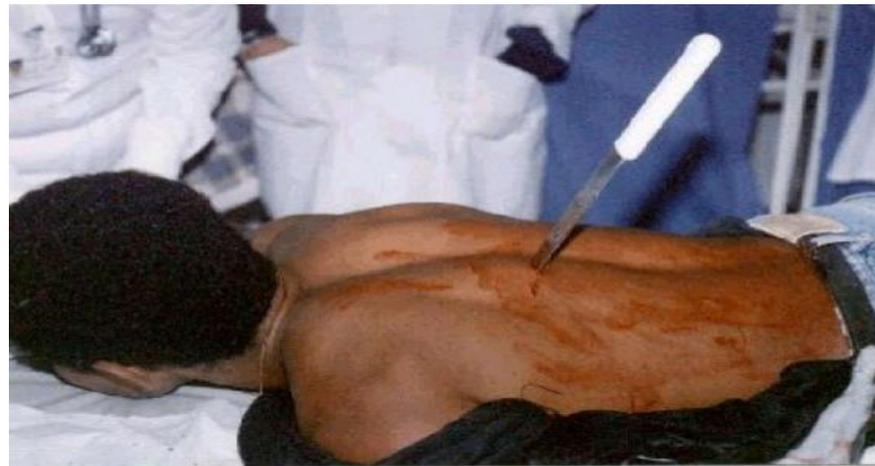
- “Occurs when a foreign object pierces the skin and enters the body, creating a wound.”
 - *Ex: Fall out a second story window, impaled by iron fence on way down*
 - *Ex: Stabbed with a steak knife*



Blunt Trauma



Penetrating Trauma



How do Surveyors Get Hurt?

Motor Vehicle Crashes & Pedestrians

- Motor Vehicle Collisions to and from the Site
- Surveyor struck by a vehicle while working
- Distracted Driving/ Distracted “Pedestrian-ing”



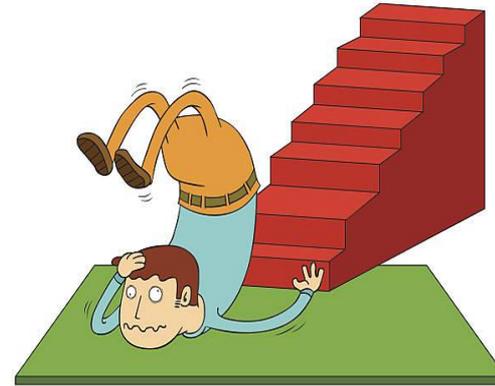
Construction Sites

- Falls

- Off of structures
- Ground level falls
- Uneven terrain

- Struck by Equipment

- Construction vehicles
- Many moving “parts and pieces” on a site



Animals, Critters, and “Nope Ropes”

- Insects
- Snakes
- Critters



Exposure to Cold Environments

- Frostbite
 - Freezing of skin and underlying tissue
- Hypothermia
 - Medical emergency
 - Body temp less than 95 degrees
- Trench Foot
 - Feet cold for prolonged time



Heat Related Illnesses

Heat Rash

- Tiny, itchy bumps that develop on your body, when sweat gets trapped beneath your skin

Heat Cramps

- Warning Sign!! – Your body is telling you that you need to cool down before you develop heat exhaustion / heat stroke

Heat Exhaustion

- Body temperature is elevated, but below 104 degrees
- Happens when you lose too much water or sodium, usually from exertion in the heat
- Symptoms: nausea, dizziness, vomiting, headache

Heat Stroke

- Life-Threatening heat illness
- Internal body temperature is above 104 degrees
- Symptoms: confusion, behavior changes, slurred speech



How Do I Treat the Injuries?

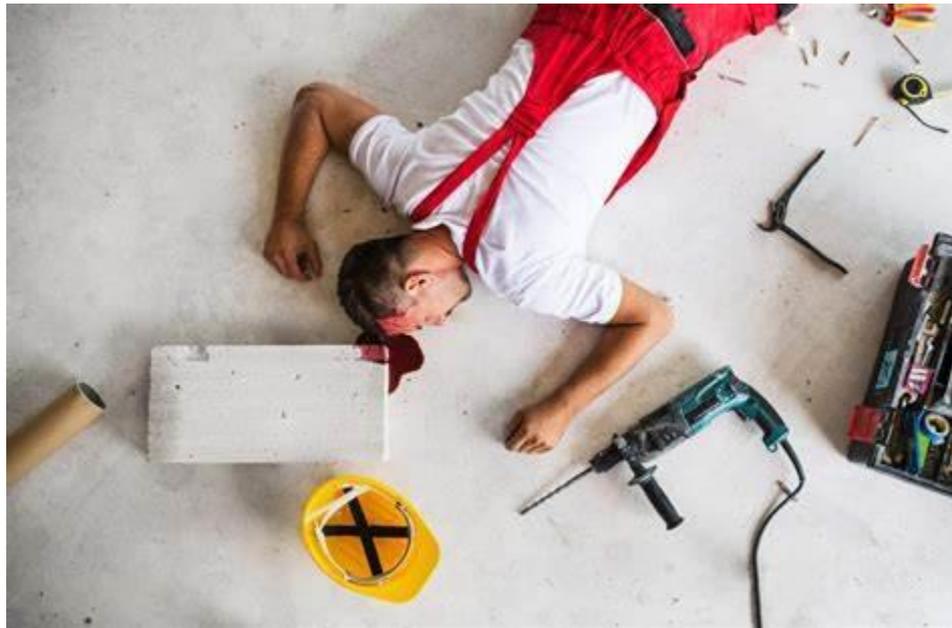
First Things First...

- Don't panic...
 - take a deep breath
- Scene Safety
- Call for Help



Trauma Basics

- MARCH
 - Massive Hemorrhage
 - Airway
 - Respiratory
 - Circulation
 - Hypothermia



M – Massive Bleeding

- Find the bleeding site
- Apply pressure, if able
 - Don't let up until relieved by a first responder
- Pack the wound if larger, then hold pressure
- If on an arm or leg, consider a tourniquet
 - Not a homemade one!!!
 - Holding pressure is much more effective than an improvised tourniquet...unless you've practiced repeatedly with this skill



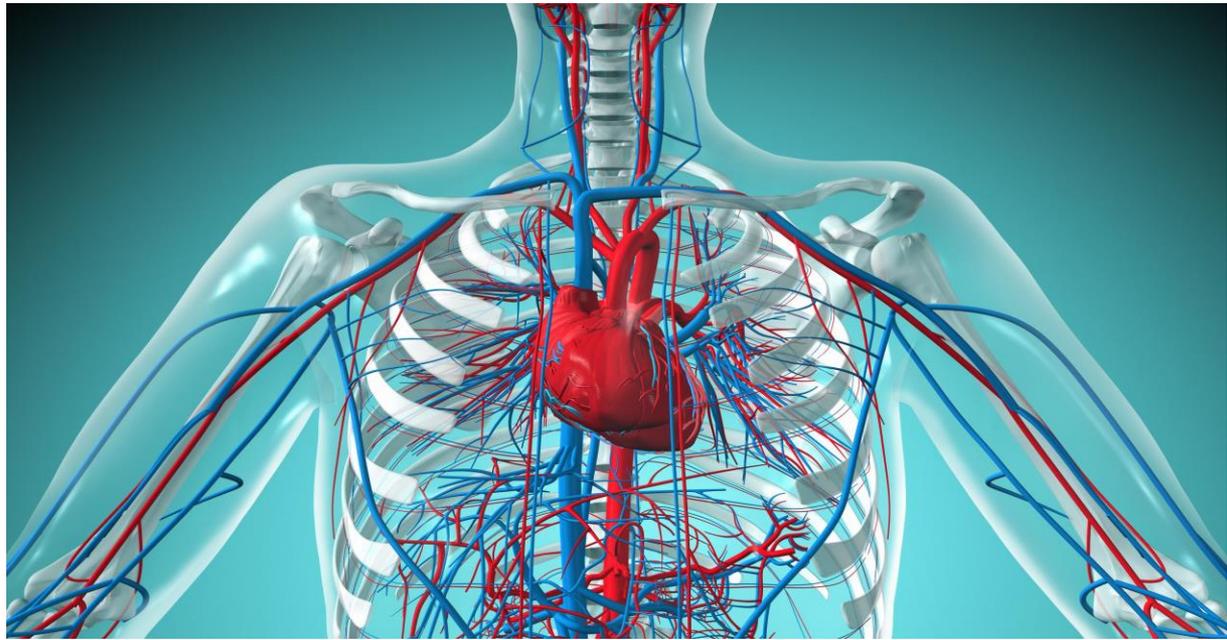
Airway/ Respiratory

- Is the injured person talking to you?
 - If yes, they have an “airway”...
- Visible injuries in the mouth?
- How is he / she breathing?
 - Fast? Slow?
 - Able to talk and breathe at the same time?



Circulation

- Color?
 - Pale? Ashen?
 - Gums white instead of pink?
- Skin temperature?
 - Cool to touch?
- Moisture?
 - Sweaty?
 - Clammy?



Hypothermia (prevention)

- Can an in person become “hypothermic” in July in PA, when it’s 106 degrees outside?
 - Let’s discuss....



Preventing Hypothermia

- Get them out of the elements
 - If raining/ snowing: seek cover
- Remove wet clothing
- Dry them off
- Cover them up with blankets, coats, etc
- If possible, put something between the ground and them (blanket, coats, etc)



Spine Immobilization



Twists, Sprains, & Fractures

- Look for Bleeding
 - Address any bleeding first
- Immobilization
 - First Aid Kits?
 - Ace wraps
 - Improvise...
- Splinting



Animal Bites

• Snake Bites

- Seek medical attention immediately (anti-venom is primary treatment)
- Move away from snake to prevent additional bites
- Move slowly
- Clean bite with soap and water
- Apply a clean, dry bandage
- Remove constricting clothing and jewelry
- Keep bite below heart if possible

• Animal Bites

- Control bleeding
- If not bleeding badly, wash wound with soap and water
- Rinse wound for at least 3-5 minutes
- Apply an antibiotic cream
- Seek medical care if:
 - *Deep puncture wound*
 - *Skin is badly torn or bleeding badly*
 - *You aren't sure if the animal has had rabies shots*



Bee Stings

- Move to a safe area to avoid additional stings
- Remove any stingers
- Wash with soap and water
- Apply cold – ice or colt, wet washcloth 10 to 20 minutes
- Treat any swelling:
 - Pain: ibuprofen (Motrin) or acetaminophen (Tylenol)
 - Swelling: antihistamine (Benadryl, etc)
 - *Remember: Benadryl will make you drowsy!!*



Known Bee Sting Allergy

- Have your EpiPen with you!
- Know how to use it...



Exposure to Cold



Early signs of hypothermia:

- Shivering, fatigue, loss of coordination, confusion, disorientation

Late signs of hypothermia:

- No shivering, blue skin, dilated pupils, slowed pulse, slowed breathing, loss of consciousness
- **CALL FOR HELP IMMEDIATELY**

In the meantime:

- Move the worker to a warm environment (warmed vehicle, warm room)
- Remove any wet clothing & replace with warm, dry clothing or blankets
- If victim is conscious, provide warm non-alcoholic fluid

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Exposure to Heat

- Symptoms:

- Abnormal thinking
- Abnormal behavior
- Slurred speech
- Seizures
- Fainting
- Heavy sweating/ hot dry skin

- Treatment:

- *Call 911 immediately*
- *Cool worker with ice/ water*
- *Move victim to shade if possible*

- Symptoms:

- Headache, nausea
- Weakness
- Dizziness
- Thirst
- Decreased urine output

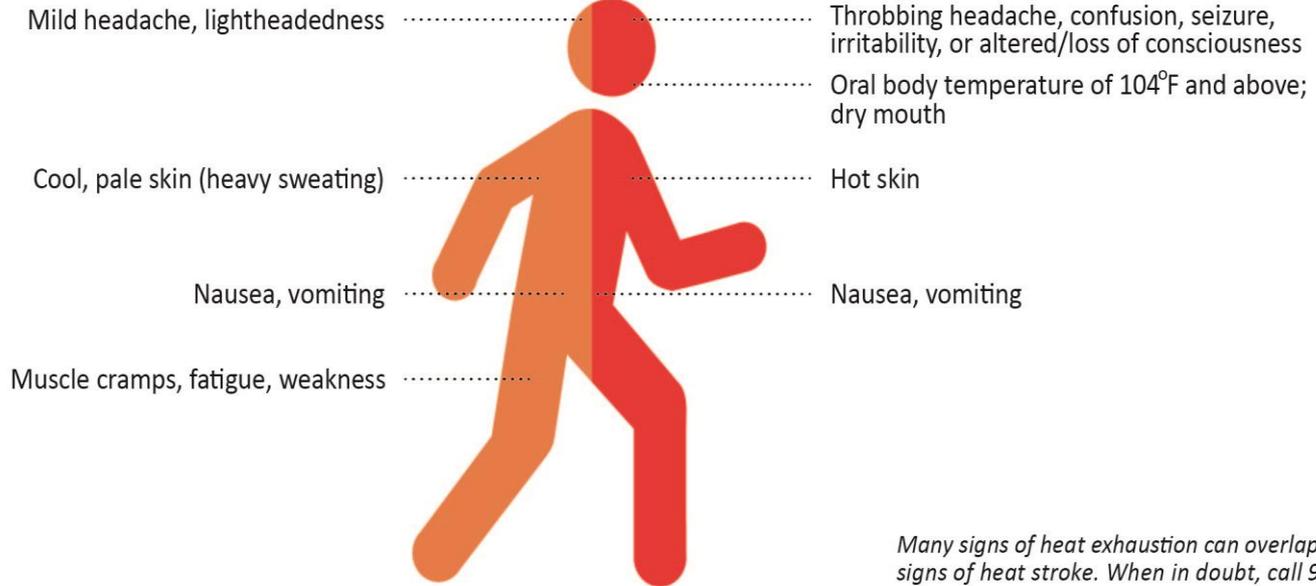
- Treatment:

- *Give cool water to drink*
- *Stay with the person*
- *Remove layers of clothes*
- *Cool with water, ice, fan*
- *Consider seeking medical care*



SIGNS OF HEAT EXHAUSTION

SIGNS OF HEAT STROKE



Many signs of heat exhaustion can overlap with signs of heat stroke. When in doubt, call 9-1-1.

WHAT TO DO

MOVE to a cooler place
COOL with ice/cold water and lay down
DRINK cool water or sports drinks
CALL 9-1-1 if symptoms last longer than 1 hour

CALL 9-1-1 IMMEDIATELY
MOVE the affected person to the shade or cooler place
COOL the affected person with immersion in cool water or by placing ice packs on the neck and groin areas

www.health.mn.gov/heatplanning

MDH Minnesota Department of Health

www.health.mn.gov/heatdata



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**How Can I Prevent The Injuries
In The First Place??**

Are Most Injuries Preventable?

- Let's discuss...



Preventing Injuries on the Job



Plan Ahead!

- *Know your role & responsibilities*
- *Your own health condition*
 - *May want to share it with your manager, coworker*
 - *Ex: allergic to bee stings, EpiPen*
- *Plan before you go – Safety Plan*
 - *“Worst Case Scenario”*
 - *Emergency action plan*
 - *Nearest hospital to you*
 - *Communication plan*
 - *Especially when working in a remote location!*



Clothing

- Wear the appropriate clothing for the job
 - Safety boots
 - Long pants/ shirts
 - Protect your HEAD!!
 - Gloves
 - Weather appropriate
 - Personal Protective Equipment
 - Eyes and Ears
 - Safety Vest/ High Vis Vest



What About your Equipment?

- Safety always comes first
 - Inspect equipment before use... every time
 - Follow the instruction manual
 - If it's broken, don't use it!
- Sharp tools
 - Gloves



Motor Vehicle Crashes

- SLOW DOWN & CHILL OUT!!
- Put. The. Phone. Down.
- Park vehicle off the road – Exit on the non-traffic side
- Do not assume that other drivers see you!
- Wear your seatbelt... EVERY TIME
 - Airbags are only ½ of the solution



Impaired Driving...

- What makes a person “impaired” behind the wheel?
 - Sleep deprivation
 - Alcohol
 - Drugs – recreational and prescription
 - Recreational
 - Marijuana – even if you have a medical marijuana card
 - Prescription
 - Pain meds
 - Sleep aids
 - Antihistamines / Allergy Medications
 - Anxiety meds
 - *If you have concerns, call your doctor and ask*



Pedestrian vs Car Crashes

- Don't assume that cars are watching for you
- Put your phone down so you can keep an eye on the other drivers
- Always wear your high visibility PPE
- Signage – do you post big signs that surveyors are in the area?



Preventing Falls

- What kinds of falls are we talking about?
 - Sides/ edges of any surface
 - High ground to lower ground
 - Through the roof
 - Through the floor to another surface below
 - On the same level
 - Uneven terrain
 - Slippery surfaces



Preventing Falls on the Job

- Wear proper footwear
- Know the terrain as best as you can
 - Did you do a risk assessment prior to this job?
- Slow down – Use caution
 - “Complacency Kills”



Cold Exposure – Preventing Cold Related Illness

Dress properly for the cold

Inner layer, mid-layer, outer layer – *wool, thermal wear*

Hat (that covers ears), gloves, knit face covering over mouth/ nose

Insulated, water proof boots

Stay dry

Bring extra clothes to replace wet clothes, if needed

Schedule repair jobs/ non essential jobs for warmer months

Limit time spent outside on extremely cold days

Have a way to communicate, especially in remote areas



Heat Exposure – Preventing Heat Related Illnesses

- Know Your Risk Factors
 - Medications
 - Antihistamines, diuretics, blood pressure meds
 - Health Factors
 - Diabetes, obesity, high blood pressure, heart disease
 - Physical Conditions
 - Older age, lower fitness ability, pregnancy, acclimitization concerns
 - Behaviors
 - Recent alcohol use, illicit drug use, cocaine, low intake of water



Heat Exposure – Preventing Problems

- Have a heat plan
 - Monitoring, acclimatization, work and rest, buddy system, protocols for first aid
- Provide training on heat illnesses
- Modify working hours to reduce heat exposure
 - Rotate workers, modify work hours
- Allow frequent rest breaks
 - Long enough to recover from environment, shade, cooler areas, tents/ canopies
- Encourage hydration
 - Balance between adequate hydration and overhydration
 - Caution with electrolyte replacements
- Be prepared for an emergency



What Would You Do?

Case #1



Truck parked along a heavily traveled road, on the shoulder

Land Surveyor out of truck – hit by a person driving a Ford Focus, traveling 35 mph

LS thrown 15 feet, unconscious on the ground

What would you do?

Case #1 – Pedestrian Struck

Don't Panic

Call 911- you or someone else

MARCH

- Massive Hemorrhage
- Airway
- Respiratory
- Circulation
- Hypothermia
- ? Head Injury



Case #2

January

Land Surveyor in the middle of the woods, up on a hill, surveying the area

Loses footing and falls down the hill approximately 25 yards

Conscious, yells for help

Left leg "deformed" - fractured

What would you do?



Case #2 - Fall

Don't Panic

Call 911 – you or someone else

MARCH

- Massive hemorrhage
- Airway
- Respiratory
- Circulation
- Hypothermia



Case #3



July

Outside on a parking lot,
working

95 degrees outside

Coworker says "I don't feel
good" and faints in front of you

What would you do?



Case #3 – Heat Related Emergencies

Don't Panic

Call 911

MARCH

Cool him / her off as quickly as possible

- Remove layers of clothing
- Shaded area
- Ice – armpits, groin, and neck
- Water – can pour cold water on the person
 - Don't offer a drink unless the person is fully awake and conscious



Know safety, no injury. No safety, know injury.

(Anonymous)

izquotes.com

THANK YOU FOR LISTENING

ANY QUESTIONS?



Thank You!



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SESSION EVALUATION



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