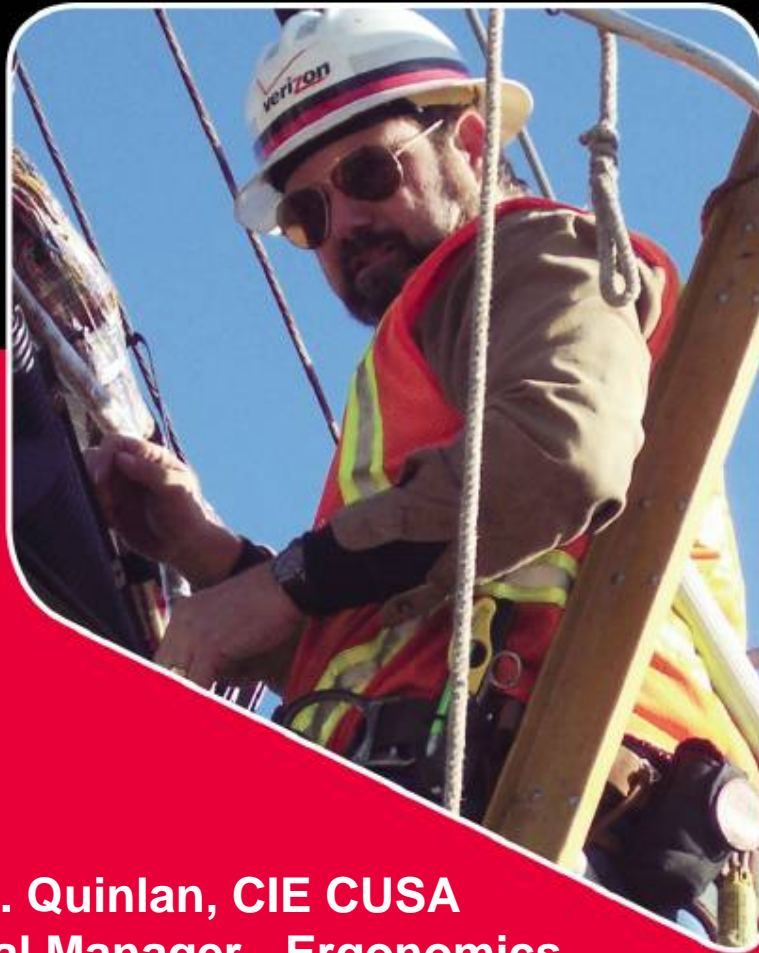




Safety Management

Texas Chunking Operations



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Certified OHSAS 18001 by

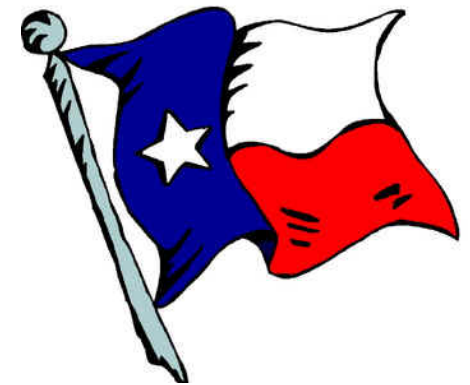




Verizon Texas Fiber and FiOS: First in Texas **Customer Service - Garland, TX**

The Buried Wire Service Technicians operation was studied in the field with two work crews from Verizon's facilities in Garland, Texas.

Critical work dimensions, video, still photography, and Operator comments were collected.





Main Tasks for Buried Service Wire

1. Load cable on vehicle in yard
2. Drive to work location
3. Unload tools from vehicle (i.e. shovels chunking tool, Ditch Witch, etc...)
4. Using chunking tool/ shovels/ Ditch Witch to create trench
5. Determine length of drop wire
6. Place drop wire in trench
7. Close trench
8. Load tools onto vehicle
9. Drive to next location





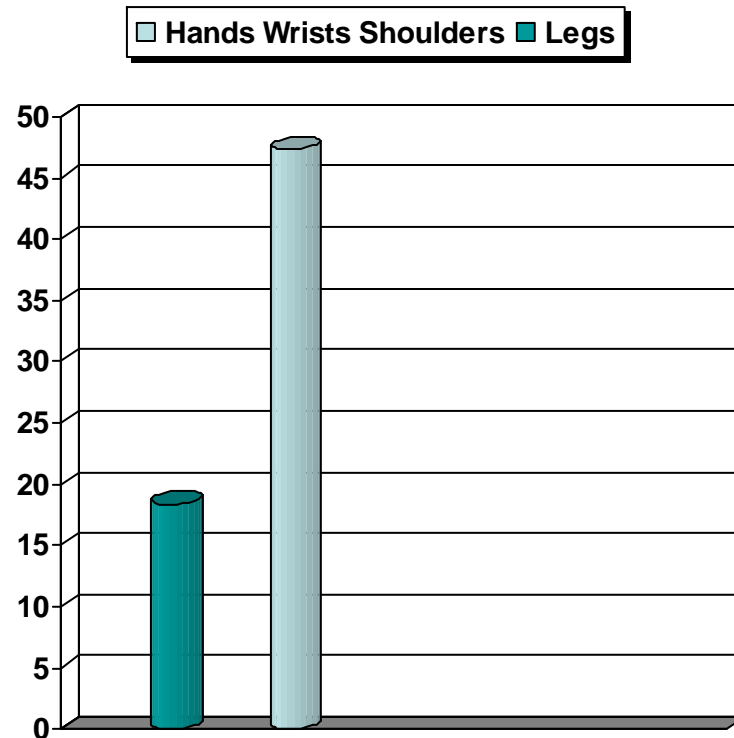
The BSW technicians were interviewed for the Chunking operation to determine routine pain or discomfort in any of nine key body areas.

The employees reported discomfort in the shoulders and arms back and the legs/feet.

They also commented that the most difficult part of the job was chunking.



Analysis of Body Parts



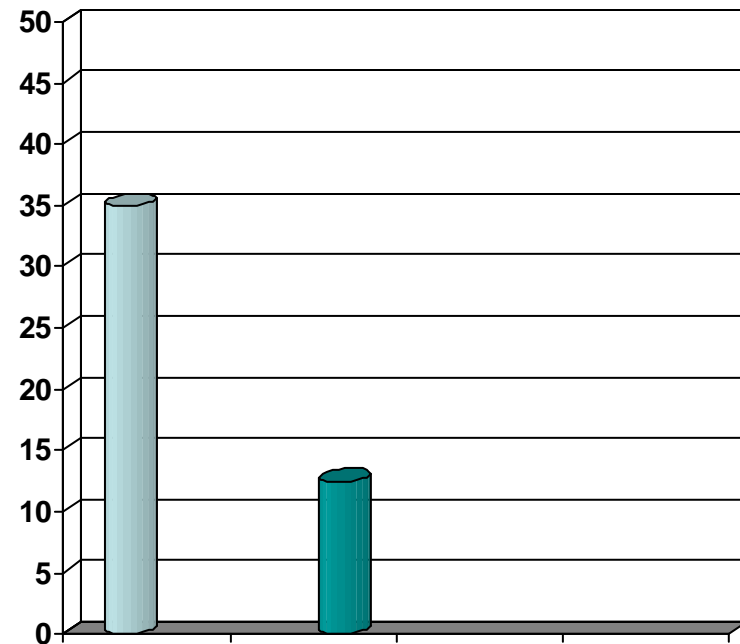
A total of 40 accidents were reviewed from 2005 to the 1st quarter of 2007 related to NSG OPS – TX Construction

The review of the Injury/Illness Analysis of Body Parts from 2005 to the 1st quarter of 2007 indicated injuries to the hands/wrists and the shoulders at **47.4%**, and to the legs at **18.4%**.



Object Category

Power and Hand Tools Power Equipment



The result of the review of the Injury/Illness Analysis of Object Category from 2005 to the 1st quarter of 2007 indicated the percentage of injuries related to the use of Tools (Power and Hand) at 35%, and Power Equipment (e.g. fork-lift, derricks, etc.) at 12.5%.



RULA Employee Assessment Worksheet

Complete this worksheet following the step-by-step procedure below. Keep a copy in the employee's personnel folder for future reference.

A. Arm & Wrist Analysis

Step 1: Locate Upper Arm Position

Step 1a: Adjust...

If shoulder is raised: +1;
If upper arm is abducted: +1;
If arm is supported or person is leaning: -1

Final Upper Arm Score = 2

Step 2: Locate Lower Arm Position

Step 2a: Adjust...

If arm is working across midline of the body: +1;
If arm out to side of body: +1

Final Lower Arm Score = 1

Step 3: Locate Wrist Position

Step 3a: Adjust...

If wrist is bent from the midline: +1

Final Wrist Score = 1

Step 4: Wrist Twist

If wrist is twisted mainly in mid-range = 1;
If twist at or near end of twisting range = 2

Wrist Twist Score = 1

Step 5: Look-up Posture Score in Table A

Use values from steps 1, 2, 3 & 4 to locate Posture Score in table A.

Posture Score A = 2

Step 6: Add Muscle Use Score

If posture mainly static (i.e. held for longer than 1 minute) or:
If action repeatedly occurs 4 times per minute or more: +1

Muscle Use Score = 0

Step 7: Add Force/load Score

If load less than 2 kg (intermittent): +0;
If 2 kg to 10 kg (intermittent): +1;
If 2 kg to 10 kg (static or repeated): +2;
If more than 10 kg load or repeated or shocks: +3

Force/load Score = 3

Step 8: Find Row in Table C

The completed score from the Arm/wrist analysis is used to find the row on Table C

Final Wrist & Arm Score = 5

SCORES

Table A

Upper Arm	Lower Arm	Wrist			
		1	2	3	4
1	1	1	2	3	3
2	1	2	3	3	3
3	1	3	3	3	3
4	1	4	4	4	4
5	1	5	5	5	5
6	1	6	6	6	6
7	1	7	7	7	7
8	1	8	8	8	8
9	1	9	9	9	9

Table B

Neck	Trunk Posture Score					
	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	3	4	5	6	7
3	3	4	5	6	7	8
4	4	5	6	7	8	9
5	5	6	7	8	9	9
6	6	7	8	9	9	9

Table C

1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8
2	2	3	4	5	6	7	8	9
3	3	4	5	6	7	8	9	9
4	4	5	6	7	8	9	9	9
5	5	6	7	8	9	9	9	9
6	6	7	8	9	9	9	9	9
7	7	8	9	9	9	9	9	9
8	8	9	9	9	9	9	9	9
9	9	9	9	9	9	9	9	9

B. Neck, Trunk & Leg Analysis

Step 9: Locate Neck Position in extension

Step 9a: Adjust...

If neck is twisted: +1; If neck is side-bending: +1

Final Neck Score = 3

Step 10: Locate Trunk Position

Step 10a: Adjust...

If trunk is twisted: +1; If trunk is side-bending: +1

Final Trunk Score = 3

Step 11: Legs

If legs & feet supported and balanced: +1;
If not: +2

Final Leg Score = 1

Step 12: Look-up Posture Score in Table B

Use values from steps 9 & 10 to locate Posture Score in Table B

Posture B Score = 4

Step 13: Add Muscle Use Score

If posture mainly static or:
If action 4-minute or more: +1

Muscle Use Score = 0

Step 14: Add Force/load Score

If load less than 2 kg (intermittent): +0;
If 2 kg to 10 kg (intermittent): +1;
If 2 kg to 10 kg (static or repeated): +2;
If more than 10 kg load or repeated or shocks: +3

Force/load Score = 3

Step 15: Find Column in Table C

The completed score from the Neck/Trunk & Leg analysis is used to find the column on Chart C

Final Neck, Trunk & Leg Score = 7

Final Score = 7

Subject: Chunking Date: 05/01/07

Company: Verizon Department: BSW Scorer: Quinlan

FINAL SCORE: 1 or 2 = Acceptable; 3 or 4 investigate further; 5 or 6 investigate further and change soon; 7 investigate and change immediately

Source: McAtamney, L. & Corlett, E.N. (1993) RULA: a survey method for the investigation of work-related upper limb disorders. *Applied Ergonomics*, 24(2) 91-99.

© Professor Alan Hedge, Cornell University. Feb. 2001



A Compounding Factor

SOIL TYPE

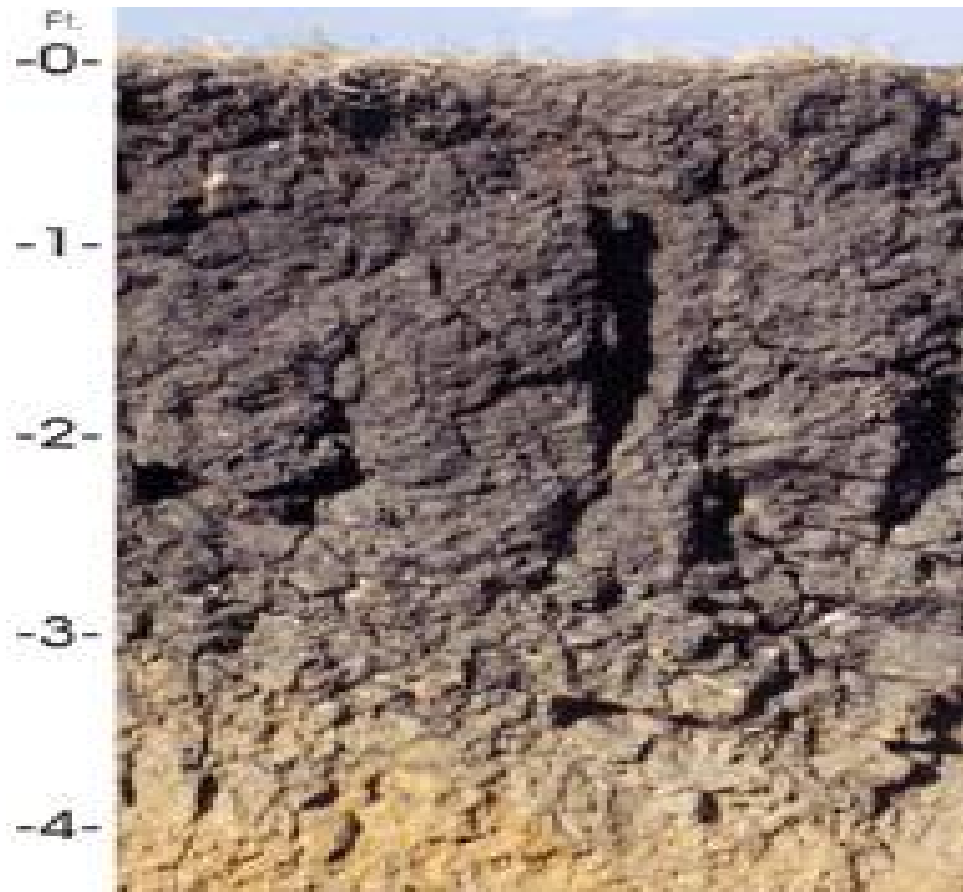
Houston Black Soil Profile

Surface layer: black clay

Subsoil - upper: black clay
with slickensides

Subsoil - lower: black clay
with slickensides and calcium
carbonate

Substratum: light olive brown
clay





The Houston Black series occurs on about 1.5 million acres in the Black and Land Prairie, which extends from north of Dallas south to San Antonio. Because of their highly expansive clays.

Houston Black soils are recognized throughout the world as the classic Vertisols, which shrink and swell markedly with changes in moisture content.



The soil consists of Texas black clay (Loam / Montmorillonite) which when wet turns spongy and sticks to surfaces.

When wet, Montmorillonite expands to many times its original volume, causing problems for foundations and roads.



In reviewing the chunking tools it was commented, that the tools are made locally and involve the welding of tubular metal to half inch plate steel.

The edge of the tool is beveled to assist it in slicing open the ground.





Tall Chunker





The shorter chunker is about waist height with a metal T handle. This model is made out flat steel with a welded steel plate wedge attached.

The weight is also approximately 30 pounds.





The ground condition during this survey would be considered muddy.

During the chunking operation it was noted that the BSW techs had to stop frequently to scrap the Loam off the chunkers so they could continue trenching. (v)



Movie file (mpeg)



The chunking operation is very labor intensive operation. Many different techniques are used by the technician to drive the chunker into the ground.

It involves the BSW Tech lifting the approximately 30 plus pound tool to waist height with his arms above his head and driving the chunker into the ground forcibly until the correct depth is reached (Six inches).

This operation is done repeatedly until the complete trench is cut. (v)



Another technique used is to split the surface with the chunker and push it back and forth.

Then move the chunker, half its length and by using the foot, push the chunker into the soil and continue back and forth movement to open the trench. (v)



Movie file (mpeg)

With the current design of the Chunking tools the BSW technicians are required to use a power grip.

The power grip requires the fingers to be bunched firmly around the metal shaft and overlapped by the thumb. The handle is thick enough to separate the finger-tips from the palm.

A common variant of the power grip is having the thumb out straight along the back of a handle. This is a power grip with a precision component. (v)



The length of the trench varies per job and when able, the BSW technicians use the Ditch Witch to bore under sidewalks and driveways or to lawn plow so as to be able to place the cable.





In holding the chunker handle firmly, this kind of grip (power grip), movements are carried out by the powerful muscles of the forearm, upper arm and shoulder, and not by the fine and delicate muscles in the palm of the hand.

The positions of the finger joints are fixed by the shape of the grip, which further fixes the small hand muscles.

Also there is none of the accuracy and control of fine movement which is available with the pinch or precision grips.





Recommendations

1. The current hand chunker's being used are of a poor ergonomic design and their use should be discontinued.
2. Hand Chunking should then be limited to very short runs to reduce the exposure to the BSW technicians.
3. In designing a new chunker there should be a large area of contact, with no spots of local high pressure to prevent strength of grip being inhibited by discomfort.
(This is like not being able to put your full body weight on the foot if there is a pebble in the shoe).



Examples of Vibratory Plows / Lawn Plows



4. A mechanical means of chunking, should be obtained, such as a walk behind Vibratory Plow or Lawn Plow to conduct the trenching for areas that the use of the Ditch Witch 410sx Vibratory Plow would not be practical.



Examples Hand Trenchers



HICAT-4
Cable Trencher



HICAT-T44
Cable Trencher "T" Handle



HICAT-T48
Cable Trencher "T" Handle

5. When Hand Chunking is necessary it is recommended that the HISCO Trenchers which are hand held products that allows the technicians to make small openings in the ground for placing buried service wire is used. These trenchers have 9" Wide x 12" High flat steel blades, similar to a shovel. The handles are made of non-conductive solid fiberglass with vinyl grips.



Questions?



New York Mets

