Ultrasonic Testing:

Purpose, Process, and Profits

Lab #5 Cypress Room

Purpose

- To find rusted poles before they fail.

Examples

- Harlingen, TX February 2015
  - Pole fell on parked Tacoma
- West Allis, WI November 2012
  - Kohls pole falls on SUV with family of 4 inside
  - Mom hospitalized with head injury.
- Port Charlotte, FL Sep 2014
  - 5 people in car caught a 8” round 4 fixture pole
- Weatherford, OK Sep 2014
  - McDonalds pole sign fell on 2 cars in drive through


FIRE
DEPT.
FIRE
DEPT.

Process

- Remove base cover
- Visually inspect poles
- Take photos of base
- Test with hammer and punch
- Take Ultrasonic readings
- Make onsite recommendations
- Compile report

Process: Tools Needed

- Accurate site map
- Pen and note paper
- Ultrasonic Wall Thickness Gage
- Bore scope camera
- Camera
- Number cards with magnet clip
- Hammer and Punch
- Electricians basic hand tools

Recommended Tester

- Ultrasonic Wall Thickness gauge
  - Capability to store readings in batches of at least 16.
  - Capability to transfer data to computer.
  - Have bin problems with Dual Eco Probes
- DeFelsko UTG C3
  - Transfers data to computer via wireless connection
  - Stores up to 1,000 batches of 100 readings each

	Estone	Phase II	DeFelsko PosiTector	DeFelsko PosiTector
				
Order Code	UTG GM100	UTG 2900	UTG C3	UTG M3
Display	Digitial	Digitial	LCD	LCD
Included Probe	Yes	Yes	Yes	Yes
Memory	12 readings	20 Batches	1,000 Bathces	1,000 Batches
Thru-Paint Capability (Multiple Echo)	Yes	Both Avalable	No	Yes
Accuracy	-+5% thickness +.001"	-+5% thickness +.001"	+-.001	+-.001"
Measurement Range* - Multiple Echo	.05"-8.86"	.118"-2.35"	.100"-2.500"	.100"-2.500"
MSRP	$120	$900	$1,300	$2,000
How to Buy	Amazon	Phase2Plus .com	Defelsko	Defelsko

Process: Taking Readings

- For pole #1, use batch #1
  - Starting at the top, take 4 readings.
    - 19” from base, 13” form the base, 6” form the base, 1” form the base
  - Be sure to use sufficient coupling fluid.
  - Repeat on 4 sides of the pole, adding up to 16 readings
- For pole #2, create a new batch, #2.
  - Continue so batch number relate to pole numbers

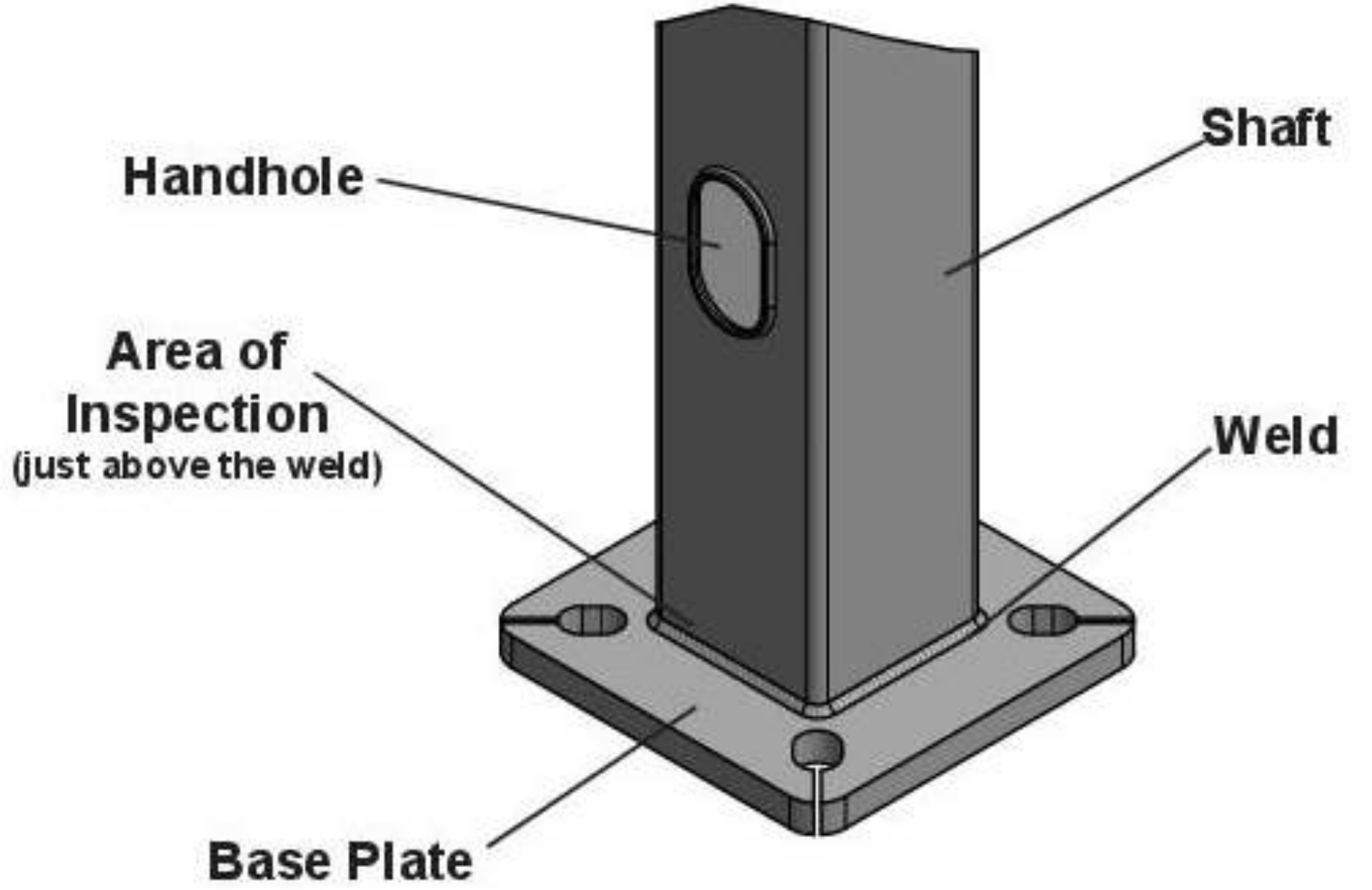
Process: Site Map

- Create accurate site map.
  - Satellite view helps
  - Ensure room for additional poles
  - Poles Numbers can be left blank so tech can decide order

Process

- Take note of pole height, diameter, fixture configuration, bolt circle, and bolt size.
- Notice the color and condition of the paint.
- Identify pole number on site plan.


Good looking paint
Above base cover
Rust hoes in pole
Covered by base cover


Handhole
Shaft
Area of
Inspection
(just above the weld)
Weld
Base Plate

Process: Checking for Rust

- Remove the base cover
  - Using a wire brush, remove debris.
  - Remove hand hole and check internally for rust.
  - Check under base plate for flaking rust and ensure proper water drainage.
- Take photos of any pole base damage
  - Include pole numbers in pictures.
  - Take 2 photos showing all sides of pole
  - Take additional photos of damaged areas.


12

Process

- Using a hammer and punch, test strength of the metal
  - Set the punch on the steel and hit it, hard, with a hammer
  - Ringing like a bell is good
  - Thud like concrete is bad
- If sumptuous, use a bore scope camera to see what's going on inside.

Process

- Using a ultrasonic tester. Take 16 readings of the pole.
- Make notes of condition of pole base
  - Include recommendation to repair or repaint pole
  - Are new base covers needed?

Process

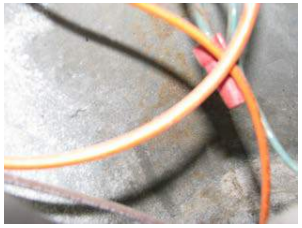
- Wipe pole clean of coupling fluid.
- Repaint with primer if needed.
- Replace base cover if still operational.
- When all poles are tested, double check to ensure numbers are correct and all poles are included

Process: Compiling the Report

Survey Description: Parking Lot Pole Base Condition

Survey Inspector:

POLE #	POLE SIDE #	TEST POINT ID	TEST READING	NOMINAL THICKNESS	DIFFERENTIAL VALUE	VISUAL INSPECTION AND RECOMMENDATION
P-152	1	A	0.130	0.133	-2.22%	Pole is Galvanized, protecting the pole from rust. New base cover installed.
		B	0.130	0.133	-2.22%	
		C	0.130	0.133	-2.22%	
		D	0.130	0.133	-2.22%	
	2	A	0.130	0.133	-2.22%	
		B	0.130	0.133	-2.22%	
		C	0.134	0.133	0.74%	
		D	0.130	0.133	-2.22%	
	3	A	0.130	0.133	-2.22%	
		B	0.134	0.133	0.74%	
		C	0.138	0.133	3.70%	
		D	0.134	0.133	0.74%	
	4	A	0.134	0.133	0.74%	
		B	0.138	0.133	3.70%	
		C	0.142	0.133	6.67%	Recommendation: Paint base cover
		D	0.134	0.133	0.74%	



Process: Pole Condition

- Good
  - Pole shows no signs of surface or internal rust.
  - Test readings are consistent.
  - Water can drain out from inside pole.
  - There is no immediate action needed
  - Retest the pole in 2 years

Process: Pole Condition

- Marginal
  - Minimal signs of rust.
  - Ringing with hammer/punch.
  - Test readings are consistent.
  - Water cannot drain.
  - Remove surface rust, repaint, & create water drainage.
  - Retest the pole in 1 year

Process: Pole Condition

- Bad
  - Rust showing through paint.
  - Flaking rust.
  - Readings show variances.
  - Metal thuds or dents when hit with hammer/punch.
  - Holes in the pole.
  - Repair immediately.

Profits

- You are the professional
- Your customers rely on you to look out for their best interest and reduce liability.
- You are providing an invaluable service
- This also removes your labiality, and gives the customer the opportunity to take action.
- Testing should be done annually on known problem properties, biannually on all properties. Some recommend every 3 months.

Profits

- How to turn ultrasonic testing into a profitable process.
  - Train employees to test the same way every time.
  - Have one main employee do testing.
  - Allow employee room to adjust process.
- Use standard report template.
  - This prevents “reinventing the wheel” each time a test report is compiled
- Do more testing.