



Evaluating Wood Pole Structural Integrity using Ultrasound Non-Destructive Inspection Technology

Wayne Hall – President Utility Asset Management Inc



Introduction - Services Provided

- **Customers**
 - 100 plus Utilities
 - 32 States
- **Pole Inspection**
 - Non-Destructive Evaluation (NDE) services
 - Training 3rd Parties Utilities / Contractors in use of technology
 - Process based on RUS 1730B-121 and AWPA M13-15
- **Fiber Consenting**
 - Minimum Clearances
 - PLA/ Make Ready



Introduction Services Provided

- **Joint Use Inventory /NESC Audits**
 - Communications Attachers
 - Heights/CWSZ
- **Pole Treatments**
 - GFume
 - Qualified Supervisor/Certified Operator
- **Network Hardening**
 - Consulting/Design Services
 - Physical Reinforcement

Industry Leading Research Team

Lead Research and Development University Partners

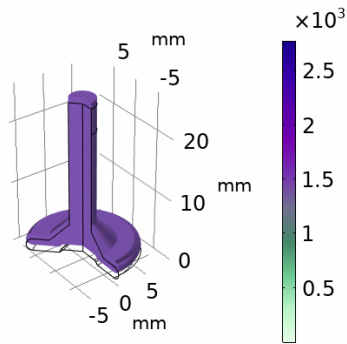



Daniel Felix Ritchie School of
Engineering & Computer Science



MISSISSIPPI STATE UNIVERSITY™
COLLEGE OF FOREST RESOURCES

totLength(1)=25 mm Eigenfrequency=0.014081i Hz

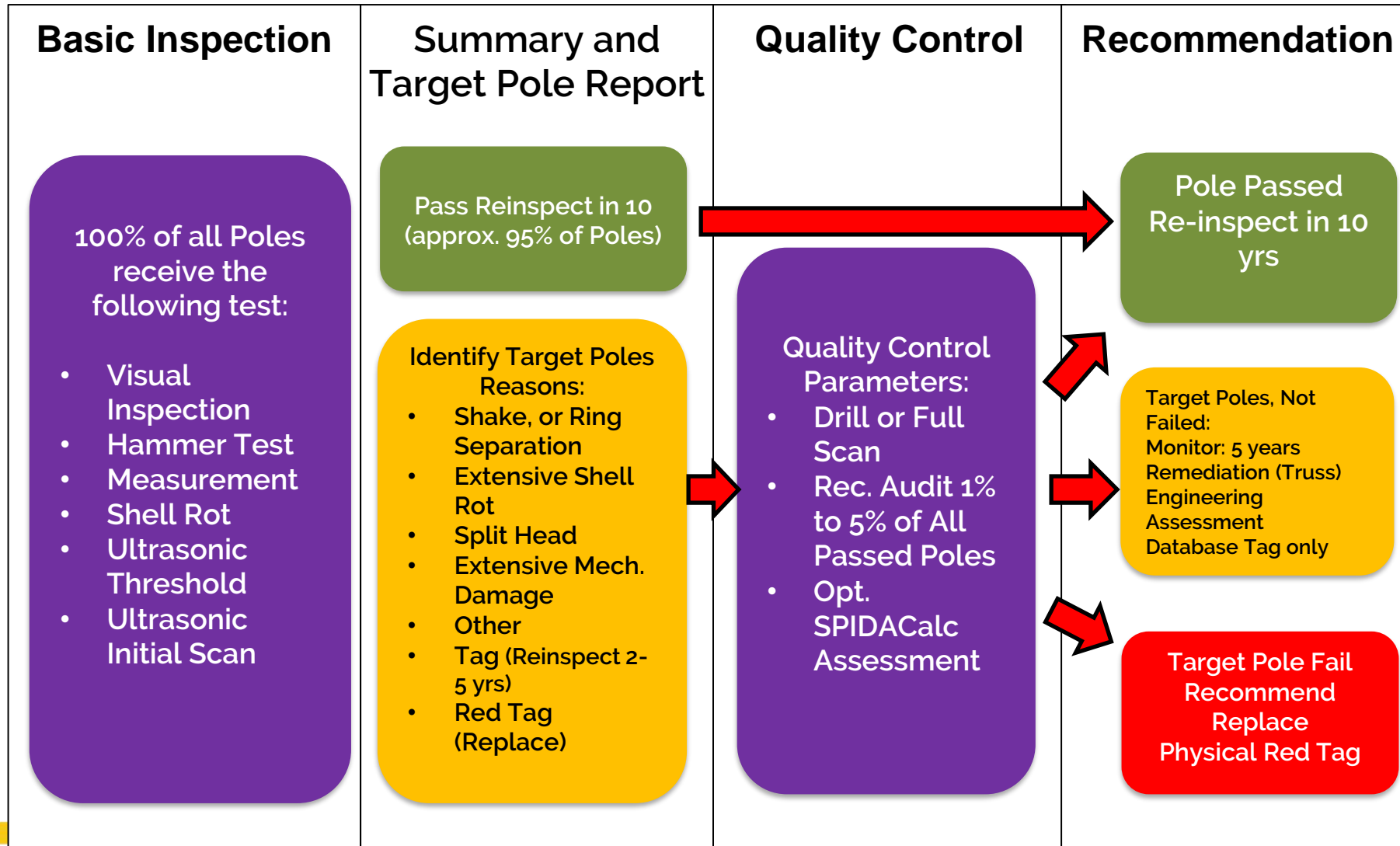




RUS 1730B – 121 : Purpose

“The purpose of a planned inspection program is to reveal danger poles and poles which are in early stages of decay so that corrective action can be taken to prolong the service life of the pole. The end result of the inspection program is the establishment of a continuing maintenance program for extending the average service life of all poles on the system.”

Basic Pole Testing Process –Guideline - RUS1730B-121/AWPA M13-15





Ultrasound NDE Key Advantages

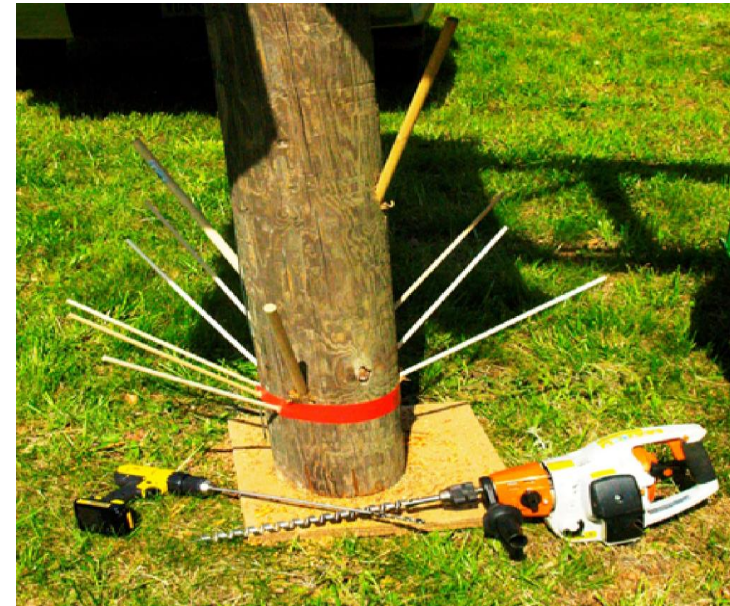
- **Concrete/Asphalt Embedded Wooden Poles can be Tested**
 - Can detect decay up to 18 inches below grade
 - No restoration Costs
- **Detection of Incipient Decay – Stage One Decay**
 - 5-7 Year Advance Notice on Issues with the pole
 - Traditional Inspection only detects ESD – Early Stage Decay – Stage Two Decay
- **Full Data Capture and infield Diagnostic Reports**
 - Audit Trail - ADC Signal – over 2000 Data Samples per file
 - Allows for Inspection Quality Control
- **No Damage to Pole versus Drill Testing**
 - IOU Engineering analysis damage estimates are around 3%-7%
 - SPIDACalc damage estimate shows 4.2% - 7% (SP 40/4)
- **Use Current Contractors Teams or UAM Teams**
 - Lease/Sell Units to utility contractors or provide direct service
 - Technology and Training Provided to Utilities and Contractors

Why is Non Destructive Evaluation (NDE) Important?

Less Damage

Current Drill Process

45 years expected but damaging inspections start at approximately yr 15-22



Pole Longevity and Reliability

Leave good wood alone, focus on target poles to increase overall pole lifespan and reliability.

ANSI O5.1-2017

(New Wood Poles: Specs/Dimensions)

5.2 Prohibited defects

5.2.4 Holes, open or plugged, are prohibited...

So How Much Damage Is Done?

C/L	Species	Circumference	Remaining Strength			
			7/8"	5/8"	3/8"	1/10" (IML)
40/4	SP	33.50	90.29%	93.04%	95.79%	98.65%
60/3	WRC	45.75	92.91%	94.98%	96.99%	99.04%
80/1	WRC	57.75	94.41%	96.01%	97.62%	99.21%



- Estimates Vary
 - SPIDACalc shows 4.2% - 7% (SP 4/40)
 - IOU Engineering analysis estimates are around 3%-7%
 - Some Traditional Inspection Co's: "Negligible Damage"
- The true cost of drilling every pole
 - Economic Damage - 4/40 base cost of \$500 means that over \$20 is caused if a drill test is performed.
 - Increased risk – a 71% RSM pole after testing becomes a reject at 66.8%
- Treating a Pole results in more reduction of remaining strength
 - SPIDACalc shows 9% reduction (SP 40/4)

Source/s** IOU internal assessment/SPIDACalc

Where Does NDE Fit in a Program

Important Complementary Tool for Inspectors

- UB1000 is used as the “Thermometer” to check the “temperature” of all poles.
- A high read means further investigation is required – Drill/Bore
- Key indicator: Peak Power (First/Second Arrivals)
- Hammer, Drill, Shell Gauge are also part of toolkit

Analogy: Doctors visit

- Thermometer first, Scalpel second

Pole Population Generic Aging/Decay Profile

- 0-5 years – Very small number of outlier rejects
- 22-25 year – Decay poles become apparent
- 65-75 years* – Poles generally become less strong

*Source: NORTH AMERICAN WOOD POLE COUNCIL TECHNICAL BULLETIN No. 17-D-202



The Decay => Ultrasound Relationship

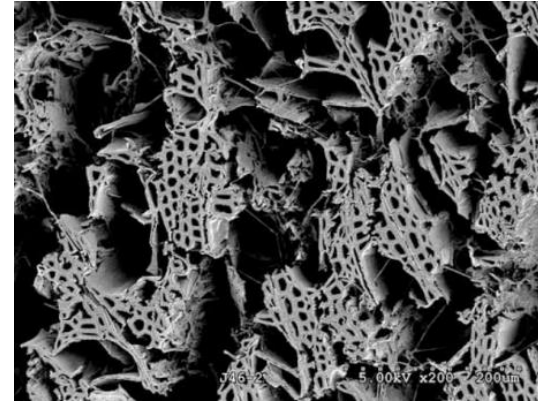
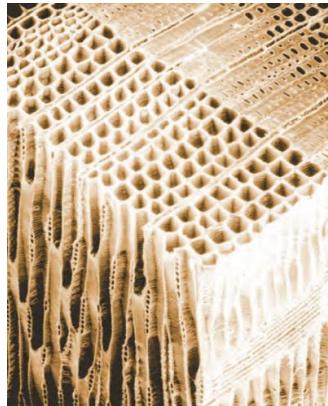
- Key Precursors for Decay *
 - Existence of Decay Fungi - Introduced or Pre-existing
 - » Brown Rot (heart rot in softwood),
 - » White Rot (Prevalent in hardwoods/conifers)
 - » Soft Rot (Shell Rot – Reduced Circumference)
 - Oxygen - Ground line and Slightly Below (approx. 18inches)
 - Moisture - Generally above about 20% Moisture Content
 - Temperature - Generally 60-80 Degrees (but begins at 32 degrees)
- Stages of Decay
 - Incipient Decay (Cell Breakdown)
 - » Detected with Ultrasonic Testing (allows better treatment decisions)
 - Early Stage Decay (Punky Wood, Dusty Wood, Doughy Wood)
 - Discoloration/Weakening
 - Detected with Ultrasonic or Traditional Drilling
 - Advanced Decay– Brown Rot /White Rot /Soft Rot
 - Detected with Ultrasonic or Traditional Drilling
 - Hollowness/Degradation

* Source – Dr Jeffrey Morrell – 2012. Wood Pole Maintenance Manual

Chemical Breakdown creates Energy Attenuation

Decay Fungi Types: soft rot, white rot, and brown rot

- Fungi spores develop fungus filaments (hyphae)
- Hyphae secrete enzymes to breakdown hemicellulose into sugars
- Hemicellulose is approx. 40% of weight of wood



Sound Scatters - Higher in Energy Attenuation

Source – Cho, Younho, and Joseph L. Rose. "A boundary element solution for a mode conversion study on the edge reflection of Lamb waves." *The Journal of the Acoustical Society of America* 99.4 (1996): 2097-2109.

Weight Loss in Incipient Decay Stage => Strength Loss

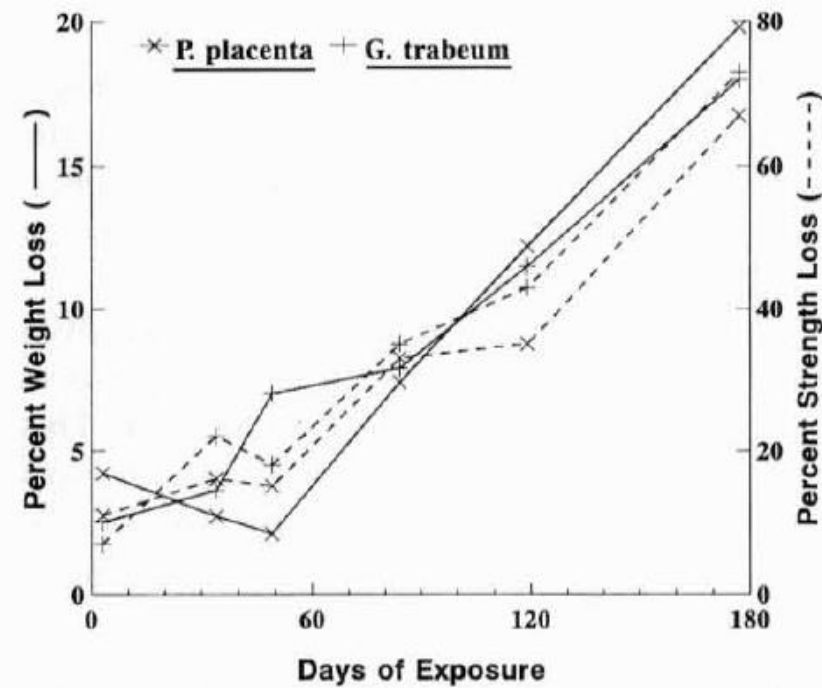


FIG. 3. Effects of two brown-rot fungi on wood weight loss and modulus of rupture of Douglas-fir heartwood microbeams.

Source – Winandy, Jerrold E., and Jeffrey J. Morrell. "Relationship between incipient decay, strength, and chemical composition of Douglas-fir heartwood." (1993).

A Trained Inspector Plus Process Plus Technology are Required

Source: Gerald L. Daugherty

The Realistic Expectation of an In-Place Wood Pole Inspection Program

Table 3. – Efficacy of conventional and newer sonic wood pole inspection programs (Osmose 1997a).

Type of inspection	Reinspection cycle	Remarks
1. Visual.	Several times a year	Provides little information to help improve pole plant. Misses most reject and priority poles.
2. Sonic.	Yearly	Used with visual inspection, 40 to 50% of reject and priority poles will be found.
3. Sound and bore.	Yearly	Used with visual inspection, 50 to 60% of reject and priority poles will be found.
4. Partial excavation plus sound and bore.	2 to 5 years depending on decay hazard zone ^a	Used with visual inspection, 80 to 90% of reject and priority poles will be found.
5. 18 to 24 in. excavation plus sound and bore. ^b	6 to 10 years depending on decay hazard zone	Used with visual inspection, 98% of reject and priority poles will be found.

^a Assumes supplemental treatment applied at time of inspection.

^b Deep decay will not be found unless the specifications call for excavation below 18 to 24 in.

^c Full effectiveness will not be achieved on poles which cannot be fully excavated due to obstructions beyond the control of the inspector such as rock, adjacent buildings, sidewalks, keys, roots, risers and underground cable.

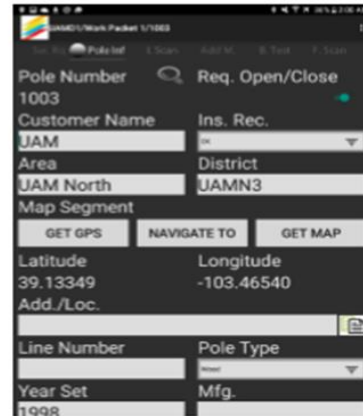
“When inspection methods that do not utilize NDE devices are employed, determination of the suitability of a given wood pole, or lack thereof, is a subjective decision made by a human being. Since all inspectors are not alike – some are more skilled and conscientious than others – another variable affecting the efficacy of in-place wood pole inspection is introduced” - Gerald L. Daugherty

Technicians – IKE or Tablet Based Apps



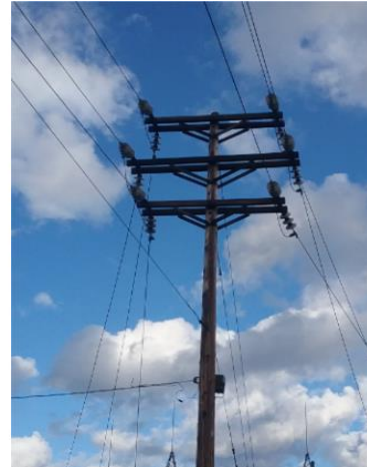
Offline Mapping

Open service requests in Red closed in Green..



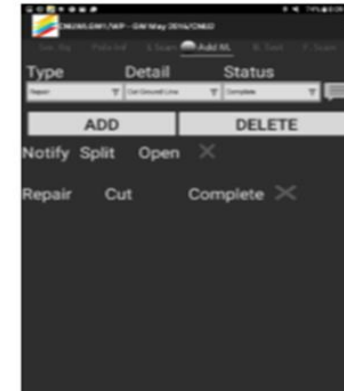
Multiple Data Capture Screens

*NETMAP GIS Id
Street Address
SAP ID
Pole ID
Condition*



Photos and Scan Data

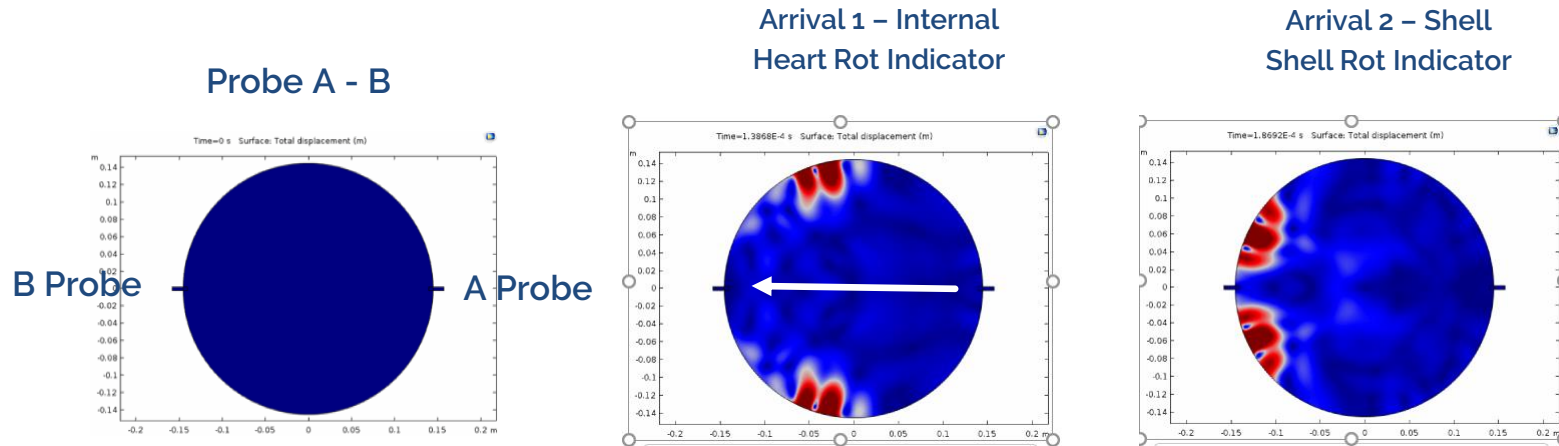
*Photos
Multiple Scan Files
IKE GPS Files
Other data files*



Maintenance Tracking

*Service Contractor
Integration
Status tracking*

Ultrasound through Wood – MATLAB Simulation



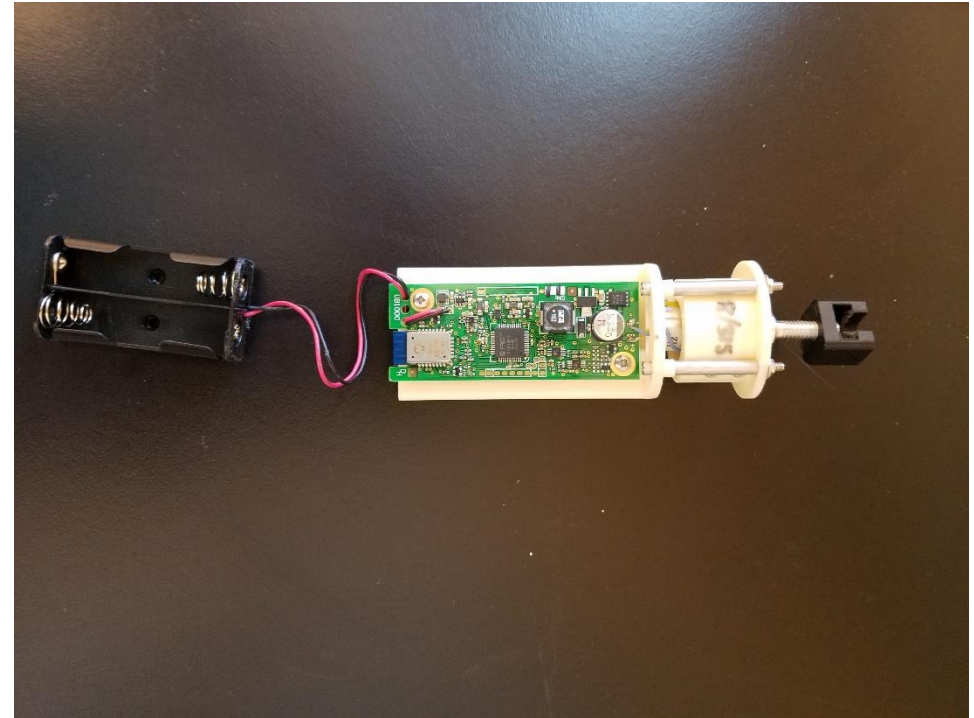
Key Indicator 1: Time of Flight

- TOF (Microseconds)
- First (TOF1a, TOF1b)/Second (TOF2) Arrivals

Key Indicator 2: Peak Energy

- Sound => Energy
- Measure Peak Energy Attenuation
- Peak Energy 1b and 2

UB1000 Device



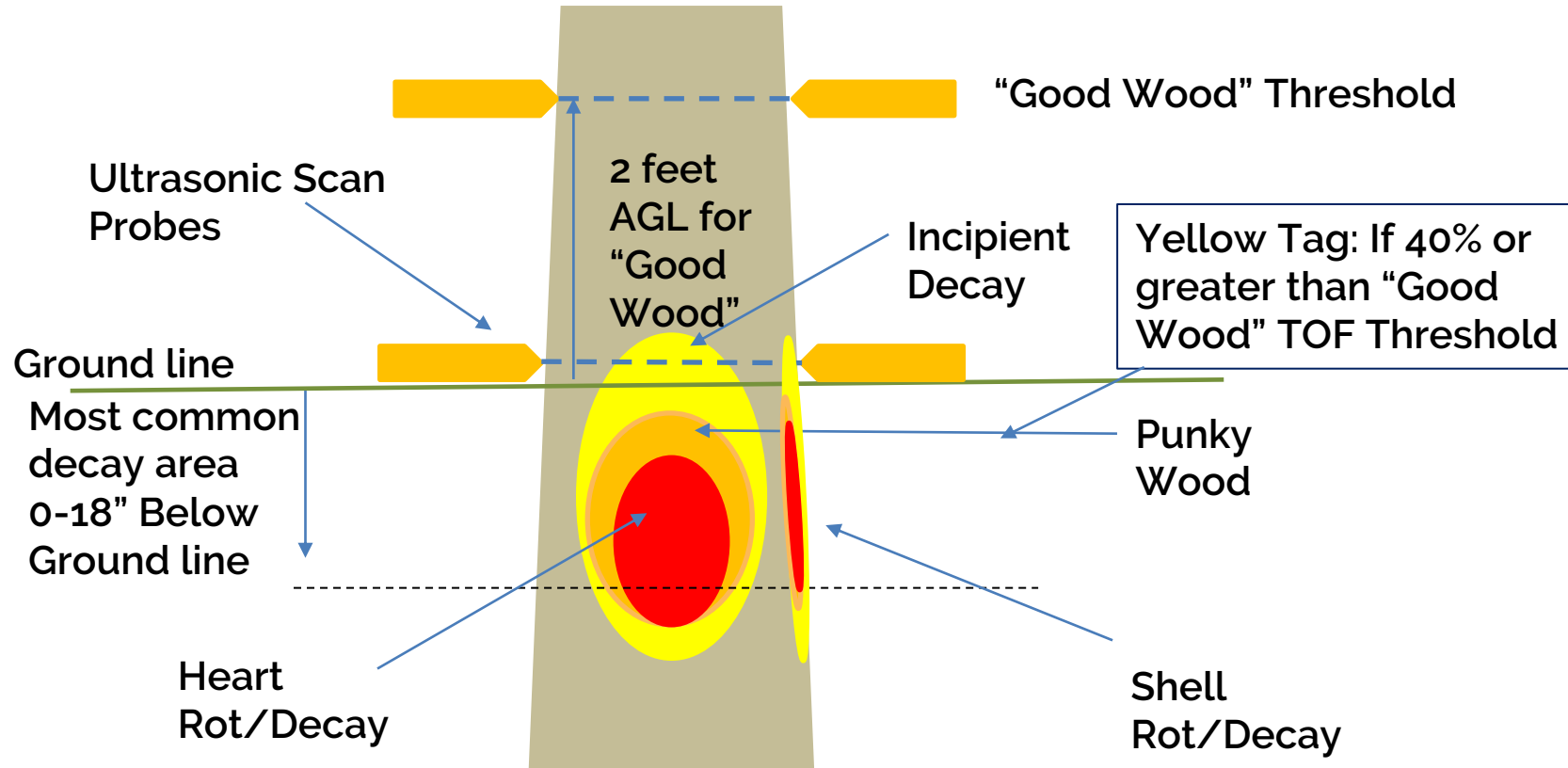


UB1000 Device and Signal Analysis

- UB1000 - Ultrasound Device
 - Serves as both transmitter and receiver
 - Generate pressure wave at 50 KHz
 - Transmits raw signal to tablet via Bluetooth for further analysis
 - Over 8000 samples downloaded per double download
- Time Domain Energy Algorithm (TDEA) / Pole Analysis App
 - TOF Calculation Immediately
 - ADC (Analog Digital Conversion) downloaded and displayed
 - DSP (Digital Signal Processing) algorithm to avoid false detection.
 - Arrivals 1A, 1B and 2 Calculated
 - Report Generated Pole Analysis App (PAA)

Decay Stages – Ultrasound Advantage

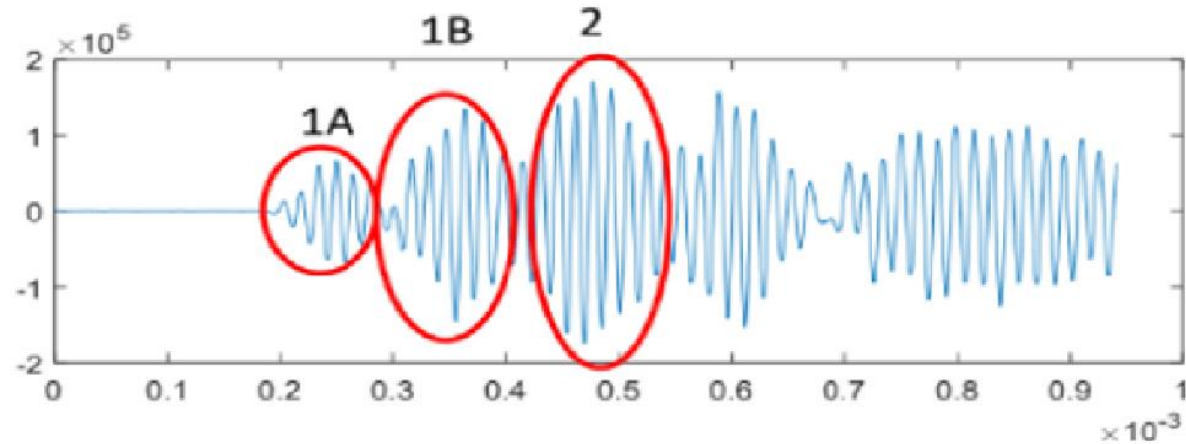
(Identifies all Decay Stages)



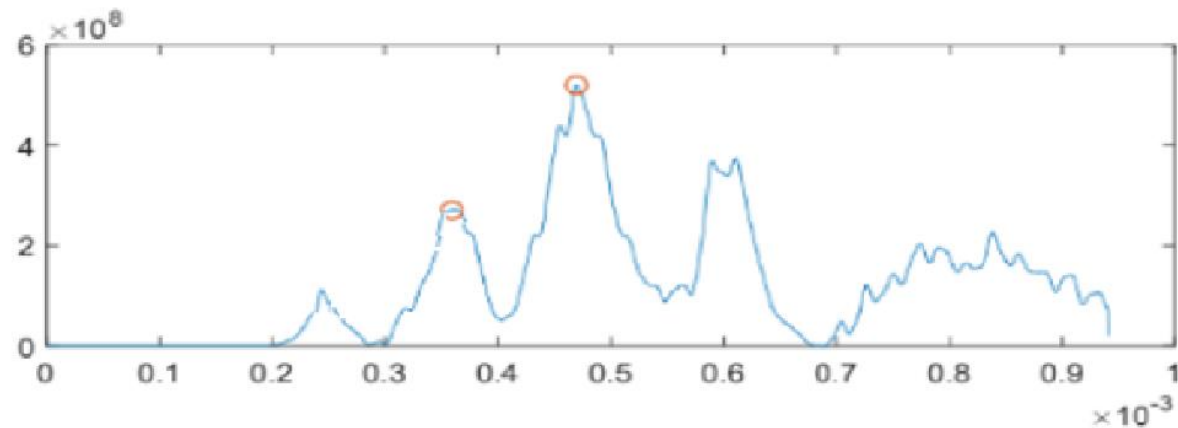
Ultrasonics Provides the same efficacy as the "Partial Excavate, Sound and Bore" process

Example Signals – Good Pole

ADC



DSP



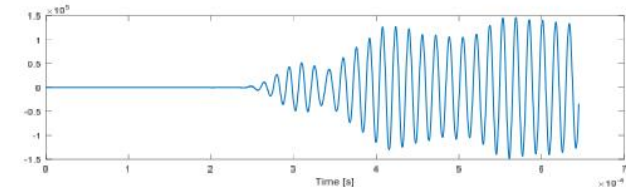
- 1A – First Arrival – Fastest / lightest signal through heart*
- 1B – First Arrival – Stronger signal through Internal/heart*
- 2 – Second Arrival – Strongest Signal around shell*

Example – Shell Rot – ADC Signal

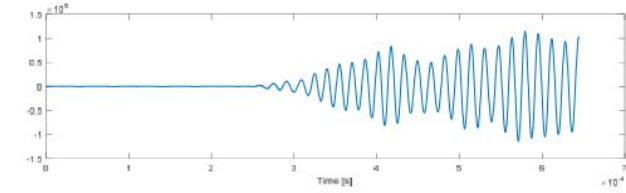
Test Result Pole ID 725186303



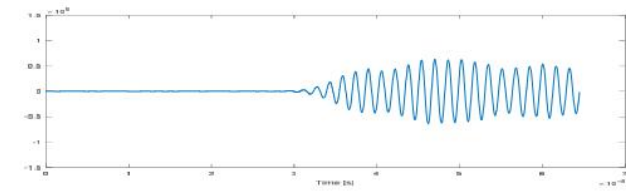
Red tagged for shell rot with GLC = 40 inches



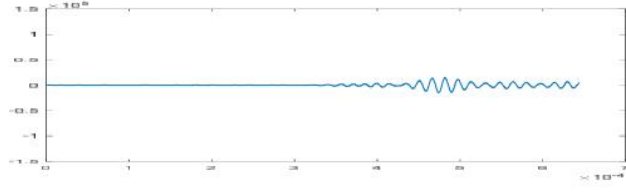
64 inches



24 inches



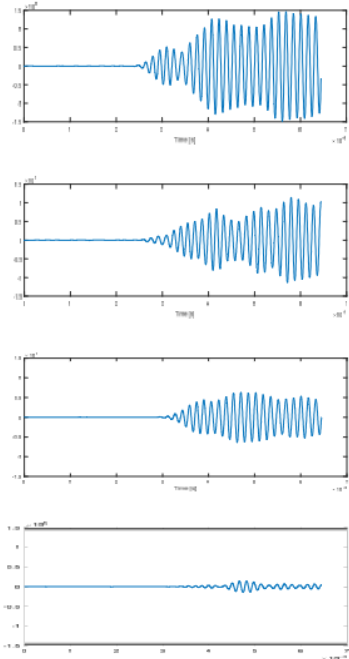
12 inches



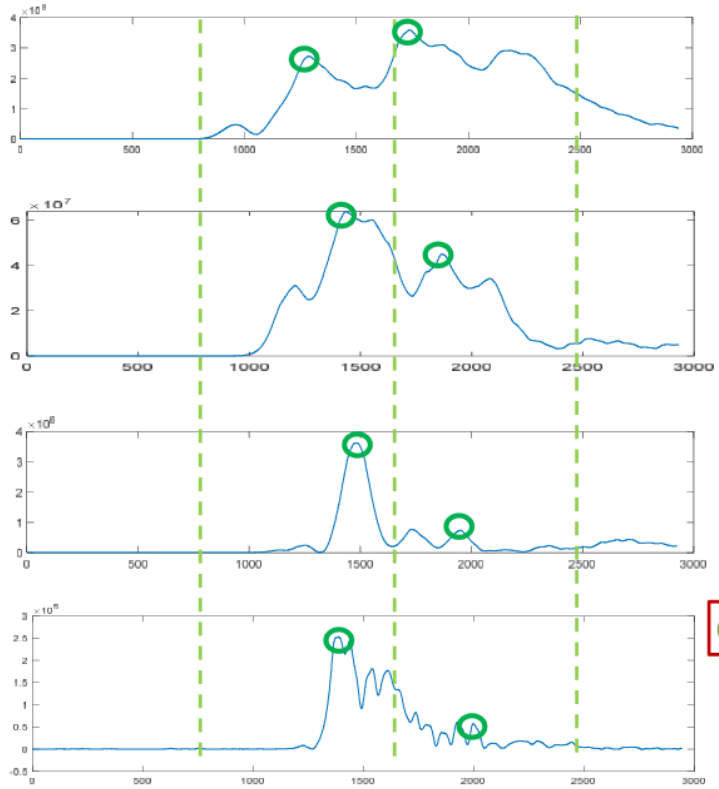
1 inch

Example – Shell Rot – DSP Signal

Test Result Pole ID 725186303



Internal/Heart Circ/Shell
1st Arrival Region 2nd Arrival Region



64 inches

24 inches

12 inches

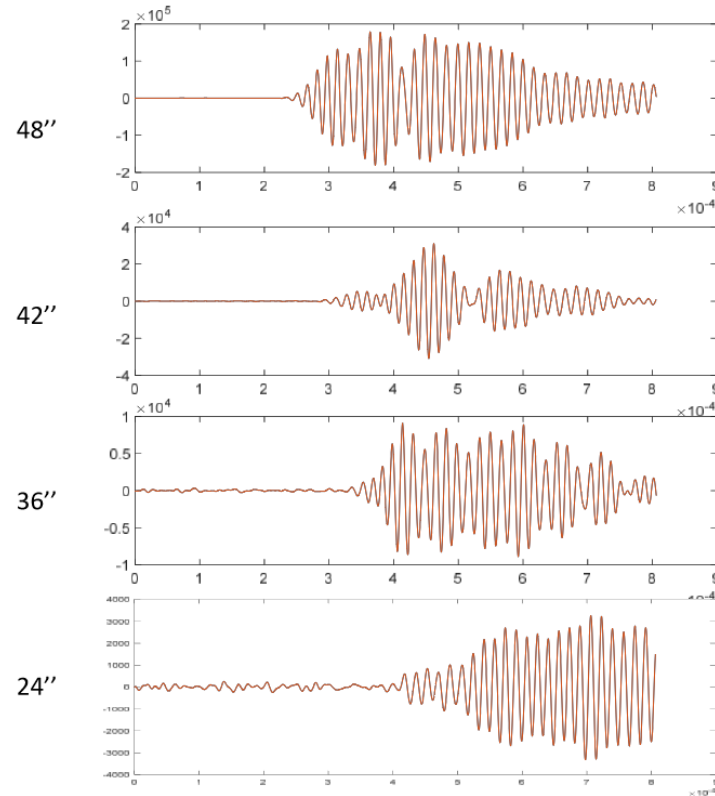
1 inch

Example – Internal Decay– ADC Signal

Test Result Pole ID C140

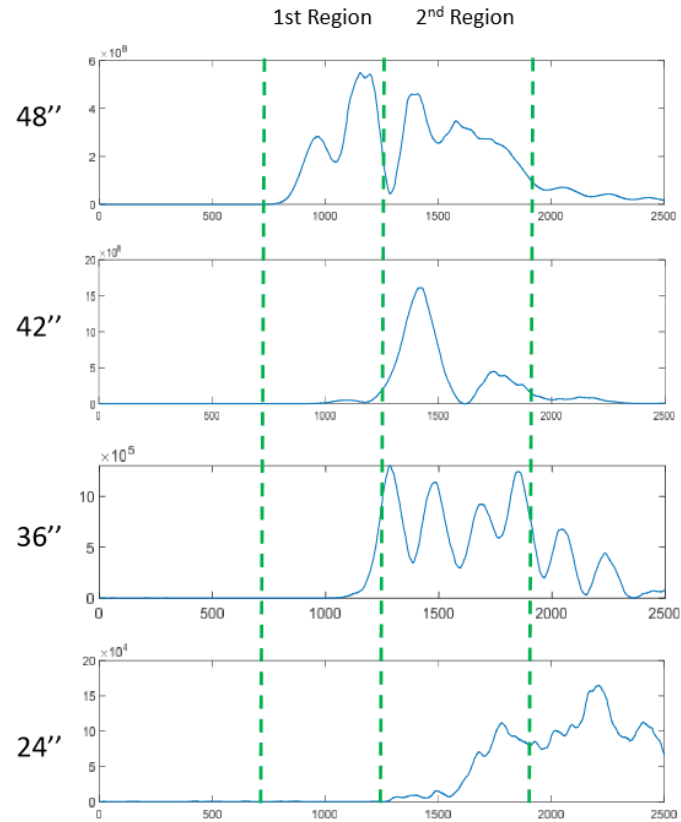


Red tagged for heart rot with GLC
= 40 inches



Example – Internal Decay – DSP Signal

Internal/Heart Circ/Shell



1st Arrival Region

AGL	TOF1B	Peak Energy
48	377	5.3
42	353	0.0048
30	374	0.0027
12	ND	ND

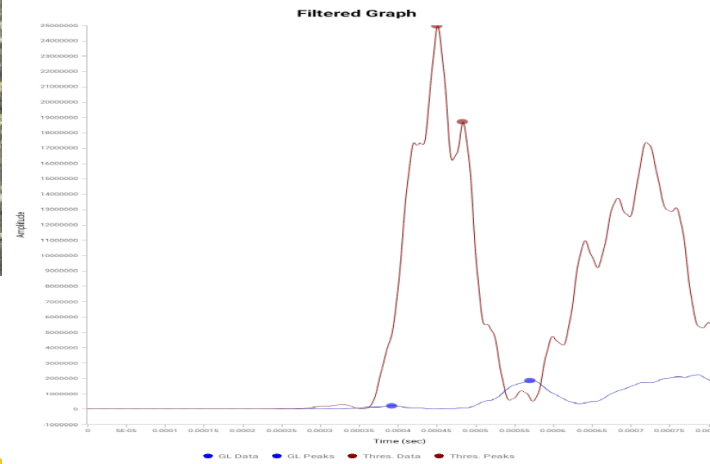
Huge attenuation in the 1st arrival region suggests heart rot decay.

Hardwood Heart Rot Example



Utility Asset
Management
Inc.

Signal Analysis Report Pole Number: 21111



Field Technician Analyzer Reporting



Signal Analysis Report Pole Number: 84404

Pole Detail

Pole ID	84404	Pole RSM %	
Pole Species	Southern Pine	Pole Class	Unknown
Pole Length	Unknown	Pole Tag	OK

Analysis Results

% Difference		Diagnostic Result		Settings
High % is BAD		High % is BAD		
(1AM-1AT)/1AT	1.10865%	Heart Condition (TOF1b)	Green	40% 80%
(2AM-2AT)/2AT	12.62626%	Shell Condition (TOF2)	Green	40% 80%
Low % is BAD		Low % is BAD		
PE1M/PE1T	6.55738%	Heart Condition (PE.1b)	Yellow	20% 5%
PE2M/PE2T	2.1223%	Shell Condition (PE.2)	Red	20% 5%

GL Metrics		Threshold Metrics	
TOF 1bAM	456	TOF 1bAT	451
TOF 2AM	669	TOF 2AT	594
Peak Energy 1M	1804587	Peak Energy 1T	27519935
Peak Energy 2M	320572	Peak Energy 2T	15104912

Diagnostic Results / Possible Issues

This signal analysis indicates the following possible pole issue/s for further investigation.

Possible Condition	Weight	Rule Description
Internal Decay	Medium	If Peak Energy 1 < Amplitude Yellow and Peak Energy 1 is > Amplitude Red
Shell Rot	High	If Peak Energy 2 < Amplitude Red

Cloud Based Data-warehouse

The screenshot displays a web application interface for 'Pole Structures'. At the top, there is a navigation bar with a logo on the left and user options like 'My Details' and 'Log Off' on the right. Below this is a secondary navigation bar with 'Organize Dashboard', 'Refresh', and 'Reset View Settings'. A sidebar on the left contains a menu with categories like 'Home', 'Work Packages', 'Pole Structures', 'Service Requests', 'Attachments', 'File Events', 'Log Events', 'Inspection Reports', 'Audit Reports', 'Views', 'Admin', 'Companies', 'User', 'IKEJobs', 'Event Type', 'Accounts', 'My Details', 'Role', and 'Reference Data'. The main content area is titled 'Pole Structures' and shows a map view. The map displays a street grid with various colored markers (green, yellow, red, blue) representing pole structures. Key streets include Sowards Park Rd, E 2nd St, Ada St, Avenue B, Avenue C, Avenue E, F Ave, Thome Ct, Garfield St, and Wood Ave. Landmarks such as Sowards Park, Nims Park, and Coloma Township Cemetery are also visible. The map interface includes a 'Filter' button, 'Map' and 'Satellite' view toggles, and standard map navigation controls.

Cloud Based Data-warehouse

Pole Structures - 87322
System User / Pole Structures / 87322

Pole Structures	Service Requests
Pole Id:	87322
Latitude:	0
Longitude:	0
Title:	87322
Altitude:	0
Address:	Rock Falls
Owner:	RFED
Network:	
Feeder:	Wood
Structure Type:	Wood
Treatment:	N/A
Construction:	
Install Year:	1,973
Map Group:	
Height_m:	9.23
Height_ft:	30.28
Condition:	Yes
Last Inspection Date:	
Cab Area:	
SAPId:	
GISId:	{99C93302-C2D4-419F-980F-DF4FB
Species:	Unknowns
Class Of Pole:	3
Comments:	

Plant Locator Record:

Wire Center Id:	
Percent Owned:	
Other Owner:	
AGL:	0
Ike Operator Name:	
Pole Structure Tag:	OK
Pole Attribute Comments:	
Pole Type:	
Ambient Temperature:	0
Base Offset Height:	
Date Collected:	
Pole Inaccessible:	
Status:	
Status Notes:	
From Service Request Type Code:	JOINTUSEAUDIT
Ike Link:	https://office.ikegps.com/#/collection/view

- Is Ike NESC
- New Pole Record
- Tag Missing
- Observable Clearance Violation
- Legacy Stub Pole
- Animal Guard



Fiber Consenting / NESC Audits / Joint Use Audits



IKE 4 Device

The IKE 4 device incorporates the latest mobile technologies to produce a best-in-class high-performance, lower-power field data collection solution. Key device features include:



Android™ 5.1, Lollipop

Easy to use, smartphone user interface and experiences



Wireless Connectivity

Wi-Fi, bluetooth and broadband data



13-Megapixel Digital Camera

Larger viewing angle, reducing distance of capture point



Class 1M Laser

300m and 650m distance options



Outdoor Screen Readability

4.8" capacitive, multi-touch
Gorilla Glass screen:
1280 x 720 resolution



ARM High-performance, low-power optimization

MediaTek 64-bit
quad-core ARM® Cortex®



Extended Battery Life

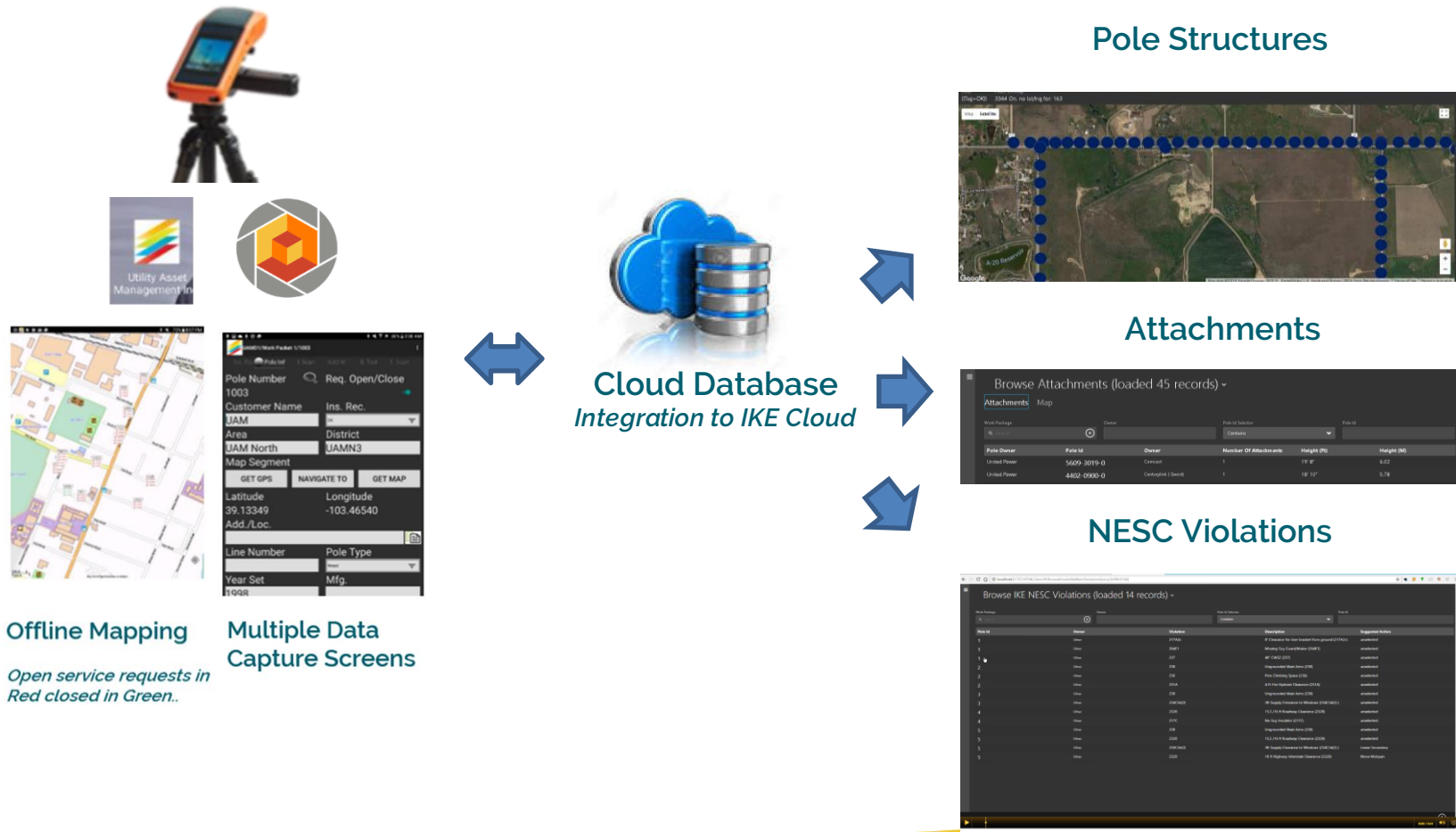
8 to 10 hours of continued usage



GPS Receiver

GPS L1 with RTK option

UAM Inc - Joint Use NESC Audit - Process



Browse Attachments (loaded 45 records) -

Pole Owner	Pole Id	Owner	Number Of Attachments	Height (ft)	Height (m)
United Power	5609-3019-0	Canada	1	19' 0"	6.02
United Power	4402-0900-0	Canada (Cloud)	1	18' 10"	5.78

Browse IKE NESC Violations (loaded 14 records) -

Id	Owner	Violation	Description	Required Action
1	UAM	21006	11 Exposed to Live Wires (21006) (21006)	Addressed
1	UAM	20071	Armored Out Line (20071)	Addressed
1	UAM	207	WP (207)	Addressed
1	UAM	208	Impedance Load Area (208)	Addressed
2	UAM	208	Area (208)	Addressed
2	UAM	20070	Area (20070)	Addressed
2	UAM	208	Area (208)	Addressed
3	UAM	20068	Area (20068)	Addressed
3	UAM	20069	Area (20069)	Addressed
4	UAM	20067	Area (20067)	Addressed
4	UAM	20068	Area (20068)	Addressed
5	UAM	20069	Area (20069)	Addressed
5	UAM	20070	Area (20070)	Addressed
5	UAM	20071	Area (20071)	Addressed
5	UAM	20072	Area (20072)	Addressed
5	UAM	20073	Area (20073)	Addressed
5	UAM	20074	Area (20074)	Addressed
5	UAM	20075	Area (20075)	Addressed
5	UAM	20076	Area (20076)	Addressed
5	UAM	20077	Area (20077)	Addressed
5	UAM	20078	Area (20078)	Addressed
5	UAM	20079	Area (20079)	Addressed
5	UAM	20080	Area (20080)	Addressed
5	UAM	20081	Area (20081)	Addressed
5	UAM	20082	Area (20082)	Addressed
5	UAM	20083	Area (20083)	Addressed
5	UAM	20084	Area (20084)	Addressed
5	UAM	20085	Area (20085)	Addressed
5	UAM	20086	Area (20086)	Addressed
5	UAM	20087	Area (20087)	Addressed
5	UAM	20088	Area (20088)	Addressed
5	UAM	20089	Area (20089)	Addressed
5	UAM	20090	Area (20090)	Addressed
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5	UAM	20094	Area (20094)	Addressed
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5	UAM	20097	Area (20097)	Addressed
5	UAM	20098	Area (20098)	Addressed
5	UAM	20099	Area (20099)	Addressed
5	UAM	20100	Area (20100)	Addressed
5	UAM	20101	Area (20101)	Addressed
5	UAM	20102	Area (20102)	Addressed
5	UAM	20103	Area (20103)	Addressed
5	UAM	20104	Area (20104)	Addressed
5	UAM	20105	Area (20105)	Addressed
5	UAM	20106	Area (20106)	Addressed
5	UAM	20107	Area (20107)	Addressed
5	UAM	20108	Area (20108)	Addressed
5	UAM	20109	Area (20109)	Addressed
5	UAM	20110	Area (20110)	Addressed
5	UAM	20111	Area (20111)	Addressed
5	UAM	20112	Area (20112)	Addressed
5	UAM	20113	Area (20113)	Addressed
5	UAM	20114	Area (20114)	Addressed
5	UAM	20115	Area (20115)	Addressed
5	UAM	20116	Area (20116)	Addressed
5	UAM	20117	Area (20117)	Addressed
5	UAM	20118	Area (20118)	Addressed
5	UAM	20119	Area (20119)	Addressed
5	UAM	20120	Area (20120)	Addressed
5	UAM	20121	Area (20121)	Addressed
5	UAM	20122	Area (20122)	Addressed
5	UAM	20123	Area (20123)	Addressed
5	UAM	20124	Area (20124)	Addressed
5	UAM	20125	Area (20125)	Addressed
5	UAM	20126	Area (20126)	Addressed
5	UAM	20127	Area (20127)	Addressed
5	UAM	20128	Area (20128)	Addressed
5	UAM	20129	Area (20129)	Addressed
5	UAM	20130	Area (20130)	Addressed
5	UAM	20131	Area (20131)	Addressed
5	UAM	20132	Area (20132)	Addressed
5	UAM	20133	Area (20133)	Addressed
5	UAM	20134	Area (20134)	Addressed
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5	UAM	20136	Area (20136)	Addressed
5	UAM	20137	Area (20137)	Addressed
5	UAM	20138	Area (20138)	Addressed
5	UAM	20139	Area (20139)	Addressed
5	UAM	20140	Area (20140)	Addressed
5	UAM	20141	Area (20141)	Addressed
5	UAM	20142	Area (20142)	Addressed
5	UAM	20143	Area (20143)	Addressed
5	UAM	20144	Area (20144)	Addressed
5	UAM	20145	Area (20145)	Addressed
5	UAM	20146	Area (20146)	Addressed
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5	UAM	20148	Area (20148)	Addressed
5	UAM	20149	Area (20149)	Addressed
5	UAM	20150	Area (20150)	Addressed
5	UAM	20151	Area (20151)	Addressed
5	UAM	20152	Area (20152)	Addressed
5	UAM	20153	Area (20153)	Addressed
5	UAM	20154	Area (20154)	Addressed
5	UAM	20155	Area (20155)	Addressed
5	UAM	20156	Area (20156)	Addressed
5	UAM	20157	Area (20157)	Addressed
5	UAM	20158	Area (20158)	Addressed
5	UAM	20159	Area (20159)	Addressed
5	UAM	20160	Area (20160)	Addressed
5	UAM	20161	Area (20161)	Addressed
5	UAM	20162	Area (20162)	Addressed
5	UAM	20163	Area (20163)	Addressed
5	UAM	20164	Area (20164)	Addressed
5	UAM	20165	Area (20165)	Addressed
5	UAM	20166	Area (20166)	Addressed
5	UAM	20167	Area (20167)	Addressed
5	UAM	20168	Area (20168)	Addressed
5	UAM	20169	Area (20169)	Addressed
5	UAM	20170	Area (20170)	Addressed
5	UAM	20171	Area (20171)	Addressed
5	UAM	20172	Area (20172)	Addressed
5	UAM	20173	Area (20173)	Addressed
5	UAM	20174	Area (20174)	Addressed
5	UAM	20175	Area (20175)	Addressed
5	UAM	20176	Area (20176)	Addressed
5	UAM	20177	Area (20177)	Addressed
5	UAM	20178	Area (20178)	Addressed
5	UAM	20179	Area (20179)	Addressed
5	UAM	20180	Area (20180)	Addressed
5	UAM	20181	Area (20181)	Addressed
5	UAM	20182	Area (20182)	Addressed
5	UAM	20183	Area (20183)	Addressed
5	UAM	20184	Area (20184)	Addressed
5	UAM	20185	Area (20185)	Addressed
5	UAM	20186	Area (20186)	Addressed
5	UAM	20187	Area (20187)	Addressed
5	UAM	20188	Area (20188)	Addressed
5	UAM	20189	Area (20189)	Addressed
5	UAM	20190	Area (20190)	Addressed
5	UAM	20191	Area (20191)	Addressed
5	UAM	20192	Area (20192)	Addressed
5	UAM	20193	Area (20193)	Addressed
5	UAM	20194	Area (20194)	Addressed
5	UAM	20195	Area (20195)	Addressed
5	UAM	20196	Area (20196)	Addressed
5	UAM	20197	Area (20197)	Addressed
5	UAM	20198	Area (20198)	Addressed
5	UAM	20199	Area (20199)	Addressed
5	UAM	20200	Area (20200)	Addressed
5	UAM	20201	Area (20201)	Addressed
5	UAM	20202	Area (20202)	Addressed
5	UAM	20203	Area (20203)	Addressed
5	UAM	20204	Area (20204)	Addressed
5	UAM	20205	Area (20205)	Addressed
5	UAM	20206	Area (20206)	Addressed
5	UAM	20207	Area (20207)	Addressed
5	UAM	20208	Area (20208)	Addressed
5	UAM	20209	Area (20209)	Addressed
5	UAM	20210	Area (20210)	Addressed
5	UAM	20211	Area (20211)	Addressed
5	UAM	20212	Area (20212)	Addressed
5	UAM	20213	Area (20213)	Addressed
5	UAM	20214	Area (20214)	Addressed
5	UAM	20215	Area (20215)	Addressed
5	UAM	20216	Area (20216)	Addressed
5	UAM	20217	Area (20217)	Addressed
5	UAM	20218	Area (20218)	Addressed
5	UAM	20219	Area (20219)	Addressed
5	UAM	20220	Area (20220)	Addressed
5	UAM	20221	Area (20221)	Addressed
5	UAM	20222	Area (20222)	Addressed
5	UAM	20223	Area (20223)	Addressed
5	UAM	20224	Area (20224)	Addressed
5	UAM	20225	Area (20225)	Addressed
5	UAM	20226	Area (20226)	Addressed
5	UAM	20227	Area (20227)	Addressed
5	UAM	20228	Area (20228)	Addressed
5	UAM	20229	Area (20229)	Addressed
5	UAM	20230	Area (20230)	Addressed
5	UAM	20231	Area (20231)	Addressed
5	UAM	20232	Area (20232)	Addressed
5	UAM	20233	Area (20233)	Addressed
5	UAM	20234	Area (20234)	Addressed
5	UAM	20235	Area (20235)	Addressed
5	UAM	20236	Area (20236)	Addressed
5	UAM	20237	Area (20237)	Addressed
5	UAM	20238	Area (20238)	Addressed
5	UAM	20239	Area (20239)	Addressed
5	UAM	20240	Area (20240)	Addressed
5	UAM	20241	Area (20241)	Addressed
5	UAM	20242	Area (20242)	Addressed
5	UAM	20243	Area (20243)	Addressed
5	UAM	20244	Area (20244)	Addressed
5	UAM	20245	Area (20245)	Addressed
5	UAM	20246	Area (20246)	Addressed
5	UAM	20247	Area (20247)	Addressed
5	UAM	20248	Area (20248)	Addressed
5	UAM	20249	Area (20249)	Addressed
5	UAM	20250	Area (20250)	Addressed
5	UAM	20251	Area (20251)	Addressed
5	UAM	20252	Area (20252)	Addressed
5	UAM	20253	Area (20253)	Addressed
5	UAM	20254	Area (20254)	Addressed
5	UAM	20255	Area (20255)	Addressed
5	UAM	20256	Area (20256)	Addressed
5	UAM	20257	Area (20257)	Addressed
5	UAM	20258	Area (20258)	Addressed
5	UAM	20259	Area (20259)	Addressed
5	UAM	20260	Area (20260)	Addressed
5	UAM	20261	Area (20261)	Addressed
5	UAM	20262	Area (20262)	Addressed
5	UAM	20263	Area (20263)	Addressed
5	UAM	20264	Area (20264)	Addressed
5	UAM	20265	Area (20265)	Addressed
5	UAM	20266	Area (20266)	Addressed
5	UAM	20267	Area (20267)	Addressed
5	UAM	20268	Area (20268)	Addressed
5	UAM	20269	Area (20269)	Addressed
5	UAM	20270	Area (20270)	Addressed
5	UAM	20271	Area (20271)	Addressed
5	UAM	20272		

UAM Inc - Joint Use NESC Audit - Process

The screenshot displays the IKE Office software interface for a utility pole audit. The main window shows a photograph of a utility pole with several callouts identifying components and wires. A detailed data panel on the right provides specifications for selected circuits and wires.

Callouts in the Photo:

- 37' 4" - 1395
- 37' - Primary - ACSR 2 AWG 6/1 SPAS X
- 24' 11" - Metal Rise - 3" Metal
- 22' 9" - Streetlight - Streetlight_6 ft. Al...
- 23' 8" - Secondary - TRIPLEX 4 AWG ...
- 16' 7" - Comm Generic CATV - CATV ...
- 15' 2" - Comm Generic Telco - TELE 1 ...
- 19' 10" - Side offset

Right Panel Data:

Circuit (3 / 4)

Mid Span Height	17' 8"
Construction	OH_POLE
Wire (1 / 1)	
Size	Comm Generic CATV - CATV 75 - Static
Insulator	Single Bolt
Quantity	1.00
Owner	COMMUNICATION - CATV
Attachment Height	16' 7"

Circuit (4 / 4)

Mid Span Height	15' 6"
Construction	OH_POLE
Wire (1 / 1)	
Size	Comm Generic Telco - TELE 1.0 - Static
Insulator	Single Bolt
Quantity	1.00
Owner	COMMUNICATION - Telco
Attachment Height	15' 2"

Guys (2)

Buttons: + Add new Span, + Copy from existing span

Questions

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