



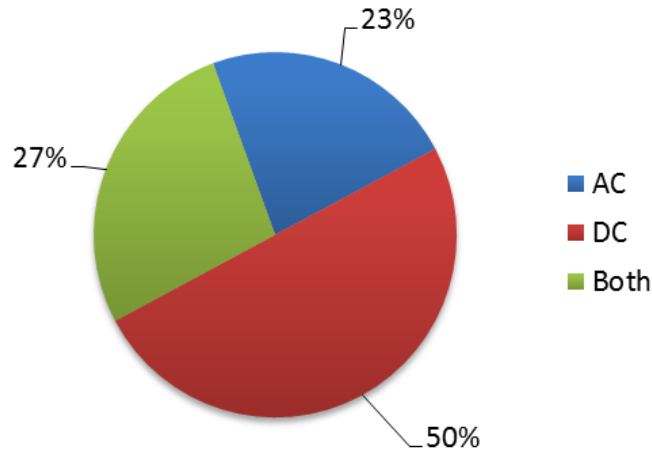
Electric Utility Fleet Best Practices Survey

This survey provides an overview of electric utilities fleet managers' practices with regards to preventive maintenance, testing of aerial equipment, and training of fleet technicians.

About 50 Fleet Managers and Fleet Directors in North America participated in this survey. This survey was conducted for the 2012 Electric Utility Fleet Managers Conference and results were presented at the conference.

Dielectric Testing on Distribution Aerial Equipment

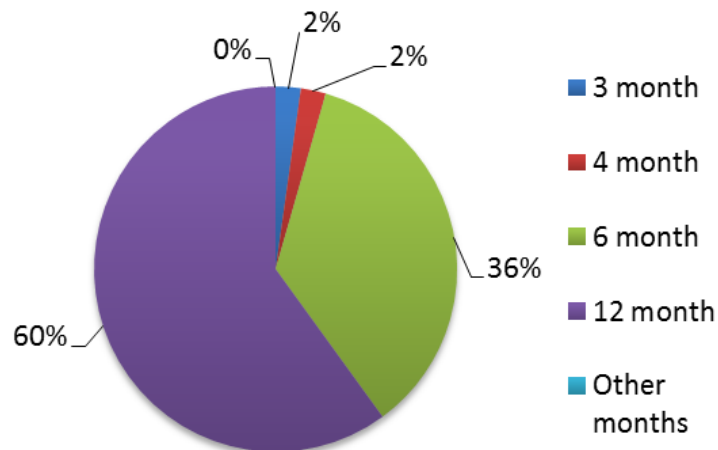
Q) What kind of dielectric testing do you perform on your distribution aerial equipment?



50% of respondents perform DC dielectric testing on their distribution aerial equipment.

Frequency of Dielectric Testing

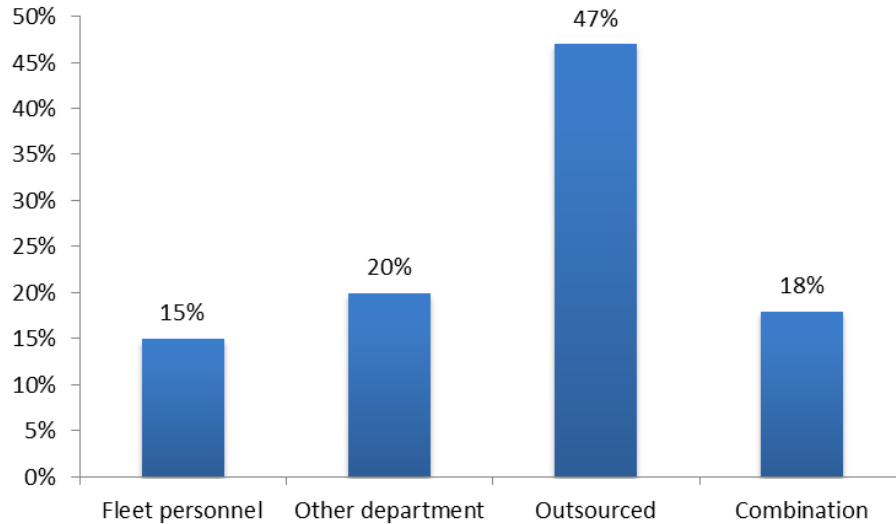
Q) How frequently do you conduct dielectric testing?



60% of respondents run dielectric testing once every 12 months, 96% of respondents run dielectric tests no more than twice a year.

Personnel Responsible for Dielectric Testing

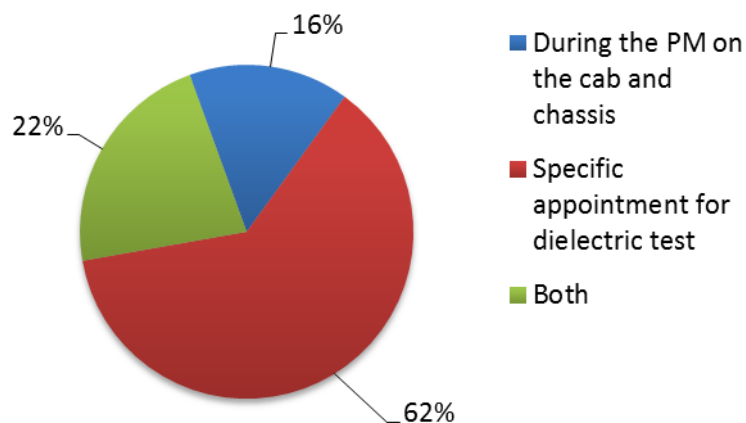
Q) Who performs the dielectric testing?



47% of respondents indicated that they outsourced their dielectric testing. 20% of respondents indicated that their dielectric testing is performed by another department.

Time Period when Dielectric Testing is performed

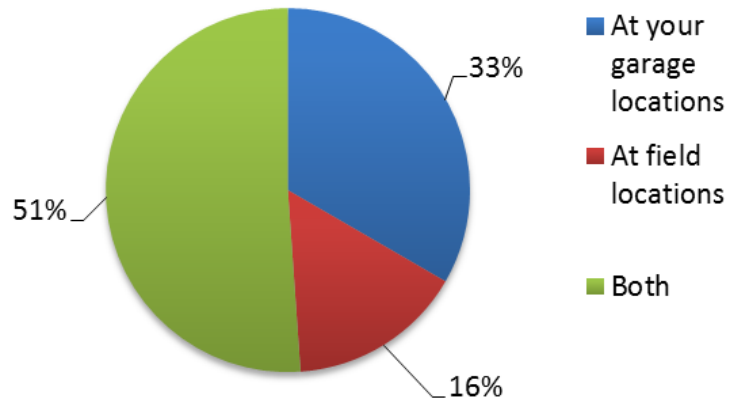
Q) When do you perform dielectric testing?



62% of respondents indicated that dielectric testing is performed during specific appointments for dielectric test.

Location of Dielectric Testing

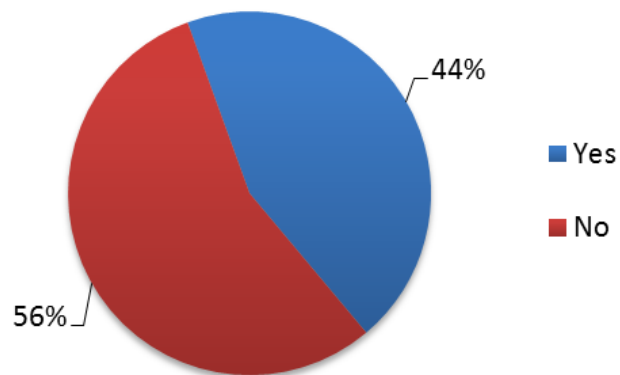
Q) Where do you perform dielectric testing?



51% of respondents indicated that dielectric testing is performed at both their garage and field locations.

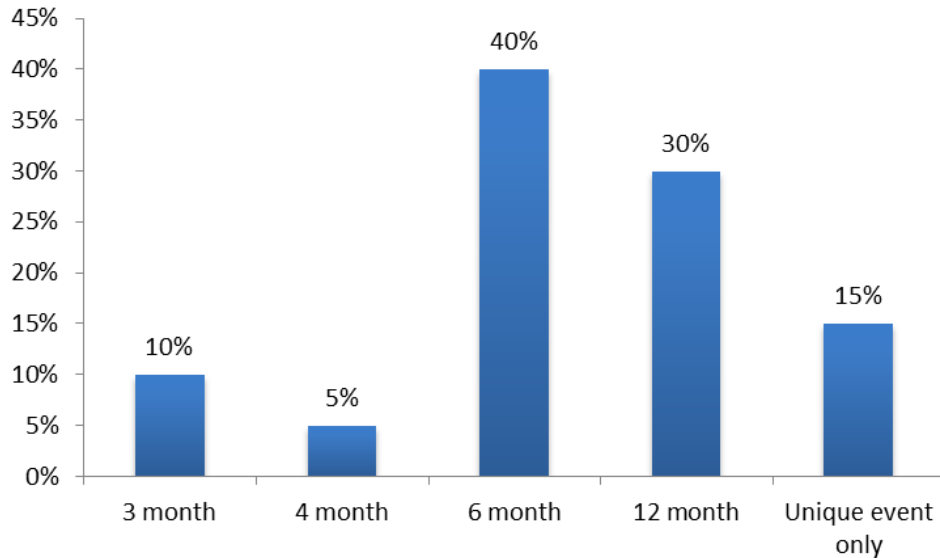
Ground Systems Tests

Q) Do you conduct truck ground system tests?



56% of respondents do not conduct truck ground system tests.

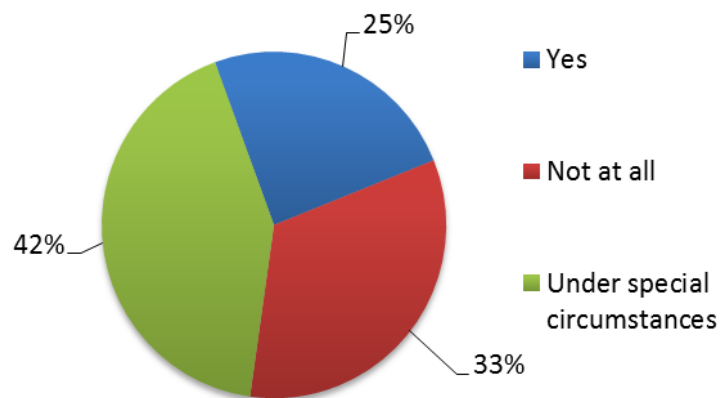
Q) If yes, how frequently?



Of the respondents who conduct truck ground system tests, 40% of them conduct the tests every 6 months. 30% of respondents conduct the test every 12 months, while 15% conduct the test under unique circumstances only.

Acoustic Emission Tests

Q) Do you conduct Acoustic Emission (AE) tests?



42% of respondents conduct AE tests under special circumstances, whereas 33% of respondents do not conduct AE tests at all. 25% of respondents conduct AE tests regardless of special circumstances.

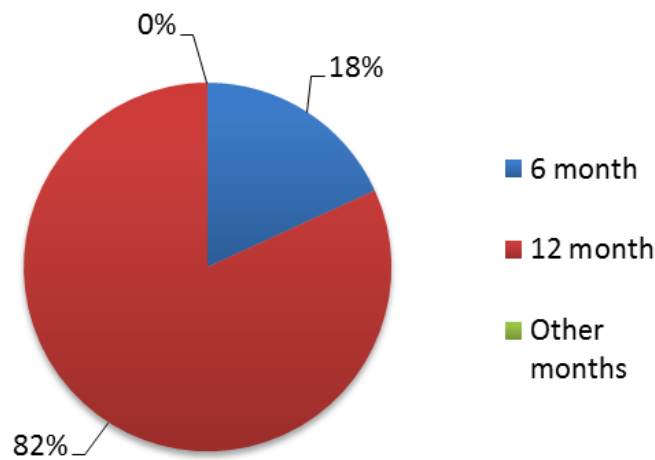
Q) Please describe the special circumstances under which you conduct AE tests.

The following describes the special circumstances under which respondents conduct AE tests:

- High voltage contact incidents, structural incidents, serious vehicle collisions
- On demand after a particular vulnerability is identified
- When a boom has been damaged or has suspect damage.
- If the boom has been damaged
- AE testing performed only as required for analysis to determine integrity of boom structure after unusual event.
- May be performed as a diagnostic tool to pin point problems that occur under loaded conditions.
- Result of visual inspection
- When a significant event with an individual unit requires a test.
- If we note structural damage
- Case by case basis
- Overload, incident
- Structural/hydraulic repairs/rebuilds, contact incidents
- Accidents or other concerns
- Accident follow up
- As required if indications of boom overload
- During rebuilds
- When there is an issue
- If there was an accident involving the boom or every 2 years
- After major repairs or damage per manufacturers' requirements.
- Demand based on specific circumstances: indications of problems or extreme boom age
- Vehicle accidents, accidental energized incident

Accidents and damages are two of the most common special circumstances under which respondents conduct AE tests.

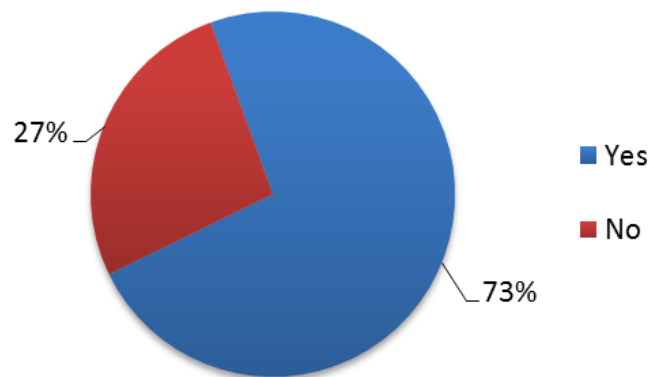
Q) How often do you conduct AE tests?



Of the respondents who indicated that they conduct AE tests regardless of special circumstances, 82% of them conduct the tests every 12 months.

Preventive Maintenance Practices

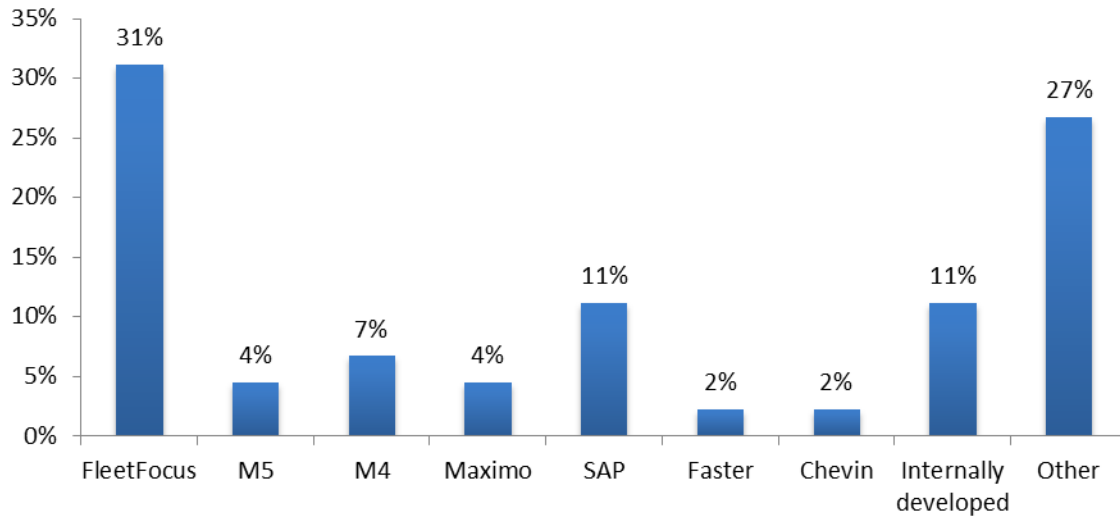
Q) Are the cab and chassis and aerial device PMs done at the same time?



73% of respondents perform preventive maintenance on the cab/chassis and aerial devices at the same time.

Fleet Management Systems

Q) What fleet management system do you use?



31% of respondents use FleetFocus, whereas 27% of respondents use other types of fleet management systems.

Capturing Usage Data

Q) Do you use the following methods to capture usage data?

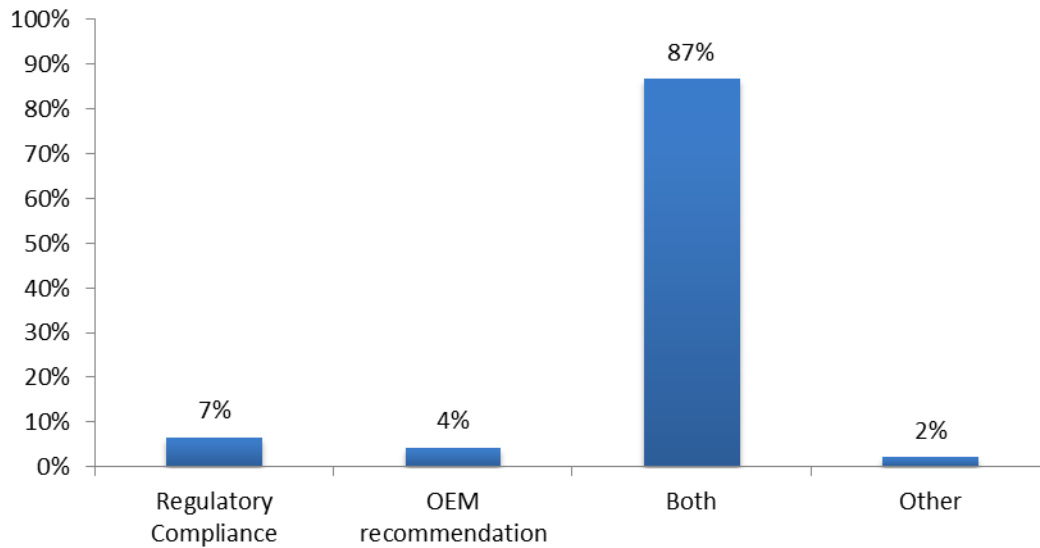
Method	Yes	No
Work Order Tracking	91%	9%
User Input Into Tracking System	44%	56%
Telematics Interfaced with Fleet System	9%	91%
Fuel Cards Interfaced with Fleet System	69%	31%
Other	11%	89%

91% of respondents capture usage data through work orders, followed by 69% of respondents who capture usage data via fuel card data interfaced to fleet system.

Criteria for Establishing PM Parameters

Q) *What criteria are utilized to establish PM parameters?*

The criteria for establishing PM parameters for 87% of respondents are both regulatory compliance and OEM recommendation.



Average PM Parameters

The following table shows the average PM parameters for different vehicle classes:

	Time (months)	Mileage	Fuel (Gallon)	Hours	PTO Hours
Cars	7	6303	-	-	-
Pickups and/or Service trucks	6	6346	-	-	-
Vans	7	6419	-	-	-
Light-duty chassis with mounted equipment	5	6348	-	329	250
Light-duty aerial device if PM schedule is separated from chassis	4	6367	-	238	250
Medium-duty chassis with mounted equipment	5	6897	600	311	250
Medium-duty aerial device if PM schedule is separate from chassis	5	6273	-	383	295
Heavy-duty chassis with mounted equipment	5	7500	700	375	250
Heavy-duty aerial device if PM schedule is separate from chassis	4	6389	-	383	295
Road tractors	5	9180	-	390	-
Trailers	10	7500	-	-	-
Coal handling dozers	5	-	-	321	300
Locomotives	3	-	-	250	-
Forklifts	8	5500	-	258	-
Generators	7	8500	-	250	-
Boats	10	8500	-	350	-

Most Common (Mode) PM Parameters

The following table shows the most common PM parameters reported for different vehicle classes:

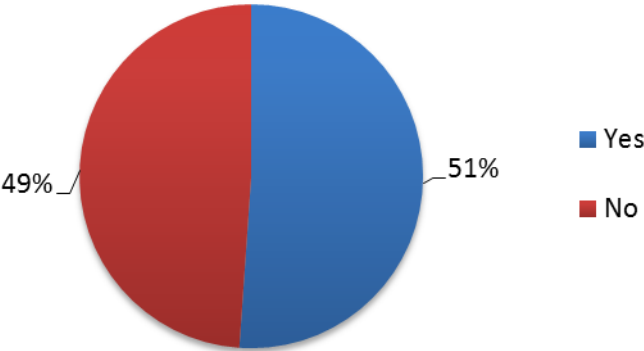
	Time (months)	Mileage	Fuel (Gallon)	Hours	PTO Hours
Cars	6	5000	-	-	-
Pickups and/or Service trucks	6	5000	-	-	-
Vans	6	5000	-	-	-
Light-duty chassis with mounted equipment	6	5000	-	200	n/a
Light-duty aerial device if PM schedule is separated from chassis	6	5000	-	200	n/a
Medium-duty chassis with mounted equipment	6	5000	n/a	200	250
Medium-duty aerial device if PM schedule is separate from chassis	6	5000	-	n/a	n/a
Heavy-duty chassis with mounted equipment	6	5000	n/a	200	250
Heavy-duty aerial device if PM schedule is separate from chassis	6	5000	-	n/a	n/a
Road tractors	6	5000	-	n/a	-
Trailers	12	n/a	-	-	-
Coal handling dozers	6	-	-	250	
Locomotives	n/a	-	-	250	-
Forklifts	6	n/a	-	250	-
Generators	6	n/a	-	200	-
Boats	12	n/a	-	n/a	-

The following shows the PM parameter most commonly used for the specific vehicle classes:

Vehicle Class	Most Commonly Used PM Parameters
Cars	Mileage
Pickups/Service Trucks	Mileage
Vans	Mileage
Light Duty Chassis with Mounted Equipment	Mileage
Light Duty Aerial Device	Time
Medium Duty Chassis with Mounted Equipment	Time
Medium Duty Aerial Device	Time
Heavy Duty Chassis with Mounted Equipment	Time
Heavy Duty Aerial Device	Time
Road Tractors	Time
Trailers	Time
Coal Handling Dozers	Engine Hours
Locomotives	Engine Hours
Forklifts	Time
Generators	Time
Boats	Time

Efforts to Extend PM Parameters

Q) Do you have any efforts to extend PM intervals?



51% of respondents undertake efforts to extend their PM intervals.

Q) *If yes, please explain.*

Of the respondents who take measures to extend their PM intervals, the following describes the measures taken:

- Older truck interval is every 4 months
- Service intervals (fluids) to 7500-10000 miles
- We match telematics data for boom out of rest time to determine (in conjunction with the OEM) what the appropriate interval should be.
- Low use vehicles and specialty vehicles are scheduled according to usage
- Oil and filter analysis on select units, and guidance from oil manufacturer to determine extended range of oil and filter. Select time interval by application and unit to determine time interval for scheduling within the desired usage interval. For gas engines with small (short) oil filter, mileage interval reduced from 10000 to 6000 miles due to filter capacity. For Power stroke diesels, interval reduced to 200 engine hours due to fuel dilution in crankcase caused by fuel enrichment for exhaust regeneration. Small aerials on F550 chassis/Power stroke, oil & filter change every 2 or 3 months to achieve 200 engine hour, and full PM at 6 month interval.
- You hear conflicting storied between Equip Mfg. and Oil Producers, one says shorten the other says extend. We perform oil sample analysis and repair data to help drive and tell us how well the oil is performing and then make adjustments. With all the issues around the Ford F550's we shifted away from them because of the need to perform excessive oil changes. Every time we touch a vehicle it cost money and we are all under pressure to reduce and control costs. Changing oil that is still performing does not make sense.
- Usage, storm response
- All PM schedules under review.
- Synthetic Oil in all light vehicles extending PM's to annual
- We installed hour meters on smaller vehicles and are sampling the engine oil
- Recently increased chassis intervals those shown above. Plans are to change light duty aerial inspections from 2 months to 3 months
- Oil sampling, adjusting to OEM extended intervals
- oil testing
- Synthetic oil
- With oil analysis results
- Looking to extend aerial devices
- Newer technologies require less maintenance
- Need to call mtc service provider to extend or change
- Synthetic oil and use of usage meters on aerial lift controls
- We extended the recommended service intervals on booms after we showed the OEM the telematics data on boom out of rest hours

Qualifications Required of Technicians

Q) Do you require the following qualifications for your technicians?

Qualifications	Yes	No
In-house Training	80%	20%
ASE Certification	51%	49%
FPS Mobile Hydraulic Certification	40%	60%
Associate Degree/Technical College	20%	80%
Other	18%	82%

80% of respondents require their technicians to have in-house training. 51% of respondents require their technicians to have ASE certification.

In-House Training

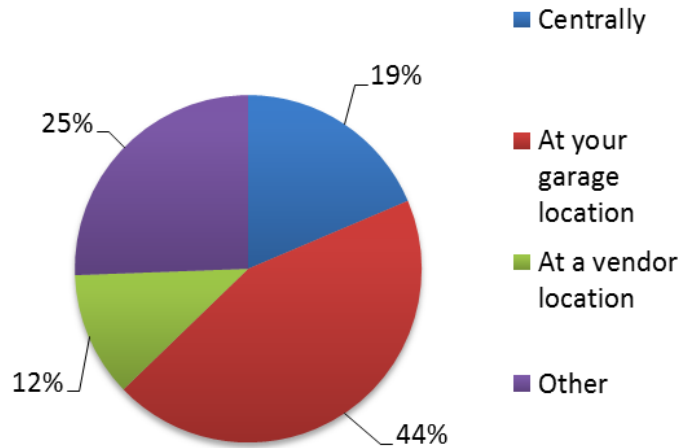
Q) Do you use the following personnel to conduct in-house training?

Personnel	Yes	No
Contract Trainers	69%	31%
Company Trainers	42%	58%
Foreman/Lead	33%	67%
Other	29%	71%
Not Applicable	9%	91%

69% of respondents indicated that their in-house training is conducted by contract trainers, whereas 42% of respondents indicated their training is conducted by company trainers.

Location of Training

Q) Where is training conducted?



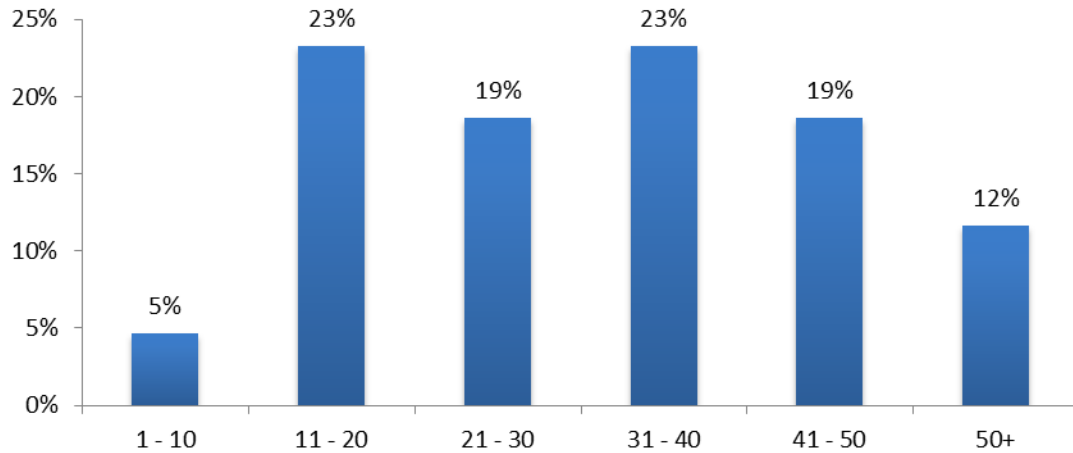
44% of training is conducted at the organization's garage location. 25% of respondents conduct their training in locations other than centrally, garage location, or at their vendor's location.

The following describes the locations in which training is conducted for these respondents:

- Field locations at jobsites
- Training is conducted both in house and at vendor locations
- We utilize a local Vo-Tech class room and bring in manufactures or industry experts
- All of the above locations
- Vendor and community college
- Boiler plate training is performed centrally. Formal Technical training and E Learning modules are performed at the garages
- our base yard & classroom
- All of the above and community college
- Must be qualified before hiring
- Both garage and online
- All of the above locations

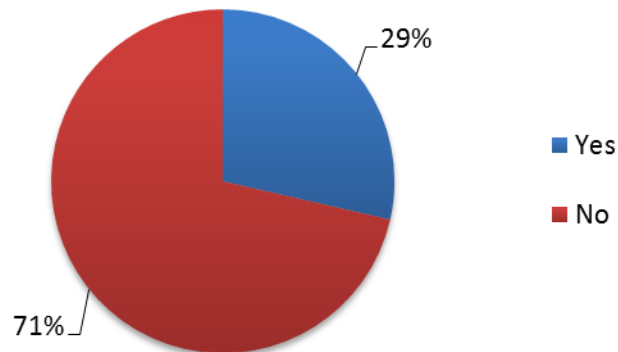
Annual Training Hours per Mechanic

Q) What are the average annual training hours per mechanic?



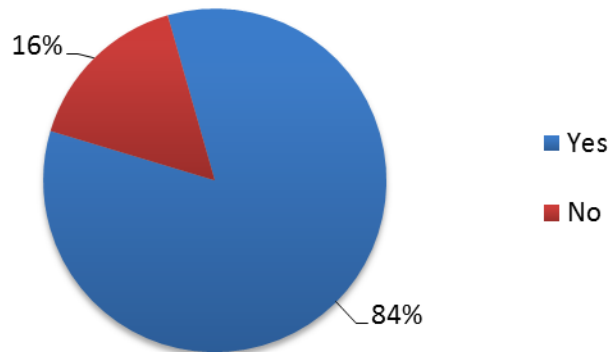
54% of respondents indicated that they spend over 31 hours annually training their employees.

Q) Is training contractually required for mechanics represented by bargaining units?



Training for mechanics represented by bargaining units is not contractually required by 71% of respondents.

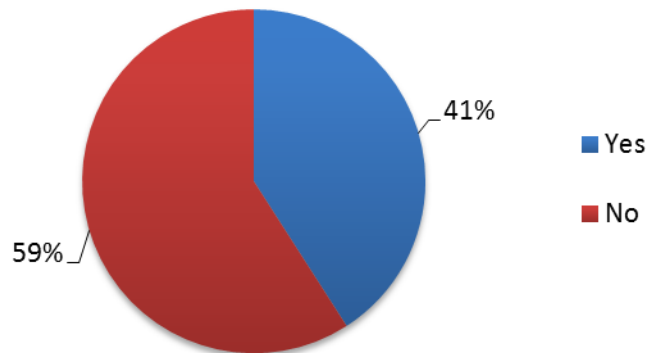
Q) Do the annual training hours per mechanic vary with need?



84% of respondents indicated that their annual training hours per mechanic vary with need.

Apprentice Program

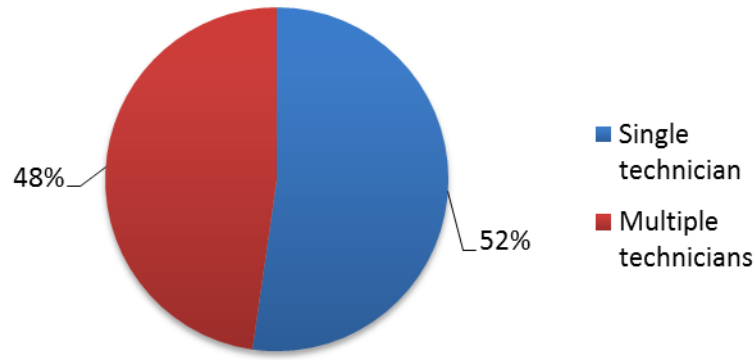
Q) Do you have an apprentice program?



59% of respondents do not have an apprentice program.

Personnel Performing PMs for Units with Aerial Device

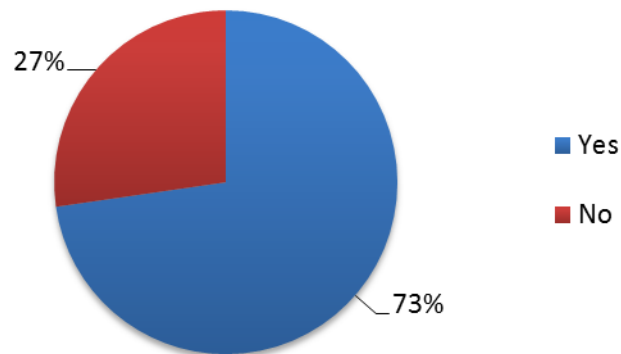
Q) Who performs the PM for units with an aerial device?



52% of preventive maintenance for a unit that has an aerial device on it is performed by a single technician.

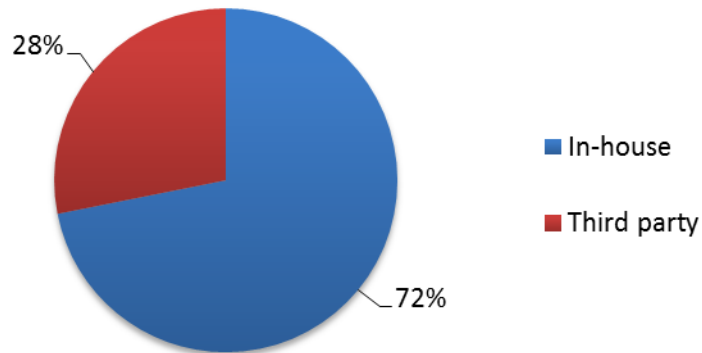
In-House Warranty Work for Light Duty Equipment

Q) Are you approved to do in-house warranty work for light-duty equipment?



73% of respondents are approved to do in-house warranty work for light duty equipment.

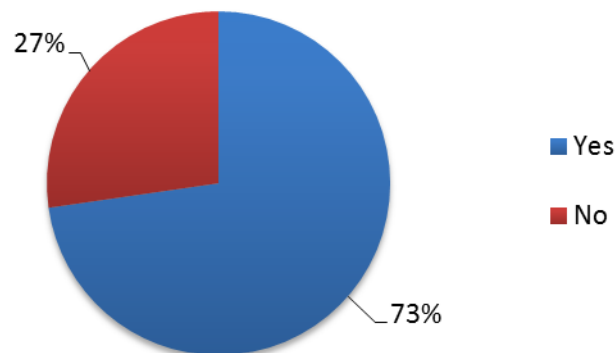
Q) If yes, how are your warranty claims processed?



Of respondents who are approved to do in-house warranty work for light duty equipment, 72% of them process their warranty claims in-house.

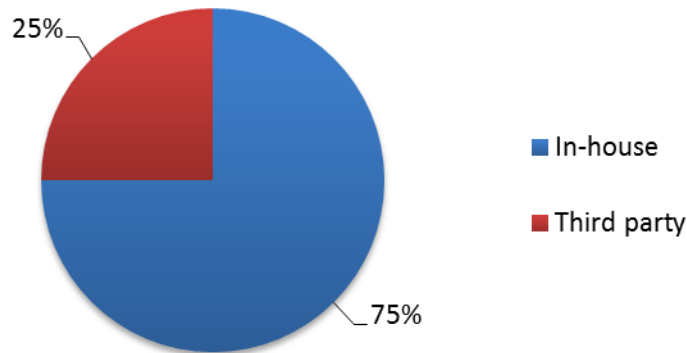
In-House Warranty Work for Heavy Duty Equipment

Q) Are you approved to do in-house warranty work for heavy-duty equipment?



73% of respondents are approved to do in-house warranty work for heavy duty equipment.

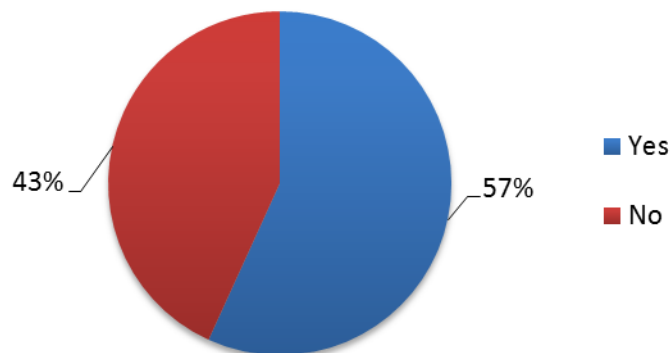
Q) If yes, how are your warranty claims processed?



Of respondents who are approved to do in-house warranty work for heavy duty equipment, 75% of them process their warranty claims in-house.

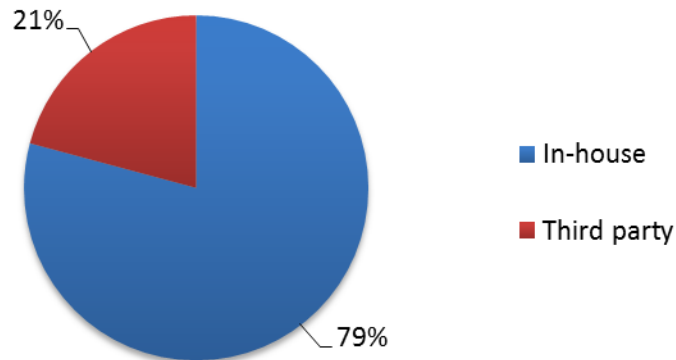
In-House Warranty Work for Power-Operated Equipment

Q) Are you approved to do in-house warranty work for power-operated equipment?



57% of respondents are approved to do in-house warranty work for power-operated equipment.

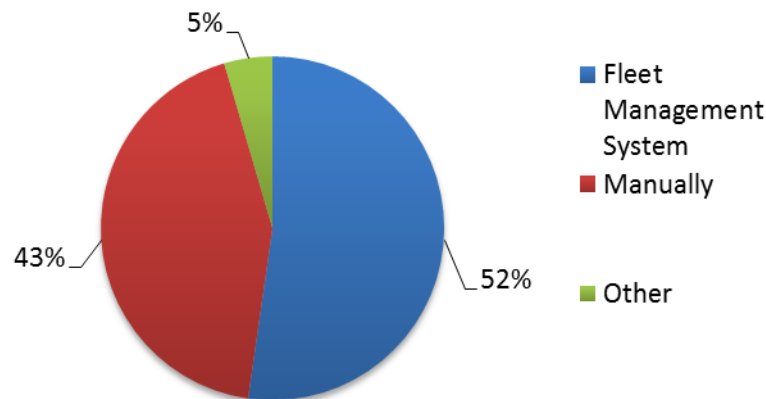
Q) If yes, how are your warranty claims processed?



Of respondents who are approved to do in-house warranty work for power-operated equipment, 79% of them process their warranty claims in-house.

Recall Notification

Q) How do you handle recall notifications?



52% of recall notifications are handled through fleet management systems, followed by 43% that are handled manually.

Insourcing and Outsourcing PM

Q) How do you perform your PMs?

The following table shows the percent of respondents who insource vs. outsource prevent maintenance.

	Insourced	Outsourced	Both
Cars	36%	30%	34%
Pickups/service trucks	40%	27%	33%
Vans	47%	28%	26%
Light duty chassis with mounted equipment	61%	18%	20%
Light duty aerial device if PM schedule is separate from chassis	70%	16%	14%
Medium duty chassis with mounted equipment	67%	16%	18%
Medium duty aerial device if PM schedule is separate from chassis	73%	16%	11%
Heavy duty chassis with mounted equipment	69%	16%	16%
Heavy duty aerial device if PM schedule is separate from chassis	73%	16%	11%
Road tractors	71%	19%	10%
Trailers	63%	16%	21%
Coal handling dozers	47%	40%	13%
Locomotives	44%	56%	0%
Forklifts	41%	38%	21%
Generators	59%	32%	9%
Boats	58%	33%	8%