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Preventive Maintenance

Kathryn Juliano

American Association of Zoo Keepers - Safety Committee

Introduction

Animal keepers often have nightmares about system failures and subsequent outcomes at work. Big cat keepers imagine tigers breaching containment barriers. Aquarists worry about losing electricity to life support systems in a room full of tropical tanks. Small mammal keepers fear animals left outside in inappropriate temperatures. However, all keepers have similar concerns about fires, animal escapes, limbs slammed in doors, and worse.

Yet, in all of this, there is one easy way for keepers to mitigate the risk that these worst-case scenarios will occur: preventive maintenance. This type of maintenance focuses on inspecting and servicing equipment to avoid malfunction; it can save time, money, and energy. Many facilities complete some level of preventive maintenance but may do so sporadically and without appropriate, detailed documentation. Creating and implementing a formal plan can seem mundane and perhaps unnecessary, but it could be the difference between life and death for both animals and zoo keepers.

Beyond animal safety and care, a preventive maintenance plan can reduce injury to keepers and prevent long-term health issues. Plans also have great benefits for the facility, including reduced damages and lowered expenses. It's often cheaper to prevent damage than repair damage; maintaining a lock following the manufacturer's recommendation is much cheaper than replacing a lock. A well-documented plan can help ensure Occupational Safety and Health Administration (OSHA) compliance and reduce stress before government or accreditation inspections. It is easy to create and implement a preventive maintenance plan and subsequently see the positive impact on facilities, keepers, and animals.

Creating A Preventive Maintenance Plan

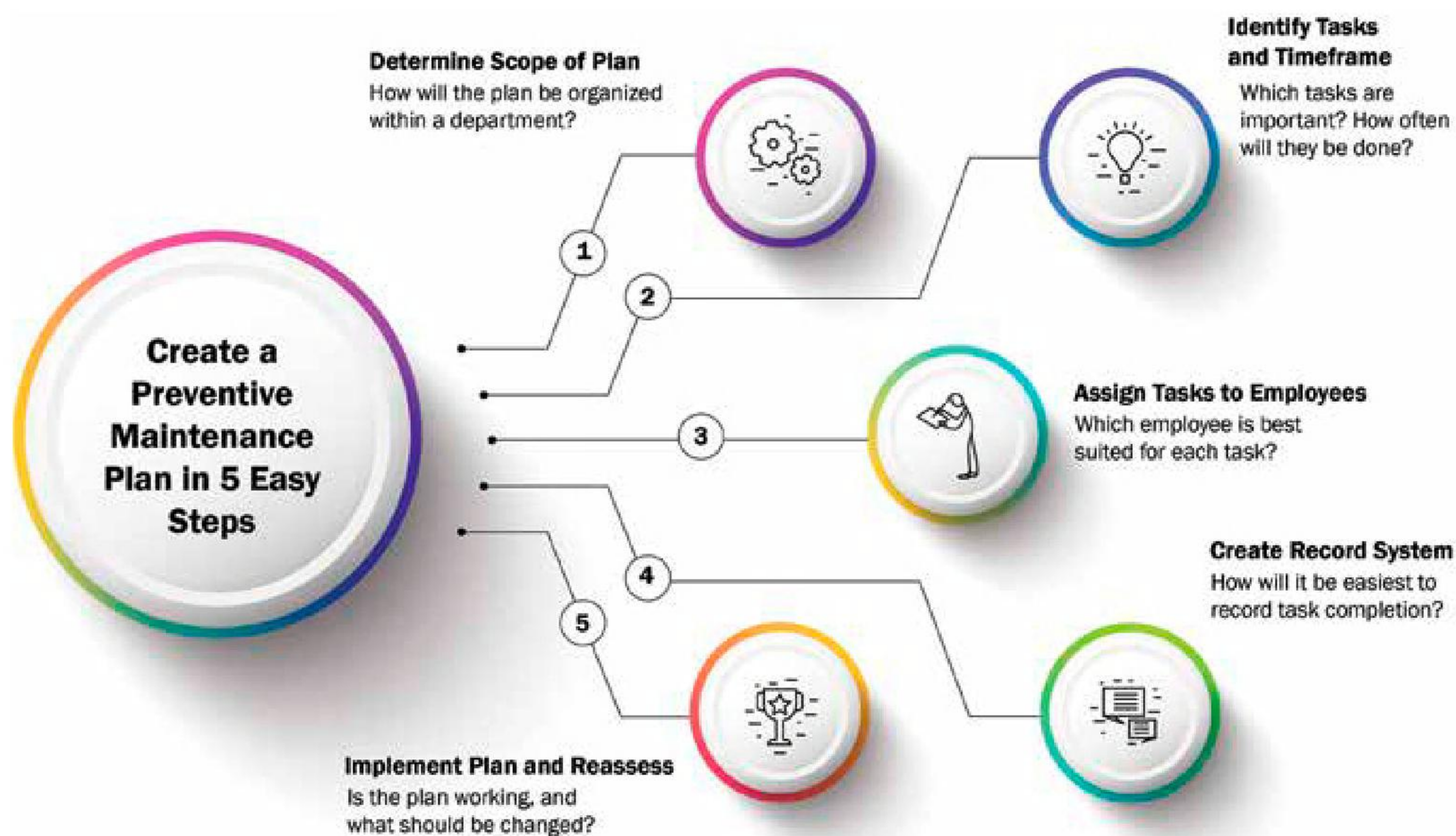
It only takes a few steps to create a preventive maintenance plan. First, in direct consultation with supervision, decide the scope of the plan within the facility. Second, create a list of preventive maintenance tasks following the manufacturer's recommendations and determine how frequently these tasks should be completed. Third, determine responsibilities for various tasks to employees within the unit or department. Fourth, create a record system that can be accessed and understood by everyone who will participate in the plan. Fifth, ensure proper instruction and training are received and begin completing the routine tasks. Evaluate and adjust the plan as needed.

To begin creating a preventive maintenance plan, first determine the scope and size of the plan. A plan may encompass an entire unit or department, or it could be organized by divisions within a section. Consider the size, organization, and staffing of the department and consult with the safety experts at the facility, too. Some zoos may have a safety specialist, safety committee, or maintenance department who could help organize, train, and implement preventive maintenance plans. Many departments already have a point person for safety who could start working on a plan.

Each plan should contain a list of maintenance tasks that will be completed on a regular basis. In order to select duties, think about an object or feature's role, risk, and implication. The role of the feature identifies how important the item is and how frequently it is used. Is it a shift door that is used every day to move primates, or is it a lock on a storage closet? Think about the risk of damage to the feature. Is the shift door fragile or durable? Is the lock to the storage closet exposed to the weather? Finally, consider the implication should the feature fail. If the shift door's cable snaps, could it potentially injure a primate? If the lock to the storage closet is stuck closed, will access to important capture items be blocked? Determining the role, risk, and implication of every item can help determine what tasks need to be included within the preventive maintenance plan, and how often the tasks should be performed.

Once a list of tasks is created within a plan, determine how frequently these tasks should be completed. Tasks could be executed every month, every six months, every year, or any time interval in between. It may be decided that some responsibilities are too important to be included in the preventive maintenance plan and must instead be completed every day. For example, many facilities would say that hotwire or other elements of primary containment must be checked every day. Make sure to follow recommended service intervals for certain equipment. Check with a manufacturer, consult OSHA resources, or look for a printed expiration date. Consider each object's role, risk, and implication, and think practically about the amount of time staff can utilize to determine how frequently each task will be completed.

After creating a list of tasks, responsibility must be assigned for each duty. When allocating preventive maintenance tasks, it's best to evenly divide tasks to ensure compliance and prevent employees



from becoming overwhelmed. Some duties are best allocated to employees who work in an area most frequently, especially if these responsibilities must be completed within animal areas. Other tasks are best appointed to shift keepers or employees who are in the area less frequently. These staff may be able to see the area and its equipment with a fresh perspective - noticing changes over a period of time that were gradual and subsequently unnoticed by daily staff - or they can have a narrow focus on one category of responsibilities across departments, like checking fire extinguishers. Get everyone in the unit involved so that staff are all accountable and able to take pride in their area's upkeep.

Finally, there needs to be an easy way to keep track of what tasks have been completed. Each plan should have a record system that allows for easy access by multiple people. Digital copies can be stored on a facility's computer network or within an online document-hosting site. Some people may prefer a paper record system that is kept in a central location. Information in paper records can then be uploaded to a digital copy for easy reference. Whichever record system is selected, records should be kept for at least five years as proof of maintenance for inspections. When recording the locations of objects or tasks in the plan, make sure that all employees understand the names of different locations. Include a key if abbreviations are used and include a map or floor plan if available. Using names for areas based off of animals should be avoided, as the facility's collection can change. Once a task is completed, each individual should initial or sign off in the records to foster accountability and ensure compliance.

Common Preventive Maintenance Tasks

Some common preventive maintenance tasks have been included here. Most of these tasks should be required in any plan, but each

facility and department is different. Consider the role, risk, and implication of these features within the facility when tasks are added to the plan.

Shift doors can cause great injury to animals and keepers if they fail, and it is recommended that they be tested at least once a month. There are many different types of shift doors, so be sure to consider what maintenance is required for the facility or building. Most doors would benefit from frequent greasing with a lubricant or a dry graphite spray. Check with the door's manufacturer to see which type of lubricant is appropriate. Some doors function with a rope or cable. Regularly check for tears, snags, or deterioration and record any possible damages the moment they are seen. Hydraulic doors must be checked regularly without animals present and should be lubricated or maintained following the manufacturer's instructions. Some shift doors may be so important that they need to be checked more frequently than once a month. Think carefully about the door's role, risk, and implication, and discuss the issue with coworkers. Remember that it may only take a few minutes to properly check a door, and the benefit of a check could be much greater than the implication if the door should fail.

Hotwire should be checked daily to ensure that it is functioning correctly. However, a more thorough check of any hotwire or electric fence can be completed every month. Look for plant growth or other items that could get too close to the hotwire and trim any tree or bush limbs that could snap off in a storm. Look for breaks or places of weakness. This task may be good for someone who is not in the area frequently and could provide a fresh perspective. Again, make sure to consider the risk, role, and implication of each set of hotwire or electric fence within the facility.

Object/ Feature	Tasks	Recommended Frequency
Shift Doors	Grease or lubricate doors, test function, look for breaks in cables or ropes	At least once a month
Hotwire/ Electric Fence	Look for breaks or places of weakness, look for objects that could disrupt hotwire	At least once a month
Locks	Grease or lubricate, test function	Once a month- every six months
Animal Escape Equipment	Inspect equipment for damage or disrepair, ensure all equipment is present	Every three months- every six months
Fire Alarms	Test alarm for proper function	Every six months
Fire Extinguishers/ CO2/ Pepper Spray	Check pressure gauges and that pins are in place, ensure proper storage, check if expired	Once a month- every six months
Eyewash Station	Check that water flows strongly, drains correctly, and water runs clear	Once a month
Hazardous Materials	Look for leaks, make sure bottles are properly labeled, keep areas clear of clutter	Every six months
Heaters and Fans	Dust as needed, look for damage to power cords, change filters as needed	Every three months- seasonally
Electrical Cords	Ensure all cords are properly stored and used	Every six months
First Aid Kits	Replace used supplies, replace kit if expired	Once a month
Radios	Check proper function, update inventory	Every six months
Vehicles	Follow owner manual's instructions, inspect tires for damage, check and replace fluids	Once a month- every three months

Locks are important to check and maintain, but not all locks need to be checked on a monthly basis. Some locks could affect animal welfare if they fail, but other locks will just inconvenience keepers. Check locks at different frequencies when it seems appropriate. When checking a lock, bring a can of lubricant or dry graphite spray, depending on the lock manufacturer's suggestion. Lubricate any area that sticks on the lock, including the locking mechanism, key opening, or openings for the shackle. Open and close the lock several times to check that it operates smoothly before placing it back in its proper location.

Take some time every month to ensure that animal escape stations or equipment are properly maintained. If there is a designated station or area for equipment, make sure it is clearly labeled and appropriately stocked. Check that all tools are in good condition. Look for holes or tears in nets, ensure that doors and tops are on critter carriers, and make sure that all bite gloves are in good condition. Some units have additional sets of equipment near animal enclosures in the chance that a person breaches animal containment barriers. Make sure to check this equipment well. The box or kit may be labelled or discreet, depending on the facility's preference, but it should always be free of clutter and easily accessible. Check that ladders function properly and haven't been

affected by the elements, and that rope or cord ladders have not been damaged by pests. Replace any missing or damaged items. Checking that animal escape equipment is functioning properly could only take a few minutes and drastically change the outcome of an animal emergency.

Fire alarms and extinguishers need to be checked regularly. It's recommended that fire alarms are tested at least every six months and batteries are replaced every year. Fire extinguishers should be inspected every month by an individual trained in extinguisher inspection. In order to ensure that every extinguisher is checked, record the locations of every canister and label each canister at its storage location. Fire extinguishers should be stored up off of the ground. Ensure that there is no clutter around the extinguishers and that they are easily accessible. When checking the extinguisher, use the gauge on the canister to ensure that the pressure within the extinguisher is at the appropriate level and the canister is not past its expiration date. Most extinguishers have a tag on the canister that allows the employee to record inspections.

Check that other safety equipment, like pepper spray or CO2 canisters, is properly stored as well. The locations of these items should also be listed in the record system, and each canister should be labeled within the facility. CO2 canisters should be stored up off of the ground. Both CO2 canisters and pepper spray should have a pin blocking the release mechanism. Check the bottle or manufacturer for recommendations on replacement times; most canisters will need to be replaced every few years.

Eyewash stations have to be inspected once a month. Make sure that the water flows strongly out of both faucets, the water drains out appropriately, and that the water runs clear from the faucets. If the eyewash station runs off of a bottle, check the bottle's expiration date to make sure it isn't expired. Record the location of every eyewash station in the plan and label each station within the facility. Eyewash stations also have tags that allow the employee to record inspections on the device itself.

Hazardous materials, such as cleaners, should be checked at least every six months. Look for signs of leaks or spills, and confirm that each bottle is properly labeled. Keep a list of materials and their locations along with a Safety Data Sheet (abbreviated as "SDS" and previously known as "Material Safety Data Sheets" or "MSDS") to ensure OSHA compliance. Make sure that SDSs are kept both near the hazardous materials as well as with the record system. Keep storage cabinets and areas clean and keep openings or doorways free of clutter.

Check heaters and fans for proper guarding and inspect their power cords. Some equipment may need to be dusted to prevent fires, while other equipment may need to be checked seasonally depending on its use. Check that power cords are intact and haven't been chewed on by mice or damaged in any other way. On dust collecting equipment, check vents and filters, and change filters according to the manufacturer's instructions.

Check regularly for poorly placed electrical cords that can create tripping hazards and electrical problems. Ensure that each electrical cord has an intact grounding device and is rated for either wet locations or outdoor use, depending upon placement. Ensure that cords are properly stored or are placed out of pathways. Remove extension cords or power strips if they are improperly used. Make

Preventive Maintenance Plan Examples:

An example of part of a preventive maintenance plan for 2 outdoor yards.

	Jan 2018		Feb 2018		Mar 2018	
Heater Checks						
Yard 1	1/5	KJ	2/8	KJ	3/20	KJ
Yard 2	1/12	DD	2/4	DD	3/6	DD
Clear Vegetation from Hotwire						
Yard 1	1/8	KJ	2/10	KJ	3/22	KJ
Yard 2	1/12	DD	2/10	DD	3/6	DD
Check and Lubricate Locks						
Yard 1	1/5	KJ	2/15	KJ	3/22	KJ
Yard 2	1/17	DD	2/12	DD	3/11	DD

An example of a record of fire extinguisher checks completed by one person. Note that no areas are identified with animal names.

Extinguisher Number	Location	Bar code #	Jan	Feb	Mar
1	Blue Line	100456	16-Jan	19-Feb	4-Mar
2	Blue Line Office	100459	16-Jan	19-Feb	4-Mar
3	Kitchen	100611	16-Jan	19-Feb	4-Mar
4	Center of Building	100612	16-Jan	19-Feb	4-Mar
5	Yellow Line	100614	16-Jan	19-Feb	4-Mar
6	White Line	100616	16-Jan	19-Feb	4-Mar
7	Yellow Mech. Room	110620	16-Jan	19-Feb	4-Mar
8	White Mech. Room	100458	16-Jan	19-Feb	4-Mar
9	Yard 97 Barn	100619	29-Jan	20-Feb	4-Mar

sure to check areas that don't receive significant foot traffic, and look at equipment that is used seasonally, too. This may be a great task for someone who isn't as familiar with the area and has a fresh set of eyes.

First aid kits should be checked every thirty days. Record the location of every kit and label the kits within the facility. Check that kits have all of the necessary supplies, and replace materials that have been used. Some kits have expiration dates. Make sure kits are replaced as needed and keep a record of when the kits were replaced.

It's important to maintain handheld radios. Work with upper management to keep a list of radios, their serial numbers, and if they are assigned to a staff member. Record damage or faulty function and submit the unit for immediate evaluation and/or repair to supervision. Make sure that batteries are charging, that the charging stations work correctly.

Vehicle maintenance can be very complex, and the owner manual for each vehicle should be consulted first. As a minimum, inspect the vehicle for damage and wear. Check the fluid levels and regularly change any oil according to the owner manual's recommendations. Inspect the tires for damage, look at the tire treads for excessive wear, and check the tire pressure. Ensure that the vehicle storage area and the vehicle are free of clutter and easily accessible. A separate set of records should be kept for each vehicle to record damages, use, and repairs.

Implementing a Preventive Maintenance Plan

Identifying tasks, determining their frequency, and ensuring tasks are assigned to different employees will lead to completing the tasks regularly. The first set of checks can take a long time to finish, but duties will get easier as they are regularly completed. Make sure to continually evaluate a plan's effectiveness and change aspects of the plan as needed. A great plan may switch responsibilities between employees every year to avoid complacency. Exchange information and plans throughout the facility to ensure that all tasks are completed and to share ideas about how to best implement preventive maintenance plans.

Preventive maintenance can seem dull and unnecessary, but it can save time, money, and lives. Just a few hours a month could change the outcomes of emergencies like fires, animal escapes, and natural disasters. Preventive maintenance is better for the keeper and the facility and, most importantly, the animals. Start working on a plan now!

References

- AZA Special Committee on Safety. 2015. Zoo & Aquarium Safety: Example Practices. Association of Zoos & Aquariums. Accessed 13 Feb 2018. https://www.aza.org/assets/2332/safety_example_practices_for_aquariums_zoos_2015.pdf.
- Occupational Safety and Health Administration. 2016. OSHA Safety and Health Program Management Guidelines. Accessed 13 Feb 2018. www.osha.gov/shpguidelines.
- Occupational Safety and Health Administration. 2016. Recommended Practices for Safety and Health Programs. OSHA 3885. Accessed 13 Feb 2018. https://www.osha.gov/shpguidelines/docs/OSHA_SHP_Recommended_Practices.pdf
- Occupational Safety and Health Administration. 2012. OSHA Brief - Hazard Communication Standard: Safety Data Sheets. DSG BR-3514 2/2012. Accessed 13 Feb 2018. <https://www.osha.gov/Publications/OSHA3514.pdf>

June is National Safety Month

AAZK's Safety Committee is dedicated to developing and exchanging resources focused on safety and health in zoos and aquariums. We create workshops and certificate courses for national AAZK conferences and share information through multiple channels, including Animal Keeper's Forum. June is National Safety Month and we're excited to present this article that focuses not only on animal safety, but overall workplace safety. Stay safe this June and look for more of our safety information on AAZK social media.