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Disinfecting Your Fleet

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Fleet managers are being challenged by an international pandemic issue that has brought countries, states and businesses to a halt. They are being asked to create processes and procedures to protect against a virus that researchers do not fully understand. Fleet managers are now in a precarious position to find a solution that accomplishes the goals of the company while minimizing the risk to employees and customers, knowing that only time will tell whether the decisions were correct.

There is not a one-size-fits-all solution as each manager has different concerns based on their type of business, types of vehicles and the environmental risk level in their area of operations. This paper is meant to look at some of the options available that can help the fleet manager create a plan of action that will be effective in accomplishing his or her goals.

It is important to note that vehicle utilization will have the greatest impact in determining the plan of action. Plans may need to vary between different types of vehicles and how they are used. For example, the plan for a sales fleet with one driver assigned to a specific vehicle will probably be very different from the plan for a commuter bus. Regardless of the plan chosen, the goal should always be to reduce the risk of infection to the driver, passengers, technicians or any one else who comes in contact with the vehicle.

PROTECTING OTHERS

Protecting your driver should be one of the highest priority items. The objective is to prevent your driver from being infected by others and the first step is to provide your driver with the personal protective equipment (PPE) and to create a safe work environment. This could range from providing sanitizing/disinfecting wipes to creating a physical barrier between a driver and passengers. There have been some very creative barriers made of plexiglass or clear vinyl which affords your driver visibility while providing protection from saliva or other particulate matter.

Drivers also need to have guidance on how to respond to specific situations whether it is a sales rep wanting to take a potential client to a meal, a work crew which shares one vehicle, or a driver of a transit bus. Much of this guidance is based on the “what if...” questions that a driver may encounter, such as:

- What if someone refuses to wear a mask?
- What if I find out that a passenger may be infectious?
- What if seating capacity exceeds the recommended levels?

It is also important to let drivers know whether the procedures are guidance or policy and how to deal with potential violations. As with any type of incident, the operating environment will be constantly changing and drivers should expect changes to their operating procedures.

Protecting your customers may be more of a challenge because of the different attitudes and relationships outside of the company, therefore is much easier to require compliance by employees than non-employees. Decisions must be made as to whether PPE is to be worn by passengers, what level of “social distancing” will be practiced, how often vehicles will be cleaned and disinfected and any other concerns that may be unique to the vehicle and/or fleet.

Social distancing in vehicles is a challenge. Due to the confined spaces in vehicles, social distancing tends to be measured in inches rather than feet. A balance has to be found to reduce the risk of infection while maintaining effective use of the asset.

There should be an expectation that passengers will be responsible for their own protection. At the same time there is also an expectation that the fleet manager is exercising due diligence in providing vehicles which are clean and free of infection. So how is this accomplished? With research and a holistic understanding of the situation, concerns and the available resources to mitigate the threat.

Technicians who service vehicles, whether in-house or outsourced need to be protected as well. Technicians will have continual physical contact during the course of service and may need guidance on cleaning a vehicle pre- and post-service.

Fleet managers must be able to make informed decisions about what the specific plan for their fleets will look like. The information below is provided to help the fleet manager facilitate the decision-making process. In an effort to reduce the risk of misinformation, most of the information contained within comes from the U.S. Center for Disease Control (CDC) and the U.S. Environmental Protection Agency (EPA). Direct links are provided to quoted sources to enable easy access for further research.

UNDERSTANDING THE TERMS

Contact Time is the time required by the CDC or manufacturer for a solution to remain on a surface to reach the specific level of decontamination desired. It is important to note that some products are designed to be applied in liquid form and remain in that form for a specified time recommended by the manufacturer.

Hard surfaces are those surfaces which do not permit liquids to permeate beyond the surface. These surfaces would include those made of metal, glass, plastic, stone.

Porous surfaces are considered any surface which allows liquids to penetrate beyond the surface, such as fabrics, leather and wood.

Wiping is the physical action of applying friction to a surface in order to remove unwanted substances.

“**Cleaning** removes germs, dirt, and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.”

“**Sanitizing** lowers the number of germs on surfaces or objects to a safe level, as judged by public health standards or requirements. This process works by either cleaning or disinfecting surfaces or objects to lower the risk of spreading infection.”

“**Disinfecting** kills germs on surfaces or objects. Disinfecting works by using chemicals to kill

germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.”

“**Sterilization** describes a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods... Sterilization is intended to convey an absolute meaning; unfortunately, however, some health professionals and the technical and commercial literature refer to “disinfection” as “sterilization” and items as “partially sterile...”

<https://www.cdc.gov/flu/school/cleaning.htm>

<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/introduction.html>

When looking at the ingredient label of most disinfectants, two points become abundantly clear: there is very small percentage of active ingredients and a chemistry degree is needed to understand them. Below is a brief summary of the chemical solutions the CDC lists which are effective against many of the biological threats.

ACTIVE INGREDIENTS

Isopropyl Alcohol (common rubbing alcohol) is often used as a sanitizing agent and is most effective when diluted to 70/30 alcohol/water ratio. This ratio has been found to be optimum for disinfecting and also reduces the personal health risks and potential fire hazards from a higher concentration. However, it may not be as effective against all strains of bacteria or virus.

Chlorine Bleach (also sodium hypochlorite) is listed throughout the CDC website as an alternative cleaner/disinfectant when diluted with 1/3 cup of bleach to 1 gallon of water. The active ingredient, sodium hypochlorite, is a very effective, inexpensive disinfectant with contact times ranging from 1 to 10 minutes, depending on the specific product. It has been known to cause some damage to materials at higher concentrations so it is recommended to test the solution before widespread use. It is very safe to use at diluted levels and should be used with adequate ventilation when used at consumer strength.

Hydrogen Peroxide is another common and effective disinfectant. Concentrations of 3-6% are usually

found at the consumer level with higher levels in commercial products. Not only is it safe, there are few health hazards associated with the product. Contact time can be from 1 to 20 minutes based on the specific product. Fabrics may be damaged and it is recommended to test on them before widespread use.

Peracetic Acid (or peroxyacetic acid) is a safe, quick-acting disinfectant that leaves no residue due to its organic composition. It may be used by itself or in combination with hydrogen peroxide and is usually dispersed via fog or mist. There is a possibility that it may cause corrosion of some metals. Contact time ranges from 30 seconds to 10 minutes.

Quaternary Ammonium Compounds or “Quats” are one of the most popular and effective products currently being used to disinfect surfaces. It refers to a family of compounds which are often used in disinfecting hard surfaces and can be found in a number of products on the EPA’s List N. There are some potential health concerns with the application of quats and PPE is recommended per the manufacturers’ instructions. Contact time ranges from 15 seconds to 10 minutes.

NOTE: All contact times are the EPA-recommended times and may not reflect the manufacturers’ specified contact times.

The EPA’s “List N” is a great resource for identifying effective products and allows searches based on surface types, active ingredients, product name and other variables.

EPA List N:
<https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19>

For a full detailed list, please visit:
<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/disinfection-methods/chemical.html>

SUPPLIES & EQUIPMENT

IMPORTANT: Always read the manufacturer’s instructions prior to usage for any product or equipment to ensure proper application. Use only as directed.

Cleaning Products

Using soap and water to clean any surface is commonly recommended throughout the CDC website as a way of

removing material that may provide a hospitable environment for reproduction or survival. The act of cleaning implies that a cleaner is applied then that cleaner is removed, generally in a wiping motion, which actually removes bacteria, viruses, other organisms and material which may provide a medium on which microorganisms can survive.

There are a large number of consumer cleaning products that can be found in liquid form via aerosols, sprays, or liquid that can be used for a various cleaning purposes which each have strengths and weaknesses. **Aerosols** are pressurized liquids that eject very small, unevenly-sized droplets which spread out to cover a wide area. As droplets are ejected, larger droplets can be observed falling to the ground while smaller droplets are seen being dispersed through the air. Droplets will only affect the immediate area where they land, though wiping can greatly increase the surface area.

Sprays are like aerosols, but manually operated which results in much larger particle sizes and coverage is in a more concentrated area making it ideal for cleaning specific areas.

Liquids are usually applied with a cloth and are the most effective in covering a specific area, although it may not be the most efficient use of the liquid and PPE may be required depending on the nature of the cleaner.

Disinfecting Products / Equipment

The CDC recommends cleaning any surface before applying any of the treatments listed below for the most effective results. As with any product, always follow the manufacturers instructions for proper use and application.

Disinfecting wipes are one of the first products people think of when it comes to disinfecting as evidenced by the rapid disappearance off retail store shelves during the current pandemic. They can be very effective when the manufacturers instructions are followed, though most people may not be aware of those instructions. For instance, both Clorox® and Lysol® state that their product must be wet and remain on the surface for 4 minutes to attain disinfection, as opposed to sanitation. This is easily attainable in a room temperature setting with little air movement, but may not be attainable in a hot vehicle.

Steam Cleaners use heated water in steam form to clean many hard and porous surfaces and have the added benefit of rapidly disinfecting surfaces due to the high heat of the steam. Many steam cleaners use ordinary tap water which makes them very inexpensive as an option. However, steam cleaning any vehicle will involve more labor time and costs over some other options.

Foggers are used to dispense a disinfectant quickly across a wide area and are very simple to operate with many options available depending on the user's requirements, such as stationary units, handheld and battery-operated. There is a wide selection of disinfectants designed for fogger use that are available through commercial sources.

It is important to note that the CDC currently does not support the use of fogging as a routine practice in clinical settings based on guidelines established in 2003, 2008 and 2011. However, that does not mean that it is ineffective, according to the CDC website:

"These recommendations do not apply to newer technologies involving fogging for room decontamination (e.g., ozone mists, vaporized hydrogen peroxide) that have become available since the 2003 and 2008 recommendations were made..."

"More research is required to clarify the effectiveness and reliability of fogging, UV irradiation, and ozone mists to reduce norovirus environmental contamination..."

"The 2003 and 2008 recommendations still apply; however, CDC does not yet make a recommendation regarding these newer technologies. This issue will be revisited as additional evidence becomes available."

<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/recommendations.html#r6>

Although clinical settings are significantly different than a vehicle, some of the core concerns are same with effectiveness and potential health hazards – depending on the disinfectant used and the type of fogger used.

- Cold Mist – Cold mist foggers use air pressure to create a very fine mist of the disinfecting agent (or another agent). They come in various shapes and sizes and commonly seen in the back of trucks spraying pesticides in high mosquito areas. The droplets are extremely small allowing them to get into hard-to-reach areas. Because they are small, they are vulnerable to

airflows and may require a higher level of PPE, depending on the agent used and environment.

- Hot Mist – A hot mist fogger is very similar to the backyard bug foggers in that they require a source of heat to create a hot mist from the disinfectant. Usually these are designed for large open areas where the fogger can be left to operate for a period of time in unpopulated areas without creating a fire hazard.

"There is not a one-size-fits-all solution..."

- ULV – This refers to Ultra Low Volume (ULV) where the agent used is a concentrate which is diluted to the proper level to allow for much more economical disinfecting. For instance, a gallon of concentrate may cost \$40 and only require 2 ounces of concentrate per gallon of water. This gallon could make up to 64 total gallons of usable product for less than \$1 per gallon.

- Electrostatic – Electrostatic foggers add a positive charge to the mist as it is emitted from the machine. These ionized droplets are attracted to surfaces and are able to cling to hard to reach areas. These foggers will generally create a more even and more effective coating of vehicle surfaces and hard-to-reach areas than a cold mist fogger.

Ultra Violet (UV) lights are just beyond the spectrum of visible light and generally harmful to living organisms, causing cancer and eye damage with prolonged exposures. The most common specific spectrums of UV light are UV-A and UV-C. The UV-A spectrum is the one that causes sunburn even on cloudy days. The UV-C light is the light often found in medical offices, kitchens, and other areas requiring germ-free or bacteria-free environments and often set to operate during times of non-occupancy. Far-UV-C lighting is a newer technology that is finding renewed interest as it has been found safe for humans, but harmful to bacteria, viruses and other disease-causing organisms. The technology is currently expensive but could be a viable option in the future.

According to the CDC, the current coronavirus has not been found to survive outside the body for more than 7 days, but this is in a climate-controlled environment with a medium that allows the virus to survive. On other surfaces, this time is dramatically reduced, especially at higher temperatures. During the summer months, temperatures can reach fatal temperatures very quickly inside a vehicle. These temperatures can also significantly shorten the life of some microorganisms. Heat and time in sunlight can actually be factored in the cleaning process. Unfortunately, most fleet managers

do not have the luxury of allowing vehicles to sit in the sun for extended periods of time as the sole means of disinfection.

CREATING THE PLAN

Fleets vary in composition, spread, usage and have unique characteristics which add to the challenge that each fleet manager will face in protecting their users. Again, there is not a one-size-fits-all solution to cleaning and disinfecting vehicles for all fleets so fleet managers will have to look at the options available to create a process that works best for their needs.

There are many ways and formulas for creating the process, but these three steps recommended by the CDC are very effective:

- Develop your plan.
- Implement your plan.
- Maintain and revise your plan.

Most fleet managers are adept at creating processes and procedures so this should pose no great challenge other than how to implement it. One of the greatest challenges will be the additional time necessary to complete an additional process along with all other operational duties.

As an example, a plan might require drivers to complete the following each day:

- Clean all hard points wearing gloves before starting each day.
- Wipe down hard, common areas after transporting passengers.
- Clean all hard points at the end of the day (wearing gloves)
- Fog the interior of the vehicle before leaving at the end of the day.

CLEANING THE VEHICLE

The CDC recommends following these instructions regarding vehicles:

- Cleaning vehicles before and after each shift
- Clean vehicles after transporting someone who is sick
- Follow procedures consistently and correctly
- Keep windows and doors open while cleaning
- Wear disposable gloves or other PPE as required by the product manufacturer.

<https://www.cdc.gov/coronavirus/2019-ncov/community/clean-disinfect/index.html> - (Disinfecting Your Non-Emergency Vehicle)

Unfortunately, the CDC does not provide any more detail than this on how to clean or disinfect a vehicle. It may be prudent to consider creating two different protocols to cover normal use or use with by someone with a known contagion. Remember this is being written during the SARS-Cov-2 (COVID-19) virus, but could be used for any contagious disease.

Hard surfaces in the vehicle are the easiest to clean using commercial cleaners and paper towels or rags (requires washing after each use). Nissan has published a good checklist that covers all the hard points that a driver may come in contact with, such as the:

- Steering wheel
- Key and remote fob
- Exterior door handles
- Trunk lid or lift gate grab areas
- Interior door pulls, both sides and interior door panels
- Start button, if equipped
- Rear view mirror, back and edges
- HVAC vents
- Gear selector
- Turn signal lever
- Windshield wiper controls
- Center stack knobs
- Center console and arm rest
- Seat belt and buckle. Avoid harsh cleaners on the belt itself, they can degrade the fibres and the belt's strength
- Parking brake handle, parking brake or release lever.

<https://usa.nissannews.com/en-US/releases/dos-and-donts-for-disinfecting-your-vehicle>

In addition to the above items, passenger-carrying vehicles, such as buses, vans or sedans may need to clean:

- Rear entry handles or bars
- Passenger windows
- Rear passenger controls (entertainment, lights, climate, etc)
- Any other contact point by passengers.

Porous surfaces are much more difficult to clean because microorganisms can penetrate within a material

and potentially avoid most of the contact disinfectants. The absorbency of materials creates challenges for clinical testing due to the additional factors that must be considered such as the depth of penetration of both the organism and the disinfectant. Fortunately, most harmful microorganisms also require a host for survival and do not thrive well outside the body.

Most of the solutions found on List N for disinfecting porous surfaces require machine washing and drying, which tend not to be an option for vehicles. Steam cleaning appears to be the best option for disinfecting porous materials in vehicles by subjecting the threat to high humid heat which destroys the cells very quickly. Disinfectants based on quaternary ammonium and applied with a fogger or spray are efficient and often used by professional biohazard cleaners on porous materials.

SUMMARY

The current pandemic has caused an awareness of a viral impact on the fleet industry that no current fleet manager has ever had to experience. They are being tasked to protect their employees and customers from an invisible enemy while still meeting the operational needs of the business. It is not an easy task by any means. The solutions are unique for each manager and will require a mix of research and creativity to successfully formulate a plan that accomplishes both goals in the current pandemic and for any future crises.

