

# Spotlight

A publication of Spotts, Stevens and McCoy



OCTOBER 2020

SPOTTS | STEVENS | MCCOY

## Our work touches everyday life.

From the water you drink to the air you breathe to the buildings and communities where you live, work and play.

Spotts, Stevens and McCoy is a family-owned regional engineering, environmental, and surveying firm serving local and global clients. We engineer solutions for a better world. Our work touches everyday life; from the water you drink, to the air you breathe, to the buildings and communities where you live, work and play.

### EXPERTISE

- Building Engineering
- Site and Civil Engineering
- Survey, Data Capture and Modeling
- Water and Wastewater Engineering
- Construction Phase Services

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## Stop, Drop, Read, and React.

Did you know that in 1922, the National Fire Protection Association (NFPA) named the second week of October Fire Prevention Week in commemoration of the Great Chicago Fire in 1871? From fire prevention activities, to safety reminders, to acknowledgement of our fire and other first responders - October is a time to remember to stay fire safe.

This month, we're talking about the ways that you can continue to keep the facilities, the communities, and most importantly the people that you love safe. We've provided some reminders and maintenance tips to keep on your to do list. Because even though October is about fire safety- emergencies happen year-round. Read our tips. Read our reminders. Read them, think about them, and then act on them. We'll be here- because when it comes to safety- it's not enough to just be aware, you also have to do.

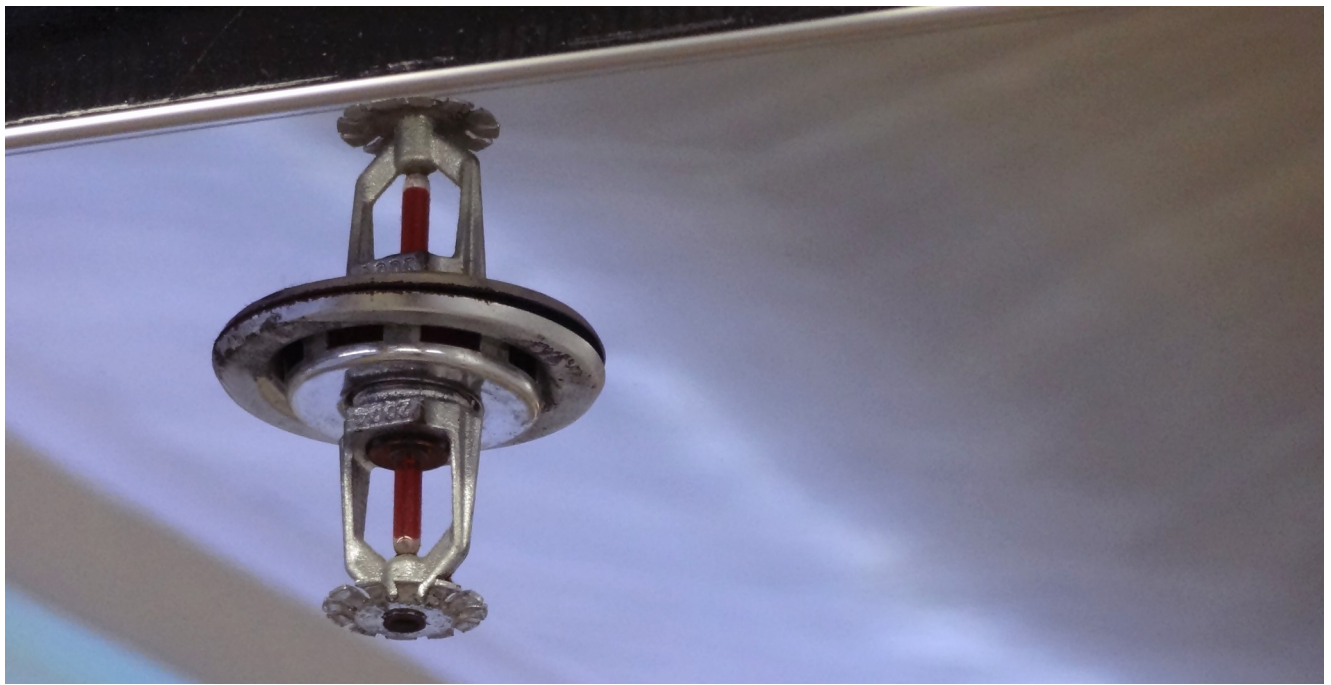
We're here to help.

Public Works Departments

## 5 Key Fire Preparedness Checkpoints

1. **Fire Hydrants:** Regular maintenance should include painting for easy visibility/identification, proper lubrication for ease of operation, markers for winter identification, and testing caps to ensure they are not seized and work smoothly.
2. **Fire Extinguishers:** In addition to logging monthly inspections, ensure extinguishers are not blocked or obstructed, and check that signage provides clear location information.
3. **Emergency Action Plans:** October is a great time to hold your annual fire drill.
4. **Smoke Detectors:** Regularly test and record testing dates.
5. **Sprinkler Systems:** Verify that access areas to Fire Department connections are easily located and not obstructed.





## Corrosion: The Hidden Risk in Your Sprinkler

Often times sprinkler systems are installed and all but forgotten. We rely on our systems to exist with next to no keep, but be ready to work in an emergency. But the truth is, you should be investing and maintaining your sprinkler system regularly to ensure that if an emergency ever occurs, your system has the capacity and the ability to do the job you need it to.

A concern to consider in your sprinkler system's functioning is corrosion among the piping.

Many automatic sprinkler systems have been installed using steel piping. Steel piping is susceptible to corrosion over time which may cause leaks or failures in these piping systems. Corrosion in the piping system involves the reaction between ferrous metal piping and its environment. In this case, water and oxygen in the steel piping system will cause corrosion inside the pipe over time. Corrosion in fire sprinkler systems can obstruct the flow of water to your sprinkler heads. That means the water isn't there when you need it to be.

By minimizing one of the variables, the rate of corrosion will be slowed. Slowing the rate of corrosion means extending the life of your system.

A great way to minimize one of these variables is by decreasing the oxygen supply that contributes to the corrosion. Most sprinkler systems do not have high point air vents, which allows trapped air to remain in the piping system. The trapped air supplies the oxygen needed for corrosion to occur. The 2016 Edition of NFPA 13 has recommended the use of air vents to purge air from the piping system, minimizing this corrosion-causing variable. Although the 2016 Edition of NFPA 13 is not yet enforced in Pennsylvania, it can be beneficial to implement this recommendation to your system. After all, the costs of corrosion related repairs later would likely be more expensive than installing high point air vents into your sprinkler piping systems now.

In addition to considering air vents, we recommend monitoring stations and regular condition inspections.

There are corrosion monitoring stations that can be installed into new systems or that can be retrofit into existing systems. These, as well as air vents, should be UL listed for fire protection systems and FM compliant.

Similarly, NFPA 25 recommends that an internal pipe condition inspection be performed on a regular basis. While the frequency of inspection can vary between buildings and locations, the recommended inspection frequency is 5 years.

This is unless there is further risk analysis and/or a recommendation for increased or extended frequency.

After 25 years of a sprinkler system being in operation, there is concern that roughly 1/3rd of sprinkler systems will have corrosion issues. Neglect of your sprinkler system can lead not only to damages, but expensive repairs in the future.

If you are a facility owner or manager and you're unsure of the impact of installing air vents, or the best approach to maintaining your system's life- we encourage you to follow up with the building insurer, or reach out to us as your consulting engineer. We're always here to help!

### FOR MORE INFORMATION

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## Emergency Vehicles and Road Design

When you are in need of an emergency vehicle, you expect it to be able to get there. Plain and simple.

It is expert civil and municipal engineers that make sure roads are made the way they should be, streets are designed the way we need them to be, curbs are structured the way they have to be, and emergency vehicles are able to get to you when you are relying on them to.

While most of us equate roadways with driving, recent trends have shown an uptick in structuring roadways to engage and include a variety of goals that include a whole lot more. Some of these enhancements include designated spaces for bicyclists and pedestrians as well as traffic calming elements that impact traffic speeds. Typically these decisions stem from an interest in encouraging public space, economic activity, and physical activity, and enhancing the safety of all road users.

The street designs that meet these ends often involve narrower travel lanes.

At the same time, emergency responders are focusing their efforts on reducing the time it takes to arrive at the scene of an emergency. And they are requiring physical space to utilize equipment.

These two priorities- well-rounded street design and first responder vehicular and equipment needs provide a tug that expert civil engineers balance in design phases.

Effective street design considers not only the efforts of complete streets that accommodate a variety of activity, but also the adequate width and turning radii for emergency vehicles.

In addition to considering lane widths, providing an adequate number of lanes to accommodate traffic is critical to reducing delays for emergency vehicles, as is providing emergency vehicle pre-emption devices on traffic signals so that emergency vehicles can gain the right of way quickly and safely through intersections.

Lastly, keeping the road pavement in good condition is another way municipal governments can help emergency vehicle response time.

All of these, combined together ensure that when you need an emergency vehicle- they get there.



### PROFILE

## City of Reading Southwest Fire Station

SSM provided mechanical, electrical, plumbing, and structural design for a 10,000 square foot, three apparatus fire station for the city of Reading PA. The facility also contained sleeping, bathing, kitchen, lounge, laundry, and office facilities to support the fire department personnel. The apparatus room was heated by tubular gas fired infrared radiant heaters. This space also contained specialized carbon monoxide exhaust system to prevent diesel fumes from accumulation. The remainder of the building was conditioned by high efficiency, condensing, gas fired boilers with 13 SEER split system air conditioners.

The plumbing systems included shower and toilet facilities containing low consumption and a laundry facility with extractor washers for cleaning turnout gear. The building had a fully automatic fire suppression system and an apparatus refilling station in each bay. The electrical systems consisted of high efficiency lighting, power distribution, emergency power, fire alarm, radio, data, and communications.

### PROFILE

## Boshulte Design Studio Echo Company Fire Station

SSM provided design engineering services for the 54,000 square foot Echo Company Fire Station. In addition to standard power lighting, air conditioning, and ventilation design, SSM sized the fire pump and provided sprinkler head layout.



# Preventing an Arc-tastrophe

Arc flash. It's just two words and it can happen in a only few rapid moments. But it can cause extensive harm, painful consequences, and irreplaceable damage.

An arc flash is the result of an arcing fault between electrical conductor(s) and another electrical conductor(s) or ground with enough electrical energy. The fault gives off a rapid release of energy (light and heat). Air becomes the conductor. A massive amount of energy discharges during the arc flash or blast. This energy burns the conductors, vaporizing the copper and thus causing an explosive volumetric increase, the arc blast. This explosion propels deadly shrapnel and molten metal as it dissipates. This rapid release of energy can cause debilitating burns, other injuries and even death. But, It's preventable. Spontaneous arc faults can stem from malfunctioning electrical equipment, improper precautions, negligent maintenance, or even unfitting electrical design.

## Prevention: Hazard Analysis & Study

Employers and facility owners know that investing in the safety of their people, and their property is always worth it. A Hazard Analysis can identify areas in which preventative measures should be taken, where modifications should be made, and where risk factors become serious dangers. Among the hazard analysis and study include: Short Circuit Study, Protective Device Evaluation, and Protective Device Time Current Coordination Study.

- **Short Circuit Study** - The study calculates the maximum short circuit current the electrical power system may be subjected to at each equipment location through out the distribution network from the sources such as utilities, generators, and motors. The equipment includes substations, switchgear, motor control centers, and panels with their respective over current protective devices; generators; transforms; motors; and UPS equipment. The short circuit results determine the required ratings for electrical equipment to adequately sustain the fault current capacity of the system. If a short circuit occurs, the electrical power system's available energy is directed to the point of the fault in amounts that greatly exceed the normal operating currents, and the equipment must have the ability to withstand and interrupt these large currents until the protective device opens to clear the faulted portion of the circuit.
- **Protective Device Evaluation** - This evaluation determines if the equipment ratings needed to sustain the fault currents calculated by the Short Circuit Study are adequate. Each circuit breaker, bus, etc., is reviewed in regards to the available short circuit to determine that the equipment can adequately withstand the fault current.
- **Protective Device Time Current Coordination Study** - The study reviews the relay and circuit breaker trip settings, fuses, and their operating time and current characteristics in order to properly coordinate these settings with upstream and downstream devices so that any faults are isolated to the location of the fault; hence, limiting the impact to the remaining portions of the system. The coordination study is used in an Arc Flash study to determine the length of time an arc would occur which is directly related to the incident energy associated with an arc flash event.

The Hazard Analysis will identify the locations which require PPE greater than Category 0. The review determines if there are possible arc flash mitigation recommendations that can be implemented to reduce the incident energy levels. Such recommendations might include device setting changes, replacement of molded case type circuit breakers with static trip type circuit breakers, changing fuse types, or installation of additional fused disconnects or circuit breakers. As a result of reducing the incident energy levels, the corresponding Category of PPE required to work on the equipment while energized is reduced.

## Prevention: Take Action

In addition to addressing your hazard analysis, you should continue to make proper maintenance, training, and care a priority. Always complete regular maintenance on your equipment. Use proper signage and labeling where necessary. Provide your teams with proper safety equipment—like appropriate arc flash suits and fire resistant attire as well as PPE gear. And lastly, don't forget to make arc flash training a part of your facility safety plan. It's not enough just to have the information- make sure you do something with it too.



## PROFILES

**Arc Flash Hazard Analysis** - Provided data collection, model building and arc flash hazard report that analyzed the power distribution system and recommended improvements to reduce arc flash hazards.

**Arc Flash Model Analysis** - Assisted plant engineers with analyzing short circuit studies, coordination studies and arc flash analysis of 13,200 Volt distribution system and all 480 Volt equipment and motor control centers.

**Arc Flash Study** - Comprehensive electrical systems review documenting the entire electrical system including the utility source, medium voltage distribution, pad mounted transformers, generator, automatic transfer switch (ATS), switchboards, bus ducts, transformers, and panels to develop single lines, verify equipment and circuits for an Arc Flash Hazard Analysis. Perform Arc Flash Hazard Analysis, provide mitigation methods to reduce the Arc Flash Hazard, create Arc Flash Labels, and conduct Arc Flash Hazard Awareness Training.

**Electrical Safety Training & Procedures**- Developed customized electrical safety training presentation and trained design engineers, electricians, field service engineers and technicians on electrical safety procedures and electrical hazards. Assisted with development of procedure that defines safe work practices and use requirements.

# KIDS CORNER

*Fire Safety can be fun for everyone!*

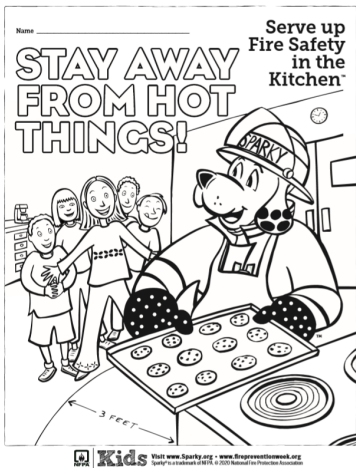
Here are some great resources, activities, and videos to share with the kids at home!



**Remember, fire safety is a job for everyone.**

It's a great idea to spend one night every month going over your family's fire safety plans, and ways that you will stay fire safe in your home.

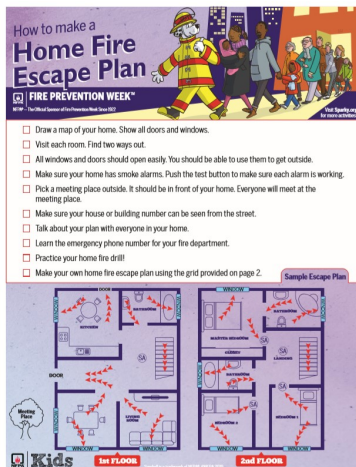
- **Know your way out:** visit every room of your home and identify an exit.
- **Get out and stay out:** don't take time to get personal belongings. Once you are outside, don't go back in for anything.
- **Safety steps:** touch door handles to feel if they are hot and make sure you don't open the door if smoke is coming through the cracks.
- **Stay low and go:** if there is smoke, stay low to the ground as you exit your home.
- **Stop, drop, and roll:** if your clothes catch on fire, don't run! Stop, drop, and roll to put the fire out.



## Free Coloring Sheet!

Download the free *Fire Safety in the Kitchen* coloring sheet!

[DOWNLOAD HERE](#)



## Family Fire Safety Plan

Work with your family to make your home fire safety plan, and find exits in each of your rooms!

[DOWNLOAD HERE](#)

## Things to Watch: Fire Safety Videos for Kids!

### WORK IN FIRE SAFETY

You can have a career where you help your community every single day. Work in fire safety! There are firefighters all over the world to keep us safe. But they can't do it alone. There are many other jobs that help firefighters.

[WATCH IT HERE](#)

### I SPY FIRE SAFETY

This fun video gives easy tips for the whole family. Learn how to be fire-safe by spotting fire hazards that you might have in your home.

[WATCH IT HERE](#)

### FIREFIGHTING'S WEIRD HISTORY AND FASCINATING FUTURE

Did you know that firefighters used to use their beards as air filtration devices? Or that they used to compete for the right to fight a fire? Get all of the details about these strange legends and help learn how to stay safe in case of a fire.

[WATCH IT HERE](#)



# Things You Should Know....



SSM



ENERGY & SUSTAINABILITY SERVICES

## Rural Energy for America Program

### REAP Grants Available from the USDA

The USDA is offering grants or grant/loan combinations for renewable energy projects or energy efficiency projects for small businesses and agricultural farmers. This is a great opportunity to offset the capital costs for projects lowering the energy and carbon footprint.

The application process is not too tedious, and there are regional USDA offices providing local support depending on the location of the projects. Included within the application process is financial information as well as information on the project scope of work, environmental impact, and financing.

Currently, the program is actively accepting applications with the following deadlines:

- Grants of \$20,000 or less: November 2, 2020
- Loan/Grants of \$20,000 or less: March 31, 2021
- Grants or Loan/Grants greater than \$20,000: March 31, 2021

Eligible applicants must be in good economic standing and include the following:

- Agricultural producers with greater than 50% of gross income from agricultural operations (these are not required to be in the considered "eligible area")
- Small businesses in the "eligible areas". [Take a look at the database to determine eligible area here.](#)

A great factsheet [found here](#) provides some more information and questions



## Welcome to the Team Craig Momose, PE Senior Engineer | Municipal Engineering and Planning

Mr. Momose has thirty-six years of professional consulting engineering experience serving both the private and public sector. He is responsible for designs of all types of private and public land development projects and review of subdivision and land development plans for local municipalities. His experience includes stormwater management, site grading and earthwork, erosion and sediment control, floodplain and floodway modeling, FEMA Letter of Map Amendment and Letter of Map Revision applications, DEP Joint Permits, General Permits and NPDES Permit applications. Mr. Momose also served numerous municipalities throughout his career. Tasks include design of storm drainage and road improvement projects, waterway permitting, preparation of annual paving specifications, contract management and construction inspection. Services for planning commissions include review of subdivision and land development project stormwater management plans, preparation of improvements agreement cost estimates and review of escrow release applications. Craig is a 1981 graduate of The Pennsylvania State University with a BS in Mining Engineering.

## Welcome to the Team!



**Cameron Knight**  
Survey Technician  
Surveying and Data Capture



**Buck Santana**  
Environmental Technician  
Water and Wastewater  
Engineering