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Focus on Construction Health: Building Safely in a World With COVID-19

Guidance Document

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EXECUTIVE SUMMARY

The coronavirus SARS-CoV-2 and the disease attributed to it - COVID-19 – still presents a major worker health protection challenge and potential surges and new variants can occur in the future. The American Industrial Hygiene Association (AIHA) Construction Committee prepared this guidance to give construction employers a practical plan for protecting construction workers from COVID-19. The guidance includes key information on how the virus spreads, provides seven flexible steps to address COVID-19, and describes the role of the Job Safety Analysis (JSA) to help identify and control factors that could lead to higher exposures. These practical steps have been revised to reflect the lessons learned during the course of the pandemic and updated information. We hope that this revised guidance gives construction employers the blueprint and tools needed to successfully meet the COVID-19 challenge.

Here are a few of the key changes reflected in this version.

- Construction workers are recognized as essential workers and cannot simply shut down in periods of infection surges. Complete shutdown of workplaces has become rare.

- Asymptomatic infection can be a source of spread. Aerosol transmission, especially in areas with poor ventilation and close contact, can be a major risk factor. Contractors should ensure ventilation systems operate to specifications and be on the lookout for poorly ventilated or crowded areas that may need to be improved. There are different degrees of controls relevant to barriers, ventilation, and HVAC systems at construction sites that may differ from those applied to occupied structures or other workplaces.

- Localized plastic barriers are likely impractical in the constantly changing construction environment now that respiratory protection is readily available. Less emphasis is placed on physical distancing.

- PPE and appropriate NIOSH-approved respiratory protection are now readily available.

- Surface contamination and droplet spread are less of a concern outside of a healthcare environment and constant disinfection appears less important, although routine sanitizing of high-contact surfaces is still a good practice. Personal hand washing is still recommended.

- Vaccines, rapid diagnostic testing, and medical treatments are available and help both reduce the potential for the spread of the virus from infected sources and protect others from infection and serious medical outcomes. Rapid antigen testing and home test kits can help evaluate if someone is infected or when they have recovered.

- Virus variants can lead to periodic surges in infection and impact the effectiveness of vaccines and treatments. Watching for elevated community transmission rates or localized workplace outbreaks can lead companies to adjust the controls they implement.

- Long COVID and the mental health challenges of the pandemic continue to require vigilance.

- CDC and other authorities have reduced the recommended isolation periods.

- Companies should have preparedness plans if another pandemic occurs; however, different precautions and controls may be required.

In many ways, now that we are learning to live with COVID-19, evaluating COVID-19 risks and determining appropriate controls can be integrated with the typical Job Safety Analysis (JSA) process used for all kinds of hazards on a construction site.

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Introduction

AIHA represents occupational health and safety (OHS) professionals (also known as industrial hygienists or occupational hygienists) who practice the science of anticipating, recognizing, evaluating, and controlling workplace hazards and conditions that may cause 'workers' injury or illness. AIHA has a Healthier Workplaces webpage that includes several resources, including the Guidance for Construction Environments document, which provides guidance and a comprehensive list of precautions for safe construction work.

After the first publication of this guide early in the 2020 pandemic, knowledge of COVID-19, how it spreads, how to protect workers, medical treatments, etc., has continued to grow. Testing, effective personal protective equipment (PPE), vaccines, and medical treatments are widely available.

This guidance is tailored to construction projects as they have a different set of risks than other workforces. Construction workers, in general, are known as belonging to a "healthy worker" group making them somewhat less susceptible; however, some risks that may impact construction workers include:

- Engineering controls (such as changes to ventilation filtration) are not as easy to implement on construction sites.
- Construction workers typically have limited health insurance and may have only limited paid time off for isolation.
- Workers have project-based employment and when the project is done, they have to go elsewhere.
- The construction workforce can be aging and transient which puts them at higher risk for COVID-19.
- And they can be a workforce that may be reluctant to use some kinds of controls.

- On the other hand, because of the nature of other health hazards at the site (dust, fumes, chemicals), workers may already be familiar with controls such as respiratory protection and the routine use of other PPE.

This guide is intended to help address the following questions:

- Which controls are most important on a construction site? Which are less so?
- How many controls to implement depending on the conditions in the community such as community spread, seasonal waves, new variants, or workplace outbreaks?
- When can you relax controls?
- How do we live with COVID-19 as it becomes endemic?
- How can a JSA help to identify and help control exposures?
- Where can I find more information?

These are the types of questions that COVID-19 site safety officers, competent persons, and construction managers/superintendents may need to answer during times of community spread. This guide will help construction organizations implement a program, identify potentially high exposure tasks, and determine appropriate and useful controls. The plan includes a Job Safety Analysis (JSA) step to tailor precautions and controls to site-specific tasks and changing conditions. A resource section provides links to many other existing guidance materials useful for construction.

This document is modeled on the 2023 AIHA Focus Four for Health guidance document for four major construction health hazards (materials handling, noise, air contaminants, and high temperatures).

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In brief, that guide describes those four hazards:

- What is the hazard? How severe are the health effects, and how common?

- What construction trades are affected and what tasks have potential exposures?

- What control strategies, regulations, and resources are available for further information?

- And how can Industrial Hygienists (IH) help?

While meeting COVID-19 demands is a continuing issue, see our original Focus Four for Health guidance document to learn about four other important construction health hazards.

Who is the intended audience for this revision?

This guide is intended to be used by construction company staff to provide information and resources so they can reflect on their policies and practices in the event of changes such as the seasonal return of COVID-19, the resurgence of more severe variants, or even if other potentially infectious agents become a concern in the future (chicken pox, bird flu, Ebola, other SARS).

It is intended to be a reference for a site COVID Competent Person (or other similar term) or any level of site management, human resources, or other environmental health and safety staff. This guide is not just intended for career industrial hygienists who work in the construction industry. More information for the career IH is contained in the *Role of the Industrial Hygienist in a Pandemic – 2nd edition*, a comprehensive document relevant to healthcare, schools, industrial sites, and other such worksites. Other resources may need to be consulted.

All readers are reminded to monitor the latest COVID-19 developments by checking with sources such as the CDC, OSHA, NIOSH, WHO, state, provincial, and local health departments, and industry and trade associations.

NOTE:

This guidance document does not apply to non-construction workplaces or construction in sensitive areas, such as healthcare, vulnerable populations, or schools. And although construction management may make some temporary changes during construction, it does not address design or operational changes to systems such as HVAC that the building owner or business may make once the facility is built and occupied.

This guidance document does **not** address every possible program element that may be needed at every construction site or be required by a specific local or state regulation. For example, every workplace will want employees who are feeling sick to stay home. Employees who are caring for someone testing positive at home or who have been significantly exposed to someone testing positive should isolate themselves per current CDC guidelines. COVID-19 testing is widely available and may play a role in future employer programs. Detailed issues related to testing, sick leave policies, confidential medical concerns, and contact tracing for public health purposes are beyond the scope of this guide and should be coordinated with your company's human resources personnel. The guidance does include links to many other online resources to help readers find additional information about these and other COVID-19 precautions.

What Are the Key Features of This Health Hazard?

COVID-19 is the name given to the pandemic Coronavirus disease caused by the SARS-CoV-2 virus which was discovered in 2019. The virus spreads easily from person to person. The resulting illness varies from mild to fatal. The virus spreads when respiratory droplets and aerosols become airborne from coughing or sneezing, speaking, and breath-

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ing. Spread is more likely when people are in close contact with each other. The Centers for Disease Control (CDC) currently suggests that close contact is being within 6 feet of an infected person for a cumulative 15 minutes in a 24 hour period for healthcare settings. (CDC, 2024a). The CDC now also suggests that since spread of viruses depends on many factors, no single number defines a "safe" distance (CDC, 2024a). In summary, brief interactions are less likely to result in transmission (CDC, 2024c).

If a person is exposed to the virus and becomes infected, it can take from 2 to 14 days for the disease to incubate for symptoms to develop, if they develop any symptoms at all. Symptoms are not always obvious – they may be asymptomatic, mild in nature, be similar to other illnesses, or not seem to match up to COVID-19 – for example, fever is common but not always present.

A key risk of the COVID-19 hazard is that newly infected persons will be contagious (able to release the virus to expose others) even before they feel sick and are aware of any symptoms. This means that there can be a few days when newly infected - but asymptomatic - individuals can spread the virus to others. One study that tested individuals over the course of their illness found that, on average, they became infectious 2 to 3 days **before** the onset of symptoms and that the highest potential for spreading the virus was just before symptoms appeared. The estimate was that 44% of virus transmissions occur before people get sick (He et al., 2020). This asymptomatic spreading of the virus is one of the reasons for controls such as vaccination, physical distancing, ventilation, frequent hand washing, and the use of face coverings or masks.

Individuals testing positive with COVID-19 are isolated until they are symptom-free and no longer pose a risk of infecting others. Determination on when a person no longer poses an infection risk and can re-

You should know ...

Is "super spreader" a real thing?

Yes. Some individuals are more likely to spread virus particles than others regardless of behavior or circumstances.

Studies that look at how humans generate aerosol particles find large variations between individuals. For example, one study of flu coughs found that the levels emitted by test subjects varied by a factor of 1000. Similar findings have been found for the generation of aerosols via speech (Lindsley et al., 2012).

You should know ...

Viruses can be spread even without sneezing and coughing.

Sneezing and coughing produce the largest amounts of large droplets that can contaminate surfaces and nearby people.

However, speech and breathing also produce important amounts of smaller particles. Louder speaking increased the levels produced (Asadi et al., 2019). Singing in a choir while ill has infected many other individuals (Hamner et al., 2020).

turn to work is made with input from a healthcare provider based on the most current CDC guidance (CDC, 2023c).

COVID-19 is a different kind of construction health hazard since it is an infectious disease. Whereas most health hazards arise from tools, materials, physical agents, or toxic substances, the primary source of COVID-19 in construction is contact with infected co-workers who can inadvertently infect others. In

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areas experiencing high community spread, there is a higher likelihood of encountering an infected individual in your workplace.

One challenge for the construction industry is that providing paid sick leave has not been a common practice, and working while in pain, injured, or sick has been tolerated. This makes it very important that all construction workers and managers know the symptoms of COVID-19, understand how it spreads, and make it acceptable for workers experiencing any illness to be able to stay home.

How Severe Are the Health Effects?

The health effects from COVID-19 vary widely. They range from mild cases where individuals did not notice any symptoms to those that caused death in days or weeks. Older adults and those with several types of underlying health conditions are believed to be at a higher risk of developing a more severe case of the disease (CDC, 2023d).

COVID-19 affects the lungs and respiratory system and can make breathing so difficult that ventilators are needed. Doctors and researchers are learning that damage can extend beyond the lungs. It can lead to blood clots, kidney damage, heart problems, nervous system problems, strokes, heart attacks, and pulmonary embolisms. Newer research suggests the persistence of longer-term effects of COVID-19 even in patients who recover, also known as Long COVID. Weakness, "mental fog," joint pain and inability to work may occur in some workers who are experiencing Long COVID (Mayo Clinic, 2023).

It is best to consult the CDC and Health Canada for the most recent findings on any new symptoms and the latest information about COVID-19.

It is a challenge to weigh the danger posed by COVID-19 fully. Some individuals will only get a mild form of the illness – but it is not possible to know for sure who will get a mild case and who will instead

Watch for symptoms of COVID-19

People with COVID-19 have had a wide range of symptoms reported – ranging from mild symptoms to severe illness (CDC, 2024b). Symptoms may appear **2 to 14 days** *after exposure to the virus. People with these symptoms may have COVID-19:*

- *Fever or chills*
- *Cough*
- *Shortness of breath or difficulty breathing*
- *Fatigue*
- *Muscle or body aches*
- *Headache*
- *New loss of taste or smell*
- *Sore throat*
- *Congestion or runny nose*
- *Nausea or vomiting*
- *Diarrhea*

"This list does not include all possible symptoms. CDC will continue to update this list as we learn more about COVID-19."

develop a severe case leading to death just weeks to a month after infection. There are also family members to consider. An infected worker with a mild case could expose family members, leading to additional cases of illness.

COVID-19 Variants

Viruses, like SARS-CoV-2, constantly change through mutations in the 'virus' genes. For example, flu viruses change often, which is why doctors recommend that you get a new flu vaccine every year.

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When a virus has one or more new mutations, it's called a variant of the original virus. Variants may be more contagious and may be more resistant to vaccines and treatment. CDC and other public health organizations monitor these variants of the virus to track their spread (CDC, 2023f).

The basic preventive measures such as vaccination, mask-wearing, physical distancing, and hand sanitizing usually do not change with new variants.

Vaccines

COVID-19 vaccines help our bodies develop immunity to the virus that causes COVID-19 (CDC, 2023e). Sometimes vaccination can cause symptoms, such as fever and soreness. These symptoms are normal and generally clear within a few days. Over-the-counter medicine may be helpful, such as ibuprofen, acetaminophen, aspirin (only for people aged 18 or older), or antihistamines.

Types of Vaccines

Currently, there are two main types of COVID-19 vaccines that are approved or authorized for use in the United States. Below is a description of how the currently approved vaccines work against COVID-19. None of these vaccines can give you COVID-19.

mRNA Vaccines (ex. Pfizer or Moderna)

These vaccines contain material from the virus that causes COVID-19 that gives our cells instructions for making a harmless protein unique to the virus. After our cells make copies of the protein, they destroy the genetic material from the vaccine. Our bodies recognize that the protein should not be there and build cells that will remember how to fight the virus that causes COVID-19 if we are infected in the future.

Vector Vaccines (ex. Johnson & Johnson's Janssen, Novavax)

These vaccines contain a modified version of a different virus than the one that causes COVID-19. Inside the shell of the modified virus, there is material from the virus that causes COVID-19. This is called a "viral vector." Once the viral vector is inside our cells, the genetic material gives cells instructions to make a protein that is unique to the virus that causes COVID-19. Using these instructions, our cells make copies of the protein. This prompts our bodies to build cells that will remember how to fight that virus if we are infected in the future.

The CDC advises that while COVID-19 vaccines were developed rapidly, all steps have been taken to ensure their safety and effectiveness. In very rare instances, vaccines have been associated with other illnesses. However, when balanced against the risk of COVID-19, these risks are generally considered acceptable. Unvaccinated individuals have a significantly greater chance of becoming infected and causing severe and long-term problems in themselves or to vulnerable family members and others around them.

While COVID-19 vaccines are initially effective (i.e., prevent a majority of infections and severe disease), these effects diminish or "wane" over time (i.e., chances of becoming infected increase after a few months and being hospitalized after several months). As a result, follow-up shots (boosters) are recommended and critical to maximizing our protection. In 2022, the emergence of new variants greatly diminished the effectiveness of the initial vaccines, and current "boosters" or annual vaccines are recommended even if one has not had the initial series. See the CDC webpage for the latest guidance.

Why are construction workers more likely to experience mental health problems?

Workers in construction and extraction occupations have a higher prevalence of dying by suicide than the average worker. While there is no single cause for suicide, it is suspected that work-related factors common with construction—such as:

- seasonal or inconsistent work,

- demanding schedules away from families,

- work-related injuries and chronic pain, and

- lack of sick leave or vacation time—can lead to poor mental health and psychological distress.

Workers in the construction industry also have a high prevalence of opioid-related overdose deaths compared with workers in other industries. There are overlapping factors that contribute to important connections between mental health conditions and substance use disorders (including opioid use disorders and alcoholism).

The cumulative impacts of COVID-19, mental health issues, and substance use disorders increase the likelihood of illness and death among construction workers facing these problems. Stigma is another factor contributing to mental health concerns among workers. There is a strong and historical stigma related to any worker seeking care for mental health concerns or substance use disorders.

Industry leaders, union leaders, peers, government agencies, nonprofit organizations, university researchers, and other stakeholders are working collaboratively with a variety of efforts to reduce suicide and overdose among construction workers as the COVID-19 pandemic transitions through different phases.

### What Trades Are Most Commonly Affected?

COVID-19 affects every construction trade in areas experiencing community spread. All workers, regardless of trade, pass through and share common workspaces such as elevator and loading dock areas, buck hoist lifts, lunch and break areas, sanitation facilities, and walkways, where contact with other infected individuals can occur. Even getting to the work site can pose a higher risk and carpooling is common not just in getting to and from the job sites, but delivery drivers, vendors, and install crews often ride in vehicles together within close proximity of each other.

The extent of such contact likely varies based on trades and jobs. Some trades (e.g., operating engineers) do more solo work. Other trades and jobs (e.g., masonry or window installation) involve work in close proximity to co-workers. Construction sites are typically restricted-access areas and construction workers do not typically have exposure to the public while on the job. However, some types of renovation work in occupied settings might also involve interaction with building occupants or the public, and in healthcare settings, with healthcare workers.

Special consideration should be given to indoor renovation and repair work done at hospitals, nursing homes, correctional facilities, industrial facilities, private residences, or other settings where COVID-19 cases are suspected or known to have occurred. Work such as repair or upgrading of heating, ventilation, and air conditioning (HVAC) systems, plumbing, or electrical systems in these settings needs to be carefully planned, scheduled, and executed to account for exposures from ongoing or previous COVID-19 cases.

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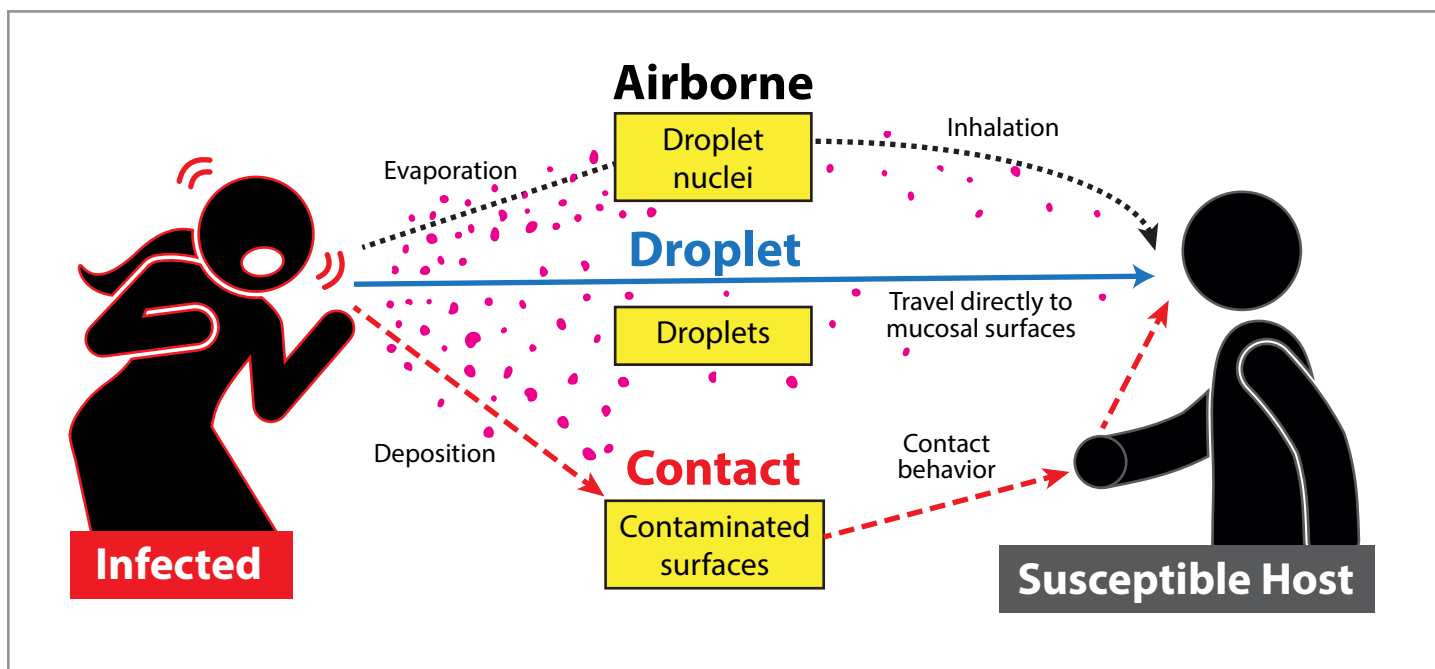
Modes of Transmission from Exhaled Pathogens. *(Adapted from: The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan (SHASE) and Architectural Institute of Japan (AIJ). 2020. Role of ventilation in the control of the COVID-19 infection: Emergency presidential discourse, March 23, 2020.)*

How Does Exposure Occur?

The primary sources of construction exposures are virus particles present in droplets and aerosols shed by infected individuals on the job site. These emissions may expose other workers via two pathways:

Airborne exposure pathways:

- Larger droplets, typically from uncovered coughs or sneezes, can spray directly onto the nose, mouth, or eyes of nearby workers (within 6 feet) where they can directly enter the mucous membranes. These droplets, along with those emitted from speaking, can stay in the air for several minutes and also be inhaled by nearby workers before settling out of the air onto nearby surfaces.

- The virus also may also be present in smaller droplets and aerosols created during speech or breathing, in addition to coughs or sneezes. These can evaporate down to smaller airborne particles. These small particles may be swept away outside on a windy day but can remain airborne for hours inside enclosed spaces or work areas with little moving air. These smaller virus particles can also be inhaled by workers both close by and further away.

The minimum amount of virus particles needed to cause COVID-19 (the "infectious dose") is not yet known. The SARS-CoV-2 virus has been shown to be viable (i.e., capable of causing infection) in the air for several hours, and on surfaces for up to a day or

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more. The virus does break down over time (van Doremalen et al., 2020).

Until more information becomes available, it is best to consider that an infection could result from a single large exposure (e.g., a direct cough and droplets near the face from an asymptomatic individual) or from multiple smaller exposures over time (e.g., extended inhalation of small aerosols in poorly ventilated indoor spaces for several hours).

Understanding the nature of exposure pathways is useful. It helps to explain and appreciate the rationale for precautions such as sneeze and cough etiquette, the use of face masks or respirators, physical distancing, and the value of frequent hand washing and cleaning/disinfection of surfaces.

A Strategy to Reduce and Control COVID-19 Hazards

This section provides a "big picture" framework – using elements that can be modified as conditions change or as new information becomes available. Not every technical detail is described here, but additional references and sources are provided at the end of this document to assist construction employers with pursuing additional details.

Step 1: Designate a COVID-19 Site Safety Coordinator

The exact title may vary, but coordination and accountability are critical. This designated person could be a "competent person" for a small firm or project or a safety or health professional at a larger company or worksite. Employees and sub-contractors should know who this person is and how to contact them.

This competent person should have a comprehensive understanding of COVID-19 exposure potential, the value of certain controls vs exposure pathways, and the practical factors of implementing additional con-

Planning for COVID-19:

The following are some additional key program elements to consider in developing your plan. Please see "Additional Resources" at the end of this document for other publications with detailed lists of program elements.

Key Responsibilities
- *Managers/Supervisors*
- *Safety and Health*
- *COVID-19 Site Safety Coordinator*
- *Human Resources*
- *Employees*

Procedures/Practices
- *Site orientation and training*
  - *Site layout*
  - *Pre-job planning and scheduling*
  - *Meeting policy*
  - *Company vehicle drivers*
- *Facility Control Measures*
  - *Ventilation*
  - *Sanitation*
- *Sub-contractor communication*
  - *Job site visitor policy*
  - *Equipment purchasing & supply*
  - *Deliveries and shipments*
- *Site inspections*
  - *Forms*
- *Signs and markings*
- *COVID-19 Human Resource policies*
  - *Vaccine and testing policy*
  - *Work at Home considerations*
  - *Pre-work illness screening, illness reporting and response*
  - *Measures to be taken if a COVID-19 case is reported on the site*
- *Health department and health care provider contacts*

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trols for task-specific situations (and the authority to do so). This may be part of the role of the site safety and health professional.

Step 2: Develop a COVID-19 Control Plan

A plan spells out roles, responsibilities, and actions. See additional resources at the end of this document. See the side box for some additional topics other than those mentioned in this guidance that might need to be addressed.

Step 3: Review a Site Map to Guide Location of COVID-19 Control Measures

Concurrent with developing a response plan, obtain and review a map of the site. A map of the worksite combined with a walk-through and information about the size of work crews helps planning by making it easier to visualize:

- common and break areas
- potential high employee density areas and "choke" points
- optimal locations for sanitation stations
- enclosed areas with poor ventilation

The site map can be used for site orientation and to communicate elements of the overall plan.

Step 4: Plan COVID-19 Site Control Program Elements

A good control plan is guided by the "Hierarchy of Controls" developed by Occupational Health and Safety practitioners to ensure that the most effective methods are given priority. Methods that control the hazard at the source itself (e.g., elimination, vaccination and testing as source reduction) are considered first, followed by methods that control the exposure pathway (e.g., ventilation, physical distancing, providing washing stations, cleaning), followed finally by methods that control at the worker (e.g., PPE and vaccines).

As you build your plan, consider the following construction risk categories from a construction site standpoint:

1. <u>Negligible.</u> Outdoors and indoors while construction is still open to the outside or occupancy is very sparse.

2. <u>Minor.</u> Typical indoor activities onsite and in the office/trailer. Transportation such as commuting to the job site or working together in equipment, during periods of low transmission or community spread.

3. <u>Potentially significant.</u> During elevated community transmission when crowded (i.e., onsite or in office/trailer), transportation such as commuting to the job site, or working together closely in equipment cabs.

Consider these risk levels from a community standpoint:

Consider conditions for requiring more stringent measures on construction sites based on community spread and regulatory requirements:

- These should be based on requirements as determined by regulatory authorities or site management.

- CDC community transmission classification for the region should be considered a minimum threshold. It should be noted that home testing results not reported to public health and lack of public cooperation make the actual infection rate up to 10 times higher. Other parameters can be considered to judge actual risk (i.e., testing positivity rates, wastewater trends).

In addition to elevated community transmission

rates, an outbreak at the construction site should also trigger more stringent controls.

Susceptible individuals should be masked when near others.

The following elements suggest some but not all of the questions you may wish to ask as you implement controls for COVID-19 at your job site considering community spread levels and worksite outbreaks. There are many more options to consider in the additional resources shared at the end of this document.

Element 1: Source Reduction and Illness Screening

A) Encourage employees to keep up to date with vaccinations and boosters. See the latest CDC guidance on vaccine schedules for workers by age and type of vaccine. Consider an appropriate testing and/or screening strategy for workers during periods of elevated community spread or a suspected site outbreak.

B) Policies and procedures are needed to actively encourage employees who are sick or who care for someone who is sick at home — even if they are unsure as to whether symptoms are from COVID-19 — to stay home, consider a home test, and seek care from a health care provider. This requires clear communication, consistency and coordination between human resources, management, and workers. For example, who do employees call in to? What are they told? See CDC's "Symptoms of COVID-19" or Health Canada's "Symptoms and Treatment" page for examples of information on what to tell employees. For this measure to be effective, it must not be seen as punitive.

C) Pre-shift screening is an option to check that employees coming on-site each day do not present signs or symptoms that could indicate a developing COVID-19 illness (CDC, 2020a). Screening could involve self-reporting, temperature checks, medical questionnaires, home tests, or any method approved by health authorities. Consider putting this in place as community levels increase or you suspect an outbreak at your worksite is occurring.

The Equal Employment Opportunity Commission What You Should Know about COVID-19 and the ADA, the Rehabilitation Act, and Other EEO Laws webpage provides guidance for human resource personnel on screening procedures and medical records management.

D) Clear employer policies and procedures, combined with worker training regarding on-the-job illness reporting, are needed to ensure that workers who become ill during the shift know to stop and notify the COVID-19 site safety officer immediately. Most construction workers find a way to work through discomfort and will finish a shift even if they are feeling ill. However, given the highly contagious nature of COVID-19, workers must understand this is not a risk worth taking.

Employees feeling ill should immediately be separated from other employees and sent home to isolate and consult a healthcare provider. There should be a designated person to notify, and a designated isolation area stocked with appropriate PPE and disinfection supplies. The employee may need help – either to safely get home or to a healthcare provider. Transportation (by either family member, commercial vehicle, or company vehicle) needs to be pre-planned and communicated to workers during training. Projects with extended shifts need to include extra planning for taking these steps at times when fewer managers and healthcare providers are available.

Refer to current CDC or local health guidance on isolation and wearing a respirator or high-quality mask after exposure, while awaiting test results, and returning to work after a positive test result.

E) A policy regarding the use of high-quality masks

Medical-grade disposable face masks and respirators are now readily available and are a better choice than cloth face coverings for source control.

What you should know about Cloth Face Coverings:

- *They are not respirators or PPE!*
- *Their main intent is to help protect others – not the wearer*
- *Came about as a response to the shortage of medical masks and PPE*
- *Not regulated or certified – and vary in how well they filter and fit*
- *Will not capture all droplets – some will escape out the sides and smaller aerosols will penetrate the fabric material*
- *May have higher breathing resistance than a respirator*
- *Gaiters and other single-layer coverings are no longer recommended as a face covering*
- *Cloth face coverings meeting ASTM F2100-19 are available*

or respirators, as source control, on the worksite needs to be developed and communicated to all employees during job orientation and training. The CDC states that face masks or respirators remain a public health measure to help reduce the spread of COVID-19. The CDC recommends the use based on the level of community spread and personal risk factors. See the latest CDC recommendations for face mask or respirator use:.

The CDC currently recommends wearing a respirator or high-quality mask in areas of high community-based transmission, while living in close contact with a person infected with COVID-19, or for workers at risk of severe disease at medium or high community spread levels (CDC, 2023b). See CDC guidelines for the duration for wearing a high-quality mask, such as an N95 respirator, for return to work after a COVID-19 infection.

In times when approved respirators are not available, alternatives such as well-fitting face masks or cloth face coverings may help capture some of the large droplets emitted from coughing, sneezing, or talking. The use of face masks or cloth face coverings does not replace the need for physical distancing and other protective measures like hand washing, and they should not be used in place of respirators or medical face masks when indicated.

Job site poster. *(Photo courtesy of AGC of Washington.)*

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When implementing face masks or respirators, ensure that they fit properly, cover the nose and mouth, do not restrict breathing, are secured to the head, and are replaced or washed daily or sooner if wet, soiled, or contaminated. As with any PPE, there may be issues with wearing it all day including irritation or rashes. The surfaces of the face covering may be infectious, so good hygiene (frequent hand washing) and minimizing handling of the face covering are recommended. If an employer decides to issue respirators to any employee, an OSHA respiratory protection plan must be in place, including voluntary use provisions.

Additional CDC information is at CDC Community Respirators and Masks. Given the wide range of construction tasks, employers should also evaluate if a face mask or cloth face covering might pose a separate risk, e.g., becoming caught in moving equipment or getting too close to hot work sources.

Local recommendations and requirements for face masks may vary over time as community spread conditions rise or fall. It is critical that employees understand that these are not respirators and should not be used in place of these PPE when needed. Individuals with medical conditions should consult with their primary physician before attempting to wear any face coverings.

See additional information on the differences between face coverings and respirators under Element 5.

Element 2: Physical Distancing Controls

During times of high community spread or site outbreaks consider the following:

A) Scheduling tasks to minimize site worker density serves to reduce exposure potential.

- Can the number of workers on the site at any one time be reduced? Fewer workers on the site makes it easier to do social distancing and contact tracing.

- Can occupancy of workspaces be managed by trades to avoid trade stacking (i.e., scheduling so that the work of multiple trades does not overlap or occur simultaneously in a single space)?

- Can delivery times be paced to avoid backups?

- Can arrival times, break times, lunch times, and departure times be staggered, since the worksite areas that typically have the highest worker density include site entry areas, wash-up areas, break and lunch areas, food truck/canteen lines, trailer workstations, tool and supply stations, lifts, and delivery areas? Bottlenecks can make physical distancing difficult.

- Can the size and frequency of meetings and training be adjusted? Can these events be presented online?

B) Separation measures to keep employees six feet apart reduce exposure potential during periods of widespread transmission risk.

- Identify those tasks requiring multiple workers. Can these tasks be adjusted to minimize the number of workers? Or is there a way to have the work performed that allows accommodation of 6-foot separations?

- Have consistent work groups; consider work pods, where people work and eat together and isolate themselves from other work groups.

- Develop policies for areas where physical distancing and ventilation are most likely to be challenging or taken for granted. This might include elevators, shared company vehicles, carpools, work trailers, etc. For example, employers might replace a huddle around blueprints while standing six feet apart around a large screen display.

- Physical distancing can be challenging during transportation, both during workers' daily

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commute to site, van ride sharing, and within the site or in company vehicles. Specific JSAs may be needed.

- Indoor lunch areas are typically self-monitored and are areas where individuals often group together. Reminders can be given to workers to space themselves apart during lunch.

- Label common areas using markings or decals to show 6-foot separations – especially in locations where bottlenecking might occur. These include site entry areas, wash-up areas, break and lunch areas, food truck/canteen lines, trailer workstations, tool and supply stations, lifts, and delivery areas.

- If barriers (rigid clear plastic, vinyl shower curtains, poly sheeting, or tarp materials) are used to create separation, consider that barriers may interfere with airflow patterns.
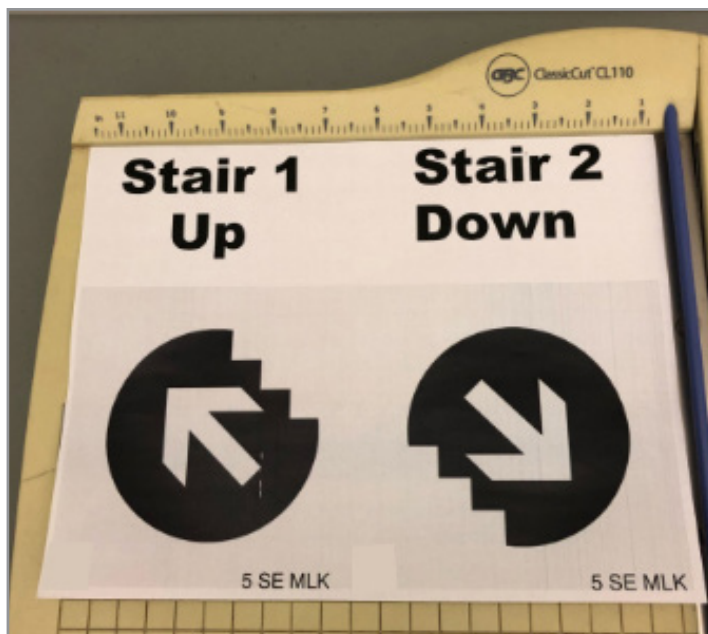
Making signs for stairways; one-way flow can help maintain social distancing. *(Photo courtesy of Oregon State Building & Construction Trades Council.)*

Element 3: Exposure Reduction Controls

A) Wash your hands regularly.

B) Ventilation measures may be effective in reducing virus exposure and risk of becoming infected.

   a. In most construction environments, outdoor work has negligible risk.

   b. In crowded indoor areas with insufficient natural or mechanical ventilation, ventilation may need to be supplemented.

- Open windows where possible; even a few inches in extreme temperatures can help.

- Use portable fans to improve airflow and help minimize dead air spaces.

- In vehicles transporting multiple people open windows to increase fresh air circulation.

   c. Construction Trailers, Office Areas, Meeting Areas, Breakrooms

- Open windows where possible; even a few inches in extreme temperatures can help.

- Use portable fans to improve airflow and help minimize dead air spaces.

- In vehicles transporting multiple people open windows to increase fresh air circulation.

- Construction trailers may need better ventilation control such as portable units.

- Check HVAC systems in the contractor's job trailers and offices and update filter systems to use higher MERV-rated filters without exceeding the limits of the HVAC system. Check controls and settings. Change settings from run on demand only (e.g., only when heat or cooling is needed) to run at all times when occupied or during the work shift.

- Run washroom exhaust fans continuously

during work hours (close toilet lids before flushing if possible).

- Consider increasing outdoor makeup air (many trailer systems have a fixed % of outside air but make sure system is not blocked).

- Consider portable HEPA units to help improve airflow and reduce airborne contaminants. These should be spread out in a space to minimize dead air or low flow spaces such as corners or opposite walls from supply.

- Maintain ventilation systems.

  i. Check filters periodically to ensure they are not dirty, which can reduce airflow and that they are intact / in place.

  ii. Verify the % fresh air makeup (if present) is still set properly or adjustable dampeners are working.

  iii. Verify system belts are still in good shape and fans are blowing.

  iv. Verify air balance has not been readjusted; people may open and close vents on their own affecting the system airflow balance.

  v. Conduct airflow evaluations to evaluate fresh air rates, and potential dead air spaces and to verify airflow is in the direction desired (non-toxic smoke tubes can be helpful or a hand-held smoke puffer, inexpensive ones from toy companies may be available).

Element 4: Personal Hygiene Stations and Measures

Hand washing is still a good practice to help prevent the spread of a variety of diseases that can impact the worksite. When wash stations are needed for hand washing:

- Provide sufficient water, soap, and drying aids or hand sanitizer with at least 60% alcohol content.

- Locate wash stations adjacent to break areas, trailers, and lunch areas.

- Use no-touch trash receptacles.

- Post signs to encourage and remind employees of good hygiene practices.

Hand-washing facilities 6 feet apart. *(Photo courtesy of Boilermakers – CIMS Ltd.)*

Element 5: Personal Protective Equipment (PPE) Measures

A) PPE is the least preferred and final option for reducing risks to workers, but PPE can play an important role when other Hierarchy of Control measures are insufficient. PPE is common in construction and both employers and workers are familiar with its use.

B) Respirators. Where respiratory protection is needed against SARS-CoV-2, the CDC recommends a NIOSH approved respirator N95 or higher. This includes air-purifying filtering facepiece respirators, half or full facepiece reusable (elastomeric) respirators with particulate filters, or powered air-purifying respirators (PAPRs) with HE filters (CDC, 2023a). If supplied air respirators are being used for protection against other haz-

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ards, they may also be considered (OSHA, 2022).

Properly fitted NIOSH approved respirators are more effective than face coverings and procedure masks for preventing exposures to airborne contaminants for the wearer. While some but not all respirators from other countries meet standards similar to U.S. standards, the emergency use authorization has ended, and NIOSH-approved respirators should be used. Be aware of counterfeit or substandard respirators.

In selecting PPE for COVID-19, consider the community spread level, type of work and other respiratory hazards to which the worker is exposed. Under OSHA's PPE standards for construction (29 CFR 1926 Subpart E), employers must consider whether their hazard and risk assessments, including construction site job hazard analyses, indicate a need for the use of more protective PPE (OSHA, n.d.).

Consider these risks from a community spread level standpoint and CDC respiratory protection recommendations:

Community Spread Level	CDC Recommended Respirator or Facemask Use
Low	Wear a facemask or respirator based on your personal preference, informed by your personal level of risk.
Medium	If you are at high risk for severe illness, wear a respirator or high-quality mask when indoors in public.
High	Wear a well-fitting respirator or high-quality mask in public. If you are immunocompromised or at high risk for severe illness, consider avoiding non-essential indoor activities in public where you could get exposed.

Wear a face mask or respirator based on your personal preference, informed by your personal level of risk. If you are at high risk of becoming very sick, talk to a healthcare provider about additional prevention.

- Consider if the job site assessment has determined that the task involves other hazards that might require a respirator (e.g., silica) or enhanced eye protection (e.g., welding, grinding); they must be provided.

During periods of high community spread or job site outbreak, there is no "one-size fits all" recommendation for job tasks requiring close contact with other workers. JSA considerations will vary based on task details, including the 15-minute CDC-recommended suggestion for defining a "prolonged" period. NIOSH-approved respirators are recommended to be worn if workers need to be near each other to perform tasks or when working in close quarters, such as confined space work. A JSA will also identify any other types of exposures (e.g., dust or chemicals) that need to be considered. In summary, during periods of high community spread or suspected outbreak at the site, enhanced respiratory protection may or may not be needed depending on the circumstances.

For example:

- **Enhanced respiratory protection not likely needed:** A task performed outdoors by three workers who will be working 3 feet apart for a 15-minute task. No other air contaminants are involved.

- **N95 respirator or higher suggested:** A task performed indoors by two workers who will be working in close proximity for more than 60 min. No other air contaminants are involved. However, the work is to be done in an enclosed area without a room ventilation

system operational.

Another high-risk exposure opportunity is a person who is returning to work after a COVID-19 infection during the 10-day infection period while wearing a high-quality mask or respirator. Another is an immunocompromised or worker at risk of severe disease who needs additional personal protection.

- N95 respirator suggested while working with others. Isolate workers during lunch or other breaks where a mask must be removed.

High exposure tasks are those involving entry into an indoor work site occupied by people such as other workers, customers, patients, or residents suspected of having or known to have COVID-19, including when an occupant of the site reports signs and symptoms consistent with COVID-19. While high exposure tasks are uncommon in construction, they definitely call for enhanced respiratory protection.

For example:

- **N95 respirator or higher suggested:** A construction worker on the site reports feeling ill on the job. He is coughing and is having difficulty breathing. Co-workers have him sit down and they call the COVID-19 Site Safety Officer. Site policy calls for the supervisor and the Site Safety Officer to go to the worker and close proximity may require additional PPE and respiratory protection.

C) Gloves. With appropriate hand washing, gloves should not be needed to protect from COVID-19 for most construction tasks. Disposable gloves may be useful to reduce skin contamination for specific tasks where contact is more frequent than surface cleaning and disinfection cycles may allow. Chemical resistant gloves are also useful

for employees responsible for surface cleaning and disinfection tasks. When disinfecting, gloves should be specific to protect against the cleaning agent used.

Note:

These PPE selection examples are just a few of many potential construction task scenarios. They are provided to help illustrate the issues that need to be considered during JSAs. Additional studies of exposure and virus transmission will better inform the science and allow more definitive recommendations in the future. Until then employers should be cautious and should consult an industrial hygienist for complex or high exposure conditions.

PPE can get contaminated during the shift. Avoid sharing PPE among employees where possible. Properly clean and disinfect reusable PPE such as face shields, eyewear, and reusable respirators (elastomeric facepiece respirators, powered air-purifying respirators (PAPR), or supplied air respirators (SAR)) at the end of each shift. Follow the 'manufacturers' recommendations for cleaning agents and procedures. Per 29 CFR 1926, all shared PPE must be cleaned and disinfected between use of different people.

When disposable or other respirators are used, employers must comply with the requirements of OSHA's Respiratory Protection standard (29 CFR 1910.134), including the requirement to train workers to don respirators before entry and to remove and properly dispose of respirators upon exit.

Table A: Comparison of Face Coverings, Face Masks, and Filtering Facepiece Respirators

Comparison Feature	Cloth Face Covering (Least effective source control for wearer only)	Face Mask (Procedure/Surgical)	Filtering Facepiece Respirators (FFRs)
Photo			
Description	Cloth face covering is used to cover the mouth and nose.	Disposable mask is used to cover the nose and mouth. Surgical masks also provide a fluid barrier.	Disposable respirator is used to cover the nose and mouth.
Fit on face	Loose	Loose	Tight
Intended Use	MAY HELP PROTECT OTHERS Per CDC, may help contain large respiratory droplets emitted from coughs, sneezes, or speech by wearers who don't yet know they have the virus (CDC, 2023a). Effectiveness depends on mask materials and design (CDC, 2023a). Not intended to protect the wearer (CDC, 2023a).	HELP PROTECT OTHERS Designed to help reduce the number of large respiratory droplets introduced into the surrounding area as wearer talks, sneezes, or coughs (OSHA, 2022). HELP PROTECT WEARER Surgical mask includes fluid barrier to help protect the wearer's nose and mouth from splashes and sprays of bodily fluids (OSHA, 2022).	HELP PROTECT WEARER Designed to help reduce wearer's inhalation of both large droplets and small airborne particles (aerosols) (OSHA, 2022). HELP PROTECT OTHERS May help reduce the emission of respiratory droplets and small airborne particles (aerosols) into the air as wearers sneeze, cough, or talk (OSHA, 2022).
Reduce the wearer's exposure to airborne particulate hazards when properly selected and worn	No Not intended to protect the wearer (CDC, 2023a).	No Does not protect the wearer against small airborne particles (aerosols) (OSHA, 2022).	Yes, NIOSH approved N95 respirators are at least 95% efficient in filtering particulates per NIOSH 42 CFR 84.
PPE Certification	Not considered PPE	FDA (Surgical masks only)	NIOSH

Pictures courtesy of 3M Company.

Step 5: Perform Job Safety Analyses (JSAs) to Review Tasks and Adjust Control Plans

Steps 1 to 4 mostly address measures needed across the site for all jobs. Step 5 uses job task as a lens for a closer look at potential exposures. It calls for doing Job Safety Analyses (JSAs) to review upcoming work. This step makes sure that what is likely to be a smaller number of higher exposure tasks are not overlooked. Controls and measures for these tasks can then be tailored further to assure protection. JSAs can also be applied to loosen precautions for tasks that have less exposure potential. During periods of high community spread, here are some "exposure factors" to consider when performing JSAs for COVID-19 hazards:

- **Indoor work without ventilation – especially in enclosed or restricted settings.** Whereas outdoor air currents dilute virus aerosols, indoor aerosols may linger. Ventilation systems in buildings under construction are not typically ready to operate. Work done in enclosed settings will merit additional controls such as arranging for temporary ventilation, fans, or opening windows.

- **Close quarter tasks.** Some construction tasks are typically done by two or more individuals working together such that physical distancing is difficult. For example, work on scaffolds, in trenches, setting glass windows, installing heavy equipment, or setting block or stone. Work in close proximity means higher exposure potential from larger droplets. It is useful to identify these tasks ahead of time for additional planning. Pre-planning or use of additional equipment may allow the work to be done in less time. Temporary barriers may be helpful to reinforce distance for some tasks. Use of N95 respirators might also be an option.

- **Noisy tasks where communication is difficult without shouting.** Speaking releases droplets and aerosols and studies show that louder speaking can produce ten times the emissions of quieter

What is a JSA (or JHA)?

*A **J**ob **S**afety **A**nalysis is a common technique to spotlight job tasks to identify and address hazards before they occur. The term "**J**ob **H**azard **A**nalysis" (JHA) is also common.*

A JSA focuses on the relationship between the worker, the task, the tools and the environment. It asks supervisors and workers to identify the basic steps to complete the job; the potential hazards that could occur at each step; and the safest way to do the job, including any controls or safety gear needed. Performing a JSA before completing a task and putting it in writing promotes good planning and safe work procedures.

While JSAs are most often undertaken for safety, the same approach works for health hazards. See OSHA 3071 and OSH Answers: Job Safety Analysis for additional information.

talking (Asadi et al., 2019). This factor could be addressed by renting or using quieter equipment, use of radios or phones, or additional pre-planning to minimize the need for communication in the task area.

- **Heavy physical exertion tasks.** Heavy exertion or working in high temperature areas can involve heavier or rapid breathing rates that could act to increase the intake of any aerosols present in the air. It may be possible to make the task easier or shorter using alternative equipment or tools.

- **Long duration or combination factor tasks.** Tasks that are longer in duration, or that involve several of the above factors (e.g., heavy noisy exertion tasks in enclosed settings) deserve additional planning due to the likelihood of higher exposures. The likelihood of exposure can be reduced by using most of the previously mentioned controls, including the use of N95 respirators for

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added protection.

- **Contact with the public or other workers.** Most construction sites have restricted entry and direct contact with the public does not occur. However, renovation or repair work in spaces such as homes, apartment buildings, or schools may involve some public or occupant contact. Work in commercial or industrial settings may include interaction with other companies' employees. This factor can be managed using planning, scheduling, temporary barriers, dedicated entrances and elevators, and similar measures.

- **Renovation or repair work at locations where COVID-19 patients have been present.** Some construction employers specialize in renovation and repair work. These contractors may be asked to perform work at locations such as hospitals, nursing homes, prisons, food processing plants, or other locations where there have been COVID-19 outbreaks. This type of work has the potential for higher exposure. Such jobs need additional coordination and communication with facility officials and an assumption that higher exposures need to be addressed. It is best to consult with an industrial hygienist to tailor precautions and controls for these types of jobs.

Here are some JSA examples to illustrate how they can be helpful:

JSA Example:

Two flaggers are needed for a road repair job that will last two days. Each will be positioned 200 feet from the work with a paddle sign.

The JSA finds lower exposure potential for this task because 1) it is performed outdoors, and 2) physical distancing is not an issue. The two flaggers do not need to wear a face covering during the work. During periods of high transmission or suspected site outbreak, the employees should have a face cover with them in case they need to put it on to interact with a car passenger or co-worker.

JSA Example:

Plumbing work at a hospital includes upgrading plumbing fixtures in the Intensive Care Unit (ICU). Tasks include removal of existing toilets and plumbing fixtures and replacement with newer models. The ICU was recently used for the treatment of COVID-19 patients but will be cleaned and closed for this renovation work.

The JSA finds this to be a case with higher exposure potential. The COVID-19 site officer will need to coordinate closely with the hospital safety representatives to understand what disinfection has been done beforehand, and to plan the work ahead of time. The Coronavirus has been found in stool samples of COVID-19 patients and in hospital room toilet spaces (Zheng et al., 2020).

While not a common exposure pathway, this would be a potential exposure pathway concern for plumbers performing this task. The International Association of Plumbing and Mechanical Officials (IAPMO) recommends that "for as long as the pandemic is still active, it should be assumed by anyone working on a sanitary drainage system that the virus is present" (DeMarco, 2020). Additional PPE such as protective suits, gloves, and face shields are needed along with frequent handwashing. This is the type of work where consultation with an industrial hygienist is advisable.

Summary of JSA Exposure Factors

Higher exposure potential: *Indoor work, close quarter work, enclosed spaces, unventilated spaces, longer tasks, heavy exertion tasks, loud speaking voice conditions, public contact*

Lower exposure potential: *Outdoor work, spread out work, good airflow, shorter tasks, lower exertion tasks, normal speaking voice conditions, no public contact*

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Step 6: Develop a COVID-19 Case Response Plan

The previous steps are all intended to reduce the likelihood of having someone on the construction worksite develop COVID-19 or test positive for the coronavirus. A current COVID-19 response action plan should be in place.

Notification and tracing measures: Good practices call for employers to develop and implement policies and procedures for workforce contact tracing following an employee COVID-19 positive test. CDC recommends that employers perform these actions in the case of a COVID-19 case:

1. Compile information on the locations where the ill or positive test employee worked on the site for two days prior to symptoms occurring

2. Identify co-workers who had close contact to be considered potentially exposed, and

3. Inform these employees of their possible exposure. See guidance for additional information and updates (CDC, 2020b).

Post Case Identification Cleaning Measures: The CDC provides the following guidance for workplaces in CDC When and How to Clean and Disinfect a Facility. Additional guidance is available in the AIHA guidance titled Workplace Cleaning for COVID-19.

Worksite COVID-19 signage. *(Photo courtesy of Matt Gillen.)*

Step 7: Implement and Monitor Overall Plans

Communicating the COVID-19 Control Plan to employees and supervisors is important. Communication should also include training workers on steps they should take such as cough and sneeze etiquette, return to work after infection procedures, and basic facts about how COVID-19 spreads. JSAs can be useful for communicating task-specific control measures.

Once the plan is up and running, the COVID-19 site officers should check and track that controls and measures are working and are being used. Employee and supervisor feedback is useful to further refine measures and improve consistent use. Multi-employer sites typically require additional coordination for consistent and reliable performance.

How Can an Industrial Hygienist Help?

Industrial Hygienists protect worker health by:

- Assisting with the development of site control plans

- Providing site COVID-19 Safety Coordinator training

- Supporting site medical with epidemiologic aspects of infectious diseases

- Assisting employers with resolving technical questions related to exposures, controls, and cleaning

- Conducting airflow filtration and ventilation studies

- Providing expert advice on jobs identified by JSAs as being of higher risk, such as:

  – Work to be done in hospital settings

  – Work in other settings that have experienced outbreaks (e.g., prisons, nursing homes and meat processing plants)

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- Providing additional guidance at sites where COVID-19 cases are occurring

- Conducting quality assurance assessments of plans and implementation effectiveness (PPE, training, ventilation, sanitation, work practices, etc.)

Please check the AIHA website for additional information and resources at https://healthierworkplaces.org/.

Takeaway Messages

- COVID-19 is an ongoing health hazard, changing from a new pandemic to an ongoing endemic disease for the foreseeable future. Community spread conditions may increase, or decrease, and these precautions can be adjusted accordingly with new variants. This basic program is likely to be needed again in the future for other epidemics or regional outbreaks.

- Asymptomatic individuals may not cough or sneeze much – but studies show they can still silently spread the coronavirus by speaking and breathing. This is the primary need for precautionary measures.

- Testing options for COVID-19 have improved; many home test kits are available and may provide additional options and dimensions to existing programs.

- Actively encouraging employees to stay home if sick (or exposed/caring for others who are sick) is important. Medical leave policies are critical to successfully minimizing having sick workers on the job. The best policies are flexible, non-punitive and allow sick employees to stay home and away from co-workers.

- Simple site-wide controls, like mandatory physical distancing or face coverings, are not always the most desired control for the wide variety of tasks on a construction site. JSAs are valuable because they help identify the smaller number of higher-risk tasks, which can be prioritized and given the proper focus to control exposures and risks. Controls may vary with community spread levels or site-specific outbreaks.

- Construction industry site sanitation historically has not been exemplary. COVID-19 is an opportunity to change these practices for the better on a permanent basis.

- COVID-19 is an urgent concern, but it is not the only health hazard on the job. Other hazards such as noise, air contaminants, manual material handling, and high temperatures are important in their own right and may also impact COVID-19 exposures and controls. See the Focus Four for Health guidance document for additional information.

In summary, COVID-19 presents an unprecedented and rapidly changing situation compared to other well-established construction health hazards. New information about the spread of infection and the course and treatment of the disease continues to develop. Federal, state, and local requirements or guidance may loosen or tighten as surges occur. Construction industry employers must regularly check for new information to guide their efforts. Construction is a creative, problem-solving business, and we are confident that construction employers and employees will adapt to address and move beyond the COVID-19 hazard.

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Photo courtesy of AGC Oregon-Columbia Chapter member Advanced American Construction, Inc.

Additional Resources

Many resources have already been mentioned in the text above. Additional resources are provided that expand on the many elements that may need to be considered in preparing a company's response plan. Some are repeated here if they provide general guidance or specific information to support COVID-19 control efforts in construction environments.

Guidance associated with healthcare-related situations or businesses with active COVID-19 are generally **not** included but can be accessed at each organization's index website for COVID-19 resources.

Some resources have notes on their use for reference to specific guidance in response plans and construction-specific information. These resources are constantly changing and being updated. Please check for current versions of each one regularly.

CDC

- **CDC**: CDC Coronavirus (COVID-19) webpage
  - Addresses a wide variety of topics and the latest guidance for individuals, health providers, and employers
    - Symptoms of Coronavirus - Addresses if you are feeling sick and how to prevent the spread of the virus
    - Data & Surveillance
    - Counterfeit Respirators / Misrepresentation of NIOSH Approval
      - (See 3M below for a list of international respiratory standards)
- CDC/EPA Guidance: Guidance for Cleaning and Disinfecting

OSHA

- OSHA COVID-19 has a variety of topics and Spanish language information.

NIOSH

- NIOSH Respiratory Infections in the Workplace includes the latest information on respirators and PPE, workplace guidance, and other topics.
  - Construction Safety and Health (Directory of Construction Resources)

Other US Agencies

- **NIEHS:** The National Institute of Environmental Health Sciences' COVID-19 webpage includes a variety of worker training resources.
- **EEOC:** The U.S. Equal Employment Opportunity Commission's Coronavirus and COVID-19 webpage includes FAQs addressing medical screening topics.

World Health Organization (WHO)

- Coronavirus Disease (COVID-19) Pandemic
- EPI-WIN: WHO Information Network for Epidemics

Health Canada

- The Health Canada Coronavirus disease (COVID-19) webpage includes a wide variety COVID-19 resources.
- Many provinces have additional information, requirements, and guidance.
  - British Columbia has a WORKSAFE COVID-19 and communicable disease webpage.

States

- Various states have guidance or requirements.
- The *National Governors Association* Coronavirus: What you need to know webpage includes a link to each state, which provides an easy way to find information.

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Organizations

- **AIHA**

  - AIHA's Healthier Workplaces webpage includes industry-specific guidance.
    - Returning to Work: Construction Environment
  - AIHA's main webpage includes:
    - Focus Four for Health Guidance Document
    - The Role of the Industrial Hygienist in a Pandemic 2nd edition

Various construction organizations also have useful sites and guidance materials. A partial list includes:

- **The Center for Construction Research and Training (CPWR)** has a COVID-19 Resources webpage.

  - See quick tips on ventilation at indoor construction sites without operating an HVAC system, January 2021

- **The Associated General Contractors of America (AGC)** has a Coronavirus (COVID-19) webpage.

- The **Canadian Construction Association** has a COVID-19 - Standardized Protocols for All Canadian Construction Sites Version 4 April 16, 2020 webpage.

- The Infrastructure Health and Safety Association has a COVID-19 Links and Resources webpage.

- The **Laborers' Health and Safety Fund of North America** has a Coronavirus and its Impact on Our Mental Health webpage.

- ASHRAE resources include books, papers on the post-COVID Era, guidance documents, and Congressional Hearing Testimony.

Private industry

(mentioning specific products does not imply endorsement)

- **3M**

  - Novel Coronavirus and COVID-19 Outbreak
  - Comparison of FFP2, KN95, and N95 and Other Filtering Facepiece Respirator Classes *(February 2021 – Revision 6)*
    - Addresses other country respirators and descriptions for those similar to N95s (i.e., FFP2, KN95, etc.)
  - Filtering Facepiece Respirators FAQ: General Public (August 2021 – Revision 9)

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