Comparison of Two Entertainment Industry COVID-19 Programs

Monona Rossol

Abstract
This article follows two entertainment industry COVID-19 worker safety programs from inception through implementation. The first plan was developed by the four major film industry unions in concert with their expert consultants. The second plan for live theater was initiated by the Broadway League, a national trade association for the theater owners, operators, producers, presenters, and general managers in North American cities and their suppliers of goods and services. The efficacy of the plans to provide cast and crew with proper industrial hygiene measures such as ventilation and protective masks is compared by the author.

Keywords
entertainment industry, Covid-19 policy, industrial hygiene, unions, trade associations

The Film Industry Covid-19 Plan
In June, 2020, the four major film industry unions, The Directors Guild of America (DGA), the Screen Actors Guild-American Federation of Television and Radio Artists (SAG-AFTRA), the International Alliance of Theatrical Stage Employees (IATSE), and the Teamsters and the Basic Crafts unions jointly released their plan to protect cast and crew from COVID-19. Called the Safe Way Forward, the opening paragraph makes it clear that the unions believe this is what their employers need to provide:

This document represents what we believe to be a path for employers to provide a safer workplace for their cast and crew members in a pre-vaccine COVID-19 world. Taking action based upon these guidelines is an essential and necessary element of any such return to work.

Over the next few months, these unions negotiated this plan’s provisions into their work agreements and contracts. Some unions also enforced these rules effectively with the assistance of their consultants. For example, if the union representatives felt there was a safety issue involving insufficient ventilation or personal protective equipment, a consultant might be asked for a written opinion or asked to join a virtual conference call to support the representatives in their negotiations. Those representatives had access to experts in many other fields as well. The plan’s introduction explains:

This document was conceived and initially drafted by a DGA committee of working members, based upon close consultation with infectious disease epidemiologists and other experts including W. Ian Lipkin, Larry Brilliant and Baruch Fischhoff. SAG-AFTRA was simultaneously but independently working on its own protocols through its President’s Blue Ribbon Commission on Safety, its staff, and expert consultants including Jonathan Fielding, Mark Katchen, and Monona Rossol. IATSE was also engaged in a similar process with experts including Letitia Davis, Gregory R. Wagner and David H Wegman.

The unions relied on these experts to set the protocols for their plan.

Testing is the Cornerstone
The foremost precaution was frequent testing.

We believe strategic testing for the presence of COVID-19 is critical for a safe return to work. Without such testing, the entire cast and crew would be asked to work each day in an environment of unknown risk; a single confirmed case would lead to a quarantining of all who came into close contact with that person. This could potentially lead to shooting delays, and—should that person be a key actor/performer or director—to production shutdowns, not to mention the real

1Arts, Crafts and Theater Safety, New York, NY, USA

Corresponding author:
Monona Rossol, Arts, Crafts and Theater Safety, New York, NY, USA.
Email: actsnyc@cs.com
possibility of illness and death. Our belief in regular, consistent testing is based on the best available public health science…

In June of 2020, many public and private employers were debating about who should be tested and the frequency. But this industry relied on its experts for the number of tests required and insisted they be provided by employers. Testing frequency was based on calculated risk for the “zone” they worked in.

The Zone System

The complex nature of a film location often involves workers with 40 or more different job titles. You need only to watch the credits roll at the end of any movie to understand this complexity. This also means that the workers, as represented by their unions, had the most knowledge of how each job is done and which activities put them at risk.

The work is divided into three zones:

Zone A is any perimeter within which activity occurs without physical distancing or the use of PPE. In most cases, this will mean performers working on set with no protection alongside crew,…

Zone B is everywhere the production has a footprint that is not Zone A. Use of PPE and stringent physical distancing practices are observed and enforced within Zone B, with variations and modifications related to both general filmmaking demands and specific production needs. Zone B could include production offices, base camps, vehicles, control rooms/trucks or any other workspace or place that a crew member may be performing work.

Zone C is the outside world: homes, hotels, wherever people employed in the production go when they’re not working.

No one can be allowed access to Zone A or Zone B for the first time unless they have been tested and cleared within the last 24 h.1 p 3

Zone Testing

The testing protocol for these zones is as follows:

In Zone A, personnel are tested three times a week at a minimum, with the understanding that certain circumstances may require daily testing (such as performers and crew involved in production of scenes that require close or intimate contact, or extreme exertion, etc.).1 p 3 People working in Zone B are tested at least once a week.1 p 4

Respirators

People in Zone B also can take other precautions not available to Zone A people such as respirators:

SARS-CoV-2, the virus that causes COVID-19, enters through the mucous membranes of the mouth, nose, and eyes. Accordingly, these surfaces must be protected by PPE. We consider N95 masks (subject to their availability) and either goggles or a face shield to be the best available standard, while acknowledging face shields may make some jobs awkward or impossible to perform. Surgical masks, while not ideal, are still better than nothing for people who cannot wear N95 masks because of sizing or grooming issues.1 p 4

This was during the shortage of N95s, and I know of no other non-health care workplace that was routinely using and recommending N95s. It was also not common for non-medical workers to wear shields or goggles with their N95s. A few workers surveyed chose to upgrade these precautions to include powered air purifying respirators. Later the unions relaxed these respiratory protection requirements, and a list of masks was provided which included KN95s, surgical masks and cloth barriers masks. However, N95 was the preferred choice on that list.

Reliance on the CDC

Only recently have the Centers for Disease Control and Prevention (CDC) begun recommending that the public wear N95s to protect against the Omicron variant,2 but in the film industry, N95s have been recommended for all workers who were not on camera since June 2020. When the Safe Way Forward was first instituted, the CDC was advising the public and non-health care workers to wear cloth masks or surgical masks due to a shortage of N95s. Within a few months, however, the industry found no difficulty in procuring N95s from U.S. sources. However, the CDC continued to promote the ineffective substitutes.

In addition, the CDC also did not seem to keep abreast of the studies being published by particle physicists around the world whose data was showing that the virus was airborne. In July 2020, 239 scientists signed an open letter appealing for recognition of airborne transmission. The CDC did not formally update its website to recognize airborne transmission until May 7, 2021,3 more than 10 months later.

It was becoming evident that the CDC’s advice was inadequate. It affirmed the film unions’ decision to choose their own experts and to follow the advice of those experts.

OSHA and the Experts

The 10 experts chosen by the unions also have in common the fact that none of them specialize in regulatory issues. Letitia Davis’s Biography includes a mention that she is a past member of the Advisory Committee to the Directorate of Construction in the Occupational Safety and Health Administration (OSHA.) And, although I did not include it in my bio, I was retained by the U.S. Department of Labor...
in 2008 as an expert for the Defense of OSHA in a contested
citation. But none of the experts were employed by OSHA or
specialized in regulatory issues.1 pp 12–16 I think this was
fortunate in the light of OSHA’s record on COVID-19 guid-
ance at this time.

**OSHA Guidance**

A few days prior to the release of the Safe Way Forward Plan,
May 26, 2020, an Occupational Safety and Health
Administration (OSHA) National News Release contained
the following advice for construction workers (these rules
are applicable to film set construction workers as well).4

- Using physical barriers, such as walls, closed doors, or
  plastic sheeting, to separate workers from individuals
  experiencing signs or symptoms consistent with the
  coronavirus;
- Keeping in-person meetings (including toolbox talks and
  safety meetings) as short as possible, limiting the number
  of workers in attendance, and using social distancing
  practices;
- Screening calls when scheduling indoor construction
  work to assess potential exposures and circumstances in
  the work environment before worker entry;
- Requesting that shared spaces in home environments
  where construction activities are being performed, or
  other construction areas in occupied buildings, have
  good air flow; and
- Staggering work schedules, such as alternating workdays
  or extra shifts, to reduce the total number of employees on
  a job site at any given time and to ensure physical
distancing.

Most of the advice is aimed at reducing contact with
potentially infected people. However, “requesting” that the
work areas “have good air flow” carries the implication
that if the request is denied, it is not a deal breaker. In con-
trast, poor ventilation was a dealbreaker in the Safe Way
Forward.

On June 2, 2020, an OSHA News Release contained
the following advice for stock room and loading dock workers5:

- allow workers to wear masks over their nose and mouth to
  prevent spread of the virus;

OSHA recommends a “mask over the nose and mouth”
which refers to a cloth or surgical mask. These masks
contain the large particles or droplets emitted by the wearer
in order to protect other workers. They do not protect the
wearer from the small particles that are released in the air.

**Enforcing the Plan’s Zone System**

The credit roll at the end of a movie was increased by the Safe
Way Forward plan to include two new positions and a small
staff:

Executing the Zone System will require the creation of one
new position and one new department. First, there will be a
dedicated Health Safety Supervisor ..., and second, there
will be a Health Safety Department, with a Manager and
staff.1 p 11

The Health Safety Supervisor is also often called the
COVID-19 Compliance Officer. And this person is key to
the plan’s ability to enforce the rules due to the following
provision:

The Health Safety Supervisor (HSS) will be the final author-
ity on COVID matters and cannot be overruled in their efforts
and activities to enforce COVID-19-related safety practices.
They have the authority to pause the production in event
that a breach threatens the health of the cast or the crew.1 p 11

Pausing a production even for a few days can cost a great
deal of money, millions of dollars in some cases. This cost is
borne by the Production Company. It doesn’t require a strike
or grievance procedure. Instead, the HSS only has to deter-
mine it is not safe and the entire location is on pause. This
means meeting the HSS’s requirements is a powerful incen-
tive for employers.

Some larger studios hired health professionals to serve in
these roles. However, many hired individuals with little or no
health or safety background who took a two-hour webinar to
become certified. Initially, this webinar cost $50, but it
became free not long after development. Although such inex-
perienced HSSs have the “authority” in writing to shut down
production, they rarely have the true ability to make that call.
Many people served in this role just to keep working during
the pandemic. They feared shutting down productions which
might blacklist them from future work in entertainment.

One strength of the short certification training was that it
clearly established that when the precautions are not fol-
lowed, personnel will more frequently test positive for
COVID-19. This motivated the HSSs to enforce the rules
because they knew they would be held to account if cast or
crew members tested positive. It is true that the HSS alone
rarely made the actual call to pause. Instead, they were
likely reach out to various union representatives and the deci-
sion to pause often involved a discussion or a negotiation. In
my experience, this system worked on the whole.

**Duties of the HSS**

The HSS has many duties relating to testing and protocols,
but two of the duties relevant to ventilation are:
e. The HSS ensures that all sets, locations and workplaces are prepared for and managed during use which shall include an assessment of ventilation, air filtration and circulation, and the disinfecting of surfaces, property, equipment and tools.

h. The HSS shall be provided with the resources and staffing necessary to oversee or to provide directly adequate, daily attention to the many exposure control activities. Examples of this include attention to ventilation (including the use of foggers or atmosphere), Personal Protective Equipment (PPE) selection, fit-testing, and maintenance, and appropriate surface cleaning and disinfecting practices.\textsuperscript{1} p \textsuperscript{12}

The underlining above is to point out that assessment of the ventilation system is required, ventilation and air monitoring of theatrical fog and smoke effects is usually required by industry standards;\textsuperscript{2} PPE selection, respirator fit-testing,\textsuperscript{3} cleaning and sanitizing, is required by OSHA regulations and are essentially in my area of expertise. As a result, if the HSS had a technical question about ventilation, air-monitoring, or PPE, I or another relevant expert could be asked to assist with professional advice.

**Ventilation and the Plan**

In addition to the assessment of ventilation required by the HSS, the plan requires “good ventilation” in the Production Office and the Catering rooms. And the Locations Department is told that “ventilation is a priority” when selecting indoor locations for filming. But the plan does not define “good ventilation.”

In a collective bargaining session, it would be impossible to demand “good ventilation” without defining “good” by setting the minimum requirements for this term. When the Safe Way Forward was released, the definitions of this term was just beginning to be written by various organizations specializing in ventilation. The first of these was published on April 14, 2020, before the Safe Way Forward plan was published. This was the Position Document on Infectious Aerosols\textsuperscript{6} from the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE). In it, ASHRAE diverges from their pre-COVID standard (ASHRAE 62.1 for Indoor Air Quality) by recommending changes including upgrading the filter (from a MERV 8 to a MERV 13), increasing outdoor air supply even to as high as 100 percent if a MERV 13 can’t be installed, disabling those energy-saving devices which leak exhaust air back into the building such as heat wheels, and bypassing demand controlled systems that only turn on the ventilation system when carbon dioxide is detected at high levels.\textsuperscript{6} p \textsuperscript{10}

ASHRAE also recommend that the usual two air changes per hour (2 ACH) rate of ventilation in hospital patient rooms should be increased to at least 6 ACH. They do not recommend any level for ordinary workplaces, only recommending it be “maximized” as much as possible. However, just as the Safe Way Forward experts decided that the N95s like those worn by health care workers were appropriate for film industry workers, it seemed to me that the same protective hospital ventilation rate also would be appropriate. Certainly, the risk of transmission of the disease is roughly the same for an individual in a room with an infected person whether that infected person is a worker or a patient.

In the first few days in August of 2020, two other ventilation documents were released which recommended six ACH for industrial workplaces:

1. The American Conference of Governmental Industrial Hygienists (ACGIH) white paper: Ventilation for Industrial Settings during the COVID-19 Pandemic. Page 15, has a list of “Important Suggested Measures.” The second bullet point reads: “Maintain between six and twelve ACH, which will provide greater than 99 percent purge in 30–60 min (CDC, 2019).” And note, they refer to the CDC for this recommendation (see: cdc.gov/coronavirus/2019-CoV).

2. The AIHA (formerly the American Industrial Hygiene Association) published its document Reducing the Risk of Covid-19 using Engineering Controls. A diagram on page four shows that when a MERV 17 (HEPA) is used, the “Effective Engineering Controls” require ACH of six to twelve. In addition, on page eight it says that:

   “In non-health care facilities where occupant density cannot be limited to fewer than one person per ∼30 ft\textsuperscript{2} (i.e., six-foot radius), or there is likelihood that infected persons are present, delivering higher air change rates than six ACH may be necessary.

   The behavior of particles was considered by reviewing the various studies being released by particle physicists such as Lidia Morawska. It became clear that some of the most infective particles were in a size-range that would not be well-captured by filters such as the MERV 13. The amounts of fresh air were calculated that would need to be diluted to escape capture and set up a simple chart for our minimum of six ACH showing the amount of outside air needed for each filter. In August 2020, SAG-AFTRA began including these simple standards in the requirements for indoor locations (Table 1).

**Validation of the Standards**

While it was considered radical at the time, today many organizations and experts recommend five and six ACH. And on March 23, 2022, a webinar from the White House on ventilation called “Let’s Clear the Air on COVID,” began with the statement “The most common way COVID-19 is transmitted from one person to another is through tiny airborne particles of the virus hanging in indoor air for minutes or hours after an infected person has been there.”\textsuperscript{27} Twice
Table 1. Minimum Required Outdoor Air (OA) Percentages at Six Air Changes/hour (ACH).

| MERV # | MINIMUM OA |
|--------|------------|
| 17     | 20%        |
| 16     | 25%        |
| 15     | 30%        |
| 14     | 35%        |
| 13     | 40%        |
| any # <13 | 100%        |

During the webinar, experts mentioned prepublication data from an Italian study in which various rates of air exchange were used in schools and the data compiled. Reuters reported the data summary as follows:

Applications that guarantee a replacement of all the air in classrooms 2.4 times per hour reduced infections by 40 percent. The study revealed that they were reduced by 66.8 percent when there were four replacements of air per hour, and by 82.5 percent when there were six replacements.

These figures are consistent with my calculations and support our use of six ACH.

Implementing the Ventilation Standards

Unfortunately, many older buildings, theaters, and even some film, TV, and broadcasting studios have problems achieving these levels of ventilation. In addition, film locations all over the country often include temporary workstations located in completely unvented enclosures such as trailers. Or filming is scheduled for the interior of a scary-looking abandoned building (a common practice). And that’s when the job got exciting. Getting proper ventilation into such locations would be solved by phone and zoom discussions with building engineers and local experts working with union experts like myself.

For example, one famous old theater in a Southern state could only achieve 4.5 ACH and about 40 percent outside air. However, the project involved filming short musical numbers with singers and musicians who had been in pods (separate housing). So, a 45-min purge of the air between sets to clear the air as a precaution was instituted.

In another case, a huge million cubic foot studio was vented with five 20,000 cubic feet per minute (cfm) HEPA units that were rented from a major equipment supplier. (There were many venues in which we used air purifiers and AC units from 200 to 20,000 cfm.)

My favorite examples were venting 20- and 40-foot trailers that have no ventilation at all. One 40-foot trailer was used as a makeup department. But trailer floors are made of small panels which can be removed, and the open space can be used to insert supply and/or exhaust ducting. Once the producer’s local consultant, Leo Ryan, was aware of our standards and with very little advice from me, he devised an external heating, ventilation and air-conditioning (HVAC) system from a portable outdoor conditioned air supply unit, a large HEPA negative air filter, and ductwork. (Appendix 1).

Did the Film Industry Covid Plan Work?

In terms of ventilation, the plan worked so well that in a few months we saw there were almost no interior spaces we couldn’t vent, at least temporarily, to almost perfection using a little creativity and some money for equipment rental.

How well the film industry plan prevented transmission of the virus is more difficult to assess. Most of what is known about individual locations and the people who have tested positive is considered confidential. It can be said that in the more than 50 locations that I provided professional advice in response to requests from SAG-AFTRA, other unions, or from inquiries received through our nonprofit (Arts, Crafts & Theater Safety), all came off essentially on schedule to the best of my knowledge.

An example of one that failed spectacularly was at a film location on which I did not consult. It was reported in the press so I can talk about it. The lead actor and his retinue didn’t want to follow precautions. By week six, 20 people tested positive including the director, the lighting director, and the Health and Safety Supervisor herself. Tests ceased being done because there was no one to do them and production had to shut down. As I remember the total eventually was around 40 people who tested positive.

Live Theater

On March 12, 2020, the Broadway theaters went dark. They would remain closed until the Summer of 2021. These theaters were only used on a few occasions during the closed period when they were rented as film locations (except for one instance when a theater was used for testing an airborne unregistered pesticide proposed for virus control). When theaters are used for filming, the performers work under a SAG-AFTRA contract instead of an AEA agreement.

Development of the Theater Plan

Unlike the film industry plan, which was initiated by the unions, the model COVID-19 plan for live theater was generated by people on the employer’s and owner’s side of the negotiating table.

The majority of Broadway theatres are owned or managed by three organizations: the Shubert Organization, a for-profit arm of the non-profit Shubert Foundation, which owns
seventeen theatres; the Nederlander Organization, which controls nine theatres; and Jujamcyn, which owns five Broadway houses. All these theatre owners and operators are members of a national trade association for the Broadway industry called the Broadway League.

The Broadway League’s 700-plus members include New York City theatre owners and operators, producers, presenters, and general managers in North American cities, as well as suppliers of goods and services to the commercial theatre industry. The League developed the plan for reopening the theaters.

The League’s Covid Plan

Unlike the original film union plan, the Safe Way Forward, which anyone can read or download from the internet even today, the League’s plan has not been publicly seen.

However, the provisions of this plan can be inferred from reading the more readily available union plans that were developed in negotiation with the Broadway League. They all have the same basic provisions:

- Improved HVAC standards;
- Mandated vaccines for the work force
- Weekly testing for employees (or more depending on risk);
- Allowance for modifications to the protocols where necessary for individual shows or locations.

Different Risks in Live Theater

The live theater priorities are different from those in film because the plan was developed after vaccines were available which reduced the risks. The live theater plan differs most from the Safe Way Forward plan in the following ways:

1. HVAC Standards Were Primary. Instead of merely a mention, ventilation was prominent in the plan because it was evident by the summer of 2021 that transmission involved airborne small particles.
2. The Audience Is a Significant Risk Factor. Film usually is shot without an audience. Live theater must have an audience from the general public. Requiring audience members to be vaccinated does not exclude the possibility that a number of audience members are infected and capable of transmitting the virus. Distancing is not an option since the house must be full or nearly full to make the production profitable. Cloth and surgical masks worn by audience members only capture large particles and are not effective at preventing aerosol transmission to people in proximity. The audience areas are a massive risk factor requiring ventilation rates well over six ACH to be effective.
3. Community Status Is a Risk Factor. While the film industry plan enabled us to film even during some of the very worst periods of the pandemic, the theater plan only allows theaters to open when infectivity rates are low enough to allow vaccinated audience members to assemble.

The Actors’ Equity Association (AEA) Plan

Just as the film industry’s actors union, SAG-AFTRA, clearly had the most power to set standards in the film industry, the AEA is a pivotal union on the Broadway scene. Following the development of their plan provides the most insight into the issues in live theater.

The AEA began by hiring a consultant, David Michaels, former head of OSHA under President Barack Obama and an epidemiologist at the Milken School of Public Health at George Washington University. His books, Doubt is their Product and The Triumph of Doubt, clearly describe the cynical industry practice of causing the public to question good studies that demonstrate the toxicity of industrial products.

Dr. Michaels’s expertise in epidemiology certainly would be a help on anyone’s COVID-19 planning committee, but without other experts in industrial hygiene, ventilation, infectious diseases, risk assessment, and more, AEA’s plans couldn’t be expected to be complete. Dr. Michaels’ letter dated May 15, 2020 to the executive director of AEA,illustrates the problem with relying on only one form of expertise. He identifies the “four core principles” (in italics type below) for safe and healthy theater productions.

1. The epidemic must be under control. Under this heading the epidemiology of the risk of transmission of the virus in the workplace is associated with the risk seen in the local community. And this discussion is limited because at this time, Dr. Michaels did not know if the new vaccines would prevent transmission or if re-infection could occur.
2. Individuals who may be infectious must be readily identified and isolated. In this section, Dr. Michaels provides plans for testing and quarantining of infected individuals.
3. The venues and productions must be modified to minimize exposure. Included here are changes in protocols for auditions, rehearsals, and activities throughout production to reduce risk of transmission. And at this point the method for keeping shows open is revealed:

… it will be important to engage additional members who can step in to replace cast members or stage managers at very short notice.

Dr. Michaels is referring to the system of hiring understudies and swing performers who can cover several different roles if there is an illness and having substitute stage managers on call. This could mean a show would close only when there are so many positive cases that there aren’t enough of these versatile people to take all the vacated jobs.
This section continues with recommendations for reconfiguring various backstage areas such as hair, make-up, and dressing rooms to allow for distancing and planning routes of travel and setting up isolation areas for employees with symptoms. The section ends with a single sentence paragraph and the only mention of ventilation:

Theater owners should also examine the ventilation systems and air flow to ensure that adequate flow of fresh air is present in all parts of the theater.

This leaves the examination or assessment of the ventilation system and its efficacy to the owners and makes no reference to any standards or requirements.

4. Efforts to control COVID-19 exposure must be collaborative. This is a call for all unions, producers, and parties involved to work together. Michaels says, “an infection control plan will not succeed if it is imposed by fiat.”

While that is a charming thought, it is clear that without an enforcement mechanisms such as assigning someone the power to pause production, the program is only words.

The AEA’s Memorandum of Understanding with the Producers is severely lacking with regard to ventilation. It says:

B. HVAC Inspection Requirement. The Employer shall conduct a ventilation inspection to verify adequate ventilation in rehearsal and performance spaces. If the inspection finds inadequate ventilation in closed spaces (for example, dressing rooms), the Employer agrees to add appropriate HEPA filtration units. The Employer shall review Equity’s ventilation guidance. (https://www.actorsequity.org/resources/Producers/covid19-info/ventilation-guidance/) and provide that ventilation guidance to any ventilation professionals engaged to service the Employer’s system.

In other words, the employer is responsible for the ventilation inspection and will decide if it is adequate or not. The statement the “employer shall review Equity’s ventilation guidance” carries no other directive. Let’s take a look at their guidance!

Actors’ Equity’s Guidance on Ventilation

I will not repeat all of the vague language in Actors’ Equity Covid-19 ventilation guidance. Since it is written in a question/answer format, the second to the last guideline says it all.

What happens if the ventilation professional as identified in the ventilation guidance says the theatrical venues, rehearsal studios and/or employer-provided shared housing units cannot meet Equity’s guidelines without significant investment that it cannot afford?

The ventilation guidelines allow a producer/theater’s ventilation professional to advise on mitigation strategies to make the system safer within the producer/theater’s budget. For those producers/theaters fortunate enough to be able to plan for capital improvement, the ventilation professional as identified in the ventilation guidance will be able to help with planning and budgeting for improvements. However, there may be locations that will never be able to satisfy every aspect of the guidance. This does not preclude those producers/theaters from continuing to produce as Equity houses. Working with a ventilation professional as identified in the ventilation guidance will ensure that the entire work force is as safe as possible within the theatre’s budget.

“As safe as possible within the theatre’s budget” is not a rational compromise for a union to make with respect to worker safety, in my opinion. And it also eliminates the need for employers to strive with unions to find ways to provide the necessary air changes.

I also observed that there was no written protocol for purchase of air purifiers to make up for inadequate HVAC systems. It seems the task of buying air purifiers was not clearly assigned to someone trained to distinguish between legitimate air purifiers and the many ineffective and outright bogus models on the market. Some of these purchasers chose negative ion and bipolar ionizers that are ineffective and/or emit toxic ozone. Others chose nice quiet units that produced so little HEPA-filtered air that they were ineffective. And some purchased good purifiers that worked well. But as long as this job was not assigned to someone knowledgeable or to someone who had access to expert help, there was no consistency from theater to theater.

AEA Testing

This provision in general, “Required daily Covid-19 testing for any unvaccinated adult or child” which would mean that there would be a lot of reasons for these performers to get vaccinated like the rest of the cast.

The test frequency for other workers depended on both the “Risk Level” which was determined by using the website COVIDACTNOW and the intimacy of personal contact in various jobs such as actors, stage managers, makeup crew, etc.

Did the Plan Work?

With all the testing, some ventilation, and other precautions, the Broadway shows still frequently ran out of understudies and swing performers and were forced to close until performers tested negative. These closures decreased as the infection rates went down. Closings have almost ceased at this time, but if a new wave comes, they will begin closing again. And if infectivity in the area rises sufficiently, the theaters again will close.

But actually, that’s how the plan was designed to work. They were never designed to institute workplace conditions
and practices that would prevent almost all infections. Instead, the objective is to keep the infection rate low enough so that understudies and swings can cover those performers who test positive. And as for the IATSE workers and Local 802 musicians, those backstage workers are usually even easier to replace.

This strategy does not make me comfortable since elderly or high-risk workers really should not be working in these theaters. The plan also doesn’t consider the collateral damage such as the family members of those workers who will test positive because the worker brought the virus home. I also understood and sympathized with the performers and craft workers who were so desperate to get back to work that this compromise was acceptable to them. However, I don’t think most really understood that their COVID-19 plan was really a profitable business model relying on their accepting a significant risk rather than motivated purely by worker protection.

**OSHA**

Unfortunately, like the AEA plan, OSHA too, provided inadequate protection during the pandemic. OSHA’s role is summarized best by OSHA itself in their January 26, 2022 Congressional Research Service report:

> On June 21, 2021, the Occupational Safety and Health Administration (OSHA) promulgated an Emergency Temporary Standard (ETS) for the prevention of the transmission of SARS-CoV-2, the virus that causes COVID-19 in healthcare employment settings. On December 27, 2021, OSHA announced that it was withdrawing all provisions of this ETS, with the exception of certain COVID-19 reporting requirements.

On November 5, 2021, OSHA promulgated a separate ETS that requires employers with 100 or more employees to require that all employees either be fully vaccinated against COVID-19 by January 4, 2022, or test negative for COVID-19 weekly in order to work onsite. After earlier actions by the U.S. Courts of Appeals for the Fifth and Sixth Circuits, on January 13, 2022, the U.S. Supreme Court granted a stay of the OSHA COVID-19 vaccination and testing ETS pending additional judicial review by the U.S. Court of Appeals for the Sixth Circuit. On January 25, 2022, OSHA announced that it was withdrawing all provisions of this ETS. The ETS will continue to serve as a proposed permanent standard subject to normal rulemaking.

If you can follow this convoluted history, it seems there was no OSHA standard for COVID-19 that would have applied to theater productions until November 5, 2021, and it would only apply to productions with more than 100 employees (not to small productions). Worse, it was in effect for less than three months. Once it was withdrawn, this left workers with nothing but the General Duty Clause for protection.

The General Duty Clause, Section 5(a)(1) of the Occupational Safety and Health (OSH) Act of 1970, 29 USC 654(a)(1), requires employers to furnish to each worker “employment and a place of employment, which are free from recognized hazards that are causing or are likely to cause death or serious physical harm.” This well-known law’s wording sounds reassuring, but it is rare to see an enforcement of this clause. During this pandemic, OSHA has clearly not been there for general industry workers, including actors, and construction workers, including set builders and riggers. I think it is a mistake to follow OSHA models and protocols except where required by law.

**OSHA Ventilation Recommendations**

Like the AEA plan, OSHA’s COVID recommendations are particularly weak in the area of ventilation. The agency has provided unenforceable “guidance” on COVID-19 safety. It is worth looking at their recommendations in the document called Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID-19 in the Workplace Section 7. Maintain Ventilation Systems, says in part:

> …Key measures include ensuring heating, ventilation, and air conditioning (HVAC) systems are operating in accordance with the manufacturer’s instructions and design specifications, conducting all regularly scheduled inspections and maintenance procedures, maximizing the amount of outside air supplied, installing air filters with a Minimum Efficiency Reporting Value (MERV) 13 or higher where feasible, maximizing natural ventilation in buildings without HVAC systems by opening windows or doors, when conditions allow (if that does not pose a safety risk), and considering the use of portable air cleaners with High Efficiency Particulate Air (HEPA) filters in spaces with high occupancy or limited ventilation.

Underlined above is the wording that makes this useless to unions in safety negotiations. Operating the ventilation system according to design specifications is not sufficient now without significant upgrades as ASHRAE declared in April of 2020. And the word “maximize” is not negotiable quantity. “Where feasible” and “consider the use” are not words that will help workers at all. If the employer says that better ventilation is not feasible and they considered use of air purifiers and rejected the idea, the worker has no recourse.

**Lessons Learned**

My opinions on what this all has meant are limited to my experience with these two industries.

1. **OSHA.** This agency has not been much help to us. This is not the fault of David Michaels or any current or former OSHA employee, it is due to the legal constraints and
budgetary restrictions this agency struggles under. If a virulent new variant of SARS-CoV-2 arrives or some other disaster befalls us, OSHA has provided clear evidence that they are not an agency to which we can look for protection. Instead, unions must organize, hire experts, and set up their own plan and negotiate with employers.

2. **The CDC.** Except for testing, treatment, and vaccination advice, the CDC did not provide good or timely recommendations for worker protections such as masks and ventilation. They didn’t even provide timely and correct information on how this virus is transmitted from person to person. It may be that we should not have expected a public health organization primarily staffed by doctors and medical experts to provide advice in areas like ventilation, industrial hygiene, and particle physics. Perhaps the lesson here is that experts need to limit their recommendations to only those areas within their respective disciplines.

3. **The need for experts.** Union workers do to not have the technical expertise within their ranks to develop a technically sound plan or to enforce it after it is instituted. Unions must assemble consultants in all disciplines needed to make the workplace safe and work with them to develop a proper plan. And those consultants must remain available to provide advice as questions arise in the workplaces.

4. **The Safe Way Forward.** The plan from the film industry in which the major unions, in concert, develop the protocols to use as the basis for negotiating their contracts, gave them much more control over their working conditions. Both the unions’ and the employers’ objectives were zero transmission since one COVID-positive lead performer can result in a highly expensive pause in production. It was to everyone’s advantage to do it right. As a result, much was learned about ventilation and worker protection.

5. **Enforcement.** The unions or workers’ representatives also must have a mechanism to enforce the safety plan quickly and firmly. When employers are misguided or following bad advice such as from building managers or sellers of bogus ventilation equipment, unions must be able to promptly stop production and bring in their own experts to correct the problem. Using the power to pause the production might not work for other industries, but without some kind of prompt enforcement mechanism, there is no real plan.

6. **Broadway COVID-19 plans.** The Broadway model in which a trade association for employers, owners, and operators develops the plan in private which is subsequently the basis for negotiated agreements with unions provides a plan that is a profitable business model. In this model, transmission of the virus is reduced to the point that understudies and swing performers can keep shows open. The workers trade the risk to themselves and to their families for the opportunity to perform. There was no enforcement mechanism or access to expert advice for workers in these plans. And it is unknown what effect the packed audiences contribute to community infection rates.

7. **Whose standards to follow.** The Broadway plan requires the industry to close if community infectivity levels rise to high levels. The film industry’s zero transmission plan has no such provision, and it kept the industry open during some of the worst days of the pandemic. The reason is clear. If an industry wants to remain open, it needs to adopt the standards of the hospitals or other institutions that also must remain open. Choosing to use N95 respirators when possible and setting ventilation rates at a minimum of six air changes per hour are two examples of adopting such standards. Today, we all know exactly how to reduce infection rates closer to zero, but we are unwilling to be inconvenienced. The CDC and the U.S. public have adopted the “economy first” plan at the cost of between 400 and 500 COVID-19 deaths per day.

8. **Ventilation in new theaters.** As a building planning consultant, I now recommend that theaters and all public buildings design HVAC systems with the capacity to operate at infection control rates, have purge cycles on demand, and be capable of running with high grade filters. It is not prohibitively expensive to include these features in a new system. It is much more costly to renovate an older system. To save energy, the HVAC systems could run in the ordinary mode most of the time but should be easily converted to run at high rates when needed. There are more and more situations today that call for such rates such as forest fires, toxic spills, smog, and more. New theaters, schools, and public buildings, or older buildings that renovate their HVAC systems should be given subsidies if they can provide refuge in pandemics and disasters.

**Acknowledgements**

I am an industrial hygienist with 40 years’ experience in consulting and building planning for the art and entertainment industries. Currently, I am a consultant to various unions in film and live performance and am also a Safety Officer and member of a New York local. The opinions expressed here are mine alone and are not the opinions or policies of any of my employers or clients.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) received no financial support for the research, authorship, and/or publication of this article.
Notes

1. There was a plan issued about a month earlier than the Safe Way Forward, but it was for an individual studio complex in which cast and crew can live and work. These are the Tyler Perry studios in Atlanta Ga. In a letter on page 2 of the plan titled “Camp Quarantine,” Tyler Perry explains:

   It took a village of staff, medical doctors, epidemiologists, lawyers, union reps, talent and their reps, crew members, insurers, and a lot of other great thinkers to come up with this plan. I have personally been in touch with union reps, and they have let me know that there is a collective union and guild guideline plan that is coming soon. My team and I will gladly be sure to implement these updates into our existing plan when available.

The plan he is awaiting is the Safe Way Forward.

2. There is an industry standard for theatrical fog, smoke and other atmospheric effect use that limits workers’ exposure to these chemical particles which usually must be verified by particle monitoring (ANSI E1.5 and E1.23 for theater and Bulletin 10-CSATF for film). There also were concerns that the respiratory irritation experienced by some people who inhale these effects may be a compounding factor in transmission of this virus.

3. I noted that only some workers in the crafts such as scenic artists and carpenters were actually in an employer’s OSHA Respiratory Protection Program and receiving formal fit testing. The OSHA Voluntary respiratory protection program was considered an alternative procedure for the full program in some cases making it a faster and cheaper set-up.

4. After more than a year of compliance, the unions loosened their ventilation, masking and other restrictions in accordance with CDC and various state and local guidelines. Some productions now have transmission issues similar to those in other industries.

References

1. DGA, SAG-AFTRA, IATSE, and Teamsters’ Committees for COVID-19 Safety Guidelines. The safe way forward. Report. 2020. Accessed September 10, 2022. https://www.sagaftra.org/files/sa_documents/ProductionSafetyGuidelines_June2020EditedP.pdf.
2. Andrejko KL, Pry JM, Myers JF, et al. Effectiveness of face mask or respirator use in indoor public settings for prevention of SARS-CoV-2 infection - California, February-December 2021. MMWR Morb Mortal Wkly Rep 2022; 71(6): 212–216.
3. Centers for Disease Control and Prevention. Scientific brief: SARS-CoV-2 transmission. 2021. Accessed September 10, 2022. https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html.
4. United States Department of Labor. U.S. Department of Labor’s OSHA issues guidance to help construction workers during the coronavirus pandemic. 2020. Accessed September 10, 2022. https://www.osha.gov/news/newsreleases/national/05262020.
5. United States Department of Labor. U.S. Department of Labor issues alert to keep stockroom and loading dock workers safe during coronavirus pandemic. 2020. Accessed September 10, 2022. https://www.osha.gov/news/newsreleases/national/06022020.
6. ASHRAE. Position document on infectious aerosols. Report. 2020. Accessed September 10, 2022. https://www.ashrae.org/file%20library/about/position%20documents/pd_infectious_aerosols_2020.pdf.
7. Nelson A. Let’s clear the air on COVID. The White House, Briefing Room. 2022. Accessed September 10, 2022. https://www.whitehouse.gov/ostp/news-updates/2022/03/23/lets-clear-the-air-on-covid/.
8. Reuters. Italian study shows ventilation can cut school COVID cases by 82%. 2022. Accessed September 10, 2022. https://www.reuters.com/world/europe/italian-study-shows-ventilation-can-cut-school-covid-cases-by-82-2022-03-22/.
9. Bond P. Ronal Reagan movie pauses production after coronavirus outbreak, Newsweek. 2020. Accessed September 10, 2022. https://www.newsweek.com/ronald-reagan-movie pauses-production after-coronavirus-outbreak-1541458.
10. Michaels D. Four core principle to support safe and healthy theatre productions. Letter. 2020. Accessed September 10, 2022. https://www.actorsequity.org/resources/Producers/covid19-info/ensuring-the-safety-and-health-of-equity-members.pdf.
11. Actors’ Equity. Memorandum of understanding between actors’ equity association and employer regarding Covid-19 pandemic reopening process. 2022. Accessed September 10, 2022. https://www.actorsequity.org/resources/Producers/covid19 info/memorandum-of-understanding/.
12. Actors’ Equity. Ventilation guidance. 2021. Accessed September 10, 2022. https://www.actorsequity.org/resources/Producers/covid19 info/ventilation-guidance/.
13. Covid Act Now. U.S. covid tracker. 2022. Accessed September 10, 2022. https://covidactnow.org.
14. Congressional Research Service. Occupational Safety and Health Administration (OSHA): COVID-19 Emergency Temporary Standards (ETS) on health care employment and vaccinations and testing for large employers. Report. 2022. Accessed September 10, 2022. https://sgp.fas.org/crs/misc/R46288.pdf.
15. United States Department of Labor. Protecting workers: guidance on mitigating and preventing the spread of COVID-19 in the workplace. Occupational Safety and Health Administration. 2021, accessed September 10, 2022. https://www.osha.gov/coronavirus/safework.

Author’s Biography

Monona Rossol, MS, MFA, Industrial Hygienist is President/founder of Arts, Crafts and Theater Safety, Inc., a not-for-profit corporation dedicated to providing health and safety services to the arts. She is also a Safety Consultant for SAG–AFTRA as well as a Safety Officer for USA829 of the United Scenic Artists, International Alliance of Theatrical Stage Employees (IATSE). She has lectured and consulted in the US, Canada, Australia, England, Mexico and Portugal.
Appendix 1: Drawings Of Exterior Ventilation System For Trailers

**Trailer Ventilation**

A/C Units and HEPA filtration to create external HVAC system

Environmental Health & Engineering, Inc.
Leo Ryan, Industrial Hygienist, Market Executive