Use of technical equipment in a potentially contaminated environment

Respiratory and hand transmission of pathogens.

Risk Assessment.

Scope.

The scope of this risk assessment is the safety of technical staff, artists and delegates in the event production environment, including, but not limited to, theatres, concert halls, outdoor stages, conference venues, and TV or Film production environments.

This risk assessment will not study warehousing and transport of items outside of the venue in question, people's behaviour outside of this space, or the safety of public or customers not involved in the production of the event or programme.

Other areas and items not covered by this risk assessment must be dealt with separately in accordance with good practice and law.

Principal dangers.

The reason for this study is the existence of the 2020 SARS-COV-2 (COVID-19) pandemic and the need to continue to operate safely within this environment. While the study seeks to deal with this issue it also covers other transmissible respiratory pathogens of similar nature like common colds, flu and personally transmittable diseases of a minor nature.

https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations

The main source of viral infection in this case is exhaled air and droplets containing pathogens. Studies (1) have shown that the SARS COV-2 virus like many others can be spread within the immediate vicinity of people who are breathing and conversing. Shouting and singing has been shown to elevate this spread significantly. This spread is usually a person to person airborne transmission where contaminated air is inhaled or deposited upon the person being infected.

The secondary source of infection has been shown to be exhaled, or excreted, material being deposited upon surfaces and later brought to the respiratory passages (mouth, nose, and eyes) by touching the contaminated items and later touching the respiratory passages. SARS Cov-2 has been shown to be persistent upon surfaces for up to one week.

Hidden dangers: The SARS Cov-2 virus has been shown occasionally to be transmittable by asymptomatic carriers, no signs of infection are present in these people, and no elevated temperature is exhibited. Screening for temperature or interviewing people for signs of symptoms is

highly ineffective to the point of being useless in these cases. As a consequence it may be required to assume everyone is infected for safety reasons,

https://www.ecdc.europa.eu/en/covid-19/latest-evidence/transmission

Severity of the risk.

It is currently not possible to give a case crude fatality rate as detection methods are currently woefully inadequate, but assumptions vary from 0.5% to 15% in which case this is an extremely deadly situation we are dealing with until the numbers begin to fall as the virus becomes endemic and populations more resistant to it. We are definitely talking about workplace risks of a similar nature to Asbestos exposure or severely carcinogenic chemicals handling. Make no mistake, although this is an invisible pathogen it is currently at a highly dangerous stage.

https://ec.europa.eu/knowledge4policy/sites/know4pol/files/jrc120420_covid_risk_and_age.pdf

Dangers within our industry.

As the pathogens are expelled from infected individuals anyone, or anything within the specified area is at elevated risk of contamination. It is commonly accepted that up to 2m is a reasonable distance that we can assume expelled material will be likely to travel in a draught free environment.

https://www.cebm.net/covid-19/what-is-the-evidence-to-support-the-2-metre-social-distancing-rule-to-reduce-covid-19-transmission/

Any persons or equipment in that zone should be assumed to have been contaminated if the potential infected person is not waring a form of face covering. Face coverings, however must not be assumed to be entirely effective and unless they are a N or FP rated device they should be assumed to be ineffective at a short distance where a person has spent prolonged time (probably under 1m)

Methods of control of primary contamination and logistical issues.

In accordance with guidelines of national governments and international organisations such as the WHO everyone is advised to use methods such as personal distancing and the wearing of basic masks over the respiratory path. There is much debate about the effectiveness of such measures, but it is agreed that they have a net positive effect upon transmission. Where a person is not in a communicative need of being mask free they should wear a face mask. Technical crews should wear masks as a matter of routine while working, and frequently wash their hands thoroughly. Gloves are not necessarily an advantage as it is not known that SARS Cov-2 is absorbed through the skin, thus washing hands regularly is as effective as wearing gloves. Gloves however are excellent items for when a very fast change must be made from potentially contaminated and uncontaminated equipment, a trained wearer of gloves can very quickly and safely change gloves where to wash hands should take more than one minute to be effective.

Where possible performers and equipment should be distanced, although it is accepted that this is normally impractical.

Where communications and media capture equipment is brought within close contact with the potentially contaminated subject (anyone) this equipment MUST be considered to be contaminated. This equipment MUST (in some cases now by law) be decontaminated in an EFFECTIVE manner. Under no circumstances must such equipment be passed to another user. Any staff handling that equipment until it has been made safe MUST treat it as a biohazard.

It should be considered that it is not simply performers or delegates who are potentially infected, the crew equally should be treated as potential transmitters and receivers of the pathogens. In most cases the crew are the people most at risk, and the people most likely to pass the pathogen to others.

With the extended persistence of the virus on surfaces it is crucial that used equipment is treated as contaminated, and great consideration taken in terms of what happens to that equipment after the event. DO NOT send contaminated gear back to stores, warehouses, or rental houses, you may as well be putting a bomb in the case if you do that. If there is no means to treat the equipment on site then equipment that has been used in high risk applications MUST be put in closed containers or cases and those cases labelled as “Biohazard”

https://www.sciencedirect.com/science/article/pii/S0195670120300463

Personal issued equipment, such as communications, cameras, tools, or similar should not be passed between crew members unless decontaminated. Doing so risks passing the pathogens from person to person rapidly, often with little or no traceability of who used what.

Risk Control Assessment.

As the pathogen is everywhere, and anyone could be a carrier it simply is not possible to stop the spread unless the world would fully quarantine, or a magic cure be found. As an industry we cannot succeed where others failed on this matter, we simply cannot control external factors that bring this danger among us. The only way in current circumstances we could currently not infect anyone at all would be to never function as an industry. It is however our duty to reduce as best possible the transmission among us and those we deal with. Within the scope of this risk assessment there are measures that we can take. Along with correct method statements and working practices we can function just as well as any other industry.

Recommendations.

Workers should for their own protection, and the protection of others, use, whenever possible, face protection. Work practices may need to be changed to accommodate this.

Workers and performers must wash their hands or change gloves regularly each time after handling potentially contaminated items and moving elsewhere.

Workers should avoid situations where they work in close quarters with others, and if not possible look at limiting the time they do so. Look at separating equipment and workstations where possible.

Workers should avoid physical contact with performers or their equipment. Performers may have to apply their own microphones or monitoring systems where they once had them applied for them.

Performers may have to be spaced differently, especially those speaking loudly or singing, with consideration to staff and equipment. (Performance issues should be dealt with in a separate risk assessment)

Equipment and areas that have been used by vocal or wind instrument performers should be dealt with very carefully and decontaminated between use or staff operation in that area.

Equipment in the breath area of up to 2m from the performer should be decontaminated before anyone else uses it or handles it. It should be considered single use only. (in the case of floor equipment such as monitors lights or cables, only when it will come into contact with the hands of others or potentially cross contaminate items)

Equipment used by workers to speak into, or which is held closely by workers (such as video cameras, laptops, tablets or communications equipment) should be decontaminated before others handle it or use it.

Delegates and performers MUST be prevented from sharing equipment such as microphones or lecterns before they can be decontaminated. If necessary, use an A-B system where one item is used as the other is cleaned. No matter how important the delegate is, they should not be allowed to bypass this protocol.

Performers and delegates should be informed of all procedures to deal with the SARS Cov-2 and should be obliged to follow local procedures as a condition of the event happening. Pervious protocols and “VIP treatment” should be withdrawn where they contradict measures to work safely in the new contaminated environment.

Careful consideration must be made to what happens to potentially contaminated equipment after the event. Careful asset management procedures should be put in place. No contaminated equipment should ever be sent elsewhere without very careful and clear labelling.

Careful asset management needs to be carried out on-site. There must be a system that can flawlessly keep contaminated and clean equipment apart at all times.

There must be effective methods of decontaminating equipment on-site if equipment is to be re-used or passed from one person to another.

Rigorous decontamination and cleaning must be carried out from dedicated cleaning stations correctly equipped for the purpose.

Adequate hand washing facilities must be present (constantly maintained) and readily available for all staff and performers from all workstations around the site.

Control measures to prevent the exposure of staff and artists to the spread of pathogens through portable production equipment.

Outline *Example* Method Statement. *SARS Cov-2 Pandemic 2020*

While this is a good starting point for small operations, please produce your own location-specific statement for your own use. No responsibility is taken here for errors or omissions or any results of such, this is just an "EXAMPLE" statement. Unverified, and untested.

This document relates to shared "House" "Company" or "Rental" equipment used in the event production environment. It does not apply to an artists own equipment or a persons personal equipment in each case they should be responsible for producing documentation to prove they have adequately reduced all risks related to pathogen transmission in a manner that integrates with their workflow.

In all cases it will be assumed that any equipment that is used within 1m of any person who is without effective respiratory filtering to at least FFP2 (N95) without exhale valve, shall be deemed as a hazard to the health of anyone who further uses it in close proximity. Ad-hoc cloth face covers or cheap masks cannot be deemed to be of use as a line of guaranteed safety for close contact workers in a professional setting.

This equipment must be sterilised before being handles by further unprotected people.

In the case of singers or speakers projecting their voice this should be increased to at least 2m.

In many territories this process is now required under various forms of laws.

Examples of such equipment. *(not exhaustive)*

Microphones

Microphone stands

Microphone cables

Floor monitors

IT equipment such as laptops, keyboards, and mice

Walkie-Talkies

Headset comms

Handheld video cameras

Lapel microphones

Headset microphones

DJ equipment, mixers, CD players, audio interfaces, laptops

Translation devices

Microphone stands and supports

Portable audio recorders

Available methods of treatment.

1. **Surface disinfection** by use of liquid or gel disinfection solutions stated to kill the required pathogens. Applicable to all equipment that will no be harmed by the repeated application of aggressive liquids in either spray, towel, brush or immersion applications. Recommended substances linked to below- note exposure time is very important and long exposures may be ineffective when wiping surfaces.
   Substances that evaporate faster than they are effective for and leave no effective residue, such as alcohol not in glycerine, are NOT RECCOMENDED for surface wiping.
   https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19
2. **UVC** surface decontamination, for use on above equipment also, and any equipment that cannot be exposed to harsh liquid disinfectants without risk of damage.
3. **Time in secure quarantine**, any equipment that is too fragile or sensitive to be treated with either of the above methods.

Equipment being disinfected by method 1

Equipment that is rugged, resistant to light exposure to liquids and has a wipe-clean surface can be decontaminated by the application of a proven liquid surface disinfectant.

Cables can be wiped from end to end by a soaked cloth and allowed to dry in air so the disinfection media is left on the surface. Do not wipe dry as this will remove the media before it has a chance to decontaminate the cables. Cables can be placed, wet, in an open transport case and allowed to dry naturally. DO NOT expose the connector pins to the solution as this can deteriorate performance. DO NOT immerse cables in any liquid.

Operatives should observe careful procedures before cleaning the cables. All used cables from high risk areas should be treated as a biohazard, correct PPE must be worn when handling and hand-was procedures followed. Cables should be unwound, laid on the floor and pulled through the soaked cloth, a bucket or bowl of disinfection solution should be nearby to maintain the level of disinfectant on the cloth. Disinfected cables should be wound and tied and placed into a receptacle that designated they are “clean”. (this may be the cable flight-case)

Microphone stands must be wiped down thoroughly before being removed from the stage or being placed in their case, again allowed to dry naturally. When wiped down they must be placed in a place that signifies that they are “clean”.

Floor monitors that have been in the “fallout zone” in front of a singer or unprotected artist should be thoroughly wiped down with disinfectant before being removed from stage. It is not necessary to disinfect between artist as no artist will be in close facial or hand contact with that monitor. Crew handling the monitor should do so wearing PPE. The monitor MUST be disinfected before removal from stage at the end of the show, or the end of its use. Foam fronts and grille cloth can be treated by spraying with a light spray of liquid disinfectant.

NO equipment that has been in close proximity to potentially infected users must EVER be put in cases or returned to stores without disinfection. All disinfection must be carried out on site. In the event that it cannot be done so, then the case that contains the equipment MUST be labelled as “Biohazard”.

Equipment being decontaminated by method 2.

Equipment should be sterilised in a UVC exposure chamber which provides adequate exposure to meet published guidelines, and is suitable for use in a production environment by existing operators.

For this method we suggest the Newell Acoustic Phoenix MB72 but the process would be similar for any other unit adapted for production environments.

The Phoenix MB 72 is factory programmed for correct exposure times, no item is deemed safe unless the green "DONE" light is illuminated. No operative can lessen the exposure time. Longer times can be achieved by multiple cycles. Factory specified times can be extended upon request. DO NOT overload or over-crowd the unit, all surfaces need to "see" the light either direct or reflected from the walls.

1. Identify the equipment to be processed.
2. Select the correct support system (Mic tray or Utility frame)
3. Ensure you are wearing the correct PPE (Gloves or disinfected hands, and face mask)
4. With clean hands open the door of the MB72 and withdraw the support tray, leave door open
5. Take the tray to the stage and carefully collect the mics on the support tray. Recover any lapel or headset mics and place on the support tray. (No need to protect the support tray from contamination, it will be in the UVC chamber while exposure is active.
6. When the support tray is full return it to the MB72 directly inside, do not leave it anywhere else in the meantime.
7. Now remove gloves or wash hands, do not touch anything else before this, do not close the door or activate the machine as you will contaminate the exterior of the machine.
8. With clean hands, close the door of the MB72 and press the START button.
9. When the cycle is complete, with clean hands or clean gloves remove the items and place them in a clean container (Bag, case, or flightcase)
10. Periodically wipe the exterior of the MB72 with a mild disinfection solution.

Personally used equipment.

For items such as headsets, walkie-talkies, translation devices, laser pointers, video cameras, or other things used upon the person it is essential that THE USER should return the equipment to the MB72 station themselves. Items MUST NOT be left for others to collect as this risks cross-contamination. There should be a clearly designated reception area next to the MB72 and the MB72 operative where users can deposit contaminated equipment. Ideally some form of easy clean surface like a table or stage riser. The operative wearing correct PPE should then pass all items through the MB72 and deliver them to a "clean" area in bags, cases, or boxes to ensure they units are not cross contaminated before being issued to users.

Large items that fit the MB72 (Such as DJ mixers or CD/DVD/SD players) should be brought to the machine and inserted as though it were the support tray, all other processes remaining equal.

Tiny items such as lapel mics without clips may be placed in small self-seal plastic bags and hung upon the support structure for exposure.

Items requiring method 3

There may be items that cannot fit the MB72 (UVC can very slowly, over long periods of exposure, degrade some cheaper plastics) (Maybe someone is worried about a very precious fragile microphone) or be soaked in disinfectant, in these cases the only option is to quarantine the items for up to 5 days (maybe 3 if left outdoors). In every case the item must be placed in a sealed marked (biohazard inside) container or sealed bag and left in a place where absolutely nobody can tamper with the item. The container must be marked with the date it was sealed and the date which it will be safe to open. Times required for pathogens is published here https://www.sciencedirect.com/science/article/pii/S0195670120300463

Great care must be taken in recovering the item from use, transporting the item to the place of quarantine, and storage in quarantine. Handling before sealing must be done in a similar way to methods 1 and 2.

Cleaning with bleach.

WHO advise.

Bleach is a strong and effective disinfectant – its active ingredient sodium hypochlorite is effective in killing bacteria, fungi and viruses, including influenza virus – but it is easily inactivated by organic material. Diluted household bleach disinfects within 10–60 minutes contact time (see Table G.1 below for concentrations and contact times), is widely available at a low cost, and is recommended for surface disinfection in health-care facilities. However, bleach irritates mucous membranes, the skin and the airways; decomposes under heat and light; and reacts easily with other chemicals. Therefore, bleach should be used with caution; ventilation should be adequate and consistent with relevant occupational health and safety guidance. Improper use of bleach, including deviation from recommended dilutions (either stronger or weaker), may reduce its effectiveness for disinfection and can injure health-care workers.

Table G.1

Sodium hypochlorite: concentration and use.

Procedures for preparing and using diluted bleach

To prepare and use diluted bleach:

- use a mask, rubber gloves and waterproof apron; goggles also are recommended to protect the eyes from splashes;
- mix and use bleach solutions in well-ventilated areas;
- mix bleach with cold water (hot water decomposes the sodium hypochlorite and renders it ineffective);
- if using bleach containing 5% sodium hypochlorite, dilute it to 0.05%, as shown in Table G.1 below.

Precautions for the use of bleach

- Bleach can corrode metals and damage painted surfaces.
- Avoid touching the eyes. If bleach gets into the eyes, immediately rinse with water for at least 15 minutes, and consult a physician.
- Do not use bleach together with other household detergents, because this reduces its effectiveness and can cause dangerous chemical reactions. For example, a toxic gas is produced when bleach is mixed with acidic detergents, such as those used for toilet cleaning, and this gas can cause death or injury. If necessary, use detergents first, and rinse thoroughly with water before using bleach for disinfection.
- Undiluted bleach emits a toxic gas when exposed to sunlight; thus, store bleach in a cool, shaded place, out of the reach of children.
- Sodium hypochlorite decomposes with time. To ensure its effectiveness, purchase recently produced bleach, and avoid over-stocking.
- If using diluted bleach, prepare the diluted solution fresh daily. Label and date it, and discard unused mixtures 24 hours after preparation.
- Organic materials inactivate bleach; clean surfaces so that they are clear of organic materials before disinfection with bleach.
- Keep diluted bleach covered and protected from sunlight, and if possible in a dark container, and out of the reach of children.