



Occupational
Hygiene Association
of Ontario
FORUM



President's Message

This is my last address as President of OHAO. Hard to believe it has only been one year since the last in-person Symposium and membership meeting took place and I moved from President Elect to President. In looking back, I am proud of the actions and resilience shown by our members in their work to protect the health of others during this crisis. I am also grateful for the response of the board and its committees to ensure you were supported in the transition to the new reality of life and work in a pandemic. I hope you felt part of a community of practitioners when virtually attending OHAO events and therefore some degree of normality.

Behind the scenes, the Board this past year re-organized somewhat to consolidate our efforts. This resulted in new Communications portfolio that consolidates the newsletter and new social media efforts. Hopefully, you are all following OHAO on LinkedIn. We also merged the Program Committee and Professional Development Course into the Education Committee to ensure sharing of new ideas and streamline meetings for committee volunteers. As a board, we have strategic goals in mind, and this year it was difficult to meet all intended targets, including explicit statements and actions on diversity. However, we met our commitment to have stakeholder meetings at the Board level with relevant organizations that impact on

our activities and profession, which helps to ensure we are front of mind when others make decisions that affect all of us.

Despite pressures to stay cocooned, OHAO pivoted quickly to hold Board meetings online and extra virtual events (free for members) and will continue to support distance education in the short term at least. In fact, this has made our normal gatherings more accessible to those who are far outside of the GTHA. The Regional Meetings Committee of OHAO had a quiet year and will need to re-assess how technology will be used in future to support education and informal gatherings of our members in Eastern Ontario, South Western Ontario, and the North.

One fear that was not realized during the pandemic was the financial pressures that could have pushed OHAO into the red. We did hear some concerns from members who were concerned due to economic problems arising from the shutdowns. Fortunately, membership and attendance at our paid events was sustainable and not a big hit to our bottom line. Details will be shared with members at the Annual General Meeting.

As we look to the future, the Board will move forward on initiatives to use technology more to our advantage, and perhaps even share experiences and content

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outside of the provincial borders with our fellow Canadian hygienists. And if the vaccine roll-out eventually allows for in-person activities, perhaps hybrid activities will be incorporated into our interactions with members. And let's hope that a third wave doesn't hit Ontario due to variants, like it seems to be enveloping European nations and possibly others around the globe.

Despite the stress of the last year, I am hopeful for a brighter future, including how your Association continues with its goals to advance the profession beyond the restrictions of the pandemic.

Paul Bozek, ROH, CIH

An Ode to the Mask

Wagish Yajaman, MHSc, CIH, CRSP

Masks, masks everywhere, yet some have decided, not to wear

Why I wonder, ponder and despair.

The law says you shall, and you must
For a few I think, this brings some disgust.

It's not for you, my friend
As much as it is for him, her or them.

Wear the three-ply,
Wear it correctly over mouth and nose, to comply.

Hurray, the vaccine is here and in multiples too
Beware, be cautious and don't throw away that mask, you!

Masks Keep me safe, Keep you safe from SARS-CoV-2
So we have a good night, and a tomorrow too.

Register Today for the OHAO Spring PDC, Symposium and AGM 2021

The OHAO 2021 Spring PDC will take place on Wednesday, March 24, 2021 and the 2021 Spring Symposium and Annual General Meeting will take place on Thursday, March 25, 2021. All sessions will take place virtually. To register today visit: <http://bit.ly/OHAOSpring2021>

Editor's Message

Greetings fellow OHAO members,

I am writing this "winter" column with a hopeful look towards the spring and summer. Not only because of the nicer upcoming seasons, but also for the freedom that we will hopefully experience with the distribution of the COVID-19 vaccines. I don't think anyone is particularly happy about the administration of said vaccines, but we are all waiting excitedly, yet patiently, for our turn to finally feel some semblance of safety. See what I did there?

Safety. It seems to have become an expectation and a right, that we would be safe at work. We have legislation, standards, guidelines, etc. to keep us safe. But not only has that been challenged this past year, so has our sense of safety everywhere. I grew up for (almost) the first decade of my life in a country under war. Even the rations, the curfew, and the blackouts of wartime seem to have been easier than the COVID-era we are living in right now. Instead of bombs, a virus is killing people, but the restrictions are not much easier to deal with.

Many of us have coped, as humans do. Yet others have also suffered mental anguish, in various forms, during this time. From school-aged kids to the elderly, everyone has had their trials this past year. Maintaining a professional career while homeschooling children in a virtual setting, should now be classified as a superpower.

With the distribution of the COVID-19 vaccines, I am cautiously optimistic about the future and how our current lives will change for the better. I hope you all have a safe and healthy season ahead. Lastly, as our home is a Persian/Irish one, I wish you all a happy St. Patrick's Day (March 17th) and a happy Persian New Year (March 20th)!

Negin Ghanavatian, MHSc., CRSP

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Mission Statement

To advance the profession of occupational hygiene and to serve the interests of our members by:

- sponsoring professional development and training;
- promoting public and legal recognition;
- developing partnerships with stakeholders;
- providing public education;
- fostering communication and networking.

rev. May 2010

New Advances and Best Practices in Noise Dosimetry

Rob Stevens, MASC, PEng, HGC Engineering

Noise dosimetry is one of the most important methods in assessing workplace noise exposure. “Dosimetry” involves attaching a small sound level monitor with data logging capability on a worker, during a full work shift. Ideally, the sound data collected represents the noise exposure of that worker.

Unfortunately, the logged results frequently overstate workers’ noise exposures. Dosimetry is prone to capturing irrelevant “pseudo-noises”, such as bumps against the microphone, rustling of clothing, or the worker’s own voice, which the dosimeter alone cannot differentiate from legitimate health impacting workplace noise. Including these “pseudo-noises” as part of the final results can misleadingly inflate the data numbers and suggest that the workplace is louder than it actually is, and lead to unwarranted costs in pursuing noise control efforts for what is actually a non-existent workplace health concern.

Recent advances in digital signal processing technology have led to the introduction of new dosimetry methods, which increase accuracy and actually enable us to identify the key sources of excessive noise in the workplace. In some jurisdictions, the governing Standards now recommend using these new methods, to better assess noise exposure.

The Role of Dosimetry in Workplace Noise Management

Broadly speaking, managing noise effectively in the workplace involves:

1. Determining the noise exposure levels of the workers and the sound levels throughout the workplace
2. Understanding where the noise exceeds the limits and then implementing engineered noise controls if practicable
3. Recommending the most appropriate hearing protection devices and enforcing their use for areas where the sound levels cannot feasibly be reduced

A shorthand way to think of these three components is: workplace noise assessment, workplace noise control, and

hearing conservation.

Traditionally, dosimetry has only been part of the first step in noise management – workplace noise assessment. If the dosimetry indicates excessive noise exposures, considerable additional work is usually needed toward workplace noise control – including: identifying the specific equipment, operations and activities contributing to elevated noise levels; and investigating developing solutions for engineered noise control measures.

“High Definition Dosimetry” – A Better Approach and Better Technology

The key benefit of dosimetry is that it can be pre-programmed to run automatically without any intervention, while a worker goes about his day while wearing the device. In this way, a dosimeter can gather many hours of continuous sound data, without the ongoing presence or participation of a technician or acoustical consultant. So, the risk of missing occasional or intermittent noisy events or other variations in sound level over time is reduced.

The automated nature of dosimetry is also its weakness. The dosimeter has no real built-in “smarts” and so, unlike an acoustical expert, cannot use its own field experience and judgement to recognize anomalous noises and exclude them to avoid “false,” inflated readings. Moreover, traditional dosimeters utilize primarily analog electronics, which cannot process or store detailed acoustical information. So, they offer little information about the characteristics of the noise, which could be useful to identify the dominant sources of the noise.

We began several years ago to research better ways to do dosimetry measurements. We adopted an approach we have dubbed High Definition (“HD”) Dosimetry.

For a decade or more, there have been digital sound level meters, much larger than a dosimeter, which can digitally record the actual audio in a workplace noise survey at the same time that it captures the sound level data. And they

can process acoustic frequency information, measuring in full-octave or 1/3-octave frequency bands

If we chose to use one in the field, we would either have to strap a cumbersome digital sound level meter to a worker, with the microphone on a cable, pinned to the lapel or shoulder. Or, we would use a dosimeter, alongside a digital audio recorder. By recording audio, and configuring the instrument to store the results in fast time steps, typically once per second, we were able to view the graph of sound level versus time (often called a “time-history”) in post-processing, find any peaks in sound level, and then listen to the audio recording to identify the type of sound.

This new approach confirmed exactly what we had long suspected – traditional dosimetry frequently overestimates true noise exposure levels. But, we were surprised by the extent of these overestimates. By clipping any the noise irregularities out of the data, we found that in a considerable number of cases, the unfiltered sound data showed noise exposure levels exceeding the governing limits, while the corrected results were well within the limits. Given this degree of divergent results, the bottom-line consequences to a business not using HD Dosimetry can be significant.

Fortunately, within the last few years, a few instrumentation manufacturers have introduced fully digital dosimeters, which can gather calibrated audio recordings, measure in full-octave or 1/3-octave frequency bands, and log the results with very fine time resolution. The accompanying post-processing software easily allows the user to view the time-history graphs and listen to the synched audio recording at the same time, while the cursor scrolls through the graph. The user can then also highlight and clip-out atypical events, or group together similar acoustical events and calculate cumulative exposure levels from different activities or noise sources.

Workplace noise standards are evolving to encourage the use of these improved method. In Canada, for example, the recently revised CSA Standard Z107.56-18 “Measurement of Noise Exposure” recognizes the limitations of traditional dosimetry and provides corrective recommendations:

4.2.1 – “Concurrent measurement with octave or 1/3-octave bands should be used to assist with hearing protec-

tion selection and noise source identification and control.”

4.2.3 – “Audio recording capability may be used to assist with the identification and removal of spurious events through post analysis if required.”

6.3.1 – “Users should be aware that dosimetry measurements can be elevated by the worker’s own voice, if communication with raised vocal effort is a common occurrence on the job.”

Additional Powerful Benefits of “High Definition Dosimetry”

There are broader benefits than simply excluding extraneous “false,” inflated noises from the data set. In complex workplace environments that have many diverse noise sources – perhaps components of multi-stage manufacturing processes with interlocked operations – it can be a labour intensive task to isolate the sound from each item of equipment or even their sub-components, in order to know which ones contribute most to the noise excesses. Traditional dosimetry offers little to no useful information about what equipment, activities or processes in the workplace are the prime contributors to noise excesses.

Now the real power of HD Dosimetry emerges. In many cases, the audio recording, together with the synchronized time-history graph, can be used to identify and collate sounds of different activities and then calculate the time-weighted sound exposure levels of the various individual activities occurring throughout the worker’s shift.

If the worker is in an area with cycling process stages – such as granulating, mixing, drying, and dispensing – by listening to the recording, we can use the software to highlight and sum together all occurrences of each process stage and thereby determine which has the greatest impact on the overall noise exposures. Or if a worker is performing different tasks throughout the shift – e.g., milling, welding, drilling, grinding, hammering – we can flag each occurrence of those activities and have the software calculate time-weighted sound exposures for each type of activity. With this functionality, it is easier to prioritize the various activities for noise control.

HD Dosimetry yields greater accuracy in assessing workplace noise exposure and provides a wealth of information for later noise control studies, reducing costs and saving

time. In that respect, it is quickly establishing itself as an indispensable next-generation tool for work place health and safety.

Fungal Exposure III: Gaps in Mould Practice and Interpretation

E.A. Sullivan, PhD, CIH, ROH, CChem

This article is the third in a series^{1a,b} regarding guidelines for interpreting fungal air sampling results. About twenty years ago, AIHA commissioned an advisory document for its Board of Directors, to address gaps identified in existing mould guidelines. An update on the preliminary workshop and the Report of Microbial Growth Task Force (TFR) appeared in 1999 and 2001 respectively^{2,3}. Unresolved issues in Evaluation and interdependent Control of fungal exposure as described in the Minority Report (TFR, Appendix 6) are still very relevant, impacting fungal data interpretation and the practice of mould remediation. Knowledge gaps relate to:

- Health effects demonstrably associated with mould exposure, in building occupants and remediation workers
- Controls, hygiene measures and PPE commensurate with health effects of mould
- Risk/health assessment of mould contamination
- Effects of hidden mould
- Role of air sampling
- Interpretation of fungal air sampling data regarding health risks and normal background levels

Current conventional OH wisdom and practice reflect the philosophy of contemporary (New York City, Health Canada, WHO) guidelines: mould considered as a hazardous material and remediated as such; sustained and/or extensive growth on interior building surfaces considered unacceptable – ‘insanitary and must be corrected’⁴...in all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Many practitioners assume that the mere presence of toxigenic mould species is a health hazard warranting extensive remediation

measures, potentially requiring re-cleaning and re-testing. Cautious consultants are unlikely to disagree, if accepting the contention that ‘the point at which mold contamination becomes a threat to health is unknown’.^{1c,4} In this context, an AIHA publication later recommended^{5a} remediation of all visible growth, regardless of area, on the conjectural premise that ‘it is impossible to say with certainty how small an area of visible mold growth is small enough to ignore’ because proximity and duration affect exposure independent of area. Although such action might seem advisable from a consultant’s perspective, necessity from a practical risk perspective is much less certain.^{1c} According to the TFR Minority Report, ill effects associated with hidden mold are overstated, a situation likely to cause remediation practitioners to ‘conduct extensive searches for hidden, perhaps non-existent, mold’.

An approach based on risk assessment would likely assume that health risks due to elevated mould exposure are generally limited to allergic responses; minimization or elimination of allergic symptoms would be the goal of exposure control while remediation procedures would emphasize common building hygiene measures rather than practices applicable to hazardous materials. Clearance testing originated in the asbestos- and lead-abatement industries; despite dissimilarities regarding mould,^{6a} a parallel concept has been suggested in many of the guidance documents for mould remediation. Mould – with allergic reactions as the primary effect – is far less hazardous than asbestos (inherently carcinogenic) or lead, with central/peripheral nervous system and hematologic effects.

The role of fungal air sampling is controversial: useful rather than essential.^{1d,5b,7} The TFR provided no additional guidance on fungal air sampling and data interpretation. The author of the Minority Report considered that the lack of guidance has resulted in ‘unprecedented testing of buildings’. The convenience and availability of instrumentation, as well as professional predilection for the numerical aspect of Evaluation has undoubtedly contributed to the (inordinate?) emphasis on sampling and analysis. Although the restoration industry has historically operated without occupational hygiene input or final quantitative testing for mould,^{1d,6a} its standards of remediation practice seem practical assessments both of risk and of effectiveness. Procedural approaches to remediation, i.e. without air sampling,

are not necessarily inconsistent with occupational hygiene principles and could be considered appropriate in low-risk situations,^{6b} e.g. for

- no unusual health symptoms or health risks;
- small amounts of mould or water release;
- building materials not impacted by, or unresponsive of, mould growth;
- rapid drying after the leak;
- conditions unfavorable to mould growth.

Professional practice regarding fungal remediation and interpretation must be defensible. For interpretation, defensibility would ordinarily rely on adherence to regulations or to consensual mould decision strategies; lacking these, practitioners tend to default to simplistic test-based approaches and reliance upon personal interpretive criteria derived from experience.^{1d,8} ‘Prudence’ is frequently invoked as a blanket default. For example, the statement ‘Without definitive determination of susceptibility, prudent practice dictates the wearing of appropriate PPE whenever known or suspected microbial reservoirs are encountered’ (TFR p.43), seemed ‘much too broad’, according to the Minority Report (TFR, p.63). ‘Due diligence’ might often just mean convenient conformity to the conventional trend.

Knowledge gaps encourage guidelines and, especially, rules. Testing proliferates, perhaps through anticipation of clarity derived from additional data. Consolidation of decision strategies and interpretation criteria is long overdue in our profession.

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Repetitive Driving Injuries

Christine Sidhom MSc (A), CIH, CRSP

Every Friday during the month of February, OHCOW (Occupational Health Clinics for Ontario Workers) has been holding virtual information sessions called RSI days. One of the talks given by OHCOW Ergonomist Dr. Daryl Stephenson February 5, was on Working from your car, which I summarized with his permission.

In the U.K., the term Repetitive Driving Injuries has been used to address the musculoskeletal injuries related to driving and vehicle use. Approximately 1 in 10 people work regularly from their cars (from a recent UK census)¹. These occupations are as varied as forklift operators, truck drivers, ambulance drivers, homecare health workers, couriers, delivery persons, and movers, to name a few.

In Canada, statistics from 2016² indicate that 31% of all car commuters who spent 60 minutes or more commuting to work had no fixed place of work, compared with less than 13% for those who spent less than 60 minutes commuting. People can have no fixed place of work when the type of work they perform requires them to frequently switch their work location. Examples are construction crews, truck drivers, salespersons, independent contractors and temporary agency employees.

Musculoskeletal injuries from driving and working from your car are also as varied ranging from your neck, spine, elbow, lower back, neck to your feet. In part, this is because working from your car is not just driving anymore. In fact, in 2021, working from a vehicle can include performing a variety of functions with other equipment such as a laptop use, handling paperwork, mobile use or manual handling.

Some of the risk factors related to musculoskeletal injuries related to driving as well as prevention strategies are listed below.

Risk Factors for Musculoskeletal Injuries

Whole body vibration:

The resonant frequency of vibration transmitted from road conditions and from the vehicle itself transmitted through

the back and buttocks is often within the body's resonant frequency range, increasing the risk of injury.

To reduce the transmission and the effects of vibration, it is recommended to improve and maintain the vehicle's suspension systems, decrease the travel speed, slightly change back rest positions frequently, and increase the amount of rest breaks for the driver to allow for more recovery time.

There is also an app at crosh.ca for measuring vibration from your cell phone.

Non-neutral postures, awkward postures, and static contractions:

Driving, not to mention undertaking other tasks in a vehicle, can be conducive to holding non-neutral postures for an extended period. In some cases, workers are seated in addition to cramped positions in cramped spaces, or the vehicle lacks adjustability, or there are pressure points created. An example of the latter is pressure on the back of the knee from too large a seat, resulting in poor blood circulation. Some drivers adopt postures while seated in the car such as slouching, leaning forward, twisting, or leaning to one side.

Furthermore, back pain can result from inadequate lumbar support of the driver's seat. Shoulder pain can develop from arms being elevated for a long period and extra movements in manual vehicles. Elbow neuropathy can result from driving with the elbow resting on the windowsill. Foot cramps can result from placing just the toes and not the entire foot on the pedal.

Lifting after driving:

A seated posture is known to create higher loads on the spine than lying down or standing, which is well known in office ergonomics. The addition of vibration creates more forces on the lower back. There have been studies linking daily or yearly kilometres driven and low back pain.³ Adding lifting tasks to the person working from a vehicle. In addition to movers and couriers, there are other occupations where there lifting after driving, such as homecare employees, is an important factor.

Prevention Strategies

Vehicle Selection

The first thing for driving in an ergonomic manner is to select a vehicle suitable for your body size and meeting the other of your job tasks. Adjustability is a key component for the cab design, especially if a lot of time is spent in the vehicle. Specifically, this means:

- adjustable seat incline 100-110 degrees
- adjustable seat bottom height, depth, and incline
- seat cushion with firm dense foam
- adjustable lumbar support vertical and horizontal
- adjustable bilateral arm rests
- adjustable head restraints
- adjustable steering wheel – in, out, up, down, tilt
- seat base has adequate leg length, so thighs are supported.
- back rest reaches and supports shoulders but does not hinder rearward vision.
- seat shock absorbers to dampen frequencies.

Vehicle Use and Adjustment

It is imperative for the worker to learn how to go in and out of the vehicle, to adjust the features so that a neutral body posture is maintained, and to vary body position throughout the day.

To clarify what is considered ideal driving posture, Dr. Stephenson mentions:

- adjust the seat height and distance so that the foot should be fully on the pedal
- the lower back should not be coming off the seat to push the pedal and the upper back should be flat against the seat while hands are on the wheel
- avoid slouching and do not lean forward when driving
- the knees should be in line with the hips, with knees at a 20-30 degree angle
- The seat back tilt is optimal at 100-110°
- The steering wheel should be at least 10-12" away and hands on the 9 and 3 o'clock positions
- It should be adjusted to not hinder viewing dashboard. The air bag should be tilted towards the chest
- The arms should be close to the side of the body and elbows slightly bent

- The ears should be in line with the collarbone, and the eyes at least 3 inches above the wheel
- Adjust the headrest so the back of the head is in the middle of the head rest and within 1 inch from the headrest

Dr Stephenson’s key message: the best posture is the next posture. This means that it is critical to vary driving positions on a regular basis, such as tilting the back seat rest back and forth every 20 to 30 minutes (just as in the office environment), adjusting the steering wheel, and avoiding slouching. Regular 5-minute stretch breaks should be incorporated into the workday as well.

Set-up your “workstation” in your vehicle

The best way to do work in your car depends on what you are doing. The workstation should be like an ergonomically set-up office and accommodate the tasks that will happen in the car, whether they are phone calls, typing, computer mouse use, or filling forms by hand.

- Consider special devices for vehicles help to keep neutral posture, such as a steering wheel laptop tray or laptop wheel desk if working on the driver side, or a lap desk if working from another seat.
- Evaluate which seat is best to use: Driver seat vs Passenger Seat vs Back Seat. Depending on the work being done, there may also be room in the passenger seat of the vehicle. While it usually has more room, it may also have less adjustability to vary posture. In addition, some trucks have an office-like set up in the back seat.
- Use organizers to help contain items if placing them on the seats or install consoles with file handles to have what is needed close at hand. Use non-skid surfaces if working while parked on a slant, such as a hill. Make sure all items are locked in place or stored in the trunk for safety before driving in case of an accident.
- Exploit new and available technology. If your phone or computer has voice to text or voice activated systems, touch screens and external keyboard and mouse, set them up to make good use of them, but do so before you start driving.

Strategies for lifting and manual handling after driving and prolonged sitting

It is best to adopt good postures for lifting. After getting out of the car or vehicle from driving, walk around for a little

before to get the blood flowing and stretch the hips before undertaking any lifting.

Afterwards, adopting lifting and manual handling strategies that maintain a neutral back posture, such as bending at the knees, the golfer’s lift, and vehicle specific strategies such as leaning the knee on the back of the trunk will help prevent injuries.

Organize your trunk for easy access with the use of nets, dividers and containers. Try to park the vehicle as close to the drop off as possible, wheeled equipment can also help reduce carrying forces on the back.

Other considerations

Consider the effects of human factors such as stress, distractions, speeding and mental fatigue on you driving. Some safety features of the car can be breached once the car goes above a certain speed. Not all these other considerations can be eliminated, but some can be greatly reduced by planning of your workstation/office in your car and by knowing they can have an effect.

It is uncertain if the phrase Repetitive Driving Injuries will be formally adopted or used in Canada. However, these injuries can surely be reduced by evaluating the vehicle as an employee’s workstation and applying the some of the preventative measures mentioned above.

Additional resources

Whole Body Vibration Measurement Application <https://crash.ca/>
<https://www.ccohs.ca/oshanswers/ergonomics/driving.html>
http://www.ohcow.on.ca/edit/files/general_handouts/Ergonomics%20and%20Driving.pdf
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