3M Transcript for the following interview: Episode 93 Local exhaust Ventilation - Part 2

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Welcome to the 3M Science of Safety podcast presented by 3M Australia and New Zealand Personal Safety Division. This is a podcast that is curious about the science and systems of all things work, health and safety, that keep workers safe and protect their health. I am Mark Reggers, an occupational hygienist, who likes to ask the questions Why, How, and Please Explain. Whether you are a safety professional, occupational hygienist, or someone with any level of WHS responsibility in the workplace, maybe you are a user of safety equipment or maybe you are a bit of a safety nerd who finds this stuff really interesting, then this is a podcast for you.

(R) Today, we're continuing our conversation with Adrian Sims from Vent-Tech about local exhaust ventilation. Welcome back.

(S) Hi Mark. Glad to be back.

(R) Now, there's a lot in this topic, so we absolutely had to get you to come back. But for those that may not have listened to part one, about local exhaust ventilation, who are you, where are you from and what do you do?

(S) So, I'm Adrian Sims. I run a company called Vent-Tech based in the UK, and we do all things LEV. So, whether it's design, testing, commissioning, servicing, maintenance; everything to do with LEV systems. That's our forte and even we train. We train our competitors and anybody who wants to listen to us talk really.

(R) I'm sure there's lots of people because there's lots of workplaces and hazards where local exhaust ventilation, as far as an engineering control, is a key thing that may be suitable.

(S) Yeah.

(R) We spoke last time about the different elements of an LEV system. So, what do workplaces need to consider when looking at the selection of local exhaust ventilation systems when it comes to the ductwork as far as the shape, the size and do angles matter of the ductwork throughout a plant?

(S) It can make or break a system. So, the ducting has to be suitable for the application. You need to consider the material. What's the substance going through the ducting? If it's acid, if it's going to corrode the ducting, then you may want to look at plastic ducting or stainless steel. If it's high temperatures, you want fibre glass.

(R) Or the variable contaminants that are out there.

(S) Exactly, yeah, it can be abrasive. Stone and grit will wear your ducting down or even metallic dust going through will wear holes in it very quickly. So, you need to get the right ducting for the right process. When we're looking at the shape of the ducting, you can get rectangular ducting. You can get square ducting. We tend to use round ducting. If you use a square duct, you'll get dust deposits in the corners. If you use round ducting, it's more stronger to the negative pressures that the LEV system will pull, therefore it's less likely to bow or collapse. When you're moving the air through the ducting, you're conveying dust, whether it's stone dust, grinding dust, you're going to be moving the air around between 15, 20, maybe even 25 metres a second. That's quite quick. You're not going to walk that fast. So, when you're sucking the air that quickly through the duct, your negative pressure that's generated will increase quite significantly. When you get to a certain size duct, the ducting gets weaker just because of its shape and you run a risk of collapsing the ducting because of the negative pressures. So, you end up having to beef the duct up; put flanges on it, make it out of thicker material to prevent it collapsing. You may even have to start thinking about putting stiffeners inside the ducting to hold it in shape. So, it's important that we get it right. We also have to consider the test engineer. At some point, when you've installed this system, someone's going to have to commission it and test it, so we need some test points on the system.

(R) So, like an opening or a hole? Is that what you mean by test points?

(S) Yeah, normally simply a 10 mm hole to put a pitot tube in, quite small, in the right locations. So, you don't want it near any turbulence. It needs to be away from bends and turbulence. When we're looking at bends, we talk about the speed of the air, 15, 20, 25, when you look at general ventilation systems, the air speed is usually around about three to six metres a second. So, in your office ventilation, you're probably going to have the air travelling around about five metres a second because you want it nice and slow because you don't want to generate noise.

(R) I was going to ask what material, as far as the noise point of view? Can you select ducting that doesn't generate much noise or less to do with the velocity, the vibration of the system?

(S) Yeah, you can. You can get silencers to go into the system to reduce the noise, but you normally have them at the fan. If you put silencers in where the dust is going through, the silencer will block up because it's a perforated pod inside the ducting with acoustic foam. So, over time, the dust will settle on that foam and it will clog it and it will lose its performance. So, we tend to put only the clean air through the silencer. So, in the actual factory environment, where you've got the air rattling through at 20 metres a second, it will be noisy, but that's usually acceptable in the factory environment because they're usually noisy places anyway. It's just part of the background noise. The other thing we need to have in our ducting is access doors so we need to be able to look into the system, make sure there's no blockages, make sure it's okay. Now, I'm not a fan of access doors. I feel there's a risk. When you open up an access door, you're being exposed to the contaminant. So, we're starting to move away from that. We're starting to use technology a bit more and things like borescopes. Can we put a hole in there where we can put a borescope through? That way, the person doing the testing work is kept safe.

(R) I haven't seen this, but I imagine people will leave the door open and they haven't latched it and a bit of vibration, it drops open and nobody realises.

(S) Exactly, you've got a huge leak from the system and that's important. If you get leaks in the system, you're going to lose the airflow at the hood, then you get people exposed to hazardous substances. So, we need to make sure it's leakproof and that we've got safe access to these test points.

(R) Can you have right angles with your …

(S) No.

(R) I would think it would be the case, but hence why I'm asking.

(S) You do see people put it in. It's usually through necessity. The LEV industry is a relatively small industry so we don't have the buying power of the general ventilation industry. General ventilation, when you're moving the air at three metres a second, you could get away with a right angle, and think of it as a country lane, a slow-moving road. You come up to a T-junction. You're going to stop. You're going to look left and right before you pull out. The LEV systems are more of the freeway. They're more of the motorway.

(R) High volume, a lot of things getting moved through there

(S) High speed. Exactly. If you put a T-junction on a freeway, you're going to have a problem. So, we tend to have branches at 45 degrees, a bit like the slip roads, so the air coming in to the main body of the traffic can flow smoothly. When we come to bends, we don't want to put sharp bends into our freeway. We want the nice sweeping bend so that again, the air can go around it without too much turbulence. We're trying to avoid turbulence, so we want to make things as smooth as possible.

(R) So, I hear that systems can sometimes can get pressure losses. How is that addressed, because the whole system is relying on airflow and certain pressures being there. How do you address those situations?

(S) So, pressure; to get air to flow, you need a pressure. So, if you think about what happens when you blow, you create a high pressure in your cheeks and then you open your lips and the air comes out.

What happens when you suck in? Well, your lungs create a lower pressure and you draw the air in, so the LEV system's the same. To get the air to flow into the system to begin with, we need to create a negative pressure, and that's what our fan does. As we go into the system, and we go through the system, the longer that system is, the more pressure we have to overcome. If you look at a surface of any sort of material, you run your fingers over it, you will feel a roughness. Ducting is the same. If you run your fingers inside the ducting, you will feel the roughness of the surface. That roughness causes friction to the air and we have to overcome that with our pressures. Also, when you start putting bends, dampers, junctions, anything you put into that ducted system is going to cause more resistance, resistance for the airflow. The more resistance there is, the more pressure. The faster you move the air, the more resistance there is. If you ride your pushbike and you ride nice and slow, it's not too much effort. If you start riding faster, you get more wind resistance. You need to put more effort in. That effort is our pressure. So, the longer the system, the faster you're moving the air, the more fittings there are in the system, the filters, if the filters start getting blocked, that's all going to add to what we call the pressure. And when we're looking at our system from end to end, we have what's called a pressure drop across the entire system and that's what our fan has to overcome. So, when you're looking at fans and you're selecting fans, the fan is based on the volume of air you need to move, so how much airflow does every single hood need added together? That's going to be your volume and that's plotted on a graph against the pressure it will overcome. If we start talking about fans, the larger the motor on the fan, either kilowatts, generally the higher the pressure it will overcome. With a fan, the width of the fan will give you an idea of how much air volume it will move, so the wider the wheel, the impellor, the more volume it's going to move, and the faster you spin it, the bigger the kilowatt rating on the motor is, is what the pressure is going to overcome. If I relate that into layman's terms; if you've got a pushbike, if you've got big wheels on your pushbike, you're probably going to ride quicker than a pushbike with small wheels and you go out for a bike ride with your kids, you can just coast along quite nicely and your kids pedal like hell to keep up. It's the same principles. But you look at the power involved, the muscles in our legs are generally bigger than the muscles in our kids' legs and the effort we can put in to drive that is more.

(R) You mentioned about fans. There's different types of fans, obviously the volume, the amount and what you're trying to achieve and how big your system is. So, what do people need to know about the fans?

(S) From the outside looking in, it looks like there's a whole world of fans. You've got to be careful what you Google when you Google fans. All sorts come up. So, when we're looking at LEV fans, there are three main sorts of fan. We get the axial fan which is the sort of thing you might get on a spray booth or maybe in the roof of a shed or in the side wall of a shed to just give some general ventilation. These are like propellers, airplane propeller sort of fan. They move large volumes of air but they're not very good with resistance. So, as soon as you put ducting and filters and what have you, they struggle, so they're good if you just want to do a general ventilation; just move some air around, suck some hot air out the building, blow some cool fresh air in. They're great for that. They're used on spray booths because spray booths tend to use large volumes of air. You've got to suck all the air out of the room, typically about 30 tonnes per hour. There is something called a bifurcated fan. It's an odd-looking thing. It's an actual fan, but it's been adapted so the air goes around the motor and the motor sits in a pod in the middle. Not a great fan of them. If the air has got anything nasty in it or it's aggressive, it's going to attack the fan. If it's heat you're trying to protect against, the pod still gets hot. So, they are out there. You will see them. You think, 'What's that?' That's a bifurcated fan. The most common type of fan on the LEV system is the centrifugal fan. Centrifugal which runs on centrifugal forces. What are centrifugal forces? Well, if you get a wet towel, a wet tee-towel and you spin it around, the water will spray out of the towel. That's centrifugal forces. So, the centrifugal fan behaves in the same way. You have a fan casing and inside the fan casing you've got the impellor the fan wheel. That will spin around and it will draw air into the centre of the impellor. That then gets thrown off the impellor and the fan casing directs it in the direction you want it to go, and that's how the fan works. You have to be careful with centrifugal fans. With an actual fan, if you get the wiring wrong on it, the airflow will come back towards you and it's obvious. You know. You feel the air blowing towards you. With a centrifugal fan, if you get the wiring wrong on that, you will still get suction because the fan will still be spinning. You'll still draw the air in, but because it's going around the wrong way on the fan casing, you get a much-reduced performance. So, it's one of the first things you want to do when you're testing your system; check the rotation on the fan.

(R) But if you don't know to check, it's not going to be performing as you need it to perform.

(S) Exactly, yeah.

(R) Does it matter where a fan is placed within the system? You get these big warehouses. Is there multiple fans? We've got one big fan for the whole system. How does that work?

(S) So, with LEV systems, we tend to like to have one fan. You can do systems with multiple fans, like the booth fans. I'm not a fan, no pun intended. So, we want to try and avoid blowing the air inside the factory or the working environment. The risk is as soon as you put your ducting under positive pressure, there's a risk of a leak. Ducting is just metal ducting. It does leak.

(R) Just metal tubes.

(S) Just metal tubes joined together sometimes better than others, but you tend to get leaks. So, we like to put the fan outside and that way, all the ducting inside the factory is under negative pressures. So, if there is a leak, the leak goes into our system and not dispersed around the factory. The location of the fan; the LEV industry hasn't been very good at this over the years and we can learn something from the air conditioning industry. A lot of air conditioning units over the last five, ten years, they used to be bolted to the side wall of the building. They've stopped doing that. They're not putting them all down at ground floor level on a few paving slabs or on a solid base so that when they get it serviced, and you have to service these things, they can be done safely. We've got to remember the whole life cycle of these systems, not just the installation element of it. So, we need to be doing the same with the LEV fans. Let's get them installed outside the building on floor level where the test engineer, the commissioning engineer, the service engineer can access them. They're easy to check. They're easy to test. That will keep your costs down in the future. We don't want to be seeing fans bolted up at high level on the side wall of buildings. It's just hard work for everyone and costly.

(R) So, we're capturing this dust and fumes and vapours. So, what is actually capturing those things and what happens to that once it's captured?

(S) So, it's the air we're drawing into the system, so we're going to capture it. That airflow is then taken to a filter plant of sorts via our ducting. That filter, depending on what you're capturing, what you're controlling … there's different types of filters for different applications, so you need to make sure you get the right one.

(R) Just like a respirator. We've got particulates and gas and vapour and this is all sounding very similar.

(S) Again, like a respirator, you may have a multi-stage filter, so if you have a charcoal respirator for VOCs, you will have a particle filter before it, because if we let the dust go onto the charcoal, it ruins your respirator very quickly. We have the same issues. It's the same principles. We're filtering contaminant from the air. So, that contaminant will go into the filter. It will sit in the filter and then we'll have cleaned air … not necessarily clean, but cleaned … coming off the filter which we then need to do something with and we should either refilter it or keep filtering it or we discharge it to a safe place. Now, once you've caught that contaminant in the filter, that filter will block up. It will be at some point need to be changed. Bins will need to be emptied and we need to understand how we do that safely and I think there's a piece that we can do that when buying these LEV systems is to ask that question. You've taken this hazard substance away from an operator and a relatively small amount, and you're putting into a collection vessel which is going to have really large amounts.

(R) You're concentrating it, ultimately, aren't you?

(S) Exactly, yeah. Then you're going to send some poor guy out there to go and empty that or change that filter. How do you do it? How do you check it? And I think there's a responsibility for the manufacturer of these plants to say, "We've considered this in our design spec. Here's the O&M manual. This is how we do it," and they should be able to demonstrate that before you buy the plant.

(R) Part of those considerations and specifications and requirements as well. So, what have you got? Fabric filters, cyclones, electrostatic precipitators, scrubbers, venturi scrubbers; there's a whole range there. Is one better for different contaminants or sizes of LEV systems to why you would pick one over another?

(S) Yeah. It depends what you've got going through the system, what you're controling. As we just said with the carbon, you may have two different types on one system. The most common one is the fabric style filter. This could be a sock. This could be a cartridge. HEPA filters fall into this category because they're a fabric filter. That's going to be used on your average or particles, your dust in the air. Now, these filters come with different coatings, so if you've got particularly sticky residue, you can get coatings for that. If you've got damp dust deposits, you can get things like oleophobic coatings your filters. That's all well and good and it will control it. Now, these filters will wear. They don't last forever.

(R) Just like a respirator filter which is why we need to change the filters and change the LEV system filters.

(S) Yeah, now it's very difficult at the design stage to say how long that filter will last because it's how long's a piece of string? How much dust are you going to put through it? How often is it going to be used? What's the wear characteristics of these things? And it might be that you install it and it just gets damaged. Something goes through the system that shouldn't go through the system. But typically, most normal types of dust, wood dust and things like that, you're looking at a two-year life for a filter.

(R) It's a pretty reasonable amount of time, obviously more or less depending on the circumstances, as you say.

(S) Yeah, and in your service, your test engineers should be inspecting these and then should be advising, "Look, we're up to two years. It still looks okay. We'll get another six months out of this," or, "We'll get another year out of this." You might find that if you've got some things like metallic dust going through, that's quite abrasive and that's going to wear it more often. Shot blast units; you're probably looking at changing those every six months to a year. Now, if you don't change these filters, what you'll find you'll end up doing is as the filter wears, it might still capture the large dust particles, but the very fine, the respirable dust, the stuff we're trying to protect against …

(R) The stuff we can't see.

(S) And the stuff we can't see will start coming through. So, we need to check for this. We need to see this. Now, there's tell-tale signs. When this stuff comes through, you'll see it settling onto high ledges and light fittings, steel work. You've got to ask the question how does that get there? If it's in the air …

(R) It's come from somewhere.

(S) Exactly, yeah. The pixies don't come sprinkling it, so we need to look at that.

(R) So, our contaminants are being captured and then we've got the cleaner air, as you say. So, where does that get discharged to? Does it matter where we're actually placing that discharge stack or location?

(S) Yeah, definitely. We need to discharge it to a safe place. So again, what is coming through the filter? What could come through the filter? Bearing in mind a filter may rupture. It may burst, so if you are recirculating it back into the factory and you suddenly have a burst filter, what effect would that have to contaminate your factory? So, my view on this is that filters should sit outside. If the filter is outside, you can discharge it out into the environment. Now, we're not looking to pollute the environment. We need to protect that, but it's a what-if reason. If you get a burst filter, if it bursts outside, is that a major problem? If it bursts inside, is that a major problem? Which is the better of the worst-case scenarios? I would argue that if it happens outside, you wouldn't expose anybody because when these things are running, most people are indoors. If we have fumes going through the system, we need to vent those to a safe place. Typically, that's via a stack. Now, a discharge stack has to make sure you discharge to a safe place and that's normally above the building. There are calculations you can do to look at exactly what it is, but as a rule of thumb, you're looking at three metres above anything in a five-metre radius. So, if you've got a pitched roof, it's not from the gutter height up. Work out five metres at the pitch and it's three metres above that height. The guidance does say three metres above the tallest part of the building. You can get some very large sheds, very shallow pitched roofs. The highest point of the building may be 20, 30, 50 metres away. That's a bit unreasonable. You've just got to do an assessment. Where are we here? How are we discharging this? Now, when you discharge from your stack, you need to make sure your weather terminations don't spoil the hard work. If you put a rain cowl on top, it's just going to deflect everything back down. Again, my view, my opinion, and HSG258 goes with this; when you're looking at stacks, you want to put the stacks so it's sat on the floor. It sits on the floor, so all the weight is going down onto a concrete base so it's good and sturdy. It's not going to go anywhere. If rain water comes into the stack, it can drain out the bottom. So, if that's the case, we can then put a jet effect. If you take your garden hose pipe and you're watering the garden and you squeeze the end of the hose pipe, you get that jet effect. The water will travel much further. We can do the same with our discharge stack. If we squeeze the top of the stack, make a jet effect, we'll get a good plume come off there, and that will get the fumes, the contaminant away from what's called the boundary layer which exists over the building. What's a boundary layer, is the next question? The boundary layer; as the wind blows across the land, it hits the building and it goes over the top of the building like a wave shape.

(R) Going over a Formula 1 car. You get that visual going up and over those smooth curves.

(S) Exactly, that's it. And then it will go on, but what it will do is cause eddy currents to form at the far side of the building. The analogy I use on this is if you ever look at a truck or a van as you're driving down the freeway, the dirtiest part of the truck is usually the back doors because as it's driving along, the airflow going over the truck, over the cab, comes around the sides and at the back, all the diesel fumes are caught up in the eddy current that exists at the back of the truck and it deposits them on the back of the doors.

(R) So, it curls back as it comes around the corner.

(S) Yeah, that's it. So, we get the same on buildings. So, this is why our stack has to be three metres. The three metres will help you penetrate that boundary layer so it won't get drained back in. Now, we make things worse. By having the LEV system in the building, you've put a negative pressure, so we're pulling the air in from outside anyway. So, you don't want to bring the fumes back in.

(R) You're putting it up and then you could potentially be bringing it straight back into the system and there's unfortunately a cycle there.

(S) Exactly. That's very common. It does happen an awful lot because people see stacks and there's a mindset issue certainly in the UK. People see a stack and they think, 'Oh, you're polluting us,' and they don't want it. And yet, the stack is the better way. A stack will discharge it to a safe place because the wind speeds are much higher, much faster, the higher up you go. So, if you can your stack higher up, it will discharge …

(R) And move it away from the area.

(S) Dispersed from the area. Certain countries; you go to places like Scandinavia, they seem to understand that. If you have a factory, you have a stack whereas in the UK, people don't want to see stacks.

(R) Visual pollution for some people.

(S) It is, yeah, and yet to me it's an odd one because you ask any five or six-year-old to draw you a factory, they will draw a chimney with a little saw-tooth roof and that's your typical picture of a factory and that's what all the kids show. But we tend not to want to see that these days. If you discharge below the boundary layer, those fumes won't go away and they will sit around the air.

(R) And someone's going to breathe them in and be exposed from an environmental point of view.

(S) Yeah.

(R) Now, the maintenance requirements of an LEV system, like a lot of things that we use in workplaces, what are the general rules of thumb when it comes to maintenance?

(S) So, we need to do it. We do need to do it. We're not very good at it. If you think about what LEV is, it's a piece of mechanical plant. Mechanical plant, if you don't look after it, will fail. LEV is starting to fail the day you start using it. You're extracting substances through there, dust and fumes. They can be aggressive. They can be corrosive. They can start causing damage from day one, so we need to look after them. Again, when I'm teaching this, the analogy we give is if you take your car; if you don't service your car, you will drive it into the ground. It will fail. It will break down on you. It will leave you stranded by the side of the road. It's the same with our LEV. We need to look after it. What do we need to do? We need to do some visual checks. We need to check it over. Does it look right?

(R) Is there a big hole in the ductwork that a forklift has driven into accidentally or something like that.

(S) Exactly, or bits missing. You'd be amazed how things go missing. I once went to a job where someone took the motor off the fan. No one picked up on it. The guys in the workshop thought they were safe. They carried on using it. There was no airflow, nothing at all, because someone's stolen the motor. So, you need to do visual checks of these things. Let's have a look. What's going on? Does it look okay? You might have drive belts on the fans, like a fan belt on a car. Again, they wear. They get loose, so you need to tension them every now and again. Filters need to be checked. Ducting needs to be checked. Is there any signs of leakage? Can I hear any hissing, which is a good sign of a leak?

(R) Unusual sound that wasn't there last week but now it's clanging around.

(S) Yeah, all those things. So, you're looking at probably a daily walk through by the operator for some very basic visual checks.

(R) And just say take those smoke tubes we mentioned?

(S) No, not even that. Is it there? Can I hear the fan? We would like to see airflow indication devices on hoods because there's no way of telling the operator whether it's working correctly or not.

(R) You can't see wind.

(S) No, exactly. We don't want people putting bits of paper on the hood. So, an airflow indication device, usually something like a pressure gauge but with some markings on it. Not just numbers; numbers don't mean anything to people. Put a green zone. Put a red zone.

(R) Some nice colours.

(S) Exactly. Keep it simple. When it's working, set in the green zone, so the operator, when they look at it at a glance, can see if it's in the green. If it's in the green, that's a universal, "This is good to go."

(R) Green is good to go.

(S) Yeah, but if it's in the red, I need to report it.

(R) Something is happening.

(S) Exactly, and things that will cause it to go into the red will be a blockage in the filter. It will cause the pressures to change. Holes, tears in the flexible ducting, holes in normal ducting, fan not running; that will cause the pressures to change and they will drop into the red zone, in which case, someone can go and report it. So, you're looking at probably three, four, five very basic visual checks. Is the flexible ducting okay? Am I in the green zone? Can I hear the fan? Is there anything untoward? They're good to go and that's a simple check for each time you use it, a bit like you're doing your RPE. Before you use your RPE, you're going to check it over. Are the straps okay? Are we good to go?

(R) Inhalation valves, good condition, all the usual things, but a LEV system is much bigger than a respirator, but still just as important.

(S) So, there's an education piece we've done there with the operator. Every three months you probably want the maintenance guys to just walk the job. Start with the furthest hood, walk along, have a look at everything. Again, check is the ducting there? Is it still hanging in the …

(R) No one's taken the motor.

(S) No one's stolen the motor. Any signs of damage? Any signs of leakage? Maybe have a look at the filter plant. Check if it's got compressed air cleaning. Is the compressed air clean? Is it dry? You don't want wet compressed air going into it and make your filters clog up. You may even want to open it up and have a look inside at the filter, have a quick check and make sure it's okay. So, you probably want to do that on a three-monthly basis; check your fan belt's okay.

(R) Whoever's installed your system, that's the information during the commissioning stage of what should be in normal operation.

(S) Exactly, so the commissioning engineer is well-placed to do this, but also at the purchasing stage. You've got to ask the question what is the maintenance requirements? What is the lifecycle cost of this? Who does this? Do we do it, as in the end users? Do we need to bring someone in to do this? How complex is it? If we've got to bring people in, what's the cost involved? Do you need specialist access?

(R) If we need an EWP every time to go get access, there's a cost on that, so it comes back to the design and the access points as you alluded to.

(S) Yeah. We can engineer a lot of this out at the design stage. Once it's installed, it's probably too late.

(R) Or very costly.

(S) Or very costly, yeah. And then, once a year, you want it thoroughly checked, someone to go over it with a fine-toothed comb. Is it providing control? Look at the velocities. Look at the pressures. Do the smoke test. Do your dust lamp checks. Maybe even do some air monitoring to help give you that full picture, that full understanding. Is it providing adequate control? When we're talking about the air monitoring around LEV systems, we tend not to do personal monitoring because personal monitoring, if the operator wanders off, they can be exposed to something else. So, we tend to do more static monitoring around the LEV system, around the hood. And again, this is the conversation you need to have with the guy, with the engineer who commissions the system. How do they do it? From day one, what levels were they finding? And we can then compare the numbers we are getting on the test …

(R) What's that baseline?

(S) What's the baseline yeah? Is it still doing what it was originally intended to do? Then we can ask the question is it providing adequate control?

(R) Are we still on an equivalent level or have things dropped off and that's that investigation stage to … because even though this is an engineering control, it's higher up on the hierarchy of control if it's working, like anything.

(S) Only if it's working, yeah.

(R) So, there's a lot here but just try and summarise the tie this up. What would you want to leave with our listeners to summarise what we've just spoken about?

(S) We need to look at getting into the purchasing stage earlier. When we're talking about engineering controls, they can be expensive and expensive to do right, but is that a one-off cost which comes out of the cashflow now, or is that an investment in the business for a 10, 15, 20-year lifecycle? And what are the real benefits here? Unfortunately, we see a lot of, "We need to put the LEV in because the regulators say we have to do it." But if we don't do it, what happens to the people who are doing the job? They will go, "I've had enough of this. I'm leaving." So, there's a cost associated with that; that training cost, that recruitment cost, the downtime if you lose an operator. How quickly can you replace them? That takes time. So, we've got to look at the true costs here, not just the LEV's expensive. We can buy cheap and you will pay in the long run. If you look at, "Okay, can we make it easy to service, easy to test, easily accessible?" Put some good visual indicators on the system so as we're doing these checks, maybe have gauges at the filters, gauges at the fan which tell us the pressures. That makes life simpler for everyone involved and it will save time. As they say, time is money. So, there's some real benefits there for the owner of the system if they look at it in the right way. If they look at it and go, "Why do we want this? This is just a hindrance to us," then they won't get the solutions they really want and we see what some of the big businesses are doing nowadays in that they're really embracing the LEV controls and looking at the control element more. We need to get in at the buying stage. When we're looking at specifying and buying systems, there's a huge saving the owners of the system can make by considering the LEV in the right light. The LEV isn't an immediate cost. It's not this month's cashflow. It's a long-term investment. It's a big investment and we know this. These aren't cheap systems, cheap solutions. So, you're looking at 10, 15, 20-year payback periods and they have to be seen in that way. If you buy cheap, if you buy systems that are inaccessible or difficult to service or difficult to maintain, your servicing costs and maintenance costs, your testing costs are all going to go up. So, if we can get systems installed in the first place that have the fan at low level which has gauges at the filters, gauges at the hoods, gauges in the fan … whilst there's a capital cost involved in that … the long term lifecycle cost comes down because these systems are easier to maintain. You get loss downtime, less problems, less failures with it. If you've got to bring in a cherry picker or a scissor lift every time you need to service the fan, that's another cost. It's going to take more time and time is money.

(R) I've talked to lots of workplaces around PPE and PPE's got it place. It's lower than engineering, but people jump straight to that, but there's more ongoing effort and cost and human resources to manage and rely on PPE. Every day, you may need to check with your workers, "Are you fitting it correctly?" when we talk respirators. So, that may not appear in a spreadsheet, but the cost to the business versus that upfront investment as you say, and then, "All right, every six months, we've got to bring someone in." That's less resources to manage ongoing than it is to manage a PPE program if you're putting all your eggs in that basket, which people shouldn't be doing, if other options are suitable. That is why it's higher up the hierarchy. It's a more effective control. It's capturing at the source. We're not relying on the worker and the behaviour. So, hence why it is where it is on the hierarchy of control. It's there and it can be very effective when done right.

(S) It has to be, yeah, and you've summed it up there. It has to be done right. There is good guidance out there. There's some very good publications. There's training courses. People need to look around, understand it, do their homework. Don't just buy the first thing you come across on the internet. Understand what's the problem. What do I need? Seek some competent advice and make the right choices. Make an informed choice.

(R) And that's why people who … that's their business, LEV systems, like yourself. And if people did want to reach out to yourself for some help in their workplace, what would be the best way to do that?

(S) So, the company is Vent-Tech Limited. Our website is www.vent-tech.co.uk. You can look me up on LinkedIn. I do a lot of stuff on LinkedIn. We put various blogs out there and bits and pieces. Or drop us an email enquiries@vent-tech.co.uk .

(R) And while they're online checking that at LinkedIn, what are some other online resources that they can maybe head as well to get that information, because there is a lot here when you really delve into it.

(S) There is. So, the big one for me, which I'm aware of because I'm from the UK, as you said, is the HSE, www.hse.gov.uk. It's freely accessible to anyone in the world. Lots of good, free downloadable resources. There's a search option there where you can put in what you're looking for and you'll find some PDFs and some stuff. The Australian Institute of Occupational Hygiene will have some stuff. If you're looking at weld fume, the BOHS, the British Occupational Hygiene Society has a weld fume calculator on their website, so it's free to use. There's also a good web resource called levcentral.com, which is the LEV community open forum. You've got a question, stick it on there.

(R) Help. This is the situation.

(S) Yeah, and you'll get some feedback. There's some good guys on there who will comment and help people out. Send us a picture. Everyone likes seeing a picture and you'll get some feedback.

(R) A bit of technology we spoke about in the last episode; we can take a picture. You've got those phones in your hand. Capture the situation and send it to the experts.

(S) So, at LEV Central, there's 500 people on there. There will be someone who has seen that problem or come across that problem before. Reach out.

(R) Thank you so much for spending time recording here.

(S) I'm having a fantastic time. It's been great so far. Thank you.

(R) Well, thanks for listening, everyone. You can get into contact with the show by sending an email to scienceofsafetyanz@mmm.com if you have any questions or topic suggestions or guests you think would be great to get in the studio. You can also contact 3M if you need any help in the workplace when it comes to PPE, and respirators. 3M are certainly here to help. You can also visit our website 3m.com.au/sospodcasts for further resources on local exhaust ventilation as well as the transcript of the chat that Adrian and I have just had as well as all the other previous episodes that we have recorded. Be sure to subscribe, rate, review and share through Apple Podcasts, Spotify, Google Podcasts or wherever you get this podcast from. And Lou Holtz says, "I never learn anything talking. I only learn things asking questions." Thanks for listening and have a safe day.