

3M Transcript for the following interview: Episode 57 Asbestos in Soil

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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 signs 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 products 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 talking about asbestos in soil with Linda Apthorpe. Welcome back, Linda.

(A) Hi Mark.

(R) Fantastic to have you back. Now, this is our first in our next little series about asbestos for asbestos awareness month which is November for in Australia, but last year we did a couple of episodes together and did six episodes in total around asbestos. So, I do recommend if you want a bit more of that supporting information that we have covered, to go back and find those previous episodes. But for those that haven't listened to those particular ones, can you please introduce yourself, who are you, where are you from?

(A) Thank you, Mark. Yes, I am an occupational hygienist. I've been working in the space for over 20 years. I'm a certified occupational hygienist and also a licensed asbestos assessor which relates to the topic of today.

(R) It certainly does.

(A) I'm a consultant hygienist and I work in Sydney and I also am a lecturer at the University of Wollongong, in the work health and safety program, particularly for the occupational hygiene subjects.

(R) So, just for a bit of a re-cover, so what is asbestos?

(A) Well, asbestos is a naturally occurring material and it has amazing and remarkable properties and so along with its fibrous nature, it's been used in lots of different products for its strength, its resistance to heat and chemicals and also its friction resistance. Some of the products include fibrous cement sheeting and materials that's been used for heat and fire insulation purposes.

(R) We did do a whole episode previously on where you may find asbestos-containing materials and it is really quite broad. So, do listen to those if you're not familiar with the breadth of products. Now, two important terms ... and we are talking about asbestos and I do like to make sure we cover those off ... is this 'non-friable' and 'friable' term. Can you explain the difference between those two?

(A) Sure. It's a good idea to set that up first up. The friable material, it's an asbestos containing material that can crumble to dust like a piece of cake if you were crumbling it in your fingers with hand pressure. And as you can imagine, there's a high chance that it can release fibres as the material crumbles.

(R) So, an example would be pipe lagging that's been worn for many years. It's still in the solid but if you were to touch it, you're going to lose a lot of those fibres.

(A) Yeah, big potential to release a lot of fibres because there's not much of the matrix holding the fibres together, so that's why it's easily able to release those fibres. And then we have non-friable material and that's pretty much everything else and it includes those materials including fibre cement or asbestos cement where the fibres are locked into the matrix and it's really difficult to actually get those fibres out. So, that's why it's a bonded or non-friable material.

(R) If you're going to cut a bit of fibre cement sheet with an angle grinder, that's going to break it and release it versus picking it up and transferring it by hand. You still need to handle it the right way but you're not expecting that release of fibres just by picking it up, so to speak.

(A) So, it's not going to release fibres in the broken fragment as such, but it's important to remember, and I'm just going to pick up on one thing you said, it's important not to cut any asbestos materials such as fibre cement with angle grinders or any other power tools.

(R) So, we are talking about asbestos in soil. Now, we've spoken about it's in a whole bunch of building materials, but how does these asbestos-containing materials get into soil, get into the ground in the first place?

(A) Well, primarily, asbestos containing materials find their way into soil due to activities such as illegal dumping where folks will dump it without taking it to a landfill facility which is licensed to accept that waste. Now, this is a really big problem for local councils and the state regulators and it can also cause a lot of concerns for local residents and users of public places where the material has been dumped.

(R) And quite often, that's what you do see in the news or the newspapers where someone's dumped it in a bush trail and we have this potential exposure just sitting there waiting to happen. So, it's not good at all.

(A) No, it's not good. Look, the chance of exposure is low, but that said, the material should not be dumped and it should be taken to the appropriate landfill facilities. It can also get into soil from other activities such as when asbestos cement roofs are cleaned with high pressure cleaners. Now, it should be noted that this is a highly illegal and prohibited activity as it can spread asbestos contamination across a large amount of area. Other ways it can get into the soil is via runoff from very weathered asbestos cement roofs where the water just runs off and is allowed to contaminate the soil.

(R) So, those materials getting broken down over time through natural elements and just spreading into the environment. We spoke about last time, the previous episode, there is this background level in all air, so to speak, but this is where it's coming from, I'd imagine.

(A) Yeah, look, that's one theory as where the material actually comes from in the air. There are background concentrations of asbestos in the air across the globe, particularly in metropolitan areas, and Australia is no different to that, where there are very small airborne concentrations and some theory is that it's from the weathered asbestos containing materials that are present in our environment, in our buildings, also from naturally occurring material such as asbestos which is present in the soil.

(R) What about demolition? I know the laws are probably quite different many decades okay where you could knock down a shed in the backyard and bury it. Was that contributing to these potential finds when you go to dig a hole and voila, there's some building waste in the ground there?

(A) Yes, look, it can be present in the soil due to activity such as building demolition which occurred in the past when the regulations were not as they are today and it was fairly common practice to knock down a building which contained asbestos and pretty much bulldoze it into the soil. Also, where there are asbestos containing materials just left on sites and not properly removed, or the soil was not remediated prior to secondary and now tertiary land uses. There may also be naturally occurring asbestos which is present in the soil in some parts of Australia.

(R) Which we are going to talk about in our next episode, all about naturally occurring asbestos. So, this asbestos in the soil from these different sources, why is it such a big issue today? If it's been buried in the ground, isn't that some form of control because it's been kept covered, so to speak?

(A) Yes, it does keep it under control, so to speak, but when we're doing a lot of land reuse, then it becomes a big problem and land is such a precious and expensive resource these days, across the country. We're now wanting to build on that land which was previously used for other purposes and the land can be contaminated with asbestos containing materials from the previous landowners due to some of the reasons I just mentioned such as inappropriate removal or remediation activities. And they all of course occurred in the past and now, it's like a legacy of the past that we have an issue today. So, in our modern world, anything to do with asbestos is a highly regulated industry and as we reuse our land, we want to make sure it's satisfactory for these subsequent land uses and make sure that it's safe for the environment and of course the community.

(R) So, I'm a developer and I want to build a lovely new apartment block on a block of land and I've now gone and dug a hole and I've found some building waste that may contain asbestos, what are some of those factors that influence how that land is now managed going forward?

(A) Some of the factors which can impact how asbestos in soil is managed is related to the type of asbestos which is found; that is, is it classically friable material? And remember, that's the material that can easily give off those little tiny fibres. Is it a non-friable material which is a bonded material which has a much lower risk profile and is unlikely to release those fibres? Another factor is how much of the material is present. Is it a lot? Or is it highly contaminated which requires complete removal from the

site? Or maybe there's just a small amount of contamination which can be easily removed by handpicking from the site.

(R) I'm guessing another factor would be the actual spread of the asbestos material in the ground as well, because you dig a hole in one point and maybe you find something, but how far does this waste go? Is it a metre to the left? Is it five metres to the right? I can imagine that would be a huge challenge to try and determine how much you may have in a particular area.

(A) Yes, that does add to the challenge of it. Asbestos contamination is not normally widespread throughout the site. It occurs in hotspots just as you mentioned, where you can find it in one location of the site and not in other locations. So, we need a systematic pattern to assess the site to see if it's present and also use some professional judgement in that process to enable us to determine where asbestos material is found.

(R) So, if you've got a large area, you'd be digging lots of holes to try and give an indication of what maybe there? You mean that systematic approach?

(A) Yes, you can use a grid type pattern as well as based on the previous history of the site. In other words, if there was a building in one corner of the site, you may want to focus your energy on doing some holes or testing the soil in that area because it's likely that's where the contamination is if the building was inappropriately removed in the past.

(R) And talking legacy issues, who knows what they did in the past, so trying to tease that apart to give us a fairly good understanding of what maybe going on in that situation. Now, I'm sure most of our listeners and most people would be aware of the health risks associated with asbestos more broadly, but when it comes to asbestos in soil, what health risks are we looking at, or potential for exposure in this situation?

(A) Well, the health risk is the same as for an asbestos containing material in a building, and we need to know first up is it friable or non-friable material. We need to figure out the amount of asbestos that's present and also the extent of the contamination and is it widespread across the site or just in those hotspots that we mentioned? And then we need to conduct a risk assessment of the material and determine the likelihood of it releasing fibres and also the potential for humans to be exposed and that's really important. That's what hygienists do. Now, in most circumstances where there's contamination with non-friable material, such as asbestos cement, the actual risk of exposure is extremely low, so low

that it can't really even be measured. However, of course it still needs to be removed from the soil to allow for further use of the land and also the soil.

(R) We've had SafeWork New South Wales on a couple of times, on previous episodes, and their scope when it comes to asbestos is the workplace. But asbestos in soil is much broader than just the workplace. So, from a regulatory point of view, are there other bodies that have responsibilities when it comes to asbestos in soil, not just SafeWork New South Wales from a workplace point of view?

(A) Well, you're absolutely right. The Work Health and Safety Regulations or equivalent in various states require that whenever there is asbestos identified which contaminates a workplace, a register and asbestos management plan needs to be created for the site. It's also an issue which can affect the environment, and so, the state environmental regulator is also involved. Now, nationally, we have a few guidelines which are applicable to asbestos. We have the enHealth federal government document which describes management of asbestos in the non-occupational environment. We also have lots of codes of practice for managing and removing asbestos and there is also some coverage of asbestos in soil in those documents. So, that's a little bit of a reference. But the main document is this thing called the NEPM. Now, the NEPM is the National Environment Protection Measures and it originates from the National Environment Protection Council and this is a document which specifies the national standards for various environmental issues, including asbestos. Now, it's a pretty technical document which is used as the guidance for managing issues that can impact the environment.

(R) Is the NEPM, from my basic understanding with the NEPM, is a bit like exposure standards from a workplace point of view, but it's the contaminant levels of things in the soil. Would that be a rough analogy from an occupational hygiene perspective to the environmental perspective?

(A) That's a very good analogy and with regard to asbestos, this NEPM, it specifies acceptance criteria for asbestos contamination in the soil, so it's essentially based on health screening levels for different land uses such as residential, commercial and community use such as parklands. And also, each state jurisdiction has its own environmental protection agency, and their take on the application of the NEPM and the way that asbestos in soil is managed within their jurisdiction. Also, the state safety regulators have a practical guidance for when asbestos contamination is present in the soil, and that's useful as well.

(R) But we still want to reinforce to our listeners, wherever you are in the world, do make sure that whatever your regulations are and local requirements are, you do check. We are talking Australia very

broadly here, so please do check that out. When it comes to NEPM; I know we spoke about friable and non-friable, but in the NEPM, I believe they have some different terminology that's similar, but slightly different. Can you explain those?

(A) Yes, and that can be quite confusing, so it is good to point out what those differences are. Remember that from a health-based perspective, the work health and safety legislation, or the equivalent in whatever jurisdiction you're in, defines asbestos containing materials as friable or non-friable with respect to health. Now, this helps us understand the risk profile, in other words the potential for fibres to be generated, and how to manage that material. And when we're talking about asbestos in soil, there are some other definitions which align with the terminology in the NEPM. And it's important to remember that when asbestos fibres are bound within a matrix, that's a non-friable or bonded asbestos containing material with that really low risk profile. So, these terms are in the NEPM; the fibrous asbestos or FA, and that comprises of classically friable asbestos material and also previously bonded material such as asbestos cement which is severely weathered and degraded. There may also be asbestos fines or AF, which is the material that can pass through a seven-millimetre sieve, and this may be materials such as small fragments of asbestos cement or even bundles of asbestos which have dislodged from other materials and can be loose and present in soil.

(R) So, when they've dug those holes, so you're saying they put the dirt in a sieve and shake it and what's left, and that's what they measure to see if you've got this particular type of asbestos. Is that very broadly what you've described there? You're shaking it out?

(A) Yeah, and it's a way of screening it onsite to start to get an idea as part of the risk assessment for what types of asbestos is present and if it falls into these categories, and that helps us later on down the track for our remediation strategies. And there is another term also to be aware about here, and it's related to the analysis and it is trace asbestos and this refers to the presence of really very small fibres which have been released from the asbestos containing materials, and they can be distributed throughout the soil, and therefore that's a problem as well.

(R) So, we've got these different classifications of asbestos in the NEPM side of things, so in the occupational hygiene we talk about air monitoring determining levels of asbestos, but how do you assess, measure, determine levels of asbestos in soil, because it's definitely not going to be using airborne capture methods?

(A) No, not at all, and we can test the materials, building materials or soils or ores for that matter for the presence of asbestos using a specific Australian Standard method and it's known as AS4964. Now, anybody who's doing a testing of a soil should be using that method and it's also important that the laboratory who's doing that analysis also be accredited by the National Association of Testing Authorities. That's often known as NATA and it's important they're accredited for that specific method and also for testing soils for asbestos.

(R) So, we've got these different terminologies for the different types of asbestos, but how is the testing actually done? I know in the airborne exposure point of view, you're not going to be putting pumps to measure what's inside soil, so how is that actually measured, assessed, determined how much asbestos is in the soil?

(A) Well, unfortunately, there is no magic machine or instrument that can analyse these samples, and the method involves using specialised microscopic techniques and skilled technicians to be able to determine if there's actually asbestos present in the soil.

(R) Is that like bulk sample analysis? You're trying to filter out if they're using the standard methodology, but what you've pulled out of the soil?

(A) We analyse the soil as a whole. It involves various sieving techniques where we fraction off various parts of the soil and inspect it for asbestos containing material, and then we get to the small fraction of soil, which is less than two millimetres in size, and we actually do a really good analysis of that material to determine if there's any asbestos present. And we also do that trace analysis to really determine if there are small fibres that are distributed throughout the actual material.

(R) So, just trying to summarise, so we're trying to sort the soil to get the different size. You've got big chunks and smaller chunks. So, when you're looking down the microscope is it just a visual, "Hey, that looks like asbestos," or are doing another kind of test to confirm it is asbestos or not asbestos?

(A) What we do is we use two different types of microscopes. We fraction off the soil using sieves and each of the fractions that we find in the soil, we actually look at under the stereomicroscope and anything that we find that looks like asbestos, we take it out of that matrix and then we put it under a different type of microscope called a polarised light microscope, and that's where we can really drill down on the actual fibre type and determine whether it's asbestos, one of the three main asbestos forms; chrysotile, crocidolite or amosite asbestos.

(R) So, who can undertake these assessments? Is it licensed asbestos assessors or is it a different qualification or training that someone needs to be working in this space?

(A) Well, generally, you need to be someone who has the specific experience and expertise to do this type of work; in other words, a competent person. It's about understanding the specific risks regarding asbestos and how to actually manage the remediation activities if they're required. Now, in some states, this type of work needs to be done by a licensed asbestos assessor and also if the material is friable, and depending on the specific state requirements, the work must also be done by a licensed asbestos assessor. And also, to undertake the work, we need special plans for removal and management of the process, and they must be prepared so that the remediation work is carried out in a safe manner.

(R) So, if you are engaging people to do this work, do ask some of those key important questions; maybe an occupational hygienist, maybe a contaminated land environmental professional. There are people out there that can undertake this work, so do ask those key questions in making sure they do have experience in this specific area.

(A) Indeed.

(R) So, all right, we've got this soil. We've determined it's at X level. So, now we get into control strategies which are the most important part in my thinking of things. This is the stuff that actually makes a difference to control the exposures and look after workers and the general public. So, what are some of the control strategies that are maybe used in managing the situation?

(A) So, there's a few ways that we can remediate the sites and control where the asbestos is present in soil and we need to of course, first up, do that risk assessment and based on our analytical results, and then prepare a plan to cover the remediation work. So, it can include actions such as cleaning up the surface of the ground and we can do that by visually inspecting the ground and using a rake to disturb the top ten centimetres or so and we can pick up any visible asbestos containing materials that we can see and that's usually best for small areas which have low amounts of asbestos cement fragments which are not degraded or weathered. And that's sometimes, you may have the terms of an emu bob or an emu pick.

(R) So, much like in primary school when they'd get you to go and clean up the playground, you'll have to walk around and pick up ten bits of rubbish, so to speak, but obviously similar but different.

(A) Indeed. And then for some sites, based on the type of asbestos material that's there and including also the concentration or the end use of the site, the contaminated soil needs to be completely removed and disposed of at a landfill site which can accept that waste in a lawful way. And this can sometimes mean that incredibly large amounts of soil need to be removed from the site and transported to that landfill facility. The other thing; it may be able to be dealt with onsite for onsite containment and again, depending on the specific site requirements, the amount and type of contamination and of course the end use, it may be appropriate to be able to clean or remediate the soil onsite by screening or hand picking or sieving, or to be able to bury the contaminated soil on the site in a containment cell and then top it with a suitable coverage material such as aggregate or concrete. For some sites, it's also acceptable that a small amount of contamination can be present, as long as there's no visible asbestos material on the soil and that type of approach means that the contamination actually stays on site and it's important to seek appropriate permissions for that to occur and also the location of the waste must be recorded for future landowners of that site.

(R) I was going to say, obviously we think about asbestos registers in a building to know where it's present, and this would still be the case, a bit like an asbestos register, but obviously a record of where that asbestos contamination is buried so future people don't come and accidentally dig it up. Was that a basic analogy, an asbestos register for the ground in a way?

(A) Absolutely, an asbestos register and also asbestos management plan because you know that there is asbestos present on that site.

(R) Like a lot of the things we talk about, asbestos and different hazards; if we know that it's there, when we have those plans in place and records of what those plans are and people know what those plans are, to manage to keep that risk nice and low because when those things aren't in place, that's when we have these potential uncontrolled, unaware situations which is what we're really trying to avoid.

(A) Yep.

(R) So, if we are taking it offsite, do you need special licenses to remove and transport the asbestos waste? How does that situation work?

(A) Definitely. The states also have their own regulations on who can transport the asbestos contaminated waste, including the distance it can travel and also precautions taken to ensure there's no

spillage along the way, otherwise our streets and roads and communities would be contaminated. And this is usually covered under environmental legislation.

(R) So, go talk to your relevant EPA to determine what those specific state or territory requirements are. We've spoken more about this I guess property development type situations where we've dug in the ground or found this, and now we have a few more resources and people to handle the situation. But say I'm a homeowner or I'm a small business and I've just gone to dig a hole to plant a tree, in a very small analogy point of view, what steps should I take if I'm in that smaller situation and I come across something I think may be asbestos containing?

(A) Well, in those situations, and of course depending on the specific context and circumstance, the local council may be able to help you with what to do and some local councils also have a service where they can pick up the asbestos for you and help you with getting rid of it. And also, an experienced hygienist or licensed asbestos assessor can also help you in the initial stages and guide you on what to do next. So, they're a good resource. Of course, if it's in a workplace, the state regulator can help you with guidance and you'll probably need to talk to again, that, experienced occupational hygienist and or a licensed asbestos assessor. And these professionals can conduct a risk assessment and arrange for testing. Of course, it's important to make sure it actually does contain asbestos, otherwise you're going down a pathway which can cost you a lot of money and it's not actually asbestos.

(R) I think that's a very good point. Before you go too far down either pathway, confirm one way or the other, and then you know for sure we have to take this course of action or we're going down a path and we're okay with that. It's a fairly important point there.

(A) And remember, just even if you find one fragment, it may not necessarily pose a risk to health, so it's important to get guidance on what to do to help you in that process.

(R) So, this is a very big topic and we've only spent a very short time covering some of these key elements and make people more aware to look into further things, but if you wanted to leave any key takeaways and the summary points about asbestos in soil, what would you want to tell our listeners now?

(A) Asbestos can be present in soils and in most circumstances, it's really important to remember that it's most likely going to be non-friable material and that's those fragments of asbestos cement and on

sites, people can get really excited about finding just one fragment. It's important to remember that fibres don't jump out and leak out of that material. They're well bound in that asbestos cement. So, whilst you find that fragment, it's not necessarily going to pose a risk to health, but it is important to get it checked out to see if it does contain asbestos and then of course remove it from the site and dispose of it in the correct way.

(R) I think a lot of asbestos in soil for the past generations, they've buried it; out of sight out of mind. We need to do the right thing. If we find it, remove it, manage it for future generations rather than just burying it and passing the same problem and risk down the track. It may not be a risk to us today by burying it again, but we also don't want to pass it down to somebody else down the line. So, we need to do the right thing. So, as always, there's always so much more to this particular topic, like all the topics we do, but where can people go to find more information about asbestos and asbestos in soil and managing these situations?

(A) Well, there's some really great resources out there and I would recommend the SafeWork Australia website. It's got some great information. Your local state regulator for work health and safety or occupational health and safety, the local EPA, your environmental protection agency; they have some really good information on managing asbestos in soil and also, there is the Australian government enHealth document, A Guide for Asbestos in the Non-Occupational Environment. You'll also find some other great resources from the Asbestos Safety Eradication Agency as well.

(R) There's plenty out there when it comes to asbestos and we've done quite a number of episodes, so there is a lot to it. But thank you once again Linda for coming in and talking about asbestos in soil.

(A) Thanks Mark.

(R) Thanks for listening, everyone. You can get in contact with the show by sending an email to scienceofsafetyanz@mmm.com. If you have any questions, topic suggestions or other guests you think would be great to get in the studio, or if you have any questions around asbestos in soil, 3M are certainly here to help and I know Linda is as well. You can also visit our website, 3m.com.au/sospodcast for further resources on this particular topic, as well as the transcript of the conversation we have just had. Be sure to subscribe and share through Apple Podcasts, Spotify, Google Podcasts or wherever you get this podcast from and as Robert Brault said, "Where the loser saw barriers, the winner saw hurdles." Thanks for listening and have a safe day.