3M Transcript for the following interview:

Ep-11-Asbestos - What is it and what can it do to you?

Mark Reggers (R) Linda Apthorpe (L)

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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 with Linda about asbestos. Welcome Linda!

(L) Hi Mark, how are you going?

(R) I am fantastic Linda. For our listeners can you please introduce yourself, who are you, where are you from and what do you do?

(L) I am Linda Apthorpe and I am an occupational hygienist, so I do lots of consulting work, I have been working in occupational hygiene for over 20 years and my work involves various management and risk assessments of various things including asbestos, lots of other workplace hazards. I also do a lot of training and I am also working at the University of Wollongong where I am lecturer in our Work,

Healthy & Safety Program where people can come and learn occupational hygiene in an undergraduate or a post graduate format.

(R) As a hygienist, I would highly recommend that to all listeners if you are interested to go and do that. I also believe you are on the Australian Standards Committee for some asbestos-related standards.

(L) So, yes, I am also on an Australian Standards Committee one that actually deals with lots of work place hazards and the types of standards that are appropriate for workplace monitoring and one of them is the asbestos identification method.

(R) So, you're the perfect person to speak to about asbestos.

(L) Well, I am also a licensed asbestos assessor and have been working doing lots of management of removals, remediation as well as involved in the analytical processes that support the hygiene work that we do.

(R) Fantastic so let's start right from the beginning. What is asbestos? I know nothing about asbestos, how would you explain it to somebody?

(L) Good question. It is a naturally-occurring mineral, it's a fibrous silicate that just happens to have some very unique properties and that's why it was put into lots of different things. There's six main forms of regulated asbestos in this country and the three main ones are Amosite asbestos, it's often known as brown asbestos. It was used in lots of different products such as heat insulation in steam vessels, in steam pipes etc., incredible heat insulation properties. It also is very fragile, and the fibre structure means that it actually is easy to render airborne even with the slightest of disturbances. Another in the amphibole series of asbestos is Crocidolite and its often known as blue asbestos and it was the one that was mined up in Wittenoom in Western Australia.

(R) Australia.

(L) Yep and it was mined in Wittenoom up into the late 1960s and it was used in a variety of different products in Australia. The other most common asbestiform is Chrysotile asbestos and its often known as white asbestos and it is an incredible naturally-occurring fibre. It has the same tensile strength as steel and so it's a remarkably resilient fibre typically used in a lot of products for strength some, to some degree heat resistance and it is a very flexible fibre so it was often used in ropes and fabrics etc.

(R) Fantastic so there's just three types, I think you mentioned six before?

(L) So, these fibres Tremolite, Actinolite and Anthophyllite, they're the other three regulated forms of asbestos in this country but they're not commonly used in a commercial product, they will be there as contaminants through some other purpose or also from the mining operations.

(R) So, you would be mining for say Amosite or may be Crocidolite and you would bring up parts or portions of the ground which would have some of those other types, is that what you sort of mean?

(L) It could be there, sometimes its present in talc and some other naturally-occurring ores which are mined for other purposes, it's there as a contaminant fibre.

(R) So, when you hear the word asbestos is that referring to one or all of those or a mix of those when you talk about asbestos-containing materials?

(L) Asbestos-containing materials can have any of those six regulated forms of asbestos in it but for a commercial product, you're typically going to find Chrysotile, Crocidolite or Amosite asbestos.

(R) From a health perspective, and we're going to get into that, are certain types of asbestos worse than another or are they all pretty much the same from a health effect point of view?

(L) From a health effect point of view, some have more propensity to cause disease than others, from a safety point of view we need to consider that exposure to any asbestos is an issue and we want to do our best to prevent any exposure to any form of asbestos.

(R) So, I mean you've spoken about different the types of asbestos getting used in so many products but it has a long history so why was asbestos used for such a long time when, I guess now we know and we look back that these negative health effects, so why was it being used so much for such a long time.

(L) Well, because it's such a fantastic fibre. It was actually used since the first century where they actually used it as a cloth and they used to wrap bodies in it, it was shroud often used as a shroud material for bodies and in fact the word asbestos is in fact meaning inextinguishable.

(R) Yeah right.

(L) So, it's an incredible fibre used for such a long period of time.

(R) They knew pretty early on they had these particular qualities if that's what the word asbestos means.

(L) Absolutely and that's why they started to use it for lots of different things. They also used it to strengthen pottery when they were making vessels for drinking and storing their food etc. In the late 1800s it was used extensively in factories, oil, chemical refineries etc. and even in the early 1900s medical practitioners started to see some concerns and started to raise some issues starting to link exposure to disease. It was used widespread in the industrial revolution when it was used in lots of different products because of this wonder fibre, they thought it was fantastic to use for friction materials, for cloth and in lots of different products.

(R) I guess that insulation when you talk about the industrial revolution in boilers, in pipework where you want the insulating properties if it's not going to catch alight.

(L) Exactly and that's why it was used extensively. In Australia, they used it extensively for manufacturing various asbestos cement products, used as a brilliant building material in this country because of our harsh conditions here, used as a reinforcing agent in those flat fibrous cements sheets and corrugated sheets used extensively across our country.

(R) So I guess to summarise what you have just went through, I guess yep this asbestos is very versatile, you've named a couple of the different products it was used in, pretty good strength, flexibility so I guess if you were making products and you could add these particular qualities, why wouldn't you put asbestos in a product I guess which is why it is so prevalent.

(L) Absolutely. Yeah used extensively for all of those reasons that you mentioned, just a fantastic product and they just used it in so many applications, just hundreds and thousands of different products that it was used in, not only in Australia but globally.

(R) So, we hear about in the news about asbestos and the risk, you know people breathing particular fibres in, so when is it an actual risk to cause health effects to people?

(L) Asbestos is a risk to health via inhalation so you can touch it no problem there, it's really a risk because of the little tiny fibres go down into the deep alveolar region of your lung and that's where the gas exchange occurs and that's where it can do its damage and when its present in your lungs for a long period of time, you don't know that it's there, you don't know what it's doing however over time it can start to develop some of these diseases you may have heard about, some of the ones called asbestosis, lung cancer and mesothelioma.

(R) So, the risk is when it gets into your lungs so if I live in an asbestos house and I have got asbestos sheets, so I would say the likelihood of me breathing in asbestos fibres would be quite low if it is blocked in a fibre cement sheet on a roof or a ceiling?

(L) Absolutely. Those three forms of asbestos, the Chrysotile, Crocidolite and the Amosite were typically put into two different types of products, one is known as friable and the other one is non-friable. So the friable products, they're ones where there is not much of a matrix holding them together and the definition is that they can be easily crumbled in your fingers to dust like a piece of cake and you can imagine that if you can crumble something in your fingers then the chance of releasing fibres is quite high and so even with slight disturbance those friable materials can render fibres into the air whereas the non-friable products are ones where the fibres are locked into a matrix and its really difficult to get those fibres out. They are sort of locked in and you need to do something like use an angle grinder or a power saw in order to get those fibres out. So, going back to your question, the type of asbestos that's in most domestic properties is in fact bonded

or non-friable asbestos cement sheets, vinyl floor tiles, that can also be in corrugated rooves, gutters etc.

(R) So going back to the sort of my very crude example of asbestos in say some wall sheeting, that would be non-friable and I am not going to be releasing any fibres unless I disturb it, break it, cut it as you say which is more likely going to be home renovated or may be a tradie person.

(L) Yes, it's best to keep it in situ. When it's in good stable condition, there is no risk of any fibres being generated when its left in situ. However, during disturbance activities, that's when there's a possibility for asbestos fibres to be released so the tradies or any other home renovators, its most important to understand where the asbestos-containing materials are in a house so that they can actually be removed by a licensed professional asbestos remover.

(R) Do you have any examples of friable asbestos material that people may come across in the workplace or in the home?

(L) Well, it's unlikely in the normal domestic property but in a commercial situation, a commercial building or a factory then the chance of finding friable asbestos is much higher because it was used in insulation products, it was also used as a fire retardant in some applications so in a commercial or a manufacturing situation more likely to come across friable materials than in a domestic situation particularly in Australia. But that said, anything which is suspect is asbestos-containing material, always best to have it analysed by NATA, a credited laboratory to actually, tell you if there is asbestos is in that particular product.

(R) So, we've got non-friable and friable. Can a non-friable turn into a friable situation or is it pretty black and white say the one or the other?

(L) Good question. A friable material is one where the fibres can easily be released and so that's a very high-risk high-profile kind of material. A non-friable material can turn into a friable one and remember that definition of being able to crumble in your fingers to dust and if a non-friable material is significantly damaged, and that's of course if your using mechanical abrasion such as power tools which are of course are prohibited in this country, you are not allowed to use any power tools on any asbestos-containing material. It can turn into friable also as a result of a hail storm or other significant event such as a fire as well where the clean-up needs to be done as a friable removal.

(R) I was going to ask about the fire but to think about there's a lot of houses made out of asbestos cladding, you have a house fibre, I mean, what's happening to the asbestos in that situation, obviously it's going up with the smoke and spreading around I assume?

(L) Yeah, look in a fire particularly these days when we have such combustible materials in our houses, an asbestos-cement house which goes up in a fire can, the asbestos cement can dry out, there can be an explosion which causes little tiny fragments to be spread across the property and from that regard then it needs to be cleaned up as a friable removal and remember when the actual fire is happening, there is plenty of water and foam that's used and it's really an issue for the clean-up of the fire for the asbestos removal guys to come in and do their good work.

(R) So often I think, in my travels, I have heard about the one fibre theory that if you breathe in one fibre, you are going to get one of the asbestos-related diseases. What's the truth or can you explain where that's come from, what is actually happening?

(L) Yeah, a lot folks think that it just takes one fibre or one fibre with your name on it however, there is no scientific evidence whatsoever to support that theory. I believe it came from a politician many years ago who said that it should be treated as if one fibre can kill because of the threshold level. Really in these days we want to prevent all exposure to asbestos and that's a community expectation that through any removal activities or any worker doing their normal work is not exposed to any airborne-asbestos fibres. Another thing to remember Mark is that in most metropolitan cities, not only in Australia but globally, there are background airborne concentrations of asbestos so there is plenty of people walking around Sydney and any other metropolitan city in Australia with background levels of asbestos in our lungs and we're not going to die of an asbestos-related disease, the body's natural process will get rid of them and there will be no problem from that background levels of exposure across our country and even if you travel overseas.

(R) So, I guess when we're talking about preventing exposure, we're trying to prevent the exposures any level above that background level because I guess we spoke about house fires, there's going to be fibres getting in the air that particular, would that be the way to think about it?

(L) Yeah, that's one way to think about it. We want to do our best to prevent any exposure and that's why asbestos is a regulated fibre in this country, there are special rules and regulations with regard to labelling it in workplaces, making sure that people are well protected whenever they do disturbance activities such as removal and that the removal work should be done always by a licensed asbestos professional.

(R) Some of these asbestos-related diseases, I think you've touched on them before, asbestosis, mesothelioma and lung cancer, can you sort of explain them in a little bit more detail, I guess they're the three big main ones I guess of what I've read about?

(L) Yeah, they're the three big main ones. Asbestosis is the scarring of the lung and that's a typical disease that falls into what we call the dose response relationship where the more fibres that one inhales, then there is more chance of development of the disease and it can cause shortness of breath, a persistent cough, tightness in the chest, chest pain and it's a pretty nasty disease. It will also be developed after a bit of a latency period from about 10 - 20 years after exposure has actually occurred.

(R) So, it's going to take a fair amount of this asbestos to build that scarring up to have those symptoms occur, is that sort of?

(L) Its really to do with how many fibres have been inhaled into the lung and the bodies defence mechanisms just can't cope with that many fibres and this adverse reaction starts to occur where the scarring of those little alveolar cells happens and we lose the elasticity in those cells and the ability for gas exchange to occur in that region of the lung.

(R) You know one of the really good ways that asbestosis is explained to me was as a visual tool, you're talking about that elasticity you lose it so think about a healthy set of lungs, it can expand and go in and out and the diaphragm can move to bring the oxygen in but imagine if your lungs are like an old leather football, and it just doesn't have that same capacity to expand and contract so yes its expanding but is nowhere near the same amount which is why you are getting that, so that is one way that I guess I like, I've had it explained to me that I think is a good visual tool to imagine what's actually happening with asbestosis in that case.

(L) That's good, I think I might use that in my training.

(R) There you go. Go for that. Lung cancer, what's the mechanism happening there?

(L) Oh look lung cancer is a nasty horrible disease and of course there is a confounding factor here with people who have been exposed to asbestos and who have been heavy smokers and that works in the favour of actually more risk of developing lung cancer because those two work synergistically together and there is more chance of developing lung cancer if you've also been a smoker.

(R) Then the last one mesothelioma, this is the one I've heard that is actually the nastiest and can occur from lower exposure amounts.

(L) Yeah, you're right Mark, mesothelioma is a nasty, horrible disease and it's the most deadly of all of the asbestos-related diseases. It's a cancer of the chest cavity, the lining of the actual lung. Mesothelioma has typically been linked to the amphiboles to exposure it to the amphiboles that's the blue asbestos, Crocidolite as well as the Amosite asbestos and it's a particularly nasty disease and usually it is incurable and that commonly leads to a great deal of pain and suffering, smoking of course also increases the risk of developing mesothelioma.

(R) So, with that, I guess dose response side of things so for asbestosis generally associated with large amounts of exposure, I would say asbestos workers working in the factories and you've got lung cancer and then mesothelioma I guess from a potential occurrence may come from a small amount?

(L) The latency period for developing mesothelioma can be up to 50 years. It's quite a nasty disease and it's difficult to track back over someone's history from those times to see how much people have actually been exposed to in that time, the fibres, and there is usually a lower dose threshold for mesothelioma than for any of the other asbestos-related diseases.

(R) So, if I had to say I've breathed in asbestos fibres, we spoke about the asbestos in the background air, can I go to the doctors and see how much asbestos is in my lungs if I am concerned?

(L) No, unfortunately you can't do that, there are some lung function tests and some x-rays that can be done however if you've just been exposed, those tests won't tell you if you've been exposed. The issue is only over periods of time where those tests will start to determine if there is a change in lung function or some masses that are developing in your lungs over a long period of time. So those tests only work if you regularly have them over certain periods of time to see if there is a change in lung function from the exposure point to every other year after that.

(R) So, I guess, historically a lot people had breathed in asbestos because I guess it was much more prevalent, but they don't know until they have a serious effect or go to the doctors and it's way too late I guess, or is much more advanced some of these asbestos-related diseases?

(L) So remember that we want to try and prevent all exposure to asbestos and do our best to protect people if there is any disturbance activities, any removal, it's always best to remember to understand if there is asbestos in a material, get it tested accordingly so that the precautions can be taken whenever the removal work or the disturbance work is going to occur. We want to do our best to prevent any exposure to anybody to any level of asbestos.

(R) I think that's a great summary point there that proactive, if you know that it's there, let's just prevent it.

(L) Absolutely, yep.

(R) So, for our listeners that what a bit more information on asbestos and what it is and what it's going to do to you, where would you recommend or where could you direct people to, to find out more?

(L) Oh, look there's a wealth of information out there and I would definitely recommend listeners go to the Safe Work Australia website, they have some fantastic information, the Codes of Practice are there for the management and control of asbestos. Also, it gives information for how the asbestos is actually removed so there is another Code of Practice that relates to the safe removal of asbestos. Also, the state regulators WorkSafe Victoria, SafeWork New South Wales etc. they also have a wealth of fantastic information for commercial removal of asbestos and the management of it as well as the domestic properties, how the home renovator can look after asbestos and make sure that they are doing the right thing to prevent that exposure to asbestos because that's what it's all about. There is other information from the other asbestos foundations for which supporters for those folks who have unfortunately developed an asbestos-related disease and they are really great, have a great community support mechanism for all of those folks. There is also ASEA which is the Asbestos Safety Eradication Agency, a federal government organisation that also provides important information about asbestos.

(R) So there is definitely no shortage of places to go and I think I found in my sort of, what I've sort of done stuff around asbestos is that it sort of directly correlates the amount of asbestos and the potential risk that's still out there because there are so many houses that still have asbestos-containing material so it's sort of a, it's a good thing there's lots of information but there's lots of information because it still is, a lot of actually out there.

(L) That's right Mark. There is a lot of domestic properties across this country as well as in a lot of workplaces and workplaces are required of course to have an

asbestos register so that they know where there is asbestos in there, on their site, that its labelled, its regularly inspected to make sure it's in good condition because remember that any asbestos-containing material when it's in good condition, poses absolutely no risk to health and its fine when its left there in situ and then it can be catered for, for the removal.

(R) Well Linda, thank you so much for coming in today. I'm going to have to get you back in for our next asbestos-related episode if that's alright?

(L) Absolutely Mark.

(R) Fantastic. Well thanks for listening everyone. If you have any questions, comments, suggestions for future topics or guests that you think we would should get into the studio, you can send us an email to scienceofsafetyanz@mmm.com. You can also contact us via that email if you need any help or information regarding PPE relating to asbestos 3M we are here to help and if you would like to get in contact with Linda, or you've got any questions for her, I know she's raring and waiting to answer all your wonderful asbestos questions, you can also contact her on that particular email I mentioned before as well. Be sure to subscribe to the podcast through iTunes or wherever you get your podcast from so that you don't miss any future episodes and if you enjoyed the podcast, we would really appreciate if you could take a few moments and leave us a review as it really does help other people find the podcast as well. And as Nelson Mandela said, "education is the most powerful weapon which you can use to change the world". Thanks for listening and have a safe day.