

3M Transcript for the following interview: Ep-32 Welding Hazards Part 2

Mark Reggers (R) Craig Leech (C)

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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.

Today, this is part two of my chat with Craig Leech from AWS around welding hazards. If you haven't listened to part one, I do suggest you go and listen to that now as part two will make a whole lot more sense from what we've already covered. Enjoy!

So, we got some of those respiratory hazards, what else, type of hazards that are associated with welding that people should be aware of.

C. Burns and in this side of it this new technology sort of coming out with proban materials that you can get a lot closer to the job because these guys are working in very tight positions and it is a real big hazard because you are working around a lot of heat and in some processes you have actually got to pre-heat the material

like a cast iron material and that could be up to 300 to 400 degrees and then you are welding over the top of that and you get in that radiant heat within that as well.

- R. Not a comfortable environment to be in for a long time.
- C. So, you know safety boots on that side of it, your helmets and also reflective gear, gloves...
- R. it is that top to toe type protection from the radiant heat point of view, but it is the splatter it may be coming off.
- C. Exactly and some of these electrodes give off a lot of spatter and if you are stuck in a particular position and you cannot move it is not a pleasant experience. We have seen some quite interesting photos come on to our website about burn spatter down the boot which if you are a welder listening to this is that you will definitely know about spatter getting down into your boots and you do become a pretty good tap dancer at that stage.
- R. I can only imagine.
- C. And then a lot of noise factors come in there as well, very noisy environments so get yourself a good pair of ear plugs, ear muffs in there because in a workshop you could have three or four different trades going on around you, the blacksmiths have got their hammering devices going
- R. When I was in a workshop a couple of weeks ago and there were probably about 30 or 40 welders throughout this big workshop you had three guys in a bay particular area focused on their task but someone may start up doing their tasks or welding and grinding and not aware when that noise is going to come through

so it was stuff happening all the time from a noise point of view so hearing protection is one of those lower control options to think about.

- C. Yes, the other side of it is with welding you have got your shock issues there because you have got quite a high current coming through, fire explosion, you look at your certain tankers might have a chemical in it. You should be flushing this and making sure it is completely clean and purging the product as well. This does not happen all the time, so you have also got that explosive issue there.

- R. As that work process pre-doing the actual welding to create an environment that is being a risk from explosion quite down, you get a whole lot of intrinsic safety, that is another whole thing. I mean as a summary from a hazard point of view there is quite a bit there, you think about the light and the respiratory but there are a few other ones there if you are new to this area or as a business or health and safety profession there is a few things to consider from a hazard and risk point of view.

- C. Or even trip hazards, you know these guys are using oxy acetylene torches that has got hoses from cylinders with regulators on them, so you have that trip hazard aspect there as well. There is a lot going on.

- R. And that is a fixed site, but I would imagine welding is happening in a mining environment anywhere at any time if there is a breakdown, but welding would be happening in these very non-static environments as well.

- C. Yes, because the guys on the mines they are maintenance vehicles, so they can be out in any environment, any weather and it is a risky business so naturally you are giving the right protection.

- R. That sort into leads into I guess the next part I want to ask you about. So I want to identify some of those hazards from a control point of view we look at the hierarchy of controls what are as a workplace that should be starting out to consider, I mean from an elimination point of view if you need to be welding that is part of the process to maintain or construct something, elimination is not clearly a practical thing because, you might not be running a business if you had to eliminate welding.
- C. You know the first thing that is not always possible that surface preparation is critical if you can get in and grind the surface protection material on there to get the actual plate first or the material.
- R. Like the paint if you are doing a maintenance point of view, if it is coated in pain or something like that.
- C. Exactly that could be even sprayed with a two-pack component and that has to be ground off because when you try to weld over you are not going to get a really good conclusion to the weld.
- R. When you are cleaning, are there certain type of chemicals you should avoid or...
- C. I would not go down the chemical path, again because you are going to get that vapour coming off it as well. It is more of a grinding or a dipping process to try and get rid of that. On the other side of it is that you can change your amperages or maybe even the welding processes.
- R. So, go from a MIG to a TIG or one of those different types, do different types of weld create more fumes or less fumes, is that why you would be looking at changes the processes?

- C. If you can depending again very much on the thickness of the material and how quickly you actually want to process to go on that, because your TIG does not put off a lot of fumes where with your MIG it does and stick welding as well puts out a lot of fumes.
- R. Can you use a lower fume producing process that would be an ideal consideration to look from a hazard risk control point of view.
- C. Or you could go mechanical where you could even go robotic and put that process in place and get the person away.
- R. Can you isolate the welders, can you separate the welding process is that something that can be considered?
- C. Yes, what you see is that you see a lot of welders together therefore there is a lot of fumes coming out of the one area and it would be great if you could separate it up in that because again it is the other person on the lathe 150 meters down that is still getting a lot of that fume getting to him as well, so yes if you can isolate it and split them up a little bit around the workplace.
- R. The welders and the non-welders.
- C. Yes, and that is something that a workshop has got to work out.
- R. It may not be practicable, but it should be looked at as far some concern to separate that welding and non-welding area.

- C. And then the other one is share the activity. So, if you have a person who is a welder, a boilermaker and that process can be mixed within the difference processes.
- R. A job rotation point of view rather than Craig is our welder he is doing all our welding but maybe you have a couple of welders you could spread.
- C. Spread the load a bit around him.
- R. Welding screens? I see them in a few workshops like those green shields, what are they actually doing is that from a light hazard point of view for people walking past?
- C. Yes, so with that UV/IR/blue light, it is you can just get that out of the corner of your eye if you are walking through the workshop, so a lot of them are on castor wheels and you can move then around on that. They have even got some new ones now that are virtually like a roll up and roll down, pull up banner, yes, it is one of those that as soon as you are on the actual welding process you should have that type of protection around you more for the other workers around you to help then without getting.....
- R. Health and safety considerations as the worker but those secondary exposures as well. And we get to the PPE point of view and something I guess we have mentioned in a few other episodes. We are very aware, and we agree that it is the lowest control but if you do need it you got to make sure it is being effective from a protection use point of view. We are now at the bottom part what are some of those things that from the head down to the respiratory system.

- C. What I am seeing out there at the moment is that you can go for a half face respiratory then you can go disposable or reusable depending on the workplace and the owner of the business and how he looks at protecting the guys.
- R. There is also I mean with any PPE that we are speaking about in previous episodes is adequate and suitable point of view, I imagine if you are a boiler maker you are doing it for eight hours a day, some of these other styles may not be very comfortable and your first impulse to rip them off very quickly as well.
- C. Yes. It is one of those ones if you are going to use a reusable half face it should be fit tested. You need to be cleanly shaven, it should be fit tested, you need to be trained.
- R. We have mentioned all those things many times over our episodes, but they are all important points to ensure that protection is being achieved.
- C. They are but today there is a trend guys want to grow bears and goatees and have these big side burns but again when you put on a half face mask on with a beard you are losing your protection.
- R. That seal is between the face and the mask is that you want that seal and you are confident the seal is going to be in there day out to create that barrier.
- C. Yes. And this is where the next option comes in where you go to a positive air system.
- R. Positive air? Can you explain that for us?
- C. So, what it is the first one it is a battery pack that filters air and that sits on your back.

- R. It is got a fan and blower essentially with that battery pack?
- C. Yes. Generally, it has got an 8 hour or 12-hour battery and that has got your P2/P3 filter and that will then filter the fumes that are around you.
- R. So P2/P3 now I have done previous episodes explaining what that is but a bit of a summary what is P2/P3 when people are referring to that.
- C. Yes, it is within the mask itself and its classification. P2 is a particular grade and P3 is basically the next level up.
- R. We are talking about particulate filters here.
- C. Correct.
- R. So, a bit of refresh P2, P3 suitable for thermally generated particulates which welding fumes are a thermally generated particulate.
- C. Correct. So, these are the guys now they feel they with a half face or a full face they have got a beard that they cannot use that, and this is now positive air pushing out and it has a face seal under the chin so irrespective if you are clean shaven or non-shaven is that you have got full protection.
- R. The amount of air blowing into the head top and whatever style of head top of it is and the amount of air is blowing out the gaps between the face seal and the persons neck or face and not allowing contaminates to enter into the breathing zone, sort of a summary a bit hard without visuals but that is the sort of the principle that is happening, the amount of air is blowing out those gaps preventing things from actually getting in.

- C. So, you are improving, that is your next step up in protection of yourself within the workplace.
- R. I guess with that moving air does that have cooling impacts for hot environments, or have I been talking to customers in Queensland and it is only getting warmer from here.
- C. Yes. Look there is a system called the vortex system and this can cool up to 25 degrees of ambient temperature so great for hot conditions. So, this now is where you actually connect it up with a hose varying from 5 up to 30 meters.
- R. We are not talking PAPR here, we are talking compressed air.
- C. So, when you are talking battery pack, where we were talking about earlier is that you cannot alter that temperature.
- R. Is that purely from moving air evaporation processes rather than the temperature change in what is coming in?
- C. So what you have got to then do is go and actually filter your air out of a compressor and with that you can then have this little regulator that you can cool the air accordingly, so it is something that is great but again it is depending on the environment you are in because again you are going towards a trip hazard because you have got hoses around you.
- R. We were talking before about confined spaces and oxygen deficient environments so that is where you will be looking at supplied air oxygen but not necessary the vortex type product but supplied air where you are not relying on

that filter and to actually protect the worker as oxygen deficiency may be the hazard that is there.

- C. Yes. The thing is that in the workplace these compressors on the workshops are sometimes generally not well serviced and you need to filter out all your oil, water and then you have a carbon filter on there as well to get rid of the odour. Depending on the quality of your compressor is how we can give you a filter system to actually make it suitable for breathing. Because the last thing we want is a drop of oil or water on the lungs and this filters it to breathing air quality so again choosing the right equipment for the right job.
- R I mean there is a whole bunch of controls there and this all comes back to risk assessment and hazard assessment in the individual workplace location and what are these hazards and whether I just skim the surface here, there is a fair bit here but as far an overview of welding hazards I think it sort of paints of picture of the stuff going on that the workplaces need to be aware of and assess what they need to put in to control and make it suitable for the worker. When you have been eating, living, breathing welding for many many years what are some of the biggest changes you have seen in your time without revealing your age if you don't want to from when you started I guess in the industry to know with what where were we are seeing in Australia and New Zealand in obviously where we are.
- C. Look it is the electronic lenses that have come in, just technology is advancing so quickly from working and going from a flip front helmet to when I first arrived here and my first job the guy gave me an electronic helmet and that was amazing.

- R. When you say electronic with the lenses, we have not really touched on that since how that helps as far the health and safety point of view but also that I know the production point of view as well.
- C. Yes, so what it is a liquid crystal lens and that actually reacts in point one of a millisecond as an example from light to dark. We generally blink at 30 to 40 milliseconds so a very quick process and this allows you to put the helmet in the down position before you even start welding. So first of all, you are going to eliminate eye injuries, you are not going to get arc eye and then you can also see exactly where you are going to start your weld. And generally, with a flip front helmet you are taking a bit of pot luck where you are going to actually weld.
- R. You flip it up, you put your stick where you want to weld, you put that down and you make sure you do not move and then start the weld and then without light you can kind of see roughly but if you shift a tiny bit that may affect the job.
- C. Yes, and the thing is on some jobs if you are starting in the wrong place and you start welding is that the product is going to be powder coated and you have welded in the wrong place and you grind it, it is going to stand out. So, this allows you to see exactly where you are going to weld and off you go and also you get in a lot better peripheral within your welding process with a standard lens as a flip front it is a very very confined small area that you see when you are welding.
- R. Like looking into a post box opening, letter box.
- C. Exactly yes, and this is giving you a better overall view of what you have done and then you can also see where you are going in the actual weld. So that is the first one and the second one is the respiratory side of it. It has been incredible from extractors have come in that were very stone age and huge to now

something that is very portable and can be moved around and then with battery packs, compressed air systems is that you are wearing the unit that becomes a lot lighter in basically the head tops with the actual PAPR themselves, they have gone from NiCad to lithium ion to lighten the weight up and it is much more comfortable being a welder and you are protected at the same time it does not feel with the welding helmet that was made of fibreglass 30 years ago that there was a ton on your head. You are now at about 550 to 600 grams on your head and under a kilogram on your waist belt, so you can get into small places, it is easier to do, and you go home feeling better, you are not getting in the shower and having all this horrible colour coming out of the nose.

- R. I cannot say I have had that happen as a non-welder but you make the point, I guess even if your welding for eight, ten, twelve hours a day in awkward positions, it sounds like welding technology and equipment is taking the same technological journey as society has as well and I think that is good to see and it is better for the worker and production and quality.
- C. So much so it is just I think if you would look down the track the amount of sick days went on eye injuries it is easily halved, even more I would say and you know for the employee as well is a great benefit in that as well and again with these new shields you can flip them up, you can do your grinding you can do your welding and you don't have to then be exposed to all the bad particles in the air and all the fumes and that you can leave it in the down position and do everything.
- R. And all those range of hazards I am glad you can have one piece of equipment that has these multiple facets and positions to cover the different aspects.
- C. And it is, right from the beginning the new lenses, the liquid crystal lenses, you can do everything from plasma cutting, air arc gauging, oxy cutting so it is not

something that you got to pull on and off to do the welding process, you put that on and virtually the only time you take that off is when you have your lunch breaks because the more you keep it down the better your protection.

R. We have only just skimmed the surface in the short time we have had here for the workplace it is currently doing welding or maybe introducing welding or contractors where can I go to find out more about welding, welding regulations, controls and ultimately some of the product stuff as well.

C. Government organisations online you can go to.

R. Safe work Australia, SafeWork NSW, Worksafe Victoria, all those regulators is that what you mean?

C. Yes. Cancer council on that side it is a carcinogenic, so they can give you some more information on that. There is 3M website or AWSI website on there as well that can help you navigate around some of the protections you might be able to put yourself into.

R. It is such a common process as you said I know there is plenty of stuff online. Jump on the internet and have a look but we also are here to help as well. Well we really appreciate your time today Craig and having a bit of a chat around welding hazards. So, thanks for that

C. More than a pleasure. Thank you

R. Well thanks for listening everyone if you have any questions, comments or suggestions for future topics or guests you think it would be great to get into the studio you can shoot us an email to scienceofsafetyanz@mmm.com. You can also contact us via email if you need any help around PPE or specifically what

we are talking about today with welding, controls andin that particular space we can certainly come to visit your workplace and give you a hand in that particular area, 3M are here to help. You can also visit our website 3M.com.au/sospodcast which has a transcript of the chat that Craig and I have just had as well as all our other previous episodes as well and resources. Be sure to subscribe to the podcast through Apple podcast, Spotify or wherever you get this podcast from. As we really don't want you to miss any future episodes that may be of interest to you. If you enjoyed the podcast or found it informative we really would appreciate if you take a few moments to leave a review as it really does help other people to find the podcast. As Tommy Lasorda says, "The difference between the impossible and the possible is a persons determination." Thanks for listening and have a great day.