



ON THE BENCH IS IT SAFE MUM?

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▶ Having earlier this year spent a good slab of my working week on construction sites, the yawning chasm between the recording industry and the construction industry's approach to health and safety has become abundantly clear. In fact, what I discovered has come as quite a shock. (Apologies...)

While there are countless factors that contribute to providing a safe work place, one in particular that naturally catches my eye is electrical safety. So for this issue, let's put aside the excitement of learning what's going on behind the front panels of your outboard rack, and focus our attention on the more mundane IEC socket or mains plug on the rear. Occupational Health and Safety (OH&S) mightn't sound like a fun topic, but it applies to anyone who works in the audio industry for money.

Oh, H&S...

Now, given that this discussion will quickly lead us into the territory presided over by Acts, Regulations and an entire army of folk in neat suits warming up their photocopiers, let's get the disclaimer out of the way first. Researching this topic has been tricky; there are as many views on interpreting the laws around this OH&S stuff as there are ways to mic up a singer with a head cold, and each state of Australia has its own set of regulations just to add to the mix. My aim here is not to give any sort of legal guidance; but rather to simply encourage anyone involved in our industry to put as much research into looking at their own specific circumstances, and what efforts they could undertake to establish a safe workplace practice, as they might otherwise put into researching which microphone to buy next.

Having said all that, each state in Australia is, in fact, pretty consistent when it comes to regulations around electrical safety. In the world of OH&S they call it 'harmonisation', which isn't about ensuring that the backing singers are hitting the right notes; it's about ensuring that each state's regulations are singing the same tune. Indeed, regulations across Australia and New Zealand are drawn from the same 'Standards'. These Standards are technical documents put together by expert committees that provide explicit tests and procedures from which laws can be enacted.

TEST & TAG

One area that has been quite clearly defined over the last few years is the concept of verifying the electrical safety of mains-operated equipment through test and tagging. We've all seen those plastic tags wrapped around the ends of extension leads with a hand-scribbled date and signature (or have we?). This is the 'tag' that indicates that the connected equipment has been tested for electrical safety and yes, in this case, an extension cord is also considered 'equipment'.

At this point you may be wondering; 'Will any of this article apply to me? Should I read on?'. Okay, let's clear that confusion up immediately: all OH&S regulations apply to the 'workplace' and a 'workplace' is anywhere that any one performs *paid* work. This includes your home studio, if you're getting slung \$100 to record a mate's band. This includes the stage at the local pub where you're a doing a set on a Wednesday night. It includes the community hall you hired to track some drums. Anywhere money is changing hands is deemed a workplace and this stuff concerns you.

In essence, regulations across Australia say that you must regularly inspect and test all electrical equipment in the workplace. When you examine the details of the regulations, words like 'portable', 'hazardous' and 'competent person' regularly appear. On the surface, these qualifying words might initially appear to be offering you an escape clause through which you can wiggle out of all responsibility, but they're not. They may indeed leave you wondering if all this really applies to 'our' industry – it does. It certainly had me scratching my head, but after spending a bit of time on the phone talking to the various authorities that administer these regulations across Australia, a number of things became clear...

GLOSSARY OF TERMS

Portable: Surely my 60-channel Neve console isn't considered portable? Yep, it is. The differentiating factor between 'portable' and 'fixed' equipment is simply whether it plugs into a wall socket, not how heavy it is. If you can plug it in, it's portable. If you need a licensed electrician to come over and hard wire it into the mains, then it's fixed or non-portable. This definition also means that extension cords, IEC leads and power boards must also be tested, since they can obviously be plugged into a wall socket. Note that this definition of the word 'portable' is somewhat contentious as it's in fact at odds with how the Standard defines portable. The thing to keep in mind is that it's the regulations in each state that determine these things, not the Australian & New Zealand Standards. Ultimately this would be ruled upon by the courts. (Anyone up for a test case?)

Hazardous: The one area that requires some

thought is how hazardous a particular workplace is and how this affects the testing required. This is where the Standard comes to the rescue. Australian & New Zealand Standard AS/NZS 3760 2003 is the document that covers testing and tagging. Included in the document is a table that outlines various work environments and the appropriate frequency of testing required. The testing periods range from once every five years, for low-hazard environments like the office computer, to every three months for equipment that is hired out. This stringent requirement of testing and tagging hire equipment every three months is also strengthened by the requirement that equipment is 'visually inspected' before *every* hire. Inspection forms part of the test & tag procedure and is more than just a case of casting your eye in the general direction of the unit as it's carried out the door. If the unit has a fixed mains cable then the full length of the cable needs to be checked over for any signs of damage and the plug inspected to ensure that the outer cable sheath hasn't been pulled back or the pins are bent, corroded or burnt.

AND THE POINT IS?

The point here is to actually give some consideration to your environment and make a sensible decision about the frequency of testing required. In fact, evaluation of your workplace is really the first step in an overall approach that all work safety authorities encourage. What is being asked is that you simply step back from the daily tasks of your business and take a look at what you do and how you do it from a safety viewpoint. Take the time, make an effort, document it and then you're well on the way to doing the right thing regarding the safety of your workplace, both for yourself and others. This is really the key point; that an assessment has been done, and that there's a plan underway for addressing safety issues. Ignorance of the regulations and your responsibilities is no protection.

Remember too, that your workplace can move

around! If you play in band, you may well soon find that the manager of the venue at your next gig wants to see the tags on all your amps, extension leads and power boards before you load in. Workplaces that have instituted an OH&S policy and are testing and tagging all their equipment will no doubt require any equipment coming onto their premises to be likewise tested.

Testing and tagging involves three basic steps. First, the visual inspection as mentioned above, for any signs of damage to cables and plugs. This is then followed by two specific electrical tests that check the continuity or bonding of any exposed earthed parts, i.e., the metal case to the plug earth pin, and then a test of the insulation resistance between the mains circuit and the protective earth, i.e., confirming the insulation between the mains circuit and the metal case. Exposed earthed parts include anything that you can touch, including things like screw heads and handles etc. In fact, there's a separate Standard that exactly defines what it means by 'can be touched'! It's called the, 'jointed test finger' and is spelt out in the Standard AS 60529 if you really want to check it out! In essence, it says if you can touch a metal part with the tip of your little finger it's considered exposed metal. In addition to these tests, extension cords, IEC cables and power boards are tested for correct polarity, ensuring that both 'ends' are wired correctly. Finally, after the inspection, the two fundamental electrical tests and the polarity test for cables are done, the application of a 'tag' completes the process. This 'tag' clearly indicates that the unit has been tested, the test date, the due date of the next test and the signature of the person who did the test.

CAN I DO IT?

The test-and-tag procedure is pretty straightforward and any competent person is allowed to do it. As a rule of thumb, 'competent' simply means that you've had training and demonstrated that



I BOUGHT IT OVERSEAS!

Deviating slightly from the topic of electrical safety – but still on the mains side of things – is an issue that's contributing to more and more equipment coming through the door of Australian workshops each day. Increasingly, people are buying directly from the USA, and although people can decide to shirk the issue of supporting the local distributor if they want, the warranty claims on such equipment will prove difficult or expensive to resolve if they're purchased cheaply overseas.

Getting around the issues of 115Vac mains voltage power supplies and plugs used in the US may seem a no-brainer to some, but to others, the discovery that putting a plug adapter onto the US plug so it fits into our Australian wall sockets is no guarantee that the unit will work, is a revelation! Unless the unit specifically has a 'universal supply' that's designed to operate from say 100 to 250Vac, you can be sure something will blow up. If you're lucky it may just be the fuse that blows. However, the chances are high that it will be something more significant that goes. In that situation, the repair costs can effectively write-off cheaper units. So it pays to fully investigate the operating mains voltage of equipment bought overseas and check that it's compatible for Australia's 230Vac before plugging it in. [And yes, you read that last bit right. Australian Standards changed Australia's 'official' mains supply to 230V a few years ago (for EU compatibility). However, each state has the right to decide for themselves what voltage they will supply and the states differ from one other. Crazy but true.]



“ Take the time, make an effort, document it and then you’re well on the way to doing the right thing regarding the safety of your workplace, both for yourself and others. ”



I BUILT IT MYSELF!

If nothing else, the internet has enabled those interested in electronics and DIY to get their feet wet. There's plenty of information available through online communities and web forums to allow anyone with the desire (and a soldering iron) to knock up a clone of some classic pieces of audio outboard. Hopefully, out of this may come the next generation of technicians and designers. So I'll try and outline a few pointers here about the mains wiring inside that kit you're building... so you'll live long enough to finish it.

First up, you can legally wire up the mains side of things *inside* a piece of equipment, so long as all the parts connected on the mains or primary side are approved for use in Australia. On items like transformers from good suppliers, you'll see the approval number to the applicable standards.

Always use a suitably rated fuse in the active side of the mains circuit and make sure you wire the fuse *before* any other parts, in particular the mains power switch. The easiest way to consistently achieve this is to use a fused IEC socket on your DIY project. This approach yields a couple of benefits. Firstly, you can use a standard off-the-shelf quality IEC lead to hook up the unit to the mains, where the correct mains wiring in this lead is

done for you. Secondly, the use of a fused socket will ensure that the first thing the active line sees inside the unit is the fuse – you can't get this wrong. Use internal wiring rated for 230Vac and always heat-shrink over your solder joints on the rear of the IEC socket, power switches and mains transformer lugs. This heat-shrink covering not only ensures that any dangerous mains voltages are insulated so you don't get an electric shock while fiddling around inside your DIY kit when it's powered up – and you will be fiddling around, I guarantee it – the heat-shrink also helps in a situation where the soldering isn't up to scratch and a dry joint leads to the wire breaking away. In this situation, the heat-shrink will hopefully cover the bare ends of the wire while it's flapping around in the unit, reducing the chance of it shorting to the case. Which leads me to the next point...

Earth the case! If the case is metal you *must* connect it to mains earth. The connection should be short and robust. Despite all the madness you can come across on the internet about grounding and earthing audio equipment, you *must* at least connect the chassis of your project to mains ground. Of course, if you're serious about safety you should take the completed unit to a service technician or electrician to have it tested and tagged.

you know what to do and how to do it. There's no prerequisite for doing a course and becoming a certified 'test 'n' tag' guy. Each state has a number of institutions such as industry training organisations and TAFEs that run test-and-tag courses. Typical cost is around \$300 and are usually completed over two evenings or wrapped up in one full day. Then, of course, you need a testing machine and a sack full of blank tags. Testing machines – which those in the know call PATs (Portable Appliance Testers) – cost anywhere between \$500 and \$1500 (some even more). The ones that hover around the \$1,000 mark are largely automated testing units. Automated testing means that you essentially plug in the unit or cable to be tested, the PAT runs the continuity, insulation and polarity tests and then simply indicates a pass or fail. Fully manual testers are available for a bit over \$300 but do require a good understanding of the testing you're doing as you need to actually read the meter and correctly interpret the results.

The economics of setting yourself up to test and tag, or contracting someone to come in and do it for you, needs to be weighed up against the amount of equipment you have and the frequency that you need to test. Certainly for those involved in hiring equipment, being certified and set up to do in-house testing could make a lot of sense.

GUN FOR HIRE

The hire situation itself is an interesting one for recording and rehearsal studios. If your studio is "hired out," meaning that if outside engineers and musicians come in and use the facilities for a fee, without any in-house staff being employed to operate the equipment, is the whole studio's equipment deemed 'for hire' and consequently all equipment subject to three-monthly testing? This lack of clarity in the interpretation of some deeper aspects of the various states' regulations certainly should encourage studio owners to

seek professional advice.

The procedures to comply with regulations around electrical safety and, in particular, testing and tagging are well understood and practiced in other industries. The construction industry, for example, is certainly in the box seat in this regard. Try walking onto a construction job with an un-tagged extension lead. If you're lucky you'll just get thrown out; unlucky and the fines could make a big dent in that year's profit sheet. Yet these same regulations apply to all industries, including the recording industry, and in time awareness and compliance will become established here too.

But it's not that difficult to put yourself ahead of the pack here by implementing an OH&S policy and electrical safety program in your workplace. The point of all this isn't about obedience to another layer of bureaucracy, but rather, preventing injury or death from electric shock... and surely that's worthwhile. ■

FURTHER READING

Australian Standards
www.standards.org.au

Australian Safety and Compensation Council
www.ascc.gov.au

Safework SA (regulating authority)
www.safework.sa.gov.au

Workcover NSW
www.workcover.nsw.gov.au

Workcover Vic
www.workcover.vic.gov.au

Workplace Standards Tasmania
www.wst.tas.gov.au/

Queensland Workplace Health and Safety
www.deir.qld.gov.au/workplace/

Western Australia Worksafe
www.docep.wa.gov.au/WorkSafe/