# GRDC PODCAST TRANSCRIPT

**Grain Storage - Silo Maintenance**

[00:00:05] **Introduction** This is a GRDC podcast.

[00:00:12] **Debra Bishop** Gas-tight sealable silos are the preferred system of grain storage and like all on-farm machinery, they require an annual maintenance health check, including pressure testing the silo. Common problems can include weather damage, wear, corrosion, or deterioration to inlet and outlet seals. Leaks can develop, an important factor to identify for effective fumigation, and also the need to check aeration vents, plumbing, fans and fittings on the sides of silos. Hello, I'm Debra Bishop. GRDC's Grain Storage Extension team suggests scheduling your annual maintenance check after you've cleaned your silo and it's empty and then, literally, starting your maintenance health check from the top, checking the roof and lid where seals can often be damaged by pecking birds or by operational use. Repairing seals relies on replacement with a quality closed-cell rubber and application of a firm adhesive which can simply be windscreen adhesive. Pressure testing is also important, as that often reveals leaks, perhaps in an aeration vent for example, which can be hard to access. So, checking pressure relief oil valves and topping them up with light hydraulic oil, if necessary, are good recommendations from the team. And remember to include a safety maintenance check around the silo's, guard rails and ladders. So, let's hear from Grain Storage Extension Project members Ben White and Alex Conway on a detailed rundown and timing for that all-important annual silo maintenance checklist.

[00:01:55] **Ben White** Well, the GRDC Grain Storage Extension team see a lot of silos and a lot of gas-tight sealable silos and of course, like any other piece of farm machinery or farm equipment, they require some regular maintenance, just to make sure that they work properly. So, we do look at all the aspects on the silo that might require attention over time, might be prone to failure and or damage, and we just go around and address all of those. And that can be just things like the seals, the sealing faces and perhaps the plumbing on a silo. It's really important to make sure that those things are all intact and operating correctly. If we're going to go and, certainly do a fumigation in a gas-tight sealable silo, we need to make sure that those components are in good order.

[00:02:33] **Debra Bishop** Absolutely, I mean Alex, can you just take us through why it's important, I suppose clearly, for the silo to seal up? Where should we be looking for those kinds of issues?

[00:02:41] **Alex Conway** Well obviously it's really important because when we're doing a fumigation, we need to ensure that we can hold the gas for a sufficient amount of time. So, we really need to make sure that those seals are performing their job properly. We do find a few pretty key culprits when we're going around and pressure testing different silos. Starting at the top of the silo, we usually see that the fill hole and the lid that goes over the top, the seal there, is often chewed out by birds. Or, damage does occur, when we're trying to pull the auger into the silo, we often see that it can be bumped or hit and yeah, the best way to rectify that is with a hammer and just try and do a bit of panel beating to straighten them back out.

[00:03:15] **Ben White** It's not hard to hit the top of the soil there, when you're down on the ground and you've got a really high auger or a conveyor that's quite awkward to shift sometimes, and a bit of damage up the top is not uncommon and certainly, the team see that a fair bit when we're getting around and doing pressure tests on silos and during workshops on farms around the country.

[00:03:33] **Debra Bishop** And with leaks, specifically foam rubber and adhesives is what we've been talking about earlier today; the importance of closed-cell rubber, can you take us through that perhaps Ben?

[00:03:41] **Ben White** Yeah certainly. The replacement seals, in a lot of cases, are pretty easily fixed to the silo and so what we'll normally do is we'll go in with a squirty bottle full of soapy water, we'll look for leaks, we'll find where those seals might have failed, and quite obviously are physically damaged. We'll take the seal off, normally peal that off with a scraper of some sort, and then as you said, the closed-cell rubber is really important because in most cases it's got a high memory, so it's not going to compress over time, it also means that the closed-cell structure of that rubber, and the profile, is kept intact and also obviously, is gas-tight. So, once we've removed the old seal, we stick down the new seal, and that's normally done with an adhesive of some sort that's quite firm and not going to release the rubber once it's stuck down. We find that windscreen adhesive is a really good option, it's a contact adhesive and once we've got the old seal off and everything prepped up, put that down both on the closed-cell rubber and then also on the sealing plate itself and stick those two together. The selection of rubber is important and of course there's a whole stack of different profiles that you can buy of that closed-cell rubber that will match whatever has been damaged.

[00:04:43] **Alex Conway** And just to extend on where we typically see those rubbers as well, like you say Ben, the different profiles we see, like on a flat-bottom silo around the access door, we often see different forms of rubber, but also on the fan sealing plate. We really do see a lot of leaks happening around those places as well; and a really easy one that is often overlooked is the vents as well. They're a little bit harder to get to, but the birds really enjoy chewing on those ones so...

[00:05:06] **Ben White** The aeration vents, yeah that's right.

[00:05:07] **Alex Conway** Yeah.

[00:05:07] **Ben White** And they can be pretty hard to get to so obviously, you know, doing a pressure test is an important thing to do. If we're sure that every other seal on the silo is in good condition and the plumbing is in good condition, in a lot of cases it can be those aeration vents, as Alex mentioned, seals can be damaged and they need to be addressed, fixed up and sorted out.

[00:05:25] **Debra Bishop** So specifically with the plumbing, you just mention that and the silos that we've been looking at, they clearly have a lot of plumbing attached to them, a lot of fittings, do they ever fail?

[00:05:32] **Ben White** Yeah, they do and certainly larger silos with a lot of fittings on them, obviously there's more areas for that to go wrong. Over time, you know, the Australian sun is pretty harsh on a lot of those fittings as well, so we do get expansion of all the metal components on the silo and sometimes that can cause these plastic or PVC components to crack and fail and so, it is important to inspect those on a regular basis. In a lot of cases, the plumbing will normally fail between the lid transition and the wall section of that plumbing, and that's always worth a look just to make sure that that is in good condition.

[00:06:04] **Debra Bishop** So I suppose annually that you're recommending definitely for the checking of your silos, but again, that would also depend on weather conditions like you say, because you can't just put it on the calendar and say "Today is a silo check day" is it?

[00:06:14] **Ben White** That's right yeah. No, that's right, it's important, I think, to annualise a check. You know, and you might do it after you've cleaned the silo out and you're getting ready for harvest and to fill a silo. The most important time is obviously before a fumigation, to make sure that all the seals are intact and the soil seals adequately. The reality is that if we do need to do some repairs, sometimes it's easier without grain in that silo as well.

[00:06:35] **Alex Conway** Yeah, I do really find, I think, the best time to be looking at this sort of thing is just before harvest, so we really do have a good handle, that, before we've loaded grain in, we are really confident that all our seals are working properly. Because as Ben mentioned, it's pretty hard to replace some of these seals once we've got a couple hundred ton of grain in the silo.

[00:06:53] **Debra Bishop** We're going to move on to the fumigation in a moment, but one more question I do want to ask you is about the importance of checking the top of the silos, and obviously, to get there you need a ladder I suppose and so a hell of a lot of safety comes into that, doesn't it?

[00:07:05] **Ben White** Look it does, and look, ladders are one of those things that are often overlooked at purchase time. They cost additional money when it comes to the silo itself, adding a ladder to a silo can increase the cost of the silo. But as you say Deb, it's really important to check the seals and certainly the structural integrity of the top of the silo, and there's no way of really doing that effectively and safely without a ladder. So, while there's a temptation to not have a ladder on a silo, we strongly recommend always buying silos with ladders fitted to them so you can safely ascend, do the work to the seals and or any mechanical work that you might need to do at the top of the silo without hiring any expensive gear or doing something silly to get up the top.

[00:07:41] **Debra Bishop** But it does involve safety harnesses?

[00:07:43] **Ben White** Yeah, look, that's right. Obviously when you've got ladders, you know, you've got cages in a lot of cases, around those letters, but yeah certainly, wearing a safety harness when you're moving at heights is essential and making sure that you've got good footwear on, making sure that everything you're going to do at the top of the silo is safe and that there's no risk of falling.

[00:07:58] **Debra Bishop** So what else should we be discussing here? I mean, valves and pressure testing, obviously, I think we should move into that area here. What is the purpose of relief valves? You know, what are they used for?

[00:08:07] **Alex Conway** So the pressure relief valve is actually on the silo. It's only typically utilised while the silo is under fumigation, so when we've got it all sealed up and, as you can imagine, it is a big steel can that does like to heat and contract both during the daytime and at night time. So, the pressure relief valve is really there just to relieve that pressure changes that occur throughout the day as the air is expanding and contracting inside the silo. It's really just to allow, and really to avoid any structural damage to the silo, just to allow pressure to relieve itself.

[00:08:38] **Ben White** And I think it's important to say that, you know, the only time that pressure relief valve really operates is when we're under fumigation. So, it doesn't need to operate all the time, our silos shouldn't be sealed up unless we're fumigating. So, it's important to point out that it's only there for a short amount of time, but it performs a very essential role.

[00:08:54] **Alex Conway** And even beyond that, it is also a very helpful tool for actually measuring pressure. So, when we are performing a pressure test, it's actually a very helpful tool, when we do pressurise the silo, we can often see the difference in oil levels in the pressure relief valve. We do a test called the 'half-life pressure test' that allows us to actually verify that that silo is sealing.

[00:09:16] **Debra Bishop** It can be pretty hard to read those oil differences on valves sometimes, can't it?

[00:09:20] **Alex Conway** It can, they come in several different formats, and some are a bit opaque, some, with the sun on them, get a bit old and a bit difficult to see through; we do find that actually having some different devices can be quite helpful. So, there's some very simple and easily accessible analogue gauges that we can use, but also digital gauges are available, and they just give us that extra level of precision when we're doing the test.

[00:09:41] **Ben White** I think it's also good for farmers to have one of these as well. So, you know as you say Deb, it is very hard to read those oil levels sometimes. If you want a bit more resolution, a bit more precision, I suppose, and you want to really know what's going on inside the silo, an analogue or a digital gauge will give you that resolution and of course, they correlate directly to what's going on in that pressure relief valve and the oil levels in there. So that 25mm oil level difference equates to 250 pascals on our analogue or digital gauge and that half-life down to 125 is 125 pascals, or the 12.5mm oil level difference. So, it's a direct correlation to what's going on in the valve, it's just that bit easier to read.

[00:10:18] **Debra Bishop** Is there any maintenance tips associated that you want to provide growers in regard to working and making sure that these relief valves are working the way they should be?

[00:10:25] **Alex Conway** Really need to check the oil level, is one we often see, it can get neglected over time. They all have a line, typically, that the oil level should be sitting at passively and yeah, just light hydraulic oil. Most growers have that lying around and it, it really is quite easy to just top that oil level up to ensure that the pressure relief valve is doing its job properly.

[00:10:44] **Debra Bishop** And a lot of these are on the market. Any tips for the comparisons between what growers might be looking for?

[00:10:50] **Ben White** Typically your manufacturer will have a valve that they normally use, and it might be that, as Alex said, that box sort of style or it might be a u-tube sort of style. I think when it comes to maintenance, as Alex said, the light hydraulic oil and ISO 46 grade oil is perfect for topping those up. So, growers have normally got that lying around and can top the oil levels up. It's all part of the silo maintenance requirements and will give them a surety that the silo is going to seal up and hold gas during a fumigation. So, all the important part of best practice when it comes to grain storage.

[00:11:20] **Debra Bishop** Where can you refer growers for more information about this silo maintenance and pressure relief valves?

[00:11:25] **Alex Conway** So there's a heap of really helpful resources on the Stored Grain website, so just go to storedgrain.com.au. There's a heap of tutorial videos, even documentation, even the GrowNotes book is a very helpful resource just for grain storage in general. So, obviously plenty of resources there, but also if you're looking to talk to a physical person, well you call the 1800 WEEVIL number and there you can get in contact with one of the Grain Storage team and they're always there, really trying to help you out in that respect.

[00:11:54] **Ben White** Yeah so look, 1800 WEEVIL, that's 1800 933 845. That'll put you in touch with your nearest grain storage specialist for GRDC and, and hopefully we'll be able to find the information that you need and if not, be able to put you in touch with someone who can. So, happy to talk to growers all across the country.

[00:12:09] **Debra Bishop** Ben, Alex, thanks a lot for your time today, good advice.

[00:12:11] **Ben White** Thank you.

[00:12:12] **Alex Conway** Thank you.

[00:12:19] **Debra Bishop** We've been listening to Grain Storage Extension Project members Ben White and Alex Conway. And you can find more information on silo maintenance and the pressure relief valves on GRDC's website and via that 1800 WEEVIL hotline, that's 1800 933 845, where you'll speak to a national team member with information about all your grain storage management needs. I'm Debra Bishop and thanks a lot for listening.