

GRAIN STORAGE FACT SHEET

CAUTION: The content of this publication provides general guidelines and does not constitute workplace health and safety (WHS) requirements or regulations. Do not act on the basis of the content of this publication alone, without first obtaining specific, independent professional advice.

STAY SAFE AROUND GRAIN STORAGE

The fundamental approach to grain storage safety is the same as for all other farming activities. The aim is to have a safe workplace for everyone on the farm, including workers, contractors, families, visitors and the owner/managers.

KEY POINTS

- ▶ Safety is a three-step process — identify hazards, assess risk and address the hazard.
- ▶ Safe grain storage starts with well thought-out design and planning.
- ▶ Consider safety features when buying new storage.
- ▶ Using the correct storage for commodities such as granular fertiliser and high-moisture grain reduces the need to enter the storage.
- ▶ Ventilate silos before entering and never enter a silo while it is being emptied.
- ▶ Use fumigants and chemicals carefully and follow the safety instructions on the label.
- ▶ Be aware of and comply with any worksafe and chemical use regulations in your state.

Start by identifying any hazards associated with the grain storage site. This involves talking with workers who use the site, taking time to thoroughly inspect the site and equipment and seeking advice and information from industry and workplace health and safety (WHS) organisations to help identify risks that may not be initially apparent.

Secondly, assess the risk of each hazard in terms of its potential severity. If an accident occurred due to the identified hazard, would it result in scratches and bruises or is there potential for someone to be seriously injured or killed?



Stuck on safety: Place warning stickers on silos near the ladder, where operators will easily see them.

PHOTO: CHRIS WARRICK, PROADVISE

The third step is to address the hazard, starting with the highest-risk hazards first. The ultimate aim is to totally remove the risk, but where that's not possible, find a way to control it. This could mean altering the way activities are carried out or providing protective equipment.

After controlling the risk as much as possible, it is important to develop a plan of action in the event that an accident does occur. For example, if a worker is exposed to phosphine gas, or another harmful chemical, ensure emergency phone numbers are readily available to get medical help.

Designing a safe storage

Regardless of the type of grain storage used, selecting a suitable site is the first consideration when designing a safe grain storage system. If the storage site is already established, assess the site for the following safety considerations and potential for improvement.

If future expansion is being considered, it may be beneficial to build on a new site and decommission the current site when it reaches the end of its working life.

Site safety considerations include:

- ▶ **Surroundings** — locate the storage site away from overhead powerlines, houses where children might play, or houses or work areas that will be affected by dust and noise from grain storage activities.
- ▶ **Access** — ensure safe access for trucks turning into and out of the site from public roads without endangering other road users.
- ▶ **Expansion** — ensure the site is clear of trees, sheds and permanent structures to allow for expansion without having to manoeuvre trucks and augers in a cramped area.
- ▶ **Drainage** — select a relatively level site for easy and safe manoeuvring of augers and trucks, but ensure sufficient drainage is available to prevent having to work in wet, slippery and boggy conditions.



Stepping to safer ladders: Safety cages and platforms significantly reduce the severity of a fall and can save lives.

Smart storage selection

Choose storage that is cost effective and practical for the volume of grain to be stored. Considering safety in the mix makes for the ultimate storage result.

Sheds and bunkers are cost-efficient options for large quantities of grain, but require a considerable amount of manual labour and dedicated equipment to empty.

Silos are comparatively less labour intensive, although the amount of manual shovelling to completely empty silos is significantly reduced by choosing cone-bottom silos or flat-bottom silos with sweep augers.

Cone-bottom silos are the obvious choice for easy and safe out-loading. They are



Protected power: All 240 volt electrical cabling and switches must be installed by a qualified electrician. Ensure they are well protected and not vulnerable to damage from machinery, such as augers.



Wired: When selecting a grain storage site, consider the surrounds and if necessary, place warning signs for hazards such as overhead power lines.

particularly beneficial if filled more than once a year — used as a buffer for harvest logistics.

Granular fertiliser, high-moisture grain and grain with a high percentage of screenings does not empty from standard silos well, which commonly leads to people climbing into the silo to shovel out the stubborn grain. It is better to only store these types of commodities in silos with steeper cone



Safe and sound on the ground: Ground-operated lids reduce the number of times a silo has to be climbed, but most situations require a climb to secure the lid for effective fumigation.

bottoms or sheds where they can be out-loaded with a front-end loader.

Manufacturers are well placed to provide advice on choosing suitable storage types for various commodities.

Safety features on silos

Before buying a silo, consider the safety features on offer.

In most cases ladders are still required to monitor grain in the top of the silo. State-based WHS requirements for ladders exist, but as a guide look for ladders with a safety cage and platforms every two metres, handrails on the top of the silo and a system that prevents children climbing the ladder.

Features that limit the need to climb the ladder are a valuable addition to silos and include:

- Sight glasses or a device to indicate the level of grain inside the silo.
- A system for applying fumigation at ground level, which will distribute the gas to the headspace in the silo.
- Lids that can be opened and closed from the ground. (Be aware that few ground-operated lids can be closed and latched tight enough to be gas-tight for fumigation. Most lids still require a climb to the top of the silo to inspect rubber seals and latch the lid before the silo will meet a half-life pressure test, required for effective fumigation. When checking this point with manufacturers, refer to AS2628 — the Australian Standard for gas-tight silos.)

STORED GRAIN FUMIGANTS AND CHEMICALS

Even though alternative fumigants are becoming more readily available, phosphine is still widely relied upon to control pests in stored grain.

Phosphine is also one of the most dangerous products used on farm, which is why it is classed as a schedule seven poison, indicated on the label — DANGEROUS POISON.

As a minimum requirement, the label directs the use of cotton overalls buttoned to the neck and wrist, eye protection, elbow-length PVC gloves and a breathing respirator with a combined dust and gas cartridge.

Never rely on the odour of phosphine to determine if the atmosphere is safe. The odour threshold of phosphine (for those that can smell it) is 2 parts per million (ppm). The threshold limit value for a time weighted average is 0.3ppm and the short-term exposure limit is 1ppm. This means by the time workers can smell phosphine (2ppm) the gas concentration level is already exceeding the safe exposure limits.



Life saver: Personal phosphine monitors sound an alarm if harmful concentration levels are detected.



Always read the product label and Material Safety Data Sheet (MSDS) for safety information and required personal protection equipment (PPE).

The respirator must be fitted with a combined dust and gas cartridge (canister) with an international code that includes the letter 'B', which stands for inorganic gas. The number in the code refers to the capacity of the cartridge, for example an ABE1 has a shorter life span than an ABE2.

Personal phosphine monitors are available and easy to use. The monitors simply clip onto the operator's collar or top pocket (close to their nose and mouth) and will sound an alarm if more than 0.3ppm is detected and sound another alarm if more than 0.6ppm is detected. Price may deter growers who only use phosphine occasionally, but these handy devices can

potentially save a life, so are worth serious consideration.

Place a warning sign on the silo to tell others to stay away. The sign must contain the words DANGER — POISONOUS GAS, KEEP AWAY.



Warning sign: During fumigation, never attempt to enter the silo until after it has been ventilated as required by the fumigant label.

Safety on the inside

When working in a potentially dangerous environment, such as inside a silo, it is preferable to have another person outside to call if help is needed. Before entering the silo, ensure you are well hydrated and wearing suitable clothing to do the job (for example, sturdy, enclosed footwear). Avoid heat stress by carrying out the job during a cool time of the day so the internal silo temperature is more comfortable.

Before entering a silo:

- ▶ Open all lids and ventilation points well before entering to allow as much free-flowing air as possible. Damp grain, especially canola, will produce carbon dioxide and carbon monoxide at toxic levels. Monitors are available to test for these gases.
- ▶ Ensure all augers or conveyers filling or emptying the silo are stopped and cannot be started by someone else while you are in the silo.
- ▶ Stop and think if there is any way the job can be done from outside the silo.

- ▶ If entry is not through an access door at ground level, ensure the ladder has an appropriate safety cage. If not, a certified safety harness must be worn.

While working inside a silo:

- ▶ Have someone outside the silo to assist and get help if required.
- ▶ Wear an appropriate dust mask to prevent fine dust particles entering your lungs.
- ▶ Stay on the ladder above the level of compacted or bridged grain while dislodging it.



PHOTO: CHRIS WARRICK, PROADVICE

Room for movement: Having a large gravelled area around silos enables machinery to be moved into position safely. Always fill silos from the centre to avoid uneven loading.

- ▶ If you become trapped under grain, avoid moving and don't panic as this will worsen the problem — try to remain calm and call for help.

Filling and emptying

Always fill and empty silos from the middle. Filling or emptying a silo from the sides will cause uneven loading on the silo, potentially causing structural failure.

Ensure augers and conveyors are fitted with adequate guarding.

Wear high-visibility clothing while working around moving machinery to reduce the chance of being run over.

Ensure all workers are trained to safely operate the grain storage facilities, filling and emptying equipment and associated machinery.

Fatigue and stress are common during harvest; ensure all operators get enough rest or downtime to avoid fatigue and stress-related accidents.

State Worksafe organisations and government WHS contacts

Safe Work Australia

1300 551 832
www.safeworkaustralia.gov.au

WorkCover Authority of NSW

13 10 50
www.workcover.nsw.gov.au

WorkCover SA

13 18 55
www.workcover.com

Workplace Health and Safety QLD

1300 369 915
www.deir.qld.gov.au/workplace/index.htm

WorkSafe Tasmania

1300 366 322
www.workplacestandards.tas.gov.au

NT WorkSafe

1800 019 115
www.worksafe.nt.gov.au

WorkSafe Victoria

1800 136 089
www.worksafe.vic.gov.au

WorkSafe WA

1300 30 78 77
www.docep.wa.gov.au/WorkSafe

WorkSafe ACT

(02) 6207 3000
www.worksafety.act.gov.au

USEFUL RESOURCES

GRDC Grain storage extension project

www.storedgrain.com.au

Grain Trade Australia

02 9235 2155
www.graintrade.org.au

Graintec Scientific Pty Ltd

07 4638 7666
www.graintec.com.au

GRAIN STORAGE SPECIALISTS

National

1800 weevil (1800 933 845)

QLD and northern NSW, Philip Burrill

0427 696 500
 Email philip.burrill@daff.qld.gov.au

Southern NSW, VIC, SA and TAS, Peter Botta

0417 501 890
 Email pbotta@bigpond.com

WA, Ben White

1800 933 845
 Email ben@storedgrain.com.au

GRAIN BIOSECURITY CONTACTS

Plant Health Australia

02 6215 7700
 Email biosecurity@phau.com.au
www.planthealthaustralia.com.au

GRDC PROJECT CODE

PAD00001

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