



Fact Sheet No. 21  
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NEED TO KNOW INFORMATION FOR  
AGRICULTURAL PRODUCERS

# GRAIN ENTRAPMENT

WHEN A WORKER BECOMES HELPLESSLY CAUGHT OR BURIED IN GRAIN.

## INTRODUCTION

In Canada, there is little information on how often grain entrapment occurs. CAIR reports 29 deaths nationwide due to grain suffocation from 1990-2008, but this is likely an understatement. In 2015, 6 fatalities and at least 2 rescue incidents were reported in the media.

In the U.S., studies have found that

- Grain entrapment is the leading cause of death in grain storage
- Entering a bin to break up spoiled grain while unloading equipment is operating is the leading cause of grain entrapment
- More than half of grain entrapments are fatal

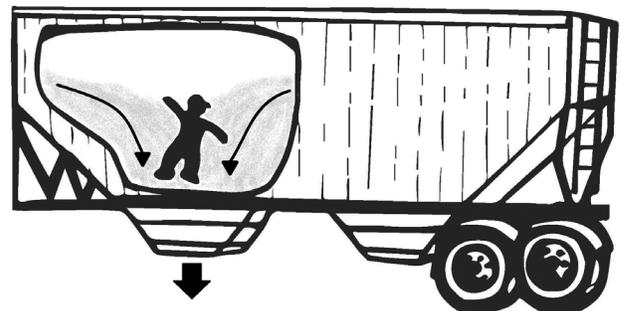
## TYPES OF GRAIN ENTRAPMENT

### FLOWING GRAIN:

Is the action of grain moving within, into or out of grain storage (for example a grain bin) or a grain transport vehicles (GTV). Flowing grain acts quite differently from standing grain.

**Unloading grain** moves in a down and inward funnel motion that causes a suction-like action. The pull of the grain can cause an individual to become covered to their knees within 3-4 seconds or completely engulfed within 20 seconds. Unless the flow of grain can be stopped very quickly, within a very short period it is unlikely that anyone will be strong enough to pull an engulfed individual out.

**Loading grain** can also pose a serious risk. For instance, a combine can empty its tank (210 bushels) in less than two minutes. This flow rate could cover a person in seconds.



## COLLAPSE OF GRAIN BRIDGE:

A grain bridge is a hardened layer of spoiled grain with a hollow pocket or cavity beneath. An individual may enter the grain storage area to break up the crust, adding weight that causes the crust to cave in. The collapse of the grain bridge may result in the victim falling into the hollow area below where they become buried by grain.



## AVALANCHE OF GRAIN WALL:

Spoiled grain can also stick to the sides of a bin, creating a wall of grain, which is exposed by unloading. An individual may enter the bin to break up the wall to remove the rest of the grain, leading to an avalanche that buries the individual.



# Prevention and Safety Measures

Wear personal protective equipment appropriate to the task; this might include a mask, respirator, non-slip work boots/shoes, and even eye protection.

## #1 ZERO ENTRY

- The safest approach is to not enter grain storage or grain transport vehicles when loading or unloading grain.
- Use equipment like grain vacuums and grain augers to eliminate the need to enter a grain bin or truck.
- Use a shovel or long pole to check for and break up crust or grain bridges from outside the bin.
- Take steps to avoid falling into a grain bin or vehicle – Do NOT overreach.
- Keep children from entering grain bins or grain transport vehicles. Move ladders out of children's reach and lock bin access openings.
- Explain the dangers of flowing grain to farm workers and family members.
- Monitor the condition of grain to avoid spoiling.

## #2 IF ABSOLUTELY NECESSARY TO ENTER GRAIN BIN OR GRAIN TRUCK

- Do not work alone. Have another worker, whose job is to observe, present at all times. This worker should be able to activate emergency services. As a minimum they should know how to stop any grain handling equipment, be able to close any chutes, and have a cell phone to call for help. But remember that rescue can be very difficult and calling for help is a poor substitute for working safe in the first place.
- Shut down and lock out grain handling equipment before entering a grain bin or grain transport vehicle.
- Take precautionary steps before entering a grain bin or truck. Use a shovel or long pole to check for and break up crust or grain bridges from outside the bin.
- When entering a bin, wear a harness that is connected to a lifeline and secured outside the bin.
- Do not stand below a wall of spoiled grain or beside steeply piled grain.
- Wear personal protective equipment (e.g. masks, respirators, non-slip work boots/shoes, eye projection).
- Avoidance of being engulfed by grain is the best plan but also prepare for emergencies. Create and discuss a rescue plan with workers.

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## What is the Network?

In 1988, the Agricultural Health & Safety Network (The Network) began as a joint venture between the Centre for Agricultural Medicine, Saskatchewan Association of Rural Municipalities (RM) and six Saskatchewan Rural Municipalities. The Network was founded with the mission “to improve health and safety on the farm through education, service and evaluation research.”

The Network works to develop community partnerships and relationships with local RMs and various organizations to increase awareness of farm health and safety. Some examples of partnerships include: working with RMs to host health clinics for farmers, attending community farm safety days, collaborating with researchers to produce applicable resources for farm families, and being present at a variety of tradeshows and presentations where the agriculture community is present.

The partnership that member RMs provide is truly the foundation of the Network as leverage to attract additional resources to better serve Saskatchewan farmers, their families and their workers.

<http://aghealth.usask.ca>

*Illustrations by Miranda Dziaduck*