

## POST-FIRE GRAIN ISSUES

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### INTRODUCTION

The grain industry has experienced an increase in grain fires over the past few years. This increase can be attributed to one or more of the following:

- Higher volume of grain,
- Low grain quality out of the field,
- Larger storage structures with aeration challenges, and
- Carryover/longer storage period due to market conditions.



### **COMMON CONTRIBUTING FACTORS**

1. *Not checking the bin every week or two.*
2. *Not properly coring the bin or not coring it soon enough.*
3. *Dumping poor quality grain or wet grain back in bin after coring it.*
4. *No temp or CO2 monitoring systems*
5. *Grain flat storage tends to be where some of the worst grain is stored. The poorer quality grain should be the first moved to market.*
6. *Grain owner tries to handle serious problems themselves and are not successful.*
7. *Late reporting of claim after insured tries to handle themselves and the salvage company not brought in soon enough.*
8. *Fire department use of excessive water on the grain or use of foam that is not environmentally friendly.*

### MOVING BURNING/DAMAGED GRAIN FROM STRUCTURES

Attention can shift to moving the grain and separating the undamaged and damaged grain once the fire is under control and the site is deemed safe by local authorities. Often, the best we can hope for is to lessen the amount of the discount; have something we can sell for salvage; or a safe and bendable material to be added back when marketed.

The grain fire is not under control however, until the grain is moved from the structure.

## POTENTIAL STORAGE ISSUES ONCE GRAIN IS REMOVED



Varying conditions of grain are found as it is removed from the structure. A strategy is needed to optimize the value of what is left. This process should involve the insurance company and an expert salvage operation. The use of specialized equipment will segregate the grain. Where to store the segregated grain is another concern that will need to be addressed.

Various screener methods are often used first and are effective.

There is some overlap, but mainly 4 variations of grain remain after a grain fire:

**1) Heavy Burn Grain, Dark Hard Chunks:**

These “chunks need to be screened from the removed grain to get the hot chunks out. This is where the heat and fire are generated from. The so-called trick to this is removing the dark hot chunks without damaging or co-mingling further the grain that is left.

The issue we see it that it only takes a small amount of black hard, smoking chunks to contaminate the remaining grain in the structure. This means decent quality grain now has smoke smell or COFO, and there could be heavy discounts or even rejections by receivers for the COFO damage grain. Key point here is to try and remove as much of the worst grain first. Sometimes easier said than done.



**2) Damaged Grain with “Salt and Pepper” Look:** Burnt kernels are co-mingled in with undamaged grain. Hard to get those out, although one would have to consider the option of continued screening that may remove some, vs market loss.

**3) Commercially objectionable foreign odors (COFO):** Good or previous condition corn that has a smell due to being in the same structure with the fire. This grain needs to be graded and stored so as not to contaminate other grain, while preserving any value it has. Aeration may help make a blend able product.

**4) No damage:** Grain pulled, drained, loaded out from periphery of structure with little or no damage. This grain usually can be moved to a regular market or stored, depending on what is available. There might be slight COFO or odor issues, but discounts such that additional are not efficient or cost effective.

## DECISION AND ACTION

A big factor in all of this is where to put this grain with varying degrees of damage. Not much of an issue in smaller structures. There could be 100,000 to 1,000,000 bushels in larger bins and flats.

Cost of additional handle versus improved discounts is a significant consideration. What would the net gain of all the additional handle and storage be?

Even heavy damage grain from fire could have some value when properly handled.

### Various potential markets

Salvage and insurance claims teams can help find and negotiate markets. For example:

1. The ethanol market can absorb damaged corn to a greater degree or at less discount than regular markets.
2. Roasters can use damaged soybeans where other traditional markets may not.
3. Small grains can be used by pet litter manufacturers.
4. Then there are also the feed markets. Cattle, hogs, and possibly poultry depending on condition.
5. In worst case scenarios extremely, damaged grain could be field spread for the freight costs.

A last-ditch effort.



The experts have the knowledge in these local markets or feeders large enough to handle large quantities of damaged grain.

### Blending opportunities. Knowing what is available in various markets.

Most large grain operations are blending grain. Not all of one crop or storage year is of equal quality. Large grain operations make money by blending and “getting rid of” the poorer quality grain within grading tolerance as they ship by truck or rail.

There are always tolerances driven by grade on shipped corn. Whether this truck, rail, or barge. Good blending operations do this in the normal course of business and this aspect should be explored in depth.

In some cases, paying additional transportation costs to move damaged grain to a better blending facility is cost effective.

In markets where available, river terminals may be an option. Large river terminals are always open to “blend” grain. The benefit here is the larger volumes those terminals can take. The down side is location and freight.

## BUNKER AND PILE ISSUES

The main issue is how long will damaged grain keep after being put in piles. The weather and the time of year are major factors. Some sort of temperature monitoring and aeration systems are needed to maintain grain quality.

Piles have potential for substantial additional cost on put down and pick up, as well as additional waste.



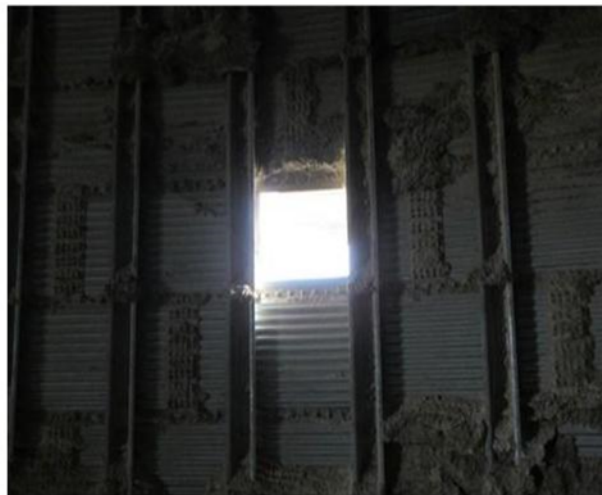
## STRUCTURE ASSESSMENT

Any structure where there is a serious grain fire must be thoroughly inspected by a qualified contractor before being put back in service. Often additional structural issues are revealed when removing the grain. Structural and non-structural components are often cut or removed to gain access to the fire and grain. Heat from the fire can also weaken supports and cause distortion of beams. Heat will spall concrete and weaken foundations. Significant problems may require an engineering assessment and inspection to help determine the extent of damage and reparability of the structure.

### Common required repairs to bins



Side wall sheet damage and sheets with heat Damage



Side wall sheet replacement where access holes were cut to get grain and fire out



Access cut in bin side wall sheet to get at burning grain column



Air floor damage from heat, and process of removing grain.

Smoke ring along the interior of bins provide an accurate depiction of where grain level was at the time of the fire. Most steel bins can be put back into use with proper repairs.

The bottom sections of the interior bin stiffeners if cut to provide loader access should be replaced. In addition, bottom sections of the stiffeners on each side of any loader door should also be replaced.

Bin wall sheeting at any loader door access and at the drainage hole should be replaced. Existing fasteners for connecting those sheets should be replaced due to the possibility they may have been overloaded during the unloading process.

Bin wall sheeting with discoloration due to heat damage should be replaced. Heat can damage bolt seal washers and wall sheet sealant that will need to be replaced to avoid future water leaks.

Aeration floors should be inspected, and the damaged floor sections replaced.

Deformed sections of interior ladders should be replaced.

There could also be additional electrical inspection as well to temp cables and roof fans. Bin interiors will need to be cleaned to remove soot, smoke and resin residue from interior and exterior surfaces. This is commonly done by media blasting the affected areas. Typically, the roof interior and upper areas are most affected by fire residue, but damage can be at all levels including the floor.

After repairs. Initial filling of the bin after repairs should be observed by plant personnel so that if any deformations or movement is detected the bin can immediately be emptied. Regular monitoring of the bin should take place after the initial fill so that changes in bin condition can be identified early

### Common required repairs to flat storage



Holes cut for access to fire or smoke venting repaired



Interior support structures evaluated for heat or deformation from fire and unloading forces.



Aeration transitions inspected for damage and repaired



Air tubes inspected for damage and repaired



Older asphalt flat building floors may require close inspection from heavy equipment traffic



Out of condition grain caused reclaim conveyor belt in tunnel to burn



This concrete tunnel ceiling will need engineering and reclaim equipment replaced



Close inspection for heat and fire damage to peripheral equipment, conveyors and support towers at vent points

In non-bunkered or lined buildings, checks should be made for evidence of compression failure of the webs and bottom flanges of the main beams at column support locations (many times deformed by heavy equipment used to remove grain or heat). Inspection for evidence of any damage to the roof. Structurally weaker components such as the purlins of covering, roof cladding (original metal panels) or wall cladding are also often damaged by heat or grain removal equipment.

If fires are intense enough, the structural members can permanently deform. Warping can also occur during fire fighting operations if water is sprayed on heated beams causing them to rapidly cool.

### Commonly required repairs to bunker storage



Like flat storage, bunker fires can cause significant damage to fill and unload equipment, structural floor and sidewall support (concrete damage). Major heat and fire will also damage the fill tower. All components may require engineering inspection and repair protocols.

### CONCLUSION

As we have seen, grain fires cause significant issues with the grain as well as the various structures where the burning or hot/out-of-condition grain is stored. However, we also see that there are ways to deal with and mitigate these damages. The very best result is always involving your insurance and salvage experts early.

Call or email the NWAG hotline with questions at [GrainTaskForce1@nationwide.com](mailto:GrainTaskForce1@nationwide.com) .