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4-1-1964

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Recommended Citation

Adler, T. A., "Safety in Processing Plants" (1964). *Proceedings of the Short Course for Seedsmen*. 124.
<https://scholarsjunction.msstate.edu/seedsmen-short-course/124>

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SAFETY IN PROCESSING PLANTS

Tom A. Adler^{1/}

It is a compliment to my company and a decided pleasure for me that we should be asked to participate in your program. Years of active work in property and life protection and especially as it relates to our nation's grain plants, has given me a great respect and admiration for the men behind this industry and for their accomplishments.

The time was that most insurance underwriters either turned thumbs down on a grain milling risk or carefully scrutinized every phase of its operation before accepting any line of property protection on it. Through the concern and efforts of men of integrity heading these plants, much progress has been made in reducing hazards formerly closely associated with it. It has been a privilege and certainly one we are very proud of to be a part of the hazard reducing effort. It has been my personal observation that grain men everywhere are just nice people to be with. The broad reaches of this nation's grain industries continues to branch forth new progress and specialization. Exposures to fire loss and to accidental injuries too have kept pace with processes development. We are convinced more than ever that dealing in the commodities of this industry requires constant vigilance, and more than ordinary care must be exercised to maintain it through its growing pains and thereafter. First the seed, and then grains and their products are the fundamental requirements of peoples of all nations. Protection of grade, quality and purity are essential. Protection against damage and loss by fire and assurance of safe plant operations are kindred to quality and purity control.

The assigned topic for this period is "Safety in Processing Plants". I shall endeavor to confine my remarks to seed processing and handling although I may also use the term grains occasionally. When considering fire hazards normally associated with storing, processing, drying, cleaning or milling processes, it makes little difference whether the term seed house or grain house is used. Germination factors of seeds are highly important items to seedsmen, but in so far as fire safety measures and accident prevention are concerned, either term is suitable. Perhaps the one difference deals mainly with damage-ability of seeds versus grains. We will consider this a little later in this discussion.

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Ignition temperature for most grains and/or seed is 329° F. Charring will occur to the fibrous dust at temperatures as low as 250° F. We can readily see that these are relatively low temperatures when we consider that it requires about 600° F. to ignite common news print paper. This ease of ignition certainly gives reason for caution and care wherever seeds and grains are handled or processed. I know that you would not intentionally permit a condition which could create temperatures in your stored commodities even approaching 250° F. I know that you would not intentionally, but unintentionally I wonder if chances are not being taken where even much higher temperatures could exist or be caused to happen. Let us examine a few possibilities where because of a careless act or a lack of understanding, these temperatures and possible fire may be caused to occur.

"What are some of the common conditions which might lead to ignition temperature requirements of the commodities handled in our plants?" If you have pencil and note paper handy, jot these down, then check them in your plants at your first opportunity. Light bulbs.....Frayed insulation of any electric wiring.....Dust settled out in fuse cabinets and on contacts of motor starters.....A portable or extension cord light without a good dust tight outer globe.....A heat lamp used for spot heating perhaps at the scale or bagging machine.....A space heater with open flame or electric resistance element.....A motor with ventilation ports and coils clogged with dust.....Bagged or binned uncleaned seeds containing stems and leaves.....High moisture stock in bins.....Loose or bent cups in a bucket elevator.....Bearings that haven't been inspected or perhaps lubricated for weeks.....Poorly designed V-belt drives.....Smoking in the cleaner room or in the process area.....Insecticides applicators.....and many more. The list can be much longer but you now have the idea I wish to convey. These and any other condition of fire hazard can suddenly be the cause of ignition and just as suddenly you are temporarily or permanently out of business.

Forklift trucks can offer great advantages in moving stock and in man-hours of arduous labor saving. But forklift trucks, with internal combustion engines requires that they be recognized as a potential fire source. The manifold and exhaust may exceed ignition temperature requirements for the dust it is subject to. Hot carbon leaking from the exhaust can become imbedded in piled stock or sacks. A hazard more common than these two is related to the engine fuel. Gasoline has a flash point of -45° F. Highly combustible vapor will be released at this temperature or higher. Any tiny spark or the heat of friction can immediately set off a flash in gasoline vapor. Fuel lines must be checked frequently for leaks. Engine must NEVER be refueled while the engine is running or when the truck is inside a building of your plants. Minor spilling of the fuel can cause a sudden blaze to not alone destroy the truck but to injure

your employee and perhaps destroy your plant. A word of warning too, regarding operation. Carelessness in the operation of these trucks can cause serious injury to the driver and to others. Like other mechanical machines, care and intelligent operation will prolong their useful life. The opposite might cost in dollars and lives. Any one of these items can cause a heat source to exist or be responsible for a fire. No one wants a fire to destroy his business. No one intentionally will permit a condition of accident or fire hazard to jeopardize life or property. A first approach to reducing the chance of either is a more conscientious effort to recognize the likely causes and then see that they do not exist.

Bear in mind that every plant represented by you, gentlemen, is powered by electricity. You may have heard it said that "Electricity does not cost, it pays". On the basis of efficient power, perhaps this statement is true. Nevertheless, electricity is also one of the most powerful destructive forces known. It is destructive to life and to property when its path for productive use is not insulated every inch of its travel. High energy sparks and heat of uncontrolled electricity can burn and destroy anything combustible. Earlier, we spoke of the low ignition temperature requirement of grain and its fibrous dust. This fact requires a consideration for safe use of electricity much more pronounced than ordinary. The mere attachment of electric conductors to a motor or its starter will probably permit its operation. Without a knowledge and application of this knowledge in circuit installation, however, safe use of electricity is not possible. For the avoidance of shock injury and the avoidance of fire hazards, we urge you to employ only qualified electricians and not rely on any other for safe circuit and device operation.

Little things like a light bulb may not be thought of as a fire source. Where we are dealing in grains and seeds and in the dust created by their handling, a light bulb can create surface temperatures sufficient to burn any dust settling on it. Dust tight fixtures with their outer glass globes are engineered to protect against this circumstance. Their choice for use throughout a dusty area of your plant is a very wise one. I not only suggest, but I urge you to consider the dangers of an open light bulb on an extension cord. In any grain or seed house, extension lights for portable use should be equipped with a substantial dust tight fixture approved for the purpose. Another thing, have a designated place for storing extension lights and check them frequently to make certain that there is no fault in the cord or fixture.

Grain and seed drying can involve several likely sources for fire to develop. A clean dryer, carefully maintained will materially reduce this hazard. Sensitive heat detecting elements located in vulnerable spots within a dryer can be used to detect the presence of high temperature and sound an alarm or shut down the operation until the trouble is corrected. These conditions we have

mentioned are likely sources of fire. Not mentioned as a likely source was housekeeping. Nevertheless, housekeeping in very exacting measures is perhaps as demanding of attention as any other single item of fire protection. Where housekeeping is neglected and where webs, dust, paper bags and scrap, burlap or other combustible refuse are permitted to accumulate, should ignition occur from any source, rapid fire spread and entire plant destruction can be expected.

Damageability of seeds was mentioned earlier. Let us see what this could mean to us. Where grain seeds are involved in a fire, damageability becomes a most important factor both to you and to your insurance carrier. Seeds damaged by smoke, water or odor contamination are usually degraded from seed value to sample grade grain. If treated, they can drop in value to zero. The results of even a small fire could find you without stock for your customers. A lost customer is hard to win back.

Let us get down to some brass tacks in this fire prevention business. First of all may I suggest that we all accept as a fact that "Fire Prevention is Everyone's Business". From that start we can work singularly and together to practice what will benefit our lives, our pocket book and our businesses. All large fires are small at their beginning. Fires account for too staggering a loss in this nation of ours. These fires need not happen. The majority of them can be prevented from occurring. These figures I am about to quote are not estimates or educated guesses, they are the result of compiled figures of the NFPA, and are facts. In 1963 this nation suffered fire loss of almost two billion dollars. There were 2,275,790 fires in the United States. 12,800 lives were lost in fires in these 12 months. 4,000 of these were children. In the U.S. the average daily fire toll of lives lost by fire is 32. The fire toll to structures has reached a daily average of 1,500 homes, 12 schools, 9 churches, 5 hospitals and nursing homes, 114 stores and 112 industrial plants. Unless fire prevention is accepted and practiced by more people in all walks of life, these figures will most surely increase. No accurate report is available on the number of injuries sustained but a fair estimate would place it in the hundreds of thousands yearly. Why should people have to be reminded of fire hazards in their homes and places of business when the evidence of fires' trickiness and destructiveness is so frequently demonstrated. Frankly, we do not know the answer. But it is sad to think that an awakening will only result after an experience to ourselves or to a loved one in our family.

If you listed the items mentioned earlier, you have a partial check list to work from in correcting possible fire sources in your places of business. Basically, prevention means "to ward off loss or harm by means of previous measures". Prevention is practiced in several ways by all of you I am sure, to reduce the chance of errors and loss in bookkeeping, in driving on the highways, and while stalking game in a wooded area. Prevention is an absolute

necessity for the avoidance of injury whether financial or personal. Not to practice it is being bold and without judgment. The same zeal can be applied to preventing causes of fire and for the occurrence of accidents in the plants which earns us a livelihood.

I have not meant to be harsh in my remarks but it was intentional in placing before you some things to think about and a base on which corrective action can be taken. A hazard can be explained as "an exposure to the chance of loss or harm". This exposure I believe, can be materially reduced and made harmless only with a will and intent to bring it about through planning and practice. The benefits are to those who will measure and fit prevention in its place.

Permit me to go back for a moment to the electrical hazards and correction of some common conditions which generally lead to device breakdowns and motor failures. These equipments and devices in your plants are essential to the plant's operation. Every breakdown in electric equipments or circuit components is placing an exposure to more serious loss on your plant and on the personnel who operate them. When a motor starter fails to function or should a motor burn out, the minimum result is a costly repair and time delay. The maximum could be the complete destruction of a building and its contents. Care and proper maintenance to all electrical equipments including motors can usually void the chance of any unnecessary business interruption. Let me suggest a few important items of maintenance and care which should be attended to as preventive maintenance. (a) Keep all electric apparatus and devices clean inside and outside any enclosing cabinet or frame. Where other than totally enclosed motors are in use, inspect them for worn or damaged insulation. This may require disassembly of the motor, but remember that dust is abrasive and can do great harm to minor insulation on motor coils. (b) Avoid using high pressure air to clean dust from motors. This sometimes can do greater damage to the insulation. Do not overload a motor beyond its name plate rating. (c) Make sure that overload heaters are properly sized for maximum protection. (d) See that terminal connections are made up tight and are provided with sufficient tape insulation inside the motor terminal box. Vibration can cause wear and tear to taped terminals resulting in a grounded circuit conductor, single phasing of the motor and probable motor burnout. (e) Ground the conduit and all other non-current carrying components of all circuits. This will greatly reduce the chance of shock injury and will give assurance of quick operation of fuses or breakers in event of a live circuit conductor becoming grounded. (f) Even before there is doubt, make sure that voltage is maintained at the rated pressure prescribed for the service. Your power company will usually be glad to install a recording volt meter on your service lines. Such a meter will give immediate indication

of any serious fluctuations in voltage, and corrections can be made before damage is done to your inside equipments. (g) Do not trust electrical repairs to any other than a qualified electrician. Even then, make certain that he knows and follows recognized code procedures.

Gentlemen, the interest that you display in safe practices in your plants, whether they be regarding accident prevention or measures for reducing the chance of fire occurrence will be contagious and spread to others around you. Talk prevention and set the example which will be noticed and respected. I wonder how many of you have ever given thought to the advantage you might gain by closer contact with your fire department. Perhaps some of you or some of your personnel are volunteer firemen. Those who are, will be quick to recognize the great benefit and advantage to fire combat when you know something about the interior of the building in advance of actual combat of flames. Your fire department will usually welcome an opportunity to dry run your plant and become familiar with all the interior. The chances are that such a tour will be the topic of discussion at more than one subsequent fire hall meeting. You can be doing yourself and your department a great favor in arranging for such a tour and personally pointing out the location of entry ways and exits, electric services, stairs or elevators, and other features of your building plan.

Today, in any discussion of fire prevention and safety measure, a most important omission is made unless the severe fire hazards associated with welding and metal cutting is given mention. In fact, this item could take up a full period at any meeting where fire protection is being discussed. Fires set from these uses of a torch are occurring at a rate far beyond reason. Fires and resulting property loss are frequent and costly, but all too frequently, lives are lost and severe injuries are sustained in explosions resulting from a careless act with a welding torch. Bins, hoppers, tanks, elevator stands and buildings themselves in our grain facilities all contain appreciable amounts of highly combustible dust. The torch can set off immediate ignition. The hot slag will spit from the point where the torch makes contact to distances of 40/50 feet away. Any particle of this slag falling in grain or in the dust of grains can set off a fire or set up a smoldering mass which will be whipped into flame with a slight breeze or wind. I honestly believe that the dangers of these torches are not understood by a great many people who attempt to use them. The danger just cannot be understood or the chances that are now being taken would never be attempted. I mentioned that an entire period could be devoted to this subject. Time won't permit this now. Nevertheless, if a few simple rules will be understood and practiced, fires and deadly explosions from these causes could be completely and forever cured. Remember, if you will, three time elements of safety. BEFORE - DURING - and AFTER.

Dismantle and do the job out of doors wherever possible even if this method does require a little extra effort. But when it is absolutely necessary to do the job inside, do it during the early daytime hours. Never, but never close your plant and leave it unattended and without a watchman after a welding job has been done. BEFORE.....Before attempting a job, clean the area thoroughly. Stop all machines, all conveyors, elevator legs, etc., and plug all spouting or holes where hot slag might fall. DURING.....While doing the job, use flame proof tarpaulin or other suitable covering over bagged or loose stock around and under the spot job. Wet down the floor and keep a watchman with fire extinguisher ready while the job is in process. AFTER.....Keep a watchful lookout for smoldering fires not alone in the immediate area of the job but wherever hot slag or sparks could have been thrown. The front office and responsible supervisory personnel should be given notice of any proposed welding or cutting and the job should be done only after those persons have inspected the area and have given their consent and approval. These brief statements concerning safe practices for use of a welding torch only sum up to good judgment for preventing a possible loss or injury. It is a means for warding off harm by means of previous measures. Thank you and good fortune to you.....