Fatality Investigation Report: Hay Processing Foreman Killed in Fall

Fatality Assessment and Control Evaluation (FACE)
Safety & Health Assessment & Research for Prevention
Washington State Department of Labor and Industries

Report # 52-3-99

Night Foreman Killed After Falling from a Hay De-Stacker, in Washington State.

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SUMMARY

On March 9, 1998, a 24-year-old night-shift foreman (the victim) died of injuries when he fell approximately 13-15 feet from a piece of equipment known as a "hay de-stacker". The victim had been trying to clear a "jammed" hay bale on top of the de-stacker when he was pinned in the machine's sweep arm mechanism. After some effort, his fellow employees released him from the machine, but the hay bales that he had been standing on collapsed and he fell head first, landing on the steel decking of the bale staging platform. Emergency medical persons responded and transported the victim to an area hospital, where he later died from head injuries suffered in the fall.

To prevent future similar occurrences, the Washington State Fatality Assessment & Control Evaluation (FACE) Investigative team concluded, that persons working with machinery, should follow these guidelines:

- **A Lockout /Tagout program should be instituted to protect employees from hazardous energy when working on machines, equipment or processes.**

- **Anytime an individual has a need to work on a piece of machinery or equipment, then that piece of machinery or equipment must be shut down, turned off and locked out.**

- **Employers should provide training and education related to the hazards of energized equipment, provide an understanding of the equipment safeguards and the basics of lockout/tagout.**

- **Routine audits/inspections should be performed on the facility's "Energy Control Program/Lockout-Tagout Program".**

- **When new, used or reconditioned equipment is introduced to the work place, a review of safety precautions should be conducted in conjunction with the equipment manufacturer. The review should include any and all regulatory compliance parameters that apply to the equipment and the operation of the equipment.**

- **Safe access should be provided, such as ladders, platforms, etc. with appropriate fall prevention/fall protection measures, to allow operators to effectively deal with equipment/machine issues.**

INTRODUCTION

On March 24, 1998, the Washington State FACE Program was notified by WISHA* (Washington Industrial Safety & Health Administration) of the death of a 24 year-old night foreman which occurred on March 19th at a hay reprocessing facility. The Washington FACE Field Investigation team met with the regional WISHA representative assigned to this case. After reviewing the case with WISHA, the WA FACE team made arrangements with the facility to conduct an incident investigation.

A NIOSH** FACE Investigator accompanied the Washington FACE Investigation team to the facility where the fatality took place. The facility processes "American-style" size and weight hay bales (about 140 lbs per bale) into a smaller, more dense (70 lb) bale for export. The process is considered an industrial operation rather than an agricultural operation.

The piece of equipment involved in this incident is called a hay "de-stacker" or a "bale feeder". It is primarily used by ranchers, feedlot operators, and dairymen to deliver a mix of hay bales to a grinder/chopper. The chopped hay is then moved by conveyor or drag chain to animal feed stations. In the case of this fatality, the hay de-stacker was used to separate individual bales of hay from a stacks of 56 bales that were loaded on to the bale staging platform.

The victim in this fatality was a 24-year-old male, night foreman that had been working at this job for approximately 16 months. The victim supervised seven other employees on the second shift.

INVESTIGATION

On March 19, 1998, a Friday morning, the victim was working as a night-shift foreman at a hay export processing facility. The night shift consisted of seven persons, including the victim. The shift started at 6:00 PM and ended at 2:00 AM the following morning. The shift foreman's job was to work throughout the plant to supervise the reformatting of the standard size (American-style) hay bale into the smaller, denser (Japanese-style) bales for export.

The hay de-stacker is an automated system that does not require an operator stationed at the equipment to run the machine. An individual activates the machine at the start of the shift, and it runs continuously throughout the shift or until the process is completed. A bale truck operator loads blocks of hay bales (56 bales) onto a bale staging platform that

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* The OSHA State Plan program in Washington State.

** National Institute of Occupational Safety and Health

is attached to the front of the hay de-stacker. The hay de-stacker is preprogrammed to automatically operate through its cycle depending on what type of hay is being processed at the time. A hydraulic lift raises the platform and holds the block of bales to a position on the hay de-stacker, where a mechanical arm sweeps a layer of bales off the top of the stack down a gravity fed chute onto a conveyor system (see diagram #1 & photo #1). Further on down the conveyor, an employee cuts the rope straps on the bales just prior to the bales being fed into the machine that cuts and compresses the hay into smaller, denser bales. It was reported that the operation went without incident through the night, up toward the end of the shift.

Just prior to the end of the shift (1:50 AM), the hay de-stacker jammed. Witnesses stated that the victim went up the work platform on the side of the machine and just before he climbed on to the top of the hay de- stacker, he called to another employee to shut down the machine while he tried to clear the jam.

When the jam had been cleared, he requested that the machine be turned back on. When the machine came back on line, the bale sweep arm cycled, pinning the foreman between the sweep arm and a structural steel beam at the top of the hay de-stacker. At that point the machine was again shut down. (see photo #2)

Several employees came to the assistance of the trapped foreman. The sweep arm was not mechanically designed to go in reverse, so the employees tried to pry and bend the sweep arm in order to release the foreman.

The employees were not able to release the pinned foreman via their prying efforts. A maintenance person reversed the sweep arm motor wiring which allowed the sweep arm to travel in reverse, releasing the foreman. At the point of release, the foreman lost his footing on the unstable block of bales and fell head first to the steel deck platform below. (see diagram #1 & photo #3)

The local emergency team was called and the victim was transported to a major medical center where he later died of head injuries sustained in the fall.

CAUSE OF DEATH

The medical examiner listed the cause of death as cerebral midbrain and pontine contusions due to blunt force injury to the head. (There was no mention by the medical examiner of any trauma resulting from being pinned in the hay de-stacker machinery.)

RECOMMENDATIONS/DISCUSSION

Recommendation #1: A Lockout/Tagout program should be instituted to protect employees from hazardous energy when working on machines, equipment or processes.

Discussion: The facility involved in the fatal incident, did not have a documented Lockout/Tagout program as part of their normal working routine.

When we talk about Lockout/Tagout we specifically refer to the use of locks and/or tags to be used on energy isolating devices to ensure that the machinery, equipment, or process cannot be started while someone is exposed to and subject to injury from that machine, equipment or process.[1,2]

Any operation that utilizes energized equipment within their process, must have a well defined Lockout/Tagout program in place. The program should identify what the employees need to know in order to control the potential hazardous energy involved with the equipment during use, during maintenance, servicing or making other adjustments to the equipment.

Because individual machines have particular requirements for shutdown and safe work application, the written program also needs to include machine-specific instructions. The instructions should define the process for deenergizing the machine and putting the lockout or energy controlling devices in place, and verifying that lockout conditions are achieved. The instructions should be described in clear and simple terms, so the process is easily understood and followed.

The employer should also ensure that their employees not only understand the lockout process but comply with the procedures.

There also needs to be an established continuity of the lockout process between shifts to include a process for communication between incoming and outgoing employees during the shift transfer.

Recommendation #2: Anytime an individual has a need to work on a piece of machinery or equipment, then that piece of machinery or equipment must be shut down, turned off and locked out.

Discussion: An important event in this incident scenario was the fact that the hay de-stacker was not locked out.

During the FACE investigation it was learned that the hay de-stacker experienced occasional equipment jams when processing "straw" hay through the system. In the early hours of the incident date, the hay de-stacker experienced a jam near the end of the operation's second shift activities.

The night foreman climbed on top of the hay de-stacker to clear the jam. He requested that the machine be shut down prior to getting on top of the machine, but the system itself was not locked out.

The facility did not have a lockout program in place and there was no supervisory oversight or training and education that would encompass the locking out of equipment for the purpose of conducting maintenance or adjustment to energized equipment.

It is highly important, that prior to putting any part of a person's body into a piece of machinery, that machine must be de-energized and locked out. It is not sufficient simply to turn the machine off. The energy source for the equipment needs to be secured . The idea is to make sure the machine stays off until the person working on the equipment is clear of the system and out of danger when the machine is put back on-line and restarted.

Recommendation #3: Employers should provide training and education related to the hazards of energized equipment, provide an understanding of the equipment safeguards and the basics of lockout/tagout.

Discussion: All persons who have any reason to work with equipment, machinery or a process, need to go through specific education and training related to the control of energized equipment.

The training needs to ensure that the purpose and function of the energy control program are understood by their employees and that they have the knowledge and skills required for safe application, use and removal of energy control devices.

The employer should not only provide effective initial training and periodic retraining, but they should also certify that such training has been given to all employee's who work with energized equipment. The training certification should include the employee's name and dates of training.[3] Language and reading skill issues should be taken in consideration when preparing and presenting any training and education program.

Supervisors (i.e. foremen etc.) are an essential component in the training and education process. Supervisors need to have a clear understanding of their employer's lockout program. They are the program administrators in the field. They not only manage the processes but make significant decisions in responding to non-routine events, such as equipment failures and jams.

Bureau of Labor Statistics data show that 61% of equipment related injuries were directly linked to individuals who had not received lockout instruction.[4] The United Auto Workers have reported that in 72 lockout fatalities between 1973 and 1988, 68% of the events had a root cause of inadequate employee training.[4] OSHA has identified training as one of the five key causal factors associated with the occurrence of lockout incidents,

and state that proper training in both the procedures and the implementation of lockout/tagout was critical for safeguarding employees.[4]

Recommendation #4: Routine audits/inspections should be performed on the facility's "Energy Control Program/Lockout-Tagout Program".

Discussion: Simply establishing a lockout/tagout program is rarely enough to ensure a successful, routine, well understood energy control process.

Operations and facilities need to ensure that all personnel use the established lockout procedures and are able to apply them to not only routine situations but also to unusual or unanticipated events.

OSHA requires annual audits of the lockout/tagout process.[2] Our recommendation is that audits should be conducted on a more frequent basis. Audits should be conducted when there is a change in machines, equipment or process, and a major change in jobs, assignments and personnel. Audits can show if employees understand and properly follow the procedures. They can also provide an assessment of whether all energy sources are covered by the energy control process being reviewed.

Some type of written record should be kept of the audit showing what equipment, machine or process was audited, when the audit occurred and who performed the audit.

The audit findings should be a part of a continuous improvement process. It should identify specific recommendations for corrective action, as needed. The recommendations should specify target dates for improvement and the steps needed to achieve the change. In some instances, the corrective action would need to be made immediately in order to correct a potentially serious problem within the facility's energy control process. If a permanent solution requires an extended time frame to implement, a temporary control should be instituted until the permanent corrective action can be applied.

Recommendation #5: Whenever new, used or reconditioned equipment is introduced to the work place, a review of safety precautions should be conducted in conjunction with the equipment manufacturer. The review should include proper equipment operation and any regulatory compliance parameters that apply to the equipment.

Discussion: A great opportunity for facilities/companies to review specific safety processes occurs when they purchase new, used or reconditioned equipment.

In the process of this FACE investigation it was noted that the hay de-stacker was purchased as used equipment from a local farm implement equipment distributor. Whenever changes are made to production processes, those changes should also trigger a

review of safety applications that need to go along with the production changes. In this stage of the process or production change, the facility has the opportunity to review the operation and mechanics of the equipment with the distributor and the equipment manufacturer. The operational review needs to include not only an education process on how to run the machine but also the safety practices that need to be applied in that operation.

Older equipment can also create problems or challenges to a facility's lockout and energy control practices. Lockout compliance has been noted to be a bigger problem for companies that frequently purchase used and rebuilt equipment according to the National Tooling and Machining Association (NTMA).[5] The NTMA's findings show that older equipment is much less likely to have appropriate built-in Lockout/Tagout mechanisms.

The FACE investigation of this case showed that the equipment involved in this incident did not readily facilitate the use of lockout devices to help secure the system. There were no operating manuals nor detailed safety procedures provided with the equipment from the manufacturer or the distributor. The documentation that is provided by the manufacturer is titled as a parts list which includes a small section describing some safety precautions.

The safety precautions list is preceded by a bold "BE CAREFUL" in capital letters followed by eight items identified by numerical prefix. A few of the safety precautions identified on their list were:

> Item # 2. "Stop engine or motor before leaving operators position to adjust, lubricate, clean, or unclog machine, unless otherwise specifically recommended by the 'Operators Manual'."
>
> Item #3. "Wait for all movement to stop before servicing the machine."
>
> Item #5. "KEEP off equipment unless seat or platform for operation and observation is provided."
>
> Item #8 "Make certain everyone is clear of machine before starting engine, motor or operation."

Although these precautions are good recommendations, they seem overly general and lose much of their visibility and safety application impact by being placed into a small section of the parts manual. The parts manual does not have the high visibility required for safety precautions.

There should be a separate operations manual that incorporates safety procedures related to normal operations and to unusual but probable occurrences such as equipment jams. An emphasis needs to be placed on the control of energized systems and the use of control measures such as Lockout \Tagout.

Another important area that could have been addressed, would have been the issue of the equipment jamming. There is a strong probability that if the sweep arm could have been easily switched to run in reverse, then this could have allowed the operator to deal with the hay jam from a remote position rather than climbing onto the equipment to clear the jam. This is an area that the manufacturer would need to evaluate to ensure the safe and effective operation of the equipment.

In addition to working with the equipment manufacturer, the company\facility could contact industry organizations and the WISHA consultative group for help in reviewing a variety of safety issues dealing with the process and equipment.

Recommendation #6: Safe access should be provided, such as ladders, platforms, etc. with appropriate fall prevention/fall protection measures, to allow operators to effectively deal with equipment/machine issues.

Discussion: There were several primary or root cause factors in this fatality. A couple of those factors were for example, putting oneself in an exposure situation within a piece of mechanical equipment and failing to lockout the energized system. These root cause factors could have, by themselves, been the event that resulted in the fatality, but in this instance, the injuries resulting from the above system failure only set the stage for the fatality causing event. The event that led to the fatality of the night foreman was the fall from the equipment on which he was working.

When the victim's fellow employees were able to release him from being entrapped by the machine, his position on the stack of hay bales became unstable. One of the top bales gave way and the foreman fell headfirst onto the steel bale staging platform located at the front end of the hay de-stacker.

The WA FACE investigation team was unable to learn if the victim suffered any injury from being pinned between the sweep arm and the equipment structural beam. Therefore we do not know if any injury from being caught in the machine helped precipitate his fall to the hay de-stacker platform.

A recommended guideline is that no one should stand on top of the hay bales, and in particular on the feed end of the hay de-stacker without some type of fall protection or fall prevention device. And certainly, no one should be on the machine at all without the hay de-stacker being locked out.

Workers should be trained to recognize fall hazard situations, and utilize fall prevention practices whenever work is to be done at elevations and when there is a fall hazard risk related to the job or task that they need to perform. The facility should review every work application and provide a safe means of access where elevated work needs to be done. Consideration should be given to not only routine job tasks but also to non-routine tasks, such as unjamming equipment.

It is important that safe access to all areas of the equipment be considered in the evaluation of tasks that might need to be performed, not only from an operations standpoint, but also from a maintenance perspective. Safe and convenient access for areas that require frequent activity includes work platforms, stairs, ramps, fixed ladders etc. Other fall protection\prevention devices that could be used for the areas that require less day-to-day activity include portable ladders, mobile work platforms, and mechanical devices such a boom hoists, etc.

In summary, being caught in machinery and falls from elevation continue to be two of the leading causes for serious injury and death in the industrial setting. The U.S. Department of Labor's Bureau of Labor Statistics, in their April 1997 fatal injuries publication, noted that 15 percent of all fatalities result from contact with objects and equipment and 10 percent of all fatalities are the result of falls.[6] These statistics demonstrate the need for continued attention to basic safe work practices. The principles of Lockout\ Tagout and control of energized machines and equipment are essential work practices in today's workplaces. Specific safety measures for working at any height above the ground or floor level need to be taken to help prevent serious injuries and fatalities resulting from falls.

REFERENCES

1) Energy Control Procedure, Chapter 296-24-11007 WAC, State of Washington, Department of Labor and Industries.
2) Control of Hazardous Energy (Lockout/Tagout), U.S. Department of Labor, OSHA 3120 (1991)
3) Energy Control Program, Chapter 296-24-11005 WAC, State of Washington, Department of Labor and Industries.
4) Accident Prevention Manual, For Business and Industry: Administration & Programs, 11th edition; Chicago: National Safety Council, c1997.
5) Smith, R. Blake. *Manufacturing's High Technology Advances.* Occupational Health & Safety, August 1993.
6) Fatal Workplace Injuries in 1995: A collection of Data Analysis, U.S. Department of Labor Bureau of Labor Statistics, Report 913, April 1997.
7) Zenz, Carl, editor. *Occupational Medicine: Principles and Practical Applications.* St Louis: Mosby-Year Book, Inc., 1988, c1975.
8) Salvendy, Gavriel andand Waldemar Karwowski, editors. *Design of Work and Development of Personnel in Advanced Manufacturing.* New York : John Wiley & Sons, Inc., c1994.
9) McBride, G. and P. Westfall. *Shiftwork : Safety and Performance.* Chicago : National Safety Council, 1995.
10) Mitler, M. *Tired Workers Cause Millions of Accidents a Year.* New York Times, January 11, 1992.
11) *Plain Languge About Shiftwork.* National Institute of Safety and Health, DHHS (NIOSH) Publication No. 97-145.
12) Klein, M. *The Shift Worker's Handbook: A Personal Health & Lifestyle Guide for Shiftwork Professionals.* Lincoln, NE, Synchro Tech, 1991, c1988.

Photo #1. The "feed end" of the hay de-stacker.

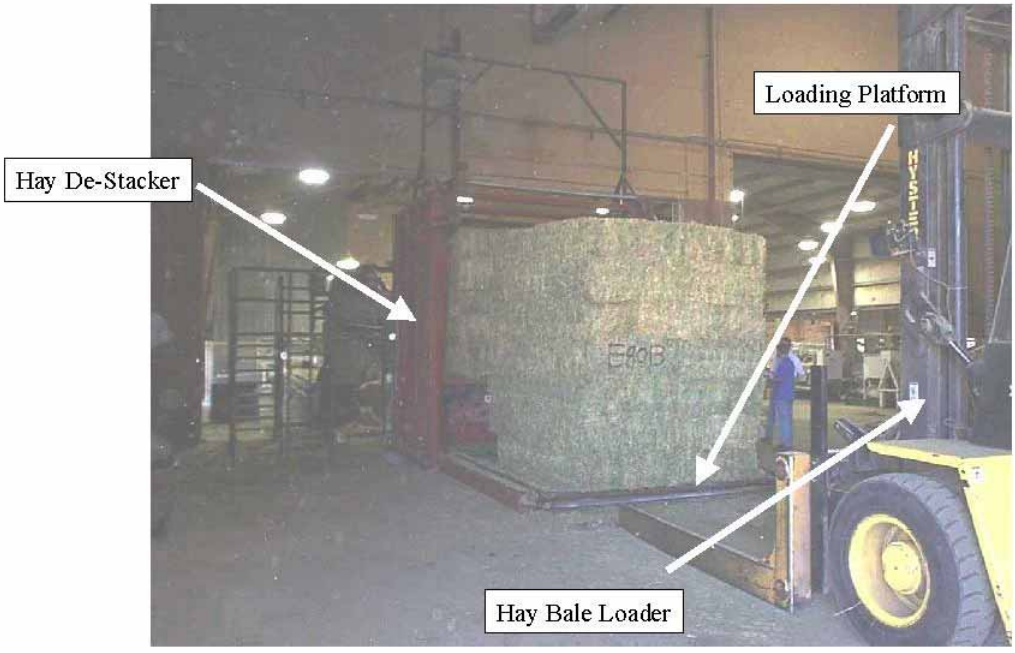


Photo #2. Location where victim was pinned between the sweep arm and the structural beam.

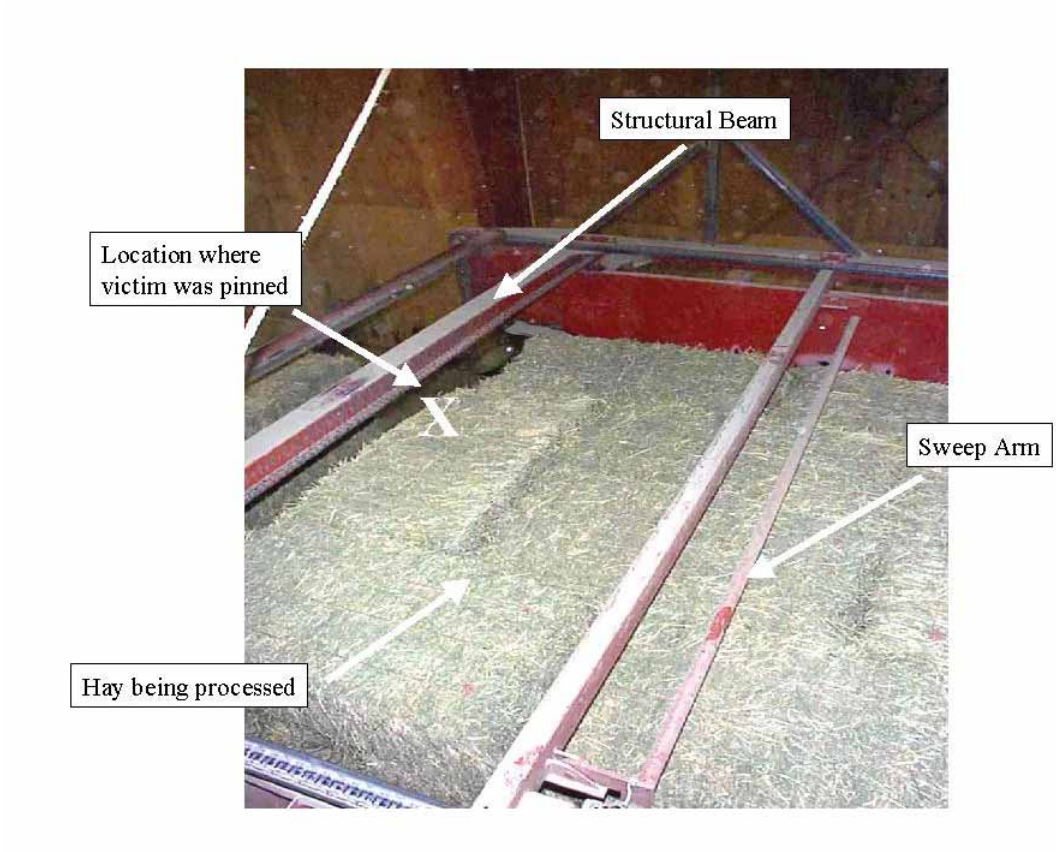


Photo #3 Pneumatic loading platform and location where victim landed.

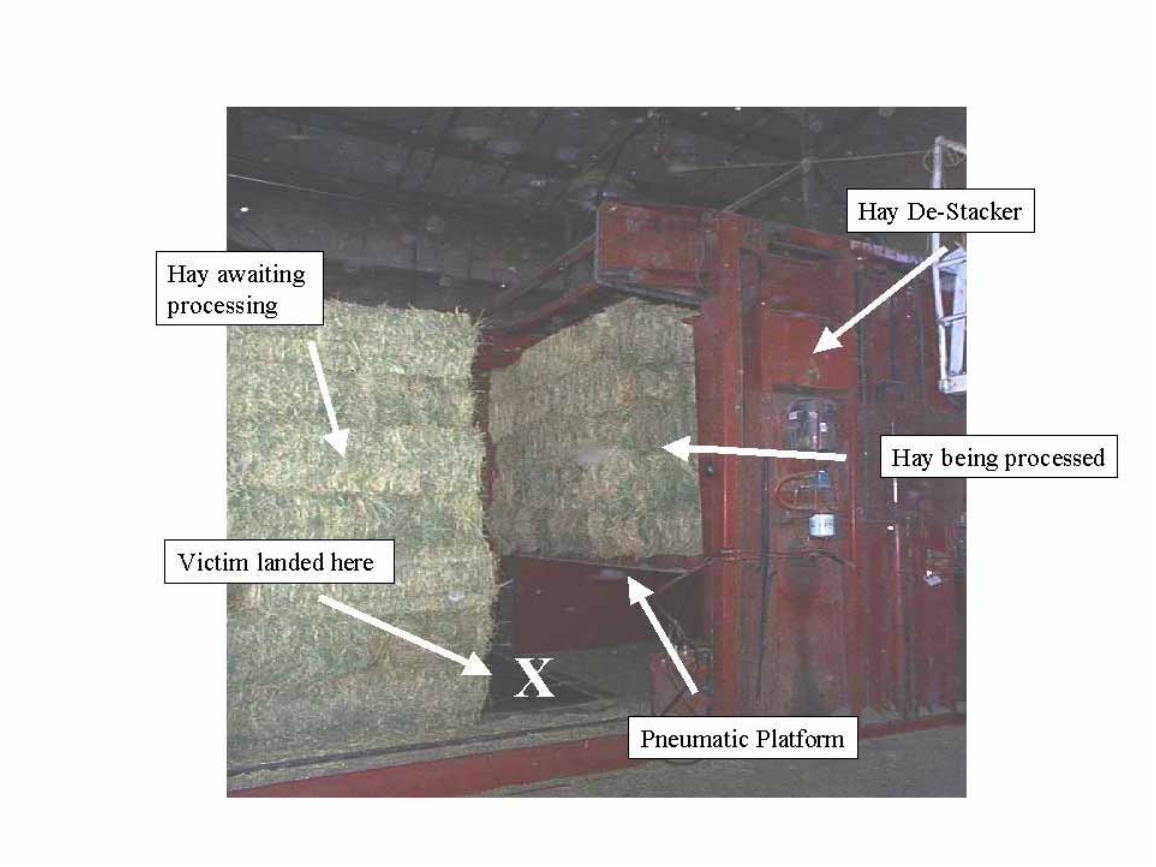
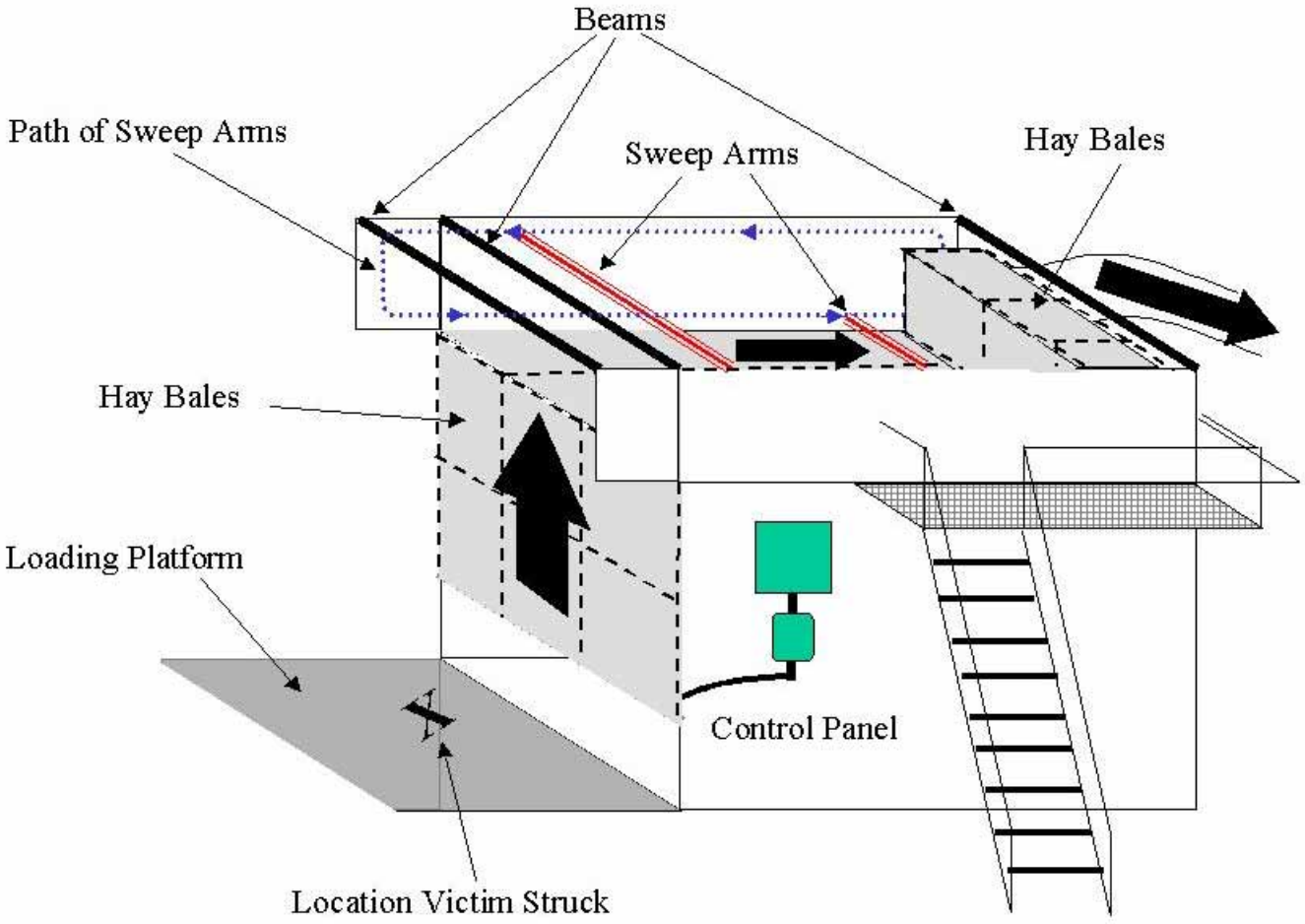


Diagram #1 Schematic drawing of hay de-stacker.



APPENDIX

Other Safety Research

In reviewing the Hay De-Stacker fatality, the WA FACE investigation team conducted research relating to non-root cause elements of the incident. Some of that research is shared in the appendix below.

Interactive communications - Manufacturer/Customer:

The FACE Field Investigator traveled out of state to review this fatal incident with the manufacturer of the Hay De-Stacker.

Equipment manufacturers can be important participants in hazard recognition, and incident/injury prevention in partnership with their customers. Whenever a piece of equipment is developed or designed, a systematic evaluation of potential hazards in the utilization of the equipment should be conducted. Issues such as equipment or system malfunctioning or jamming should be evaluated and processes put in place to help deal with those situations. The manufacturer should, in particular, develop recommendations and processes that eliminate or minimize risk of incident or injury.

The manufacturer in this case indicated that they were not receiving any communications from their customers/users regarding jamming problems related to the Hay De-Stackers. The manufacturer did take great interest in learning more about the problem and planned to conduct additional research by surveying known customers/users to learn more about the equipment jamming issue.

The facility involved in this fatal incident, had not been in contact with the manufacturer, neither in dealing with the jamming situation that precipitated the fatality nor with the jamming problem that was experienced on a regular basis since the purchase of the equipment.

An important proactive measure that the facility could have taken would have been to contact the manufacturer or the equipment distributor to address the hay de-stacker's jamming problem.

APPENDIX (cont.)

In communicating with, and working out the issue with the manufacturer, the facility would not only have been addressing the production and quality issues for their operation, but also would have the opportunity to directly address safety issues. Dealing with these types of issues head-on with the manufacturer, makes for good business sense.

A key issue identified in the FACE investigation was the fact that the hay de-stacker sweep arm was functionally not set-up to travel in reverse. In an overview of the process, if the sweep arm had been able to move in reverse, 1) it might have helped resolve the jamming problem, 2) it might have precluded the need for the night foreman to climb on the machine to clear the jam and, 3) if the foreman had bypassed the lockout safety process and still have climbed on to the machine to clear the jam, it would have been easier and quicker to release him from being entrapped by the equipment. All of these actions might have prevented the incident from resulting in a fatality.

An important part of any incident\injury prevention process is effective communication. All parties involved in the process, from the manufacturer, sales and distribution groups and ultimately the end user/customer need to open communication avenues to address issues, concerns and questions related to the equipment and machinery.

In today's American industrial arena, the standards, which are defined by the Occupational Safety and Health Act of 1971 and supported by Washington State's Administrative Codes, require the employer to provide a workplace which is free from recognized hazards. In order to accomplish this important and sometimes seemingly difficult task, the employer should utilize a multitude of resources that are available. The equipment manufacturer should be an essential part of the process.

To help the customer, the manufacturer needs to make design reviews that include both hazard recognition and energy audits. The energy audits will help provide guidance for lockout\tagout procedures for the users.

Effective communication between the manufacturer and the equipment user translates into a safer and more productive product.

APPENDIX (cont.)

Fatigue / Shiftwork:

Although the systems safety review for this incident investigation did not highlight fatigue or issues surrounding shiftwork, the FACE investigation team did research these possible contributors to the events that led to this fatality.

Research shows that fatigue plays a significant role in how well shiftworkers (persons working other than what is considered standard daylight working hours between 6:00 AM to 6:00 PM) physically and mentally perform their jobs [4]

The National Safety Council states that at least 25% of the U.S. labor force is engaged in some type of industrial or service activity that requires around-the-clock work.[4] With the use and continued development of computer systems and the internet, the U.S. continues to move toward a 24-hour society.

Physiologically, human beings have a natural 24-hour clock/activity cycle that has developed since the first human walked the earth. The cycle is reset everyday by the rising and setting of the sun. This cycle is known as the 'circadian' cycle or rhythm. [7]

Fatigue can be attributed to a variety of different causes. Shiftwork can enhance and increase the general fatigue symptoms. Rutenfranz & Knauth state that it can not be expected that the circadian rhythms of a shift worker adapt completely to night work. Although the partial adjustment to night work is more advanced, in connection with more consecutive nights shifts worked than shorter periods of night shifts, the adjustment always remains incomplete.[7]

Fatigue has been more closely related to nightshift activities as opposed to straight day workers. The capacity of people to work is at its maximum in the morning hours (about 9:00 -10:00 AM) and the minimum at night (about 2:00-3:00 AM). [8]

APPENDIX (cont.)

There have been many studies reviewing the relationships of fatigue, shiftwork and work related incidents resulting in property damage, injury and fatalities. Glenn McBride and Peggy Westfall, in their manual *Shiftwork: Safety and Performance*, discuss many serious incidents that have occurred which implicate fatigue and shiftwork as primary factors involved in those incidents.[9]

A recent study from the Congressional National Commission on Sleep Disorders Research shows that individuals are more likely to make errors between midnight and 6:00 AM, even when they have slept seven to eight hours during the day. [10]

The NIOSH document, *Plain Language About Shiftwork*, also states that shiftworkers and night workers are often tired and sleepy which increases the possibility of errors or injury causing incidents.[11]

Was fatigue/shiftwork a factor in this fatality? There is a distinct possibility that fatigue could have been another factor in this fatality, in combination with the failure to understand and follow an energy control process, the equipment failure/jamming that occurred at the end of the shift, and with everyone anxious to clean up and go home at the close of their workday.

In addressing shift related fatigue there are many approaches that the facility and the individuals working shifts can follow. There is no easy solution to eliminate fatigue, as this is a natural phenomena. However much can be done to alleviate the problem by paying attention to general working conditions and the physical environment at the workplace. Ergonomic and human factor interventions can help many of the stressors that impact the level of performance on the job. The worker also needs to take steps off the job as well, to help balance the battle against his or her circadian rhythm.

APPENDIX (cont.)

Information to address the issues of workplace fatigue, can be found in the following and other resources:

The Shiftworkers Handbook : A Personal Health & Lifestyle Guide for Shiftwork Professionals, by Marty Klein , Ph.D., SynchroTech.

Facing and Fighting Fatigue : A Pratical Approach, by Benjamin H. Natelson, Yale University Press, c1998

Farewell Fatigue, by Natalie Rogers, Arco Publishing Co.,1979, c1977.

Plain Language About Shift Work, National Institute for Occupational Safety and Health, November 1997.

APPENDIX (cont.)

Remote Wireless Emergency Stop:

As part of the Washington State FACE Investigation process, we investigate different ideas and safety applications that currently are not used or are not in general use by the industry in their operations. This is done to stimulate discussion within the relevant industries. One of those ideas is briefly discussed in the section below.

Remote Wireless Emergency Stop: The remote wireless E-Stop (Emergency Stop) is a small remote control unit that clips to a worker's belt. The worker is able to move around the designated equipment for a specified distance, usually approximately 500 hundred feet. The worker can quickly activate the remote E-Stop anywhere that he or she may be while working or traveling in the zone.

In many situations, the wired Emergency Stop is located a significant distance from or just out of reach of the machine operator or a person with a need to rapidly stop the machine. This is particularly important during non-routine events such as equipment or process failures when a worker might put themselves into position of an exposure hazard in relation to the machine. The remote E-Stop can be a very effective resource for these situations

The remote E-Stop is not designed to take the place of a wired E-Stop, but provides another level of protection to the operators in the process. The quicker one can respond and react to a system failure or an emergency event, the more likely a serious injury can be prevented.

Would the remote E-Stop have helped prevent the hay de-stacker fatality? That's a difficult, if not impossible question to answer. There certainly could have been a greater possibility for the night foreman to have quickly shutdown the hay de-stacker preventing him from being caught in the sweep arm and thus changing the sequence of events that led to the fatality.

APPENDIX (cont.)

The remote E-Stop would also not replace the need for a Lockout\Tagout energy control program, nor application of fall protection and the ability to safely and effectively access all work areas on the hay de-stacker while dealing with a variety of operations, maintenance and servicing issues.

APPENDIX (cont.)

Applicable Regulations

In reviewing the WISHA standards, there are defined requirements that deal with the control of energized systems, Lockout\Tagout and fall protection. The standards specifically state:

> **Energy control program. The employer shall establish a written program consisting of an energy control procedure, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up, or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source, and rendered inoperative. WAC 296-24-11005(1)**

and;

> **The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees…WAC 296-24-11005(7)(a)**

and;

> **The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed. WAC 296-24-11005(6)(a)**

and;

> **Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees. WAC 296-24-11007(2)(a)**

and;

Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position. WAC 296-24-1107(2)(b)

and;

Every wall opening from which there is a drop of more than 4 feet shall be guarded by one of the following: WAC 296-24-75005(1)

Rail, roller, picket fence, half door, or equivalent barrier.

The guard may be removable but should preferably be hinged or otherwise mounted so as to be conveniently replaceable. Where there is exposure below to falling materials, a removable toeboard or the equivalent shall also be provided. When the opening is not in use for handling materials, the guard shall be kept in position regardless of a door on the opening. In addition, a grab handle shall be provided on each side of the opening with its center approximately 4 feet above floor level and of standard strength and mounting. WAC 296-24-75005(1)(a)

Extension platform onto which materials can be hoisted for handling, and which shall have side rails or equivalent guards of standard specifications. WAC 296-24-75005(1)(b)

and;

The employer shall develop and implement a written fall protection work plan including each area of the work place where the employees are assigned and where fall hazards of 10 feet or more exist. WAC 296-155-24505(1)

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