

15 Explosion ---Inspection #1301806 Lighting Resources

A **46 year old male** was fatally injured when an **explosion** happened while trying to extinguish a fire in a non-ferrous materials bin located in the shredding room. During the investigation, it was determined that the victim was working in the shredding room, loading seatbelt pre-tensioners into the shredding machine for the purpose of reclaiming recyclable metals. The entire process involves loading seatbelt pre-tensioners onto an entrance conveyor that loads the shredder, wherein the seatbelt pre-tensioners are destroyed by hammering and shredding inside the machine. The pieces then exit via a separate conveyor. The exit conveyor is fitted with a rare-earth magnet which facilitates the separation of the pieces into ferrous and non-ferrous materials. Two bins were placed at the exit conveyor; one was for ferrous, and the other for non-ferrous (mostly aluminum, but also contained plastics from the pre-tensioner housings).

Security camera footage of inside the shredding room showed the victim standing near the non-ferrous bin when a fire started in the bin. A garden-style hoe was used to rake the fire, which caused the fire to flare and grow. It is possible that the victim believed he could pull the burning piece out of the bin with the hoe. Once the fire began to grow and intensify, he walked around behind the bin attempting to extinguish the fire with a 30- pound, Class D fire extinguisher. The fire decreased in intensity but continued to burn. The footage inside the shredding room is then obscured by smoke until the camera loses power due to the explosion.

The cause of the fire and subsequent explosion is believed to be primarily combustible aluminum dust created by the destruction (shredding and pulverizing) of seatbelt pre-tensioners and airbag charges. The hammering, grinding, and shredding processes carried out within the "shredding machine" are believed to have created aluminum dust in quantities sufficient enough to produce the explosion. The employer did not have a dust collection system in place, and dust was allowed to accumulate in the collection bins and on other surfaces; the employer had installed a smoke exhaust system, which did not remove the dust from the facility.

Citation(s) as Originally Issued

A complete inspection was conducted at the accident scene. Some of the items cited may not directly relate to the fatality.

Citation 1 Item 1

Type of Violation: **Serious**

\$7000

TCA 50-3-105(1): The employer did not furnish employment, and a place of employment, which were free from recognized hazards that were causing or likely to cause death or serious physical harm to employees:

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In that two employees working in the seatbelt pre-tensioner and airbag-charge recycling area and six employees working in other areas of the facility were exposed to fire and explosion hazards from combustible metal dust.

Citation 1 Item 2 Type of Violation: **Serious** **\$2800**

TDLWD Rule 0800-01-09-.06(2): Employer did not ensure that work areas in which non-containerized hazardous chemicals are generated or produced as a result of the process or operation taking place in such work area contain a sign or placard identifying the hazardous chemicals and appropriate hazard warnings:

In that eight employees were exposed to fire and explosion hazards in the facility from hazardous chemicals (combustible dust) and there were no signs or placards identifying the hazardous chemicals and appropriate hazard warnings.

Citation 1 Item 3 Type of Violation: **Serious** **\$5400**

29 CFR 1910.132(a): Protective equipment including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers was not provided by the employer:

In that two employees were working in the seatbelt pre-tensioner and airbag-charge recycling area and were exposed to fire and explosion hazards from combustible metal dust and were not issued flame-resistant clothing.

Citation 1 Item 4 Type of Violation: **Serious** **\$2450**

29 CFR 1910.134(e)(1): The employer did not provide a medical evaluation to determine the employee's ability to use a respirator before the employee was required to use the respirator in the workplace:

In that one employee, working in the fluorescent bulb recycling area and exposed to mercury vapor, was utilizing a tight-fitting face piece respirator and had not received a medical evaluation.

Citation 1 Item 5 Type of Violation: **Serious** **\$2450**

29 CFR 1910.134(l)(2): The employer did not ensure that an employee using a tight-fitting face piece respirator was fit-tested prior to initial use of the respirator:

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In that one employee, working in the fluorescent bulb recycling area and exposed to mercury vapor, was utilizing a tight-fitting respirator and had not received a fit-test.

Citation 1 Item 6 Type of Violation: **Serious** **\$2450**

29 CFR 1910.134(g)(1)(i)(A): The employer did not prohibit the usage of respirators with tight-fitting face pieces by employees with facial hair that comes between the sealing surface of a face piece respirator and the face:

In that one employee, working in the fluorescent bulb recycling area and exposed to mercury vapor, was utilizing a negative-pressure, tight-fitting face piece respirator and had a full beard.

Citation 1 Item 7 Type of Violation: **Serious** **\$2450**

29 CFR 1910.134(h)(2)(i): The employer did not ensure that all respirators were stored to protect them from damage, contamination, dust, sun light, extreme temperatures, excessive moisture, and/or damaging chemicals :

In that two employees who utilize respirators while working in the fluorescent bulb recycling room store the respirators by hanging them on a nail in an open environment.

Citation 1 Item 8a Type of Violation: **Serious** **\$2800**

29 CFR 1910.134(k)(1)(i): The employer did not train employees that utilize respirators on why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator:

In that three employees who utilize respirators in the fluorescent bulb recycling room had not been trained on fit, usage and maintenance.

Citation 1 Item 8b Type of Violation: **Serious** **\$0**

29 CFR 1910.134(k)(l)(v): The employer did not provide training on the procedures for maintenance and storage of respirators:

In that three employees who utilize respirators while working in the fluorescent bulb recycling room had not been trained on procedures for maintenance and storage of their respirators.

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Citation 1 Item 9

Type of Violation: **Serious**

\$2450

29 CFR 1910.157(g)(1): The employer provided portable fire extinguishers for employee use in the workplace and did not provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire-fighting:

In that two employees working in the airbag charge and seatbelt pre-tensioner recycling room and exposed to fire hazards, had been provided fire extinguishers for use against fires but had not received training.

Citation 1 Item 10a

Type of Violation: **Serious**

\$7000

29 CFR 1910.1200(c)(1)(i): The employer did not maintain a list of the hazardous chemicals known to be present in the workplace:

In that the employer, an environmental waste recycling facility, implements a hazard Communication Program, but does not maintain a list of the hazardous chemicals present in the facility.

Citation 1 Item 10b

Type of Violation: **Serious**

\$0

29 CFR 1910.1200(g)(1): The employer did not have a safety data sheet in the workplace for each hazardous chemical which they use:

In that eight employees working in an environmental waste recycling facility are exposed to chemical hazards and the employer does not maintain safety data sheets for each hazardous chemical.

Citation 1 Item 11

Type of Violation: **Serious**

\$7000

29 CFR 1910.1200(h)(1): The employer did not provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and/or whenever a new chemical hazard the employees have not previously been trained about is introduced into their work area:

In that eight employees working in an environmental waste recycling facility are exposed to chemical hazards, such as combustible dusts, and have not received training on those chemicals.

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Photo shows a close-up view of the scene. The seat of the detonation occurred in a bin (no longer present in this photo) placed under the blue conveyor **belt** (right side of the photo).



Photo shows a close-up view of the shredding machine (covered by debris, yellow hatch, blue housing) used to recycle seatbelt pre-tensioners.

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