

## Fatality Assessment & Control Evaluation

### Prevention through comprehensive research and investigation

#### INVESTIGATION/RESEARCH

#### CA STORAGE: RESPIRATION HALTED FOR FRUIT AND PEOPLE

In 2008, a 59-year-old male employee at a fruit storage facility located on a farm died after entering a controlled atmosphere (CA) apple storage room containing less than 3% oxygen ( $O_2$ ). The decedent removed the Plexiglas window's wing nuts and climbed through the opening of the CA door. He was working alone. He was found by the farm owner in the room. The farm owner took a deep breath and leaned his upper body through the CA door opening and pulled the decedent to the door. After calling for emergency response, the farm owner took another deep breath, again leaned into the room and removed the decedent.



Incident area

#### IN ORDER TO PREVENT SIMILAR INCIDENTS IN THE FUTURE

- **Evaluate workplace to determine if a confined space and/or permit-required confined space (PRCS) is present.** Consult MIOSHA Permit-Required Confined Space standard (See MIOSHA PRCS reference) for definitions. If a confined space *contains or has the potential to contain a hazardous atmosphere* it is a PRCS.
- **Develop and implement a written PRCS program.** See MIOSHA PRCS/Right-to-Know Sample Program reference. The program should **include** rescue procedures, location of confined spaces and employee/family member training specific to confined spaces.
- **Ensure appropriate Danger signs are placed on CA door.** Ensure sign's language is understandable to all workers.
- **Develop and implement a written Hazard Communication (Right-to-Know program).** See MIOSHA PRCS/Right-to-Know Sample Program reference.
- **Develop a product sampling procedure.** Ensure adequate ventilation outside of room. See MIFACE CA Safety Reference.
- **Check  $O_2$  levels prior to entering a closed CA room after product loading.** Contact MSU Extension or CA storage supplier for the appropriate testing equipment.



Sign Does Not Meet PRCS Requirements



Sign Meets PRCS Requirements

#### DID YOU KNOW?

- Atmospheric  $O_2$  levels are 21%, symptoms begin below 16.5% and coma/deaths below 10%. The optimum level of  $O_2$  for storing different apple varieties is 1-2%.
- Hazardous atmospheres for PRCS include  $O_2$  deficient levels below 19.5% or at explosive levels above 23.5%.
- Fruit respiration alone can cause a PRCS condition! In 4 days, even without  $N_2$  drawdown,  $O_2$  levels can decrease to 16% when the CA door is sealed, Plexiglas® affixed, temperature lowered, and cooler door shut.
- Confined Space Entry means an action by which any part of your body (including your hands) breaks the plane of an opening into the space.
- Carbon monoxide (CO) can build up in a CA room when using propane-powered forklifts. State of Washington found that ~41% of CO poisoning from forklifts specific to fruit packing and storage occurred in cold rooms or open CA rooms.

MSU Occupational and Environmental Medicine: [www.oem.msu.edu/](http://www.oem.msu.edu/)

MIOSHA PRCS Standard:  
[www.michigan.gov/documents/CIS\\_WSH\\_part\\_490\\_55724\\_7.pdf](http://www.michigan.gov/documents/CIS_WSH_part_490_55724_7.pdf).

MIOSHA PRCS/Right-to-Know Sample Programs: [www.michigan.gov/lara/0,1607,7-154-11407\\_30453-94707--,00.html](http://www.michigan.gov/lara/0,1607,7-154-11407_30453-94707--,00.html)

MIFACE CA Safety:  
[www.oem.msu.edu/Resources.aspx](http://www.oem.msu.edu/Resources.aspx)

Hazard Alert #12

#### TO REPORT A NEW WORKPLACE FATALITY TO MIOSHA

**1.800.858.0397**

MICHIGAN FATALITY ASSESSMENT &  
CONTROL EVALUATION

INFORMATION: 1.517.353.1846  
E-MAIL: [debra.chester@ht.msu.edu](mailto:debra.chester@ht.msu.edu)