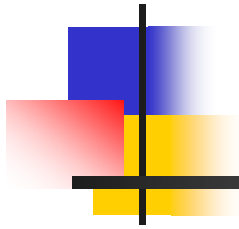


Mechanical Integrity Inspections of Ammonia Refrigeration Systems



Ed Ford, P.E.

ColdWorks Engineering, Inc.



What is Mechanical Integrity?

- Cal OSHA accepts the term '*Mechanical Integrity*' to mean, *activities* that provide assurance that a refrigeration system is designed, installed and maintained in a safe and sound manner appropriate for its intended application, and in compliance with *governing Codes*.



Mechanical Integrity *vs.* Mechanical Integrity Inspection

- Mechanical Integrity Inspection is a procedure that undertakes a systematic approach to auditing a refrigeration system to determine if it is in compliance with its mechanical integrity *program* and with recognized and generally accepted good engineering practices. (RAGAGEP).



Who Should Conduct a Mechanical Integrity Inspection?

IIAR Bulletin 109, *Minimum Safety Criteria for a Safe Ammonia refrigeration System*, Section 5.3, requires that, every five (5) years...

“A more thorough inspection of an ammonia refrigeration system should be conducted by a competent ammonia refrigeration engineer, a fire safety official, and/or, other authority.”



Who Should Conduct a Mechanical Integrity Inspection? (Cont'd)

IIAR Bulletin 110, *Start-up, Inspection and Maintenance of Ammonia Mechanical Refrigerating Systems*, Rev. 2004 § 6.4.4 requires that every five (5) years...

pressure vessels should be given an independent inspection by a person who has the training and knowledge for this task... a person competent to perform inspections and who is independent of the daily operating responsibilities for that installation.



What Should be Included in a Mechanical Integrity Inspection?

- Cal OSHA Requires That Each Mechanical Integrity Inspection and Test (MIA) Must be Documented identifying the Date of the Inspection or Test, the Name of the Person who Performed the Inspection or Test, the Serial Number or Other Identifier of the Equipment on which the Inspection or Test was Performed, a Description of the Inspection or Test Performed, and the Results of the Inspection or Test.

What Should be Included in a Mechanical Integrity Inspection?

(Cont'd)

General Safety:

- Inspection for Consistency with governing Codes and Industry Standards_ Before a refrigeration system can be maintained in a good and sound condition, it *first* must be designed and installed correctly.

What Should be Included in a Mechanical Integrity Inspection?

(Cont'd)

Pressure Relief Valves and Pressure Relief Systems:

- Relief Valves and Pressure Relief Systems are intended to safely relieve overpressure at all times; hence, they must be included in a MI Inspection.
- Relief Vent Systems must be inspected for sufficient ammonia diffusion capacity. If ammonia discharge is to atmosphere, discharge lines should be inspected to verify that they terminate as required by Code.



What Should be Included in a Mechanical Integrity Inspection?

(Cont'd)

Emergency Shutdown Systems, Alarms and Ammonia Detection Systems:

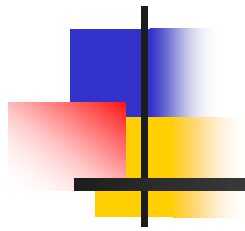
- Safety systems installed to minimize the risk of a catastrophic ammonia release must be functional at all times; hence, they must be included in any Mechanical Integrity Inspection.



Summary

- A successful MI Inspection affords us an opportunity to operate our systems with improved Safety, Prolonged Equipment Life, and, in compliance with Codes having Jurisdiction.
- A successful MI Inspection allows us to conduct business in a Safe manner for our employees, our customers, the environment and surrounding community.

Mechanical Integrity Inspections of Ammonia Refrigeration Systems



Ed Ford, P.E.

ColdWorks Engineering, Inc.