

The Power to Perform

J-W POWER COMPANY

SLIP, TRIP & FALL HAZARDS IN THE FIELD GAS COMPRESSION INDUSTRY

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Objectives

- *Review data and basic requirements
- *Understand common challenges faced in the field
- *Understand direct and indirect results
- *Discuss solutions, and Success



Statistics - Nationwide

Slips, trips and falls are a major cause of workplace injuries. Unsafe conditions and behaviors, along with a lack of safety awareness, can lead to these types of accidents.



SLIPS, TRIPS & FALLS:
15% of all accidents*

SLIPS, TRIPS & FALLS
on the same level are the
2nd LEADING
CAUSE OF
INJURY**

25,000
SLIP, TRIP & FALL
ACCIDENTS occur **DAILY**
in the US*

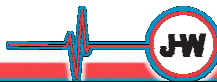
* National Safety Council ** Bureau of Labor Statistics



Statistics - Nationwide

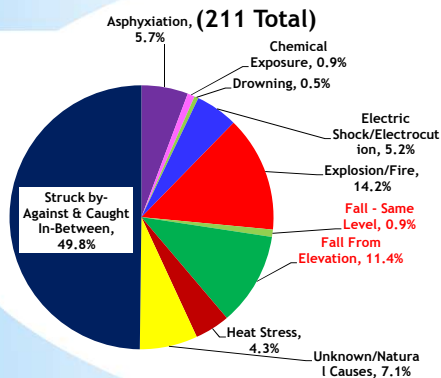
Per the Liberty Mutual Workplace Safety Index, in 2014, “falls on same level” ranked #2 as a leading cause of disabling injuries, with direct costs to U.S. industry of **\$9.19 Billion**

“Slip or trip without fall” was ranked #7, with direct costs of **\$2.17 Billion**.



Statistics – Industry Specific

2012-2015 OSHA Data for NAICS 211111, 213111 and 213112 Fatal Incidents



Field Gas Compression is NAICS 213112

Fall related injuries caused 12.3% of all fatalities during a 3-year period

About 1/3 of non-fatal injuries are slip/trip/fall incidents



Statistics – Industry Specific

The Stats Do Not Always Reflect the Whole Picture

Most slips/trips/falls are non-fatal OSHA-Recordable or First Aid case only
Some workers may not report at all - no injury, embarrassed

May be categorized by injury/result, not cause (i.e., ‘drowning’ or ‘MSD’,
but caused by a fall)

Many smaller oil & gas employers, who do not report data anywhere, or
report only raw TRIR data



Basic OSHA Regulations Let's Review...

January 2017 - All New/Revised Regulations in 1910 Subpart D
Walking-Working Surfaces for General Industry, 1910.21-30

Most changes already required, with phase-out of fixed
ladder safety cages (>24') occurring through 2036

Covers many industries, including O&G



General Industry Construction Maritime Agriculture Recordkeeping State Plans All

1910 Full Table of Contents

Printed Copies

- 1910.19 - Special provisions for air contaminants.
- 1910 Subpart C - Adoption and Extension of Established Federal Standards
- 1910 Subpart D - Walking-Working Surfaces
 - 1910.21 - Scope and definitions.
 - 1910.22 - General requirements.
 - 1910.23 - Ladders.
 - 1910.24 - Step bolts and manhole steps.
 - 1910.25 - Stairways.
 - 1910.26 - Dockboards.
 - 1910.27 - Scaffolds and rope descent systems.
 - 1910.28 - Duty to have fall protection and falling object protection.
 - 1910.29 - Fall protection systems and falling object protection-criteria and practices.
 - 1910.30 - Training requirements.
- 1910 Subpart E - Means of Egress
 - 1910 Subpart E, App. - Exit Routes, Emergency Action Plans, and Fire Prevention Plans.
 - 1910.33 - Table of contents.
 - 1910.34 - Coverage and definitions.
 - 1910.35 - Compliance with alternate exit-route codes.
 - 1910.36 - Design and construction requirements for exit routes.
 - 1910.37 - Maintenance - obstructions and operational features for exit routes.

Basic OSHA Regulations Let's Review...

“All Facilities”, shops, passageways and access routes are required to be kept clean, orderly and free of surface hazards, such as loose items and holes, within walking areas.

A stairway or ladder at any point of access/travel where there is an elevation break of **19 inches** or more, railing and possibly toeboards for stairways or work platforms at **4 feet** or more in height.

Ladder safety system or personal fall arrest for ladders **24 feet** or higher.

Self closing safety gates for all fixed ladders.

Conduct Walking-Working Surface hazard assessments for all work sites.

Provide one of several acceptable means of protecting workers, and training.



What if this was your office?



Or This...?



A Day at The Office



A Day at The Office



Compressor Service Technicians

Emissions Specialists

Lease / Station / Plant Operators

Component Specialists, such as CAT or GE/Waukesha

Installation crews (welders, roustabouts, crane operators/riggers, etc.)

Supervision, Sales, Engineering, Safety



Common Challenges - General

Weather / Nature / Working Outdoors

Working Solo, Human Nature

Geography/Terrain, Remote Areas

Market Stability, "Boom or Bust"



Common Challenges - Industry Specific

Industry Specific Slip/Trip/Fall Hazards:

Two Classes - LOCATION and EQUIPMENT



Common Challenges - Industry Specific

LOCATION HAZARDS

Contractor vs. Customer Relationship
Work Environment Not Controlled by
Those Most Affected by the Hazards

Piping, tubing, hoses run along surface
of location (#1 Cause of many incidents)



Common Challenges - Industry Specific

LOCATION HAZARDS

Uneven terrain, holes/trenches, wheel ruts, containment and fire walls, spill control liners,

raised or sunken compressor foundations

Tie-downs, guy wires, stakes, tarps, ground rods

Lack of lighting



Common Challenges - Industry Specific

EQUIPMENT HAZARDS

High level of Variation with gas compressors – design, packager, age, application, other factors

Safe access to package skid, engine, exhaust/catalysts

Lots of onboard piping, conduit/wiring, pressure vessels

Safe access/work on top of cooler when required

Most field compression Not inside a (proper) building

Trucking/shipping requirements, portability



Common Challenges - Industry Specific

EQUIPMENT HAZARDS

Smaller compressors mounted on trailers present unique hazards



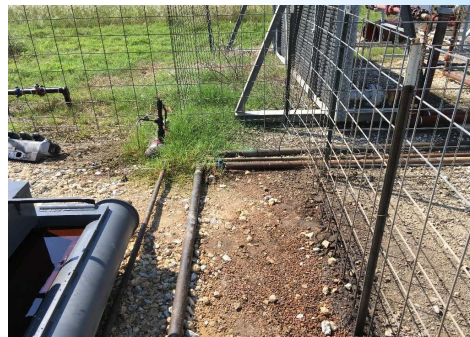
Direct Results

Multiple Types of Injuries

OSHA Recordables, First Aid, Lost Work Days

Short or even Long Term Disability

Quality of Life



Indirect Results

Higher TRIR and Severity Rate

Higher EMR

Competitiveness and Profitability Issues

Lower Scores in ISN, PEC, Veriforce, etc.

Morale Issues, “Set Up to Fail”, then penalized for being “Unsafe”



What's the Solution?

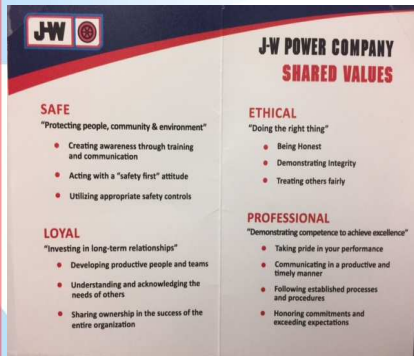
CREATE AWARENESS!!!

Get the word out.

People cannot fix problems they do not know about or fully understand.



Solutions – Upper Level



1. Develop minimum standards (GCA, GMRC)

2. Agree to follow the standards (MSAs, Contracts, Policies)

3. Hold all parties accountable to the standards (Audits, JSAs, Assessments)



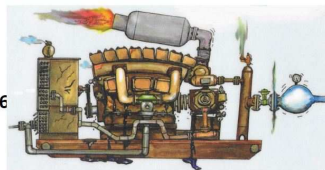
Solutions – Upper Level

ACI Services, Inc. GMRC High Speed Compressor Package Guideline Project

**GMRC High Speed Compressor Package
Guideline Project**

Work Team Kick-Off

ACI Services Inc.
W. Norm Shade, PE
Nov 20/Dec 1, 2016



Work Team Launch – Nov. 30/Dec. 1, 2016

**2017 Field Gas Compressor Guideline
(High Speed Recip & Screw)**

**Developers: Gas Machinery Research
Council, in partnership with the Gas
Compressor Association**

**Intent: An Industry Standard, with
field gas compressor specific content
on numerous aspects, many of which
affect safety**



Solutions – Field Level

Perform WWS-Specific Hazard Assessments and Site Inspections

**Share Site Inspection Results with Customers
Gather Data, Prioritize, Seek Changes and
Improvements to LOCATION as needed**

**Gather Data, Prioritize, Implement Changes and
Improvements to EQUIPMENT as needed**

J-W POWER COMPANY ELEVATED WORKING SURFACE ASSESSMENT SHEET

J-W UNIT#: _____	Model #: _____	District #: _____	Area: _____	State: _____
Customer Name: _____	Lessee Name: _____			
Complete One form for each compressor unit and answer all applicable questions! To access the work area, or work surfaces 48 inches or higher from the next lower level? If yes, complete the appropriate section(s) below.				
Assessment of Steps and Stairways (complete if stairs or steps are present to access the work area)				
Is there a vertical rise of 18 inches or more between adjacent levels?	Yes/No/N/A			
Are steps at least 12 inches wide, and do they have a level surface?	Yes/No/N/A			
Are there four nosing (nose) inches of the leading edge?	Yes/No/N/A			
Is there a minimum tread depth of 8 inches or more?	Yes/No/N/A			
Is there a maximum height of 36 inches for ladders, 28 inches and at least 36 inches for stairs?	Yes/No/N/A			
Assessment of Fixed Ladders (complete fixed ladders are present to access the work area)				
Is there a fixed ladder for access?	Yes/No/N/A			
Does it have a minimum diameter of 16 inches?	Yes/No/N/A			
Is there a distance between rungs of no more than 36 inches?	Yes/No/N/A			
Are rungs at least 16 inches wide, and are they spaced consistently with each other?	Yes/No/N/A			
Are rungs and side rails so made that only one foot can rest on a rung?	Yes/No/N/A			
Is there a platform at least 18 inches deep in front of the ladder rungs?	Yes/No/N/A			
Is the platform at least 12 inches wide and 18 inches high?	Yes/No/N/A			
Is the platform at least 18 inches wide and 18 inches high?	Yes/No/N/A			
Do you use fall protection on the ladder rungs?	Yes/No/N/A			
Is there a minimum height of 24 inches, but not less than 36 inches?	Yes/No/N/A			
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Do you use fall protection on the ladder rungs?	Yes/No/N/A			
Assessment of Other Elevated Work Surfaces, Walkways, and Platforms				
Is there a minimum height of 48 inches above the ground or other lower level?	Yes/No/N/A			
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Please use the comments section to describe any deficiencies noted, or to post any comments about the assessment of this unit.				
COMMENTS:				
Inspector's Name (printed): _____	Signature: _____	Date: _____		



Solutions – Location Hazards



Day tank hoses replaced with sub-surface piping!

Address LOCATION Hazards During Unit Set (Install) Not Created at the Start vs. Correcting After the Fact

Reps for all Parties On Site, Plus Construction Crews and Equipment

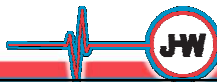
Hot Work, 811/Dig Tess, LO/TO, etc., Likely Already Done

Much Easier to Install or Re-Route Piping



Solutions – Location Hazards

On Location, cover piping/hoses with gravel or route to avoid hazards.
Ensure a clear path around equipment!

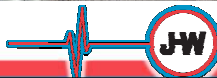


Solutions – Location Hazards

Use bright color paints to identify permanent hazards,
plus cones, orange fencing, etc. for temporary ones.

Provide cross-overs for piping and firewalls.

Provide lighting.



Solutions – Equipment Hazards

Correct EQUIPMENT hazards during engine swings, unit make-ready and other downtime opportunities.

In-Shop Is Easier Than In-Field!



Solutions – Equipment Hazards

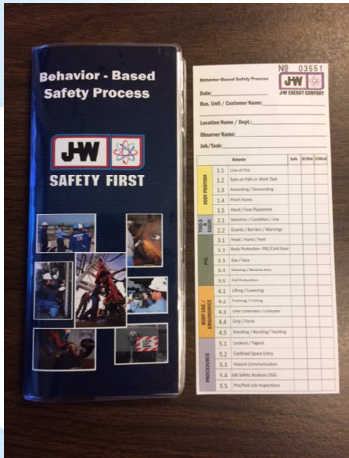
Provide OSHA WWS-compliant access for all parts of compressor packages.

Stairs, ladders, non-slip platforms, railing systems, toeboards, anchorage points, etc.

Maintain blowcases and fluid drain systems to keep oil on skid to a minimum!



Solutions – Ongoing

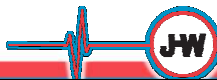


Job Safety Analysis

Behavior Based Safety Observations

“Own” Observed Hazards! Report & Follow Up Correct On-The-Spot When Appropriate

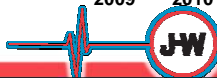
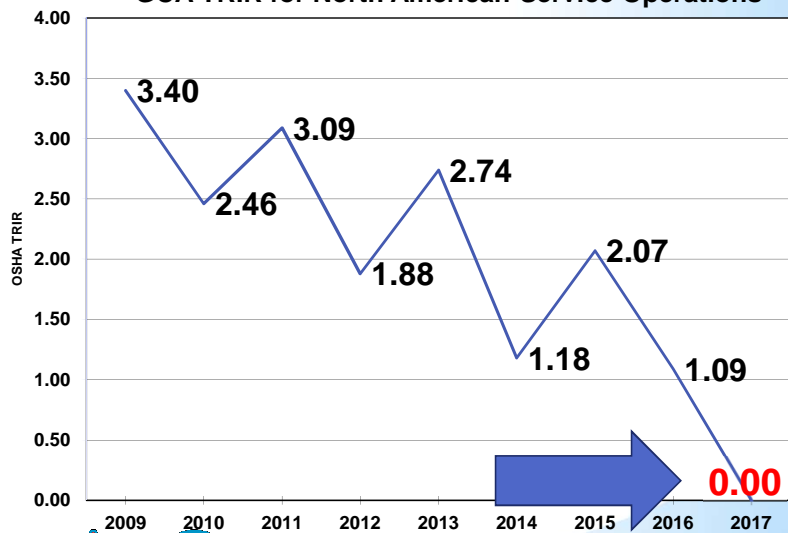
Sales & Supervision – Establish Direct Line of Communication to Customer Representatives



What Does Success Look Like?



GCA TRIR for North American Service Operations



What Does Success Look Like?



Piping routed and/or covered under gravel to provide clear path of travel around the unit with minimal trip hazards. All piping painted bright, reflective color. Suction line is routed at a height of about 6 ½ feet, and painted a bright color to help keep a safe path of travel along side of unit. Light poles not visible in photos, but present.

What Does Success Look Like?

Engineered Anchorage point within armreach of cooler ladder with safety cage



Metal grating floor around entire unit



Safety Yellow railing/toeboards around all edges of barge-mounted unit



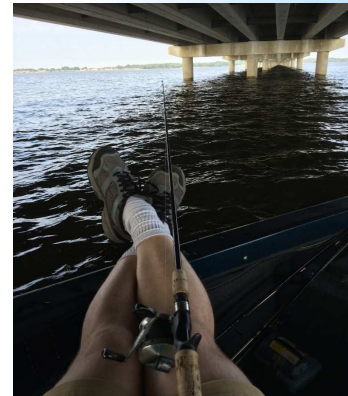
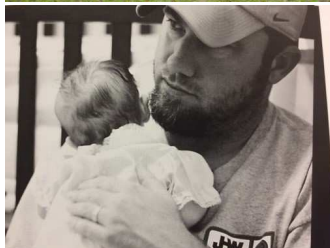
What Does Success Look Like?



Platforms, guardrail systems, steps and ladders



What IS Success, Really?



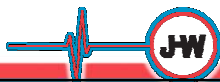
Summary

Slip, Trip and Fall incidents are a leading cause of workplace injury.

In Field Gas Compression, slip, trip and fall hazards can be abundant, affecting many oil & gas production workers.

**Safety is a Shared Responsibility, By and For All Involved.
Oil & Gas Production Companies are the Key to Location safety.
Gas Compressor Companies are the Key to Equipment safety.**

Working Together, These Hazards Can Be Controlled!



? QUESTIONS ?