



“Beginning in 1999 [John] Mathis and others at CII began taking detailed looks at 38 projects with construction values of \$50 million to \$600 million. They found the fewest accidents on projects where top management insisted on listing safety training as a budget item, participated in investigations of recordable injuries and encouraged anonymous disclosures of unsafe behaviors. On the safest projects, every worker on site received at least four hours per month of safety training, each safety professional served no more than 50 workers and subcontractors submitted site-specific safety plans. Mathis urged wider adoption of such safety practices, in an industry in which work-related accidents kill approximately 1,000 construction workers annually.”

– David B. Rosenbaum, Craft Labor Shortage Provokes More Studies of Pay and Safety, *ENR*, August 20, 2001



CII: Making Zero Accidents a Reality

John Mathis

“CII: Making Zero Accidents a Reality”

- Construction Industry Institute (CII)
- Take a safety journey
- Review the research methodology
- Reveal best practices identified
- Review and discuss key findings
- Summary and questions





Project Team

160 - Committee Members

Bill Alfera
FPL Energy, Inc.

Alan R. Burton
Cianbro Corporation

Mike Cain
Lockwood Greene

Dennis Cobb
*E.I. du Pont de Nemours & Co.,
Inc.*

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Mike F. Schwimmer
Chevron U.S.A., Inc.

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Austin Industries

Construction Industry Institute

A consortium of leading owners, contractors, suppliers, and academia who are interested in improving the constructed project and the capital investment process.



CII Mission

To improve the safety, quality, schedule, and cost effectiveness of its members through research and implementation support for the purpose of providing a competitive advantage to its members in the global marketplace.



Owner Members

- Exxon
- Chevron
- Shell
- BP/Amoco
- Dupont
- Conoco
- Citgo
- Texaco
- Phillips
- Celanese
- Intel
- General Motors
- Alcoa
- Reliant Energy
- Nasa
- TVA
- Ontario Power
- U.S. Steel



CII Contractor Members

- ABB Lummus Global
- Bechtel Group
- BE&K
- Black & Veatch
- Chicago Bridge & Iron
- Burns and Roe
- The Parsons Corp.
- Rust Contractors
- Fluor Daniel
- Foster Wheeler USA
- Jacobs Engineering
- Kellogg Brown & Root
- Kiewit Construction
- Morrison Knudsen
- H. B. Zachry
- Stone & Webster Engineering
- S&B Engineers and Constructors



Participating Universities

- Arizona State
- Auburn
- Cal-Berkeley
- Carnegie Mellon
- Cincinnati
- Clemson
- Colorado
- Columbia
- Drexel
- Florida
- Georgia Tech
- Houston
- Illinois
- Iowa State
- Kentucky
- Lehigh
- MIT
- New Mexico
- North Carolina State
- North Dakota State
- Oklahoma State
- Oregon State
- Penn State
- Polytechnic University NY
- Purdue
- Stanford
- SUNY-Buffalo
- Texas
- Texas A&M
- Virginia Tech
- Washington
- Wisconsin
- Worcester Polytechnic
- Xavier

CII Knowledge Structure

Identifies CII:

- Best Practices
- Pending Best Practices
- Informational products

Industry input critical to Best Practice selection.

All Best Practices validated.



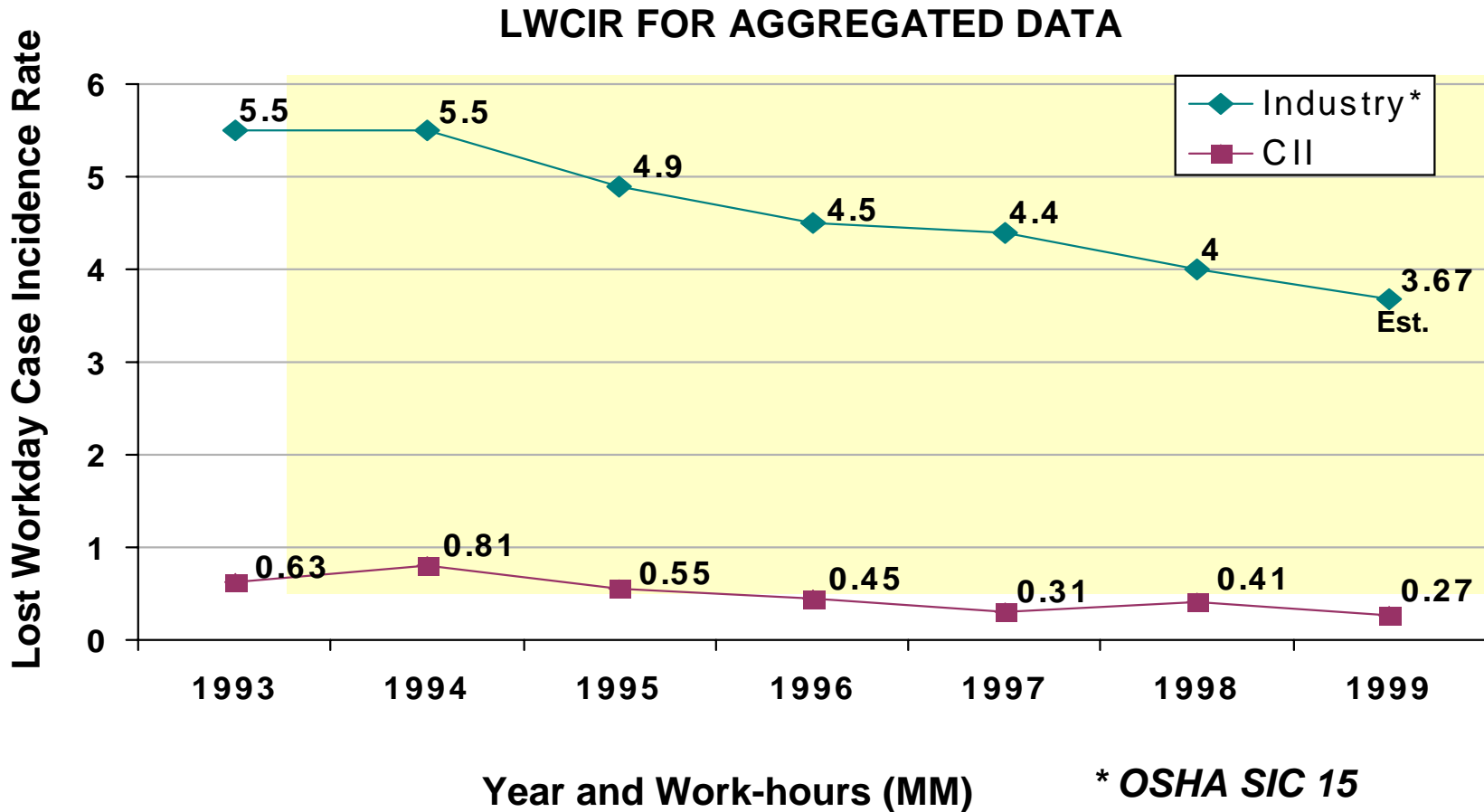
First CII Zero Accidents Study Findings - 1993

High-impact zero accident techniques

- Pre-project/pre-task planning for safety
- Safety orientation and training
- Written safety incentive programs
- Alcohol and substance abuse programs
- Accident/incident investigations



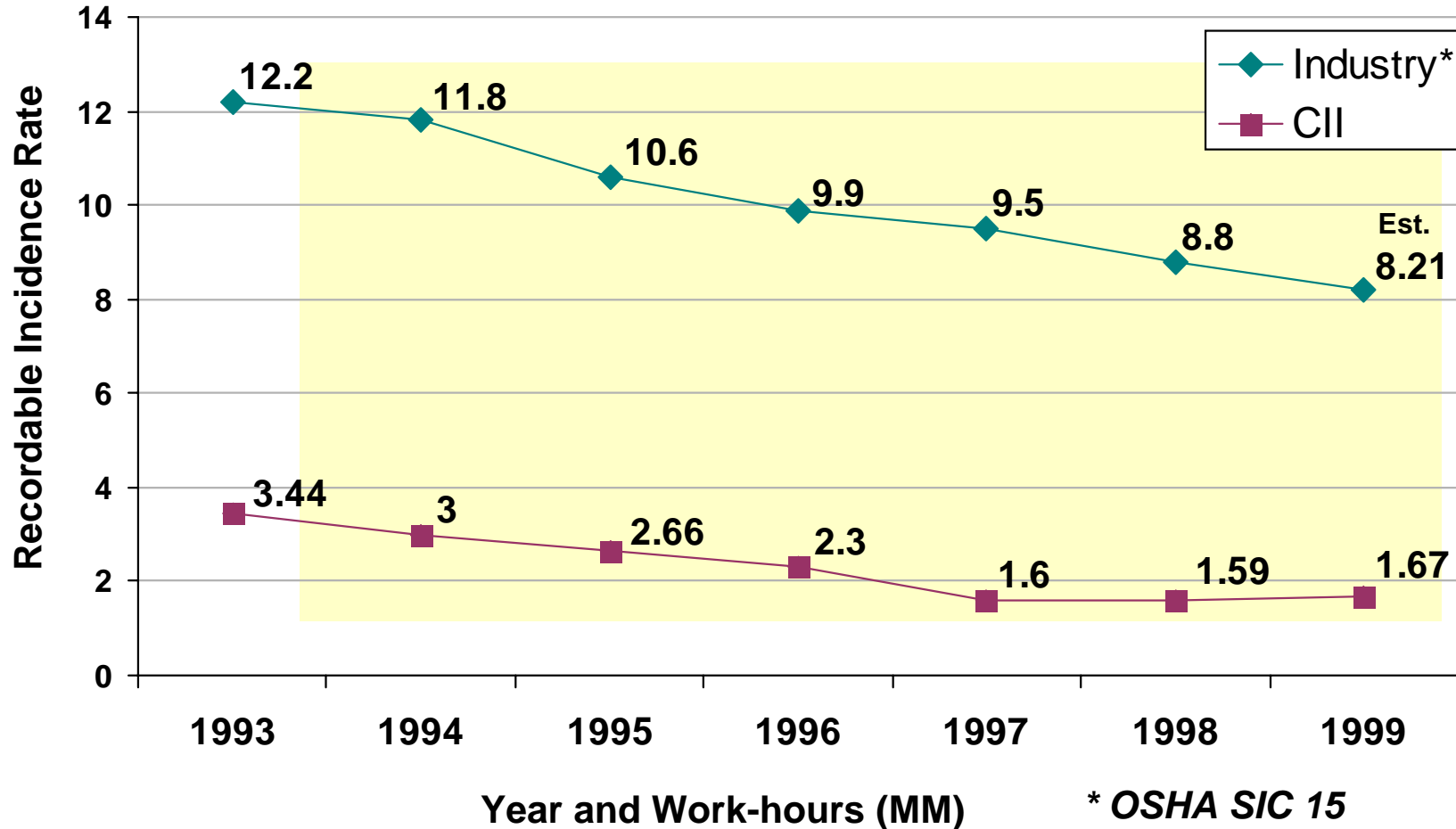
CII Lost Work Case Performance - 1993-1999



CII OSHA Recordable Performance - 1993-1999



RIR FOR AGGREGATED DATA



Zero Accidents - Revisited

What safety best practices have supported this improvement and are at the forefront of safety management today?

“Making Zero Accidents a Reality”

Nov. 1999

Project Team -160



Zero Accidents Study 2000/2001

Methodology – two studies

- Large construction firms
- Large construction projects

Survey of 400 largest construction firms in the U.S.

- Based on ENR 400 for 1999
- 400 surveys sent – 102 responses



Zero Accidents Study 2000/2001

Detailed interviews on construction projects

- 38 Projects
- Types
 - Petrochemical
 - Industrial
 - Public works
 - Transportation
 - Hotel-Casino
 - Commercial buildings
- Locations: U.S. wide geographic area
- Sizes: \$50-\$600 million





Nine Zero Accident Best Practices

- **Demonstrated management commitment**
- **Staffing for safety**
- **Safety planning**
- **Safety training and education**
- **Worker participation and involvement**
- **Subcontractor management**
- **Recognition and rewards**
- **Accident/Incident reporting and investigations**
- **Drug and alcohol testing**



Best Practice Results

Over 30 key findings revealed significant lower recordable injury rates with companies utilizing these best practices.



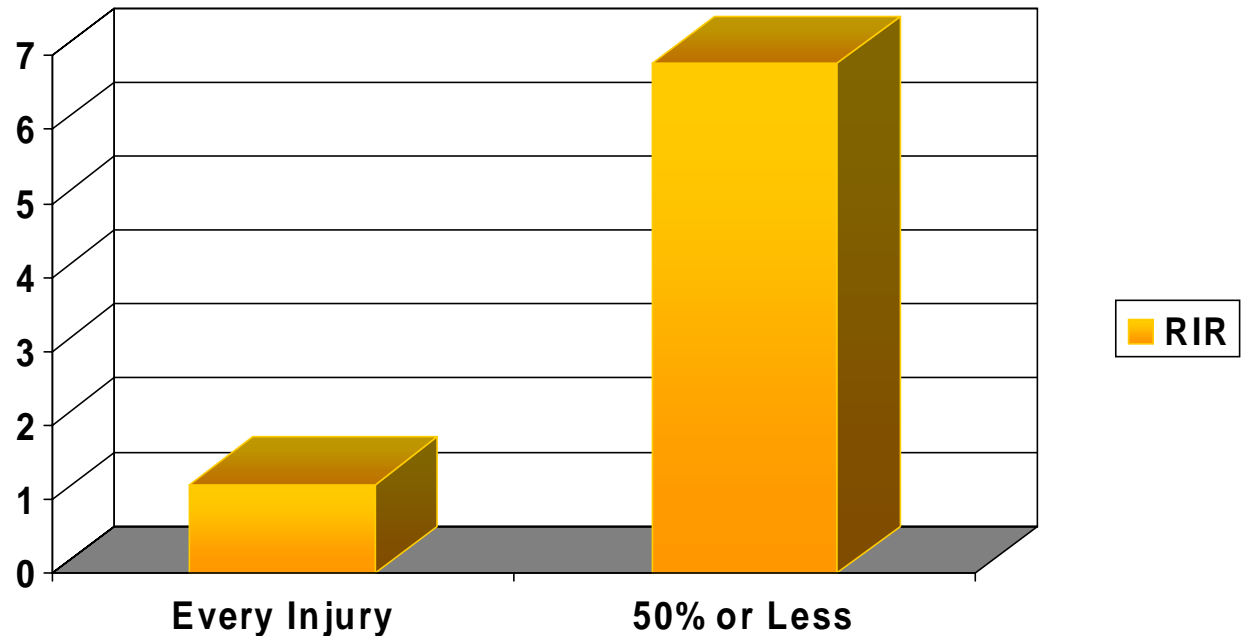
Demonstrated Management Commitment

- **Safety mission statements**
- **Project-specific newsletters**
- **Top Management involved in accident/incident investigations of recordable and lost time injuries**
- **Top Management personally involved in reviewing safety performance reports**
- **Senior field management**
 - **Participation in field safety inspections**
 - **Participation in orientation**



Demonstrated Management Commitment

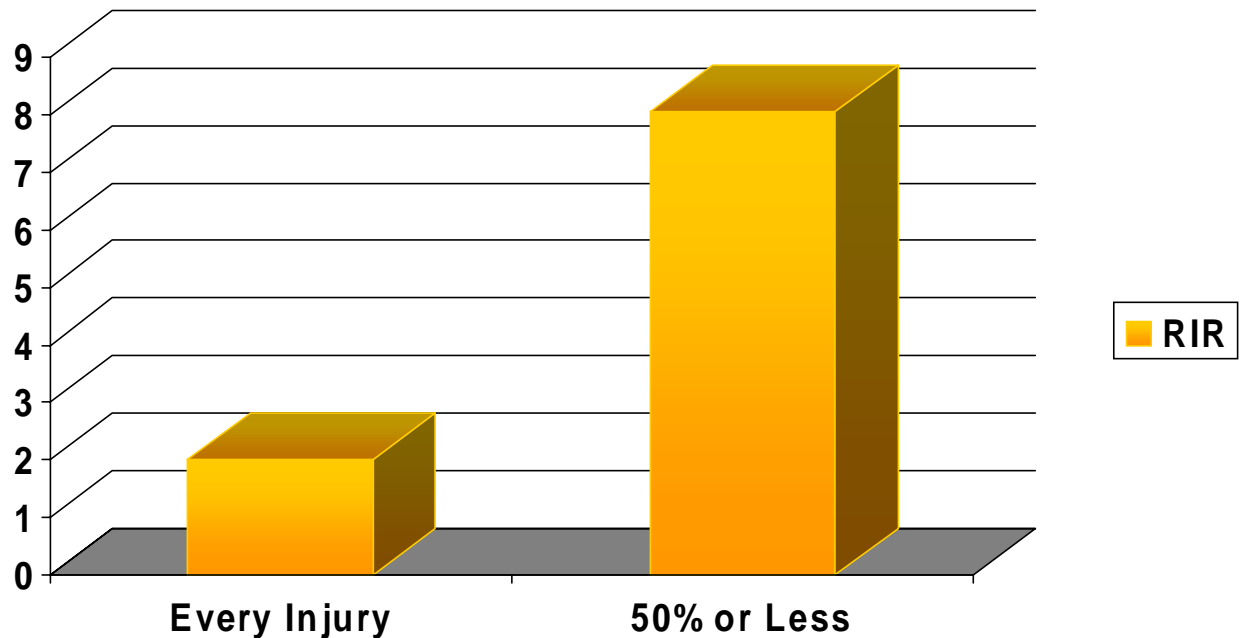
Top management participated in investigation of recordable injuries





Demonstrated Management Commitment

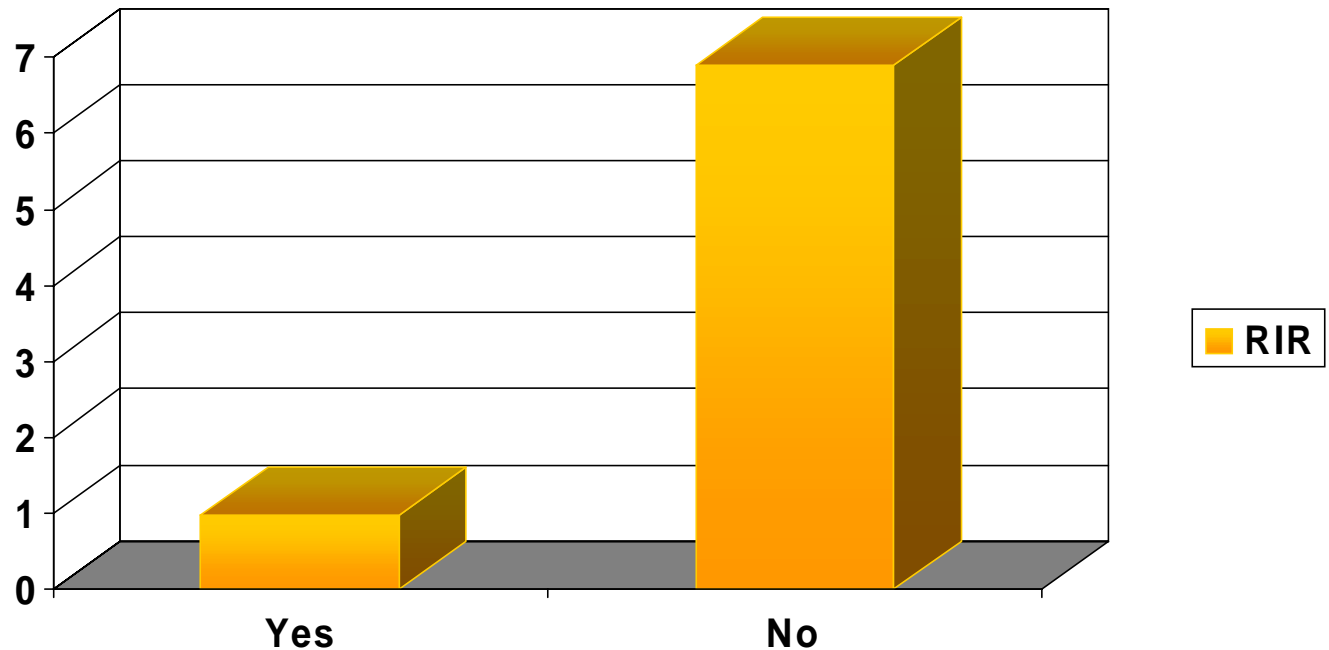
Top management participated in investigation of lost time injuries





Demonstrated Management Commitment

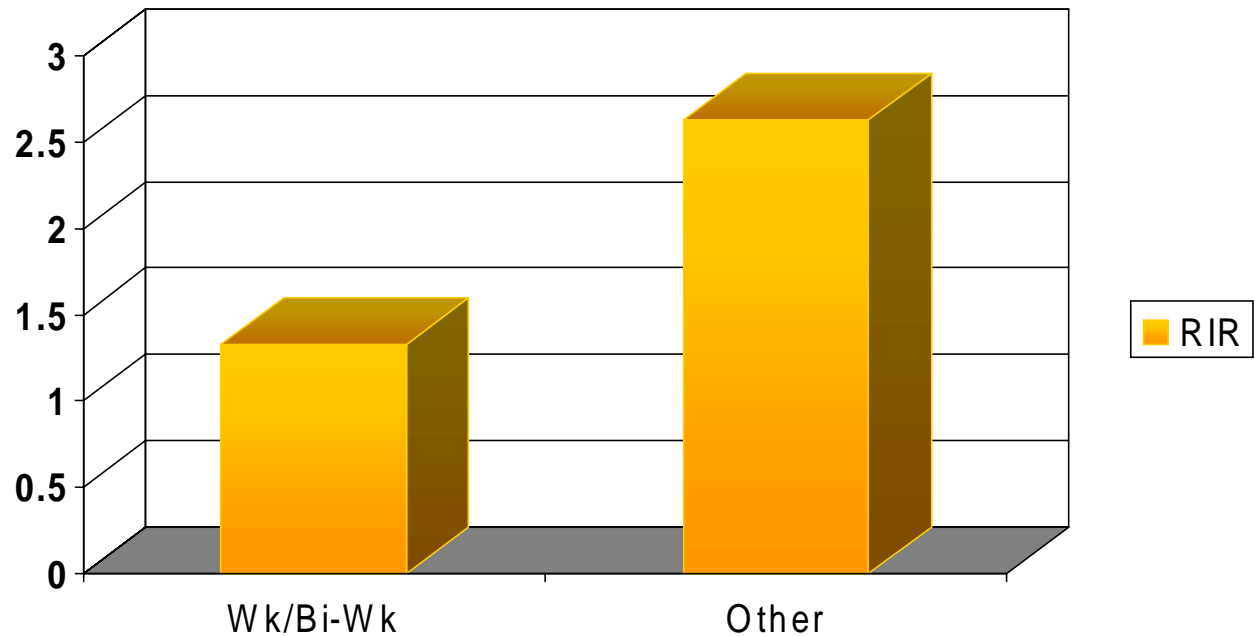
Company president/senior management reviews safety performance report





Demonstrated Management Commitment

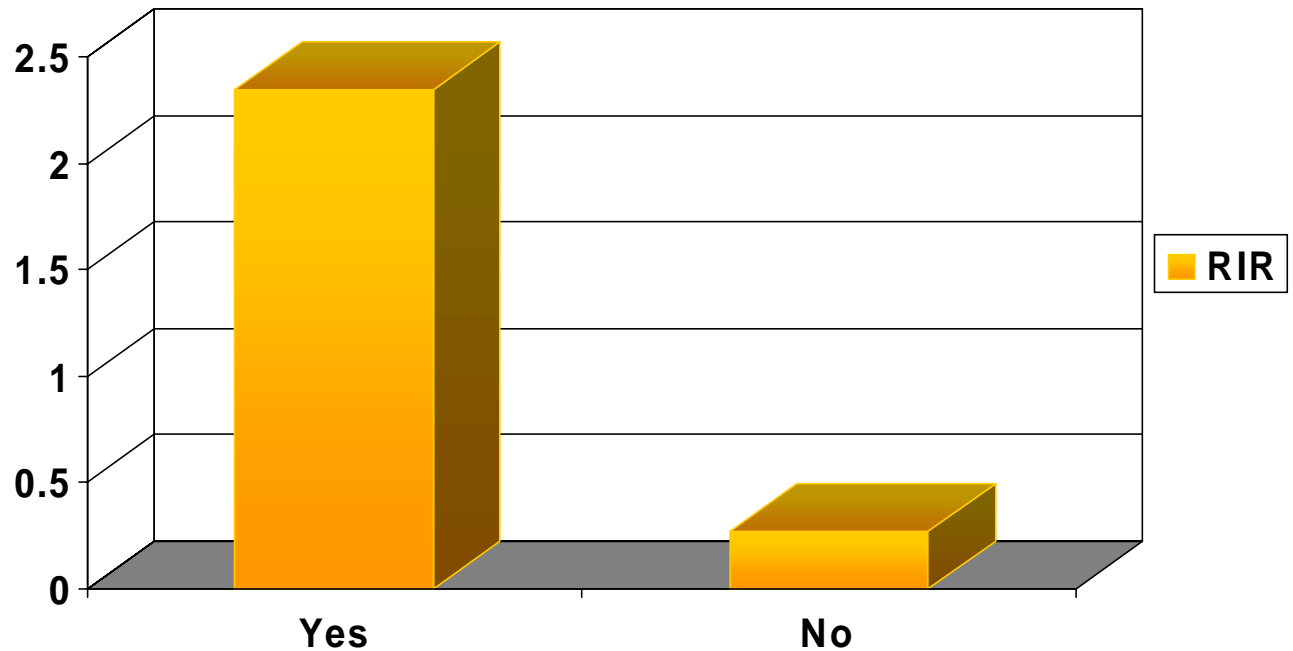
Home office safety inspections on the project





Demonstrated Management Commitment

Corporate accident report summary provided to all the jobs?



Safety Staffing

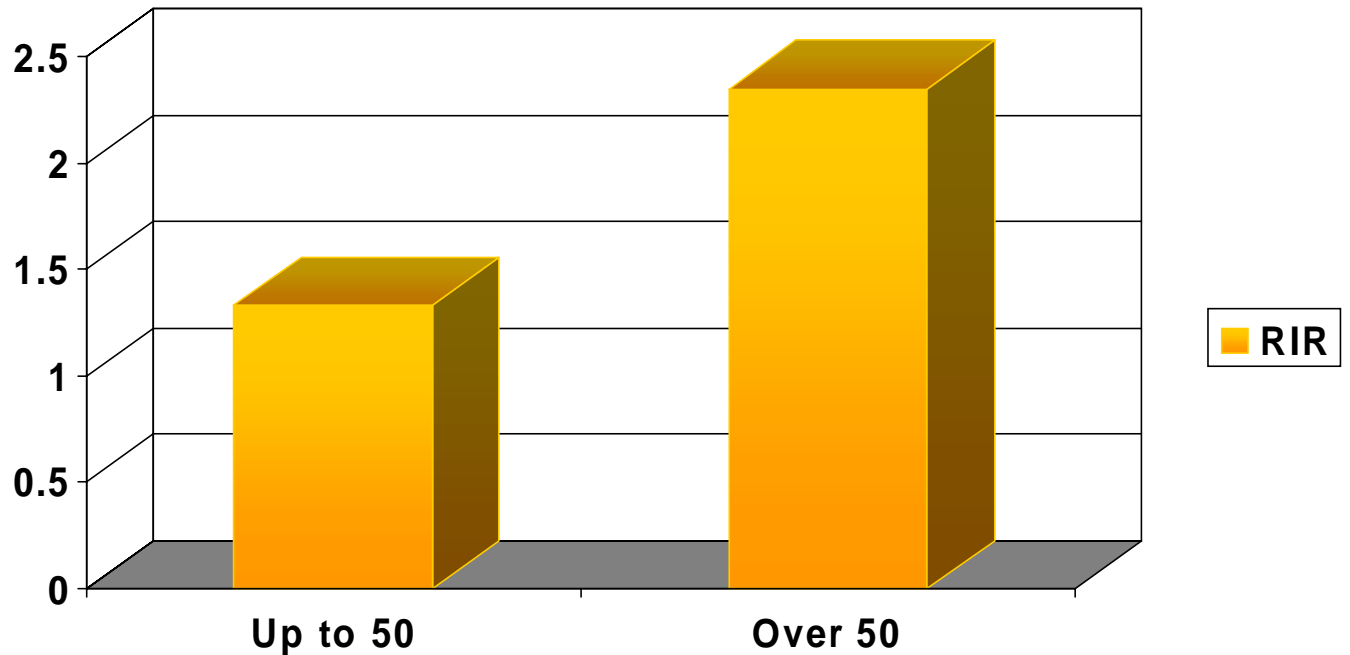
People, methods, resources, and key impacts

- Adequate staffing
- Safety involved in project meetings
- Safety included in cost, scheduling, and quality reports



Safety Staffing

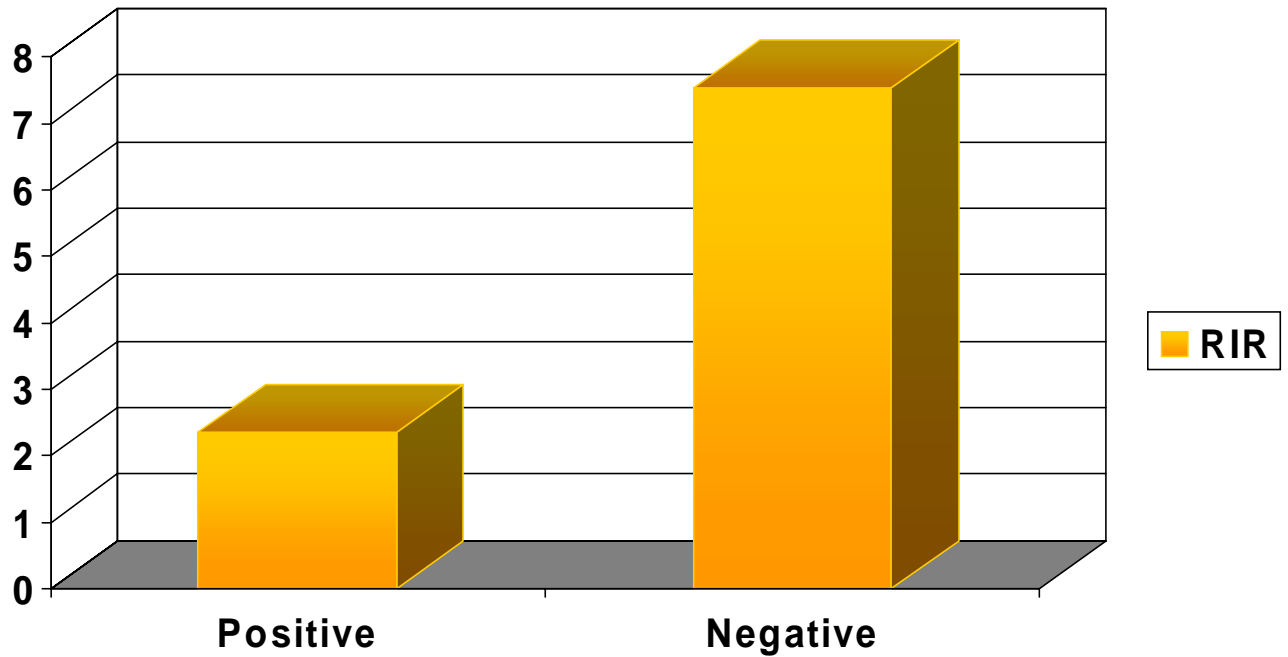
Safety professionals per 50 workers





Safety Staffing

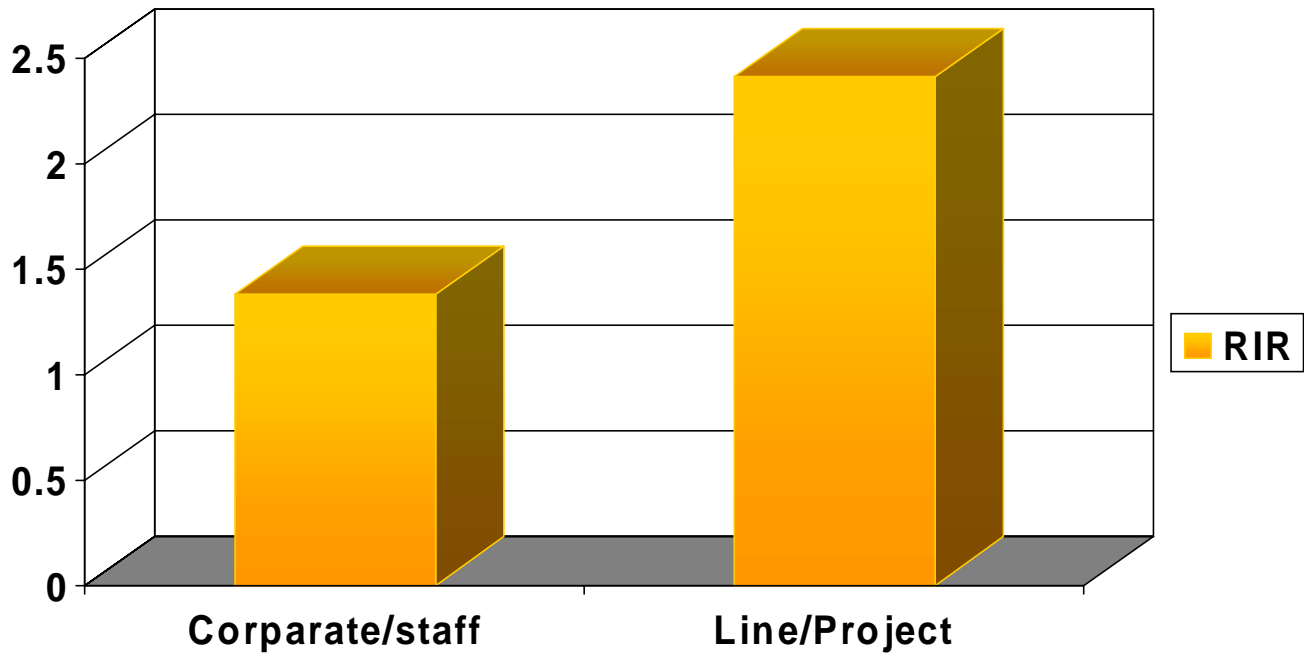
View of safety personnel by other workers on the site





Safety Staffing

Who does the safety representative report to?



Safety Planning

Pre-project and pre-task planning-key impacts

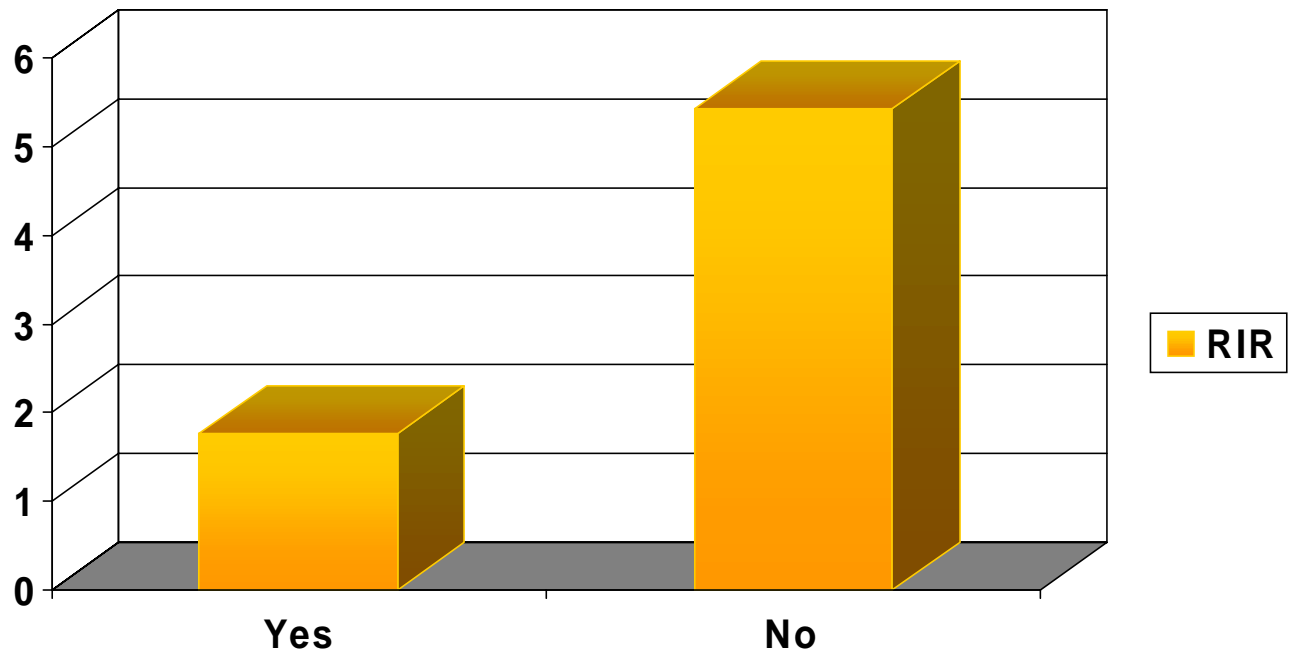
- Job hazard analysis
- Constructability reviews
- Pre-task planning
- Site-specific safety programs





Safety Planning

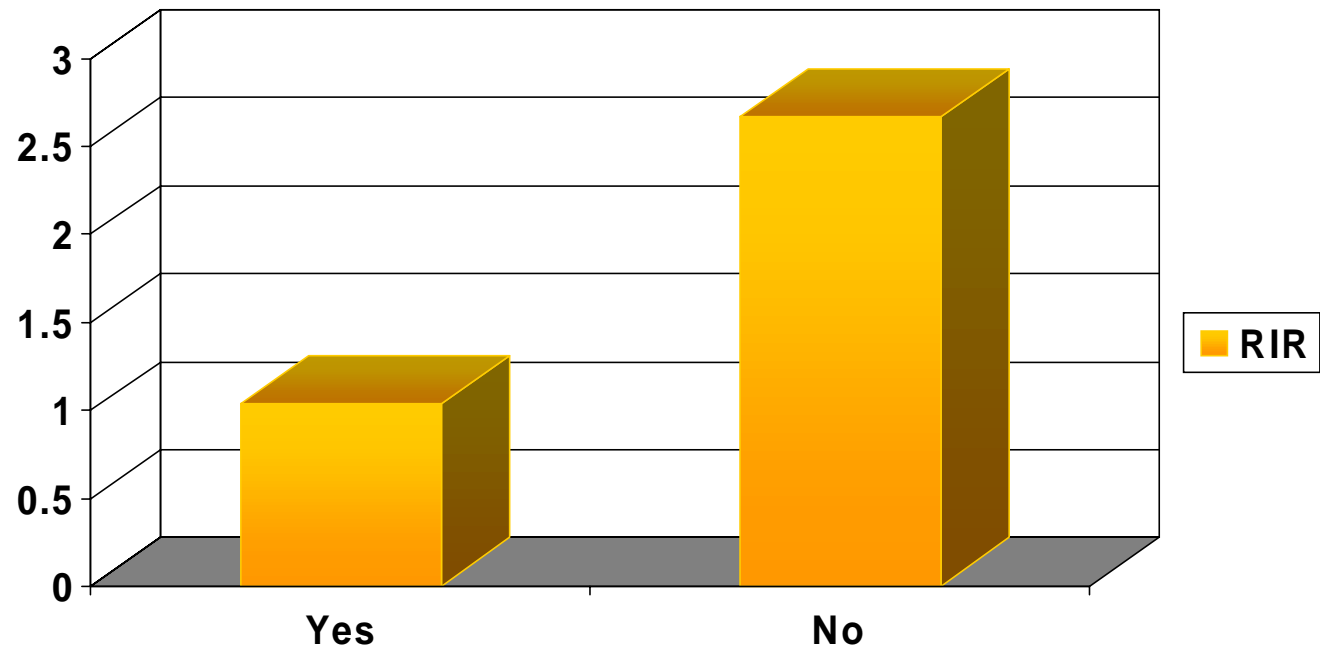
Does the project have a site-specific safety program?





Safety Planning

Pre-task meetings held?



Safety Training and Education

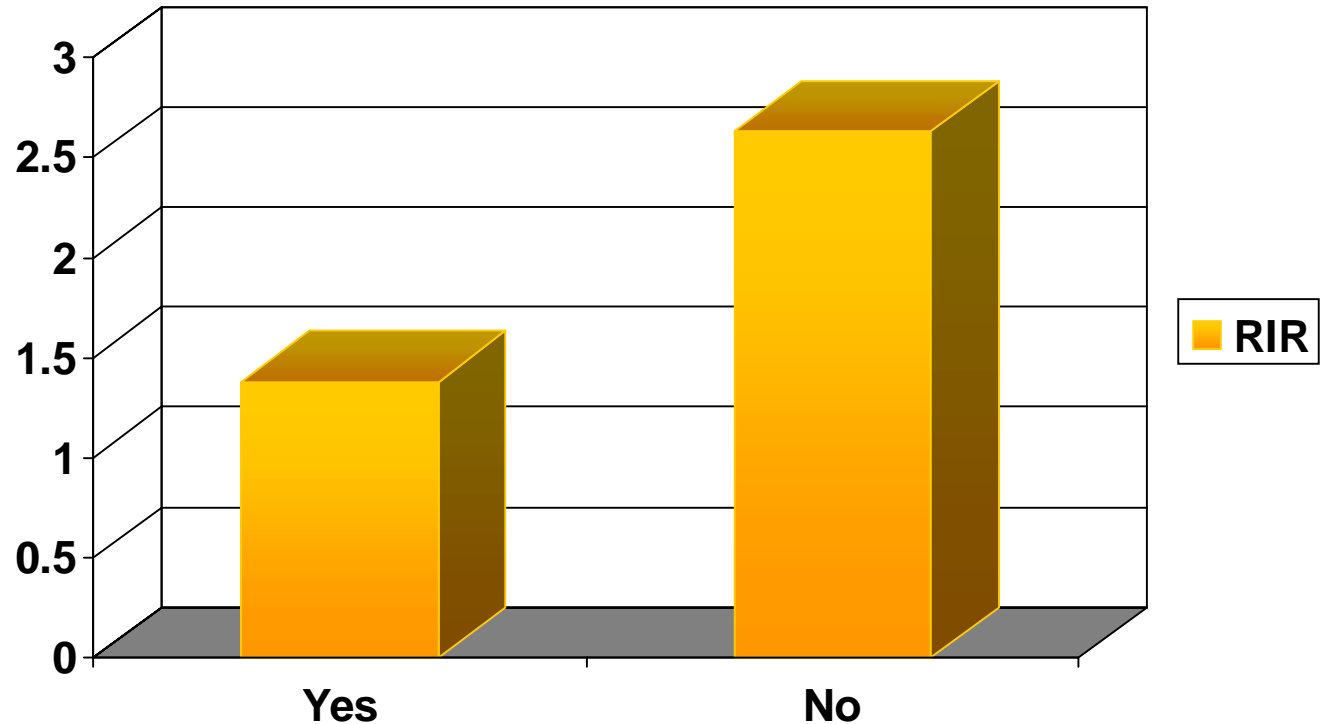
- New worker safety orientation
- Follow-up safety training
- Tool box safety meetings





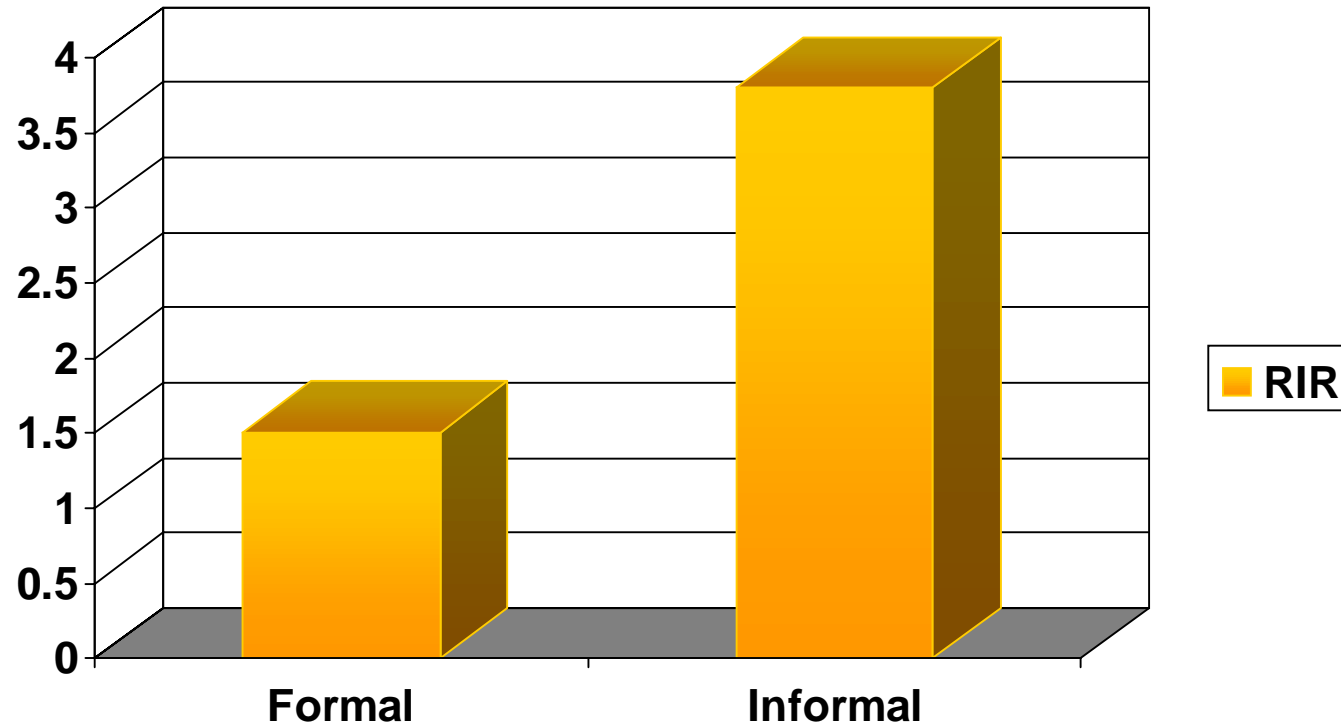
Safety Training and Education

Is Safety Training a line item within the budget?



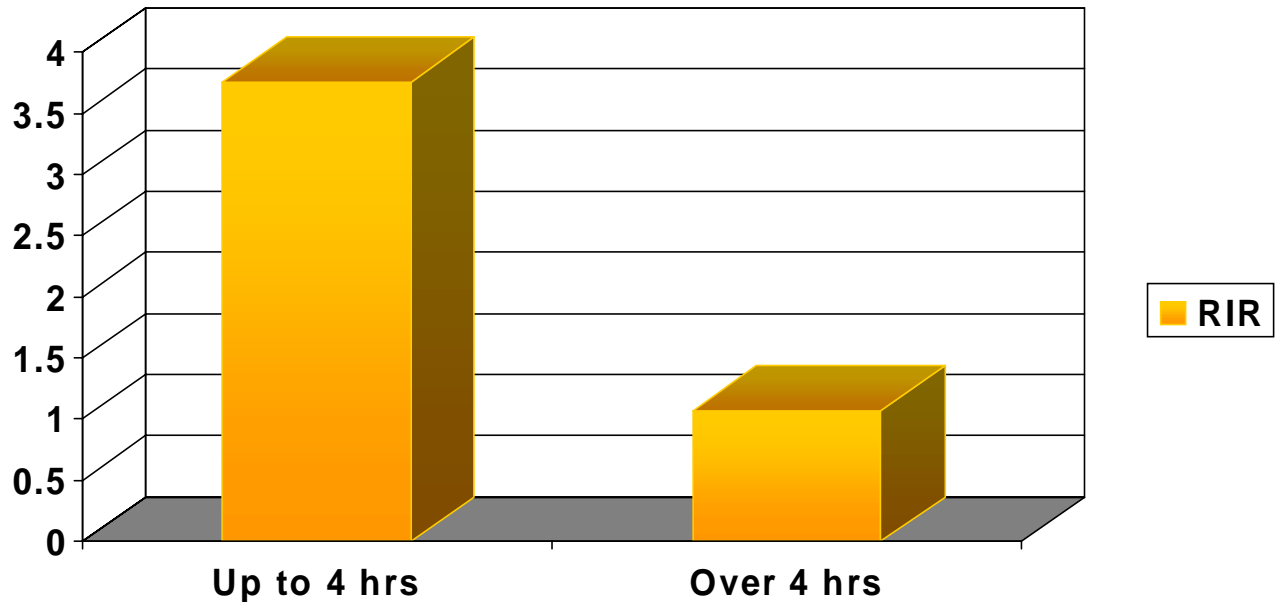
Safety Training and Education

Every Worker on site receive a formal standard orientation



Safety Training and Education

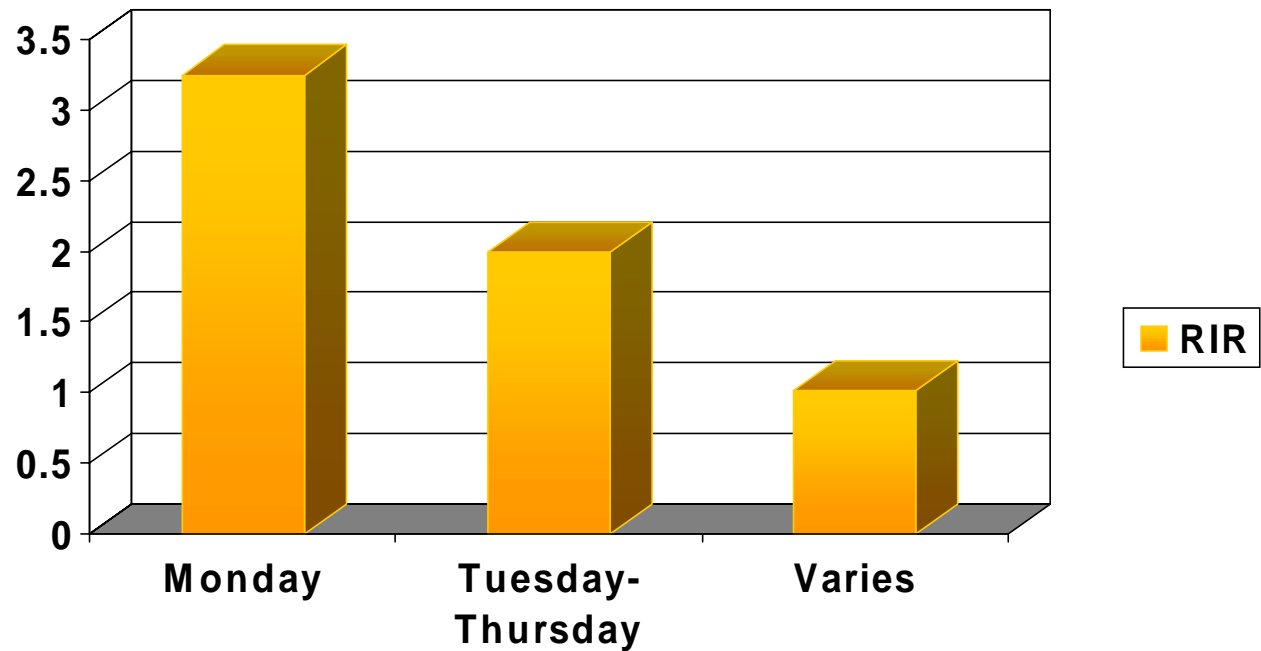
Additional monthly training for employees





Safety Training and Education

What day toolbox safety meetings held



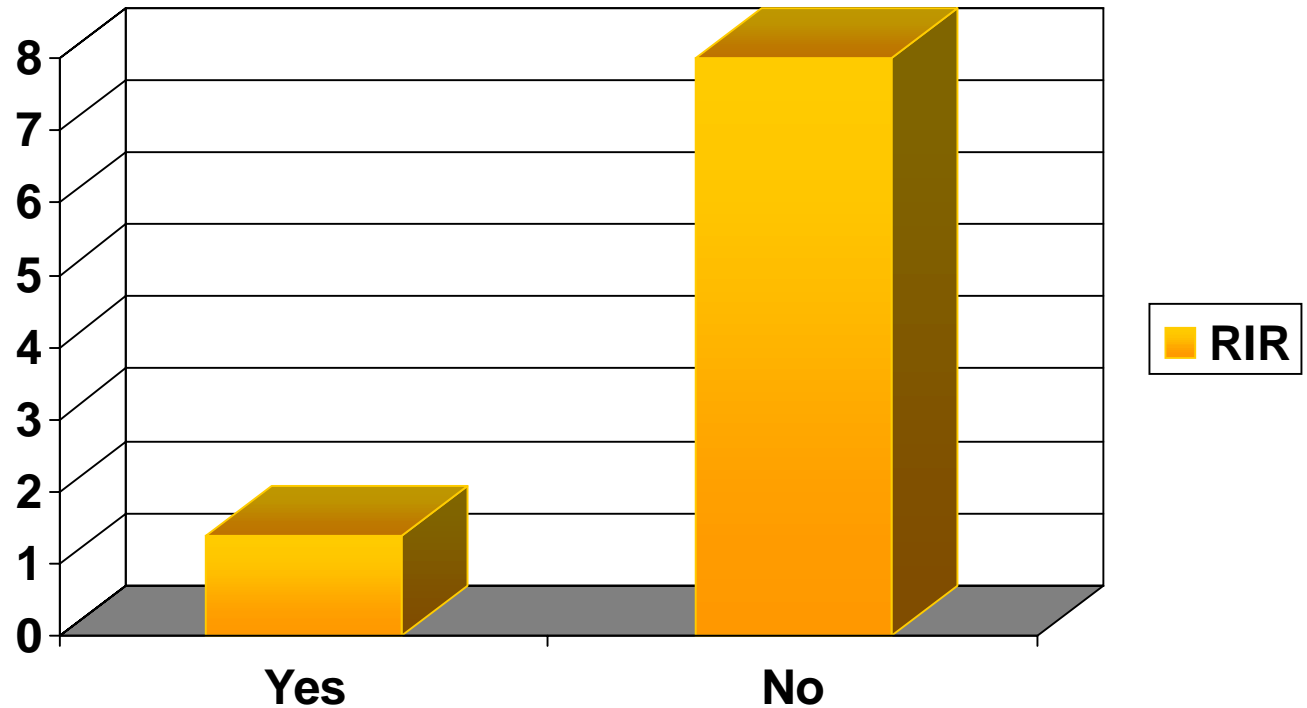
Worker Involvement and Participation

- Employee/Involvement Safety Teams
- Worker-to-worker observation process
- Worker perception surveys



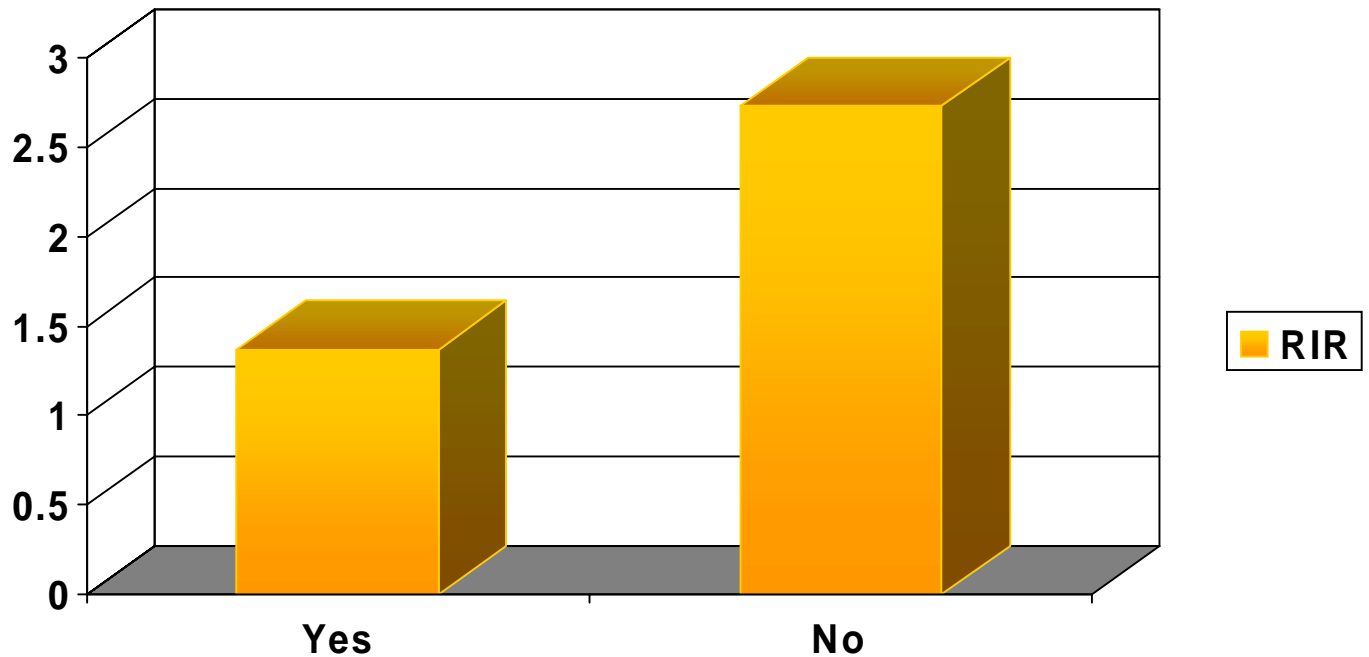
Worker Involvement and Participation

Are safety observers used on the projects?



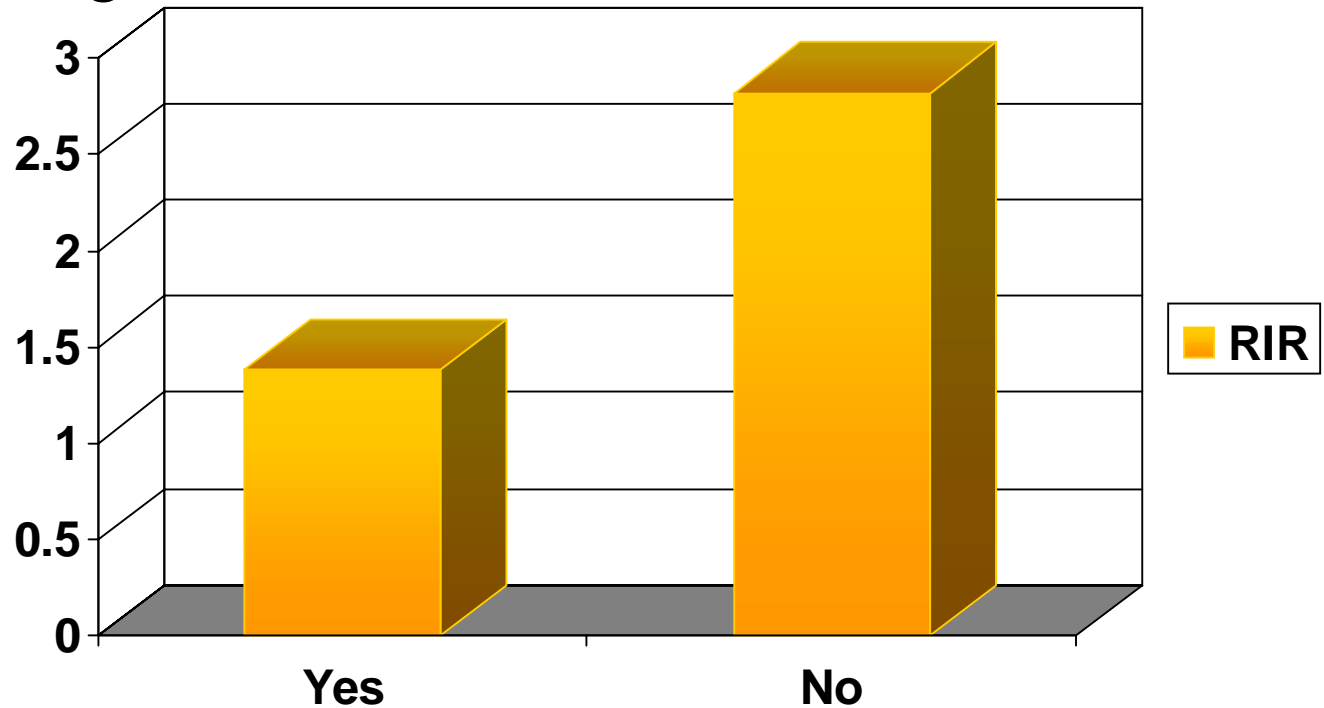
Worker Involvement and Participation

Workers trained and utilized for worker-to-worker observation?



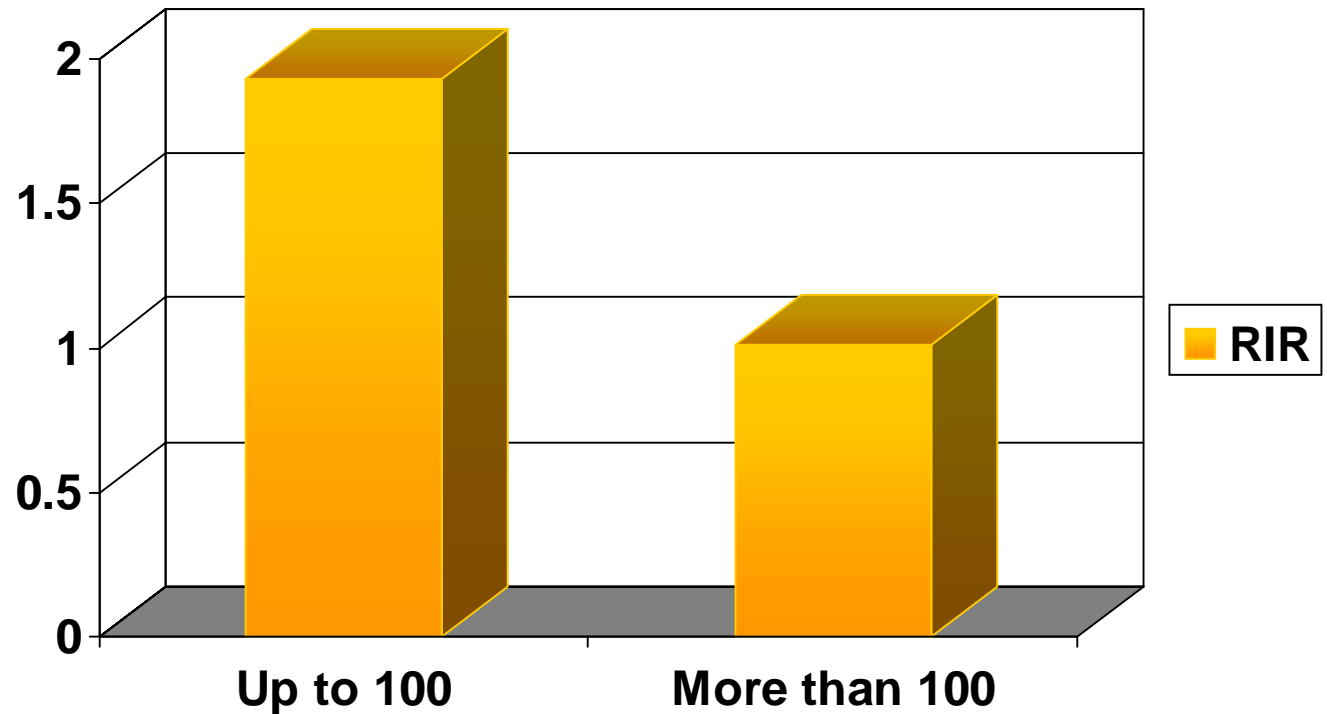
Worker Involvement and Participation

Do management and supervisory personnel receive behavior overview training?



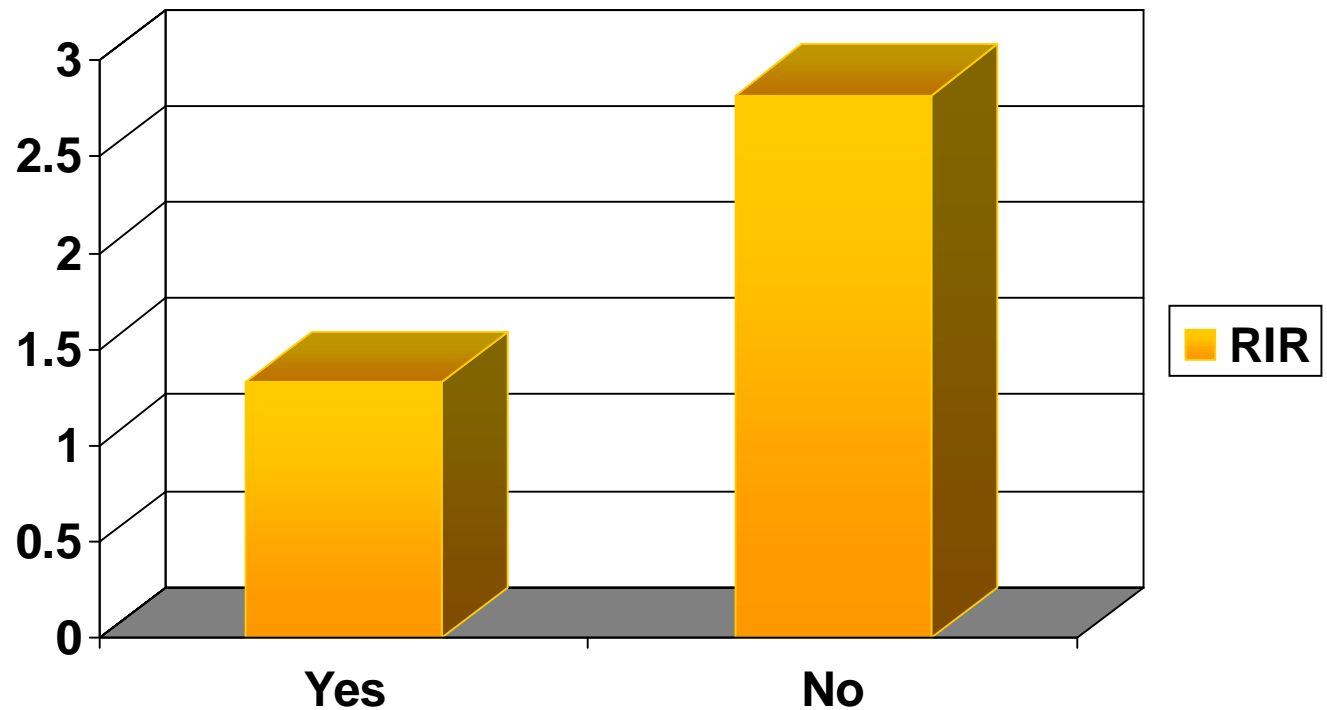
Worker Involvement and Participation

Total amount of safety observation reports filed on the project



Worker Involvement and Participation

Are safety perception surveys conducted on the project?



Recognition and Rewards

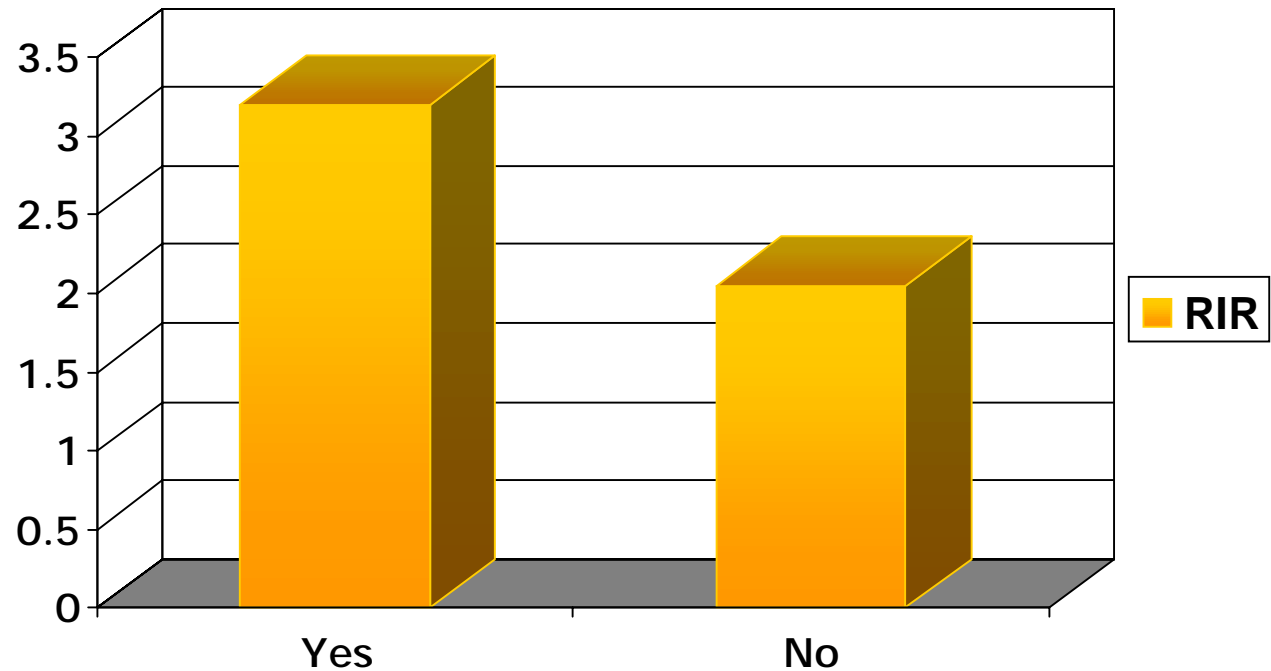
Effect of worker safety incentives

- Individual versus crew incentives
- Based on injuries or safe behavior
- Frequency of awards
- Career progression



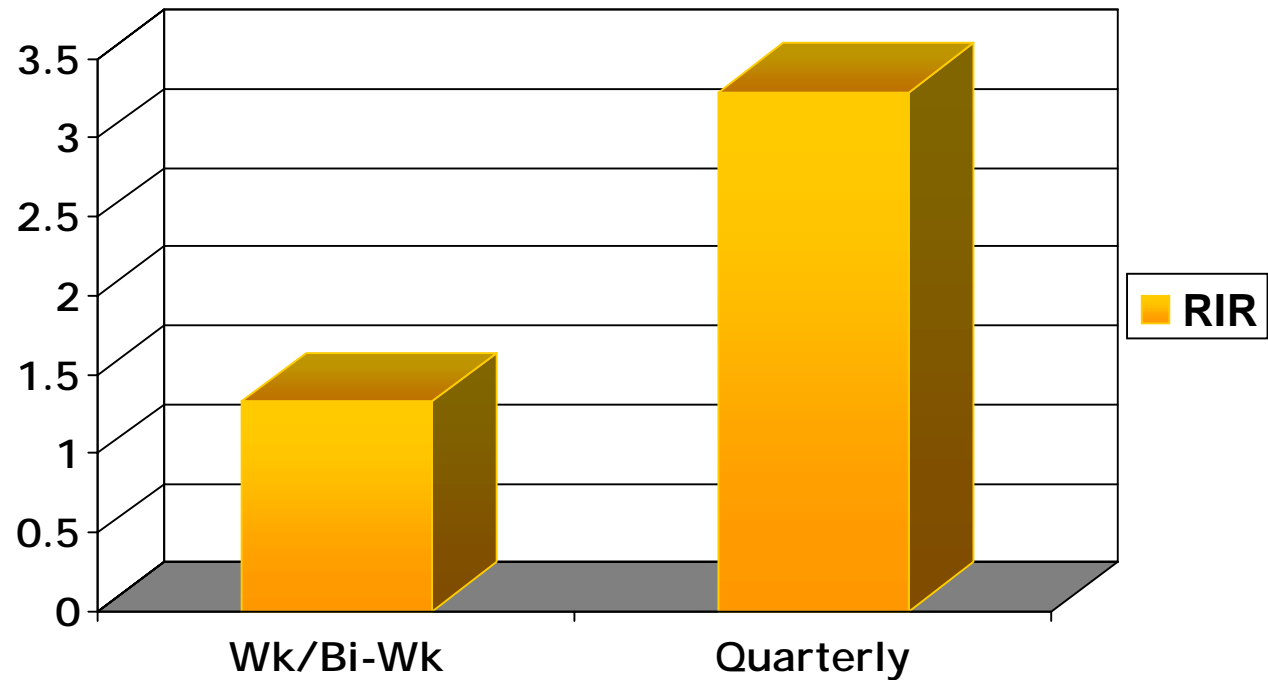
Recognition and Rewards

Does a formal worker incentive/
recognition and reward program exist?



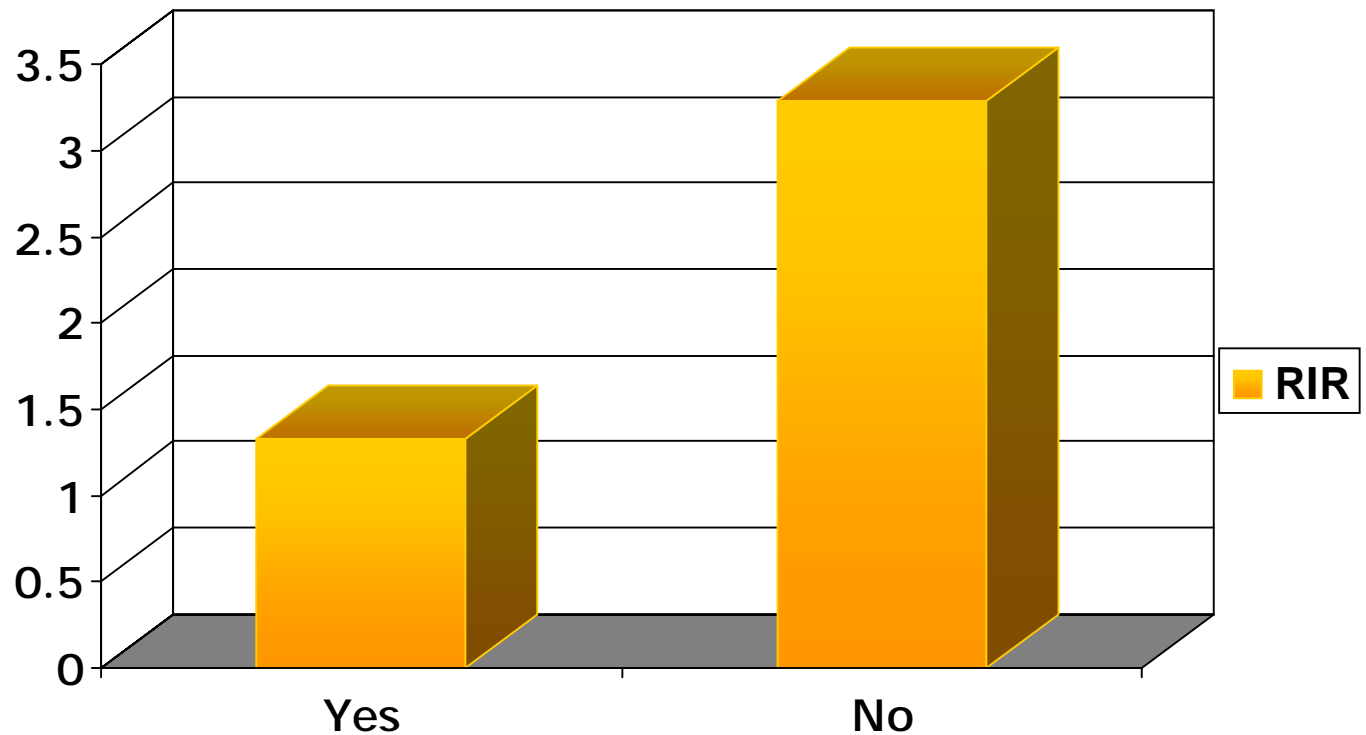
Recognition and Rewards

How often are incentives given to workers?



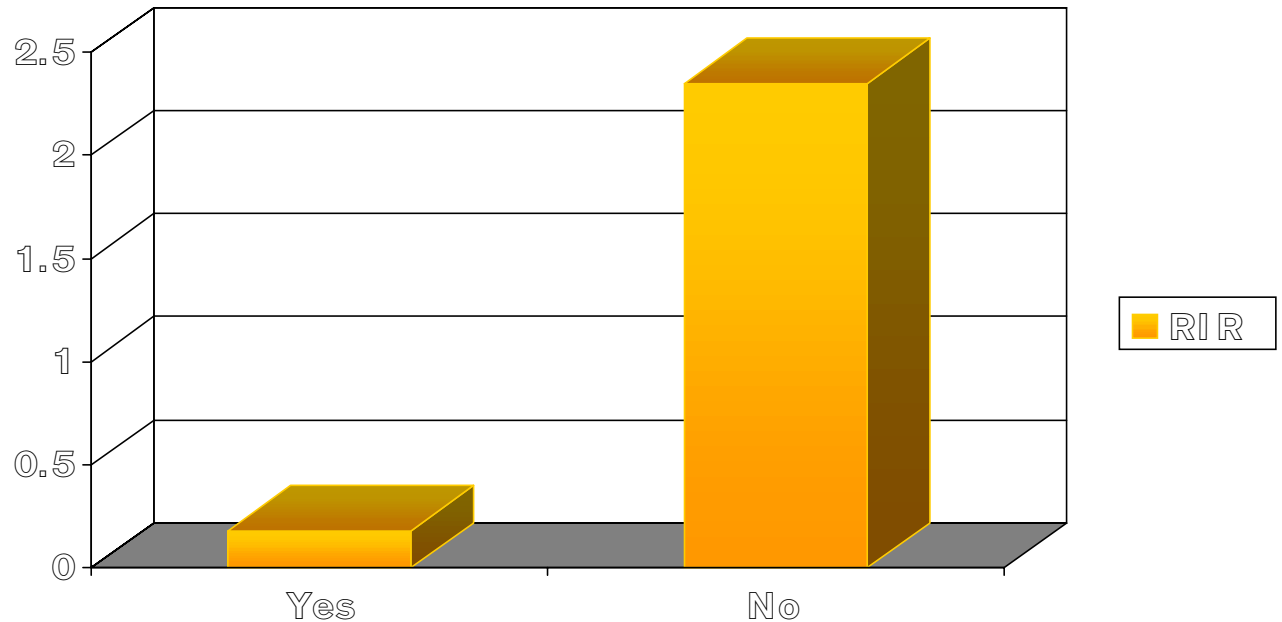
Recognition and Rewards

Incentive based on zero injury objective?



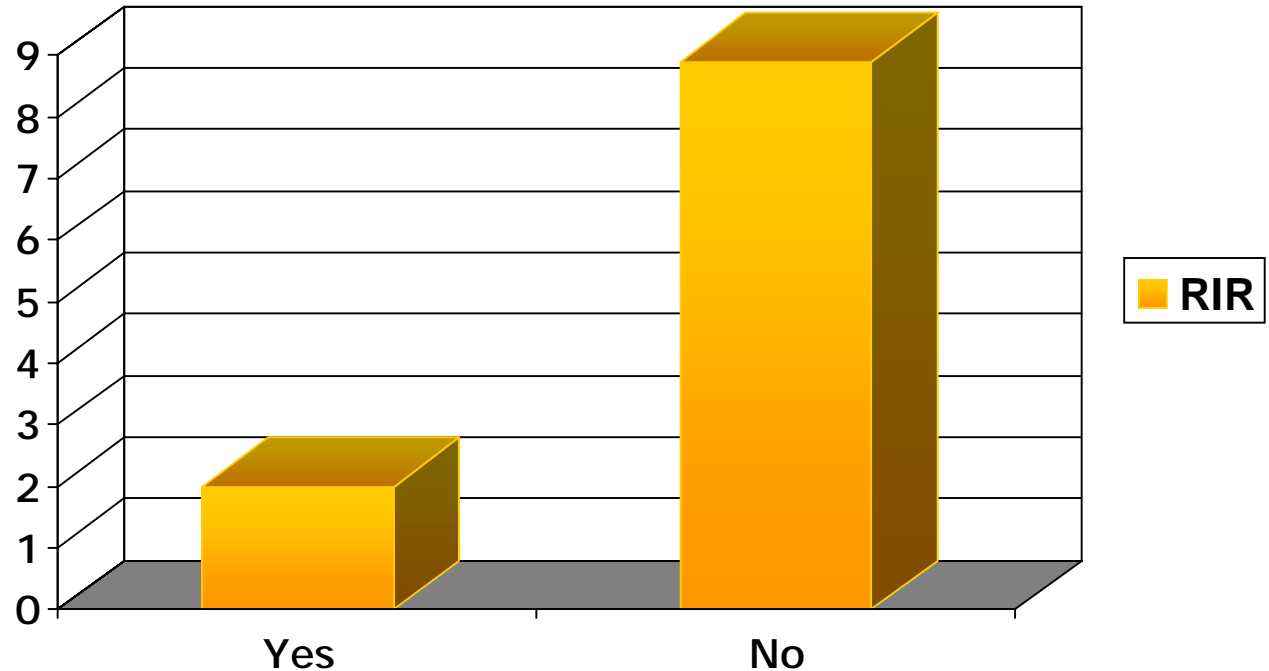
Drug and Alcohol Testing

Do family members attend safety dinners?



Recognition and Rewards

Field supervisors evaluated on safety?





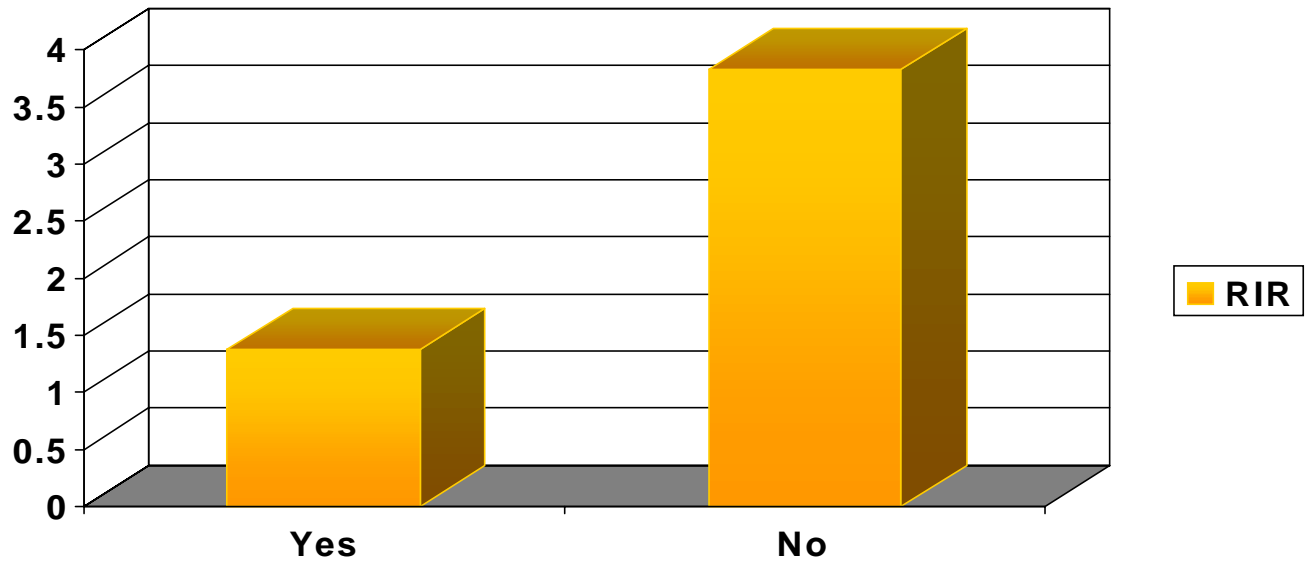
Subcontractor Management

- Site-specific safety plans
- Site orientation
- Sanctions for sub-standard performance
- Frequency of safety meetings



Subcontractor Management

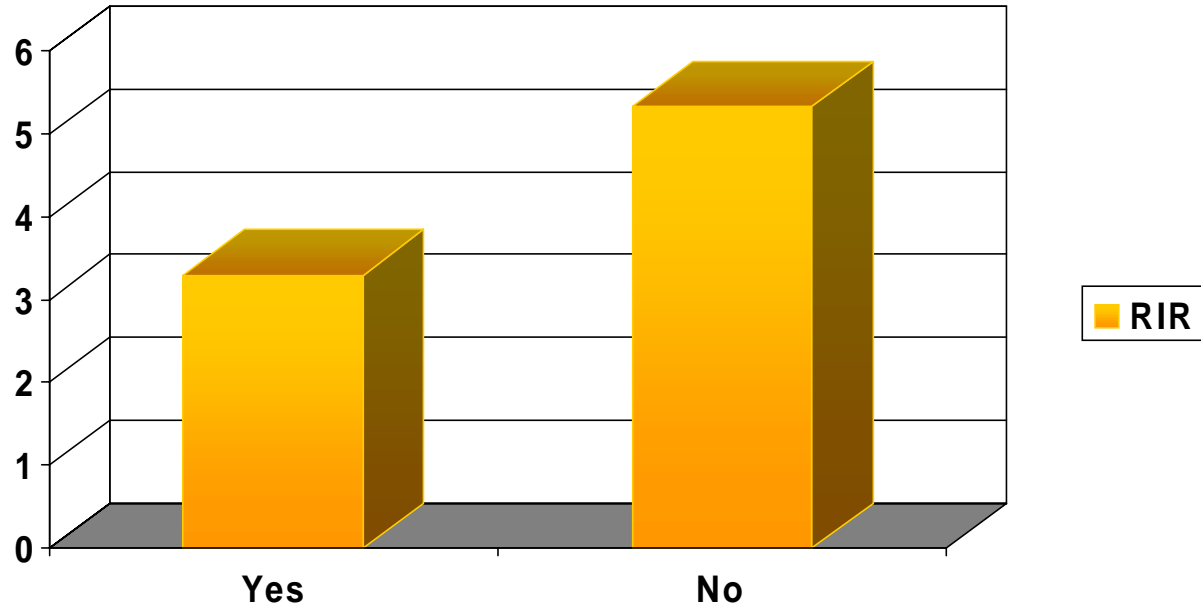
Subs submit site-specific safety plans?





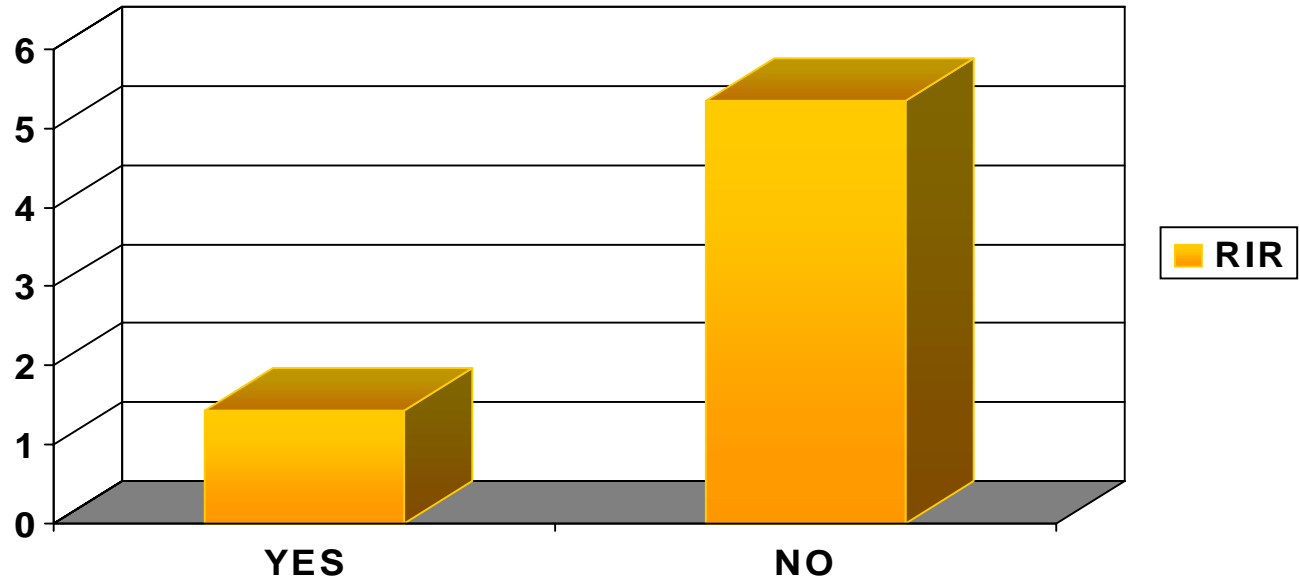
Subcontractor Management

Subs attend a formal standard safety orientation?



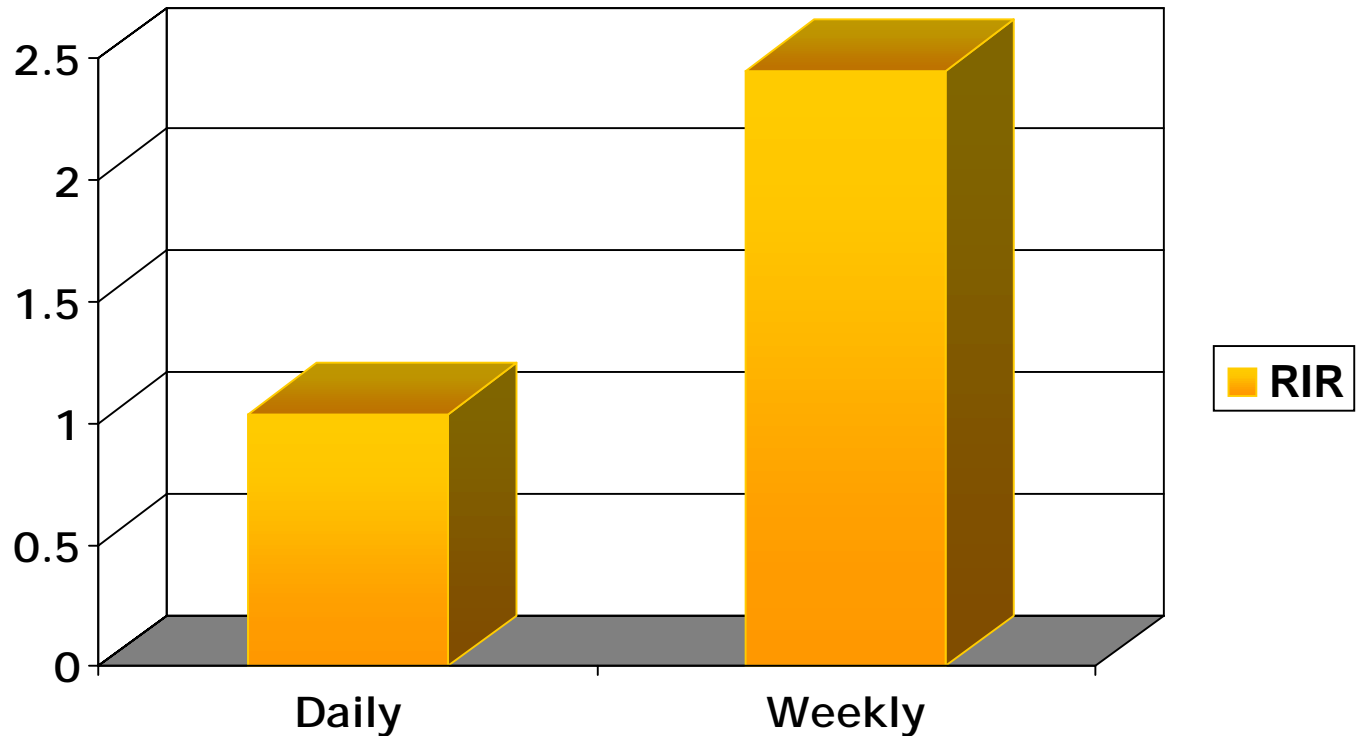
Subcontractor Management

Sanctions are imposed for non-compliance?



Subcontractor Management

Frequency that subs hold safety meetings



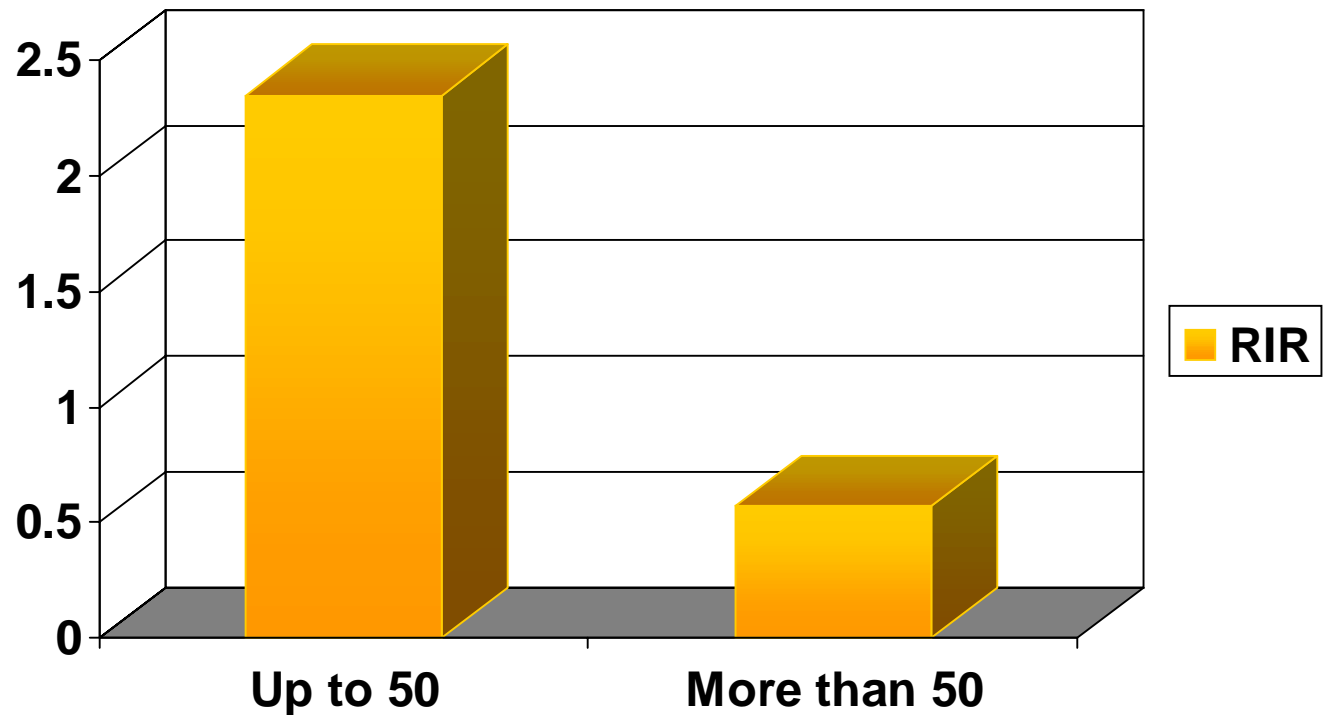
Accident/Incident Reporting and Investigation

- Documented near misses
- Top management involvement



Accident /Incident Reporting and Investigation

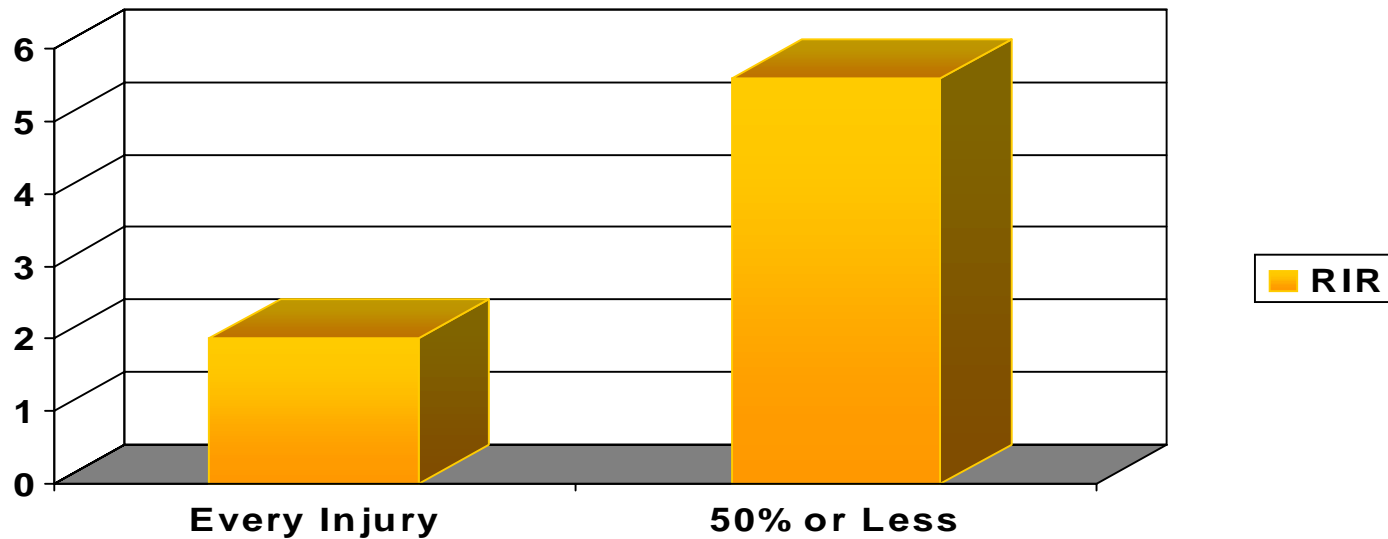
Amount of near misses recorded on the project





Accident/Incident Reporting and Investigation

Recordable injuries investigated by top management



Work in Progress

- Implementation Data Sheets
- Education Modules
- Outage/Turnaround Research
- Overtime Research



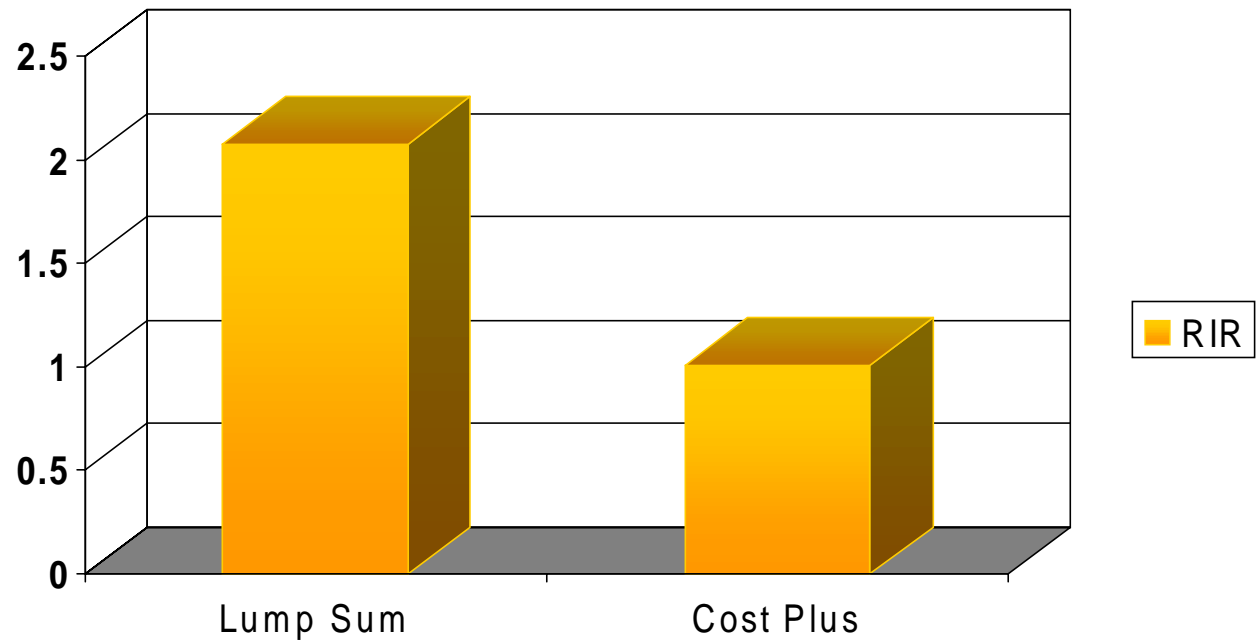
Best Practices

Getting to Zero Accidents

- **Demonstrated management commitment**
- **Staffing for safety**
- **Safety planning – pre-project/pre-task**
- **Safety training and education**
- **Worker involvement and participation**
- **Recognition and rewards**
- **Subcontractor management**
- **Accident/incident reporting and investigation**
- **Drug and alcohol testing**

Types of Contract

Is Safety managed as a value?



Concluding Remarks

- Establish a Formal Safety Education Process for management, and the workers
- Evaluate and measure the safety management system
- Reward management, workers, and subcontractors for safe behavior
- Make safety a evaluation criteria for Management and supervision
- Engage sub-standard safety management, practices & conditions at all levels



Concluding Remarks

- Demonstrated management commitment is essential
- Employee involvement is essential
- Integrate safety early into the project development and planning process
- Build your project safety plans based on specific scope and risk;
- Pre-Task analysis is critical

*Even if you're on the right track,
you'll get run over if you just sit there.*

Will Rogers

