



Global Business and IT Consultants  
**Know-how to Win™**

## A Rules-based System to Support Effective Incident and Near-Miss Management Programs



Daniel Hillman, AMS  
Bill Qualls, AMS

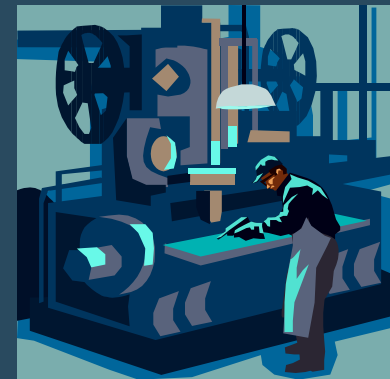
NDIA – 29<sup>th</sup> Environmental and Energy  
Symposium and Exhibition, Richmond VA  
April 7-10, 2003

## Outline

- What is a Near-Miss?
  - Notable Examples – Near-Misses Ignored
  - The Safety Pyramid
- Benefits of Incident Tracking and Near-Miss Programs
- Opportunities for Improvement
- Tr@ction™ - An Example of Automated Best Practices In Action

## What is a Near-Miss?

- ... an opportunity to improve environmental, safety, and health practice based on a condition, or an incident with potential for more serious consequence.



## Why is Near-Miss and Incident Tracking Important?

- Unaddressed or un-remedied unsafe conditions can lead to significant OSHA penalties.
- Sound management of risk depends on accurate information about state of follow up actions in an organization.
- Public scrutiny of hazardous facilities increasing with consequences for bottom line results.

## Notable Examples of Near-Misses Ignored

- 1986 Space Shuttle Challenger Explosion (US)
- 1997 Hindustan Refinery Explosion (India)
- 1999 Paddington Rail Crash (UK)
- 1998 Morton Explosion and Fire (US)



# The Safety Pyramid



# Benefits of Near-Miss Programs

- Identify weaknesses in safety management systems through accident precursors.



Near-Misses



Accidents

## Additional Benefits

- Delegation of Safety Responsibility
  - Harnessing the larger workforce to identify unsafe operations.
- Increased Safety Awareness
  - Making individuals more safety-conscious.
- Creation of an Information Pool
  - Creating a knowledge base to reduce risk exposure.



# Elements of a Near-Miss and Incident Tracking Management System



- Identification/Reporting – incident recognized/reported.
- Disclosure – individual / group reports incident, case file opened.
- Distribution/Dissemination – information transferred for follow-up. Rules-driven workflow.
- Causal Factors Analysis – direct / root causes identified.
- Solution Identification – find solution to each causal factor.
- Resolution – complete follow-up, close out, summarize and report.

Modified from [Near Miss System Analysis: Phase I, December 2000, Phimister, Oktem, Kleindorfer, and Kunreuther, Wharton School Center for Risk Management and Decision Processes, University of Pennsylvania](#)

# Identification/Reporting – Best Practices

Identification  
Reporting

Disclosure

Distribution  
Dissemination

Causal Factors  
Analysis

Solution  
Identification

Resolution

- **37%** of the respondents felt this was an area for significant improvement.
- Adopt broadly-encompassing definition of what constitutes a near-miss or incident.
- Automate identification of near-misses.
- Automate reporting of incidents.
- It is estimated that 1/3 of sites do not have effective systems to aid in identification of near-misses.

# Identification/Reporting – Best Practices

Identification  
Reporting

Disclosure

Distribution  
Dissemination

Causal Factors  
Analysis

Solution  
Identification

Resolution

- Examples of near-misses under this definition:
  - Unsafe conditions.
  - Unsafe behavior.
  - Minor accident/injuries that had the potential to be more serious.
  - Events where injury could have occurred but did not.
  - Events where property damage resulted.
  - Events where a safety barrier was challenged.
  - Events where potential environmental damage could result.

## Disclosure – Best Practices



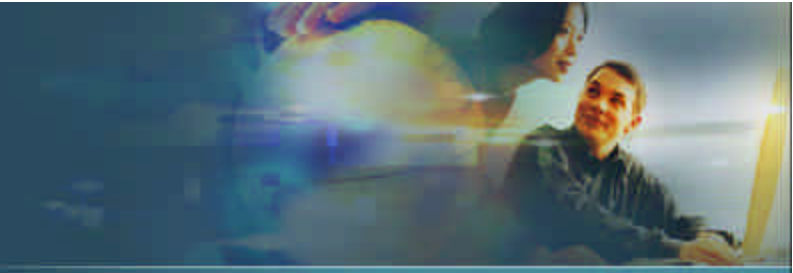
- Make report forms simple and readily available
- Encourage reporting
- Provide incentives for reporting
- Share near-miss reports widely
- **26%** of the respondents felt this was an area for significant improvement

## Distribution/Dissemination - Best Practices



- Provide clear guidelines
- Empower employees and supervisors
- Provide electronic platforms
- Automate dissemination
- Initiate action tracking
- Disseminate to a broad audience
- **58%** of the respondents felt this was an area for significant improvement

# Causal Factors Analysis – Best Practices



- Train supervisors in methods of causal factor analysis
- Capture direct causes and root causes

## Solution Identification – Best Practices



- Link solution identification to causal factors
- Develop at least one solution or corrective action for each causal factor
- Link to work order system
- Address Management of Change issues

## Resolution – Best Practices



- Automate action tracking
- Integrate with work order system
- Integrate with HR systems
- Provide feedback to reporter when corrective actions are completed
- **53%** of the respondents felt this was an area for significant improvement





## What Is Tr@ction?

**An integrated incident reporting and action tracking system to allow manufacturing organizations to:**

- Monitor and analyze trends and identify areas for improvement.
- Analyze safety performance across business units.
- Identify areas for pro-active loss prevention/reduction.
- Track actions associated with EHS incidents, safety audits, general EHS audits and, Hazop Reviews.

## Tr@ction Was Developed Because Market Products Failed to Meet BP HSSEQ Management and Visionary Needs



As an acknowledged leader in HSSEQ management, BP knew what features were required for a successful tool...

- Global application / multilingual access
- Ease of use / local configuration
- Progress on actions transparency
- Delivery of regulatory requirements worldwide
- Data protection / data migration
- Simple flexible reporting

# Tr@ction Was Developed Because Market Products Failed to Meet BP HSSEQ Management and Visionary Needs



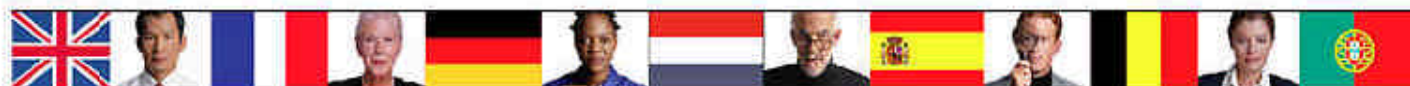
As an acknowledged leader in HSSEQ management, BP knew what features were required for a successful tool...

- Universal Access
- Unplanned Events (Major to Minor/Cradle to Grave)
- Electronic Management / Efficient Operations
- Management of Organizational Change
- Modularity / Beyond HSSEQ
- Consistent Data



welcome Bienvenue WILKOMMEN wellkom bem-vindo

- What Is Traction? >
- User Training Login >
- XtraNet & WTS Access >
- Defects >
- Notices >
- Traction Support Materials >
- HELP >
- Request An Enhancement >
- FAQs >
- TRACTION LOGIN >



LOGIN

Page Owner: [Neil Marr](#)

Last Updated: Feb 27, 2002

# TR@CTION MAIN PAGE


































Tr@ction - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print Refresh

Address http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS\_THE\_SYSTEM

File Edit Report Inbox Home Help **tr@ction** LILANDSA (User Training System) **Inbox: 4 new 0 old**

 create new	 find existing	 reports	
<ul style="list-style-type: none"> <li> Incident Report</li> <li> Advanced Safety Audit</li> <li> Audit</li> <li> HazOp</li> <li> Other Event</li> </ul>	<ul style="list-style-type: none"> <li> Incident Report</li> <li> Advanced Safety Audit</li> <li> Audit</li> <li> HazOp</li> <li> Other Event</li> <li> Action Item</li> </ul>	<ul style="list-style-type: none"> <li> ASA Concerns/Comments Summary</li> <li> ASA Safety Deviation Summary</li> <li> Action Items Report</li> <li> Blank Advanced Safety Audit</li> <li> Completed ASAs</li> <li> Employee Listing</li> <li> Incident Summary</li> <li> North Slope Spill</li> <li> Rolling Frequency</li> <li> Web Intelligence</li> </ul>	<ul style="list-style-type: none"> <li> ASA Recognition Summary</li> <li> Action Item Aging</li> <li> Alaska Spill Report</li> <li> Blank Incident</li> <li> Document Audit Report</li> <li> Hours Worked</li> <li> Injury/Illness Summary</li> <li> Organisation Hierarchy</li> <li> Stream\BU Monthly Report</li> </ul>

http://tdcirsd3.amoco.com:7793/pls/oratraqb/HSE\_Interviewer\_Resp\_BU.Display\_Screen\_Static?strType\_=1&strMode\_=1 Local intranet

# Follow the Incident Information Wizard

The screenshot shows a Microsoft Internet Explorer browser window displaying a web application titled "tr@ction". The address bar shows the URL: `http://tdcirs3.amoco.com:7793/pls/oratraqb/ACCESS_THE_SYSTEM`. The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The address bar also contains "Back", "Forward", "Home", "Search", "Favorites", "History", "Go", and "Links" buttons.

The main content area of the browser displays a form titled "Incident Report Interviewer - Incident Type". The form has a green background and contains the following sections:

- Please select one or more incident types for this report.**
- Near Miss / HSE Opportunity**
  - Near Miss / HSE Opportunity
- Occupational Injury and Illness**
  - Injury
  - Illness
- Transportation**
  - Road
  - Rail
  - Third Party Transport
  - Maritime
  - Pipeline
  - Air
- Compliance / Conformance**
  - Environmental Event
- Material Release**
  - Material Release
  - Halon Discharge
- Complaints**
  - Public / Third Party
- Security**
  - Robbery
  - Theft
  - Assault/Threat
  - Burglary
  - Criminal Property Damage
  - Drug / Alcohol Abuse / Possession
  - Fraud / Unethical Conduct

Two callouts are present:

- A speech bubble on the left points to the "Near Miss / HSE Opportunity" checkbox, containing the text: "Near Miss Capture box".
- A speech bubble on the right points to a pop-up box that appears over the "Near Miss / HSE Opportunity" checkbox. The pop-up box contains the following text:  
A Near Miss is an undesired event that, under slightly different circumstances, could have resulted in harm to people, damage to environment or property, or loss to process.  
An HSE Opportunity is an observation or realization that action can be taken to enhance the HSE conditions or standards under which we work.

Tr@ction - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address [http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS\\_THE\\_SYSTEM](http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS_THE_SYSTEM) Go Links >>

File Edit Report Inbox Home Help **tr@ction** LILANDSA (User Training System) **Inbox: 4 new 0 old**

**Transportation**

- Road
- Rail
- Third Party Transport
- Maritime
- Pipeline
- Air

**Compliance / Conformance**

- Environmental Event

**Material Release**

- Material Release
- Hal

**Complaint**

**Security**


- Rob
- The
- Assault / Threat
- Burglary
- Criminal Property Damage
- Drug / Alcohol Abuse / Possession
- Fraud / Unethical Conduct
- Terrorist / Guerrilla Activity

**Loss or Damage**

- Equipment / Property / Explosion / Fire
- Production Loss
- Reputation / Business Loss
- Drilling Trouble Time
- Quality

Help Cancel < Previous Next >




**Microsoft Internet Explorer**

 A Near Miss cannot be selected with other incident types

OK


Example of business rule logic to enforce safety policy

Done Local intranet

Start    Inbox - Microsoft Outlook: Tr@ction - Microsoft I... 84% 4:38 AM

**Incident Report Interviewer - General Information 1** [X]

Please enter general information about the event.

Date Occurred (DD/MM/YYYY):  

Short Description:

Event Description:

Help Cancel < Previous Next >



**Incident Report Interviewer - General Information 2**

Please enter general information about the incident.

Primary Company Involved: BP

Overtime?: No

Operation(s) in Progress: Product Loading

Immediate Action Taken: Site secured by

Help Cancel < Previous Next >

### Incident Report Interviewer - Injury

Please enter information for person 1.

**Given Name:** Test

**Family Name:** User

**Date of Birth (DD/MM/YYYY):** 24/02/1966

**Employee Number:** 4500345

**Gender:** Male

**Occupation:** - Needs Data -

**Continuous Days Worked:** 5

**Worker Type:** Contractor

**Classification:** Days Away From Work

Body Part Affected	Nature of Injury	Relevant PPE being worn
Ankle	Fracture	<input checked="" type="checkbox"/>

Add Multiple injury/illnesses

**Hospital Attended?:** Yes

### Calendar - Microsoft Internet Explorer ...

April 2002

Navigation buttons: Previous, Next, Home, End

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4

Close Calendar

# Enter initial estimates of causes

The screenshot shows a Microsoft Internet Explorer browser window displaying a web application. The browser's address bar shows the URL: `http://tdcirs3.amoco.com:7793/pls/oratraqb/ACCESS_THE_SYSTEM`. The browser's title bar reads "Tr@ction - Microsoft Internet Explorer provided by BP Group Digital Business".

The web application interface includes a menu bar with "File", "Edit", "Report", "Inbox", "Home", and "Help". The "Report" menu is active, showing a sub-menu with "tr@ction" and "LILANDSA (User Training System)". The "Inbox" status shows "4 new 0 old".

The main content area displays a form titled "Incident Report Interviewer - CLC Immediate Cause". The form has a green background and contains the following elements:

- A text input field for "Please enter Critical Factor".
- A text input field for "Please enter Comprehensive List of Causes (CLC) Information."
- A dropdown menu for "Possible Immediate Cause:" with "1-FOLLOWING PROCEDURES" selected.
- A list of checkboxes for various causes:
  - 1-1 Violation by individual
  - 1-2 Violation by group
  - 1-3 Violation
  - 1-4 Operation
  - 1-5 Improper position/posture for task
  - 1-6 Overexertion of physical capability
  - 1-7 Work or mechanical
  - 1-8 Improper lifting
  - 1-9 Improper loading
  - 1-10 Shortcuts
  - 1-11 Other
- A text input field for "Comments:".
- A "Skip" button.
- Navigation buttons: "Help", "Cancel", "< Previous", and "Next >".

A callout bubble points to the "1-3 Violation" checkbox, containing the text: "Early capture of causal information". A tooltip for the "1-3 Violation" checkbox reads: "Material being lifted, either by human or mechanical means, was lifted contrary to proper practices or was over the capacity of the person or the lifting equipment".

The Windows taskbar at the bottom shows the Start button, several open applications (Inbox, Tr@ctio..., Documen..., C:\Docu..., Calendar...), a 58% system tray indicator, and the time 5:16 AM on a Windows XP desktop.

# Create action items for follow up tracking

The screenshot displays a Microsoft Internet Explorer browser window titled "Tr@ction - Microsoft Internet Explorer provided by BP Group Digital Business". The address bar shows the URL: [http://tdcirs3.amoco.com:7793/pls/oratraqb/ACCESS\\_THE\\_SYSTEM](http://tdcirs3.amoco.com:7793/pls/oratraqb/ACCESS_THE_SYSTEM). The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The address bar contains navigation buttons (Back, Forward, Home, Search, Favorites, History) and a "Go" button. The browser's status bar shows "Local intranet".

The main content area displays the "Enter/Edit Action Item" form, which is titled "Please enter/edit this Action Item." The form includes the following fields and controls:

- Action Item Number:** New
- Action Item:** Bring all Site 1 ladders in for Inspection
- Priority:** 3 Low
- Responsible Party:** Senior Safety Compliance Manager
- Target Date (DD/MM/YYYY):** 30/04/2002
- Completion Date (DD/MM/YYYY):** (empty)
- Approved Date (DD/MM/YYYY):** (empty)
- Comments:** (empty text area)
- Add Another Action Item

A callout bubble points to the "Action Item" field with the text "Initial Solution Identification process". The form has "Help", "Cancel", and "Finish" buttons at the bottom.

Tr@ction - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address [http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS\\_THE\\_SYSTEM](http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS_THE_SYSTEM) Go Links >>

File Edit Report Inbox Home Help **tr@ction** LILANDSA (User Training System) **Inbox: 4 new 0 old**

◆ View Incident Report

**Edit the Report:**

- ◆ Responsible Organisation
- ◆ Location
- ◆ General Information 1
- ◆ General Information 2
- ◆ General Information 4
- ▶ Injury
- ▶ Critical Factors
- ◆ Loss Control Costs
- ◆ Actual Severity
- ◆ Potential Risk
- ▶ Witness Statement(s)
- ▶ Action Item(s)
- ▶ Investigation
- ◆ Attached Files
- ◆ Add another Incident Type

**Document: 2002-IR-158994 Incident Report Explorer**

Submit for Approval Download Report Refresh Close Delete

**Select an Approver**

Select Approver: Insurance Risk Manager

Submit

Close

Help

Enter a message:  
Tom,  
Please approve this incident  
regarding the employee that  
fell from the ladder.

Dissemination and Distribution processing according to business rules



Done Local intranet

Start 53% 5:24 AM

# Reports and workflow mgmt.

Incident Report: 2002-IR-158994 - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

 Incident Report: 2002-IR-158994 

---

**Responsible Organisation Information**

**Stream:** Commercial  
**Site:** Commercial Site  
**Business Unit:** Comm 10

---

**Location Information**

**Stream:** Commercial  
**Site:** Commercial Site  
**Business Unit:** Comm 10

---

**General Information 1**

**Date Occurred (DD/MM/YYYY)\*:** 25/04/2002 00:00  
**Short Description:** Employee fell from Ladder.  
**Event Description:**

---

**General Information 2**







**Primary Company Involved:** BP  
**Overtime?:** N  
**Operation(s) in Progress:** Product Loading  
**Immediate Action Taken:** Site secured by staff

---

**General Information 4**

**Summarize Lessons Learned** Inspection of ladders prior to use is necessary  
**Police Report #?** 4567889  
**Check here if security protocols were breached?**

U-S-C-A-T-E-R-D

ams Start       52%  5:25 AM inSM

Tr@ction - Microsoft Internet Explorer provided by BP Group Digital Business

File Edit View Favorites Tools Help

Address [http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS\\_THE\\_SYSTEM](http://tdcirsd3.amoco.com:7793/pls/oratraqb/ACCESS_THE_SYSTEM)

File Edit Report Inbox Home Help

tr@ction LILAN

**Inbox**

Tasks (4)

Calendar

Messages

Personal Folder (1)

Rule Results

Edit Rules

**Tasks**

Copy to Personal Folder Delete

	From	Message	Type	Assign	Date Received (DD/MM/YYYY)	Date Due (DD/MM/YYYY)	Status	
<input type="checkbox"/>	BASTUDEN	Incident Report 158825 was submitted	Approv	Supervisor 3	23/04/2002	26/04/2002	Open	
<input type="checkbox"/>	BASTUDEN	Incident Report 158831 was submitte...	Approv	Supervisor 3	23/04/2002	26/04/2002	Open	
<input type="checkbox"/>	BASTUDEN	Incident Report 158830 was submitte...	Approv	Supervisor 3	23/04/2002	26/04/2002	Open	
<input type="checkbox"/>	LILANDSA	Incident Report 158801 was submitte...	Approv	Dodsworth, Simon	23/04/2002	26/04/2002	Open	

Example of workflow – self managing inbox dedicated to near miss and incident follow up

javascript:window.open('http://tdcirsd3.amoco.com:7793/pls/oratraqb/hse\_task.display\_task?strTask\_=84956&strSwitch\_=12360~T~S~D') Local intranet

Start Inbox - Micr... Tr@ction - ... Document1 - ... C:\Documen... 50% 5:27 AM



## Open Action Item Aging

February 2002

Stream: *Downstream*Site: *Not Applicable*Business Unit: *BP South Houston*Action Item Category: *-All-*

Aging in month	Priority 1(HIGH)				Priority 2(MEDIUM)				Priority 3(LOW)				Totals
	0-6	7-12	13-24	24+	0-6	7-12	13-24	24+	0-6	7-12	13-24	24+	
ASA	0	0	0	0	0	0	0	0	0	0	0	0	0
Audit	0	0	0	0	0	0	0	0	0	0	0	0	0
Event	0	0	0	0	0	0	0	0	0	0	0	0	0
HazOp	0	0	0	0	0	0	0	0	0	0	0	0	0
IR	0	0	0	0	3	0	0	0	0	0	0	0	3
Current Totals	0	0	0	0	3	0	0	0	0	0	0	0	3
Closed during month	1	0	0	0	4	0	0	0	1	0	0	0	6
Created during month	8				20				6				34





# Incident Summary Report



Generated on: 25/04/2002

Stream: Traction Test      Site: Traction Site      Business Unit: Traction BU  
 Organisation1: -All-      Organisation2: -All-      Organisation3: -All-  
 Primary Company: -All-  
 Incident Type: -All-  
 Incident Subtype: -All-  
 Injury/Illness Classification: -All-

01/01/2002 To 25/04/2002

DAFWC	2
Fatality	1
Total Recordables	3
First Aid	1

Complaints	0
Loss/Damage	0
Near Miss/HSE Opportunity	12
Occupational Injury/Illness	10

Transportation	8
Material Release	12
Security	7
Compliance/Conformance	1

Total Number of Incident Reports 47

25/04/2001 To 25/04/2002

DAFWC	2
Fatality	3
Total Recordables	7
First Aid	4

Complaints	2
Loss/Damage	24
Near Miss/HSE Opportunity	54
Occupational Injury/Illness	72

Transportation	41
Material Release	47
Security	22
Compliance/Conformance	4

Total Number of Incident Reports 224

