

SIEMENS



Tom McDaniel

April 2014

Applied Human Performance for the Wind Industry

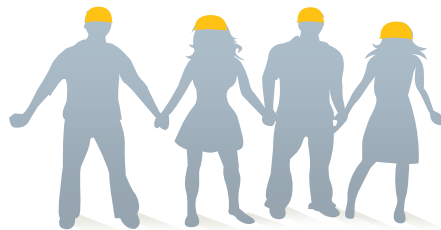
Zero Harm Culture – A loss prevention initiative



Zero incidents –
It is achievable

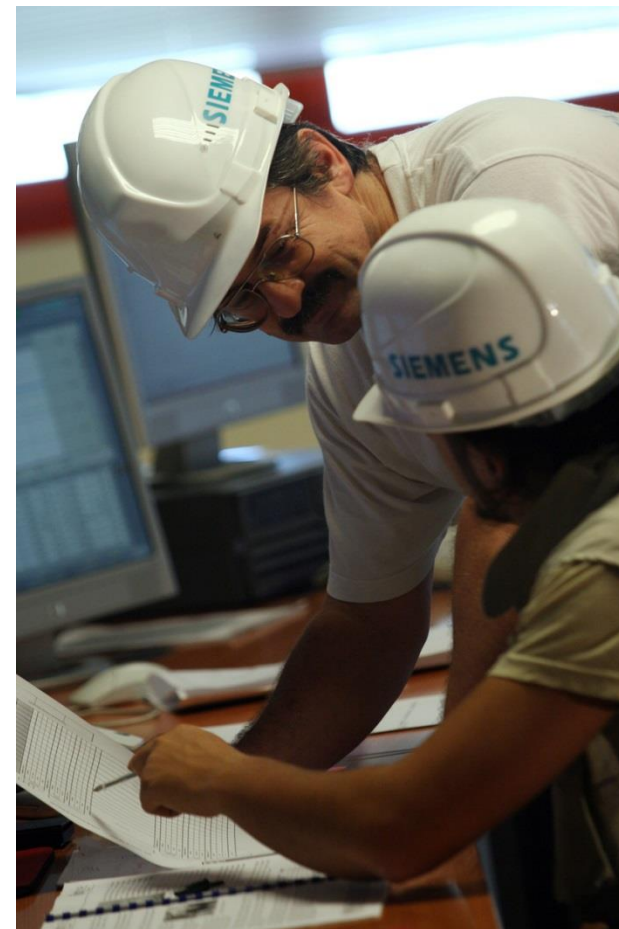


Health and safety
We won't compromise on that



We take care
of each other

Zero Harm Culture Assessments Process



What we learned from Industry and Academia

- You **can't stop** Human Error (the cognitive act)
- You **can intervene** between error and incident
- You can **learn to recognize** error-likely situations
- Human Performance includes **violation recognition** and management as well
- Understanding these fundamentals **opens opportunities**



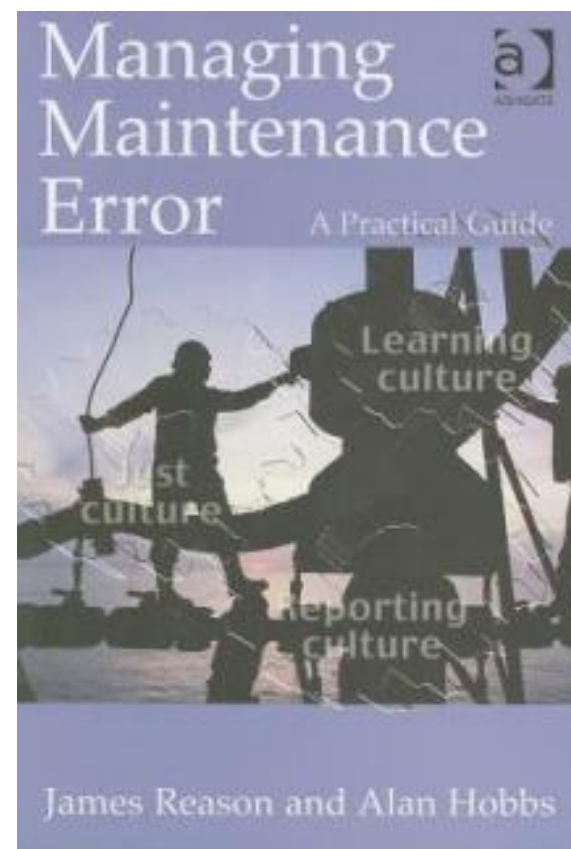
HuP Introduction Discussion

A quote from the first page of

Managing Maintenance Error

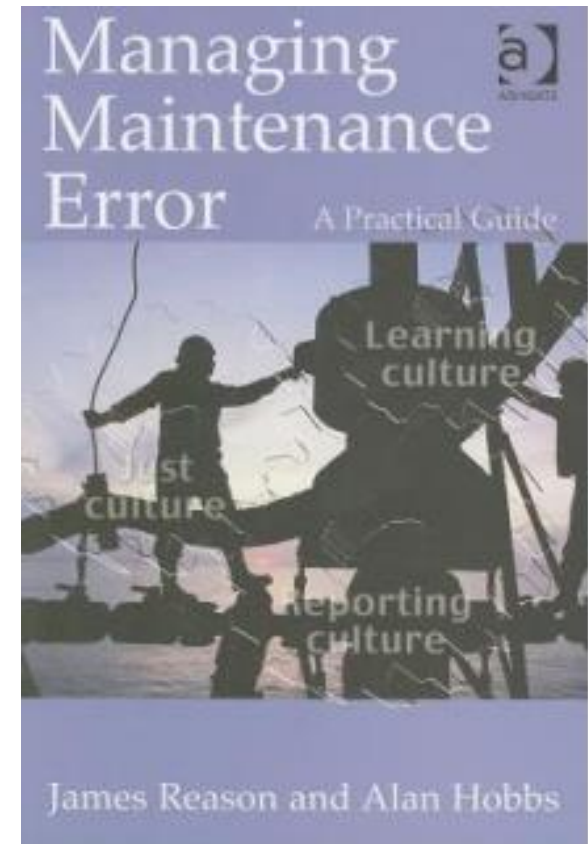
By

James Reason and Alan Hobbs



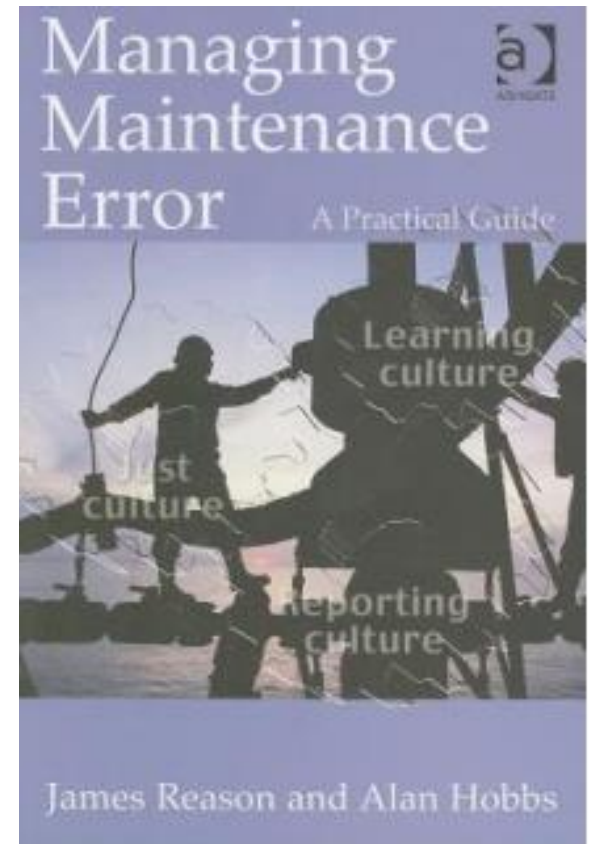
HuP Introduction Discussion

“If some evil genius were given the job of creating an activity guaranteed to produce an abundance of errors, he or she would probably come up with something that involved the frequent removal and replacement of large numbers of varied components, often carried out in cramped and poorly lit spaces with less-than-adequate tools, and usually under severe time pressure...the people that wrote the manuals and procedures rarely if ever carried out the activity under real-life conditions...



HuP Introduction Discussion

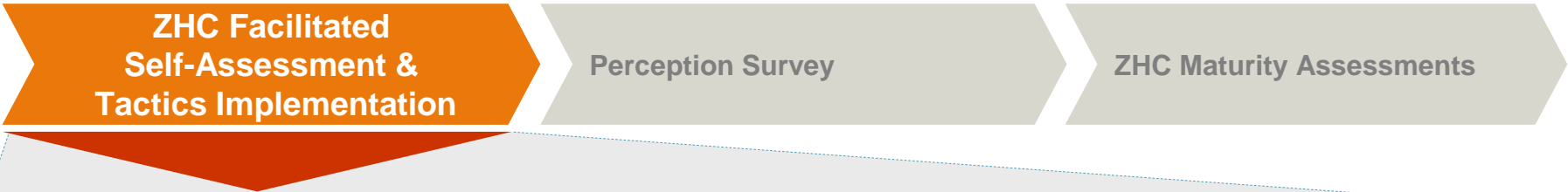
Those who started a job need not necessarily be the ones required to finish it...(and) a number of different groups work on the same item of equipment either simultaneously or sequentially...”¹



¹ J. Reason and Alan Hobbs,
Managing Maintenance Error

Zero Harm Process

Facilitated Self-Assessment (FSAs) & Tactics Implementation



- FSA's developed to:
 - Assist organizations to Identify existing EHS tactics and actions
 - Measure degree of implementation for identified tactics
 - Map them against 12 ZHC Aspects
- Allows for customization of tactics based on local culture and/or concerns
- Output helps to identify areas of concerns and/or improvement opportunities
 - “Just Do Tactics”
 - Action Plans – Informal (embedded within SA) or formal (Action Plan template) – for tactics requiring implementation details.

		Region or Organizational Unit Specific Tactics								Average DI for Tactics	FY 12-13 Baseline			
ZHC Aspect	#1 Tactic	DI	#2 Tactic	DI	#3 Tactic	DI	#4 Tactic	DI	#5 Tactic	DI	#6 Tactic	DI		
Roles and Responsibilities	DOR within FS Safety team	4	Safety Leadership	3	PII @ Siemens	3							4.0	4.0
Operational Control	Fleet wide scannable observation cards	2	Rapid Risk Assessment	3	Take SJHA	3	Challenge Review	3	EHS Field Procedures	4			3.0	3.0
Risk Assessments	Rapid Risk Assessment	3	EHS involved in risk assessments	3	Pre-Job risk mitigation	3	Contract review (LOA)	3					3.5	3.5
Incident Investigation	Development of a reporting culture	4	Unified investigation method	4	Trained investigators	4							4.0	4.0
Training	Develop a Leadership (management) stand on required training for Field Service employees.	3	Ensure contractor compliance with training requirements.	3	Outage site orientation	4	Continuing education matrix	3					3.3	3.3
Contractor Management	Approved vendors	4	Site orientation	4	3rd party Safety Contractors	4							4.0	4.0
Believe in Zero Harm Goal/Culture	Site orientation	4	Management stand	4	Reporting Culture	4							4.0	4.0
Leadership Commitment	Site orientation	4	Management stand	4	100 hour safety stand down	4	I am Safety campaign	3	Leadership involvement in investigations	3	Management visibility	3	3.5	3.5
Responsibility for Safety	I am Safety campaign	3	EHS Field Procedures	4									4.5	4.5
Communication	Develop a medium for communicating safety related issues.	4	Communication of lessons learned and best practices from previous outages.	2	Communication of incident investigation results.	3	Management stance and expectations for safety.	4	Effectiveness communication with FSE, PII, Craft, etc.	3	Safety Bulletin Boards	2	3.0	3.0
Intervention	Rapid Risk Assessment	3	Fleet wide scannable observation cards	2	Challenge Review	3							2.7	2.7
Praise and Recognition	YouAnswered	3	3i Suggestions	3	Management Engagement & Recognition Program	1	I am Safety & Zero Harm Recognition	2	Good Catch Program	2			2.2	2.2

Transparent method to observe both weaknesses and strengths in defined tactics

Zero Harm Culture Facilitated Self-Assessment Chart

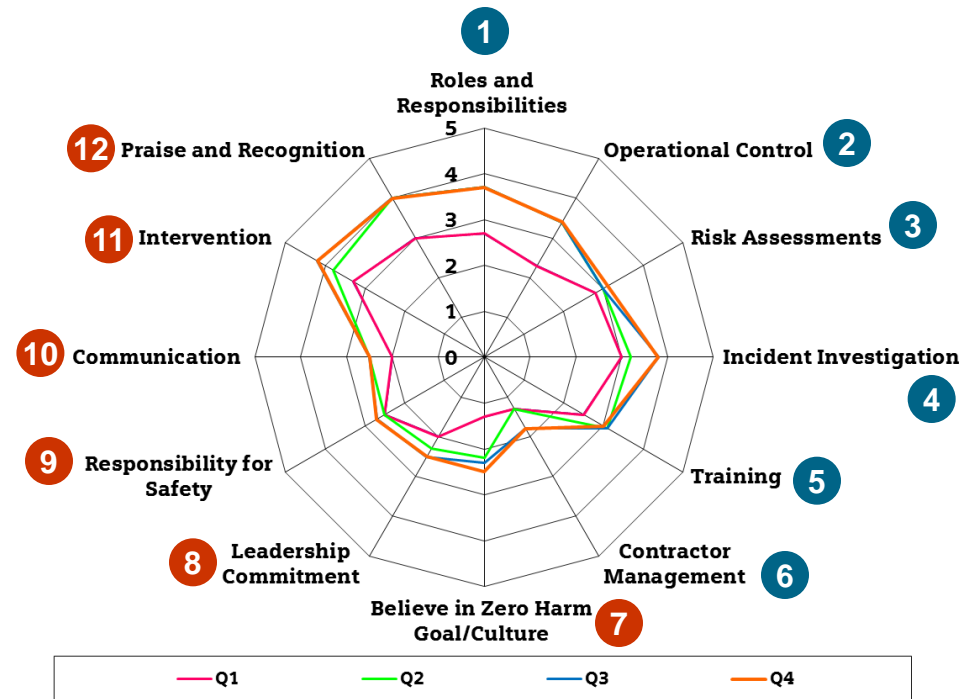
ZHC Design Tactics mapped against the 12 ZHC Aspects and measured using Degree of Implementation (DI) levels

System-related aspects

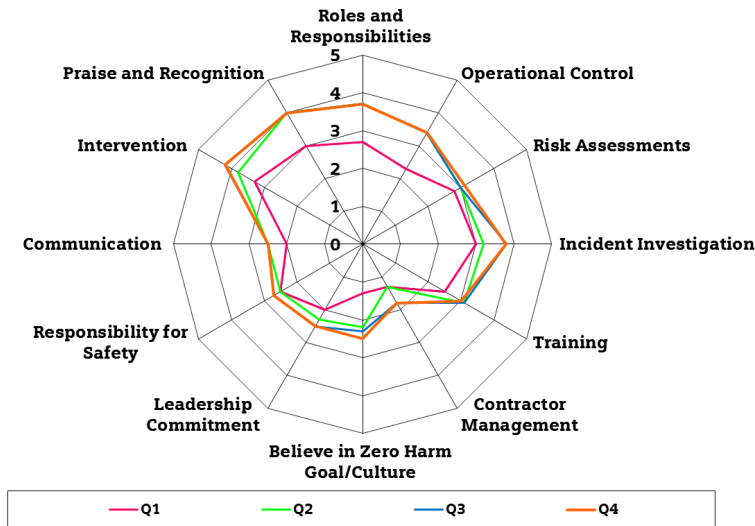
1. Roles and Responsibilities
2. Operational Control
3. Risk Assessments
4. Incident Investigation
5. Training
6. Contractor Management

People-related aspects

7. Belief in Zero Harm Culture
8. Leadership Commitment
9. Responsibility for Safety
10. Communication
11. Intervention
12. Praise and Recognition



ZHC Spider Chart & Value System



Level 1 Innocence

The Field Service organization is not aware that alternatives exist. There is no plan and investigation for changing the current safety processes. Not in place

Level 2 Awareness

The Field Service organization, and individuals have become aware that current practices are inadequate and that changes are required to improve safety system and performance. Aware if the issue (or opportunity) but no action has taken place.

Level 3 Understanding

The Field Service organization and individuals are developing improvement plans for systems and improvements are being implemented throughout the plant. Some action is taking place with positive results.

Level 4 Competence

The Field service organization has implemented comprehensive improvements as well as consistent systems and processes, which are subject to continuous monitoring and improvement. Action is taking place with established goals.

Level 5 Excellence

The Field service organization monitors systems and processes on a regular basis, initiates continuous improvements and is recognized as an industry leader. Program is considered Best in Practice.

Note: Example Region ZHC Strategy & Tactics Self Assessment.
DI Level based on Region identified Tactics, both current and planned.

ZHC Tactics

Tactic/Initiative	System Aspects			People Aspects		
ZHC workshops for managers & employees (management stand, safety days, etc)	RolesRes	OpControl	RiskAsses	BelZHC	Lead Com	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog
Human Performance Tools and Practices	RolesRes	OpControl	RiskAsses	BelZHC	Lead Com	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog
Management/Leadership Stand	RolesRes	OpControl	RiskAsses	BelZHC	Lead Com	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog
Safety Walk downs	RolesRes	OpControl	RiskAsses	BelZHC	LeadCom	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog
Incident Investigation using TapRoot and HuP methodology	RolesRes	OpControl	RiskAsses	BelZHC	Lead Com	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog
Contractor Management – pre-qualification, real time observation and post evaluation	RolesRes	OpControl	RiskAsses	BelZHC	LeadCom	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog
Praise and Recognition strategy and initiatives – Zero Harm Awards	RolesRes	OpControl	RiskAsses	BelZHC	LeadCom	Resp.Safety
	Inc. Invest.	Training	Contr.Mgmt	Commun.	Intervention	PraiseRecog

Many other tactics available to address organizational needs

Zero Harm Process

Perception Survey



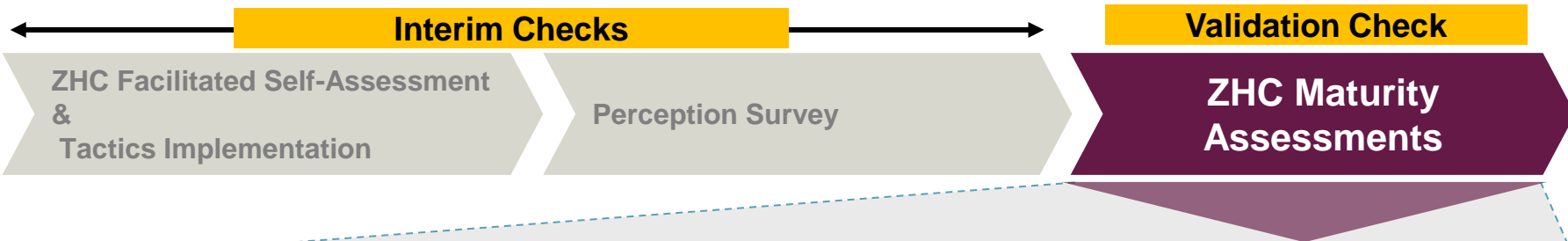
- Allows to identify and address gaps between FSA's and employees perception; what is perceived by employees vs. what is perceived by management
- Perception survey questions aligned to the 12 ZHC Aspects
- Roll-out approach:
 - Online survey and/or email
 - Workshops – face-to-face engagement workshops ; increase engagement and involvement of employees and management (i.e. ZHC roadshow)

Please identify yourself as to your employee status:

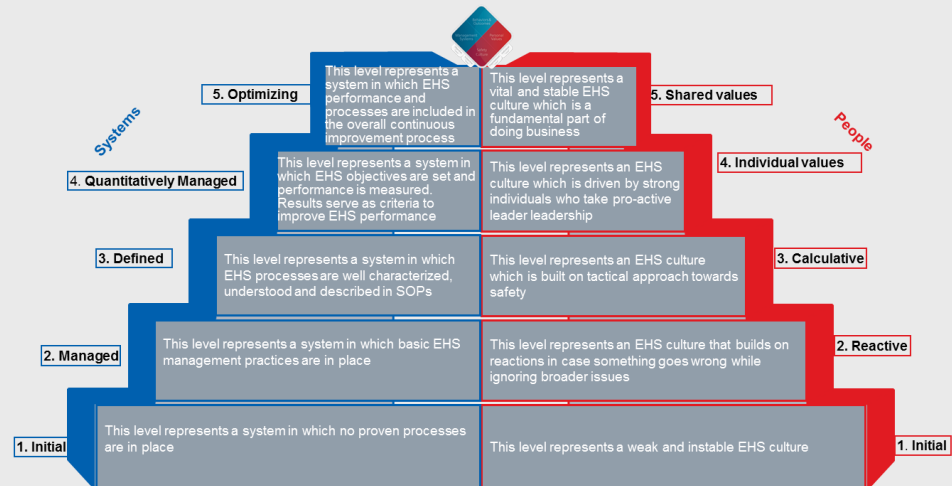
Perception Survey Questionnaire	Employee Status					ZHC Principal
	2014-2015 (P)	2014-2015 (M)	2014-2015 (O)	2014-2015 (C)	2014-2015 (D)	
1 I strongly believe in the possibility of accident-free and healthy workplace.						Belief in ZHC
2 Off-the-job safety and health are part of our company's safety program.						Belief in ZHC
3 Employees are influenced by our company's efforts to promote safety and health.						Communications
4 Worker safety and health is considered important by management.						Leadership Commitment
5 Employees are supported by management in the correction of hazardous conditions.						Leadership Commitment
6 Supervisors provide a safety and health orientation for newly assigned employees.						Leadership Commitment
7 Safe work behavior is recognized by my company.						Praise
8 Employees participate in inspections for potential hazards.						Intervention
9 Employees are expected to intervene when they observe another employee performing an unsafe act						Responsibility for Safety
10 I am never asked to perform operations that I feel are unsafe.						Responsibility for Safety
11 Employees are involved with development and implementation of safety and health programs.						Responsibility for Safety
12 Employees participate in setting goals for safety and health.						Responsibility for Safety
13 Contract employees receive our location's EHS orientation and are expected to follow our established rules						Contractor Management
14 All incidents, injuries and near misses are thoroughly investigated and corrective actions implemented						Incident Investigations
15 Supervisors discuss safety and health goals and performance with employees regularly.						Operational Control
16 Promotion to higher level jobs is dependent upon good safety performance.						Operational Control

Zero Harm Plan – ZHC Next Steps

ZHC Maturity Assessments

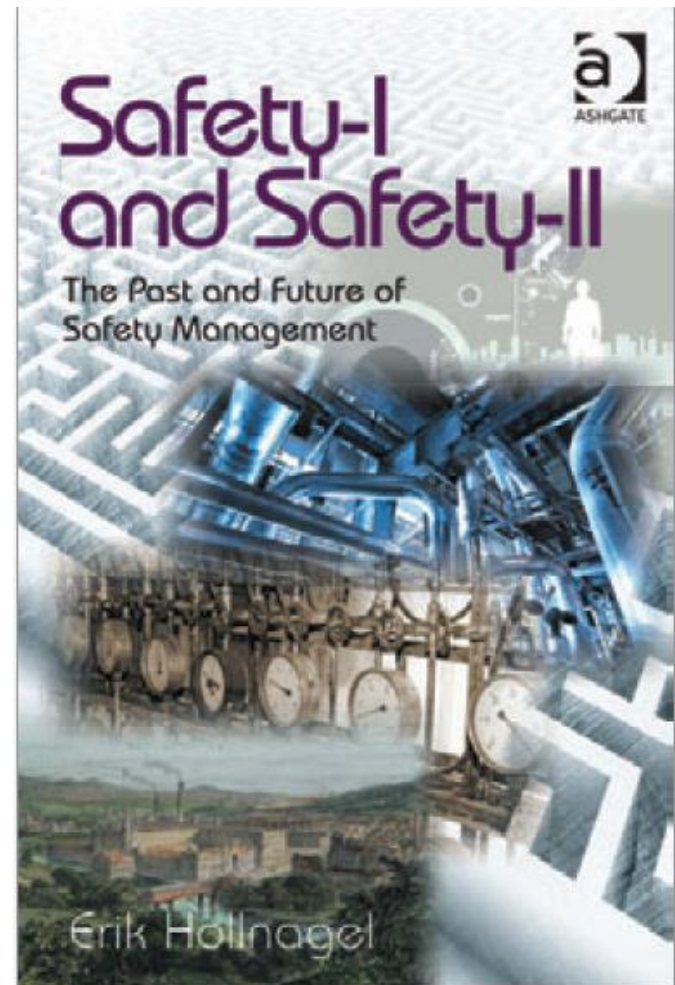


- Comprehensive evaluation against specific standards and requirements for each of the ZHC aspects and maturity levels - validate that actions were taken by the organization on interim checks to increase their maturity in ZHC
- All managers/employees engagement - involvement of all personnel to be expected (similar to CMMI and MPM)
- Locations/organizations to be selected based on various criteria that could include AFR, SA DI improvement, employees/management engagement and others



Safety I and Safety II
The Past and Future of Safety Management
(to be released May 2014)

Erik Hollnagel



Safety I Characteristics

- Explains accidents in terms of simple cause and effect, usually human operator error whose behavior appears to be outrageous, willful disregard of critical cues or factors.
- Tends to be misleading, incomplete, and ineffective when it comes to trying to make the system safer.
- Tells nothing about the factors that influence human performance before the fact; in other words, it only represents how managers, with knowledge of outcome and as stakeholders, react to failures.
- Describes incidents as after-the-fact (with hindsight bias) that seem to be easily preventable by applying relatively simple measures, such as new policies and procedures or calls to increase vigilance of operators.
- Declares end of investigation after the culprit is found.



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Safety II Characteristics

- Goes beyond Safety I to discover what lies behind the term 'human error' and captures how system usually works to manage risks but sometimes fails.
- Broadens the scope of inquiry in ways that lead investigators to identify systemic vulnerabilities of the larger system which contribute to failure. The result is a very different view that highlights many factors that Safety I ignores.
- Examines how changes in technology, procedures, and organizations, combine with economic pressures, to create new vulnerabilities at the same time that they create new forms of economic success.
- Reveals that bad outcomes don't usually flow from single-point failures but from a set of factors; therefore, enhancing safety begins with efforts to understand not just the sources of failure but also the sources of success.
- Shifts attention away from the sharp end of the system, where the people closest to the accident perform the work, toward the blunt end of systems where regulatory, administrative, and organizational factors reside.



Contrast between Safety I and Safety II

Safety I

Saying what people should have done is a satisfying way to describe failure.

Telling people to be more careful will make the problem go away.

Safety professionals make their management feel good about safety performance.

Safety II

Saying what people should have done does not explain why it made sense for them to do what they did.

Only by constantly seeking out its vulnerabilities can organizations enhance safety.

Safety professionals continue to remind management of the possibility of failure (make management uncomfortable).

Contrast between Safety I and Safety II

Safety I

Safety professionals look for **short-term** solutions.

Safety professionals **compare their incident performance against others** (better than industry average example).

Celebrate success based on incident and hours worked data.

Safety II

Safety professionals look at **long-term** impact and solutions.

Safety professionals **focus on actions and behaviors** that have long-term impact to safety in their own organization.

Nothing changes with data; **continues to pursue solutions.**

Contrast between Safety I and Safety II

Safety I

Investigates failures, usually only the catastrophic events.

Works with existing knowledge base.

Looks at cause and effect – **one** or **two** root causes.

Safety II

Investigates both **failures** and **successes**. As much effort is given to high potential events, not actual outcome events.

Continually seeks out new knowledge to build into new opportunities.

Takes non-linear view of incident causation – **multiple**.

Contrast between Safety I and Safety II

Safety I

Looks at safety performance as a **safety** issue.

Presume if task has been completed successfully that process must be valid.

Focuses on sequence of events at the incident scene – sharp end.

Safety II

Looks at safety performance as a **systems** issue.

Satisfactory completion of a task does not prove that the process is valid.

80/20 rule for investigations – 80% organizational and system investigation.

Contrast between Safety I and Safety II

Safety I

Presumes individual processes are valid and safe regardless of new combinations and/or conditions.

Safety goals established (incident rates) – **Lagging indicators.**

Assumes everything is linear in how it works / progresses.

Safety II

New sequences of existing processes and/or new conditions can lead to failure.

Loss goals established (combines safety, quality, efficiency, reliability, EBIT, and customer satisfaction) – **Leading indicators.**

Understands that we work in complex systems with continuous interaction – never accepts the single solution for an incident.

Contrast between Safety I and Safety II

Safety I

Assumes procedures will fix task issues and reduce variability.

Assumes individuals know requirements for acceptable behavior.

Safety II

Not following a procedure is never the cause of an incident.

Understands that individual and organizational behavior is driven by management stand and standards – cultural and social system influences. Management continually works to close the gap between **work as imagined vs. work as performed.**

Contrast between Safety I and Safety II

Safety I

Incident is viewed as a **failure**.

Captures the **culprit** of the incident.

Safety belongs to EHS teams.

Safety II

Incident is viewed as an **opportunity**.

Captures lessons learned from the incident.

Safety is **everyone's responsibility**.

Contrast between Safety I and Safety II

Safety I

Only significant Safety and quality related issues are reviewed at high level meetings.

Relies on **trained personnel**.

Risk assessments are only performed using known hazards and risks.

Safety II

All Safety and quality related issues are reviewed at high level meetings.

Relies on **competent personnel**, not just trained personnel.

Risk assessments are performed using hazards, risks, error-likely and loss potentials.

Contrast between Safety I and Safety II

Safety I

Blame Culture

Safety II

Just, Reporting, Learning, and Informed Culture

Steps to Achieve Zero Harm

Contact



Tom McDaniel

Global Manager
HuP and Zero Harm

4400 Alafaya Trail
Orlando, FL

Phone: 1-727-510-8863

Fax: 1-727 826-3511

E-mail:

tom.mcdaniel@siemens.com