Comparative Analysis of Management Systems

Core Elements of Safety Process Models

Leadership unites followers to a shared vision that offers true value, integrity, and trust to transform and improve an organization and society at large. (source: www.bambooweb.com)

Management characterizes the process of leading and directing all or part of an organization, often a business one, through the deployment and manipulation of resources (human, financial, material, intellectual or intangible). One can also think of management functionally: as the action in measuring a quantity on a regular basis and adjusting an initial plan and the actions taken to reach one's intended goal. This applies even in situations where planning does not take place. Situational management may precede and subsume purposive management. (source: www.bambooweb.com)

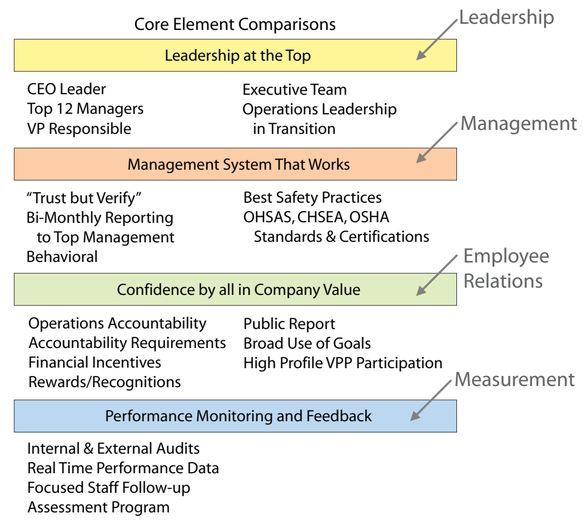
Employee Relations are characterized by people understanding their role in the Organization, with two-way open communications and managers ability to effectively relate to inspire, motivate, and leverage the talents of the employees within the organization to achieve organizational goals.

Measurement is the determination of the size or magnitude of something. Measurement is not limited to physical quantities, but can extend to quantifying almost any imaginable thing such as degree of uncertainty, worker confidence. (source: www.bambooweb.com)

Safety Culture is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine commitment to, and the style and proficiency of, an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by the efficacy of preventive measures. (source: The Advisory Committee on the Safety of Nuclear Installations (ACSNI)1993, p23).

Model Validation

Core elements chosen for this analysis map directly to core elements chart in Driving Towards "0", written by the Conference Board. The report was a response to request by members of the Conference Board's Townley Center for Environment, Health & Safety Councils for a benchmark on corporate safety culture & rating of policies, and best practices that affect Corporate Safety Performance.



Source: Driving Toward "0"
Best Practices in Corporate Health and Safety, R-1334-03-RR,
The Conference Board. www.conference-board.org

Safety Management Systems

ISO 14000 Environmental Management System (EMS) - American National Standards Institute (ANSI) (1996)

1 Policy	2 Planning	3 Implementation & Operation	4 Checking & Corrective Action	5 Management Review
	pollution prevention top management commitment continual improvement	program achieving objectives objectives & targets legal & other requirements environmental aspects & impacts significant aspects structure & responsibility	emergency preparedness & response operational control document control EMS documentation communication training, awareness, competence	EMS audit records nonconformance, corrective & preventative action monitoring & measurement

The ISO 14000 family is primarily concerned with "environmental management". This means what the organization does to minimize harmful effects on the environment caused by its activities, and to achieve continual improvement of its environmental performance. There are five major elements of the standard; policy, planning, implementation and operation, checking and corrective action, and management review commonly referred to as plan, do, check, act. These elements interact with each other to form the framework of an integrated, systematic approach to environmental management, with the ultimate result being continual improvement of the overall system. Copies of all ISO standards can be purchased from the American National Standards Institute (ANSI), 25 West 43rd St., NY,NY 10036; phone: 212-642-4900 e-mail info@ansi.org www.webstore.ansi.org/ansidocstore/

Health & Safety Management System OHSAS 18001 (1999)

1 Policy	2 Planning	3 Implementation & Operation	4 Checking & Corrective Action	5 Management Review
policy statement supported & authorized by top management	hazard identification risk assessment risk control objectives to achieve policy specific and measureable legal & other requirements plans that define: what will be done who will do what and by when	define roles, responsibilities and authorities of staff top mgmt. representative provide appropriate training int. & ext. communication develop process & procedures control OHSMS documentation manage risk control record maintenance establish, maintain & test a process	procedures for handling & investigating accidents, incidents & non-conformities eliminate actual or potential cause assess system suitability & effectiveness "audits"	top mgmt. meet periodically facilitate continual improvement review policy & performance against objectives reviews determine suitability, adequacy, and effectiveness of management system reviews focus on improvement & customer satisfaction

OHSAS 18001 is an internationally accepted specification that defines the requirements for establishing, implementing and operating an OHSMS.The specification was developed with the assistance of a number of international standards and certification bodies. OHSAS 18001 fills a void, in that there is currently no international ISO standard suitable for independent third-party certification. OHSAS 18001 was designed to be compatible with ISO 9001 and ISO 14001. This will be helpful if you want to design, implement and operate an integrated quality, environmental and occupational health and safety management system. The benefits of an OHSMS include: • Reductions in staff absence • Reductions in claims against the organization • Reductions in adverse publicity • Improved insurance liability rating may equal lower insurance premiums • Improved productivity • A positive response from customers who want to deal with an organization with a proven health and safety track record.

"THE ARCHITECTURE OF SAFETY EXCELLENCE" © Copyright 2000, Larry L. Hansen, L2H Speaking of Safety, Inc.

Operational Strategies of a Safety Program — Safety success = CEOu, where C = culture; E = elements of safety; O = organization and u = you

1 Education	2 Enforcement	3 Engineering	4 Behavioral Strategy	5 Organization	6 Leadership	7 Cultural Strategy
"awareness" policies procedures meetings training disciplinary policies	"improving" facility inspections compliance audits walkthroughs program minimum requirements citations, fines, penalties	"engineering" automation ergonomics work methods safeguarding process design	"actions of all" Human Resources Engineers Operations Legal Risk Management behave safely	"structure" organizational design job descriptions responsibilities communications performance measurement rewards systems	"managing people" encourage reward participative teaming reinforcing	"culture" vision & mission building values clarification high-visibility executive involvement

Note: The 'Operational Strategies' of Education, Enforcement and Engineering…working left to right and the 'Organizational Strategies' of Culture, Leadership, and Organization, working right to left - in concert, influence 'Behavior'…the ultimate event(s) prior to incident...and potential injury.

Peak safety performance is the result of multiple strategies designed and applied across a broad spectrum of issues and risk factors within an organization. Safety excellence is the outcome of a strategy continuum–one that addresses a company's regulatory, technical, engineering, organizational, behavioral, managerial and cultural loss sources. Safety excellence is a function of individual and organizational behavior, both of which are a function of organizational culture–that force which determines what everyone does to drive safety through the process. For the past 70 years, American business has focused almost exclusively on the "E" in this equation–engineering,education and enforcement. In large part,safety professionals have mastered these areas. Now it is time to work on the building blocks of culture, organizational strategy, performance leadership and organizational behavior–the true accident sources.

People Based Safety (2001) - E. Scott Geller, Safety Performance Solutions - Alumni Distinguished Professor, Virginia Tech

1 Observable Behavior	2 External/Internal Factors	3 Activators & Motivate	4 Focus on Positive Consequences	5 Scientific Method Improve Intervention	6 Theory to Integrate Information	7 Consider Internal Feeling & Attitudes of Others
"act to think differently" what people do analyzes why intervention strategy	"improve behavior" improve job satisfaction work quality & production interpersonal relationship Occupation Safety & Health	"ABC's" activator, behavior, & consequence design interventions for improving behavior at individual, group, & organizational levels	"motivate behavior" working to achieve success avoid reactive behavior using total recordable injury rates	"DO IT" D = define target action & increase or decrease O = observe, set goals I = intervene T = test impact, record	intervention techniques situation individual work practice	leadership empathy & sensitivity to message delivered

"People-Based Safety" (PBS) strategically integrates the best of behavior-based and person-based safety in order to enrich the culture in which people work – improving job satisfaction, work quality and production, interpersonal relationships, and occupational safety and health.

Australian Defence Aviation System (2004)

1 Genuine Command Commitment	2 Generative Safety Culture	3 Defined Safety Organization Structure	4 Communication	5 Documented Safety Policy	6 Training & Education	7 Risk Management	8 Hazard Reporting & Tracking	9 Investigation	10 Emergency Response	11 Survey & Audit	12 ASMS Review
safety recognized as a priority command committed to improving appropriate allocation of resources trained and qualified staff personnel aware of: orders, instructions, procedures high level of awareness effective risk management process	Promote stds of excellence: professionalism, innovation loyalty integrity - adherence to codes Commanders Should: lead by example allocate adequate resources acknowledge concerns & suggestions give feedback on decisions Actively measure: safety climate, behaviors, & SMS Measure perceptions: integrity, trust, morale, quality & leadership	committee purpose: inform commander promote interest forum for: viewpoints policy objectives eliminate/mitigate safety hazards	policy documentation review boards/working groups surveys audits safety stand-downs open reporting mechanisms confidential reporting activity briefings/de-briefings face to face discussions visits and liaisons safety information communication strategy	group policy: a Safety Mgmt System culture - open reporting hazard ID process risk management target - zero accidents personnel policy: adequate training awareness risk management	Training: orientation postgraduate skill specialization contractor safety staff overseas domestic conferences websites recognition program	establish the context identify risks analyze risks evaluate risks treat risks communication & consultation monitoring & review 5-M Model for assessment hazard identification risk control strategies risk control tools risk decision making	hazard reporting occurence reporting: event incident accident serious accident hazard review board tracking reports hazard identification perception of a hazard	analysis findings contributing factors defenses risk management actions & recommendations	standard plan framework standard terminology facility names promulgate authority planning committee emergency plan context define any problems set planning objectives design & apply the management structure determine roles determine responsiblities analyze resources develop emergency systems document response plan test the plan review the plan	safety survey purpose: assess the SMS recommendations for improvement measure culture recommendations for improvement improve the Quality quality mgmt. system: identify positive impacts identify hazards risk mitigation strategies facilitate safety education transfer new information raise safety awareness mgmt. system audits: ensure compliance check standards & quality of documentation improve the QMS	continuous improvement cycle: safety policy planning implementation measure & evaluate management review

The specific goals of the Defence Aviation Safety Management System (ASMS) to accomplish this purpose are the: a. preservation of the human and materiel resources of Defence aviation in order to maintain capability, improve quality and enhance readiness to perform the organisation's mission(s); b. reduction in the rate of aviation accidents and serious incidents resulting from human, organisational and systemic deficiencies to zero; c. establishment and maintenance of an effective hazard identification, reporting, investigation and management system, which eliminates, or reduces to an acceptable level, aviation risks within Defence aviation; and d. establishment and maintenance of a generative safety culture.

Transport Canada - (2005)

1 Senior Management Commitment	2 Safety Policy	3 Safety Information	4 Establishing Safety as a Core Value	5 Setting Safety Goals	6 Hazard Identification & Risk Management	7 Establishing a Safety Reporting System	8 Safety Audit & Assessment	9 Accident & Incident Reporting & Investigation	10 Safety Orientation & Recurrent Training	11 Emergency Response Plan	12 Documentation
expressed as direction allocates responsibilities holds people accountable	commitment & objectives performance goals & review clear statements of responsibility accountabilities converge at top ensure compliance w/ regulations adequate knowledge & skills compatability or integration with other management systems	safety goals evaluation of progress accident/incident records investigation findings corrective actions concerns raised by employees/resultant action safety review & actions records of safety initiatives	safety integral to mgmt. plan set safety goals hold managers & employees accountable achieve goals establish deadlines part of normal business part of normal job in acquisition process	identify & eliminate or control hazards risk management identify: systemic weaknesses accident precursors eliminate or mitigate them	during implementation regular intervals afterwards major operational changes when changes are planned if organization is: undergoing rapid change changing services new equipment/procedures key personnel change	employees: report hazards report concerns trust & use system staff know: how to report reports are: acknowledged analyzed resolved	includes contractor activities are staff following procedures? if not? Why? audits & assessments are conducted regularly	every accident/incident is: reported investigated analyzed what happened why it happened how it happened responsible manager acts on findings	new employee training: how safety is managed company philosophy policies procedures practices employee training: each discipline refresher/retrainer	checklists & contact info regularly updated exercised to ensure adequacy & readiness after plan is adopted: staff are briefed staff receive training in procedures POC has plan on desk	policy statement reporting chain key personnel responsibilities identifies processes: hazard identification risk management safety reporting audit/review

A safety management system is a businesslike approach to safety. It is a systematic, explicit and comprehensive process for managing safety risks. As with all management systems, a safety management system provides for goal setting, planning, and measuring performance. A safety management system is woven into the fabric of an organization. It becomes part of the culture, the way people do their jobs. The organizational structures and activities that make up a safety management system are found throughout an organization. Every employee contributes to the safety health of the organization. In larger organizations, safety management activity will be more visible in some departments than in others, but the system must be integrated into "the way things are done" throughout the establishment. This will be achieved by the implementation and continuing support of a coherent safety policy which leads to well designed procedures.

Nine Elements of a Successful Safety and Health System © 2005 National Safety Council

Administrative - Management			Technical - Operational			Cultural - Behavioral		
1 Management Leadership & Commitment	2 Organization Communications & System Documentation	3 Assessments, Audits & Continuous Improvement	4 Hazard Recognition, Evaluation & Control	5 Workplace Design & Engineering	6 Operational Safety & Health Programs	7 Employee Involvement	8 Motivation, Behavior & Attitudes	9 Training & Orientation
clear policy goals & objectives performance measures resources accountability integrated	two-way communication record keeping documentation	compliance to policy & procedure audits assessments at all levels action plans	hazard control policy hazard analysis procedure hazard evaluation hazard risk redution	ergonomic design regulations & standards design policies	risk management regulation compliance resourcing external exposures	training communications behavior auditing recognition & reward observations	Organization Behavior Management (OBM) reinforcement & feedback Total Quality Management (TQM) attitude adjustment methods	systematic training plan management training orientation program

A safety management system is an organized and structured means of ensuring that an organization (or a defined part of it) is capable of achieving and maintaining high standards of safety performance. A comprehensive safety and health system should be proactive and preventive. It should be an integrated system that involves everyone in the company, starting with a solid commitment from top management. It should include a formal method of measuring and evaluating individual and organizational safety performance with an emphasis on improving safety performance within the system. In creating a safety management system, a company's management system must first clarify and establish its safety and health philosophy, beliefs, and vision or mission. Through these efforts, a culture that promotes safety and health is established. A comprehensive safety management system should give equal consideration to the administrative, operational and technical, and cultural issues of safety and health.

Occupational Safety & Health Administration (OSHA) Challenge - OSHA Draft revised 4/4/2007 - Occupational Safety & Health Administration, U.S. Department of Labor

Management Leadership & Employee Involvement			2 Worksite Analysis	3 Hazard Prevention & Control	4 Safety & Health Training
1a management commitment	1b employee involvement	1c contractor employee coverage			
mission & policy statements goals & objectives leadership by example open communications between managers & employees adequate resources responsibility, authority & accountability employees notified of results of complaints, investigations, etc. annual self-evaluation continual improvement	employee safety & health perception survey meaningful employee involvement in the SHMS, (such as investigations, hazard analysis, planning) employee rights intact "ownership" of SHMS	documented oversight & management system adherence to rules same level of protection as regular employees contractor selection process encourage contractors to develop & operate effective SHMS track correction of hazards stop work policy	baseline safety & industrial hygiene (IH) analysis data trend analysis hazard analysis of routine jobs, tasks, and processes hazard analysis of significant changes pre-use analysis change analysis	access to certified professional resources hazard elimination & control methods hierarchy of controls: engineering, administrative, work practice, personal protective equipment (PPE) documented system for hazard correction & tracking emergency preparedness & response IH program routine self-inspections employee hazard reporting system investigation of hazards & near misses equitable & clearly communicated disciplinary system	orientation for all employees, including contractors training for all workers appropriate to level of responsibility and exposure to hazards training for specific groups of workers training for non-routine tasks change of job training

The OSHA Challenge Pilot uses the Voluntary Protection Programs (VPP) model of safety and health program management to guide employers in the development and improvement of workplace safety and health management systems (SHMS), with the goal of improving performance and ultimately qualifying for VPP recognition and participation. Challenge participants follow a 3-stage roadmap of progressively more comprehensive actions, documentation, and results. At each stage, they address the four major elements of the VPP model: 1. Management leadership and employee involvement. Management accepts responsibility for, and commits to implement and operate (including allocation of necessary resources), an effective occupational safety and health program that protects all employees and contractors working at the site. Employees agree to participate in the program and work with management to ensure a safe and healthful workplace. Annual SHMS self-evaluations are performed, actions items identified and SHMS adjustments made to foster continual improvement. 2. Worksite Analysis. Management of workplace. safety and health must begin with a thorough understanding of all hazardous situations to which employees may be exposed, plus the ability to recognize hazards as they arise; 3. Hazard Prevention and Control. Hazards identified during the hazard analysis process must be eliminated or controlled by developing and implementing appropriate systems; and 4. Safety and Health Training. All employees must understand the hazards to which they may be exposed and how to prevent harm to themselves and others. Effective training ensures safety and health personnel, managers, and employees acquire knowledge and skills they need to perform their work free of harm.

Culture Maturity Models

Values-Driven Safety (Safety is a Social or Cultural Issue) - Copyright 1996, Don Eckenfelder, Profit Protection Consultants, Inc.

lowest maturity ⟷ highest maturity

1 Performance Map	2 Bridge Metaphor	3 Safety Culture Barometer	4 Exercises for Improvement
"causation diagram" create loss resistance facilitate loss prevention work on beliefs and values creating organizational culture	"strong bridge" deal with culture directly change it consciously change it strategically	Safety Culture Scorecard "maturity grid" "measurement tool" 1. Do it for the right reason 2. See it as part of the whole 3. Recognise there is no end 4. First, it is a people business; things are a distant second 5. Put the right person in charge 6. Use a yardstick everyone can read 7. Sell benefits - and they are many 8. Never settle for second best 9. Be guided by logic, not emotion 10. Empower others rather than seek after support	do it for the right reason routine exercises

Organizational attitude will determine whether safety initiatives will be successful. The attitude flows directly from the culture and:
1. Culture predicts performance.
2. Culture can be measured and managed.
3. Nothing is more important than getting the culture right.

This knowledge - together with the "tools" to act on it and the resolve to get on with it - can serve as a catalyst for every existing safety effort. It will overcome the deficiencies in behavior-based safety (BBS) and magnify its benefits.

14 attributes that are invariably resident in organizations that are loss resistant:
1. Each employee takes responsibility for safety.
2. Safety is integrated into the management process.
3. The presence of the full-time safety professional is limited.
4. There is an off-the-job safety effort.
5. Safety and other training are seamlessly integrated.
6. Compliance comes naturally.
7. Programs and technical processes have history and occur naturally
8. There is a bias against gimmicks.
9. Leadership always sets the example; safety is never taken lightly.
10. There is a recognizable safety culture.
11. The focus is more on process than statistics.
12. Negative findings are treated expeditiously.
13. The few safety professionals have stature.
14. Safety is seen as a competitive edge...not overhead.

"Connecting the dots" for Values and Attributes and the role of "Exercises"

Excellence in safety or any other endeavor is directly related to the attributes or characteristics of excellence. These are generally well known. The attributes can be acquired by working on them individually or creating a climate that automatically leads to their acquisition. We believe the latter is the best way as it is enduring and works from the inside out instead of the outside in. Hence, we have a correlation matrix that validates our Culture Barometer™.

In order to improve in the physical or intellectual realms, there is a need to perform "exercises." It is no different in the social realm. So, once we have performed a cultural diagnosis using the Safety Culture Barometer™ to create a Safety Culture Profile™ we provide some generic exercises that can be customized to meet the specific needs of a user. Our process is culture sensitive and takes people from where they are to where they want to go…culturally. Then they can demonstrate success but continuing to monitor progress by periodic data collection and creating updated profiles.

Keil Centre Ltd. - Safety Culture Maturity ® Model (1999)

1 Emerging	2 Managing	3 Involving	4 Cooperating	5 Continually Improving
Develop Management Commitment	Realize the importance of frontline staff and develop personal responsibility	Engage all staff to develop cooperation and commitment to improving safety	Develop consistency and fight complacency	

The safety culture maturity model ® presented refers to organizational behaviors; NOT safety management systems. A positive safety culture is the product of effective safety management. As part of a project sponsored by the United Kingdom offshore oil industry and the Health and Safety Executive, The Keil Centre developed the Safety Culture Maturity® Model, providing a structured safety culture improvement process. The Safety Culture Maturity® Model assists organizations to identify their current level of safety culture, and develop level-specific improvement actions. The focus of improvement actions differs, depending upon the existing level. The Model is set out in stages. Organizations progress sequentially though the five levels. Growth in Safety Culture Maturity® normally takes one to two years per level, and collectively five to ten years for an organization to achieve peak performance, assuming they start at Level 1 and maintain a sustained and well-resourced effort. Safety Culture Maturity is a Registered Trade Mark of The Keil Centre Ltd. Copyright The Keil Centre, 1999

Safety Culture Maturity ® Element	Leadership	Management	Employee Relations	Measurement
Visible Management Commitment	X			
Safety Communication	X	X		
Production versus Safety	X			X
Learning Organization	X		X	X
Health and Safety Resources		X		
Participation in Safety	X		X	
Risk-taking Behavior		X		X
Trust between Management and Frontline Staff	X		X	
Industrial Relations and Job Satisfaction			X	
Competency		X		X

Department of Defense, Office of Inspector General

Evaluation of the DoD Safety Program, July 2007
Note: This list is not all inclusive.
These management systems were selected for analysis as they were generally well accepted in government and industry.

The inclusion of any system, model, or product on this list does not constitute endorsement by the U.S. Department of Defense or the U.S. Department of Defense Office of Inspector General.