Session No. 566

Implementation of ANSI Z-10 Process

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Background

In 2009, M.C. Dean Inc. celebrated its 60th anniversary. For more than 60-years the company has continued to grow, experiencing especially notable advancements in the past decade. The small regional organization founded in 1949 is now the largest independent electrical design-build and systems integration firm for complex, mission-critical organizations in the United States.

M.C. Dean's portfolio grew substantially in 2007 when the Department of Defense awarded it a significant number of high-value contracts connected to the Base Realignment and Closure (BRAC) initiative. M.C. Dean experienced tremendous growth in the private sector around the same time. The number of employees grew from several hundred to more than three thousand. The massive increase in revenue and manpower presented the company with new challenges and opportunities for improvement. The frequency and severity of OSHA recordable safety incidents grew as the company expanded.

M.C. Dean's safety performance over the previous decade consistently hovered around 50% below the United States Bureau of Labor Statistics' (BLS) national average recordable incident rate for electrical contractors. Deeply concerned, senior management hired additional professional safety resources to provide guidance and solutions to the occupational safety, health and environmental issues the company was facing. President William Dean's directive to the newly formed group was simple: Evaluate and compare M.C. Dean's practices to the best in the world, determine the gaps, and make the necessary adjustments.

Ultimately, the company chose ANSI Z-10 as the preferred guidance document to provide the framework for moving the M.C. Dean Safety program forward. According to Vice President of Safety, John Bennett, the Z-10 Standard provided the appropriate level of specific Occupational, Safety and Health (OSH) element detail, guidance, and assessment tools to aid the company in its improvement efforts. This paper recounts the process of assessing, developing, implementing, and continuously improving the program within the context of the ISO/ANSI adoption of the Deming four-phase "Plan-Do-Check-Act" continuous improvement cycle.

Phase 1 - The Assessment/Audit (Plan)

A team of internal stakeholders was assembled to conduct a detailed audit and analysis of existing

company Occupational Health and Safety Management Systems (OHSMS) in accordance with the Z-10 2005 Standard. The team utilized three major assessment path-forward planning tools.

1. The audit protocols, defined in Appendix I of the Standard, provide guidance for the five major elements and corresponding sub-elements by examining the following objective and subjective evidence:

    - Documents
    - Records
    - Employee interviews
    - Organizational behavior
    - Employee observations

2. The company utilized the OHSMS Conformance Scorecard, featured in Appendix J of the Standard. The scorecard provides a five color-coded qualitative assessment of the effectiveness of each OHSMS element. The color-coding method provides "at-a-glance" information to aid decision makers with an immediate calibration point relative to the level of OHSMS compliance for each element. In addition to the qualitative assessment, the company utilized a simple quantitative scoring approach through the application of points for each color code. The ratings are:

Points	Color Code	Code Description/Maturity Level
4	Blue	World class occupational health and safety performance
3	Green	Strong. Conforming/complete, may have minor gaps in action plans
2	Yellow	Moderate. Scattered non-conformances need to be addressed, positive trends/major elements in place
1	Violet	Significant non-conformance exists, still needs focus
0	Red	Major effort required, major or systematic nonconformance exists

Table 1. The OHSMS Conformance rating scale.

3. The third tool utilized was the S.M.A.R.T. (Specific, Measureable, Realistic, and Time-based) planning tool exhibited in Appendix F of Z-10. The SMART tool enables organizations to approach findings and corrective action with a format focused upon the identification of clear, specific objectives that are measurable, action-oriented, realistic and time based.

M.C. Dean embarked on a two-month journey, from August 9th through October 2010, to evaluate the status of the company's Safety, Health and Environmental (SHE) program by utilizing the tools and techniques identified above. The audit's focus was to determine the maturity level of the OHSMS technical/regulatory and operation procedures and compliance and overall safety culture. The following is a summary of the five major elements of Z-10, our findings, initial score and path-forward plans.

Element 1 - Management Leadership and Employee Participation
Initial Score: Violet – 1 point

Points	Color Code	Code Description/Maturity Level
1	Violet	Significant nonconformance exists, still needs focus

Table 2: Management leadership and Employee Participation showed significant nonconformance and needed focus.

Summary of Findings:

An in-depth review of both written and unwritten rules and internal policies and procedures revealed that a traditional command and control SHE structure was in place. Organizational and operational management had little to do with the safety process and viewed the safety department and its personnel as the enforcement group responsible for compliance with external regulations. Roles and responsibilities were largely undefined. Corporate policy indicated the Safety Director was responsible for the implementation, enforcement, and ongoing maintenance of the program.

The audit team was unable to identify specific activities that indicated the existence of a structured process. Involvement was sporadic and varied from project to project.

The auditors determined that the company had a traditional reactive safety department-driven program versus a management-driven process.

SMART Plan Objective:

- Clearly define the roles and responsibilities of each level of management including executive, senior, operational, and field level supervision. Shift emphasis from reactive to proactive.
- Redefine the corporate OHSMS policy to shift performance responsibility to operational management and establish a collaborative environment where employee participation and involvement result in a culture of continuous improvement.
- Conduct educational sessions with management and employees to discuss the vision and cultural adjustments required for improved performance in the 21st century.

Element 2 – Planning
Initial Score: Red – 0 Points

Points	Color Code	Code Description/Maturity Level
0	Red	Major effort required, major or systematic nonconformance exists

Table 3: Planning was rated zero on a scale of five.

Summary of Findings:

Opportunities for improvement in the planning element existed. The company did not have a structured process to evaluate work tasks or prioritize hazardous work activities within the context of the Z-10 standard. Practices related to the development of short and long-term objectives and goals were absent. Strategic initiatives and short-term tactical activities to produce safe outcomes on a daily basis were inadequate. This element provided the company with the best opportunity for immediate improvement and over time the company filled this critical gap with a structured planning process that was updated every day by employees engaged in the work activities.

SMART Plan Objective:

- Adopt and implement the Naval Facilities Command – "Operational Risk Management" (ORM) process to identify risks/hazards associated with each work task. Implement controls to reduce risks from people, the operation and the environment. Simplify the process to ensure each party clearly understands each function and element of control.
- Adopt the risk register concept from the Australian Risk Management standards to assist in the categorization, prioritization and implementation of the appropriate hierarchy of control to accommodate the work process safely. Involve workers to ensure adequacy of the final product.
- Adopt the United States Army Corps of Engineers methodology for assessing and controlling hazards for each work activity and work position. The Activity Hazard Analysis (AHA) is an administrative control that helps to identify hazards associated with each step of a definable feature of work. The Position Hazard Analysis (PHA) is an administrative tool that identifies the physical hazards, chemical hazards, skills, tools, material, equipment, training and certification requirements associated with a position (such as electrician).
- Implement the "Daily Work Briefing" process that requires each work group to meet each day prior to beginning work to discuss the scope of work for the day and to identify hazards and appropriate control measures. Daily work briefings are also reconvened whenever the work task changes.
- Implement routine management ORM field inspection requirements to demonstrate management's commitment to the process.
- Implement weekly review of upcoming scheduled activities to reduce work interruptions.
- Implement a weekly, monthly and annual review process. (See evaluation and corrective action)
- Engage employees in all planning activities.
- Conduct educational sessions to explain the ORM process (including its five core functions and six elements of control) and define roles and expectations.
- Adopt and implement the Construction Industry Institute's (CII) Zero Incident Techniques.

Element 3 – Implementation and Operation
Initial Score: Violet – 1 point

Points	Color Code	Code Description/Maturity Level
1	Violet	Significant nonconformance exists, still needs focus

Table 4. Implementation and Operation was rated one on a scale of five.

Summary of Findings

M.C. Dean identified significant opportunities for improvement, as it went about identifying gaps in implementation and operational elements of control. The Z-10 hierarchy of controls methodology was a new concept to the organization. Personal protective equipment was identified as the first line of defense rather than other elements of the hazard control hierarchy. As an engineering firm, M.C. Dean realized that prevention opportunities presented themselves during the design phase of the work. Subcontractor controls were implemented to protect the company and improve their performance. Emergency preparedness plans required updating. Educational programs

explaining the standard and newly developed programs and processes were developed to close the knowledge gap. Routine communications regarding safety performance were weak. Document controls and recordkeeping were determined to be inadequate.

SMART Plan Objective:

- Implement a process to identify each work activity and apply associated controls.
- Implement a management of change process and apply to design services, changes in supply chain management, changing codes and standards and other critical areas of the operation.
- Develop a procurement procedure to establish safety, health and environmental issues associated with purchased products.
- Develop and implement contractor pre-qualification standards, orientation programs and specific work activity safety, health and environmental control requirements, and contract specifications.
- Upgrade and implement emergency preparedness procedures.
- Modify and upgrade current training and awareness program to include: how to nurture a safety culture, operational risk management and issues that stretch beyond regulatory compliance.
- Develop and implement a means to communicate SHE issues, performance results and recognition to the entire organization.
- Establish, implement and maintain an ISO 9001 recordkeeping and procedure development process and review cycle.

Element 4 – Evaluation and Corrective Action
Initial Score: Violet – 1 point

Points	Color Code	Code Description/Maturity Level
1	Violet	Significant nonconformance exists, still needs focus

Table 5. Evaluation and Corrective Action scored violet.

Summary of Findings

- The audit revealed that some structure was in place to monitor activities. An on-line safety management database system allowed for the capture of information relative to employee behavioral observations with the capability of being expanded to accommodate regulatory inspections and OHSMS audits. However, the data was not being utilized to the extent possible. Incident investigations were conducted, but the reports were rudimentary. The reports were based on insurance type information rather than an examination of root causes or contributing factors related to system failure. Focus of investigations generally pointed to an error of immediate cause, i.e. employee carelessness. Management system audits were not conducted to evaluate alignment with a system-based approach. Corrective actions were taken at projects but not recorded well. Processes to capture feedback for performance improvement purposes were not in place.

SMART Plan Objective:

- Expand the analysis and evaluation capabilities of the on-line safety management database.

- Develop a weekly and monthly analysis of captured information and distribute to stakeholders for continuous improvement efforts.
- Develop an on-line self-assessment scorecard to track leading indicators such as training, management and employee participation, compliance with OHS program activities, and lagging trends such as recordable and DART rates. Distribute to stakeholders monthly.
- Expand the incident investigation process to include a review of potential system deficiencies, key elements of control, and contributing cause factors. Involve management and employees.
- Develop and implement a "lessons learned" process.
- Develop audit protocols to assess OHSMS maturity levels based upon the 21 elements of Z-10. Repeat annually until all elements are scored in the green range and trending toward blue. Conduct the audit bi-annually thereafter (or more often if conditions warrant). Communicate audit results to appropriate parties for review and corrective actions as required.

Element 5 – Management Review Process
Initial score: Violet – 1 point

Points	Color Code	Code Description/Maturity Level
1	Violet	Significant nonconformance exists, still needs focus

Table 6. Management Review Process scored violet.

Summary of Findings
Some evidence of a management review process was identified. However, the focus of the review was primarily financial, with some OHSMS goals and objectives outlined. Significant critical elements of review were missing, including: strategic long-term programmatic issues, short-term tactical controls, and specific targeted areas for reduction of incidents, identification of major risks, policy improvements/adjustments, and resource requirements.

SMART Plan Objectives:
- Establish a team of internal stakeholders to evaluate and steer the OHS program.
- Develop an annual review of program elements, results and progress to determine path-forward goals and objectives.

Phase 2 – The Implementation (Do)

The initial implementation of the Z-10 for all projects in the engineering and construction division of the company began in December 2009 and was completed in late February 2010. Construction represents more than 70% of M. C. Dean business and presents the highest risk profile. Special emphasis was placed upon a simple, easy to understand, daily planning process that included management and employees.

As the implementation process began, project teams focused on the elements of control featured in the SMART Plan contained in the review of Element 2 (discussed above in Phase 1).

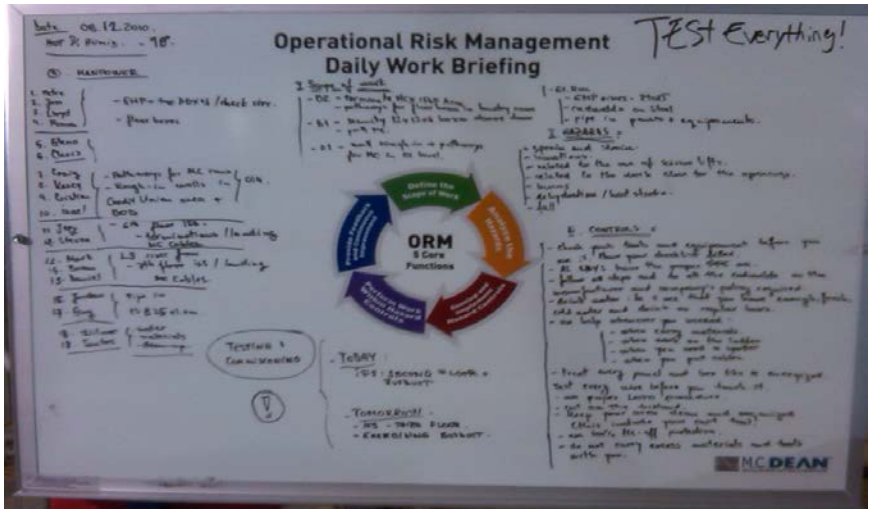

Exhibit 1. Operational Risk Management Daily Work Briefing on a jobsite.

An employee suggestion to place the Organizational Risk Management (ORM) symbol on a white board to guide employee teams in the daily work briefing caught fire. Each work crew at every project began the practice. Within weeks, the white boards began popping up at project locations world-wide. This simple workplace safety practice stimulated a dramatic change in the culture of the organization, clearly visible within weeks of implementation.

Excitement for the process spread. Employees began to realize that their ideas, concerns and issues were being resolved in a timely manner. Employee involvement in the development of risk registers, activity hazard analyses, and position hazard analyses created awareness among the work force resulting in the immediate reduction of incidents and accidents world-wide. Employees began looking after each other's well-being, rather than watching safety incidents occur. They began communicating and resolving safety issues on their own. The traditional enforcement and compliance approach was abandoned. A more collaborative system focusing on people rather than regulations took root.

Management involvement increased as teams began to clearly understand Safety's mission, and teamwork improvements were evident. Traditional "us versus them" barriers were quickly crumbled. Communication improved and better performance followed. This level of improvement continued throughout 2010.

By the end of 2010, the number, frequency and severity of incidents had declined. Recordable incidents were reduced by a modest 15%; however, workers' compensation costs were reduced by over 57%, a savings of over $1.2 million dollars, despite working 1.1 million additional hours.

Additional program adjustments were made as audits and feedback indicated several areas to be targeted and implemented for improvements in 2011.

Safety performance continued to improve as the OHSMS began to mature and as adjustments to practices, procedures, and auditing protocols were implemented. External customers, suppliers, clients and regulators noticed improvement. They were inquisitive about the white-boards that displayed the ORM symbol and notes from Daily Work Briefings. Members of the ANSI Z-10 committee visited our sites and began to ask questions about the M.C. Dean Z-10

process. In April 2011, ANSI selected M. C. Dean to become a member of the accredited standards committee. The M. C. Dean Safety Department assisted with the development of the second edition of the ANSI standard, scheduled for release in the summer of 2012.

M.C Dean closed out 2011 with a 37% reduction in recordable incidents, for a recordable incident rate of 1.33. Workers' compensation reductions followed as costs were reduced from the previous year by another 60%. Several high risk exposure sites with previous unacceptable safety recordable incident rates experienced zero recordable incidents in 2011.

The 2012 improvement plans' goal is to reduce incidents by another 50%. Written program adjustments are planned to align with modifications to the second edition of ANSI. Continued reduction in worker compensation costs should follow.

Phase 3 – Checking the Plan

As with many programs, what gets checked gets accomplished. Implementation of a Z-10 program provides many opportunities for data collection and metric. The more meaningful the data, the more impact to the organization. In the case of our implementation, we chose to create a Mind Map of each of the 21 elements comprising the Z-10 standard, linking our policy, procedures, and artifacts to each element. When completed, the MAP provides the ability to:

1. Audit the process in either direction
2. Provide a visual reference of implementation
3. Color code elements and sub-elements indicating further guidance

At project locations, checking the plan consists of an audit in eight categories. They range from paper process that is documented and implemented in the field, to supervisory engagement. Internal auditors conduct a 360 audit on a project that will include employee interviews concerning their own performance, their supervisory staff performance, and the engagement from management to employee. In the past, management commitment was difficult to gauge.

MC DEAN 60th anniversary 1949 – 2009

ORM Program Assessment

Corporate Audit
Self-Audit
Third Party

Site Name: Date of Audit:

Auditor:

	1.0 Administration/Training	Input	Comments	Score
1	ORM Being Conducted and Documented	Yes	Available in binders at the safety office	100%
2	Does the project site document ORM training in employees' training records (paper or electronic)?	Yes	paper copies available	100%
3	Records for the ORM process are being maintained	Yes	DWB, PHA, Risk Assessment, Site Orientation, APP	100%
4	All Employees Attend Orientation	Yes	Site orientation developed and all attended	100%
5	Superintendent speaks to all employees as part of site orientation	Yes	Florian is present and speaks of the importance of safety	100%
	2.0 Activity Hazard Analysis, (AHA) Process	**Input**	**Comments**	**Score**
1	AHA are developed for each task	Yes		100%
2	AHA are being reviewed before the start of each new job task by foreman/supervisor with employees. Follow-up reviews will be conducted on a weekly basis as a minimum	Yes	AHA are part of the DWB	100%
3	AHA is being developed with input from employees	80%	Comments to the AHA will be inputed as they are received	80%

Exhibit 2. ORM Self Audit conducted on a project site

It can now be quantified and included in a monthly assessment to executive management. Corporate 360 audits use an employee's peers to assist in the evaluation of the project. It allows for a fair assessment of project data and areas where we may all improve upon. Other projects can

immediately use the findings to improve on their respective sites. The sense of healthy competition drives better results.

Phase 4 - Acting upon Findings

The ability for us to use our leading metrics provides for increased safety on projects, involvement of craft workers, and implementing controls. The program is simple to use and easy to implement. The results have been positive. As information is received, it can be easily identified, analyzed and resolved through our leading indicators making M.C Dean's safety program even stronger.

M.C Dean's approach to safety, health, and environmental management is unique because, unlike other companies that rely of their safety rote calculations and formulas, M.C. Dean focuses on one simple question put to every employee every day: "If an incident were to happen …where would it happen?" M.C. Dean believes that putting the spotlight on that critical question has helped reduce accidents and build strong interpersonal relationships among personnel and with clients.

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