BREAKTHROUGH IMPROVEMENT IN H&S PERFORMANCE THROUGH 6Δ SIGMA

Mr. Ali Irfan,
COO & Chief Trainer
IDEAS, a Management Trainer and Consultancy Firm.

What is 6 Sigma?

The term six sigma is a statistical measure and a business strategy. Statistically six sigma can be defined as less than 3.4 defects per million opportunities i.e. plus or minus six standard deviations from the mean. e.g. Near Perfection.

As a business strategy six sigma was introduced by Motorola in the 1980's to standardize the way defects were counted, six sigma performance became their five year goal and they set about achieving this through their innovative six sigma programme.

Since then, the six sigma philosophy has been adopted widely by all types and sizes of organizations throughout the world, most notably General Electric, Allied Signal, and Citibank.

The most common approach to six sigma is **DMAIC:**

D **Define** a suitable project for Six Sigma efforts based on business objectives as well as customer needs.

M **Measure** the variables of the process and count the defects.

A **Analyze** the process to identify and validate root causes of problems.

I **Improve** the process by implementing and testing solutions.

C **Control** the modified process to ensure the key variables remain within the maximum acceptable ranges over time.

The benefits of developing a six sigma programme are numerous but simply: less defects, less waste and reduced costs leading to increased customer satisfaction and stakeholder value.

However, as with all business improvement techniques a six sigma programme is not something to be taken lightly. To achieve anywhere near six sigma levels of performance requires long term vision, commitment, leadership, management and training.

Now this methodology also used in health and safety. COMPANY has expanded the use of this approach to help manage aspects of the Company's operations beyond production and quality, including the safety and health of its workforce. Some of the other projects to which Company has applied the Six Sigma methodology include:

- Reducing injuries;
- Improving safety for visitors (especially contractors);
- Reducing site-logistics risks; and

As the example in the case study illustrates, COMPANY has found the Six Sigma methodology particularly useful in identifying and validating root causes that are hard to discern because of their subjectivity and in focusing improvements in a motor vehicles program in ways that caused measurable improvements. Moreover, since the Six Sigma process includes the implementation of controls to ensure that achievements are sustained over a long term, the Company expects to realize the benefits of its efforts for years to come.

MOTOR VEHICLE ACCIDENT CASE STUDY: THE CASE

Reducing MVAs is just one facet of company's overall commitment to safety and health. One of these goals called for a reduction in the number of MVAs per million miles by 50 percent (from a 2007 base). As part of this initiative, COMPANY launched a project in 2008 to reduce MVAs by its employees.

From September 1, 2006, to August 31, 2007, there were 125 work-related MVAs among field employees. The drivers involved in the accidents were the operations and marketing personnel who drive to client sites and the employees who drive vehicles on-site at facilities. In addition to personal injuries, the MVAs contributed to lost sales and productivity while the COMPANY employees were away from work recovering from their injuries. To reduce these negative consequences, company management decided to launch an effort using the Six Sigma methodology to understand the causes of MVAs and implement continued improvements that would allow company to meet the goal of a 50-percent reduction.

The Company believes that using Six Sigma enables employers to develop program improvements based on measurement and analysis rather than on speculation and results in a more cost-efficient and sustainable fix that will yield benefits indefinitely. Rather than undertaking costly trial-and-error attempts at solutions, the Company is able to identify the root causes of safety concerns with confidence. Improvements can then be implemented in a systematic and sustainable way, not only in the business unit

where the project took place, but also throughout COMPANY's other business units where the relevant conditions are substantially similar.

Step 1: Measure

To address the MVA problem, company created an MVA project team. The team established an initial goal of reducing MVAs by 50 percent over a 12-month. After creating a project charter, which defined the project's timelines and objectives, the team began to collect information on the variables associated with MVAs. These variables included factors related to the accident, the driver, and the vehicle driven, along with details of the accident itself.

Step 2: Analyze

After identifying the variables associated with MVAs, the team divided them into three categories of possible risk factors: methods, people, and environment. (See Figure 1.)

Figure 1. Possible MVA Risk Factors

Methods	People	Environment
Not adjusting mirrors/seats	Hurrying	Slippery surface
Not "Aiming High" in steering	Inattention to construction	Reduced lanes
Not utilizing a spotter when backing	Pulling forward before stopping/looking	Heavy traffic
Not checking behind vehicle before backing	Inattention while backing	Unfamiliar area
Not wearing seat belt	Left a running vehicle unattended	
	Tired	
	Eating	
	Using cell phone/radio	
	Not getting clear picture of surroundings	
	Driving on autopilot	
	Inattention	
	Driving too fast for conditions	

Variables in the methods category were related to driving skills; risk factors in the people category were largely behavioral; and variables in the environment category were related to both the driver and the condition of the environment.

The team next performed a root-cause evaluation that analyzed the probability of each risk factor occurring and determining whether it was measurable. The actual MVAs were then charted according to:

- Site (i.e., off-site, on-site, business sites, plant within site);
- Environmental conditions (e.g., weather, light);
- Vehicle (i.e., COMPANY-owned or -leased); and
- Moving backward or not.

Next, the team studied the police and accident reports of the MVAs and surveyed the drivers involved to determine which factors played key roles in the accidents. The analysis confirmed that the following three variables contributed to (i.e., were the root causes of) most of the Company's MVAs:

- Not focusing on driving tasks in general;
- Not having a clear picture of surroundings (e.g., not properly evaluating road conditions, other drivers); and
- Not checking behind the vehicle before backing.

Through its analysis, the team determined that all of the accidents involving backing up were avoidable as were 81 percent of the other accidents.

Step 3: Improve

After determining the most significant root causes of the MVAs through the Six Sigma's analysis and validation steps, the team developed a series of driver procedures or steps to address the risk factors. For example, all drivers involved in MVAs are now required to complete a course on defensive driving and have their driving observed by a supervisor in an "in-car" driver improvement course. These drivers develop a "Learning Experience Report," which is shared with other COMPANY employees. In addition, topics pertaining to driving are discussed at monthly environmental, health and safety meetings. Every employee must also review a 10-step "Arrive Alive" checklist (Figure 2) before driving a COMPANY-owned or -leased vehicle, and suggested procedures for backing up and guidelines for using cell phones are provided.

Figure 02

10 Steps to Arrive Alive

1. **I realize that my number 1 priority right now is to drive this vehicle safely and without incident to my destination.**
2. **I have checked behind the vehicle for obstacles; it is safe to back this vehicle if needed.**
3. **I am mentally and physically alert and am capable of making this trip.**
4. **I have securely fastened my seat belt and adjusted it for proper fit.**
5. **I am aware of the weather and realize that it can change during my trip. I will adjust my driving technique to allow for darkness, fog, rain, ice, etc.**
6. **I will be alert for traffic and road hazards and adjust my driving to safely allow for them.**
7. **I will obey all posted highway traffic signs.**
8. **I have a good attitude toward my driving, and I will be courteous and allow for other drivers' mistakes.**
9. **I am devoting my undivided attention to safely operating this vehicle, and I will not allow distractions to take my mind away from driving.**
10. **I know the five keys to safe driving**
    - **Aim high in steering**
    - **Get the big picture,**
    - **Make sure they see you,**
    - **Keep your eyes moving, and**
    - **Leave yourself an out,**

    and I will practice them as I drive to my destination.

Step 4: Control

The final phase of the project required that controls be established to sustain the project's immediate MVA reduction and to develop further improvements in line with COMPANY's 2009 goals. The project team developed and held a series of specific presentations, some with general information geared to all drivers, and others with more in-depth information for drivers involved in MVAs and/or who drive over 30,000 miles per year in an assigned vehicle.

The project team also established new criteria for investigating future MVAs that provide for the continuing collection of relevant data. All MVAs are now the subject of root-cause investigations, and the findings are reviewed and tracked by an MVA reduction team. As

new risk behaviors are identified, this team is responsible for developing appropriate corrective measures and employee education programs.

RESULTS OF THE PROJECT

The project was conducted during the 3rd quarter of 2006, and the improvements and control plan put into place beginning January 2008. For 2008, HSE dept. experienced 08 MVAs, This number exceeded the 50 percent reduction established as the immediate goal by the project charter. Following this success, many of the training materials developed by the project team (e.g., Vehicle Pre-Startup Checklist shown in Figure 2) have been adopted for use at other COMPANY businesses.

The project team believes that the Six Sigma methodology was a key factor in the project's success. Through Six Sigma, the project team was able to validate the root causes of the MVAs prior to implementing corrective actions, saving both the time and expense of studying and correcting factors that did not contribute significantly to the accidents. As a result, the MVA project team was able to achieve substantial improvements almost immediately. Moreover, the improvements that the team made to record keeping and data collection will help ensure that as root causes develop, they are identified and eliminated on an on-going basis.