

Positive Effects of a Fall Protection Program: A Case Study

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Introduction

Health and safety programs—fall protection, ergonomics and hearing protection to name just a few—are often treated as independent entities. Each program has its own set of rules, regulations, policies and procedures, which, if followed, will result in success of the specific program. The authors' experience is that not only is this true, but also that the success of one specific program can have positive effects on other seemingly unrelated health and safety programs. Employee involvement is at the core of this positive side effect. This paper discusses how employees were involved in turning a fall protection program into a dynamic instrument that is helping to improve safety throughout their facility.

The “Before” Picture

Harnesses and lanyards are the first things most people think of when they hear the phrase fall protection. In spite of OSHA's requirement to follow the Hierarchy of Control (Exhibit 1) and decades of attempted training, policies, and programs, the higher levels of fall protection are often forgotten or ignored. Even those who should know better, such as safety professionals and OSHA compliance officers, often immediately jump to personal protective equipment (PPE) as the solution for fall protection problems. It should not be surprising then that people without fall protection expertise do the same, and Marathon's Detroit refinery was not exempt from this shortsighted thinking.

Before the fall protection program underwent its recent overhaul, the refinery's fall protection program consisted of a half page of guidance under the General Safety Rules procedure. Not

surprisingly, the scope was limited mostly to harnesses and lanyards. Guidance on fall protection issues associated with roofs, pipe racks, aerial lifts, scaffolds and ladders was either non-existent or scattered in multiple documents that were difficult to locate.

Fall hazards can be found in all areas of any refinery. Fortunately no injuries or fatalities resulted from the apparently incomplete fall protection program. In spite of this fact, in 2006 the company agreed that the time had come to enlarge and enhance the program.

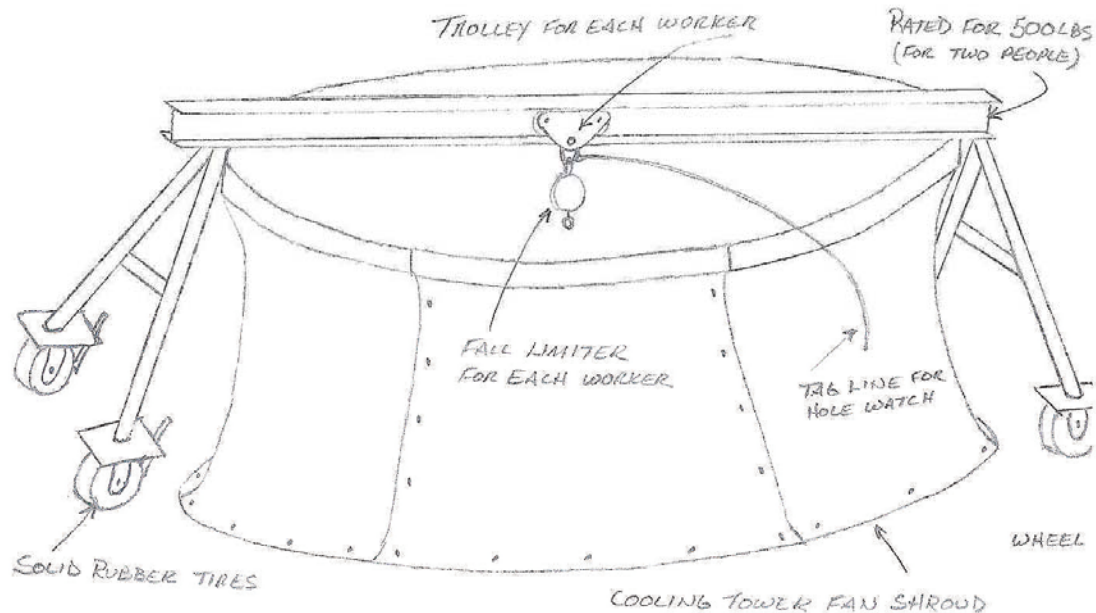


Exhibit 1. The Hierarchy of Control for fall protection measures the effectiveness and “defeatability” of fall hazard solutions.

The first step

The first step in transforming the fall protection program was to identify a champion of the program. As the champion was organizing and preparing to begin the process, he found a sketch buried in a stack of forgotten papers. The sketch, shown in Exhibit 2, was created by a maintenance craftsman, and depicted a suggested solution to a fall hazard that had been troubling the refinery for years. Although the suggested solution required PPE, the champion decided to rekindle the idea, knowing that the current method of fall protection on the refinery’s cooling towers was less than ideal.

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WHEN YOU'RE WORKING ON A COOLING TOWER FAN OR GEAR BOX, YOU NEED AN OVERHEAD TO HOOK YOUR SAFETY HARNESS TO. AND BE ABLE TO MOVE AROUND WITHOUT FALLING INTO THE TOWER.

Exhibit 2. This sketch of a possible fall protection system was developed by a maintenance employee.

The first step was to engage a fall protection consultant who had provided specialty fall protection services to other facilities within the Marathon corporation for several years. The consultant was asked to investigate the concept shown on the sketch and complete the design. After reviewing the sketch, however, the consultant recommended a slightly different approach, based on experience with other similar problems. The recommendation was to investigate not only the idea shown on the sketch, but also to conceive and evaluate other alternatives. The goal of the study, commonly referred to as a "conceptual phase," was to examine all the hazards associated with cooling tower maintenance and to objectively evaluate the advantages and disadvantages of each proposed solution.

For the cooling tower study, the fall protection consultant interviewed numerous employees to obtain their input. At first some employees were reluctant to offer suggestions. They doubted that anything would result and did not want to waste their time or get their hopes up. However, enough people were convinced that the subject of fall protection was getting some much needed attention, and enough information was collected to prepare some conceptual abatement methods.

Exhibits 3 through 5 show just some of the concepts that were investigated. Throughout the development of the concepts, employees were asked on numerous occasions to add their thoughts to the potential solutions. As with any diverse group of people, some thoughts were offered constructively while others were offered critically, such as “that’ll never work” or “management will never pay for it.” Properly handling these critical comments, combined with Marathon’s commitment to improving the fall protection program, allowed the process to move forward.



Exhibit 3. This is an example of a fall protection concept that was presented.

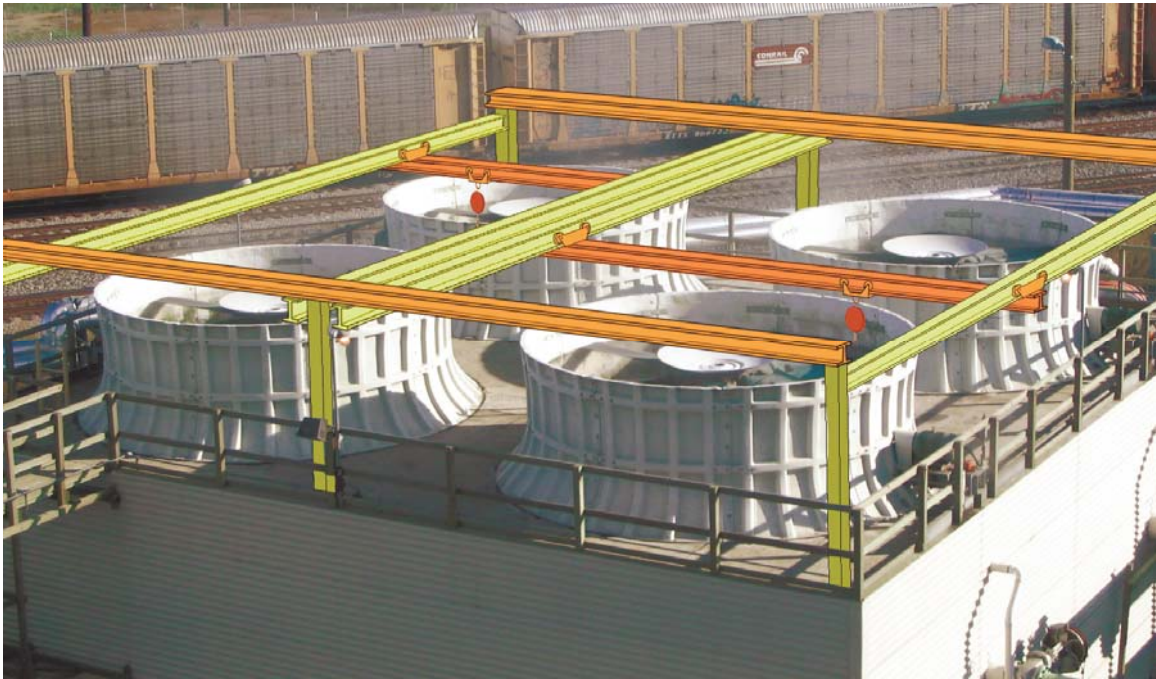


Exhibit 4. This is an example of a fall protection concept that was presented.



Exhibit 5. This is an example of a fall protection concept that was presented.

The concepts were presented in a workshop format. The workshop included representatives from safety, engineering, operations, project execution, and maintenance, including the craftsman whose sketch had started the whole process. The ideas were not presented as final detailed solutions offered by “outsiders.” Rather, they were offered as possibilities that could be objectively evaluated by both fall protection experts and cooling tower maintenance personnel. This spirit of cooperation is a critical success factor. No one likes to be told what to do, especially by people whose interest in the subject is viewed suspiciously. If all the stakeholders are involved throughout the process, several good things happen. First, the resulting solution is more likely to address the most important aspects of the task. Second, the solution is more likely to be embraced by the employees ultimately affected. Third, management is more likely to believe that the chosen solution addresses not only the safety of the employees, but also residual risks and effectiveness, as well as both short- and long-term costs.

As the cooling tower study progressed, the maintenance employees involved came to realize that the idea shown in the original sketch – the portable beam and trolley PPE system – contained numerous hurdles. While the design of the actual structure would be relatively straightforward, the creator of the sketch did not consider some important factors. Would the wooden structure of the cooling tower be strong enough to support the PPE system along with the impact loads generated by a fall? Since the tasks often require as many as six people, would a single beam arrangement provide the freedom of movement needed? Would the PPE system arrest a fall before a person struck the framework of the cooling tower, in some cases just a few feet below the work surface? How would the structure withstand the harsh environment, including the somewhat corrosive vapor of the cooling tower? Given that the refinery has more than two dozen cooling tower cells located throughout the complex, how many such systems would need to be constructed, and at what cost? What would be the recurring costs for inspection, training, and re-training? Last, but certainly not least, how would a fallen worker be rescued? Needless to say, what was at first thought to be the perfect solution was far from ideal.

Another solution that was studied was higher on the hierarchy of Control. The concept, shown in Exhibit 5, was to install permanent platforms with standard railing inside the tower. This idea has been successfully implemented on other similar cooling towers, and many maintenance employees immediately embraced it. However, other employees were skeptical that it would be accepted due to the perceived cost and the assumed performance impact to the cooling towers. Indeed, this idea was at first met with disapproval by the engineering group, who believed the airflow would be severely restricted by the proposed platforms. However, the merits of the idea, combined with the drawbacks of many of the other concepts, allowed the discussion to continue. When an outside cooling tower expert provided an assessment that the cooling tower performance would not be affected, the engineering group was convinced. When estimates of construction costs came in much lower than expected, the decision was easy, and the platforms were installed. Maintenance workers who were at first skeptical that anything would be accomplished were thrilled at how much easier and safer it became to perform their tasks. Word of the success started to spread.

Capitalize on momentum

Not being satisfied with merely abating a troublesome fall hazard, the refinery’s fall protection champion seized the opportunity to generate some momentum in the newly revived fall protection

program. A safety bulletin highlighting the cooling tower project was created to help spread the word that real changes were being made. The safety bulletin shown in Exhibit 6 was well received and made a particular point about how employees were involved in the solution.



Exhibit 6. This is the safety bulletin that was circulated about the cooling tower project.

Other things were happening with the fall protection program as well. The policy and procedures expanded from the half-page general guidelines to include a complete program addressing portable and fixed ladders, stairways, walking and working surfaces, aerial lifts, scaffold, roofs, pipe racks, and general use of personal fall protection equipment. Although PPE was no longer being viewed as the solution for every fall hazard, it was acknowledged that PPE does have an important place in the program. However, finding existing PPE that was suitable for a given task was difficult. To that end, all employees were provided with their own brand new harness and lanyard. Once again, employees felt a sense of ownership in the program. (Exhibit 7).



Exhibit 7. The graphics show employees with their new PPE equipment.

The momentum continued when the management team chose to accelerate the task of fall hazard identification. Originally planned as a five-year program, funding and resources were shifted to allow a complete facility-wide fall hazard survey in less than one year. The goal of the survey was to identify and prioritize the hazards so that they could be abated in a systematic, logical order. While the survey was conducted with outside resources, employees were involved throughout the process. Employees who know the facility inside and out are best able to point out tasks that expose them or others to fall hazards. However, their familiarity with the tasks often causes them to overlook hazards, having grown accustomed to performing such tasks as a routine part of business.

As the employees became engaged in the identification process and temporarily stepped away from their daily activities, they quickly embraced the program's objectives. Once they realized that they had an opportunity to make a concrete improvement in the safety of their workplace, they become even more enthused. The result of this engagement was an extremely thorough survey that took reams of paper to catalog. While this amount of data can appear overwhelming at first, it allows for a rational approach to evaluating and controlling the hazards. The hazards can be ranked according to their risk, by combining the severity of injury with the likelihood of a fall so that those hazards that present the greatest risk can be abated first.

Working together

Another way to get employees involved in the program is to form a fall protection committee. At the Detroit refinery, a request was sent to all employees asking for volunteers to be on the committee. Having seen the management team's commitment to the program, the employee

response was outstanding. A group consisting of operators, maintenance personnel, engineers, safety, and foremen was assembled. The charter of the committee was to define a long-term plan for improvement using the recently completed fall hazard survey. Significant progress had been made in a short time, but no one expected all the problems to be solved overnight. The committee worked to establish an aggressive but achievable goal of permanently abating the most significant fall hazards over a five-year period.

Training

Training is another critical part of any program, and this fall protection program is no exception. Since adopting their policy and long-term improvement plan, formal classroom training for Authorized Persons has taken place. Going forward, the refinery has committed to reducing computer-based training in this area and is using formal classroom training in its place. Competent Person training for refinery personnel is also ongoing. Another aspect of training is the informal training that occurs as a normal part of the job. When the employees are involved in the program, they help one another do the right thing even when no one else is looking. This is the ideal that any Safety Supervisor dreams of.

The outline

OSHA has established the following core elements that are fundamental to any health and safety program:

1. Management leadership and employee participation
2. Hazard identification and assessment
3. Hazard prevention and control
4. Information and training
5. Evaluation of program effectiveness

While each specific program has unique issues that need to be addressed, this outline can and should be applied to any program, including fall protection. This outline is not a list of sequential steps that need to be followed in order, but rather it provides a logical way to organize all the various aspects that must be considered. This is the outline that has been implemented at the Detroit refinery.

Unexpected consequences

When Marathon decided to revamp its fall protection program, the goal was focused, logically, on fall protection. Significant improvements have been made in the facility's fall protection program in a relatively short time, given the size of the facility, its workforce and the complexity of the issues. Everyone involved is pleased with the progress, but no one expected the success of this program to have any impact on other seemingly unrelated programs.

Once employees saw and believed in the company's commitment to improving safety, they began adhering to previously established policies offering suggestions for improving programs such as

emergency eyewash and shower equipment, ergonomics, lighting and housekeeping. Consequently, employee morale has improved and a spirit of cooperation has emerged. Ideas that once might have been discounted as something that the safety department was forcing upon workers were accepted willingly. A prime example of this lies in the development of a safety program aimed at employee ownership of the safety process. The program is called DRIVE Safety (Detroit Refinery's Investment in the Value of Employee Safety). It uses many widely recognized tools used in the industry to foster a high level of involvement and ownership of the safety process. Ultimately, the goal of DRIVE Safety is to improve employee safety by eliminating at-risk behaviors, injuries and accidents. In years past, a program like this was viewed as a well-intentioned, but short-lived management initiative. However, due to the positive effects of other programs, employees took DRIVE Safety, made it theirs and made it work to their advantage.

This employee involvement has resulted in a 250% reduction in the OSHA recordable rate in just one year's time. It's true that many factors contributed to this improvement, but involving employees has certainly had a significant positive impact.

Conclusion

There is a Chinese proverb which says, "Tell me and I will forget. Show me and I may remember. Involve me and I will understand." The authors' experience at Marathon's Detroit refinery confirms the wisdom of those words.