

# increase profitability by incorporating a turnaround safety plan

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## Introduction

The cost, both direct and indirect that is incurred as a result of poor safety performance during a turnaround is often overlooked. This cost directly impacts the bottom line and can mean the difference between being under or over estimated budget cost.

A process was developed around the premise established in the Process Safety Management Standard established by Occupational Health and Safety Administration (OSHA) for Contractor Safety. In conjunction with the OSHA regulations, I.S.H. utilized the philosophies of the Business Round Table A-3 and A-10 Reports ("Improving Contractor Safety Performance" and "Improving Construction Safety Performance") and the CMA API recommended practice 2220 and 2221 ("Improving Owner and Contractor Safety Performance" and "Implementing a Contractor Safety and Health Program"). All of these practices were established with a run and maintain maintenance work status in mind, to be implemented over a long period of time. I.S.H., Inc. has compiled all of this into a process to meet the demands of a labor intensive, short duration time frame associated with turnaround activities. This article highlights the elements of this process.

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## Culture Shock

During pre-turnaround and actual turnaround activities any facility experiences a major culture change. A strong sense of urgency is created as a result of lost productivity and product sales. The need to get work activities performed and systems back on line in a safe, cost effective manner is of the utmost importance.

The facility is no longer in a run and maintain status. All activities from planning, material, expediting, establishing staging areas, and equipment preparation have a high intensity factor. Every person involved is placed in a high stress status with increased workloads. Many individuals are placed in positions that are out of their normal range of responsibilities and often perform multiple functions.

## Safety Effects

Due to economic status and current trends of small, more efficient maintenance contractor's workforce, a major adjustment occurs to meet demands of a turnaround. The utilization of specialty contractors to perform turnaround activities has become a growing trend within our industry. Whether the existing maintenance contractor increases his manpower or an outside contractor is brought into the facility, the results are the same. There are employees on site who are unfamiliar with the facility, its policies and procedures, the safety culture or the process. This inexperience can often affect the safety performance of these individuals.

In many cases, the total man-hours worked in a turnaround often far exceeds the average total man-hours a facility would work in an entire year. Many facilities have safety records that consist of years without lost time accidents or extremely low OSHA recordable incident rates.

## The Key: Pre-Planning

### Contractor Selection

The beginning factor for a safe and effective turnaround starts with the selection process of contractors to perform the work activities. This may entail utilizing the existing in house contractor with supplemental support or the outsourcing of specialty contractors. This selection process initially entails the completion and review of the facilities pre-qualification package, commonly called PQF. This will establish if the contractor meets the acceptable criteria for the facility.

Consideration must be made as to the contractor's turnaround experience. Many contractors have an excellent safety record but the majority of the work performed by the contractor is in the construction arena. The construction contractor is often not geared for the high level of intensity required during a turnaround. As to the contractor's turnaround experience, consideration must be given to the contractor's ability to man the job and his recruitment process.

The work performance of a contractor is only as good as the field supervision overseeing the work activities. Does the contractor have adequate experienced supervision to meet the job requirements? Many in house contractors promote from the rank craftsman to supervisor positions. The intent is that they are familiar with the facility, policies and personnel, which is an added value. Care must be given in this consideration. Just because a person is a great pipefitter or boilermaker does not necessarily make this person a good leader or personnel supervisor.

The contractor is required to provide skilled craftsmen to perform the turnaround work activities. As part of almost all PQFs this area is addressed in the craft verification section. Under the OSHA PSM standard this is also mandated. Careful examination of the selected contractor's craft verification process must be made, including spot checks of personnel throughout the course of the turnaround. ▶▶

### Work Scope

Safety and environmental issues must be established early in the planning process. This is above and beyond ordinary safety goals. Specific attention should be provided to the areas or tasks of the turnaround pre-established as critical path issues. Safety should enhance this endeavor not hinder. Facility safety and environmental staff should be actively involved with the planning department. As the critical path changes additional input should be sought from safety. Once a clearly defined scope of work is defined, safety planning can be incorporated to establish respirator, PPE or industrial hygiene issues that should be addressed with the contractors in the pre-turnaround phase.

### Safety Action Plan

To provide for the safe execution of a turnaround, a proactive approach should be utilized rather than a reactive one once a situation has arisen. To achieve this goal, a specific turnaround Safety Action Plan should be developed. This plan should address all issues from a safety standpoint that could directly impact the safe execution of work activities. Once developed, the plan should be disseminated to all contractors participating in the turnaround activities well before pre-turnaround activities commence. After a period of time for contractors to review the plan, a kickoff meeting should be held. Attendance to this meeting should be mandatory and should include contractor management and safety representation from both the company and field level. This provides both the host facility and contractors

the opportunity to be fully aware of the safety requirements and contractor expectations.

### Safety Procedures

In almost all facilities the safety procedures are written with routine run as maintain maintenance in mind. All too often these procedures are unfeasible to be utilized during turnaround activities. Safety involvement of policies and procedures in the pre-turnaround stages is critical. REMEMBER, under OSHA's Process Safety Management Standard, if a policy is written, it must be followed. This would mean that if practices or procedures are different during turnaround activities, written policy variances must be made following the company's procedure. Training of both host and contractor employees must be performed to these changes to avoid confusion and delays during turnaround activities.

### Foundation

In order to build upon anything, a strong foundation is required to support the load. Safety representation by contractors and host facilities is crucial not only in administration but in the field where the work activities are taking place.

In the event of an injury/illness occurring, onsite medical treatment is the determining factor as to whether an injury becomes an OSHA Recordable incident or a basic first aid. One method of achieving consistent medical treatment and documentation is through the use of a centralized contractor medical facility.

All facilities have policies and procedures for accident/incident reporting and investigation. In most facilities the distribution system is a lengthy process. The time frame from the incident to final notification is, in many cases, well over a week. During a 28-day turnaround this is unacceptable. Accident investigation should be used as a learning tool to prevent a reoccurrence of a similar situation. Prompt reporting and dissemination of information is necessary due to the small window of a turnaround. A method of rapidly disseminating this information is in the forum.

Every facility has established some type of a communication meeting with its contractor work force to discuss safety issues. This is often on a monthly or quarterly basis. During turnarounds this time frame is unacceptable due to the changes that occur daily. Planners and schedulers meet daily with contractors to review work progress. Contractors and host safety representations should meet in an open forum daily to discuss safety progress as well.

A viable tool that is utilized by many contractors is the job safety analysis (JSA). There are many names given to this item but the function and intent are the same. What is the task, how will it be performed, and what safety pre- ▶▶





cautions must be taken? In many facilities this is a mandatory function for routine maintenance but falls to the wayside during turnarounds. It is a perception that this is time consuming due to the number of jobs performed. The fact is, this function not only increases safety performance, but productivity as well. This is a result of the proper tools and equipment ready to perform the task safely and properly the first time, thus eliminating re-work.

#### General Issues

Employee morale is a hidden factor that affects productivity. A small factor can directly impact morale of an entire job site. A recent finding concerning rest room facilities for the work force indicates that the lack of rest rooms, poor locations, or cleanliness can directly reflect on employee morale as well as productivity. In conjunction with employee morale and sanitary issues, OSHA has specific regulations governing the number of facilities based on the work force size.

Due to the increased awareness of the effects of smoking many facilities have completely banned smoking on site. If your facility does allow this practice, policies should be established up front as to acceptable locations and times.

In the early 90's, drug testing of the workforce became a common occurrence to ensure a drug free workforce. In the present time, a different drug culture has come about due to drugs that are only detected for a short duration and the availability of agents to mask drug detection. Careful review and consideration should be made to address this issue in the pre-planning stages.

#### Personal Protective Equipment

Safety involvement planning with regard to contractors personal protective equipment (PPE) must be established once a defined work scope has been identified. The requirements for additional PPE for specific jobs, areas or conditions, need to be communicated to contractors in

advance. Lost productivity can result from a lack of proper PPE being available on site. In addition to the lack of PPE., OSHA regulations also require site specific training prior to use. In some cases, such as respiratory, medical testing/certification and fit test must occur prior to use.

#### Scaffolding

During turnarounds scaffolding is always an area of specific emphasis. The recent changes to the OSHA regulations have a direct impact on scaffolding during turnarounds. These items need to be addressed with the scaffolding contractor as to how he plans to meet compliance.



#### Electrical

The electrical design of an operating unit does not encompass the availability of electrical outlets to meet the needs of a turnaround. Temporary power sources and locations are established to meet this demand. Verification of circuit grounding is an issue of concern. Many facilities require the use of ground fault interrupter (GFCI). Caution must be given to unauthorized or untested sources of power such as welding machine and light plants.

In addition to the use of GFCI's, it is recommended that contractors be required to implement an assured equipment grounding conductor program. This will afford the additional protection necessary. A single designated color coding system should be established for all contractors. This will provide for a quick visual account of equipment inspection prior to use within your facility.

#### Barricades

As with most facilities during turnarounds, barricades become a nightmare. Barricades are necessary for specific tasks but removal after completion is the problem. This results in employees ignoring barricades due to the number of unnecessary barricades left in place. As part of the plan, specific color designations should be established based on tasks and a system for identification and removal.

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### Blinding

Coordination with operations is essential to provide for equipment preparation and isolation. A clearly defined blind list should be established and communicated. Due to the numerous work activities taking place by multiple contractors continuous re-verification should take place throughout the duration of the turnaround.

### Lifts

During the course and scope of a turnaround, numerous tasks require the use of mechanical lifting assistance. This can range from a simple lift utilizing a Drott to a significant lift utilizing an 800-ton crane. Regardless of the lift size, all lifts have a potential for mishaps to occur. A review of the facility's policies regarding lifts should be examined to ensure it will meet the needs of a turnaround. A clear definition should be established as to what constitutes a critical lift and what participation is required to perform the lift.

### Confined Space

Confined space entry is a necessary task associated with most turnaround activities. Any time entry is made into a confined space the potential for an incident occurring is increased. When an incident occurs within a confined space, the magnitude of response is greatly increased. Rescue personnel or services needed to be addressed to verify that adequate coverage is provided as long as entry is taking place. In conjunction with rescue personnel, each confined space must have a rescue plan. Most facilities have rescue plans in place for each entry. During the course and scope of work activities these plans may no longer be acceptable. A review of the scope of work should be made and involvement with the rescue captain to determine if revisions to the rescue plans will be required.

OSHA standards are specific with regards to confined space entry. A review of the standards should take place and a means established to verify the contractors training programs as to entry supervisor, entrant and attendant. The host facility has the responsibility of reviewing the Material Safety Data Sheets and establishing a hazard recognition so that employees performing work activities in confined spaces may be aware of the signs and symptoms of over exposure.

### Training

The action plan should address the training requirements for the facility. This should be clearly defined as to who will provide what and what is required. The plan should

include what documentation is expected to be maintained on site, on the employer or available for review upon request.

### The Bang for the Effort

The Bureau of Labor and Statistics has established that the National averages for SIC code 17 for OSHA Recordable and Lost Time Rates are:

OSHA Recordable	12.8
Lost Time Frequency	5.8

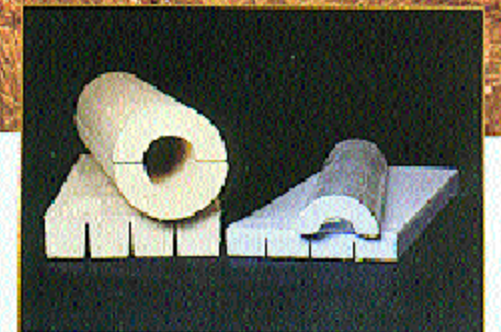
These rates are based on specialty contractors. It has become an acceptable presumption that turnaround activities generally fall into this classification. With these figures in mind, this plan of action has been implemented on nine (9) major turnarounds across the country. During the initial stages a learning curve was established to fine tune the information provided here. This effort has resulted in a combined contractor safety performance for the nine (9) turnarounds of:

Total Man Hours	OSHA Recordable Rates	Lost Time Rates
6,825,760	1.93	0.38



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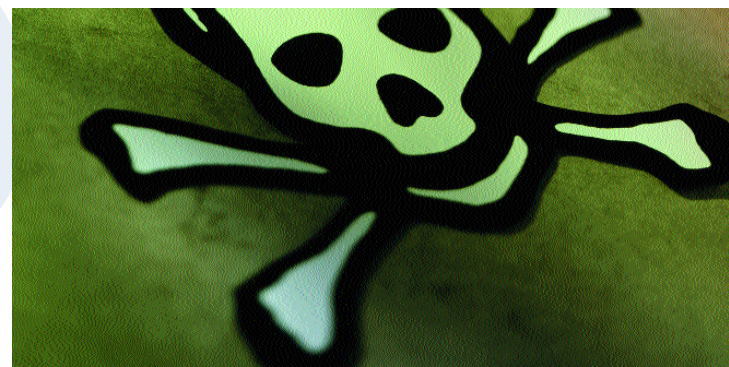


The average hourly billing rate experienced by the facility was \$31.35. This figure is relevant in calculating savings experienced by the facility. The Business Roundtable established tangible extrapolations that can be recognized during its A-3 Report concerning construction industry cost effectiveness. The A-3 report projects that the average cost of labor is approximately equal to material for an estimate of the total project cost. The A-3 report continues on to state that if, through an effective safety program significant reductions can be experienced, this can be correlated to approximately a ten percent (10%) direct savings to the project. It is felt that with an OSHA recordable rate of 1.93 vs. 12.8 and a lost time frequency of 0.38 vs. 5.8, this can be considered a significant reduction. Utilizing this principle, the total net savings experienced by these facilities were approximately \$42,797,515.20.

Man Hours	6,825,760
Avg. Labor Cost	\$31.35
Total Labor Cost	\$213,987,576
Approx. Cost of Material	x 2
Total Project Cost	\$427,975,152
CICE A-3 Reduction	x 10%
Savings	\$42,797,515

Through these concepts an additional extrapolation can be calculated to recognize an additional savings by the implementation of an effective safety program. Utilizing the BLS statistics for the man-hour work, approximately 437 OSHA recordable injuries and 198 lost times should have occurred based on the total man-hours worked. When compared to the actual injury data experienced this was a reduction of 371 OSHA recordables and 185 lost time injuries.

	Reductions	
	OSHA Recordable	Lost Time
BLS National Average	437	198
Actual	-66	-13
Difference	371	185



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In 1995 (latest dollar value known) the National Safety Council Accident Facts published that the national average cost per OSHA recordable was \$990.00/case. This figure indicated the value of goods or services each worker must produce to offset the cost of a work injury. This does not include the cost of the working injury. The report continues on to state that the national average cost for a disability injury (lost time) is \$29,000/case. This figure includes the estimates of wages, losses, medical expenses, and employer costs, but excludes property damage to motor vehicles. Utilizing these figures and reductions of injuries below national average an additional \$5,732,290 has been experienced by the facilities.

Cost Savings		
NSC Avg. Cost	Recordable \$990	Lost Time \$29,000
No. below Nat. Avg.	x371	x185
Net Savings	\$367,290	\$5,365,000
<b>Additional Total Savings</b>	<b>\$5,732,290</b>	

When these figures are combined, this provides for net savings of \$48,529,805. Therefore, incorporating safety into planning and execution of a turnaround will provide a safe and incident free turnaround as well as increase cost effectiveness and profitability.

Harry Keesing is the president of Industrial Safety and Health, Inc. (I.S.H., Inc.), a safety service company specializing in turnaround safety support located in Metairie, LA. He has been involved in the health and safety field for over 26 years. He is a Board Certified Safety Professional and a professional member in the American Society of Safety Engineers.



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