CRISP™ A New Theory For Managing Safety In The 21st Century

By Thomas A. Smith

Introduction

Although command and control is the preferred management method of most U.S managers it has been losing its influence and effectiveness since the 1970's. There were plenty of warning signs it was on the wane. Back then American industries were just starting to feel the effect of foreign manufacturers who were making products that cost less but had equal or higher quality. They responded by copying what they could see instead of seeking to understand what was really going on. A paradigm shift was moving management away from command and control toward continual improvement.

By the 1970's companies were learning about the competitive advantage they could gain by leveraging the mental as well as the manual labor of all its employees. In command and control management hourly workers are not asked or required to think. Thinking is reserved for management. This environment quickly eliminates any mental motivation on the part of the hourly workers.

Companies that understood the competitive advantage of quality and continual improvement quickly realized the necessity of a motivated workforce. Hourly workers jobs were no longer just to "punch in, catch hell and punch out." To compete companies were starting to understand they would have to use the brains of the hourly workers to capture data and make decisions previously reserved for supervision. Middle management jobs began to disappear.

Safety retains the status quo

About the time command and control was starting to lose its stature in the management arena, safety management was solidifying around it. On December 29, 1970, President Richard M. Nixon signed ***The Occupational Safety and Health Act of 1970***, also known as the Williams-Steiger Act. It became the ultimate endorsement for using command and control to manage safety. Since the enactment of OSHA the primary responsibilities and activities of safety departments is to ensure companies comply with OSHA or other safety regulators.

We now understand the effects command and control has on the culture in a company. Managers become overconfident in the system of hierarchy and bureaucracy and believe it is the best and only way to run a business. It produces similar hubris for safety. One of the most glaring and tragic examples of this is the Columbia space shuttle accident. The findings of the Columbia Accident Investigation board states:

> *In the Board's view, NASA's organizational culture and structure had as much to do with this accident as the External Tank foam. …. Given that today's risks in human space flight are as high and the safety margins as razor thin as they have ever been, there is little room for overconfidence. Yet the attitudes and decision-making of Shuttle Program managers and engineers during the events leading up to this accident were clearly overconfident and often bureaucratic in nature. They deferred to layered and cumbersome regulations rather than the fundamentals of safety.*[1]

Although workers in a typical manufacturing operation don't face the type of danger associated with the space shuttle the safety system they use fails them in the same way. It's been almost thirty years since the space shuttle Challenger accident. Even though NASA was warned about the problems with its culture after Challenger, they were not able to change it which led to the Columbia accident. Today command and control remains the dominant culture for safety, not only at NASA but for most companies in the U.S. The aim of this article is to present a compelling argument for the need to abandon command and control and apply continual improvement management theory to safety.

Job dissatisfaction vs. motivation

In his 1968 Harvard Business Review article Frederick Herzberg enlightened us with his two-factor theory about what really matters when it comes to having motivated employees. He pointed out you can move people, get them to do what you want, by any number of methods; ask them, tell them, train them or give them a KITA. He explained the difference between negative and positive KITA. When you are on the receiving end of a positive KITA you are participating in a form of seduction which makes you a party to your own downfall. [2] (Basically this is what happens during an accident investigation when the injured employee is reminded they didn't follow a company safety rule and their individual miscue was the primary cause of the accident. In reality compliance with the safety rule may have little or nothing to do with the real reason the accident happened.)

Herzberg recognized the distinction between moving and motivating people. You can make a dog move by kicking him. But if you want him to move again you must kick him again. Motivation exists when a person does something because they want to do it. They don't need any outside or extrinsic stimulation.

The following table presents what he said were the top six factors causing dissatisfaction and the top six factors causing satisfaction on-the-job, listed in the order of higher to lower importance.

Motivator factors. These things lead to satisfaction at work – For these to work they must be found in the job content. (Psychological growth)

- Achievement
- Recognition for achievement
- Work itself
- Responsibility
- Advancement
- Growth

Hygiene factors. These things at work lead to dissatisfaction – extrinsic to the job (Biological needs to avoid pain from the environment)

- Company policy
- Supervision
- Relationship with boss
- Work conditions
- Salary
- Relationship with peers

Safety and job dissatisfaction

Herzberg's research showed the hygiene factors were the biggest contributors to dissatisfaction with the job and the motivator factors had the most to do with creating job satisfaction. When you consider the fact safety management is administered and managed primarily through the hygiene factors it is easy to see why managing safety causes a lot of job dissatisfaction. It starts with company safety policies that rely heavily on command and control methodology. Employees are expected follow safety rules explicitly and may even have to sign a document stating so that is placed in their personnel file. From that point on employees are responsible for their own safety. If they don't follow safety rules they can be reprimanded and even fired.

Additional job dissatisfaction is created through administration of safety by supervision. Most of this effort is directed at improving employee safety behaviors using extrinsic motivation. Supervisors are required to administer and enforce safety rules and regulations on their subordinates. (Subordinate is a term that by itself can cause job dissatisfaction.) The methods can reach a point of absurdity when supervisors hold employees accountable for things the employee can't control, like monotony of the job that leads to boredom and inattention to details. Or poor quality of safety training that results in the employee forgetting or not knowing how to handle a situation to ensure it is done safely. Or poor ergonomic design of the work process that leads to strains. Workers can obviously become very dissatisfied in these circumstances. Safety can drive a wedge between management and hourly workers when proper when housekeeping and maintenance is neglected or attention is not paid to controlling or eliminating safety hazards workers point out to management.

Herzberg said the opposite of job dissatisfaction is not job satisfaction but *no* job dissatisfaction. In other words just taking care of basic safety management (hygiene) issues will not create a highly motivated and satisfied workforce. It will just put things back to neutral. Motivation is almost always an inside job stemming from intrinsic motivation

on the part of the individual. Peter Scholtes went so far as to say management's biggest conceit was its belief it can motivate workers – they can't. But managers can de-motivate workers. Especially through blind application of hygiene factors at work.[3]

How safety de-motivates employees

Dr. Deming was fond of pointing out the most important numbers in business are unknown and unknowable. He was talking about the impact of the system where the correlation between cause and effect is hidden and difficult to prove. The following are more things in command and control management we can't produce numbers for yet they impact safety in negative ways. These things end up frustrating workers to the point it could be said they are de-motivated.

→ Ultimately everything is about controls. The most important things become what management wants measured. That means things that can't be measured easily won't receive any attention and things that can will receive too much. For example, getting people's cooperation for thinking and solving safety problems requires a great deal of effort by management. But it is not easy to measure this so it doesn't happen. When the ultimate goal of management is to control people, worrying about how they think is not important. Instead management devises ways to create numbers for things that can be observed such as "unsafe" or "at risk" behaviors which are not causes of accidents but symptoms (outcomes) of poor safety management.

  Eventually workers come to accept that their ideas and opinions about safety aren't required or allowed by management. The need for workers to think about safety on-the-job is eliminated. People end up working without thinking. We call this *malicious obedience*, where workers do exactly what they are told, nothing more and nothing less. It becomes the norm in daily routines. If by chance a worker is involved in an accident management rebukes them for "not thinking." In fact the system, commonly known as the culture, prevents them from thinking about things on the job. That is reserved for management.

→ Safety standards are developed primarily to control what workers do and they are not to be tampered with. (Try to change an OSHA regulation or a company safety rule.)

→ Ultimately the major portion of responsibility and accountability for safety is thrust upon the workers. (How many times have you seen a safety poster exclaiming, "Safety is just common sense!" or "Safety is up to you!" or a similar message?) Workers understand the absurdity of these kinds of statements and lose respect for management.

→ For years managers have been taught and deep down inside believe the major cause of accidents are unsafe actions and at risk behaviors of workers.[4] Consequently, even when there are obvious safety problems on-the-job workers are not allowed to change how work is planned or performed. So while management applies systems thinking to other management functions such as quality, production, sales and maintenance it retains an event focused command and control mode for safety. This creates *organizational schizophrenia*. On one hand workers are encouraged to improve things that affect quality but when it comes to safety they are told little or nothing can be done.

→ Non-systems thinkers by default blame people for things that go wrong. It's true unsafe actions and at risk behaviors happen every day but it's not because workers voluntarily set out to do them. (In fact workers have a built-in self presentation bias not to get injured on the job.) By default these managers view workers as *the* reason for any kind of safety problem. More respect is lost for management.

→ Systems that focus on controls foster short term thinking with no thought about long term effects. The larger purpose of safety in the organization is forgotten i.e. working safe isn't just about today but into the future. This creates conflict between production and safety. Any supervisor will tell you that if forced to make a choice of production vs. safety, production will win almost every single time. This mindset permeates engineering, purchasing and sales. So management may say safety is the number one priority but in reality it is much lower on the "what's important" scale.

→ When measureable controls and goals are stressed but they are not realistic, such as "0" accidents, workers, managers and departments will fabricate results to stay out of trouble. If the pressure is large enough people will be dishonest about things and "cook the books." (There is plenty of evidence this takes place but I felt it was better to protect the innocent rather than cite them in this article.)

- → If controls are violated or not met a CYA mentality results. When a safety inspection or an accident investigation results in violations being discovered people tend to point fingers or place the blame somewhere else. In this system people work to save their own skin not to cooperate for the greater good of the company and the employees. This type of culture remains long after the last safety inspection or accident investigation takes place.
- → The worst thing about command by control for safety is the more rigid the safety controls are the more prevalent fear is in the organization. Nothing good comes from working scared. Especially when management uses fear instead of knowledge to react to a safety problem.
- → Command and control prevents the organization from focusing on anything that does not satisfy management. That includes paying attention to the real and important needs of its safety customers. The most important things for a safety director become meeting the goals of control, i.e. safety laws, regulations and the Voice of the Boss. The fact is all work systems have both internal and external customers. Anyone that benefits from a product or service is a *customer*. The first and foremost reason safety exists in a company should be to benefit the workers. They are *the* most important customers of safety. Just meeting safety specifications or pleasing the Voice of the Boss does not guarantee the job of every worker is "safe." Command and control does not recognize or acknowledge safety customers even exist.

The point is command and control safety management with its emphasis on hygiene factors results in a lot of job dissatisfaction. To be more effective safety management must change this. It will have to pay more attention to the motivators that lead to job higher job satisfaction, growth and ultimately safer operations.

Being able to have people come to work and not be injured should not be viewed as a major achievement on the part of management as is done now when plants post their safety record for everyone to ponder. Can you imagine an airline proudly posting the number of days since its last crash at its check-in counters? Being safe on the job is a fundamental issue for management and should lead to high job satisfaction. All employees should expect to be able to come to work, perform their jobs and go home without being injured. The fact is all human beings have a built-in drive to avoid any kind of pain from the environment which aids management when it comes to managing safety fundamentals. The problems then becomes: How can we manage safety so managers and hourly workers can apply their intrinsic motivation to solving the complex problem keeping accidents at absolute minimums?

Two theories: two different outcomes

The answer to this complex problem lies in how safety is managed for which there are basically two choices; command and control or continual improvement. These two distinct theories of management have different approaches and assumptions about people and how they work in a system. Some people believe you can combine the best elements of each ending up with a hybrid management system. This hasn't worked because when it comes to people there are two elements of the theories that can't be reconciled.

The first is the matter of trust. Command and control was developed primarily because management didn't trust the ability of "subordinates" to do their jobs correctly unless they were watched and monitored by their "superiors." Consequently the system is arranged in the organization chart to designate the chain of command showing exactly who is in charge and how much authority they have. This theory implies employees cannot be left to their own devices. They cannot be trusted to do things correctly or safely. Hence it is the duty of management to check on employees or set up controls to ensure they are behaving properly by following company policies, rules and regulations. This theory was easily adapted to safety.

The other element is the factor of "thinking." In command and control all of the thinking about how the job is to be done is reserved for management. This concept was solidified by Frederick Taylor when he created scientific management in the 1890's. It resulted in the white collar think and blue collar do approach to management that is practiced in various forms to this day.

Command and control management results in the *division* of manual and mental labor. The basic assumption is management oversees the workers who are to do what they are told. It works quite well for mass production if there is a low emphasis on quality and calculating profit is just a matter of adding how much is desired to the cost of making the product. But when quality is the driving feature of the product and profit is determined by how well costs are reduced it fails miserably. In this world the market determines the price. That means to increase profit and

stay competitive you must constantly be looking for ways to reduce costs. You must learn how to manage to achieve continual improvement which requires the *synthesis* of manual and mental labor. In this world, employee accidents are the worst form of scrape. If an employee is injured you are taking the mental as well as manual labor out of the job.

Continual improvement management requires everybody in the organization be on a daily productivity hunt to reduce all forms of waste, scrap, rework and employee accidents. This means everyone in the company is simultaneously a supplier or a customer in the operations. From the start to finish all processes are linked together in a supplier – customer relationship. Two things are a given in continual improvement. First, management and employees have to trust each other. Second, everyone in the organization must apply their mental abilities to study and improve all phases of the system. Everyone must think.

CRISP™ - Continual Renewal and Improvement and System/Safety Performance

> *When there are problems, or performance fails to live up to what was intended, it is easy to find someone or something to blame. But more often than we realize, systems cause their own crisis, not external forces or individual's mistakes*. Peter Senge

> ***Dr Deming****: I ask people in management what proportion of this problem arises from your production worker. And the answer is always: All of it! That's absolutely wrong. There's nobody that comes out of a School of Business that knows what management is, or what its deficiencies are. There's no one coming out of a School of Business that ever heard of the answers that I'm giving your questions—or probably even thought of the questions.* From the NBC White Paper – If Japan Can Why Can't We?

To be effective in the new economy requires a transformation of the way we manage. A new management model of continual improvement is evolving. It addresses the issue of trust and application of the mental labor of all employees by facing these issues in constructive ways. Continual improvement is required to propel the success of business.

Most managers agree there are serious problems with using command and control management for safety but then ask, "What's a better alternative?" The answer is continual improvement. We've seen how it outperforms command and control for quality. It's time to use it for safety.

Continual improvement management is not new. We have been trying to use it since the 1970's when we were introduced to competition from the Japanese. By the 1980's major quality gaps were realized in every sector of manufacturing from air conditioners to automobiles to copiers.[5] In response to this many new quality management methods were developed such as Total Quality Management, Lean manufacturing, Theory of Constraints, Re-Engineering, Zero Defects and Six Sigma just to name a few.

They are now seen as fads but each one has made their mark on the management landscape. Companies ended up picking the parts of them they liked or understood so they could compete. They all had one thing in common. They were designed to help managers abandon command and control methods and implement continual improvement.

CRISP is a comprehensive, disciplined yet flexible management system. It was developed because command and control limits managers' and workers' ability to improve any operation. CRISP recognizes the need to pay attention to the system and internal and external safety customers. Results are achieved by continual application by teams of the Check, Plan, Do, Study and Act cycle to solve systemic safety problems. It creates a culture which encourages and enables employees to improve quality, productivity and safety every day. Adopting CRISP as your management theory puts everyone in the organization on a daily productivity hunt. CRISP creates enthused, engaged and empowered employees. It creates a culture where people have a meaningful place to work.

Elaboration of the terms

The following is a more complete description of the elements of CRISP

CONTINUAL means a steady repetition over and over again. Most people use the term "continuous improvement" without thinking about what it really means. There is a subtle but important distinction between continuous vs. continual. "Continuous" means something happening without interruption. For example there is a continuous flow of water over a water fall. The word "continual" is defined as a close prolonged recurrence, happening over and over, regularly. An example is … a blinking light. Think about your efforts to improve quality, productivity and safety. They are continual not continuous. No company I know of works on quality, productivity or safety improvement 100% of the time. If they did that would be continuous and nothing else would get done.

The fact is employees need to spend most of their time working. They work intermittingly on improving the quality and safety which is on a continual basis. There is nothing you can do about it because ultimately work is what you get paid for. On the other hand quality events such as improvement projects, quality circles and stopping the line happen repeatedly over time. In other words your improvement efforts are on-going versus non-stop. The results are continual improvement of quality, productivity and safety and there is nothing wrong with that.

Work is designed to be continuous but it never really turns out that way. There are always interruptions for meetings, down time due to problems, accidents, etc. We'd like safety designed into the process beforehand so we wouldn't have to worry about it. But even if it is processes are subject to variation and degrade over time. This takes place on a daily basis. This means there will always be problems, including safety problems, happening in the system. Even if safety was designed up front before production started there will be problems over time. That is why we must have continual improvement of safety.

RENEWAL means the act of renewing which is to restore or re-establish on a new, usually improved, basis. This will require managers and workers trust each other. Command and control was created because management believed workers could not be trusted. Trust will be the first thing to be renewed between management and workers. It's like the old saying, if you think you have won or lost you are probably correct. If management believes in its workers they can be trusted. If management doesn't believe in workers trust will not exist.

How many times have you been involved in a new quality or safety program only to see it fade away or be rejected and replaced when a new manager takes over? Often the new approach is based solely on the personality or bias of your new boss. Workers call this the flavor-of-the-month. People in your organization must know why safety exists and be able to identify what it stands for. You have to be careful not to reject something just because it is new and different. The only way to improve things is to try something new and different. Risk and hazards will always exist. People must be given freedom to decide how to respond to what's going on around them and change things so they will get better, not deteriorate. When freedom is given in this way people work to achieve control over a process.

Managing for continual improvement also requires renewal of the mental and manual labor of everyone in the company. Managing for continual improvement every day requires discipline and hard work. It's hard for managers to allot time to work to let people work on the system and still keep up production. (I've heard this described as trying to change a flat tire on your car while you keep traveling at 30 miles per hour. Not a very easy task.) It means you are open for business during renovation and it goes on every day.

There will always be starts and stops to improvement efforts and this is frustrating. But people thrive when they work intensely on things they enjoy. They take pride and joy in their work. To make this happen you must create a positive, constructive culture in which people can renew their efforts, ability and energy every day. It isn't enough to improve your processes. You must learn how to balance improvement efforts with production and there is no simple formula for doing this. Your people must also be renewing their individual skills and ability to think and solve problems. It is easy to do this once a year but very difficult to make it part of your daily work routine. Education is a life-long proposition.

IMPROVEMENT means to make things better than they were before.

No matter what your present level of quality, productivity or safety performance is, it can always be improved. This includes things you do for safety such as training, communication, learning and promotion. There is always a better way. To improve you must know how your system is doing now then strive to find ways to make things better in the future. In the new economy just meeting specifications is no longer "good enough." You must work to make your processes operate with minimum variation from the target and fit with your other processes so your system is optimized.

SYSTEM is defined as interdependent components working together in a cooperative manner to accomplish a purpose. SAFETY means to be free from harm when working in a system.

People must learn how to study and improve systems. To study and understand a system you must employ *systems thinking*, so you can see what is going on. Most people employ single event thinking with painstaking accuracy but this ability is not that useful for understanding systems. We've been taught that to understand what goes on in a process you should separate and isolate individual pieces of the whole. When you do this you pay the price of losing the ability to determine how parts of the system work together and affect each other. A system cannot achieve high productivity without high quality and high safety. You will have to learn how to observe a system to be able to see what is going on in it to make improvements. You will have to visualize how things are connected even when it is not obvious.

Most people think a system, like a machine shop or a hospital, is the sum of its parts. They believe if every person would just do their best the system will work at maximum efficiency. This way of thinking worked quite well in the past. In simpler times it was all that was required to understand and manage how work got done. Systems thinking helps you fit the local situation with the purpose of the organization. The total outcomes of a system are defined by its characteristics and the product of the interactions of its parts not just the sum of its parts.

Systems thinking and safety go hand in hand. A system must be made safe or it will cause harm to the people who work in it or around it. Deming was one of the few who pointed out all systems will produce accidents. [6] This statement contradicts traditional safety folklore which surmises just the opposite that all accidents can be prevented. When looking at an accident after it happens it is easy to support this statement and some operations have achieved commendable safety records. But every system eventually will experience some form of an accident.

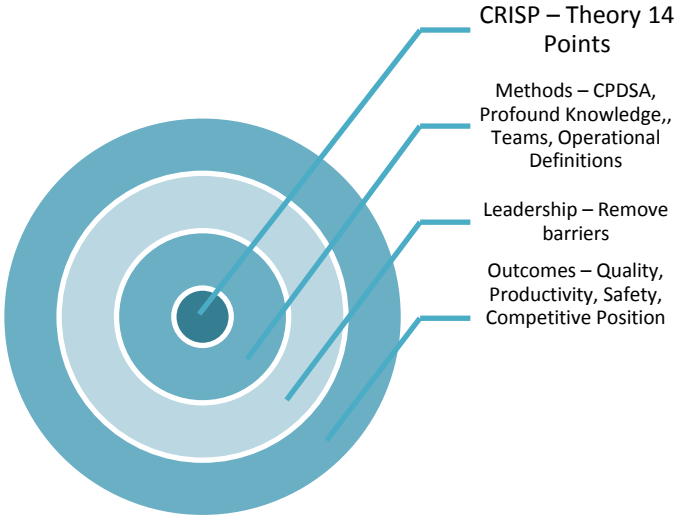
Ultimately the goal of continual improvement is to keep accidents at an absolute minimum. Consequently you must pay attention to the system all the time. Systems do not improve by themselves. They will always be susceptible to variation which means over time things will go wrong. A system that is not safe cannot accomplish its intended purpose. There will be accidents some of which could be serious. There will also be the hidden impact of poor safety in the form of lack of respect for management, low morale and a negative culture. To counteract this you should work to have a self correcting management system designed to improve the safety of your processes and keep them at a higher level. Ironically the best way to achieve this kind of control is by giving employees the freedom to study and act on the system which is contrary to the theory of command and control. Management cannot do this on its own.

PERFORMANCE means what is accomplished by both outputs and people in the system. You must learn to view performance with some understanding of statistics. What do the numbers or data truly mean? You must learn how to use them to react appropriately when the system and processes aren't doing what you predicted.

CRISP as a system

The picture below shows how CRISP functions as the central theory for a system to manage safety. CRISP is the center circle and provides the theory for people to manage using the principles of continual improvement. The next circle shows some of the tools and methods people will use to study and improve the system. The third circle addresses the need for leadership to remove the barriers in the organization that prevent the use of the theory, teams, tools and technology to work on the actual processes in operations. The outer circle depicts the outcomes affected by what happens in the inner three circles. The aim of the CRISP system is to ensure the work system is safe as opposed to making workers behave a certain way.

The 14 Points applied to safety



Dr. Deming created his14 points to provide a theory of managing for continual improvement.[7] Managers who have worked at adopting his theory say it is the hardest thing they have ever done. One reason; it is almost the complete opposite of what they have been taught and what they believe works. Besides being counter-intuitive it calls for experienced managers to start a new learning curve.

Take variation for example. Command and control managers look at variation and believe it is their job to react to every single data point as being either good or bad. It is difficult for them to comprehend the fact that variation from one point to the next may mean nothing at all. This knowledge is essential for managing safety. In command and control variation in the number of accidents is always interpreted as good or bad. An absence of accidents is automatically interpreted as a positive. An increase in the number of accidents is always considered a negative. If the process is stable the variation may mean nothing at all just the result of common cause variation.

It's worth repeating here the most important numbers for management are unknown and may be unknowable. Obviously visible numbers are important. But if you make all of your management decisions based only on the visible figures (money) your company will soon be out of business. The American automobile industry is most glaring example of management making this mistake.

Where are the numbers for the lack of poor morale or lack of respect for management by the workers when employees are injured on the job? We have yet to figure out a way to present any kind of exactness for the hidden costs of workers injuries that means something to top management. Without these numbers the consideration of worker's safety is just an afterthought. What kind of figures are produced to show the relationship between all of the causes in a system that result in things that go wrong and result in an employee injury? Where are the numbers that show how poor supervision results in higher number of employee accidents? These numbers don't exist yet these problems are real and they must be managed.

Most managers and supervisors don't know that if a process is in a state of statistical process control action taken on a defect will usually be ineffective and may cause more trouble. Yet this is exactly what is prescribed by command and control safety management. These managers believe they are practicing continual improvement by intensifying their investigation of every single accident. They are just covering up their own mistakes of not fixing what is wrong in the system that causes accidents.

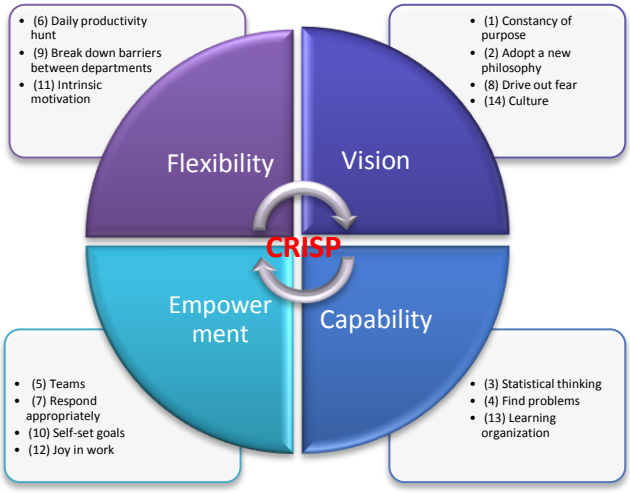
A new theory is required to counteract this line of reasoning, to study the processes that deliver safety and fix the system so the average number of accidents is continually reduced. The primary focus of command and control safety theory is on changing employee's actions so they will follow safety rules and regulations. This approach cannot and does not deliver continual improvement. The theory behind the 14 points is to improve outputs of a system by improving what is going on in the system. There have been numerous real-life examples of companies that have applied this theory and reaped the benefits. (Ford Motor Company in the 1980's is the most prominent example.) [8]

It would be irresponsible not to adapt the 14 points to safety management. They are not a recipe. You should not treat them as a *to do* list. They represent a way of thinking. A philosophy you can apply to help you improve your safety outcomes. They are the core values of a new culture. They are not a "safety" culture but will create a culture in which safety is given proper attention.

1. *Create a constancy of purpose for continual improvement of safety in all company operations. Safety doesn't stop and start depending on how many accidents you have had recently.*

2. *Adopt the new management philosophy of continual improvement for safety. Eliminate the need for command and control.*
3. *Cease dependence on mass safety inspections or any after-the-fact activity to accomplish safety.*
4. *Find problems by listening to the Voice of the Customer for safety and focus on how to get it into your systems.*
5. *Learn how to develop, manage, employ and empower teams for decision-making (consensus) and problem-solving of systemic safety problems. Systems cannot manage themselves.*
6. *Provide leadership instead of managership of safety. Do this by working constantly working to remove barriers around the workers that prevent them from improving safety in daily operations.*
7. *Respond appropriately. When safety problems are exposed take appropriate action. Learn how to indentify common and special causes and how to handle them.*
8. *Eliminate the use of any type of fear to motivate people to work safely.*
9. *Break down and remove barriers between departments that prevent good safety management. Foster cooperation not competition between departments.*
10. *Allow employees and work units to set their own safety goals. Remove structural barriers to achieving* them.
11. *Eliminate the dependence or use of extrinsic motivation such as safety slogans, posters, cheerleading and goals set by management for the work force. Seek ways to ensure all employees can contribute to the success of safety performance.*
12. *Seek always to instill pride and joy in work when it comes to eliminating accidents.*
13. *Institute a vigorous program of educating and retraining everyone on how to obtain and apply profound knowledge and critical thinking to safety problems.*
14. *Work daily on creating and sustaining a culture throughout your organization that will push on the above 13 points every day.*

These 14 points cannot work in a vacuum. If you try to apply then using the command and control model they will fail. The elements of the command and control model are: Plan, Organize, Implement, Monitor and Control. A new business model is required for 14 points to be effective. The elements of the new business model are: Vision, Capability, Empowerment and Flexibility. These four elements with the 14 points that apply to each one is shown in the diagram to the right.



CRISP business model and the 14 Points

The business model and the 14 Points are necessary because when it comes to safety the command and control theory is not adequate. At best it can only try to maintain the status quo. At its worst it masks its inefficiencies by surreptitiously placing most of the responsibility for safety directly on the workers.

Safety management requires leadership at all levels in the organization. To allow this an organization must have:

- Vision for what needs to be achieved and what methods will be used
- Capable processes to please internal and external customers
- Empowered people to run and improve the system
- Flexible methods to handle the problems that will happen every day

The 14 Points define the characteristics of a process improvement system focused on taking care of internal and external safety customers. When combined with profound knowledge they will make CRISP a reality.

Profound knowledge

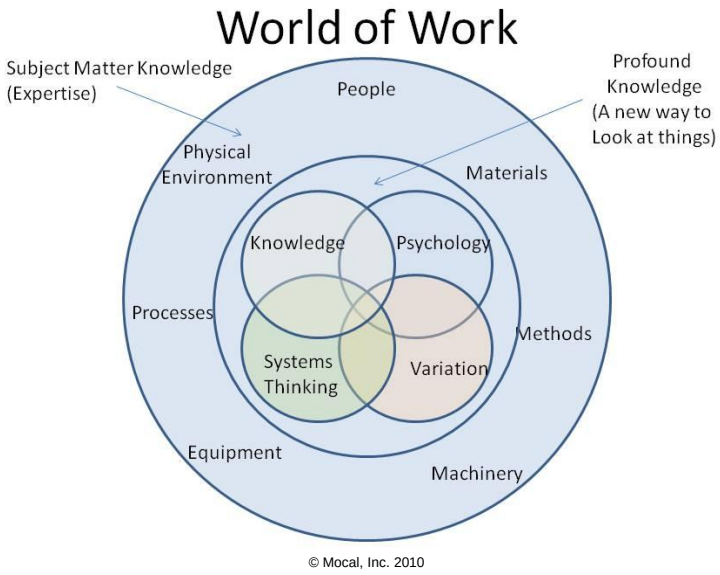
Any fool can know. The point is to understand. Albert Einstein

Dr. Deming believed that to gain a better understanding about a system you need to acquire and apply what he called profound knowledge.[9] Profound knowledge creates a lens to help you observe what is going on in the world with a new perspective. One that can take you to a higher level of understanding of how to improve what you are observing. Profound knowledge has four elements. They are:

→ **Knowledge**. How do you know something for certain? To have knowledge requires you can confidently predict the future. In safety management how can you make predictions what you are doing will stop accidents in the future? You obtain knowledge by testing your theories about controlling or eliminating hazards through the constant application of the Check, Plan, Do, Study and Act Cycle. Most people believe safety can be achieved simply by applying a good dose of common sense. But common sense in and of itself is unsystematic. It has its place but it is not useful when you are trying to learn "why" things happen. To do that you must develop a theory so you can test and compare things to see if what happens is the same as what you predicted. The only thing worse than relying solely on common sense to manage safety would be to not use our ability to study and understand "What causes accidents?" and how to reduce or eliminate them from the system.

Things we must learn:

- Knowledge about the theory of learning
- Knowledge about interpreting data
- Knowledge about tampering with a stable system
- Knowledge of learning and teaching styles
- Knowledge about the losses from competition
- Knowledge of the sensitive dependence of initial conditions (Chaos theory applied to safety training)



→ **Psychology**. Psychology is the science to study and learn about how people interact with each other under different circumstances. It helps you understand that people learn and are motivated in different ways. Everyone has intrinsic motivation to do good work and be safe. Command and control relies on the psychology of extrinsic motivation to control or motivate people commonly referred to as *behaviorism.* In this psychological theory the ability of human beings to think is denied or ignored. For behaviorist the only thing that matters is what's observable.[10] CRISP depends more on the field of cognitive psychology which recognizes the existence of the human mind and intrinsic motivation. All people possess the intrinsic motivation of not wanting to be injured at work. This theory recognizes a style of thinking called "achievement" which balances the need an individual has for personal satisfaction with the concerns for other people and tasks. The five elements of achievement thinking are[11]:

- High standards of excellence. The higher level of achievement a person desires the more they focus on excellence. Normal people desire a high level of safety. Excellence for safety requires people think about what they are doing and how they are going to do the job without any kind of accident. It is one thing to set a goal but you must also think about what method you will use to achieve it. For safety you must think about which method, command and control or continual

improvement, will help you achieve safety excellence. We have seen how command and control removes thinking on the part of the individual. Being safe on the job requires employees think about safety which is an integral element of cognitive psychology and continual improvement but denied by behaviorist.

- Cause and effect relationships. Accidents are caused. They are not a result of fate, chance, hope or magic. Using inductive reasoning you can figure things out, even if causes are buried deep in the system. You should always remember cause and effect are not always closely connected in time and space. What was going on at the moment an accident happens is the culmination of things that took place, days, weeks, months and sometimes even years before.
- Self-set goals. When people are involved in setting their own safety goals they come to own the safety of the process they are involved in. When people own the safety process you can trust they will do the right thing even when management isn't around. Ownership of safety ensures commitment to its application.
- The individual effort can and does make a difference. In a command and control environment the individual becomes disenfranchised. Employees conclude fairly quickly their effort doesn't matter since all decisions are ultimately controlled by management. When you can set your own standards of excellence even if the area you work is not currently performing at a high level, internal discipline and accountability for safety becomes a non-issue.
- Feedback. People want to know what has happened as a result of their effort. We're not talking about positive re-enforcement. This is about letting people collect and examine the data so they can see how their problem solving efforts have improved the system. One of the best ways of doing this is to use the common language of statistical process control so everyone understands what the data is telling you.

Here are some things you will have to learn about psychology to add to profound knowledge:

- Knowledge about the failure of *behaviorism* to help understand human behavior
- Knowledge about cognitive psychology
- Knowledge about losses due to demanding performance beyond the capability of the system (0 accidents)
- Knowledge about the danger of the exclusive use of extrinsic motivation
- Knowledge about intrinsic motivation
- Knowledge about the psychology of change (from command and control for safety to continual improvement)

→ **Variation**. No two things are exactly alike. There is variation in every process. Safety management is not immune to this reality. Variation occurs in safety processes such as training, communication, instructions, the number of accidents. What does the variation tell us? Is the problem from the system or something outside of the system? It may mean nothing. By learning how to study and control variation you can avoid the two mistakes in trying to improve safety of the system. Mistake No. 1 is to act as if an outcome was the result of a special cause when it came from a common cause of variation. Deming and Shewhart said this is reacting to noise as though it were a signal. Mistake No. 2 is to treat an outcome as though it was a common cause of variation when it actually came from a special cause. This is reacting to signals as though they were just noise.

Common causes are built into the system and are going to stay there until the system is improved. If a powered industrial truck is required to be driven in an area where it is constantly crossing paths with pedestrians you can bet (predict) that eventually an accident will occur. There is just too much variation in the system that can't be controlled every second of the day. There lies the challenge of management for every work process.

If safety training is conducted in a haphazard approach in a room that is uncomfortable by an instructor that has lost his enthusiasm to teach about a subject he knows little or nothing about it is going to fail. Yet the company has met safety training specifications because it can prove the employee was in the room at the time the safety training took place. Rather than trying to fix the blame after an accident happens the

management system should work on fixing problems in the system before things go wrong. Design the system so people and powered industrial trucks will not cross paths. Fix the training system so people actually learn, retain, practice and use the safety methods presented in the training. Focus on the common causes built into the system that need to be improved.

To do this here are some things you must learn about variation:

- Knowledge about the proper use of data
- Knowledge about statistical process control
- Knowledge about common and special causes
- Knowledge about the Taguchi loss function and the Pareto principle

→ **Systems** and thinking about them, which leads to *systems thinking*. When it comes to safety we must learn how to study systems and understand how they work. Safety management is a system set up to serve the various functions of production. How the safety system interacts with the other things it serves; employees, management, other departments, internal and external customers and suppliers, depends on many different things. Conversely the effectiveness of the safety management depends on how other parts of the system cooperate with it.

Systems thinking helps everyone understand how multiple components of the system with their common causes are responsible for most accidents in a system. Common causes stem from the essential elements of the system; people, methods, materials, equipment and environment. Common causes are interactive and interdependent at different times and places. There are connections between common causes and they are not always visible nor sequential. They are often hidden deep in the system out of view and are therefore difficult to discover and comprehend. The ability to do this comes from systems thinking or the ability to see the whole. That is why systems are a key point of profound knowledge.

Some things you will have to learn about systems that create profound knowledge:

- Knowledge about, What is a system?
- Knowledge about interaction of forces in a system
- Knowledge that stable processes produce variable results
- Knowledge that in a process brought into statistical process control the subsequent data points can be thought of as noise

The figure showing the World of Work shows how profound knowledge functions as a lens to enhance and supplement subject matter knowledge. It helps you examine any particular subject from a new and different perspective that will lead to a deeper understanding about it. This includes safety management. Using all four elements of profound knowledge is the sweet spot of problem solving. As one obtains profound knowledge it is like peering through the lens of a microscope and seeing all kinds of new things about your subject matter for the first time. It affords you a closer more accurate view of what you are examining.

The power of profound knowledge is when its four elements work together. They interact and complement each other to help you optimize a system. For example knowledge about psychology is incomplete without knowledge about variation. This will help you understand why it is useless and usually detrimental in terms of management to spend time ranking people. If you have ten people there will always be one at the top and one at the bottom no matter what. It may mean nothing at all, just normal expected variation. To understand a cause and effect relationship you will have to combine the theory of knowledge with a cautious application of the theory of statistics to interpret outcomes of tests and experiments.

With a better understanding of systems and how cooperation leads to their optimization we would stop singing the praises of internal competition that destroys people's pride and joy in work. We might then know when to allow win-win in business instead of always striving for I win-you lose result where the system is sub-optimized. For example management encourages friendly competition between two departments to win a safety award. It would be further ahead encouraging the two departments to work together and share information about how to stop accidents.

With the new business model we would also realize there are situations where flexibility is required to achieve optimization. For example when purchasing adds to the cost of production by paying more for a safety device that actually works and is used by employees. As opposed to cutting cost with a cheaper version that breaks down often and one the employees will not use. Or even worse, not spending any money on the safety device at all.

Conclusion

American management still operates from the cost principle where Selling price = Profit + Actual Costs. As a result top management believes the Safety Department as a place where you lose money and keep the wolves away (Regulators such as OSHA, EPA, etc. or corporate safety auditors). That is why safety departments usually report to Human Resources instead of the President on the organization chart.

Since the 1980's companies have learned they must combine the non-cost principle where Selling Price – Costs = Profit with the Customer first principle to manage quality. Management started applying continual improvement theory to quality when they realized higher profit is gained through reduced costs. When management realizes employee accidents are the worst form of waste they will apply continual improvement to safety. But to do so will require a paradigm shift.

What causes accidents is a divergent problem with many different and interesting answers. Every company has to deal with systems and variation. How management handles them is what sets companies apart. If management operates from the cost principle safety is treated as a money loser and middle managers may treat it as though it is optional. Accident costs are just passed on to the customer or off into the Milky Way. They are built into the price of the product. Command and control works in this environment because the primary goal for production and safety is to meet specifications not continual improvement.

When a company applies the non-cost and customer principles, worker accidents become the worst form of waste in operations. In this world command and control with its emphasis on rules and regulations is of little or no value.

Every business requires materials, methods, machinery & equipment, money, processes and people. The first five items are basically the same for everyone. If any of these are damaged it is fairly easy to fix or replace them. But the last one, people, is a different matter. In command and control people are treated as though they are bionic machines. If one is injured just put another one in its place. Management's job ultimately is to keep production going at all costs and quality and safety are just afterthoughts. In a company that lives the non-cost principle and focuses on quality and lean processes if you damage your people you are diminishing your competitive position in the worst possible way. Employees are the brains of the operation that keep it running smoothly so it will flow every day. Consequently the culture of the company places a high value on the safety of employees today and in the future.

When it comes to safety in today's economy every second of every moment should be about the way management serves employees so they can do their jobs without being harmed. It's time to release managers from the self-imposed prison of ideas known as command and control and elevate safety management to the higher level of continual improvement. When this happens management will realize the real truth in the old adage that safety doesn't cost it pays. I hope this article has helped to expose the serious limitations of using command and control to manage safety and provide compelling reasons to make the transformation to CRISP.

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Endnotes

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