Review of Literature

The review of literature has been discussed under the following heads.
I) Basics of Psychology and human behavior.
II) Industrial and organizational psychology.
III) Relation of human behavior with safety.
IV) Safety psychology.

I) Basic of Psychology and human behavior

Definition of Psychology \(^{(17)}\)

- **Psychology** is “the science of human and animal behavior; it includes the application of this science to human problems.”

- **Psychology**: \(^{(18)}\) Is an academic and applied field involving the study of the human mind, brain, and behavior. Psychology also refers to the application of such knowledge to various spheres of human activity, including problems of individuals' daily lives and the treatment of mental illness.

Psychology as a Science \(^{(17)}\)

A science is a body of systematized knowledge that is gathered by carefully observing and measuring events. Psychologists conduct experiments and make observations which others can repeat; they obtain data, often in the form of quantitative measurements, which others can verify. This scientific approach is very different from forming opinions on the basis of individual experience or arguing from premises that no one can test. Thus experiments and observations are at the core of scientific psychology.
What is personality\(^{(17)}\)

“The sum total of ways in which individual reacts and interacts with others” or it can be defined as, “personality is a collection of emotional, thought and behavioral patterns unique to a person that is consistent over time”.

Personality Determinants\(^{(17)}\)

An adult’s personality is generally considered to be made up of hereditary and environmental factors, moderated by situational conditions.

- **Heredity**: it refers to those factors that were determined at conception. Physical stature, facial attractiveness, gender, temperament, muscle composition and reflexes, energy level and biological rhythms. These are characteristics that are generally considered to be completely or substantially influenced by whose one’s parents were, that is, by their biological, physiological, and inherent psychological makeup.

- **Environment**: Among the factors that exert pressure on one’s personality formation are the culture in which one is raised, one’s early conditioning, the norms among the family, friends, and social groups, and other influences that one experiences. The environment to which one is exposed plays a substantial role in shaping one’s personality.

- **Situation**: A third factor, the situation, influences the effect of heredity and environment on personality. An individual’s personality, although generally stable and consistent, does change in different situations. The varying demands of different situations call forth different aspects of one’s personality. These personality patterns cannot be seen in isolation.
**Personality Traits**

These are enduring characteristics that describe an individual’s behavior or prominent aspects of personality that are exhibited in a wide range of important social and personal contexts. Popularly the characteristics include, shyness, aggressiveness, submissiveness, laziness, ambition, loyalty, and timidity. These characteristics, when exhibited in a large number of situations, are called personality traits.

There are sixteen traits which have been found to be generally steady and a constant source of behavior, allowing prediction of an individual’s behavior in specific situations by weighing the characteristics for their situational relevance.

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Recent research supports the five basic dimensions that underlie all others and encompass most of the significant variations in human personality. The five big factors are:

- **Extroversion**: This dimension captures one’s comfort level with relationships. Extroverts tend to be gregarious, assertive, and sociable. Introverts tend to be reserved, timid and quiet.

- **Agreeableness**: This dimension refers to an individual’s propensity to defer to others. Highly agreeable people are co-operative, warm and trusting. People who score low on agreeableness are cold, disagreeable, and antagonistic.

- **Conscientiousness**: This dimension is a measure of reliability. A highly conscientious person is responsible, organized, dependable and persistent. Those who score low on this dimension are easily distracted, disorganized, and unreliable.

- **Emotional Stability**: This dimension taps a person’s ability to withstand stress. People with positive emotional stability tend to be calm, self-confident, and secure. Those with highly negative scores tend to be nervous, anxious, depressed and insecure.

- **Openness to experience**: The final dimension addresses an individuals range to interest and fascination with novelty. Extremely open people are creative, curious, and artistically sensitive. Those at the other end of the openness category are conventional and find comfort in the familiar.
What is attitude

Attitudes are evaluative statements—either favorable or unfavorable—concerning objects, people, or events. They reflect how one feels about something.

Attitudes are not the same as values, but the two are interrelated. One can see this by looking at the three components of an attitude: cognition, affect, and behavior. Most attitudes in individuals are a result of social learning from the environment.

- Cognitive component: The opinion or belief segment of an attitude.
- Affective component: The emotional or feeling segment of an attitude.
- Behavioral component: An intention to behave in a certain way towards someone or something.

Viewing attitude as made up of three components—cognition, affect, and behavior—is helpful towards understanding their complexity and the potential relationship between attitude and behavior.

In organizations, attitudes are important because they affect job behavior.

Types of attitudes

A person can have thousands of attitudes, but the focus here is on a very limited number of job-related attitudes. These job-related attitudes tap positive or negative evaluations that employees hold about aspects of their work environment. Most of the research in this field has been concerned with three attitudes: job satisfaction, job involvement, and organizational commitment.

- **Job Satisfaction**: The term “job satisfaction” refers to an individual’s general attitude towards his or her job. A person with a high level of job satisfaction holds positive attitudes towards the job, while a person who is dissatisfied with his or her job holds negative attitudes about the job.
• **Job involvement:** The term “job involvement” is a more recent addition to this literature. Employees with a high level of job involvement strongly identify with and really care about the kind of work they do. High level of job involvement has been found to be related to fewer absences and lower resignation rates.

• **Organizational Commitment:** It is defined as a state in which an employee identifies with a particular organization and its goals, and wishes to maintain membership in an organization.

**The Measurement of attitude**

There are many techniques available to measure behavior like Likert Scale, which is easy to use and objective. Besides, it helps to analyze data very easily.

**What is Behavior** (17)

Behavior includes anything a person or animal does and can be observed in some way. Behavior, unlike mind or thoughts or feelings, can be observed, recorded, and studied. No one ever saw or heard a mind, but one can see and hear behavior. One can see and measure what a person does and hear and record what a person says (this is vocal behavior). From what is done and said, psychologists can and do make inferences about the feelings, attitudes, thoughts, and other mental processes which may be behind the behavior. In this way, internal mental events can be studies as that manifest themselves through what people do – their behavior. Thus, it is through behavior that one can actually study and come to understand internal mental processes that would otherwise be hidden from us. When one defines psychology as “the science of behavior” one is not excluding mind, one is saying that what a person does – his or her behavior – is the avenue through which internal mental events can be studied.
**Describing behavior**

It is said, that one aspect of the method of systematic observation in psychology is simply to describe behavior as it occurs naturally. What do people do? Can various behaviors be classified in systematic ways? How do people differ in their behavior? For instance, using questionnaires, surveys, and interviews, one may study the personalities and motivational patterns of successful political leaders, the attitude of successful executives, or the ideas that liberal and conservative parents have about the best way to rear children, or the behavior of the person working unsafely. Behavior generally is predictable if one knows how the person perceived the situation and what is important to him or her. Certainly there are differences between individuals. Placed in similar situations, all people don’t act exactly alike. However, there are certain fundamentals consistencies underlying the behavior of all individuals that can be identified and be modified to reflect individual differences.

These fundamental consistencies are very important, because they allow predictability. For example, when a person gets in to his car, he makes some definite and usually highly accurate predictions about how other people will behave. In North America, for instance, it can be predicted that other drivers will stop at stop signs and red lights, drive on the right side of the road, pass on your left, and not cross the solid double line on the mountain roads. Obviously the rules of the driving make predictions about the driving behavior fairly easy.

For another instance, does one turn around and face the doors when one gets into an elevator? Almost everyone does it. But did they ever read that they are supposed to do this? Probably not! Just as they make predictions about the automobile drivers (where there are definite rules of the road), they can make predictions about the behavior of the people in the elevator.

These examples support a major contention in this text: Behavior is generally predictable, and the systematic study of behavior is a means to making reasonably accurate predictions.
When the phrase “systematic study”, is discussed, it means looking at relationships, attempting to attribute causes and effects, and basing conclusions on scientific evidence – that is, on data gathered under controlled conditions and measured and interpreted in a reasonably rigorous manner.

Systematic study replaces “intuition”, or those “gut feelings” about “Why he does what he does” and “what makes others tick”. Of course, a systematic approach does not mean that those things one has come to believe in an unsystematic way are necessarily incorrect.

Finding the causes of behavior from a number of observations is called “Inductive reasoning”, or establishing general principles from particular instances.

Foundations of Individual Behavior

- Biographical Characteristics

Obvious characteristics would be employee’s age, gender, marital status and length of service with an organization. Fortunately there is a sizable amount of research that has specifically analyzed man in relation to biographical characteristics.

A) Age: The relationship between age and job performance is likely to be an issue of increasing importance in the near future, because there is a widespread belief that job performance declines with increasing age. What is the perception of older workers? Evidence indicates that employees hold mix feelings. They see a number of positive qualities that older workers bring to the jobs, specifically, experience, judgment, a strong work ethic, and commitment to quality. But older workers are also perceived as lacking flexibility and as being resistant to new technology. Studies done in (Finland, Austria, Kenya & Italy) show that older workers meet with less accident in comparison to younger workers. However on
the other hand, as individual skills, particularly speed, agility, strength and co-ordination decay over time and prolonged job boredom and lack of intellectual stimulation, which results into less adaptability towards new safety techniques and implementing what is learnt in Safety training.

B) Gender: Few issues initiate more debate, misconceptions, and unsupported opinions that whether women perform as well on jobs as men do. Psychological studies have found that women are more willing to conform to authority and those men are more aggressive and more likely than women to have expectations of success, but those differences are minor. One should operate on the assumption that there is no significant difference in job productivity between men and women. Similarly there is no evidence indicating that an employee’s gender affects job satisfaction. Men have more accidents at work than women. This is due to men’s higher labor market participation, and indeed number of accidents involving women is rising as they enter the workforce in greater numbers. The number of accidents also depends upon the occupational segregation of men and women.

C) Marital Status: There are not enough studies to draw any conclusion about the effect of marital status on productivity. However research consistently indicates that married employees have less absence, undergo fewer turnovers, and are more satisfied with their jobs than are their unmarried co-workers. This is also true in case of industrial accidents that married employees undergo less numbers of occupational injuries, the main reason is because the problem of alcoholism is less, they live healthy lives, their mental health is stable, they have pressure from the family to work safe, they are responsible to bring up the family, etc.

D) Tenure: The last biographical characteristics to look at is tenure. Extensive reviews have been conducted on the seniority-productivity relationship. If one defines seniority as time on a particular job, one can
say that the most recent evidence demonstrates a positive relationship between seniority and job productivity. So tenure, expressed as work experience, appears to be a good predictor of employee productivity. Studies also demonstrate seniority to be negatively related to absenteeism along with turnover. It is studied in (Spain, Texas & USA) that the long employment with the job is good for safety, as these people have better understanding of the work, organization culture and safety precautions to be followed while working. Besides, there is a large difference between the temporary workers and permanent workers meeting with an accident. It is observed that temporary workers meet with more accidents than do permanent.

**Behavioral genetics** (15)

Sir Francis Galton (1822-1911) was the first scientist to study heredity and human behavior systematically. He found that behavior like all complex traits, involves multiple genes, a reality that complicated the search for genetic contributions. He also found that behavior is often species specific, it changes in response to alterations in biological structures or processes. In humans, some behavior runs in families.
II) Industrial and Organizational Psychology

The first application of psychology to the problem of industries and organization was the use of intelligence and aptitude tests in selecting employees. Today, many companies use modern versions of such tests in their hiring and placement programs. Private and public organizations also apply psychology to the problem of management and employees training, to supervision of personnel, to improving communication within the organization, to counseling employees, and to help Industrial Safety management system and reduce accidents.

Organizational Behavior\(^{(21)}\)

It is a field of study that investigates the impact that individuals, groups, and structure have on behavior within organizations for the purpose of applying such knowledge towards improving an organization’s effectiveness.
• **Figure 02 : Towards an Organizational Behavior**

- **Psychology**
  - Learning
  - Motivation
  - Personality
  - Emotions
  - Perception
  - Training
  - Leadership
  - Effectiveness
  - Job Satisfaction
  - Individual Decision-making
  - Performance appraisal
  - Attitude measurement
  - Employee selection
  - Work design
  - Work stress

- **Sociology**
  - Group dynamics
  - Work teams
  - Communication
  - Power
  - Conflict
  - Intergroup behavior
  - Formal organization
  - Theory
  - Organizational Change
  - Organizational Culture

- **Social Psychology**
  - Behavioral Change
  - Attitude change
  - Communication
  - Group processes
  - Group Decision-making

- **Anthropology**
  - Comparative values
  - Comparative attitudes
  - Cross-cultural analysis
  - Organizational Culture
  - Organizational Environment

- **Political Science**
  - Conflict
  - Inter-organizational Politics
  - Power

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Organizational Behavior
III) Relation of Human behavior with Safety

- Link between Behavior and Safety:

**Human Behavior and causes of accidents** \(^{(16)}\)

When considering human behavior and safe performance, the type of error needs to be addressed. This usually involves two perspectives. Firstly, the individual and his or her characteristics, age, gender, type of learning style, risk taking tendencies etc, and the perspective of the wider, organizational culture, management systems and prevailing climate.

**The errors of our ways** \(^{(2)}\)

Human error due to unsafe behavior is a major causative factor in up to 45% of critical incidents in nuclear power station accidents, 60% in aircraft accidents and more than 90% in road traffic accidents.

**Figure 03: To err is human** \(^{(9)}\)

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<th>Box 1: Underlying causes of accidents</th>
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| A NUCLEAR industry study identified the following underlying organisational, team and individual causes of accidents: |%
| Deficient procedures or documentation | 43 |
| Lack of knowledge or training | 18 |
| Failure to follow procedures | 16 |
| Deficient planning or scheduling | 10 |
| Miscommunication | 6 |
| Deficient supervision | 3 |
| Policy problems | 2 |
| Other | 2 |

**Why did they make unsafe decision (Biological factor)** \(^{(18)}\)
A person can perceive a hazard and still fail to make a safe decision and response. Sensory processing in the brain should be explained to understand why unsafe decisions are made. Brain functions are mediated interconnected systems of brain regions working together rather than by individual areas working in isolation. This interaction results in the complexities of human behavior. Decisions can be linked to the receipt and processing of the information.

Fundamentally, sensory information takes two paths through the human mind simultaneously; these two paths are routed through various portions of the human mind. The slower route travels through the “thinking brain” or “neocortex”, which is involved in reasoning, consciousness and rational responses.

In the neocortex, sensory information is assessed and responses are based on “full analysis”. This region of the brain is involved in assessment of sensory information with detailed and accurate representation of the sensory information. A limitation of this thorough analysis is a slow response, due in part to the amount of neural links involved in data analysis through the “thinking brain”.

According to researchers, a faster path goes through, what is identified as the “emotional brain” and specifically the region called “amaygdala”. This region is important for various forms of emotional memory and responses. In this region, sensory information undergoes association to past events. This association processes the sensory data more quickly that the “thinking brain”. However, decisions are made from incomplete analysis and may result in serious incident. The chances for “emotional brain” take over increases if events in the present have or relate to previous emotional situations.

Further more, emotional processing of and subsequent reactions to stimuli can occur without any conscious registration of the stimuli. The emotional portion of the human brain acts independently of the rational portions of the brain (cortical area). In other
words, emotional memories and reactions can occur without the involvement of consciousness or thinking brain.

Emotional memories are stored in an associative network. Memories in this network are activated by cues or reminders occurring in the present that were existent at the time the memory was learnt. Cues can be any sensory sensation (e.g. particular noise, irritating smell, or familiar sight) that activates state-dependent memories. The cues will return the person to an emotional state like the one they were experiencing when the memory was learned. During this subconscious response by the “emotional brain” and employee id unaware of their choice for action and responds to sensory input in an “automatic” fashion.

The next question is how it relates to safety. The human mind’s capability of quickly bypassing the safety knowledge stored in individuals “thinking brain” can allow the person to rapidly make unsafe decisions and respond unsafely to hazardous situations without conscious analysis by the “thinking brain” and based on emotional memories.

**Practical Examples**

As already mentioned in the Chapter on Introduction, statistics shows that 88% of accidents are caused due to unsafe actions, which was proved by H.W. Henrich, in the studies done by him. Practically also it can be found with the help of these two examples that the findings of Henrich apply to the industries also.
Example 01

This example indicates the statistical analysis of accidents of Bajaj Tempo (Force Motors) for the year 2001. It can be understood from the graph that 77% of accidents are caused due to unsafe actions of the workmen.

![Cause wise analysis of accidents](image)

**Figure 04: Cause wise analysis of accidents (BTL)**
Example 02:

This example indicates the statistical analysis of accidents of Kirloskar Oil Engines Ltd. for the year 2004. It can be understood from the graph that 74% of accidents are caused due to unsafe actions of the workmen.

Figure 05: Cause wise analysis of accidents (KOEL)
IV) Safety Psychology

- Total Safety Culture \(^{(12)}\)

The “Total Safety Culture” mission is much easier said than done, but it is achievable through a variety of safety processes rooted in the disciplines of engineering and psychology. Generally, a Total Safety Culture requires continual attention to three domains:

1. Environmental factors (including equipments, tools, physical layout, procedures, standards, and temperature)
2. Person factors (including people’s attitudes, beliefs, and personalities)
3. Behavior factors (including safe and at-risk work practices, as well as going beyond the call of duty to intervene on behalf of another person’s safety)

Figure 06: The triangle of safety-related factors has been termed “The Safety Triad” (Geller, 1989) and is illustrated as follows:
These factors are dynamic and interactive. Changes in one factor eventually impact the other two. For example: behaviors that reduce the probability of injury often involve environmental change and lead to attitudes consistent with the safe behaviors. This is especially true if the behavior is viewed as voluntary. In other words when people choose to act safely, they act themselves into safe thinking. These behaviors often result in some environmental change.

The basic principle here is that behavior-based and person based factors need to be addressed in order to achieve a Total Safety Culture.

There are various recommendations on how the psychology of safety can be used to produce beneficial change in people and organization. Most can be classified in one of two basic approaches; “Person based and behavior based”. Person based approaches attack individual attitudes or thinking processes directly. They teach clients new thinking strategies or give them insight into the origin of the abnormal or unhealthy thoughts, attitudes, or feelings. In contrast, behavior – based approaches attack the client’s behavior directly. They change relationship between behavior and their consequences.

The person based approach

This approach focuses upon individual’s personal feelings, attitudes, or intentions. Focusing only on observable behavior does not explain enough. People are much more than their behaviors. Concepts like intention, creativity, intrinsic motivation, subjective interpretation, self esteem, and mental attitude are essential to understanding and appreciating the human dynamics of a problem. Thus, a person-based approach in the workplace applies surveys, personal interviews, and focus-group discussions to find out how individuals feel about certain situations, conditions, behaviors, or personal interactions.
The key principles of humanism found in most of the psychological approaches to increase personal achievement are:

1. Everyone is unique in numerous ways. The special characteristics of an individual cannot be understood or appreciated by applying general principles or concepts, such as the behavior-based principles of performance management or the permanent personality trait perspective of psychoanalysis.

2. Individuals have far more potential to achieve than they typically realize and should not feel hampered by past experience or present liabilities.

3. The present state of individual’s interims of feeling, thinking and believing is a critical determinant of personal success.

4. One’s self-concept influences mental and physical health, as well as personal effectiveness and achievements.

5. Ineffectiveness and abnormal thinking and behavior results from large discrepancies between one’s real self (who I am) and ideal self (who I would like to be)

6. Individual motives vary widely and come from within a person.

**The Behavior-based approach**

The behavior-based approach to applied psychology is founded on behavioral science conceptualized and researched by Skinner (1938, 1974). The behavior-based approach starts by identifying observable behavior targeted for change and the environmental conditions or contingencies that can be manipulated to influence the target behavior(s) in desired directions. (Contingencies are relationships between target behaviors and their supporting consequences)

The basic idea was that behavior can be objectively studied and changed by identifying and manipulating environmental conditions (or stimuli) that immediately precede and follow a target behavior. The antecedent conditions (activators) signal when behavior can achieve a pleasant consequence (a reward) or avoid unpleasant conditions (a penalty). Therefore, activators, direct behavior, and consequences determine whether the behavior will recur. Accordingly, people are motivated by the
consequences they expect to receive, escape or avoid after performing a target behavior.

When people act in certain ways, they usually adjust their mental attitudes and self-talk to parallel their actions. When people change their attitudes, values, or thinking strategies, certain behavior change as a result. Thus person-based and behavior based approaches to changing people can influence both attitudes and behaviors, either directly or indirectly. Most parents, teachers, first-line supervisors and safety managers use both approaches in their attempts to change a person’s knowledge, skill, attitudes or behaviors.

- When they lecture, counsel, or educate others in a one-on-one group situation, they are essentially using a person based approach.
- When they recognize, correct, or discipline others for what they have done, they are operating from a behavior-based perspective.

Unfortunately, all are not always effective with other person-based or behavior based change techniques, and often they do not know whether their intervention worked as intended. This is because these personnel are not trained as professionals to use these techniques.

In contrast, behavior-based psychotherapy was designed to be administrated by individuals with minimal professional training. From the beginning the idea was to reach people where the problems occur. The behavior based methods are especially cost effective for large scale applications.
Figure 07: The internal and external aspects of people determine the success of a safety process

**Elements of an organizations Safety Culture** (7)

Ten elements of the Safety Culture Maturity Model

1. Management commitment and visibility.
2. Communication.
3. Productivity versus safety.
4. Learning organization
5. Safety resources
6. Participation
7. Shared perception about safety
8. Trust
9. Industrial relation and job satisfaction
10. Training.
Human barriers to Safety (12):

The complexity of people

- “All injuries are preventable”.
- “It is human nature to work safely”
- “Safety is just a common sense”
- “Safety is a condition of employment”

By reading these familiar statements people get the idea that working safely is easy or natural.

In fact, it is often more convenient, more comfortable, more expedient, and more common to take risk than to work safely. Besides, past experience usually supports one's decisions to choose the at-risk behavior, whether one is working, traveling, or
playing. So, they are often engaged in a continuous fight with human nature to motivate them and others to avoid those risky behaviors and maintain safe ones. Most of the times the employees are not sure how to perform safely, perhaps they lack training, maybe the surrounding environment was not as safe as it could be. Demand from a supervisor, coworker, or friend put pressure on them to take a shortcut risk. Maybe, it was inconvenient or uncomfortable to follow all the safety procedures.

It is possible that the physical conditions – fatigue, boredom, drug impairment – influence at-risk performance. There are other factors like distraction by external stimuli or by an internal state, like thoughts or emotions.

Fortunately, it is rare that injury follows unsafe behavior. The attitude “it won’t happen to me” is usually supported or rewarded by actual experience. Risk taking is rarely punished with an injury or even near miss, instead it is consistently rewarded with convenience, comfort, or time saved. This creates a vicious cycle. The rewards of risky behavior means likelihood of taking more chances. As people gain experience on work they often master dangerous shortcuts. Because these at-risk behaviors are not followed by a near miss or injury, they remain unpunished and they persist.

**Dimensions of Human Nature**

The factors contributing to a work injury can be categorized into three areas:

1. Environmental factors.
2. Person factors.

The most common reaction to an injury is to correct something about the environment- modify or fix equipments, tools, housekeeping, or an environmental hazard. Often the incident report includes some mention of personal factors, like the
employee’s knowledge, skill, ability, intelligence, motives, or personality. These factors are typically translated into general recommendations.

The kind of vague attention to critical human aspect of a work injury shows how frustrating and difficult it is to deal with the psychology of safety – the personal and behavioral sides of the Safety Triad. The human factors contributing to injury are indeed complex, often unpredictable and incontrollable. The following acronym BASIC ID reflects the complexity and uncontrollability of human nature. As depicted below each letter represents one of seven human dimensions of an individual.

B ehavior
A ttitude
S ensation
I magery
C ognition
I nterpersonal
D rugs

This can be well understood by the following example:
Ram, an experienced and skilled craftsman, works rapidly to make an equipment adjustment while the machine continues to operate. As he works, production-line employees watch and wait to resume their work. Ram realizes all too well that the sooner he finishes his task, the sooner his co-workers can resume quality production. So he does not shut down and lock out the equipment power. After all, he had adjusted the equipment numerous times before without locking out and he had never got injured.
A morning argument with his teenage daughter pervades Ram’s thought as he works, and suddenly he experiences a near miss. His late timing nearly results in his hand being crushed in a pinch point.
Removing his hand just in time, Ram feels weak in his knees and begins to perspire. This stress reaction is accompanied by a vivid image of a crushed right hand. After
gathering his composure, Ram walks to the switch panel, shuts down and locks out the power, then lights up a cigarette. He thinks about this scary event for the rest of the day and talks about the near miss to fellow workers during his break.

“Behavior” is illustrated by observable actions such as adjusting equipment, pulling a hand away from the moving machinery, lighting up a cigarette, and talking to co-workers.

Ram’s “attitude” about the work was fairly neutral at the start of the day, but immediately following his near miss he felt a rush of emotions. His attitude towards “energy control and power lockout” changed dramatically, and his commitment to locking out increased after relating his close call to friends.

“Sensation” is evidenced by Ram’s dependence on visual acuity, hand-eye coordination, and a keen sense of timing when adjusting the machinery. His ability to react quickly to the dangerous situation prevented pain and potential loss of valuable touch sensation.

“Imagery” occurred after the near miss when Ram visualized a crushed hand in his “mind’s eye”, and this contributed to the significance and distress of the incident. Ram will probably experience this mental image periodically for some time to come. This will motivate him to perform appropriate lockout procedures, at least for the immediate future.

“Cognition” or “mental speech” about the morning argument with his daughter may have contributed to the timing error that resulted in the near miss. Ram will probably remind himself of this episode in future, and these cognitions may help trigger proper lockout behavior.

“Interpersonal” refers to the other people in Ram’s life who contribute to his near miss and will be influential in determining whether he initiates and maintained appropriate lock-out practices.
For example, it was the interpersonal discussion with his daughter that occupied his thoughts or cognitions before the near miss. The presence of production-line worker influenced Ram’s thought of subtle peer pressure to quickly adjust the equipment without lockout practices. These onlookers may have distracted Ram from the task, or they could have motivated him to show off his adjustment skills. After Ram’s near miss, his interpersonal discussions were therapeutic, helping him relieve this distress and increase his personal commitment to occupational safety.

“Drugs” in the form of caffeine from the morning may have contributed to Ram’s timing error. The extra cigarettes Ram smokes as a “natural” reaction to distress also had psychological consequences, which could have been reflected in Ram’s subsequent behavior, attitude, sensation and cognition.

Ram’s lesson shows how human nature interacts with environmental factors to cause at-risk work practices, near miss, and sometimes personal injuries.

The following are more aspects of human nature which make safety achievement challenging:

**Cognitive failures**

Some people call it “Brain cramp”. Research by Broadbent et al. (1982) \(^{(12)}\) demonstrated that people who report greater frequency of “cognitive failure” are more likely to experience injury.

In his classical book, “the psychology of everyday things”, Norman (1988) \(^{(12)}\) classified various types of cognitive failure according to a particular stage of routine thinking and decision making. Almost everything people do result from the basic information processing cycle.

They sense a stimulus (input), they evaluate the stimulus and plan a course of action (interpretation and decision making), and then they execute a response (output). Unintentional cognitive errors usually occur at the input and output stage of information processing. Judgment errors and calculated risks occur at the middle cognitive stage of interpretation and decision making.
Capture errors

Examples like borrowing someone’s pen to write a note or sign a form, and later finding the pen in our pocket. Norman calls these “capture errors”, because a familiar activity or routine seemingly “captures” us and takes over an unfamiliar activity. This error seems to occur at the execution stage of information processing, but it also involves misperception or inattention to relevant stimuli, as well as the absence of conscious judgment or decision making.

The “capture” is beneficial to workplace safety, when basic safety related behavior becomes habit, people have more mental capacity for higher level thinking and the probability of cognitive failure is reduced.

Description errors

These “brain cramps” occur when the description or locators of the correct (safe) and incorrect (at-risk) execution are similar. E.g., throwing a tissue paper in the clothes hamper instead of the waste can, even though the clothes hamper is not next to the trash receptacle. The similar characteristic of these two items – a large oval opening – led to these errors. Thus it might be useful to evaluate the work setting with regard to the need for different behaviors with similar descriptions.

Loss-of-activation errors

It is commonly referred to as “forgetting”. Norman refers to this as “loss-of-activation” because the cue or activator that got the behavior started was lost or forgotten. This happens when they start the activity with a clear and specific goal, but after they get engaged in the task they lose sight of the goal. Workers might, in-fact, continue with the task but with little awareness of the rationale or progress towards the goal. With regard to the three stages of the information processing discussed earlier, this error starts in stage 1- input- but eventually affects the output stage when workers cannot complete the task without more information. Stage 2 is involved
because lapse in memory occurs during interpretation and decision making, e.g.: Walking into a room to do something or to get a certain object, but after reaching there, forgetting what was the purpose of coming there, but after some time remembering the cause of going into the room.

**Mode errors**

Mode errors are probable whenever they face a task involving multiple operations or modes of operation. These errors are inevitable when equipment is designed to have more functions than the number of control switches available. In other words when controls are designed for more than one mode of operation, one can expect occurrence of this error. Airlines pilots must be explicitly wary of this kind of error.

This type of cognitive failure is essentially one of execution, but these errors often occur because they forget the mode they are in. This involves memory and the interpretation and decision making phase of information processing. Equipment design is certainly important here, along with proper training and the behavior based tools.

**Mistakes and calculated risks**

The four types of cognitive failures discussed so far-capture, description, loss-of-activation, and mode errors are unintentional. Their sources are mostly at the in out and output stages of information processing. The middle interpretation and decision-making stage is essentially uninvolved. Thus, the at-risk behavior resulting from these errors is unintentional. The person meant well. The plan was good but the execution was unintentionally flawed.

Mistakes and calculated risk occurs at the interpretation and decision-making stage of information processing. Here is where one interprets one’s sensory input and decides on a course of action. With mistakes, the individual is well informed regarding the ultimate outcome of getting the job done, but has poor judgment of getting there.
e.g.: while driving a vehicle, turning right onto a main road in to the path of an oncoming vehicle not seen or whose speed was misjudged.

Thus, understanding the difference between the various types of cognitive failure can help us predict when one type of at-risk behavior is more likely. For example, the probability of an input or output error increases with more experience and perceived proficiency on the job. That is, as people become more competent and confident, they pay less deliberate and conscious attention to what they are doing. They automatically filter out certain stimulus inputs, they do less interpretation and decision making, and they resort to automatic modes of execution.

Mistakes and calculated risks are possible among both beginning and experienced workers. New hires make safety-related mistakes when they do not know the safe way to perform a task or when they do not understand the need for special safety precautions. They take calculated risks when the actions and conversations from others favor the at-risk alternatives.

Experienced workers make mistakes when they take safety for granted and fail to consider the injury potential of a certain at-risk behavior. They take calculated risk when they feel especially skilled at task, realize they have never been seriously injured at the work and consider the soon and certain benefits of at-risk-behavior to outweigh the improbable cost.

Understanding the variety of potential cognitive failure in the workplace leads to a realization that most of these are unnoticed or ignored. In other words, when ones at-risk behaviors do not lead to personal injury, one just forgets them or explains them away. This is basic human nature. After all no one likes to talk about errors.
Interpersonal factors

Interpersonal aspects of human nature can be a barrier to safety. This is the second “I” of BASIC ID.

One’s interpersonal relationship dramatically influences one’s thoughts, attitudes, and actions. One does not feel as good- or as “free”- when working to avoid failure or disapproval as when working to achieve success or approval. In both the cases, other people are the cause of his motivation and behavior. It is not hard to see what all this has to do with safety in the workplace. People take risks on the job because others do the same, and sometimes workers blindly follow a supervisor’s orders that could endanger them, other co-workers or the environment. This reflects the interpersonal power of two principles of social influence- conformity and authority. Indeed the right kind of interpersonal influence is critical for achieving a Total Safety Culture.

Peer Influence

Peer influence plays a major role in performing the job safely, and prevents personal injury. The phenomenon of social conformity has a major influence on things and actions of human beings, e.g.: One can see it from the clothes people wear, to how they communicate both verbally and in writing. The power of conformity in influencing at-risk behavior cannot be overlooked. It is learnt that peer pressure increases when more people are involved and when the group members are seen as relatively competent or experienced.

It is important to remember, though, that one dissenter-a leader willing to ignore peer pressure and do the right thing-is often enough to prevent other persons from crumbling to potentially dangerous conformity at work.
Power of authority

As a result of social obedience or social conformity, people might perform risky acts or overlook obvious safety hazards, and put themselves and others in danger. To say “I was just following the orders” reflects the obedience phenomenon, and “Everyone else does it” implies social conformity or peer pressure.

To achieve “Total Safety Culture” it is needed to realize the power of these two interpersonal factors. Interventions capable of overcoming peer pressure and blind obedience are important. This point stresses on the vital role of leadership. One person can make the difference-decreasing both destructive conformity and obedience- by deviating from the norm and setting a safe example. And when a critical mass of individuals boards the “Safety bandwagon”, they get constructive conformity and obedience that supports a Total Safety Culture.

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**At-Risk Behavior is Usually a Result, NOT a Cause**

| Poor Communication | Imperfect Memories |
| Poor Ergonomic Job Design | Time/Pressure |
| No Supervision | Peer Pressure |
| Confusing Procedures | Bad Habit |
| Inadequate Training | Lack of Accountability |

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Figure 09: At-Risk behavior and accident causes
Leadership for Safety: industrial experience \(^{(9)}\)

O’Dea and Flin surveyed 157 offshore installations in the UK oil Industry. They found that:

1. Effective leadership has been shown to improve safety performance in high hazard and complex working environments such as aviation, energy, and manufacturing.
2. There is little systematic research on leadership and safety in health care.
3. Research has identified that different leadership behaviors are effective for safety depending on the level of management studied.
4. Transformational and transactional leadership theory may provide a useful model for health care in relation to patient safety.

Why do workers behave unsafely at work? Determinants of safe work practices in industrial workers \(^{(13)}\)

**Aims:** To explore the relation between safety climate (workers’ perceptions regarding management’s attitudes towards occupational safety and health) and workers’ behavior at work.

**Methods:** Cross sectional survey of workers at the pottery industry in Castellon, Spain. Sampling was stratified by plant size and workers’ gender, according to data on the working population at this setting. A total of 734 production workers were interviewed. Information was collected on safety climate and workers’ behavior towards occupational risks with a specific questionnaire. A safety climate index (SCI, scale 0–100) was constructed adding scores for each item measuring safety climate in the questionnaire. Workers’ unsafe behavior was analyzed for the different safety climate index levels.

**Results:** Mean score for SCI was 71.90 (SD 19.19). There were no differences in SCI scores according to age, gender, education, children at charge, seniority at work, or type of employment. Small workplaces (<50 workers) showed significantly worse SCI (mean 67.23, SD 19.73) than the largest factories (>200 workers). Lower levels of SCI
SCI <50) were related to workers’ unsafe behaviors (full/high accord with the statement "I excessively expose myself to hazards in my work”, adjusted odds ratio OR a 2.79, 95% CI 1.60 to 4.88), and to lack of compliance with safety rules (ORa 12.83, 95% CI 5.92 to 27.80).

Conclusions: Safety climate measures workers’ perception of organizational factors related to occupational health and safety (for example, management commitment to risk prevention or priorities of safety versus production). In this study these factors are strongly associated with workers’ attitudes towards safety at work. Longitudinal studies can further clarify the relation between safety climate and workers’ behavior regarding occupational safety and health.

Paradigm Shifts for total safety

Ten new perspectives need to be adopted in order to succeed to the current level of safety excellence and reach the ultimate goal – a Total Safety Culture. The traditional three Es of safety management – engineering, education and enforcement – have only got so far. A Total Safety Culture requires understanding and applying three additional Es- empowerment, ergonomics and evaluation

The old three Es

Over the past few decades, the basic protocol for reducing injury has been:

1. Engineer the safest equipment, environment settings, and protective devices.
2. Educate people regarding the use of engineering interventions.
3. Use discipline to enforce compliance with recommended safe work practices.

The three Es have dramatically reduced injury severity in the workplace, at home and on roads. But to achieve a level more than a plateau, the old three E’s will not help.
The three new Es are - ergonomics, empowerment and evaluation. A focus on these new Es has to be kept by not abandoning traditional Es but also with matching those with new ones. But these three new Es suggest specific directions or principles.

- **Ergonomics**

It requires careful study of relationships between environment and behavior, as well as developing actions plans (such as equipment work orders, safer operating procedures, training exercises) to avoid possible acute or chronic injury form the environment – behavior interaction. This requires consistent and voluntary participation by those who perform the behaviors in the various work environment. These are unusually line operators or hourly workers in an organization, and their participation will happen when these individuals are empowered.
• **Empowerment**

Some definitions of the traditional three Es for safety (especially enforcement) have been detrimental to employee empowerment. Many supervisors have translated “enforcement” into strict punishment approach, and the result has turned off many employees to safety programs. These workers may do what is required, but no more. Some individuals who feel especially controlled by safety regulations might try to beat the system, and success will likely bring a sense of gratification or freedom. This is predictable from theory and research on the area of psychology reactance. Especially “empowerment” related to developing behavior change interventions.

• **Evaluation**

This is the new E work essential to achieving a Total Safety Culture. Without appropriate feedback or evaluation, practices does not make perfect. Thus one needs the right kind of evaluation process. It is important to know that some traditional methods of evaluation actually decrease or stifle empowerment. This calls for changing some safety measurement paradigms.

**Shifting Paradigms**\(^{(12)}\)

In simple language Paradigm is defined as “pattern, example or model” and in business language paradigm has been equated with the psychological term such as “perception, attitude, cognition, belief, and value”.

The shift in how paradigm is commonly defined does contain an important lesson. When one adopts and uses new definitions, one’s mindsets or perception changes. In other words, one acts one into a new way of thinking. When employees get involved in more effective procedures to control safety, they develop a more constructive and optimistic attitude towards safety and achievement of a Total Safety Culture.
From Government regulations to corporate responsibility

Many safety activities and programs in India are driven by “Director of Industrial Health and Safety”, rather than employers and employees who can benefit from a safety process. In other words, many industries do “Safety Stuff” because the government requires it- not because it was their idea and initiative.

People are more motivated and willing to go beyond the call of duty when they are achieving their own self initiated goals, ownership, commitment and proactive behaviors when they are working to avoid missing goals or deadlines set by someone else.

From failure oriented to achievement oriented

If one strives to meets someone else’s goals rather that one’s own, one will probably develop an attitude of “working to avoid failure” rather than “working to achieve success”. One is motivated by achieving success rather than by avoiding failures. If one has a choice between positive reinforces (rewards) or avoiding negative reinforces (punishment), one will probably choose the positive reinforcement situation.

This principle helps explain why more continuous and proactive attention goes to productivity and quality than to safety. Productivity and quality goals are typically stated in achievement terms, and gains are tracked and recorded as individual or team accomplishments, sometimes followed by rewards or recognition.

In contrast, safety goals are most often stated in negative reinforcement terms. It is heard may times “We will reach our safety goal after another month without a loss time injury”. Keeping score in safety means tracking and recording losses or injuries. Measuring safety with only records in injuries not only limits evaluation to a reactive stance, but it also sets up a negative motivational system that is apt to take a back seat to the positive system used for productivity and quality. Giving safety an achievement
perspective (like productivity and quality) requires a different scoring system with a paradigm shift.

**From outcome focused to behavior focused**

Companies are frequently ranked according to their recordable and lost-time injuries. Within companies, work groups or individual workers earn safety awards according to outcomes – those with lowest number win. Offering incentives for fewer injuries, for instance, can often reduce the reported numbers while not improving safety. Pressures to reduce outcomes without changing the process (or ongoing behavior) often causes employees to cover up their injuries. This keeps the outcome numbers low, but does more harm to Corporate Culture.

A scoring system based on what people do for safety (as in behavior-based process) not only attacks a contributing force in most work injuries, it can also be achievement oriented. This puts safety in the same motivational framework as productivity and quality.

Safety can be on or equal footing with productivity bad of quality. It is recorded and tracked with an achievement score perceived by employees as directly controllable and attainable. This occurs with a focus on the safety processes that can decrease an organization’s injury rate, as well as ongoing measurement system that can continuously track safety accomplishment and displays them to the workforce.

Safety accomplishments occur in three general areas, environment, behavioral and personal, with environmental successes easiest to record and track. Environmental achievement for safety range widely, from purchasing safer equipments to correcting environmental hazards and demonstrating improved environmental audits.

Personal factors are influenced by numerous situations, such as safety education, safety celebration, and increased safety personnel. It is possible to estimate achievement in this domain by counting the occurrences of these events. A more
direct assessment can occur through periodic perception surveys, interviews, or focus group discussions. These measurements can be time consuming, though and the reliability and validity of results from intermittent subjective surveys are equivocal. Moreover, findings on improvement in perceptions does not necessarily imply an increase in safe work practice – the human dynamics most directly linked to reducing work injuries.

Work practices can be observed, recorded and tracked objectively (Geller, 1998b, Krauss et al, 1996, Mcsween, 1995). (12) When daily displays of behavioral records shows increases in safe behavior and decreases in at risk-behavior, the workforce can celebrate the success of an improved safety system.

**From Top-down to bottom-up involvement**

Total safety culture requires continual involvement from operations personnel, such as hourly workers. After all, these are the people who know where safety hazards are located and when the at-risk behavior occurs. Besides, they can have the most influence in supporting safe behavior and correcting at-risk behavior and conditions. In fact, the ongoing process involved in developing a Total Safety Culture needs to be supported from the top but driven from the bottom.

Understanding and feeling good about something brings one to considering those person factors such as knowledge, intentions, attitudes, expectancies, and mood states. Certain dispositions or mood states, for example, influence an individual’s propensity to help another person, and is possible to increase these personal factors through changing environmental and behavioral factors. (Carlson et al. 1988 and Geller 1994) (12). To support the general principle introduced earlier, a Total Safety Culture requires integrating both behavior –based and person-based approaches to understand and influence the human dynamism of a corporation.
From rugged individualism to interdependent teamwork

An employee-driven safety process requires teamwork founded on interpersonal trust, synergy, and win-win contingencies. However, from childhood most of them have been taught an individualistic and win-lose perspective. But the Total Safety Culture requires more interdependent teamwork than rugged individualism.

From piece meal to systems approach

The long term improvements of Total Safety Culture can only be achieved with a systems approach, including balanced attention to all aspects of the corporate culture.

From fault finding to fact finding

Blaming an individual or group of individuals for an injury-producing incident is not consistent with a systems approach to safety. Instead, an injury or near miss provides an opportunity to gather facts from all aspects of the system that could have contributed to the incident. However, most evaluations of near miss or injuries are incomplete, and are much less informative than they could be. “Accident Investigation” which is a commonly used term in industry mainly focuses upon a hunt for the single cause of a person to blame for a particular incident. To learn more about how to prevent injuries from an analysis of an incident, an approach with a different mindset is needed. It is not “Accident Investigation” – it is “incident analysis”. This simple substitution of words can have a great impact. More employees will participate in the process and reap more benefits.

Gain a broader understanding

A common myth in the safety field holds that injuries are caused by one critical factor—the root cause. By considering “The Safety Triad” one side is for environment, including tools, equipments, engineering design, climate, and housekeeping factors. Another side of this triangle stands for behavior, the actions every one did or did not
perform related to an incident. The third side represents personal factors, or the feelings of the people involved in the incident – their attitudes, perceptions, and personality characteristics.

Given the dynamic interdependency of environmental, behavioral and personal factors in everyday events it is not expected to find one root cause of an incident. Instead, one should take a systems approach and search for a variety of contributory factors within the environment, behavior, and person domains. It can be decided which of these factors can be changed to reduce the chance of another unfortunate incident.

**Improved Communication**

Intrapersonal conversation is the key to finding and correcting the potential contributors to an incident. People need to talk openly about the various environment, behavior and personal factors related to a near miss, injury, or damage to property. But this will not happen if the focus of the investigation is to find a single reason for the failure. People want nothing to do with failure. It is human nature to deny personal influences in a loss. To get such people to open up, it is needed to approach incident analysis as an opportunity for success. Such a mindset is right.

**Increased Involvement**

One can expect more participation in incident reporting and analysis if one involves workers in the actual correction phase of the process. People will contribute more if they have a say in the outcome. Workers know more than anyone else about what it will take to make environment, behavioral and personal factors safer.

**Apply systems solutions**

Traditionally, the corrective action following an incident is not designed narrowly, but is also applied narrowly. After doing the accident analysis the corrective / preventive action suggested is normally only implemented to that particular area. People will get a broader interest and involvement in an incident analysis process if corrective action
plans are applied to all relevant work areas. This promotes a systems perspective rather than piece meal “band-aid” approach. This sends the kind of actively caring message that not only promotes participation but also makes that participation more constructive.

**Promote Accountability**

Both the quality and quantity of participation in an incident analysis process depends on the numbers one uses to evaluate successes or failures. The success of any safety effort is ultimately by the bottom line outcome, the total recordable injury rate, but this index provides neither instructive guidance nor motivation to continue a particular safety process.

Instead, keep track of various components of an incident analysis. Monitor the number of near miss, property damage and injury reports. Track the number of corrective action implemented for environmental, behavior and person based factors. Then one has the accountability system that facilitates participation. The focus needs to be on successfully completing the various steps of the process rather than avoiding a penalty for not completing the process. Keep scores of the processes achievements rather than only waiting to see a reduction in injury.

### Table 01: Accident Investigation V/S Incident analysis

<table>
<thead>
<tr>
<th>Accident Investigation</th>
<th>Incident analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A safety professional investigates</td>
<td>A safety team analyses.</td>
</tr>
<tr>
<td>Reactive: investigate serious injuries</td>
<td>Proactive: analyze near hits and first aid cases.</td>
</tr>
<tr>
<td>Fault finding</td>
<td>Fact finding</td>
</tr>
<tr>
<td>One root cause</td>
<td>Many contributing factors</td>
</tr>
<tr>
<td>Piecemeal approach</td>
<td>Systems approach</td>
</tr>
<tr>
<td>Avoid failure</td>
<td>Achieve success</td>
</tr>
<tr>
<td>Conversation stifled</td>
<td>Conversation encouraged</td>
</tr>
<tr>
<td>Management corrects the environment</td>
<td>Workers recommend environmental change.</td>
</tr>
<tr>
<td>Management punishes the behavior</td>
<td>Workers encourage Behavior change.</td>
</tr>
<tr>
<td>Solution applied narrowly</td>
<td>Solution applied broadly</td>
</tr>
<tr>
<td>Evaluation focuses on injury rate</td>
<td>Evaluation focuses on participation.</td>
</tr>
</tbody>
</table>
Sensation, perception and perceived risk \(^{(12)}\)

It is critically important to understand that perceptions of risk vary among individuals. One cannot dramatically improve safety until people increase their perception of risk in various situations and reduce their overall tolerance for risk.

Figure 11: Relation of perception and accidents

The “S” of the BASIC ID acronym introduced earlier refers to sensation – a human dimension that influences one’s thinking, attitudes, emotions, and behavior. One uses five basic senses daily to experience one’s world, one sees, hears, smells, tastes and touches. One also know that his senses do not take in all of the information available in out immediate surroundings. Instead, one intentionally and unintentionally tunes in and tunes out certain features of his environment, thus some potential experiences are never realized.
This is a complex process. To experience life on a selective basis, one begins by using one’s five senses,

- Define (or encode) the information received.
- Interpret its meaning or relevance.
- Decide whether the information is worth remembering or responding to.
- Plan and execute a response (if called for)

At any time in this chain of information processing and decision making, one can and does impose one’s own individual bias, which is shaped by one’s past experiences, personality, intentions, aspirations, and expectations. One can see how one’s everyday sensation is dramatically influenced consciously and unconsciously by a number of “person factors” unique to the situation and the individual sensing of the situation. Psychologists refer to such biased sensation as “perception”.

**Selective sensation or perception**

It is quite possible that one may judge one thing on the perception one has in one’s thinking or as the situation demands. Reactions may be diverse to a particular situation and it can be the result of environmental factors, gender, age, occupation and personal experiences. But this is more dependent on the influences (instructions) given to a person making an assessment of the situation.

**Biased by context**

The context or environmental surroundings in one's visual field influence how one sees particular stimuli. E.g.: missing out spelling mistakes because one takes into consideration the meaning of the spelling when one sees it at once. Perception on the work place can be shaped by equipments, housekeeping, job titles, and work attire. In fact, one's own job title or work assignment can influence how one interacts with others or if needed, one choose not to interact at all.
Biased on one's past

It is widely accepted that one's past experiences influence one's present perceptions. Past experiences bias present perceptions. Actually, there is a long trial of intertwined factors here. Past experiences filter through the personal evaluation process that is influenced by many factors, including many past perceived experiences. The cumulative collection of these previous perceived experiences biases every new experience and makes it indeed difficult to “teach an old dog a new trick”.

Relevance to achieving a Total Safety Culture

One can become more tolerant of individuals who do not appear to share one's opinion or viewpoint. It is also possible that discussion on personal perceptions have reduced the tendency to blame individuals for an injury to look for a single root cause of an undesirable incident.

Perceived risk

People are generally underwhelmed or unimpressed by risk or safety hazards at work. This is because their experiences on the job lead them to perceive a low level of risk. This is strange. After all, it is quite probable someone will eventually be hurt on the job when they factor in the number of hours workers are exposed to various hazards.

Real V/S Perceived risk

The real risk associated with a particular hazard or behavior is determined by the magnitude of loss if a mishap occurs, and the probability that the loss or accident will indeed occur. Although the chance of accident is minuscule every time but in a lifetime the probability is quite high.

Estimating the risk of injury from working with certain equipment is even more difficult to determine because work situations change so dramatically. Plus, the risk
can be eliminated completely by the use of appropriate protective clothing or equipment. Yet, many people do not appreciate the value of using personal protective equipments or following safe operating procedures. Their perception of risk is generally much lower than actual risk. This thinking pervades society.

Research of risk communication has found that various characteristics of a hazard irrelevant to actual risk, influences people’s perception. It is important to consider these characteristics, because behavior is determined by perceived rather than actual risk.

Given below are the factors that influence one’s risk perceptions. These are derived from research by Sandman (1991), Slovic (1991) (12), and their colleagues. The factors listed on the left reduce perceptions of risk and are typically associated with the workplace. The opposing factors on the right-hand column have been found to increase risk perception, and these are not usefully experienced in the work setting. As a consequence, perception of risk on the job is not as high as it should be, and therefore, one does not work as defensively as one should.

<table>
<thead>
<tr>
<th>Lower Risk</th>
<th>Higher Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure is voluntary</td>
<td>Exposure is mandatory</td>
</tr>
<tr>
<td>Hazard is familiar</td>
<td>Hazard is unusual</td>
</tr>
<tr>
<td>Hazard is forgettable</td>
<td>Hazard is memorable</td>
</tr>
<tr>
<td>Hazard is cumulative</td>
<td>Hazard is catastrophic</td>
</tr>
<tr>
<td>Collective statistics</td>
<td>Individual statistics</td>
</tr>
<tr>
<td>Hazard is understood</td>
<td>Hazard is unknown</td>
</tr>
<tr>
<td>Harvard is controllable</td>
<td>Hazard is uncontrollable</td>
</tr>
<tr>
<td>Hazard affects anyone</td>
<td>Hazard affects vulnerable people</td>
</tr>
<tr>
<td>Preventable</td>
<td>Only reducible</td>
</tr>
<tr>
<td>Consequential</td>
<td>Inconsequential</td>
</tr>
</tbody>
</table>

Table 02: Lower Risk V/S High Risk

The power of choice

The hazard one chooses to experience (like driving, skiing, and working) are seen as less risky that one feel forced to endure (like food preservatives, environmental pollution, and earthquakes).
Familiarity breeds complacency

Familiarity is probably a more powerful determinant of perceived risk than choice. The more one know about a risk, the less it threatens one.

The power of publicity

It is easy to tune out the familiar hazards of the workplace. Safety professionals respond constantly remanding employees of risks with a steady stream of memos, newsletters, safety meetings, and signs. Still, these efforts cannot compete with the impact of unusual catastrophic and memorable event broadcast by the media and dramatized on television and in the movies.

Sympathy for victims

Many people feel sympathy for victims of a publicized incident, even vividly visualizing the injury as if it happened to them. Personalizing these experiences increases perceived risk. At work employees show much more attention and concern for hazards when injuries or near miss are discussed by the coworkers who experienced them, compared to a presentation of statistics. This suggests that one should shift the focus of safety meetings away from statistics emphasizing instead the human element of safety.

Understood and controllable hazards

Hazards that one can explain and control cause much less alarm than hazards that are not understood and thus, perceived as uncontrollable. This point is a problem with many employee safety education and training programs. Work place hazards are explained in a way that creates the impression that can be controlled. Indeed, safety professionals often state a vision or goal “Zero Injuries” implying complete control over the factors that cause injury. This actually lowers perceived risk by convincing people that the causes of occupational injuries are understood and controllable.
It would be better for safety leaders to admit and publicize that only two of the three types of factors contributing to workplace injuries can be managed effectively—environmental / equipment factors and work behaviors. The mysterious inside, unobservable, and subjective work of people dramatically influences the risk of personal injury. These attitudes, expectations, perceptions and personal characteristics cannot be measured, managed, or controlled reliably. Internal human factors make it impossible to prevent all injuries.

**Acceptable consequences**

One is less likely to feel threatened by risk taking or a risk exposure that has its own rewards. But if benefits are perceived by an at-risk-behavior or environmental conditions, outrage – or heightened perceived risk – is likely to be the reaction, along with a concerted effort to prevent or curtail risk.

**Sense of fairness**

Most people believe in a just fair world. When people receive benefits like increased productivity from their risky behavior, the outrage, public attention, or perceived risk is relatively low. On the other hand, when hazards or an injury seems unfair, then special attention is given. This increased attention results in more perceived risk.

The victims of the workplace injuries, however, are not perceived as weak and defenseless. Occupational injuries are indiscriminately distributed among employees who take risks, and they deserve what they get. This is a common perception or attitude and it lowers the outrage one feels when someone gets injured on the job. Lower outrage translates into lower perceived risks.

**Risk Compensation**

A discussion on risk perception would not be complete without examining one of the most controversial concepts in the field. In recent years, it has been given different
labels, including “risk homeostasis, risk or danger compensation, risk offsetting behavior, and perverse compensation”. Whatever the name, the basic idea is that people are presumed to adjust their behavior to compensate for changes in perceived risks. If a job is made safer with machine guards or the use of personal protective equipments, workers might reduce their perception of risk and thus, perform more recklessly. The notion of taking more risks to compensate for lower risk perception certainly seems intuitive.

**Stress v/s distress**

Stressors can contribute to a near miss or an injury, they are barriers to achieving a Total Safety Culture. However, stressors can provoke positive stress rather than negative distress, which can lead to constructive problem solving rather than destructive, at–risk behavior.

The concept of “attribution” is introduced as a cognitive process one uses to turn stressors into positive stress or negative distress. Attribution bias can reduce distress, but it can also prevent a constructive analysis of an injury or property damage incident.

It is estimated that from 75 to 85 percent of all industrial injuries can be partially attributed to inappropriate reaction to stress (Jones 1984). Furthermore, stress related headaches are the leading cause of lost-work time in United Sates (Jones,1984) (12).

Attribution errors along with stress and distress represent potential barriers to achieving a Total Safety Culture.

**What is Stress**

In simple terms, stress is a psychological and physiological reaction to events or situation in ones environment. What triggers the reaction is called a stressor. So stress
is the reaction of ones mind and body to stressor such as demands, threats, conflicts, frustrations, overload, or change.

There are so many people with much to do and not enough time to do it. Then the goals are thwarted, and stress turns to distress. Such frustration can lead to aggression and a demeanor that only increases distress. It is a vicious cycle, and it certainly increases one’s propensity for personal injury. Certain personality characteristics referred to as “Type A” are more likely to experience the time urgency and competitiveness and these are associated with high risk for coronary diseases.

**Constructive or destructive**

One usually talks about stress in negative terms. It is unwanted and uncomfortable, but it is defined in The American Heritage Dictionary (1991) as – “importance, significance, or emphasis placed on something.” Similarly, by The new Merriam-Webster Dictionary (1989) defines stress as – the factor that induces bodily or mental tension. a state induced by stress.. Urgency, emphasis”.

The bad state is distress. Distress is defined as “anxiety or suffering… severe strain resulting from exhaustion or an accident”- by The American Heritage Dictionary (1991). It also defined as “suffering of body or mind: pain, anguish : trouble, misfortune. a condition of desperate need” – by The new Merriam-Webster Dictionary (1989).

Stress can be positive, giving one heightened awareness, sharpened mental alertness and an increased readiness to perform. Certain psychological theories presume that some stress is necessary for people to perform.
The Yerkes-Dodson law states that, up to a point, performance will increase as arousal, or pressure to perform well, but the best performance comes when arousal is optimum rather than maximum. Push a person too far and his performance starts to deteriorate.

**The eyes of the beholder**

Perceptions play an important role in stress and distress. The boss gives a group of employees a deadline, some tighten up inside, others take it in their stride. Some circle their calendars and cannot take their minds off the due date. Other seems to pay it no heed.

When a stressor is noticed and causes a reaction, the result can be constructive or destructive. If one is in control— that one can deal with the overload, frustration, conflicts, or whatever is triggered by the stressor – one become aroused and motivated to go beyond the call of duty. One actually achieves more. On the other hand, when
one believes one cannot handle the demands of the stressor, the resulting psychological and physiological reactions are likely to be detrimental to one's performance and one's health and safety.

**Identifying stressors**

Stress or distress can be provoked by a wide range of demands and circumstances. Some stressors are acute, sudden life events, such as death or injury to a loved one, marriage, marital separation or divorce, birth of a baby, failure in school or at work, and a job promotion or relocation. Other stressors include the all too frequent minor hassles of every day life, from long lines and excessive traffic to downsized work conditions and worries about personal finances. Prolonged, uncontrollable stressors can lead to “burnout”. Common symptoms of burnout include:

1. Physical exhaustion resulting in lack of energy, headaches, backaches and general fatigue
2. Emotional exhaustion manifested by loss of appetite, feelings of helplessness, and depression.
3. Mental or attitudinal exhaustion revealed through irritability, cynicism, and a negative outlook on life

Obviously, burnout puts people at risk of causing injury to themselves or others. For the key points about stress and distress, the flow diagram in Figure 13, says it all. First, an environmental event is perceived and appraised as a stressor to be concerned about or as a harmless or irrelevant stimulus. Lazarus (1966,1991) refers to this stage of the process as primary appraisal. According to Lazarus, an event is perceived as a stressor if it involves harm or loss that has already occurred, a threat of some future danger or a challenge to be overcome.

Harm is how one appraises the impact of the event. For example, if one oversleeps and misses an important safety meeting. The damage is done. In contrast, threat is how one accesses potential future harm from the event. Missing the safety meeting
could lower a tour team’s opinion and reduce one’s opportunity to get actively involved in a new safety process. Challenge is the appraisal of how well one can eventually profit from the damage done. One could view missing the safety meeting as an opportunity to learn one-on-one discussion with coworkers. This could demonstrate one's personal commitment to the safety process and allow one to collect diverse opinion.

In this case, one perceives the stressor as an opportunity to learn and show commitment. This evaluation occurs during the secondary appraisal stage, and the result can be positive and constructive. On the other hand, one's appraisal could be downbeat—one see no recourse for meeting the safety meeting, and so one does nothing about it.

The secondary appraisal stage, as depicted in figure 13, determines whether the stressor leads to positive stress and constructive behavior or to negative stress and destructive behavior. The difference rests with the individual. Does he or she access the stressful situation as controllable and, thus, remain optimistic during attempts to cope with the stressor? When people judge their stressors as uncontrollable and unmanageable, a helpless or pessimistic attitude can prevail and lead to distress and destructive or even at – risk behavior. Several personal, interpersonal and environmental factors influence whether the secondary appraisal leads to constructive or destructive behavior.
Figure 13: Through Personnel appraisal, people transform stressors into positive stress or negative distress

Coping with stressors

Understanding the multiple causes of the conflict, frustration, overload, boredom, and other potential stressors in one’s lives can sometimes lead to effective coping mechanism. These include:

- Revising schedules to avoid hassles like traffic and shopping lines.
- Refusing a request that will overload.
- Finding time to truly relax and recuperate from tension and fatigue.
- Communicating effectively with others to clarify work duties, reduce conflicts, gain support, or feel more comfortable about added job duties.
- Getting reassigned to a task that better fits one’s present talents and aspirations.
Person Factor

Certain personality characteristics make some people more resistant to distress. Individuals who believe they control their own destinies and generally expect the best from life are, in fact more likely to gain control of their stressors and experience positive stress rather than realize that these person factors – self mastery and optimism – are not permanent inborn traits of people. They are states of mind or expectations derived from personal experiences that increase feelings of being “in control”-experiences that lead people to believe something good will come from their attempts to turn stress into constructive action.

Learn to feel helpless

Many a times when one assesses the safety climate of the work places, It often uncovers an attitude among hourly workers, and some managers as well, that reflects an important psychological concept called “learned helpless.” For instance when It is asked to the worker what they do regularly to make their workplace safer, often they say:

“Besides following the safety procedures there’s not much I can do for safety around here.”

“It really doesn’t matter much what I do, whatever will be will be.”

“There’s not much I can do about reducing work injuries; if it’s my time, it’s my time.”

This is learned helplessness. The concept was labeled more than 20 years ago by research psychologists studying the learning process of animals and humans (Maier and Seligman, 1976; Seligman 1975)\(^{(12)}\).

It is easy to assume that workers develop a “helpless” perspective regarding safety as a result of bad past experience. If safety suggestions are ignored, or policies and procedures always come from management. Workers might learn to feel helpless about safety. It is also true, however, that life experiences beyond the workplace can
shape an attitude to learned helplessness. Certain individuals will come to work with a greater propensity to feel helpless in general, and this can carry over to feelings regarding occupational safety and health.

Learned optimism

A bad experience does not necessarily lead to an attitude of learned helplessness. One probably knows some people who seem to derive strength or energy from their failures, and try even harder to succeed when given another chance. Similarly, it can be derived that some people tend to give up in the face of stressors, while others fight back.

What can be done to help those who feel helpless? How can one get them to commit to and participate in proactive processes of injury prevention? The work climate can play a critical role here. This happens when employees are empowered to make a difference and perceive they are successful.

When workers believe from their personal experience that their efforts can make a difference in safety, they develop an antidote or learned helplessness. This has been termed “learned optimism” (Carver and Seligman, 1992; Seligman 1991) (12). If the corporate climate empowers workers to take control and manage safely for themselves and their coworkers, they can legitimately attribute safety success to their own actions. This bolsters learned optimism and a feeling of being in control.

Fit for stressors

Fitness is another way to increase one's sense of personal control and optimism. Being physically fit increases one's body's ability to cope with the fight-or-flight syndrome. Workers probably know the basic guidelines for improving fitness which, include 'stop smoking' reduce or eliminate alcohol consumption, exercise regularly, eat balanced meals, not to skip breakfast and obtain enough sleep. One needs support and encouragement to give up a bad habit or to maintain a regular exercise routine.
**Social factors:**

A support system of friends, family and coworkers can do wonders at helping one reduce distress in one’s life’s (Coyne and Downey, 1991, Jain, 1983, Lieberman, 1983)\(^{(12)}\) Social support can motivate one to do what it takes to stay physically fit and the people around one can make a boring task bearable and even satisfying. Of course, they can also turn a stimulation job into something dull and tedious. It works both ways. People can motivate one or trigger conflict, frustration, hostility, a win-lose perspective, and distress. It is up to one to make the most of the people around one self. They can learn from those who take effective control of stressful situations and expect the best or they can listen to the complaining, back-stabbing, and cynicism of others and fuel their own potential for distress.

It is obviously important to interact with those who can help one to build resistance against distress and help one feel better about potential stressors. One can also set the right example and be the kind of social support to others that one wants for onself. The good feelings of personal control and optimism from reaching to help others can do wonders in helping him cope with his stressors. This actively caring stance builds one’s own support system, which one might need if one's stressors get too overwhelming to handle oneself.

**Attribution Bias**

Many times when there is an incident or near miss, employees facing it would give more emphasis on environmental factors rather than talking or writing about own distress. This helps to bias the report and focuses more on fault findings rather than fact findings.
The fundamental attribution error

Every day, one struggles to explain the actions of others. Why did she say that to me? Why did the job applicant refuse to answer that question? Why did Joe leave his workstation in such a mess? Why did the secretary hang up on me? Why did Gayle take sick leave? Why does the allow her young children to ride in the bed of her pick up truck? Why did the motorist pull a gun out of his glove compartment to shoot someone in the next car? Why were Nicole Brown-Simpson and Ronald Glodman murdered so brutally? In trying to answer questions like these, they point to external environmental factors, such as equipment malfunctioning, excessive traffic, warm climate, and work demands, or to internal, personal factors, such as personality, intelligence, attitude, or frustration.

Social psychologists have discovered a fundamental attribution error when systematically studying how people explain the behavior of others. When evaluating others, one tends to overestimate the influence of internal factors and underestimate external factors. They are more apt to judge the job applicant as rude or unaware (internal factors). Joe was sloppy or inconsiderate rather than overwhelmed by production demands. The injured employee was careless rather than distracted by a sudden environmental noise.

That is how one sees things when one is judging others; it is different when one evaluates oneself. The individuals performing the behaviors in the previous paragraph would say the causes owed more to external than internal factors.

The self-Serving bias

How does this bias affect incident or injury analysis?
People will obviously go to great lengths to shake blame for unintentional property damage or injury. This reduces negative stress or distress. No one wants to feel responsible for a workplace injury, especially if the company puts heavy emphasis on reducing “the numbers,” such as the plant’s total recordable injury rate.
One can see how a focus on outcome statistics, perhaps supported with rewards for not having an injury, can motivate people to cover up near hits and injuries whenever possible. It also motivates a self-serving bias during injury investigations. Actually, the term “investigation” as in “criminal investigation,” encourages the self–serving bias. A better term is “incident analysis.”

By accentuating outside causes, victims remind that behavior is, in fact, influenced by many external factors and, compared to internal factors, these are more readily corrected.

It is important for one to acknowledge how perceptions can be biased. Outsiders tend to blame the victim, victims look to extenuation circumstances. One should empathize with the self-serving bias of the victim because it will reduce the person’s distress. It will shift attention to external factors that can be controlled more easily than internal factors related to a person’s attitude, mood, or state of mind.

**Fatigue and Shift Patterns**

In the study conducted by “Health & Safety Executive” for the accidents of Railways in England, it was found that, the potential for fatigue–induced errors has been explored in a number of major accidents. They all resulted in major cost that were not only financial, but also in terms of human life and in some cases, environmental consequences.

The formal investigation identified uncontrolled levels of overtime working. 28% of the workforce worked 7 days every week and another 34% worked 13 days out of 14. This led to recommendations of monitoring to reduce excessive levels of overtime and then the introduction of scheduled hours to make better provision for weekend engineering working.
Insurance Based Credit Scoring individual and Contextual Co-relation of risk \(^{(9)}\)

This study indicates that there is a direct co-relation between the socioeconomic status and risk. In fact, it suggests that socioeconomic status is the single best predictor of a wide variety of risk.

Figure 14 & 15 show the graphical representation of the studies carried out by this insurance company in England.

**Fig 14 : Risk and Socioeconomic Status: Evidence from around the**

Self-Reported Health by Family Income

Behavior-based psychology

Basic principles

To achieve a Total Safety Culture, one needs to integrate behavior-based and person-based psychology and effect large-scale culture change.

The overall map or guiding principle is represented by the Safety Triad (Figure 6). Its reference points are the three primary determinants of safety performance-environment, person, and behavior factor. To achieve a Total Safety Culture, one needs to understand and pay attention to each.

In the BASIC ID acronym as introduced earlier to express to complexity of human dynamics and the special challenges involved in preventing injuries, Behavior was the first dimension discussed, and it is implicated directly or indirectly in each of the other dimensions. Attitudes, sensations, imagery, and cognitions- the thinking person side of the Safety Triad (Geller et al., 1989) are each influenced by behavior. That is what is meant by the phrase, “Acting people into changing their thinking.” When one changes his behavior, such as adopting a new strategy or paradigm, certain personal factors change, too.

The reverse is also true. Changes in attitudes, sensations, imagery, and cognitions can alter behaviors. However, considerable research has shown that it is easier and more cost effective to “act people into changing their thinking” than the reverse, especially in organizations and community setting (Glenwick and Jason, 1980, 1993, Goldstein and Krasner, 1987, Greene et al, 1987)

Primacy of behavior

Whether treating clinical problems (such as drug abuse, sexual dysfunction, depression, anxiety, pain, hypertension, and child or spouse abuse) or preventing any
number of health, social or environmental ills (from developing healthy and safe lifestyle to improving education and protecting the environment), overt behavior is the focus. Treatment of prevention is based on three basic questions.

1. What behavior needs to be increased or decreased to treat or prevent the problem?
2. What environmental conditions, including interpersonal relationships, are currently supporting the undesirable behaviors or inhibiting desirable behavior?
3. What environmental or social conditions can be changed to decrease undesirable behavior and increase desirable behaviors?

Thus, behavior is both the outcome and the means. it is the desired outcome treatment or prevention, and the means to solving the identified problem.

**Reducing at–risk behavior**

Heinrich’s well known law of the safety implicates at risk behavior as a root cause of most near hits and injuries (Heinrich et al., 1980) over the past 20 years, various behavior-based research studies have verified this aspect of Heinrich’s law by systematically evaluating the impact of interventions was a common ingredient in most of the successful intervention processes, whether the feedback was delivered verbally, graphically by tables and charts, or through corrective action.
Figure 16 – Behavior-based safety can decrease at-risk behavior in order to avoid failure

The behavior based approach to reducing injuries is depicted in Figure 16. At risk behavior is presumed to be a major cause of a series of progressively more serious incidents, from a near hit to a fatality. According to Heinrich’s law, there are numerous risky acts for every near hit and many more near hits than lost time injuries. This is fortunate news, but let one not forget that timing or luck is usually the only difference between a near hit and a serious injury.

Typically, behavior change techniques are applied to specific targets. It is necessary, that participants know why targeted behaviors are undesirable and have the physical ability to avoid them. Education and engineering interventions are sometimes needed to satisfy the physical and knowledge factors of figure 16. The execution factors
which represent the motivational aspect of the problem, usually require the most attention. In other words, people usually know what at risk behavior to avoid and have the ability to do so, but their motivation might be lacking or misdirected. Behavior change techniques are used to align individual and group motivation with avoiding the undesired at risk behavior.

Values and attitude form the foundation of the pyramid in figure 16. This happens when people believe in the safety process and help to make it work. Behavior helps to make the process work and, if involvement is voluntary and appropriately rewarded, it will lead to supportive attitudes and values to keep the process going.

**Du Pont Stop**

One popular behavior safety intervention is Du Pont’s STOP (for Safety Training and Observation Program). Employees are given a STOP card to record the occurrence of at least one at-risk behavior or work conditions each workday, along with their corrective action. At the end of the day the STOP cards are collected, compiled and recorded in the data log. Sometimes the data is transferred to a display chart or graph for feedback.

It was seen that Du Pont STOP works well in some plants, In other plants it met with substantial resistance. Why? Interviews conducted with employees illustrate some important reminders for rolling out a behavior based process. In some cases employees felt that the program was not theirs, it was forced on them by the management Behavior observations programs cannot succeed if they are viewed as “gotcha” or “rat on your buddy” campaign. Employees will refuse to record the at-risk behavior of their peers or focus only on environmental conditions.

Behavior based approach illustrated in the earlier figure is failure oriented, it is also more reactive than proactive. The outcome measure are failures – fatalities, lost work days and the like- that require a fix.

The reactive and punitive approach is typically for government agencies. The most
convenient way to control behavior is to pass a law and enforce it. It is usually better
to focus on increasing safe behavior. This is being proactive, when safe behaviors are
substituted for at risk-behaviors, injures will be prevented. By emphasizing safe
behaviors, employees feel more positive about the process and are more willing to
participate.

**TOFS (Time out for safety)** (8)

Mr Mike Simpson, the Santa Fe drilling manager for the Andrew, is credited with the
idea for TOFS. The concept was initially presented to the Andrew work force at an
away day prior to installation hook-up. Initially TOFS only appeared to be relevant to
drilling operations because it was designed to operate in a drilling context, where
team members work closely together and all team members need to have a clear
understanding of what is happening. In contrast, production teams tend to be more
dispersed and communication tends to occur over a longer time-scale (hours versus
minutes). Despite these differences, it became clear that TOFS had a wider
application and was adopted by the entire platform six months after platform
commissioning.

One of the most distinctive features of TOFS is its simplicity. The technique provides
team members with a mechanism to stop any operation if they are uncertain about
anything or have safety concerns. Employees 'call a TOFS' by making a T sign with
their hands. This signal is useful in noisy environments where it can be difficult to
hear colleagues. The technique provides a medium to promote this positive behavior,
which was encouraged before the advent of TOFS. The technique makes it clear that
employees are able, and in fact expected, to stop a job if they feel this is necessary.

**Advance Safety Auditing - ASA** (8)

Advanced Safety Auditing was originally developed in the UK coal mining industry.
Three principles underpin ASA: accurate observation, effective two-way
communication and individual goal-setting. ASA training requires that auditors must
demonstrate the safety is of equal importance to other work priorities: if safety
conflicts with other priorities, safety must always win. Audits involve observing other people at work, and focus on behaviors. Auditors attend to those aspects of work which are critical to safety, using all of their senses. Following a period of observation, the auditor initiates a conversation, using an open questioning technique. Ideally the auditee should be speaking for at least 75% of the time, whilst the auditor listens carefully. The aim of this form of conversation is to guide the auditee to recognize any hazards and unsafe behavior, and formulate solutions. Good work performance and safe working practices are commended. The final very important element of the ASA process is to gain commitment to what the auditee will do in the future to ensure safe working and confirming any actions necessary to the auditor. Fellow-auditors are encouraged to share learning from ASA’s with as wide an audience as possible.

**Care Plus**

Cormorant Alpha staff describes Care Plus as a behavioral intervention system owned and driven by the workforce. It has also been referred to as a full behavioral intervention, as it involves peer observation of specified safety behaviors, face to face feedback, goal setting by the workforce and graphical presentation of performance against targets.

Care Plus is managed by a steering committee, which is made up of workforce employees who volunteered to participate in the programme. In effect there is one steering group across the four platform shifts with communication facilitated through the use of IT and quarterly review meetings onshore as a complete steering committee. The steering group members initially received training to develop the skills and knowledge required to run a behavior modification programme. The steering group specified the behaviors that they were going to measure and defined what constituted safe and unsafe behavior. Once the behavioral measure had been finalized observer training was provided for 35 volunteers. The training was delivered offshore over two shifts by the consultant that designed the programme. Baseline data was collected following the completion of observer training and used as the basis for the participative goal setting exercise, where the steering committee led the entire
workforce in setting targets for the level of safe behavior they aim to achieve over the next three month period. Supervisors were excluded from the steering group, but they supported the process by ensuring that observers have time to carry out observation trips. The results of the observation trips are summarized regularly and performance against targets is presented graphically.
Increasing Safe Behaviors: (12)

Figure 17: Behavior based safety can increase safe behavior in order to achieve success

Figure 17 illustrates a positive and proactive behavior – based model. It is not recommended instead of the corrective approach depicted in Figure 16. A complete behavior-based process should target both what is right and wrong about a particular
work routine but, again, more employees will participate with a positive attitude and remain committed overtime if there is more recognition than correction of failure.

**Monitoring achievement**

The indices of achievement in figure 16 are generally more difficult to record and track than those in figure 16. Actually, the failure outcomes in Figure 16 are observed and recorded quite naturally. Except for near miss and first-aid cases, the failures in figure 16 have traditionally resulted in systematic investigation and formal reports. In contrast, the achievement in figure 17 is somewhat difficult to define and record. In fact it is impossible to obtain an objective record of the number of injuries prevented. A reasonable estimate of injuries prevented can be calculated, through, after achieving consistent decrease in injuries as a result of a proactively, behavior-based process.

It is possible to derive direct and objective definitions of the other success indices in figure 17 and to use these to estimate overall achievement. Involvement, for example can be defined by recording participation in programs, and incident of corrective action can be counted in a number of situations. It can also be charted by the number of safety work orders turned in and complete, the number of safety audits conducted and safety suggestions given, and the number of safety improvement occurring as a result of near miss reports.

**Safety Share**

The safety share noted in figure 17 is a simple behavior-focused process that reflects emphasis on achievement. At the start of group meetings, the leader asks participants to report something they have done for safety during the past week or since the last meeting. Because the safety share is used to open all kinds of meetings, safety is given a special status and integrated into the overall business agenda. The experience is that people come to expect queries about their safety accomplishment, and many go out of their way to have an impressive safety story to share.
The simple awareness booster – what have you done for safety helps teach an important lesson. Employees learn that safety is not only loss control, and attempt to avoid failure, but can be discussed in the same term of achievement as productivity, quality and profits. As a measurement tool, it is possible to count and monitor the number of safety shares offered per meeting as an estimate of proactive safety success in the work culture.

In conclusion, the variety of successful applications of the behavior – based principles – the primary factors of behavior, direct assessment and evaluation, intervention by managers and peers, and three types of learning are explained in this section. Because at-risk behavior contributes to most if not all injuries, a Total Safety culture requires a decrease in at-risk-behavior. Organizations have attempted to do this by targeting at-risk acts, exclusive of safe acts, and using corrective feedback, reprimands, or disciplinary action to motivate behavior change. This approach is useful, but less proactive and less apt to be widely accepted than a behavior-based approach that emphasizes recognition of safe behavior.

The three types of learning are relevant for understanding safety-related behaviors and attitudes. Most of one’s safe and at-risk behavior are learned operant behavior, performed in a particular setting to gain positive consequences or to avoid negative consequences. Classical conditioning often occurs at the same time to link the positive or negative emotional reactions with the stimulus causes surrounding the experience of receiving consequences. These causes include the people who deliver the reward or punishment. One often learns what to do and what not do by watching others receive recognition or correction for their operant behavior. This is observational learning, an ongoing process they should motivate one to try to set a safe example all times.

Identifying critical behavior

E.Scott Geller gives the practical method of implementing a behavior-based- safety process to develop a Total Safety Culture. The overall process is referred to as DO IT, each letter representing four basic components of behavior approach: Define target
behavior to influence, observe these behaviors, intervene to increases or decrease target behaviors, and test the impact of the intervention process. The whole process is based on developing a critical behavior checklist for objective observing, intervening, and testing.

Defining critical behavior to target for observation and intervention is not easy. A work team needs to consult a variety of sources, including the workers themselves, near miss reports, injury records, job hazard analyses, and the plant safety director. After selecting a list of behavior critical to preventing injuries in their work area, the team needs to struggle through defining these behaviors so precisely that all observers agree on a particular property of each behavior at least 80% of the time. The behavioral property most of the time observed for industrial safety is frequency of occurrence per individual worker or per group of employees.

A critical behavior checklist (CBC) is used to observe and record the relative frequency (or percentage of opportunities) when critical behaviors occurs throughout the work setting. If the CBC contains only a few behaviors or behavioral outcomes (conditions caused by behavior), it is possible to conduct observations without engaging in a one-on-one coaching session. This is often the best approach to use when first introducing behavior-based safety to a work culture. It is not as overwhelming as one-on-one coaching with comprehensive CBC.

Over time and through building trust, a short CBC can be readily expanded and leads to one-on-one safety coaching. Safety coaching is one very effective way to implement each stage of the DO IT process.
Example of critical behavior checklist for use of proper personal protective equipment \[^{17}\]

Table : 03 – Critical Behavior Checklist

<table>
<thead>
<tr>
<th>Critical Behavior Checklist for Personal Protective Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation period (dates) :</td>
</tr>
<tr>
<td>Observer :</td>
</tr>
<tr>
<td>Total no. of employees observed</td>
</tr>
<tr>
<td>PPE ( for observed area)</td>
</tr>
<tr>
<td>Safety Glasses / Shield</td>
</tr>
<tr>
<td>Hearing Protection</td>
</tr>
<tr>
<td>Safety Shoes</td>
</tr>
<tr>
<td>Hard Hat</td>
</tr>
<tr>
<td>Lifting belts</td>
</tr>
</tbody>
</table>

**Behavioral Safety analysis \[^{12}\]**

E.Scott Geller, details the procedure of a behavioral safety analysis, including a step-by-step examination of the situational, social, and personal factors influencing at risk behavior in order to determine that most cost-effective corrective action. Critical distinctions are made between the four types of intervention, instruction, motivation, support and self management between training and education, and between accountability and responsibility.

He offers some basic guidelines for diagnosing the human behavior aspect of a safety-related problem. Many situational, social, and personal factors contribute to a behavioral discrepancy- a distinction between the behavior performed and the behavior desired. In safety terms, this is the difference between at-risk and safe behavior.

Most of the factors contributing to a behavioral discrepancy are due to the context in which the task is performed or characteristics of the task itself. Common contextual variables include:
1. Unclear or misunderstood expectancies.
2. Upside-down contingencies that reward at risk behavior or punish safe behavior.
3. The lack of behavior-based feedback to help people to improve.

Often a job can be simplified or re-engineered to reduce physical or mental effort, which decreases the probability of personal injury.

Training should only be considered after critical contextual and task variable have been analyzed and corrected. Adequate educations also enable a worker customization of procedures to fit a particular work context. This in turn leads to employee ownership of the process, a feeling of responsibility and increased involvement. Some training is required to keep people in practice for handling a relatively rare event (as in emergency training), while other training is needed to help people change frequently occurring at-risk behavior to safe behavior. There is a training needed to introduce a new procedure or process. Each of these training situation requires behavior-based feedback.

Education and training reflects an instructional approach to corrective action. This type of intervention is obviously most effective when the participants are willing to learn. They are unaware of the correct procedures and are “unconsciously incompetent”. Instructions will not help much for people who know what to do but do not do it. These individuals are “consciously incompetent” and need a motivational intervention.

For most of the employees, the issue is not a matter of knowing what is safe. They periodically perform all of the safe operating procedures called for on the job. The problem is consistency or fluency. They do not follow the safe protocol every time. These people need supportive intervention to keep them on a safe protocol every time.
When safe work particles are relatively convenient like putting a PPE or buckling a safety belt, the behavior can become habitual. When such behavior becomes a natural part of the work routine, the participant is considered “unconsciously competent”. However, some behavior like locking out a power source, are relatively complex and never reach the automatic stage. Regular supportive intervention is often needed to keep these inconvenient behavior going, unless the individual is self-directed with regard to the particular behavior.

The bottom line is that before selecting an intervention strategy, conduct a careful analysis of the situations the behaviors, and the individuals involved in an observed discrepancy between desired and actual performance. Do not impulsively assume corrective action requires “training” or “discipline”. A behavioral safety analysis will likely give priority to a number of alternative interventions and approaches. Performing such an analysis before intervening will help ensure that the corrective action plan does not reflect malpractice.

**Intervening with activators** (12)

Intervention techniques called activators occur before desired or undesired behavior to direct potential performers. Based on rigorous behavioral science research and backed by real-world examples, six principles for maximizing effective activators were given. They are:

- Specify behavior.
- Maintain salience with novelty.
- Vary the messages.
- Involve the target audience.
- Activate close to response opportunity.
- Implication consequences.

Geller specifies that there needs to be careful planning of the right safety directives (activators) which will influence the behavior of the person.
Intervening with consequences

Consequences motivate behavior and related attitude. This happens in various ways. Consequences can be positive or negative, intrinsic (natural) or extrinsic (external) to a task, and internal or external to be person. These characteristics need to be considered when designing and evaluating intervention programs. Natural consequences produced by the target behavior are usually immediate and certain. In contrast, extra consequences are added to the situation and often delayed and may be uncertain. Extra consequences are necessary when the natural consequences are insufficient to motivate the desired behavior, as is often the case with safety related activities.

<table>
<thead>
<tr>
<th>Source of consequence Relative to task</th>
<th>Natural (immediate)</th>
<th>Extra (often delayed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>Listening to music, reading for pleasure, watching television</td>
<td>Reading for Homework, Reading for work, Monitoring instruments.</td>
</tr>
<tr>
<td>External</td>
<td>Playing recreational sports, doing crossword puzzles, painting a picture</td>
<td>Playing professional sports, doing math homework, working on assembly lines</td>
</tr>
</tbody>
</table>

Figure: 18   Behavior is motivated by four different types of consequences

A behavior consequences contingency is a relationship between a target behavior to be influenced and a consequence that follows. Safety can be improved by managing or manipulating four distinct behavior consequences relationships. Specifically, the probability of injury can be reduced by:
1. Increasing positive consequence of safe behavior.
2. Decreasing negative consequence of safe behavior.
3. Decreasing positive consequence of at-risk behavior.
4. Increasing negative consequence of at-risk behavior.
Discipline and involvement

There is futility of using punishment as a corrective measure in most situations. Errors, cognitive failure and mistakes are unintentional and often caused by environmental factors. When errors are intentional (as in calculated risk), the person did not intend to cause an injury. Rather, there were factors in the situation that influenced the decision to take risk. These factors need to be discovered and addressed.

Figure 19: Punishment is only warranted when the undesirable behavior is intentional and not encouraged by the work culture.

Basic Guidelines

The seven basic guidelines for establishing an incentive / reward program to motivate the occurrence of safety-related behavior and improve industrial health and safety are:

1. The behaviors required to achieve a safety reward should be specified and perceived as achievable by all participants.
2. Everyone who meets with the behavior criteria’s should be rewarded.
3. It is better for many participants to receive small rewards than for one person to receive a big reward.
4. The rewards should be displayed and represent safety achievement.
5. Contests should not reward one group at the expense of another.
6. Groups should not be penalized or lose their reward for failure by an individual.

7. Progress towards achieving a safety reward should be systematically monitored and publicly posted for all participants.

**Intervening as a behavior change agent**

The letters of COACH represents the critical sequential steps of safety coaching: Care, Observe, Analyze, Communicate, Help. This coaching process is clearly relevant for improving behaviors in the area of safety.

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**Figure 20:** The five letters of COACH represents the basic ingredients of effective safety coaching
An ExxonMobil Chemical facility in Texas has demonstrated exemplary success with a coaching process based on the principles and procedures of COACH.

![TRIR record graph](image)

**Figure 21: COACH and recordable injuries graph**

Safety coaching is a key intervention process for developing and maintaining a Total Safety Culture.

**Intervening with supportive conversation**

Interpersonal conversation defines the culture in which one works. It can create conflict and build a barrier to safety improvement or it can cultivate the kind of work culture needed to make a major breakthrough in injury prevention. Interpersonal conversation also affects one's interpersonal conversations or self-talk, which in turn influences one's willingness to get involved in safety improvement efforts.

The following strategies listed here for getting the most from interpersonal conversation are reviewed. Each technique is relevant for getting more safety-related involvement from others. Applying these strategies effectively can improve one’s self talk or interpersonal conversations. This leads to increased self-esteem and
perceptions of empowerment – person states which enhance an individual's willingness to actively care for the safety and health of others.

**Safety Conversation Checklist**

- Listen attentively and proactively.
- Focus on positive actions observed.
- Draw out responses from the other person.
- Influence others to tell you what they should do to be safe.
- Ask questions with a sincere and caring demeanor.
- Act as if you don’t know the answer, even though you think you do.
- Shift the focus to future possibilities for improvement.
- Bring the conversation back to the present and develop an action plan.
- Seek a verbal commitment to follow the action plan.
- Plant words to improve public and self-image.

In conclusion the status of safety in one’s organization is greatly determined by how safety is talked about – from manager’s board room to the workers break room. Whether one feels responsible for safety and is committed to go for a breakthrough depends on one's interpersonal or mental script about safety conversation.

**Actively caring**

Actively caring behavior is planned and purposeful. It can be direct or indirect and its focus is on the environment, person, or behavior. Actively caring that addresses the environment is usually easiest to perform because it does not involve interpersonal confrontation. Behavior focused actively caring is often most proactive but is most difficult to carry out effectively because it attempts to influence another person’s behavior in a non emergency situation.
A decision model developed by Latane & Darley helps one to understand why one does not see more actively caring behavior. Before one steps in either reactively or proactively one presumably make five sequential decisions.

Figure 22: Actively caring model

This decision logic suggests certain methods for increasing the likelihood that people will get involved. For e.g.: the model shows that importance to teaching employees how to recognize and correct environmental hazards and at-risk behavior.
The person based approach to actively caring (12)

One’s willingness to actively care for others is affected by certain and states of mind. If one has a strong seed of self-esteem, self-efficacy, personal control, optimism and belonging, there is a greater chance one will go beyond the call of duty. Understanding these connections enables one to design conditions and interventions to increase actively caring throughout an organization or community.

The effect of Team work on Safety Processes and outcomes (8)

The research carried out in continuation of the study done by Frone, 1998; Hemingway & Smith, 1999, Zohar 2000. Suggests that team structures within organizations can have positive consequences for safety.

The research carried out by many researchers (Nicker Turner & Sharon K. Parker), suggested that team structures within organizations can have positive consequences for safety. However, a shortage of rigorously filed studies, especially those focusing on health and safety committees and autonomous work teams- combined with highly diverse methods, measures and setting, make it important to qualify such a conclusion.

One reason that teams appear to be important is that they provided a structure for employee involvement in decision making.

Assessing Employee Attitude towards Behavioral Approaches to Safety management within UK Reactor Plants (19)

The objective of the study was to assess employee attitudes towards behavioral approaches to safety management. The impact on “Employee role in BSP (observer and non-observer) was focused upon three sites of reactor.

The questionnaire developed by the team was given to 157 employees and there were 28 objective questions and 1 open ended question.
Employees reported positive perceptions of the Behavioral Safety Process, at their site:

1. BSP was considered to be an important approach to improving safety at site.
2. BSP assists in changing of attitudes.
3. BSP acts as motivator.
4. BSP encourages communication.

Behavior-Based Safety Reduces Lost Days at a Manufacturing Facility (24)

Dr. Boyce assisted in the implementation of behavior-based safety with 476 hourly and salary employees at a manufacturing facility that produces engine parts for a large American automobile company. The population of employees ranged in age from 19 to 63 years and employment at the facility ranged from six months to more than 25 years. The proportion of hourly to salary workers was approximately five to one.

Figure 23 below depicts a cumulative record of this organization's lost workdays for 18 months prior to and 18 months following the introduction of the BBS process. The figure shows a marked decrease in lost days due to injuries after the start of BBS education and training, implementation of observation and feedback for hearing protection, and the department specific interventions. An average of 10.9 lost days per month occurred prior to BBS; whereas after BBS, an average of 1.5 days per month was lost due to injury.
BBS: A case study illustrating a successful approach (6)

A large paper manufacturing company in Australia recognized that many of the injuries and incidents that were occurring at two of their paper mills were attributable to at-risk behavior. Therefore, the introduction of BBS program was seen to be an appropriate approach to address this issue.

At first the pilot test of the program failed due to the following points:

1. Failure to establish workforce buy-in and commitment to the process.
2. Workers and unions were concerned about the principles behind the process.
3. The program was too advanced for the current organizations and its workforce to cope with.
4. The program was not well integrated with existing systems and the required infrastructure was not in place to support the programs functioning.
These key issues were taken into account and a revised strategy was formulated:

1. Assessment: A assessment of current safety culture and review of current safety management systems were carried out.
2. Design: The workforce was actively involved in designing the new Behavior based safety program.
3. Implementation: The program was phased in over three months across two paper mill sites. Every person working on the site was trained. Representatives from shop floor and management were integrated, and the BBS program was actively practiced.
4. Follow up: A strong mechanism of follow-up was planned and implemented after the program started implementation.

This approach helped the company to substantially decrease the injury and incident rate over few years of implementation period.

Encouraging self-protective employee behavior – Case studies

Employees survey done by Robert H. Peters of U.S bureau of Mines, found that under the following heading the empirical evidences tell us that:

Incentive

One criticism of safety incentive program is that they may encourage employees to fail to report relatively minor types of accidents and injuries in order to avoid all or a portion of the reward being offered.

Fear Message

Leventhal’s (1970) model of the effect of fear message assumes that a highly threatening communication will produce multiple responses and the strength of this association will change with the passage of time. The research evidence is quite clear
in showing that fear communications can be effective in persuading people to modify their attitudes and intentions towards adopting some form of preventive act or treatment in order to avoid an unwanted outcome. Cohen, Colligan and Berger (1985) identified several factors other than the content of the message that also appear to have an important impact on the effectiveness of attempts to communicate warnings to employees.

**Disciplinary action**

Evidence shows that many companies combine safety training with the threat of disciplinary actions designed to encourage safe behaviors. However, little evidence exists regarding the extent to which the organizations actually use these disciplinary procedures to improve safety. Sulzer – Azaroff (1928) reviewed the empirical evidence on the effectiveness of punishment to suppress or eliminate unsafe behavior. She cites that use or threatened use of punishment brought about significant improvements in safety performance. However, she argues that most attempts to improve safety through the application of the aversive consequences are not very effective because the reinforced conditions are less than optimal.

**Management and Employees involvement**

Several studies have attempted to identify organizational and safety program characteristics that differentiate between companies with good and poor safety records. A consistent finding of these studies is that there is an open two-way communication system between labor and management and where management encourages employees to participate in the identification and control of hazards.
Human reliability analysis

It is an assessment of the human contribution to risks, commonly known as “Human Reliability Analysis” (HRA). There are two distinct types of HRA:

a) Qualitative: Assessments that aim to identify potential human failures and optimize the factors that may influence human performance and

b) Quantitative: Assessments which, in addition, aim to estimate the likelihood of such failures occurring. The result of quantitative HRAs can feed into traditional engineering risk assessment tools and methodologies, such as event and fault tree analysis.

There are difficulties in quantifying human failures (e.g. relating to a lack of data regarding the factors that influence performance), however, there are significant benefits to the qualitative approach and it is this type of HRA that is described below.

This structure is well-established and has been applied in numerous industries, including chemical, nuclear and rail. This approach is often referred to as “human HAZOP”. The following are the steps which are adopted for conducting this study.

1) Consider main site hazards.
2) Identify manual activities that affect these hazards.
3) Outline the key steps in these activities.
4) Identify potential human failures in these steps.
5) Identify factors that make these failures more likely.
6) Manage the failures using hierarchy of control.
7) Manage error recovery.

Human factors designing equipments

Many incidents show that, whenever people use control systems whether by turning valves, using pushbuttons, or a keyboards if those systems are poorly designed, then
the operator, could make an error. Poor design in this way is one example of a “Human Factor “problem.

Figure: 24 – The circle of Human Factor.

**Human Factor Checklist**

In order to facilitate the understanding and application of human factors, which underlie most mishap, Anthony Ciavarelli, of school of Aviation Safety has developed a “Human Factor Checklist” which is intended to serve as a user-friendly accident investigation tool by identifying potential source of human error. The major categories of checklist are as follows:

1. **Sensory perception:** Capabilities and limitations in our ability to see, hear, and correctly interpret incoming sensory information.

2. **Medical physiological:** Refers to the physiological or psychological state of a person at the time of a mishap or incident. e.g.: Loss of oxygen, physical stressors such as noise, vibration, heat or cold and physiological factors such as lack of sleep or inadequate rest, use or exposure of rugs, mental or impairment from presence of situational or cumulative social stressors.
3. **Knowledge and skill:** Ability to understand and use information and perform task and the task sequence at the right time and in the right order.

4. **Personality / Attitude:** personality refers to persistent patterns of behavior which epitomize our interpersonal style and interactions. Attitudes refer to the combined belief, feeling and intend behavior towards a particular person, idea or situation.

5. **Decision / judgment:** Capabilities and limitations in our ability to assess hazard and / or associated mission risk related to skill level, work limits or status or environment.

6. **Communication / Coordination:** Refers to capabilities and limitations in a person’s ability to transmit and receive information regarding performance of task.

7. **Design / systems:** Refers to system equipment design deficiencies, including poor control or display placement, inadequate displayed data, and poor documentation of system operation or maintenance procedures.

8. **Supervisory:** Refers to leadership, culture and organizational factors such as organization climate which is defined as attitudes polices and practices established. Errors include thins such as poor organization climate, failure to establish adequate standards, failure to monitor compliance of standards and failure to remove a known high-risk behavior.

**The 50 principles**

E.Scott Geller has put together 50 important principles that summarize the psychology of safety and lay the ground work for building a Total Safety Culture. They are summarized as follows:

1. Safety should be internally- not externally-driven.
2. Culture change requires people to understand the principles and how to use them.
3. Champions of a Total Safety Culture will emanate from those who teach the principles and procedures.
4. Leadership can be developed by teaching and demonstrating the characteristics of effective leaders.
5. Focus recognition, education and training on people reluctant but willing, rather than those resisting.
6. Giving opportunities for those can increase commitment, ownership and involvement.
7. A Total Safety Culture requires continuous attention to factors in three domains, environment, behavior and person.
8. Do not count on commonsense for safety improvement.
9. Safety intensive program should focus on the process rather than outcomes.
10. Safety should not be considered as a priority but a value with no compromise.
11. Safety is continuous fight with human nature.
12. Behavior is learned from three basic processes: classical conditioning, operant conditioning, and observational learning.
13. People view behavior as correct and appropriate to the degree they see others doing it.
14. People will blindly follow authority, even when the mandate runs counter to good judgment and social responsibility.
15. Social loafing can be prevented by increasing personal responsibility, individual accountability, group cohesion, and interdependence.
16. On the job observation and interpersonal feedback are key to achieving a Total Safety Culture.
17. Behavior based safety is continuous DO IT process.
18. Behavior is directed by activators and motivated by consequences.
19. Intervention impact is influenced by the amount of response information, participation and social support, as well as external consequences.
20. Extra and external consequences should not over justify the target behavior.
21. People are motivated to maximize positive consequences (rewards) and minimize negative consequences (costs).
22. Behavior is motivated by eight types of consequences: positive v/s negative, natural v/s extra, and internal v/s external.
23. Negative consequences have four undesirable side effects: escape, aggression, apathy, and counter control.
24. Natural variation in behavior can lead to a belief that negative consequences have more impact than positive consequences.
25. Long-term behavior change requires people to change “inside” as well as “outside”
26. All perceptions is biased and reflects personal, history, prejudices, motives, and expectations.
27. Perceived risk is lower when hazard is perceived as familiar, understood, controllable and preventable.
28. The slogan “all injures are preventable” is false and reduces perceived risk.
29. People compensate for increase in perceived safety by taking more risk.
30. When people evaluate others hey focus on internal factors; when evaluating personal performance, they focus on external factors.
31. When succeeding, people over attribute internal factors, but when failing, people over attribute external factors.
32. People feel more personal control when working to achieve success than when working to avoid failure.
33. Stressors leas to positive stress or negative distress depending on appraisal of personal control.
34. In a total Safety Culture everyone goes beyond the call of duty for the safety of themselves and others – by actively caring.
35. Actively caring should be planned and purposeful and focus on the environment, person, or behavior.
36. Direct, behavior based focused actively caring is proactive and most challenging and requires effective communication skill.
37. Safety coaching that starts with caring and involves observing, analyze, and communicating and leads to helping.
38. Actively caring can be increased indirectly with procedures that enhance self-esteem, belonging, and empowerment.
39. Empowerment is facilitated with increase in self-efficacy, personal control and optimism.
40. When people feel empowered, there safety behavior spreads to other situations and behaviors.
41. Actively caring can be increased directly by educating people about factors contributing to be stander apathy.
42. As the number of observers of a crisis increases, the probability of helping decreases.
43. Actively caring behavior is facilitated when appreciated and inhibited when unappreciated.
44. A positive reaction to actively caring can increase self-esteem, empowerment and sense of belonging.
45. The universal norm of consistency and reciprocity motivate everyday behavior, including actively caring.
46. Once people make a commitment, they encounter internal and external pressures to think and act consistency with their positions.
47. The consistency norm is responsible for the impact of “foot-in-the-door” and “throwing a curve”.
48. The reciprocity norm is responsible for the impact of the door-in-the face technique.
49. Numbers form program evaluations should be meaningful to all participants direct and motivate intervention improvement.
50. Statistical analysis often adds confusion and misunderstanding to evaluation results, thereby reducing social validity.

The hazards of BBS (5)

Fear and underreporting

Safety incentives create an atmosphere of fear and intimidation in the workplace. If workers or groups of workers are competing for the safety award they often experience peer pressure not to report an injury. The implications for not reporting and injury can be serious for the worker involved and the management.
“Injury discipline programs” are the flipsides of a safety incentive program. When a worker is inured he or she is “blamed” for not working careful enough. Discipline can then become some management’s preferred response to workers injury. These programs / polices advocate negative consequences such as automatic drug testing, counseling session, verbal and written warning, suspension or unpaid time off work and even termination. BBS weakens hard-won protections and discourages workers from taking a more active role in the union. A number of unions in Canada and America have issued policy positions opposing “blame the worker” approaches to health and safety.