

Personality Types & Injuries

A statistical study and effective strategies

By F. David Pierce

PERSONALITY TYPES are receiving increased attention within the occupational safety and health profession as a possibly significant injury-causing factor. As a clarifying and constructive effort for this expanding debate, the study described in this article used best statistical means and comparative case study approaches to find answers to three progressive questions:

- 1) Is an individual's personality type a causal or associated factor to increased or decreased injury experience?
- 2) If a statistically significant correlation exists between certain personality types and increased injuries, do like organizations or companies experience the same or similar injury experience because of them?
- 3) If a strong correlation exists between personality types and increased injuries in some companies but not in others, what successful injury preventive strategies are used?

This study found that a statistically significant correlation exists between a certain personality type and increased injuries but that some companies studied had implemented successful preventive means which seemed to negate this association.

Personality and its importance in many aspects of life is certainly not a new subject. Personality's impact on the safe behavior of individuals and on the safety performance of organizations seems to be, however (Olivares; Cooper). How much do SH&E practitioners truly know about personality theory and how does personality apply to injury risk? If per-

sonality has a detrimental impact on an organization's safety performance (associated with higher injury experience), how can safety and health programs minimize or control this affect? With the economic futurists' warning of a thinning workforce in the near future, how can the safety of all employees (regardless of personality type) be positively impacted—while negating the need to even consider applicant personality screening as a way to reduce the number of at-risk individuals considered for employment?

A good starting point is to level the "knowledge field" concerning personality typing. To do a decent job in this expanding safety area of application and theory, one needs a basic understanding of personality theories and modeling, and especially their history.

Introduction to Personality Typologies

Identifying differences in people is as old as mankind. Aristotle (384-322 BC) wrote about the different kinds of people who attended the Olympic Games, separating them by the roles they chose to play. Nicolo Machiavelli (1469-1527) also dissected different personalities, dividing people by the way they thought. Arthur Schopenhauer (1788-1860) explored the metaphysical aspects of personality.

Carl Jung

To a large extent, the scientific and systematic concepts of personality truly started with the work of Sigmund Freud (1856-1939). His concepts never really gained impetus until Swiss psychologist Carl Jung (1875-1961) carefully studied Freud's work and began to structure a foundation of personality theory (Jung).

Like Freud, Jung believed in the existence of the "collective unconscious," which he called "dominants, imagos, mythological or primordial images." Jung later used the term "archetype." He then gave each archetype a name that characterized behaviors of individuals having that archetype. Jung theorized that some inner-wiring exists in each individual which forms an "organizing principle on the things we see and do." He further theorized that this innerwiring began early in life and became basically unalterable throughout the individual's life.

Jungian typology, as it was termed, was derived from the theory that basic personality "functions" could be used to describe how each individual first perceived things, then from that information, how they made decisions. In essence, Jung created a four-square personality grid that was defined (top axis) by what he felt was the most important binary division—introversion versus extroversion—and by a secondary binary division (side axis)—being rational versus irrational. Each of the grid's four squares

F. David Pierce, M.S.P.H., CSP,

CIH, is a professional member and two-time president of ASSE's Utah Chapter. He has been involved in the SH&E profession for more than 30 years, fulfilling many roles in corporate management, safety and environmental leadership, academia and research. His current professional focus is directed at discovering the true causes of success, injuries and behavior.

was further divided in half by two additional sets of functions—thinking versus feeling, which were ascribed to the grid's rational band—and sensation versus intuition, which were assigned to the irrational band. Jungian typology, therefore, included eight different personality types or archetypes.

Myers & Briggs

Building on Jung's work, personality theory moved into high gear with the expansive work of Katharine Briggs and Isabel Briggs Myers (Myers and Briggs). Their epic work formed the foundation of one of the best-recognized personality typologies used today. Differing from Jung, Myers and Briggs began not by establishing a primary function but by treating all as equals. They also added another binary function—judging versus perceiving—thus creating 16 different personality types (4 x 4).

They furthered the theory of a development sequence and timeline for superior, secondary, tertiary and inferior functions. Their sequential development "stack" of functions included: 1) the flow of energy (from inside or outside-introversion versus extroversion); 2) how information is absorbed—via sensing or by intuition); 3) how decisions are made—using thinking or feeling; and 4) how the individual deals with the external world on a dayto-day basis—using judging means or perceiving means. This became known as the Myers-Briggs typology.

Myers and Briggs also developed a testing means, the Myers-Briggs Type Indicator (MBTI) to determine the personality type of individuals (e.g., ESTJ, ESTP, INFJ, INFP). This test has been used for many yearsprimarily in academic and research settings.

Like Jung, Briggs and Myers visited the important question concerning where personality functions come from, which was expanded by the work of W. Harold Grant. All suggested that personalities are built step-by-step, beginning at a young age and finishing at or near maturation. During this process, a "boilerplate" personality encoding was created.

The primary complaints lodged against the Myers-Briggs approach are significant and two-fold. Becaused it originated in a research environment and was developed and validated almost totally in academic settings, the typing and tool have been generally shunned by those seeking practical approaches and answers. In other words, the personality typing is interesting but not applicable or useful in the real world.

Furthermore, only limited descriptive correlations have been drawn between Myers-Brigg's four functions or 16 personality types and actual individual behavior patterns. In other words, testing says a team of four employees has an ESTJ, an ISFP, an INTP and an ESTP, but what can be expected of them and how can this information be used to make this team stronger or to make decisions better?

Keirsey & Bates

This was certainly not the end of this Freud-initiated evolution of personality theory. David Keirsey

Principles of Personalities

1st Principle

There exist distinct and definable personality types in people that influence the way they relate to the world and to others, and the way they absorb and process information.

2nd Principle

Each person's personality type can be determined accurately by a testing means.

3rd Principle

Personality types are developed very early in life and remain principally intact throughout a person's entire life.

and Marilyn Bates took a different scientific approach, dissecting personality into two sides: temperament and character (Keirsey and Bates). Temperament is first developed early in life and is predisposition—that is, precharacter. According to Keirsey and Bates, "temperament is the brain's hardware and character is the brain's software"-one obviously set in cement and the other modifiable. Keirsey and Bates viewed Myers-Briggs four types as "dimensions of temperament."

Keirsey also created a testing means, the Keirsey Temperament Sorter, to identify the personality of individuals and to divide them into the four temperaments: rationals, idealists, artisans or guardians. This naming of temperaments was a throwback to Jung's character descriptions (archetypes), but this remains only a minor thrust of this typology. The major thrust of the Keirsey-Bates approach has been to connect or align the different temperaments with well-known historical figures.

To many, however, although Keirsey's work is certainly interesting, it seems to fail the "so what?" test. In other words, from a practical perspective, if one individual aligns with same temperament as Dwight Eisenhower did and another aligns with the temperament that Mother Teresa had, then "so what?" How does knowing these various temperament alignments help an organization or team succeed, build relationships or define expected behavior patterns?

The Ennegram

Another personality typology also exists that at first seems non-Freudian-based. Usually referred to as the Ennegram (or Enneagram), this theory emphasizes psychological motivations as the root of personality. It has its roots in ancient Sufi (ancient Persian mystics) traditions that were described around the turn of the 20th century by George Gurdjieff (1866-1949) and emerged via the writings of Claudio Naranjo. However, it was not until Don Richard Riso wrote *Personality Types* in 1987 that the

Personality theory is interesting, but is it of value to SH&E practitioners? How can at-risk personalities be identified and how can that information be used to improve safety and health programs? Ennegram got much notice (Riso). Since then, many researchers have contributed to this theory and provided a nine-type matrix based on "long-term drive" matched against "short-term drive," which in theory diagnoses one's emotional outlook on life (www.enneagraminstitute.com).

These nine personality types include the reformer, the helper, the motivator, the romantic, the thinker, the loyalist (sometimes called the skeptic), the enthusiast, the leader (also called the confronter and the boss) and the peacemaker (sometimes referred to as the mediator). As with other Freudian-based personality theories, most agree that the Ennegram is "fixed" in each individual early in life.

Two primary problems are encountered in applying the Ennegram personality model to practical applications, however. First, it fails the "so what?" test. It may be interesting but it does not seem to be practical or applicable. Second, no accepted and validated personality-testing tool is available. Although the RHETI test and the Essential Ennegram Test are available, both struggle with determination accuracy. What is significant about the Ennegram is that it returns personality typing back to Jung's archetypelike thinking in that character descriptions are used to describe personalities.

Correlating Personality to Behaviors

Personality theory is interesting, but is it of value to SH&E practitioners? How can at-risk personalities be identified and how can that information be used to improve safety and health programs? These questions lie at the crux of the "so what?" issue for many reasons. Theoretically, on the conservative side, personality is a major contributor to behavior. Viewing this relationship from the other side of the pendulum, personality may well be a predisposing, individual hard wiring for behavior.

Factually, from a safety perspective, the hard wiring of the subconscious (personality) plays a major role in automatic (auto-pilot) or default decision making and, thereby, is a major influence on an individual choosing at-risk or risk-avoidance behaviors, compliant or noncompliant behaviors. How can personality be correlated with automatic or default behavior and decision making? Furthermore, how can those individuals with at-risk personalities be identified with certainty? Finally, what can be done to minimize or control both behavior-caused risk-taking and the resulting increased injuries?

This is where current work in psychology coupled with currently used business concepts and tools can help. Keirsey began an interesting divergence in theory progression when he simplified the MBTI and identified four fundamental temperaments. He aligned this approach with those used by Hippocrates (430-377 BC), Immanuel Kant (1724-1804) and Friedrich Nietzsche (1844-1900). This divergence started an effort to align temperaments with definable and predicable behaviors.

More recently, this line of correlating personality theory has been described in *The Hero and the Outlaw*:

Building Extraordinary Brands Through the Power of Archetypes (Mark and Pearson). This book focuses on building products that appeal to specific personality types due to hard-wired preferences and decision-making patterns. Unfortunately, as this effort pushed toward adding practicality and applicability to personality types, it offered no testing process or tool.

Social Style of Individuals

The most significant bridge between personality and behavior has become known as the social style of individuals. Begun more than 25 years ago, this concept also begins with four basic "temperaments," but instead of focusing on identifying differences, this approach focuses on understanding them. It recognizes an early development of social style (personality) hard wiring as well as the existence of both primary and secondary social styles.

Social styles were first identified and correlated with behavior by Merrill and Reid. Through the work of two primary sources, the Tracom Group (www.tracomcorp.com) and Wilson Learning Corp. (www.wilsonlearning.com), an extensive amount of validation research on social styles has been accomplished over the past 20 years—much of it focused on practical business applications. This scientific yet business-focused approach provides a personality typing approach that easily passes the "so what?" test because personality is tied to behavior and decision-making patterns. Additionally, several sources have developed highly validated tests that will determine both the primary and secondary social styles of individuals with great accuracy.

Two of the associated behavioral opposites identified within the social style grid are: risk-taking versus risk-avoiding, and thinking (determine actions by carefully and meticulously thinking things through) versus feeling (going with the flow, automatically reacting). Grounded fundamentally in personality theory, these two behavior extremes provide an ideal approach for use in this study because they help identify individuals who are both risk-takers and feeler decision-makers (reactors). Individuals with these two traits are the personalities who would be most likely to choose to hang glide off El Capitan, drive fast, play chicken with real knifes or be more accepting of higher-risk situations (Merrill and Reid). In addition, these risk-taking automatic-reacting individuals are identifiable using simple and validated accurate tests.

Study Methodology

Twenty-five employers, representing moderateto higher-injury-potential industry sectors, were selected and asked to participate in a study that sought a statistical correlation between worker personality types and injury performance. As a studyspecific deviation from classical cohort study formats, no matching of employers was attempted in that the different social styles existing within each employer's workforce would constitute a matching population in itself. Only employees of study employers whose jobs were involved directly with

product manufacture, warehousing and/or distribution, or those involved directly in providing services were included in the study and were tested for individual social styles. The rationale for selecting only these employees was to focus primarily on jobs that were most at risk of injury due to increased exposure to hazards.

A social styles assessment tool developed by Alliance for Training Inc. (Salt Lake City) was used. This tool was selected based on four factors: 1) ease and quickness of the assessment process; 2) ability to self-grade and determine social styles on-site in real time; 3) extensive validation of the tool with other social style assessment tools successfully used for more than 20 years; and 4) lower expense.

The results of the social style testing provided data pools that were divided into four definable social styles or temperaments:

- driver (risk-takers and deep-thinkers);
- analytical (risk-avoiders and deep-thinkers);
- amiable (risk-avoiders and feeling-reactors);
- expressive (risk-takers and feeling-reactors).

Theoretically, based on characteristic behavior (hard-wiring) factors associated strongly with each social style, one would expect (the null hypothesis) that expressive individuals would have the highest potential for injuries and analytical individuals the lowest, leaving individuals with driver and amiable social styles somewhere in between. For this reason, expressive and analytical individuals became the comparative focus populations in this study.

Each study company provided detailed injury statistics and data that covered in some cases more than 10 years. All injury data were initially used. All data—both social style testing results and the provided injury data from employers—used an individual identifying means, a simple numerical coding. This coding was comprised of a leading alphabetical character (A through Y) to distinguish the individual's place of employment, followed by the last four digits of the individual's social security number (e.g., H3209). This coding was used to eliminate any possibility of compiler-bias that may arise concerning differing gender, race or other factors.

Data Considerations

As the study progressed, several data considerations were identified, including the lack of consistent injury data periods reported by participating employers, possible data impacts caused by employee turnover, and possible impacts of personalitycaused work-preference issues.

Thirteen (52 percent) of the study employers provided injury data that extended beyond 10 years, while the remaining employers reported data for periods between five and nine years. The concern was not knowing what impact these differences would have on the power of the statistical inferences made using all acquired data. In most compilers' minds, this deviation provided too many unknowns and inserted possible biases into the data pool. Therefore, all injury data past five years were excluded from the data pool and all employee tests with employment longevity past five years were excluded from the analyses.

Most statistical studies (e.g., epidemiological studies) have captive or identified populations where all necessary data for comparison can be acquired. One major issue in this case was that the injury data covered many years, but personality typing (social style) involved only those currently employed by the study companies. Three concerns were identified.

- 1) Turnover is a normal ongoing component of any business. The greater the time period covered, the greater the potential impact of turnover.
- 2) Depending on industry sector, management values, work and work environment issues, and organizational culture, turnover rates varied widely among employers—and were not calculated or known by many employers in the study.
- 3) In addition to and paired with turnover, the influence of different personality types on both voluntary and "for cause" termination was unknown and highly suspected as being a potential data bias.

The major unanswered questions regarding this third concern were two-fold. First, does having a risktaking personality raise the probability or individual acceptability of using voluntary termination (quitting) as a means of dealing with job, pay or other workrelated dissatisfactions above that of a risk-avoiding personality? Second, does having a risk-taking and/or feeling-reactor personality raise the probability that an individual will be involuntarily terminated (fired) due to personality conflicts, job performance or decisionmaking issues beyond that of those with a risk-avoiding and/or deep-thinking personality?

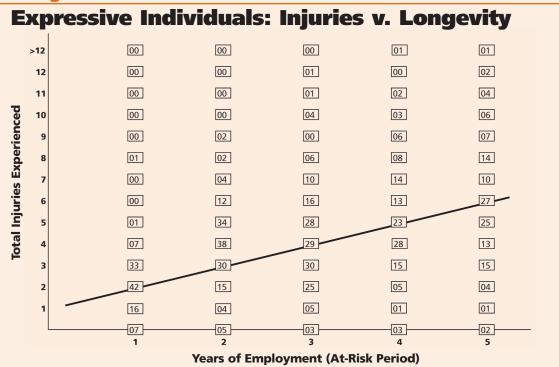
To address these concerns, compilers made the following decisions. With respect to concerns 1 and 2, it was determined that their only impact on the data and analyses would be to reduce the number of individuals caused by their leaving employment during the five-year data period and, therefore, would have no injuries assigned to them within the study. This would lead to fewer injuries being assigned to the focused social styles, which would generate softer inferences; it would definitely not result in more injuries being assigned or in more powerful inferences.

With respect to the third concern, the compilers generally agreed that individuals who possess risktaking and/or feeling-reactor personalities would be more probable candidates for both voluntary and involuntary termination. However, because the focus of this study was on the association between injury experience among individuals with risk-taking and feeling-reactor personalities, the only possible impact would be that fewer injuries would be assigned to the focused group.

The compilers also concurred that all possible impacts from these concerns would be to reduce the statistical gap between populations in the study. Therefore, these possible impacts were noted but not considered in the data and inferences.

The possible impacts or data biases caused by per-

Figure 1



sonality-caused work-preference issues was also discussed. The question was whether an individual's personality type contributes either substantially or partially to his/her choice of a job and decision to keep that job? In other words, is a risk-taker more likely to choose and stay in a job that has a greater hazard potential or contact than a risk-avoider? The compilers felt this question was most likely true based on the well-documented higher prevalence of analytical personalities in occupations such as accountants and engineers and the higher prevalence of driver personalities in management. Therefore, it was agreed that this personality-caused work-preference issue may well be a significant source of bias in a study of all types of jobs. However, this study only included workers employed in hands-on production, warehousing, distribution and service roles. Based on this, it was determined that personality-caused work-preference issues would most likely provide only a minor or possibly a negligible impact on data and inferences.

Study Findings

In total, the 25 participating companies reported more than 10,500 injuries from 1999 to 2003. The reported injuries included first-aid cases through more-severe incidents. Additionally, more than 10,000 employees were given personality tests (social style typing) to determine their dominant social style (personality). Only those employees who tested expressive (risk-taking and feeling-reacting)—a population of 2,771 individuals—and those who tested analytical (risk-avoiding and deep-thinking)—1,429 individuals—were included in the study and statistical analyses.

All injuries that occurred over the previous five years which were reported by study companies were then compared against the individuals included in the study by matching identifying codes. Regardless of injury severity, a large data matrix was created in which individuals pooled first by years of employment (at-risk period); the number of injuries these workers had experienced over their at-risk period was then used to separate them.

Figures 1 and 2 plot total injuries experienced versus

at-risk period (longevity of employment) for those who tested expressive and those who were found to be analytical. The resulting regression lines shown in each figure establish the best-fit linear correlations (statistical relationship) between the maximum amplitudes for each year's distributions.

One need not use complex statistical tools to determine that the linear regression lines for both plots (expressive versus analytical) are very different. In fact, the resulting regression line for injury experience of the expressive study population (Figure 1) is about double the slope of the analytical injury experience line (Figure 2). Simply translated, this study strongly infers that those individuals who have expressive social styles (at-risk and feelingreactors) are nearly twice as likely to experience injuries as those individuals who have analytical social styles (risk-avoider and deep-thinker). In fact, the plotted results validate what many years of safety experience would surmise to be true: Without controls or with inadequate controls, risk-takers have more injuries than risk-avoiders.

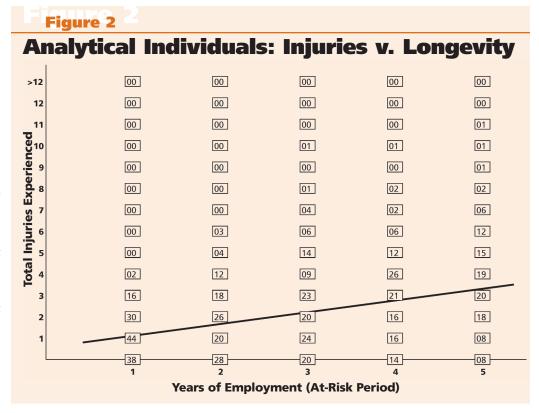
Figures 3 and 4 show comparative distributions of injury experience at two different points. Figure 3 shows a comparison of injury distributions for two years of employment exposure while Figure 4 shows the same for five years of exposure, for both expressive and analytical individuals.

Comparing arithmetic means for each distribution at two years (Figure 3) showed 3.97 injuries (an annual injury experience of almost two injuries per person on average) for expressive individuals versus 1.91 injuries (an annual injury experience of about one injury per person on average) for analytical individuals. Additionally, the +2 standard deviation (+2 sigma) ranges for these distributions were 0.65 to 7.29 injuries for individuals with expressive social styles and 0.00 to 5.33 for the graphed analytical injury distribution.

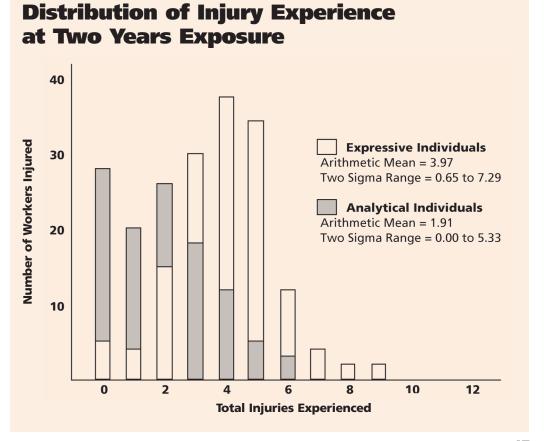
According to the statistics of distributions, these should represent the range of injuries into which 95 percent of all individuals with expressive or analytical social styles, given an infinite database (and all other factors being the same). Translated, this means that given any representative population of employees in higher-risk work settings, it would be unreasonable to expect that a risk-taking and reacting individual could go without injury for two years; at the same time, it would be reasonable to expect them to have as many as four injuries each year.

Comparing the arithmetic means for each distribution at five years (Figure 4) showed 6.12 injuries (an annual injury experience of more than one injury per person on average) for expressive individuals versus a value of 3.74 injuries (an annual injury experience of much less than one injury per person on average) for analytical individuals. Additionally, the +2 standard deviation (+2 sigma) ranges for these distributions were 0.92 to 11.38 injuries for individuals with expressive social styles and 0.00 to 8.18 for the graphed analytical injury distribution.

According to the statistics of distributions, these should represent the range of injuries into which 95 percent of all individuals with expressive or analytical social styles, given an infinite database (and all other factors being the same). Again translating the statistical inferences from this data, it would be reasonable if not a near-certain expectation for a worker with a risk-taking and reacting personality to have at least one injury each year and also rea-

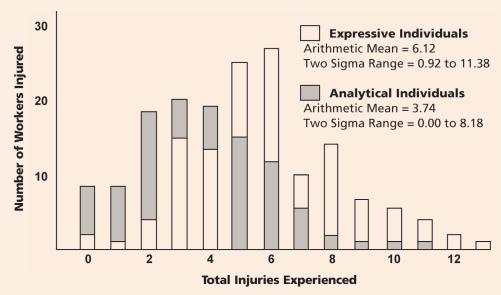








Distribution of Injury Experience at Five Years Exposure



sonable to expect this worker to average more than two injuries per year if s/he worked five years.

Figure 5 shows the total injuries experienced by years of exposure (total injuries divided by the number of years of exposure) for both expressive and analytical individuals identified in the study. Best fit linear regression lines for both data pools are also shown. This data presentation appears to show that as employment longevity increases, individuals have fewer injuries. That is, their injury rates are greatest in their first years of employment and lower as they gain experience, adapt to the company's culture and expectations and/or are more impacted by the company's injury-preventive strategies. For example, using the expressive individual's regression line, the percentage of injuries decreases 35 percent from year one to year five.

One might argue that this 35-percent decrease could also be explained by a near-linear turnover rate of around nine percent each year. This also would account for fewer counted and assigned injuries in each year past the first. However, this argument fails to explain the near parallel nature between the expressive and analytical regression lines. If it is truly more probable for expressive individuals to terminate employment voluntarily or to be terminated due to personality (as one would conjecture from experience), one would expect the lines to not be parallel. Instead, one would expect to see a statistical closing of the data each year with it reaching the closest point in year five. This would be the result of the slope of the analytical line being less than that for expressives. However, this is clearly not the case. The parallel nature of both regression lines led compilers

to suggest that this reduction in injuries with longevity was truly an observed phenomenon in this study (Figure 5).

Injury Performance: Individuals with **Expressive Social Styles**

This study attempted to compare the injury performance of expressive individuals in each of the 25 firms that participated. This comparison looked strictly at the calculated injury rates of those employees identified to have expressive social styles to determine whether consistency existed between employers. Figure 6 shows the distribution of injury rates from companies with the best expressive injury rates to the worst. This low-to-high distribution shows a central injury rate plateau (range 32 to 68 with an average at 47) that described more than half

of the participating companies. Figure 6 also shows that five companies had much lower injury rates (range 4.5 to 21 with an average at 9.5) for their employed expressive individuals and that three companies had much higher rates (range 81 to 100 with an average at 93) for this same social style.

Impact of Management & Culture

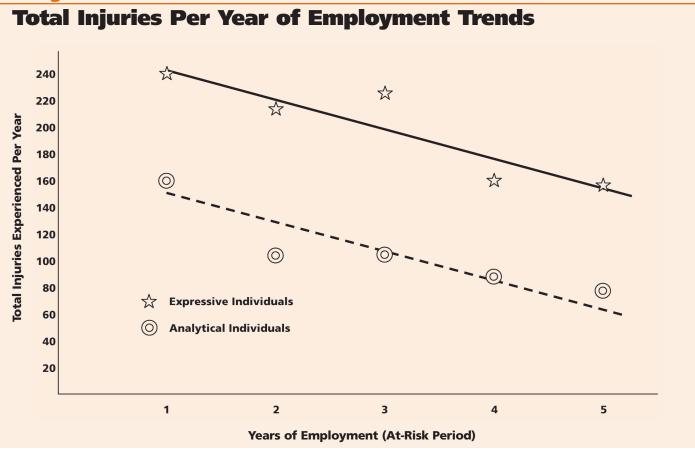
From an injury prevention focus, these results demanded the answer to a constructive question that laid at the purpose of this study. Why did five companies show not only lower injury rates for expressive employees, but much lower rates? What common injury prevention strategies were used by these companies or what other common management system elements were absent or minimally used/effective in the other companies included in the study?

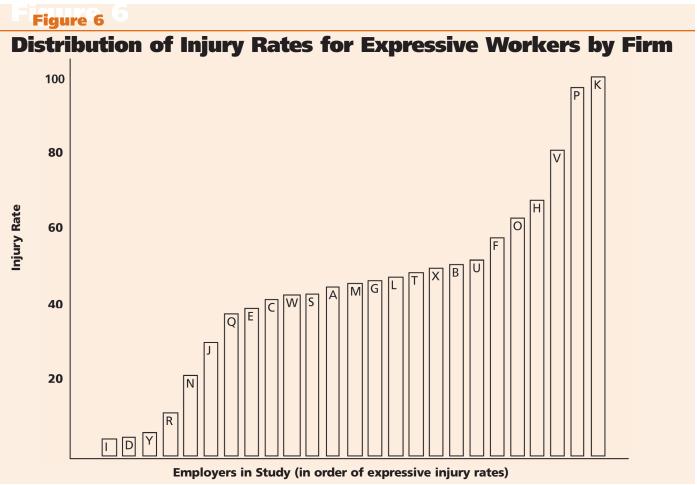
Of significant note, primary differences were observed in management philosophy; this was immediately noted by the researchers when identifying employers for inclusion in the study. The largest pool of employers was primarily interested in the study's findings as a means of validating personality causality for injuries. A smaller pool viewed their involvement as a way to measure or baseline their efforts and discover ideas for improving their safety programs.

Perhaps predictably, these two approaches were distinguished by their total injury performance and injury experience with expressive workers. Those employers with interest in personality causality had higher injury rates, while those focused on measurement and ideas had much lower injury rates.

These observed and correlated differences led the researchers to visit the issue of company culture, and in particular the work of Don Eckenfelder (a; b). He

Figure 5





has established a high correlation between positive safety cultures and safety excellence. He has also provided a means of measuring safety culture (the Safety Culture Barometer) that was used to evaluate the management system differences between study companies with excellent and poor safety performance.

From a search for these common strategies among study companies with excellent safety performance among potentially at-risk employees, the following 10 commonalities were identified.

- •These companies had more than just an executive management commitment to safety. They had a mandate for safety by which all management was measured and held accountable.
- •The safety program emphasized leading indicators (injury prevention efforts and activities) versus trailing indicators (injury rates and statistics).
- •The workforce was fully involved in the safety program and day-to-day safety activities (some companies had such deep involvement that no formal safety committee existed).
- An active recognition and celebration program was in place to accentuate safe performance and safety participation.
- •An aggressive quality improvement program was in place; it included process control, quality control and the use of statistical process controls.
- •The organization had an equal dedication to other associated efforts such as efficiency and cost minimization.
- •An open communication climate was evident. Almost everything was shared with employees and every employee had open communication pathways directly to the top.
- A strong and ongoing investment was made in building employee skills and knowledge.
- Ethnic and cultural differences were seen as a strategic advantage. These differences were appreciated and celebrated by management.
- •The culture was built on strong personal relationships between management and employees. Mutual trust was also strong.

Conclusions

The data from this extensive case study establishes that a strong potential exists for causality or association between risk-taking and reacting personalities and increased injury experience. This association appears to make individuals with such personalities twice as likely to have injuries as their risk-avoiding deep-thinking counterparts. Addi-

Your Feedback

Did you find this article interesting and useful? Circle the corresponding number on the reader service card.

RSC# **Feedback**

> 39 Yes

40 Somewhat

41 No

tionally, the data infer that it is reasonable to expect that workers with risk-taking reacting personalities will have at least one injury per year and could well have as many as four injuries per year unless highly

effective prevention strategies are implemented. Further, the data infer that all workers—regardless of personality type—experience fewer injuries per year on average the longer they are employed.

A significant finding of this case study was that wide differences existed in injury rates of risk-taking and reacting workers among the 25 participating companies. Review of injury preventive strategies used by those with lower injury rates validated the positive impact of safety-culture-related strategies such as executive leadership, high participation, effective leading measures, and a commitment to communication, building skills and trust, strong relationships and gaining strength from workforce differences.

This study's findings has three possible uses. To a major extent, these are a function of the company culture/management system into which they would be used and by the primary safety strategies/beliefs of the SH&E practitioner.

- 1) The statistical correlation between at-risk personalities and increased injuries might be used to validate safety emphasis or applicant selection/screening focused on individuals with such personalities. It may even support the use of personality testing of employees and applicants as a means of reducing injuries and/or the potential for injuries in these companies.
- 2) Second, the commonalities found among those companies with excellent injury performance among at-risk personality employees could be a significant and important supportive argument for improving a company's management system and/or changing the culture with respect to safety and highly related business aspects. In other words, the SH&E practitioner may be able to cite these commonalities and their correlation to reducing injuries to support the argument that significant changes are needed in a company's culture.
- 3) The commonalities noted could serve as a validation for companies and SH&E practitioners who have already embraced the importance of safety in their cultures and perhaps add some new ideas for improvement. ■

References

Cooper, D. "Psychology, Risk & Safety: Understanding How Personality & Perception Can Influence Risk Taking." *Professional* Safety. Nov. 2003: 39-46.

Eckenfelder, D. "Getting the Safety Culture Right." Occupational Hazards. Oct. 2003:

Eckenfelder, D. Values-Driven Safety. Rockville, MD: Government Institutes, 1998.

Jung, C.G. Psychological Types. Bollingen Series XX, Vol. 6. Princeton, NJ: Princeton University Press, 1971, 1976.

Keirsey, D. and M. Bates. Please Understand Me: Character & Temperament Types. Del Mar, CA: Prometheus Book, 1984.

Mark, M. and C.S. Pearson. The Hero and the Outlaw: Building Extraordinary Brands Through the Power of Archetypes. New York: McGraw-Hill, 2001.

Merrill, D. and R. Reid. Personal Styles and Effective Performance. Boca Raton, FL: CRC Press, 1999.

Meyers, I. and K. Briggs. Myers-Briggs Type Indicator. Palo Alto, CA: Consulting Psychologists Press, 1999.

Olivares, O.J. "Selecting for Safety." Occupational Health & Safety. Sept. 2003: 46-48.

Riso, R.R. Personality Types. New York: Houghton Mifflin, 1987.