A Delphi Technique Study

By SHAWN J. ADAMS

Asbestos liability. The sharp rise in workers’ compensation rates in the 1980s. The increasing role of ergonomics and human factors. Many organizations were caught unprepared to deal with these issues and experienced negative financial outcomes as a result.

To help firms better prepare for such issues, safety professionals must attempt to project future trends in their area of specialization that could affect their employer’s future profitability. Such forecasting can be difficult since people inherently assess matters from their own perspective and based on their own experiences. Furthermore, when soliciting input, people often seek out those in the same geographic area and with similar life experiences. This biases any projections developed.

To predict the future accurately, one must have a method that enables educated predictions about the future, from a diverse group, and within budget restrictions. The Delphi Technique is one such method.
METHODOLOGY

The Delphi Technique used for this study was selected based on several criteria. Developed by the Rand Corp., it lends itself to problems without “precise analytic techniques [that] can benefit from subjective judgments on a collective basis” (Linstone and Turoff 4). The technique provides “a set of procedures for formulating a group judgment for subject matter where precise information is lacking” (Dalkey, et al 1). It can also be used “to obtain opinions on what the future holds” (Helmer 2).

In addition, Delphi also provides a broad representation of diverse backgrounds and prevents participants with strong personalities from dominating the group, thus preventing the “bandwagon effect” (Brown 2). In fact, group homogeneity and response anonymity are vital to preserving validity (Linstone and Turoff 4). Furthermore, the technique allows experts from around the nation to provide feedback to participants regarding group responses. It is also effective for research when cost and time make group meetings impractical (Linstone and Turoff 4).

Delphi was also selected for its reliability. In the early 1950s, the technique was used to predict traffic fatality figures and estimate bombing requirements needed to reduce U.S. munitions output to certain levels in the event of a war with the Soviet Union (Dalkey and Helmer 1). Delphi has been employed in each military service as well as by government agencies such as the DIA and CIA, and firms such as TRW, Martin-Marietta, McDonnell Douglas and Monsanto Chemical (Dalkey, et al ii, iii). In 1985, Dillon reported that 50 to 100 corporations were using Delphi as a planning tool (24). Clearly, the technique is a recognized method for predicting the future.

For this study, a list of 120 ASSE chapter presidents (2000-2001) was obtained in July 2000; these individuals served as experts, known as the Delphi Panel. All received a letter of introduction and explanation (this process began in September 2000 and continued through February 2001).

In the survey instrument, respondents were asked an open-ended question regarding their predictions about safety for the remaining decade. Participants were asked to identify “up to 10 trends you feel the safety profession will experience between now and Dec. 31, 2009.”

After four weeks—the end of Round One—54 people had responded. Those who had not were contacted again. Throughout the proceeding rounds, any participant who did not respond was contacted multiple times, since s/he had indicated some interest in participating based on the previous round.

The Delphi Panel provided almost 200 predictions. Repeat predictions, as well as those that were not safety-related, not general to the entire field or incomplete, were removed, leaving a total of 168 predictions.

In Round Two, panel members received the list of 168 recommendations and were asked to identify their top 25 predictions. During Round One, panelists had “brainstormed” ideas; this produced quantity. In Round Two, the focus was on quality, as the panel identified which predictions were most likely to occur.

A total of 35 ASSE chapter presidents completed Round Two. Results were tallied, and predictions falling into the top quartile—46 in all—were targeted for further study.

In Round Three, respondents were asked to rank the 46 predictions based on a one-to-four Likert scale (on which four was “very likely”; three “somewhat likely”; two “not likely”; and one “very unlikely”). Respondents ranked each prediction “based upon its likelihood to occur between now and Dec. 31, 2009.” Thirty-three chapter presidents completed this round.

In Round Four, respondents were again presented with the 46 predictions, as well as information on how they had rated each during Round Three. In addition, respondents received the median and interquartile range as required by the Delphi Technique (Helmer 8). The median was used for consensus during the study because the median (as opposed to the mean) helps reduce the trend toward conformity (Dalkey and Helmer; Dalkey 3).

At the end of this round, 33 respondents remained in the study. Cyphert and Gant conclude that an attrition rate of approximately 38 percent of those who initially agreed to participate is acceptable. The rate for this study was 38.9 percent. It has also been reported that validity and reliability decreases the longer the Delphi Panel must be completed (Brown 1). In this study, after four rounds, the Delphi Panel had completed its work.

Panel Predictions

Following is a list of the 46 trends identified by the Delphi Panel. Descriptive statistics are provided to indicate agreement within the panel. Predictions are listed from highest to lowest mean. For predictions with identical means, listing order is based on lower standard deviation. If both measures are identical, then predictions are listed together. Median and mode are also provided with statistical reporting in a mean/median/ mode/standard deviation format.

**Prediction 1**
Information such as programs, manuals and JSAs will be maintained on computer. All safety/health professionals will be expected to use this technology.
3.85/4.00/4.00/0.3641.

**Prediction 2**
Companies and safety professionals will have to address the challenges of an aging workforce.
3.82/4.00/4.00/0.3917.

**Prediction 3**
The industry will experience a significant increase in the use of computer-based training products to accomplish necessary safety training.
3.67/4.00/4.00/0.4787.

**Prediction 4**
Musculoskeletal disorders will continue to account for the highest percentage of injuries. (This prediction tied with the following prediction, having the same mean, median, mode and standard deviation.) Safety training will increasingly be state-of-the-art, with aids such as PowerPoint being used. 3.61/4.00/4.00/0.6093.

**Prediction 6**
New OSHA recordkeeping requirements will become effective.
3.52/4.00/4.00/0.7953.

(Author’s note: This recommendation was developed in September 2000. OSHA has announced that the new recordkeeping standard will take effect Jan. 1, 2002.)

**Prediction 7**
The cost of injuries will increase due to changes in the healthcare industry.
3.49/4.00/4.00/0.6185.
(’Author’s Note: A Towers Perrin survey predicts an average increase in healthcare rates of 13 percent for 2001, the second straight year of double-digit increases. More than 90 percent of those surveyed expect these double-digit increases to continue over the next few years. See www.towers.com/archives/lt_archives/2001/101-31/1200005doubledigit.asp.)

**Prediction 8**
Safety as a career field will continue to lag behind engineering and computer science.
3.42/4.00/4.00/0.8303.

**Prediction 9**
Safety professionals will be responsible for emergency response planning at their respective facilities.
3.39/3.00/3.00/0.6095.

**Prediction 10**
The safety profession will continue to show management that “safety” can affect the company’s bottom line. 3.33/3.00/4.00/0.6922.

**Prediction 11**
Multinational mergers will continue, requiring safety issues to be more global.
3.30/4.00/4.00/0.6093.

**Prediction 12**
Safety standards and regulations will be more performance-oriented, allowing latitude in enforcement, but requiring a more in-depth knowledge of safety.
3.30/3.00/3.00/0.6366.

**Prediction 13**
The trend toward greater responsibilities for safety and health professionals will continue, but there will be little increase in

continued on page 28
Panel Predictions (con’t)

**Prediction 21**
More universities/colleges will offer degree programs to handle the demand for trained safety professionals. (This prediction tied with the following prediction, having the same mean, median, mode and standard deviation.) The human factors/ergonomics specialist will play a significant role in safety, equipment/building design and the general work environment. 2.97/3.00/3.00/0.6366.

**Prediction 22**
More “divisional” and “site-specific” safety personnel will be in place. 2.97/3.00/3.00/0.6840.

**Prediction 23**
The U.S. will continue to lose heavy industry to developing countries. 2.97/3.00/3.00/0.8472.

**Prediction 24**
The trend of empowering employees will continue, which will affect the way safety is administered. 2.93/3.00/3.00/0.6093.

**Prediction 25**
The desire to reduce insurance losses will be the primary motivator behind successful safety management systems. 2.93/3.00/3.00/0.7475.

**Prediction 26**
It will become more obvious that safety professionals are advisors rather than the person to blame for a poor safety culture. (This prediction was tied with the following two predictions, having the same mean, median, mode and standard deviation.) a) “Safety culture” will become a more-common term. This culture must be developed and many will be heading in that direction. b) Volunteerism in professional associations will continue to decline. 2.94/3.00/3.00/0.7882.

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Panel Predictions (con’t)

Prediction 30
OSHA will require industry to complete safety program self-assessments. (This prediction was tied with the following prediction, having the same mean, median, mode and standard deviation.) The CSP designation will become the norm for practicing safety professionals. 2.85/3.00/3.00/0.7550.

Prediction 31
More people will be employed via staff leasing. 2.85/3.00/3.00/0.9722.

Prediction 32
Successful businesses will manage safety programs through motivated employee-based teams. 2.79/3.00/3.00/0.7398.

Prediction 33
A Safety Program Management Standard will be published; it will outline requirements for being recognized as actually having a safety management program. 2.76/3.00/3.00/0.8671. (Author’s note: This is the only prediction with a standard deviation above 1.00.)

Prediction 34
The current emphasis on behavioral safety techniques will be discredited due to the inability to effect a long-term change in behavior. 2.76/3.00/3.00/0.9024.

Prediction 35
Safety professionals and industrial hygienists will merger closer to unify the profession to a greater degree than is currently found. 2.73/3.00/3.00/0.8013.

Prediction 36
The adversarial relationship between OSHA and industry will improve, resulting in greater participation in programs such as VPP. 2.70/3.00/3.00/0.8095.

The projections are a valuable planning tool for safety professionals. The panel sees a profession that will be more global and more reliant on computers.

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OCTOBER 2001 29