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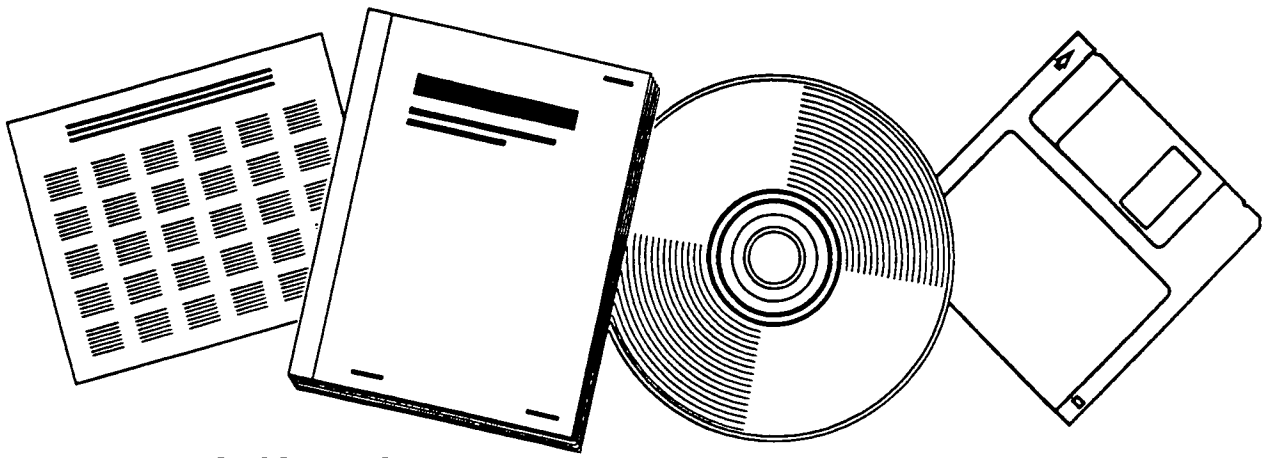
COMPREHENSIVE OCCUPATIONAL SAFETY TRAINING (COST)

ABACUS MANAGEMENT GROUP, INC., CRANSTON, RI

28 JUN 96



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16. Abstract (Limit: 200 words) A prototype Comprehensive Occupational Safety Training (COST) Program was developed and tested with 50 small employers from a wide range of industries in Rhode Island. The system was a behavior based safety training program which was designed with the small employer in mind. The 50 participating companies were chosen based on their high injury rates and associated costs relative to comparable companies. The companies were followed up for 6 to 18 months after training. Information on work related injuries for each company were obtained, including total incurred costs, lost time case incidence rate, loss ratio, compensable accident and injury incidence rates, and satisfaction with COST. There was a significant mean reduction in lost time case incidence rates, and a significant reduction in loss ratios from before COST through the post COST period. The conclusion of the Phase One analysis was that COST is effective in reducing work related injuries and illnesses and the costs associated with them. The prototype materials were refined, including the manual, forms, video, and CD ROM.

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1210 Pontiac Ave.
Cranston, RI 02920

Title: Comprehensive Occupational Safety Training (COST)

Date: 6/28/96

Report: Phase 1 Final Performance Report

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Grant #: R43 OH03355-01

Comprehensive Occupational Safety Training Program (COST)

Abstract

Work-related injuries and illnesses have risen to their highest level in ten years. The severity and associated pain and disability are also rising. Interestingly, the incidence is highest among small employers who's survival is most threatened by the high cost of workers' compensation. The Abacus Management Group Inc. has developed a prototype Comprehensive Occupational Safety Training Program (COST) and has pilot tested it with 50 small employers from a wide range of industries. COST is a behaviorally-based safety training program designed specifically for small employers. Phase I analyses indicate that COST is effective in reducing work-related injuries and illnesses and their associated costs. The investigators refined the prototype materials including specifically the manual, forms, video and CD ROM. Preparations are underway for randomized trial in Phase II. The goal is to make available to small employers a commercially viable and tested behavioral-based training program that can have an immediate and significant impact on work-related injuries/illnesses and their associated costs.

List of Presentations:

Alavosius, M.P., Adams, A.E., Ahern, D.K., & Follick, M. (1996, March). Analysis of a behaviorally-based safety training program for small employers. Paper at the 4th International Congress of Behavioral Medicine, Washington, D.C.

Alavosius, M.P., Ahern, D., Adams, A.E., Follick, M (1996, May). Small business innovations research: Report on development of interactive safety training for small employers. Symposium paper at the Annual Meeting of the Association for Behavior Analysis, San Francisco, CA.

Planned Publications:

Alavosius, M.P., Adams, A.E., Ahern, D.K., & Follick, M. Analysis of a behaviorally-based safety training program for small employers. Paper to be submitted to Journal of Safety Research.

Abacus (Abacus Management Group, Inc.) presently provides management services to both insured and self insured workers compensation programs within New England. Incorporated in 1988, it developed and now manages several workers' compensation "trusts" in Rhode Island, representing almost 350 small employers. In the management of these self-insurance groups (SIGS), Abacus is responsible for the development and implementation of accident/injury prevention programs as well as claims management. Abacus has developed and piloted a comprehensive occupational safety training program (COST) targeted for small businesses that typically have serious safety problems and little sophistication in addressing them. This Phase 1 project conducted an after-the-fact analysis of that program, and revised the program as the analysis indicated. The Phase 1 findings indicate reduction in injuries and lower costs. The following technical report presents the results from Phase I and serves as the basis of the Phase II proposal currently being developed.

A. Specific Aims:

1. Analyze existing data on frequency and type of work-related injuries, medical and indemnity costs, lost work days, and employer/employee satisfaction collected from 50 small companies (mean = 45 employees) in Rhode Island who received the behaviorally-based, prototype Comprehensive Occupational Safety Training Program (COST).

2. Develop a survey instrument to assess the added expenses and barriers for small business associated with implementing COST and administer it to the 50 companies;

3. Arrange for selected employers/employees from the 50 companies to review the COST prototype materials and suggest refinements. Revise the materials informed by customer feedback and the data analyses noted above; and

4. Prepare for a large scale randomized trial of COST in Phase II to include small businesses from a wide range of industries, varying in size (5 - 500 employees) and with different risk financing mechanisms, (e.g. insured vs. self-insured).

B. Significant Findings:

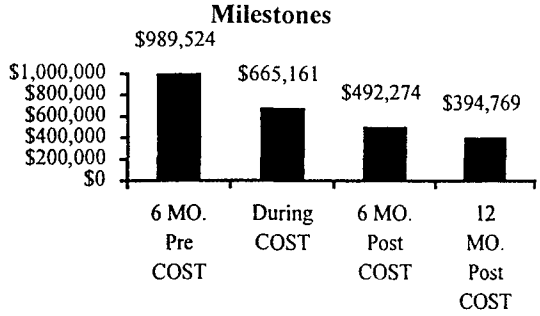
Specific Aim #1: Analysis of existing data was performed on a total of fifty (50) companies which underwent COST training from 1993 to 1995. Each of the fifty companies was followed up for at least six months post COST, 40 (80%) were followed for 12 months post COST training, and 31 (62%) for 18 months. These companies were selected for COST because of their high injury rates and associated costs relative to comparable SIG member companies. Measures obtained and/or derived associated with work-related injuries for each company included (1) total incurred costs[1], (2) lost time

[1] Paid and reserved funds to pay the medical, indemnity, legal, and other expenses of work injuries.

case incidence rate[2], (3) loss ratio[3], (4) compensable accident and injury incidence rates[4], and (5) employer/employee satisfaction with and obstacles to implementing COST.

Figure 1 shows the change in total incurred costs (i.e., payments and reserves for indemnity, medical, legal, and other expenses) by COST phase.

Figure 1: Incurred Losses for 50 COST Companies at Major Milestones



The two primary outcome measures that were analyzed statistically are: (1) lost time case incidence rate, and (2) loss ratio. These variables were chosen as the most sensitive measures of injury rates and costs. In the Phase I proposal the plan was to construct a group of companies that were determined to be COST-eligible but did not undergo COST and compare that group with those companies that underwent COST on the two primary outcome measures. During the startup phase of the project an effort was made to construct a matched group but was not deemed feasible for the following reasons: (1) there was an insufficient number of COST-eligible companies (<20) which had not already undergone COST at the time of project startup, (2) these COST-eligible companies which as of 10/1/95 had not received COST tended to have relatively lower injury rates than companies which had undergone COST. Consequently, it was not possible to arrive at an acceptable matched comparison group on average injury rate statistics.

Preliminary to statistical hypothesis testing about the effects of COST, an analysis was performed to determine whether the time of COST training (e.g., January 1993 vs. January 1995) was a significant factor since COST sessions covered a 2.5 year period. There were no statistically significant differences among COST sessions on lost time incidence rates or loss ratios as a function of time of the COST training ($p > .05$)

As an acceptable *post-hoc* alternative to the matched group design, lost time case incidence rate and loss ratios derived for COST companies were analyzed in a Repeated Measures Analysis of Covariance (ANCOVA) design, statistically controlling for number

[2] Lost time case incidence rates show the number of lost time cases per 100 workers per six months. Lost time case involve the loss of one or more scheduled work days.
[3] Loss Ratios are calculated by dividing incurred losses by earned premium x 100.
[4] Compensable case incidence rates show the number of cases per 100 workers per six months that involved any incurred expenses.

of employees. The amount of time that a COST company had been with Abacus as the workers' compensation plan manager was not significantly related to the two primary outcome measures (p's > .05). Hence, that variable was not included as a covariate in the analysis. Figures 2 and 3 present the results from separate ANCOVAs for lost time case incidence rate and loss ratio, respectively for 6 months pre COST training, during COST, and 6 and 12 months post COST. Figure 2 indicates that a statistically significant mean reduction was observed in the lost time case incidence rates for the 50 companies from 6 months pre COST to 6 months post. This effect is maintained at 12 months ($F(3,116) = 13.91$, $p < .0001$). Similarly, Figure 3 shows a statistically significant reduction in loss ratios for companies undergoing COST from 6 months pre to 6 months post, with maintenance at 12 months ($F(3,116) = 7.64$, $p < .0001$). The power estimates derived from the analysis of lost time case incidence rates was .86 and for loss ratios was .98.

Figure 2: Number of Lost Time Cases per 100 EE's (50 companies)

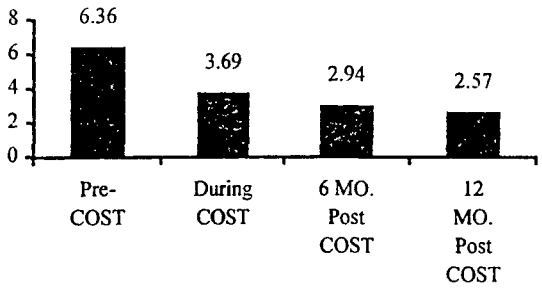
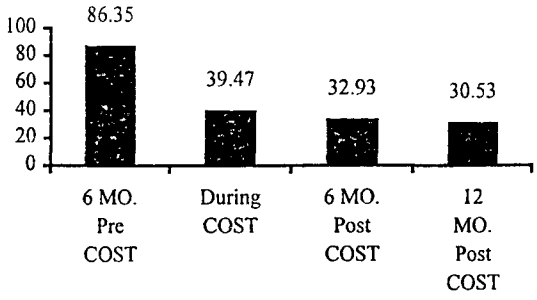


Figure 3: Loss Ratio for 50 COST Companies



Since companies were defined as COST-eligible based on higher than average incidence rates, the observed decrease over time may represent a statistical artifact of regression to the mean. This possible explanation for the findings are unlikely for two reasons. First, the average lost time case incidence rate and loss ratio for the self-insured groups as a whole were 4.3 and 34, respectively, which is higher than the observed values at 6 months post COST. Second, the observation of a further decline at 12 months is contrary to what would be the expected reversal in the trend based on regression to the mean. Moreover, the declining trend continues at 18 months post COST for the companies for which data are currently available (lost time case incidence rate: 18 month post = 2.00, loss ratio: 18 month post = 20.00).

Tables 1 and 2 present the cross tabulation of the top 5 accident and injury incidence rates by COST phase, e.g., 6 months pre COST. Results indicate that *Struck By* accidents and *Sprain/Strain* injuries are the most frequent. The data show reductions in these accident and injuries at the six month post COST phase consistent with overall reductions in lost cases. At the 12 month post COST phase there was an increase in *Contact* and *Slip/Fall* accidents relative to the 6 month post COST phase although still below the pre COST phase.

Table 1. Accident Type Incidence Rates

Accident Type	COST Phase			
	6 months Pre	During	6 months Post	12 months Post
Struck By	1.25	.95	1.15	1.04
Handling	1.20	.56	.79	.65
Contact	.80	.79	.54	.76
Slip/Fall	.91	.62	.42	.76
Bodily Motion	.48	.41	.25	.07

All of the top five injury rates decrease at the 6 month post COST phase relative to the pre COST period. At the 12 month post COST phase, *sprain/strain* and *laceration/puncture* injuries continue to decline. At the 12 month juncture, *bruise*, *inflammation* and *fracture/dislocation* stabilize or show slight increase relative to the 6 month post COST period.

Table 2. Injury Type Incidence Rates

Injury Type	COST Phase			
	6 months Pre	During	6 months Post	12 months Post
Sprain/Strain	2.17	1.55	1.49	1.26
Laceration/Puncture	1.17	.43	.82	.79
Bruise	.60	.60	.34	.43
Inflammation	.74	.35	.34	.36
Fracture/Dislocation	.37	.35	.17	.25

Table 3 presents mean lost day incidence rates by COST Phase. Results indicate that the mean lost days incidence rate declines across COST phases.

Table 3. Lost Work Days Incidence Rates

	COST Phase			
	6 months Pre	During	6 months Post	12 months Post
lost days incidence rate	184	111	84	58

Specific Aim #2: An assessment of the session evaluations (15 question survey using a 5 point scale; 1 = completely dissatisfied, 5 = completely satisfied) completed by all COST participants at the conclusion of each session was done to evaluate consumer satisfaction. Overall satisfaction with COST ranged from 4.5 to 4.65 where 5 equals completely

satisfied. High satisfaction was expressed for the quality of the COST program (4.6 - 4.8) and program content (4.4 - 4.5). To assess long-term satisfaction with COST and obstacles encountered in implementation we surveyed employers about the additional expenses of implementing the COST Program such as personnel costs associated with formation of the safety committee, additional clerical support, and costs of bi-weekly or monthly self-inspection activities. Identification of expense categories associated with modifications and work site re-design as recommended by COST were also requested. To the extent possible, estimates of actual expenditures for the aforementioned categories were collected. Barriers to successful implementation were also surveyed.

The follow-up survey was mailed to a target group of past participants. The survey was mailed to those alumni of the training Program who had demonstrated a high level of interest and participation. By selecting the members of the target group in this way we sought to receive back a high percentage of the surveys mailed, but also to acquire more useful survey information (such as 'additional comments') in addition to the basic-level survey responses. In all, thirty-eight (38) surveys were sent to past COST participants. Eight of these past participants were unfortunately no longer with the company where his/her survey was sent, so these eight surveys were eliminated from the pool. Of the thirty (30) remaining surveys, twenty-three (23) were received back, resulting in a 76.7 % return rate.

The survey instrument was a four-page document posing sixty-two (62) survey items, forty-four (44) were forced-response questions, and eighteen (18) required the respondent to write in his/her individual comments. Survey items fell under seven section headings: Program Cost/Benefit, Program Quality, Program Content, Program Format, Training Methods, Obstacles to Implementation, and Program Follow-up.

All sections were used to assess customer satisfaction with the training Program, but, one section, Obstacles to Implementation, was also used to assess Program success and to suggest warranted improvements to the training Program. The results of this section are of particular interest in developing and refining safety training Programs, since the responses are those of the people trying to implement safety programs in their companies. Participants were first asked what general obstacles they encountered implementing the overall Program, and then what specific obstacles related to the individual elements of the Program (Safety Committee, Accident Investigation, Self-Inspection, Safety Targeting, and Safety Improvement Plan). Each of these six survey items included a representative listing of possible obstacles, compiled by the Abacus safety staff based on their experience. Respondents were instructed to check all obstacles that they had encountered. The results were analyzed and plotted in bar graph form to better illuminate trends. Selected bar graphs are included here, to illustrate the results.

Figure 4: Obstacles to COST Implementation (% of Respondents)

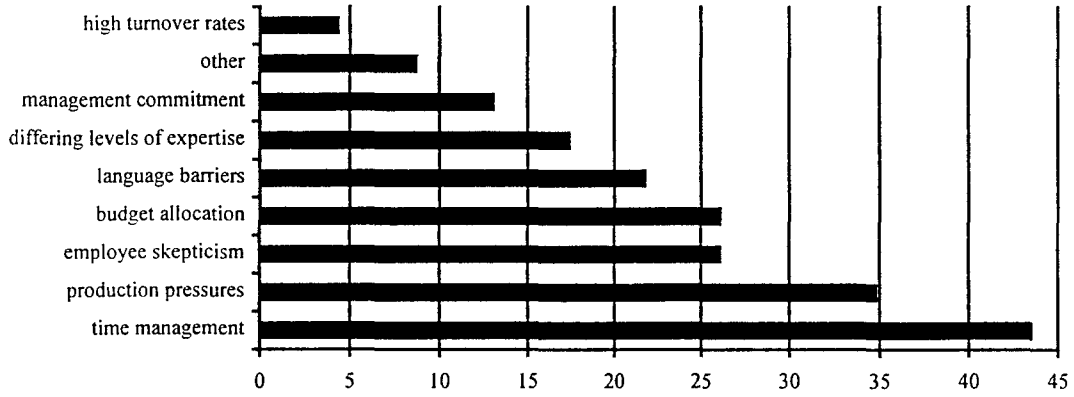
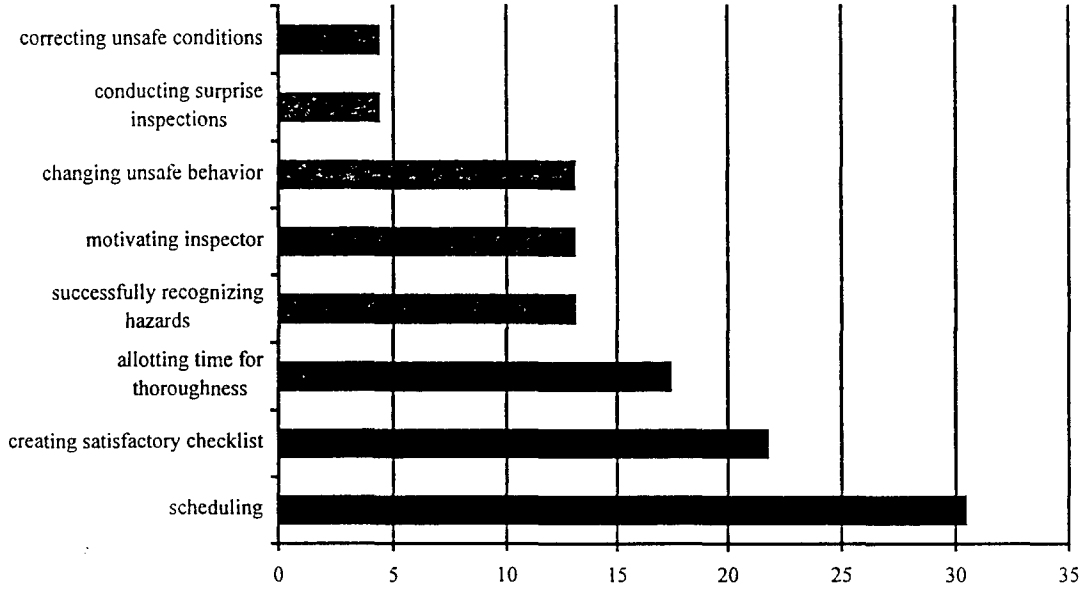


Figure 5: Obstacles to Self-Inspections (% of Respondents)



The survey results show that time management is the most significant problem faced by the small employer, in implementing the COST Program. Time management (and related obstacles, such as 'maintaining a regular schedule' (Safety Committee), 'responding immediately' (Accident Investigation), and 'scheduling' (Self-inspections)) was by far the problem selected most often by survey respondents (82.6 % of survey respondents selected at least one of these problems). Another significant insight gained from the survey results regards the Safety Improvement Plan. Garnering employee cooperation and enthusiasm for the safety Program is a problem faced by most if not all small employers. Fifty-two percent of survey respondents selected at least one of these three related problems: 'motivating employees', 'sustaining motivation', and 'employees see safety measures as impractical'. Other significant problems faced by small employers include production pressures, focusing on fact-finding as opposed to finding fault during

accident investigations, and creating a satisfactory checklist to use for self-inspections. Refinements in the Program and materials to increase efficiency are indicated by these surveys. Procedures to reinforce employees' participation in the Program are also indicated. See appendices for the survey and summary.

Estimates of monetary costs and benefits associated with the implementation of the COST Program were more difficult to extract from the survey respondents. Responses to questions regarding costs resulting from Program implementation and benefits gained from Program implementation ranged from qualitative responses to exact estimates. Disregarding those surveys who did not answer (i.e., left blank) or who responded 'unknown', the majority of survey respondents (84.6 %) indicated that implementing the COST Program cost them $1000 or less. One survey respondent indicated that implementation cost his/her company more than $10,000. This company incurred these costs by re-designing press guarding and provision of a safety incentive system.

Specific Aim #3: Based upon review of training evaluations completed by attendees at the close of each COST session and instructors' input, the training materials were revised to improve their content, organization, readability, and utility. The graphic design of the COST manual was changed to improve its presentation. See the appendices for the revised manual, video and CD ROM. Given that time management constraints were identified as a key obstacle to implementing the COST procedures, the manual includes checklists and forms to help managers implement and evaluate the system. These are also made available to consumers on computer disk to permit their customization for particular applications. For example, the inspection audit forms and behavioral observation checklists can be edited to tailor their content to specific applications.

The interactive elements of the training materials were further developed by additional workshop activities and a video tape sequence that illustrates key behavioral safety practices. This first video presents a manager's dilemma in balancing safety with production pressures. The video vignettes offers the viewer choices as to how the manager might communicate with employees and correct unsafe material handling techniques. The video is also included in a prototype CD ROM where it is embedded as an interactive exercise in the revised COST manual. The video and CD ROM were evaluated in five test sessions. Forty-six managers and safety professionals critiqued the materials during safety training sessions (at Abacus offices and an ASSE sponsored safety forum). Using a 5 point Likert scale where 5 indicates strong agreement, reviewers agreed that the video would assist them in training supervisors to use positive feedback (4.06), was realistic (4.16), was believable (4.15), and was clear and understandable (4.47). These sessions confirmed that the video and exercises enhance the instructional power of materials. More development work is needed; additional videos are planned for development in Phase 2 to supplement the written materials. The materials included in the appendices show the instructional designs that will guide development of additional content areas. Copies of the manual, video, and CD ROM are included in the appendices.

Specific Aim #4: The empirical evidence presented above suggests that COST significantly reduces workplace injuries and associated costs when provided to small businesses in the context of self-insured groups. However, COST has not been shown to be effective in a traditional insured indemnity model. Also, COST has not been compared to a general safety training approach commonly available in the marketplace to small employers. Continued evaluation of COST is warranted.

We propose a randomized controlled, comparative trial with COST versus a general safety training approach within a large insured indemnity program. Abacus has a unique opportunity to conduct such a comparative trial in collaboration with our business partner, Arbella Mutual Insurance Company. Abacus is the administrator for Arbella Indemnity Insurance Company which provides a fully insured workers' compensation product to small to mid-size employers in Massachusetts and Rhode Island. As of 6/1/96 Arbella Indemnity provides workers' compensation insurance to 372 companies (10 - 500 employees) representing a wide range of industries including human service, light to medium manufacturing, retail, and financial services. The total premium is approximately 13.5 million dollars. Companies average annual workers' compensation premium is $37,000. Currently, the COST program is undergoing pilot testing for our Phase II application with 11 companies (human services) at Arbella Indemnity in Massachusetts. The COST materials are customized to suit the needs of human service and other industry segments.

The proposed research design consists of two groups of individually insured companies which will undergo either: (1) COST + General Safety Training (GST), or (2) GST alone. Companies with moderate to high loss ratios (50-80%) will be considered eligible for the study. Companies will be stratified on loss ratio, type of industry, and company size and randomly assigned to either COST + GST or GST alone. The power estimates obtained from the statistical analyses presented above in Specific Aim #1 suggests that a total sample of 100 companies, equally split between the two groups, is sufficient to detect a medium effect size for Loss Time incidence rate and Loss Ratio, given an alpha level of .05, and power of .95. Hence, we will recruit 100 companies over a 2 year period to participate in the study. Repeated measures also will be employed as in our Phase I design with assessments at 6 and 12 months following the intervention. The research design will presented in the Phase II proposal submitted by August 15, 1996.

C. Usefulness of Findings:

Examination of the outcomes of the COST Program, customer satisfaction with the Program, and reviewers' critique of recent refinements indicate that the Program is effective in reducing occupational injuries and illnesses and their associated costs. The Program has been successfully implemented by 50 small businesses from a range of businesses, industries and services. While scheduling and time management issues are identified as obstacles to implementation, the financial costs of implementation are not prohibitive. Direct savings in terms of reduced incurred costs and lost work time

significantly exceed the estimated costs of implementation. Further refinements in materials to heighten their impact and ease their use are underway. Additional testing of the Program outside of self-insurance groups is warranted. At the conclusion of Phase 1, it is evident that the COST Program at its current level of development provides a viable technology for producing demonstrable improvements in work safety within employers who are members of self-insurance groups.

Appendices

Summary Report
COST Satisfaction Surveys 1993-1995

Over the past three years, the COST Program has been conducted five times. Each time, at the close of the final session, participants were asked to complete an evaluation of the Program. This "satisfaction survey" consists of 15 survey items, and space below to include handwritten comments. A numerical response range, from 1 to 5, was used with the 15 survey items, a "1" translating to "disagree strongly" and a "5" translating to "agree strongly". An example of the survey is included in this report.

In order to help recommend improvements to the COST Program, all available satisfaction surveys (55) from the past 3 years were researched and analyzed. Excel spreadsheets and charts facilitated this analysis. The raw data (that is, the numerical responses to each survey item, for each participant, for each COST Program conducted) were entered into a worksheet. The sum of the responses, for each survey, was calculated, and then divided by the number of items responded to, to determine the average response value for each survey. This average response value was then translated to a "satisfaction score" based on a numerical range, 1 to 5, where a "1" translates to "completely dissatisfied", a "3" translates to "neither definitively satisfied nor dissatisfied", and a "5" translates to "completely satisfied". These satisfaction scores were then plotted, and from this chart we conclude that while all the scores fall above the critical "3" line (which indicates the participant is neither satisfied nor dissatisfied), there is visible room for improvement. To look at it another way, the satisfaction scores for each COST Program conducted were summed and averaged, to determine the general satisfaction score for the individual COST Programs. These data were plotted, and from this chart we conclude that while the overall level of satisfaction with the COST Program has been steadily increasing since Spring 1993, satisfaction seems to drop in Spring 1995, indicating a need for further investigation.

In order to get more in-depth information, the survey items were divided into five categories. The breakdown is shown on page 8. The response values of each COST Program conducted were then summed and averaged, to yield satisfaction scores for each category. These data were then plotted, and the resulting charts give a clear visual indication of the relative success of each Program category.

**Please Note: In most cases, the satisfaction scores vary over extremely small ranges. Almost all scores occur in the high end of the scale, so these variations are also occurring in the high end of the scale. This means that participants are generally satisfied with the COST Program. Variations deemed relatively significant are summarized below, because they indicate trends. For instance, satisfaction with Program quality drops off, from a 4.77 in Spring 1994 to a 4.60 in Spring 1995. The accompanying charts make this trend clearer. The possibility that, if left unchecked, satisfaction in Program quality would continue to deteriorate, is the motivation behind this analysis and the resulting recommendations.

From this analysis, the following recommendations can be made:

1. The Group Two survey item analysis and chart indicate that satisfaction with Program quality dropped off from a 4.77 in Spring 1994 to a 4.60 in Spring 1995. An exception to this generalization is survey item #12: participants are more and more satisfied with the responsiveness of the COST Program instructors. However, the chart indicates that program organization needs to be improved. Also, approximately 20% of participants do not feel the training objectives are being met. Several handwritten comments indicated the need for a clear syllabus; perhaps introducing a clear, standard syllabus during the first session would remedy the above three problems. The chart and accompanying table likewise indicate a need to look into the presentation style of the COST Program instructors: some participants seem to lose confidence in the

knowledgeability and effectiveness of the instructors over time (a score of 5 in Spring 1994 drops to a 4.6 in Spring 1995).

2. The Group Three survey analysis and chart reveal that satisfaction with Program content improves and then plateaus in Spring 1994. Site inspections and self-inspections are regarded as helpful overall, but homework assignments and loss analysis are not, particularly in Spring 1995. Videos, in particular, are a problem. Participants consistently responded to survey item #9 with a 1, 2, or 3 (indicating dissatisfaction). Handwritten comments indicated that the videos were "boring", that the content needed to be updated, that they are reminiscent of "driver's-ed" videos, and that they are "insulting to our [COST Program participants] intelligence". One solution may be to create our own videos in-house. Note that Fall 1994 data in this area are unavailable, because a slightly different survey was used (one which did not include these survey items).

3. Analysis of Group Four survey items is particularly interesting: while owner's commitment to improving safety has consistently improved since Spring 1993, COST Program participants' understanding (of why their company was required to attend COST) steadily decreased since Spring 1993. This may indicate a lack of communication on our part. Again, data from Spring 1993 and Fall 1994 are not available in this area, because a slightly different survey was used.

4. The Group Five survey analysis and chart indicate that overall, the number of companies that feel COST is a burden has decreased. However, a relatively large proportion of participants did feel COST was a burden to their company, in Spring 1994. This may warrant further study. Note that data from Spring 1993 and Fall 1994 are not available in this area, because a slightly different survey was used. This lack of data makes it difficult to draw any definitive conclusions in this area.

Thus far, the most obvious improvements to the COST Program are to include a syllabus and improve the videos. Improving the homework assignments and loss analyses should also be considered. A new survey evaluating the COST Program has been developed, and a copy is included at the end of this report. This survey will be sent to past participants of COST later this week. The survey is designed to reveal any lasting impressions held by the participants, and to illuminate the obstacles faced by companies when implementing the principles of the COST Program. The data gathered from this more in-depth survey will better help us refine the COST Program.

K.Quinn, Dec. 6, 1995

Abacus Management Group, Inc.

Training Session Evaluation

Comprehensive Occupational Safety Training Program
Spring 1995

Please circle the number indicating your agreement with the following:

	Disagree Strongly		Unsure		Agree Strongly
1. This program will help our safety program	1	2	3	4	5
2. The program was well organized	1	2	3	4	5
3. The site inspections were helpful	1	2	3	4	5
4. The Abacus staff were knowledgeable	1	2	3	4	5
5. The Abacus staff were clear and effective	1	2	3	4	5
6. The training objectives were met	1	2	3	4	5
7. The homework assignments were helpful	1	2	3	4	5
8. We plan to use the self-inspections	1	2	3	4	5
9. The videos were informative	1	2	3	4	5
10. I recommend this training to others	1	2	3	4	5
11. Loss analyses were helpful	1	2	3	4	5
12. My questions were answered	1	2	3	4	5
13. Owners/executives in my company are committed to improving safety	1	2	3	4	5
14. I understand why my company was required to attend the COST program	1	2	3	4	5
15. This program was an unnecessary burden on me and my company	1	2	3	4	5

Make the following changes to improve the COST program:

Comments:

COST session date	Survey Number	Evaluation Number	company rep	Item #1 Response	Item #2 Response	Item #3 Response	Item #4 Response	Item #5 Response	Item #6 Response	Item #7 Response	Item #8 Response	Item #9 Response	Item #10 Response	Item #11 Response	Item #12 Response	Item #13 Response	Item #14 Response	Item #15 Response	Sum of Responses	Satisfaction Score
Spring 95	1	1		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	75	5.00
Spring 95	2	2		5	5	4	4	5	4	5	5	4	5	5	5	5	4	5	70	4.67
Spring 95	3	3		4	3	5	4	4	4	3	5	2	4	4	5	4	1	3	55	3.67
Spring 95	4	4		5	5	5	5	4	3	4	5	3	5	4	5	5	5	5	68	4.53
Spring 95	5	5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	75	5.00
Fall 94	6	1		5	4		4	4	4				5		4				30	4.29
Fall 94	7	2		5	5		5	5	3				5		5				33	4.71
Fall 94	8	3		4	5		4	5	3				4		5				30	4.29
Fall 94	9	4		5	3		5	5	5				5		5				33	4.71
Fall 94	10	5		5	5		5	5	5				5		5				35	5.00
Fall 94	11	6		5	5		5	5	5				5		5				35	5.00
Fall 94	12	7		5	5		5	3	5				4		5				32	4.57
Spring 94	13	1	Donna @ Dancecraft/Alan	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	74	4.93
Spring 94	14	2		5	5	5	5	5	4	5	5	4	5	5	5	5	3	3	67	4.47
Spring 94	15	3		5	5	5	5	5	4	5	5	4	5	5	5	4	5	5	72	4.80
Spring 94	16	4		5	5	5	5	5	5	4	5	3	5	5	5	5	5	4	71	4.73
Spring 94	17	5		5	5	2	5	5	3	4	4	1	3	4	5	5	5	2	56	3.73
Spring 94	18	6		5	5	4	5	5	5	4	5	4	4	5	5	5	4	5	70	4.67
Spring 94	19	7		5	5	5	5	5	5	5	5	3	5	5	5	5	3	2	68	4.53
Spring 94	20	8	Ed	5	5	5	5	5	5	4	5	4	5	5	5	5	5	5	73	4.87
Spring 94	21	9		4	4	5	5	4	4	4	5	4	4	4	5	5	5	5	67	4.47
Spring 94	22	10		4	4	4	5	4		4	5	4	5	4	5	4	5	5	62	4.13
Spring 94	23	11		5	5	5	5	4	4	5	5	4	4	5	5	5	5	5	71	4.73
Spring 94	24	12		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	75	5.00
Spring 94	25	13	Patrick Donnelly	5		5	5	5	4	4	5	5	5	5	5	4	2	5	64	4.57
Fall 93	26	1	Mike Tudino	5	5	5	5	4	4	5	4	5	5	5	5	3	4	5	69	4.60
Fall 93	27	2	Norman	4	4	3	4	4	3	3	5	3	4	5		5	3	4	54	3.86
Fall 93	28	3	Wayne	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	74	4.93
Fall 93	29	4	Michele	5	4	5	5	5	4	4	5	4	5	5	5	3	5	5	69	4.60
Fall 93	30	5	Coretz	5	4	3	4	4	5	4	4	5	5	3	4	4	5	5	64	4.27
Fall 93	31	6	Viking	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	73	4.87
Fall 93	32	7	Metals	5	5	4	5	5	4	5	5	5	5	5	4	5	5	5	72	4.80
Fall 93	33	8	Desmon	4	5	5	5	5	4	4	5	4	5	5		4	5	5	65	4.64
Fall 93	34	9	Bolden	4	4	5	5	5	5	3	4	5	4	5	5	5	5	4	68	4.53
Fall 93	35	10	United	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	75	5.00
Fall 93	36	11		5	5	4	5	4	3	5	4	3	4	4	5	5	5	5	64	4.27
Fall 93	37	12	Florence	5	5	5	5	5	5	4	5	4	4	4	5	5	4	5	70	4.67
Spring 93	38	1		4	4	4	5	5	3	4	4	3	4	3	4				47	3.92
Spring 93	39	2		4	4	5	5	5	4	4	5	4	4	5	5				54	4.50
Spring 93	40	3		5	5	4	5	5	5	5	5	4	4	4	5				56	4.67
Spring 93	41	4		5	5	5	5	5	5	5	5	5	5	5	5				60	5.00
Spring 93	42	5		5	5	5	5	5	4	4	5	5	4	4	4				55	4.58
Spring 93	43	6		5	4	5	4	4	4	4	5	5	5	4	5				54	4.50
Spring 93	44	7		5	5	5	5	5	5	5	5	5	5	5	5				60	5.00
Spring 93	45	8		4	3	4	4	4	4	5	5	5	3	5	5				51	4.25
Spring 93	46	9		5	5	4	5	4	3	4	5		4	3	4				44	4.00
Spring 93	47	10		5	4	5	5	5	4	5	5	4	5	5	4				55	4.58
Spring 93	48	11	H&H	5	4	4	4	4	4	4	4	4	5	4	5				51	4.25
Spring 93	49	12		5	5	5	5	5	4	2	5	4	5	5	3				53	4.42
Spring 93	50	13		5	5	5	5	5	4	4	4	3	5	5	4				54	4.50
Spring 93	51	14	Dan Case	5	5	5	5	5	5	4	5	5	5	5	5				59	4.92
Spring 93	52	15	Norman-Vinyl	5	5	3	4	4	5	5	5	4	5	5	5				55	4.58
Spring 93	53	16	Dave Serpa-Pride	5	5	5	5	5	5	2	5	4	5	2	5				53	4.42
Spring 93	54	17		3	5	5	5	5	3	2	4	4	5	2	5				48	4.00
Spring 93	55	18		5	5	5	5	5	5	5	5	5	5	5	4				59	4.92

Responses to Item #15 were "normalized" to result in accuracy in the sums and scores columns. A "1" on the actual survey was transcribed as a "5" on this worksheet. Similarly, a "2" becomes a "4", a "3" stays a "3", a "4" becomes a "2", and a "5" becomes a "1". This is understandable if you look at the response key and realize that a "1" is the worst response for survey items 1-14 but the best response for item 15.

**Light Gray areas indicate missing or unavailable data.

Item Key for the COST Evaluations:

Item #1 = "This program will help with our safety program."
Item #2 = "The program was well organized."
Item #3 = "The site inspections were helpful."
Item #4 = "The Abacus staff were knowledgeable."
Item #5 = "The Abacus staff were clear and effective."
Item #6 = "The training objectives were met."
Item #7 = "The homework assignments were helpful."
Item #8 = "We plan to use the self-inspections."
Item #9 = "The videos were informative."
Item #10 = "I recommend this training to others."
Item #11 = "Loss analyses were helpful."
Item #12 = "My questions were answered."
Item #13 = "Owners/executives in my company are committed to improving safety."
Item #14 = "I understand why my company was required to attend the COST program."
Item #15 = "This program was an unnecessary burden on me and my company."

Response Key:

1 = Disagree Strongly
2 = Disagree
3 = Unsure
4 = Agree
5 = Agree Strongly

Key to Satisfaction Scores (Approval Ratings):

1 = Completely Dissatisfied
2 = Generally Dissatisfied
3 = No Definitive Opinion
4 = Generally Satisfied
5 = Completely Satisfied

COST Evaluations - Method 1 Analysis

** Evaluations completed by participants of the COST programs, 1993-1995. A perfect score (i.e. completely satisfied) is equal to 5.00. In each cases, the Score for each Survey # (i.e. participant) was calculated by summing the response values (1 thru 5) and dividing by the total number of items responded to.

Satisfaction Survey Results Spring 1995			
Survey #	Response Sum	Score	
1	75	5.00	**
2	70	4.67	
3	55	3.67	
4	68	4.53	
5	75	5.00	**
	sum =	22.87	

Fall 1995 COST sessions have not yet been completed.

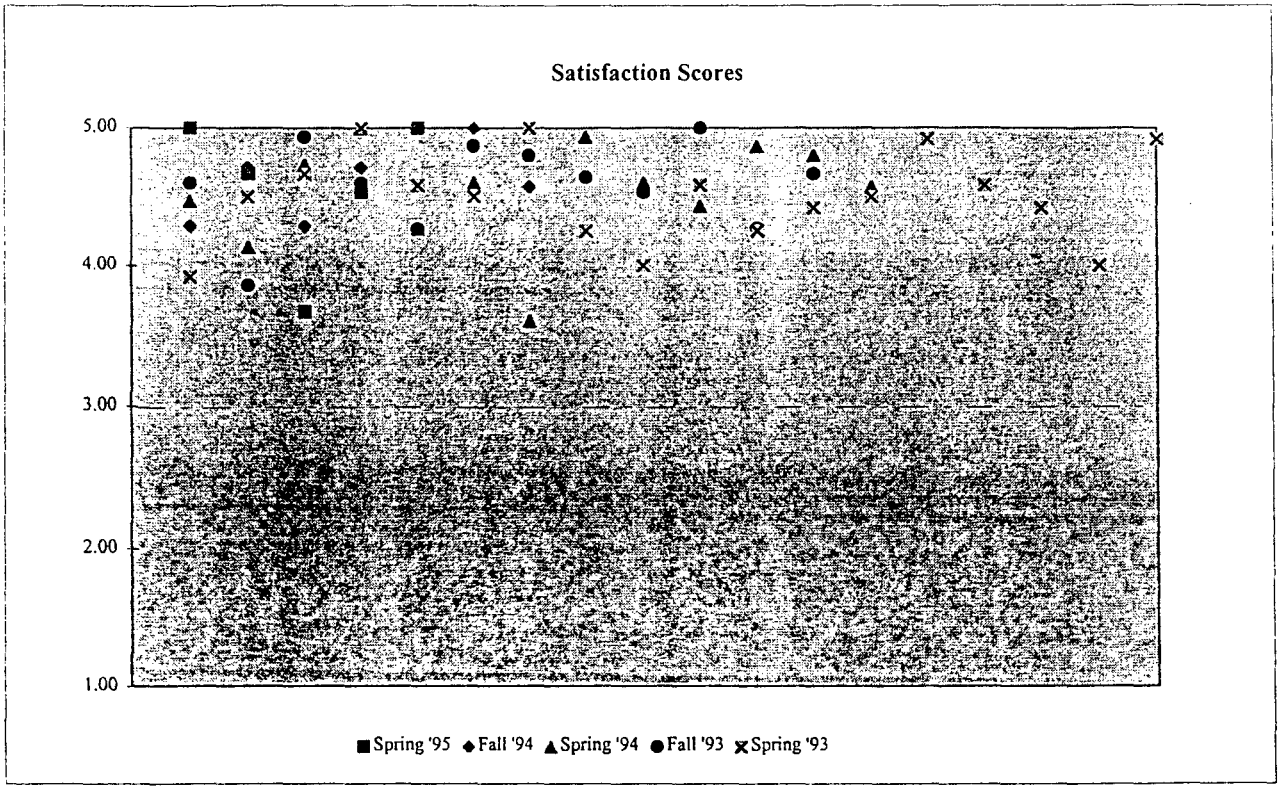
Satisfaction Survey Results Spring 1994			
Survey #	Response Sum	Score	
1	67	4.47	
2	62	4.13	
3	71	4.73	
4	75	5.00	**
5	64	4.27	
6	69	4.60	
7	54	3.60	
8	74	4.93	
9	69	4.60	
10	62	4.43	
11	73	4.87	
12	72	4.80	
13	64	4.57	
	sum =	59.00	

Satisfaction Survey Results Fall 1994			
Survey #	Response Sum	Score	
1	30	4.29	
2	33	4.71	
3	30	4.29	
4	33	4.71	
5	35	5.00	**
6	35	5.00	**
7	32	4.57	
	sum =	32.57	

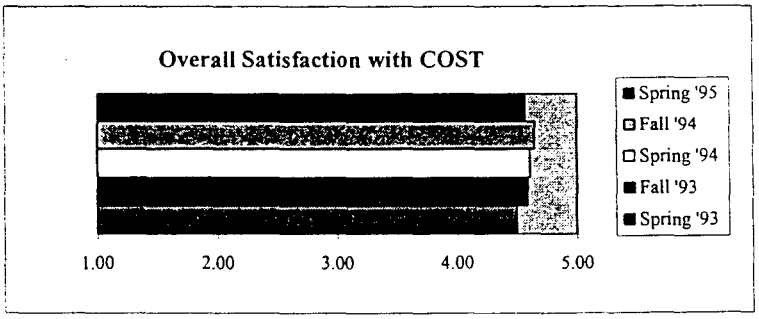
Satisfaction Survey Results Spring 1993			
Survey #	Response Sum	Score	
1	47	3.92	
2	54	4.50	
3	56	4.67	
4	60	5.00	**
5	55	4.58	
6	54	4.50	
7	60	5.00	**
8	51	4.25	
9	44	4.00	
10	55	4.58	
11	51	4.25	
12	53	4.42	
13	54	4.50	
14	59	4.92	
15	55	4.58	
16	53	4.42	
17	48	4.00	
18	59	4.92	
	sum =	81.00	

Satisfaction Survey Results Fall 1993			
Survey #	Response Sum	Score	
1	69	4.60	
2	54	3.86	
3	74	4.93	
4	69	4.60	
5	64	4.27	
6	73	4.87	
7	72	4.80	
8	65	4.64	
9	68	4.53	
10	75	5.00	**
11	64	4.27	
12	70	4.67	
	sum =	55.03	

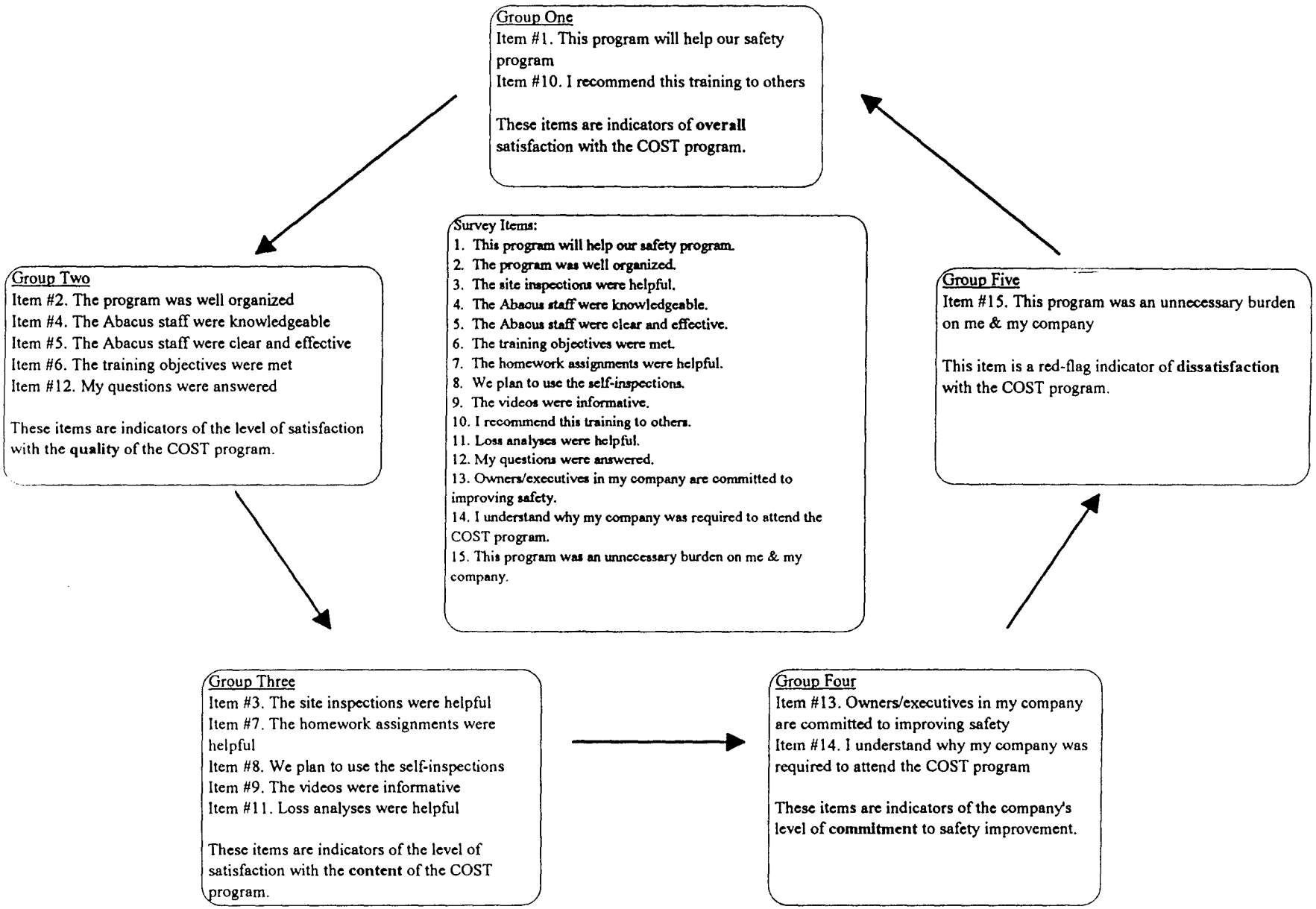
COST Evaluations - Method 1 Analysis



Overall Satisfaction	
Mo/Yr	Overall Score
Spring '93	4.50
Fall '93	4.59
Spring '94	4.61
Fall '94	4.65
Spring '95	4.57



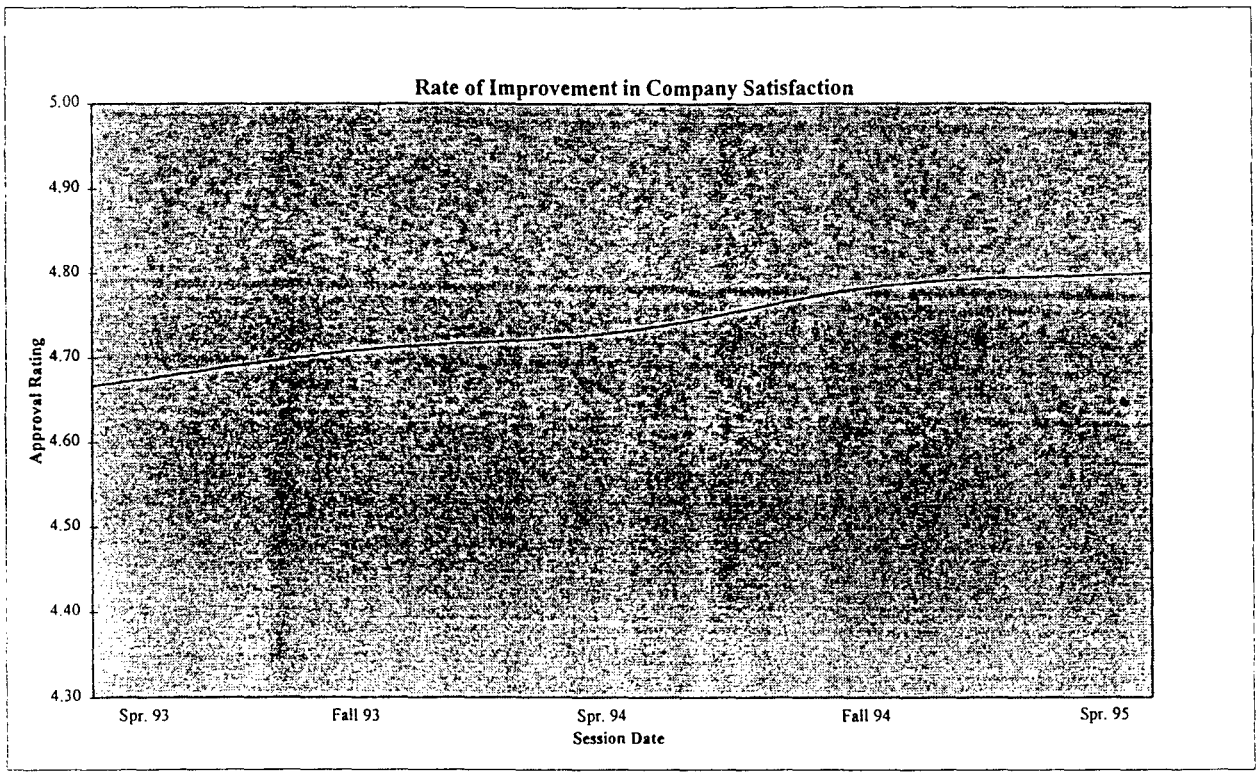
COST Evaluations - Method 2 Analysis



COST Evaluations - Method 2 Analysis

Group One
Item #1. This program will help our safety program
Item #10. I recommend this training to others

These items are indicators of **overall** satisfaction with the COST program.



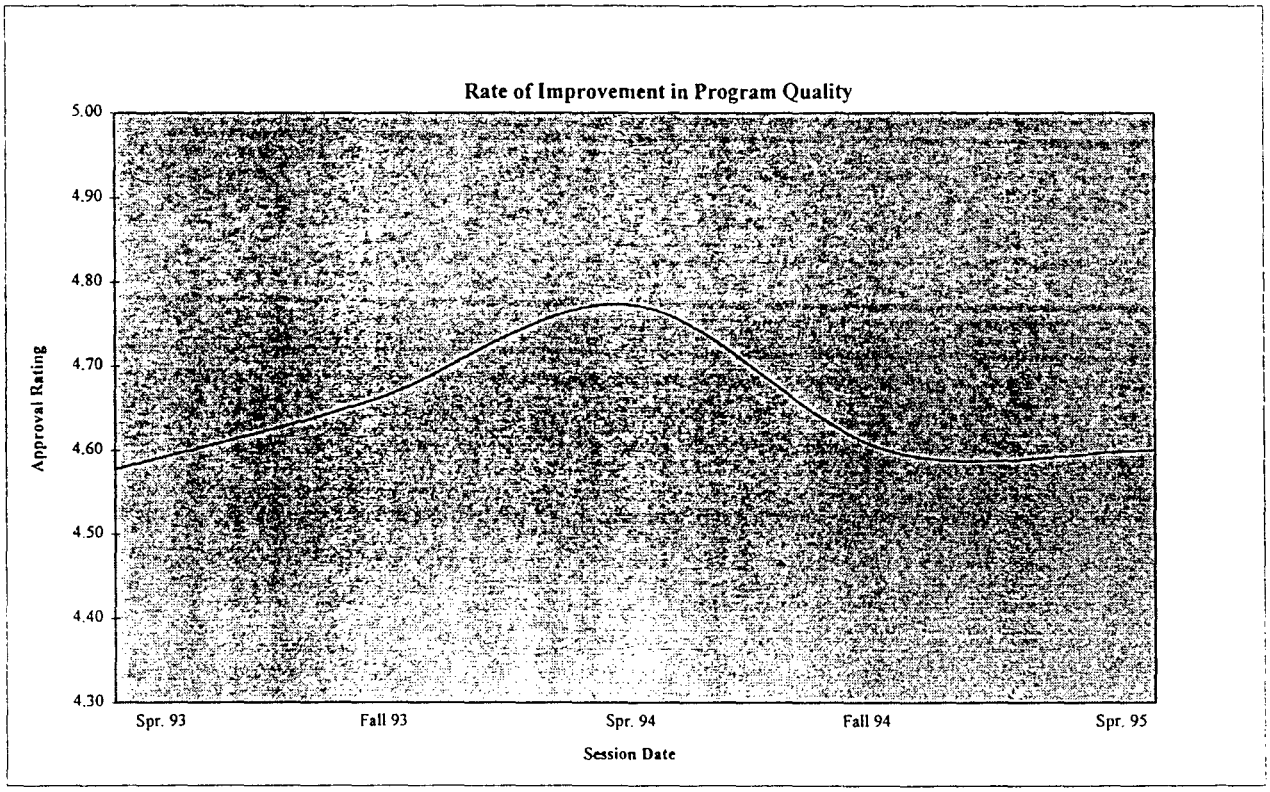
Group One

COST session date	Ave. response to Item #1	Ave. response to Item #10	Approval Rating
Spring 95	4.80	4.80	4.80
Fall 94	4.86	4.71	4.79
Spring 94	4.85	4.62	4.73
Fall 93	4.75	4.67	4.71
Spring 93	4.72	4.61	4.67

COST Evaluations - Method 2 Analysis

Group Two
Item #2. The program was well organized
Item #4. The Abacus staff were knowledgeable
Item #5. The Abacus staff were clear and effective
Item #6. The training objectives were met
Item #12. My questions were answered

These items are indicators of the level of satisfaction with the **quality** of the COST program.

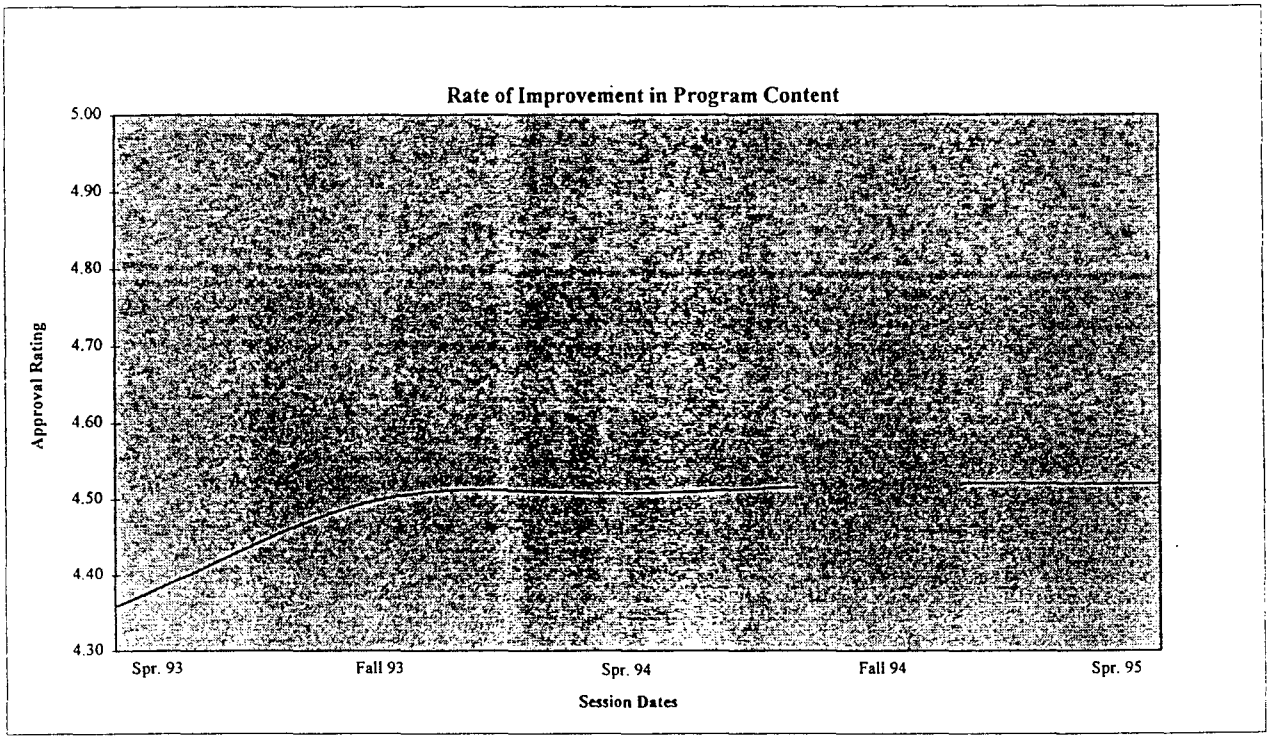


Group Two

COST session date	Ave. response to Item #2	Ave. response to Item #4	Ave. response to Item #5	Ave. response to Item #6	Ave. response to Item #12	Approval Rating
Spring 95	4.60	4.60	4.60	4.20	5.00	4.60
Fall 94	4.57	4.71	4.57	4.29	4.86	4.60
Spring 94	4.83	5.00	4.77	4.42	4.85	4.77
Fall 93	4.67	4.83	4.67	4.33	4.80	4.66
Spring 93	4.61	4.78	4.72	4.22	4.56	4.58

Group Three
Item #3. The site inspections were helpful
Item #7. The homework assignments were helpful
Item #8. We plan to use the self-inspections
Item #9. The videos were informative
Item #11. Loss analyses were helpful

These items are indicators of the level of satisfaction with the **content** of the COST program.

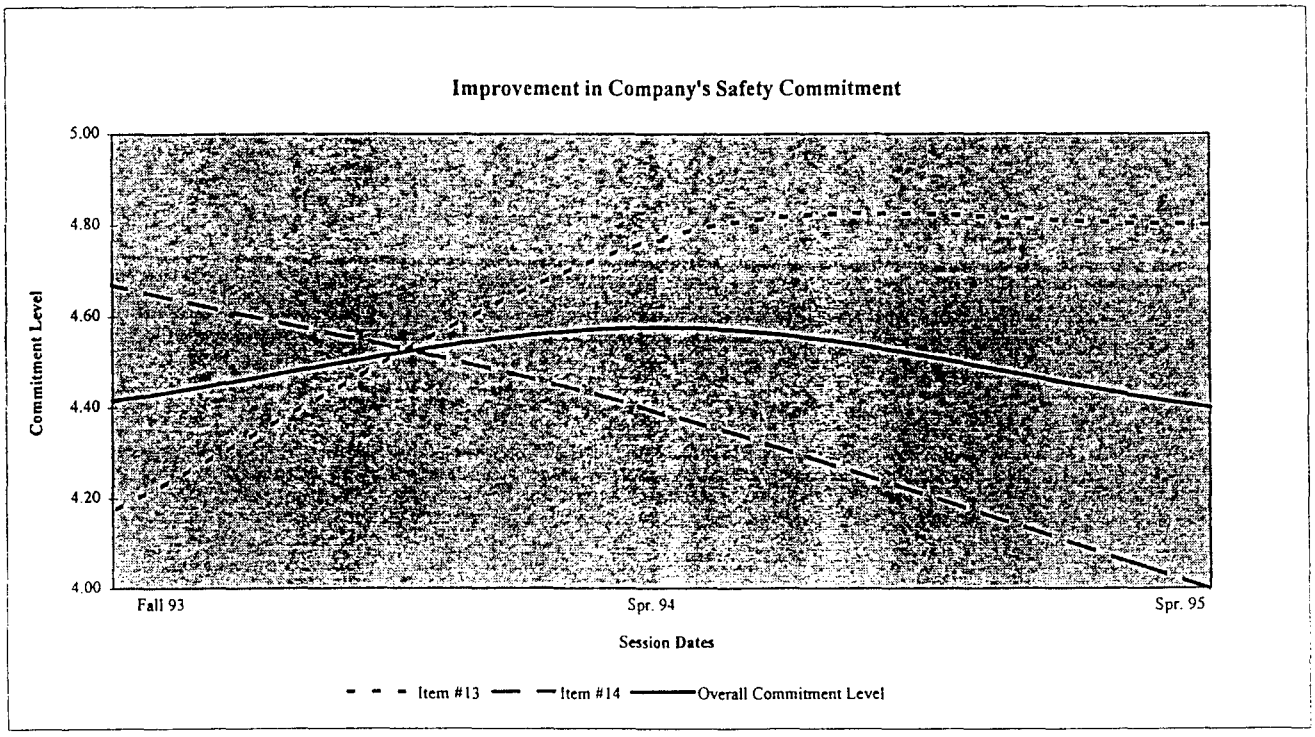


Group Three

COST session date	Ave. response to Item #3	Ave. response to Item #7	Ave. response to Item #8	Ave. response to Item #9	Ave. response to Item #11	Approval Rating
Spring 95	4.80	4.40	5.00	3.80	4.60	4.52
Fall 94						4.52
Spring 94	4.62	4.46	4.92	3.77	4.77	4.51
Fall 93	4.50	4.33	4.67	4.33	4.67	4.50
Spring 93	4.61	4.00	4.67	4.29	4.22	4.36

Group Four
Item #13. Owners/executives in my company are committed to improving safety
Item #14. I understand why my company was required to attend the COST program

These items are indicators of the company's level of **commitment** to safety improvement.

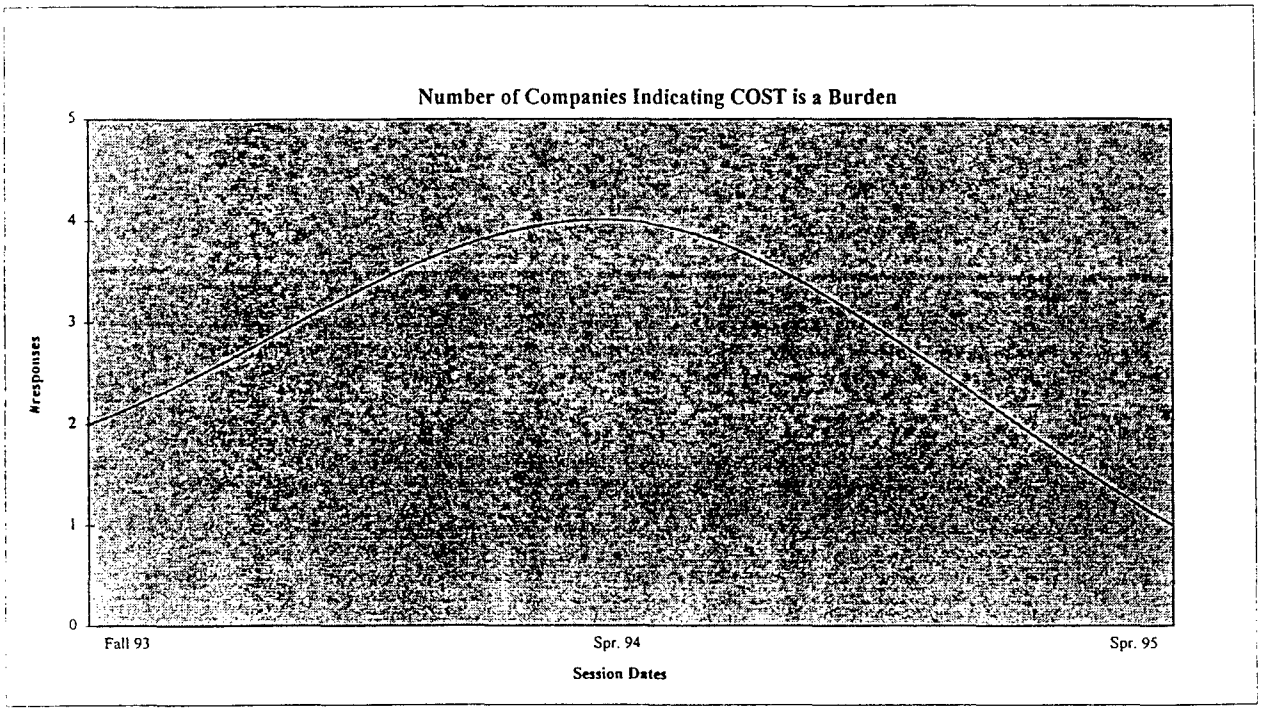


Group Four

COST session date	Ave. response to Item #13	Ave. response to Item #14	Approval Rating
Spring 95	4.80	4.00	4.40
Fall 94			
Spring 94	4.77	4.38	4.58
Fall 93	4.17	4.67	4.42
Spring 93			

Group Five
Item #15. This program was an unnecessary burden on me & my company

This item is a red flag indicator of dissatisfaction with the COST program.



Group Five

COST session date	#responses to Item #15 <>1
Spring 95	1
Fall 94	
Spring 94	4
Fall 93	2
Spring 93	

New COST Video - 1st Evaluation administered immediately after SRC ("Safety Committee") on January 25, 1996

companies:
Tri-Bro Tool Company
Liberty Plating
Hallmark Healy Group
DeWal Industries
Mandeville Signs
Tru-Kay
Greylawn Foods
Central Tools

New COST Video - 2nd Evaluation administered immediately after SRC given by Jim & John at Arbella on February 7, 1996

companies:

[redacted]

New COST Video - 4th Evaluation administered immediately after SRC ("Managing & Motivating") on April 18, 1996

companies:
Blazing Graphics
Taylor Box Company
Hallmark Healy Group
Stylecraft, Inc.
Mandeville Signs
MH Stallman
Fielding Manufacturing
Liberty Plating
DeWal Industries
Evans Findings

Item #

1 "This video will help convince supervisors to use positive feedback.
2 "The scenes portrayed in the video are realistic."
3 "The characters and their lines are believable."
4 "The length of the video is appropriate."
5 "The video looks professional."
6 "The video is enjoyable."
7 "This video would help my company train supervisors."
8 "The message of the video is clear and understandable."

Response Codes:

1 = Disagree strongly
2 = Disagree
3 = Unsure
4 = Agree
5 = Agree strongly

	Item #								
Survey #	1	2	3	4	5	6	7	8	Average
1.1	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)	n/a
1.2	4	4	5	5	4	4	4	5	4.38
1.3	2	3	3	4	4	4	3	4	3.38
1.4	4	4	4	4	4	4	4	4	4.00
1.5	1	1	1	1	1	2	1	1	1.13
1.6	4	4	3	4	4	4	4	5	4.00
1.7	4	4	5	4	4	5	4	5	4.38
1.8	4	3	5	5	5	5	5	5	4.75
1.9	4	3	3	4	4	4	4	4	3.75
1.10	4	4	4	4	4	4	4	4	4.00
1.11	4	4	4	3	4	(blank)	4	4	3.86
1.12	5	5	5	5	5	5	5	5	5.00
1.13	2	4	3	5	4	4	4	4	3.75
1.14	5	4	5	5	4	5	5	5	4.75
Average	3.69	3.62	3.85	4.08	3.92	4.17	3.92	4.23	3.93
2.1	3	5	4	4	5	3	4	5	4.13
2.2	5	4	4	4	4	4	5	5	4.38
2.3	4	4	3	4	2	2	3	5	3.38
2.4	4	4	4	5	4	4	4	5	4.25
2.5	5	5	4	5	5	5	5	5	4.88
Average	4.20	4.40	3.80	4.40	4.00	3.60	4.20	5.00	4.20
[redacted]									
Average	3.95	4.11	3.92	4.42	4.00	4.00	3.63	4.38	4.04
4.1	4	4	5	5	4	2	2	2	3.50
4.2	4	4	4	5	3	4	4	5	4.13
4.3	4	4	5	4	5	4	4	4	4.25
4.4	5	5	5	5	5	5	5	5	5.00
4.5	5	5	5	5	5	5	5	5	5.00
4.6	4	4	4	5	5	5	5	5	4.63
4.7	4	5	5	5	4	5	5	5	4.75
4.8	5	5	5	5	5	5	4	5	4.88
Average	4.38	4.50	4.75	4.88	4.50	4.38	4.25	4.50	4.52

"What do you think the video's message is?"

Survey #	Comments
1.1	(blank)
1.2	"How to deal with day-to-day problems in production situations."
1.3	"Communication is needed with upper & lower management levels."
1.4	"Give immediate & positive feedback."
1.5	"Lifting safely."
1.6	"Use positive feedback in a timely fashion."
1.7	"You reap what you sow. If other words, you can respectfully deal with your employees & your employees will be willing to work with you and respect you back."
1.8	"Safe lifting."
1.9	(blank)
1.10	"Showing how lifting should be done."
2.1	(blank)
2.2	"Excellent start tool - more training videos on needed subjects to make employees aware of what is expected."
2.3	"Not to ignore unsafe work habits."
2.4	"The right and wrong way to communicate with individuals."
2.5	"That positive feedback and reinforcement is a good tool for work safety."
3.1	(blank)
3.2	"Get the point across in an obvious manner of how to get supervisors to teach people proper safety methods and to communicate with the employee."
3.3	"Spend the extra time to train someone the proper way to do a specific task."
3.4	"That a front line supervisor is on top of any and all problems regardless how small."
3.5	[redacted]
3.6	[redacted]
3.7	[redacted]
3.8	[redacted]
3.9	[redacted]
3.10	[redacted]
4.1	(blank)
4.2	"Communication - feedback."
4.3	(blank)
4.4	"Positive feedback accomplishes more than negative."
4.5	"To concentrate more on how to lift and move boxes."
4.6	"More help and instruction on supervisor's part."
4.7	(blank)
4.8	(blank)

"What would make the video better?"

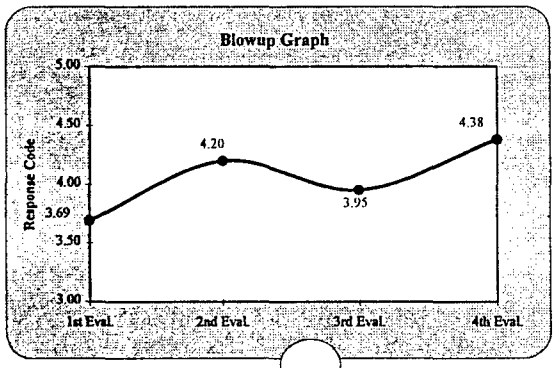
Survey #	Comments
1.1	(blank)
1.2	"No opinion."
1.3	"n/a"
1.4	"Heavier boxes."
1.5	"Write the safety director's complaint." Be
1.6	"I think Gus would have flipped the guy off behind his back after the down-dressing."
1.7	"Make boxes appear heavier."
1.8	"Boxes not realistically heavy."
1.9	(blank)
1.10	"Supervisor not so strong."
1.11	(blank)
1.12	(blank)
1.13	"The 'lay down the law' segment doesn't work? Supervisor spends too much time telling employee to go to the library doesn't seem realistic."
1.14	(blank)
2.1	(blank)
2.2	(blank)
2.3	(blank)
2.4	"Video is fine."
2.5	"Fine."
[redacted]	[redacted]
4.1	(blank)
4.2	(blank)
4.3	(blank)
4.4	(blank)
4.5	(blank)
4.6	(blank)
4.7	(blank)
4.8	(blank)

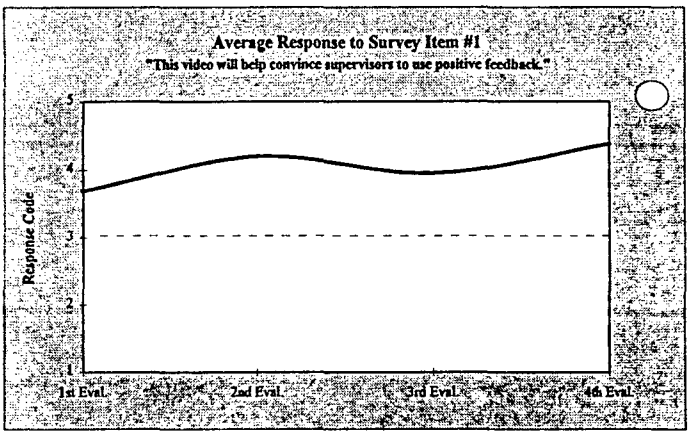
Additional Comments:

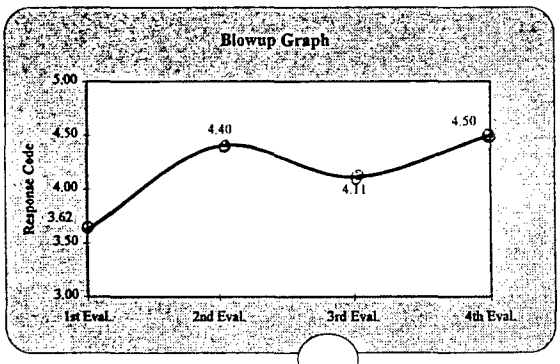
Survey #	Comments
1.1	"In what context would you present a 7-minute video to a company? What is the overall subject being covered?"
1.2	(blank)
1.3	(blank)
1.4	(blank)
1.5	(blank)
1.6	"Heavier boxes, a little bit more in length, commentary afterward, etc."
1.7	(blank)
1.8	"Message may be more geared to supervisory techniques than safety."
1.9	(blank)
1.10	"Use heavier boxes."
1.11	(blank)
1.12	(blank)
1.13	(blank)
1.14	(blank)
2.1	(blank)
2.2	(blank)
2.3	(blank)
2.4	(blank)
2.5	"Too many stops along way with supervisor. People should report to him after arrival."
[illegible]	[illegible]
4.1	(blank)
4.2	(blank)
4.3	"Well made and message is common to all."
4.4	"The characters are real 'characters'!"
4.5	(blank)
4.6	"Great job."
4.7	(blank)
4.8	(blank)

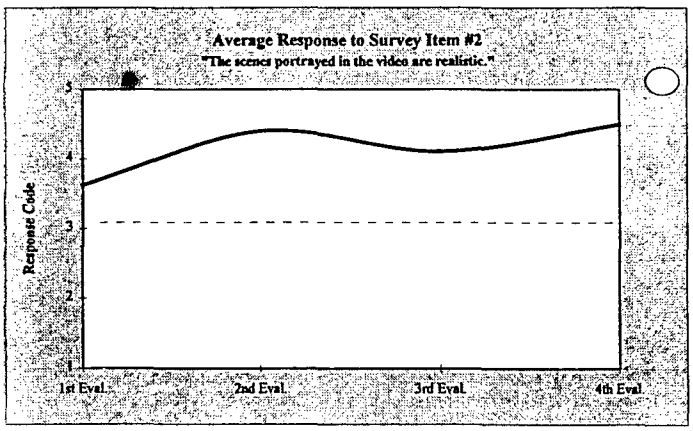
Summary: Average Responses to Survey Items

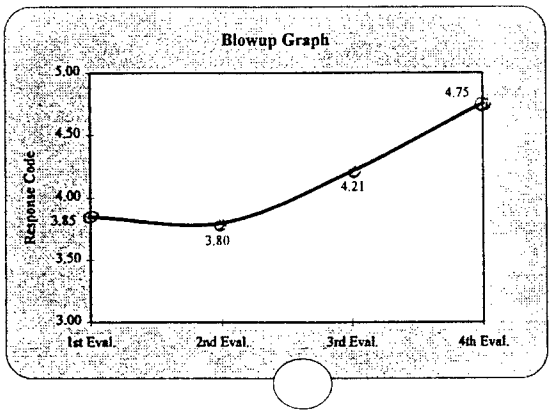
Item #	1st Eval.	2nd Eval.	3rd Eval.	4th Eval.	Average
1	3.69	4.20	3.95	4.38	4.06
2	3.62	4.40	4.11	4.50	4.16
3	3.85	3.80	4.21	4.75	4.15
4	4.08	4.40	4.21	4.80	4.37
5	3.92	4.00	4.15	4.50	4.12
6	4.17	3.60	4.00	4.38	4.04
7	3.92	4.20	3.63	4.25	4.00
8	4.23	5.00	4.16	4.50	4.47

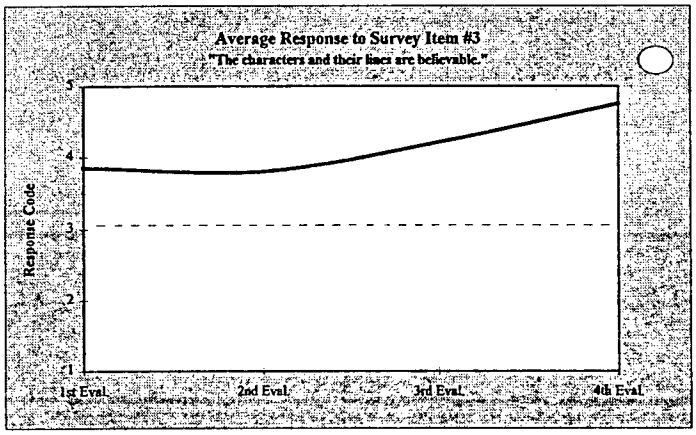


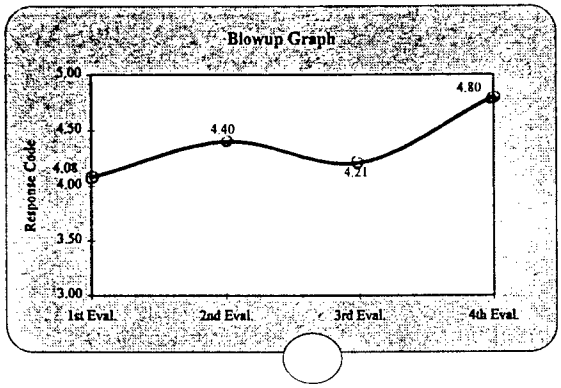


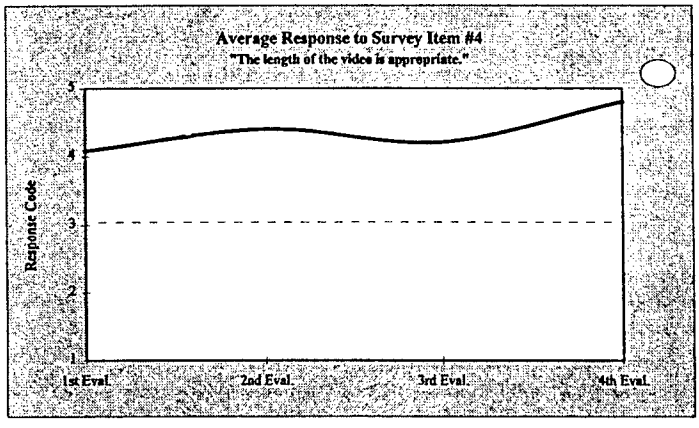


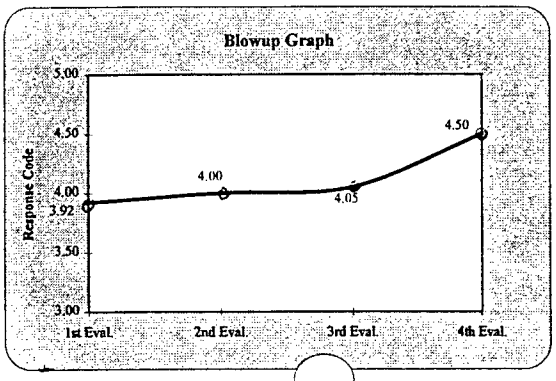


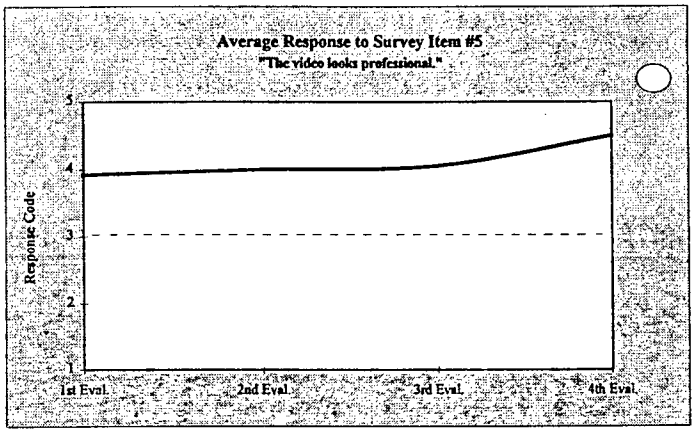

Blowup Graph
Response Code
5.00
4.50
4.00
3.85
3.50
3.00
4.75
4.21
3.80
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

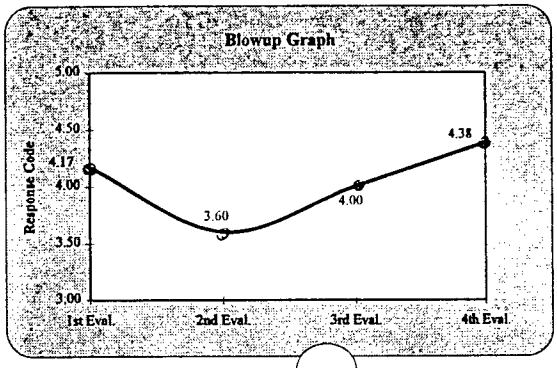

Average Response to Survey Item #3
"The characters and their lines are believable."
Response Code
5
4
3
2
1
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

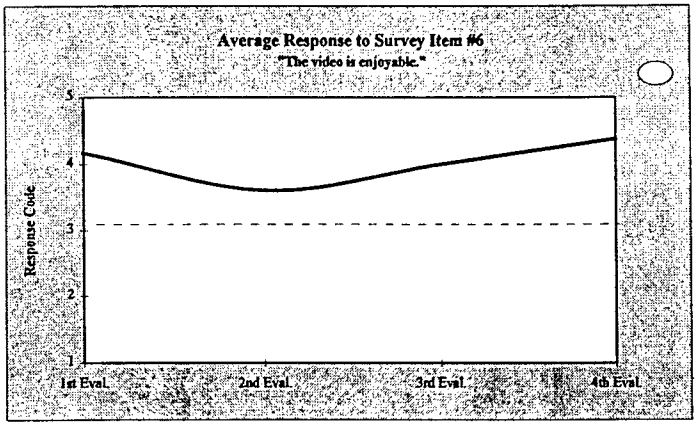

Blowup Graph
Response Code
5.00
4.50
4.08
4.00
3.50
3.00
4.80
4.40
4.21
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

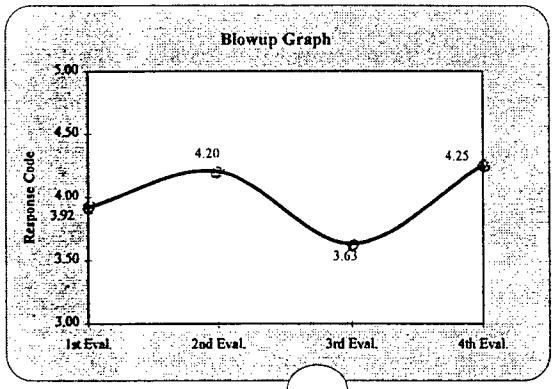

Average Response to Survey Item #4
"The length of the video is appropriate."
Response Code
5
4
3
2
1
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

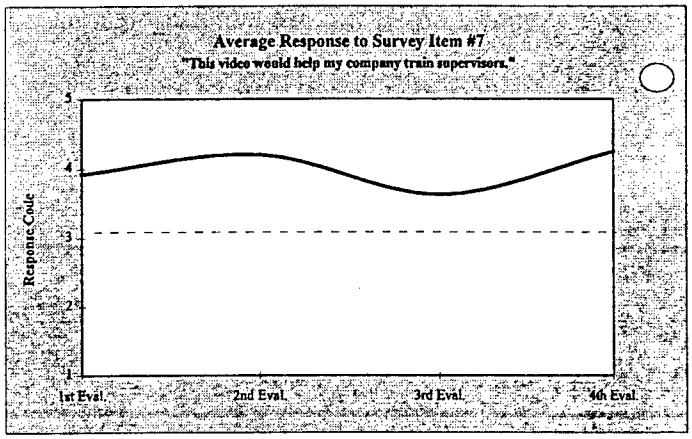

Blowup Graph
Response Code
5.00
4.50
4.00
3.92
3.50
3.00
4.00
4.05
4.50
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

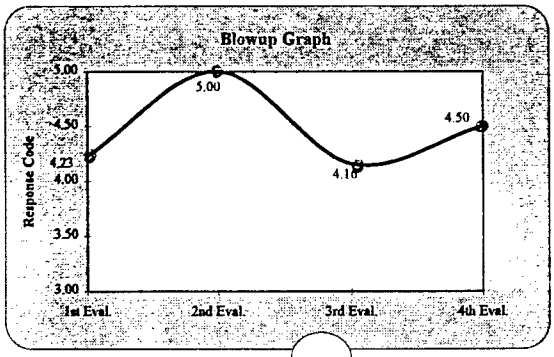

Average Response to Survey Item #5
"The video looks professional."
Response Code
5
4
3
2
1
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

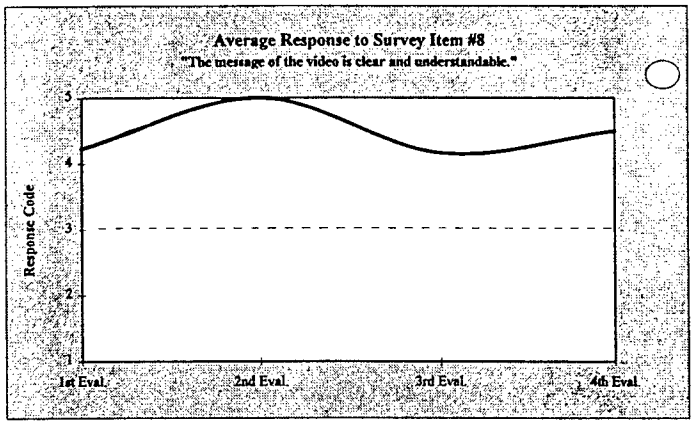

Blowup Graph
Response Code
5.00
4.50
4.17
4.00
3.50
3.00
3.60
4.00
4.38
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.


Average Response to Survey Item #6
"The video is enjoyable."
Response Code
5
4
3
2
1
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.


Blowup Graph
Response Code
5.00
4.50
4.00
3.50
3.00
3.92
4.20
3.63
4.25
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.


Average Response to Survey Item #7
"This video would help my company train supervisors."
Response Code
5
4
3
2
1
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.


Blowup Graph
Response Code
5.00
4.50
4.23
4.00
3.50
3.00
5.00
4.10
4.50
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.


Average Response to Survey Item #8
"The message of the video is clear and understandable."
Response Code
5
4
3
2
1
1st Eval.
2nd Eval.
3rd Eval.
4th Eval.

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