**Evaluation of Construction
Safety in DOE Course Taught
in Los Alamos, New Mexico
June 8 - June 11, 1992**

E. C. Handwerk

December 1992

**Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830**

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EVALUATION OF CONSTRUCTION SAFETY IN DOE
COURSE TAUGHT IN LOS ALAMOS, NM
JUNE 8, 1992 - JUNE 11, 1992

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Pacific Northwest Laboratory
Richland, Washington 99352

1.0 SUMMARY

This section summarizes trainee evaluations for the Safety and Health Training Section course, "Construction Safety in DOE", which was conducted June 8-11 at Los Alamos National Laboratory, in Los Alamos, New Mexico.

Section 1.1 and 1.2 of this report summarize the quantitative course evaluations that trainees provided upon completion of the course. Appendix A provides a transcript of the trainees' written comments.

Numeric course ratings were quite low, compared to previous courses, and indicate the need for improvement in course content and instruction selection. The written comments generally reflect the needs of the course and all comments will be carefully reviewed and changes will be made to improve the course.

Individual students with limited construction background, feel that they gained greater insight into the applications and use of the standards by attending the course.

Areas that were addressed by the students in the "Needs improvement" category will be reviewed by the instructors and, where necessary, corrections will be made in course content and presentation techniques.

Results from the final examination showed that twenty-one of the students attending class successfully completed the exam.

CONTENTS

1.0	SUMMARY	iii
1.1	SUMMARY OF TRAINEE COURSE EVALUATIONS	1.1
1.2	NUMERIC RATINGS	1.1
1.3	WRITTEN COMMENTS	1.3
1.4	EXAMINATION RESULTS	1.5
	APPENDIX A - EVALUATION COMMENTS	A.1
	APPENDIX B - TRAINEE EVALUATION FORM	B.1

4. Would recommend this course to others.

Average Class Rating - 3.89

5. Compliance knowledge gained from this course will make work environments safer.

Average Class Rating - 3.84

6. The final test was a good measure of the knowledge gained in the course.

Average Class Rating - 3.79

The average class rating for the course content area and testing materials area was 3.90. This rating reinforces the applicability of the course content to the trainees' interests and work environments.

The third rating area asked the respondents to rate the value of each of the fifteen topic areas using a five-point scale with 1 (Unsatisfactory), 2 (Satisfactory), 3 (Good), 4 (Very Good), or 5 (Excellent). The following are the average class ratings that dealt with topic content as well as with the value of the instructor:

INSTRUCTOR	TOPICAL AREAS PRESENTED	INSTRUCT	CONTENT
Edward Handwerk	Introduction to DOE Safety and Health Programs	2.68	2.63
Edward Handwerk	General Interpretations	2.63	2.89
Edward Handwerk	General Safety and Health Provisions	2.74	3.00
Len Luce	Scaffolding	3.00	3.11
Edward Handwerk	Floor and Wall Openings	2.84	2.79
Edward Handwerk	Ladders	2.89	2.95
Len Luce	Electrical	2.74	2.95
Len Luce	Power Transmission and Distribution	2.79	2.89
Edward Handwerk	Materials Handling, Storage, Use and Disposal	2.89	3.00

Len Luce	Cranes, Derricks, Hoists, Elevators and Conveyors	2.84	2.95
Edward Handwerk	Motor Vehicles, Mechanized Equipment and Marine Operations	2.84	3.00
Edward Handwerk	Rollover Protective Structures, Overhead Protection	3.00	3.05
Len Luce	Hand and Power Tools	3.11	3.11
Edward Handwerk	Welding and Cutting	2.74	2.89
Len Luce	Concrete and Masonry Construction	3.00	3.00
Edward Handwerk	Fire Protection and Prevention	2.89	2.89
Len Luce	Steel Erection	3.16	3.21
Len Luce	Underground Construction, Caisson, Cofferdams and Compressed Air	3.05	2.89
Edward Handwerk	Demolition	2.95	2.95
Len Luce and Edward Handwerk	Blasting and the Use of Explosives	2.84	2.79
Edward Handwerk	Occupational Health and Environmental Control/HazMat	2.84	2.74
Edward Handwerk	Personal Protective Equipment	2.89	2.95
Len Luce	Signs, Signals and Barricades	2.89	2.95

The overall average class rating for specific topic content was 2.94. The overall average class rating for E.C. Handwerk was 2.83, and the average class rating for L.F. Luce was 2.94.

1.3 WRITTEN COMMENTS

After providing numeric course evaluations, participants provided written comments about the course. Written comments were transcribed and are presented verbatim in Appendix A.

Expectations

Most students felt that they gained knowledge of the standards and how to use them. A few students with an abundant knowledge of the materials covered were disappointed with the basic 1926 information as it was presented.

Most Helpful Topics

Those commenting felt various subparts were helpful based upon their individual needs and positions at the site. Most addressed verbally and in written comment that scaffolding was very helpful.

Least Helpful Topics

Specific Subparts addresses were too lengthy for a few students and they also felt that if we said one hour for the sessions we should keep it to that even if there are questions or more concern from the students.

Suggestions For Improvement

Many suggestions were put forth for improvement. These include better timing of subjects, less stories, more emphasis on OSHA standards, showing a slide of the wrong way, then a slide of the correct way to comply, better organization of the course manuals, redefining the objectives and closer interaction with specific standards, updating handouts and adding DOE interpretations. All of these areas are being addressed in the ongoing revisions of the Construction course.

1.4 EXAMINATION RESULTS

On the last day of the course, a final examination was administered to twenty-two attendees. There were 25 questions all which were multiple choice questions. The scores ranged from 68% to 100% with the average score being 89%. Twenty-one persons successfully completed the class.

APPENDIX A

EVALUATION COMMENTS

"CONSTRUCTION SAFETY"

JUNE 8-11, 1992

LOS ALAMOS, NM (LOS ALAMOS NATIONAL LABORATORY)

APPENDIX A

TRAINEE EVALUATION RESPONSES

CONSTRUCTION SAFETY"

JUNE 8-11, 1992--LOS ALAMOS, NM

LOS ALAMOS NATIONAL LABORATORY

Please briefly describe how your expectations of this course were or were not met.

It will help me in my job.

I did not know what the intent of the course was prior to coming. The course taught me a lot.

I feel the course, was better than I expected.

Less of standards.

There were satisfied.

The course was very informative however more video presentation would have been very helpful.

Several questions regarding interpretations could have used more backup.

I feel I understand the mechanics and language of the standards in 1926.

Not met essentially, no new information - a lot of duplication of the material covered by the 1910 course.

Many times the instructors allowed the class conversation to get out of hand, then glassed over things to catch up on time. Make this a 40 hour course?

The newer changes to the standards were not covered, much information was from the old standard. i.e., ladders, hazard communication, asbestos.

Did not ever use explosives for demolition.

The most helpful topics covered or activities presented in this course were:
Everything.

All topics were helpful.

Construction.

All.

All. I was looking for a general overview of OSHA standards.

Fire protection, occupational health and environment, scaffolding, personal protective equipment, material handling, hand tools, guarding.

Electrical safety and scaffolding.

Concrete and masonry construction, and steel erection were well done.

Scaffolding - description of various types.

The least helpful things discussed or done were:
HS&E.

Blasting and use of explosives. However it was interesting.

A great deal of this information was a duplication of the 29 CFR 1910 course.

Time management should be improved. The lesson objectives were not met and the time was not tracked as indicated in the lesson plan.

Concrete/masonry were: Incorrect information on employees beneath concrete bucket - only applies when raising/lowering. Introduction and general interpretation too lengthy. Shorten or omit and add to course content.

More emphasis should be given to:

Organization of course material notebooks, slides, etc.

Giving examples by photos of the proper way (compliance) and improper (non-compliance) with OSHA standards.

Assignments, they don't really teach anything.

All of those areas where the instructor was rated with a 1. indicate that the objectives stated were not met by the instructor. In some cases important information was missed.

Ladders: fixed ladders - not discussed at all electrical: Lockout/tagout - only cursory coverage - Hazardous location - not covered; welding/cutting; cover hazards of compressed oxygen.

Less emphasis should be given to:
Things that do not apply to OSHA.

The first morning (3) hours. A simple terminal learning objectives must be developed.

Subpart N; crane signals was not covered completely anyway.

What specific suggestions do you have for improving future sessions?
More control of the class.

Should give specific examples of how a DOE facility handles each section rather than going thru a lot of slides from all over. Still show some slides, but more emphasis on a concrete example to give a better understanding.

More video presentation.

Closer interaction between objectives and regulations.

Slides showing correct methods.

Combine 1910, and 1926 courses instead of requiring 32 hours for each.

Continue referencing paragraphs to cover other areas.

Keep on track, develop a positive training program using visual aids that illustrate the equipment that conforms to standards.

Hazards encountered in crane use poorly covered; cover respirator use in welding, this was omitted; more complete discussion of UEL/LEL.

Other materials to supplement or substitute for the provided handouts?
Handouts rearranged.

Provided handouts need to be updated - they need to be consistent.

Better arrangement on some.

Some more FateIFax to cover other areas.

Many handouts contained errors and misspelling.

Informational. More of the "OSHA" or "DOE" interpretations should be included.

Daily schedule/timing of activities, worktime?

Good.

Set lunch time?

Use fewer slides showing how not to comply and more on how to comply.

Very good.

Okay.

Time management. Many lesson plans were too long which detracted from the other plans.

Facilities/training room arrangements?

Good. Need more coffee.

Good.

Excellent.

Cold.

What other types of safety training courses would you like to see available?

Topic specific courses.

More specific classes on subjects (e.g., concrete work, electrical safety, scaffolding and ladder safety, etc.).

1910, NEC, UBC.

Any further comments?

Trainers tend to get off track; also occasionally need to explain overheads more. First day of class the instructors mostly just read the overheads to us.

More coverage of hazard communication standards. More time on ergonomics since this is such a timely issue.

Handouts are bound out incomplete and have no page numbers. Hence, and hard to find and follow the instructor.

I will follow up these comments with more specific comments.

APPENDIX B

TRAINEE EVALUATION FORM

EVALUATION FORM

C-101—Construction Safety in DOE

Name (optional) _____ Date _____
 Title _____
 Location _____

Please evaluate various features of the course you have just completed. The information you provide here will be combined with that from other attendees and summarized for the sponsor, the U.S. Department of Energy. Results from this evaluation will be used to improve this course.

Course Content

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
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Overall, as a result of this course I believe that I:

developed specific skills and competencies in occupational safety compliance that I can use on the job.5	4	3	2	1
gained a greater understanding of 29 CFR 1926, Safety and Health Regulations for Construction5	4	3	2	1
gained factual knowledge about Federal safety and health program requirements related to Construction5	4	3	2	1
compliance knowledge gained from this course will make work environments safer.5	4	3	2	1
would recommend this course to others.5	4	3	2	1

Testing Materials

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
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The final test was a good measure of the knowledge gained in the course.5	4	3	2	1
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Topic Areas

Please evaluate each topic area using the 5-point scale below.

5 Excellent 4 Very Good 3 Good 2 Satisfactory 1 Unsatisfactory

	Content					Instructor				
Introduction to OSH/DOE Safety and Health Programs5	4	3	2	1	5	4	3	2	1	
General Interpretations/Recordkeeping (OSH 200 Form)5	4	3	2	1	5	4	3	2	1	
General Safety and Health Provisions5	4	3	2	1	5	4	3	2	1	
Scaffolding5	4	3	2	1	5	4	3	2	1	
Floor and Wall Openings5	4	3	2	1	5	4	3	2	1	
Ladders5	4	3	2	1	5	4	3	2	1	
Electrical5	4	3	2	1	5	4	3	2	1	
Power Transmission and Distribution (Optional Section)5	4	3	2	1	5	4	3	2	1	
Materials Handling, Storage, Use and Disposal5	4	3	2	1	5	4	3	2	1	
Cranes, Derricks, Hoists, Elevators and Conveyors5	4	3	2	1	5	4	3	2	1	
Motor Vehicles, Mechanized Equipment and Marine Operations5	4	3	2	1	5	4	3	2	1	
Rollover Protective Structures, Overhead Protection5	4	3	2	1	5	4	3	2	1	
Hand and Power Tools5	4	3	2	1	5	4	3	2	1	

Welding and Cutting	5	4	3	2	1	5	4	3	2	1
Concrete and Masonry Construction	5	4	3	2	1	5	4	3	2	1
Fire Protection and Prevention	5	4	3	2	1	5	4	3	2	1
Steel Erection	5	4	3	2	1	5	4	3	2	1
Excavations, Trenching and Shoring	5	4	3	2	1	5	4	3		
Underground Construction, Caisson, Cofferdams, and Compressed Air (Optional Section)	5	4	3	2	1	5	4	3	2	1
Demolition (Optional Section)	5	4	3	2	1	5	4	3	2	1
Blasting and the Use of Explosives (Optional Section)	5	4	3	2	1	5	4	3	2	1
Occupational Health and Environmental Control/HazMat	5	4	3	2	1	5	4	3	2	1
Personal Protective Equipment	5	4	3	2	1	5	4	3	2	1
Signs, Signals and Barricades	5	4	3	2	1	5	4	3	2	1
Current Trends in DOE Construction (HQ Assessment)	5	4	3	2	1	5	4	3	2	1

1. Please briefly describe how your expectations of this course were or were not met. _____

2. The **most** helpful topics covered or activities presented in this course were: _____

3. The **least** helpful topics or activities in this course were: _____

4. More emphasis should be given to: _____

5. Less emphasis should be given to: _____

6. What specific suggestions do you have for improving future sessions? _____

7. Other materials to supplement or substitute for the provided handouts? _____

8. Daily schedule/timing of activities, worktime? _____

9. Facilities/training room arrangements? _____

10. What other types of safety training courses would you like to see available? _____

11. Any further comments? _____

12. **Overall rating:** Based on your comments above, please rate the course on a 5-point scale by
circling the number of your choice.

5 *Excellent* 4 *Very Good* 3 *Good* 2 *Satisfactory* 1 *Unsatisfactory*

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