LIGHTING CODE COMPLIANCE TRAINING THROUGH THE USE OF INTERACTIVE VIDEO TAPES

Warren S. Baker, PhD
OSU Extension Energy Program

THE NEED FOR TRAINING

The state of Oregon adopted on July 1, 1986, a new statewide energy code which includes a section on lighting controls and lighting power budgets. Ensuring compliance with these new regulations is the responsibility of code officials who have no lighting or electrical background. To effectively enforce the new code, there is an immediate requirement for training code officials on the new lighting requirements.

The enforcement of lighting codes plays a critical role in reducing lighting energy demands in the commercial sector. Lighting accounts for 40 percent of the commercial electricity usage in Oregon. The heat produced by lighting can also represent a substantial portion of electrical usage devoted to cooling. Code compliance also encourages the use of daylighting through the use of better lighting controls and more efficient lighting design.

THE APPROPRIATE TRAINING METHOD

Oregon has a statewide building code, and code officials are required to maintain their certification through an approved continuing education program. However, meeting this requirement is difficult because of the travel time involved in seminar-type training. The officials also have problems with the timeliness of seminars. Often the need for training occurs when a set of plans are submitted. The time and place of this need usually bears little relation to scheduled seminars.

Technical reference manuals and accompanying video training tapes on various code topics, which could be sent to code officials through out the state appeared to be a good solution to satisfying the continuing education requirements. Training on the new lighting codes was chosen as the most appropriate subject on which to try out this innovative training approach.

DEVELOPING AND DELIVERING THE TRAINING PACKAGE

Oregon State University Extension Energy Program produced a pilot training package consisting of a technical reference manual (Baker, 1986) and an accompanying training video tape on determining compliance with the new lighting codes. The video tape is interactive in nature. (See the appendix for details on the video tape techniques used.) The tape and manual use an

example building to illustrate how you determine code compliance. At the end of the tape, the user has an opportunity to do a lighting code compliance exercise using another example building.

The training package was prepared for the Oregon Department of Commerce Codes Division with funds from the Bonneville Power Administration. The Oregon Department of Energy and the Oregon Section of the IES cooperated in the training package development.

The Technical Reference Manual

A forty-page technical reference manual (1) was produced on the lighting section of the 1986 Oregon Structural Specialty Code. The main body of the manual was broken into the following areas: 1) introduction, 2) exemptions, 3) interior and exterior lighting power budgets, and 4) interior and exterior lighting control requirements.

The manual had appendices containing: 1) the lighting section of the code; 2) blank code compliance worksheets including those for determining the power budgets and connected watts, fixture counts, and switching requirements; 3) an example code compliance determination for a small office building; and 4) a code compliance exercise for a small office building.

Below are the items in the manual which are particularly useful:

- Default values for commonly used fluorescent and HID fixtures, based on standard ballasts and tubes.
- Electrical plan examples showing complying and non-complying control strategies.
- Code compliance worksheets which can be given out to those submitting plans which have inadequate lighting information.
- Illustrations and nomenclature of common lighting fixtures.
- An explanation of common lamp designations e.g. F96T12CW/HO/WM.
- A section on how to read a ballast catalog.

Video Tape Format

The 45-minute video training tape was arranged in the same order as the manual. Below is the outline of what is covered in the tape:

- Need for the code and training
- Lighting code exceptions

- Determining interior Lighting Budgets
- Determining interior Connected Wattages
- Determining exterior Lighting Power Budgets
- Determining interior Lighting Control Requirements
- Determining exterior Lighting Control Requirements
- Section 5310 code compliance exercise (video off)
- Exercise review
- Problems that are likely to be encountered.

Program Delivery

The lighting code training package was primarily designed as a part of a statewide continuing code official certification program. It was intended for distribution to local associations of code officials. The associations being responsible for arranging a time and place for the training session, usually in conjunction with a scheduled meeting.

The association was also expected to provide a qualified person to administer the one- to two-hour training session. This person would give a brief introduction and then proceed with the video tape, stopping it to review or clarify points and for the prescribed exercise at the end of the tape which can be administered as an examination. The code was to have been in effect 1 January 1986, but printing delays caused the effective date to slip to 1 July. Consequently the code official association training arrangements have not been tried.

There has already been interest in the training package by individual code officials, not interested in certification credits. These individuals review the course materials at their own pace, often at home with their personal VCR equipment.

The technical reference manual was designed so that it, or the compliance worksheets in it, could be given out by code officials to parties who have submitted plans without adequate information to determine code compliance. This reduces the time needed to explain the section by the code official.

Even though the technical reference manual was designed primarily for code officials, the most receptive audience to date has been architects and engineers. These professionals appreciate a document that further clarifies the code. They feel that the manual will help them submit plans that are less likely to have Section 5310 compliance problems.

PROBLEMS AND REACTIONS

The response to the training package has been very favorable from both code officials and their clients. The video tape/manual training package will probably be expanded to cover other aspects of the code. There are logistics involved in handling the tapes and manuals, but the advantages of using video far outweigh any logistical problems encountered. No major problems were encountered in developing the training package. However, problems were encountered that involved interpreting the lighting section of the code itself.

CONCLUSIONS

Lighting codes are a cost effective and logical approach to reducing commercial energy and power requirements, and encourage the use of daylight. However, codes are only as good as their enforcement, and training plays a key role in enforcement. Training code officials through the use of a technical reference manual that is coupled with a video tape is an innovative and cost effective way of providing the training. The technical reference manual can also assist those who have to submit plans and specifications for code compliance. Continuing education and professional development to non-university students is an often overlooked area in efforts to reduce energy consumption.

ACKNOWLEDGMENTS

The information presented in this paper resulted from Bonneville Power Administration funds, and was done in cooperation with the Oregon Department of Commerce Codes Division, the Oregon Section of the I.E.S. Video production was mainly the responsibility of Dave Burtner, Energy Agent, OSU Extension Energy Program.

REFERENCES

W.S. Baker, "Technical References Manual of Section 5310, Artificial Lighting, 1986 Oregon Structural Specialty Code," OSU Extension Energy Program, Corvallis, Oregon, 1986.

APPENDIX

The following are some technical details on the interactive video tape. Most of the footage was shot in an office which was used as the setting. Much use was made of closeups of forms and tables from the reference manual.

Some video tape was taken in the field showing different lighting situations. This footage was "voiced over." Eliminating audio from on-site videotaping had 3 advantages: 1) it eliminated extra "takes" usually required because of unwanted background noise and audio equipment problems frequently encountered in on-site videotaping; 2) it eliminated the need for a narrator, so much of the field footage could be taken by one person; and 3) it reduced interference with the occupants of buildings being filmed.

A 1/2" VHS commercial grade recorder operating at standard speed was the recorder used. This equipment is not much more expensive than home equipment. Two cameras were used; a single-tube low light color camera, and a rented low end broadcast quality three-tube color camera with a 16X lens. Because the broadcast quality camera had a lens suitable for closeups of the worksheets, it was used for videotaping in the office setting. Editing was done on 3/4" equipment and provides the master. Distribution tapes are typically 1/2" VHS which the OSU Extension Energy Program has found to be the most common video format.