INCIDENT AT MORALES: AN ENGINEERING ETHICS VIDEO

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Abstract *- The National Institute for Engineering Ethics has produced a new video that dramatizes a fictional but realistic case in which an engineer addresses numerous ethical issues in designing a new chemical plant in Mexico. In a special session at the conference, participants will learn to use a new video to teach professional and ethical issues in engineering effectively, with two basic cooperative learning techniques: generating questions in pairs and structured discussions in small groups.*

Index Terms - case study, cooperative learning, engineering ethics, video

BACKGROUND AND CONTEXT

In universities across the United States, engineering departments are striving to meet the EC 2000 criteria for engineering accreditation, which require that all engineering students demonstrate an understanding of professional and ethical responsibility. One effective method to teach engineering ethics is to use cases [1]. Cases, both text and video, are effective because they foster critical thinking, encourage student responsibility for learning, draw on both affective and cognitive skills, offer opportunities for collaboration among students, and enliven the classroom [2].

In engineering ethics, one of the most widely used fictional cases is *Gilbane Gold*, an award-winning video produced by the National Institute for Engineering Ethics (NIEE) and Great Projects Film Company in 1989. *Gilbane Gold* has been successful for five reasons:

- Engineering students identify with the central character
- The dramatic conflicts between people and urgent concerns about environmental safety capture the attention of viewers
- The legal and scientific issues are understandable to a broad audience
- The lack of a conclusion encourages critical thinking and discussion
- The video production involved professional screenwriters, actors, filming crew, and editors

NIEE and Great Projects have collaborated to produce new video, *Incident at Morales*, in 2003. While the new video has the same five features that made *Gilbane Gold* successful, in contrast with *Gilbane Gold*, the new video emphasizes everyday concerns rather than whistle-blowing situations, and it shows engineering in an international context. The new video shows positive and negative role models of engineers who endeavor to reconcile conflicting ethical, technical, and economic constraints. The emphasis on positive obligations of professional responsibility might promote exemplary conduct [3].

While *Incident at Morales* portrays many ethical issues, it places special emphasis on three:

- Ethical considerations are an integral part of making engineering decisions
- Although legal requirements may vary among states and nations, ethical obligations do not stop at state or national borders
- Wherever engineers practice, they should strive to protect the health, safety, and welfare of the public.

Like *Gilbane Gold*, the new video can be used to support instruction in professional and ethical responsibility in undergraduate engineering programs. *Incident at Morales* is not intended as a "quick fix," but instead as one tool to support programs in engineering ethics. It can be used with groups of engineers at in-house workshops and at professional meetings.

One copy of *Incident at Morales* will be sent free of charge to the dean of every engineering college in the United States. It will be available for purchase in either VHS or DVD format at a modest price from the NIEE. A printed study guide will accompany both versions of the video, and additional materials will be posted on the NIEE Web site (www.niee.org).

To develop the new video and supporting materials, NIEE assembled a team of four engineering professors and two philosophy professors at five different universities, a consulting engineer, and a former corporate ethics officer, who are the co-authors of this paper.

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DESCRIPTION OF THE SPECIAL SESSION

The special session is addressed to all engineering faculty, and others involved in professional development, who are interested in either the teaching of engineering ethics or the use of cooperative learning. By participating in this session, audience members will learn to lead classes and workshops on engineering ethics using *Incident at Morales*—and other videos and cases—in colleges, companies, and professional meetings.

The session will prepare participants to use the new video effectively to foster critical thinking, moral reasoning, and moral imagination. With directed discussions in both pairs and small ad hoc groups—two basic cooperative learning techniques [4]—participants will learn

- To identify ethical, technical, and economic issues
- To identify affected parties (stakeholders), and their rights and responsibilities
- To formulate alternative courses of action
- To imagine possible consequences of those alternatives
- To evaluate those alternatives according to basic ethical values (honesty, fairness, respect, civility, etc.) and through simple tests such as the following [5]:
    - *Harms test*: Do the benefits outweigh the harms, short term and long term?
    - *Reversibility test*: Would I think this choice would be good if I traded places?
    - *Publicity test*: How would my choice bok on the front page of a newspaper?

Here are some of the many ethical questions raised by *Incident at Morales*:

- What issues are involved in hiring an engineer from a competitor?
- How are engineering decisions affected by corporate culture?
- Do professional responsibilities for the environment and for safety change when crossing national borders?
- Is it proper to share concerns about work with one's spouse? When the work is regulated by the spouse's employer?
- What are the implications of separating engineering design from operations? Is it appropriate to convert design decisions into maintenance procedures without including operations people in the decision process?

SESSION FORMAT

Incident at Morales is designed to be used interactively with a facilitator. The total running time of the video is 36 minutes, but it has major breaks after 12 minutes and after 24 minutes. At each break the facilitator should engage viewers in a discussion of the ethical issues raised in the previous segment. At a university, the video could be used in three consecutive 50-minute class sessions: the professor would use one segment in each class session. In a professional development workshop, two hours would be sufficient to show the video and to conduct the discussions.

For the 90-minute special session at FIE, participants will be organized randomly into pairs. After watching the first segment of the video, each participant will individually list ethical issues in the segment, then compare lists with the other member of the pair. After the second segment, pairs will join to form groups of four; each small group will formulate the ethical questions raised by the segment and prepare an answer to one of the questions. Each small group will exchange its list of questions with another small group and answer one of the other group's questions. As time permits, some small groups will share their answers with everyone. During the discussion periods, the presenter will circulate to monitor the progress of the participants. At the end of the session the presenter will conduct a general discussion of the video.

Schedule of the special session:

- Introduction (4 minutes): Explanation of this session, instructions for participants
- First segment of video (12 minutes)
- Discussion of first segment in pairs (10 minutes)
- Second segment of video (12 minutes)
- Discussion of second segment in small groups (20 minutes)
- Third (final) segment of video (12 minutes)
- Discussion of entire video (20 minutes)

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