A LOOK AT OPPORTUNITIES FOR COMMUNITY COLLEGE DISSEMINATION OF EARTHQUAKE HAZARD MITIGATION INFORMATION

THE CALIFORNIA EXPERIENCE

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California's community, junior, and technical colleges (CJT) seek appropriate techniques for dissemination of earthquake hazard mitigation (EHM) information to the state's lay public. The report reviews California's history of earthquakes and profiles the state's community college system. A section delineates the need for EHM information to increase public awareness of the problem and enlist support for a realistic hazards reduction program. The potential for using CJT and other agencies to disseminate EHM information is outlined together with the problems involved in such a project. Foremost of these are the impact of Proposition 13 and CJT lack of involvement in or commitment to earthquake studies. However, these problems are more than offset by findings that CJT are geared to communicate with the lay public, and have the most flexible and community-responsive curricula of higher education institutions within the state. The report concludes that CJT could play a significant role in EHM dissemination with respect to practical needs of the state's many communities.

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I. EXECUTIVE SUMMARY

There are several roles which California's community, junior and technical colleges (CJT) could take to disseminate earthquake hazard mitigation (EHM). Most important of these roles is the involvement of a substantial and previously uninvolved wide base of lay public in the understanding and application of earthquake-related information.

In order for the lay public to become more involved, there needs to be a greater understanding of earthquakes and how their effects on man can be lessened. The earthquake-related information which the public receives needs to be monitored and studied for the overall effect it has on public understanding and action. Perhaps there needs to be some coordinating effort to control the timing of information the public receives.

The existence of "Proposition 13" has forced many state and local programs to provide proof of their effectiveness. Therefore, it is reasonable to assume that any newly introduced program would have to prove its value against other programs vying for public financial support. Even if such a program were federally supported,

it might have to devise a process for testing its effectiveness.

If it is the eventual intent of the federal government to support the dissemination of EHM information through California's CJT, there are several potential problems which must first be addressed--effects of "Proposition 13" on program and resource availability, CJT emphasis on full-time teaching and no research by its faculty, lack of vocationally-related importance for studying earthquakes, lack of CJT involvement in or commitment to other natural hazards (information dissemination), relatively few people involved in earthquake study or the mitigation of their effects, and virtually no joint courses or projects between CJT and state universitites. The federal government should also be cautious not to concentrate too exclusively on California's CJT without taking a hard look at CJT in other earthquake-prone states, with an eye to the application of California's CJT experience to the CJT in the other states.

If this seems like an insurmountable set of obstacles, it is not. There are strong reasons for getting CJT commitment and participation in EHM--

(1) Most of the universities and research groups currently involved in earthquake investigation and infor-

ation dissemination have very little involvement with the lay public. Therefore, the results of their efforts tend to go to a relatively small group of people, which does not include the lay public. Conversely, CJT are specifically geared towards communications with and service to the lay public.

(2) Although California has several public and private organizations involved with the investigation, policy making and dissemination of earthquake information, there is no single agency which either coordinates or controls the dissemination of EHM information to the lay public. It is likely that CJT could play a significant role in this function, especially as this information might relate to the practical needs of the state's many communities.

(3) CJT may have the most flexible and community-responsive curricula of all the institutions of higher education within the state. Public interest groups, businesses, and local and county governments are accustomed to having specific educational needs satisfied by the CJT. Therefore, what better place to introduce a new set of information to the public than through an institution the public already turns to for information.

(4) There are 70 CJT districts, 107 colleges and even more community outreach centers in cities and counties

from one end of the state to the other. These institutions have long been at the forefront of using innovative devices to teach their students. Many of these same dissemination vehicles could be applied to EHM.

II. INTRODUCTION

The purpose of this report is to convey the results of an exploratory investigation into the most appropriate ways that California's community, junior and technical colleges (CJTs) might contribute to the dissemination of earthquake hazard mitigation information to the lay public of that state.

This report focuses on the input that California's CJT can make to the dissemination of earthquake (and other natural hazards) information at the community or local level. Dissemination needs and issues will be examined, and specific CJT resources, capabilities and limitations will be explored. Special attention will be devoted to the possibility of California's CJT:

- undertaking a major role in the dissemination of EHM information to local citizens;
- forming a multidisciplinary team to develop project plans for the dissemination of EHM information to municipal and community groups;
- developing EHM education programs for secondary and post secondary school teachers, municipal school boards, business organizations, community

awareness and utilization groups, local decision makers, private citizens and emergency preparedness and response bodies (e.g., police and fire departments, rescue squads, utilities, transportation, medical care services, and food and shelter groups);

- delineating and developing community out-reach mechanisms designed to provide realistic knowledge of earthquake hazards and effective mitigative actions; and
- providing research data to encourage sound earthquake practices.

Prior to this study virtually no attention had been given to a systematic CJT role in EHM either in California or elsewhere. There will be an examination of the reasons for this lack of previous earthquake involvement, opportunities for and restrictions to wider involvement in earthquake-related activities (especially EHM), and recommendations for future roles.

This report does not attempt to provide comprehensive answers to the EHM roles that CJT can and should be playing. Rather, some issues are identified that will require subsequent investigation before CJT can take a full partnership in the investigation and dissemination of earthquake-related information.

It is hoped that this report will lead to a wider use of CJT both in California and in other states to investigate and disseminate information about earthquakes and a wider range of natural hazards.

III. BACKGROUND

For many years the National Science Foundation and other federal, state and local agencies have encouraged and supported the development of numerous projects about earthquakes and their related effects. These studies have involved virtually every aspect of earthquakes -- intensity, subsequent effects, mitigation, prediction, prevention, emergency operations and recovery.

Initially most of this investigation was conducted by scientific and technical groups representing such disciplines as seismology, geology, structural engineering and sociology, but the results of these activities remained largely within the confines of their ranks and relatively few people with specific earthquake interests.

The next set of investigation and dissemination efforts involved the professions and public interest groups who assist political decision makers and the construction industry on development issues -- architects, planners and city managers. However, there was still no systematic link with the largest group of information users, the lay public.

This report investigates the feasibility of using California's CJT as one bridge to the lay public.

California Earthquakes

Although California possesses a wide variety of natural beauty, it is well known for something else -- earthquakes. During the past 200 to 400 years of recorded earthquake history, only 25 of the 50 states have been virtually earthquake free. California is the most active of these 25 states. Based upon today's exposure and past history, some experts feel that California could account for more than 65 percent of this nation's earthquake damage to buildings.

California is located along the circum-Pacific seismic belt, which is responsible for 80 percent of the world's earthquakes. Other areas along this belt, such as Japan and the Aleutian Islands, may have more earthquakes than California, but the state is still subjected to thousands of shocks every year.

California has averaged at least one earthquake of destructive magnitude per year for the last 50 years. However, this activity rarely takes place in highly populated areas. In fact, most of these earthquakes hit areas so far from population centers that these areas feel little more than the last faint tremors.

Small tremors rattle California daily, and during the past century large earthquakes have killed nearly 1,000 people. Even a relatively minor earthquake occurring near Los Angeles in 1971 killed 64 people. By one estimate a major earthquake occurring during rush hour could cause 100,000 deaths.

Current studies reveal that such an earthquake could take place as soon as today, but almost certainly within the next few decades.

California is crisscrossed with hundreds of faults, the largest of which are the:

San Andreas Fault	Haywood Fault
Sierra Nevada Fault	White Wolf Fault
Garlock Fault	Santa Yney Fault
San Fernando Fault	Newport-Inglewood Fault
San Jacinto Fault	Imperial Fault

The longest and most active of these faults is the San Andreas Fault, which stretches more than 700 miles through and near the most populated urban areas. Virtually every major city within the state is located near an active fault.

According to some scientists who study place tectonics, the North American Plate (containing most of the conterminous United States) is slowly moving southward, while the Pacific Plate (containing part of

Southern California) is slowly moving northward. Someday the coast of Southern California will dissapear beneath the Alaskan coast. Meanwhile, earthquakes will appear wherever the plates stick together and then suddenly release.

There is general agreement that the Southern California coast has already moved approximately 140 miles to the northwest during the past 5 million years, averaging almost two inches per year.

Peter MacDoran, a scientist at California Institute of Technology, has been using a radio telescope to trace movement along the San Andreas fault. He has found that in 6 months an area near Los Angeles moved almost 5 inches to the west. This east-west movement is counter to the normal north-south movement, and could mean that forces are bending the earth around the fault.

These findings become all the more disturbing when geologists reveal that the Pacific and North American Plates appear to be blocked in two places (near Los Angeles and San Francisco). These are the same two places that experienced major earthquakes in 1857 and 1906.

A recent survey has revealed that the San Andreas fault near San Francisco has stored up pressure caused by 20 feet of movement, waiting to be released. This

is the same amount of pressure released by the 1906 San Francisco earthquake.

Another area which has experienced recent movement in Palmdale, a community near Los Angeles. In Palmdale an 11 inch bulge has appeared during the past few years. This bulge could signal stress building to an explosion. And, between 1976 and 1977 about 700 minor tremors have been detected in the Palmdale area.

According to Kerry Seih, a California Institute of Technology faculty member, geologic excavation points to a major earthquake in Southern California every 160 years, dating back to 575 B.C. If one counts the 1857 earthquake as the last major earthquake in this area, another is due in that area within the next 50 years.

Other Natural Hazards

During 1976 the National Oceanic and Atmospheric Administration published a report on Natural Hazard Management in Coastal Areas. This report listed hurricanes, floods, coastal erosion, landslides, earthquakes, tsunamis, volcanoes, avalanches and land subsidence as the natural hazards which most threaten the coastal states of this nation. With the exception of volcanoes and possibly avalanches, California suffers from each of these threats, including tornadoes.

Although this report focuses on the earthquake threat in California, each of these natural hazards is important -- both in how they relate to California earthquakes and how lessons learned in California might assist in the understanding and mitigation of natural hazards in other states.

A study by the J.H. Wiggins Company noted the importance that meaningful steps taken during this decade can have in reducing the increasingly destructive losses which America faces from earth, air and water-related hazards. Unless significant new steps are taken to mitigate natural disaster damage, the cost of replacing or repairing effected buildings during the 30 year period between 1970 and 2000 could increase by more than 85 percent.

Under average 1970 conditions the combined costs of building losses from earthquakes, expansive soils, landslides, riverine floods, local winds, hurricanes and storm surges, tornadoes, local floods and tsunamis would approximate 10.5 billion (1978 dollars) versus $19.5 billion in 2000. By comparison the 1970 figure for fire damaged buildings was 4.5 billion (1978 dollars) versus $10.5 billion in combined natural disaster damage.

These figures are probably low because they do not include estimates for probable road and bridge damage,

loss of building contents, income, and transportation effects on dislocation of suppliers, homelessness and unemployment.

During an average year Florida and Louisiana suffer the greatest losses from combined natural disasters. California falls within the next set of states hardest hit by natural disasters, as well as Mississippi, Missouri, Kansas, Texas, Nebraska, Oklahoma and Washington. However, when viewed solely in terms of total damage to buildings, California heads the list.

A 1976 report by the Association of Bay Area Governments identified a series of primary and secondary disasters that could be triggered by a single major earthquake in the San Francisco Bay area. Some of the disasters noted were landslides, dam failures, building collapses, train wrecks, utility malfunctions, flash floods, explosions, chemical spills, fires and pollution. Other problems included tsunamis, aircraft wrecks, automobile wrecks, water supply lost, nuclear spills and oil spills.

California Community Colleges

California's community college system consists of 70 districts and 107 institutions, located across the length and breadth of the state. It is unique because of its combination of philosophical and legal premises

which include extensive local control (at the district level), equity of access to all residents, free tuition and a broad spectrum of subject offerings.

These institutions provide many services to their students and those people in the neighboring communities--developmental or cultural education; occupational training; preparation for transfer to a major college or university; mid-career training for public servants or others wanting to upgrade their existing occupational skills; special education for minorities, handicapped, aged and others; two-way forums for exchange with various community residents, so that the community can suggest and receive instruction in needed areas; and community centers whose facilities are available to various groups for public use.

The CJT have a substantially larger student body than any other higher education system in the state. By some estimates as many as 1 out of every 7 adults in the state enrolls in a CJT at some point; this figure might reach 1 in 5 if one includes non-credit community service program exposure.

The student body is extremely diversified and represents all types and age groups from young adults to senior citizens. The average student has worked for several years, supports a family and is 27 years old.

The CJT are notable for their innovative methods for disseminating information. "Outreach Centers" are mini campuses or satellite educational facilities used to make the institution's resources more accessible to the student body. Courses are offered at all hours of the day, evening and on weekends. Course time varies with the goals of the course. The media (radio, television, telephone, computers, newspapers) are extensively used. Learning resource centers with a variety of educational aids are common. Self-paced instruction permits students to learn at their own pace, and tutors are available for those needing help. Special instructional methods and activities provide support for the disadvantaged and disabled students.

Courses may be taken for credit, non-credit or as part of a community services program. Credit courses are directed towards an associate, certificate or baccalaureate degree. Non-credit courses do not carry credit toward a degree, and are frequently a part of the continuing education program or a high school diploma program. Community services provide an opportunity for individuals to continue their formal education for personal growth and productive community involvement. Community services offer publicly supported cultural and recreational events such as lectures, forums, concerts

and art exhibits.

California's CJT educational system follows a specific chain of logic. First, education costs money but the returns to society are greater than the costs, and in some respects education is to society what research and development are to industry. Second, occupational education, whether welding or medicine, must be grounded in and enriched by general, humanistic education. Third, education should be viewed not as a discrete phase in life but rather as an integral process throughout life. Lastly, education can come in many shapes and forms and the participant can be anyone and everyone in the community.

IV. NEEDS

There is an ever-increasing body of information about earthquakes and how their potential damage can be reduced. Current indications are that the mass of this information is not reaching the lay public, and that information which is shared is not done so in any systematic or logical basis.

In order for any large scale mitigation program to be successful, from energy conservation to the purchase of earthquake hazard insurance, there must be a wide-spread public awareness of the problem and a willingness to take definitive action.

For the lay public to become more involved in EHM, there needs to be (1) a greater understanding of earthquakes; (2) how their effects can be mitigated; and (3) what action the lay public can take. Earthquake-related information needs to be monitored and studied for the overall effect it has on public understanding and action. There may need to be some coordinating effort to control the timing EHM information the public receives.

In 1978 the Working Group on Earthquake Hazards Reduction recommended that:

- Before a population can effectively respond to an earthquake threat, it must know the nature of the threat and what can be done to minimize it.
- A single exposure to new information is often inadequate, especially if it greatly differs from previous knowledge. Therefore, repeated exposure in different formats and through several channels may be required. This approach is expecially successful when the new information comes from persons or places customarily looked to for guidance (such as a nearby community college).
- The lay public is not a homogeneous group. These people differ widely in their information needs and capacity to absorb information.
- Information dissemination and educational programs should be designed for people responsible for making decisions that will influence the welfare of large numbers of individuals and groups.

The Working Group also pointed out the probability that (1) the public is more apt to cooperate with EHM if their leaders initiate a realistic hazards reduction program; (2) special attention should be paid to those people who

are especially vulnerable to natural hazards and who would bear a disproportional share of the burdens (e.g., the poor, the aged, and children); and (3) although there are numerous channels for disseminating earthquake information, there are relatively few mechanisms which link these efforts.

The Working Group found that many people seem unable to incorporate the growing body of earthquake training and skills. Part of this problem may be with improper educational training by universities and colleges. This problem exists with both the physical and socioeconomic aspects of earthquake information. To rectify this problem, the Working Group suggested that colleges and universities (1) encourage changes in curriculums and professional registration requirements; (2) encourage workshops and minicourses for state and local officials; (3) encourage intergovernmental personnel exchanges; and (4) make increased use of local and state information disseminators and role models.

In its report to the City of Los Angeles, the Task Force on Earthquake Prediction noted that:

> . Special interest should be placed on public information for earthquake preparedness, because individuals, families and neighborhoods may need to be self sufficient for days and

even weeks after a major earthquake. This will require the preparation of special programs and materials, especially as they relate to the particular needs of children, the handicapped and the aged.

- Public anxiety can be minimized by providing clear information concerning damage and relatively hazardous places, augmented with information about ways to make the home, work place and travel routes relatively safe.
- A centralized information center could function as a rumor control center to relieve public anxiety.
- Community response to predictions will be more fruitful if business and community leaders are involved in seminars before and after a prediction.
- Viable public information and self-help programs can increase self-confidence and self-reliance, and help people to assume greater responsibility for their own welfare.
- As interest and awareness in earthquake prediction grow, the educational needs will change. Interest and knowledge may become more sophisticated. Therefore, a series of educational

materials may need to be prepared with phased increments, each increment treating the topic in an increasingly technical manner.

. The public should be familiarized with the secondary effects of earthquakes, such as fresh water contamination, disruption of water supply, leaking gas, uncertainty of sewage lines, broken electrical connections, chemical leaks, etc.

A 1977 pool by the San Francisco Examiner revealed that out of 500 people interviewed, only one in five had taken even the slightest precaution of setting aside emergency food and water. One-third could not disconnect their electricity, and nearly half could not turn off their gas.

A San Francisco parapet reinforcement ordinance, adopted after reports showed that falling balconies and gargoyles could cause considerable death and injury, went unfunded and unenforced for 6 years. A map available to the public listing predesignated earthquake shelter areas, contained some locations which were not earthquake-proof.

During a 1978 conference on communicating EHM information to the lay public, Claire Rubin (The Academy for Contemporary Problems) stated that the acceptance

and effectiveness of EHM planning largely depends on public receptivity and utility of plan implementation elements. Today there is a serious gap between the existing body of earthquake information and the awareness of that knowledge among the lay public.

William Anderson said that the National Science Foundation has recognized this problem, and has encouraged many of its researchers to consider several factors which will assist the dissemination of EHM information, such as:

- two-way communication between research producers and users,
- recognition that user groups differ in their information needs,
- periodic opportunities for users to update their information base,
- use of several formats or vehicles to transmit data, and
- evaluation of dissemination efforts to determine their effectiveness and to improve upon it.

Howard Kaplan (Empire magazine) believes that when communicating EHM information the target population will often be people who have no substantial scientific background or understanding. Therefore, it may be necessary to mount a sustained effort presenting the information

in clear, concise and simple language, probably through two types of media -- electronic (television and radio) and print (newspaper, magazines and other periodicals). EHM communicators should be completely honest with the public and its representatives, establish regular lines of communication with the local press, and try to learn what information the public wants to know. Perhaps most important, EHM communicators must gain and maintain the public's trust, and avoid projecting a "know it all" image.

V. POTENTIAL

Jane Martin, a Program Administrator for the Fremont Union High School District (California), has made several suggestions which could be useful both at the secondary and CJT levels:

(1) If educational programs are developed for teachers, they can serve as consultants, advisors and educators for the community's students and lay public.

(2) Program continuity may be better assured by securing faculty volunteers through state educational and scientific associations and students may be helpful in developing these programs.

(3) A school Earthquake Club may serve as a focal point for community earthquake educational efforts.

(4) Students and faculty should be encouraged to participate in earthquake prediction and mitigation programs. Two approaches may be useful to achieve this encouragement -- (a) use of research data to apply for scholar-

ships and compete in science fairs and symposiums (County Science Fairs, Junior Science and Humanities Symposium, etc.), and (b) development of reward incentives for participation such as certificates, medals, and workshops.

John Whitman, Director of the Center for Public Involvement in Science, has suggested that the experience of the Civil Defense Preparedness Agency (with their public awareness efforts involving natural and civil hazards), the California State Department of Education, and other agencies concerned with disaster education and response, could prove very useful in formulating an effective earthquake education program. Schools interested in communicating EHM information could begin by identifying all groups interested in earthquake education, inviting them to participate in a combined EHM educational effort, designing and developing mass media and community outreach efforts, using existing materials and resources, and identifying specific target groups requiring different educational strategies.

By increasing environmental awareness (potential relationships between earthquakes and other natural and related civil hazards), applying this information to

local conditions (building codes, relationships between building codes, zoning and public safety, local hazards mapping and searching their own homes for safety hazards and correcting them) and involving students and teachers in earthquake-related research, the CJT could play a viable and valuable EHM role.

Using existing information, EHM information could be channeled to the public through several approaches:

- mass media releases (camera-ready copy for bulletins or handbooks),
- simulation games and role-playing activities (involving various public groups),
- posters (for public display in businesses, schools, public buildings and mass transit),
- public information centers with a telephone number to dispense the latest earthquake information and serve to control rumors), and
- periodic radio and television programs (alerting people what to expect from an earthquake, how to protect one's family and possessions and where to get additional information).

Whitman has suggested a comprehensive public education program involving (1) mass media (television, radio, newspapers, posters in public places, and announcements in public areas); (2) in-school activities

(formal courses, community projects and school-wide activities, such as assemblies); and (3) community outreach efforts geared at:

- existing community groups (e.g., Boy Scouts, Girl Scouts, 4-H Clubs, religious groups, professional societies and organized community programs for the elderly, youth, homemakers, etc.),
- work-related groups (e.g., firemen, policemen, taxicab drivers, businesses and government agencies), and
- special individuals and groups (e.g., the elderly, live-alones, the unemployed, non-English speaking people living alone or in relatively isolated ethnic groups and other poor and disadvantaged people who may be difficult to contact).

This comprehensive earthquake education program should also take into account (1) the physical, social and economic characteristics of earthquakes; (2) the scientist and policy aspects of earthquake predictions; (3) the psychology of reaction to disaster predictions and the actual occurrence of earthquakes; (4) how to prepare for an earthquake and to lessen its destructive potential; (5) where to find the resources that will help

mitigate earthquake damage; (6) how to respond to a prediction; (7) how to react during an earthquake; and (8) what to do following an earthquake.

State Agencies

The California Seismic Safety Commission was established in 1975 to advise the Governor, Legislature, state and local governments on ways to reduce earthquake hazards. More specifically, the Seismic Safety Commission is charged with:

- Advising the Governor and Legislature on earthquake programs and needed seismic safety legislation.
- Reviewing earthquake-related activities funded by the state and advising the Governor and the Legislature.
- Setting goals and priorities for reducing the earthquake hazard in the public and private sectors.
- Providing consistent policy for earthquake-related programs for agencies at all government levels.
- Proposing needed legislation and reviewing other earthquake-related legislation.
- Conducting public hearings on earthquake safety issues.

- Helping coordinate the earthquake safety activities of governments at all levels.
- Recommending program changes for earthquake safety to state and local agencies and to the private sector.
- Requesting state agencies to devise criteria to promote earthquake safety.
- Recommending amendments to state standards, when such actions promote earthquake safety.
- Reviewing reconstruction efforts after damaging earthquakes.
- Gathering, analyzing and disseminating information; encouraging research; and sponsoring training.

In 1978 the Seismic Safety Commission asked its Earthquake Education Committee "to develop the objectives and specifications for a short course about earthquakes for use in elementary and secondary schools, and to promote the development and use of the course." Although this charge is limited to primary and secondary schools, some committee members felt that the committee should be concerned with educating the entire lay public.

The six objectives of this charge are to:

(1) Influence the public to take actions during an earthquake which will minimize deaths and injuries.

(2) Influence the public to take actions in the first minutes and hours after an earthquake to avoid injuries and to minimize property damage.

(3) Provide adequate information about the nature of earthquakes and earthquake-related hazards, so that rational private and public decisions can be made dealing with earthquake risk.

(4) Inform the public about precautions that can be taken privately and by governments before an earthquake to minimize deaths, injuries and property losses.

(5) Convince the public of the need to take private earthquake hazard reduction measures.

(6) Inform teachers and school administrators about their legal responsibility to insure the safety of their student during an earthquake.

The California Office of Emergency Services was established to provide the state with a high degree of preparedness in the event of earthquake, flood, fire, riot, epidemic, foreign attack or other emergencies. This agency (1) prepares and distributes state emergency plans; (2) is responsible for emergency planning and preparedness of each state agency; (3) ensures that the

Governor is kept abreast of disaster situations and actions being taken to reduce their effects; (4) provides information to individuals, families and agencies on pre-emergency, emergency and post-emergency operations and resources; (5) makes decisions about information priorities; and (6) coordinates mutual aid among state and local agencies.

The Division of Mines and Geology traces the location of faults and other physical features throughout the state.

California's Community Colleges

California has 107 public community colleges, located in 70 community college districts across the length and breadth of the state. Each of these districts is governed by a publicly elected Board of Trustees. This is the largest higher education system in this nation, as well as the free world.

During the 1977-78 academic year the CJT enrolled more than 75 percent of the 1,752,000 students enrolled in all state divisions of higher education (the California Community, Junior and Technical Colleges, the California State University and Colleges, and the University of California). This is more than three times as many students as the combined total of the other divisions of higher education.

The community colleges provide a variety of tuition-free services, including academic experiences that are easily transferable to a four-year institution; vocational training (62 percent of all CJT instructional time); special programs for minorities, women, elderly, non-English speaking people and the disadvantaged; personal enrichment courses; and community-oriented recreational and cultural events.

These institutions are unique in their ability and flexibility to respond to local needs and desires. They are often used as community centers by a variety of groups. Special courses and training programs are offered to public servants and business people to upgrade their occupational skills.

The CJT use a variety of methods to disseminate information from the more traditional courses, lectures and seminars to workshops, television courses, evening and weekend course offerings, newspapers and self-study programs.

Television

Instructional television represents one of the most flexible means of community education. These programs provide a wide variety of dramatic techniques to make instruction interesting, and the subject matter can differ from very complex to very simple affairs.

In the past few years several programs have been devoted to earthquakes, included mini-series in Salt Lake City and San Francisco and a nationally television NOVA broadcast.

Educators have begun to create nationwide partnerships to provide new courses and to market them both to television stations and other colleges. For example, Coast Community College District teamed with McGraw-Hill Publication Company to produce Growing Years, a credit course on child psychology.

In Texas, the Dallas County Community College District offers a range of TV courses to its 16,000 students and leases these courses to approximately 250 other colleges in 30 states.

An example of intercollegiate cooperation was provided by the creation of an American government course -- the product of a collaboration by Dallas and Coast Community College Districts with Chicago's City Colleges and Tarrant County Junior College District (Forth Worth).

These national consortia are forming to make money and to produce the "slickest" possible product to vie for viewers' attention. The slicker the product, the less likely any individual institution could afford to provide the necessary resources.

All types of people benefit from these courses -- women at home with young children, prisoners, handicapped, people with jobs that prevent them from attending traditional classes, retired people, and people too shy to attend regular classes.

Environmental/Natural Hazards Education

The Alabama State Department of Education, in conjunction with the State Department of Civil Defense, has developed a course of study and textbook emphasizing survival in natural and civil emergencies. This report was prepared to help teachers better cope with emergencies and to help others who have not received such training. This course was prepared to help instructors retain this knowledge for the rest of their lives. This report speaks to all natural and civil hazards likely to befall Alabama.

In a 1976 address before the National Council of State Directors of Community/Junior Colleges, William M. Brown, President of the Environmental Research Institute of Michigan, outlined a potential role for community colleges in the dissemination of technological information to business and industry. Mr. Brown pointed to the favorable geographic distribution of this nation's community colleges, and suggested that these institutions could be a useful conduct between federally-sponsored research and local needs.

In the area of environmental education numerous institutions, like Lee Junior College (Kentucky), Bronx Community College (New York) and Wilbur Wright College (Illinois), have developed curriculum around locally-familiar topics.

Perhaps the most successful of these efforts in the field of earthquake-related information, are the courses offered at Foothill Community College. These courses were designed to help expand the community's general awareness of earthquakes and what can be done to reduce their hazards. Specific activities have included (1) establishment of self-guided trails along the San Andreas fault, with a related trail brochures; (2) incorporation into its regular curriculum a course that combines both geology and natural history; and (3) establishment of an exhibit and public clearing house for earthquake information designed to keep the public abreast of the "state-of-the-art" in earthquake research, and how the lay public may use this information to protect themselves, their families and their property against future earthquakes.

The exhibit, entitled "Vibrations," is part of Foothill's Community Services Science Center. This exhibit was funded by a state-mandated function of the CJT known as Community Services, which receives funds

through a permissive override property tax. Community service programs such as these are not part of the college's formal educational program, but have greater flexibility and can respond to the cultural and informational interests of a community.

VI. PROBLEMS

It is axiomatic that societal change must be reflected in education. Current discussions and reports on educational innovation might make it appear that our schools and colleges are keeping pace with societal developments. Yet, numerous classrooms are unaffected by many new ideas and procedures, which have been developed by and are being advocated in education. This situation is not confined to any level, but is characteristic of all levels of education.

Colleges and universities resist change for many reasons, not the least of which is a comfortable complacence with the "tried and true." Many educators and administrators realize that all innovations will not succeed, and there is fear of the consequences for innovations that fail.

Concurrent with the demand for innovation, rising costs are leading taxpayers to ask questions about educational expenditures. There are signs of taxpayers revolts. Across the nation a growing number of taxpayers are rebelling against the mounting costs of public education by voting down new levies and bond issues.

This situation, which primarily applies to primary and secondary education, is also reflected at higher education levels, where legislative reduction in college budgets have resulted in increased need for contributions from private or outside sources.

Although California's CJT has traditionally received its leadership from the local level, more than 50 percent of its financial support now comes from the state through property taxes. This support comes from two programs -- Section 84903 (Apportionment Funds) and Section 84904 (Proposition 13 "Bail Out Funds"). Because of recent taxpayer complaints about the increasing cost of taxes, Proposition 13 monies will be removed from CJT use beginning in the 1979-80 academic year. It is projected that this reduction in funding will mean fewer CJT faculty and administrative personnel and substantially less non-credit, community services activities and courses. (Most of the academicians interviewed agreed that the most logical place for special earthquake courses to be located within a CJT curriculum would be in its non-credit, community services program.)

Another problem which is directly linked to the increased dependency on state funds, is the increasing perception of CJT control at the state rather than local level. This concern was recently formalized by

meetings between two of the state's top educators -- Pat Callan, Postsecondary Education Commission Director, and William Craig, California Community Colleges Chancellor. The result of this meeting was a perception of increasing state influence and an increasing reluctance on the part of local CJT officials to initiate new, locally responsive courses and activities without adequate state-level support.

California's seismic activity might receive more publicity than in any other place in the world. As a result of this publicity, a series of relatively minor tremors (rattling windows, cracking plaster and the occasional displacement of an old home from its foundation) and widespread lack of public exposure to a major earthquake, there may be a growing lay public complacence towards major earthquakes and actions to mitigate their effects. Earthquake talk is common, but it is treated with nonchalence rather than a basis for horrifying fear.

Most of today's population were not alive when California suffered its last major earthquake (1906). The San Fernando earthquake (1964) was, by comparison, a moderate event.

Although California is exposed to a wide variety of publicity and information about earthquakes (mostly

through newspaper, magazine and television offerings), none of these activities are coordinated either by the state or any private organization. As a result, no one really knows what impact this continued but erratic and unpredictable dissemination has on the lay public. Is the public's awareness of earthquake hazards heightened or dulled?

This lack of coordination of earthquake information dissemination is reflected at the state level where the Seismic Safety Commission, the Office of Emergency Preparedness and the Department of Mines and Geology all have earthquake related missions, but none has a clearly defined responsibility for the dissemination of EHM information. The problem is further complicated by the presence of numerous federal, private enterprise and public educational agencies which periodically conduct earthquake studies and disseminate their findings.

The Proposition 13 issue has created an increasing air of fiscal responsibility about the expenditure of public monies. In other words, if state monies were used to finance a program to disseminate EHM information at the CJT level, how would the CJT prove the efficiency of the program -- especially if much of this effort were centered on public dissemination versus more traditional classroom methods. Unless a method could be

designed to measure the impact of an EHM dissemination program on the lay public, it would be impossible to determine the effectiveness of such a program, short of a major earthquake requiring the application of that information.

A major earthquake may result in widespread secondary damage from floods, fires, landslides, building collapses, and numerous natural and civil occurrences. Yet, the public continues to build on land which is subject to earthquake-related damage and fails to buy earthquake insurance. It is questionable whether there is a widespread knowledge of what individuals can do to protect themselves, their families and their private property before, during and after a major earthquake.

It is also questionable whether local, community and state governments are able to cope with the probable socio-economic results of a major earthquake -- reduction in property values, emigration of businesses and population, loss of business opportunities, loss of jobs, reduced construction, and reduced municipal services accompanied by an increase in municipal problems (e.g., looting and arson).

It is very difficult for governments or the lay public to prepare for events such as earthquakes, which cannot accurately be predicted by time, place and inten-

sity. Unlike floods, hurricanes and tornadoes (and even landslides and brush fires) which take place often at predictable times and places, earthquakes cannot be tracked and rarely strike this country with full intensity. This unpredictability makes it more difficult to convince the public to take EHM measures, especially when there is evidence of need for more immediate concerns (like getting enough gasoline, finding a job, getting a useful education and being happy).

The CJT have a long-standing reputation of being a place where academicians go when they want to teach. If research is desired, most of these people go to universities, where there is a much greater emphasis on research and writing. The CJT places such an emphasis on teaching that research is discouraged through a (1) a system which gives neither financial nor prestige incentives for research accomplishments, and (2) a normal academic course load which often makes faculty responsible for 15 to 18 hours per semester. There is no widely adopted procedure by which CJT faculty can split course work with research.

One factor which contributes to this particular emphasis on instruction, is the increasing CJT perception that it is best qualified to address the basic higher education needs of California's population. As a result

of this, there is a heavy emphasis on bilingual education, high school equivalency diplomas, vocation-based education and mid-career training. These are your "meat and potatoes" courses geared towards the broad base of the lay public, which will never go on to full four-year or graduate degrees. There is simply not enough time to inject an EHM component into their CJT experience; that class time might displace some other information that could be more directly job related.

Adequate course time is even a problem for those students who will eventually need some aspect of earthquake information in their jobs -- structural engineers, geologists, architects, etc. Usually these students must wait until they have transferred to a four-year institution before they can become more exposed to earthquake information.

During a 1977 AIA Research Corporation Summer Seismic Institute for Architectural Faculty, the following barriers to incorporating seismic design into schools of architecture were identified:

(a) information overload -- There may be a reluctance on the part of faculty to integrate additional material into their already full course.

(b) reluctance to change curricula -- Some ad-

ministrators and faculty may be reluctant to change curricula because of the lead time involved and the administrative process required.

(c) lack of importance -- There may be some faculty reluctance because of a perceived lack of importance of seismic design and its relevance to the school's regional location.

(d) lack of knowledge -- Because of perceived lack of responsive data and seismic design information, faculty may be reluctant to teach a subject about which they feel unknowledgeable.

(e) technical subject -- Some may perceive a conflict in trying to incorporate what is thought to be highly technical subject matter into a far less technical course context.

(f) interdisciplinary constraints -- There may be a reluctance to promote a subject which crosses several traditional disciplines.

(g) student interest -- Lack of student interest may increase faculty reluctance to incorporate seismic design information into their courses.

(h) professional interest -- If one's professional peers do not grasp the importance of earthquake research and dissemination, this may result in reduced future participation by individual members of that profession.

(i) curriculum development -- There may be some difficulty in finding the proper place to incorporate earthquake data in the curriculum.

(j) usable information -- There is a severe shortage of earthquake information which is responsive to faculty and institutional needs.

In a broader sense, there are the same kind of problems and barriers which any CJT component would face were it to undertake a full-scale effort to disseminate earthquake hazard mitigation information.

VII. FINDINGS

The findings related in this section were largely taken from a survey conducted among California CJT faculty and administrators, state and county officials with natural hazards or emergency preparedness responsibility, and federal officials with expertise in earthquakes, California's earthquake-related risks and the dissemination of EHM information.

(1) What kind of information should the lay public be receiving about earthquakes and the damage resulting from their occurrence? The public should be receiving every available bit of information about earthquakes, their secondary effects and how individuals can protect themselves and their property. This information should be made available through a carefully thought out dissemination program using all possible measures to present this information in easily understood and interesting formats.

(2) What are the most effective ways of transmitting EHM information to the public? It depends on the size and location of the audience and the timing of that dissemination. For example, for a brief hard

hitting effort which will reach thousands of people at once, a single television program, radio broadcast, newspaper or magazine article, movie or exhibit will suffice. However, if the intent is a broader based EHM awareness which can reach thousands of people in a longer period of time, the preferred dissemination devices would be a broadcasted lecture series (radio or television, preferably the latter), a series of newspaper or magazine articles, or exhibits with changing emphases and pamphlets for subsequent study. Periodic lectures are popular among public interest groups and technicians but their impact is relatively limited. If the EHM dissemination effort is to be restricted to CJT facilities and students, the most popular vehicle is a series of special "mini" courses. Television appears to be the most effective of all the dissemination methods available but all these methods may have to be used in concert to assure broad based dissemination of EHM information.

(3) What methods can be used to trace the effectiveness of these dissemination devices? There is no foolproof method to test the effectiveness of an EHM dissemination program short of examining the effects of a major earthquake on an area after it has been subjected to both an EHM dissemination program and a

major earthquake, in that order. If a classroom format is used (structured lectures or mini courses), examinations can be given to program participants. However, if a broad based public information effort is mounted, some type of random survey (telephone, mail or newspaper) may be useful. This question may become increasingly important as demand grows to prove cost-effectiveness, especially in the light of many programs competing for the same scarce funds.

(4) What role do various non CJT-related agencies play in the dissemination of EHM to the general public? The National Science Foundation funds a series of research and dissemination projects but largely relies on the efforts of its grant recipients to take the lead in EHM dissemination. The US Geological Survey also supports a range of research and dissemination activities, many of which are geared to the potential for earthquake-related problems. The Survey produces multi-hazard maps for various parts of the state, and several of its staff members are actively involved in lecture activities, especially in the San Francisco Bay Area. The California Seismic Safety Commission is the state agency with the primary responsibility for the development of legislation and executive statements (for the Governor) concerning earthquake hazards and their miti-

gation. Most of the Commission's efforts are geared to lobbying, but a recent charge to the Commission's Education Committee could prove fruitful for EHM dissemination through elementary and secondary schools. The Office of Emergency Services is responsible for preparedness planning, emergency operations training and operations during emergencies, and issuance of emergency-related information for the state. Although this agency develops training materials and conducts classes for state, county and local officials, it does not have a clear mandate nor the budget to conduct broad based training of the lay public. The California Department of Mines and Geology is responsible for mapping faults and other geologic features throughout the state. The Association of Bay Area Governments conducts a variety of EHM studies, conferences and workshops but most of these efforts are geared towards local government needs. Many of the counties through an Office of Disaster Preparedness develop earthquake safety pamphlets for public dissemination and provide courses for county officials. In 1978 the Pacific Telephone and Telegraph Company published a multi-lingual booklet (English, Spanish and Chinese) which includes actions which residents can take before, during and after an earthquake. This information is also printed in the

to have specific, clearly defined roles which are consistent with the existing CJT mission. The CJT would also have to have more faculty and administrators who are knowledgeable about EHM and committed to its dissemination. There would need to be someone or several people, probably at the state level, to assure the success of these efforts. And, there would have to be substantial input of outside funding, especially in the wake of Proposition 13.

(8) How effective are existing emergency operations systems at getting earthquake information to the lay public? Is there a meaningful CJT role in this area? It is questionable whether the lay public is aware of what to do before, during and after an earthquake. This is not an attack against the Office of Emergency Operations but rather a statement that their efforts appear to be largely unknown to the lay public. Two useful roles which the CJT could provide are a place where courses and exchange could take place with community leaders and a wide variety of individuals and groups not normally exposed to OEP activities. The CJT and the OEP could also develop and present a series of courses and handouts geared to lay understanding of earthquakes and what individuals can do to mitigate their destructive potential.

(9) What CJT are involved in the dissemination of earthquake or other natural hazard information? Virtually none of the state's CJT now or previously present earthquake or other natural hazards courses. The exception are those institutions which have geology departments or incorporate earthquakes as part of local or state history courses. A notable leader in the area of earthquake education is Foothill Community College, which presents courses, has an earthquake exhibit, conducts research and is an active participant in lecture activities.

(10) What is the CJT role in California's higher education system? California's CJT provide an opportunity for every resident adult to receive a free post secondary education. This education can lead to a two-year associate degree or technical certificate, an entree into a state university, a facility with the English language and American culture, an employable skill, mid-career training, or an opportunity for cultural enlightenment. While the CJT concentrate on basic education to a broad based, highly diversified group of people, the state universities are more geared to specialized, technically-oriented education and related research.

(11) What is the structure of the state CJT system? A community college is located in virtually every county

and most cities within the state. The entire system is headquartered in Sacramento. There are 70 districts statewide, with each district administered by a chancellor under whose leadership may be one or several institutions (107 in all). New programs may be introduced at any of three levels -- state, district or individual college. Traditionally, most educational and cultural programs have come from the district or local levels, but this trend is beginning to shift to the state level.

(12) Which of the following groups is a primary user of information disseminated by the CJT -- public interest groups, university-bound students, non-English speaking residents, handicapped individuals, minorities, public servants (fire, police, health, etc.), political leaders, or senior citizens? Excepting political leaders, each of these groups is a heavy user of CJT resources. Perhaps the largest CJT is a relatively difficult to classify group of part-time students.

(13) What role, if any, has the CJT traditionally played in the dissemination of EHM information to the lay public? The CJT has not played any substantial role in the dissemination of EHM information or any other natural hazard related information to the lay public.

(14) Do many institutions offer courses (archi-

tecture, structural engineering, building construction or geology) which could be used to introduce earthquake-related information? Yes, a substantial number of institutions do offer architecture, building construction and geology courses, but most of these courses deal with the basics and it is an open question as to how much EHM information could be introduced. However, it is likely that some aspect of EHM information could be tailored for inclusion into these and other courses (see Appendix).

(15) Which of the following dissemination devices are most often used to communicate information to CJT students and the public -- television, newspapers, lectures, radio, newsletters, flyers, etc.? Each of these devices, especially lectures, are successfully used by the CJT to communicate with its students. Newspaper inserts, mailers, television and radio spots are used to communicate with the general public.

(16) Can existing CJT personnel and resources be effectively used to disseminate earthquake-related information to the lay public? No. There are not enough individuals who are knowledgeable about or committed to dissemination of earthquake information. The realities of Proposition 13 are that without a massive public demand, there is not enough available money at the state or local levels to fund dissemination in any effective manner.

(17) What are the most effective ways of communicating EHM information to the lay public? Current methods being used to communicate EHM information involve television, lectures, movies, pamphlets, newspaper and magazine articles, exhibits and mini courses. However, there has been no formal attempt to trace the relative effectiveness of any of these methods.

(18) Should the CJT develop regular (credit) courses that give instruction about the nature of earthquakes and what can be done to mitigate their effects? No. There should not be regular earthquake courses. However, earthquake information could be included in existing courses, or special mini courses could be developed. These mini courses should be presented periodically.

(19) How are new courses introduced to the CJT? Sometimes local groups will indicate that additional mid-career training is needed. In these cases a decision may be made at the district or state level, depending upon the extent of the need for instruction. If an instructor has an idea for a new course, the district will determine whether any other faculty member or institution could better present that course before okaying it. Periodically, district administrators will conduct needs studies within the area to

determine what courses the public desires. Recently, though, there has been an increasing growth of new course and activity development being generated from the state level.

(20) Is there a different level of earthquake interest in various parts of the state? Yes. Interest is probably highest in the southern part of the state where there has been recently remembered damage. A variety of research and media activities in the Bay Area have also helped to maintain interest there. However, as you move towards the mountains, the interest appears to fade.

(21) To what extent do CJT and universities co-operate with courses, research and other joint projects? Excepting agreements whereby certain university courses are available to CJT students, there is virtually no joint activity between universities and CJT.

VIII. RECOMMENDATIONS

Very large earthquakes occur infrequently in this country, in comparison with hurricanes, tornadoes and floods. Therefore, the lay public tends to treat earthquakes more casually than these other natural hazards. There needs to be a public awareness effort geared towards communicating the fact that earthquakes pose the largest single-event natural hazard which threatens this country.

There needs to be a concentrated effort which goes further than merely describing the nature of an earthquake. This effort should show the interrelations between earthquakes and other natural hazards and civil emergencies, and whether there are a series of common mitigation efforts which can be taken to lessen their effects.

This report has looked at the feasibility of using California's CJT to disseminate EHM information. However, it should be used as a springboard for at least two follow-up activities - (1) development of a detailed action plan for the development of an EHM program in California's CJT, and (2) development of a study which

explores the possibility of using California's CJT experience in CJT in other states. This second study should also look at those natural hazard activities the other state CJT are engaged in which could be helpful to California's CJT.

Each CJT should identify the user groups most likely to benefit from an EHM dissemination effort by its institution. Possible user groups include state, county and local government officials, volunteer groups, business and industry executives, educators (primary, secondary and post-secondary), mass media representatives (television, radio, print), religious leaders, etc. It is likely that the varying needs and intellect of these groups will require types and levels of EHM preparation.

Tailor dissemination programs to local user needs, interests, natural and geologic hazards, and potential for self help.

Concentrate on those actions that individuals or specific user groups can take to mitigate potential earthquake damage.

The CJT should develop a three-tiered series of EHM efforts which can be undertaken with (1) no outside funding (using existing budget, staff and materials), (2) modest outside funding and (3) substantial outside funding. These projections should be accompanied by

statements of respective cost-effectiveness.

The CJT should pay special attention to those potential user groups which are especially vulnerable to natural disasters -- the poor, the aged, children, the handicapped, non-English speaking residents -- so that they are not subject to disproportionate hardship.

Many recovery plans are based on the assumption that the surviving population will effectively cope with earthquake-related problems and show a high degree of adaptability and resilience in handling rescues, relief, and long-range reconstruction efforts. The CJT need to develop information packages which will familiarize people with the type and nature of hardships they will likely face and what will happen while recovering from a major quake.

Several cities with relatively high earthquake occurrence probability should be selected as CJT observation and information exchange laboratories -- San Francisco, Los Angeles, Seattle, Anchorage, Salt Lake City, Memphis, Boston and Charleston.

Encourage the inclusion of EHM in every feasible area and format.

Develop a series of rewards for faculty members who wish to pursue EHM research and dissemination projects.

Encourage exchange about EHM between CJT, state universities, government agencies and private research "think tanks."

The CJT should make continued and effective use of all available dissemination resources and channels.

The CJT should help the lay public to better understand the nature of earthquakes, the problems inherent with occurrence and mitigation, and various EHM activities which are now being explored. They should also help the lay public to ask the "right" questions and to take greatest advantage of new information -- even where to look for additional information.

Because of the widely diverse and loosely structured system of EHM information dissemination, CJT can indicate what impact this system has on the lay public and on non-involved educational institutions. They can also take a lead role in setting up a recommendation for an EHM dissemination network which works on a statewide basis.

The California CJT should initiate a three-phased program to disseminate EHM information. During the first phase -- short term (0-1 year) -- the CJT could present a series of exhibits and lectures. During the second phase -- intermediate term (1-3 years) -- the CJT could offer special short courses, incorporate EHM into existing

regular courses and begin cooperative research projects with universities and research institutes. The last phase -- long term (3-6 years) -- would call for CJT to begin their own earthquake-related research and/or dissemination projects and, if appropriate, develop a series of semester-long earthquake courses. During the entirety of this process all CJT faculty and administrators should be exposed to national and regional earthquake conferences and workshops.

If the CJT develop and market a series of television courses about earthquakes and other natural hazards and the mitigation of their effects, the proceeds could help to support other EHM projects.

A major earthquake may be imminent. The only way to assure substantial savings of lives and property is to get the lay public involved in EHM. However, this activity should be carried out in such a manner as to avoid panic or information overkill.

It should be recognized that the CJT cannot alone do the job of involving the lay public in EHM activities. This must be done in concert with community, county, city and state groups.

The CJT could research all recommendations for the dissemination of EHM information, determine the current status of each of these recommendations, and determine

what impact the CJT could provide to each of those thoughts or activities.

Many majority and special interest groups use CJT facilities and resources. Yet, there is relatively little known about the needs and interests of these groups in the area of EHM. There should be some investigation into this potential need area.

A major thrust of this report has been to identify appropriate roles which California's CJT could play in the dissemination of EHM information to the lay public. The following lists are divided into "appropriate" and "inappropriate" roles which the CJT could take. However, these lists are not presented in order of needed or perceived priority.

Appropriate Roles

(1) Communicate broad-based earthquake information to the lay public through classes, mini courses, lectures and demonstrations.

(2) Make available CJT physical resources, faculties and student bodies to government officials, public interest groups and technicians for public meetings, discussions and short courses.

(3) Share CJT physical resources, faculties and student bodies with university-level researchers for joint projects.

(4) Eventually conduct application-oriented research geared to the practical needs of the lay public.

(5) Develop a program for controlled dissemination (coordination, timing, project accountability, feasibility testing and cost effectiveness) on three levels -- CJT at local and state levels, and state earthquake-related agencies.

(6) Look at ways that California's CJT experience can be useful to CJT in other states.

(7) Develop ways that CJT disaster-related experience in other states can be used to assist disaster-related dissemination by California's CJT.

(8) Develop dissemination plans which encourage CJT instructors to get involved in earthquake-related research, rather than be restricted to teaching only.

(9) Look for opportunities to incorporate earthquake hazard mitigation information into existing classes such as journalism, public safety (health, fire, police), building construction, electrical engineering, utilities and architecture.

(10) Develop model curricula which might include locally relevant topics (e.g., geography) with guided tours and speakers.

(11) Examine relationships between earthquakes and other natural and manmade hazards, especially as they might relate to local needs.

(12) Conduct seminars on ways that the lay public can get involved in EHM -- encouraging wise construction and land-use planning decisions, purchase hazard insurance, be sure that the community has a workable and practiced emergency operations plan, each household knows what to do to make itself more physically secure, and individuals know what to do in the event of an earthquake.

(13) Encourage residents to raise questions about EHM procedures and concerns at CJT facilities and community centers.

(14) Conduct training for other CJT instructors (perhaps including high school and elementary school teachers) on EHM.

(15) Look for ways to broaden earthquake expertise at each college.

(16) Remain within and build upon the traditional strengths of the CJT.

(17) Each CJT know its earthquake-related roles and responsibilities and what can be done to mitigate campus damage.

Inappropriate Roles

(1) Get immediately involved in the same type of earthquake research as is being conducted by the state universities.

(2) Overpower or overexpose students or the lay public with earthquake-related information.

(3) Frighten people about earthquakes to the extent of generating a panic situation.

(4) Attempt to become mini emergency operations centers (where specific tactical information is dispersed) unless at the specific request of state or local emergency operations offices.

(5) Attempt to teach especially advanced technical aspects of earthquake-related information such as plate tectonics, land-use planning, structural engineering or other courses more appropriate to upper division higher education.

(6) Become the earthquake expert in a locality (e.g., U.S. Geological Survey or Seismic Safety Commission) as opposed to being a center for general information.

(7) Attempt to scare the local public into EHM action.

(8) Attempt to use earthquake-related concerns as a political vehicle for lobbying against the repeal of Proposition 13, rather than working within the bounds of Proposition 13 to accomplish EHM.

(9) Try to dislodge the Office of Emergency Services, California Seismic Safety Commission, Office of Mines and Geology, or any other state or local agency with legal mandate to perform some aspect of earthquake information dissemination, training or policy making.

IX. APPENDIX

CJT Majors That Could Accept EHM

Each of the following majors are offered at California CJT institutions, and each of these majors could accept some aspect of EHM information as a part of its normal course offerings.

architectural engineering technologies

banking and finance technologies

business and commerce

building maintenance

carpentry

child development

city planning

civil technologies (surveying and photogrammetry)

communications and broadcasting

construction and building technologies (carpentry, electrical work, plumbing, sheet metal, air conditioning, etc.)

ecology (environmental control technologies, water and wastewater technologies)

education technologies (teacher aide, etc.)

emergency medical technician

fire control technology
health service technician
hotel and restaurant management technologies
human services (social work-related technologies)
industrial electricity
institutional management technologies (rest home, etc.)
insurance management and sales
journalism
land resources management
market, distribution, purchasing, business and industrial management technologies
masonry
mechanical and engineering technologies
medical assistant and medical office assistant technologies
natural science technologies
nursing (LPN, LVN, RN)
photography
police, law enforcement and corrections technologies
psychiatric technologies
public administration and management technologies
public service technologies (religious, educational, legal, social and civic)
radio broadcasting

real estate management and sales

sanitation and public health inspection

surveying

television broadcasting

transportation and public utility technologies

water and wastewater technologies

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