WHAT DO WE DO NEXT?
THE NEXT STEP IN EARTHQUAKE EDUCATION

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ABSTRACT

"Do I have to teach this earthquake drill to my students? I simply do not have the time!" said the frustrated first-year fourth grade teacher to her assistant principal at Newington Elementary School in Summervihis paper is to address the future approach for earthquake education to a specific audience, schools. There is no one formula for successfully integrating a program in our educational system. There are the usual barriers for integrating any program or anything different in the educational system. In taking the next step, make use of the knowledge that has put us at this point of the process. Be aware that, without question, problems will emerge. Let the problems be stepping stones rather than stumbling blocks. The steps for implementing earthquake education to the school population is to (a) commit, (b) consult, (c) channel, (d) communicate, and (e) charge. Respond to these steps which I call the five C's in light of where you are. Your presence at this meeting indicates your serious intent to educate our school population in earthquake preparedness.

JOYCE BAGWELL

Ms. Joyce Bagwell has been both a high school science teacher and college professor as well as a frequent lecturer at civic and professional groups in South Carolina on the subject of earthquake history, causes, effects, and preparedness. The author of numerous publications, she is currently Assistant Professor of Chemistry-Geology at Baptist College at Charleston, Principle Investigator for Seismic Activity in lower South Carolina, and Director of the Earthquake Center at Baptist College.

INTRODUCTION

In constructing an earthquake education program for a vulnerable audience, our school children, it is logical that the next step in planning should be to examine the goals and objectives set at this conference. Refine them. Determine your commitment, and take proactive steps to educate school administrators and teachers to integrate earthquake safety in the curriculum. The methods by which to accomplish this task will be diverse, but the ultimate outcome should be to facilitate students' learning of life-saving behavior in the event of a damaging earthquake.

The purpose of this paper is to present five steps for implementing an earthquake education program to the school population. The steps I call the five C's are: (1) commit, (2) consult, (3) channel, (4) communicate, and (5) charge. Some of the methods I use to teach the concepts of earthquake history, causes, effects, and preparedness to school audiences will be demonstrated at the conclusion of my talk.

COMMIT

The advocates, individuals and agencies, instigating earthquake education will commit their energies to the continuance of upgrading the quality of the earthquake education materials that exist. The advocates will commit themselves to explore every possibility through which the material can be utilized. The materials will be applicable to the target audience addressed. Accurate and practical information must be made available to the user/learner.

Assign the task to carry on the work only to those who have the qualities of being a "champion" for the cause of earthquake education. Enthusiasm, interest, professional expertise, and understanding the subject of earthquakes are qualities that the "champion" will possess. The importance of possessing a contagious spirit about the need of earthquake education will attract the attention of policy/decision makers who are able to produce institutional changes locally, statewide, and nationally. Commitment to educating the school population will open doors of opportunities. The only limits that an earthquake educational program has is the limit of the imagination and commitment of the program's leaders.

CONSULT

The work of the past decade in earthquake education will become a basis upon which to build. Consult people like Marilyn MacCabe of the Federal Emergency Management Agency (FEMA) who put together pilot earthquake education programs. Learn the technique of providing the concepts and allowing individuals to build upon them. The 1983 pilot projects funded by FEMA at the Baptist College at Charleston, Memphis State, and Seattle, Washington modified the materials of the Environmental Volunteers of California and CHES of California (currently Lafferty and Associates, Inc.) to be applicable for Charleston, Memphis, and Seattle. The activities of the plans and programs that worked well and those that did not work well should enlighten anyone implementing earthquake education programs in other states. The success

that the pilot programs in Charleston, South Carolina, Memphis, Tennessee, and Seattle, Washington, had in the schools has led to the emphasis of this conference.

It was the National Earthquake Hazard Reduction Plan (NEHRP) of 1977, that set in motion the tasks of government agencies planning ways to reduce the risk of earthquakes in the United States. The Federal Emergency Management Agency (FEMA), the U.S. Geological Survey (USGS), the Nuclear Regulatory Commission, the National Science Foundation, and the National Bureau of Standards and Technology involved the local private and public sectors in each section of the country to attend conferences throughout the U.S. and Puerto Rico to generate awareness of the risks of earthquakes in eastern United States as well as the known risk of damaging earthquakes in California. Consult the literature about the outcomes of the conferences. The Office of Earthquake Engineering and Research of the USGS in Reston, Virginia is an excellent resource to get the proceedings of the conferences to you. The earthquake education for the public was a very significant part of all the conferences.

All the scientific research, challenges for the engineers, vulnerability studies, mitigation plans for responders are vital, but the role of integrating earthquake education in the school population in order to plan and prepare themselves for a damaging earthquake is the important key to reducing the loss of lives in the event of a damaging earthquake in the United States.

California, being more active seismically than the eastern United States, is the leader in planning and educating their populace. Yet, there remains the task of involving *all* the schools to develop earthquake safety plans and practice earthquake drills. The difficulty which California and all other states will have is to "educate" the populace of *where* their closest resources lie, *what* materials are available, and *who* to get to act upon their knowledge.

Two outstanding earthquake educational resources at the present time are: Earthquakes: A Teacher's Package for K-6 developed by the National Science Teachers Association under contract to FEMA and the Guidebook for Developing a School Earthquake Safety Program written by FEMA. These resource materials are written specifically for the school population and are excellent. The methods of disseminating the information will begin in July 1989, in St. Louis, Missouri, with a train-the-trainer workshop using the National Science Teachers Earthquake Curriculum.

As the educator, Robert Mager, made us aware, it is difficult to construct or map goals and objectives for where one wants to go unless one knows what has been done or accomplished in the past. Consulting with the beginning advocates in the field and researching the literature and programs are necessary beginning steps.

CHANNEL

Everyone has limited energy and resources. For a program to be successful, there must be continuous channeling of energies. The concept of channeling here means focusing, putting on blinders to avoid deviations or distraction. A magnifying glass concentrating the sun's rays in

one spot upon paper can cause a fire. If the magnifying glass does not channel the sunlight to the one spot, there is no concentration of heat generated, no fire can be started. In the same analysis unless the focus of one's goals and objectives upon an audience is concentrated or channeled, no lasting earthquake education program will be generated.

Channeling can be interpreted by some as following a chain of command. The procedure of following a chain of command in the educational system can eliminate embarrassment and problems for a program. Recognize, however, that one does not abandon a school district or a school if the person in charge does not want to become involved with the earthquake education program. Successfully implementing a program in another school or district nearby can cause changes in the thinking of those who at first were reluctant to participate. This actually happened in our EEC program. A teacher from the reluctant school, not knowing how the principal felt, attended a teacher recertification course. She participated in the hands-on earthquake program that was taught as one of her classes. She returned to her school and integrated the earthquake program in her class. She shared her materials with the other teachers. The school as a whole has not initiated an earthquake safety committee, but the students have been exposed to earthquake drills in the classroom. Hopefully, in the near future, the principal who did not think his teachers would respond to the earthquake education program will be calling us for more information.

The approach used by the Baptist College Earthquake Education Center was successful, because the science coordinators for the counties involved were 100 percent in favor of the earthquake education program. The science coordinators invited the EEC staff to present the earthquake material in workshops. Teachers recognized the value of utilizing an interesting subject to enhance basic skills of the students. The interdisciplinary aspects of the subject stimulated ideas of ways to integrate earthquake safety for just about any discipline.

Teachers like the hands-on experience that students were afforded in learning the what and why's of earthquakes. Several teachers have expressed a feeling of reward when students appeared to be stretching their minds beyond the natural "what if" questions. "What if" questions always get in earthquake discussion sessions. Teachers "turned on" by the EEC programs presented during summer workshops, in-service workshops during the year, and various education courses offered for teachers never failed to write or call for brochures, material, film, slides, or borrow some of the models the EEC had to loan.

The proper channel to use for initiating an earthquake safety program can be through the teachers attending workshops, the principals or the district level staff. Only those exposed to an adequate presentation of the material and enabled to see the far reaching effects of improving safety within their own environment are the ones who have taken steps to utilize the program.

COMMUNICATE

Communicate with those who are interested in getting earthquake education into the schools. All participants at this conference are aware of the importance of networking. Make a deliberate list

of those associates who share the same interest and communicate with them often. By attending workshops, symposiums, and conferences, the chance to enlarge the network is increased with the added bonus of obtaining added information.

In the communication step, be prepared to spend time on the telephone, make appointments with individuals, write notes to yourself so you will not forget or overlook anyone who is seeking information. There is a motivational book entitled Rhinoceros Success by Scott Alexander. The same concepts for a person to be successful as this book indicates, are applicable to a successful earthquake education program. In your communication, choose to be audacious. Alexander states that success, in itself, is audacious. Do not become obnoxious; but, to initiate a program where you live commands a daring feat to reach your goals. To convince educators that the possible threat of earthquakes requires initiating action plans for preparedness of an earthquake will be a major task anywhere because all Americans are convinced "It will not happen here." Your communication must be to convince others that you believe in the program.

CHARGE

You are a Niagara Falls of energy! With the power of the knowledge you possess on the importance of earthquake education in schools, you could easily light up New York City. You have the knowledge of what needs to be done. Think big! Go to the superintendents of education within your state with a plan for implementing earthquake safety in the schools. Use your energy wisely. The Niagara Falls are not used for taking a shower. Exercise your discipline. Changing people's attitudes from a "what will be, will be" to "what can I do to reduce the risk of getting hurt in an earthquake?" requires an impressive force from someone with a sound program ready to be executed.

The scientific principle of inertia confirms that all objects tend to stay still unless acted upon by some outside force. A baseball will not pick itself up off the ground and throw itself. An outside force is required to put the ball in motion. We must be the outside force to get an earthquake education program implemented in our schools. We must fine tune ourselves to a degree of excellence. Each of us here must take the information presented and apply it to our own situations. With singleness of purpose, we must CHARGE!

CONCLUSION

The next step in earthquake education is to leave this conference with the determination to exercise the five C's **Commit** to upgrading and utilizing earthquake curriculum materials and enlisting enthusiastic "champions" for the integration of earthquake science and safety into the educational curricula. **Consult** the leaders of the earthquake education programs in progress. **Channel** your energy toward clearly defined goals and objectives for school earthquake safety programs. **Communicate** often with colleagues concerning methods to implement earthquake safety to the school population. Present a positive approach. **Charge** forward! As leaders in the earthquake education programs for the school population throughout the United States and other countries represented here, it is up to each of us to **take action**.

III. CONFERENCE WORKSHOPS

CONFERENCE WORKSHOPS

The Conference Workshops were designed as working sessions. Conference products were developed during these sessions and included goal statements, lists of recommendations, limitations for achieving listed goals, factors that would encourage the successful attainment of the goals and general position statements. The minutes from these workshops are on the following pages.

To avoid duplication and maximize discussion, each workshop had three sessions occurring simultaneously. One workshop session discussed the listed topic from the point of view of an administrator, another from the point of view of an educator, and the third from the point of view of a developer of science and/or safety curricula, inservice, and other related materials. These were not assigned groups. Attendees were encouraged to join the group with which they felt most comfortable and would best be able to contribute.

Workshop 1: Avenues of Dissemination

This workshop focused on available avenues for the dissemination of materials and how these avenues could be utilized more fully, and even expanded.

- Who should be responsible for dissemination?
- How do we get existing materials to students and teachers? What local, state and professional organization mechanisms are there?

Workshop 2: Barriers to Implementation

This workshop focused on regional, national, and political factors that interfere with the full implementation of earthquake education in the schools.

- Where does natural hazard education fit into the existing curriculum?
- Should existing materials be regionalized to meet the needs of particular areas of the country?

Workshop 3: Strategies - Getting Earthquake Education into Our Schools

This workshop focused on ways that earthquake education can be fully incorporated into the existing school curriculum at a variety of levels and across age groupings.

- How can parents and teachers be motivated to ask for the inclusion of earthquake education in the schools?
- In what ways can earthquake education in the schools be designed so that students internalize the concept of hazard mitigation and grow to become informed adults?

CONFERENCE WORKSHOPS

Point of view of administrators.

Leader: Marjorie Greene
BAREPP, Oakland, CA

Discussant: John Gill
Arkansas Department of Education

Recorder: Laurie Laughy
Emergency Preparedness Canada Fellow
Vancouver, B.C.

Workshop 1: AVENUES OF DISSEMINATION

The participants first examined the routes of dissemination of earthquake materials and information within the school system. Three main routes were identified:

1. TOP - DOWN: The information flow moves from the state school board, through to the local school board, the Superintendent, school principal, teachers and finally to the students.

2. BOTTOM - UP: Interested parties from lobby or advocacy groups either via the P.T.A. and then up to the school board or from interested local science teachers via the teachers association to school boards at the local or state level.

3. LEGISLATIVE: Legislative charges cause direct or indirect changes at the school level. It was stressed that unless the changes were deemed credible and were accompanied by funding and with policies of enforcement their effect was often negligible.

In order to better identify and utilize existing routes, the participants made three recommendations:

1. that existing data-base systems (e.g. ERIC) be identified and utilized as a National Clearing House of source materials and distribution networks;
2. that organization/agencies use the established data-base when producing or distributing materials or products; and
3. that proven known dissemination routes be identified and listed regarding earthquake safety and curriculum.

Four major principles were endorsed as a means of insuring that these routes of dissemination be used to their fullest.

1. Involve participants and recipients as part of the preparation of material.
2. Train the trainers--making use of in-house inservice training.
3. Encourage local authorities to establish an office of primary responsibility.
4. Insure that products are developed according to established routes of dissemination.

Workshop 2: BARRIERS TO DISSEMINATION

Five main barriers towards following these principles were identified. These were:

1. **Credibility**: because of denial or overdependence on government agencies, persons fail to "buy in" to the process.
2. **Resources**: financial, material, and personnel resources are often inadequate.
3. **Fragmentation**: government bureaucracy often dictates restricted scope and mandate and thus fragmentizes the response to the problem.
4. **Dissemination Routes**: there exists a lack of documented and proven routes for people to use.
5. **Research**: research is inadequate and at times contradictory.

Therefore, since it was noted that both public and school administrators control the financial resources and make the decisions regarding school earthquake safety and curriculum, the participants recommended that what was needed was a:

> "broad, integrated comprehensive approach that identifies and involves existing and potential players in terms of roles, mandate, responsibility and scope of influence and support and establishes the long and short-term goals and objectives."

Workshop 3: IMPLEMENTATION STRATEGIES

Eight specific strategies for overcoming barriers to using such an approach were identified:

1. **Sales**: there is a real need to develop a marketing plan and program to include both short-term benefits (i.e., what can you do to save yourself?) and long-term benefits (i.e., if you educate children now they will grow up to be concerned and aware parents).
2. **Developing a Quality Product**: existing materials needed to be demonstrated and displayed and become recognized. Research and development in the area of USAR needs to be redirected and made available to persons involved in damage assessment.
3. **Lobbying Politicians**: politicians must be made aware of the need for earthquake safety programs and that any such changes must be accompanied with programs for monitoring and with penalties for failure to comply.
4. **Developing a Model**: efforts need to be made to develop an integrated model of earthquake safety, mitigation and curriculum.

5. **Developing Dissemination Routes:** existing routes need to be identified so as to mitigate the effects of fragmentization and distribution problems. Existing corporate models regarding in-house training programs need to be identified and exploited.
6. **Education**: Development of earthquake curriculum is crucial in the education process. People need to be aware of the need for self-sufficiency. Children can be used to reach their parents and make them aware of the problems. More use of the electronic and print media needs to be made.
7. **Motivation**: People need to be motivated to make earthquake preparedness a priority. Research in the areas of motivating and reaching groups needs to be conducted. People have to be told that what's in place now won't work and decision-makers need to be made aware of the issues.
8. **Implementation**: Players have to be identified and then involved in the process of identifying the long and short-term goals of an integrated approach.

The discussion was considerable and spirited and it was the hope that these conclusions and recommendations would be of benefit in getting earthquake education into our schools.

CONFERENCE WORKSHOPS

Point of view of educators.

Leader: Deedee O'Brien
Utah Museum of Natural History
Salt Lake City, Utah

Discussant: Rodney Doran
State University of New York at Buffalo
Buffalo, New York

Recorder: Carole Martens
Washington State Community Development
Olympia, Washington

Workshop 1: AVENUES OF DISSEMINATION

Many different sections of the country and disciplines represented in group.

- Association, national, state, subject matter, local
  NSTA, STS, CESI - elementary, NAGT
- Parent groups/PTA's/School Boards/Community organizations/Principals/NASSP/
  Council of State Supervisors
- Newsletters/Periodicals
- Television, media, public service: Discovery channels
- State Education office turnkey
- Colleges-Seminars-AETS; all teachers
- Teacher Centers/Local Resource Centers/Museums
- Electronic Bulletin Boards
- Educational Resource Information
- Catalogue of free and inexpensive materials $75
- Libraries
- Conferences/conventions
- Brochures
- Fire depts./Police depts.
- Staff development/In-Service/Pre-Ser.
- Textbook
- Governmental entities

Teacher resource centers located at different locations throughout states. Individuals feel these don't get broad usage. Create need. Information on availability can be disseminated through newsletters.

Key is to get information to teachers.

Number of publications available - science oriented. e.g.: Super Science.

Discover channel - was set up last April in Seattle.

Who has influence on textbook content? (Publishers easy to get to - comment from person in Mississippi.)

NSTA has a wealth of information
- Make things hands on.

SUMMARY:

Look at the audience. The dissemination avenue is determined by audience. Target specific groups: elementary teachers, principals, earth science teachers, state science supervisors. (Comment from participant - "don't separate entities.")

Can't do everything; - resources limited. Use Teacher centers and direct 5 groups to target. Choose where you want to focus energies. Year 1: which of 5 groups would we name priority 1?

Is there enough communication between levels of education to limit dissemination to one group and expect it to spread?

Use interdisciplinary groupings.

Are channels in various states similar? Not all states have Teacher Centers. Do we go through national organizations or the state level? (State education offices?)

What is it we are trying to disseminate? Awareness/safety? This should go out to the media - get parents involved - then they'd go to school and ask for earthquake education.

Another suggestion is a letter to school board asking "Would you be free from litigation if an earthquake occurred?"

We don't have a position paper. Needed!

If one were available it could be sent out to various outlets.

If State Board of Education is on record endorsing a position paper, can use it effectively to accomplish goals.

What can we use to communicate? Position paper good idea - select target group. Too many elementary teachers to get to all. Must be more focused.

Recommendations

1. Contact science periodical publishers and associate newsletters with suggested articles.

2. Create position paper. Use it as a tool to get endorsement and achieve goals.

3. Select target groups/resources limited.

Workshop 2: BARRIERS TO IMPLEMENTATION

Leader Summary:

-Focus on a target audience
-What to disseminate (a position paper)

What are Barriers -
Does anyone think there's not an appropriate channel? No one.

BARRIERS:

1. Teaching overload especially in elementary grades; interdisciplinary approach might be more effective
2. Lack of science/safety knowledge - In-service might be effective approach
3. Resistance: may need to mandate change
4. No support/resources
5. Some would say it's not necessary
6. Unsure which curriculum is best
7. No correlation with SLO's
8. Apathy
9. Presented as an extra; need to characterize it as a core part of the curriculum.
10. Independence
11. Money; insufficient funds for dissemination (mailing/contacting)
12. Personal overload
13. Lack of Principal support
14. Disorganization - separate teams
15. Multifaceted issue
16. Question of whether to isolate earthquakes or integrate
17. Uncooperative attitude
18. Will scare kids
19. Inability to have lasting impact
20. Secondary level may perceive safety as not an academic subject

21. Fragmented concepts on part of the persons disseminating the info.
22. No unified goal.
23. Improperly planned system of delivery or dissemination
24. Mind sets that consider only dissemination to a special interest or target populous; perception on the part of disseminators that there is only one basic way to approach the concept of dissemination.
25. Not enough personnel to handle the task of dissemination
26. Lack of cooperation or ignorance on the part of disseminators to use technology as a tool to assist in sending out information.
27. Lack of knowing how to positively disseminate information.
28. Personal or negative, selfish feelings and concerns override the goal of entire focus of earthquake education; hidden agendas on the part of disseminators.

Suggestions for Overcoming Barriers:

1. Overload: At elementary level, teachers can integrate but need guidance and hands-on help.

   Discussion included defining earthquake education.

   Questions: What should the in-service training include?
   Where should earthquake education be in the system?
   How much should be presented?
   Should there be a one time presentation? As what?

2. Lack of In-Service: Provide Inservice; Provide information, incorporate teachers, government, mentor-teacher; NSF Grant
   - Who should do it?
   If media focuses on school program, want to be involved.

3. Resistance to being told: time, persistence, ask them; education

4. Resources made available; information made available; team approach; identify "zealot", or local key contact. NCEER could take lead.

5. Awareness and emphasize mobility; link it with daily crises; link with other hazards.

6. Evaluate and analyze.

7. School wide plan; peer pressure.

8. Integrate.

9. Local business, service organizations, PTA's support to principals, workshops.

10. Establish consensus, guidelines.

11. Recognition; patience.

12. Local decision.

13. Education.

14. Science-technology-society.

15. Institutionalization needed.

SUMMARY:

Focus, Integrate, Support, Time (patience) - FIST.

Workshop 3: STRATEGIES

1. Process: State, local, regional process for getting quake education in schools

2. Institutionalization

What are the strategies?

-Mandates
- Framework and test
- Legislature
- Textbook: 90% of teachers depend on it
  What would textbooks include?
- Inservice
- Networking-effective to work with all possible groups and individuals on a continuing basis
- Dissemination: packets of information to provide what? Awareness or resources to implement programs and curricula and/or both?
- Exhibits at conferences
- Safety committee; mandate a school response plan. PTA can be a great help.

Framework

To continue, must be a renewal process - could be most successful if district or state mandate.

Peer sharing can occur and help but many advocates are not "peers".

Legislation

Difficult to get support. How can we attain it? Get advocates within the legislature and other decision-making bodies.

New York state science syllabus is just being rewritten. Process is on a 20-year cycle.

List of motivators. (Unable to do at this time).

Process

Awareness, position paper

Recommendation

NCEER give workshops to train teachers to go back to state. Contact: use marketing strategies on how to motivate: provide resources and directions on how to use curriculum. Participants could be earth science teachers, elementary teachers, administration.

SUMMARY:

Kinds of motivation we can use:

- Safety of the kids
- Legal issue
- Practical applications of science
- Science-technology

Children Legal Application Problem solving - CLAP

CONFERENCE WORKSHOPS

Point of view of developer of science and/or safety curricula, inservice, and other related materials.

Leader: Marilyn MacCabe
FEMA, Washington, DC

Discussant: Daniel Cicirello
Arkansas Office of Emergency Services

Recorder: Paul Spengler
Disaster and Emergency Services
Helena, Montana

Workshop 1: AVENUES OF DISSEMINATION

1. NSTA Bulletin Board: (202) 328-5853 (This connects directly to bulletin board service).
2. Unions: NEA and National Federation of Teachers - this is a good way to reach those not in professional organizations. Use their journals.
3. Serve most interested first. They will become the spokesmen.
4. Institutionalize - avoid temporarily incorporating earthquake education.
5. Train teachers.
6. Professional journal articles (NSTA - Science & Children is anxious to get material).
7. Package curriculum to make useful.
8. Aim at teachers. About 10% adopt innovative instruction early. Aim at the rest.
9. Aim at textbook companies. Preparedness information should be in math and reading books.
10. Identify and aim at support groups. Involve other people, grassroots.
11. Consider non-traditional ways to disseminate.
12. Make the curriculum part of the education system. Permanent, not temporary.
13. States need to mandate the education with policy statements.

To be a part of an on-going educational system, we need to be more systematic. Could couple dissemination with staff development.

Workshop 2: BARRIERS TO DISSEMINATION

1. Don't know how education works: access, instruction, legislation-legal.
2. Denial.
3. Decision making: state, local and personal.
4. Time/priorities.
5. Money: materials and training.
6. Lack of support from the public and professionals.

7. Don't know how to get resources.
8. Decision makers. Rigid bureaucracy.
9. Ill defined strategies and target audience. No agreed upon goals and objectives that can be evaluated.
10. Ignorance "Won't happen here;" risk perception low.
11. Dependence on outside resources.
12. Earth science not universally taught.
13. Can be locked in earth science which not all students study.
14. High turnover of teachers, especially in some areas.
15. Curriculum committees are swamped with requests.
16. Many textbooks do not change over the years.
17. Too specific for use as general curriculum material.
18. Lack of dissemination strategies.
19. No tested, proven model that's documented.
20. Different groups of students to be reached, i.e. special education, elementary, pre-school, etc.
21. Lack of teacher training. No team approach.

Workshop 3: IMPLEMENTATION STRATEGIES

1. Focus - don't confuse message.
2. Key agencies and personnel to lead identification and use.
3. Make positive messages.
4. Learn how education system works.
5. Identify funding and resources.
6. Use alternative dissemination methods.
7. Different states use different ways to implement curriculum; identify these ways.
8. Form coalition with other groups; team approach.
9. Document and evaluate programs to develop model.
10. Develop marketing strategy.
11. Public education: motivate the key people.
12. Develop a plan to implement.
13. Ownership of key players. Encourage their participation in implementation.
14. Central training sites. Train key people.
15. Mandate (federal, state, and local) implementation.
16. Become a part of textbook adoption strategies. Textbooks drive learning.
17. Followed by assessment. Evaluation of implementation techniques to learn if they work.
18. Get public support.
19. Use integrated approach, with other disciplines with earth science emphasis.
20. Talk to service groups for grassroots support. Teachers and administrators are often members of these groups.
21. Enlist the aid of local emergency managers (under various titles, e.g. disaster and emergency services coordinator or civil defense director).
22. Establish a partnership with volunteer agencies, such as the Red Cross.

23. Use the University Homemaker's Program and state office of disaster preparedness.
24. Informal approach will sometimes work. Just ask the right person.

APPENDIX A
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APPENDIX C

Program and Schedule

Sunday, July 9:	3.30-4:30 pm	Conference Registration **Hilton Lobby**
	4:45 pm	Bus leaves Hilton for Amherst Campus
	5:30-7:00 pm	Tour of NCEER Seismic Simulator Laboratory Demonstration of NCEER Quakeline Poster and Exhibit Displays **Room 140 and Computer Lab, Ketter Hall,** **UB Amherst Campus**
	7:00-9:30 pm	Dinner Meeting - The Earthquake Risk in the Pacific Northwest Ms. Linda Noson, FEMA, Region 10 Mr. Larry Pearce, Emergency Preparedness Canada, British Columbia and Yukon **Center for Tomorrow, UB Amherst Campus**
Monday, July 10:	7:30-8:30 am	Conference Registration Continental Breakfast **Outside of Newport Room, Hilton**
	8:30-9:00 am	Welcome: Ms. Katharyn E.K. Ross, NCEER The Need for Earthquake Education Dr. Ian Buckle, NCEER **Newport Room, Hilton**
	9:00-9:20 am	Seismic Safety of Idaho Schools Mr. Kurt Othberg, Idaho Geological Survey **Newport Room, Hilton**
	9:20-9:40 am	The Benefits of Earthquake Education to the Schools Mr James L. Tingey, Utah Comprehensive Emergency Management **Newport Room, Hilton**
	9:40-10.00 am	Internalizing Mitigation Education in the Schools Mr. Daniel Cicirello, Arkansas State Office of Emergency Services **Newport Room, Hilton**
	10:00-10:15 am	Break **Outside of Newport Room, Hilton**

Program and Schedule (Cont'd)

10:15-10:35 am	What Currently Exists in Earthquake Education: An Overview Ms. Katharyn E.K. Ross, NCEER **Newport Room, Hilton**
10:35-11:00 am	Plate Tectonics - Learning the Science to Understand the Hazard Dr. Joyce R. Blueford, Math/Science Nucleus, Fremont, California **Newport Room, Hilton**
11:00-11:25 am	Earthquake Preparedness From a School's Perspective Mr. Karl Naugle, Dorchester Two School District, Summerville, South Carolina **Newport Room, Hilton**
11:25-11.50 am	Teacher Participation in Earthquake Curricula Mr. Jeffrey Callister, Newburgh Free Academy, Newburgh, New York **Newport Room, Hilton**
11:50-Nooh	Questions and Answers
Noon-1:30 pm	Lunch Presentation - It's Not My Fault: The Role of Denial in School Earthquake Preparedness Ms. Ferne Halgren, Education Extension, UCLA **Palo Alto Room, Hilton**
1:30-2 00 pm	The Process of Dissemination Ms. Phyllis Marcuccio, National Science Teachers Association **Newport Room, Hilton**
2:00-2:15 pm	Implementation of Earthquake Education in the United States: An Overview Ms. Katharyn E.K Ross, NCEER **Newport Room, Hilton**
2:15-2:35 pm	Crisis Management and Earthquake Preparedness - A Regional Perspective Mr. Larry Pearce, Emergency Preparedness Canada, British Columbia and Yukon **Newport Room, Hilton**

Program and Schedule (Cont'd)

2.35-2:45 pm	Policies and Projects in the British Columbia Ministry of Education Mr. Neil Jackson, Ministry of Education, British Columbia **Newport Room, Hilton**
2.45-3:00 pm	Break **Outside Newport Room, Hilton**
3:00-3:10 pm	Strategies for the Implementation of Earthquake Preparedness in the Arkansas Schools Dr. John Gill, Arkansas Department of Education **Newport Room, Hilton**
3.10-3:20 pm	Implementation of Earthquake Education in California Public Schools Mr. Thomas Sachse, California State Department of Education **Newport Room, Hilton**
3:20-3:30 pm	Seismic Safety Standards for Idaho Schools Mr. Eldon Nelson, Idaho State Department of Education **Newport Room, Hilton**
3:30-3:40 pm	Slow Scholars Consider the Realities of Significant Seismicity Dr David Kennedy, Washington State Department of Education **Newport Room, Hilton**
3:40-4.30 pm	Implementation Panel Discussion Dr. John Gill, Mr Neil Jackson, Dr David Kennedy, Mr. Eldon Nelson, Mr. Larry Pearce, Mr. Thomas Sachse, Ms. Katharyn Ross This time is provided to allow for optimal exchange between speakers and participants **Newport Room, Hilton**
4:30-5:00 pm	Summary of the Day; Identification of Key Issues and Workshops, July 11 Ms Katharyn E.K Ross, NCEER Newport Room, Hilton

Program and Schedule (Cont'd)

	5:00-6:00 pm	Poster and Exhibit Session Participants are encouraged to display materials and descriptions of their programs Cash Bar **Palo Alto Room, Hilton**
	7:30-8:30 pm	Optional Curricular Discussion This is designed for those who would like to further discuss available curricula and the future directions of earthquake education materials **Palo Alto Room, Hilton**
Tuesday, July 11:	7:30-8:30 am	Continental Breakfast **Outside Newport Room, Hilton**
	8:30-9:45 am	Workshop 1: Avenues of Dissemination Group A: Point of View of Administrators Ms. Marjorie Greene, BAREPP **Palo Alto Room, Hilton** Group B: Point of View of Educators Ms. Deedee O'Brien, Utah Museum of Natural History **Newport Room, Hilton** Group C: Point of View of Material and Curriculum Developers Ms. Marilyn MacCabe, FEMA **San Carlos Room, Hilton**
	9:45-10:00 am	Break **Outside Newport Room, Hilton**
	10:00-11:00 am	Psychological Aftermath of School Tragedy: Planning and Coping Dr. Thomas Frantz, Department of Counseling and Educational Psychology, State University of New York at Buffalo **Newport Room, Hilton**
	11:00-11.15 am	Break **Outside Newport Room, Hilton**
	11:15-12:30 pm	Workshop 2: Barriers to Implementation Group A: Point of View of Administrators Group B: Point of View of Educators Group C: Point of View of Material and Curriculum Developers
	12:30-1.30 pm	Lunch **Justine's, Hilton**

Program and Schedule (Cont'd)

1:30-2.45 pm	Workshop 3: Strategies: Getting Earthquake Education into the Schools Group A. Point of View of Administrators Group B: Point of View of Educators Group C: Point of View of Material and Curriculum Developers
2:45-3:00 pm	Break **Outside Newport Room, Hilton**
3:00-3:45 pm	What Do We Do Next? The Next Step in Earthquake Education Ms. Joyce Bagwell, Earthquake Education Center, Baptist College at Charleston **Newport Room, Hilton**
3:45-4:15 pm	Conclusions and Recommendations From Workshops; Reports From Workshop Leaders **Newport Room, Hilton**
4:15-4:45 pm	Closure Ms. Katharyn E.K. Ross, NCEER

APPENDIX D

DISASTER PREPAREDNESS - THE PLACE OF EARTHQUAKE EDUCATION IN OUR SCHOOLS
July 9-11, 1989

EVALUATION

	Low				High
	1	2	3	4	5

1. Did you find the conference to be useful for:
   a. defining the need for earthquake education? _____
   b. understanding the impact of earthquakes on children and schools? _____
   c. developing strategies to implement earthquake education in the school system? _____
   d. understanding the benefits of earthquake education to the schools? _____
   e. formulating ways to disseminate earthquake education materials? _____
   f. identifying currently available earthquake education materials _____

2. Did the conference benefit you or your organization by:
   a. providing new sources of information and expertise you might want to utilize in the future? _____
   b. establishing a better understanding of the issues involved in earthquake education? _____

3. Did you find the following activities/materials useful:
   a. formal presentations? _____
   b. implementation panel? _____
   c. workshops? _____
   d. displays of materials and posters? _____
   e. tours of Seismic Simulator lab? _____
   f. demonstration of "Quakeline?" _____
   g. informal discussion during breaks, lunches, after hours? _____
   h. preliminary proceedings? _____
   i. handouts? _____

4. Prior to this conference, I would rate my awareness of earthquake education and the need for its inclusion in the schools as _____

5. Prior to this conference, I would rate my concern about earthquake education and its inclusion in the schools as _____

6. I now rate my awareness as _____

7. I now rate my concern as _____

8. Should future workshops be planned to continue the work initiated at this meeting? _____

COMMENTS:

DISASTER PREPAREDNESS--THE PLACE OF EARTHQUAKE EDUCATION IN OUR SCHOOLS
July 9-11, 1989

EVALUATIONS OF THE CONFERENCE BY PERCENTAGES OF RESPONDENTS

No. of evaluations received: 33

		Low		High
		1 & 2	3	4 & 5
1.	Did you find the conference to be useful for:			
a.	defining the need for earthquake education? (33)	3%	9%	88%
b.	understanding the impact of earthquakes on children and schools? (33)	6%	12%	82%
c.	developing strategies to implement earthquake education in the school system? (32)	9%	22%	69%
d.	understanding the benefits of earthquake education to the schools? (33)	3%	9%	88%
e.	formulating ways to disseminate earthquake education materials? (32)	3%	25%	72%
f.	identifying currently available earthquake education materials? (33)	3%	6%	91%
2.	Did the conference benefit you or your organization by:			
a.	providing new sources of information and expertise you might want to utilize in the future? (33)	-	9%	91%
b.	establishing a better understanding of the issues involved in earthquake education? (33)	-	15%	85%
3.	Did you find the following activities/materials useful:			
a.	formal presentations? (32)	3%	6%	91%
b.	implementation panel? (26)	12%	15%	73%
c.	workshops? (31)	6%	10%	84%
d.	displays of materials and posters? (32)	15%	38%	47%
e.	tours of Seismic Simulator lab? (29)	4%	41%	55%
f.	demonstration of "Quakeline?" (22)	19%	36%	45%
g.	informal discussion during breaks, lunches, after hours? (33)	-	3%	97%
h.	preliminary proceedings? (30)	-	13%	87%
i.	handouts? (32)	-	16%	84%
4.	Prior to this conference, I would rate my awareness of earthquake education and the need for its inclusion in the schools as (33)	9%	18%	73%
5.	Prior to this conference, I would rate my concern about earthquake education and its inclusion in the schools as (33)	6%	15%	79%
6.	I now rate my awareness as (33)	-	-	100%
7.	I now rate my concern as (33)	-	-	100%
8.	Should future workshops be planned to continue the work initiated at this meeting? (33)	-	-	100%

*Number of responses for each question listed in parentheses; percentages for each question are based on the number of respondents to that question.

NATIONAL CENTER FOR EARTHQUAKE ENGINEERING RESEARCH
LIST OF PUBLISHED TECHNICAL REPORTS

The National Center for Earthquake Engineering Research (NCEER) publishes technical reports on a variety of subjects related to earthquake engineering written by authors funded through NCEER. These reports are available from both NCEER's Publications Department and the National Technical Information Service (NTIS). Requests for reports should be directed to the Publications Department, National Center for Earthquake Engineering Research, State University of New York at Buffalo, Red Jacket Quadrangle, Buffalo, New York 14261. Reports can also be requested through NTIS, 5285 Port Royal Road, Springfield, Virginia 22161. NTIS accession numbers are shown in parenthesis, if available.

NCEER-87-0001 "First-Year Program in Research, Education and Technology Transfer," 3/5/87, (PB88-134275/AS)

NCEER-87-0002 "Experimental Evaluation of Instantaneous Optimal Algorithms for Structural Control," by R C Lin, T T Soong and A M Reinhorn, 4/20/87, (PB88-134341/AS).

NCEER-87-0003 Experimentation Using the Earthquake Simulation Facilities at University at Buffalo," by A M. Reinhorn and R.L. Ketter, to be published.

NCEER-87-0004 "The System Characteristics and Performance of a Shaking Table, by J S. Hwang, K.C Chang and G.C Lee, 6/1/87, (PB88-134259/AS). This report is available only through NTIS (see address given above).

NCEER-87-0005 "A Finite Element Formulation for Nonlinear Viscoplastic Material Using a Q Model," by O Cyebi and G. Dasgupta, 11/2/87, (PB88-213764/AS).

NCEER-87-0006 "Symbolic Manipulation Program (SMP) - Algebraic Codes for Two and Three Dimensional Finite Element Formulations," by X. Lee and G. Dasgupta, 11/9/87, (PB88-219522/AS).

NCEER-87-0007 "Instantaneous Optimal Control Laws for Tall Buildings Under Seismic Excitations," by J.N. Yang, A. Akbarpour and P. Ghaemmaghami, 6/10/87, (PB88-134333/AS)

NCEER-87-0008 "IDARC: Inelastic Damage Analysis of Reinforced Concrete Frame - Shear-Wall Structures," by Y.J. Park, A.M Reinhorn and S.K. Kunnath, 7/20/87, (PB88-134325/AS).

NCEER-87-0009 "Liquefaction Potential for New York State: A Preliminary Report on Sites in Manhattan and Buffalo," by M. Budhu, V. Vijayakumar, R.F. Giese and L. Baumgras, 8/31/87, (PB88-163704/AS). This report is available only through NTIS (see address given above).

NCEER-87-0010 "Vertical and Torsional Vibration of Foundations in Inhomogeneous Media," by A.S. Veletsos and K W. Dotson 6/1/87. (PB88-134291/AS).

NCEER-87-0011 "Seismic Probabilistic Risk Assessment and Seismic Margins Studies for Nuclear Power Plants," by Howard H.M Hwang, 6/15/87, (PB88-134267/AS). This report is available only through NTIS (see address given above).

NCEER-87-0012 "Parametric Studies of Frequency Response of Secondary Systems Under Ground-Acceleration Excitations," by Y. Yong and Y.K. Lin, 6/10/87, (PB88-134309/AS).

NCEER-87-0013 "Frequency Response of Secondary Systems Under Seismic Excitation," by J.A HoLung, J. Cai and Y K. Lin, 7/31/87, (PB88-134317/AS)

NCEER-87-0014 Modelling Earthquake Ground Motions in Seismically Active Regions Using Parametric Time Series Methods," by G.W Ellis and A.S. Cakmak, 8/25/87, (PB88-134283/AS)

NCEER-87-0015 "Detection and Assessment of Seismic Structural Damage," by E. DiPasquale and A.S. Cakmak, 8/25/87, (PB88-163712/AS).

NCEER-87-0016 "Pipeline Experiment at Parkfield, California," by J. Isenberg and E Richardson, 9/15/87, (PB88-163720/AS)

NCEER-87-0017 "Digital Simulation of Seismic Ground Motion," by M. Shinozuka, G. Deodatis and T. Harada, 8/31/87, (PB88-155197/AS) This report is available only through NTIS (see address given above)

NCEER-87-0018 "Practical Considerations for Structural Control: System Uncertainty, System Time Delay and Truncation of Small Control Forces," J.N. Yang and A. Akbarpour, 8/10/87, (PB88-163738/AS).

NCEER-87-0019 "Modal Analysis of Nonclassically Damped Structural Systems Using Canonical Transformation," by J N Yang, S. Sarkani and F.X. Long, 9/27/87, (PB88-187851/AS).

NCEER-87-0020 "A Nonstationary Solution in Random Vibration Theory," by J.R. Red-Horse and P.D Spanos, 11/3/87, (PB88-163746/AS).

NCEER-87-0021 "Horizontal Impedances for Radially Inhomogeneous Viscoelastic Soil Layers," by A.S. Veletsos and K.W. Dotson, 10/15/87, (PB88-150859/AS).

NCEER-87-0022 "Seismic Damage Assessment of Reinforced Concrete Members," by Y.S. Chung, C. Meyer and M. Shinozuka, 10/9/87, (PB88-150867/AS). This report is available only through NTIS (see address given above)

NCEER-87-0023 "Active Structural Control in Civil Engineering," by T.T. Soong, 11/11/87, (PB88-187778/AS).

NCEER-87-0024 Vertical and Torsional Impedances for Radially Inhomogeneous Viscoelastic Soil Layers," by K.W. Dotson and A.S. Veletsos, 12/87, (PB88-187786/AS).

NCEER-87-0025 "Proceedings from the Symposium on Seismic Hazards, Ground Motions, Soil-Liquefaction and Engineering Practice in Eastern North America," October 20-22, 1987, edited by K.H. Jacob, 12/87, (PB88-188115/AS).

NCEER-87-0026 "Report on the Whittier-Narrows, California, Earthquake of October 1, 1987," by J. Pantelic and A. Reinhorn, 11/87, (PB88-187752/AS). This report is available only through NTIS (see address given above).

NCEER-87-0027 "Design of a Modular Program for Transient Nonlinear Analysis of Large 3-D Building Structures," by S Srivastav and J.F. Abel, 12/30/87, (PB88-187950/AS)

NCEER-87-0028 "Second-Year Program in Research, Education and Technology Transfer," 3/8/88, (PB88-219480/AS).

NCEER-88-0001 "Workshop on Seismic Computer Analysis and Design of Buildings With Interactive Graphics," by W. McGuire, J.F. Abel and C.H. Conley, 1/18/88, (PB88-187760/AS).

NCEER-88-0002 "Optimal Control of Nonlinear Flexible Structures," by J.N. Yang, F.X. Long and D. Wong, 1/22/88, (PB88-213772/AS).

NCEER-88-0003 "Substructuring Techniques in the Time Domain for Primary-Secondary Structural Systems," by G.D. Manolis and G. Juhn, 2/10/88, (PB88-213780/AS)

NCEER-88-0004 "Iterative Seismic Analysis of Primary-Secondary Systems," by A. Singhal, L D. Lutes and P D Spanos, 2/23/88, (PB88-213798/AS).

NCEER-88-0005 "Stochastic Finite Element Expansion for Random Media," by P D. Spanos and R Ghanem, 3/14/88, (PB88-213806/AS)

NCEER-88-0006 "Combining Structural Optimization and Structural Control," by F.Y. Cheng and C.P. Pantelides, 1/10/88, (PB88-213814/AS).

NCEER-88-0007 "Seismic Performance Assessment of Code-Designed Structures," by H H-M Hwang, J-W Jaw and H-J Shau, 3/20/88, (PB88-219423/AS).

NCEER-88-0008 "Reliability Analysis of Code-Designed Structures Under Natural Hazards," by H.H-M. Hwang, H. Ushiba and M. Shinozuka, 2/29/88, (PB88-229471/AS).

NCEER-88-0009 "Seismic Fragility Analysis of Shear Wall Structures," by J-W Jaw and H H-M. Hwang, 4/30/88, (PB89-102867/AS).

NCEER-88-0010 "Base Isolation of a Multi-Story Building Under a Harmonic Ground Motion - A Comparison of Performances of Various Systems," by F-G Fan, G. Ahmadi and I.G. Tadjbakhsh, 5/18/88, (PB89-122238/AS).

NCEER-88-0011 "Seismic Floor Response Spectra for a Combined System by Green's Functions," by F.M. Lavelle, L.A. Bergman and P.D. Spanos, 5/1/88, (PB89-102875/AS).

NCEER-88-0012 "A New Solution Technique for Randomly Excited Hysteretic Structures," by G.Q. Cai and Y.K Lin, 5/16/88, (PB89-102883/AS).

NCEER-88-0013 "A Study of Radiation Damping and Soil-Structure Interaction Effects in the Centrifuge," by K. Weissman, supervised by J.H. Prevost, 5/24/88, (PB89-144703/AS)

NCEER-88-0014 "Parameter Identification and Implementation of a Kinematic Plasticity Model for Frictional Soils," by J.H Prevost and D.V. Griffiths, to be published.

NCEER-88-0015 "Two- and Three- Dimensional Dynamic Finite Element Analyses of the Long Valley Dam," by D V. Griffiths and J.H Prevost, 6/17/88, (PB89-144711/AS).

NCEER-88-0016 "Damage Assessment of Reinforced Concrete Structures in Eastern United States," by A.M. Reinhorn, M.J. Seidel, S.K. Kunnath and Y J Park, 6/15/88, (PB89-122220/AS)

NCEER-88-0017 "Dynamic Compliance of Vertically Loaded Strip Foundations in Multilayered Viscoelastic Soils," by S. Ahmad and A.S.M. Israil, 6/17/88, (PB89-102891/AS)

NCEER-88-0018 "An Experimental Study of Seismic Structural Response With Added Viscoelastic Dampers," by R.C. Lin, Z. Liang, T.T. Soong and R H. Zhang, 6/30/88, (PB89-122212/AS).

NCEER-88-0019 "Experimental Investigation of Primary - Secondary System Interaction," by G D Manolis, G. Juhn and A.M. Reinhorn, 5/27/88, (PB89-122204/AS).

NCEER-88-0020 "A Response Spectrum Approach For Analysis of Nonclassically Damped Structures," by J N. Yang, S. Sarkani and F.X Long, 4/22/88, (PB89-102909/AS).

NCEER-88-0021 "Seismic Interaction of Structures and Soils. Stochastic Approach," by A.S. Veletsos and A.M Prasad, 7/21/88, (PB89-122196/AS).

NCEER-88-0022 "Identification of the Serviceability Limit State and Detection of Seismic Structural Damage," by E. DiPasquale and A S Cakmak, 6/15/88, (PB89-122188/AS).

NCEER-88-0023 "Multi-Hazard Risk Analysis: Case of a Simple Offshore Structure," by B K Bhartia and E.H Vanmarcke, 7/21/88, (PB89-145213/AS).

NCEER-88-0024 "Automated Seismic Design of Reinforced Concrete Buildings," by Y.S. Chung, C. Meyer and M Shinozuka, 7/5/88, (PB89-122170/AS).

NCEER-88-0025 "Experimental Study of Active Control of MDOF Structures Under Seismic Excitations," by L L. Chung, R.C. Lin, T.T. Soong and A.M. Reinhorn, 7/10/88, (PB89-122600/AS)

NCEER-88-0026 "Earthquake Simulation Tests of a Low-Rise Metal Structure," by J.S. Hwang, K C. Chang, G.C. Lee and R L Ketter, 8/1/88, (PB89-102917/AS).

NCEER-88-0027 "Systems Study of Urban Response and Reconstruction Due to Catastrophic Earthquakes," by F. Kozin and H.K Zhou, 9/22/88, (PB90-162348/AS).

NCEER-88-0028 "Seismic Fragility Analysis of Plane Frame Structures," by H H-M. Hwang and Y.K. Low, 7/31/88, (PB89-131445/AS).

NCEER-88-0029 "Response Analysis of Stochastic Structures," by A Kardara, C. Bucher and M. Shinozuka, 9/22/88, (PB89-174429/AS).

NCEER-88-0030 "Nonnormal Accelerations Due to Yielding in a Primary Structure," by D.C K. Chen and L.D. Lutes, 9/19/88, (PB89-131437/AS).

NCEER-88-0031 "Design Approaches for Soil-Structure Interaction," by A S. Veletsos, A M Prasad and Y. Tang, 12/30/88, (PB89-174437/AS).

NCEER-88-0032 "A Re-evaluation of Design Spectra for Seismic Damage Control," by C.J. Turkstra and A G Tallin, 11/7/88, (PB89-145221/AS).

NCEER-88-0033 "The Behavior and Design of Noncontact Lap Splices Subjected to Repeated Inelastic Tensile Loading," by V.E. Sagan, P Gergely and R.N White, 12/8/88, (PB89-163737/AS).

NCEER-88-0034 "Seismic Response of Pile Foundations," by S M. Mamoon, P K. Banerjee and S. Ahmad, 11/1/88, (PB89-145239/AS).

NCEER-88-0035 "Modeling of R/C Building Structures With Flexible Floor Diaphragms (IDARC2)," by A.M. Reinhorn, S.K. Kunnath and N Panahshahi, 9/7/88, (PB89-207153/AS).

NCEER-88-0036 "Solution of the Dam-Reservoir Interaction Problem Using a Combination of FEM, BEM with Particular Integrals, Modal Analysis, and Substructuring," by C-S Tsai, G.C. Lee and R L. Ketter, 12/31/88, (PB89-207146/AS).

NCEER-88-0037 "Optimal Placement of Actuators for Structural Control," by F.Y. Cheng and C.P. Pantelides, 8/15/88, (PB89-162846/AS).

NCEER-88-0038 "Teflon Bearings in Aseismic Base Isolation. Experimental Studies and Mathematical Modeling," by A. Mokha, M C. Constantinou and A.M Reinhorn, 12/5/88, (PB89-218457/AS).

NCEER-88-0039 "Seismic Behavior of Flat Slab High-Rise Buildings in the New York City Area," by P. Weidlinger and M Ettouney, 10/15/88, (PB90-145681/AS)

NCEER-88-0040 "Evaluation of the Earthquake Resistance of Existing Buildings in New York City," by P. Weidlinger and M Ettouney, 10/15/88, to be published.

NCEER-88-0041 "Small-Scale Modeling Techniques for Reinforced Concrete Structures Subjected to Seismic Loads," by W. Kim, A. El-Attar and R.N White, 11/22/88, (PB89-189625/AS).

NCEER-88-0042 "Modeling Strong Ground Motion from Multiple Event Earthquakes," by G.W. Ellis and A.S. Cakmak, 10/15/88, (PB89-174445/AS)

NCEER-88-0043 "Nonstationary Models of Seismic Ground Acceleration," by M. Grigoriu, S.E. Ruiz and E. Rosenblueth, 7/15/88, (PB89-189617/AS).

NCEER-88-0044 "SARCF User's Guide: Seismic Analysis of Reinforced Concrete Frames," by Y S. Chung, C Meyer and M Shinozuka, 11/9/88, (PB89-174452/AS)

NCEER-88-0045 "First Expert Panel Meeting on Disaster Research and Planning," edited by J. Pantelic and J. Stoyle, 9/15/88, (PB89-174460/AS).

NCEER-88-0046 "Preliminary Studies of the Effect of Degrading Infill Walls on the Nonlinear Seismic Response of Steel Frames," by C.Z Chrysostomou, P. Gergely and J F Abel, 12/19/88, (PB89-208383/AS)

NCEER-88-0047 "Reinforced Concrete Frame Component Testing Facility - Design, Construction, Instrumentation and Operation," by S.P. Pessiki, C. Conley, T. Bond, P. Gergely and R.N. White, 12/16/88, (PB89-174478/AS).

NCEER-89-0001 "Effects of Protective Cushion and Soil Compliancy on the Response of Equipment Within a Seismically Excited Building," by J.A. HoLung, 2/16/89, (PB89-207179/AS).

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