BACKGROUND

Although the magnitude of the earthquake that occurred on March 10, 1933 in Long Beach, California, was moderate (6.3 Richter magnitude), the damage to buildings was heavy. The occupancy to suffer the worst was the elementary and seconday schools. Within seconds, 75 percent of the school buildings were heavily damaged and many collapsed. It was apparent that had the earthquake occurred a few hours earlier, during regular school hours, the death and injury to students and teachers would have been a horrifying tragedy.

Thus started the State of California's massive effort to identify their schools as critical buildings and require their increased seismic design and protection. Only in recent years have the numerous other states started acknowledging the earthquake risk to their schools. The Federal Emergency Management Agency (FEMA) has over the recent two years developed a comprensive program to provide seismic protection to the nation's school buildings and their occupants-the students and teachers.

This program includes various elements:

- A manual entitled "Seismic Considerations for Elementary and Secondary Schools" which promotes earthquake design for schools buildings to school administrators, boards, architects, and engineers.

- An accompanying videotape entitled "Earthquake Design for Schools-Building Schools Resistant to Earthqakes" which provides visual support for the promotion of earthquake design for school buildings.

- A manual entitled "Guidebook for Developing a School Earthquake Safety Program" which promotes the development of an earthquake school safety program (including hazard indentifcation, earthquake drills, and response planning) for principals, teachers, students and parents.

- An accompanying videotape to be released during the summer of 1989 which will promote the development of the earthquake safety program for schools.

- A teacher's package for students from kindegarden to the sixth grade to educate them on the understanding of earthquakes and their self protection.

- A children's package for earthquake awareness including a poster, a badge, audio tape, and an earthquake game identified with the Sesame Street character "Big Bird".

The earthquake risk to Latin America is well documented and recorded. What is not so well understood is the major risk of Latin American schools and their children. With similar construction as the schools located in Long Beach, California back in 1933 (that is, minimally reinforced masonry and concrete) their specific hazard has yet to be reduced. Hidden within the damage statistics of the past Latin American earthquake their immense potential for damage and destruction is just now being realized. A few recent examples can show the senarios that can be expected in the future.

During the Popayan, Columbia Earthquake of March 31, 1983, a relatively moderate earthquake registering only 5.5 on the Richter scale, the area around Pubenza was one of the most affected by the earthquake, as evidenced by the collapse of several school buildings.

During the Chile Earthquake of 1985, various public schools in Melipilla suffered severe structural and architectural damage.

During the most recent San Salvador Earthquake of October 10, 1986, moderate earthquake of 5.4, elementary and secondary schools were heavily damaged. Over 50 of the 220 schools in San Salvador were so severly damaged they required major reconstruction or demolition.

Much like the Long Beach earthquake time was on the side of the children of San Salvador, the earthquake occurred at noon when the majority of children had left school for lunch in their homes. However one tradegy can show the possibilities had the earthquake occurred a few hours earlier or later. Thirty children perished in the collapse of a private girls schools, Colegio Santa Catalina. The victims were waiting to be picked up by their parents when the earthquake caused the collapse of an exterior wall.

However, the most illuminating statistic for school damage results from the recent Mexico City Earthquake of 1985. This earthquake, which is the most studied and researched of all earthquakes provides a glimpse into the hazard of Latin America's schools.

During the Mexico City Earthquake 1435 of the city's 3000 schools were damaged, and 22 percent either collapsed or were so severly damaged they had to be replaced. Again time was on their side, the earthquake occurred at 7:20 in the morning before the students had arrived. In all, 150,000 students were temporaily disrupted from attending classes

However, the most awesome statistic was that aside from houses, schools received more damage than any other building type. Over 12 percent of the damaged buildings during this earthqake were schools, surpassing office buildings, hotels, stores, and other building types.

The translation and transfer of the FEMA Earthquakes and Schools program into the language and format suitable for Latin America would go far in mitigating the immense risk that presently resides with this vulnerable population. Although school construction is similar to that of other buildings, their size, their occupancy and their purpose pose special earthquake problems. These are summarized below:

- The occupancy of elementary and secondary schools is a society's most precious resource, its children.

- The occupancy density of schools is one of the highest of any building type, in other words, large numbers of children occupany one building posing the possiblity of large singular tradegies.

- After an earthquake, the children are verly likely to be frightened, which can make emergency egress difficult at best and virtually impossible in a badly damaged structure.

- Typical construction practices for school buildings (unreinforced or minimally reinforced masonry because of limited heights) is particularly hazardous during earthquakes.

- Schools can be very complex facilities combining a wide range of structural and functional areas including small classrooms, laboratories, and large assembly areas, thus increasing their seismic hazard potential.

- After an earthquake, community disruption will result in an influx of people in need of shelter and assistance. If the school building is not functional, it becomes another disaster liability rather than an asset.

- Closure of schools for any length of time represents a very serious community problem and major school damage can have a disastrous and long-term economic and social disruption on a community.

- Even without building collapse and no injuries, earthquake damage to school equipment and contents can approach 50 percent of the worth of the facility.

- The contents of a school building including heavy equipment, lockers, laboratory equipment, can pose special hazards to children and must be identified and protected against.

- Evacuation from a school, during an earthquake is impossible, therefore it is important to develop and practice appropriate response actions to protect the children.

- Earthquake safety is an important part of everyday life, therefore children, in particular, should be made aware of self protection and appropriate responses not only in schools, but also at home.

This joint effort between the U.S. Federal Emergency Management Agency (FEMA) and the Office of Foreign Disaster Assistance (OFDA) would provide a program which would promote increased earthquake safety of school buildings and their occupants in Latin America. The particular roles of each of the federal agencies would be as listed below:

- FEMA would provide for the translation, formating, and development of their Earthquakes and Schools program to make it appropriate and suitable for use in Latin America.

- OFDA would provide for the actual implementation of the program in Latin America including the travel and time for conducting a range of workshops for various audience groups including school administrators, teachers, schools architects, and engineers.

TASK ACTIVITIES

The program would accomplish the following task activities:

Task 1: Development of Adjunct Material

Certain material in the existing FEMA material is appropriate only for the United States. New material would be developed appropriate for Latin America and incorporated into the existing program material. This new material would not be an extensive addition and would include:

- Information on the seismicity and risk to the various countries of Latin America.
- Information on the actual earthquake damage to schools in recent Latin American earthquakes to be used as case studies and illustrative examples.

Task 2: Translation and Formatting of Material

The entire program package would be translated into Spanish and formatted into modules more appropriate for Latin American teaching and educational techniques. In addition, the videotapes would be professionally duped in Spanish.

Task 3: Development of Workshops and Seminars

A series of workshop and seminar programs would be developed utilizing the program package. This development would include the production and testing of two workshops. One would be for the promotion of safer school buildings through appropriate earthquake design and would be developed for school facility administrators, government officials, and school architects and engineers. The second workshop would be for the promotion of the development and implementation of a school earthquake safety program and would be developed for school administrators, government officials, and teachers.

The workshop production would include the identification of the workshop outline, instructor's manual, and accompaning slides and visual aids.

Task 4: Identification of Contacts, Organizations, and Instructors

The project team would identify a range of contacts, qualified instructors, and appropriate organizations to utilize during the workshop implementation activities. The organizations would include appropriate government agencies, school administrator associations, teacher associations and unions, parent-teacher organizations, and professional societies for architects and engineers. The instructors would be used to review and comment on the material produced at this point, while the organizations would be asked to sponsor, endorse and publicize the workshops.

Task 5: Workshop Testing

After development each workshop would be conducted before a test audience in a selected Latin America country. Based upon review comments, the two workshops would be revised and any new appropriate information added.

Task 6: Implementation of Workshops

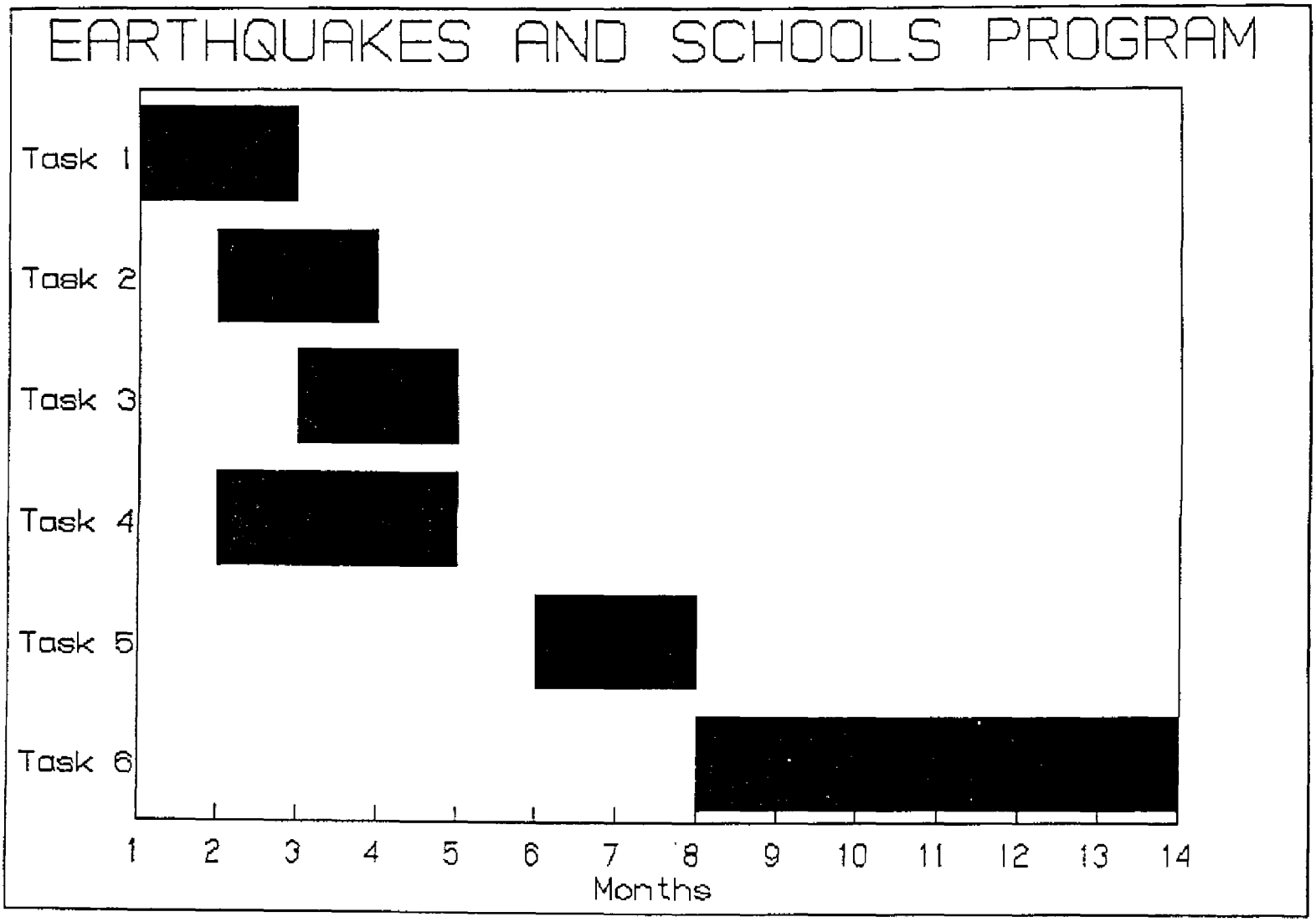
Upon final revision of the program package, the workshops would be conducted in a range of selected Latin American countries using the instructors and in concert with the organizations identified in Task 4. After the initial implementation of the workshops, it is expected the individual countries would produce the material and conduct the workshops on a more regional basis within their countries.

MANAGEMENT APPROACH

The program would be a jointly funded effort between FEMA and OFDA utilizing an appropriate organization such as Partners of the Americas as the contractor.

The contractor would provide the following services:

- Overall management of the program to ensure the project is completed in a timely and cost effective manner.
- Development of any required adjunct material for the program.
- Translation and duping of the existing program material.
- Contact with appropriate instructors and sponsoring organizations in the selected countries.
- Development of the workshops.
- Testing of the workshops.
- Initial implementation of the workshops.


EARTHQUAKES AND SCHOOLS PROGRAM
Task 1
Task 2
Task 3
Task 4
Task 5
Task 6
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Months

BUDGET

Program Manager (Milagros Nanita-Kennett)	
300 days x $175	$52,500
Support Staff	
Translation 50 days x $100	5,000
Videotape duping 4 days x $250	1,000
Travel	
7 countries (2 workshops) x $1500	10,500
Material Production	
Graphics, slide production	1,000
Materials Printing 14 workshops x $500	7,000
Instructors	
7 countries x 2 workshops x 3 instructors x $500	21,000
Indirect Costs	
Administration and Overhead (Partners)	?
TOTAL	$98,000

FEMA (Translation, development)

Program Manager (.44 x 52,500)	= $23,100
Support Staff	= 6,000
Material Production	= 8,000
Total	= $37,100

OFDA (Implementation)

Program Manager (.56 x 52,500)	= $29,400
Travel	= 10,500
Instructors	= 21,000
Total	= $60,900