Report on

New IAEE Initiatives for Improvement of Earthquake Engineering Practice Worldwide with particular reference to Developing Countries

/

By an ad-hoc committee consisting of

Sudhir K Jain (India): Chairman
Luis Garcia (Colombia)
Polat Gülkan (Turkey)
David Hopkins (New Zealand)

Appointed by

Sheldon Cherry
Past President
International Association for Earthquake Engineering

September 2002
Revised November 2004

Executive Summary

This report on New IAEE Initiatives for Improving Earthquake Engineering Practice Worldwide with particular reference to Developing Countries has been compiled by an Ad-Hoc Committee appointed in September 2001 by Professor Sheldon Cherry as President of IAEE. The four committee members, *Sudhir K Jain (India)(Chairman), Luis Garcia (Colombia), Polat Gülkan (Turkey), David Hopkins (New Zealand)* exchanged ideas via email, each consulting with others in their country to pool ideas.

Presently IAEE has modest budget and level of activities. Hence it was seen as appropriate to consider modest but realistic initiatives that are likely to contribute to long-term capacity building actions and improvement in earthquake engineering practice. The proposed initiatives were formulated to be particularly applicable to developing countries. In this final revision there is a recognition that many of the initiatives could be applied to any country that seeks to improve its culture and practice of earthquake engineering.

Three broad areas of possible initiatives were identified:

- Raising global awareness towards earthquake mitigation issues
- Development of human resources
- Dissemination of information

Recommended actions

Recommended actions for IAEE under each of these headings are as follows. These are intended to be in support of and with appropriate liaison with World Seismic Safety Initiative (WSSI):

1 Raising Global Awareness towards earthquake mitigation issues

a) Conduct workshops such as WSSI High Level Meetings, using "IAEE Visiting Experts".
b) Using local and overseas experts, assist countries to review their earthquake risk status, mitigation efforts, earthquake engineering practices, and future directions. Promote the review to help strengthen earthquake risk mitigation practices.
c) Convince governments and local authorities to assume their responsibility towards code compliance by professionals in charge of structural design and construction.
d) Develop "IAEE Road Shows" to provide selected test demonstrations to design and construction personnel emphasising the fundamentals in design, detailing and construction.
e) Explore ways of rewarding building owners, local authorities and builders/developers with cash and/or kudos for earning a certificate of compliance authenticated by IAEE.
f) Facilitate the identification of local examples that demonstrate achievement of good seismic standards.

2 Development of Human Resources

a) Develop special awards to recognize persons or organisations carrying out outstanding work.
b) Recognize and encourage leadership development in younger earthquake engineering professionals. This may be done by actively promoting younger professionals, for international committees, and for chairing sessions in international conferences, etc.
c) Actively provide and promote opportunities for future leaders to participate in national and international conferences. Lobby conference organisers to encourage participation from developing countries.
d) Facilitate the participation of international experts with practical experience in national conferences. Promote the idea of an "IAEE Visiting Expert".
e) Help publicize training opportunities for professionals. Lobby governments to create more training opportunities for their earthquake engineering professionals.

f) Actively facilitate linked collaborations between two countries, cities or universities in different countries.
g) Help develop expertise in the emerging areas of earthquake engineering by organizing training workshops. In particular use IAEE influence to raise money for such activities.

3 Dissemination of Information

a) Develop a section of the IAEE website (or any other website by arrangement) dedicated to earthquake engineering literature and publications of interest to practitioners particularly in developing countries. Use the website as a platform for exchange of information and ideas across the world through electronic bulletin boards, discussion groups, and e-conferences.
b) Launch a new journal for IAEE, covering a wide range of issues, especially international issues of earthquake risk mitigation and make the journal widely available.
c) Work with the publishers of the journal, Earthquake Engineering and Structural Dynamics to make it more widely available and affordable.
d) Create a Standing Committee to encourage and facilitate the reprinting of low cost versions of good publications of books with wide appeal.
e) Establish a few regional information resource centers with the objective of collecting and disseminating earthquake engineering literature
f) Lobby the numerous professional societies in countries with resources to provide literature to those with fewer resources at no or nominal cost.
g) Develop and support a "Donate Your Library" program wherein retiring members of earthquake engineering community could donate their collections to interested organisations or individuals.
h) Update the IAEE publication on Guidelines for Earthquake Resistant Non-engineered Constructions, especially the section on reinforced concrete buildings. Promote its ready availability in countries where its application will have most effect.
i) Through the establishment of a special committee, develop an internationally targeted monograph for school children on earthquake issues and concepts of earthquake safety. Facilitate its ready availability.

Implementation Strategies

Recognising the limitations of budget and resources, the following implementation strategies are suggested:

a) Invite individuals or institutions around the world to come up with specific activities for which they seek IAEE endorsement.
b) Make each Director of IAEE responsible for one small initiative in a country other than their own.

The following possibilities exist for funding:

a) Activities involving no or little financial inputs can be started right away. For instance, many of the activities require only the endorsement of IAEE.
b) IAEE could provide, say, a $1,000 token grant, and a $5,000 initiation grant for the approved activities. Quite often such grants from IAEE will help strengthen the hands of promoters in fund-raising from local sources. It will also provide encouragement to and strengthen the hands of the champions of earthquake safety.
c) A fraction of the gross receipts (or, of the net savings) of the WCEEs could go to the IAEE for supporting activities that will bring about improved earthquake engineering practice worldwide.
d) IAEE could lobby the international companies such as cement and steel manufacturers, or insurers for funds.

e) IAEE could and should become a strong advocate and facilitator of funding by using the collective ‘clout’ of member countries to lobby funding agencies such as World Bank and Asian Development Bank to support projects that IAEE endorses.

1 Preamble:

1.1 Through his e-mail in September 2001, the then President of the International Association for Earthquake Engineering (IAEE) Professor Sheldon Cherry appointed an Ad-Hoc Committee. The Committee was to consider and prepare a report on New Initiatives for Assisting Developing Countries for consideration and possible adoption by the Association's Executive Committee. The Committee consisted of Sudhir K Jain (India: Chairman), Luis Garcia (Columbia), Polat Gülkan (Turkey), and David Hopkins (New Zealand). The four committee members, exchanged ideas via email, each consulting with others in their country to provide a wider range of input.

1.2 Although the ideas were formulated with "developing countries" in mind, it was recognized that the proposed initiatives had wider applicability and that the recommendations would better serve the overall improvement in earthquake engineering practice worldwide by not directing them exclusively at developing countries. The title "New IAEE Initiatives for Improving Earthquake Engineering Practice Worldwide with particular reference to Developing Countries" was thought to describe better the purpose and the title of the report was changed accordingly.

1.3 The underlying challenge was to come up with ways for IAEE to employ its limited resources but overwhelming goodwill from its members to help improve earthquake engineering culture and practice on a worldwide basis. The degree of awareness of seismic related issues varies in the different regions and countries of the world and even within the same country. The IAEE is in a unique position to carry out this task by being composed by the most representative earthquake engineering societies of practically all the countries of the world. These societies have among their members the foremost worldwide experts in earthquake engineering. This report proposes a plan for improving the earthquake engineering practice and culture on a global basis. The main objective is to reduce the harmful effect of seismic events on people and the built environment in a way that reaches practically all the inhabitants of the world.

1.4 Out of the numerous possible and desirable activities for improvement of earthquake engineering practice, this report focuses on those where IAEE with its limited resources can be most effective. It outlines the basic premises on which the report is based, briefly reviews some of the issues and lists a range of activities. Also, a plan for implementation of the report is suggested.

1.5 The recommendations are intended to fully respect each country's existing earthquake engineering culture and practice and are centered on improving the existing situation. Specific actions resulting from the recommended initiatives will vary according to circumstances.

1.6 The overall thrust of the recommendations is to make the most of available knowledge and experience that exists in the world and encourage the sharing of it in ways that bring about tangible improvements in earthquake engineering practice when viewed from a global perspective.

2 Premises:

2.1 This report has been developed on the following premises:

2.1.1 IAEE currently operates without a budget. However, it may be possible to raise funds for some high value / low cost activities. Hence, the focus of recommendations in this report is on activities that involve no or small expenditures.

2.1.2 Presently IAEE has modest level of activities. Hence, a very ambitious plan of action at this stage may not succeed. It is therefore more appropriate to consider modest but realistic initiatives that are likely to contribute to long-term capacity building actions.

2.1.3 It is a well-established fact that earthquake risk has been increasing over the last several decades, especially in developing countries. At the same time progress in the effective mitigation of earthquake risk has been slow. Therefore, any initiatives may take a very long time before concrete results emerge and IAEE should plan for sustained efforts.

2.1.4 The challenge faced by many countries is not just the lack of adequate financial resources. There are a number of other issues that contribute to their difficulties, such as social attitudes, professional environment, and inadequate leadership. Hence, even the most modest initiatives may or may not work in a country depending on several factors. Therefore, IAEE should initiate a variety of activities so that individual countries are able to adopt and implement those that suit the local circumstances.

2.1.5 The initiatives to be suggested in this report should be fairly general so as to enable a range of activities. Depending on acceptance of these proposals, the specific details will vary. The recommendations are intended to be sufficiently generic to allow flexibility in developing detailed plans for implementation.

2.1.6 The problem of earthquake risk reduction is fairly complex and different solutions may be appropriate for different countries. Hence, the solutions to the earthquake mitigation problem should emerge from within the country and cannot be suggested from outside. Outsiders may however play an important role by drawing attention to important issues and to the success stories elsewhere.

2.1.7 The actual work of earthquake risk reduction can only be carried out by local professionals and therefore IAEE can at best be a facilitator and a motivator.

2.1.8 Any initiatives would be seen as complementary to and coordinated with those of the World Seismic Safety Initiative (WSSI).

2.2 Based on these premises, it emerges that the IAEE can contribute in three broad areas:

- raising global awareness towards earthquake mitigation issues
- human resource development
- information dissemination.

3 Sensitization Towards Earthquake Mitigation Issues:

3.1 The issue of earthquake risk reduction is complex in all countries and there are many additional complexities in the developing countries.

3.2 At policy level, there may be serious handicaps because the political or government leadership in the developing countries is engaged in numerous pressing and urgent problems such as providing basic education, adequate medical facilities, shelter, employment, etc. It is thus much more difficult to draw attention of the policy makers to the issue of earthquake safety. This is particularly so since (a) the earthquakes are infrequent and, (b) often the earthquake safety is advocated by the very people who stand to gain professional advantages from vigorous earthquake risk mitigation activity.

3.3 At a technical level too, there are additional complications. Developing countries tend to have a much larger range of construction typologies. Most people reside in dwellings without any engineering inputs using the most traditional materials. Such dwellings cause the majority of deaths and injuries in strong earthquake shaking. On other hand, in addition to modern multi-storey buildings, many countries are also currently engaged in major infrastructure projects (e.g., dams, energy-producing facilities, urban transport infrastructural projects) that require the most sophisticated earthquake engineering inputs.

3.4 Large projects in these countries are generally done with better levels of engineering than ordinary buildings. Often, respected international consulting and construction firms are involved for large projects. It is therefore implicitly assumed that good international practices will be followed in such projects. However, this may not always happen for a variety of reasons; e.g., (a) the client may not demand adequate earthquake safety, (b) the project specifications developed by the client may be inadequate, (c) the local codes may be primitive, or (d) the contractor may have won the design-build contract based on competitive lump-sum bid with primitive seismic specifications. Hence, for such projects, it is essential to have adequate indigenous expertise in Earthquake Engineering.

3.5 Since most earthquake-caused deaths in developing countries are due to the collapse of non-engineered dwellings, there tends to be more focus on related issues and the problem of engineered construction gets ignored in such countries. There is a need for experienced engineers and good constructors. It is often overlooked that a critical mass of competent experts in different areas of earthquake engineering is needed in a country to bring about consistent achievement of the required standards of practice.

3.6 Often, countries do not recognize that they have a serious earthquake problem, or that they do not have the manpower and the institutional framework to handle such a problem. Moreover, even the outside world may not realize that a country does not have adequate human resources needed to mitigate earthquake problem in that country. A good example in India is the January 26, 2001 earthquake in Gujarat wherein numerous multi-storey buildings collapsed. Prior to this earthquake, it was felt both inside and outside the country that India has “well-developed” earthquake engineering since it developed the subject more than forty years back, and has some very visible earthquake engineers. This earthquake clearly showed that the manpower available in India is highly inadequate for its needs. In fact, before the 2001 earthquake, many structural engineers in India were not willing to recognize the significance of earthquake resistant constructions. Till the problems are identified, the solutions cannot be expected. The IAEE can contribute in this direction in a number of ways:

3.6.1 Develop and conduct workshops within such countries with the help of overseas experts to focus on the earthquake problem. A good example will be the High Level Meetings (HLM’s) that WSSI has been organizing in many countries leading to awareness of the political, economic and scientific leadership issues involved. Use and promote the title “IAEE Visiting Expert” for this purpose.

3.6.2 An objective review by competent persons about the earthquake risk, the mitigation efforts, the state of earthquake engineering, and the future directions will significantly help decision-making. For instance, in the United States, a review on Earthquake Engineering Research was carried out in the late sixties (NAS 1969). This review was of considerable help in pushing the agenda for earthquake safety and hence the review was repeated in early eighties (NAS, 1982). IAEE could help the development of such status reports in selected countries. Depending on the local human resources available, such reports can be developed using a mix of local and overseas experts. The overseas experts could be particularly helpful in setting the benchmarks of reasonable expectations, and for comparing the status with international practices.

3.6.3 Develop *Earthquake Engineering Road Shows* to bring to design and construction practitioners selected test demonstrations, for example, of good detailing of reinforced concrete. This could best be done with physical demonstrations and a mobile facility and can be backed up by videos of larger tests in Universities, etc.

3.6.4 Many countries have good codes, but a poor record of implementation. Significant efforts should be devoted by the academic and professional leading organizations related to earthquake engineering in those countries to convince governments and local authorities to assume their responsibility towards code compliance. This may require actions of different types, including sensitization, official supervision and special courses on seismic design. IAEE should explore ways to reward building owners and developers with cash and/or kudos for earning a certificate of compliance authenticated by IAEE. IAEE would set minimum procedural processes needed to qualify

3.6.5 It will be worthwhile to use high profile but representative projects as good examples of proper practice. IAEE could facilitate the identification of such projects and help set out the criteria needed for it to be a useful, practical example that demonstrates that achievement of good seismic standards is possible in the economic environment of the country or region.

4 Development of Human Resources:

4.1 Development of human resources is perhaps the most important and the most effective means of establishing and applying sound earthquake engineering practices.

4.2 Different countries are at different levels of development in earthquake engineering. At one end of the spectrum are countries with significant seismic risk and yet having practically no earthquake engineering expertise within the country. A top priority for such countries should be to develop a few key champions for earthquake safety. This can best be done by handpicking a few individuals with leadership potential, giving them adequate exposure, and then supporting their efforts to initiate changes in their own country. A good example of this is the four-month visit of Professor Jai Krishna to Caltech in the fifties that led him to develop earthquake engineering in India. Additionally, it will help to sensitize the leadership (political, business, administrative) of the country of the earthquake problem as discussed in Section 3 above.

4.3 At another level, there are many countries where earthquake engineering has already been formally established. Many universities, university professors, and some professional engineers in such countries have expertise in the subject. The manpower related problems in such countries may include:

4.3.1 The country may have sub-critical mass of competent technical persons, that is, there may be too few experts considering the needs. Additionally, there may be very high expectations from too few persons making them perform at below-optimal level.

4.3.2 The country may have “Structural Earthquake Engineering” expertise but may lack in other areas such as Geotechnical Earthquake Engineering, Engineering Seismology, Earthquake Geology, and societal aspects. The lack of expertise in crucial areas may not even be noticed by the decision makers since they see many “earthquake engineers” and may not realize that the subject is sophisticated enough to have sub-specialisations.

4.3.3 In many countries the key persons have tendency to do everything themselves and do not delegate real responsibilities to younger persons. In the process, there is a leadership vacuum after some years.

4.3.4 Despite the lack of adequate manpower in the country, there may be lack of opportunities and encouragement to the younger experts. With time, many may be demoralized or may drift away to allied areas such as space technology, information technology, vehicle dynamics, traditional structural engineering, machine vibrations, offshore engineering, finance etc.

4.4 IAEE can play an important role in developing technical expertise and leadership especially in the developing countries. Some of the possibilities include:

4.4.1 Recognition of the efforts of earthquake engineers within each country. IAEE could develop some awards to recognize persons carrying out outstanding work. This can significantly facilitate the activities of such persons within their own country. The awards could involve monetary benefits or just formal recognition.

4.4.2 Recognize and encourage leadership development in younger persons. This may be done by drawing out younger persons, especially from developing countries for international committees, for chairing sessions in international conferences, etc.

4.4.3 Provide opportunities for participation in the international conferences. To some extent, IAEE is already doing this with respect to the WCEE wherein it is raising money to provide partial support to a few persons from selected countries. However, this could be done on a much larger scale and could be extended to conferences other than the WCEE also. IAEE can help lobby with other conferences by emphasizing the need to encourage participation from these countries.

4.4.4 It will also help to have international experts with practical emphasis (e.g., having experience related to the developing countries) participate in the conferences within the developing countries. Such participation can be clubbed together with other activities that the visiting experts could be engaged in, such as (a) lecturing in a few cities, (b) meetings with the leadership in the country to sensitize them, (c) conducting training workshops, and (d) spending a few days to a few weeks in some university or research institutions. IAEE can help facilitate such exchanges and whenever appropriate, the “IAEE Visiting Expert” title could be used.

4.4.5 Some opportunities for training and exposure already exist. (e.g., the JSPS fellowships in Japan). IAEE can help publicize such opportunities through its web site. Moreover, IAEE can help lobby those in countries with greater resources to create more such opportunities. Such exchanges not only help the development of improved earthquake engineering culture and practice, but also contribute significantly to the research and development efforts in the host country.

4.4.6 It would also be useful to develop collaborations between pairs of countries or universities in different countries. Considerable learning is possible from such exchanges especially where there is a commonality of constraints.

4.4.7 To develop expertise in the emerging areas of earthquake engineering, training workshops should be organized in the selected countries. Usually, the local costs can be covered by the local funding, and the overseas experts are willing to participate in such workshops without charging their time (or charging it at only a nominal rate). Hence, the main impediment to such workshops is the costs associated with the international travel of resource persons. IAEE could use its collective influence and status to raise some money for supporting such activities.

5 Information Resources:

5.1 Availability of information resources is essential to seismic risk reduction. Provision of affordable and convenient access to available knowledge and literature is a key to making significant progress in developing earthquake engineering practice. IAEE being an international body is in an eminent position to help in information dissemination. This has been made much easier with the widespread use of internet and emails. IAEE should seriously consider setting up a web site of its own with a special section designed to meet the needs of developing countries, with links to other relevant websites. The web site should also be used as a platform for exchange of information and ideas across the world through electronic bulletin boards, discussion groups, e-conferences, etc.

5.2 Earthquake Engineering is a fast evolving subject, when compared with other streams of Civil Engineering, wherein the design concepts are still evolving. A significant amount of technical literature is being published through the professional societies and other such organisations. It is not always easy to keep track of availability of such literature, particularly from countries where languages other than English are used. Moreover, even when the availability is known, the costs may be prohibitive. Membership of professional societies is a very effective way to remain in touch with the latest trends, but their memberships can be prohibitively expensive for professionals from less wealthy countries. Moreover, at times it may be difficult to find the ordering information. Some suggestions with regard to information dissemination are listed below:

5.2.1 The IAEE web site (or any other web site with arrangement) can develop a section on availability of selected literature in earthquake engineering, its price and ordering information. The purpose should be to list publications of applied nature (books, codes, commentaries, explanatory handbooks, monographs, etc) rather than very specialized research materials. To sustain such an effort in the long term, IAEE could develop a joint project with an established information provider (such as the MCEER Buffalo).

5.2.2 At present the journal of the IAEE, Earthquake Engineering and Structural Dynamics (EESD) is too expensive for libraries in developing countries ($2,770 per year). However, the same journal is available for subscription by the individual members of the national societies at a very reasonable price (about $220 per year). It is doubtful whether many libraries in the less wealthy countries could afford to subscribe to the Journal. Therefore, the IAEE could work with the publishers of the journal to make it available to the libraries of selected countries at the reduced rate applicable to the individuals, and this should not cause any hardship to the publishers[1]. This will lead to better availability of the journal worldwide, and will also offer a role model for other journals to consider a reduced subscription rate for those countries.

5.2.3 Over the years, EESD has evolved into a prestigious journal but with a bias towards the academicians due to strong analytical component. It will be very worthwhile for IAEE to now launch another journal of its own: this could be an international version of the EERI's *Earthquake Spectra* with its coverage of a wide range of issues, and appeal to a wide international readership.

5.2.4 Most books on Earthquake Engineering are published in the developed countries and are usually too expensive for professionals in developing countries. Low-price editions of some selected books for sale in the developing countries will contribute substantially toward developing the subject in those countries. At present, International Editions of a few books are available, but much more needs to be done in this direction. IAEE should create a standing committee with the objectives to (a) continuously monitor good publications with wide appeal, and (b) encourage and lobby for reprinting low-cost editions of such publications for

[1] It seems that the publishers are already providing complimentary copies of the Journal to a few countries on recommendation of the IAEE. However, efforts are needed so that the entire arrangement is made more institutionalized and covers all interested libraries in the developing countries.

sale in selected countries. The low-cost reprints do not necessarily mean loss of revenue or profits to the original publishers or the authors since in the absence of such reprints, the sales of such books in these countries are negligible. For instance, the Indian reprints of Chopra's book on *Dynamics of Structures* (Pearson Education) have been doing very good sales. It is doubtful if many copies of the original book would have been sold in India considering the cost. A few other books that come to mind immediately for local editions include: Some of the EERI Monographs, Bruce Bolt's book on Earthquakes, and books by David Key, Dowrick, Wakabayashi, Arnold and Reitherman, Park and Paulay, Paulay and Priestley, etc.

5.2.5 IAEE could help establish a few regional information resource centers with the objective of collecting and disseminating earthquake engineering literature, and supporting those that already exist[2]. Such Centres could be established at reasonable costs and can play a very important role in earthquake disaster reduction. IAEE could contribute in a number of ways in this regard:

a) Identify the needs for such Centres. Identify the right institutions to host such Centres.
b) Provide initial help to the new Centres through small grants
c) Help new Centres develop network with other such Centres.
d) Provide international expertise on information management and dissemination through visit of experienced persons to such Centres.

5.2.6 IAEE may be able to effectively lobby with numerous professional societies in some countries to provide literature to other countries at no or nominal costs. Recently, IAEE and WSSI successfully persuaded EERI to donate some of its publications to a number of developing countries. NICEE at IIT Kanpur has received publications at no cost from a number of organisations around the world (including the back volumes of the NZSEE Bulletin, and numerous duplicate publications from MCEER Buffalo). More such bodies will be willing to donate their publications if IAEE can help identify deserving recipients.

5.2.7 IAEE should develop a "Donate Your Library" program wherein retiring members of earthquake engineering community in one country could donate their collections to interested organisations in another country. IAEE could help channel such donations.

5.2.8 The IAEE publication on Guidelines for Earthquake Resistant Non-Engineered Constructions has been one of its success stories. The fact that it was made copyright free has enabled inexpensive local editions. Also, with IAEE permission, the same is now available at the NICEE web site and has been reprinted by NICEE for wide distribution. It was first published in 1980 and subsequently revised in 1986, and it is now time for its revision. This is particularly so, since there are concerns about its chapter on Reinforced Concrete Buildings.

5.2.9 At present IAEE Guidelines can be purchased from the IAEE office in Japan. Even though the price is reasonable, it is still quite expensive for many professionals in other countries. IAEE could develop an arrangement to publish and disseminate these Guidelines through a country where printing and handling costs are much lower.

5.2.10 IAEE should develop a monograph for school children on earthquake issues and concepts of earthquake safety. For instance, some materials targeted at schools are available from FEMA in the United States. However, an international adaptation of such materials that can be useful to schools anywhere will go a long way in sensitizing the communities. This can best

[2] Role models could include *National Information Centre of Earthquake Engineering* (NICEE) set up at Indian Institute of Technology Kanpur, India (www.nicee.org), and The Earthquake Hazard Centre at Victoria University of Wellington, New Zealand.(www.ehc.arch.vuw.ac.nz)

be done through an international committee of the IAEE. Further, in line with the Guidelines on Non-Engineered Constructions, it should be made copyright free.

6 Implementation Strategy:

6.1 An attempt has been made in this report to outline various activities that could be taken up by the IAEE depending on financial and human resources available to it. Some of these will require more resources than the others. The important thing is to initiate some of these activities. With a few activities off the ground, it will be easier for IAEE to raise resources for the others. Some suggestions in this regard are listed herein.

6.2 IAEE has no full-time manpower to fulfill its objectives. Hence, the question arises: who is responsible for the initiatives being discussed? The following two approaches could be adopted:

6.2.1 An approach paper on implementing the initiatives should be finalized and approved. Based on the approved overall plan, let individuals or institutions around the world come up with specific activities in which they seek endorsement, support or intervention of the IAEE. IAEE President and Secretary General, with assistance from the other Directors, would provide the input from IAEE side.

6.2.2 Each of the Directors on the Board of IAEE could be made responsible for taking one small initiative in a country other than their own. A modest target could be that each Director develops at least one such activity every two years.

6.3 IAEE currently has no budget. The question arises how the activities are to be funded. The following possibilities exist:

6.3.1 Activities involving no or little financial inputs can be started right away. For instance, many of the activities require only the endorsement of IAEE, and yet would benefit greatly through such endorsement.

6.3.2 Depending on the funds available, IAEE can provide a $1,000 token grant, and $5,000 initiation grant for the approved activities. Quite often such grants from IAEE will help strengthen the hands of promoters in fund-raising from local sources. IAEE President may use discretion to decide between the token grant and the initiation grant for specific requests. However, it is suggested that generally, (a) for one-time activities, such as workshops or a publication, a token grant may be provided, and (b) for initiatives that will be long-term in nature, for instance in development of an Information Resource Centre, an initiation grant could be provided.

6.3.3 It should be kept in view that IAEE is not, and should not attempt to become, a funding agency. Hence, the token grant and the initiation grant are only meant to provide encouragement and to strengthen the hands of the champions of earthquake safety.

6.3.4 IAEE could and should become a strong advocate and facilitator of funding by using the collective ‘clout’ of member countries to lobby funding agencies such as World Bank and Asian Development Bank to support projects that IAEE endorses.

6.3.5 Some of the above grants could be given with the understanding that the promoters will try and help IAEE raise equivalent money in the future. For instance, if a workshop receiving

token support from IAEE ends with surplus funds, it may pass on the equivalent savings to IAEE.

6.3.6 A fraction of the gross receipts (or, of the net savings) of the WCEEs could go to the IAEE for supporting the activities targeted at the developing countries.

6.3.7 IAEE should lobby the international companies such as cement and steel manufacturers, and insurers for funds.

6.4 The IAEE may set up a group to develop a monograph targeted at the school children. Similarly, another group may look at revision of the Guidelines on Non-Engineered Construction.

References:

- NAS, 1969, "Earthquake Engineering Research," A Report to the National Science Foundation, by the Committee on Earthquake Engineering Research, Division of Engineering – National Research Council, National Academy of Engineering, Published by the National Academy of Sciences, Washington, D.C.

- NAS, 1982, "Earthquake Engineering Research - 1982," A Report by the Committee on Earthquake Engineering Research, Commission on Engineering and Technical Systems, National Research Council. Published by the National Academy of Sciences, Washington, D.C.