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16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)

THE TENTATIVE PROVISIONS FOR THE DEVELOPMENT OF SEISMIC REGULATIONS FOR BUILDINGS were developed by the Applied Technology Council to present, in one comprehensive document, current state-of-knowledge pertaining to seismic engineering of buildings. The TENTATIVE PROVISIONS are in the process of being assessed by the building community. This report is one of a series of reports that documents the deliberations of a group of professionals jointly selected by the Building Seismic Safety Council and the National Bureau of Standards and charged with reviewing the TENTATIVE PROVISIONS prior to the conduct of trial designs. The report contains the recommendations and records of the committee charged with review of the regulatory implementation and enforcement aspects of the provisions. The committee made two recommendations for revisions to the TENTATIVE PROVISIONS and five additional recommendations concerning subsequent activities, such as the conduct of trial designs. These recommendations were made to the parent group, the Joint Committee on Review and Refinement, and their action on these recommendations is documented in a companion report.

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REVIEW AND REFINEMENT OF ATC 3-06 TENTATIVE SEISMIC PROVISIONS

Report of Technical Committee 9: Regulatory Use

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Codes and Standards
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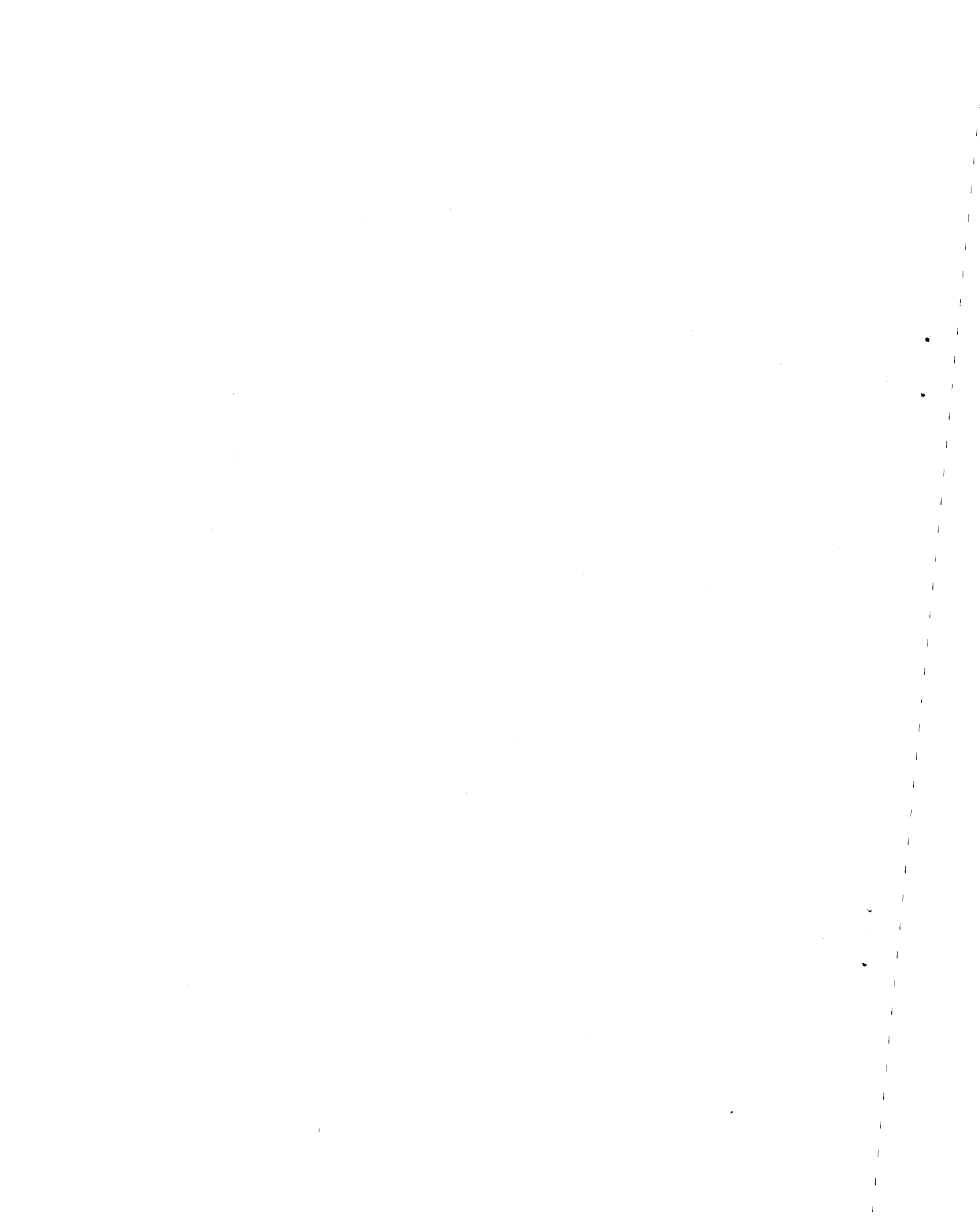
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October 1980

U.S. DEPARTMENT OF COMMERCE, Phillip M. Klutznick, Secretary
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and Innovation
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director.



Abstract

The TENTATIVE PROVISIONS FOR THE DEVELOPMENT OF SEISMIC REGULATIONS FOR BUILDINGS were developed by the Applied Technology Council to present, in one comprehensive document, current state-of-knowledge pertaining to seismic engineering of buildings. The TENTATIVE PROVISIONS are in the process of being assessed by the building community. This report is one of a series of reports that documents the deliberations of a group of professionals jointly selected by the Building Seismic Safety Council and the National Bureau of Standards and charged with reviewing the TENTATIVE PROVISIONS prior to the conduct of trial designs. The report contains the recommendations and records of the committee charged with review of the regulatory implementation and enforcement aspects of the provisions. The committee made 2 recommendations for revisions to the TENTATIVE PROVISIONS and five additional recommendations concerning subsequent activities, such as the conduct of trial designs. These recommendations were made to the parent group, the Joint Committee on Review and Refinement, and their action on these recommendations is documented in a companion report.

Keywords: Building; building codes; building design; disaster mitigation; earthquakes; engineering; standards.

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1.0 INTRODUCTION

1.1 General

The Tentative Provisions for the Development of Seismic Regulations were developed by the Applied Technology Council (ATC) in an effort that included a wide range of experts in the actual drafting of the provisions. Two external review drafts were circulated to a large portion of the interested and informed community of eventual users. However, because the Tentative Provisions were innovative, doubts about them existed. Consequently, an attempt was made to investigate these doubts and to improve the Tentative Provisions where possible before an expensive assessment of the Tentative Provisions was undertaken by conducting trial designs.

This review and refinement project was planned and conducted by the National Bureau of Standards with the advice and approval of the Building Seismic Safety Council, a private sector organization formed in 1979 for the purpose of enhancing public safety by providing a national forum to foster improved seismic safety provisions for use by the building community.

The assessment of the Tentative Provisions was performed using the committee structure shown in figure 1. Nine Technical Committees were formed with interests that collectively cover the Tentative Provisions. The Joint Committee on Review and Refinement consists of all voting members of the Technical Committees. The chairmen of the Technical Committees form a Coordinating Committee.

Membership of each Technical Committee is made up of representatives of organizations that have particular interest in the Tentative Provisions; the participants are listed in the committee membership section of this report.

In addition to the voting members, each Technical Committee includes a non-voting member from each of the following organizations: The Applied Technology Council (ATC), the Building Seismic Safety Council (BSSC) and the National Bureau of Standards (NBS). The ATC representative served as a technical resource to the committee since he was closely involved with the development of the provisions of interest to the committee. The NBS representative was the technical secretary throughout the effort. The BSSC representative provided a link with the Building Seismic Safety Council, which will be involved in trial designs and evaluations.

1.2 Committee Summary

Technical Committee 9 initially met on December 11, 1979 at NBS to select a Committee Chairman and to develop an approach for carrying out its area of responsibility during the review of the ATC 3-06 provisions. Mr. William Dripps, the representative of the National Conference of States on Building Codes and Standards (NCSBCS), was elected as Committee Chairman. The committee determined that the thrust of its work should focus on "regulatory" aspects of the ATC document as opposed to "technical". In this context the primary areas for committee deliberations were to cover such areas as:

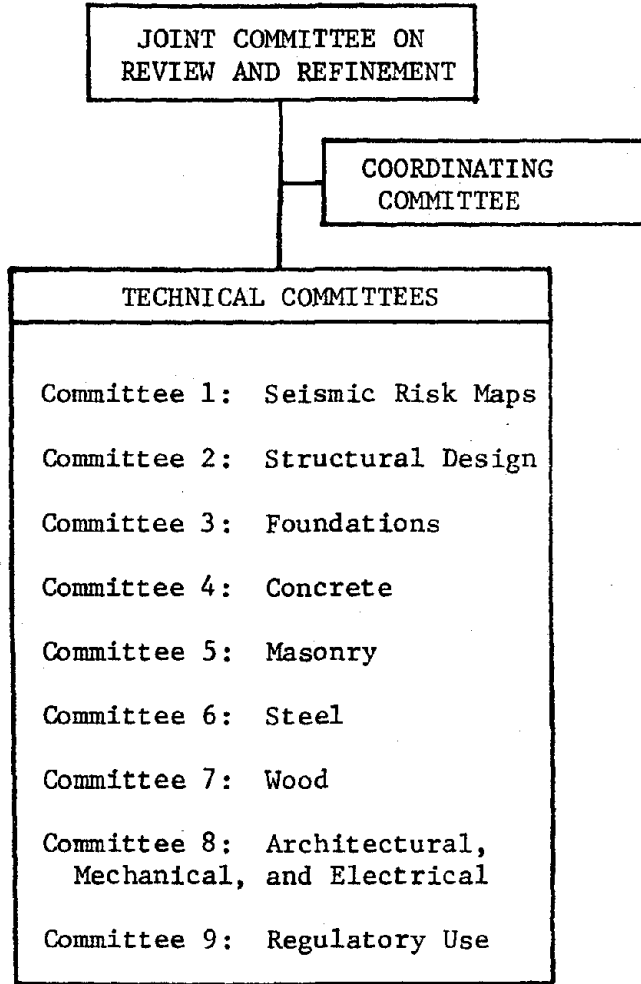


Figure 1: Committee Structure

- ° regulatory intent of the provisions
- ° code format suitability of the provisions for regulatory adoption by political jurisdictions
- ° legal enforceability of the provisions, and
- ° impact of the provisions on all aspects of the building regulatory process.

Chapters 1 (Administration) and Chapter 13 (Systematic Abatement of Seismic Hazards in Existing Buildings) of the ATC 3-06 Publication were the main areas of Committee interest, however, the enforceability of all the provisions are a concern of regulatory personnel. (see section 3.1 for the minutes of first meeting.)

Comments from nine individuals were received containing proposals and criticisms relative to regulatory use of the Tentative Provisions. These comments were each individually reviewed, discussed and acted upon at a public work session of the committee on February 20-21, 1980 at the offices of NCSBCS in McLean, Virginia. The committee recommendations resulted in either "no change" need be further considered, that certain issues be balloted by the committee or that recommendations for further study be undertaken in conjunction with the trial design phase. (see section 3.1 for the minutes of second committee meeting.)

Two ballot items affecting word changes were voted on by the committee and were passed affirmatively. A brief committee meeting at NBS was held on July 16, 1980 for the election of a new committee chairman to replace Mr. Dripps, who had resigned his position with the National Conference of States on Building Codes and Standards. The committee unanimously elected Mr. Norton S. Remmer to succeed Mr. Dripps.

1.3 Chairman's Statement (by William Dripps)

It was quite difficult for Committee 9 to find issues which fit the instructions for a "mid course" correction, and it is likely that some of them presented in this report will not. The tentative provisions assume, apparently, that political leaders in areas of the United States subject to earth tremors only on rare occasions will view seismic building requirements in the same light as do the political leaders in such areas as California, where damage from earthquakes is an unpleasant fact to be dealt with by political leaders. Such is not the case, I believe, judging from experience with political leaders who have dealt with building regulations in the past.

If, in those areas of the United States not subject to frequent and severe earthquakes, the final document is to be accepted some actions are needed, which to my knowledge, are not contemplated. These actions are not difficult nor excessively time consuming and I recommend serious consideration be given them.

1. An explanation of the development of the Seismicity Index, including the consideration given to frequency of earthquakes.

2. A clear exposition and explanation of the proposed provisions for use with existing buildings plus cost analyses for addition of seismic strengthening applied to typical existing buildings.

3. Some analysis of added costs to and personnel requirements for administration and enforcement of seismic regulations plus some guidance as to the methods of securing skilled personnel for the purpose.

These recommended actions should be presented in language easily understood by political leaders; that is, without jargon, without obscure scientific and engineering terminology, but with a realistic assessment of the likelihood of need for seismic requirements.

2.0 Committee Actions

2.1 Recommended Changes

The following is a compilation of the results of the Committee 9 ballot issued on April 14, 1980.

Section	Affirmative	Negative	Affirmative with Reservations	Did Not Vote
° <u>Chapter 1</u> - Change of title for Chapter 1 from "Administration" to "General Provisions"	6 votes	2 votes ^{1/2/}	-0-	4
° Section 13.1.1 - Change the word "designed" to "with a permit issuance date" in paragraphs one and two of Section 13.1.1.	7 votes	-0-	1 vote ^{3/}	4

Summary of "Remarks" offered on negative and affirmative with reservations ballots:

- 1/ "The chapter should be titled 'General'. This document is not a code - 'General Provisions' is code language".
- 2/ "Propose 'Application'".
- 3/ "With regard to seismicity index of 4, Add asterisk and Note: Local jurisdiction may change this for their location".

2.2 Recommendations for Trial Designs

1. The committee recommends that economic studies be undertaken in conjunction with the trial designs to determine the economic impact of the provisions on one- and two-family dwellings in all Seismicity Zones.
2. It was recommended that the seismicity index numbers appear on the map legends to correspond to the designated map areas.
3. Chapter 13 should be re-written so that it can be comprehended by the layman. As presented in its current version, the chapter is difficult to understand and comprehend.
4. Chapter 13 should be reviewed for its applicability to the Eastern part of the United States. R_C of 1 is for all practical purposes not attainable for most older buildings in the Eastern part of the U.S.

5. The committee recommends that a legal review of the entire ATC3-06 document, particularly Section 1.6 on Quality Assurance and Chapter 13 on Existing Buildings be commissioned. Such a legal study would involve:

- ° liability assumed by governmental entities that adopt the provision
- ° extent of liability assumed by regulatory agency and building officials.

It was indicated that such a study could be carried out in conjunction with the trial designs and that the firm or person selected by competent in local jurisdiction regulatory matters (i.e., municipal law with respect to buildings and enforcement).

2.3 Recommendations for Commentary Changes

None

2.4 Other Recommendations

The committee identified a number of specific issues that need further attention or resolution. For regulatory use of the Tentative Provisions, the committee identified the following issues as not being adequately addressed in the current version of the document:

1. Appeals
2. Changes
3. Quality Assurance
4. Application to existing buildings
5. Education and Training of regulatory personnel

3.0 Committee Records

3.1 Minutes of Meetings

Minutes of First Meeting
Technical Committee 9: Regulatory Use
Review and Refinement of Tentative Seismic
Provisions (ATC-3-06)

at

National Bureau of Standards

December 11, 1979

The first meeting of Technical Committee 9 was called to order at 12:15 p.m. by Acting Chairman, Patrick W. Cooke. The following members were present:

<u>Name</u>	<u>Representative of</u>
Michael Sbaglia	American Insurance Association
Norton S. Remmer	American Society of Civil Engineers
Campbell L. Reed	Associated General Contractors of America
Neal D. Houghton (alternate for Lenny Rosenberg)	Building Owners and Managers Association
G. Robert Fuller	Interagency Committee on Seismic Safety in Construction
Jack Allen	International Association of Plumbing and Mechanical Officials
Ralph C. Grippo	International Conference of Building Officials
David E. Johnson, P.E.	National Association of Home Builders
William Dripps	National Conference of States on Building Codes and Standards
James M. Hicks, Jr.	National Academy of Code Administration
Warner Howe, P.E.	Applied Technology Council
Patrick W. Cooke	National Bureau of Standards

Members not present or organizations not represented were:

Jack M. Fratt Association of Major City Building Officials

William J. Tangye, P.E.

Southern Building Code Congress International

Donald F. Pinkerton

Building Seismic Safety Council

--

American Institute of Architects

--

Building Officials and Code Administrators
International

--

International Association of Electrical
Inspectors

The first order of business was the selection of a permanent Committee Chairman. William Dripps was nominated and unanimously elected. Mr. Dripps chaired the subsequent committee deliberations.

The next action was selection of the date and place for the committee's next meeting (i.e., public work session). It was decided that the next meeting would be on February 20 (and 21, if necessary), 1980 at the facilities of the National Conference of States on Building Codes and Standards, Inc., 1970 Chain Bridge Road, McLean, Va.

The Committee then embarked on a discussion pertaining to such issues as the regulatory intent, code format suitability, and enforceability of the Tentative Provisions. Concern was indicated that the Tentative Provisions as presently formulated go far beyond other types of codified documents and that they are not enforceable by building officials in their present format. It was the sense of the members, however, that the document offered a unique opportunity for a partnership in Federal/State/Local cooperation in the regulatory area. Various members expressed the opinion that all interested parties should be afforded the opportunity to influence the document and to present their views on its adoption and implementation. With this in mind, it was determined to broadly publicize the next meeting (i.e., public work session) and to allow for a two-day meeting if necessary.

The committee broke for lunch at 1:00 p.m. and reconvened at 2:00 p.m.

Thoughtful discussion continued around a variety of issues affecting the regulatory and other aspects of implementing the Tentative Provisions and the role of Technical Committee 9. These include:

- o types of buildings and occupancies to be covered (e.g., one and two family dwellings not covered in seismicity index areas 1 or 2 when these are the most populous class of buildings).
- o economic impacts - should building official have control over economic impacts? (e.g., how far to go with coverage?)
- o size and type of role for regulators, policy makers and others - economic, social, political aspects (i.e., are these areas a concern of this technical committee?)
- o applicability of the document as presently formulated to all geographic regions of the United States

- o training and education program to properly guide enforcement personnel in field use of document
- o need for Quality Assurance Plan as required in Section 1.6. (preparation and interpretation of the Quality Assurance Plan?)

In a discussion on committee procedural matters, balloting and the consensus process and interfacing with the Joint Committee the following motions were made:

Motion 1

"Technical Committee 9 recommends that the requirement for a two-thirds majority of votes cast for adoption of changes by the Joint Committee be changed to a simple majority."

The motion was made by David Johnson; seconded by Neal Houghton; and was defeated (Four/yes; four/no; two/abstained).

Motion 2

"That the issue raised by Motion 1 be expressed to the BSSC"

The motion was made by Robert Fuller; seconded by Campbell Reed; and passed unanimously.

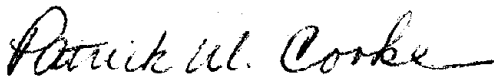
Warner Howe submitted a copy of a paper "Major Criticisms of ATC 3-06" (Nov. 8, 1979) as an individual proposal for revision of the standard (copy of paper enclosed). Any other proposals with specific recommendations for changes to the Tentative Provisions are to be sent prior to Jan. 11, 1980 to:

Mr. James H. Pielert
Technical Committee, No. 9
Tentative Seismic Provision Project
B168, Bldg. 226
National Bureau of Standards
Washington, D.C. 20234

One approach suggested by which the committee might operate would be to compartmentalize individual provisions with respect to being either "technical" or "regulatory" and focus on the latter. The committee reaffirmed its desire to involve all interested organizations and individuals to submit proposals and to participate in the deliberations at the Feb 20 and 21, 1980 work session.

There being no further business, the committee adjourned at 3:45 p.m.

Respectfully submitted,



Patrick W. Cooke

Enclosure

MAJOR CRITICISMS OF ATC-3-06

By Warner Howe, P. E.

BSSC Meeting - Nov. 8, 1979 - San Francisco

I am keenly interested in the ATC-3-06 "Design Provisions" having been a participant in the project; and, as a member of the Board of NIBS and ATC, and having made Earthquake Risk Study for MATCOG, I am concerned for its proper use. Therefore, I am happy to have been asked to discuss "Major Criticisms of ATC-3-06" because the way this document is used can have a major impact on all of those involved in the building process and the users of the products of that process. That is this group!

Let me say, I am pleased, even proud, that 85 authorities who worked together 3 years were able to agree to a single comprehensive document on such a complex subject. ATC-3 is an excellent treatment bringing together the current state-of-the-art technology for addressing the earthquake hazard. Indeed, if it were labeled as a state-of-the-art document and taken out of code format, I would have few criticisms to make at this juncture.

But, the ATC-3-06 "Design Provisions" was written in code format and was intended by many to be used in its entirety as a code reference standard. In my opinion, it is totally unsatisfactory as a mandatory code for the following reasons:

- (1) It far exceeds the customary code philosophy of minimum mandatory requirements for reasonable and prudent protection of human lives and property.
- (2) It is far too complex for effective use by most designers and enforcement officials.
- (3) It does not appropriately address the earthquake hazards in the less seismically active regions of the U. S., particularly in the Eastern half of the country.

Let me explain each of these assertions as follows:

Exceeds customary Building Code requirements

Building codes in their development over the years, purposefully have been limited to the minimum requirements that will assure a reasonable and prudent protection of public health and safety. Events which could endanger life and property are weighed for their relative risks, considering the probabilities of occurrence, costs for providing protection, and the impacts of non-protection; absolute protection generally cannot be economically justified and frequently would be counter-productive; the need for shelter may be more demanding than a higher level of protection.

A Building Code is not intended to be a comprehensive design/construction manual whose purpose is to insure excellence or quality. It is a legal document which establishes the absolute minimum requirements mandated by the enforcing governmental

jurisdiction. Most buildings will be designed and built to a higher more comprehensive set of standards than the building code.

ATC-3 far exceeds this traditional code philosophy for a hazard which has a much lower probability of occurrence than many other hazards which have not been addressed by the codes to this extreme.

Specifically:

(a) Operability of Essential Facilities

It is a prudent public policy and in the best public interest to have certain "essential" facilities needed after an earthquake to be designed to be operable after such an event. Obviously, appropriate design criteria for these facilities is needed, but they should not be made a part of the building code regulations - WHY?

Most facilities which are classified as "Essential" are publically owned and are designed with many features that exceed minimum building code requirements. Such features include not only operability but also maintenance, durability, aesthetics, etc. Public buildings are seldom built to minimum building code requirements, and the public policies affecting such structures should be addressed by means other than the building code.

In the few instances where essential facilities are not publically owned, they are usually regulated by other mandatory standards. The one possible exception might be private hospitals which are totally funded by private sources. In this case building code requirements for post-disaster "operability" is unfair to patients who have to pay for this extra protection for the public of which they are such a small part. If such protection is deemed necessary, public policy should provide for public financing of this added protection.

There are certain "critical" facilities (such as, Nuclear Power Plants, Toxic Chemical Plants, Dams, etc.) whose failure in an earthquake would cause a catastrophe that must be given special attention. Neither ATC-3 nor the Model Building Codes addresses these hazards. Perhaps they should since these facilities present serious hazards and the owners thereof should be required by the code to provide prudent protection for the public.

(b) Protection of Non-structural Elements

Non-structural elements failing in an earthquake present a far less risk to life and safety than many other more probable hazards, such as, fire, explosions, sabotage, etc.

Obviously, heavy exterior architectural elements that could hazard life in the streets should be treated thru regulation. But, many of the other non-structural elements requiring protection by ATC-3 are not so hazardous. Protection of such non-structural elements, particularly in the regions of less frequent earthquakes, can hardly be justified economically. Requirements for non-structural elements and other non-life safety elements have recently begun to find their way into codes and the economic impact is only now beginning to be felt. If this trend continues, the cost of needed shelter for many people could well become prohibitive.

(c) Retro-active Requirements for Existing Buildings

Retro-active provisions have been resisted by the Building Code authorities over the years for all but the most serious hazards. In most cases the degree of hazard will not be significantly reduced by upgrading to conform to a new code requirement.

Traditionally, a building conforming to the code when it was built has been adjudged as providing reasonable protection unless a serious hazard is identified. Where major additions or alterations are made, however, present codes require total conformance to the current code.

The requirements in ATC-3 for existing structures can hardly be justified economically in areas other than the high risk regions of the Western United States (and questionably there). If such requirements are to be mandated thru the code, some provision must be made to weigh the relative risks involved in relation to other hazards, taking into consideration, for example, the reduced exposure due to limited future life of the facility.

Opening these new avenues of mandatory protection in building codes as proposed in ATC-3 would set a dangerous precedent and doubtlessly would lead to ever increasing efforts to add more and more stringent requirements for many other hazards which traditionally have been resisted over the years. This is not to say that there isn't a need for Voluntary non-mandatory standards to assist the designer in planning facilities which will be kept operable, in which non-structural elements are to be protected, and for evaluating and strengthening existing buildings whether damaged in an earthquake or potentially hazardous in a future earthquake. Therefore, as a state-of-the-art manual for guidance of designers who wish to go beyond the minimum code requirements, ATC-3 is an appropriate document. Any intimation that it is suitable as a mandatory requirement in a building code, however, should be eliminated and its appropriate use be clearly identified

ATC-3-06 is too complex to be a Building Code Standard

A code should not be a design manual. Conversely, design manuals should not be put forward in a manner that they encourage adoption as minimum code requirements. This is too often the case with most

structural systems; witness the ACI, PCI, AISC, Masonry and Wood Standards. These are recognized as acceptable standards for code reference, but other designs may be used if they provide equivalent protection. In fact, the model code groups claim they have performance codes because of this opportunity to demonstrate equivalency. The basic format for ATC-3 was formatted with a view to creating such a reference standard.

In attempting to create the "Comprehensive" standard as originally perceived by the ATC-3 project planners, the project participants became deeply involved in seismic research and technology in their individual fields of specialization. As a result, much more detail than is warranted for a code document has been included.

To be readily usable by the building designer as he works with every day projects of modest scale and by the Building Official as he seeks to determine compliance with the code, code provisions must be streamlined and simplified, 50% of the designers and building officials could very easily become lost in trying to understand and apply the ATC-3 document. A mandatory standard should be drafted principally for the less knowledgeable designer and code enforcer.

ATC-3 does not address the less active seismic regions of the United States in an appropriate manner.

The ATC-3 project was led by a body of experts with the most knowledge and experience; this meant, quite naturally, that most of them came from the more seismic areas of the West Coast. Obviously, California, with its greater exposure to earthquakes, should be given the major attention in such an effort. ATC-3, therefore, basically addresses the seismic problems of California and only tangentially deals with other geographic areas. No criticism is intended, but other parts of the country do have somewhat different exposures and problems. This, of course, is no great revelation, but it is important that the knowledge, experience and viewpoints of those from these other areas be given proper attention. For example, I would like to address the local situation in Memphis, Tennessee, where I am intimately familiar with the local situation having made an Earthquake Risk Study of this area for the local Council of Governments.

Memphis is in a major earthquake risk zone. As most of you know, three of the largest recorded earthquakes to have occurred in the continental U. S. occurred in the New Madrid seismic zone of Southeastern Missouri and Northeastern Arkansas, in 1811 and 1812. They were followed by over 1000 recorded aftershocks. The felt area for each of these earthquakes was approximately 2 million square miles. Topographic changes occurred over an area of some 50,000 sq. miles; the 50+ sq. mile Reelfoot Lake was created and the mile wide Mississippi River briefly flowed backwards. These earthquakes took place in the basement rock beneath relatively unconsolidated tertiary and cretaceous sediments and deeper Paleozoic rocks of the Mississippi Embayment. The duration of ground shaking was reported to be 2 to 3

minutes. Because of the large area of perception, most authorities believed these to be the largest earthquakes in U. S. history. Recently, Otto Nuttli at St. Louis University has studied the available data and estimated the maximum magnitude of these earthquakes to be 7.4. Maximum MMI's reported indicate an epicentral intensity of X.

Had there been a city here then there undoubtedly would have been serious damage to structures. There have been continuing smaller earthquakes in the region, but the recurrence rate appears to be about 1/10th of that in California. This indicates a very low probability of a major quake during the life of a structure- i.e., a 500 to 1000 year return period is indicated. No damaging earthquake has occurred in Memphis during its 150+ years as an established community.

Because of the possibility of another major earthquake sometime in the future, Algermissen placed Memphis in a Zone 3 on his 1969 Risk Map, which is equal to California. The ATC-3-06 Risk Map, based upon 90% probability of not being exceeded in a 50-year period, placed Memphis in a Zone 5 (whereas California is a Zone 7). The 1972 ANSI A58.1 Risk Map places Memphis in a Zone 1, just outside a Zone 2,- unless you live in North Memphis which is on the line between Zones 1 and 2. Which best depicts the earthquake risk?

The Memphis earthquake risk differs from California in several important ways:

- (a) Major earthquakes are highly probable during the life of California structures, but are highly improbable in Memphis. The statistical recurrence rate of earthquakes in the New Madrid zone is about 1/10th that of California.
- (b) Though infrequent, major earthquake ground motions are possible in Memphis, however.
- (c) A major earthquake will do damage over an area 10 times larger than in California.
- (d) Damage in California is predominantly in the near-field (within 25 to 35 miles of the epicenter. Whereas, Memphis may be in the far-field of a New Madrid source area 80 to 100 miles distant.
- (e) Many portions of the City of Memphis are in the Mississippi River Alluvial Valley with extensive unconsolidated, saturated, alluvial deposits.

Because of these differences, ATC-3 (which is based upon California near-field strong motion records and California-type exposures to the earthquake risks) does not appropriately address the seismic hazards in Memphis, or for that matter other similar regions of the Eastern United States. WHY?

- (a) Since California earthquakes have a relatively high frequency of occurrence, all types of building occupancy in California are protected the same degree - a life lost in a warehouse is considered equally probable to a life lost in a theatre, school, or highrise office building. In the present codes, no variation in requirements is made for differing building occupancy types (except for essential facilities to be operational). ATC-3, likewise, makes no differentiation for occupancy, regardless of the area of the country involved. Is this appropriate in the less seismically active regions where the probabilities of a damaging earthquake are much lower? Should not the reduced probability of life loss be considered in the lower-occupancy type structures? I believe so, particularly when one considers the relative cost of providing earthquake protection. In the predominant construction, low rise masonry bearing wall warehouses, light business, commercial and residential structures, the cost increase for earthquake protection is large compared to that for high-rise, more ductile construction generally found in the higher occupancy type buildings. ATC-3 if applied to Memphis would impose the greatest hardship on the type of construction that presents the least risk. There should be some acknowledgement of the reduced risks in low occupancy structures for the less active seismic areas.
- (b) Though improbable, a major earthquake could occur in Memphis. If so, shouldn't "critical" and extremely hazardous facilities be designed and built for the maximum "credible" earthquake ground motion to prevent an extreme catastrophe?
- (c) If and when a major earthquake does occur in the Central United States, it is expected that it will cause damage over a wide area, perhaps 10 times that of a similar quake in California. Damage will not be localized - will this not result in a catastrophic event because of the rapid urbanization and rising population densities, if reasonable mandatory provisions are not soon promulgated?
- (d) Seismic ground motions in Memphis during a damaging quake will be different than those in California (which was used as a basis for ATC-3). The predominant ground motions will likely be in the lower frequencies at greater distances from the fault break - the higher frequency ground motions being attenuated more rapidly than the low frequencies. Will low-rise, rigid structures be as affected by the earthquake as will the high-rise, more limber structures? This concern parallels and reinforces those expressed in (a) above.
- (e) Memphis is in the center of the Mississippi Embayment and large portions are in the Mississippi River Alluvial Valley.

Much of the Mississippi Valley and the valleys of its tributaries are composed of unconsolidated, saturated river deposits which will amplify the lower frequency ground motions and be resonant with taller structures.

Memphis may be very similar to Mexico City, which is on an old lake bed with unconsolidated saturated sedimentary deposits and is located some 100 miles from earthquakes epicentering near Acapulco. There the predominant period of ground motion is approximately 2.5 seconds. On the ground floor of the Holiday Inn in Mexico City last year in March one got the feeling of being ill from a swaying motion when a 6.0+ magnitude earthquake occurred near Acapulco. No short period vibrations were felt, but the chandeliers swung through several inches of displacement. Obviously, the shorter period vibrations had been damped-out by distance and/or the unconsolidated alluvium. Is it not probable that the response in Memphis will be similar? If so, a considerable alteration to the response spectrum used in developing ATC-3 provisions will be necessary to properly account for this difference.

CONCLUSIONS

ATC-3 is not a suitable code document because:

- (1) Its provisions, if adopted by code-enforcing jurisdictions, would require levels of performance well beyond those which one would expect in a code that is founded in the principal of reasonable and prudent protection of public health, safety and welfare.
- (2) It does not address the earthquake hazards in the less seismically active regions of the United States in an appropriate manner, and
- (3) It is too complex for effective use by most designers and enforcement officials.

This is not to say, however, that the ATC-3 effort cannot serve a very useful purpose -- that of bringing the state-of-the-art together in a single, comprehensive document which can be a solid stepping stone for the development of appropriate code provisions, reference standards, and guides to the planning, design and construction of facilities throughout the United States. In this context, ATC-3 has been most successful and should be widely recognized for its valuable contribution. At the same time and in its present form, the document should not be promulgated as a standard for code adoption.

Hopefully, through the participation of BSSC, this work can be carried forward with the ultimate goal of improving seismic safety provisions -- provisions that are readily useable and enforceable, and provisions that will result in a level of performance that is consistent with the need and the ability to pay.

Minutes of Second Meeting
Technical Committee 9: Regulatory Use
Review and Refinement of Tentative Seismic
Provisions (ATC 3-06)

at

National Conference of States on
Building Codes and Standards, Inc.
1970 Chain Bridge Road
McLean, Virginia
February 20-21, 1980

The second meeting of Technical Committee 9 was called to order by Chairman William Dripps at 9:30 a.m., February 20, 1980. The following members were present:

<u>Name</u>	<u>Representative of</u>
Michael Sbaglia	American Insurance Association
Norton S. Remmer	American Society of Civil Engineers
G. Robert Fuller	Interagency Committee on Seismic Safety in Construction
Jack Allen	International Association of Plumbing and Mechanical Officials
Ralph C. Grippo	International Conference of Building Officials
William Dripps, Chairman	National Conference of States on Building Codes and Standards
James R. Harris	National Bureau of Standards
James H. Pielert	National Bureau of Standards
Patrick W. Cooke	National Bureau of Standards

The following members were not in attendance:

Lenny Rosenberg	Building Owners and Managers Association
Neal D. Houghton	Building Owners and Managers Association
David E. Johnson, P.E.	National Association of Home Builders
Warner Howe, P.E.	Applied Technology Council

<u>Name</u>	<u>Representative of</u>
Jack M. Fratt	Association of Major City Building Officials
William J. Tangye	Southern Building Code Congress International
Donald F. Pinkerton	Building Seismic Safety Council
- - -	American Institute of Architects
- - -	Building Officials and Code Administrators International
- - -	International Association of Electrical Inspectors
- - -	National Academy of Code Administration

There were no other guests or attendees at this public work session of Technical Committee 9.

The minutes of the first meeting of Technical Committee 9 on December 11, 1979, were approved without change (motion made by Ralph Grippo/second by Michael Sbaglia).

Correspondence in the form of comments, proposals and criticisms relative to the Regulatory Use Aspects of the Tentative Provisions were received from nine individuals. These comments and proposals were individually reviewed and acted upon by the committee and formed the basis of this meeting. A copy of each piece of correspondence is attached to these minutes for the record.

Committee discussions opened with a review of the background and development of the Tentative Provisions along with a reiteration of the purpose and intent of the review and refinement project and this committee's role in that project. Generally stated, the objective agreed upon was ". . . to participate in a systematic assessment of the Tentative Provisions to refine and improve them prior to undertaking the trial design phase." Such an approach dictates that any changes at this point in the process be small refinements and not major changes in the basis of the entire project.

Other preliminary points discussed included the probable acceptability difficulties of the provisions in a political atmosphere that is concerned about deregulation and legal liability of municipalities.

The committee then proceeded to discuss each of the individual comments received in the proposals and to arrive at a recommendation for each. This action was taken without benefit of an official ATC response to the proposals as required in the Work Plan for Review and Refinement of Tentative Seismic Provisions (Revised 11/27/79). Jim Harris of NBS was present for the first

days deliberations and provided the committee with background into the intent and rationale by which various provisions were formulated by ATC in the Tentative Provisions.

The following is a summary of committee actions on each of the comments submitted:

1. Comments relative to Chapter 1 of Tentative Provisions

- 1.1 The Associated General Contractors of America; Cambell L. Reed, Director, Building Division; letter January 2, 1980 (see Attachment #1).

Section 1.5 Alternate Materials and Methods of Construction

No change recommended.

The committee concluded that the ultimate responsibilities of the Regulatory Agency to accept or not accept alternates cannot be changed. The Regulatory Agency (or Building Official) can seek technical expertise as appropriate, but the responsibility rests with the Regulatory Agency.

Section 1.6.1 (B) Contractor Responsibility

See discussion on Quality Assurance. (It was decided to consolidate all the comments on Quality Assurance matters into a single discussion and recommendation.)

- 1.2 Building Owners and Managers Association, International; Leonard H. Rosenberg, Jr., Vice Chairman, Codes and Regulations Committee; letter January 9, 1980. (see Attachment #2).

Section 1.1 Purpose

No change recommended.

The committee determined that the purpose of the provisions are clearly stated and that probabilistic methods were used. This is further expanded upon in the Commentary starting on page 228 and in particular on pages 312 and 313.

Section 1.2 Scope

No change recommended.

The committee felt that this comment does not have merit. One- and two-family dwellings are covered by the provisions in areas having a Seismicity Index of 3 or 4.

Section 1.3.1 New Buildings

No change recommended.

(Same response as that given above for Section 1.2)

Section 1.3.2 Existing Building Alterations and Repairs

No change recommended.

The committee felt the comment was not correct since the 25-50% rule on building alterations has been eliminated from all of the major model building codes.

Section 1.3.3 Change of Use

No change recommended.

Section 1.4.1 Seismicity Index and Design Ground Motions

Recommend change of title for Chapter 1 from "Administration" to "General Provisions." No change to Section 1.4.1.

Section 1.6 Quality Assurance

See discussion on Quality Assurance.

(It was decided to consolidate all the comments on Quality Assurance matters into a single discussion and recommendation.)

- 1.3 National Association of Home Builders; David E. Johnson, P.E., Assistant Director, Technical Services Department; letter January 10, 1980. (see Attachment #3).

The committee recommended that the comment on expanding the guideline for single or double top plates in light timber construction be referred to Technical Committee 7 on Wood. It was the sense of the committee that extending the exception on one- and two-family dwellings in areas having a Seismicity Index of three was minor since most of the affected population are in zone four, therefore, no change was recommended.

The comment on quality assurance was deferred to an overall discussion on quality assurance provisions.

- 1.4 Pascoe Steel Corporation; William A. Sontag, P.E., Chief Engineer; letter to Technical Committee 2, January 15, 1980 (see Attachment #4).

Section 1.6.2 Special Inspection

No change recommended.

The committee felt that the suggested approach is already adequately covered in building codes.

Section 1.6.3 D 1 Structural Steel

It was decided to refer this suggested change to Technical Committee 6 on Steel for resolution.

1.5 Notes on the Meeting of Technical Committee No. 5 on Masonry, Minutes of January 4, 1980 (see Attachment #5).

No changes were recommended, instead the committee determined that the issues were technical and should be resolved by Technical Committee No. 5 on Masonry.

1.6 International Conference of Building Officials; Ralph C. Grippo, P.E., January 22, 1980 (see Attachment #6).

Section 1.1 Purpose

No change recommended.

The committee felt that the provisions excluded the safeguarding of property on purpose. The concept is adequately explained in the commentary.

Section 1.2 Scope

The committee recommended that an economic study be undertaken - possibly in conjunction with the trial designs - to determine the economic impact of the provisions on one-and two-family dwellings in all Seismicity Zones.

Section 1.3.1 New Buildings

No change recommended.

Section 1.3.3 Change of Use

No change recommended.

Section 1.4.2 Seismic Hazard Exposure Group

No change recommended.

Section 1.6 Quality Assurance

See discussion on Quality Assurance.

(It was decided to consolidate all the comments on Quality Assurance matters into a single discussion and recommendation.)

- 1.7 Forell/Elsesser Engineers, Inc.; Nicholas Forell; letter to Technical Committee No. 2, January 11, 1980 (see Attachment #7).

Section 1.4.4 Site Limitation for Seismic Design Performance Category D

No change recommended.

- 1.8 G. Robert Fuller, ICSSC Representative; letter January 31, 1980 (see Attachment #8).

Section 1.1 Purpose

The committee felt that further treatment of potential property damage issues should be covered in the appropriate commentary section.

Section 1.2 Scope

After discussion, the committee requested and Mr. Fuller agreed to provide a further statement on this comment.

Section 1.3.1 New Buildings

It was recommended that this comment be referred to Technical Committee #7 on Wood for resolution.

Section 1.5 Alternate Materials and Methods of Construction

No change recommended.

Mr. Fuller to comment further.

Section 1.6 Quality Assurance

See discussion on Quality Assurance.

- 1.9 Warner Howe, P.E., Warner and Howe Consulting Structural Engineers, letter December 12, 1979 (see Attachment #9).

No changes recommended on Mr. Howe's comments.

2. Comments relative to Chapter 13 of Tentative Provisions

Section 13.1.1 Identification of Buildings Requiring Evaluation

- (1) It was recommended that the seismicity index numbers appear on the map legends to correspond to the designated map areas.
- (2) It was recommended that the word "designed" be changed to "permit issuance date" in paragraphs one and two in Section 13.1.1.

Other recommendations relative to Chapter 13 were:

- (1) The Chapter should be re-written so that it can be comprehended by the layman. As presented in its current version, the chapter is difficult to understand and comprehend.
- (2) Chapter 13 should also be reviewed for its applicability to the Eastern part of the United States. R_C of 1 is for all practical purposes not attainable for most older buildings in the Eastern part of the U.S.

3. Legal Liability

In a discussion on legal liability it was clear that the previous concept of sovereign immunity of municipal governments is gone; local governments are becoming more liable in civil suits. This leaves public officials liable. Thus local governments that adopt the provisions can leave itself vulnerable to court actions. It was also indicated that the provisions will not be able to be fully complied with in existing buildings. It was felt that all aspects of legal liability have not been adequately addressed by the Tentative Provisions. In this regard the committee recommended the following:

- (1) That a legal review of the entire ATC 3-06 document, particularly Section 1.6 on Quality Assurance and Chapter 13 on Existing Buildings be commissioned. Such a legal study would involve:
 - o liability assumed by governmental entities that adopt the provision
 - o extent of liability assumed by regulatory agency and building officials.
- (2) It was indicated that such a study could be carried out in conjunction with the trial designs and that the firm or person selected be competent in local jurisdiction regulatory matters (i.e., municipal law with respect to buildings and enforcement).

4. Quality Assurance Provisions

In a lengthy discussion on all aspects of Section 1.6 of the Tentative Provisions, the committee determined that the matter of including the Quality Assurance requirement be held for further comment. It was determined that the concept was somewhat extreme particularly when imposed on areas of the country that have had no previous exposure to such a sweeping approach. The committee decided to allow additional time to provide an opportunity for more review and comment from those most concerned and affected by the quality assurance provisions if they were imposed in their present form.

5. Adoption Mechanisms

The committee then pursued a discussion on various means by which the provisions could be adopted by governmental jurisdictions and considered the following four alternatives along with their respective advantages and disadvantages:

- (1) Incorporate directly into the body of codes

Advantages

1. All available in one document, uniformity

Disadvantages

1. Increase bulk of codes
2. Inappropriate material included
3. Becomes law - no alternatives, flexibility for alternate approaches

- (2) Prepare the provisions as a standard and recommend adoption by reference.

Advantages

1. Option whether to adopt or not on part of jurisdiction.

Disadvantages

1. Have to get in order to use, retrieve.
2. No control by each jurisdiction (participation)
3. Possible conflicting documents

- (3) Incorporate the basic requirements directly into codes and present the technical detail in an accompanying reference document.

Advantages

1. Users can have basics at hand
2. Can change basics without impacting details
3. Adhere most to performance approach
4. More uniformity

Disadvantages

1. More work for #3 to separate
2. Require greater level of expert knowledge to separate
3. Responsibility to evaluate content at local level
4. More coordination to maintain documents

(4) Prepare rules locally based on ATC 3.

Advantages

1. Total local/regional control

Disadvantages

1. Different rules for each locality; no uniformity
2. No local expertise in technical areas
3. Ignores model code process

Specific advantages and disadvantages for each alternative were put forth and discussed.

6. Issues To Be Resolved

The committee then identified a number of specific issues that need further attention or resolutuion. For regulatory use of the Tentative Provisions, the committee identified the following issues as not being adequately addressed in the current version of the document:

1. Appeals
2. Changes
3. Quality Assurance
4. Application to existing buildings
5. Education and Training

Mr. Grippo submitted a bulletin from the Structural Engineers Association of Southern California which carried a news item indicating consideration of ATC-3 by SEAOC in the development of their 1983 Blue Book (see Attachment #10).

The committee decided to tentatively hold a second public work session on April 10, 1980, in the Washington, D.C. area.

The meeting adjourned at 2:30 p.m. on February 21.

Respectfully Submitted,



PATRICK W. COOKE

10 Attachments



THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

1957 E Street, N.W. • Washington, D.C. 20006 • (202) 393-2040 • TWX: 710-955-1134 AGC AGTN

PAUL N. HOWARD, JR. *President* IVAL R. CIANCHETTE, *Senior Vice President* THOMAS E. DAILEY, *Vice President*
CLIFF MORTENSEN, *Treasurer* JAMES M. SPROUSE, *Executive Vice President* HUBERT BEATTY, *Executive Director*

January 2, 1980

Mr. James H. Pielert
Technical Committee No. 9
Tentative Seismic Provision Project
B168, Building 226
National Bureau of Standards
Washington, D. C. 20234

Dear Mr. Pielert:

As a member of Technical Committee No. 9 assigned to review the Regulatory Use areas of ATC-3-06, I submit the following specific comments on Chapter 1:

1.5 I believe it would be beyond the expertise of many building officials to evaluate whether alternate materials and methods of construction are equal to those prescribed in the technical provisions of the regulations. This evaluation should be the responsibility of a licensed engineer or architect.

1.6.1 (B) In submitting a bid or signing a contract for a project, each contractor agrees to build the project in accordance with the plans and specifications. If the pertinent provisions of the seismic regulations are to be followed in constructing the project, these should be included in the specifications on which the contractor bases his bid or quote. It is redundant to ask him to submit and sign the statement required in 1.6.1 (B).

Further, the procedures he uses for exercising control within his organization, and the frequency and distribution of reports is a managerial function of his operation and should not be subject to a review by the Regulatory Agency.

Mr. James H. Pielert
January 2, 1980
Page Two

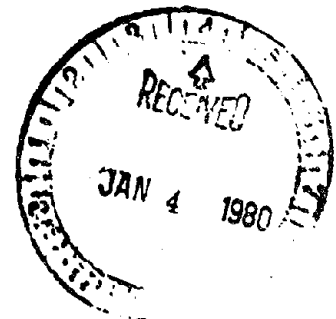
In general, I must speak against the basic philosophical approach used in this proposed document. I believe too much of the proposed regulations is based upon the frequent and severe seismic conditions found in California and not enough consideration has been given to developing less severe or restrictive regulations for those areas of the country where seismic occurrences are less frequent, less probable and less intense.

Sincerely yours,



CAMPBELL L. REED
Director
Building Division

CLR:chh



Chesapeake Center

A DIVISION OF THE CHESAPEAKE LIFE INSURANCE COMPANY

January 9, 1980

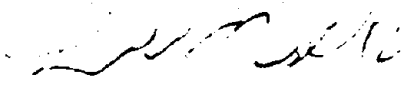
Mr. James H. Pielert
Technical Committee #9
Tentative Sizing Provisions Project D168
Building 226
National Bureau of Standards
Washington, DC 20234

RE: ATC 3-06 Comments

Dear Mr. Pielert:

Attached you will find three pages of comments on ATC 3-06, covering Chapters 1, Administration and Chapters 13, Commentary. The basic problem with the document as it stands now is it is totally unclear as to whether it is supposed to be a design criterion, a design reference manual or a code, and thus causes major problems. I believe that my comments are self-explanatory, and if you have any questions, please feel free to call me at 800-638-3182, ext. 290.

Yours truly,



Leonard H. Rosenberg, Jr.
(Vice-Chairman, Codes and
Regulations Committee
Building Owners and Managers Association,
International)

c

cc: Mr. Neil Houghton
BOMA, International

Section 1.1 - Purpose - The purpose of this document is not clearly stated in this paragraph. Question #1, is this document designed to be a reference material for local codes or is it designed to be a code itself, in which case there are many problems with it. Or is it meant to be a design reference manual for architects? None of these items are stated in the first paragraph for the purpose of this document. They should be so stated.

2, the purpose states that the design criterion is used to produce a low probability of collapse due to seismic-induced ground shaking. Yet there is no reference as to what the probability level desired is. I feel that this is a critical factor due to the fact that the whole document can only be judged in the light of its purpose, and without a clear statement of what the probability factor that was desired to be achieved by the document and what the purposes of the document are to be used for, this purpose cannot be ascertained.

Section 1.2 - Scope - Using an exception for one and two family dwellings is basically a cop out. One is thereby assuming with this exception that earthquakes only happen during the daytime and not during the nighttime where these one and two family dwellings would contain the largest amount of population. I do not think it is appropriate to exclude one and two family dwellings in a comprehensive document that is supposed to address itself to building damage due to seismic disturbances, and I can see no justification for excluding them.

Section 1.3.1 - New Buildings - Again there is the exclusion for one and two story dwellings and again I can see no justification. Also the section is rather vague when it talks of architectural systems.

Section 1.3.2 - Existing Building Alterations and Repairs - The addressing of conformance for existing buildings is a dangerous and unacceptable diversion from the normal code process, due to the fact that existing buildings have never been required to comply with current codes unless the alterations or repairs have reached such a magnitude as to consider the building as a new building. Typically this ratio has been produced as a percentage of building value being spent for the alterations. I feel that this entire section should be dropped in favor of local code option.

Section 1.3.3 - Change of Use - The same comments as Section 1.3.2 apply.

Section 1.4.1 - This entire section should not be in the administrative area due to the fact that it is technical in nature and belongs in design procedure.

Section 1.4.2 - Seismic Hazard Exposure Groups - No comment

Section 1.4.3 - Seismic Performance Categories - No comment

Section 1.4.4 - Site Limitation for Seismic Design Performance Category D - No comment

Section 1.5 - Alternate Methods of Construction - No comment

Section 1.6 - Quality Assurance - The submission of a quality assurance plan is redundant in the light of code specifications. I have yet to run into a code whereby the engineer, the architect and the contractor are not responsible for seeing to it that a building is built per code specifications. Unless this document is to be used in conjunction with local codes, then those provisions in the local codes would take precedence. The need for special inspections is also redundant due to the fact that building inspectors throughout the country have the right to inspect at will any building during construction or after construction. These inspectors are empowered to cite for violation and to cause cessation of work if they deem it necessary.

As for the special testing that would be necessary, I have yet to run into a code that did not provide for testing by an approved agency to be acceptable. Therefore a long and lengthy section on how special testing is to be done is not necessary. All that need be stated is that equivalent levels of protection (strength or otherwise) need be obtained. And that these levels shall be determined by an approved testing agency. As for the excess reporting and compliance procedures, they are unwieldy and not necessary due to the normal inspection process of building codes. The same comment would apply to 1.6.5 concerning the manufacturer's certification. In effect, by requiring everybody up and down the line to certify or submit plans you have created a bureaucratic nightmare in the enforcement of these regulations. The tried and true method of building permits, and how they apply to the local code sections is the best method possible. Those people that would normally be responsible for building failure due to non-compliance with codes would be the same ones responsible in the case of a seismic failure due to non-compliance with codes. If this section was rewritten to encompass the normal building permit procedure rather than this multitude of plans and certificates, etc., and if it is the goal of this document to increase the manpower needed to enforce codes, than this section will surely achieve that goal. I believe that this section should be totally stricken and replaced by a simple statement that if this document is adopted by the local regulatory agency it is recommended that it be enforced through its normal code procedures.

Unfortunately, criticism of this chapter is difficult due to the fact that the purpose of the entire document has not been clearly stated. If this document is meant to be a design standard the entire chapter of administration need not be there. If this document is supposed to be a design reference manual for local codes to refer to than, again, the administration section is not necessary. If this document is meant to be a code unto itself than the administration section needs an extreme rewrite and flushing out, but than the rest of the sections need to be totally redrawn due to the fact that they are way overpowering in their detail and their requirements and the cost benefit ratio of this document being enforced as a minimum requirement code is unrealistic.

Section 13.1.1 - The next to the last paragraph on page 480 is buried in the text of this document and, in fact, should be clearly stated either in the beginning of Chapter 13, or, perhaps, at the beginning of the entire document showing the areas that need be evaluated. These areas should clearly be stated as to geographic boundaries instead of referring to a map. They are nearly all of California, most of Nevada, two thirds of Utah, portions of Idaho, Wyoming, Montana, one-half of Washington, and portions of Missouri, Arkansas and Tennessee. A simple list by county within state in the beginning would suffice, and thereby eliminate alot of searching and interpretation of maps by those reading this document.

The major question, however, has not been addressed as to why such a document is needed and before this document can be completed and put to use certain questions must be answered.

1. What is the documents purpose?
2. What is it trying to achieve in probabilities of collapse?
3. What are its costs vs. its benefits?



National Association of Home Builders

15th and M Streets, N.W., Washington, D.C. 20005

Telex 89-2600

(202) 452-0200

January 10, 1980

Mr. James H. Pielert
Technical Committee, No. 9
Tentative Seismic Provisions Project
B168 - Building 226
National Bureau of Standards
Washington, DC 20234

Dear Mr. Pielert:

At the first Annual Meeting of the Building Seismic Safety Council, there were many valid criticisms of the ATC 3-06 provisions expressed and I trust the current organizational structure will be sufficient to comprehensively address the problems identified. Committee 9 - Regulatory Use has the responsibility of determining how the ATC 3-06 provisions will be applied and the development of practical, cost-effective, and reasonable guidelines should be the goal of the other committees.

The National Association of Home Builders encourages the design and research communities to develop state-of-the-art documents such as the ATC 3-06. We call upon the organizations involved in the review of ATC 3-06 to be conscious of the fact that a reasonable and practical eye should be used in reviewing these state-of-the-art guidelines. Accordingly, this approach should not be jeopardized by formulizing a long, complex, and comprehensive state-of-the-art design and construction manual into a building code format. The Building Seismic Safety Council and the organizations committed to the review of ATC 3-06 should not continue to operate under the promise that this document should be wholly independent of other codes. This document as currently drafted has taken the form of an independent model code rather than a series of recommended practices that could be included in the three model codes.

Without question, the ATC 3-06 document is far too complex for practical or regulatory use. We are, therefore, recommending that the format of this document be revised from a code format to a support document reflecting seismic safety design guidelines.

Developing guidelines applicable for one and two family dwellings in areas having a seismicity index of 3 or 4 is an approach that could be supported. However, in our opinion, it would be more practical and reasonable for dwellings with seismicity index of 1, 2, or 3 not be subject to the design guidelines developed for conventional light timber construction. In addition, the guideline for top plates should be expanded to indicate that if studs are located directly under the joists, double top plates would not be needed.

Mr. James H. Pielert

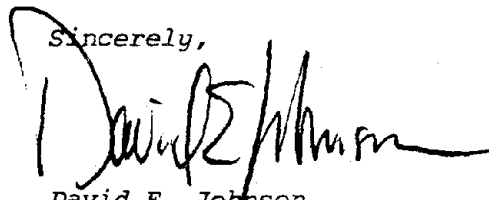
Page 2

January 10, 1980

The quality assurance portion of this document is an ambitious plan that needs to be carefully considered by all of the organizations involved in the ATC 3-06 review. Without discussing this plan in depth and the serious problems resulting from this plan, it would probably be more acceptable to a wider spectrum of organizations if the quality assurance plan was applicable only to buildings in Seismic Hazard Exposure Group III when located in areas having a seismicity index of 2, 3, or 4.

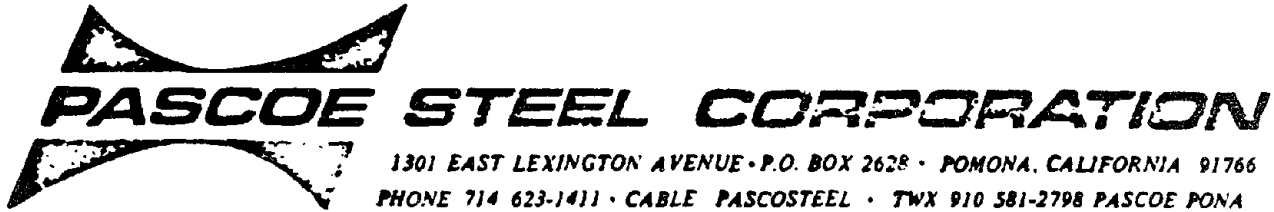
In summary, the original intent of the drafters of this document was to reach for the ultimate---an independent code for a hazard with a high probability of occurrence in many parts of the country. In our opinion, this goal is impractical, unreasonable, and subject to serious criticisms within the building and regulatory communities. Therefore, Committee 9 members should evaluate this document on how it can be interfaced with the three model code groups rather than maintaining a complex design manual written for code adoption.

Sincerely,



David E. Johnson
Assistant Director
Technical Services Department

DEJ:saw



15 January 1980

National Bureau of Standards
Mr. James Harris, Secretariat
Committee 2
Tentative Seismic Provision Project
Room B168, Bldg. 226
Washington D.C. 20234

Subject: Review of ATC-3-06

Gentlemen:

The following are my suggested modifications to ATC-3-06 which require serious consideration. Due to the interaction and close relationship of individual chapters, I am including comments to Chapters other than Chapter 2.

Item 1. Paragraph 1.6.2 - Add:

EXCEPTION: When welding is done in an approved fabricator's shop.

Based on the above proposed change, Paragraph 2.1 definitions must have the following added:

APPROVED FABRICATOR is an established and qualified person, firm or corporation approved by the Regulatory Agency, Model Code Organization or recognized National Trade Association

Reason: if a steel fabricators shop is approved by any of the type of organizations listed in the definition, they must comply to approved quality control procedures with corresponding continuous monitoring of their personnel and equipment. Therefore, requiring continuous plant inspection only adds duplicating efforts with corresponding increases in cost without effecting the quality of workmanship.

Item 2. Paragraph 1.6.3D 1

Change the first sentence to read as follows: Welded connections for special Moment Frames over 2 stories in height and clear spans over 200 feet shall be tested by non-destructive methods conforming to AWS D1.1.75.

Reason: The thickness of material and type of welds are such that no additional structural safety results with the non-destructive testing.

Item 3. Paragraph 2.1 - Shear Panel

Change to read as follows: Shear panel is a floor etc.

Reason: Shear Panels are not limited to wood.

Item 4. Section 2.1 - Loads

After definition of snow load, add the following:

EXCEPTION: Where snow load is less than 30 pounds per square foot, no part of the load need be included in seismic loading.

Reason: Agreement with all other model codes. In addition, probability of maximum earthquake and maximum snow load occurring simultaneously is very remote.

Item 5. Paragraph 3.3 - Framing Systems

Change first word "four" to "five".

Reason: See Item 7 below.

Item 6. Paragraph 3.7.1 - Combination of Load Effects

Change equation 3.1 to read $= 1.2 Q_D + k Q_L + k Q_S + 1.0 Q_E$

Reason: The introduction of k is to allow for the varying proportion of loads. k for Q_L only varies when Q_L is roof live load or floor live load. k for Q_S varies due to proportion of Q_S used. To use 100% combinations of all loads will result in loads far in excess of any logical probability occurrence.

Item 7. Table 3B

1. Under Type of Structural System add the following:

Plane Moment Resisting Frame System. A structural system with a Plane (2 dimensional) Moment Frame providing support for vertical loads. The Plane Moment Frame shall have the capacity to resist the total required lateral force in its plane.

Lateral forces perpendicular to the Plane Moment Frame shall be resisted by shear walls, moment frames or diagonal bracing. This type of framing shall be limited to two stories.

2. Under Vertical Seismic Resisting System Coefficients R and C_d add the following:

Light framed walls with shear panels	7	$4\frac{1}{2}$
Shear walls reinforced concrete	$5\frac{1}{2}$	5
reinforced masonry	$4\frac{1}{2}$	4
Braced frames	5	$4\frac{1}{2}$
Unreinforced and partial reinforced masonry shear walls	$1\frac{1}{2}$	$1\frac{1}{2}$
Plane moment resisting frames	$4\frac{1}{2}$	4

Reason: As the classical definition of space frame is a three dimensional system, no where in the recommendations are plane frames allowed. This eliminates steel, concrete and timber rigid frames, truss buildings (non type buildings), therefore there must be a classification for this type structure.

In addition BSS46 Building Practices for Disaster Mitigation issued February 1973 on Page 223 states "Constraining the designer to use highly ductile elements may be unreasonably restrictive since it appears possible to design a structure with as much margin to resist failure by making it less ductile but stronger, in an appropriate manner."

15 January 1980

Item B. Table 3C

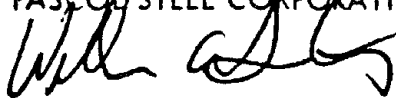
Change subscript 1 to read as follows:

Where there are no brittle finishes in buildings two or three stories in height, these limits may be increased one-third. In one story buildings where there is no brittle finish story drift is not applicable.

Reason: There is no reason to limit drift in single story buildings without brittle finishes provided the effect of drift is included in the design analysis.

Very truly yours,

PASCOE STEEL CORPORATION



William A. Sontag, P.E.
Chief Engineer

WAS:nz

cc:

Dr. Howard Simpson
Mr. Hal Iyengar
Dr. Richard D. McConnel
Mr. Nicholas Forell
Dr. Robert Englekirk
Mr. Joseph V. Tyrrell
Mr. Mark Fintel
Mr. Alan Yorkdale
Mr. Edwin G. Zacher
Mr. Roland L. Sharpe
Dr. Ajit S. Virdee
Mr. William J. LeMessurier

NOTES on the Meeting of:

TECHNICAL COMMITTEE No. 5 on MASONRY

for

Review and Refinement of Tentative Seismic Provisions (ATC 3-06)

Wiss, Janney, Elstner and Associates
Conference Room

Northbrook, Illinois
4 January 1980

1.0 The meeting opened at 9:15 a.m., C.S.T., with the following members of the Committee present:

Amrhein, James E.	(MIA)
Gensert, Richard M.	(ACI)
Hogan, Mark	(NCMA)
Hanson, George	(TMS)
Helfrich, Robert	(WSCP)
Stockbridge, J.G.	(ASCE)
Yorkdale, A.H.	(BIA)

1.1 Committee Members not Present:

Gerich, Andrei	(ISCCS-HUD)
Mark, Melvyn (non-voting)	(ATC)
Mayes, Ron (non-voting)	(ATC)
Bush, Vincent (non-voting)	(ATC)

1.2 One guest was present:

Wintz, J.A., III

1.3 It was noted that all but one voting member of the T.C. 5 was present. Therefore, any action taken could be considered that of the Committee after it is circulated.

2.0 It was suggested that the group consider some of the "design" questions, before attacking Chapters 12 and 12A.

The Committee reviewed some preliminary comments and positions prepared by Mark Fintel, of Portland Cement Association. Especially the Tables in Chapters 1 and 3 and height limitations.

It was the consensus that TC-5 should support these positions in general and several items in particular: i.e., Tables 1-A and 1-B, also some changes in Chapter 3.

The Schedule for the Committee was discussed and is as follows:

January 4	T.G. Meeting
January 11	T.G. Draft to full Committee
January 30	Committee Comments to T.G.
February 21 and 22	Full Public Meeting of Committee in Dallas
May 10	Submission of full proposals to ATC

2.1 The first subject to be considered was Table 1-B, which appears on page 35.

2.1.1 Following is the result of the discussion and consideration:

TABLE 1-B
COEFFICIENTS A_a and A_v and SEISMICITY INDEX

<u>Coefficient A_a Figure 1</u>	<u>Map Area Number</u>	<u>Coefficient A_a Figure 2</u>	<u>Seismicity Index</u>
0.40	7	0.40	4
0.30	6	0.30	4
0.20	5	0.20	3
0.15	4	0.15	2
0.10	3	0.10	1
0.05	2	0.05	1
0.00	1	0.00	0

The ATC says in their commentary that they assigned the arbitrary peak acceleration of 0.05 g to map area 1. The actual seismicity of map area 1 is actually zero. In addition, the peak acceleration of map area 2 is actually 0.00 to 0.05 as maximum.

It is the intention that any reasonably designed and built structure will survive a peak acceleration of 0.05 intact and all materials remain within the elastic range. Therefore, the Coefficients of Map Area 1 is reduced to 0.00 and the Seismicity Index for that area is reduced to 0. The other Seismicity Indices are adjusted accordingly.

2.2 The next subject to be considered was Table 1-A, on page 35.

TABLE 1-A
SEISMIC PERFORMANCE CATEGORY

<u>Seismicity Index</u>	<u>Seismic Hazard Exposure Group</u>		
	<u>III</u>	<u>II</u>	<u>I</u>
4	D	C	C
3	C	C	B
2	B	B	A
1	B	A	A

The reasoning for these proposed changes is as follows:

- .1 It is felt that Seismic Hazard Exposure Group III Buildings should be investigated and analyzed, even for Seismicity Index 1.
- .2 It is also felt that based on performance history, S.H.E.G. I Buildings in S.I. 2 need not be required to be reinforced masonry.

2.3 The next item to be considered was the Building Categories, which appear in Sections 3.4 through 3.7 of the ATC Documents.

2.3.1 The proposed revisions will install the following general requirements:

- .1 Building Category - A may be of any masonry system.
- .2 Building Category - B requires analysis and foundation study, but will only be enforced as needed to resist the loads.
- .3 Building Category - C requires analysis, foundation study, and be reinforced to minimum requirements.
- .4 Building Category - D requires analysis, minimum reinforcement, foundation study and special details.

2.4 The next item considered was Table 3-B on page 52, concerning R factors and C_d factors.

2.4.1 It was determined that the R factors shown are only opinions. They have no basis technically.

2.4.2 In addition, the R factor is a material and system related confidence factor.

- .1 Based on this, the Committee recommends that the R factors for reinforced masonry be at least equal to those for concrete.
- .2 The Committee also recommends that the terms "partially reinforced" and "unreinforced masonry" be eliminated.
- .3 The Committee recommends that the term to be used be "Engineered Masonry".
- .4 Engineered Masonry requires analysis and design and is reinforced as needed.
- .5 Reinforced Masonry also requires analysis and design, but is required also to have at least a minimum area of reinforcement.
- .6 It is recommended that these terms be used in the Document and in Table 3-B.

.7 It is also recommended that all R factors and C_d factors be the same for Concrete and Reinforced Masonry.

2.4.3 It is the Committee's understanding that the Concrete Industry is performing computer inelastic studies to determine what the R factors and C_d factors should be.

.1 The Committee recommends the same factors for masonry.

2.5 The next item to be considered was Section 4.4 on page 57, dealing with accidental torsion.

2.5.1 The Committee recommends that the section be revised as follows:

Last paragraph: "The design shall provide for the torsional moment M resulting from location of the building masses or the torsional moments M_{ta} caused by assumed displacement of the mass each way from t_a its actual location by a distance equal to 5 per cent of the dimension of the building perpendicular to the direction of the applied forces, whichever is the larger."

.1 The Committee believes that the minimum of 5 per cent for torsion is legitimate for "accidental" torsion. Also, we agree that actual torsion should be included, but to improve both requirements simultaneously is arbitrary and capricious.

2.6 The next item to be considered was Section 1.6.2, "Special Inspection", on page 31.

2.6.1 The Committee recommends that the section be revised as follows:

Section 1.6.2 Special Inspection, (E):

(E) STRUCTURAL MASONRY. Continuous Special Inspection required during placement of all masonry units for buildings assigned to Category D, and during all grouting operations for masonry which is part of the seismic resisting system in Categories C and D.

.1 The reason is that continuous special inspection should be required full time for Category D building, but only grouting operations inspection need be required for Category C.

2.7 The next item to be considered was Section 1.6.3, Special Testing (C) STRUCTURAL MASONRY.

The Committee recommends that the section be revised as follows:

(C) STRUCTURAL MASONRY. Special Testing of structural masonry shall be as follows:

.1 When f'_m is to be established by prism tests, at least five representative prisms shall be prepared and tested prior to start of work. During construction at least one sample prism

shall be prepared per day, but not less than one sample prism per 5,000 sq ft of wall area nor less than five such sample prisms for any building during the progress of the work.

OR

- .2 When f' is established based on the strength of units and mortar types
- a. Sample at job site and test mortar and grout at the rate of at least once per day, but not less than once for each 2,000 sq ft of wall area, and
 - b. Sample at manufacturer's plant and test masonry units proposed for use. Sampling rate shall be at least five representative units per production lot, but not less than one unit per 5,000 sq ft of wall area. Tests shall be performed for compressive strength in accordance with ASTM Standards appropriate for the type of unit used.

3.0 Consideration of Chapters 12 and 12A

- 3.1 General - In a general discussion of the Chapters, 12 and 12A, the following appeared to be strong consensus of the Committee present:
- 3.1.1 General goal is to do what is in the best interest of the public and the industry.
 - 3.1.2 Not to try to do away with the psuedo Ultimate Strength Design portion in Chapter 12.
 - 3.1.3 We must check the ϕ factors to see what the resultant design will be.
 - 3.1.4 It will also be necessary to check the R factors.
 - 3.1.5 It was agreed that the present Chapter 12A is very bad. It is not worth attempting to revise.
- 3.2 It was at this point that the basic impasse was reached.
- As perceived by the group, there are two choices:
- 3.2.1 Adopt a National Standard and eliminate Chapter 12A and make suitable revisions to Chapter 12.
 - .1 This position was supported by four of those present.
 - 3.2.2 Keep a Chapter 12A, but insert a completely rewritten document, based on the ACI-531 Standard and the draft Standard of the Masonry Society.
 - .1 This position was supported by three of those present.

3.3 After considerable discussion, no agreement could be reached.

3.3.1 It was the general feeling that both would be developed, and at a point near completion, perhaps a decision could be reached.

4.0 The meeting adjourned at approximately 5:30 p.m., C.S.T.

Respectfully submitted,



Alan H. Yorkdale, P.E.

AHY/jcr

Distribution: To All on Committee List

**COMMENTS AND PROPOSED CHANGES OF ATC3-06
TENTATIVE PROVISIONS FOR THE DEVELOPMENT OF SEISMIC REGULATIONS FOR BUILDINGS**

By Ralph C. Grippo, P.E.
International Conference of Building Officials

Technical Committee 9 - Regulatory Use

The scope of these comments delve into a philosophical level with respect to the applicability of the provisions. Also, specific comments are made with recommended changes to the provisions along with a justification statement.

The tentative provisions draft is a monumental effort between the various disciplines involved in building construction. The Applied Technology Council must be commended for this major achievement. The basic question to be answered is should the ATC3-06 Seismic Provisions become a code document.

The model code organizations have minimum seismic design provisions in the present codes. The broad acceptance of the model code has created a standard regulation to design the building to. This is a consensus procedure to amend the model building codes and update them as the state-of-the-art improves. The minimum standards must be looked at and improved upon when justification is documented. These provisions should be submitted to the model codes in this manner to provide minimum mandatory code standards.

Of great concern are those buildings that are designed for occupancy and owned by public jurisdictions that have pre-emptive rights to waive the local and regional construction code. These include Federal buildings as well as some State or special district buildings. Adequate safeguards of life and limb do need to be provided for the people occupying Federal public buildings. The "Seismic Provisions" would certainly answer this need. Also there would be a uniform regulation for all Federal agencies that would eliminate conflict and duplication. This efficiency of effort to provide standard regulations is laudatory and it is most encouraging to see an Interagency Committee on Seismic Safety in Construction at the Federal level.

The consensus process is a most important part in the adoption of these "Seismic Provisions." It is vital that all levels of participants take part in the evolution of the provisions. The end document should be something that everyone could "live with." The review and change process now affords us this opportunity. I submit that the regulations as adopted are not cast in concrete; a mechanism for changes needs to be included in the policy paper or even the document if there is concern.

I submit that the "Seismic Provisions" should become regulations for all buildings not presently controlled by a model building code with seismic provisions. This should provide a guarantee for those Federal buildings that are exempt from local government code regulations that they have adequate life safety provisions. This should be a mandatory requirement.

For those buildings constructed to minimum seismic requirements of the model codes (or equivalent), these new seismic provisions should be submitted for inclusion in the model codes through the consensus code change process.

Those areas of the provisions that do not meet the test of the consensus review should be placed in an appendix or companion guideline report as a recommended design provision. Those elements of the provisions that are prescriptive rather than performance orientated need to be quantified or reworded into more enforceable language.

Specific Changes to the Seismic Provisions

A. Section 1.1 Purpose

Add the words "and property" after the words "hazard to life."

The model codes propose to "safeguard life and property" as their goals. A review of the philosophy stated in the text (page 2) clearly shows that an effort is made to protect the structure from collapse or significant structural damage when subject to moderate earthquake. This is a definite effort to protect property.

B. Section 1.2 Scope

Delete Exception Number 2.

There should be an economic study for the cost of providing a minimum seismic protection of 5 percent versus the risk factor. The economic impact of the construction of one- and two-family dwellings to provide a degree of structural safety needs to be studied. The requirements for Conventional Light Timber Construction (Section 9.7) would be a minimum standard that could be used.

C. Section 1.3.1 New Buildings

Delete the portion of the second sentence after the word "height" which start with "located" and ends with "Table 1-B."

To allow all wood frame structures to have a minimum seismic resistance (the added comments in Part B above apply also).

Clarification of the application of the conventional wood framing Section 9.7 needs to be made. Section 9.8, Engineering Timber Construction, provides for more complex design for wood frame houses yet it is not clear that Section 1.3.1 would allow this design. (Also see Appendix A-2 datum 9001.)

D. Section 1.3.3. Change of Use

This section leaves unanswered the treatment of an existing building which does not meeting the present seismic requirements yet does not fit into the category of Section 13.1.1, that is, it is not significantly weakened since construction. This implies that seismic resisting elements of the building have been removed. More study is needed in this section. Perhaps an exception similar to the wording of the exception to Uniform Building Code Section 502 can be used:

EXCEPTION: The character of the occupancy of existing buildings may be changed subject to the approval of the building official, and the building may be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

E. Section 1.4.2 Seismic Hazard Exposure Group



Subsection (D) Multiple Uses

Clear justification of the 15 percent figure is not documented. The rationale should be stated in the commentary; i.e., why not 14 percent or 25 percent?

F. Section 1.6 Quality Assurance

This section expands an enforceable Uniform Building Code section (Special Inspections, Section 305) into a complex matrix of design and construction regulations. An in-depth economic cost analysis should be conducted to justify the inclusion of all Seismic Hazard Exposure Group II buildings in Seismicity Index 4 area in this plan.

Design costs, contractor costs and owner costs will increase proportionally if all Group II buildings are subjected to these provisions. Certainly schools and hospitals and public buildings can warrant this quality control.

This "first-time" effort to place minimum quality assurance requirements on installation of nonstructural components can become a major economic impact on the construction costs, generates a second level of approval and review and adds an additional enforcement burden on the local jurisdiction. The seismic life-risk factors need to be documented to justify the adoption of this provision.

I recommend the deletion of Seismic Hazard Exposure Group II except hospitals and schools and deletion of Designated Seismic Systems from these provisions.

G. Chapter 13 and 14

These chapters should be placed in the appendix of the provisions and labeled as guidelines. A preface should be included to note that special local action is required by the political jurisdiction to adopt these appendix provisions.

H. Omissions

1. A section should be included to provide a mechanism for review and change of the provisions on a systematically timed basis; i.e., a three- to six-year cycle. The amendments could be published on an annual basis on the off years with the code reissued on the designated year. The organization to administer this provision needs to be defined, perhaps the Building Seismic Safety Council (BSSC) is that organization.
2. A section should be included for an appeal process. A board or agency shall be established (or referred to) that has the authority to hear and resolve formal appeals regarding these seismic provisions.

FORELL / ELSESSER ENGINEERS, INC.

Forell · Elsesser · Chan Structural Engineers

Nicholas F. Forell SE
Eric Elsesser SE
F. C. Chan SE

Donald M. Chappell SE
William C. Honeck SE

January 11, 1980

James Harris, Secretary
Technical Committee No. 2
Tentative Seismic Provisions Project B168
Building 226
National Bureau of Standards
Washington, D.C. 20234

Gentlemen:

The enclosed lists of comments and recommendations are intended to improve on the Tentative Provisions to be used in the trial design test program.

The list prepared by me had assistance from members of the Structural Engineers Association of Northern California and was briefly discussed in a meeting of the Steering Committee of the Seismology Committee of SEAONC. The list prepared by T. Zsutty, Chairman of the State Seismology Committee, and Ed Zacker, past President of SEAONC, are transmitted as received.

I wish to restate my expressed concern at the December 11th meeting at the National Bureau of Standards. The importance of the Tentative Provisions is too great to limit the time for the preparation of comments and recommendations as severely as the schedule demands. The result of placing such a severe time restraint on this process will be a lingering doubt in the minds of the participants and their sponsoring organizations that they have not been given a fair opportunity to have their voices heard. I sincerely hope the door will not be closed for future well reasoned and sincere comments.

Very truly yours,


Nicholas Forell

/cs

encl. - incomplete for this copy

cc: Steve Johnston

CHAPTER 1

Section 1.4.4. Why is this requirement limited to Category D buildings? New buildings of lower category should be protected from this exposure. What is the definition of "site"? 1 acre, 100 acres, or what? Clarification required.

CHAPTER 7

One comment received points out that interconnection of footings is not required or needed under certain conditions, such as solid rock or other soils materials that would not permit differential motion of footings.

CHAPTER 10

Section 10.g. There is an implication in this section that Special Moment Frames shall be designed by the Plastic Design Method. This is undesirable and wrong. The concept should be to incorporate the useful and important provisions of Section 2 of A.I.S.C. Specifications into the design of special Moment Frames. This section requires clarification which could be accomplished by writing a new section which coherently states the requirements, rather than deleting from and adding to two pages of Section 2 of the A.I.S.C. (which makes both the original and the revisions incomprehensible).

Memorandum

U.S. DEPARTMENT OF
HOUSING AND URBAN DEVELOPMENT

TO : James Pielert, NBS Secretariat
BSSC Committee 9, Regulatory Use

DATE: January 31, 1980

IN REPLY REFER TO:

FROM : G. Robert Fuller, ICSSC Representative

SUBJECT: Review of ATC 3-06

Following are several comments derived from my review of Chapters 1 and 13 of ATC 3-06, for dissemination to other members of Committee 9, Regulatory Use.

I. Chapter 1 Administration

Sec. 1.1, Purpose: Potential property damage should also be minimized.

Sec. 1.2 Scope: Provisions for seismic resistance of agricultural buildings and one- and two-family dwellings should also be included, even if minimal. The purpose is to reduce economic loss as well as to promote life-safety.

Sec. 1.3.1 New Buildings: One- and two-story dwellings, other than wood frame construction, are not adequately covered in other chapters. Wood-framed dwellings, particularly modular and mobile homes, with Seismicity Index 3 and 4 need much more stringent anchor bolt requirements than shown in Sec. 9.7 (7 diam. = $3\frac{1}{2}$ " for $\frac{1}{2}$ " bolts). Dwellings with Seismicity Index of 2 have a coefficient $A_v = 0.10$ and a resulting lateral shear force which should be accounted for.

Sec. 1.5 Alternate Materials: The second sentence needs to be rewritten. More specific criteria is required, as well as guidance to "Regulatory Agency."

Sec. 1.6 Quality Assurance: Special inspections and testing should also be required for precast concrete structural and architectural elements and related connections.

FEB 7 1980

II. Chapter 13 Existing Buildings

Sec. 13.1 General: Evaluation of seismic hazard should be required of all buildings with critical occupancies, such as multi-story residential in Seismicity Index 2, Map Area No. 2 and 3, A_a & $A_v = 0.10$ and 0.05 .


Sec. 13.1.1 Identification: Requirements are excessively complicated, i.e.: SFPO (Dwellings) = 300. Therefore, with $OP = 100$, buildings with Total Area of All Floors less than 30000 sf with Seismic Performance Category C are not subject to provisions. However, evaluation is required for all buildings designed before 19(?) with Seismicity Index 4 and for all exterior nonstructural elements in Category C buildings. Then an "Earthquake Capacity Ratio, r_c " has to be calculated using the "OP", and a "Permissible Time to Complete Seismic Hazard Abatement Measure, t_x " needs to be developed using a factor for ? years plus the r_c ratio. The alpha factor is "To be determined by the Regulatory Agency (see Commentary)."

Finally, the hazard needs to be abated by strengthening so that the applicable earthquake capacity ratio is increased to 1.0 for Seismic Performance Category C and D Buildings, which in other words is 100% compliance with the present Code, unless it is an "Historical Building." It is our opinion at HUD, that it is not feasible to require 100% compliance with present codes. A structural evaluation should be required and then the "Regulatory Agency" must decide what is economically feasible.

III. General Review of ATC 3-06:

"Regulatory Use" Aspects: ATC 3-06 does not adequately address many aspects of application of aseismic design and construction criteria, codes or standards by regulatory agencies. One such aspect pertains to "liability" and "tort law." A study funded by NSF and conducted by the Association of Bay Area Governments (ABAG), Berkeley, California covers this topic. The subsequent report by Terry Margerum, dated January 1979, titled "Will Local Government be Liable for Earthquake Losses," should be reviewed.

One area where liability to local government, contractors and designers could be reduced is in rehabilitation of existing buildings. The ATC-3-06 requirement of 100% compliance, mentioned previously, and the 50% rule for rehabilitation contained in most codes should be reviewed in light of implied liability.



G. Robert Fuller

cc: Dr. Charles C. Thiel
FEMA - ICSSC

GARDNER & HOWE
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H N HOWE, P.E.
(1887-1960)
WARNER HOWE, P.E.

December 12, 1979

TO: COMMITTEE 9: Regulatory Use
NBS - ATC-3-06 Review Project

Gentlemen:

It was a pleasure meeting with most of you at the Bureau yesterday and feel that we talked around the problems but made very little resolution of them. As stated, I believe that the format and use of this document as a code per se is inappropriate and I do not know who would address this if Committee 9 does not.

As requested by Chairman Bill Dripps, I presented my comments in the form of a paper which I presented at the Building Seismic Safety Council in San Francisco on November 8th and am sending the Committee a copy herewith for your information.

Some discussion was made at our meeting of the problems of the county by county maps now included in the ATC-3-06 document, but again no resolution was made. My opinion is that the concept of contoured probability maps as explained in the Commentary to ATC-3-06 is an excellent approach and affords the opportunity for presenting a family of risk maps based on different degrees of probability and life periods of structures, thus allowing a rational approach to varying exposures to hazards due to type of occupancy. It further allows some rational modifications due to local conditions, particularly in the less seismic regions of the U. S. The use of county by county maps in my opinion connotes a much greater degree of accuracy than exists in the preparation of the maps and can be misleading from that aspect.

There would appear to be two approaches at this point:

- (1) Prepare a Code document that can be adopted by reference or inclusion without major modifications, and
- (2) Prepare a guide document to provide a basis for local adaptation.

In view of the the present pressure from the Federal Government and from the Model Code Groups and the National Institute of Building Sciences to adopt a National Model Code without modifications, it is rather improbable that (2) will be acceptable. Therefore, I believe that the Committee must reconcile our thinking to the fact that this document, if it remains in code format, will probably be adopted intact as a model code provision and ultimately be adopted by most code enforcement authorities.

TO: COMMITTEE 9: Regulatory Use
NBS - ATC-3-06 Review Project

December 12, 1979
Page Two

I, therefore, believe that it is the responsibility of
Committee 9: Regulatory Use - to deal with the philosophical
content of the document if it is to remain in code format.

Yours very truly,

Warner Howe
Warner Howe, P. E.

WH/rv

cc: Roland Sharpe - ATC
Neville Dunivant/Dames & Moore



JANUARY MEETING

DATE: January 9th, 1980.

DINNER: \$9.00

SOCIAL HOUR: 5.45 p.m.

DINNER HOUR: 6.45 p.m.

PLACE: Luminarias Restaurant, 3500 Ramona Blvd., Monterey Park.

RESERVATIONS: Return enclosed card before noon, January 7th.

SUBJECT: "KEMPER ARENA ROOF COLLAPSE"
Kansas City, Missouri.

SPEAKER: JAMES L. STRATTA, Consulting Engineer,
Menlo Park, California.

On June 4th, 1979, the roof of the Crosby-Kemper Memorial Arena collapsed during an intense wind and rain storm. A-490 high strength bolts were involved. Retained by the Kemper Arena Commission to determine failure cause and potential repair, James Stratta, will discuss his findings as presented to the owners of the 17,600 seat convention hall.

SEAOC SEISMOLOGY COMMITTEE - NEW VERSION OF THE BLUE BOOK

The SEAOC Seismology Committee has begun a program leading to a new version of the Blue Book for 1983. The basis for this program comes from last year's committee resolution that "the methodology contained in the ATC-3 document deserves consideration in developing new lateral force requirements and commentary". The work is organized according to the following time schedule and task committees. Willing and knowledgeable SEAOC members are encouraged to join these task committees. Hopefully we will end up with a code that is both easy to use and hard to misinterpret rather than the opposite!

Time Schedule

1980 - Organize Task Groups; Discussion of viewpoints from each SEAOC Section; Begin commentary and provisions for resolved viewpoints.

1981 - Draft commentary on all provisions except materials sections.

1982 - Detailed statements of provisions including materials sections.

1983 - Blue book provisions and commentary.

1984 - Review for UBC publication.

1985 - UBC publication.

Task Committees

A. Purpose to assemble information from all sections and sources, draft commentary and provisions, and lead to discussion sessions.

B. Section tasks (Chairman).

SEASD (Jim Libby)

Foundations

Precast and prestressed concrete

Masonry

SEASC (John Robb)

Dynamic response related provisions

Dynamic analysis

Steel

Special structures

SEACC (Gene Cole)

Timber

Decking and sheathing

SEANC (Fritz Matthiesen)

Design criteria and method

Structural system factors

Zoning and ground shaking description

Reinforced concrete.

Seismology Committee Procedure

Based on a 1-1/2 day committee meeting setup.

A. Friday afternoon - Regular Seismology Committee business, including necessary changes to existing Blue Book.

B. Saturday work session on New Provisions. Discussion as directed by the assigned task committee. Approved section guests and materials representatives may attend.

C. First 1-1/2 day meeting is February 8th-9th (an appropriate seismological anniversary date) at San Francisco Airport.

Agenda will be:

- Design philosophy and criteria (SEANC)
- Zoning objectives, criteria and Methods (SEANC)
- Dynamic response provisions (SEASC).

Any SEASC member wishing to serve on any of the above task committees, is invited to attend a meeting of the Seismology Committee, which will be held at Luminarias Restaurant, prior to the dinner meeting on January 9th. The committee meeting will commence at 3 p.m.

STRUCTURAL ENGINEERING PROFESSION

The Professional Policies Committee of SEANC is in the process of developing a position paper on Structural Engineering registration similar to the paper recently prepared on Civil Engineering registration.

In discussing the present and future status of Structural Engineering, it became apparent that we are near the point of losing the history of the start

of Structural Engineering as a profession in California.

The committee has, therefore, decided to attempt to write a brief history recording when, why and how Structural Engineering Registration came about.

We would appreciate any help that any member could give us in the recreation of the history of Structural Engineering. Any bit of information, no matter how brief or informal, will be useful. With the help of everybody, we should be able to piece the story together.

Please send any information to Nicholas F. Forell, Chairman, Professional Policy Committee, SEANC, c/o 1005 Sansome Street, San Francisco, California 94111.

STRUCTURAL STABILITY RESEARCH COUNCIL - CALL FOR PAPERS

The Structural Stability Research Council will hold its 1980 Annual Technical Session and Meeting at the New York Sheraton Hotel in New York City on April 29-30, 1980. There will be open Task Group meetings on April 28, and the Technical Sessions are scheduled for April 29-30.

A special panel discussion on "Bridge Stability Problems" will be held in the evening of April 29.

The technical sessions provide an opportunity for practicing engineers, research workers and students to describe their latest findings, and to exchange information with others working in similar fields. Papers and reports on a wide range of subjects related to the stability of metal structures and to the theme will be presented at the technical sessions.

Those interested in presenting a paper should contact Ms. Lesleigh G Federinic, SSRSC Headquarters, Fritz Engineering Laboratory 13, Lehigh University, Bethlehem, Pa. 18015 (215) 861-3519.

FIRE RESISTIVE MATERIALS COMMITTEE

The Fire Resistive Materials Committee completed their important 1979 report on the

use of structural epoxy materials. Their next project is "The Structural Aspects of Fires in Multi-Story Buildings", a very contemporary engineering topic.

Members of the Association are invited to submit their observations and experiences, and to participate in the committee work.

New chairman of this committee is Nick Parris (620-3684). The next luncheon meeting will be held on January 9, 1980, 11.30 - 1 p.m., at the OSA Office, Room 3032, 107 South Broadway, Los Angeles 90012.

LA SECTION OF ASCE TECHNICAL SEMINAR

The first of a series of two-day technical seminars will be held on Friday and Saturday, January 25 and 26, 1980.

The subject of this important seminar is Seismic Design Today - State-of-the-Art and Applications. SEASC is a co-sponsor of this seminar.

Subject to be presented at the seminar, which will be held between 9.00 a.m., and 4.30 p.m., each day, include:

- An overview of seismic design practice.
- Earthquake resistant design of earth and rock-fill dams.
- Earthquake resistant design of concrete gravity and arch dams.
- Earthquake resistant design of intake towers and water storage tanks.
- Seismic risk analysis on water resources projects.

The seminar will be held in the main auditorium of the L. A. Department of Water & Power building, 111 North Hope Street, Los Angeles. Parking will be available under the Music Center across the street on Friday, and at DWP on Saturday.

Registration fees for the seminar are as follows: Members of Co-Sponsoring Organizations \$100.00, Students \$40.00, All others \$125.00. In accordance with DWP policy, all fees must be paid in advance. Fees include lunch on Saturday and all handout materials.

For further information and registration, please contact Ms. Connie Bickmore, ASCE Office, 2550 Beverly Blvd., Los Angeles 90057, telephone 386-6291.

NEWS ABOUT MEMBERS

Bob Tobin has been selected to receive the "Wason Medal" at the 1980 ACI Convention for the year's most meritorious paper published in the January 1978 Journal, entitled "Flow Cone Sand Tests".

Bill Liljeström has resigned as President of Chemically Prestressed Concrete Corporation, and formed a new company - 5C Service, Inc., which provides quality assurance for shrinkage compensating concrete.

LeRoy Crandall has been elected President of the Consulting Engineers Association of California. He will take office at the 27th Annual Meeting in February 1980. He has been serving on the CEAC Board of Directors since 1976.

Jim Amrhein advises of a two-day conference on "Masonry Research in Progress" to be held March 11-12, 1980, at the Marina Del Rey Hotel. Call Jim at 388-0472 for further details.

Zorah Sheffner attended the Third International Conference on Automation in Warehousing, held in Chicago on November 27-29, 1979, and presented a paper on "Economic Considerations in the Design of High-Rise Storage Racks in Seismic and Non-Seismic Regions".

APPLICATIONS FOR MEMBERSHIP

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KOSO NAKATANI

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Has been in engineering 11 years.
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DISASTER SERVICE WORKER REPORT

Jim Ruthroff, Chairman.

The first call SEASC has had for Disaster Service Workers, was from Laguna Beach, California. SEASC has been working since 1976 to establish the qualifications and willingness of registered Civil or Structural engineers to volunteer for disaster work.

Within two hours of the start of advancement of the massive landslide, Don Wiltse was contacted by Mr. Douglas Schmutz, Assistant City Manager, requesting the presence of structural engineer representatives to inspect and post various structures for safety. Don Wiltse contacted Jim Ruthroff, and was advised by Jim that SEASC would be unable to dispatch any engineers until the Governor declared the area a disaster.

On or about November 9th the area was declared a disaster area, and Jim Ruthroff selected 12 registered disaster service workers to survey structures for safety.

The 12 engineers were organized into teams of two men each, and assigned various houses for inspection and reporting. It was made clear that inspection was for structural stability, and not to report on geological stability or for hazard of services such as gas, electricity and sewers.

The Disaster Service Workers were able to post 37 homes as being structurally sound for occupancy. Twenty-seven homes were either completely destroyed, partially destroyed, or in any case unsafe to occupy.

On December 11, 1978, the SEASC received a letter from Mr. Fred S. Solomon, City Manager of Laguna Beach, as follows:

"I appreciated our telephone conversation on the landslide disaster because it gives me an opportunity to express the thanks of the City of Laguna Beach to the SEASC for their assistance in evaluating the structural integrity of homes impacted by the slide.

The SEASC's evaluation, in conjunction with geology studies, has permitted homes to be occupied which may otherwise have been subject to question and conversely supported a position of refusing

occupancy in certain cases.

One further form of assistance they provided which you may not be aware of is that the reports of the engineers were utilized in abatement hearings to support a declaration of public nuisance and need for demolition on the site to provide for emergency attention to the grading of the headscarp and main slide area.

If I have a criticism of the involvement of the SEASC, which is intended as a constructive means of addressing a more widespread disaster, such as the San Fernando Valley earthquake, it is the delay in your participation arising out of the need to await official disaster status and the liability you incur until then. Official disaster status may take some period of time causing hardship which may not be necessary. Houses and businesses may be declared unsafe to occupy by local officials where the expertise of the SEASC would result in an entirely different conclusion. I would hope that a mechanism could be derived which would permit your immediate attention to these problems.

Finally, uniformity of reporting and a bit more attention to detail in the reports would be helpful in later abatement hearings."

3.2 Roster

COMMITTEE 9: Regulatory Use

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Committee 9 (continued)

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3.3 Selected Committee Correspondence and Applied Technology Council Comments

The following is a composite summary of all responses received from committee members to the request for comments/recommendations to specific sections of the ATC document.

Section 1.6.1 Quality Assurance Plan

"The contractor has already assumed, when he submitted his bid or signed his contract, the responsibility covered in 1.6.1(B). This requirement is redundant."

"(B) CONTRACTOR RESPONSIBILITY - According to my notes, on 2/20/80 the committee had reached consensus to delete Section 1.6.1(B) until it could be legally investigated. Towards the end of the meeting on 2/21/80 the committee reached consensus to recommend that the entire document be legally reviewed, especially Section 1.6 and Chapter 13."

"Much of what is in the Quality Assurance Plan should not be the responsibility of the regulatory agency. By establishing all the details in the "code", it makes the regulatory agency responsible for enforcing all such relationships."

"1.6.1(B) "Contractor Responsibility" was to have been removed from the document after balloting. The responsibility should be placed on the building official or regulatory agency, not on the Contractor".

"I recommend the deletion of Seismic Hazard Exposure Group II except hospitals and schools as well as deletion of Designated Seismic Systems (H) & (I). Arch. & Mech/Elec. components. I further recommend the deletion of subsection 1.6.1B Contractors Responsibility as unenforceable for the local jurisdiction. There is a greater cost factor in the administering of contractor regulations. This would not be cost-effective, just create more paperwork".

Section 1.6.2 Special Inspection

"Already covered in building codes."

"In my opinion, the committee reached consensus to specifically include precast, prestressed concrete. However, upon reading Section 1.6.2(D) more carefully, I believe that it can be interpreted as including precast, prestressed concrete as well."

"The municipality's building department or the regulatory agency should provide for "Special Inspectors." Certain inspections should also be provided for in the Contract as the responsibility of the "Architect of Record," "Engineer of Record," "Design Architect," or "Inspecting Architect."

"I recommended modification of (D) to include precast concrete structural and architectural elements."

Section 1.6.3 Special Testing

"Adds to the overall cost of construction."

"Requirements outside of West Coast seismic zones should vary from ATC 3 document."

Section 1.6.4 Reporting and Compliance Procedures

"More government regulation and red tape, increasing the cost of construction without necessarily increasing the quality."

"There are serious legal and regulatory conflicts in the requirements. There are gaps in responsibilities. Deficiencies may require engineer modifications and permit modifications requires at least engineer approval. It is likely that some work completed will not be in compliance. Requires thorough review of all legal and technical literature."

"All work noted not in compliance on the inspector's reports and certification shall be accepted by the design engineer or architect prior to final approval by the local jurisdiction."

1.6.5 Approved Manufacturer's Certification

"Is there adequate expertise in all regulatory agencies to evaluate whether a manufacturer meets the requirements to be approved?"

"This section is vague in reference to the means of approval by the regulatory agency and the obligation of the manufacturer. This section would have to anticipate a complete system to accomodate the approvals and monitoring system required."

"The manufacturer's certification could be approved by the local regulatory agency or an approved alternate organization, i.e. ICBO, BOCA, etc."

Other issues relevant to Regulatory Use that received specific comments/recommendations.

1. Appeals

"Appeal Procedure - There does not appear to be any reason to impose any specialized appeal procedure requirements on any standard procedures now existing."

"Appeals procedures will need to be established by each municipality or Regulatory Agency in conformance with statutes and regulations."

"A board or commission should be established that has the authority to hear and resolve formal appeals regarding these seismic provisions. This appeal board would be the elected officials of the local jurisdiction if they did not delegate this responsibility."

2. Changes

"Recommended procedures in commentary reflecting work of SEAOC, ICBO, etc. A central source should be established for promulgating material which is code oriented for consideration by agencies and jurisdictions for code changes. Don't recommend specific change procedures incorporated in document."

"A periodic review procedure needs to be established by BSSC for continual updating of the requirements. Annual revisions of the document would enable state-of-art correlation."

"A section should be included to provide a mechanism for review and change of the provisions on a systematically timed basis, i.e., a three year cycle. The amendment could be published on an annual basis on the off years with the code reissued on each third year. The organization to administer the provision should be the Building Seismic Safety Council."

3. Application to Existing Buildings

"I believe that the recommended legal review of Chapter 13 should provide guidance regarding this matter."

"This requires careful review of policy and procedures in less seismic areas. Existing section is reasonable reference as guide but local policy, cost-benefit, etc. in less seismic areas requires careful study and policy development."

"Evaluation of seismic hazard should be required of all buildings with critical occupancies, such as multistory residential in Seismicity Index 2, Map Area No. 2 & 3. The Regulatory Agencies must have the latitude to decide degree of compliance with new code provisions. An r_c factor of 1.0 is not economically feasible for most buildings. Entire section needs simplification."

"Chapter 13 and 14 should be placed in the appendix of the provisions and labeled as Guidelines (or placed in a separate document). A preface shall be included in the regulations noting that special action by the local political jurisdiction shall be required to adopt these appendix provisions. This provides local decision on an as needed basis."

4. Education and Training

"An extensive program of exposure to general comments relative to seismic design considerations is necessary. In addition, general information on seismology, microzonation and risk which is applicable to policy making decisions should be covered."

"BSSC sponsored seminars and workshops could be organized to educate building officials, regulatory agency personnel, as well as engineers and architects. A curriculum or syllabus could be developed for adoption by academic institutions."

"It is obvious from the scope of the regulations that funds need to be provided along with personnel and material to educate the local code enforcement officials and their staff. The training could be delegated (contracted) to the regional model code organizations with staff already existing."

3.4 Other Comments Received

"I think that the purpose of this regulation should not be limited to safeguard life only but should be expanded to the protection of property. The structures are asked to be designed to withstand certain loads to protect the building from collapse or significant structural damage when subject to moderate earthquakes. This philosophical point should be acknowledged under the purpose section (1.1)."

"The tables (1-A, 1-B, etc.) are complex as well as the detailed regulations, yet the overall effort is to be commended. I recommend that the "Seismic Provision" become regulations for all building not presently controlled by a model building code with seismic provisions. This will provide a guarantee for those buildings that are exempt from local code regulations that they will have adequate life safety provisions. This should be a mandatory requirement."

"For those buildings subject to the seismic provisions of the model codes, these draft regulations should be submitted for inclusion in the model codes through consensus process for code change."

