Association of Engineering Geologists

"Serving Professionals in Engineering, Environmental and Groundwater Geology Since 1957"

Southern California Section

NEWSLETTER - March 1997

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Deadline for submittals to the April Newsletter:
March 21st

Next Meeting April 8th

Dinner Meeting *Wednesday March 19th* w/ ASCE

- ❑ **Stevens Steak House**
  5332 Stevens Place
  City of Commerce
- ❑ **Cost - $20.00**
  ($10.00 for full-time students with valid I.D.)
- ❑ **For reservations call Pat Stewart at Montgomery Watson at (818) 568-6161 by Friday March 14th**

Make reservations by Noon on the Friday before the Meeting

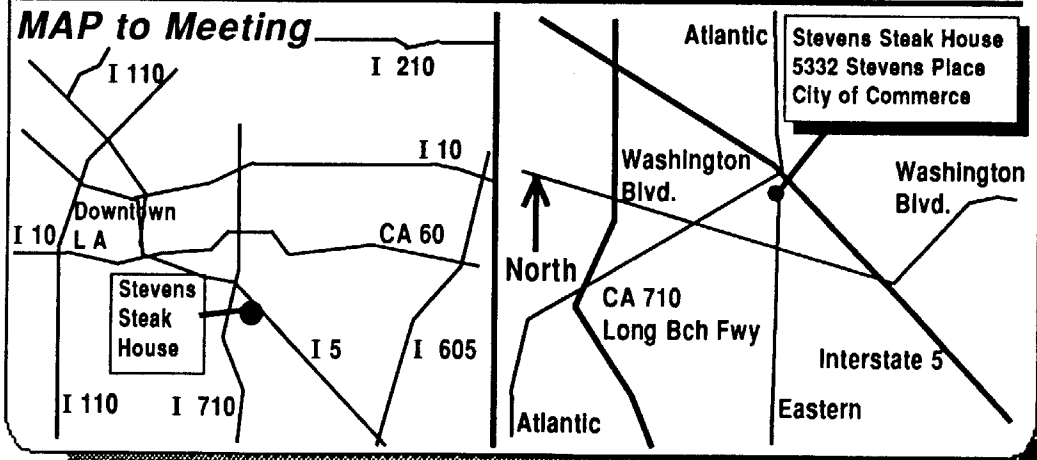
- ❑ **5:30 Social Hour & One-Half**
- ❑ **7:00 Dinner**
  7:30 Announcements
- ❑ **7:45 Program**

Program

TOPIC **Trying to Take Some of the Mess Out of the Message**

SPEAKER **Richard L. Tandy, Ph.D.**
Distinguished Professor Emeritus & Consultant in Geotechnical Engineering

MAP to Meeting



Program Topic & Speaker

Trying to Take Some of the Mess out of the Message

Richard L. Handy, Ph.D.

Distinguished Professor Emeritus and Consultant in Geotechnical Engineering

We all have a message, but specialists prefer to link arms and trade their words with each other rather than building on their common languages and common interests. As a result, specialists in different fields have difficulty communicating with each other, not to mention communicating with the general public. Abstracts aren't much help. For instance, "Science" magazine now has a page in each issue dedicated to translation, trying to convey something meaningful from some minor glitch in biological chemistry with 14 co-authors.

To the common person, our "common languages and common interests" are not all that common either. In fact, formal presentations may sound a bit like the tonal repertoire of Tibetan monks reading algebra from the prayer wheel. But people do need to know about things that we happen to know about: landslides, expansive clays, and other hazards which can affect their lives and property. People need to be informed. However, getting the information across is no easy matter. It involves (1) catching interest and sustaining it for longer than a sound byte, and (2) translating into language that really is common, instead of conspicuously uncommon. For example, "landslide" is a fairly graphic term and means something to everybody. But we instinctively hate dramatics because we worry that it may mean too much. We generally prefer more conservative expressions like "slope stability" and "factor of safety." To a lay person, a factor of safety of one sounds pretty good, maybe even better than 1.5. Yes, we can explain it, but who has time for explanations once the cornerstone is laid?

We expect that people would recognize how foolish and dangerous it is to put one's house on a temporarily inactive landslide. Mention it and they readily agree. But what if we don't mention it, and keep mentioning it? Apparently people like realtors, architects, developers, and engineers who might reasonably be expected to know about such things may not even recognize one in their own backyard. Even geotechs can mess up if they don't know their geology. But if a story doesn't involve sex, fun, sports, murder, or disaster, people tend not to be interested. For instance, how much news coverage does the costliest natural disaster, expansive clay, receive? There is also nothing very fun, sexy, sporting, murderous, or dramatic about spotting a landslide before it happens. The bottom line is this: I once put a scientific article through a readability computer program and the article was accurately characterized as "pompous." Enough already! There's nothing to hide, or that should be hidden, unless you're in politics. Let's not be pompous; let's get real!

Speaker: Dr. Richard Handy received his BS and MS degrees in Geology from Iowa State University. In 1956, he received his Ph.D. in Soil Engineering and Geology, and was appointed to the faculty in the Department of Civil Engineering. He is co-author of the 3rd and 4th editions of a textbook, "Soil Engineering," and currently is working on a 5th edition, but not very hard. His papers and patents include the Borehole Shear soil tester, Rock Borehole Shear tester, Stepped Blade device for measuring in situ soil stress, and the Drilled Lime method for landslide stabilization, all in use world-wide with the possible exception of California. In 1970, he and his students conducted the ice tests and analysis on the NW Passage expedition of the SS Manhattan. He also has done research or consulted on Alaska, Hawaii, South Africa, Italy, India, and Pakistan. His award include the ASCE Middlebrooks Award for an analysis of soil arching. He is a Fellow in the Geological Society of America and the American Association for the Advancement of Science. In 1985, he was named Anson Marston Distinguished Professor of Engineering. He now is Distinguished Professor Emeritus, which he says only means that his tenure ran out.

THIS MONTH

March 1997

Kelly E. Rowe
Hydrogeologist

This month is our traditional annual joint meeting with members of the Los Angeles Branch of Geotechnical Division of the American Society of Civil Engineers. It is on Wednesday the 19th at Steven's Steak House. The speaker is Dr. Richard L. Handy , who has had a long and distinguished career in geotechnical engineering. He will discuss how awful we generally write our technical reports and will provide suggestions on how we may become better communicators of our work to the public. This meeting is usually well attended as it gives us an opportunity to meet some of the active southern California geotechnical engineers and find out how they are doing.

Last month Erik Rorem, western regional manager for the Brugg Cable Co., provided an excellent presentation of how wire-rope net and wire mesh net systems can prevent damage due to rockfalls and debris flows. Brugg, a Swiss company, has provided specialty cables for trams throughout the world and initially developed wire-rope net systems for control of snow avalanches. Included in the presentation was a video on a giant screen about recent field tests completed by CalTrans. The video described the planning and conduct of testing a Brugg wire rope net assembly at the base of a 1.5 to 1 slope about 250 feet high. It was interesting seeing the increasingly larger boulders they used slam into the net. Erik concluded his discussion on rockfalls by showing applications of the net at several places in Southern California, including a 4-feet high net system located along the pass on California Highway 101 north of Gaviota, and several systems setup along a mountainous highway near Banning.

Use of wire-rope net systems for debris flows have good promise. Brugg, along with CalPoly, the USGS, et.al., used the USGS debris flow experimental station (a very impressive debris flow test system) in northern California to evaluate the capabilities of wire-rope netting to control simulated debris flows. The testing showed that the net system worked great. The cable netting systems are primarily designed to dissipate the kinetic energy.

Wire rope netting is composed of galvanized steel and has a relatively long life. It can be easily cleaned by lowering the net from the support columns and cables, removing the soil and reset the system onto the columns.

Buzz Spellman announced at the meeting that I misquoted him in the February newsletter. He said the California Department of Consumer Affairs (DCA), not the Board of Registration for Geologists and Geophysicists, does not want to have continuing education requirements for licensing geologists. I understand the DCA does not know or care what geologists do. The DCA would probably prefer to eliminate geologists registration altogether, thereby becoming heroes to politicians showing they reduced the size of bureaucracy in the state. At the same time they would probably allow any engineers and landscape architects to do geology work.

Robert Sydnor, engineering geologist with the California Division of Mines & Geology in Sacramento, sent me pages excerpted from the new **Uniform Building Code (UBC) Chapter 16 Earthquake Regulations.** Because there were so many pages I photoreduced them and cut & pasted them in the latter pages our small newsletter for your information. If you have good eyesight you can read these pages. Now we have A, B and C types of earthquakes...

Do you want to have the newsletter e-mailed to you? A few members have asked if I could e-mail the newsletter to them because they are often out of town. No problem. Just send me a message with your address at one of my e-mail addresses noted on the first page.

Chairman's Column

Dave Ebersold

Lots of stuff going on - here's a sampling. The mid-year Board of Directors Meeting of AEG will be held on April 19th and 20th in Orange County. Hot topics include selection (hopefully) of a new Executive Director and proposed Bylaws change regarding who can and cannot hold Section office. With regard to the Bylaws change, there are two versions. Version A would allow a Member (M), Associate Member (AM), or Affiliate Member (AF) to serve in any position except on the Executive Council of National AEG. Version B is the same, except that only an M could serve as Section Chair and on the Board of Directors. Have an opinion on these topics? Let me know because I will be voting in April.

A State Board of Registration for Geologists and Geophysicists Strategic Planning Committee Workshop was held on March 6, 1997, 9AM. Location 2535 Capitol Oaks Drive, Suite 300A, Sacramento, CA. Did anyone go? Please let me know. The Examination Committee met on March 7, same place, same time.

Continued from page 2

The California Council of Geoscience Organizations (CCGO) continues to move forward. Notes from the last meeting, held in Berkeley on February 15, are included in this newsletter. The next organizational meeting will be held Sunday, March 23, at Montgomery Watson's offices in Pasadena. Funding is a key issue. If you are interested in attending and learning for yourself about this new organization, I encourage you to attend! Ask me for details.

We have a field trip scheduled for Saturday, April 26, to the Eastside Reservoir Project courtesy of the Metropolitan Water District of Southern California. Since I have never seen a dam of this size being constructed, I am looking forward to this trip! Construction activities will be ongoing during our visit. See the announcement in this newsletter and sign up early!! Please note that no private vehicles will be allowed to travel to the site due to parking and safety restrictions so reserve your space now.

Also, we have an exciting short course scheduled for April 19th and 20th in Irvine. Given by Woody Higdon, the important course covers photographic techniques and use of GIS in engineering geologic applications. Additionally, the cost of this two-day event is extremely reasonable! Having used GIS on some of my projects, I can assure you that this is an invaluable tool for both data analysis and presentation. Desktop GIS applications save hours over conventional data analysis techniques and graphics preparation. In my opinion, if you're not using it, your falling behind the competition and way behind the state-of-the-art. No, Woody didn't pay me to say that.

Announcements for applications for the Stout Scholarship are now going out in the SCS newsletter and AEG news. Please encourage any qualified candidates (must be a Student Member of AEG) to apply. Also, NOW IS THE TIME TO CONTRIBUTE TO THIS FUND. Checks may be made out to the Stout Scholarship Fund and sent to me (address on front of newsletter). I am also starting the process of transferring the scholarship over to the Engineering Geology Foundation. While the transaction will not occur for several months, it will accomplish two things, at a minimum: 1) contributions to the fund will be tax deductible and 2) the fund will not be threatened by any potential financial liabilities which AEG experiences. Again, both contributions and applications are welcome now.

FIELD TRIP To East Side Reservoir: The AEG Southern California Section is coordinating a field trip, courtesy of the Metropolitan Water District of Southern California, on **Saturday, April 26** to the East Side (aka Domenigoni) Reservoir project, about 5 miles south of Hemet. This is the largest imported surface water supply storage project in the history of southern California. It is presently under construction is to serve as an emergency supply of water (800,000 acre-feet) for southern California in the event a rupture along the San Andreas Fault cuts-off water supply aqueducts from Northern California and Arizona. The reservoir consists of three separate embankments that have their foundations in various stages of construction. We will be given a tour of the foundation areas, borrow site area, soils laboratory, and various structures associated with the dam. This will be a one day trip with a catered lunch. If you are interested in attending, sign-up sheets will be available at the March & April meetings. Or contact Kim Bishop at 213-343-2409 and speak to him personally.

AEG Web Site Survey
In an effort to improve both the aesthetics and utility of the AEG Web page, Aime Brown sent this survey to our section. The Web page is being redesigning to assure that it is interactive, an effective source of information and a useful tool for all of our members. Your input is essential for this task. The new system should be up and running by the end of April. Comments and suggestions are also welcome in addition to the answers to the survey.

E-mail your survey response to: aimee@geopsun.tamu.edu or mailed to:

Aimee Brown - AEG Web Page Coord. (409) 845-0142.
Dept. of Geology, Halbouty Room 109
Texas A&M University, College Station, TX 77843-3115

1) What type of operating system do you use?
a-Macintosh
b-Windows
c-other, if so please enter which system:
2) What server are you currently using?
a- America Online
b- Netscape Navigator, please specify 1.0, 2.0, or 3.0
c- Compuserve
d- Microsoft Internet Explorer
e- other, please specify:
3) Do you generally access the web from home or your office?
4) What is the memory capacity of your computer
a- 8 MB or less
b- 8-16 MB
c-16 MB or above
5) When working with research or scientific material on the WWW do you read on screen or print to read? If you print, what is your printer resolution?
6) What geology or engineering geology web sites do you find most useful and interesting? (This submissions may be added to the AEG web site as related links)
7) Have you ever accessed the AEG web site? On a regular basis?
8) Did you find the page easy or difficult to load as far as time and images?
9) Please list any personal suggestions or ideas for improvement of the AEG Web Page:

CCGO, the California Council of Geoscience Organizations, is moving along toward incorporation. A second organizing meeting was held February 15 in Berkeley.

CCGO is a proposed coalition of geoscience-based professional/technical organizations and businesses with an interest in two overlapping areas: the quality of geologic practice in California, and the implementation of reasonable laws and regulations that incorporate geoscience-based rationale.

Attending the February 15 meeting were representatives of these organizations: Groundwater Resources Association of California (state level and San Francisco Bay Branch); Association for Women Geoscientists (San Francisco Bay Area Chapter and national); American Association of Petroleum Geologists (Pacific Section); Northern California Geological Society; Association of Engineering Geologists (all three California sections plus national); American Institute of Professional Geologists (California Section); Inland Geological Society, and South Coast Geological Society.

The group reaffirmed the mission and vision statements adopted at the first meeting, and then moved on to defining the structure and operating methodology of CCGO via a review of proposed bylaws. A bylaws committee was established to refine the draft document based on suggestions provided at the meeting. The AEG section chairs present agreed to look into subsidizing some initial legal advice, perhaps leading to the preparation of Articles of Incorporation.

The approach to financing CCGO was explored. CCGO member organizations seem to be of two types, organizations composed predominantly of geoscience professionals, and organizations composed predominantly of geoenthusiasts (to use Geotimes terminology). The dues structures of the two types of organizations are different, and their financial contributions to CCGO may differ. Both types of organizations, however, have expertise and clout to contribute to CCGO, and both can benefit from participation in CCGO. Because businesses that employ geoscientists will benefit from CCGO's quest for both a better regulatory climate and for geoscience-based laws and regulations for the protection of the public, those businesses might become a prime financing source for CCGO.

A marketing committee was established and charged with promoting CCGO and with exploring potential funding mechanisms. The next CCGO organizing meeting will be held Sunday, March 23, in Pasadena. CCGO invites participation from all professional and technical organizations that have an interest in promoting quality geological work in California, improving the geoscience-based regulatory environment, or promoting better recognition of geologic resources and hazards.

For more information on CCGO, contact Betsy Mathieson at Terratech in San Jose (408-297-6969; fax 408-297-7716; or e-mail at: BMathieson@aol.com).

MARTIN L. STOUT SCHOLARSHIP
The Southern California Section is pleased to announce the competition for the Martin L. Stout Scholarship. This year's award is $500.00. All applications must be completed and returned by July 15, 1997. The award will be made at the Section's August meeting. The competition is only open to student members of the AEG. You must be a student member in good standing at the time your application is received.
Applications may be obtained from:

David B. Ebersold, Chairperson, SCS AEG e-mail dave.ebersold@us.mw.com
c/o Montgomery Watson, 301 North Lake Avenue, Suite 600
Pasadena, CA 91101

A theme session of the HYDROGEOLOGY OF LANDSLIDES has been proposed for the 1997 GSA ANNUAL MEETING IN SALT LAKE CITY. The deadline for submission of abstracts to GSA is July 7, 1997.

The theme session on landslide hydrogeology is of great practical importance, both locally and globally. We are actively soliciting participation of engineering geologists in the theme session, which will probably be well attended by geologists who work with many damaging landslides along the Wasatch Front and throughout the intermountain West. If you have a good landslide paper that would be appropriate, please consider submitting an abstract. For more information, please contact Robert A. Larson at (818) 786-8884 or ralarson@compuserve.com.

Description of theme session: The infiltration of water into and percolation of water through landslides of all types will be discussed, including modeling, theoretical aspects, dewatering, monitoring, affect on activation and rate of movement, and case histories. Papers on debris flow generation and rainfall thresholds for failure initiation of previously stable slopes are appropriate.

Subject: Educational material for our members
Ali Tabidian has available a large collection of geological slide/overhead transparencies and video tapes. The education committee now has at its disposal several hundred slides and overhead transparencies and over one hundred videos. The slides and transparencies cover a wide range of geological topics including landslides and earthquakes. Most of the videos are water, earthquake, and environmental geology related. I would appreciate it if you could let the members know that these are available for their "educational activities" and they may obtain them by contacting the association or the education committee.

SEISMIC HAZARDS ANALYSIS SHORT COURSE
Hosted by San Francisco Section, Association of Engineering Geologists
Saturday, May 3, 1997 8 AM to 5 PM
Failure Analysis Associates Conference Center, Menlo Park, California
$95 AEG members, $110 nonmembers
Contact Jack Alt, 510-791-1986 or EpigeneInt@aol.com

 Pretty small font sizes, eh... Short Course Form & new UBC stuff follows:

GEOTECHNICAL PHOTOGRAPHY AND GIS
From Shooting to Digital Use

A Two-Day Short Course Sponsored by the
Association of Engineering Geologists
Southern California Section

April 19 and 20, 1997 - 8am to 4:30pm
Irvine Ranch Water District Office
15600 Sand Canyon Avenue, Irvine, California

A two-day short course titled **"GEOTECHNICAL PHOTOGRAPHY AND GIS: From Shooting to Digital Use"** is scheduled for April 19 and 20, 1997, in Irvine. The short course instructor is **Woodrow L. Higdon** of **Geo-Tech Imagery International.** This short course was taught last fall for the northern California sections of AEG and was well praised by the attendees.

Topics to be discussed by Mr. Higdon during this two-day short course will include cameras, film types, lab print production, auxiliary lighting for ground shooting, shooting techniques, general litigation site documentation, infrared photography, aerial photograph interpretation, digital imaging, MapInfo GIS software, and Sure Map raster data sets. More specific details regarding topics to be covered can be provided upon request.

This is a short course you shouldn't pass up! Continuing education units will be awarded to AEG members. The reasonable course fee will include a CD with course-related digital images, lunches and drinks/munchies during breaks. Plan to attend and **SIGN UP NOW!** Complete the attached registration form and return it with your check promptly. Registration is limited to 90 participants. Advance registration of $95 is requested by April 9, 1997 and will be confirmed by letter. Please add $25 for LATE registration (postmarked after April 9, 1997). If you have any questions, please contact Sue Tanges at 619-442-8022 or s.tanges@worldnet.att.net.

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REGISTRATION FORM, AEG SHORT COURSE
Geotechnical Photography and GIS: From Shooting to Digital Use
April 19 and 20, 1997, in Irvine, California

Name_____

Company_____

Address_____

City/St/ZIP_____

Phone_____

Course Fee: $95 per person (by April 9)
$120 per person (after April 9)

Are you an AEG member? _____

Make check or money order payable to:
Association of Engineering Geologists
and mail to:

AEG Short Course
c/o Southland Geotechnical Consultants
1238-A Greenfield Drive
El Cajon, CA 92021

SEE YOU APRIL 19th & 20th!!!

New Soil Profile in 1997 Uniform Building Code, Chapter 16

TABLE 16-J—SOIL PROFILE TYPES

SOIL PROFILE TYPE	SOIL PROFILE NAME/GENERIC DESCRIPTION	AVERAGE SOIL PROPERTIES FOR TOP 100 FEET (30 480 mm) OF SOIL PROFILE		
		Shear Wave Velocity, v_s feet/second (m/s)	Standard Penetration Test, $\bar{N}$ (or $\bar{N}_{CH}$ for cohesionless soil layers) (blows/foot)	Undrained Shear Strength, $\bar{s}_u$ psf (kPa)
S_A	Hard Rock	> 5,000 (1500)		
S_B	Rock	2,500 to 5,000 (760 to 1500)		
S_C	Very Dense Soil and Soft Rock	1,200 to 2,500 (360 to 760)	> 50	> 2,000 (100)
S_D	Stiff Soil Profile	600 to 1,200 (180 to 360)	15 to 50	1,000 to 2,000 (50 to 100)
S_E[1]	Soft Soil Profile	< 600 (180)	< 15	< 1,000 (50)
S_F	Soil Requiring Site-specific Evaluation. See Section 1644.3.1.			

[1]Soil profile Type S_E also includes any soil profile with more than 10 feet (3048 mm) of soft clay defined as a soil with a plasticity index, $PI > 20$, $w_{mc} > 40$ percent and $\bar{s}_u < 500$ psf (25 kPa). The Plasticity Index, PI, the moisture content, w_{mc}, shall be determined in accordance with approved standards.

Summary of Five New Concepts in Chapter 16, Earthquake Regulations of the new 1997 edition of the Uniform Building Code

for engineering geologists, seismologists, geotechnical engineers, and structural engineers

- **Type A, B, C faults** defined by Mmax ≥7Mw or <6½Mw; and fault slip-rate ≥5 or ≤2 mm/yr
- **Mmax, maximum magnitude** using moment magnitude scale, Mw.
- **A new geologic subgrade classification**, whereby the old
  S_1, S_2, S_3, S_4 classification (old Table 16-J) is replaced by
  S_A, S_B, S_C, S_D, S_E, and S_P (new Table 16-J) that is based on average **shear-wave velocity** of upper 30 meters,
  or
  SPT with $N_{1(60)}$ **blow-counts** > 50, 50-15, <15 (ASTM Test D-1586-92)
  or
  S_U, **undrained shear strength**
- **Near-field effects:**
  proximity to the Type A, B, C Fault for
  acceleration: distance ≤2, ≤5, or ≥10 km
  velocity: distance ≤2, ≤5, ≤10, or ≥15 km
- **New Seismic Coefficients** for both acceleration *Ca*, and velocity, *Cv* that are based on Seismic Zone (3 or 4) *and* the new geologic subgrade

Geologists and engineers will need to purchase individual copies of the new code (volumes 1 and 2 only) to utilize the explanatory text and cite pertinent sections. The new 1997 UBC will be published in May 1997 by ICBO in Whittier, telephone (800) 284-4406 to place your publication order or write to the International Conference of Building Officials, 5360 Workman Mill Road, Whittier, CA 90601-2298 for a catalog and price list; e-mail information: http://www.icbo.org/product. There are options for bound or ring-binder copies for Volume #1 (administrative plus Chapter A-33, Grading Code), Volume #2 (structural engineering, including Chapters 16 structures and earthquake engineering, 18 foundations and expansive soils), and Volume #3 (material testing standards). Most engineering geologists and seismologists will *not* need Volume #3, because the only pertinent geotechnical material is UBC Standard 18-1 (soil classification from ASTM Test D2487-93); UBC Standard 18-2 (expansive soil test method); and UBC Standard 19-1 (portland cement, e.g., Type II and Type V).

The latest California Division of Mines and Geology earthquake fault parameters (magnitudes, slip rates, fault length, etc.) have been compiled in a large spreadsheet by Seismologist Mark D. Petersen, Senior Geologist William A. Bryant, and Seismologist Chris H. Cramer. Refer to Petersen and others (1996), CDMG Open-File Report 96-08 (released 12-18-96), *Probabalistic Seismic Hazard Assessment for the State of California*, and a related abstract published in *EOS, Transactions of American Geophysical Union*, v. 77, no. 46, Nov. 12, 1996, page F-506. The state-wide table of ≈188 faults is available to the public and can be down-loaded from CDMG's bulletin board at this *Internet* web-site address:

http://www.consrv.ca.gov/dmg/shezp/fltindex.html

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(916) 323-4390 2-3-97

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Table 16-Q, Seismic Coefficient, *Ca* (for acceleration)
1997 Uniform Building Code
extract from changes to Chapter 16 (earthquake regulations)

the user must previously determine
Soil Profile Type, S_A, S_B, S_C, etc.; *and*
the Near-Source Acceleration Factor, *Na* (only within Zone 4)

California is either Seismic Zone 3 or 4,
so only the two right-hand columns apply.

Note that for California Zone 4 and S_E site conditions (such as deep soft clay), special **non-linear soil effects** are modeled by 1997 UBC, so the *acceleration* coefficient remains at $Ca = 0.36$, whether in Zone 3 or 4. However, compare this to new Table 16-R for the *velocity* coefficient and note the large increase from $Cv = 0.84$ to $0.96Nv$ when moving across columns from Zone 3 to Zone 4.

California

TABLE 16-Q—SEISMIC COEFFICIENT C_a

SOIL PROFILE TYPE	SEISMIC ZONE FACTOR, Z				
	Z = 0.075[1]	Z = 0.15[1]	Z = 0.2[1]	Z = 0.3[1]	Z = 0.4[1]
S_A	0.06	0.12	0.16	0.24	$0.32N_a$
S_B	0.08	0.15	0.20	0.30	$0.40N_a$
S_C	0.09	0.18	0.24	0.33	$0.40N_a$
S_D	0.12	0.22	0.28	0.36	$0.44N_a$
S_E	0.19	0.30	0.34	0.36	$0.36N_a$
S_F	See Footnote 2[1]				

[1] ~~For seismic isolated structures, replace Z with ZN or M_MZN (see Section 1652). For values of ZN or M_MZN other than those in the table, linear interpolation may be used.~~

[2] [1] Site-specific geotechnical investigation and dynamic site response analysis shall be performed to determine seismic coefficients for soil profile Type S_F.

Table 16-R, Seismic Coefficient, *Cv* (for velocity)
1997 Uniform Building Code
extract from changes to Chapter 16 (earthquake regulations)

the user must previously determine
Soil Profile Type, S_A, S_B, S_C, etc.;
and the Near-Source Velocity Factor, *Nv*

California is either Seismic Zone 3 or 4,
so only the two right-hand columns apply.

California

TABLE 16-R—SEISMIC COEFFICIENT C_v

SOIL PROFILE TYPE	SEISMIC ZONE FACTOR, Z				
	Z = 0.075[1]	Z = 0.15[1]	Z = 0.2[1]	Z = 0.3[1]	Z = 0.4[1]
S_A	0.06	0.12	0.16	0.24	$0.32N_v$
S_B	0.08	0.15	0.20	0.30	$0.40N_v$
S_C	0.13	0.25	0.32	0.45	$0.56N_v$
S_D	0.18	0.32	0.40	0.54	$0.64N_v$
S_E	0.26	0.50	0.64	0.84	$0.96N_v$
S_F	See Footnote 2[1]				

[1] ~~For seismic isolated structures, replace Z with ZN or M_MZN (see Section 1652). For values of ZN or M_MZN other than those in the table, linear interpolation may be used.~~

[2] [1] Site-specific geotechnical investigation and dynamic site response analysis shall be performed to determine seismic coefficients for soil profile Type S_F.

Continued from page 6

Table 16-S, Near-Source Acceleration Factor, *Na*
1997 Uniform Building Code
extract from changes to Chapter 16 (earthquake regulations)

The user first determines Seismic Source Type A, B, or C. Note that for certain Type A faults within California, the acceleration is modeled by 1997 UBC for distances ≥10 kilometers from the fault. Examples of Type A faults (Mw≥7.0 and fault slip-rate ≥5 mm/yr) include certain segments of the San Andreas, San Jacinto, Elsinore, Hayward, Rodgers Creek, Maacama, Bartlett Springs, San Gregorio, Cucamonga, Death Valley, Garlock, Mendocino, and Little Salmon faults; and the Cascadia Subduction Zone. Most of the remaining seismogenic faults in California are Type B, so the acceleration coefficient for those is 1.0 at ≥5 kilometers.

****

TABLE 16-S—NEAR-SOURCE FACTOR N_a[1]

SEISMIC SOURCE TYPE	CLOSEST DISTANCE TO KNOWN SEISMIC SOURCE[2,3]		
	≤ 2 km	5 km	≥ 10 km
A	~~1.9~~ 1.5	~~1.5~~ 1.2	1.0
B	~~1.5~~ 1.3	~~1.2~~ 1.0	1.0
C	1.0	1.0	1.0

[1]The near-source factor may be based on the linear interpolation of values for distances other than those shown in the table. ~~Alternatively, the value of *N* for Type A faults may be calculated as $N = 2.13 - 0.11 d_f$ and the value of *N* for Type B faults may be calculated as $1.7 - 0.1 d_f$, where d_f = the closest distance to fault rupture. In all cases, *N* shall not be taken as less than 1.0.~~

[2]The location and type of seismic sources to be used for design shall be established based on approved geotechnical data (e.g., most recent mapping of active faults by the United States Geological Survey or the California Division of Mines and Geology).

[3]The closest distance to seismic source shall be taken as the minimum distance between the site and the area described by the vertical projection of the source on the surface (i.e., surface projection of fault plane). The surface projection need not include portions of the source at depths of ~~7.5~~ 10 km or greater. The largest value of the near-source factor considering all sources shall be used for design.

Table 16-T, Near-Source Velocity Factor, *Nv*
1997 Uniform Building Code
extract from changes to Chapter 16 (earthquake regulations)

The user first determines Seismic Source Type A, B, or C. Note that for certain Type A faults within California, the velocity is modeled by 1997 UBC for distances ≥15 kilometers from the fault. Examples of Type A faults (Mw≥7.0 and fault slip-rate ≥5 mm/yr) include certain segments of the San Andreas, San Jacinto, Elsinore, Hayward, Rodgers Creek, Maacama, Bartlett Springs, San Gregorio, Cucamonga, Death Valley, Garlock, Mendocino, and Little Salmon faults; and the Cascadia Subduction Zone. Most of the remaining seismogenic faults in California are Type B, so the velocity coefficient for those is 1.0 at ≥10 kilometers.

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TABLE 16-T—NEAR-SOURCE FACTOR N_v[1]

SEISMIC SOURCE TYPE	CLOSEST DISTANCE TO KNOWN SEISMIC SOURCE[2,3]			
	≤ 2 km	5 km	10 km	≥ 15 km
A	2.0	1.6	1.2	1.0
B	1.6	1.2	1.0	1.0
C	1.0	1.0	1.0	1.0

[1]The near-source factor may be based on the linear interpolation of values for distances other than those shown in the table.

[2]The location and type of seismic sources to be used for design shall be established based on approved geotechnical data (e.g., most recent mapping of active faults by the United States Geological Survey or the California Division of Mines and Geology).

[3]The closest distance to seismic source shall be taken as the minimum distance between the site and the area described by the vertical projection of the source on the surface (i.e., surface projection of fault plane). The surface projection need not include portions of the source at depths of 10 km or greater. The largest value of the near-source factor considering all sources shall be used for design.

Table 16-U, Seismic Source Type
1997 Uniform Building Code
extract from changes to Chapter 16 (earthquake regulations)

Examples of Type A faults (Mw≥7.0 *and* fault slip-rate ≥5 mm/yr) include certain segments of the San Andreas, San Jacinto, Elsinore, Hayward, Rodgers Creek, Maacama, Bartlett Springs, San Gregorio, Cucamonga, Death Valley, Garlock, Mendocino, and Little Salmon faults; and the Cascadia Subduction Zone.

The majority of the seismogenic faults in California are Type B, including many of the blind thrust faults.

The Foothills Fault System of the northern Sierra Nevada is an example of a Type C Fault because this system is currently believed to have a low slip rate, 0.05 ± 0.03 mm/yr and Mmax ≈ 6.5.

A certain segment of a seismogenic fault could be redesignated from Type B to Type A, based on new field knowledge of the slip rate. This may occur after new fault trenching with offset datable piercing-points yields insights of higher fault slip-rates.

The CDMG spreadsheet of state-wide fault parameters will have sustained usefulness for private consultants, particularly for updated values of Mmax and slip-rates. Consulting engineering geologists, seismologists, geotechnical engineers, and earthquake engineers can down-load the most current information prior to fault classification for a particular project. The CDMG web-site address is:

http://www.consrv.ca.gov/dmg/shezp/fltindex.html

Note that these 1997 Uniform Building Code definitions of Type A, B, C faults *differ* from the SCEC terminology for southern California; see WGCEP, 1995, Bulletin of the Seismological Society of America, v. 85, no. 2, p. 379-439. That classification utilizes the terms Type A, B, C Faults to classify sufficiency of fault data for conditional probabilities.

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TABLE 16-U — SEISMIC SOURCE TYPE

SEISMIC SOURCE TYPE	SEISMIC SOURCE DESCRIPTION	SEISMIC SOURCE DEFINITION	
		Maximum Moment Magnitude, M	Slip Rate, SR (mm/year)
A	Faults that are capable of producing large magnitude events and which have a high rate of seismic activity	$M \geq 7.0$ and	$SR \geq 5$
B	All faults other than Types A and C		
C	Faults which are not capable of producing large magnitude earthquakes and which have a relatively low rate of seismic activity	$M < 6.5$ and	$SR \leq 2$

FIRST CLASS POSTAGE

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