PHASE 1 SUMMARY

Existing Buildings Committee
Building Performance Ratings Subcommittee
Structural Engineers Association of Northern California

Purpose of Building Performance Ratings Sub-Committee:
To develop a system to rate the future earthquake performance of buildings.
Co-Chairs: Ron Mayes, Kate Stillwell
Participating Members: Mehri Ansari, Marguerite Bello, Mathew Bittleston, Colin Blaney, David Bonowitz, Evelyn Bravo, Doug Hohbach, David McCormick, Ann Roche

Purpose of Phase 1:

1. Define the objective of a potential rating system
2. Identify the audience of a potential rating system
3. Investigate existing rating systems (both structural and nonstructural)
4. Recommend whether or not to develop a rating system and process (Phase 2).
5. Establish a common understanding and direction among committee members to conduct Phase 2.

This summary document presents, in a question-and-answer format, the committee's recommendations, should a rating system be developed. It also discusses some basis and background for the recommendations, and identifies implementation issues to be addressed during Phase 2. All recommendations are subject to revision during Phase 2.

Why are we doing this? What are we trying to achieve?
The objective of a system that rates the earthquake performance of buildings is to communicate seismic risk to non-engineers. The ultimate goal is for the rating system to spur action that will reduce seismic risk from the overall building inventory. SEAONC is charged with the reduction of seismic risk (in its mission statement and strategic goal), and this effort aligns with that goal. This effort best fits within three different categories of SEAONC's Strategic Plan: public safety, technical cutting edge, and image/outreach.

Who uses the rating?
The system should be usable by all occupants, buyers, sellers, and tenants of a building. Thus, the audience for the system includes a broad audience of people who make decisions about buildings, though many of whom might know little about seismic risk. The most frequent users may be facility experts (structural engineers, brokers, insurance industry, investors), and the system should be usable by all who assess, mitigate, insure or accept risk. However, the system requires integrity and clarity without regard to the users or their objectives.

How is the rating different from other information that is available?
The primary difference between existing evaluation methods, on which the rating process could be based, and the proposed ratings system is the intended audience, and thus the format of communicating the information. ASCE-31 evaluations are typically conducted for major transactions or by large owners, and the typical output is a detailed engineering report. On the other hand, the proposed rating is aimed to a broad audience with varying interest and education on seismic risk, and the output will be standardized and clear. A

second distinguishing feature is that a rating is intended for comparison of performance relative to other buildings, rather than describing a building's independent performance.

What information does the rating provide?

Recommendation: The rating should provide comparative information on the seismic risk inherent in any given building. It should include two components: a quantitative assessment over multiple parameters (dimensions), and a qualitative, overall "value judgment." The rating should be presented in a standardized format, contain enough information to provide a basis of decision making, and be clear enough to be understandable by those likely to use it.

Recommendation for Quantitative Component: The multiple quantitative parameters reported should include safety ("deaths"), durability ("dollars", or damage), and continuity ("downtime"). The rating should phrase the dimensions with "positive" words, although the committee is not attached specifically to the words above. The rating should not specifically predict absolute values for deaths, dollar amounts, or downtimes, since these values change through time. Downtime and damage could be directly related (when factoring for occupancy), but for many building types they are likely still to be independent dimensions for the evaluation. Damage can be structural and non-structural, and these might need to be reported separately. The rating should communicate confidence levels for each parameter. For further discussion of confidence levels, see below "How much effort does it take to provide a rating."

Recommendation for Qualitative Component: The "value judgment" should include something like an overall letter grade or a number of "stars" (like for restaurants), which conveys an overall qualitative assessment. The committee did not reach unanimity on this issue, but a majority of committee members believe that a qualitative, relative "grade" would help communicate seismic risk to a broad audience. Whether this qualitative portion is relative to other similar buildings or absolute, needs further study. It should also be further studied whether to provide only one overall qualitative value, or one for each of the parameters reported in the quantitative component. The reported qualitative component should avoid words that imply promises of performance, such as the de-facto "ratings" of Vision 2000 ("Collapse Prevention," "Immediate Occupancy," etc.), even though these performance levels may be embedded in the assessment process.

Which building types / occupancy types are included?

Recommendation: All building types should be considered in the effort, including single family residences. The committee considered limiting the scope to exclude single family residences, mainly because the inventory is so diverse and distributed. However, specifically because single-family residences constitute such a large portion of existing buildings, excluding them might not achieve the goal of significantly influencing the building inventory as a whole. The committee did not reach unanimity on this decision and eliminating single family residences is a potential way of reducing scope in the future, if the job of developing the rating system becomes unmanageably large. Another

option is to split this building category into a separate effort to be conducted either in parallel or in sequence sequentially with the remaining building types.

What causes a rating to be obtained?

Recommendation: Obtaining a rating should be strictly voluntary. It is not within our committee's or our profession's interest (or power) to specify the uses of a rating system. However, we see greatest value in a system which meshes with economic decisions. Thus, we have envisioned a potential context for its use, for the purpose of developing these Phase 1 recommendations: a building rating could be information disclosed as part of a real estate acquisition; typically a sale, but possibly a lease, appraisal, or other change of circumstance. The adversarial tension inherent in these transactions could enable adoption of a rating system, even if it is voluntary, since either or both the buying and selling parties may wish to obtain a rating independently. We do not intend to limit the use of the system to only this scenario; however, choosing one context helped us focus the recommendations (see the Appendix for further discussion). As the system achieves increasing acceptance, mortgage lenders could potentially use it in the way they currently use PMLs. This situation also contains inherent tension, promoting adoption of a voluntary system.

In the context of a sales transaction, we envision that market pressures would encourage buyers and/or sellers to obtain a rating, making it part of pre-purchase due diligence. A related situation which could initiate a rating to be obtained is a lease turnover. Examples of this market mechanism include the BOMA rating system for office space (Class A, B, C), and building inspections of houses. In addition, both the Federal GSA and State DGS require a rating to be obtained as a means of vetting the buildings they lease, and the USGBC could use it in its certification criteria for both new and existing buildings.

How is the rating reported?

Recommendation: The rating should be presented in a consistent and standardized format. In the context of a sales transaction, the rating would be reported as part of the disclosure package released to prospective buyers or other stakeholders in the property. The rating should have some relation to the format requirements of ASTM E2026 for reporting PMLs.

Who provides the rating? How much effort does it take to provide a rating?

Recommendation: The rating should be performed by a licensed civil or structural engineer. We do not intend to specify the amount of effort, but we imagine it could range from half a day to several weeks, depending on the complexity of structural analysis. One way of integrating a measure of confidence in the system, on which the committee has not reached consensus, is to limit the best possible rating that can be achieved, according to the type of analysis performed. In other words, with a "simpler" evaluation, the rating could have an upper bound, with the highest rating(s) requiring a more detailed evaluation. This upper bound could vary according to complexity of building type.

Using upper bounds to represent confidence, assumes that error shrinks with additional analysis.

Since we propose to include single family residences in the system, the rating process must consider situations where an engineer might not typically be hired. Thus, we recommend conducting a separate study during Phase 2, investigating whether the system should allow technical professionals who are not engineers to perform inexpensive ratings, in the same way that contractors and architects may design conventional construction without engineers. The concept of upper bounds would likewise apply to these evaluations, with higher ratings requiring evaluation by an engineer. If evaluations are proposed to be performed by non engineers, then, as noted above, developing a rating system for residential building types should be split into a separate effort.

What is the rating based on?

Recommendation: The rating should be reproducible, and therefore tied to technical standards or objective guidelines. Connection to a standard could also speed adoption of the system by the engineers who might produce the ratings. Some possibilities are to base the process partially on ASCE 31 or ATC-58, but the committee has not yet agreed on this. ASCE 31, for example, could provide guidance and background to the rating provider, and although ASCE 31 represents the current best standard for evaluation, it is not suited to comparative ratings. Therefore we plan to avoid having rating values correspond one-to-one with overall ASCE 31 performance levels. However, like ASCE 31, the basis of evaluation (and thus the rating process) will depend on building characteristics, such as age, construction material, etc. How to integrate standards with the rating system is a topic requiring special study in Phase 2.

Who initiates and pays for the rating?

Since we are developing a strictly voluntary system, we would not specify how the rating is initiated and paid for. However, in the context of a sales transaction, we envision that buyers and sellers could initiate and pay for a rating independently. This could be an action that is recommended by real estate agents in the same way real estate agents recommend that residential sellers obtain a pest report.

How is the rating verified / regulated?

Recommendation: The committee realizes the critical importance of this issue for the system's credibility and likelihood of adoption, though we have not reached consensus. The committee discussed two approaches to verification. The first approach is to have a third-party expert review board that independently verifies a sample of ratings. The other possibility is market-based "enforcement," i.e., verification by way of multiple competing opinions. This would work only in scenarios (e.g. a sales transaction) containing adversarial tension, where counterparties (e.g. a buyer and seller) would each self-verify by obtaining separate, independent ratings. Market-based verification has slightly more support among the committee, because it is consistent with the voluntary nature of the rating, and it is simpler and faster to implement.

To rely on market verification, the rating process must be sufficiently robust so that results among multiple providers are reproducible. This requires either an "idiot-proof" process, which may not be realistic, or a climate of "buyer beware," where the credentials of the rating provider could be verified (e.g., by means of an engineer stamp). Reproducibility would be facilitated by basing the rating process on an accepted standard.

How can a rating be improved? / How can a building get a more favorable rating?
This question is most relevant in the context of a mandatory rating. The voluntary system that we have assumed should be tested to ensure that a building's rating improves if seismic mitigation is performed, which is common sense. It is also possible, but not guaranteed, that a higher rating could be obtained with more detailed evaluation.

How do two conflicting ratings get resolved?
The answer to this question also depends on the context. In the context of a voluntary, market-based system, we envision that conflicting ratings would be a basis of negotiation and not require agreement of the parties on a single "right answer." In a mandatory system, this question would be addressed by the party that requires the rating.

What will happen after a rating is issued?
As part of a voluntary system, we do not intend to specify the follow-up action taken as a consequence of a rating being provided. The rating provides a "vocabulary" of seismic risk for the public, and a common understanding for comparing seismic risk among multiple buildings, locations, and states of nature ("should I retrofit or not?"). Ideally, there will be users who, prior to the rating, conveniently ignored seismic risk, but when informed, are motivated to reduce or transfer risk, e.g. through mitigation or insurance uptake. Insurance companies could also use ratings as a basis for risk-based premiums.

How long will a rating be valid?
Because standards evolve, ratings should eventually become obsolete. We anticipate that part of the standard presentation format will include at least the date the rating was produced. Whether the rating system should include rules for obsolescence is a question to be studied in Phase 2.

How does the rating system account for historic buildings?
Recommendation: As part of a voluntary system, no special consideration should be made for historic buildings or any other special cases. The users themselves should weigh relative importance of a seismic rating with other factors. This would eliminate the need to adjust the rating for issues outside the scope of seismic risk. Buildings made of unconventional materials, which are not covered in the standard documents, may be a topic requiring special study in a future phase.

Will the rating system be immediately usable upon release?
Usable upon first release, yes, though the initial system cannot be expected to be perfect. However, lack of perfection should not delay the committee from releasing a beta version. The system might not be immediately adopted by risk owners who currently use other methods, but we should expect interest to rise after the next damaging earthquake. Thus, there may be time for refinement between now and the time of widespread adoption. Recommendation: The rating system should undergo a rigorous testing process, perhaps using model building types, and obtain user feedback.

When will the rating system be released for use?
Because the committee is a volunteer effort, strict adherence to a timeline cannot be guaranteed. We propose to conduct Phase 2 development for at least three building types as a pilot study in approximately 9 months. Remaining building types (including single family residential) are likely to be addressed separately, and perhaps in parallel. Phase 2 will be followed by the "alpha" testing phase, which could last another several months. An aggressive estimate for public release of a "beta" version is January 2009. A more realistic estimate is summer 2009. The scope of Phase 2 is outlined in more detail below.

Overall Recommendation:
The committee recommends that it be tasked with completing Phase 2, to develop a detailed building ratings system. It expects to solicit input from other interested parties on an invited basis during this phase. The proposed scope for Phase 2 is as follows:

1. Define building categories (by occupancy or construction material)
2. Choose which categories to include in Phase 2

For each category:

3. Define the process
    a. Choose and integrate basis standards
    b. Specify qualified providers
    c. Specify how the level of detail in the analysis affects the rating
4. Define the content
    a. Identify what quantitative information to provide
    b. Choose how to convey the qualitative information
    c. Specify a format for presentation
5. Conduct special studies identified in Phase 1
    a. Qualitative component: should it be relative to other buildings or absolute? Should it report one overall value, or separate values for each dimension?
    b. Should non-engineers be permitted to provide ratings for houses or other certain conditions?
    c. How should buildings made of unconventional materials be addressed?

The subsequent Phase 3 will include (but not be limited to) these tasks:

- Obtain feedback from potential providers and users
- Initial (alpha) testing: controlled internal tests, not public

Respectfully Submitted,
Kate Stillwell, Co-Chair

Appendix
Discussion notes, alternatives considered, and basis for recommendations
by David Bonowitz

In 2006, responding to a request from the SEAONC Board, the Existing Buildings Committee agreed to study the feasibility and value of producing an earthquake performance rating system. A subcommittee was formed, and this report presents its findings and recommendations. The actual development of a system is a separate matter, described in this report as Phase 2.

The body of the Phase 1 report presents our findings and recommendations regarding the attributes of a useful rating system. This appendix presents some of the background to the subcommittee's work as well as the reasoning it applied in developing its recommendations.

What is meant by an earthquake performance rating system?
A rating system is a set of definitions, rules, and procedures that leads to a concise characterization of earthquake performance, in other words, a rating. A rating *system* is different from a rating *program*. A *program* is a set of activities by individuals or organizations intended to produce ratings, often by implementing a *system*.

A building code can be understood as a basic rating system for earthquake performance of buildings. Buildings may be "rated" as either compliant or non-compliant. Further distinctions might be made based on the date of the applicable code, the importance factor *I*, or the seismic design category. The current building code, of course, is not well suited to rating older buildings. Other standards and guidelines, however, such as FEMA 154 and ASCE 31, are specifically intended for the seismic evaluation of existing buildings.

With these documents available, why would a separate rating system be needed? While it's likely that ASCE 31 and other relevant documents will be referenced or required by a SEAONC rating system, the subcommittee thinks of a rating as having a concise standard format tailored to a particular audience, which most evaluation guidelines do not provide. Other distinctions between a general rating system and documents like the IBC, ASCE 31, or FEMA 154 include:

- Our rating system should address both new and existing buildings in consistent terms. The available documents all use different terminology.

- Our rating system should allow for measures of performance other than safety. In some ways this requires more than ASCE 31 offers; in some ways it requires less than ASCE 31 provides.

- Our rating system should be supportive of non-expert users looking for concise information at a broad level for their everyday decision-making. ASCE 31 (and to some extent even FEMA 154) are typically used by owners seeking detailed or nuanced findings, often because they have retrofit or risk management programs already in place.

- Our rating system should more directly address stakeholder questions, which typically seek to contrast one building with another or with a norm. For example, users of a rating system might want to know "Is this building better or worse than average?" or "Is Building A significantly better than Building B?" A rating system should facilitate those comparisons, but a comprehensive standard like ASCE 31 only evaluates to absolute criteria.

Is a universal rating system possible?
Systems and programs are linked (and should be). For a rating system to have value it must be implemented through a program, and for a program to be successful it must adopt a feasible system – one that will be accepted by key stakeholders and executable with available resources. Thus, a system can be simple or complex, objective or judgment-based, precise or broad in its findings, focused or comprehensive in its scope, etc. The best choice depends on who will be producing ratings for whom. Further, since earthquake performance is more than structural response, a rating system can focus on safety, habitability, code compliance, suitability to a specific occupancy, remaining useful life, insurability, recovery cost, or other measures depending on the interests of the stakeholders. Thus, while a universal system might be possible, we find it neither practical nor advisable to produce one.

Our subcommittee finds that if an earthquake performance rating system is to be feasible and valuable, **it must be designed for the context in which it will be used.**

To illustrate, imagine a Bay Area city considering a rating program simply to raise awareness and motivate voluntary retrofits. Three straightforward questions:
- Will the program be mandatory or voluntary?
- Will owners self-declare their ratings or will city staff produce them?
- Will the ratings be based on occupant safety, expected repair cost, or something else?

These are rather basic questions for any proposed program, yet the answers affect the degree to which the rating system must apply to various building types, have features that allow quality control, be easy or inexpensive, account for local market conditions, etc.

Most important, if the ratings are to be valuable to the city or to building owners, they need to contain the right information. In this case, with the objective of "raising awareness and motivating voluntary retrofit," the rating content must at least suggest a retrofit scope, and its presentation format must be in language that non-experts will find

meaningful. Had the objective been to create a database for earthquake preparedness planning, a different system, with different criteria and products, would work better.

For some programs, then, a simple logging of buildings' dates of construction might be adequate. For other programs, the rating must include qualitative language about safety (with disclaimers likely to dilute any message). For still others, the rating needs some kind of score to support a go/no-go decision. Thus, the effectiveness of a rating system depends on the logistics of the rating program and on the needs of stakeholders.

What context should SEAONC have in mind?
If a rating system depends on the program that will apply it, what kind of rating program should SEAONC have in mind? The subcommittee made these considerations:

- SEAONC's primary objective here is to communicate seismic risk to non-engineers. A rating system endorsed by SEAONC might be one way to do that.

- Successful risk reduction programs are multidisciplinary. SEAONC's expertise, and its most useful contribution, is in structural engineering, not law or economics.

- The biggest challenges to earthquake risk reduction are not in engineering but in finance, policy, and regulation (as confirmed at the September 2007 NEHRP workshop in San Francisco). Yet public policy, market forces, and the competing interests of building owners are largely outside our control.

The most feasible and effective broad-based rating program – the kind SEAONC should have in mind when proposing a rating system – would therefore be one that:
- fills existing knowledge gaps
- leverages the interests of motivated stakeholders
- does not preach to or force itself on those without the resources to act
- does not have a system already in place, and
- would involve minimal logistical costs to implement and regulate.

The subcommittee discussed and debated a number of potential programs and scenarios, several of which are described in the following paragraphs. The first one, a voluntary program to inform purchase or lease transactions, most closely matches the list of desired attributes; it provided the context that best aligned with what the subcommittee had in mind in developing its Phase 1 recommendations.

Prototype Program 1: *voluntary and transaction-based* (adopted by committee)
A private program motivated by market forces and voluntarily implemented by one or more stakeholders in the course of an economic or legal transaction. Examples:
  - Pre-purchase or pre-lease due diligence
  - BOMA office space classification

- Termite and house inspection
- UL certification
- MPAA (movies) and ESRB (video games) ratings

Here, disclosure of relevant information is either demanded by a "buyer" or voluntarily provided by a "seller," often for purposes of satisfying another interested party, such as a lender or insurer. The rating is not made public but is developed for and shared by interested stakeholders, who are likely experts in some aspect of building acquisition, not structural engineering or earthquake risk. Experts are paid to develop the information, but for purposes of communicating earthquake risk, no standard rating system or presentation format exists. Whether there are enough transactions for such a voluntary program to have an impact on regional earthquake risk is unknown, but similar voluntary programs have become de facto requirements; the ratings are so common that the lack of one prompts questions. A rating system developed for such a voluntary program would likely be adaptable to a triggered program if earthquake risk disclosures were to be required.

Prototype Program 2: *mandatory, publicly administered, and safety-based*
A broad program, triggered by certain conditions (such as building type, size, or occupancy), and managed by a public agency (such as a building department), for purposes of informing citizens of safety risks in the buildings they frequent, with the expectation that increased awareness will motivate risk avoidance by citizens or risk reduction by building owners. Examples:

- Placards for unreinforced masonry buildings
- Warning labels on cigarette packs
- Nutrition labels on packaged foods
- Mileage and emissions data for automobiles

Here, the government acts on behalf of non-expert consumers. The information is not always directly useful, and its significance to the consumer is not always clear. URM placards are quickly ignored by building tenants who have no options, and the Seismic Safety Commission has found that they do not reduce any risk. More likely, as with cigarette warnings, they merely transfer risk from the provider/producer to the user/consumer. Most important, these programs require substantial public resources to develop and maintain, are complicated by legal issues of condemnation and police power, and are rarely implemented without resistance from affected stakeholders.

Prototype Program 3: *mandatory for special cases and publicly administered*
A focused program, triggered or mandated for certain conditions, and managed by a public agency for purposes of targeting and mitigating specific risks to the public.
Examples:

- SB 1953 (for California hospitals)
- Local programs in support of SB 547 (the 1986 URM law)
- UC Berkeley SAFER
- USDOT National Bridge Inspection Program

Here, the government also acts on behalf of non-expert consumers, but with a focus on specific identified risks and with a purpose beyond raising awareness. The focused nature of these programs (which are often mandated by law) leads to highly technical rating systems implemented only by experts. The programs are generally effective, as they are designed to prioritize improvements, but they are expensive and extremely limited in scope, applying to privately owned buildings only in rare cases where a class of buildings has already been recognized as hazardous.

Prototype Program 4: *voluntary, privately developed by non-expert parties*
A private program of voluntary self-assessment by non-expert building owners.
Examples:

- ABAG quizzes for Bay Area homeowners and small businesses
- Checklist guides or online tips from the SSC, USGS, or others
- Medical self-examination kits (e.g. home pregnancy testing)

Here, an expert organization merely provides a tool for non-experts to use. The tool might be marketed or publicized, but otherwise the program infrastructure is minimal. One might call this the no-program program. This eliminates some costs and the need for regulation, but because no expert is involved in the actual application, the tool must be fool-proof or limit itself to simple yes/no ratings. These tools exist for simple conditions such as unbraced cripple walls and even soft-story apartment buildings (ABAG), but they might not be feasible for more complicated structures. Even for the simpler structures they require an owner to be self-motivated and are unlikely to see enough use to impact regional risk. Importantly, the rating is not made known to stakeholders other than the user.

Prototype Program 5: *voluntary, privately developed by expert parties*
A private program of voluntary assessment by expert consultants, expected to motivate risk reduction by assigning liability to building owners.

This, of course, is the status quo for most buildings, and it relies entirely on the motivation of building owners. The question is whether a new rating system is needed to support it; the current tools include ASCE 31, FEMA 154, IEBC Appendix A, HAZUS, and other loss estimators. (For this pseudo-program to be more broadly effective or helpful to stakeholders other than building owners, the potential liability for losses might

need to be increased through punitive damages. In some cases, owners might transfer their risks through voluntary placards. These legal questions, while important, are outside the subcommittee's current scope and expertise.)

Prototype Program 6: *triggered, publicly administered*
A public program of assessment by expert consultants, triggered by a change of circumstances (such as a proposed building alteration or change of occupancy) and intended to improve the building stock over time. This differs from Program 3, which is targeted to a class of buildings already known to be hazardous. Program 6 is generic policy for all existing buildings; it does not have a specific risk reduction goal or deadline. Examples:

- CBC (or local code), Chapter 34
- IEBC
- Condominium conversion regulations

This is the status quo for buildings undergoing major changes. Because the rating trigger is generally in the building code, the rating system is also generally code-based and applied by design professionals. These programs are incremental at best and can discourage building improvements as often as they encourage risk reduction. They are public only to the extent that building department records are public. Because they are code-based, they rarely consider performance other than code compliance. Most regulations allow existing risks to remain as long as the proposed alteration would not make the risk substantially worse. Efforts to make upgrade triggers more conservative have been resisted by code officials and other stakeholders.

Who uses the rating?
Rating systems can be designed for a range of expertise, from experts in understanding earthquake performance (such as engineers) to non-expert risk "owners" (such as most building owners), to those who do not even stop to recognize their risk (such as shoppers, office workers, or students).

The subcommittee recommends a system designed primarily for stakeholders in a purchase or lease transaction. These are likely to include buyers, sellers, lenders, insurers, and tenants. They are likely to be knowledgeable about buildings in general but not experts in earthquake risk. The subcommittee feels that this audience, which is motivated to accept information but is not well served by existing rating systems and programs, represents a knowledge gap that SEAONC can effectively fill.

What information does the rating provide?
Current documents such as ASCE 31 are most often used to assess only safety. While this might be the primary concern of most system users, the subcommittee feels that SEAONC should be trying to expand public awareness of earthquake risk to include notions of community resilience. Most Bay Area residents already know enough to ask "Is my building safe?" We would like to educate our community so that most residents

will begin to ask also "Will my building be re-occupiable? Is my job at risk? Can I afford not to insure my house?" etc. Similarly, a rating system based entirely on estimated financial losses would not communicate the full spectrum of risk.

The subcommittee therefore recommends a multi-parameter rating along the lines of the "deaths, dollars, downtime" perspective being taken by ATC-58.

The subcommittee further finds that quantitative or factual information alone might not suit the needs of our target users. Less sophisticated users will value SEAONC's guidance about what rating makes sense for them. Therefore, the subcommittee recommends that the rating system should provide some value judgment as well, much as nutrition labels report not only grams of sodium, but the percentage of a recommended daily allowance represented by that amount.

Which building types / occupancy types are included?
As discussed in the body of the Phase 1 report, the subcommittee considered excluding single family residential buildings and treating them in a separate system but ultimately decided against that. The subcommittee also considered whether to propose a rating system (or separate systems) for pre-selected classes of buildings, such as soft story apartment buildings or non-ductile concrete buildings. The argument in favor of such an approach is that those classes are already identified as candidates for regulation, and any program which would prioritize their upgrade would likely make immediate use of a rating system. In other words, developing a rating system to support pre-legislation programs already in progress, such as the San Francisco's soft story effort, would increase its speed of adoption. Focusing on specific, well-known hazards, however, might fail to serve our more general goals. It would leave large numbers of potential system users without a rating tool, and it would presume that the only risks worth communicating to the public are the safety risks in collapse-prone buildings.

What causes a rating to be obtained?
See the discussions of rating programs and system context above in this Appendix.

How is the rating reported?
See the body of the Phase 1 report.

Who provides the rating? How much effort does it take to provide a rating?
See the body of the Phase 1 report regarding technical qualifications of the rating provider. Importantly, the subcommittee recommends developing a system largely for voluntary use in the private sector. This means the system will leave room for engineering judgment, as opposed to being entirely prescriptive or bureaucratic. It also means the system must be reliable even when applied by individuals of varied experience, since no single agency or entity will oversee its use on a private sector program.

What is the rating based on?

See the body of the Phase 1 report regarding the expected use of reference standards and guidelines. We envision that the rating system will provide rules for assigning a prescribed rating (the format of which is to be determined) from the products of several existing procedures, such as the score from FEMA 154, the deficiency list or DCRs from ASCE 31, or the PML from a loss estimation procedure.

SEAONC finds value in engineering. We believe that building-specific engineering analysis and judgment are more valuable and reliable than default assessments based on model building type, year of construction, design code, or other nominal attributes. Therefore, the subcommittee recommends against a rating system so simple that it could be applied in all cases by non-experts.

Whether a rating may be assigned based on a fragility curve (as opposed to building-specific evaluation) is a question that will require study in Phase 2.