



**Bureau of
Development
Services**
FROM CONCEPT
TO CONSTRUCTION

PDC | PORTLAND
DEVELOPMENT
COMMISSION
www.pdc.us



November 3, 2016 | Meeting Agenda

Unreinforced Masonry Building Policy Committee

Architectural Heritage Center | 701 SE Grand Ave. | 3 - 5 PM

Committee members in attendance: Margaret Mahoney (chair), Ken McKinney, Tom Carrollo, Peggy Moretti, Tom Sjostrom, Stephanie Whitlock, Walt McMonies, Brian Emerick, Reid Zimmerman (telephonically).

City staff members present: Carmen Merlo, Jonna Papaefthimiou, Amit Kumar, Shelly Duquette.

Observers: Curtis Snope, Mike, Shelly Duquette, Amit Kumar, Steve Smatterly, Ricky, Steven Lacey, Phil, Susan Seward, Gwen Baldwin, Alan, Michael, Ben Kaiser, Ashley, Brett, Chad, Dana, David.

Welcome and Introductions (Margaret Mahoney, Chair)

Cost Benefit Analysis: presentation and question-and-answer

Ken Goettel introduced himself; he has 25 years of experience doing cost-benefit analysis on different disaster mitigation projects. He was an early leader in the field, designed software for modeling, and has done more than 1,000 cost-benefit analysis of hazard mitigation, about half for earthquakes.

[Refer to slides for more detailed presentation information.]

Overview of URM building inventory; size, historic status.

Overview of earthquake risk: there is a 12-18% likelihood of a major quake in the next 50 years. Reminds group that worst-case scenario is actually M7 on Portland Hills Fault.

Reviews shake maps for Cascadia and Portland Hills.

Reviews probabilities of Earthquake Ground motion and what they mean.

Review the assumptions of the cost-benefit analysis. A cost-benefit shows the total benefits versus total costs – doesn't say who should pay to do the work.

BCA addresses a typical URM building. He presents the assumptions on a typical URM building: 10,000 SF, low-rise, \$200/SF replacement value, average occupancy 1 person per 1,000 SF.

BCA was completed in Excel; gave some software parameters.

Discussed technical data inputs: fragility curves and extent of damage. Mentioned that seemingly low levels of damage still often result in the building being demolished. Also mentioned how he added other considerations to the standard model such as fires, casualties from people adjacent URM or hit by partition walls.

He showed the typical cost-benefit ratios.

Results in the report are for the defined typical building. But each building is different. Building's expected lifetime, retrofit costs, building content values, occupancy type, soil type all modify cost-benefit for a specific building.

About 50% of total benefits are life-safety benefits, 22% are building damage, 17% contents damage, 4% displacement.

Discussed the effects of soil type on the cost-benefit ratio; discussed the cost of demo for an old building with lead, asbestos, etc. also present.

Stated that there are costs not quantified: litigation costs and liability settlements, business income losses, loss of rental income from greater awareness of risks, higher insurance premiums. When one URM collapses, no one wants to live in a URM anywhere, and the value plummets. Stated that there are benefits also not quantified: historic value, increase in (or non-loss of) rental / market value.

He notes that the cost-benefit ratio may be overstated when the building has low occupancy, has a shorter lifetime, or when the time it takes to retrofit is longer than expected.

Briefly discussed value of human life in the study; study used the accepted value from FEMA.

Conclusions:

URMs pose a safety risk to occupants and adjacent people.

They also pose a substantial risk of economic loss.

Retrofits reduce damages.

The analysis suggests that policy as proposed makes sense from the cost-benefit standpoint.

The majority of the benefits are life safety rather than economic. A retrofit is like an air bag. You might never use it. But if you need it, it could save your life.

There is a question from the audience about the useful lifetime of buildings. Answer: for a truly historic building: will probably never be torn down. For a crumbly garage: as soon as you can sell it. Fifty years is the number FEMA uses for historic buildings.

Question about variation: there are such variations between buildings that one cannot extrapolate to other buildings. However, the bang for the buck seems greatest for the easy retrofits – parapet bracing, etc. Answer: That's true, but the benefits are mostly during small and medium earthquakes. Those partial retrofits don't prevent mass casualty in a big event.

Ken states that for buildings that have more than 1 person/1,000 SF, the cost-benefit ratio is higher than average. Similarly, for a fire station or hospital, there is a greater benefit. The question is, what is the acceptable level of life safety that doesn't bankrupt everybody? We're probably looking to agree on a standard where nobody is happy but we're balancing cost, performance, and risk.

There is a question about who receives the benefit. Building owners benefit from reduced costs of repair, insurance, liability, etc. Their rents may go up after retrofit. Comment from the audience: the

rents haven't gone up following retrofits. Response: after an earthquake, no one in Portland will want to walk into a URM again in their lifetime; in Christchurch, URMs became almost valueless. There is a 100% chance we will have an earthquake here eventually.

Question about now the CBA is useful to / ought to inform the work of the policy committee. Response: generally, the CBA greater than 1 means the work is worth doing. We have to find the sweet spot where there are adequate life safety improvements, historic buildings aren't all lost, and owners aren't all bankrupt.

Discussion of likely impacts to URMs in a Cascadia subduction zone earthquake. 0.2G – 0.3G peak ground acceleration is expected in Portland; this would not flatten every URM.

Long discussion of why the CBA doesn't result in an estimated number of casualties for a design earthquake; the CBA doesn't use a design earthquake but has a range of possibilities for earthquake strength and building damage. The CBA numbers came from the average costs and the average damages to one building over a range of scenarios, not averaging over many different buildings. Because there is no occupancy data available for URM buildings, it is not possible to estimate the total number of URM casualties from an earthquake.

Ken stated that the discussion about retrofit standards would probably be entirely an economic decision for building owners, except that the safety risk to the public is great and there is therefore a public interest in this standard, as for other safety standards such as seatbelt laws, etc.

A building owner stated that she does not feel she has a choice because she simply cannot afford to retrofit her building, and that she will lose everything under the current retrofit scenario. She also says that she feels that the implication is that she does have a choice, and that building owners are greedy and don't care about people. Also, that the publicity around this issue has damaged the value to her building, and she feels shamed.

Walt states that he appreciates Ken's work; he is most interested in the benefits to building owners. He wonders if a payback period can be extrapolated from the data, e.g. how long that the rent increases and insurance benefits and etc. may take to pay back building owners.

A building owner states that the City's priorities do not seem to support people like her; too much focus on public buildings and historic districts.

Brian states that Walt's question make sense from a building owner's perspective, and would like to pursue the idea of developing what can be paid for, and perhaps that would suggest the appropriate level of subsidy.

Tom Carrollo also raises the issue of liquefaction costs and how that can be addressed because it is a significant cost to consider.

There is some additional discussion of the likelihood of receiving subsidy to pay for the buildings.

Another visitor suggests placing a safety cage inside URMs and encouraging people to shelter inside them during an earthquake. He says Beaverton is now embracing this idea. He says this is a better idea from a logistic and financial standpoint and he encourages Portland to consider this to be a more affordable and practical way to approach this.

Ken says that there is a 99.9% consensus in the engineering community that this idea will not work; he compares it to the scientific consensus about global warming.

Margaret states that the group clearly needs to meet again; policy committee members agree to complete a Doodle poll to set a date.