Utilities & Transportation Committee

Water Utilities Fact Sheet

1. **Who provides the Bay Area's water?**
   Over 60 different water utilities (of greatly varying size) serve the ten Bay Area counties.

2. **Is water service vulnerable to earthquakes?**
   Water for drinking, sanitation, and fire-fighting has been lost in recent earthquakes, often for days, sometimes for months. After the 1995 Kobe earthquake, a million people were without water for an average of 30 days.

   Prior to EBMUD's seismic retrofit program, the water-related loss in a likely earthquake was expected to reach $1.6 billion (1993 dollars), 30% of it due to fire spread. Only 15% of the projected loss was due to damage to the water system itself. A severe event on the San Andreas fault is projected to cost about $6 billion (2002 dollars) in water-related losses.

3. **Which Bay Area water utilities have active seismic retrofit programs?**
   There are no Federal, State or Local laws mandating seismic improvements. Many utilities, however, have voluntary retrofit programs in various stages, with the larger utilities among the most proactive.

   EBMUD's seismic retrofit program is near completion. SFPUC will use 2002 bond measure funds to mitigate vulnerabilities in its system. Of the Bay Area's many water utilities, experts estimate that:
   - 10% have assessed, prioritized, and completed substantial seismic retrofits and improvements.
   - 40% have assessed and prioritized their facilities. Actual retrofit remains to be done.
   - 30% have retrofitted selected facilities as vulnerabilities are identified.
   - 20% have not performed system analysis or any seismic retrofit.

4. **What are the remaining risks?**
   - Buried pipelines. Many Bay Area water utilities continue to install buried pipelines with no special requirements for earthquake resistance. More than 70% of buried pipelines in the Bay Area (more than 10,000 miles of pipe) are made of materials prone to earthquake damage. At current replacement rates, much of the current inventory will remain in place for years to come.

   - Tanks. About half of Bay Area water utilities have retrofitted their most important water tanks, many of which feed fire hydrants. Smaller and older tanks have not been addressed as thoroughly. Seismic retrofit of water tanks can include anchoring to foundations, strengthening of concrete tank walls, replacing non-flexible connections, and improving roof structures over large reservoirs.

   - Pump stations. About 20% of Bay Area water utilities have made good progress retrofitting pump stations, which deliver water to uphill areas for fire fighting and domestic use. Seismic retrofit of pump stations can include building improvements, provision of emergency power, and bracing of equipment.

5. **What are the costs?**
   Unknown, but likely in the billions of dollars to secure seismically reliable water service for the entire Bay Area. Some breakdowns are possible: for example, at an average replacement cost of about $1 million per mile, many cities could replace critical portions of vulnerable buried pipelines for a few tens of millions of dollars.

   Since the 1989 Loma Prieta earthquake, Bay Area water utilities have already spent about $300 million. Recent bond measures have approved another $1.3 billion for seismic improvements.
Notes and Sources

1. Sources: Eidinger (see below) and AWWA Research Foundation. A list of California water utilities that subscribe to the AWWA Research Foundation is available online at http://www.awwarf.org/thefoundation/ourSubscribers/.

2. Sources: G & E Engineering, Eidinger (2003). Notes: The EBMUD estimate was for a magnitude 7 event on the Hayward fault; the remaining 55% were regional economic losses. The San Francisco estimate is for losses by the SFPUC and 29 suburban customers for a magnitude 7.8 event on the San Andreas fault.

3. Sources: EBMUD, SFPUC. Percentages are estimates by Eidinger, to be updated by an EERI-NC survey of Bay Area water utilities in November-December 2003. See also the EERI-NC Best Practice at http://quake06.org/quake06/best_practices/WSSIP.html.

4. Sources: Eidinger, Scawthorn (piping). Re piping, see also http://www.abag.ca.gov/bayarea/eqmaps/liquefac/pipes.html. Notes: Percentage estimates given for retrofitted tanks and pump stations may be low because the larger utilities have been among the most proactive in addressing existing earthquake risks. Percentage estimates will be updated by an EERI-NC survey of Bay Area water utilities in November-December 2003.

5. Sources: Eidinger, Scawthorn (piping). Note: Recently bond amounts exceed the figure cited, but only about $1.3 billion is dedicated to seismic improvements. The balance is for non-seismic work, including operational flexibility, maintenance, capital improvements, etc.

References


Eidinger, J., G & E Engineering Systems, Inc.

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