

THE BROAD DIMENSION

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Resilient Buildings

Worldwide, the greatest number of deaths from natural disasters have resulted from earthquakes, and mostly from failures in buildings and other structures. The USRC (US Resiliency Council) is trying to address that issue by establishing a rating system for buildings, depending on how they are likely to behave in an earthquake. The idea is meant to be similar to that of a LEED rating, and encourage building owners to make their building more attractive to potential tenants or purchasers. Unfortunately,





while showing that a building is ecologically friendly can give a warm fuzzy feeling to owners or potential buyers, reminding people of potential dangers can send a cold shudder through them. But the goals of the USRC are nevertheless laudable.

Their system rates buildings in relation to safety, repair cost (amount of damage), and the time needed to achieve functional recovery, and in each category a rating of between one and five stars is given. In the safety category, three stars would be equivalent to saying the building was up to current code, meaning that loss of life in a major earthquake would be unlikely. It would not mean the building would necessarily be useful afterwards. One star would mean that loss of life was likely throughout the building. A five star safety rating indicates that injuries would be unlikely because, while the building may not escape totally unscathed, it will largely still be functional.

In the Damage category, five stars means repair costs after a major earthquake should be less than 5% of the replacement cost. One star indicates there's likely to be severe damage that would cost more than 40% of the replacement cost. In the Recovery category, five stars means the building should be immediately available for occupation, or at least within a matter of days. With a one star building it could take over a year, if ever, before the building is able to be occupied again.

Their rating system also uses Platinum, Gold, Silver, and Bronze classifications, similar to LEED. To achieve Platinum, a building would need to achieve a five star rating in each of the Safety, Damage, and Recovery categories. Gold means at least four stars in each, Silver three, and Bronze means three for Safety and at least two stars for the other two categories.

USRC ratings can be either Verified or Transactional. A Verified Earthquake Rating involves a full technical review, and it is this rating that a building owner is allowed to use in marketing material or display on the building (perhaps alongside the LEED rating). A Transactional Earthquake Rating is less rigorous in the review process, can only result in a rating of three stars at most, and cannot be used in advertising. However, it can be used for assessing risks involved with the building, and can be useful information for potential investors, etc.

How soon even a five star rated building could be brought back into use does not depend completely on how well the building performs in an earthquake, but also on how well the services, such as water supply, power, and communications, have fared. Local authorities are trying to address these issues, because rapid recovery is also important to the economy of the area.



The Northridge earthquake struck at about 4.30 a.m. on Monday, January 17, 1994. At a moment magnitude of 6.7 it was by no means the largest earthquake that the area could expect. Nevertheless, it damaged buildings up to 85 miles from the center, with the usual suspects (soft-story apartment building, unreinforced masonry, and non-ductile reinforced concrete buildings) being hit particularly hard. Major freeways and other roads were cut, and electricity went out over a large area. Water pressure dropped to zero in many areas, affecting the ability to fight the inevitable fires, and drinking water wasn't restored to many areas for about a week.

Earthquakes are certainly not the only types of disasters that can affect buildings. As an example, some are predicting that Hurricane Harvey will go down as the most expensive natural disaster in US history at over \$190

billion (as compared with \$160 billion for hurricane Katrina as estimated by The National Oceanic and Atmospheric Administration). The USRC is aiming at extending its rating system to cover things like hurricanes, tornadoes, floods, and blasts.

Disaster Recovery

The WannaCry ransomware attack wreaked havoc on computer systems around the world, and showed the vulnerability of the computer systems we rely on for almost all of our day-to-day business. The NotPetya attack soon afterwards showed that people hadn't learned from the first attack. It was the most important assets, the data, that WannaCry and NotPetya went after, but even things like power-outages and hardware failures can prevent you being able to access your data, bringing your business to a halt. Disaster Recovery Plans are there to ensure your business is interrupted for as short a time as possible when worst comes to worst.



Making sure antivirus software is functional on all computers, having operating system updates applied regularly, and having good backups goes a long way towards minimizing the potential for data loss, and giving you a good chance of getting data restored in the event of problems occurring.

WannaCry and NotPetya both used the same basic exploit, hitting computers that had not had updates applied for several months (mostly Windows 7 machines), or that were using so-called legacy software that required the use of operating systems (like Windows XP) that no longer received updates. Keeping your network and its computers updated might be costly at times, but not as costly as an attack can be. It is estimated that almost 50% of companies hit by a disaster (which could include events above and beyond major data loss) do not reopen. The way Microsoft forces us to accept updates on Windows 10 suddenly seems a lot more reasonable.

Phishing emails are a very common way of introducing ransomware and other malware to a network, so educating users about good email practices (don't open attachments or click links if you have the slightest suspicion about the sender) can be an excellent strategy for protecting your data.

With backups, it is important to have copies maintained off-site as well. A fire that destroys a server will almost certainly destroy the backup hard drive alongside it, and if that hard drive is connected to the network, the ransomware that encrypts the files on the server will almost certainly encrypt those on the backup drive also, or delete backups as WannaCry was programmed to do.

To prepare a disaster recovery plan, a company would need to assess the effects of various potential disasters on the company, see what plans can be implemented for mitigating such disasters beforehand (such as installing UPS systems and emergency generators), set up protocols for initial responses to get back up and running (short-term plan), and then to get the system back to full capacity (long-term plan). Such procedures should also be practiced, not only to test if they actually work, but so staff knows what to do in the event of a disaster happening.

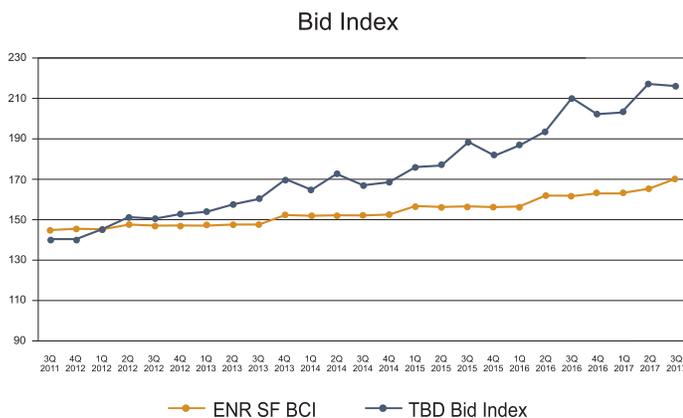
A disaster recovery plan should form an important part of a larger, Business Continuity Plan, that addresses additional issues such as where people might work from if the current business premises was rendered uninhabitable, and how

you might staff the business if a virus epidemic (for instance) hospitalized a sizable proportion of your employees.

Businesses also need to consider who has knowledge of, and access to the business continuity plan if disaster strikes. It is not going to be much use if it ends up as one of many encrypted documents that you can't access after a ransomware attack. Build resilience into your network.

Resilient Economy

At the time of writing (second week in August), the stock markets here and around the globe have been fluctuating as the war of words between the US and North Korea heats up. But the stock market is a leading indicator that had probably got too far ahead anyway, so even a substantial pullback would not be of much concern, and might be a therapeutic dose of reality.



The rapid rise in the stock markets had been fired by the promises of President Trump, but, as those got bogged down in the quagmire of modern politics, the markets still continued their headlong rise to record heights. The reason for the continued rise was the fact that the economy was, and is, doing very nicely despite (or some would say because of) the lack of clear direction out of Capital Hill. With that thought in mind, it is interesting to note that healthcare construction projects have been holding up well, and even increasing, despite the confusion over the future of the Affordable Care Act.

While the annual growth rate is not as high as many would like, and projections for the US have been revised down a bit by the IMF, they are still firmly in positive territory. Growth rates in the Eurozone and Japan have shown signs of picking up, which strengthens the prospects of trade and helps exports to these regions.

The US is now at a stage that historically would be called full employment, and more jobs are still being created and the unemployment rate continues to edge down. There are, actually, a lot of available jobs going unfilled simply because suitable applicants are not available, and the construction industry is being hit by that issue. With the low unemployment level, the surprising fact is that wage rates nationally haven't been increasing faster, but they are starting to pick up.

Finding suitable staff to meet the needs of construction sites and design offices has been a problem for some time, and is definitely not getting easier. The result is that contractors and subcontractors can afford to be very selective in what projects they want to bid on, so competition for work is becoming almost non-existent, especially where a project is in any way problematic. Examples of general contractors having difficulty interesting any subcontractors to bid for a particular section of work are very easy to find. This lack of competition has been allowing construction prices to rise, fueled partly by the contractors being able to demand a larger profit margin, but also driven by the fact that it is costing them more to attract and retain suitable staff.

Meanwhile, the demand for new projects continues, as commerce continues to give strong corporate revenue and profit growth, leaving large bank accounts that companies can invest in new and improved infrastructure. The Architectural Billings Index has remained in positive territory, meaning that there is plenty more work in the pipeline.

There is some concern being expressed about the stock market's climb, and a realization that it isn't going to last forever. The ongoing concerns about the Russia investigation, and the North Korea situation, have resulted in dips in the market, and more than likely will again. What the Fed does with interest rates, and how and when Congress will deal with the debt ceiling are other known concerns. The future will undoubtedly come up with new issues to worry investors, but for now the economy is proving to be extremely resilient.

Geoff Canham, Editor