

What We Have Learned from the Miami Surfside Condo Collapse

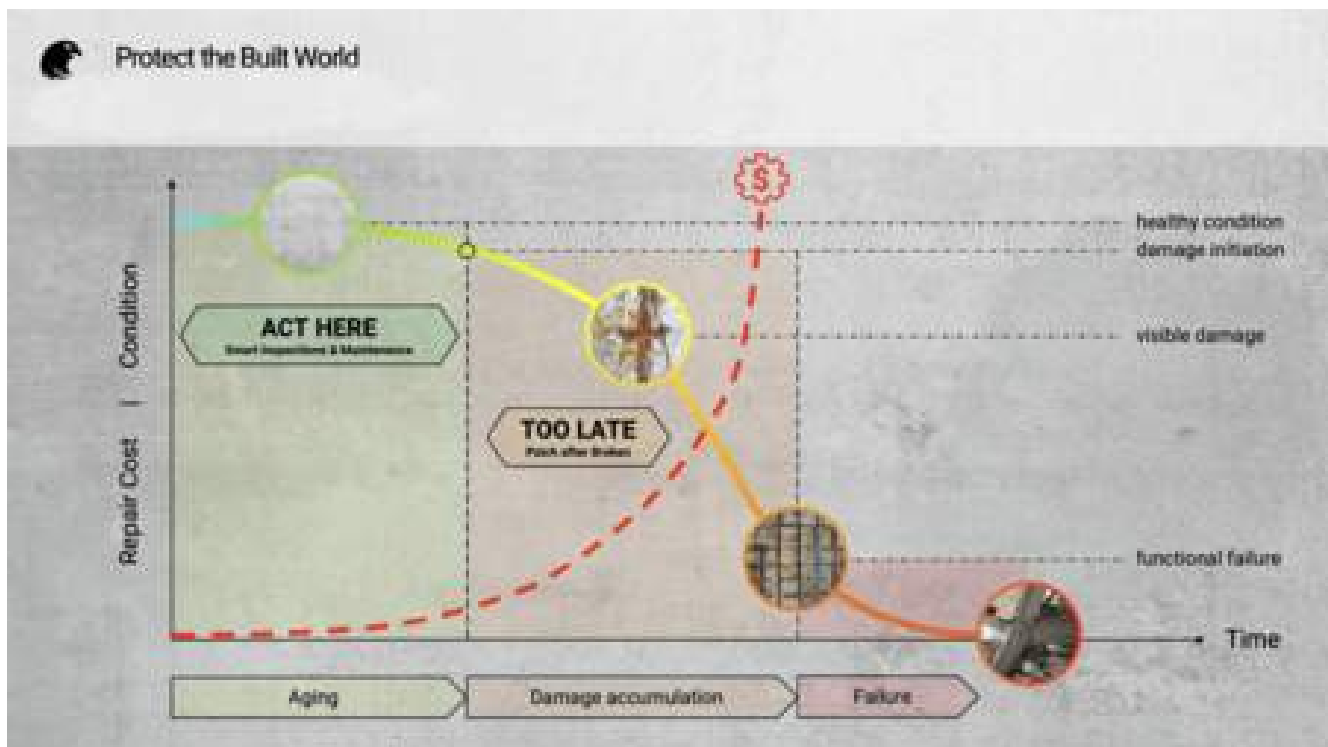
In the past, engineers thought that reinforced concrete structures would last for 1000 years or more. In reality, the lifespan is more like 50 years or less. Damage can start even in the first five years of a new build. Furthermore, things like birth defects, weather and climate change, or unexpected events can further speed the aging and deterioration, heightening the risk of a disastrous event.

Following one of the most devastating infrastructure catastrophes in recent times, we look at what we have learnt, what we as a global community can do better, and what comes next to protect our aging buildings.

The facts are that in Miami alone, two out of every three condo buildings are older than 30 years. In other states and around the world, figures are similar with many high-rise buildings built in the 80's now overdue for major repairs. Since as much as 30-50% of global CO2 emissions can be attributed to the construction and operations of the built environment, knocking down decaying buildings and rebuilding them could take decades to recover the CO2 damage caused. Preventive maintenance not only saves lives, but it also contributes to saving the planet.

Before we look at how to prevent these catastrophic events in future, let's look at some of the challenges of the current situation:

- Structural inspections are not scalable without the right technology
- Most asset owners have no preventive or periodic maintenance planning
- There are minimal preventive repairs leading to a 'fix it when broken' approach
- Responsibilities for structural health are not always clear or defined
- Older buildings may not have sufficient maintenance and repair funds in place
- With new buildings, the lifespan is not always defined or certified at purchase
- Inspection data may be lost over time
- Late repairs become too expensive to manage



Where do we go from here?

When purchasing a property now, we can see its score for CO2, energy efficiency, thermal indicators and other surface level issues. These issues are important, but going forward, a certificate of the structural health of the building is needed for current and future owners.

For example, humidity issues can cause structural issues, but as yet this information is rarely available to buyers and there is no law to say a structural health certificate is required. For new builds, a birth certificate documenting all vital signs and birth defects has to be created with testing and inspections, following up with periodic testing within defined periods. And the technology to do this efficiently is already available.

The key is to track the life of the building, monitor how it is deteriorating and take proactive decisions for repairs before it becomes too expensive to manage.

After one too many preventable disasters, it's time to act now before any new legislation is in place.

We need deeper insights, reliable and trackable data to really get ahead of all the aging buildings around the globe. But as we have learned, there are several challenges we must overcome for this to truly happen. Visual inspections are the first step.

Going back to the Florida case as an example, there are only around 300 structural engineers in the state to perform inspections and over 50,000 housing associations in the state. The numbers simply don't add up. Currently in Florida only structural engineers or architects can do the inspections, but following the collapse, the government are considering changing so that only structural engineers can perform the inspections - putting more strain on the system.

How can we solve this problem?

What if more people were able to take a certification to train them on how to perform visual inspections and report the results to a structural engineer in an efficient way.

For example, when we go to the hospital, it will usually be a technician who performs the scan who will then send the findings to the doctor who reviews everything for diagnosis.

The same could happen for our structural health checks. As yet there is no requirement or official certification for performing visual structural inspections. But if there was, certified inspectors could assess the buildings then pass the data to a structural engineer for evaluation and decision making.

Anyone working in the property industry such as maintenance professionals or repair companies could potentially train to become a certified visual inspector. This requirement for certified inspectors would solve the huge problem of not having enough structural engineers to fully assess every building. And it would allow our buildings to be monitored more frequently.

With the right technology, visual inspections can be made more efficient and cost effective, allowing the certified inspector to assess the building, then instantly send all findings to the structural engineer to create the health score. The structural engineer will then use the latest technologies to test the building's strength and integrity on a deeper level.

This would catch many of the small problems that lead to big issues and potential disasters later on. It's clear there is a need for standards and requirements for structural certificates and health scores, yet we must not wait for them. When lives are at risk, there is no time to wait.

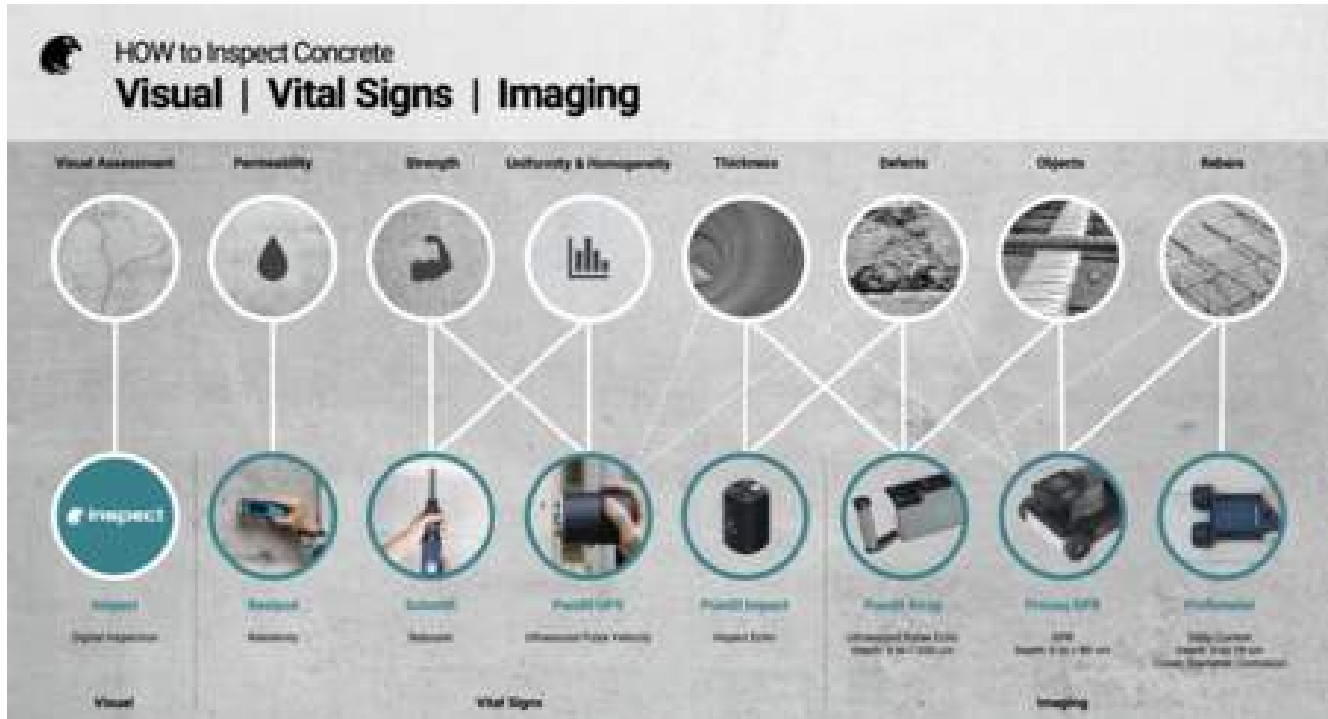
Furthermore, insurance companies may want the insured asset to be evaluated now and then. It is in the best interest of asset owners to insure the building so that its life expectancy fulfils its expectation. Structures with damage due to incidents such as fires, floods and collisions need to be inspected to establish proper corrective measures within the recommended time frame.

The optimum solution

To find the optimum repair solution and to avoid corrosion problems in the future, a thorough condition assessment of the structure has to be performed. This concentrates on the location of those areas already corroding, concrete crack inspection, the identification of the cause of damage, detecting invisible damage beyond the surface, and the prediction of the expected progress of damage with time.

The thing is with concrete is that it is designed to creak and crack over time. Cracks don't always mean structural failure, and it's not necessarily about stopping them altogether, but managing their progression with preventive and predictive maintenance. Specialized software with artificial intelligence could be used to analyze and monitor the cracks over time. But cracks are just one part of the corrosion picture...

Preventive inspections and proactive maintenance



How to health check your concrete structures to determine [preventive maintenance to keep assets safe and long-lasting?](#)

Like for us humans, only a combination of checking vital signs, imaging (X-ray, MRI, CT etc.) and blood tests can give the full picture. All these in-depth tests would be impossible to do without technology, and it's the same for assessing the health and strength of structures.

A multi technology approach is the only way to inspect our aging global assets accurately and efficiently. The commonly used, destructive methods are expensive, limited in scope, time consuming and the structure must be repaired after the test. But with [powerful sensors](#) that can 'see' into the concrete without causing any damage to the structure, combined with intelligent software to visualize the defects, we can prevent these tragedies from happening again.

In the U.S, the [structural testing procedures](#) are all well-defined for the public sector, but for the private sector there is nothing similar yet. Well defined structural testing procedures in the private sector is a crucial piece to the solution.

Next steps and action recommendations:

1. NDT Testing - Visual concrete crack inspection is not enough to detect all structural defects.
2. Recording - Unified recording system for know-how and data transfer.
3. Asset Ratings - Active monitoring and comparability of similar assets.
4. Birth Certificate - Compare to asset ratings to a reference with quality control.
5. Digitize Workflows - Increase efficiency, secure safety and improve profitability.

Conclusion

Here at Screening Eagle, we continue to push the awareness and conversation for preventive and proactive inspections. We will also push for new legal requirement changes for the inspection of infrastructure and provide refresher training for inspection engineers. And ultimately, we continue to deliver the technologies required to make this happen.

It's time to talk about the elephant in the room that no one wants to talk about – our evidently aging infrastructure. The unfortunate collapse of the Surfside condos in Miami (June 24, 2021) must be prevented from happening anywhere again.

Screening Eagle technologies were used in the official building investigations *after* Miami's Surfside condos collapsed, but our efforts and technology is meant to be used primarily for prevention.

What is necessary now is having the technologies in place for preventive inspections, structural insights, data, and health records **BEFORE** these tragedies happen...

Preventive maintenance strategies can then be planned with precision and prepared for well in advance before repairs become too expensive. Transparency of the situation for asset owners and buyers can be achieved through the scoring system. Asset owners can build up a detailed history of the structural health, much like we would for our car and for our human health.

Together, we can drive the necessary changes to enforce safer, stronger and healthier infrastructure from condos to roads, tunnels and bridges.



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