2019 CLM Southeast Conference
October 3-4, 2019
Orlando, FL

Adjacent Construction Claims and GIS-Based Cost-Effective Adjusting

I. Cause and Effect of Adjacent Construction Claims

In urban environments, heavy construction is conducted in close proximity to neighboring buildings and other structures. This adjacent construction may cause damage to existing buildings and structures from construction-induced vibrations, temporary lowering of the groundwater table from construction dewatering, and/or from the loss of lateral support induced by excavations. The construction activities can produce effects such as cracking and separation of exterior and interior finishes, building settlement and, most commonly, complaints of disturbance by building occupants from vibrations. Hence, construction activities, and their impact on surrounding structures, should be carefully designed, inspected, and instrumented.

Construction activities cause vibrations of various amplitudes and frequencies that propagate within the subsoils. Ground vibrations may be of sufficient magnitude to cause direct damage to structures. The magnitude of vibrations that causes damage varies with the type and the vibration response of the structure. Vibrations can also cause damage indirectly because they can cause densification of loose soils, resulting in differential settlement of building foundations.

Excavations are typically needed in construction projects, especially in dense urban environments, and can cause multiple additional effects on adjacent properties. Soil removal reduces lateral support for neighboring soil and may induce movement in the surrounding soil and structures close to the excavation. Typically, when excavation is performed, dewatering is also performed in parallel to the excavation. Dewatering causes the lowering of the groundwater table within the soils and can also contribute to additional differential settlements of neighboring building foundations.

Fortunately, many of these effects can be mitigated so that existing buildings are not adversely affected. If damage is claimed from these construction methods, the above mechanisms can be investigated to demonstrate cause-and-effect.

II. Insurance Products to Mitigate Adjacent Construction Risk

There are several insurance products available today for purchase to protect architects and designers, builders, construction companies, and sub-contractors from liability exposure against adjacent construction claims.

Architects and building designers should expect claims from a liability perspective for under-designed buildings and/or other potential exposure from a third-party seeking damage from a liability perspective.

Builder's risk policies generally cover the potential loss from the general contractor's perspective for the project. These policies usually include a sliding escalation for the amount of coverage based on the percentage of the project's completion at the time of loss.

Claims exposure for construction companies may come from many different alleged causes. These would include striking underground utilities, damage to adjacent structures from various activities, direct damage to property from equipment, and other various claims generated from nuisance to the neighbors. These additional claims can be from noise, dust, overspray and the like just to mention a few.

The more important coverage for all of these companies is the need to have an excess insurance policy sometimes referred to as an Umbrella Policy. These policies sit on top of the underlying policies and will respond on covered loss that breaches the underlying insurance policy limit of liability. This coverage is critical in the event of catastrophic claims and many companies have several layers of this excess insurance available.

III. Insurance Claims

The most commonly encountered claim is the allegation of cracks to the exterior of the adjacent building and shifting of doors/windows. In order to adjust a claim, investigation is important, but the most important investigation was what is done before the first shovel was put into the ground.

Such investigations should address multiple questions:

- Were pictures taken of adjacent buildings? Were they close-up enough to show details of the exterior? Do they show prior damage to the building? If so, was extra care taken to document such cracking/damage? Were pictures taken of adjacent buildings during construction to show (hopefully) no change in façades? Were pictures taken after construction?
- Was a survey taken of preconstruction elevation levels of adjacent buildings? If adjacent buildings are showing signs of distress prior to construction, what steps did the team do to take such into consideration going forward? It is crucial to understand and document the pre-construction condition.
- Was there a plan in place for monitoring vibration/dewatering activities? Was it closely followed? Was an expert retained to monitor activities consistently at site? We find many times that a plan is in place but records are spotty compared to the monitoring that actually took place and the expert was not there consistently monitoring. It is important to know whether there exists any risk transfer to experts and what their contract states.
- Did any value engineering take place? What was changed during this process? A common impact is that less monitoring than originally intended is taking place.

- Finally - Record keeping, Record keeping, Record keeping… How good are the records to show the preconstruction condition?

Based on these records -or lack thereof-, after a claim has occurred, one should usually retain an expert to evaluate pre- and post-construction conditions of the building. Based on the expert's findings, one can evaluate the claim for settlement considering any risk transfer provisions.

IV. Litigation, Alternative Dispute Resolution (ADR) and subrogation process for adjacent construction claims

The legal obligations involved in these types of projects can be extensive. Of paramount importance is taking action to prevent liability from damages. While in many states these actions/measures may vary, depending on building codes and ordinances, in many states wherein these issues arise there are processes in place. For example in New York- Construction Access Agreements (voluntarily entered into between adjacent property owners), and judicial access licenses, allowing for work to be done and access to be provided by adjacent properties, governing same and providing for measures to prevent damage, address liability, etc. Often, these agreements may address indemnification obligations, insurance coverage, bonds or the equivalent and protocols for monitoring the work. If/when issues or claims arise and damage to the adjacent property occurs (or is alleged), determining the cause of same, the parties involved, experts needed, remedial work to be performed, the scope of damages and exposure, applicable insurance, liability for attorneys' fees and the forum for dispute resolution are just some of the issues to be addressed. While there are a number of potential contractual and indemnification claims that may be involved, general negligence, private nuisance, violation of building codes, and other claims may also be asserted. For example, in the Millennium Tower matter of San Francisco, multiple lawsuits were filed by unit owners, the homeowners' association, the San Francisco City Attorney, etc., against the building owner, the architects, engineers, Webcor and the Transbay Joint Powers Authority. Legal fees in the Millennium Tower dispute have already reached into the 8-figure range and continue to climb. While the resolution is in process, it's a glaring example of the legal issues involved in these types of projects.

V. Managing Project Data: Utility of Geospatial Data (Antonios Vytiniotis)

The quantity of geospatial data available to the public is increasing exponentially with time. Cities and government agencies provide publicly available geospatial data portals through which anyone can download data such as aerial imagery, property parcels, tax assessor information, city maps, surface elevations or other. GIS software can manage the data in simple to use graphical interfaces with a look similar to Google Maps™.

These publicly available geospatial data and project specific data, including damage claim data, can be combined within GIS software to create an incredibly robust tool to efficiently perform sophisticated analyses of damage claims. For example, once the data are input in a GIS system, the user can create graphics and statistics that allow for analysis of the specific issues of each property. Moreover, the graphics produced can become very compelling exhibits in a dispute (e.g., court exhibits).

Compiled publicly available geospatial data and project specific data are efficiently analyzed to answer both simple and more complicated questions such as:

1. What is the proximity of various construction activities most likely to cause damage to the subject property? An overlay of construction drawings, field records along with aerial photos allows for estimation of the distance of the subject property and the limits of various construction activities such as pavement removal, excavations, and pavement compaction with private buildings and improvements.
2. Can construction-induced vibrations contribute to the claimed conditions? A geospatial overlay of the measured peak vibration levels can indicate whether significant vibrations occurred within a construction period and at what distances from the subject properties.
3. Is the building worth repairing? A comparison of the claim value vs. the tax assessed market value of the property can provide an easy way to evaluate whether the claim value is reasonable based on the assessed value of the property.
4. Are there any effects of non-construction activities that need to be considered? Has the damaged property ever been flooded from a large flooding event? A simple overlay of the property and an inundation map could show if that ever occurred. Can vegetation affect the measured cracking within a building? An overlay of a city-wide tree map and aerial imagery can show whether any trees exist that can contribute to this damage mechanism.

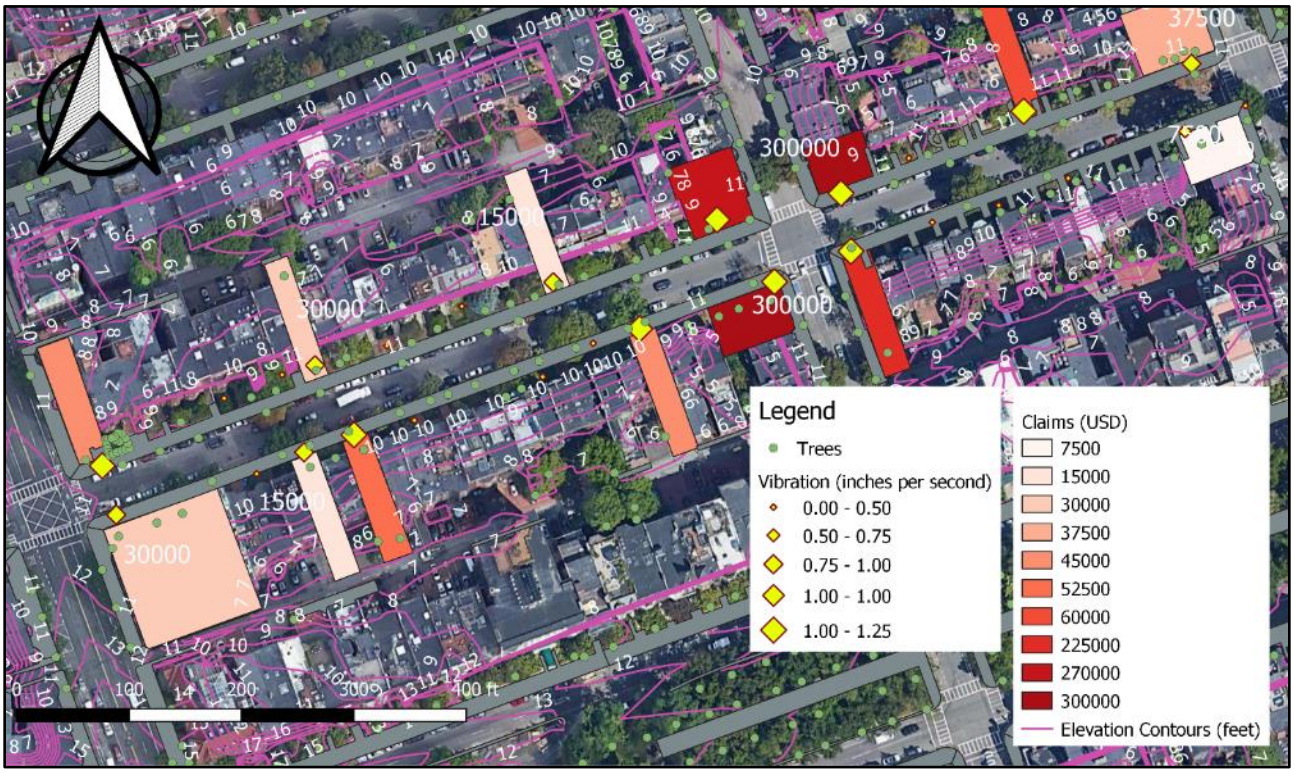

Figure 1. Example of GIS use showing sample parcels, tree locations, claim amounts, vibration data and elevation contours.

Example Scenario: Asphalt Pavement Replacement

In this section, we present a hypothetical scenario for illustration purposes. A contractor is replacing the asphalt pavement and relocating some underground utilities on a city street. After construction is complete, 14 adjacent properties file claims for damage reportedly caused by the adjacent construction activities.

Publicly available geospatial data was acquired from the City. In this example a tree map, a sidewalk inventory, a parcel map and an elevation contour map have been utilized. On top of these layers, a city map is included in the GIS model and aerial imagery provided by Google. Finally, project specific data are loaded, which are the specific parcels, the claim amounts and the peak vibration measurements recorded during construction.

Figure 1 shows how multiple layers of the above data can be incorporated into a simple map. The parcels are colored based on the value of each claim and the actual claim value is shown in select parcels. The surface elevation contours allow one to identify critical gradients that can potentially lead to adverse surface water drainage patterns. Aerial photographs show that trees exist in a dense spacing outside the claimants' buildings. Therefore, one potential damage mechanism is the effects of trees roots on the claimants' foundations. This analysis also quickly shows that properties with claims are situated in areas where larger vibrations were recorded at the claimant's property lines during construction. The larger the symbol used in Figure 1, the greater the vibrations recorded. With a closer look at the data, many of these values measured next to claimant properties exceed 1 inch per second, a value which literature indicates potentially can lead to visible cosmetic or architectural to finishes within the subject buildings.

Data analysis of the construction records can provide even more insights about the contributing factors and assist in the analysis of damage claims. Typically, field vibration records include, apart from the vibration measurements, descriptions of the various construction activities performed. These activity descriptions can be digitized and statistically analyzed. The plot and table in Figure 2 reveal the most common words encountered in the description of construction activities when vibrations greater than 0.5 inches per second were measured. The size of the word indicates the frequency of the word. It is clear that pile driving and pavement breaking contributed the most.

(a)

Word	Frequency (%)
Sheet	14%
Piles	12%
Driving	9%
Blue iron	6%
Hammer	6%
Notified	6%
Komatsu	4%
Breaking	4%
Concrete	3%
Excavator	3%

(b)

Figure 2 (a) Construction activities word map and (b) frequencies

VI. Putting It All Together

Adjacent construction claims will continue to be a common claim associated with construction activities. Claimed damages can be small such as cracks to the exterior of the adjacent building and shifting of doors/windows or much larger such as building settlement or collapse.

Hence, the legal obligations involved in large construction projects can be extensive, and therefore it is important to take action to prevent liability from damages. The types of legal claims may be contractual and indemnification claims but also may include general negligence, private nuisance, violation of building codes, and other claims.

Various types of insurance can be purchased in advance to protect against such liability such as professional liability, builder's risk and umbrella policies. When insurance claims occur, detailed investigation of such claims is needed but typically the most important investigation may be the investigation that was done before the first shovel was put into the ground.

Luckily, in situations where multiple claims arise, managing them has been more effective than ever with the rise of open data offered by multiple sources and the modern geospatial and data analysis tools. Individual inspections are still necessary, especially when claims are litigated but multiple data including the inspection data for multiple claims can now be managed more effectively. The financial value of the claims can be easily identified and correlated with causative mechanisms. At the same time, the causation analysis performed by retained experts can be more accurate and more consistent.