

LOSS CONTROL BULLETIN | LAND SURVEYORS | PROFESSIONAL LIABILITY INSURANCE

Construction layouts and "simple" errors









The goal of this bulletin is to help reduce the frequency and severity of insurance claims resulting from construction layout services provided by land surveyors, which can be costly and time-consuming.

These claims represent 59% of total claims under the Professional Surveyors Canada (PSC) program over the last five years and the trend is on the rise. These claims are largely due to a lack of independent checking procedures or not following procedures already put in place. As a result, in this bulletin, PSC's Professional Liability Insurance Committee along with Victor claims specialists and the program's broker, Arthur J. Gallagher and Co., share their valuable insights on how these claims are managed, and provide recommendations on procedures that land surveyors can consider to prevent these claims from occurring.

Claims resulting from construction layout services provided by land surveyors are often a result of several factors, which can be termed "simple" errors. These simple errors can be transposed numbers, misread plans, mathematical miscalculations, and horizontal or vertical shifts during data transfers. Not catching these errors as they occur and before they cause damage usually arises from poor or incomplete procedures on the part of the land surveyor. A client's demands, short timelines and other businessrelated pressures faced by a land surveyor can also cause or contribute to the land surveyor completing a building layout in a manner not consistent with established normal practices. Rushing work or cutting corners may also lead to a portion or even an entire building being laid out incorrectly.

With these kinds of claims, the mistake is often not recognized until after construction has commenced or is near completion. Consequently, construction layout claims can be very expensive. The average indemnity payment made on these types of claims is 71% higher than other claims reported under the PSC program. Most often, Victor's claims specialists are not only having to consider the hard costs associated with rectifying the construction layout error itself, but also delay-related costs and consequential losses of revenue, which can often be substantial.

Claims examples

The insured land surveyor was retained to layout the pile locations for a large industrial plant. The piling contractor insisted on starting construction while the land surveyor laid out the pile locations. The land surveyor agreed and modified their procedure to layout the pile locations radially from one point without independent checks, instead of establishing a layout grid. An error occurred shortly after construction began and was only discovered once all the piles were constructed in position. The error was such that none of the piles could be used as they were all located differently from what the design showed. The total cost to investigate and undertake the necessary repairs was over \$300,000.

In another claim, the insured land surveyor was retained to provide a topographic plan as well as the excavation and construction layout for a residential home. In establishing the temporary benchmark elevation on an adjacent utility pole, the land surveyor transferred the incorrect elevation. The contractor was unaware of the error and relied upon the benchmark elevation to establish the elevation for the foundation. In doing so, the concrete for the foundation was poured resulting in the house being one meter higher than it should have been. The error was only discovered after the foundation had been poured and the framing of the basement had commenced. The total cost to investigate and remediate was \$125,000. Had the land surveyor simply checked their field notes, they would have discovered the discrepancy in their numbers.

Several claims have been reported involving complex foundation layouts. Often, architectural site plans do not clearly show individual and overall dimensions or may have mathematical errors in the sums of the individual dimensions shown on the plans. Zoning setbacks shown on the plans can be unclear or incorrect. These inaccuracies may result from changes during the design process not being completely reflected on the drawings. Reliance on one dimension without checks to related dimensions or other sources such as structural drawings can lead to layout errors.



Solutions



Many of the errors that occur are the result of improper pre-calculation in the office prior to the field work. Here are seven steps to consider in avoiding these errors:

- Ensure that the proper version of the design plans is being used. This should be confirmed with the client before starting. In order to keep all versions of the plans accounted for, maintaining a robust document management system is of utmost importance.
- Check the source data thoroughly for "simple" errors on the part of the architect, engineer or contractor. As described earlier, these "simple" errors can include transposed numbers, misread plans, mathematical miscalculations, and so on.
 - a. Make sure any ambiguous dimensions are confirmed by the appropriate party.
 - b. Check site plan dimensions against structural drawings for complex projects.
 - c. Double check that setbacks are consistent and logical, and if you are responsible for by-law compliance, check directly against the specific by-law or with the relevant municipal authority. Setbacks may need to be checked with the contractor or directly with the architect or engineer. Take the time to do so, if, in your opinion, there is any doubt.

- 3. Use a hard copy or pdf version of the design plans for your calculations. Drawing files often have features mislocated. Using the hard copy will overcome those issues. Drawing files can be used after the initial calculations as a check.
- 4. Have the calculations checked by a second person. An individual can make the same error over and over, while a second person can spot it immediately.
- 5. Overlay the calculation drawing over a pdf version of the site plan. This will uncover any gross errors in the calculations.
- 6. Make sure that any transferring of the calculations to a field co-ordinate system account for all scale factors and shifts. Use the correct system.
- 7. Ensure that the layout file is clearly identified and is the only file available for selection. Again, this requires a robust document control system both in the office and on field data collectors.

Once the data is ready to be applied in the field, a whole new set of procedures should happen to ensure an error free layout. Here are the next five steps to consider:

- 1. Ensure that the client representative on site is using the same plan version as you are. If it is different, bring things to a stop until any differences are resolved.
- 2. Implement proper independent field check procedures. The checking procedure must be substantively different than the original layout method. Make independent check measurements of dimensions and elevations to existing structures or previously established and confirmed work. If a layout is entirely radial, take some direct measurements of angles and distances to confirm dimensions against the plans or calculations.
- 3. Take time to look at the layout to confirm that it "feels right." Take some check measurements to existing features to look for gross errors. Take suggestions from contractors or site supervisors that a layout appears too low, too high, or horizontally not right and make appropriate checks immediately.
- 4. Record the laid-out position of every point. These positions should be checked back in the office for conformity with the design calculations.
- 5. Provide the client with a hard copy and/or record (in pdf format) of what was laid out. Ensure that the client agrees to not proceed until the layout is checked.



In summary, here is a checklist that you can reference to help reduce the frequency and severity of insurance claims resulting from construction layout services:

- Do not be overly influenced by unreasonable client demands.
- Insist on plans of the layout prior to sending staff to the site. Time is required to thoroughly review the plans.
- Check dimensions and setbacks.
- Plan a layout process suitable to the specific job.
- Discuss site conditions, procedures and timing to educate the client about what is required of them to make use of your services effectively.
- Recognize that undue pressure placed on your staff, especially on the site, can lead not only to professional liability errors, but to dangerous working conditions.
- Communicate with your client. This is paramount.

The cost of making an error or omission

There is a direct cost to the land surveying firm in making a professional error. They are required to pay their deductible on any indemnity payment made to a third party. In addition, they will be surcharged on their insurance premium to account for the professional error. The surcharge will be dependent on the frequency and severity of historical claims. Those that have claims pay a higher insurance premium.

Furthermore, there are additional costs of having a claim including loss of productivity (assisting the adjuster and/or lawyer retained to look after the land surveying firm's interests when a claim is made) as well as loss of profitability (unpaid remedial work, loss of fees). These claims may also have damaging effects on a land surveyor's corporate and professional reputation.

A concerted effort to reduce the frequency and severity of construction layout claims will contribute to maintaining client satisfaction with the services rendered as well as increase the likelihood of a return business for the land surveying firm. In addition, fewer mistakes will have a positive impact on the loss performance of the insurance program and result in lower insurance premiums for everyone.

Implementing procedures based on these recommendations and then being sure to execute them every time can help land surveyors better manage their business—with less stress and fewer claims.



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