

Loss Control Bulletin

Land Surveyors

Professional Liability Insurance

Construction layouts and “simple” errors

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The goal of this Bulletin is to help reduce the frequency and severity of insurance claims being reported from construction layout services. Layout claims with common characteristics are being reported repeatedly under the Professional Surveyors Canada professional liability insurance program and it would appear that the claims are largely due to lack of independent checking procedures. Your insurers and the Professional Surveyors Canada wish to share this experience with all land surveyors so that land surveyors can recognize the situations where these errors may occur.

The following paragraph is an excerpt from the new “Loss Prevention and Practice Management Guide: Professional Liability Insurance Issues for Canadian Land Surveyors” which can be found on the Professional Surveyors Canada website noted at the end of this Bulletin.

“... the age-old problems associated with improper checking procedures, insufficient research, inadequate communication, result in a large majority of claims against surveyors and other professionals. Simple transposition of numbers, not caught by closing to a second benchmark or closing a traverse are disturbingly frequent examples. This is especially evident when times are good, when there is plenty of work and everyone is busy and may not spend the extra time needed to follow established procedures

despite knowing the potential consequences. It can be a challenge to repeatedly inform our insureds of the basics of good practice management and basic measurement science without sounding condescending or patronizing.”

This Bulletin is written simply as a tool to help prevent your firm from experiencing a costly construction layout related insurance claim.

Claims resulting from construction layouts by land surveyors are often a result of several factors. Recently, insurers have seen a significant rise in claims as a result of construction layout errors involving what can be termed “simple” errors. Transposed numbers, misread plans, mathematical miscalculations, horizontal or vertical shifts during data transfers are not complex mistakes and can happen in any practice on a regular basis. Not catching these errors as they occur before they cause damage usually arises from poor or incomplete procedures on the part of the land surveyor doing the construction layout. Client demands, short timelines and other business-related pressures faced by a land surveyor result in the land surveyor completing a building layout in a manner not consistent with established normal practices. Rushing work or cutting corners may well 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 nearly completed. Consequently, construction layout claims can be very expensive. Costs can include extensive mediation because the parties must determine the costs the claim has caused as a domino effect on project delay and consequential lost revenue.

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The dollar amounts involved for delay and lost revenue can be substantial, in the range of tens of thousands of dollars per day, as crews and equipment are kept on standby and penalties accumulate for incomplete project stages and lost sales. The costs for these claims can go far beyond the hard costs associated with remedial work, which in themselves can be substantial.

Claim examples

In an actual claim involving a large industrial plant, the land surveyor was retained to layout the building pile positions. The pile contractor insisted on starting construction while the land surveyor was laying out the pile positions. The land surveyor agreed and modified his procedure to layout the pile positions radially from one point without independent checks, instead of establishing a layout grid. An error occurred shortly after the work 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 in the resulting construction, as all were in locations different from the design locations. The resulting cost to the insurers to investigate the problem and make repairs was over \$300,000.

Another claim resulted from a calculation error that occurred when co-ordinates were uploaded to a field notebook with a 10-metre horizontal shift error incorporated into the data. These co-ordinates were based on calculations using original fieldwork, but the layout did not provide a check into the existing work. The resulting cost of the remedial work was over \$100,000.

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

Several straightforward procedures can be put in place to prevent these types of errors.

FIRST – Implement proper independent field check procedures. The key word here is “independent”. 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.

SECOND – 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, and plan a layout process suitable to the specific job. Discuss site conditions, procedures and timing to educate the client about what is required of him or her to effectively make use of your services. 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. Communication with your client is paramount.

THIRD – Do not be overly reliant on the technology you elect to use. As well, be aware of potential pitfalls regarding electronic data collection and transfer, and data files collected by other professionals for other purposes. Paper copies of electronic files should be included with the information being transferred to or from another professional. Software “glitches” resulting from files created by one type or version of software and subsequently opened using different software can and have occurred to the detriment of land surveyors. Use caution and data integrity checks when using data transfer processes and be sure that all transfer of information, either digitally or in hard copy, contains appropriate disclaimer statements.

FOURTH – Check the source data thoroughly, whether it is paper or electronic, 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. Make sure any ambiguous dimensions are confirmed by the appropriate party. In complex projects, check site plan dimensions against structural drawings. 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.

FIFTH – Have an experienced staff member look at the data from a logic and possibility aspect; that is, get a second opinion on the data integrity. The same exercise can be applied to the layout itself. An experienced field person should be on site to ensure that everything “looks right”. Instruct field staff to take suggestions from contractors or site supervisors that a layout appears too low, too high or not right seriously and make appropriate checks immediately.

The cost savings from implementing these suggestions are real and are relatively easy to achieve. Construction layout claims will not happen as frequently if proper independent checks of data, calculations, and measurements are made. The costs associated with mediation of a claim, remedial work, delays and lost revenue will be lowered, if not eliminated.

Claims reported under the program can serve to increase premiums and can also exert severe strain on your personnel. Time and staff must be allocated to deal with the problem and to provide assistance to the professionals investigating the claim. A claim may also have damaging effects on your corporate and professional reputation. On the other hand, concerted efforts to minimize or reduce the number of survey errors will contribute to maintaining client satisfaction with your services and increase the likelihood of return business to the land surveying firm.

The hard truth is that mistakes are a fact of life in the business. That is not to say, however, that land surveyors should not take all measures possible to prevent errors in the first place, and then minimize the effects when they do occur. By learning from past mistakes, we have a better chance to prevent future ones.

For more detailed information, please refer to the “Loss Prevention and Practice Management Guide: Professional Liability Insurance Issues for Canadian Land Surveyors” produced by the Professional Surveyors Canada in 2001, which can be found on the Professional Surveyors Canada website: www.psc-gpc.ca

