CALCULATING THE PERIOD OF RESTORATION USING CRITICAL PATH METHOD (CPM) SCHEDULING

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Property insurance policies that provide coverage for business interruption losses contain specific language that defines the parameters for evaluating such losses. Regardless of the specific form (ISO, hybrid, or specific manuscript) used, all such policies contain language that defines the period for which coverage exists as a result of the interruption to the business. This period is commonly referred to as the Period of Restoration, the Period of Liability, the Period of Recovery, or even the Period of Indemnity. Regardless of which title is used for the BI period, policy forms typically define the length of the period of coverage as either “the date when the property at the described premises should be repaired, rebuilt or replaced with reasonable speed and similar quality” or “for only such length of time as would be required with the exercise of due diligence and dispatch to rebuild, repair or replace the damaged property.” Either of these phrases begs the question: how is this length of time to be determined? The problem is compounded further when the insured does not rebuild, rebuilds in a different location or rebuilds a facility with substantial improvements or upgrades. There is general agreement in the industry and within the courts that any of the three scenarios listed above would necessitate the creation of a “theoretical” period of restoration.

In situations like those above where the actual period of restoration is inappropriate for use, it is still very important to establish an appropriate period of coverage in order to avoid over- or under-paying a Business Interruption (BI) claim. Even in smaller BI claims, millions of dollars could be at stake based solely on the length of the period of restoration. The dollar amount of BI claims can be more fairly and accurately determined through scheduling, a management tool commonly used in the construction industry to plan and control a project. Scheduling methodologies can be effectively implemented to accurately determine the period of restoration even in the event that the period is theoretical.

However, not all scheduling methods are created equal. The easiest and quickest way to prepare any schedule is to create a standard Bar Chart known as a Gantt Chart. A Gantt Chart consists of horizontal bars, each one of which represents a particular work activity, with a timeline across the top indicating when each activity will be performed. The overall duration of the project, which could be considered the period of restoration, is simply the time from the beginning of the first bar to the end of the last bar.

The main risk of using Bar Charts to calculate the period of restoration is that the results have no scientific credibility. The longer the lines are drawn, the longer the schedule. In the construction arena, courts have long held that Bar Charts are not an appropriate means of schedule analysis and cannot be relied upon to yield meaningful results. Critical Path Method (CPM) scheduling, on the other hand, has been accepted by courts throughout the country as the only acceptable method of schedule analysis.

So what exactly is CPM Scheduling? CPM scheduling has been used in the construction industry for decades to plan and schedule the design, procurement, and construction of large projects. This methodology centers around the calculation of the longest path of activities through the project. These activities control the duration of the project because they (by definition) have no “float” or slack time, and thus will impact project completion. In other words, activities along this “Critical Path” will, if extended or delayed, delay the overall completion of the project. The length of the Critical Path determines the duration of the project. Often times, however, the terms “critical path” and CPM are mistakenly interchanged. Frequently, “critical path” is used as a generic expression to refer to items that are important or those that will likely have an impact on project completion. For example, seasoned professionals often know from experience what the “critical path” of a project may be. Accordingly, they might draw it out as a bar chart or highlight the activities on a Gantt Chart to identify their “critical path”. CPM, however, uses an

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established, supportable, scientific algorithm to calculate the Critical Path.

CPM Scheduling differentiates itself from bar charts not only in its calculation of the Critical Path but also in its sequencing of work activities. Whereas the bar chart focuses attention on discrete activities, the CPM Schedule emphasizes the interrelationships among activities. In CPM, activities are logically connected to one another through predecessor and successor relationships. In constructing the CPM Schedule, the scheduler is required to consider which activities must be performed consecutively and which ones can be performed concurrently. The scheduler then constructs a network of activities that model the actual sequence of work necessary to complete the project. As such, the CPM Schedule can be used to analyze the effect that an impact to one activity can have on other activities on the Critical Path.

CPM Scheduling has the further advantage in that the schedule can be resource loaded to check the validity of the schedule. By resource loading the schedule, the scheduler can generate manpower, quantity, and equipment curves or graphic representations of resources utilized over time, to determine if requirements are reasonable. Due to its focus on quantitative analytical calculation and decision making, CPM Scheduling is highly reliable and is the most proven methodology available today with which to calculate the theoretical period of restoration.

The following case study illustrates just how important it is to accurately calculate the theoretical period of restoration.

The All Star Apartment Complex was constructed in the year 2000 and consists of 40 buildings of 30 units each. During the hurricane season of 2005 the buildings began to experience water intrusion that led to mold and insect infestation. With the damage caused by water intrusion understood to be an insured loss, the insured competitively bid and hired a restoration contractor to repair each building. The insured then produced the bar chart schedule shown in Figure 1. The insured’s claim for BI loss centered around the bar chart schedule showing an “actual” construction duration consisting of a 10 month period of restoration for each building. At a revenue loss of $45,000 per month per building, the insured’s total claim was $18M.

![Figure 1. Insured’s Bar Chart](image)

However, when the insurer prepared a CPM Schedule for this same project as shown in Figure 2, the CPM Schedule showed that the “theoretical” period of restoration was actually 7 months. Thus, the BI claim should only amount to $12.6M, $5.4M less than was claimed by the insured. What accounts for such a discrepancy of three months, and thus $5.4M, in the period of restoration between what the bar chart illustrated and the CPM Schedule shown below?

First, the insured’s bar chart (Figure 1) represents the “actual” work to be performed and not the “theoretical” work necessitated by the actual loss sustained. In fact, Figure 1 identifies two items that the insured is not entitled to recover for: the architectural eyebrows (which amount to a betterment) and the flashing, wrap, and hurricane ties that were left out of the original construction either due to a design omission or a construction defect. Second, each bar chart activity is performed consecutively: work on demolition does not start until all the scaffold is completed, work on the siding does not start until all windows are set and the work on the stucco does not start until work on the siding is complete. As the result, the bar chart illustrates that the actual restoration period was 10 months.

However, because the insurer’s CPM Schedule uses a network to establish the relationships among activities that are logically interconnected, it shows that much of the work on the scaffold, demolition, windows, siding and stucco can be performed concurrently. Thus, the CPM Schedule, shown in a highly summarized version in Figure 2, indicates that the period of restoration would actually be 7 months, not 10 months. The validity of the CPM Schedule is then proven by resource loading
it with manpower, material quantities, and equipment. The resource loading of the schedule proves that the essential activities can be performed concurrently, so long as normal construction logic is followed. Using a proven, scientific methodology, the CPM Schedule has accurately calculated, with mathematical certainty, that the fair and accurate amount for the BI claim for All Star Apartments is $12,600,000, not $18,000,000. Without using the CPM Schedule, the insurer could have potentially overpaid All Star’s claim by $5,400,000.

**Figure 2. Insurer’s CPM Schedule**

This case study demonstrates that CPM scheduling is an effective and accurate method for calculating the period of restoration. But what makes CPM scheduling the ideal tool for any period of restoration calculation are the four fundamental axioms of CPM scheduling themselves:

- **First**, CPM scheduling uses a proven, scientific methodology. Because it offers this degree of precision, it can facilitate the resolution of BI claims quickly and will yield the most accurate results.
- **Secondly**, CPM schedules can be validated and tested. The schedules can be “loaded” with manpower, resources, and quantities, which allow for a number of ways to check the credibility and reasonableness of the period of restoration.
- **Third**, a risk analysis of CPM schedule can be performed using computerized simulations to check the reasonableness of the schedule with results being presented in the form of percentage likelihood of completing within a certain time frame.
- **Finally**, a properly prepared CPM schedule becomes a powerful tool in defending the period of restoration calculation if the matter should end up in litigation as CPM scheduling has been accepted by courts throughout the country as the only acceptable method of schedule analysis.

It is obvious that the risks of not using CPM to calculate the period of restoration are significant. In addition to the potential to overpay the BI claim, the risks include having an adverse decision rendered in a court of law based upon the use of unaccepted scheduling methodologies. With BI claims, millions of dollars could be at stake solely upon the length of the period of restoration. Conversely, the cost of using CPM is relatively minimal. Prudent policy would therefore suggest evaluating the use of CPM to determine the theoretical period of restoration for virtually all significant BI claims. 

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