Chapter 20

Modeling Risk and Opportunity Reality

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ABSTRACT

The author of this chapter worked for 42 years in the construction industry. Employed by a company with great leadership, vision and values. The author was able to evolve from the pencil and paper applications to the latest in data acquisition, analysis and modeling. Simulation modeling and business science were successfully applied to many business functions with significant results in predicting risk and uncertainty ranges before bids, projects and investment decisions were complete. Included in this chapter are samples of Strategic Bidding, Cost (Range) Estimating, Scheduling, Project Management/Control, and Corporate Resource Management. Business processes can be measured for Stability, Capability and Predictability. Consistently balancing decisions within the upper and lower control limits, using valid reasoning for taking advantage of risk or opportunity will usually guarantee long term success. Reality can be a friend if it is measured and applied with the right expectations. Modeling creates the environment for tapping into substance and understanding.

INTRODUCTION

It has been said there are two sides to every story. In this case the story is about leveraging risk and uncertainty. To do this effectively we should first recognize both sides, risk and opportunity. It would be really nice if business could focus on the opportunity side of expectations and avoid the risk side. Unfortunately, in the world of competition there are very few projects that afford this luxury. Knowing how processes range up and down for both frequency and magnitude is a real advantage in this environment of competition. Most businesses breakdown into multiple related processes. If these processes are consistently measured and reviewed for analysis we find variation in the results. Often this variation is greater than perceived when decisions have to be made prior to execution. The reality is that most processes are impacted by both internal and external forces that change from time to time. There are expectations that are reasonable and even most likely (mode) but, for the most part results are usually skewed to one side.

DOI: 10.4018/978-1-5225-1790-0.ch020
side or the other. In the case of cost and schedule it is difficult to perform much better (lower) than the reasonably expected distribution point. But, when circumstances turn difficult (sometimes catastrophic) the worst can be much higher than anticipated.

In this chapter we will look at some simplified samples to illustrate valuable business insights that are gained when a simulation tool (Monte Carlo Simulation (MCS), using Palisade @RISK, capable of 100 to 10,000 simulations of a single item) is applied to construction processes. Samples will include:

- Strategic Bidding,
- Cost Estimating,
- Scheduling,
- Project Management/Control, and
- Corporate Resource Management.

These same principles and practices are applicable to most any business where decisions have to be made prior to executing the work. That sounds like just about every business where risks can either be accepted, shared or avoided. A quantitative understanding of both frequency and magnitude provides significant advantage in achieving successful results.

In today’s world of internet communication, 3D graphics, digital enhancements, drone delivery and much more; at what level can the reality of the past remain viable? Numerous dimensions define the ways that reality is observed and measured. Some are measured in length, width and height, while others reveal themselves as thoughts, ideas and actions. Reality is often referred to only as perception. In an environment where diversity is encouraged and establishments are considered old or no longer relevant it is hard to promote practices that emphasize learning from historical experience. Experience is sometimes referred to as only the past and we can always do better. Now, that is a great attitude and hard to argue with but, how do you know you are doing better if you have not measured the past. How can you even make the comparison if you have not established the capability, stability and predictability of processes to know that the new is compatible and improvement is meaningful?

**Capability**

What is a man capable of running 100 meters in? A world class sprinter can run it in less than 10 seconds (9.58 is the world record). The women’s record is 10.49 seconds. High school athletes run it in about 12 seconds. At the next track meet what would be expected to be the winning time? And, what would be the average time for all the runners? Don’t you think that categorizing the group of runners would be essential to making a reasonable prediction?

**Stability**

Throw in a few 40, 50 and 60 year old runners and the measurements become so inconsistent and unstable that the variations would make at least the average time unpredictable.