Preface

Interim 9th Edition of 2021
(an Addendum and not Replacement for the 8th Edition)

Why are we writing, and why do our readers need a 9th edition? After our first eight editions, what more may be said about CPM planning and scheduling for the construction and other time-centric industries?

In the 7th edition, we said the mighty ship *USS Scheduling* had come about 180 degrees. In the 8th edition, we suggested it had continued to a full 360-degree circle. Three events or series of events now suggest we are moving again, but perhaps in a new direction away from the entire 360-degree plane surface and into a third dimension.

One is the passing of James J. O'Brien to whom this 9th edition is dedicated, December 31st 2020. Jim did not write the mathematical algorithm or protocols of CPM, but he did personally recognize how this academic exercise would be valuable to the construction industry and promote it to the world.

In the period 1956 up into the early 1980s CPM was a product by, of and primarily for experts or "priests" who would feed what they deemed relevant information to the large mainframe computer oracle and then explain or translate the oration emanating therefrom. In the early 1980s a new path was created by the development and mass dissemination of personal computers and personal computing so that mere mortal ordinary people could collect and enter the data of the logic of the project, and compute and read the then calculated initial schedule. More importantly management at the jobsite could visually assess current status, directly enter such information to their personal computer and then calculate and read an updated schedule. Power had been moved from the "priests" to the people.

You will read in this text that this had a cost; the less powerful personal computers ran a watered down version of the algorithms used on the big mainframes; the ability to obtain the fastest or most accurate (likely) schedule was degraded. The upside was converting the mainframe process requiring several days and hundreds of dollars for each update was reduced to only a few hours to collect and enter data and minutes to calculate and print reports, and only pennies for the electricity.

The mighty ship *USS Scheduling* continued on course for another decade or two with emphasis by software developers to make the process easier, more intuitive, and more useful to the primary end user being the construction superintendent and team. But seeds of course correction began with also seeking to raise sales by providing ancillary services to project owners and contractor home office facilities managers with enterprise issues where the schedule for one project could be compromised for other projects of the target buyer's enterprise. Complexities were added requiring special training and software company "university" courses for trained clerks (and not "priests") to operate the product (and yet another source of revenue) who may be posted (and charged) to the field but were in reality home office clerks. Often the superintendent would send these parasites off to produce required reports but meet with forepersons to actually plan work falling back upon the 1910s technology of bar-charts.

By 2010 in our 7th Edition, Jim wrote our mighty ship *USS Scheduling* had turned 180 degrees. The push for software as a service (SAAS) had largely triumphed with contractors required to maintain teams of scheduling clerks on the jobsite who rarely spoke with the superintendent or any foreperson, and had little knowledge of actual construction practice, working full time to maintain the official schedule. I would be invited to fly out to jobsites and meet with the superintendent and his team of graphic schedulers. The two teams of schedulers refused to talk to each other. The official schedule with "activities" tied to accounting codes bore little resemblance to the graphic schedule activities relating to efforts by the forepersons. Work continued to be performed invoiced and paid for with little progress shown on official schedules; the team needed advise.

But by 2016 in our 8th Edition Jim suggested the mighty ship *USS Scheduling* had continued to a full 360-degree circle, perhaps as in the *Caine Mutiny* cutting her own tow line. Superintendents and their project teams continue to manage using their 1910s bar-charts while looking for some form of computer assistance. The plethora of push, pull, graphic, group-think, and other mostly short term scheduling systems and softwares is a testament to a vastly underserved industry. The construction team desires an improvement over the bar-chart for their one project.

Even the big established "scheduling" software giants were promoting their version of computer enhanced graphic scheduling. But instead of standing around a large pad of paper or whiteboard, the forepersons should meet weekly to stand around a rather expensive large touch enabled screen in a dusty construction trailer and connected to Cloud Services to "plan" the work they would "like" to do

in the coming weeks. Some software providers also continued to reluctantly sell their legacy product so that the team may be told what they "should" do in the coming weeks to promote project completion, but despite promises have invested little or nothing to update that 1990s era software.

As we enter the 2020s we are starting a new phase based upon the latest buzzwords of Cloud and Artificial Intelligence. This is a new direction neither forward to assist the team to plan and schedule with computer assistance nor return to manual graphic solutions. I compare it to now aiming off the 360 degree plane to a third dimension. The general concept is to develop an artificial intelligence that can read the thought process of the superintendent and team, or many superintendents and teams, and mimic that thinking process to create a plan and schedule. Thus you do not need to read this book because the AI will plan and schedule your project for you, directly from the BIM file. You do not need that experienced superintendent nor team, but may simply hire a bunch of recent high school attendees (graduate preferred?) to act as the clerks for the AI who will direct the labor of crafts or robots.

Utopia or dystopia? The AI with millions or billions of inputs may negotiate and write subcontracts and purchase orders, track procurement and documentation of compliance with all socially approved mandates, as well as communicate with the AI of the owner or other entities in a higher language than understood by us mere humans. Despite hype, I do not think we are there yet and still require human wisdom and insight to deal with all that cannot be encoded by that army of clerks. The challenge to our developers of software is to utilize AI is to assist the knowledge and intuition of the experienced superintendent charged with project success rather than consider this person simply another clerk performing to the command of Central Planning.

It remains the purpose and goal of this text to educate and assist project professionals to plan and then schedule their projects to be completed as expeditiously and cost effectively as possible. We rededicate this ninth edition to this effort and to the proposition that training in CPM logic networks and scheduling software to support solutions shall have a new birth of freedom—and that construction software of construction professionals, by construction professionals, for construction professionals, shall not perish from the earth