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“Pragmatism in Productivity”

 **Project Controls**
EXPO
Washington, DC - USA

(W)www.projectcontrolexpo.com/usa (M) +44 (0) 203 883 1386 (E)usa@projectcontrolexpo.com

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- Tyler Konter PE PSP
- Senior Consultant @ POINT Construction Advisory Group.
- Schedule Delay & Productivity Analyst on jobs \$10B+



Pragmatism in Productivity

A case study detailing the importance of choosing the correct method of productivity measurement at the correct point in the Project

Goals:

- Introduce a real Project in Canada that experienced significant productivity losses.
- Discuss how Contractor (X)* measured its productivity loss and submitted its claim to the Owner.
- Critique of the method used by the Contractor and similar methods.
- Describe the solution proposed by the outside consultant that ultimately led to a commercial settlement between the Owner and the Contractor.
- Take Home something of Value!!!

* names, amounts, exact locations and other identifying information has been altered to respect client privacy

The Project



- Western Canada heavy civil Infrastructure Project
- c.2014-2019
- ~ 100M+ Original Contract Value
- MAJOR earth-moving operation

So...what went wrong?



- In-situ moisture content of the soil ranged from 20% to 30%+. (12% to 20% anticipated and described in the contract documents).
- Required intense disc work to dry out fill areas, sealing & un-sealing during weather events, sweeping and scraping to maintain the existing roadway (haul-route).
- Resulted in *Extremely* unproductive cut & fill operations.
- Earthworks budget >200% overage.



- The Contract contained an exculpatory clause attempted to shift the earthwork risk to the Contractor.
- Contractor pursued a labor productivity and excusable delay claim against the owner at the commercial level while the project was ongoing.
- Requested ~18 Months excusable time extension to offset LD's.
- Requested ~\$22M



The Method



- Contractor used their Project Management resources to put together a productivity analysis using Mechanical Contractor's Association of America ("MCAA") Factors.

What are MCAA Factors and why are they used?



Factor	Percent of Loss per Factor		
	Minor	Average	Severe
7. LEARNING CURVE: Period of orientation in order to become familiar with changed condition. If new men are added to project, effects more severe as they learn tool locations, work procedures, etc. Turnover of crew.	5%	15%	30%
8. ERRORS AND OMISSIONS: Increases in errors and omissions because changes usually performed on crash basis, out of sequence or cause dilution of supervision or any other negative factors.	1%	3%	6%
9. BENEFICIAL OCCUPANCY: Working over, around or in close proximity to owner's personnel or production equipment. Also badging, noise limitations, dust and special safety requirements and access restrictions because of owner. Using premises by owner prior to contract completion.	15%	25%	40%
10. JOINT OCCUPANCY: Change cause work to be performed while facility occupied by other trades and not anticipated under original bid.	5%	12%	20%
11. SITE ACCESS: Interferences with convenient access to work areas, poor man-lift management or large and congested worksites.	5%	12%	30%
12. LOGISTICS: Owner furnished materials and problems of dealing with his storehouse people, no control over material flow to work areas. Also contract changes causing problems of procurement and delivery of materials and rehandling of substituted materials at site.	10%	25%	50%
13. FATIGUE: Unusual physical exertion. If on change order work and men return to base contract work, effects also affect performance on base contract.	8%	10%	12%
14. RIPPLE: Changes in other trades' work affecting our work such as alteration of our schedule. A solution is to request, at first job meeting, that all change notices/bulletins be sent to our Contract Manager.	10%	15%	20%
15. OVERTIME: Lowers work output and efficiency through physical fatigue and poor mental attitude.	10%	15%	20%
16. SEASON AND WEATHER CHANGE: Either very hot or very cold weather.	10%	20%	30%

MCAA Factor Application Example

Estimating Lost Labor Hours Using MCAA Factors			
1	Actual Earthwork Hours	2000	
2	Change Order Hours	500	
3	Revised Hours	1500	=1-2
4	Dilution of Supervision	10%	
5	Errors and Omissions	15%	
6	Total MCAA Factor	25%	=4+5
7	"But For" Hours	1200	=3/(6+1)
8	"Lost Hours"	300	=3-7

MCAA Factor Pros: MCAA Factor Cons:

- Quick and easy
- Quick and easy
- Easy and quick

- Ignores specific Project conditions (all projects are different, why would the factors be the same?)
- Application of factors is subjective and typically performed by the party attempting to substantiate its claim.
- Where do these factors come from anyways?
- Don't do this.

And if you don't believe me yet...

DECLARATION OF JOHN R. GENTILE

I, John R. Gentile, hereby declare as follows:

1. My name is John R. Gentile. I have been the Executive Vice President of the Mechanical Contractors Association of America ("MCAA") since March 1, 1996. My business address is 1385 Picard Drive, Rockville, MD 20850-4340. The information in this Declaration is based on my personal knowledge and on information provided to me by MCAA staff members at my direction.

And if you don't believe me yet...

6. Because MCAA and its membership recognize that the loss of labor productivity is difficult to quantify with specificity, the MCAA Factors are expressly intended to serve only as a point of reference for mechanical contractors and other parties. The specific percentage values set forth in the MCAA Factors must be applied with careful consideration and a review of the facts surrounding the loss of productivity. The MCAA Factors are intended to be used in conjunction with the experience of the particular contractor seeking to use them, because

And if you don't believe me yet...

7. MCAA has published the MCAA Factors periodically since the early 1970s. Unfortunately, **documentary evidence concerning the development of the MCAA Factors is sparse.** The MCAA Factors apparently were developed by the MCAA Management Methods Committee beginning in the late 1960s and continuing into the early 1970s. It is my informed belief that the committee was comprised of MCAA Member representatives who were experienced mechanical contractors. MCAA records show that in April 1969 a “rough draft on the subject of Change Orders in the Construction Industry” was presented to MCAA’s Board of Directors. See Exhibit 2 attached hereto. Unfortunately, despite a diligent search, the actual draft document could not be located. MCAA Board of Directors meeting minutes from October

And if you don't believe me yet...

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 16th day of April, 1999.


John R. Gentile

LABARASHD3GENTILE.DEC



Vickie A. Mallow
My commission expires 8/23/00.

So, what happened?:

- Contractor submitted multiple iterations of the MCAA based claim to the Owner.
- The Owner rejected the claim each time for the reasons discussed previously.
- Project Management spent significant hours on the active and struggling project compiling, analyzing, and submitting the claim through each iteration.
- *Hired an outside consultant.*



The Method Part 2

The Measured Mile Method, AACE's RP 25R-03

- Compares “Impacted” and “**LEAST**-Impacted” periods
- Compares **Like** scopes of work. (We aren't comparing plumbing to drywall)
- Hours per - “widget” completed/ unit Installed/ hours per % complete
- Incorporates project dynamics and conditions
- Incorporates inefficiency/efficiency compared to the “Bid” Productivity. (May be better or worse)

Measured Mile steps on THIS Project:

- Identify Areas of the Project where in-situ soil moisture % was similar to the % in the contract documents. (Least Impacted)
- Identify all actual hours expended to complete this work (hauling, sweeping, embankment)
- Calculate Hours per cubic yard.
- This Project had excellent documentation in the form of daily reports that identified the yardage per day (by truckload proxy, (11YD/Truck)). **Documentation is the key to an effective MM.**
- Repeat the process for the unimpacted period and compare.



Measured Mile Math Example

Estimating Lost Productivity Using the Measured Mile		
1	Actual Hours (Impacted Period)	5000
2	Actual Hours (Unimpacted Period)	1000
3	Quantity (Impacted Period)	10000
4	Quantity (Unimpacted Period)	5000
5	Productivity (Impacted)	0.50
6	Productivity (Unimpacted)	0.20
7	Productivity Difference (Impacted - Unimpacted)	0.30
8	"Lost Hours"	3000

So, what happened? Part 2:

- Project Management staff were able to divert their attention back to the Project while the analysis was performed.
- A “ghost-written” Change Order was re-submitted to the owner on the client’s letterhead.
- After subsequent negotiation with The Owner, a commercial resolution was reached, and a change order approved that increased the contract value *significantly* based on the measured productivity losses. Simultaneously, a time extension was granted that relieved the client of yet to be assessed liquidated damages based on a schedule analysis identifying the earthworks as the driver of delay.
- *A successful engagement*

Takeaways from this Case Study:

- Using an established and well accepted analysis method is imperative when substantiating a productivity claim. A sophisticated owner or owner's representative will scrutinize anything else.
- Don't "try and fit a square peg into a round hole", submitting multiple iterations of the same analysis that has already been deemed flawed is time consuming for project staff and often futile.
- Certain contracts have language that shift all or portions of the existing site-conditions risk to the Contractor. *Read the Contract!*
- Understand the constraints and capabilities of your resources, bring in outside help as necessary.



THANK YOU