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CONSULTING GROUP

Cracking the ‘WIP’

NFBA NATIONAL FRAME BUILDING ASSOC.

Stephane McShane

March 6, 2024

Introduction

Maxim Consulting Group Overview

Management Consulting	Lean Transformations	Peer Groups	Corporate Finance Advisory
▪ Strategic Planning ▪ Operational Excellence ▪ Technology Integration ▪ Training & Development	▪ Supply Chain Management ▪ Design Standards ▪ Enterprise Scheduling ▪ Process Standardization	▪ Electrical ▪ Mechanical ▪ Fire Protection ▪ General Contractor ▪ Heavy Civil ▪ Utility	▪ Mergers & Acquisitions Advisory ▪ Equity & Debt Financing ▪ Ownership Transition ▪ Management Succession ▪ Captive Insurance

Agenda

- Obstacles and Opportunities
- System Setup Considerations
- Earned Value Analysis
- Forecasting and Change Control
- The WIP or the WHIP?

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Obstacles and Opportunities

- Why is an accurate forecast critical?

_____

_____

- What are the challenges?

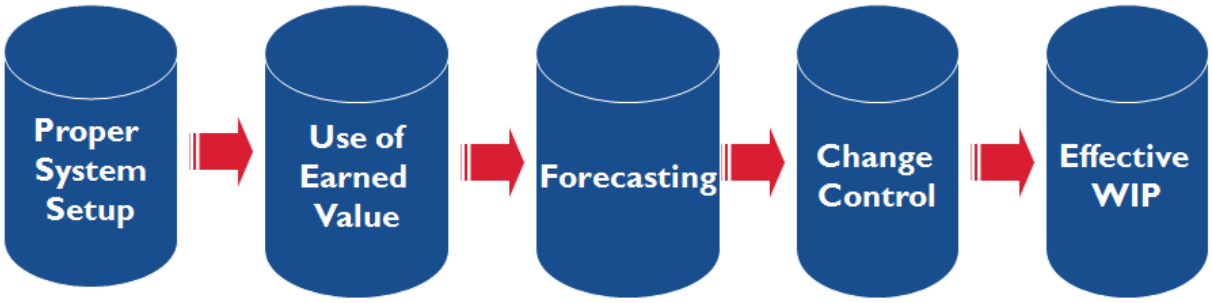
_____

_____

The Four Tenants of Successful Firms

- Hire the Right People
- Build a Strong Culture
- Discipline and Consistency
- Financial Aptitude

The Building Blocks of Financial Controls



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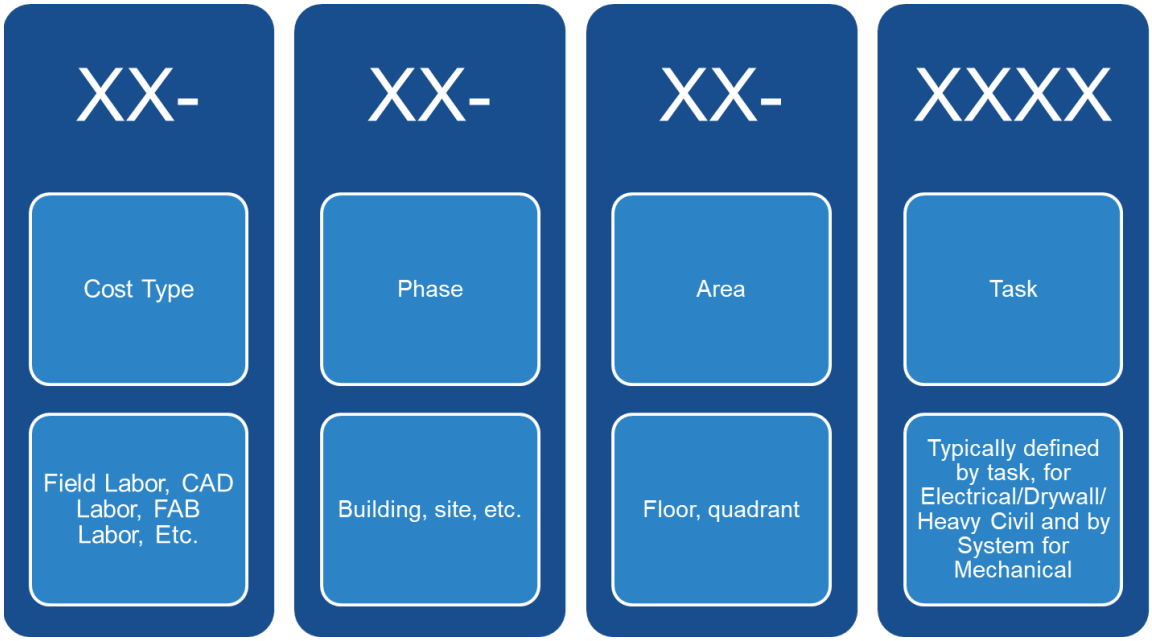
System Setup Considerations

Cost Types and Cost Codes

- Cost types enable tracking of total installed cost by function or department
  - Field Labor
  - CAD / Detailing Labor
  - Prefabrication Labor
  - Labor Burden
  - Materials
  - Equipment
  - Subcontractors
  - Other
- Cost codes enable "trackability" of project
  - Phases
  - Areas
  - Tasks

Cost Code Structure



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Labor Budget Structural Limitations

- No single labor budget item shall exceed 5% of the total labor hours on the project
- Example – If conduit makes up 30% of labor hours on the job, split the job into six areas with the same cost codes in each areas

Link Cost Codes to Estimating

- How you bid a job and how you build a job a two different things
- Link cost codes into estimating database using user defined fields / sort codes / etc.
- Understand you will NEVER get a perfect translation out of estimating for an operating budget

Project Setup Overview

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Earned Value

Why is Earned Value Important?

Estimated Labor	Actual Labor	Variance	Projected Labor
$10,000	$5,000	$5,000	$?

How is this job performing? What is the projected labor?

Reporting Both Quantities and Associated Hours

Estimated Labor	Actual Labor	Variance	Projected Labor
$10,000	$5,000	$5,000	$?

How is this job performing? What is the projected labor?

Estimated Units	Act. Installed Units	Est. Labor $	Act. Labor $	Projected Labor
100	25	$10,000	$5,000	$?

How is this job performing? What is the projected labor?

Earned Value – The Industry Standard

- Practical way to provide feedback
- Single productivity metric for:
  - One Activity
  - Group of Activities
  - Job
  - Group of Jobs
  - Division
  - Total Company
- Adds objectivity to your cost to complete projections

Using Earned Value

- From the Budget:
  - Estimated units or quantities for key items in the budget
  - Estimated man-hours for each item in the budget
- From the Field:
  - Installed units or quantities for key items in the budget
  - Percent complete for all other items in the budget
  - Actual man-hours for each item in the budget

Earned Value

The 2 formulas you MUST know

$$\text{Earned Hours} = \frac{\text{Actual Quantity}}{\text{Total Estimated Quantity}} \times \text{Total Estimated Hours}$$

$$\text{Cost at Completion} = \frac{\text{Actual Hours}}{\text{Actual Quantity}} \times \text{Total Estimated Quantity}$$

Earned Value Workshop - Scenario

- You are the project manager and you are scheduled to meet with your boss to report on the status of your project
- Specifically, he wants a summary of labor productivity to date as well as projected labor hours and labor costs at completion
- You have thoroughly walked the project with the superintendent and are satisfied that the quantities (or percent complete) reported from the field are accurate

Assignment

- Review the summarized information from the project budget (Exhibit One)
- Review the summarized information from timecards and quantity reports (Exhibit Two)
- Complete the earned value summary report (Exhibit Three)
- Calculate the total labor cost at completion assuming a labor cost of $50/hour (Exhibit Four)

Exhibit One: Summarized Information from the Project Budget

	Budgeted Man-Hours	Total Quantity	Unit of Measure
Activity A	8,000	100,000	SF
Activity B	6,000	50,000	LF
Activity C	4,000	1,000	EA
Activity D	1,000	1	LS
Activity E	1,000	1	LS
Total	20,000		

Exhibit Two: Summarized Information from Timecards and Quantity Reports

	Hours Reported JTD	Units or Percent Installed JTD	Unit of Measure
Activity A	4,000	40,000	SF
Activity B	2,500	25,000	LF
Activity C	2,400	600	EA
Activity D	300	30.00%	LS
Activity E	300	10.00%	LS
Total	9,500		

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Exhibit Two: Summarized Information from Timecards and Quantity Reports

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Activity E	300	10.00%	LS
Total	9,500		

Exhibit Three: Earned Value Summary Report

A	B	C	D	E	F	G	H F/B	I (F/B) x D	J	K I/J	L (J/F) x B
	BUDGETED				ACTUAL					PRODUCTIVITY	PROJECTED
Activity	Units	UOM	Hours		Units	UOM	% Comp.	Earned Hrs.	Act. Hours	Earned/Actual	Hours
A											
B											
C											
D											
E											
TOTAL											

Exhibit Four: Labor Cost Summary

Labor cost to date =

_____ Hours X $50 = $_____

Projected labor cost-to-complete remaining work =

_____ Hours X $50 = $_____

Projected labor cost at completion =

_____ Hours X $50 = $_____

Cost and Profit Projection

Estimate for Individual Project

	Amount	% of Sales
CONTRACT AMOUNT	$2,000,000	100.00%
DIRECT COSTS		
Labor	1,000,000	50.00
Materials	600,000	30.00
Subcontractors	50,000	2.50
Equipment	70,000	3.50
Total Direct Costs	$1,720,000	86.00
GROSS PROFIT	$280,000	14.00

At the end of the third month…

- **Your job cost report indicates that you have spent:**
- **$475,000 on labor (9,500 hours X $50/hour)**
- **$492,000 on materials**
- **$ 25,000 on subcontractors**
- **$ 40,000 on equipment**
- **$1,032,000 total (60% of total estimated costs)**

You have billed the customer $1,000,000

- After verifying installed quantities and percent complete on the various work activities and preparing your earned value summary, you estimate the cost to complete the remaining work to be as follows:
  - $675,000 on labor (13,500 hours X $50/hour)
  - $114,344 on materials
  - $ 25,000 on subcontractors
  - $ 30,000 on equipment
  - $844,344 total

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What percent complete are you to date?

Percent Complete: _____

How much revenue and profit have you earned to date?

Earned Revenue-to-Date: _____

Earned Profit-to-Date: _____

Assumptions:

- No change orders have occurred on this project
- No change orders will occur on the remaining work
- This is a lump sum

Is this project over-billed or under-billed? If so, by how much?

Over-billed/Under-billed: _____

How much profit do you project that this project will make once completed?

Project Profit at Completion: _____

How much profit gain or erosion does this represent when compared to the original estimate?

Margin Gain/Erosion: _____

Monthly Projections and Percent Complete Calculations

- There is only one way to accurately determine percent complete ... You must re-estimate the remaining work on the project
- A 5% error in percent complete on a $2,000,000 project equals a $100,000 error on the bottom line

$$\%\ \text{Complete} = \frac{\text{Actual Costs to Date}}{\text{(Actual Costs to Date + Costs to Complete Remaining Work)}}$$

Earned Value, LABOR PRODUCTIVITY & Cost Completion

		From Estimate			From Field		Calculated		
Cost Code	Description	Est. Hours	Est. Quantity	Unit	Actual Hours	Actual Quantity	Earned Hours = *(Act Qty / Est Qty) x Est Hours*	Productivity Index = *(Act Hours / Earned Hours)*	Status
10014	" Water Line	800	4,000	LF	400	2,000			
20026	" Sanitary Line	1,000	1,000	LF	600	400			
3005	Concrete	2,000	500	CY	1,100	300			
	TOTAL	*3800*			*2100*				

		From Estimate			From Field		Calculated			
Cost Code	Description	Est. Hours	Est. Quantity	Unit	Actual Hours	Actual Quantity	Earned Hours = *(Act Qty / Est Qty) x Est Hours*	Productivity Index = *(Act Hours / Earned Hours)*	Cost at Completion = *(Act Hours / Act Qty) x Est Qty*	Status
10014	" Water Line	800	4,000	LF	400	2,000	400	1.00	800	On Budget
20026	" Sanitary Line	1,000	1,000	LF	600	400	400	1.50	1,500	Over Budget
3005	Concrete	2,000	500	CY	1,100	300	1,200	0.92	1,833	Under Budget
	TOTAL	*3800*			*2100*		*2,000*	1.05	*4,133*	Over Budget

Forecasting and Change Control

Forecasting

- Contrary to popular belief, there is only one way to do this correctly!
- Define the Work Steps
  - Step 1 - Verify contract value
  - Step 2 - Verify approved changes
  - Step 3 - Verify earned value reporting (Labor Forecast)
  - Step 4 - Forecast by line item (All other costs forecast)
  - Step 5 - Correct discrepancies in Traffic Light Report
  - Step 6 - Liquidate open commitments
  - Step 7 - Review Job Status Report
- Automate the work flow using reporting engines

Forecasting Work Steps

Step 1 – Verify Contract Value

- Compare system reported values to latest AIA billing
- Use reports provided by accounting system to ensure correct amount

Step 2 – Verify Approved Changes

- Internal and External Change Orders
- Revenue, Cost and Profit recognition policies and status codes
- Where best to manage changes – Job Cost or PM Module?
- Change Order Logs and backup
- Clear Rules of the Road

Step 3 – Verify Earned Value Reporting

Description	Orig. Est. Hours	Orig. Est. Quantity	Change Order Hours	Change Order Quantity	Total Hours	Total Quantity	JTD Hours	JTD Quantity	Calc'd CTC	Adjust.	CTC
4 " Water Line	720	3600	80	400	800	4,000	400	2,000	400		400
6" Sanitary Line	900	900	100	100	1,000	1,000	600	400	900		900
Concrete	1,800	450	200	50	2,000	500	1,100	300	733		733
Total	3,420		380		3,800		1,100		2,033		2,033

CTC Hours	Avg. Labor Rate	Labor CTC $
2,033	$50	$101,650

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Step 4 – Non-Labor Forecasting Worksheet

Cost Type	Description	Original Estimate	Approved Changes	Total Budget	Committed Cost	JTD Cost	CTC	% Complete	CAC	Variance	Adjust-ment	Final CAC
M	4" Galv Pipe	$22,000	$2,000	$24,000	$19,000	$13,000	$2,000	50%	$21,000	($3,000)	$0	$21,000
M	6" Galv Pipe	$30,000	$3,000	$33,000	$28,000	$15,000	$3,000	40%	$31,000	($2,000)	$1,000	$32,000
M	Concrete	$10,000	$1,000	$11,000	$8,000	$6,000	$2,000	60%	$10,000	($1,000)	$0	$10,000
		Total Material Budget		$68,000					Total Material CAC			$63,000
S	Trenching	$20,000	$5,000	$25,000	$20,000	$12,000	$5,000	50%	$25,000	$0	$0	$25,000
S	Boring	$45,000	$0	$45,000	$45,000	$40,000	$0	90%	$45,000	$0	$0	$45,000
S	Testing	$15,000	$0	$15,000	$5,000	$5,000	$0	100%	$5,000	($10,000)	$0	$5,000
		Total Sub Budget		$85,000					Total Subcontract CAC			$75,000
E	Scissor Lift	$2,000	$0	$2,000	$1,500	$1,500	$0	100%	$1,500	($500)	($500)	$1,000
E	Artic. Lift	$5,000	$0	$5,000	$5,000	$5,000	$0	100%	$5,000	$0	$0	$5,000
		Total Equip. Budget		$7,000					Total Equip. CAC			$6,000
O	Fuel	$2,000	$0	$2,000		$1,100	$1,500		$2,600	$600		$2,600
O	Job Trailer	$8,000	$0	$8,000		$3,000	$9,000		$12,000	$4,000		$12,000
O	Temp Power	$11,000	$0	$11,000		$6,000	$3,000		$9,000	($2,000)		$9,000
		Total "Other" Budget		$21,000					Total "Other" CAC			$23,600

Total Budget	Total CAC	Variance
$181,000	$167,600	($13,400)

Detailed Support of Committed Costs

Code	Description	Revised Budget	Total Committed	Job Cost to Date	% of Budget Committed	Open Commitments	Budget Remaining
MATERIAL							
02-0100	Underground	$54,150	$37,700	$36,611	69.6%	$1,089	$16,450
02-1050	Rough in	$72,970	$52,340	$21,100	71.7%	$31,240	$20,630
02-1100	Lighting	$13,211	$13,211	$1,990	100.0%	$11,221	$0
TOTAL MATERIAL		**$140,331**	**$103,251**	**$59,701**	**73.6%**	**$43,550**	**$37,080**
SUBCONTRACTORS							
03-1000	Backhoe	$9,000	$0	$7,655	0.0%		$1,345
03-1200	Fire alarm	$7,700	$7,700	$0	100.0%	$7,700	$0
03-1400	Testing	$3,600	$3,600	$1,113	100.0%	$2,487	$0
TOTAL SUBCONTRACTORS		**$20,300**	**$11,300**	**$8,768**	**55.7%**	**$2,532**	**$9,000**
EQUIPMENT							
04-0500	Scissor lift	$2,200	$2,200	$1,610	100.0%	$590	$0
04-0700	Articulating lift	$3,200	$2,700	$1,990	84.4%	$710	$500
04-0950	Gradeall	$1,200	$0	$1,885	0.0%		($685)
TOTAL EQUIPMENT		**$6,600**	**$4,900**	**$5,485**	**74.2%**	**$1,300**	**$1,700**
OTHER							
05-0500	Job trailer	$4,800	$4,200		87.5%	$4,200	$600
05-1050	Fuel	$5,600	$0	$3,880	0.0%		$1,720
05-1090	Temp fencing	$11,000	$8,000	$4,000	72.7%	$4,000	$3,000
TOTAL OTHER		**$21,400**	**$8,000**	**$7,880**	**37.4%**	**$4,000**	**$5,320**

Step 5 – Traffic Light Report

- Exception report created to flag inconsistencies in the forecasting process
- These exceptions are:
    - Incurred > Forecast
    - Incurred > Revised Budget
    - Forecast > Revised Budget
    - Committed > Revised Budget
    - Forecast > Committed
    - Committed > Forecast

Step 6 – Liquidate Open Commitments

- Anytime the forecast is less than the commitment
- Don't allow PM's to play "hide the peanut"

Step 7 – Job Status Report

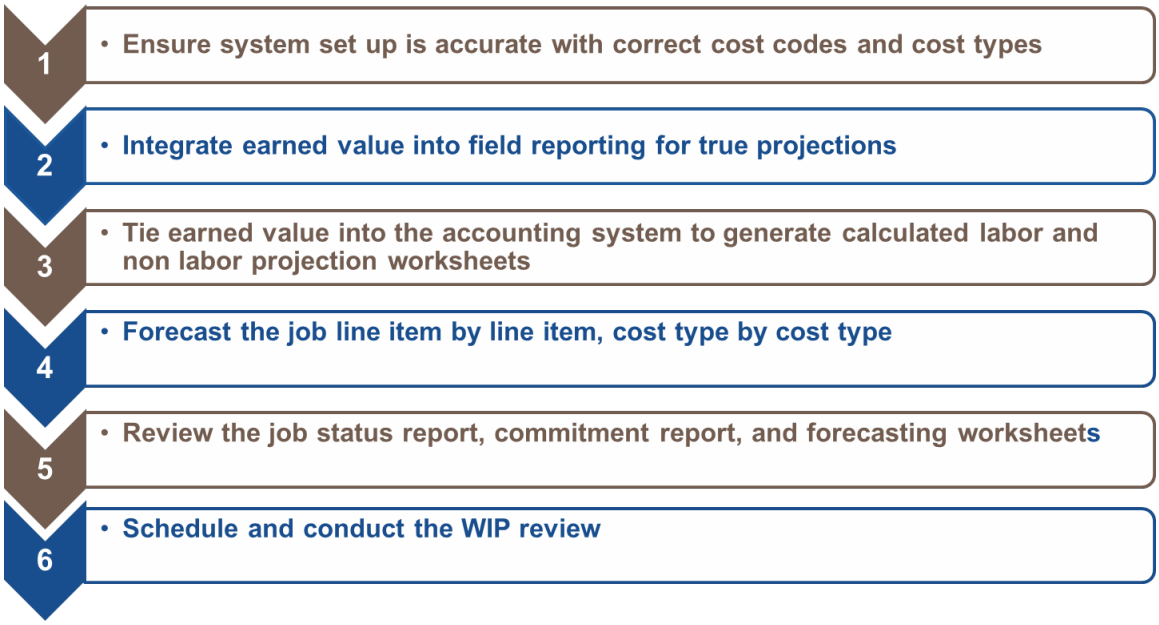
- Gives a summary of all pertinent project financial data on one single sheet of paper
- Includes Key Components:
    - Contract Values
    - Schedule Data
    - Cash Position
    - Forecast
    - Metrics

The WIP or the Whip

Conducting the wip

- **Standardized Process**
  - Monthly review process
  - WIP review checklist
  - Standard attendance
  - Running log of issues / costs / margin
- **Accountability**
  - Expect PM's to know and understand process
  - Hold them accountable for results
  - Make them forecast weekly if they "don't get it"
  - Ensure you provide adequate training within the organization

Review of Cracking the 'WIP'



Speaker Bio

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Career History

- Maxim Consulting Group
  Director
  (2011-current)
- Turnupseed Electric
  Division Manager
  (2010-2011)
- A-C Electric Company, Inc.
  Division Manager
  (1998-2010)
- Gates Electric Company
  (1985-1998)

Background

Stephane McShane is a Director at Maxim Consulting Group responsible for the evaluation and implementation processes with our clients. Stephane works with construction related firms of all sizes to evaluate business practices and assist with management challenges. With a large depth of experience working in the construction industry, Stephane is keenly aware of the business and, most specifically, operational challenges that firms face. Her areas of expertise include: Leadership development, executive coaching, organizational assessments, strategic planning, project execution, business development, productivity improvement, and training programs. Mrs. McShane is an internationally recognized speaker, mentor, author, and teacher. Her ability to motivate, inspire, and create confidence among your work groups is extremely rare and very effective.

Professional and Industry Experience

Stephane possesses the rare combination of talent from being in the field as an apprentice, electrician, foreman, then working her way through each operational chair within a successful electrical construction firm. Her ability and drive defined her to be "best in class" at each position held. This talent is what makes her tremendously effective at operational and organizational assessments today. She has successfully conquered every operational position from being an estimating trainee through executive management. She has built, trained, and led her teams to become the undisputed leaders in their markets. She is able to quickly identify organizational positives and negatives and assess appropriate action steps and throughputs.