Spring 5-4-2024

MPEM Capstone Presentation

Sarah Hambidge

MPEM CAPSTONE MEETING

Sarah Hambidge

May 1 2024 3:30 MST

Project, Engineering and Management (Web Based Master's), M. — Distance Learning

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Agenda

1. **Introduction- Sarah**
2. **MPEM Overview**
3. **Board Questions (3)**
4. **MPEM Improvement Suggestions**
5. **Discussion/Wrap ups**

Introduction- Sarah Hambidge

Undergraduate Degree

- Petroleum Eng 17’ Montana Tech
- Minor Mathematics
- Started Distant MPEM program during slow down of pandemic 2020’

Career Portfolio

- **2017-2020 Oilfield Completion Services (Field Engineer)**
  - Frac Completions ND & WY
  - Wireline Completions ND & WY
  - Cementing operations ND
- **2020-2022 Geotechnical/Exploration Services (Project Manager & Engineer)**
  - Soil Stabilization/ characterization/ Lab QAQC
  - Project Manager for Low Income Backup Water well Improvement Municipal Projects
  - Drilling & Exploration Engineer
- **2023-Present Oilfield Cementing Services (Field/District Engineer)**
  - ND Primary (Casing) & Remedial Completions
  - Occurrence/Incident Reviews
  - Lab QAQC under API and Customer Specs in the Bakken

What IS MPEM

Project Managers are needed in all fields of Engineers and are leaders who coordinate the creation of new projects.

What Kinds of Jobs Do Project Engineering and Management Graduates Get?

Project managers are needed in all fields of engineering. Whether you supervise the creation of infrastructure like highways and bridges, or oversee endeavors in fields like biomedicine, environmental remediation, or mining engineering, leaders are needed at the highest level.

$98,420 average annual wage

For Project Management Specialists in the U.S., 2021

$45.43 median hourly salary

For Project Management Specialists in the U.S., 2021

743,860

Project Management Specialists in U.S., 2021

MPEM Graduate Program

- Started Fall of 2020
- Concluded Spring of 2024
- 30 credits
- Distant program
- Career Based

4. **Graduate program courses taken/required:**

Course # Not CRN	Course Title	Credits	Term Taken
MPEM 5010	Entrepreneurship and Economic Feasibility	3	Fall '20-21
MPEM 5020	Project & Engineering Management	3	Spring '20-21
MPEM 5030	Legal Issues Related to PE & M	3	Spring '21-22
MPEM 5040	Financial Management of Tech Enterprises	3	Fall '22-23
MPEM 5050	Management, Economics, & Accounting	3	Spring '20-21
MPEM 5110	Energy Conversion	3	Fall '20-21
MPEM 5160	Managerial Communication for PMs	3	Spring '22-23
MPEM 5180	US Energy Policy	3	Summer '23
BGEN 430	Oil & Gas Lease Law	3	Fall '23-24
BMGT 426	Strategic Management	3	Expected Spring '23-24

Final MPEM Board Meeting

Members of the Committee Include:

- Todd Hoffman- Management Skills: Key Communication Aspects
- Dave Ratheburger- CO2 Footprint: Cement Remediation
- Tim Kober- Business: Porter Lumber Case Study

What Makes a Good Leader

- **Not IQ or Technical Skills…**
- **Self Awareness- Knowing our strengths & weaknesses**
- **Self Regulation- Controlling Disruptive Emotions**
- **Motivation- Faking it till you Make it**
- **Empathy- Understanding others emotional makeup**
- **Social Skills- Building healthy rapport with others to build them up in the right direction**

Key Aspects of Communication

ACTIVE LISTENING

- **Means a manager is paying full attention to team members during team calls, one-on-ones, and feedback sessions**
- **Effect: demonstrates respect and empathy, which in turn builds trust and rapport during collaboration and problem solving**

Key Aspects of Communication

TRANSPARENCY

- **Openly sharing information, decisions, & intentions with team in a clear & honest manner.**
- **Effect: promotes clarity trust and accountability within teams and organizations**
- **Forth coming about positive and negative situations**
  - Challenges, successes, uncertainties

Key Aspects of Communication

CLARITY

- **Managers are to use clear language so employees can better comprehend tasks, expectations, and objectives**
- **Effect: improved performance and productivity**
- **The more practice, the better at breaking down foreign language barriers**

Key Aspects of Communication

FEEDBACK MECHANISMS

- Managers to providew regular and constructive feedback in a specific, timely, and focused on behavior or outcomes fashion, rather than personal traits
- Offer both praise for accomplishments, and suggestions for improvements, to foster continuous learning
- Outcome: facilitate growth and development within teams

Key Aspects of Communication

CONSISTENCY

- **Maintain a consistent approach to communication throughout project lifecycle**
- **Enhance project coordination, mitigate risks, achieve success**
- **Valued by stakeholders, investors, vendors**

Key Aspects of Communication

ADAPTABILITY

- Flexible & capable of adjusting owns communication style to accommodate different personalities, cultural backgrounds, preferences

- Effect: Managers will be able to build stronger relationships in a inclusive environment where team members feel VALUED and UNDERSTOOD

Business Strategy- Case Analysis

Financial Question from Tim Kober

Porter Lumber Company, Inc

Case Questions

Would I give the $200,000 loan to Mr. Porter as a financial advisor?

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Porter Lumber Company, Inc

Porter Lumber Co was Founded in 1983 as a partnership

- Products include Plywood, Moldings , Sash, Door products
- In 1990, Mr Porter bought out Mr Smiths Interest for $47,000

Porter Lumber experienced increase in Sales in Spring of 1993

- They already borrowed $50,000 from the local bank at maximum
- Mr. Porter is looking for another bank to loan from for $200,000
- to pay off his debts to his trade creditors, earn the 2% purchase discount and expand his business.

Porter Lumber Co- Operational Info

- Moldings accounted for 40% of sales while sash and door products accounted for 20%. 55% of total sales were made through March through August
- The company wholesaled plywood, mouldings and sash and door products to small contractors in the local area. Credit terms of 1% 30, net 60 days on open accounts were usually offered customers.
- Mr. Porter paid all his union dues and social security taxes for his employees and annual bonuses which was 40% of their annual salary in 1992.
- Mr Porter did his own clerical work, keeping overhead costs to a min

Mr. Porter other assets include:

House which costed $140k to build in 1977, with $65k equity
$50k Life Insurance Policy payable to Mrs Porter
Mrs Porter owns independently a half interest in a home worth about $48k

Porter Lumber Co- Business Strategy

- balancing debt management, product focus, sales volume, employee compensation, and asset utilization to achieve growth and profitability.
- His attention to credit terms, seasonal sales, and cost control demonstrates a conservative approach to business operations
- keep focused on fast growth and increasing market share while maintaining low overhead to maximize personal profits
- Maximize inventory levels during Peak (Mar – Aug) to maximize inventory turnover, while taking advantage over **a 2% trade discount** from vendors which equates to A/R: 36.5% =(2%/(30-10))*365
- He also offers credit terms to half of his customers at 1% 30, net 60 days
- No admin overhead$ since he does it himself

Porter Lumber Co- Income Statement

Exhibit 1 Income Statements for years ended December 31 1990 through 1992, and three months ending March 31, 1993 in thousands						ROE=Net Income/shareholders equity
	1990	**1991**	**1992**	**Q1 1993**	**1993 Projection**	
Net Sales	$1,481	$1,830	$2,358	$621	$2,905.39	(621*2358/504)
Cost of Goods Sold:						
Beginning Inventory	222	194	368	409	409	
Plus: Purchases	1222	1748	1102	632	2641	
	1444	1942	1470	1041	3050	
Less: Ending Inventory	194	368	409	497	490.8	Costs of goods sold 1993/turnover in 92
Cost of Goods Sold	1250	1574	1061	544	2559.2	
Gross Profit Margin	231	256	297	77	$360.27	12.4% * 2905
Operating Expenses	75	109	146	41	$174.32	6% * 2905
Net operating Income	156	147	151	36	186	
Plus: Purchase discounts	9	9	11	1	40	Purchase discounts plus 2% of purchases in subsequest 3 quarters
	165	156	162	37	226	
Less: Customer Discount	33	42	57	15	70	
Profit before taxes	132	114	105	22	156	
Net Tax Expense	57	48	44	9	63	
Net Income	75	66	61	13	93	
Less: Dividends	0	0	20	5	0	assume zero
Profits Retained in Business	75	66	41	8	93	

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Porter Lumber Co- Balance Sheet

Exhibit 2						
Balance Sheet ($000's)		31-Dec		31-Mar		
	1990	**1991**	**1992**	**Q1 1993**	**1993 Projection**	
ASSETS						
Cash	3	3	3	4	3	assumption 3
Accounts recievable	114	153	230	256*	283	230*2905/2358
Inventory	194	368	409	497	505	
Total Current Assets	311	524	642	757	804	
Property Less	22	23	25	24	24	
Deferred Charges	5	6	10	8	0	
Total Assets	338	553	677	789	828	
Liabilities						
Taxes Payables	57	48	44	9	63	from projected income statement
Notes Payable-Bank	0	0	43	50	0	
Notes Payable-Trade	0	0	0	47	73	2641/360*10
Notes Payable-Employees	0	0	0	10	0	
Accounts Payable	115	298	350	421	0	
Notes Payable-Smith	48	0	0	0	0	
Accruals	5	8	0	4	0	
Total Current Liabilites	225	354	437	541	502	
Owners Equity						
Capital Stock	38	58	58	58	58	
Retained Earnigs	75	141	182	190	268	182+91-5
Total Owners Equity	113	199	240	248	326	
Total Liabilities and Equity	338	553	677	789	828	
*includes 10,000 assigned to Hardware Company						

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Portler Lumber- Financial Ratios

1990	Current Ratio= assets/liabilities	1.502
1993		1.649
1990	Quick Ratio= (assets-inv)/liabilities	0.640
1993		0.597
1990	Cash Ratio= Cash/liabilities	0.013
1993		0.006
1990	Total Debt Ratio= liabilities/assets	0.666
1993		0.606
1990	ROA= Net income/assets	0.222
1993		0.112
1990	Inventory Turnover= Cost of goods sold/ inventory	7.443
1993		6.214

		1990	1991	1992	Q1 1993	1993 Projection	
	Performance Metrics						
	% increase in Sales		19%	22%	-280%	79%	
	% Change in Net income		-13.6%	-8.2%	-369.2%	86.0%	
ROE	Annual Net income/Avg net worth	22%	12%	9%	2%	11%	
	Profit as % of Sales	15.60%	13.99%	12.60%	12.40%	12.40%	Gross profit/sales revenue
	Net Income Growth Rate	48%	45%	40%	36%	50%	(net income/Net revenue)

How has Mr Porter Financed in recent yrs?

- 2% Trade discount offered by vendors for quick payment : profitability will increase and retify the current cash flow operation
- A/R (Annual Rate) is 36.5% which means Capital cost is much higher than the cost of the bank loan
- Is the trade discount attractive ?

Operating Cash Flows	1991	1992	1993	total
Net income	66	61	93	220
Cash	3	4	4	11
change in Trade recievables	-39	-77	-53	-169
Inventory difference	-174	-41	-96	-311
Accruals and prepaid expenses difference	-1	-4	-2	-7
change in debt to tax authorites	-9	-4	19	6
debt to suppliers	183	52	-277	-42
change in trade payables	0	0	0	0
debt to employees	0	0	0	0
Operating Cash Flow A	29	-9	-312	-292
Investment Cash Flow B	-4	-6	-3	-13
Short term debt to bank	0	43	322	365
Smith debt	-45	-8	0	-53
dividends	0	-20	-5	-25
increase in capital	20	0	0	20
Financial Cash Flow C	-25	15	317	307
Change in cash and liquidity (A+B+C)	0	0	0	0

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What has Mr Porter done with the financial resources he has obtained?

- In 1993 Mr Porter issued $5000 of dividends and $20,000 in 1992, resulting in higher net income
- He increased short term debt by spending $277,000 to suppliers in 1993
- Larger amount of debt to tax authorities in 1993 because of very high income

- The company is growing at a rate faster than it can sustain currently with the existing asset requirements and internal financing capacity.
- Accounts recievable, sales and inventory have all INCREASED, making it difficult to have enough cash on hand to invest back into the company

- As a financial advisor, I would NOT recommend taking a $200,000 loan because it would increase his liabilities and debt and interest

Recommendations

Explore Equity Financing!

- **Re-mortgage his $141k home and invest his personal cash into the business, or pay himself less to reduce risk of creditors**
- **Make detail plans to reduce A/R on inventory, supervised by Bank**
- **He could recommend his brother in law to keep his 50K investment and receive dividends to increase overall equity of the company**
- **Sell stock to increase return on stockholders equity**
- **Sell depreciated assets**
- **Increase paid in capital by issuing new shares of stock**
- **Stricter policies for allowing customers to purchase from them on credit to tighten accounts receivable window**

Cement Remediation- CO2 Footprint

- ***Im managing a major cement remediation project in Williston, North Dakota, for the company "Safe Cement". The company prides itself in using "low carbon" cement for its operations, and you have been tasked with selecting a vendor that has competitively low emissions. However, I need to factor in not only the emissions of the Portland cement process, but the emissions expected to transport from the Plant location to Williston ND.***
- **I will identify 3 feasible cement plants capable of providing 20 tons of cement to Williston and compare the total Co2 emissions**

Cement Remediation- CO2 Footprint

- **Cement plants operate high-temperature kilns (2600F) to produce a substance called clinker. Clinker is then ground and blended with other materials to create cement, which serves as the bonding agent in concrete. This production process releases substantial amounts of carbon dioxide (CO2) into the atmosphere. In 2019, 92 cement plants in the United States reported emissions totaling 67 million metric tons of CO2 equivalents (CO2e) to the EPA. (Metric ton = 1000kg or 2204 lbs)**
- **Manufacturing begins with mining and grinding raw materials like limestone and clay to a fine powder, then heated. The other main ingredients For Portland cement include:**
  - 62% Lime, 22% Silica, 5% Alumina, 4% Calcium Sulphate, 3% Iron Oxide, 2% Magnesia, 1% Sulphur, 1% Alcalies

Cement Remediation- CO_2 Footprint

- **Cement is classified to their early and final strength and composition**
- **Cements which are 100% clinker= composite cements, which a portion of clinker is replaced by alternative raw materials such as fly ash, ground slag, or limestone**
- **The production of clinker is energy-intensive and releases large amounts of CO_2**
- **Use of raw materials can conserve natural resources while reducing CO_2**

Cement Remediation- Plant 1

PERFORMANCE AGAINST TARGETS

Unit key

Mt – million tons	Mm^3 – million cubic meters	$kgCO_2/t$ – kilograms of carbon dioxide per ton	# – number	g/t – grams per ton
M GJ – million gigajoules	CHF – Swiss Francs		ha – hectares	mg/t – milligrams per ton
MJ – million joules	NR – Not reported	L/t – liters per ton	CHFm – million Swiss francs	LTIs – Lost Time Injuries
MJ/t – million joules per ton	% – percentage	L/m^3 – liters per cubic	ton – metric ton	

	Unit	Base Year	Baseline	Target	Target Year	Current Performance	Achieved to Date
Specific CO_2 emissions - Net (Scope 1) - Cement only	$kgCO_2/t$	2018	590	420	2030	545	-7.6 %
Specific CO_2 emissions - Gross (Scope 1) - Cement only	$kgCO_2/t$	2018	623	-23.30 %	2030	587	-5.8 %
CO_2 emissions - electricity (Scope 2) - Cement only	$kgCO_2/t$	2018	46	-65.00 %	2030	36	-22.7 %
CO_2 indirect emissions from purchased fuels (Scope 3)	$kgCO_2/t$ purchased fuels	2020	286	-20.00 %	2030	283	-1.1 %
CO_2 indirect emissions from purchased clinker and cement (Scope 3)	$kgCO_2/t$ per ton CLC	2020	710	-25.10 %	2030	702	-1.2 %
CO_2 indirect emissions from downstream transportation	$kgCO_2/t$						

CLIMATE HIGHLIGHTS 2023

20% Reduction in CO_2/net sales[1]

3% Reduction in CO_2 net/ton of cementitious material[2]

6 CCUS projects in execution

5M Tons of CO_2/annum captured by 2030

8.4M Tons of CDM recycled

+24% Recycling of CDM[2]

[1] 2023 Scope 1 + Scope 2 CO2 emissions per million of net sales compared to 2022
[2] Compared to 2022

- Reported 545 kgCO2/t Net Scope 1 Emissions
- Carrington, ND Plant 294 miles from Williston ND

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Cement Remediation – Plant 2

- Reported 731.7 kgCO2/t Specific net Emissions 2022
- GCC Plant Bismark, ND 229 miles

Absolute emissions (Scope 3), from 1,3,4,9 Activities (note 3)	Mt/yr	1.249	1.266	1.242	305-3
Specific gross CO_2 emissions (kg/tonne of cementitious)	$kgCO_2/t$	746.3	754.8	741.2	305-4

Units Key Mt - million tons MJ - million joules M GJ - million gigajoules Mm^3 - million cubic meter

INTRODUCTION PEOPLE PLANET **ANNEXES**

CO_2 & Energy Cont.	UNIT	2020	2021	2022	GRI
Specific net CO_2 emissions (kg/tonne of cementitious material)	$kgCO_2/t$	734.0	744.1	731.7	305-4
Reduction gross CO_2 emissions/t cementitious from 2015 (SBTi target)	%	2.7	1.6	3.4	305-5
Specific CO_2 emissions (scope 2) (kg/tonne of cementitious)	$kgCO_2/t$	64.1	55.2	57.1	305-4

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Cement Remediation: Plant 3

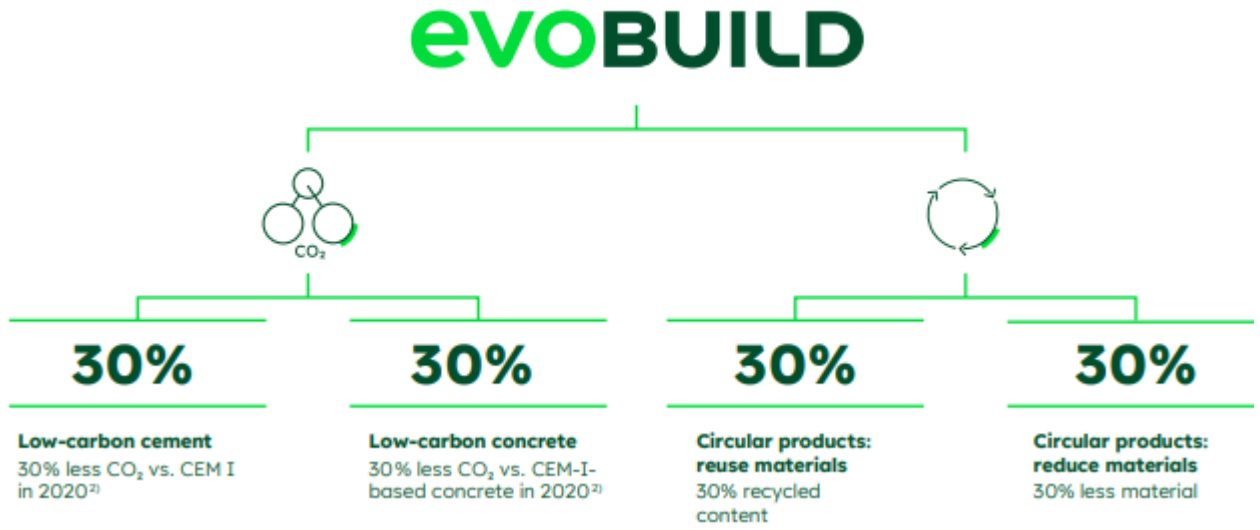
Heidelberg Materials

- 2023 Reported 534 kg CO2/t net emissions
- Bainville MT Cement Terminal 27 miles

Building a net-zero future

		2023	Target 2030
CO_2 & Energy	Reduce our net Scope 1 emissions to 400 kg per tonne of cementitious material	534 kg CO_2/t cementitious material	400 kg CO_2/t cementitious material
	Reduce our total CO_2 footprint according to the SBTi 1.5°C pathway		
	Gross Scope 1 (-24% per tonne of cementitious material vs. 2020)	-7%	-24%
	Gross Scope 2 (-65% per tonne of cementitious material vs. 2020)	-3%	-65%
	Scope 3 (-25% in absolute emissions from purchased cement and clinker vs. 2020)	-12%[1)]	-25%
	Capture 10 million tonnes of CO_2 cumulatively through our CCUS projects	0 m tonnes	10 m tonnes

Criteria for sustainable products



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Comparative Analysis : CO2 Emissions

Quartile	Metric Ton CO_2 / Metric Ton of Clinker	Metric Ton CO_2 / Metric Ton of Cement	Carbon Intensity
75th percentile	0.787	0.722	Low
50th percentile (median)	0.838	0.776	Midpoint
25th percentile	0.934	0.886	High

Production Process Emissions Net (Scope 1)

Manufacturer	Metric Ton CO2/Metric Ton Cement	Volume Cement tons	CO2 Emissions (Metric Tons CO2)	CO2 Emissions lbs	Carbon intesnsity Rating	Miles to Williston	Ton Miles (x20 short tons)	*grams of CO2 per ton-miles	Metric Ton of CO2	lbs of CO2
HOLCIM	0.545	20	10.90	24,030	Very Low	294	5880	951384	0.951384	2097
GCC Cement	0.7317	20	14.63	32,262	Low	229	4580	741044	0.741044	1634
Heidelberg Materials	0.534	20	10.68	23,545	Very Low	27	540	87372	0.087372	193

*avg emisison factor for freight truck in US is 161.8 grams CO2/ton-mile

Manufacturer	Total lbs of CO2
HOLCIM	26,128
GCC Cement	33,896
Heidelberg Materials	23,738

$$161.8 \text{ grams/ton-mile} \times 20,000 \text{ ton-miles} = 3,236,000 \text{ grams of CO2}$$

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Part 2: Cement Supplier Conflict

- ***My project is behind schedule, primarily due to supply delays from a particular company. I have not had issues with them in the past, and have been using them for years. Recently, one of the team members expressed their frustration towards the supplier through a public post on their personal social media account.***
- ***The news of the post traveled to the supplier, and now they are quite upset over it. I am now tasked with resolving the conflict that has developed to get things back on track. Communication between the supplier and your company has historically been strong – Im not sure why this particular team member publicly expressed frustration over the incident. This member is in charge of communicating with vendors and ensuring supplies are on time, so you have not been in direct contact with the supplier until they contacted you regarding the post.***

Part 2: Cement Supplier Conflict

What is my plan to confront the supplier and team member? How could this situation been avoided?

- **Gather Data first, approach team member first and hold private conversation**
- **Use active listening, then work together to find a resolution to concern**
- **Discuss Impact of the post and relationship**
- **Involve HR**

Part 2: Cement Supplier Conflict

- **Call Supplier and their boss for a Teams meetings to discuss the behavior of my team member**
- **Start with small talk, acknowledge that I value the relationship and have had positive experiences in the past**
- **Apologize for hurting feelings and causing any inconveniences**
- **Actively and empathetically listen to their side of the story**
- **Clarify companies core values and stance on harrassement in the workplace, and assure them the post was taken down**
- **Replace team member….Follow up**

Part 2: Cement Supplier Conflict

The Conflict could have been avoided by:

- **Holding stricter “no social media” policies**
- **Non work related material online only**
- **HR should screen social accounts periodically**
- **Hold Mandatory Annual training to teach the importance of Internal Communication**
- **Conflict resolution Training**

MPEM Improvements Suggestions

- **Specific Sales Strategies**
- **How to work up the ladder from Engineer to Manager to Corporate over career**
- **Better tools to help with Scheduling Projects like Gannt Charts that aren't using excel…etc.**

Wrap Up

Thank you for being apart of my Project Committee and attending my meeting today.

Open floor up for Questions & Feedback

ENJOY YOUR SUMMER VACATION