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Cleopatra Enterprise Metrics & KPIs in Project Cost Management

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Cleopatra Enterprise



Presentation topics

- Personal and company introduction
- What are Metrics & KPIs and when to use?
- Why are Metrics & KPIs important?
- Examples of Metrics & KPIs in various phases
- How to find Metrics & KPIs by benchmarking?
- How to use benchmarking intelligence?
- Project Metrics & KPIs vs business objectives
- Conclusions

Introduction



Project Controls
EXPO
Melbourne, Australia

About the Speaker



Gideon Klipstein

VP Business - Europe, Middle East & Australia

- Bachelor, postbachelor & postmaster degrees in Business Administration & Consulting
- Various courses in Cost Estimating & Cost Management
- 9 years of commercial consulting experience for various technical industries

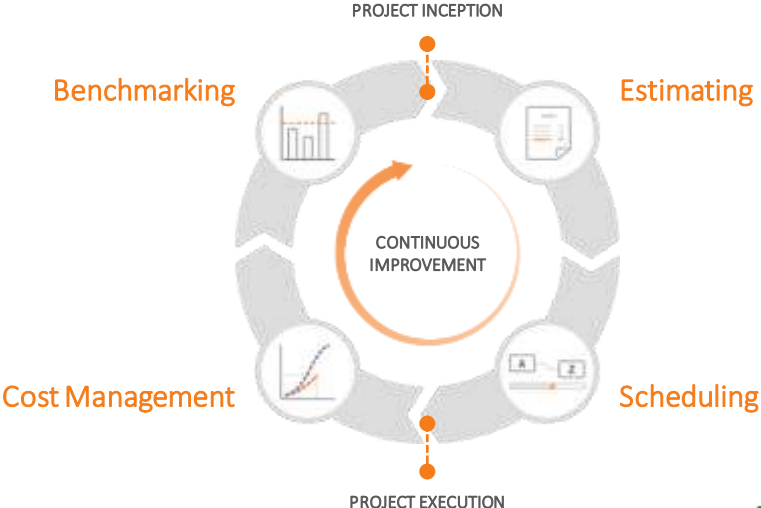
About Cleopatra Enterprise and Cost Engineering

A brief introduction

- 25 years experience
- Software and Consultancy solutions
- Operating worldwide
- Knowledge Provider



Vision & Activities



Services since 1996



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What are Metrics and KPIs?

What are Metrics & KPIs?

- A metric is a value derived from the relation between two or more units of measurement
- A Key Performance Indicator is a metric that demonstrates the performance of a project, portfolio or company.
- Metrics and KPIs can be used in project cost management practices throughout the project lifecycle
- $KPI = Metric$ / $Metric \neq KPI$

Where to start?



When to use Metrics & KPIs?

- We apply metrics while creating an Estimate
- We use KPIs to measure project performance during the Cost Management phase
- We derive metrics from actual project results during benchmarking phase to apply again during Estimating or set-up KPIs for Cost Management
- Cleopatra Enterprise offers an integrated platform to easily derive and use metrics and KPIs



Why are Metrics & KPIs important in Project Cost Management?

Why are Metrics & KPIs important?

- Metrics are essential in effectively creating early phase or conceptual Cost Estimates
- KPIs can present a summarized overview of the project performance
- KPIs and Metrics can provide early warnings and trigger actions to avoid faulty investment decisions and overruns
- KPIs are objective and unbiased

Examples of Metrics & KPIs in various project phases

Essential: Breakdown Structures



Hierarchical classification



Break down scope to standard chunks to allow for analysis



I.e. disciplines, project phases or materials



Examples of Metrics & KPIs



Cleopatra Cost Estimating

- Project capacity vs total costs
- Equipment costs vs other disciplines costs
- Direct costs vs Indirect costs
- Material costs vs labour costs
- Quantities vs quantities....



Total installed costs methodology

- Adding factors of costs and labour hours over the basis of Equipment costs
- Hand & Lang methodology developed after numerous years of executing & analyzing projects.

Level ID	Description	Quantity	Unit
000000	000 - Process Heat Exchangers	1	EA
000000	000 - Control, Warning, Drive	1	EA
000000	000 - Heat Exchangers	1	EA
Concrete Sides			
Exchanger_00_Tand (under/over/Equipment based (hand method))			
Level ID	Description	Unit total cost	Quantity
A 000000	0000 - Mechanical Equipment	Equipment, Scaffolding	1
A 000000	7000 - Concrete Foundations	Reinforcing Foundations and pavement	1
A 000000	7000 - Buildings	Reinforcing buildings	1
A 000000	8000 - Piping/Structural	Reinforcing piping	1
A 000000	8000 - Instrumentation/Process	Reinforcing instrumentation and control	1
A 000000	8000 - Electrical/Process	Reinforcing electrical	1
A 000000	9000 - Structural Steel	Reinforcing supporting and scaffolding	1
A 000000	9000 - Excavation	Reinforcing excavation and foundation	1
A 000000	9000 - Paving	Reinforcing paving, clearing, bedding and consolidation	1
A 000000	9000 - Concrete Foundations	Reinforcing foundations and pavement	1
A 000000	9000 - Buildings	Reinforcing buildings	1
A 000000	9000 - Piping/Structural	Reinforcing piping	1
A 000000	9000 - Instrumentation/Process	Reinforcing instrumentation and control	1
A 000000	9000 - Electrical/Process	Reinforcing electrical	1
A 000000	9000 - Structural Steel	Reinforcing supporting and scaffolding	1
A 000000	9000 - Excavation	Reinforcing excavation and foundation	1
A 000000	9000 - Paving	Reinforcing paving, clearing, bedding and consolidation	1
Concrete Sides			
Concrete, Total (under/over/Equipment based (hand method))			
Total			
Total (under/over/Equipment based (hand method))			

Express cost validation

Easily look at some ratios like:

- Material vs Installation costs
- Direct vs Indirect costs

100%	Cost category	Total cost	%
<input type="radio"/>	Instal	13,703,942.31	29.67%
<input type="radio"/>	Remove	511.52	0.00%
<input type="radio"/>	Prefabrication	256,703.09	1.03%
<input type="radio"/>	Testing	112,090.49	0.32%
<input checked="" type="radio"/>	Material	34,546,890.13	100.00%
<input type="radio"/>	Consumables	5,344.77	0.02%
<input type="radio"/>	Subcontracting	11,377,511.81	32.92%
<input type="radio"/>	Construction tools	15,872.80	0.05%
<input type="radio"/>	Construction tools & equipment	14,028.36	0.04%

100%		total cost	%
<input checked="" type="radio"/>	Direct costs	68,132,895.29	100.00%
<input type="radio"/>	Allowances	3,216,877.46	5.18%
<input type="radio"/>	Sub total	64,916,017.79	95.38%
<input type="radio"/>	Indirect costs	33,490,323.84	49.18%
<input type="radio"/>	Sub total	98,406,341.64	144.04%
<input type="radio"/>	Escalation	1,481,880.60	2.17%
<input type="radio"/>	Sub total	100,000,000.00	146.97%
<input type="radio"/>	Contingency	20,605,991.21	30.24%
<input type="radio"/>	Sub total	120,605,991.21	177.14%
<input type="radio"/>	Grand total	128,835,717.29	189.12%

Examples of Metrics & KPIs

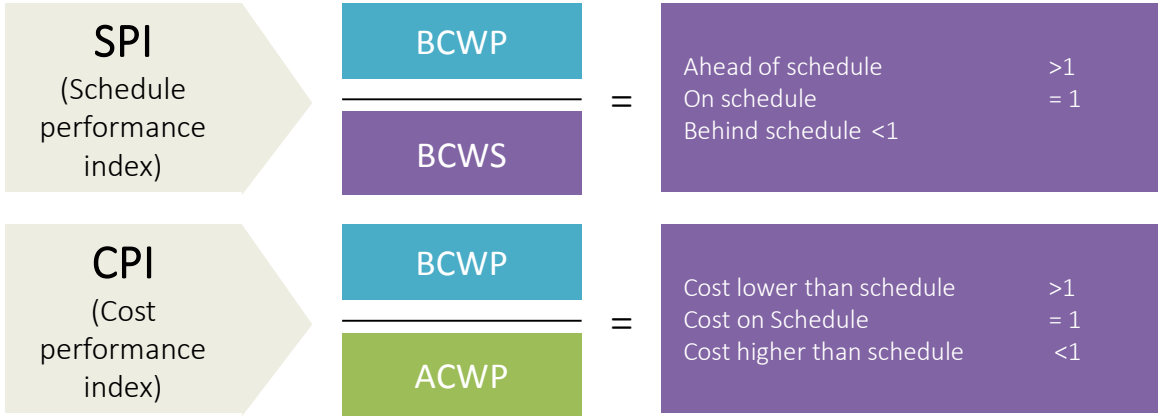


Cleopatra Cost Management

1. Cost Performance index (CPI)
2. Schedule Performance index (SPI)
3. So many possibilities....



Cost Management KPIs

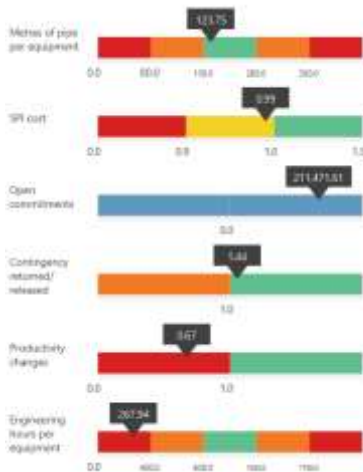


• BCWP (Budgeted cost of work performed)

• (Budgeted cost of work scheduled)

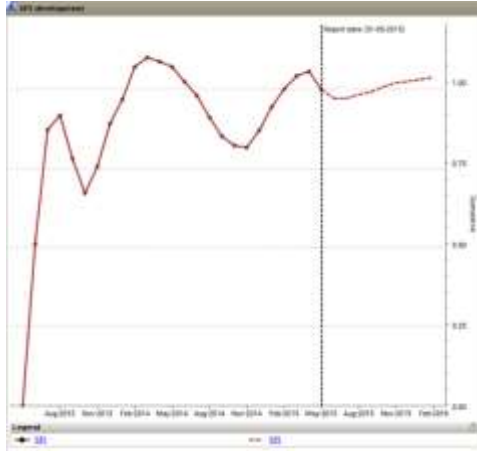
• ACWP (Actual cost of work performed)

Visualize Cost Management KPIs



Track through time

SPI
(Schedule
performance
index)



How to find Metrics & KPIs by analysis in Benchmarking phase?

Cleopatra Benchmarking

- Collect all historical projects
- Normalization & indexation of data
- Big Data analysis to improve estimating
- Asset, Project or Portfolio level analysis
- Use intelligence to create cost models



Breakdown overviews

- Breakdown per work package or discipline
- Find factors, e.g. mechanical equipment cost distribution

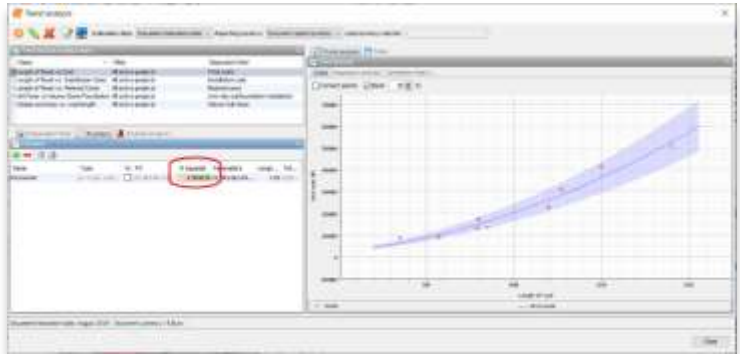


The screenshot displays a software interface titled 'Project Components' showing a detailed cost breakdown. The table is organized into columns for 'Total', 'Early Work', 'Charles Hill', and 'Only Cost', each with sub-columns for 'Cost' and '%'. The 'Mechanical Equipment' row is highlighted in orange, showing a total cost of \$4,796,147 (100.00%) and a cost of \$1,019,042 (21.04%) for the 'Early Work' category.

Name	Total		Early Work		Charles Hill		Only Cost	
	Cost	%	Cost	%	Cost	%	Cost	%
Benchmark structure	\$ 14,861,876	309.27%	\$ 2,344,873	206.29%	\$ 1,321,731	451.02%	\$ 2,217,282	197.94%
Base Estimate	\$ 13,562,401	282.78%	\$ 2,219,634	279.32%	\$ 1,283,723	591.99%	\$ 1,936,457	180.20%
Direct Cost	\$ 9,018,913	208.00%	\$ 1,548,257	188.79%	\$ 1,135,823	483.99%	\$ 1,379,914	155.02%
Machinery and Equipment	\$ 9,981,481	208.32%	\$ 1,518,803	185.44%	\$ 1,138,923	485.99%	\$ 1,379,914	155.02%
Mechanical Equipment	\$ 4,796,147	100.00%	\$ 1,019,042	100.00%	\$ 239,741	100.00%	\$ 1,019,111	100.00%
Pump	\$ 364,838	7.61%	\$ 196,465	19.27%	\$ 0	0.00%	\$ 84,147	8.25%
Pressure Vessel	\$ 4,237,339	88.39%	\$ 824,287	79.96%	\$ 181,149	75.59%	\$ 934,666	91.74%
Heat Exchangers	\$ 193,934	4.04%	\$ 28,094	2.75%	\$ 32,362	13.49%	\$ 0	0.00%
Electric Equipment	\$ 5,193,314	108.32%	\$ 699,742	68.69%	\$ 62,182	26.36%	\$ 983,853	96.53%
Direct Contracts	\$ 27,482	0.57%	\$ 27,482	2.69%	\$ 0	0.00%	\$ 0	0.00%
Indirect Cost	\$ 3,543,488	73.88%	\$ 669,367	65.73%	\$ 247,787	103.31%	\$ 286,542	28.17%
Excavation	\$ 744,128	15.52%	\$ 75,712	7.43%	\$ 47,321	19.73%	\$ 119,328	11.73%
Contingency	\$ 496,509	10.35%	\$ 39,488	3.87%	\$ 0	0.00%	\$ 61,235	6.01%
Capitalized Interest	\$ 58,918	1.23%	\$ 0	0.00%	\$ 19,652	8.24%	\$ 0	0.00%

Trend analysis

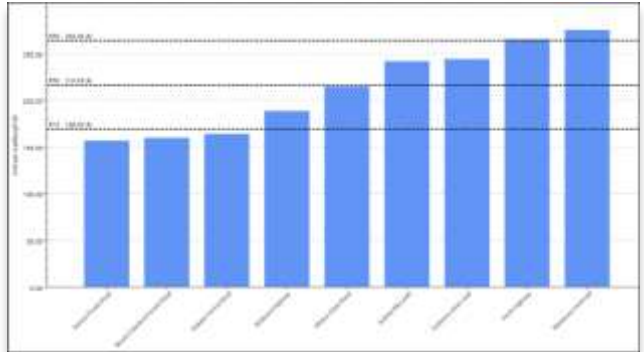
- Using regression functions to determine the relation between various units
- I.e. length of road vs project costs
- R-squared states the usability of this function



How to use Benchmarking intelligence?

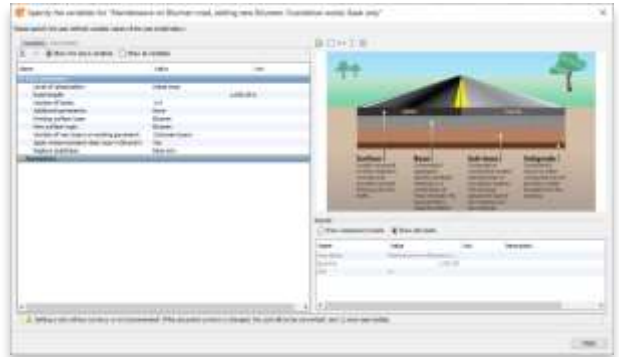
Distribution chart

- Metrics per project can be compared in order to find applicable cost for probability
- Outcomes may advise contingency to be applied from a perspective of analyzing metrics.



Cost modelling

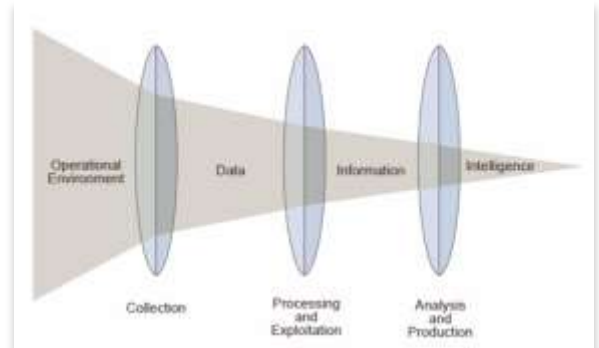
Benchmark information can be used to create new parametric cost models for early phase estimating



Project Metrics & KPIs vs Business Objectives

How to tie KPIs to your business objectives?

- Identify metrics within successful and unsuccessful projects for lessons learned
- Tie KPIs to those metrics in order to make projects measurable and manageable
- For asset owners: incorporate performance bonuses for contractors based on KPIs
- For contractors: use KPIs as a tool to drive project performance and take timely corrective action



Conclusions

- Metrics and KPIs can be found and used throughout the project lifecycle, from Estimating to Cost management and benchmarking.
- Metrics and KPIs are essential to determine the presumed costs and performance of your projects
- Metrics and KPIs are of key importance in order to make sound data driven business decisions
- Cleopatra Enterprise can help you to obtain and use all useful metric and KPI intelligence!

Thank you for joining



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