



# Business Intelligence in the Construction Industry

*Presented by:*

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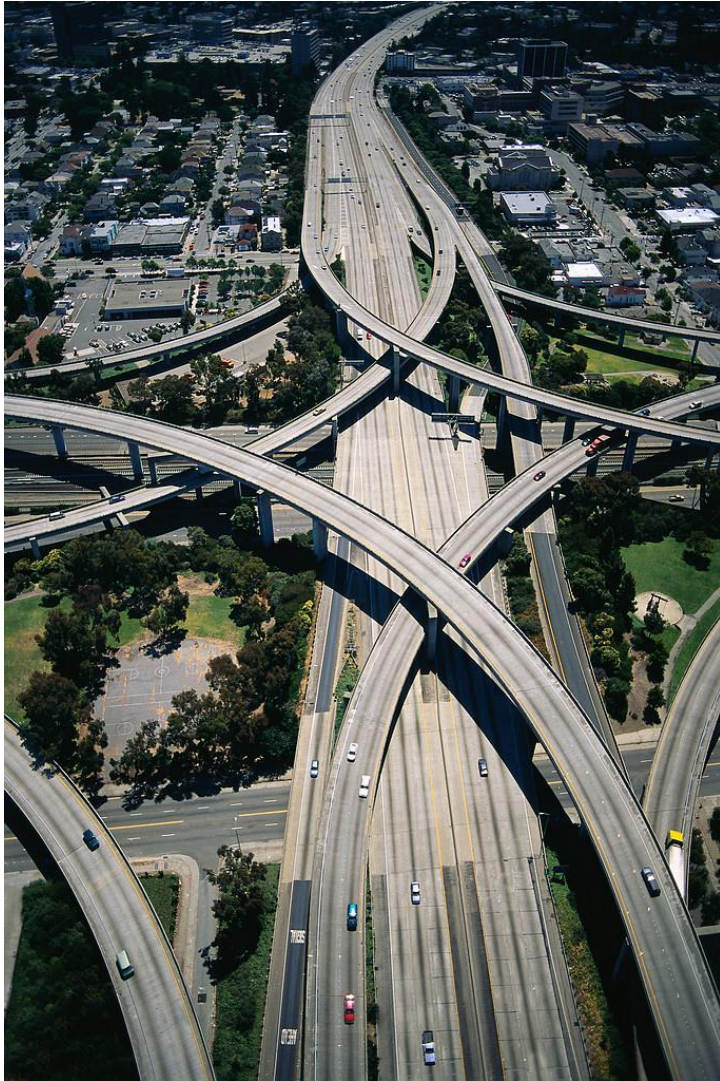


# Goals for this Session

- Review Business Intelligence concepts
- Evaluate report effectiveness against best practices
- Review the purpose and use of Excel
- Understand Construction Key Performance Indicators
- Review dashboards and scorecards



# Business Intelligence is Information



BI is the intersection between

- Processes
- Data Quality
- Data Governance
- Cross System Reporting



# Fancy Definition of Business Intelligence

**Business intelligence (BI)** is an umbrella term that includes the applications, infrastructure and tools, and best practices that enables access to and analysis of information to improve and optimize decisions and performance.

Gartner Group



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# Good BI Provides Useful Information



Not what's obvious

# Construction Business Intelligence

## **Construction Business Intelligence –**

Provides information across multiple systems to allow each person to succeed in their role.

**Anterra**





# Construction Business Intelligence

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Provides information across multiple systems to allow each person to succeed in their role.

**Anterra**



# Construction Roles

- CEO/ President / Family
- CFO / Controller / Finance Staff
- VP Construction
- Project Manager
- Site Super

Each role has “customers” with information requirements



# Current Reporting Technology

1396-000 San Antonio Avenue

	Total			Labor			Material			Equipment			Subcontracts			Overhead & Other		
	Estimate	Cost	Variance	Estimate	Cost	Variance	Estimate	Cost	Variance	Estimate	Cost	Variance	Estimate	Committed	Incurred	Estimate	Cost	Variance
Preliminaries - Head Office/CI																		
01-020 Project Staff- Head Ofc	7,453,402	4,832,493	2,620,940	6819,103	4,789,262	2,019,841	188228	9,205	179,023	416,199	6,536	409,663	29,872	689	689		16,771	16,771
01-070 Survey	880,657	980,542	112,885	9,265	996,063	976,798		5,337	5,267				871,382	5000	2113			
Division Totals	8,334,059	5,813,035	2,520,054	6828,368	5,785,325	1,048,043	188228	14,542	173,856	416,199	6,536	409,663	301,254	5689	2902	0	16,771	16,771
Preliminaries - On Site																		
02-001 Insurance, BGs, Bids & F	23,709	71943	48,134		71,277	71,277		465	465									
02-002 Fees (Frm Chrgs, BCTIF,	188,997	284,557	87,660		112,798	112,798		90,000	90,000		111	111	23,709	99,504	99,504		72,331	72,331
02-003 Insurance Costs	119,215	151,612	32,397					119215	1,03	117,712			106987			60,110	150,110	
02-004 Public Liability/Insurance		6,932	6,932					6,932	6,932									
02-007 Bank Guarantee Charges	68,981	68,981						68,981	68,981									
02-020 Project Staff	400,000	285,842	164,158	450,000	106,965	348,035		11,390	11,390			4845	4845			162,643	162,643	
02-080 Staffing & Supervision		28,643	28,643		7,125	7,125											21,518	21,518
02-100 Site Facilities & On-Site Spp	583,184	534,825	48,359	4747	62,188	57,439	77,149	129,028	51,859	124,607	158,331	33,424	386,381	181,591	175,042	10,398	10,398	
02-101 Site Offices	278,275	252,715	25,560		50,116	50,116	55,106	5589	49417	22,500	4081	18,418	200,669	183,198	191622	1,006	1,006	
02-165 Hazardous Storage Container	10,070	3,586	6,484					3,586	3,586	8,400		8,400	1,670					
02-195 Office Consumables		1,124	1,124														1,124	1,124
02-201 Sewer Locks and One Calls	324,258	127,169	197,089	211988	118,789	93,179	34,028	1,855	32,443	48,800	676	48,124	31,462	11,433	5,859	262	262	
02-202 Clapnet Sney/Satlm	55,255	76637	21,382										55,255	75,974	75,974			
02-203 Vehicles		2,869	2,869					273	273							2,597	2,597	
02-205 Small Tools	30,000	73680	43,680		2,902	2,902	30,000	70,588	40,588		10	10		180	180			
02-210 Site Facilities & Marine		42,796	42,796		6,497	6,497		22,960	22,960		1,116	1,116				12,223	12,223	
02-211 Site Security	589,556	246,153	343,403	476,942	100,463	376,479							112,624	148,540	146,660			
02-215 Site Storage		258	258														258	258
02-228 Temp Fence for Site	348,399	318,149	30,250	5,271	17,788	12,497	44,085	1,880	42,225	706	449	25	288,337	315,873	289,068			
02-228 Temporary Water	161,255	64,173	97,082	13,000	10,140	3,360	400	17,191	13,191	94,700	3,711	90,989	48,055	33,028	30,121			
02-229 Temporary Sewer	12,000	2,473	9,527		2,130	2,130	12,000	181	11,819		162	162						
02-230 Project Safety Management	577,694	577,694		537,300	537,300					40,394								
02-240 Traffic Management	70,057	554,051	483,994		90,542	90,542	12,500	90,113	77,613		48,559	48,559	57,567	404,696	324,626			
02-251 Entertainment - Staff		998	998														998	998
02-270 General Rubbish Removal	6,000	16,360	10,360		4,212	4,212	6,000	1,695	4,305		1,797	1,797		7,198	7,198	1,198	1,198	
02-306 Recruitment Fees	140,000	33,363	106,637		27,727	27,727	150,000	3,476	146,524		285	285		1,620	1,620			
02-324 Indirect Labor- Shopers	18,981	101,665	82,684	168,981	101,665	82,684												
02-332 Lost Time- Indirect Vthr	255,000	255,000			255,000													
02-333 Lost Time- Training		9,992	9,992		9,530	9,530												
02-334 Lost Time- Indirects		499	499		499	499												
Division Totals	4,478,755	3,282,559	1,196,196	2,113,708	939,237	1,210,471	703,064	368,756	334,258	338,397	224,606	113,791	1,323,626	1,422,835	1,359,435	0	46,811	46,811
Safety																		
03-001 Safety	601,342	273,122	328,220	465,588	68,810	386,759		135,378	135,378	18,462	588	17,874	117,312	3085	2,109		66,238	66,238
Division Totals	601,342	273,122	328,220	465,588	68,810	386,759	0	135,378	135,378	18,462	588	17,874	117,312	3085	2,109	0	66,238	66,238
Training																		
04-001 Training		1,927	1,927		742	742		260	260		170	170		500	220		546	546
Division Totals	0	1,927	1,927	0	742	742	0	260	260	0	170	170	0	500	220	0	546	546
Part & Equipment Workshop & F																		
05-002 Used Fuel		755	755					755	755									
05-003 Fuel	637,802	431,779	206,023		5,486	5,486	633,996	541,831	91,965		115,720	115,720	3,908				83	83
Division Totals	637,802	432,534	205,268	0	5,486	5,486	633,996	542,586	91,710	0	115,720	115,720	3,908	0	0	0	83	83
Small Part & Equipment																		
05-001 Small Part & Equipment		28,603	28,603		17,485	17,485		3,900	3,900		6,303	6,303		815	815			
05-008 Barbed Wire	27,900	1,464	26,436		499	499				27,900	1,005	6,303	21,445					

# Current Report Challenges

- Hard to read!
- Can't tell what is important
- Can't sort columns
- Often have to run more reports to dive in
- No color
- Need a highlighter to use

Each role has “customers” that require information.



# Reporting Challenges

- Reporting across multiple databases & systems
- Reporting technology –
  - Speed
  - Complexity of reporting tools
  - Time to develop
  - Testing
- Access to reports – vpn's, remote desktops slow users down when they are on site.



# Why Improve Reporting?

- Make your organization more proactive
- Consistent monitoring of KPI's
- Empower people to investigate variances on their own
- Automatic notification of off plan situations
- Alignment of results to plan



# Reporting Worst Practices

1. 8.5 x 14, 20 columns, 7 point font – “Kitchen Sink”
2. Report purpose isn’t obvious
3. No context – today’s cash balance by itself
4. Poor sort order – numeric vendor #
5. No page number, date/time info
6. Generic report name – “Property Report”
7. Totaling single line items





# Reporting Best Practices

1. Immediate meaning, obvious measurement with context
2. Expanding context
3. Trend analytics – graphs
4. Good default parameters
5. Beautiful design – easy to read fonts, good use of color
6. Intuitive sorting, possibly multiple sorts
7. Clear title tied to purpose
8. Clear totals



# Excel Based Reporting Use Cases

- Cross system / folder reporting
- Formatting report output – i.e. Financials
- Creating graphs and charts
- Adding content to reports – i.e. income statement variance comments



# Excel Challenges

1. Google “Excel Error Cost” [www.google.com](http://www.google.com)
2. Overwriting formulas
3. Building and maintaining data connections
4. 2 dimensional, not a database
5. Can be the most expensive program you own



# Excel Challenges

- Excel spreadsheet calculations are complex
- Typically only understood by the creator of the spreadsheet
- Act as a computer program but not typically independently tested or documented
- Very expensive system if you count staff time to prepare spreadsheets



## Reducing Use / Risk of Excel

- Understand where spreadsheets go and what is really used
- Build in control totals – have a home tab with conditionally colored red cells if cross tab totals do not agree
- Lock down spreadsheet formulas
- Improve reporting technology



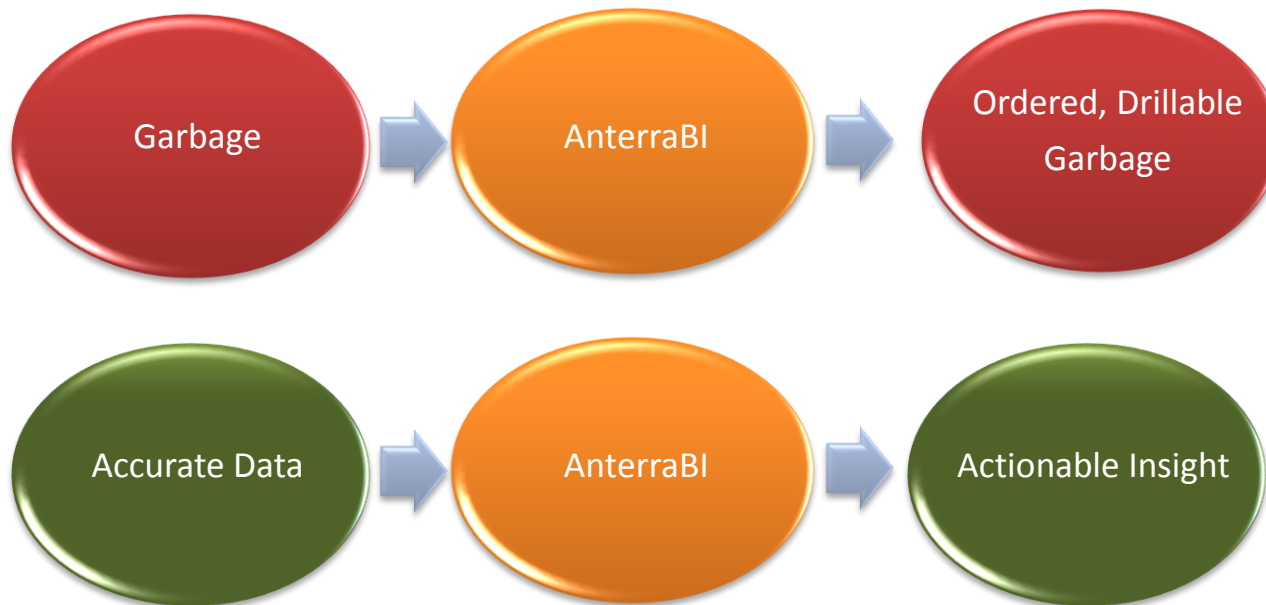
# Construction Reporting Data Quality

- Data quality is the accuracy, timeliness and reliability of your data
- Lack of accurate data reduces report usage
- “Ad Hoc” information streams develop to get the “real information”



# Construction Reporting Data Quality

## Garbage In – Garbage Out





## 5 Tips for Improving Data Quality

1. Executive sponsorship to support processes
2. Make people responsible for their submissions
3. Schedule data clean ups regularly
4. Review data entered to ensure it is used
5. Review form design to ensure it supports efficient and accurate data entry



# Construction KPI's

- Forecast Margin - \$, %
- Margin Erosion
- Work Backlog
- % Committed
- Construction Gross Margin
- Selling, General and Admin % of Revenue
- NOI, % of revenue



# Putting it all together

Let's review these concepts in action.



# How to Implement BI

- Look for productivity gains and risk reduction first
- Eliminate Excel as a “report production” system
- Financial statements, statement of cash flow, WIP, margin reporting are often done first
- Ad hoc inquiry – spreadsheets, pivots



# Results of a Successful BI Implementation

- Pro active organization
- Consistent monitoring of KPI's
- Automatic notification of off plan situations
- Common language of performance



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