

Business Intelligence in the Construction Industry

Presented by:

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Anterra



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.

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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

1386-000 San Antonio Avenalk

	Total			Labor			Material			Equipment			Subcontracts			Overhead & Chr			
	Estimate	Cost	Variance	Estimate	Cost	Variance	Estimate	Cost	Variance	Estimate	Cost	Variance	Estimate	Committed	Invoiced	Estimate	Cost	Variance	
Preliminaries - Head Office/CI																			
01-020 Project Staff - Head Ofc	7,463,402	4,832,493	2,630,940	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	89,657	980,542	112,895	9,205	996,063	976,799		5,337	5,267				871,382	5000	2,113				
Division Totals	8,334,059	5,823,035	2,508,054	6828,308	5,785,325	1,046,048	188228	14,572	173,856	416,199	6,536	409,663	301,254	5689	2,902	0		16,771	16,771
Preliminaries - On Site																			
02-001 Insurance, BGS, Bds & FS	23,709	71943	48,134		71,277	71,277		465	465										
02-002 Fees (Finc Orgs, BCTIF,	188,997	294,557	87,660		112,798	112,798		90,000	90,000				111	111	23,709			72,331	72,331
02-003 Insurance Costs	119,215	151,612	32,397					119,215	1,03	117,712					106,987	99,504	99,504	60,110	150,110
02-004 Public Liability/Insurance		6,932	6,932						6,932										
02-007 Bank Guarantee Charges	68,981	68,981	68,981					68,981	68,981										
02-020 Project Staff	40,000	285,942	164,938	40,000	106,965	349,035		11,390	11,390			4945	4945					162,643	162,643
02-080 Staffing & Supervision		28,943	28,943		7,125	7,125													
02-100 Site Facilities & Ofc Spp	593,194	534,926	58,268	4747	62,188	57,439		77,149	129,028	51,959	124,907	158,331	33,424	396,381	181,591	175,042		21,518	21,518
02-101 Site Offices	278,275	252,715	25,560		50,116	50,116		55,106	559	49,417	22,500	4081	18,449	200,669	183,198	191,622		10,358	10,358
02-159 Hazardous Storage (Onsite)	10,070	3,396	6,674						3,396		8,400		8,400					1,006	1,006
02-195 Office Consumables		1,124	1,124																
02-201 Sewer Locks and One Cals	324,228	127,169	197,059	211,988	118,789	93,179		34,028	1,655	32,443	4,600	676	46,124	31,462	11,433	5,859		262	262
02-202 Captain Sney&Satlm	55,255	76,537	21,282											55,255	75,974	76,537			
02-203 Vehicles		2,899	2,899						273	273								2,627	2,627
02-205 Small Tools	30,000	7,980	43,660		2,902	2,902		30,000	70,588	40,988		10	10			180		180	
02-210 Site Facilities & Marine		42,796	42,796		6,497	6,497			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	146,680			
02-215 Site Storage		258	258																
02-228 Temp Fence for Site	348,399	318,149	30,250	5,271	17,789	12,497		41,085	1,800	42,225		706	449	295	288,337	315,873	289,068	268	268
02-229 Temporary Water	161,255	64,173	97,082	13,000	10,140	3,360		4,000	17,191	13,191		3,711	90,689	49,055	33,028	33,121			
02-229 Temporary Sewer	12,000	2,473	9,527		2,130	2,130		12,000	81	11,919			162						
02-230 Project Safety/Management	577,694	577,694	577,694	537,300	90,542	90,542		12,500	90,113	7,613		40,384	4,559	48,969	57,567	40,696	32,426		
02-240 Traffic Management	70,057	564,051	493,994																
02-251 Entertainment - Staff		998	998																998
02-270 General Rubbish Removal	6,000	16,900	10,900		4,212	4,212		6,000	1,695	4,005		1,797	1,797		7,198	7,198		1,168	1,168
02-306 Recruitment Fees	140,000	33,263	116,737		27,727	27,727		150,000	3,476	146,524		285	285		1,620	1,620		255	255
02-324 Indirect Labor - Stopers	18,981	101,665	57,316	168,981	101,665	57,316													
02-332 Lost Time - Incident Mtr	255,000	255,000	255,000		9,530	9,530													
02-333 Lost Time - Training		9,992	9,992		469	469													
02-334 Lost Time - Inductions		469	469		469	469													
Division Totals	4,478,785	3,282,939	1,195,846	2,113,708	939,237	1,210,471	703,064	368,756	384,268	338,397	224,806	113,791	1,223,628	1,462,835	1,359,485	0		468,811	468,811
Safety																			
03-001 Safety	601,342	273,122	328,220	465,588	68,810	386,759		135,378	135,378	18,462	588	17,674	117,312	30,85	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	17,674	117,312	30,85	2,109	0		66,238	66,238
Training																			
04-001 Training	0	1,927	1,927	0	742	742		200	200	200		170	170		500	220		546	546
Division Totals	0	1,927	1,927	0	742	742	0	200	200	200	0	170	170	0	500	220	0	546	546
Part & Equipment Workshop & P																			
05-002 Dead Fuel		755	755						755	755									
05-003 Fuel	637,402	431,779	205,623	0	5,486	5,486	633,966	541,831	91,865			115,720	115,720	3,908				83	83
Division Totals	637,402	432,534	205,289	0	5,486	5,486	633,966	542,666	91,710			115,720	115,720	3,908	0	0	0	83	83
Small Part & Equipment																			
06-001 Small Part & Equipment		28,600	28,600		17,485	17,485		3,900	3,900			6,303	6,303		815	815			
06-008 Barbedwire	27,900	1,464	21,096		499	499						1,095	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
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



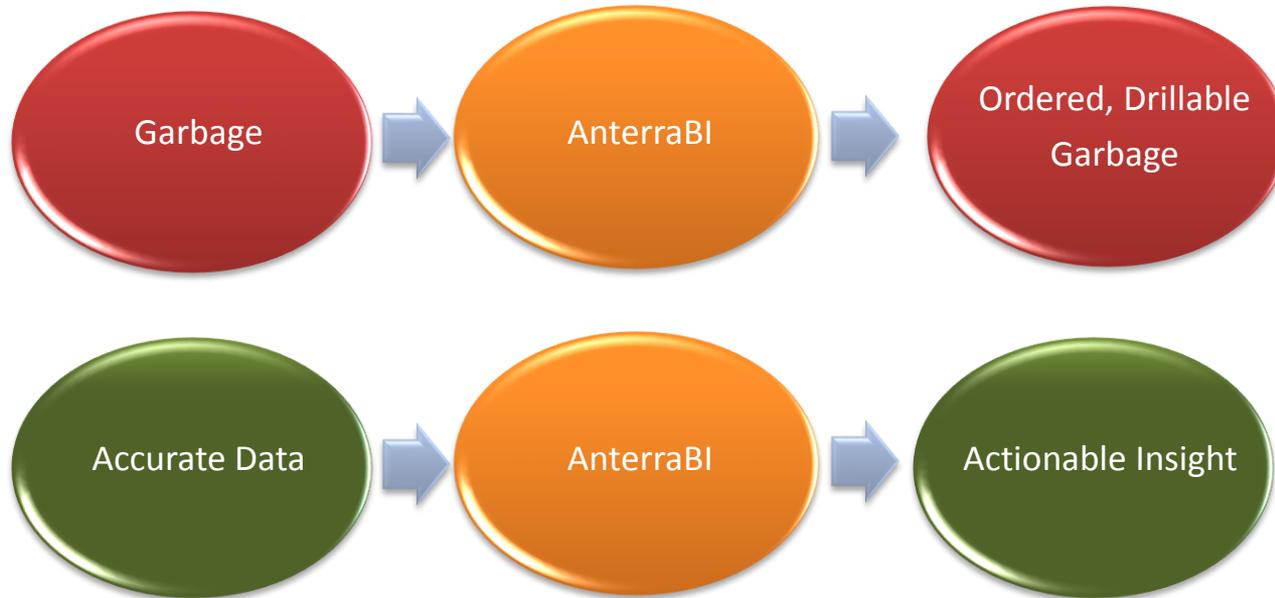
Construction Reporting Data Quality

- 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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