

**Project Controls Expo - 22<sup>nd</sup>  
November 2018  
Melbourne Cricket Ground**

**High-Fidelity Project Controls**

# About the Speaker

**Michael Maslen**  
Solution Director, InEight



- Responsible for leading InEight's solution and value engineering engagements with organisations to help them find innovative ways to use best-practice processes and technology.
- 25-year background in tier-1 Project Controls and ERP solution architecture and deployment.

InEight is a global leader in construction project management software, with solutions spanning from design to estimate, from field execution to turnover.



**25,000**  
USERS

**550**  
CLIENTS

**33**  
COUNTRIES

**650**  
EMPLOYEES



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# High-Fidelity Project Controls

Michael Maslen  
Solution Director, InEight



**Project Controls**

**EXPO**

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# High-Fidelity Project Controls

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01.

Concept of High-Fidelity Project Controls

- Definitions

02.

What are the Essential Ingredients?

- The 3 'F's

03.

Putting it all Together

- The Art of the Possible

04.

A Practical Example

- The MetroTrains Experience



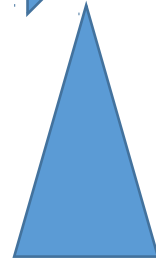
# Who Knows what This Is?

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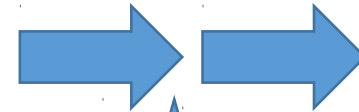


# Music Consumption in the 1980s

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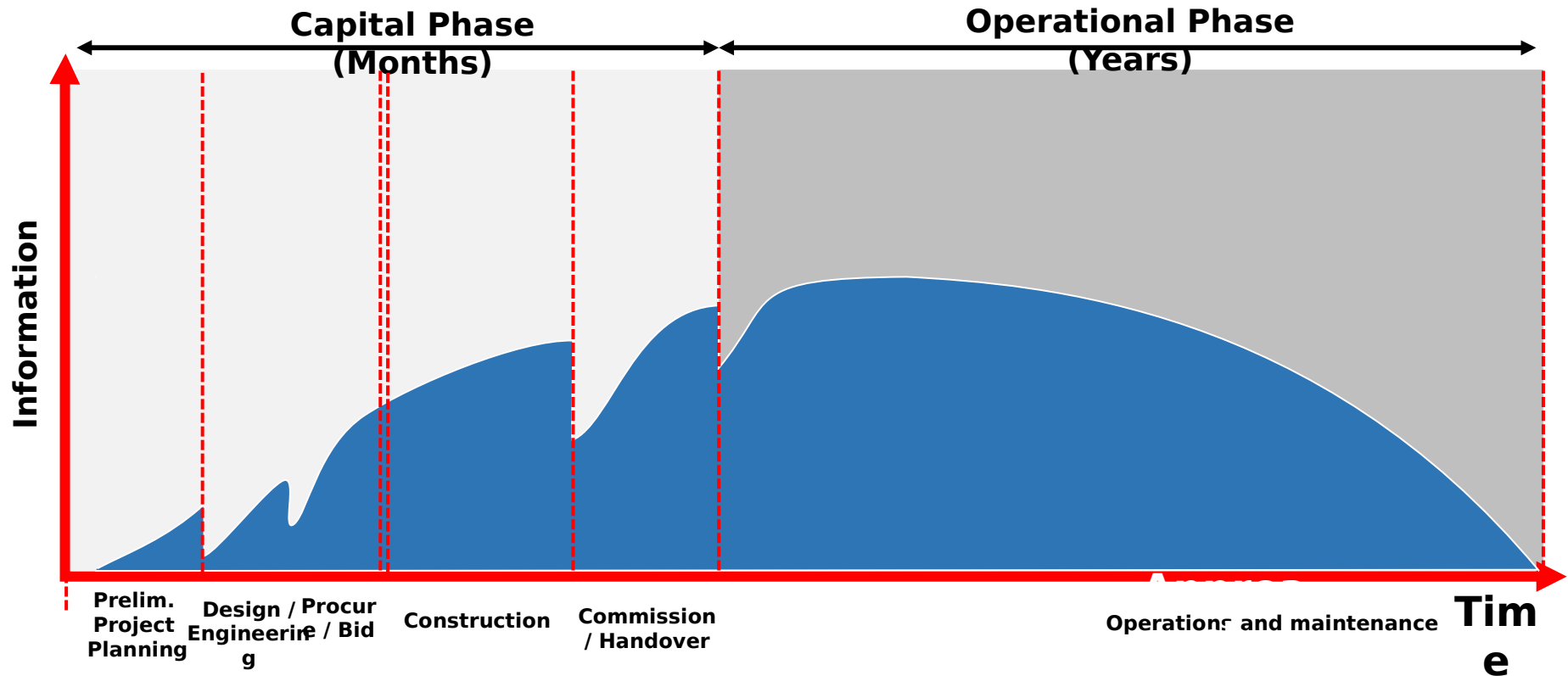
Data-Conversion  
ie, Bit-loss



Data-Conversion  
ie, Bit-loss



# Project Lifecycle

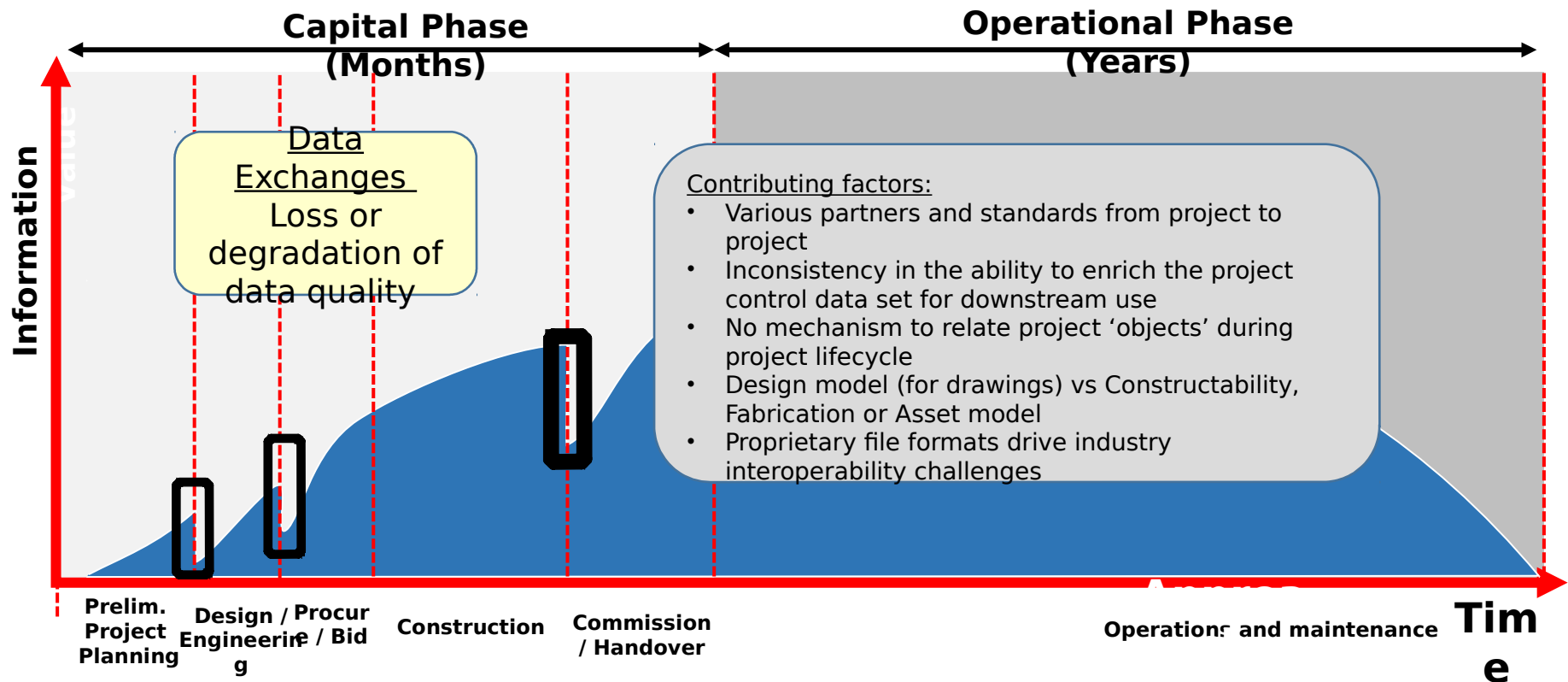


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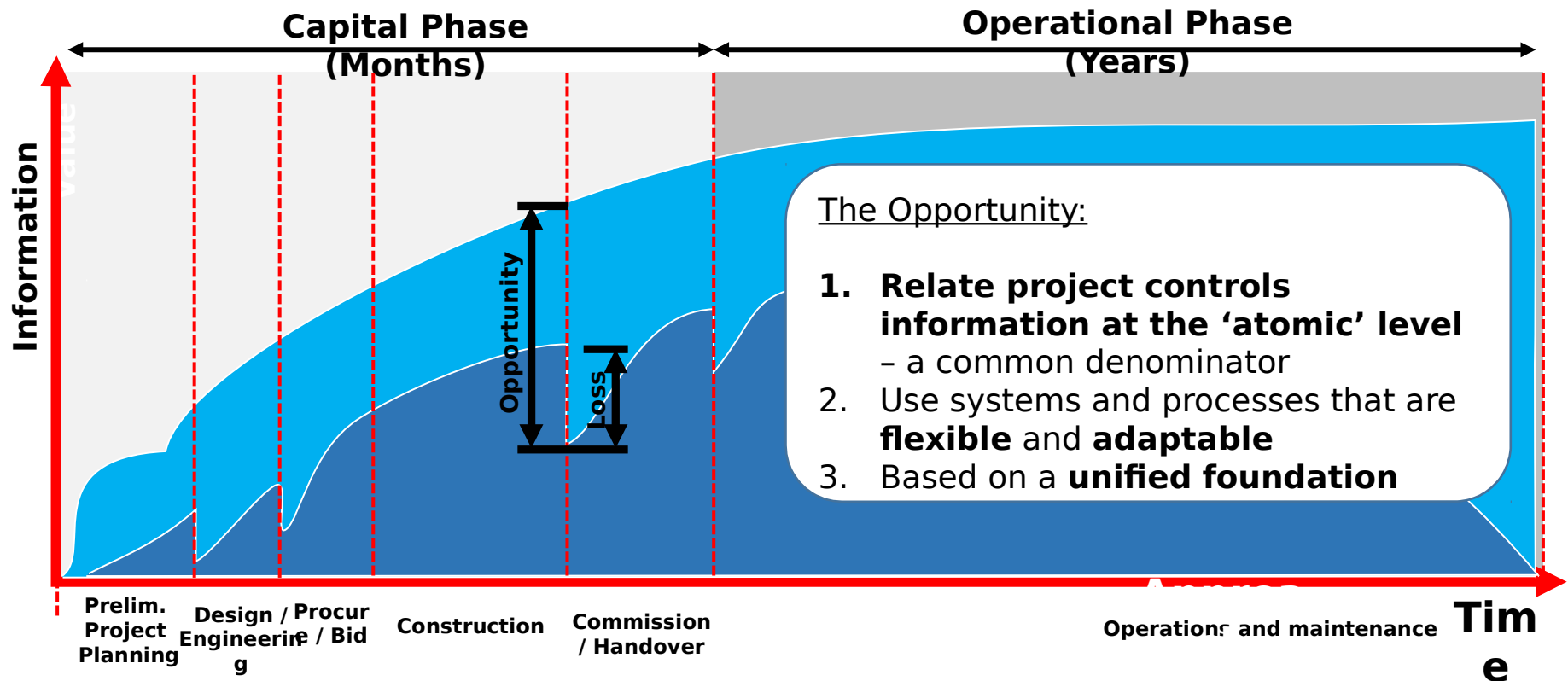
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# Project Lifecycle - Traditional Approach





# Introducing 'High-Fidelity' Project Controls



# The Essential Elements of High-Fidelity Project Controls - The 3 F's:

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1. Foundation
2. Flexible
3. Flow



# The Essential Elements of High-Fidelity Project Controls - The 3 F's:

---

1. Foundation
2. Flexible
3. Flow



# Element #1: Foundation

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- Fine-grained / atomic structure of all your project information needs to be designed-in
- The ability of project data to be architected to be stored at the lowest common denominator
- Supports any audience and any business process



# Structural Beams

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# Estimator sees: *Single Line, Total Quantity*

Building Job 2 x TH 35W x Library x

Cost Breakdown Structure (CBS) Register x

File Edit Data Source View Tools

Alternate Scenario: BASE

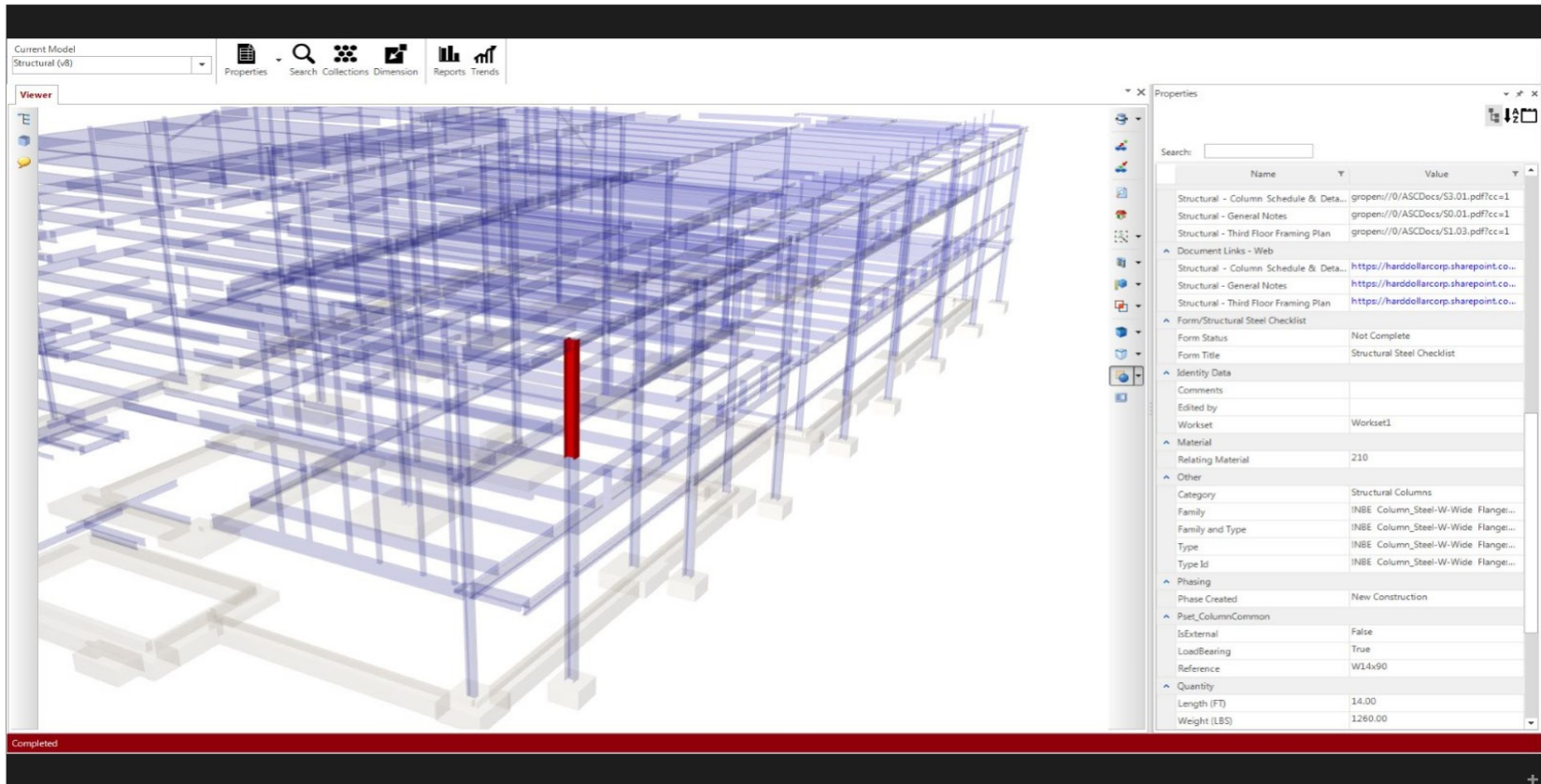
CBS Tree (Filter Mode)

Drag columns here to group Find: column Save

CBS Code	Description	CE Quantity	Unit	Man-Hours (Total)	CE Unit Cost	CE Total Cost	Labor
	BUILDING JOB						
1	DIV 1 - GENERAL REQUIREM...						
2	DIV 2 - SITE WORK						
3	DIV 3 - CONCRETE						
4	DIV 4 - MASONRY						
5	DIV 5 - METALS						
6	DIV 6 - WOOD & PLASTICS						
7	DIV 7 - THERMAL & MOISTU...						
8	DIV 8 - DOORS & WINDOWS						
3.10.1...	Concrete finishing, floor, hard...	198	S.F.	0	\$1.73	\$343	
3.10.1...	Concrete surface treatment, c...	2	C.S.F.	0	\$22.02	\$44	
3.10.1...	Vapor Retarders, building pap...	2	Sq.	0	\$20.50	\$41	
4.1	Conc blk, back-up, tooled	67,585	Square F...	0	\$3.64	\$245,988	
5.1	Structural Steel, WF,W12x35	1,575	Linear Feet	0	\$27.36	\$43,089	
5.2	Structural steel, 8" and larger, field ...	1,235,300	Lb.	59,294	\$3.69	\$4,555,786	
6.1	Framing, beams & girders,	170	1000 BO...	0	\$1,094.04	\$185,987	
6.2.1	Moldings, base, stock pine	1,125	Linear Feet	0	\$2.20	\$2,478	
6.2.2	Moldings, cornice molding	1.100	Linear Feet	0	\$1.67	\$1.835	



# Procurement - *Multiple components*



The screenshot displays a software interface for managing a structural model. The main view shows a 3D wireframe of a building's structural frame, with a single vertical column highlighted in red. The interface includes a top toolbar with icons for Properties, Search, Collections, Dimension, Reports, and Trends. A Properties panel is open on the right, showing a table of data for the selected component.

Name	Value
Structural - Column Schedule & Data...	gropeni//0/ASCDocs/S3.01.pdf?cc=1
Structural - General Notes	gropeni//0/ASCDocs/S0.01.pdf?cc=1
Structural - Third Floor Framing Plan	gropeni//0/ASCDocs/S1.03.pdf?cc=1
Document Links - Web	
Structural - Column Schedule & Data...	https://harddollarcorp.sharepoint.co...
Structural - General Notes	https://harddollarcorp.sharepoint.co...
Structural - Third Floor Framing Plan	https://harddollarcorp.sharepoint.co...
Form/Structural Steel Checklist	
Form Status	Not Complete
Form Title	Structural Steel Checklist
Identity Data	
Comments	
Edited by	
Workset	Workset1
Material	
Relating Material	210
Other	
Category	Structural Columns
Family	INBE Column_Steel-W-Wide Flange...
Family and Type	INBE Column_Steel-W-Wide Flange...
Type	INBE Column_Steel-W-Wide Flange...
Type Id	INBE Column_Steel-W-Wide Flange...
Phasing	
Phase Created	New Construction
Pset_ColumnCommon	
IsExternal	False
LoadBearing	True
Reference	W14x90
Quantity	
Length (FT)	14.00
Weight (LBS)	1260.00

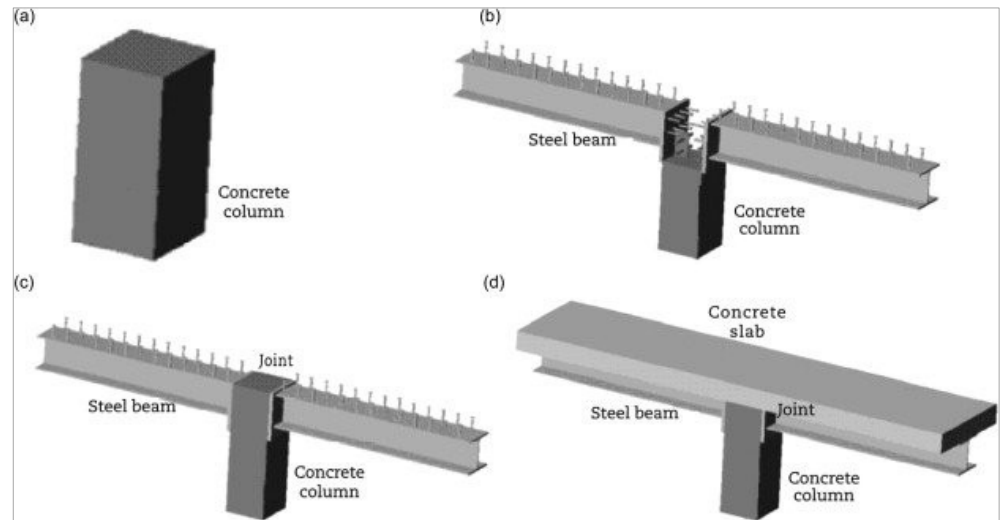


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# Job site - Piece marks, Work (Sub)Components





# **Element #1: Foundation - *Solved:* *Designed-in Atomic-level Structures***

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- **We call this the ‘Quantity Breakdown Item’**
- Having the right foundation enables project data to be represented correctly
- Accordion-style expansion or contraction of project data



# The Essential Elements of High-Fidelity Project Controls - The 3 F's:

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1. Foundation
2. Flexible
3. Flow



# Element #2: Flexibility

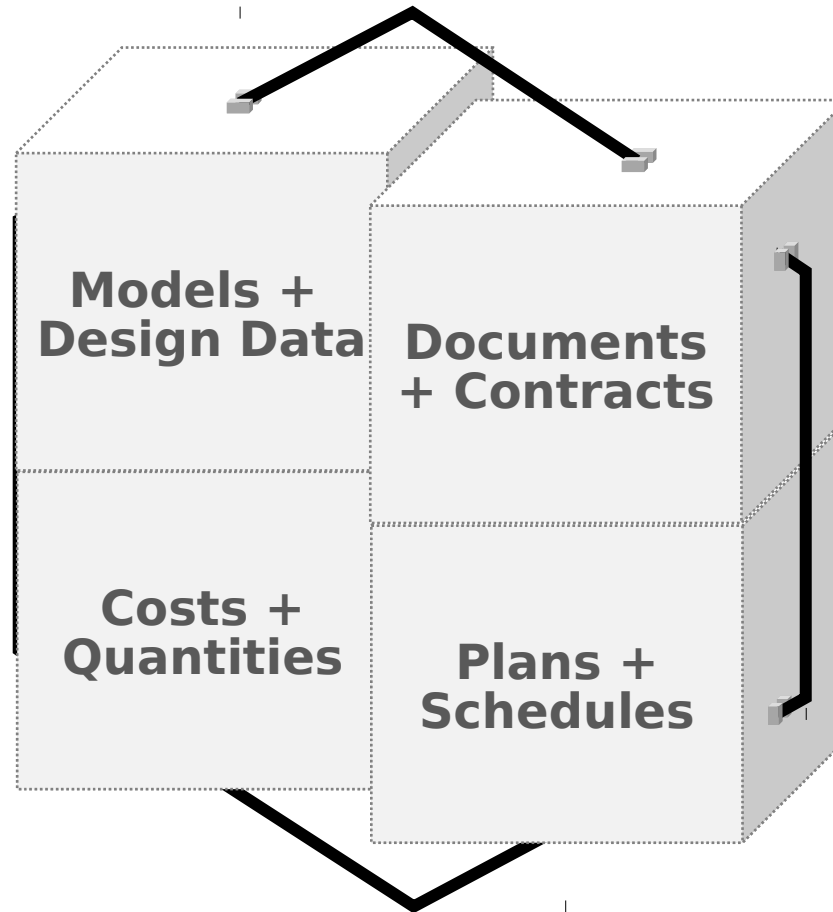
---

- Project outcomes by their nature are individual
- What we see is that process and technology being applied to unique and individual outcomes ‘brittle’
- Not designed to flexibly handle day-to-day or project-to-project business demands



# Project Control Building Blocks

- Geo-spatial data / dimensional data
- Design data (metadata)
- Geo-location data
  - Budgets
  - Forecasts
  - As-builts

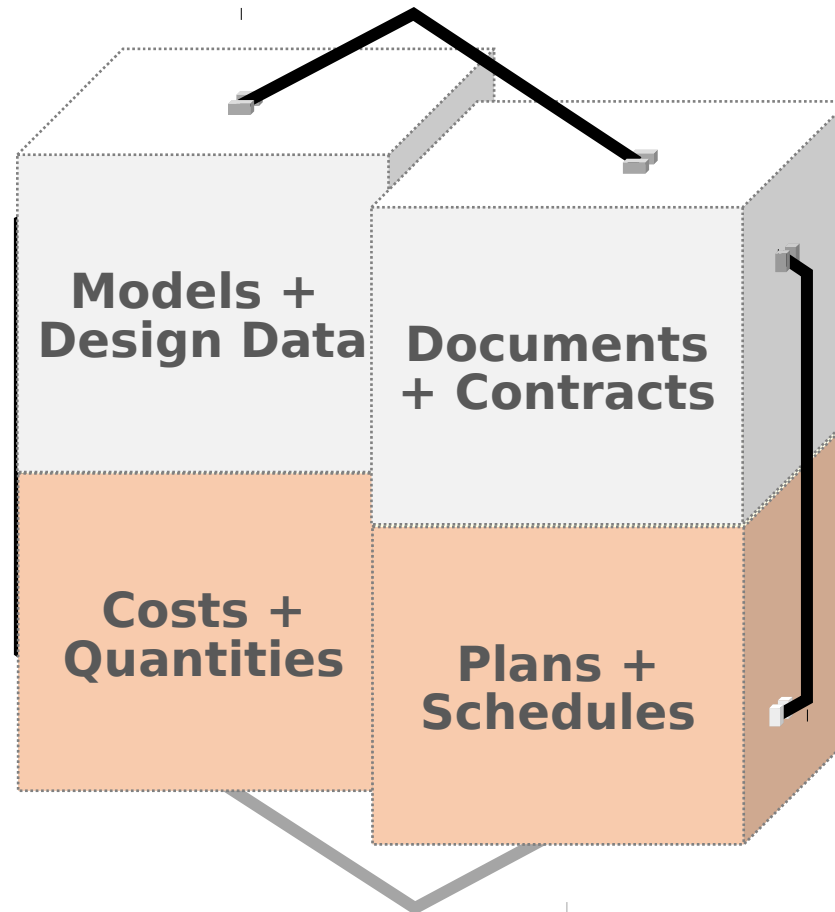


- Document repository
- Project correspondence / e-mails
- RFIs, submittals
- Subcontracts
- Issues and changes
- Prime contracts
- Billings / payments
- Project schedules
- Short interval schedules
- Commissioning plans
- Procurement plans
- People plans



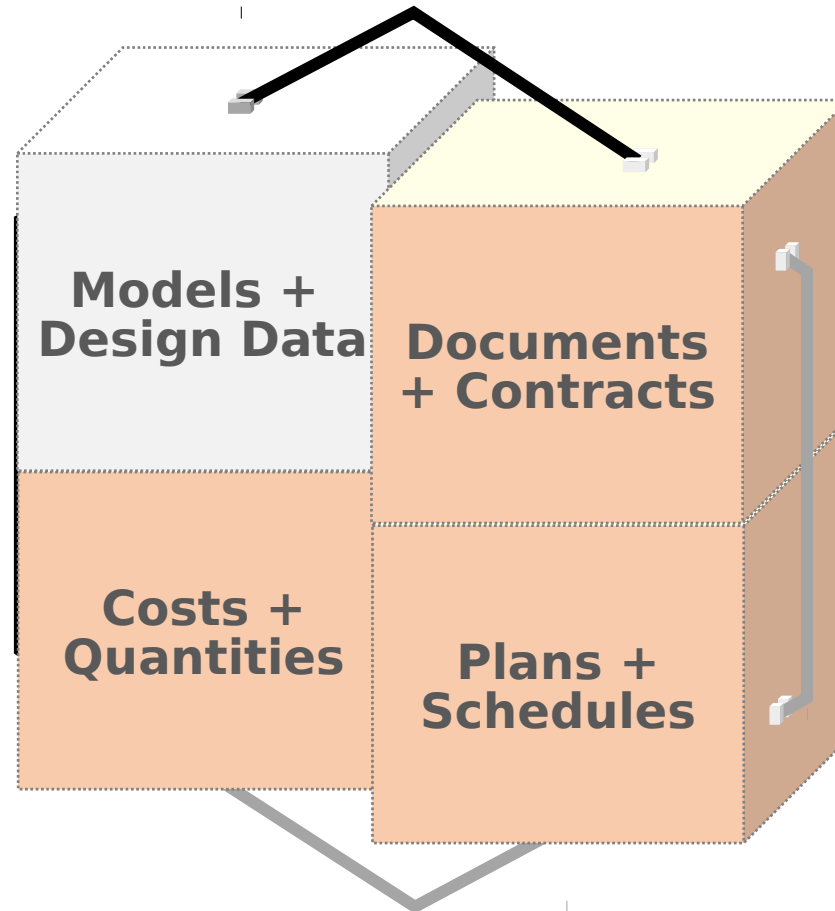
# “Earned Value Management”

---



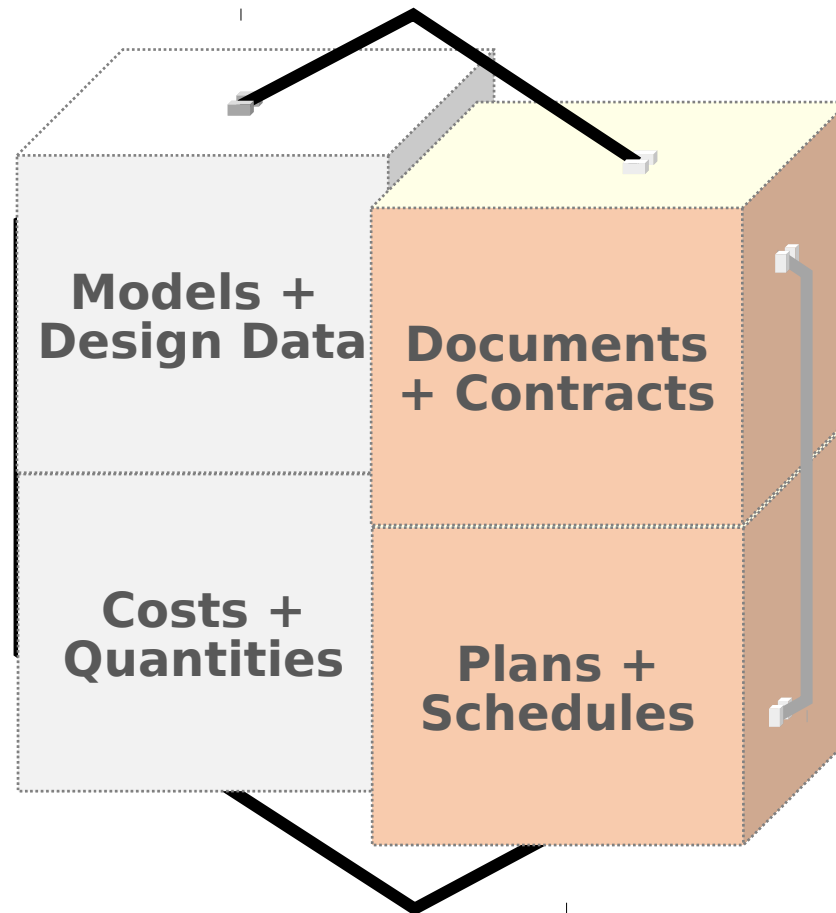
# “Construction Project Management”

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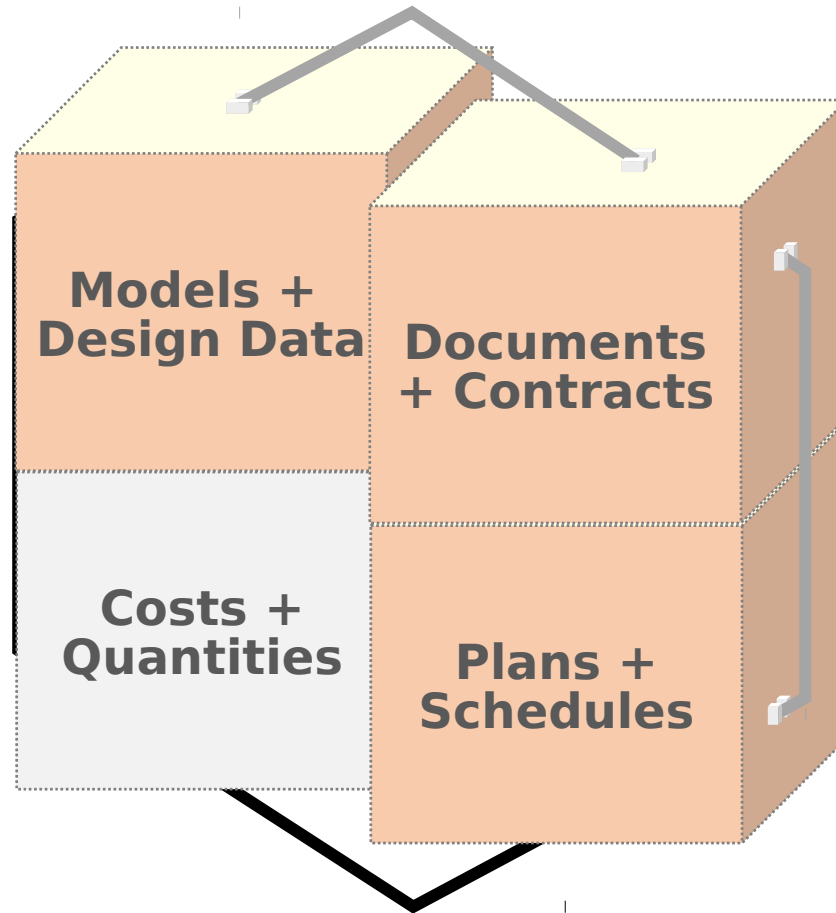
# “Work Planning”

---



# “Advanced Work Packaging”

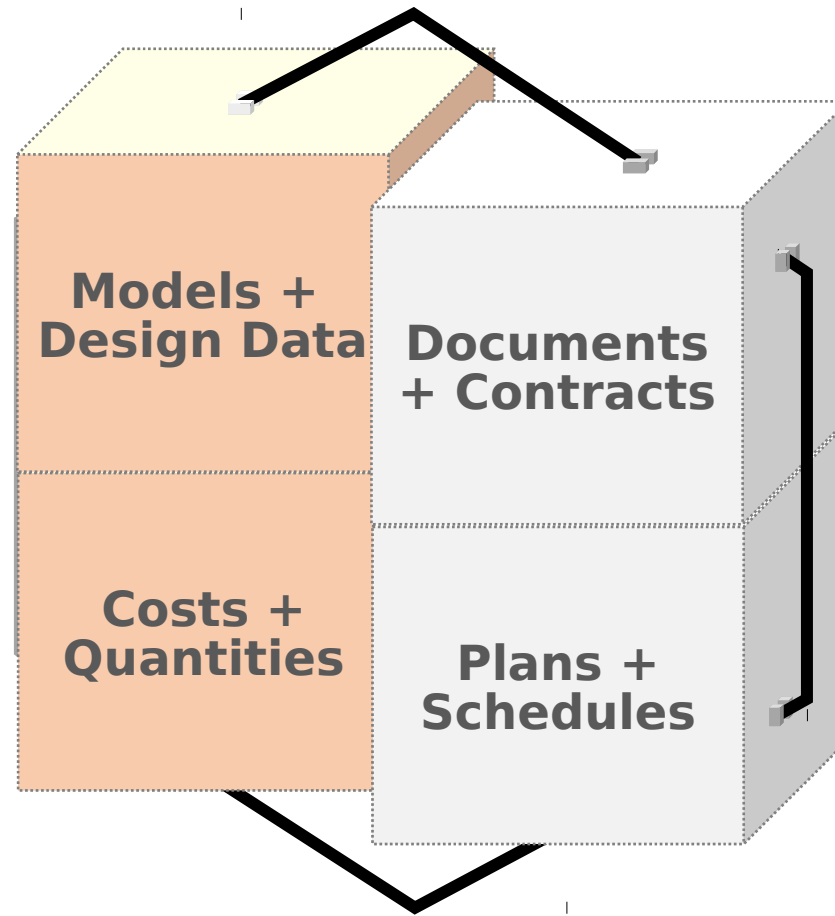
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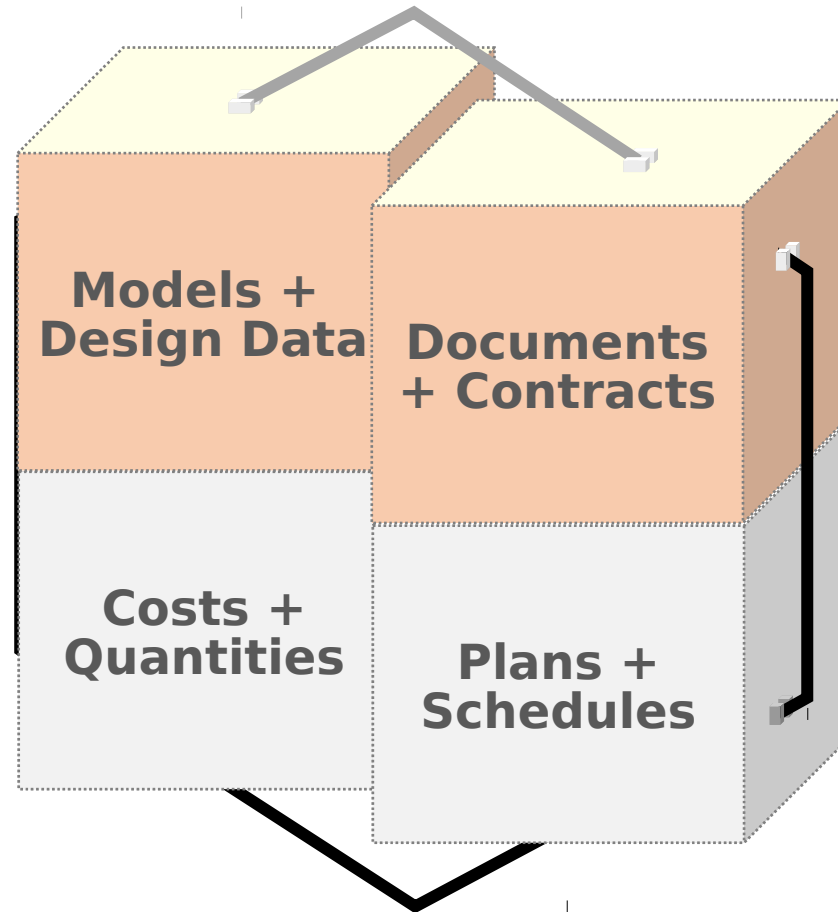
# “Model-driven Estimating”

---



# “Digital Engineering”

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# Element #2: Flexibility - Solved: *Modular Interoperability*

---

- Project delivery styles of today demand:
  - Flexible technology ‘baseplate’
  - Flexible processes
- Low-cost and low-risk approach
  - Use what you have
  - Plug-in and modernize when required



# The Essential Elements of High-Fidelity Project Controls - The 3 F's:

---

1. Foundation
2. Flexible
3. Flow



# Element #3: Flow

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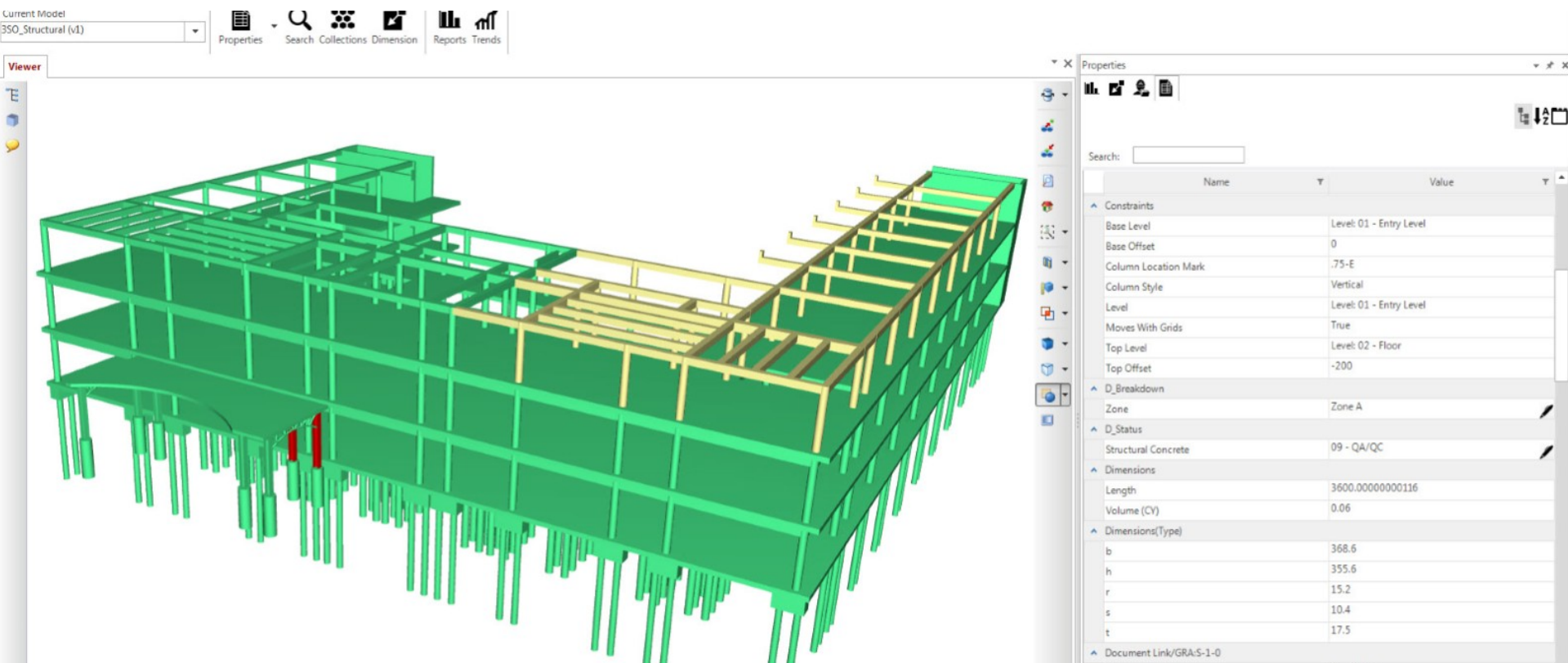
- Too often, process and technologies connectedness is absent or broken
- Connected project information is often a pipe-dream
- Simply put, actionable information is power

***Connected Processes leads to  
Project Certainty!***

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# Interactive - Visualisation Example



The image shows a 3D visualization of a structural model in a software application. The main view displays a green wireframe structure of a building frame with yellow reinforcement bars. The interface includes a top toolbar with icons for Properties, Search, Collections, Dimension, Reports, and Trends. A 'Viewer' tab is active on the left. On the right, a 'Properties' panel is open, showing a table of object properties.

Name	Value
<b>Constraints</b>	
Base Level	Level: 01 - Entry Level
Base Offset	0
Column Location Mark	.75-E
Column Style	Vertical
Level	Level: 01 - Entry Level
Moves With Grids	True
Top Level	Level: 02 - Floor
Top Offset	-200
<b>D_Breakdown</b>	
Zone	Zone A
<b>D_Status</b>	
Structural Concrete	09 - QA/QC
<b>Dimensions</b>	
Length	3600.00000000116
Volume (CY)	0.06
<b>Dimensions(Type)</b>	
b	368.6
h	355.6
r	15.2
s	10.4
t	17.5
<b>Document Link/GRAS-1-0</b>	



Project Controls

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# Interactive - Visualisation Example



## Daily cost performance

Project name: 105002 - Cove Point  
 From date: 1/8/2017  
 To date: 3/8/2017  
 Task(s): ALL

Executor(s): ALL  
 Approver 1: ALL  
 Approver 2: ALL  
 Production type: Mhrs / Qty  
 CB Mhrs / CE Mhrs: Current Budget Mhrs  
 Group by: Task

Expand task: Expand  
 Executor: Collapse  
 Prod. notes: Collapse  
 Show approvers: Show  
 Planned values: Hide  
 Financial GL: Show

Task	Budget				Period 1/6/2017 to 3/6/2017							FC remaining		Overall project to date							Run on: 3/7/2017 7:55:54.8 PM	
	Forecast T/O Qty	UoM	CB total Mhrs	Budget unit	Install Qty	Actual Mhrs	Earned Mhrs	Actual Mhrs GL	Financial GL	Unit	PF	Unit	PF	Install Qty	Actual Mhrs	Earned Mhrs	Actual Mhrs GL	Unit	PF	% Cmp	Approver1	Approver2
105002 - 1138 Craft (Leads, Advisors) (MD)	100.00	-	-	0.000	-	11.25	-	-11.25	-	-	-3925	-	-	39.25	-	-39.25	-	-	-	-	Justine Acosta	Rickie France
105002-1138 Craft (Leads, Advisors) (MD)		-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Justine Acosta	Patricia Savage
105002 - 1200 SS In-House Party Chief, Surveyors and Rodmen	1,341.54	-	-	0.000	3.26	12.75	-	-12.75	-	3.913	-0.095	-	3.26	12.75	-	-12.75	3.913	-	0.24%	Justine Acosta	Patricia Savage	
105002-1200 SS In-House Party Chief, Surveyors and Rodmen		-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Justine Acosta	Patricia Savage
105002 - 1229 MM Warehousemen	4,825,005.00	-	8,844.51	0.001	-	7.00	-	-7.00	-285.53	-	0.002	1.001	-	17.00	-	-17.00	-	-	-	-	Arthur Dent	Patricia Savage
105002-1229 MM Warehousemen		-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Justine Acosta	Patricia Savage
105002 - 1263 SS Maint Equipment Moves	126.00	-	2,780.33	1.826	1.00	38.00	21.91	-16.09	-822.49	37.998	0.577	21.603	1.002	1.00	60.00	21.91	-38.09	59.996	0.365	0.79%	Daniel Coates	No Approver2
105002-1263 SS Maint Equipment Moves		-	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Arthur Dent	Patricia Savage
105002 - 1267 Purchase Embeds	8.00	-	-	0.000	0.50	6.00	-	-6.00	-	12.000	-8.000	-	0.50	6.00	-	-6.00	12.000	-	6.25%	Arthur Dent	Burt Flart	
105002 - 1328 Agg Base - Place Mainline Roadways (construction use)	58,993.00	-	10,643.99	0.180	-	2.00	-	-2.00	-102.70	-	0.180	1.000	-	2.00	-	-2.00	-	-	-	-	Bubb Rubb, Sr	Burt Flart
105002 - 1330 Agg Base - Finish-Mainline (Blade) Roadways (construction roads)	110,959.00	-	1,764.47	0.003	350.00	11.00	5.57	-5.43	-279.08	0.031	0.506	0.016	0.999	350.00	11.00	5.57	-5.43	0.031	0.506	0.32%	Bubb Rubb, Sr	Burt Flart



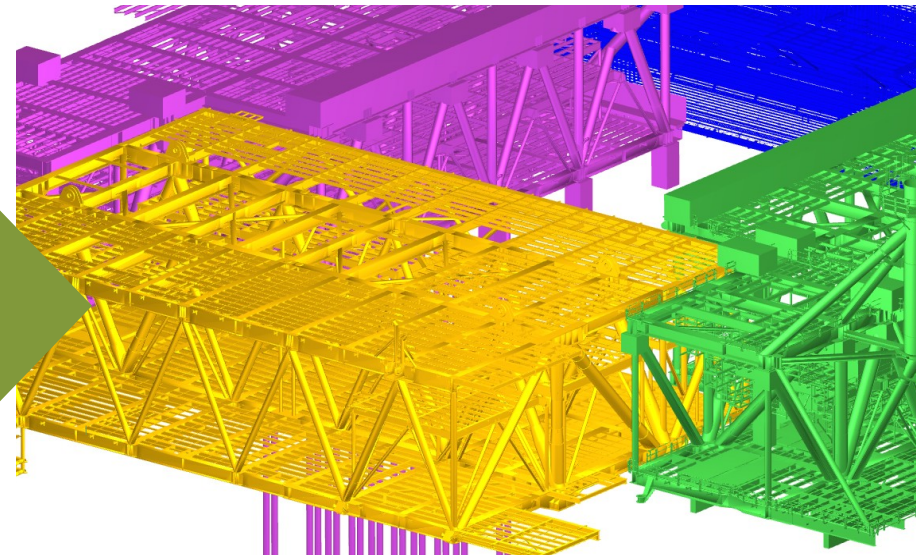
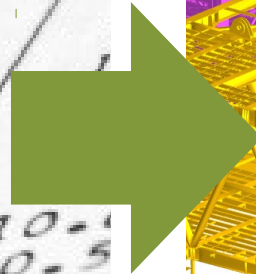
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# Project Controls Information Needs to be Intelligent, Interactive, Responsive

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**Today**

**A Better Way -  
Visual Index**



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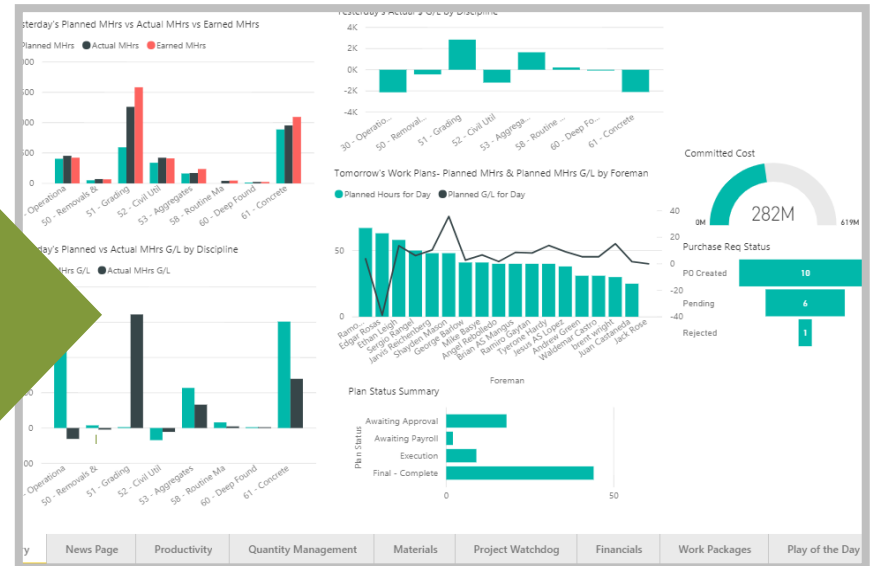
# Project Controls Information Needs to be Intelligent, Interactive, Responsive

**ABC BUILDERS**

**Budget Variance Report**  
By Account Code

Group By: Account Code	Tracking Code	Description	Quantity	Planned Unit Of Measure	Original Budget	Approved Changes	Current Budget	Percent Complete	As Built Cost	Total Cost Variance To Date Dollar	Total Cost Variance To Date Percent	Budget Remaining
	2.2.1.2.4	Packaging and Shipping Labour	1	PLS	178,560		178,560		19,954	47,899	71 %	158,606
	2.2.1.2.5	Final Clean & Sell	1	PLS	95,775		95,775		10,243	(10,243)		85,533
	2.2.1.2.6	Temp Power Demobilization	1	PLS	105,800		105,800		13,097	(13,097)		92,503
	2.2.1.2.7	Westcoast Offical Labour	1	PLS	38,795		38,795					38,796
<b>Account Code Subtotal:</b>					<b>585,251</b>		<b>585,251</b>		<b>91,260</b>	<b>(5,507)</b>		<b>479,696</b>
<b>Account Code:</b> 30.06.02.002												
	2.2.1.1.2.1.1	Construction Equipment and office Mobilization, Setup etc	726,842	PLS	726,842		726,842	100 %	733,570	(6,727)		6,727
	2.2.1.1.2.1.7	5 Star Setup Assistance	14	MH			6,302		6,302	(6,302)		
	2.2.1.1.2.2	Building Water setup/removal support	1	PLS			13,531		13,531	(13,531)		
<b>Account Code Subtotal:</b>					<b>726,842</b>		<b>726,842</b>		<b>753,402</b>	<b>(26,560)</b>		
<b>Account Code:</b> 30.06.08												
	2.2.1.1.2.8	Care & Preservation Labour	7,355	MH	452,335		452,335		246,248	(20,143)		
<b>Account Code Subtotal:</b>					<b>452,335</b>		<b>452,335</b>		<b>246,248</b>	<b>(20,143)</b>		
<b>Account Code:</b> 30.06.12.002												
	2.2.1.1.4.1	Temporary Electrical - Installation and Removal	10,000	MH	383,831		200,410	59 %	890,560	(548,253)	-160 %	(306,319)
<b>Account Code Subtotal:</b>					<b>383,831</b>		<b>200,410</b>		<b>890,560</b>	<b>(548,253)</b>		<b>(306,319)</b>
<b>Account Code:</b> 30.06.12.004												
	2.2.1.1.4.2	Temporary Electrical - Motion	3,000	MH	124,958		50,336	68 %	140,279	(21,210)		34,994
<b>Account Code Subtotal:</b>					<b>124,958</b>		<b>50,336</b>		<b>140,279</b>	<b>(21,210)</b>		<b>34,994</b>
<b>Account Code:</b> 30.06.14.002												
	2.2.1.1.3.1.1	Erect Single Bay Scaffolds	270,767	kg	746,980		746,980	100 %	759,663	(29,087)		(28,785)

4/6/2017 6:39 PM Copyright © 1989-2014 Hard Dollar Corp. All Rights Reserved. 2 of 72



Today

A Better Way - Actionable Insights



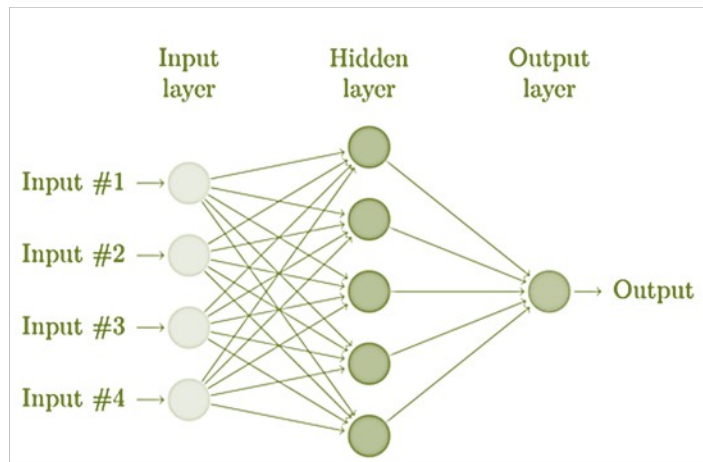
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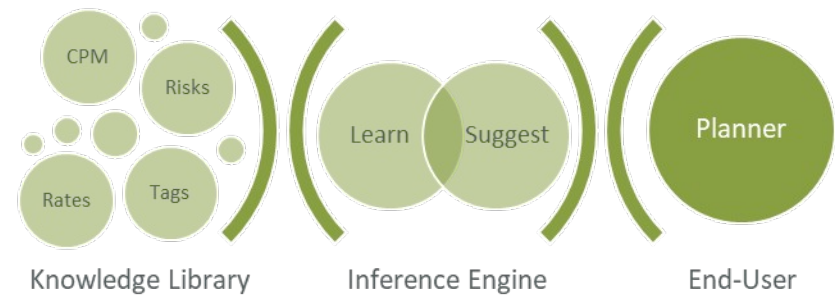
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# Project Controls Information Needs to be Intelligent, Interactive, Responsive

Neural Network



Knowledge-Base



## Artificial Intelligence

- Guided plan development
- Real time suggestions

## Human Intelligence

- Consensus analysis
- Survey scorecard approach
- Eliminates challenge of building risk models



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# Element #3: Flow - Solved: *Connected Processes*

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- Connected processes and systems is no longer a nice-to-have
- End-to-end flow - elimination of disparity - creates connected workflows and unified reporting
- Only possible with 'Quantity Breakdown Item'
- Only possible with modular approach with common 'baseplate'



# Ask yourself - Do You Have the Essential Elements of High-Fidelity Project Controls?

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1. Foundation – do you have atomic structures designed-in?
2. Flexible – do you have the building-block approach?
3. Flow – do you have connected project information?



# High-Fidelity Project Controls - In Practice

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## The Metro Trains Experience

Rula Rozakeas  
Business Liaison  
Manager



Project Controls

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# High-Fidelity Project Controls - In Practice

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## The Challenge

- Cost control function – Excel - detailed and complex Excel spreadsheets
- Actuals captured via financial system is exported and uploaded to Excel templates for forecasting and reporting
- The process was taking take up to 10 man days per month



# High-Fidelity Project Controls - In Practice

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## The Journey

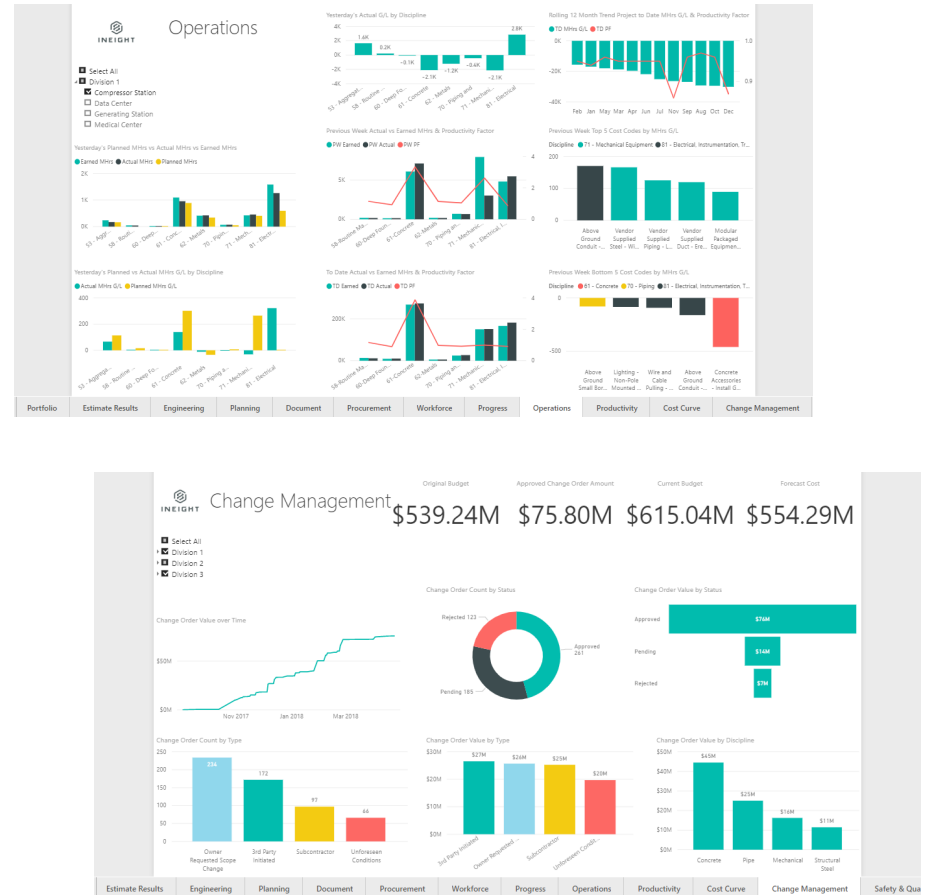
- Implemented systems and processes that embraced the high-fidelity approach
- Information being modelled and captured at the atomic-level
- Centrally-managed
- Stable, Secure, Transparent



# High-Fidelity Project Controls - In Practice

## The Outcome

- Visualized, more accurate, far more efficient reporting
  - Multi-level: project, portfolio, division
- Cost performance dashboards produced almost at the click of a button
- Other portfolios across the division are now





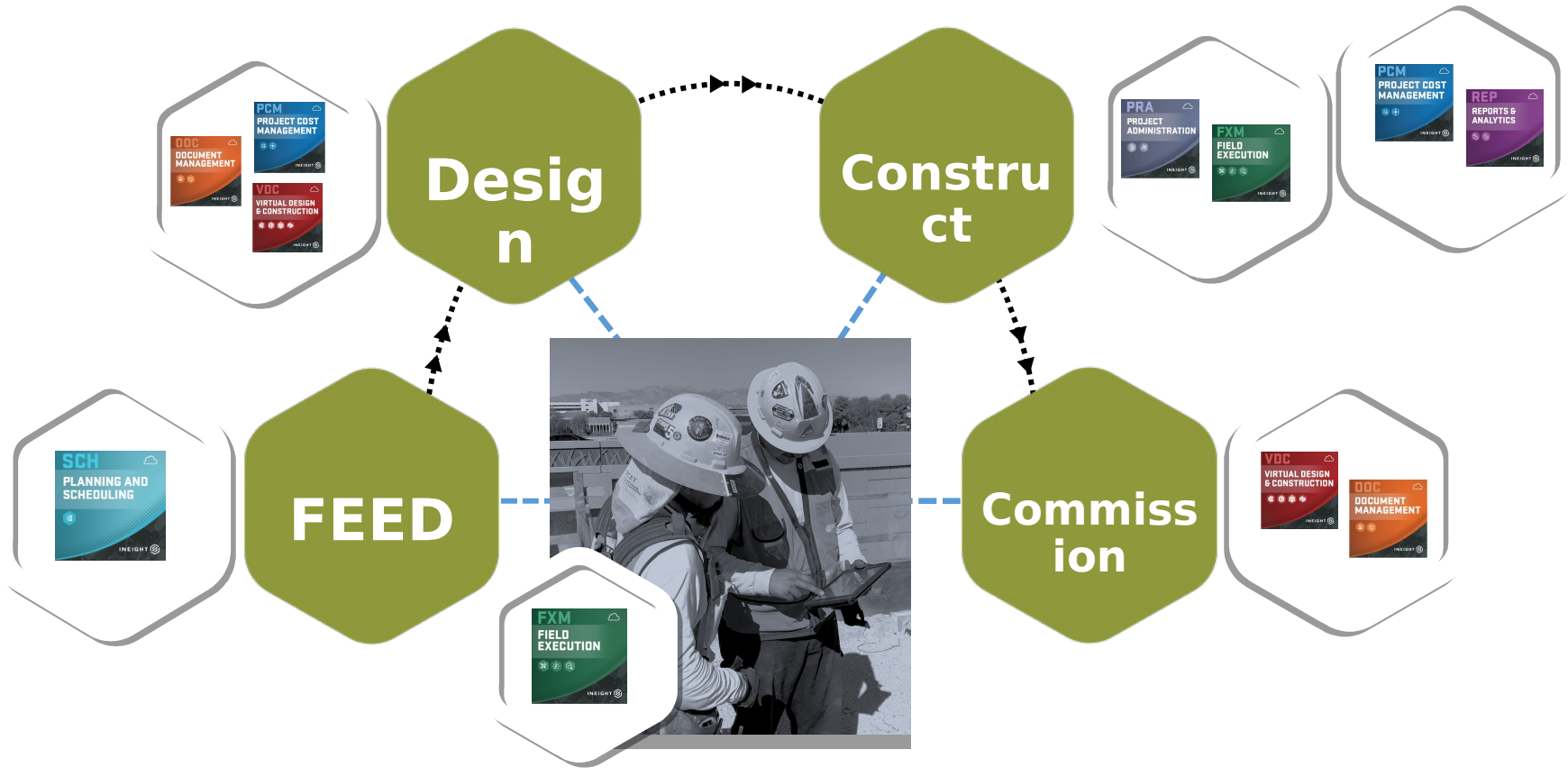
# The MTM Experience - the Art of the Possible

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1. Established foundation / key structures
2. Embraced the building-block approach – bite-site as the organisation is able to consume
3. Project controls systems and processes are now joined-up



# High-Fidelity Project Controls: *Only InEight*



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# Thank You

Michael Maslen  
Solution Director, InEight



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