

23RD ANNUAL



23RD LCI CONGRESS
OCTOBER 19-22

Developing Cost Awareness in Preconstruction and Design Management

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LEARN BY DOING FROM THOSE WHO DO

OCTOBER 20, 2021

Health precautions to keep everyone as safe as possible at Congress:

- Wear masks at all times in indoor events.
- Complete your daily health screening on your phone and bring it with you when you enter the center each day.
- Practice social distancing to the extent possible. Seating at plenary sessions is structured to help with this.
- If you feel ill at any time, please leave the conference and return to your room/consult a physician as necessary.
- Ultimately, our collective health and safety at Congress is up to all of us. Thanks for your support!



LCI Partner **UC DAVIS**
Continuing and Professional Education

Active Estimating and Preconstruction Management

Advanced Studies and Professional Concentration Program



Problem Statement

The roles of a pre-construction team are fundamentally shifted in the TVD environment

- **Actively predict cost** using incomplete information
- Provide **rapid cost feedback** to design
- Collaborate with the design team to **steer cost to targets**
- Must **balance project dynamics**

Learning Objectives

Understand	Implement	Lead
<ul style="list-style-type: none">• full-cycle approach in estimating• conduct highly collaborative interactions and shared vision with the owner and design team	<ul style="list-style-type: none">• behavioral estimating practices that increase activeness and predictability• integrating new technology and innovations	<ul style="list-style-type: none">• lead changes in continuous estimate implementation

A Story



Gypsum Board Assemblies Cost Model

\$/SF Aggregate Unit Cost based on:

- Benchmark project
- Wall and ceiling densities

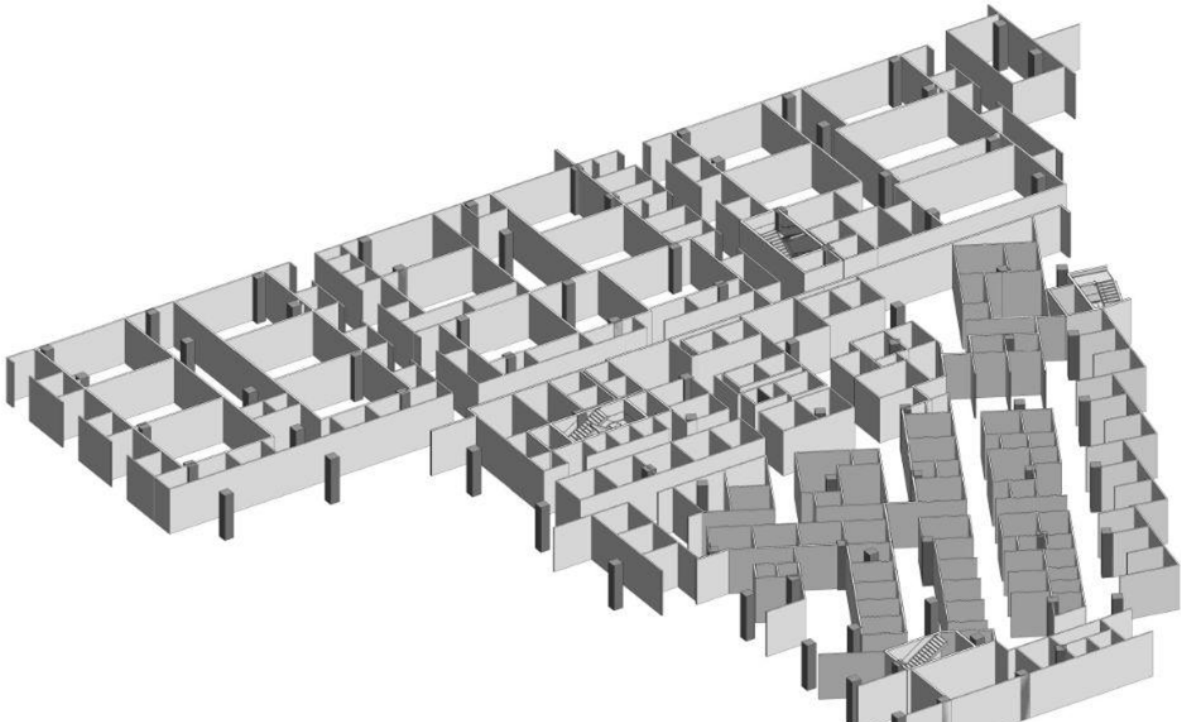
How does new hospital compare to historical data and assumptions?



Risky Business



Production and Analysis



QA Schedule - Interior Partition Types - CE						
Type	Type Mark	Assembly Description	Width	Structure Thickness	Area	Length
LEVEL 0B1						
Type 00TL	00TL		4"		18874.12 SF	1228' - 10 17/32"
Type A4 - Single Layer GWB - NR - STC-35 - 4" Stud	A4	Partitions - Drywall w/ Metal Stud	5 1/4"	4"	19421.96 SF	109' - 2"
Type A6R - Single Layer GWB - 1HR - STC-35 - 6" Stud	A6R	Partitions - Drywall w/ Metal Stud	7 1/4"	6"	11891.1 SF	784' - 10 3/16"

Findings and Results

	Floor Level/ Department	Totals
Wall Footage Extractions		
Calibration 1.6 % Increase		
Assumption %		
Assumption Wall Footage		
Total Model w Assumptions		
Wall Footage OST		
Assumed/Missing OST		
Total OST Footage		
Percentage Increase		
Hard Lids		
Sterile Clinical		
Floor Plate OST		
Floor Plate Revit		
Wall Density OST		
Wall Density Revit		
Ceiling Density OST		
Ceiling Density Revit		

	Benchmark
Wall Density	0.132
Ceiling Density	0.143

% Change	Value
9.85%	\$5.5 M
-25.87%	- \$1.0 M
RISK TO PROJECT	\$4.5 M

Active Estimating



\equiv *NOM*

Passive
Objective

Active
Subjective

Status of
Design

Behavioral

Objective

Ratio

Subjective

Verifiable
Reactive
Analytical
Quantification

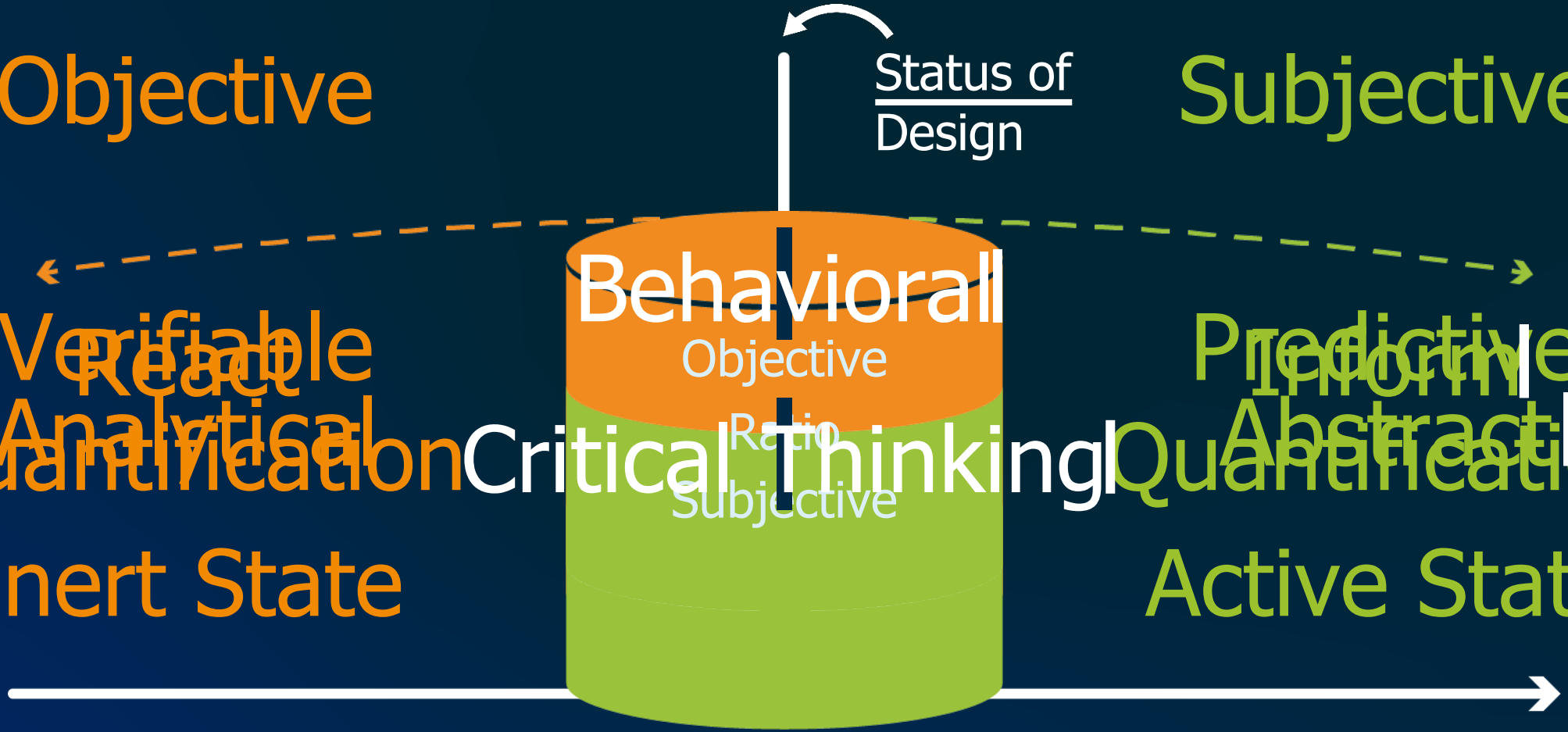
Critical Thinking

Predictive
Informative
Abstract
Quantification

Inert State

Active State

TIME



Leveraging Technology for Continuous Estimating

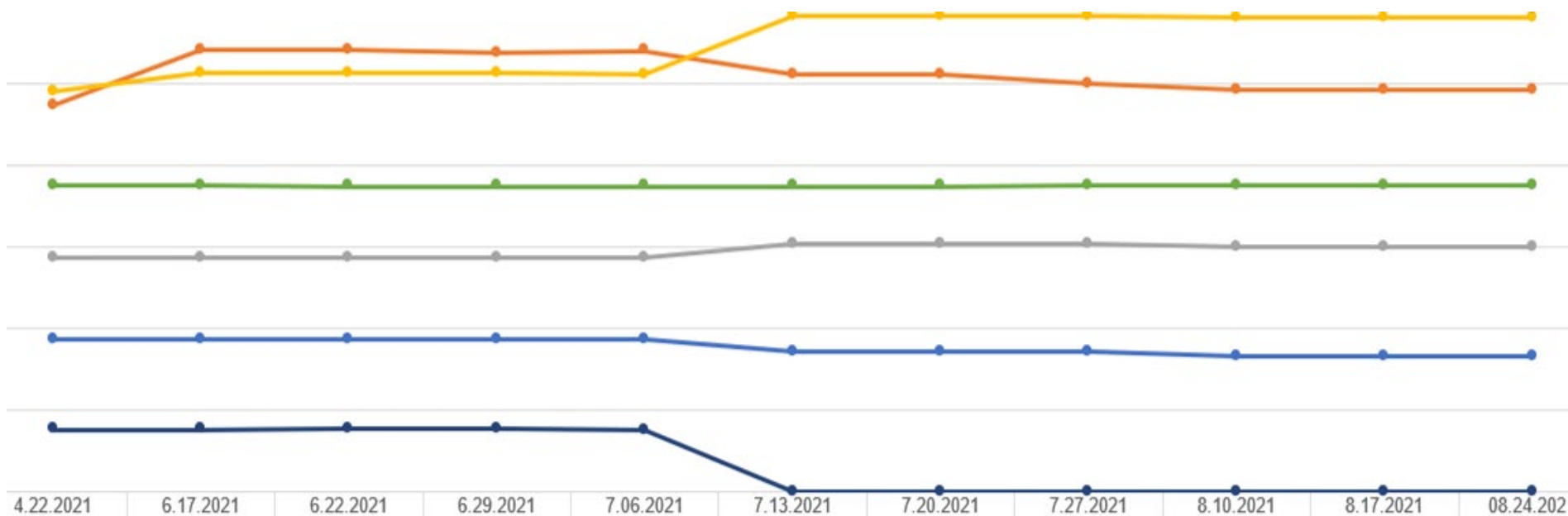


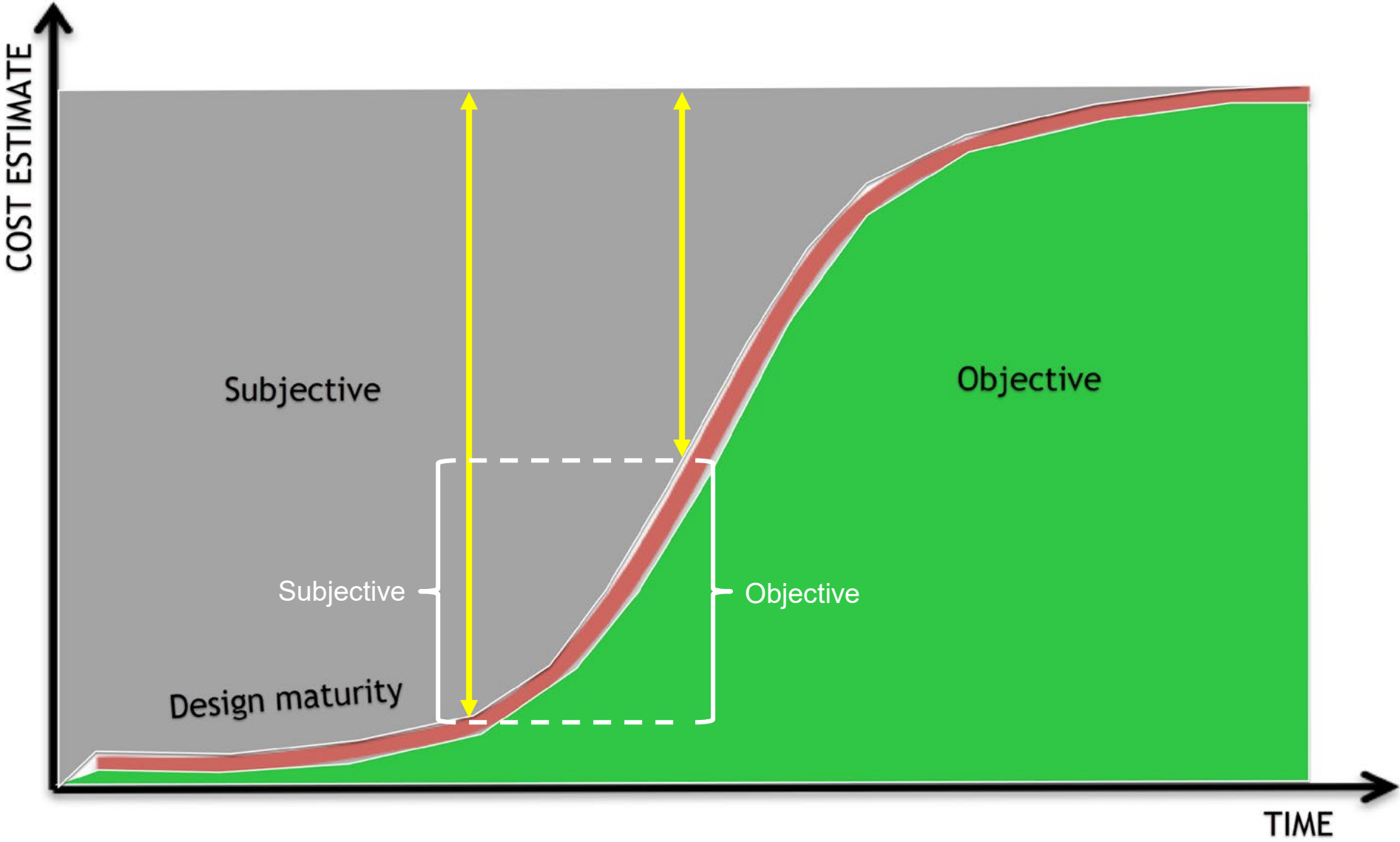
Continuous Estimating—The Challenges

Regularly update the estimate

and **track variances** from the last update

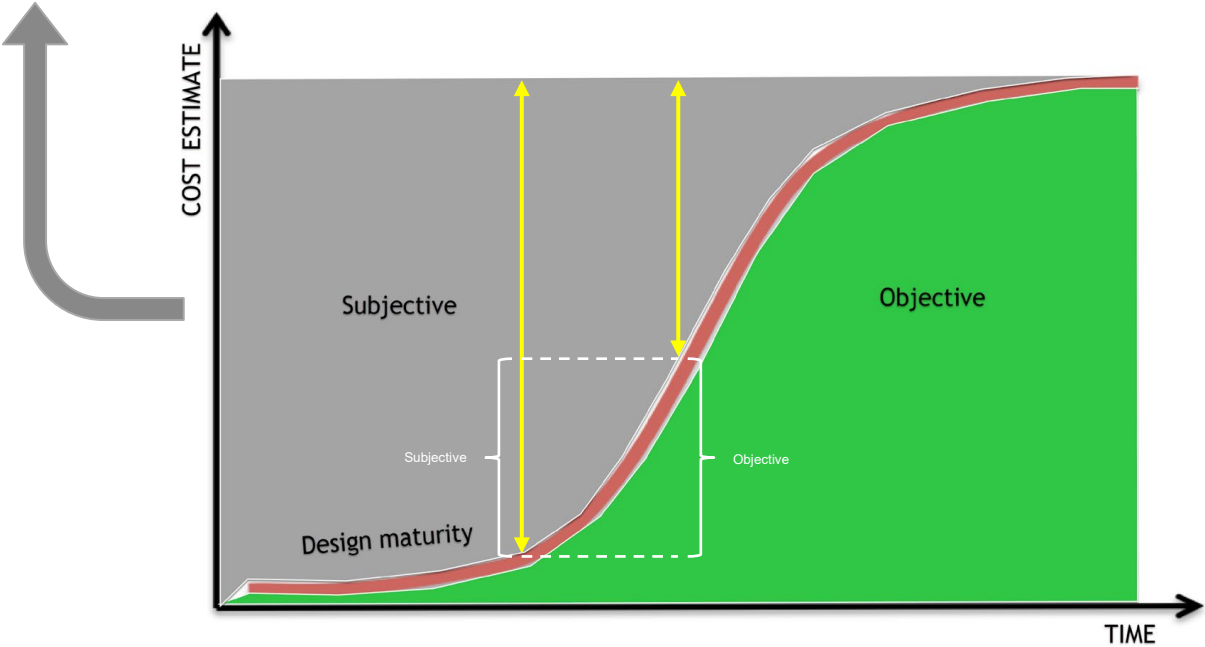
while **design is progressing**.





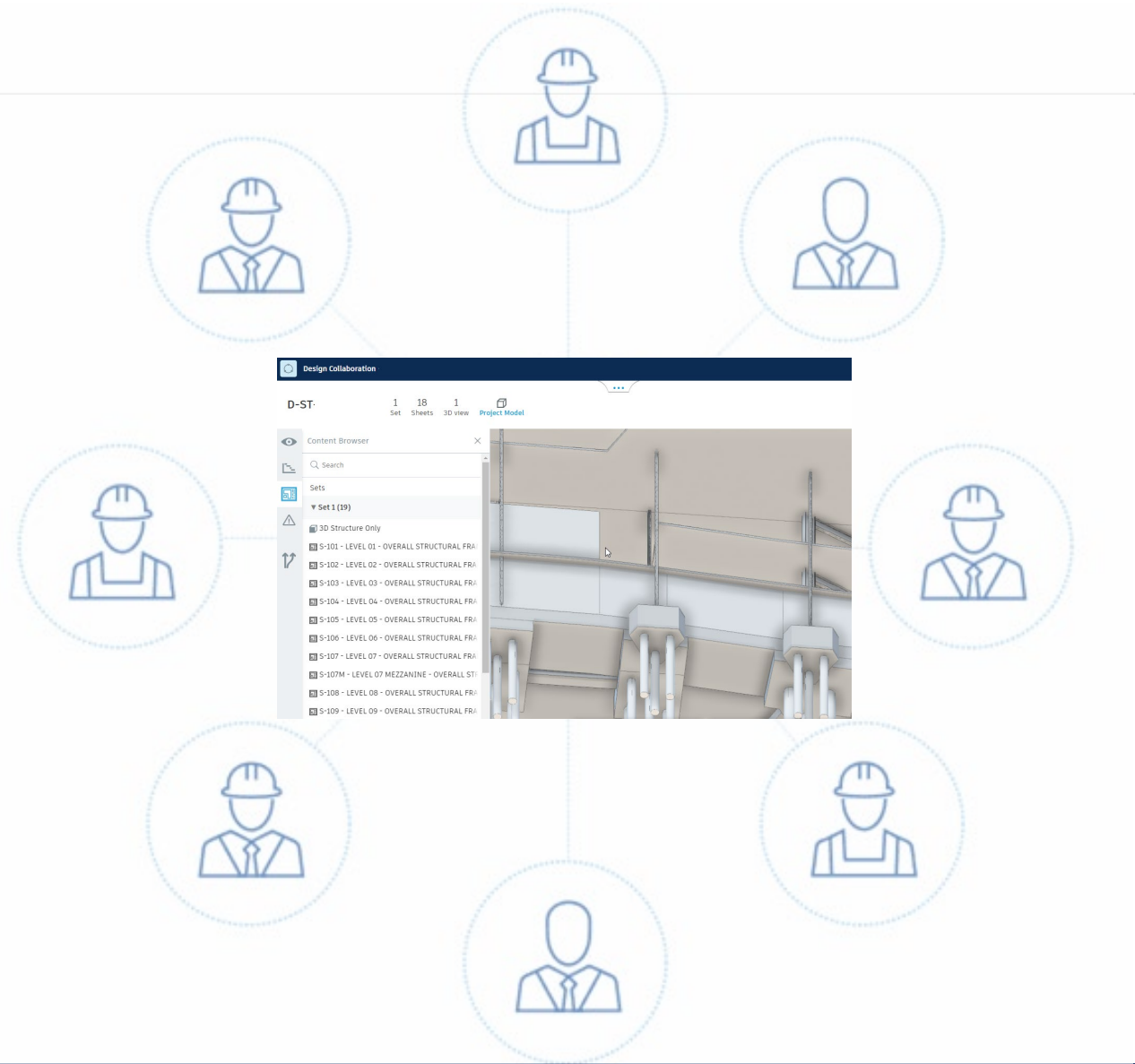
Subjective/Objective Tracking

Description	Obj. Quantity	Unit	Subj. Quantity	Total	%	Update Log
				Obj. + Subj.	Subj./Total	
Concrete Floor: 3 1/4" Lightweight Concrete on 3" Metal Deck - from	3,654	CY	110	3,763	3%	10/9/2019: allow



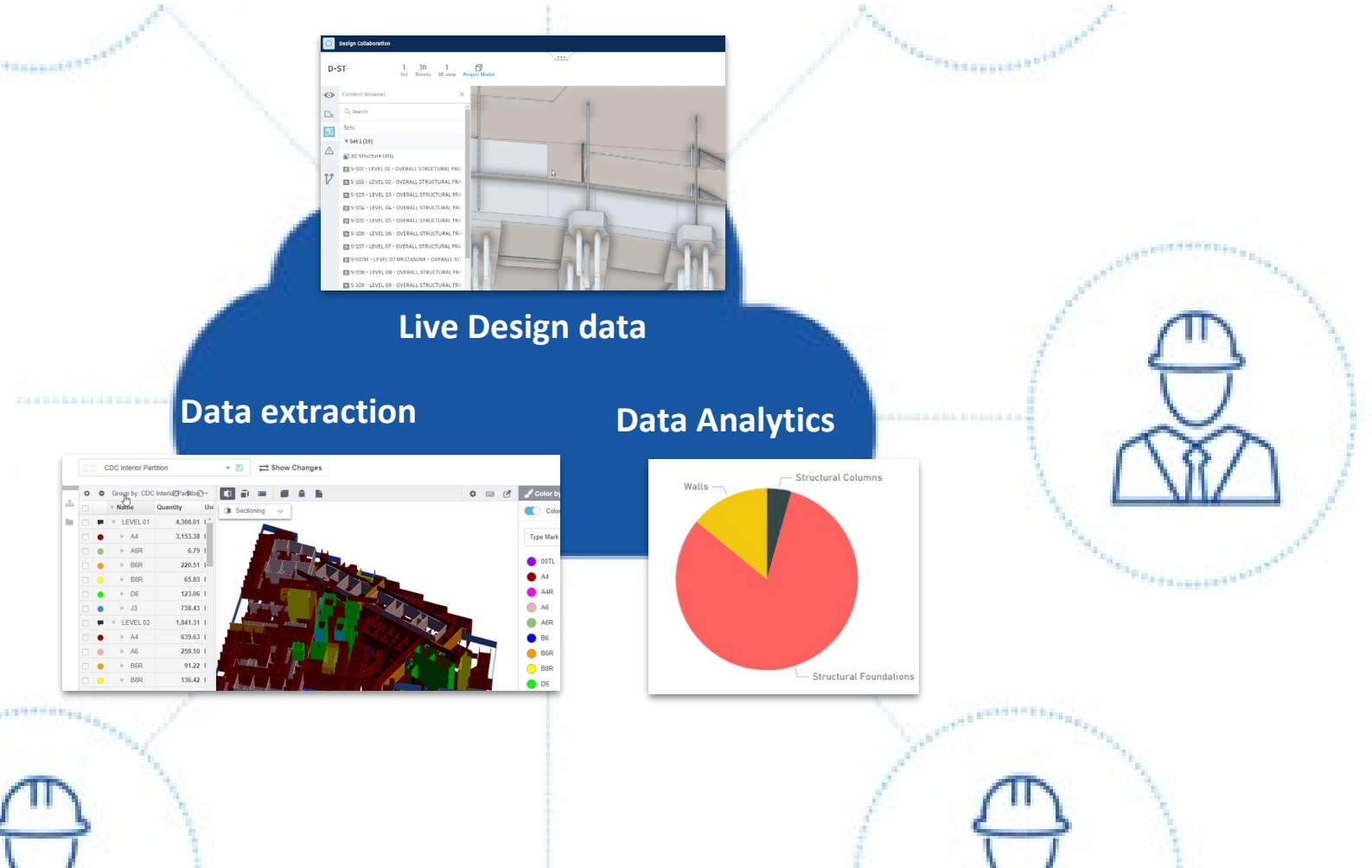
Leverage Technology

- All design model hosted **on the cloud**
- Allow **collaboration between design teams** (A, S, MEP, Civil...) and Trade Partners
- **Sharing incomplete information**
- Continuously **track changes**



Leverage Technology

- Automate data extraction
- From QTO to data mining and verification
- Facilitate continuous estimating and rapid feedback to design



The Trade Contractor Role in TVD



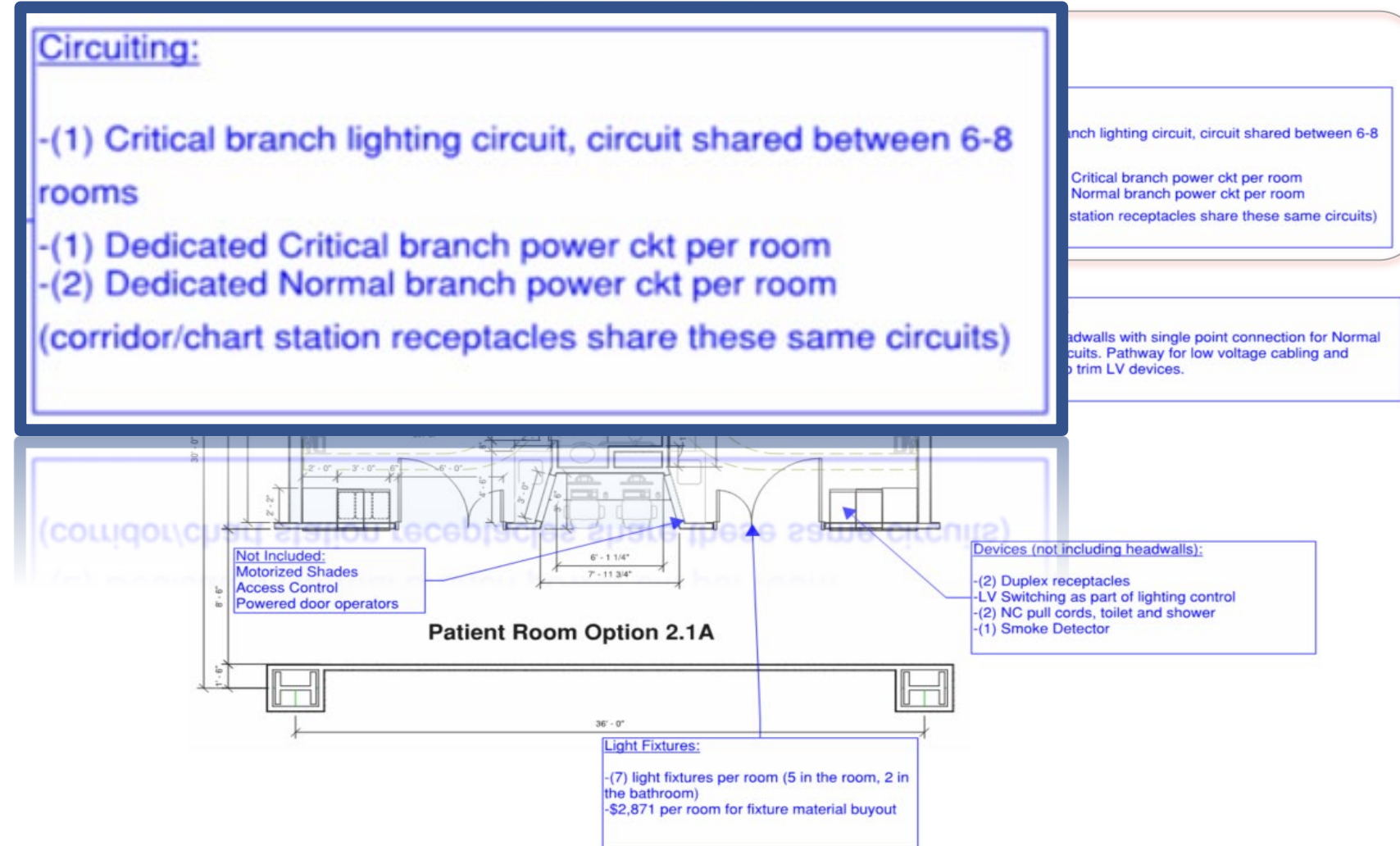
Trade Contractor—Conceptual Estimating

- Estimating Ahead of Design Documents
- High Aggregate \$/SF Unit Cost—Historical Data
- Making adjustments
 - Code Cycle Updates
 - Scope of Work Differences
 - Site conditions

		Reference Project San Francisco <i>Excerpted</i>	
Project Metrics			
Actual Manhours/SF incl SUPV		570,319	0.57
Total Branch Raceway LF/SF (MC/EMT)		1,277,337	1.64
Branch Conduit		730,087	0.94
MC Cable		547,250	0.70
Feeder Raceway/SF		89,262	0.11
Qty of Light Fixtures		14,378	0.02
Materials			
Lighting Fixtures		\$ 7,270,667	9.35
Lighting Control		\$ 1,524,718	1.96
Switchgear		\$ 8,831,580	11.35
Generators		\$ 6,482,674	8.33
Temp Power		\$ 1,038,560	1.33
FOMs		\$ 286,153	0.37
Commodity Materials (cond,wire,misc)		\$ 7,664,450	9.85
Total Materials (Code 300)		\$ 33,098,802	42.54
	Tel Data	\$ 13,476,594	17.32
	Fire Alarm	\$ 2,973,670	3.82
	Lightning Protection	\$ 104,525	0.13
	Nurse Call/Infant/Access/CCTV/AOR	\$ 10,527,366	13.53
	Rigging	\$ 39,220	0.05
	Core Drilling	\$ 232,528	0.30
	Misc	\$ 92,042	0.12
	Subcontractors Totals	\$ 27,837,651	35.78

Conceptual Estimating & Design

- Mark-Ups of Typical Rooms
- Inform Design Team What is Included in High-Aggregate \$/SF Estimate
- Provide Initial Framework for Design



Informing Target Value Design

New Hospital Switchgear KPI						
Note: Positive value = savings & negative = overage						
Equipment Type	Benchmark SLD Take-Off	Benchmark KPI/SF	New Hospital Base KPI	New Hospital SLD Take-Off	Delta	Notes
IFS SWB w/ 12KV SW, Xfrmr, 480v Sec	20	0.0000257069	22	9	13	Possible savings. Awaiting final switchgear quote.
IFS/IPC Switchboard	56	0.0000719794	61	30	31	Evaluate use of IPC on Critical Branch to maximize labor savings. Currently \$500K risk on R&O Log.
12KV Switch	34	0.0000437018	37	9	28	Possible savings. Awaiting final switchgear quote.
Automatic Transfer Switch	26	0.0000334190	28	30	(2)	Minor overage.
12KV/480V Transformer	20	0.0000257069	22	9	13	Possible savings. Awaiting final switchgear quote.
480v/208v Transformer	81	0.0001041131	89	90	(1)	Minor overage.
480v Distribution Board	45	0.0000578406	49	48	1	Minor savings.
120 Distribution Board	11	0.0000141388	12	58	(46)	Overage may be offset by reduction in feeder lengths. Further evaluation required.
277/480v Panelboard	76	0.0000976864	83	108	(25)	Overage may be offset by reduction in feeder lengths. Further evaluation required.
120/208v Panelboard	324	0.0004164524	354	264	90	Possible savings. Awaiting final switchgear quote.



Culture & Behavior

The background image shows a group of people in silhouette against a bright, hazy sunset sky. They are working together to build a bridge across a deep chasm. Some people are on the left rock, some are on the right rock, and a group is in the middle, supporting a large horizontal beam with their hands. Two people are standing on the rightmost peak, raising their arms in celebration. The word 'TRUST' is written in large white letters on the left rock.

TRUST

- Open & Transparent Estimate Review
- Identify Contingencies
- Architect & Engineers Commit to Design within “Conditions of Satisfaction”



Key Takeaways

- **Active and full-cycle approaches** in estimating are needed to support TVD.
- **Behavioral changes are critical** in implementing Active Estimating.
- **BIM, data analytics, and visuals** improve estimating workflow and enable incomplete information sharing and **rapid cost feedbacks**.



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In the spirit of continuous improvement, we would like to remind you to complete this session's survey! We look forward to receiving your feedback.

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Thank you for attending this presentation. Enjoy the rest of the 23rd Annual LCI Congress!

