

23RD ANNUAL



23RD LCI CONGRESS
OCTOBER 19-22

MEP Wall Panels & Takt Time Produce 73% Schedule Savings: Wins & Lessons Learned

James Pease, Makayla Oei, & John Pearson

LEARN BY DOING FROM THOSE WHO DO

OCTOBER 21, 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!



Introduction



James Pease
LeanIPD



Makayla Oei
Project Executive
Mark III Construction



John Pearson
Multi-Trade Superintendent
Mark III Construction

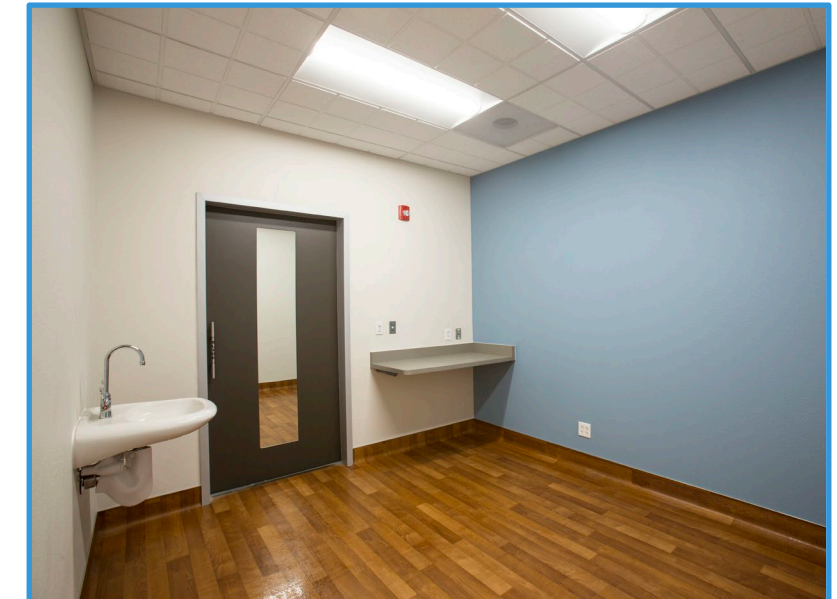
Who is Mark III – The Power of One



- 1976 – Founded
- California based
- Single trade (Electrical) → Multi-trade (MEP, UG, service)
- 1997 – Opened first prefabrication shop
- 2019 – Opened NEW and IMPROVED facility
 - 24k SF with a focus on manufacturing and field assembly
 - 5 trades – Plumbing, Electrical, HVAC, Mechanical Pipe, Framing/Panel Line

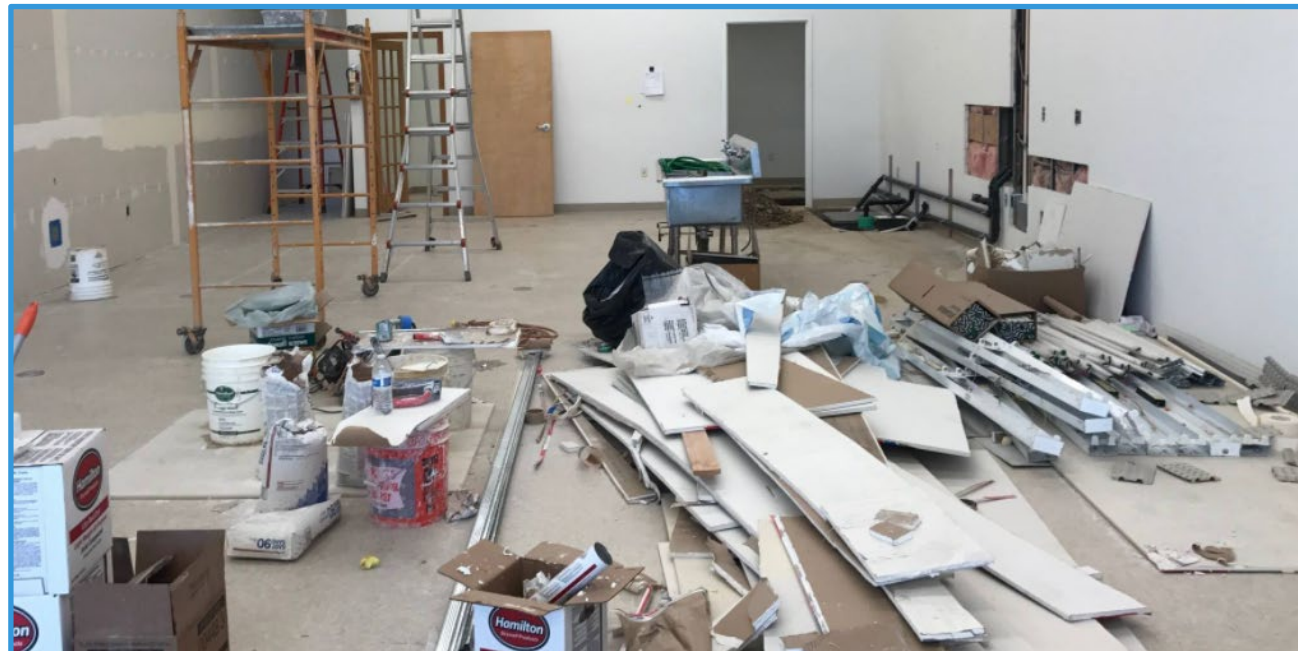
Innovation & Continuous Improvement

- Mission Statement:
Leading the Evolution of Construction
- Internal Strategic R&D – Project Mountain
- Launched in 2017
- Off-site innovation efforts
- Self-funded
- Two “climbs” so far
 - Overhead Racked System
 - Kit-of-parts for a typical exam room
 - 3rd initiative in planning – Volumetric Modular + Kit-of-parts



Why are we trying to Lead the Evolution of Construction?

Evolution of Construction



- Innovation & Construction rarely commingle
 - “Why are you trying to reinvent the wheel”
 - “We don’t do it that way”
- Problems that need to be solved
 - Industry is too siloed
 - Dwindling skilled labor force
 - Riddled by waste – up to 70% !!!!
 - Most projects are treated like one-offs

STANDARDIZATION & HEALTH CARE CONSTRUCTION



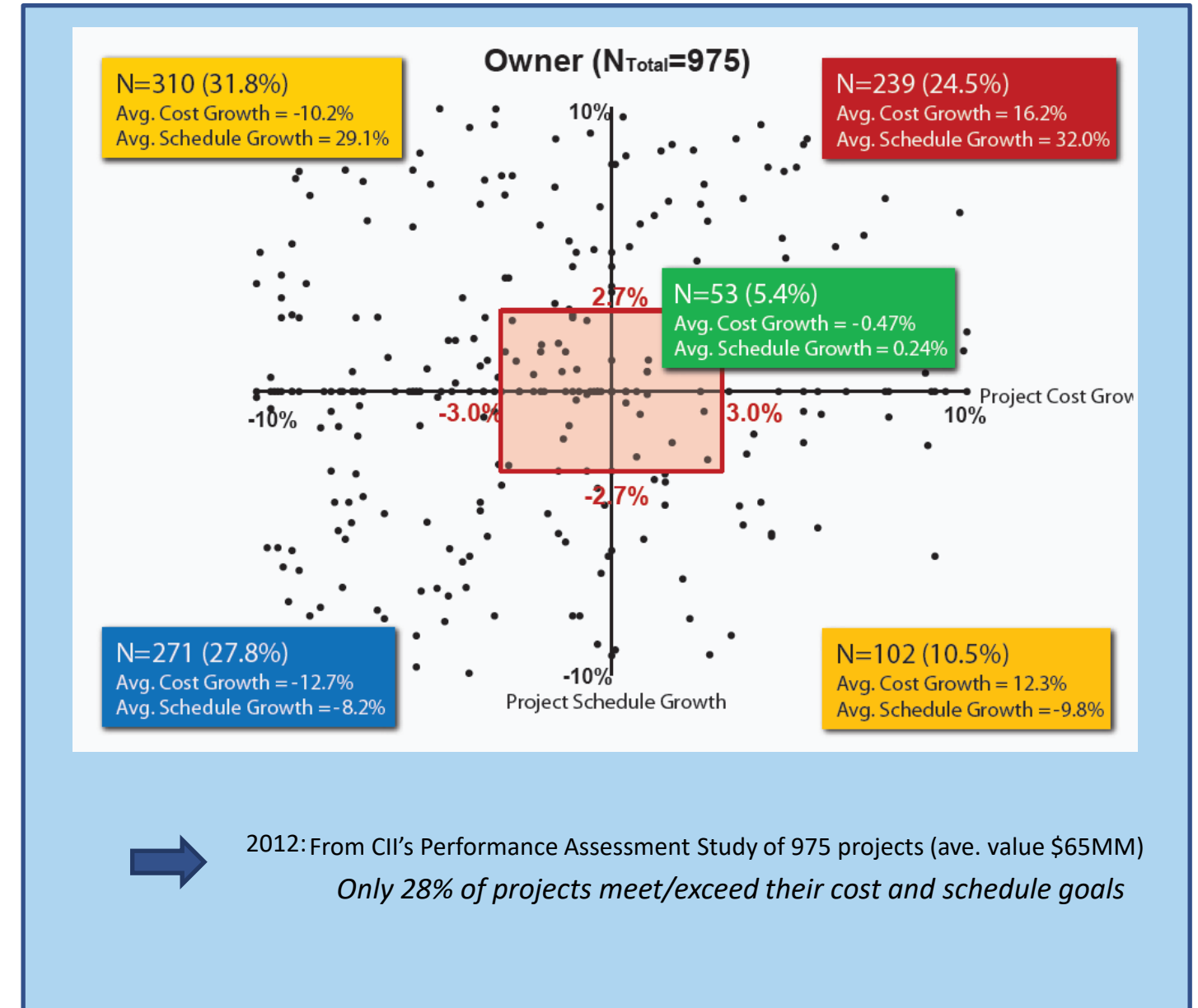
Huge Opportunity

- Construction accounts for 13% of global GDP
- **\$1.6 Trillion of additional value** could be added each year **through increased productivity**, meeting **half of the world's infrastructure needs.**
- *McKinsey Research Report 2017*



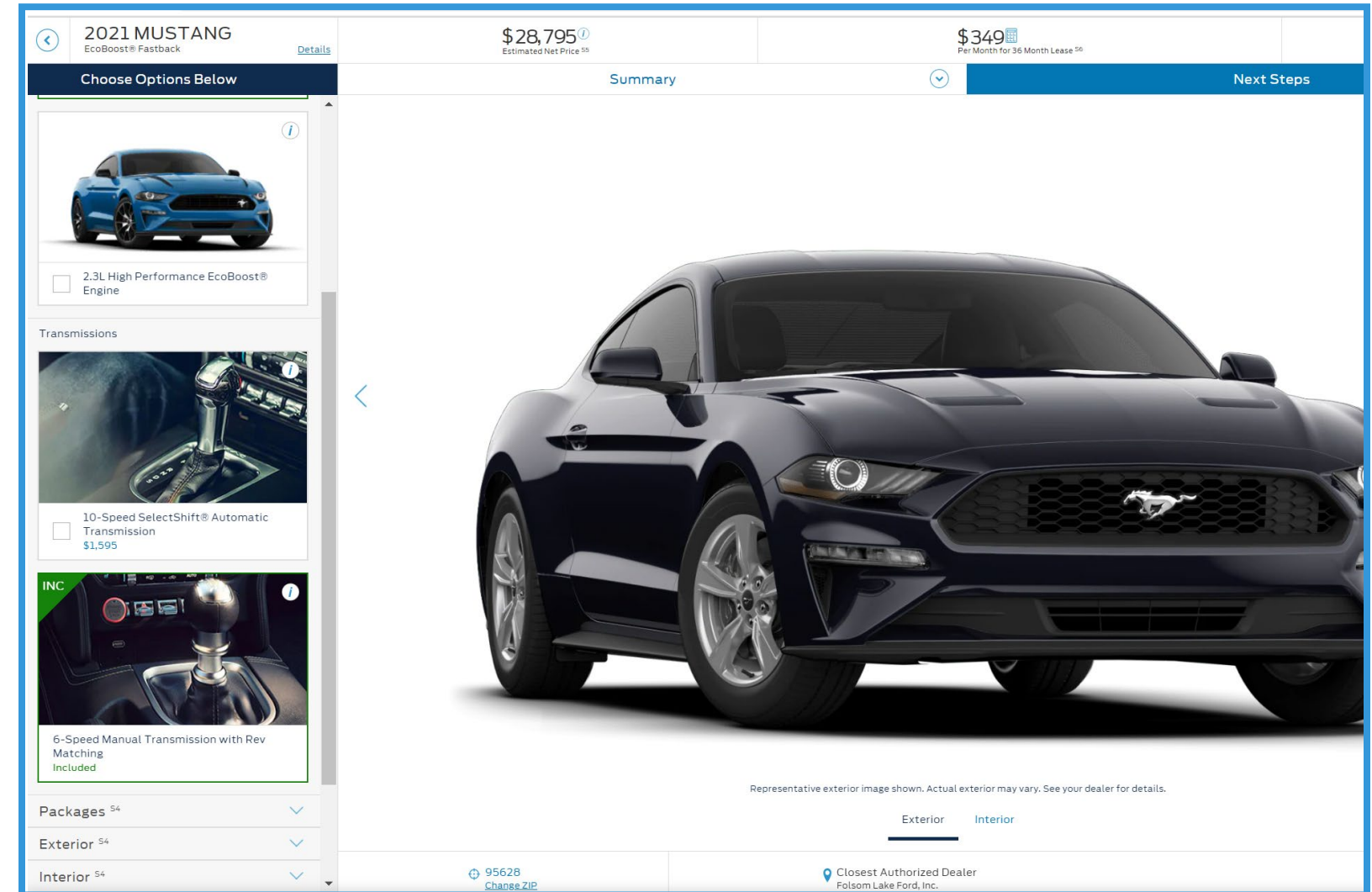
What does this mean for Healthcare Owners

- Always more projects than capital available
- Focus on flow of capital projects opposed to cost/sf only
- If we can reduce the duration and save money, we can do more projects



What if we bought buildings like we buy cars?

- Change future with instant price/schedule updates
- Real time rendering of final product
- Confidence in the delivery and quality of the final product



This is how we currently buy buildings

- Diverse supply chain delivers parts to site
- New team of installers for each project
- Multiple companies that we attempt to get to work together

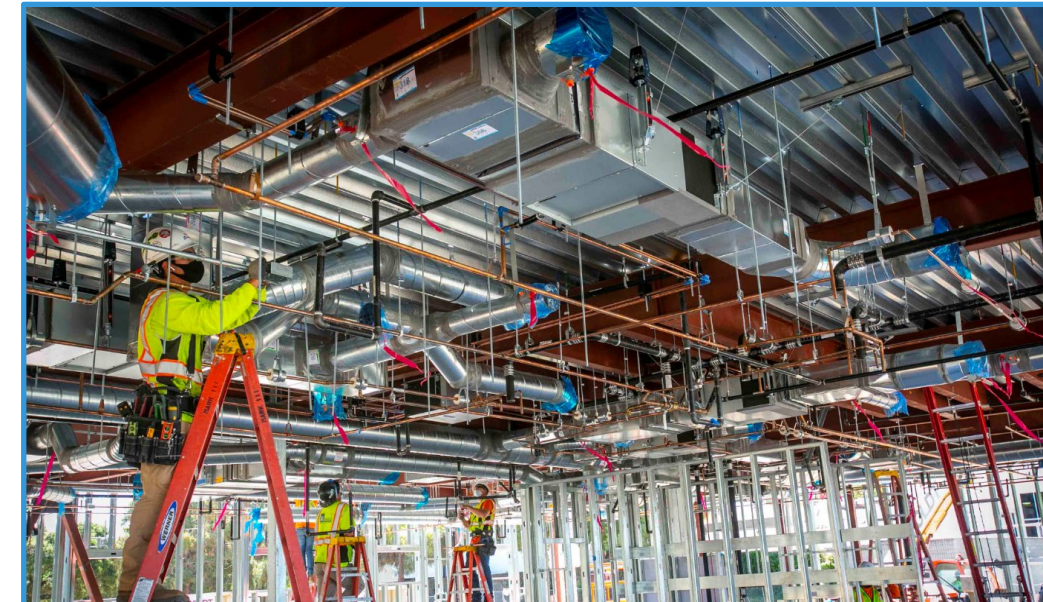
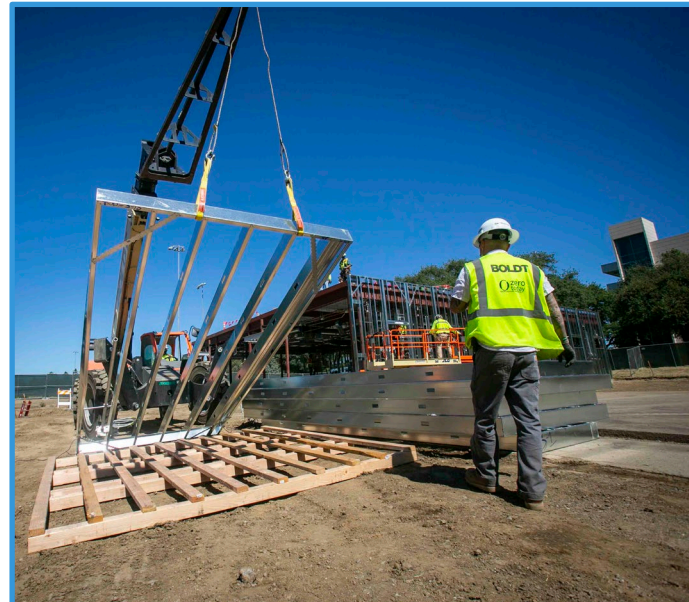
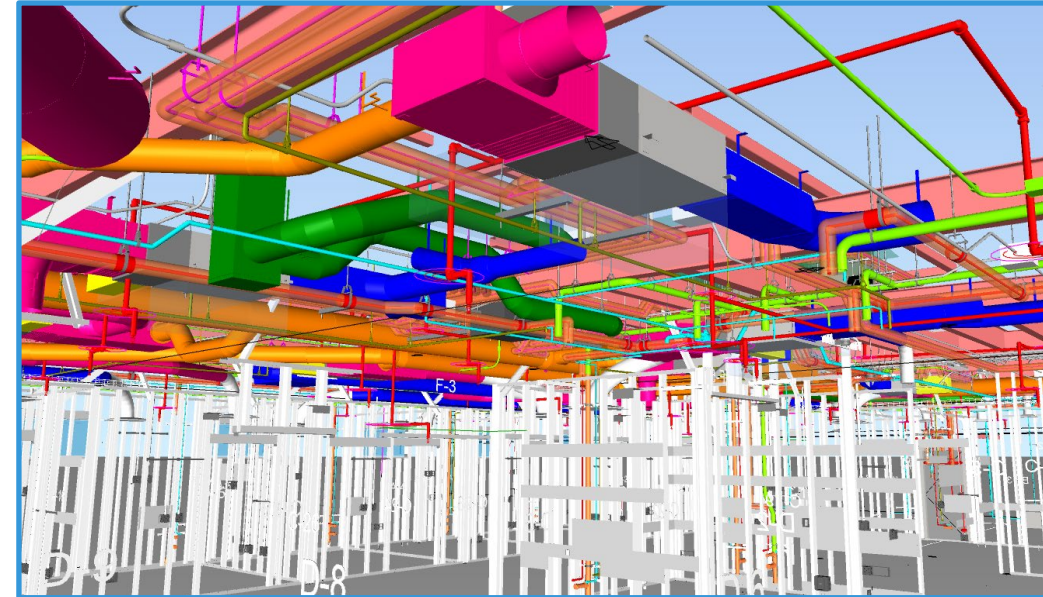
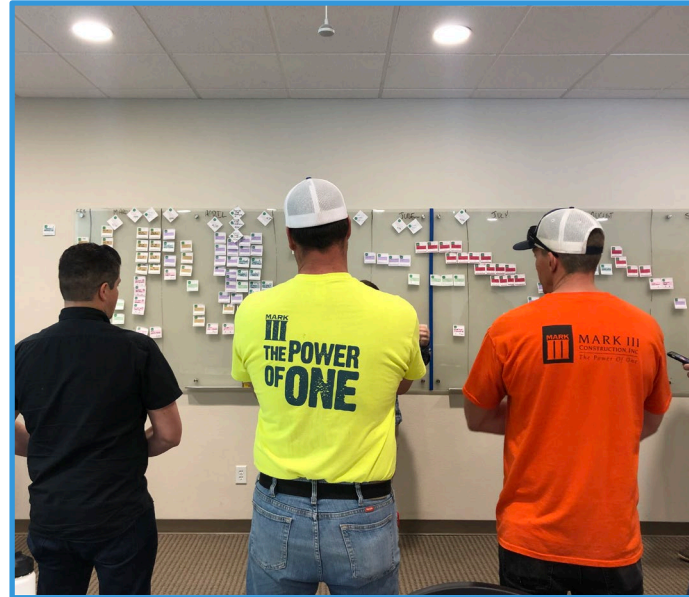


PROJECT EXPERIENCE & LESSONS LEARNED

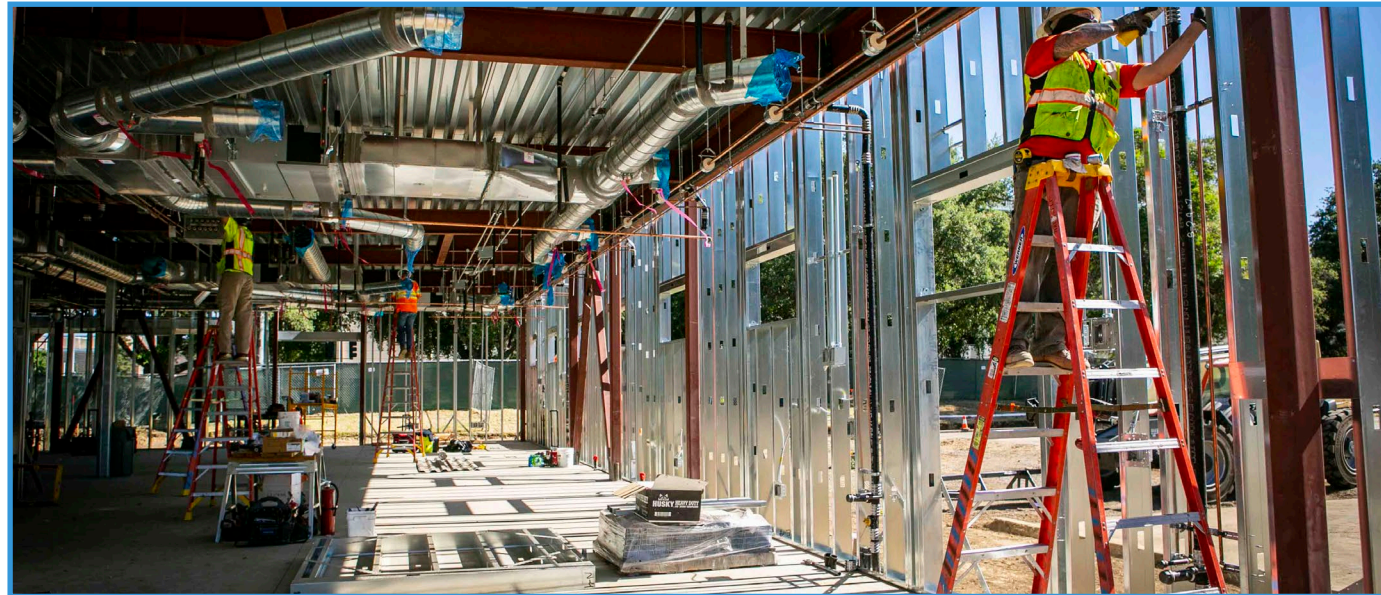


UC DAVIS – New Campus Clinic

- 4k SF, ground-up
- (9) Exam rooms
- Mechanical, Electrical, Plumbing
- Manufactured wall panels partnership with The Boldt Company
 - Interior and Exterior Panels
 - LGS by Boldt
 - In-wall by Mark III



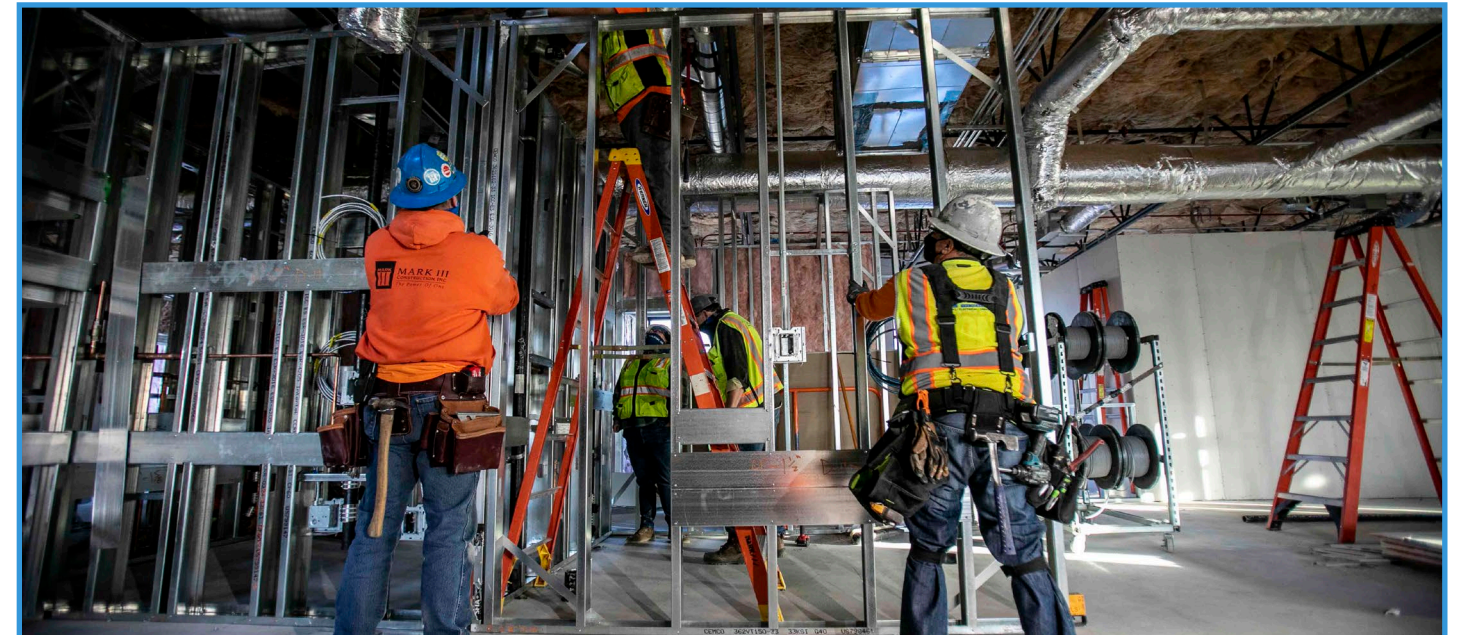
UC DAVIS – On-site & Offsite Activities



- COVID Safety
 - Minimized bodies on-site = 4k SF building
 - Offsite Construction = 24k SF Facility
- Exterior panels set in 1.5 days
- Interior panels set in 2 days
- Issues Log entries – categories, dept, etc...

Sutter Health Natomas MOB

- 18k SF, 2-story tenant improvement
- (25) Exam rooms
- Standard design-build contract with shared saving incentives
- Mechanical, Electrical, Plumbing
- Prefabricated MEP wall panels
- Issues & Opportunities Log

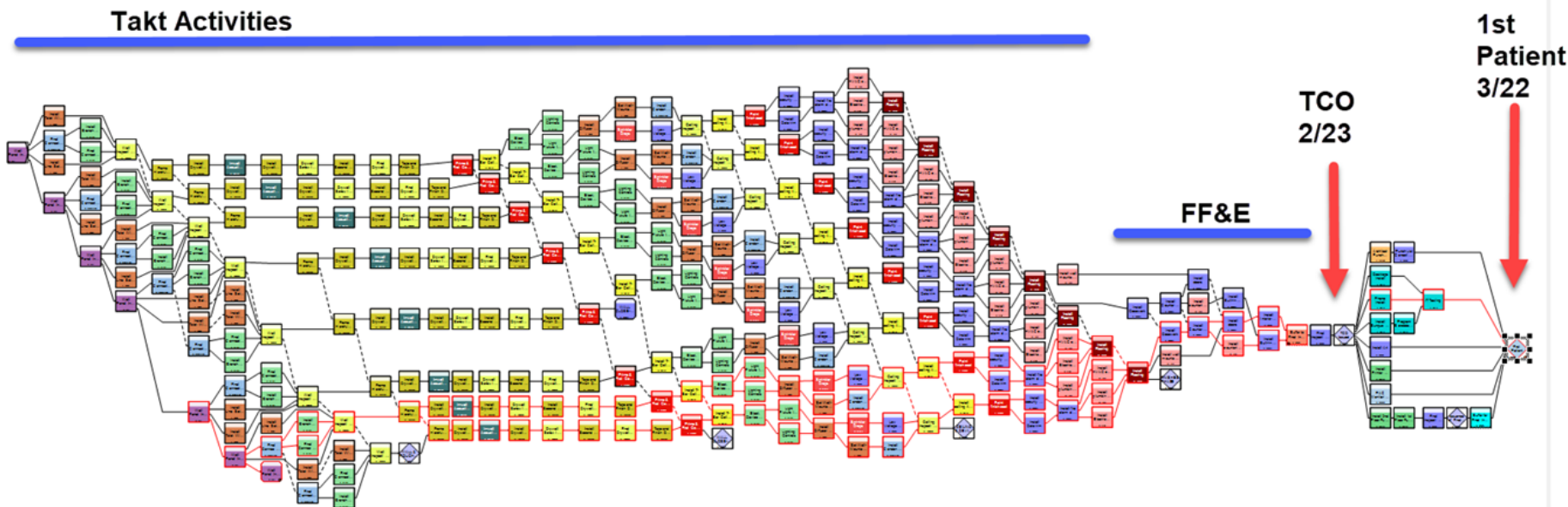


Sutter Health Natomas MOB – Collaboration

- Pull planned design phase
- Utilized Last Planner System & Takt planning
- Schedule durations based on a 2018 Sutter MOB
 - 30 days for all interior framing + in-wall utilities
 - Install took 8 days – 73% less time



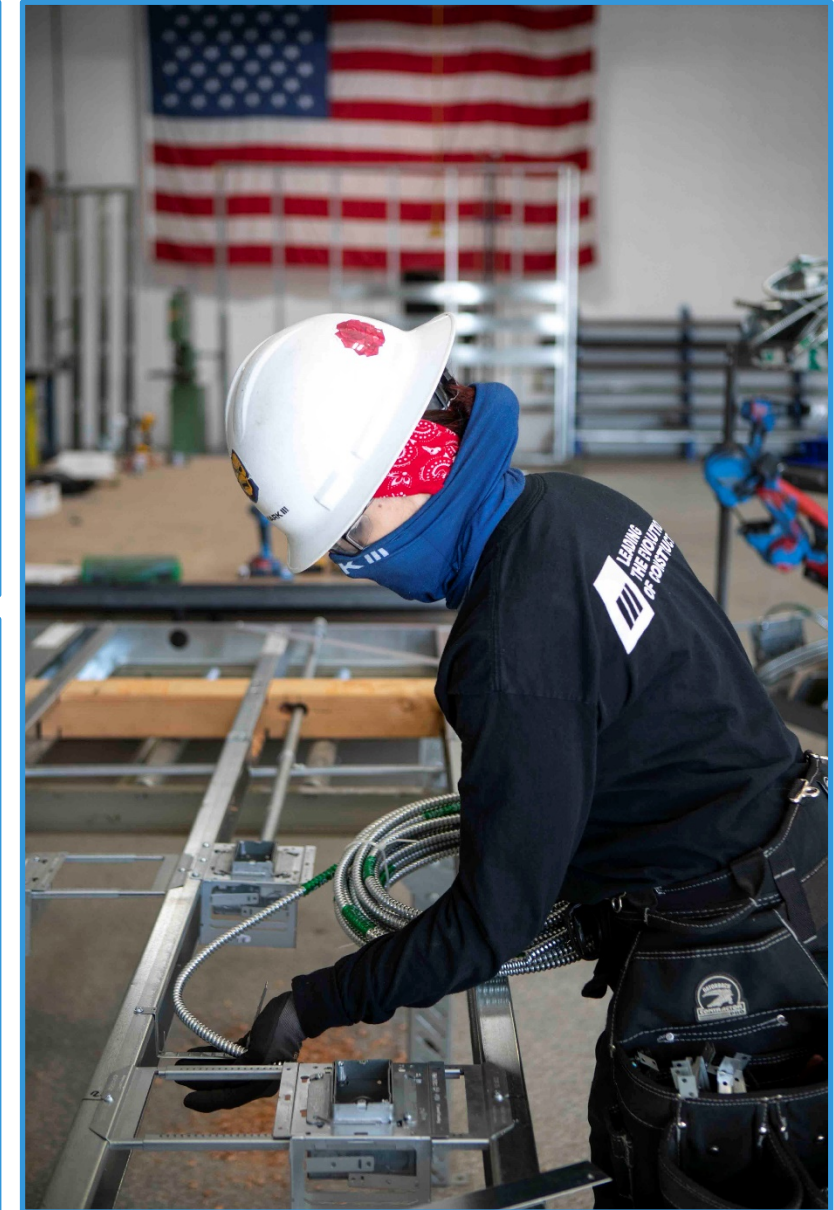
Takt Activities



Date		08/31/20	09/07/20	09/14/20	09/21/20	09/28/20	10/05/20	10/12/20	10/19/20	10/26/20	11/02/20	11/09/20	11/16/20	11/23/20	11/30/20	12/07/20	12/14/20	12/21/20	12/28/20	01/04/21	01/11/21	01/18/21
Week #		1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2	3	4	5	6	7
	N	OverHead																				
Floor 2	W																					
	E																					
Floor 1	W																					
	E																					
Roof																						
Floor 2	1																					
	3																					
	2																					
	4																					
	5																					
Floor 1	6																					
	7																					
Floor 1	8																					

Sutter Health Natomas MOB – Field Perspective

- Changing the mindset
 - “Old School” Framers trying something new
 - Skeptic – not convinced that it would work or be faster
- Manufacturing facility efforts
 - Organized
 - Ergonomic
- Field efforts
 - Palletized walls wheeled to install area
 - Panels increased pace



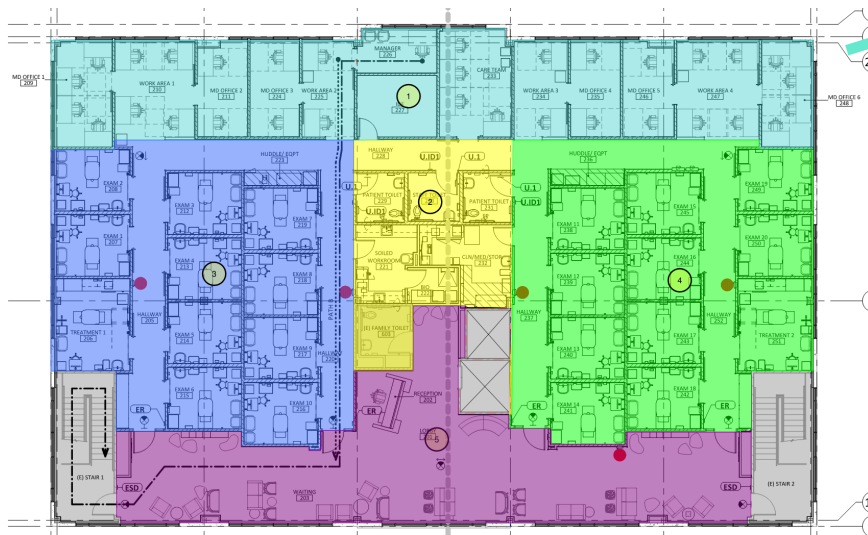
Sutter Health Natomas MOB – Installation Pain Points

- Install wasn't 100% seamless
 - Gap for drywall
 - Directional labeling on panels
 - Uneven floor surface
 - Speedbumps, not the end of the world



Sutter Health Natomas MOB – Installation Wins

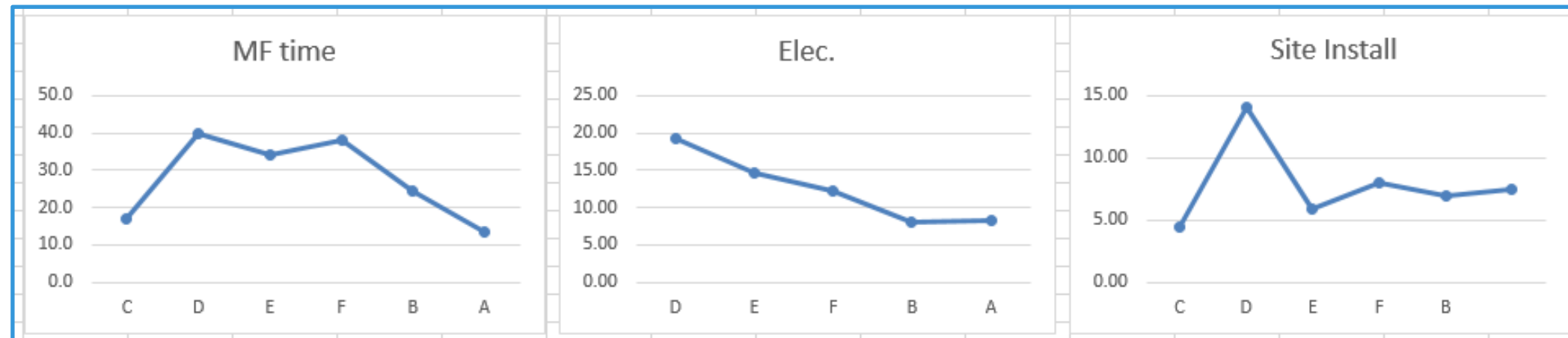
- Install was 3 guys / 1 day
- Typical install of 5-6 guys, 3 days
- AND electrical and plumbing rough was there after panels were set
 - Final connections, rather than complete rough



Sutter Health Natomas MOB – Metric Tracking

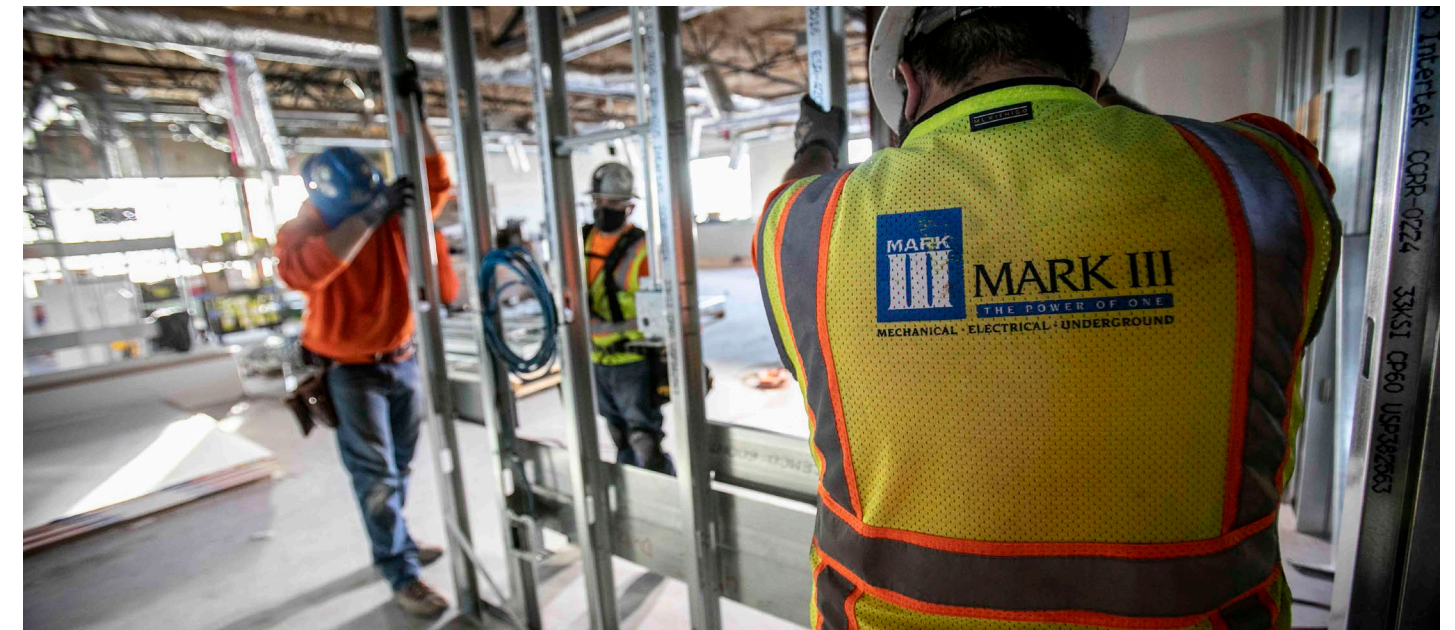
- What did we track?
 - Wall panel production
 - Electrical installation into wall panel
 - Plumbing installation into wall panel
 - Wall panel installation on-site
- Manufacturing production improved
- Site install stayed steady
- Plumbing experienced the most issues and rework

				MANUFACTURING METRICS								FIELD METRICS			
								JASON	CARRIE	GREG		JOHN			
Floor	Area	Panel ID	Panel LF	# of Elec Assemblies	# of Plumb Assemblies	Qty Backing	Qty Framed Opening	VP Fab Duration	ELECT RICAL In-wall Install	PLUMBING In-wall Install	Total Fab Duration	Fab Time by LF	Total Install Duration	LF/min	Scheduled Install Date
1	6	A-2	5.33	2				2	9		13	2.44	5	1.07	11/10/2020
1	6	A-3	8.50	3		2		17	6.5		40.5	4.76	5	1.70	11/10/2020
1	6	A-4	3.58	1		3		5	4		14	3.91	6	0.60	11/10/2020
1	6	A-5	4.33	1		3		5	4		14	3.23	4	1.08	11/10/2020
1	6	A-6	8.00	1	1	4		6	4	25	41	5.13	7	1.14	11/10/2020
1	6	A-7	7.75	3	3	10	1	30	16	87	163	21.03	7	1.11	11/10/2020
1	6	A-8	4.42	1				2	2		6	1.36	5	0.88	11/10/2020
1	6	A-9	8.00	1	1	1	1	23	3	26	75	9.38	6	1.33	11/10/2020
1	6	A-10	10.50	2		7	1	49	8		106	10.10	15	0.70	11/10/2020
1	6	A-11	9.33	2		7	2	36	7		79	8.46	6	1.56	11/10/2020
1	6	A-12	8.00	2			2	30	9		69	8.63	6	1.33	11/10/2020
1	6	A-13	10.33	3		6	1	54	12		120	11.61	10	1.03	11/10/2020
1	6	A-14	2.58	1	1			2	2	11	17	6.58	4	0.65	11/10/2020
1	6	A-15	11.83	4		4	1	46	16		108	9.13	7	1.69	11/10/2020
1	6	A-16	8.17	3		4		10	7		27	3.31	7	1.17	11/10/2020
1	6	A-17	3.50		1	3		7		17	31	8.86	10	0.35	11/10/2020
1	6	A-20	5.50	1		4		7	2		16	2.91	5	1.10	11/10/2020
1	6	A-21	5.33	1		6		6	4		16	3.00	4	1.33	11/10/2020
1	6	A-23	9.83	4		3	1	26	20		72	7.32	9	1.09	11/10/2020
1	6	A-25	10.67	2		5	1	51	8		110	10.31	10	1.07	11/10/2020
1	6	A-26	10.42	2		9	1	89.5	12		191	18.34	15	0.69	11/10/2020
AREA A SUM			166.83					540.5	172.5	166			165		
AREA A AVERAGES			7.58					24.6	8.2	33.2	64.5	7.6	7.5	1.07	



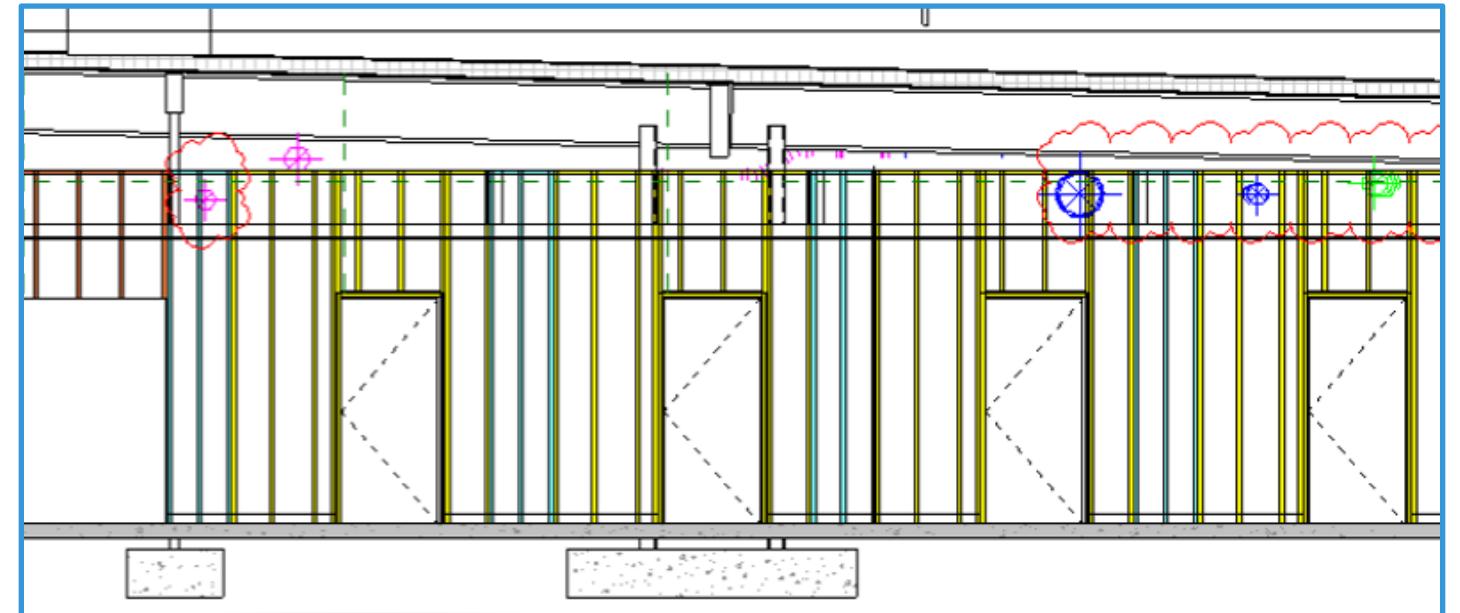
Sutter Health Natomas MOB – Overall Team Wins

- ALL interior panels installed in 8 days
- Boots on the ground
 - 4-person crew vs. Framing + Elec. + Plumb
- Production increase in manufacturing
- Increased I&O Log Entries mid-project
 - Looked for Opportunities, not just issues
 - Editor-in-chief – word choice matters
 - Incentivized
- I&O Log utilized during project postmortem
- Total contribution back to team – 11% of MEP + Framing cost, just shy of \$200k



Sutter Health Natomas MOB – Lessons Learned

- Material procurement caused production delays – shop could not keep up with field
- 78 opportunities for improvement tracked
 - 8 entries – communication
 - 27 entries – material/damage/defects
 - 38 entries – design
 - 5 entries – schedule, tools
- Missed Opportunity – creating more standardize panels
- Applying Lessons Learned
 - Increase standardization
 - Smaller repeatable components
 - 2', 4', 6' wall sections

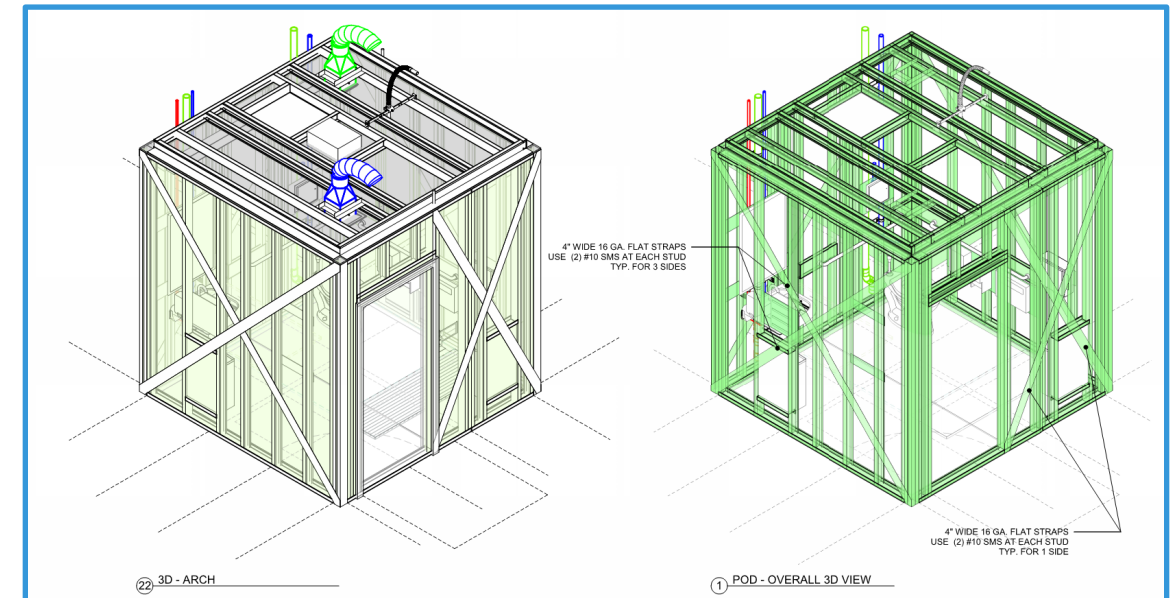
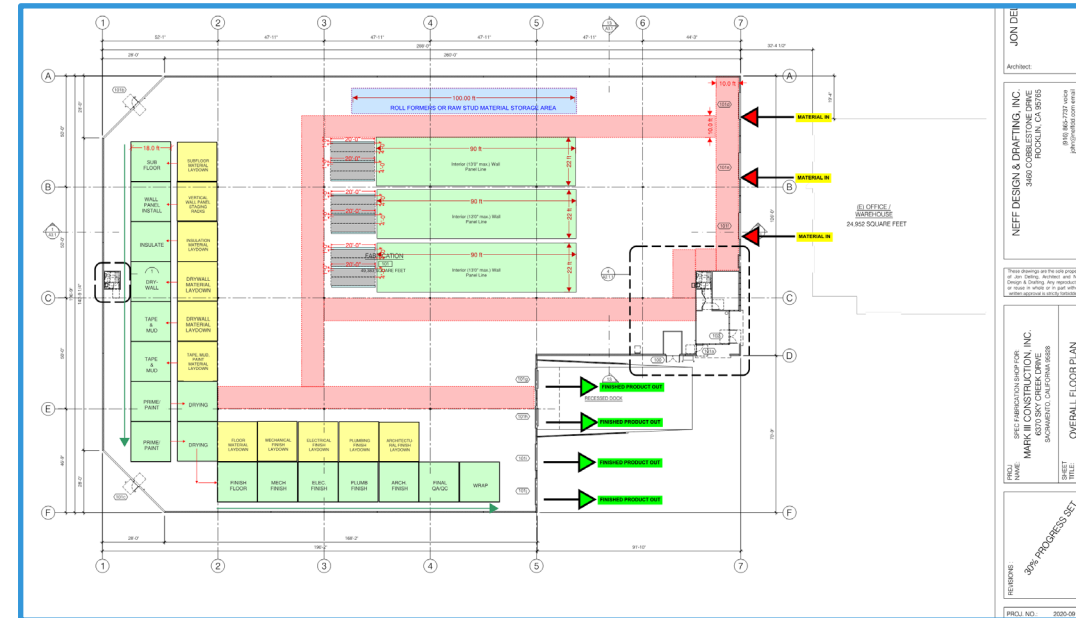


WHAT'S NEXT?



WHAT'S NEXT – Mark III Construction

- 30k SF MOB in Northern California
 - Applying countermeasures
 - More involvement from Superintendent early on
- New Manufacturing Facility
 - 50k SF
 - Additional panel framing lines
 - Volumetric Modular Pods
- New Strategic R&D initiative
 - Partnership – architect, owner, GC, Mark III
 - 2 rooms – exam and unisex toilet
 - Volumetric modular approach
 - Kit-of-Parts approach
 - Metrics & CoS for all



Owners – How can you apply this to tomorrow?

- More partnerships and collaboration
- Most potential when starting with the end in mind
- Most opportunity when delivering a program of similar projects
 - Leverage standards
 - Speed up design/permitting
 - Go quickly into installation
- **Think onsite assembly – not construction**



Contact Us

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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!