

10/22/2024

T House/A Pillar Ultrasonic Welder Process Optimization

Presented By: Jerod Williams



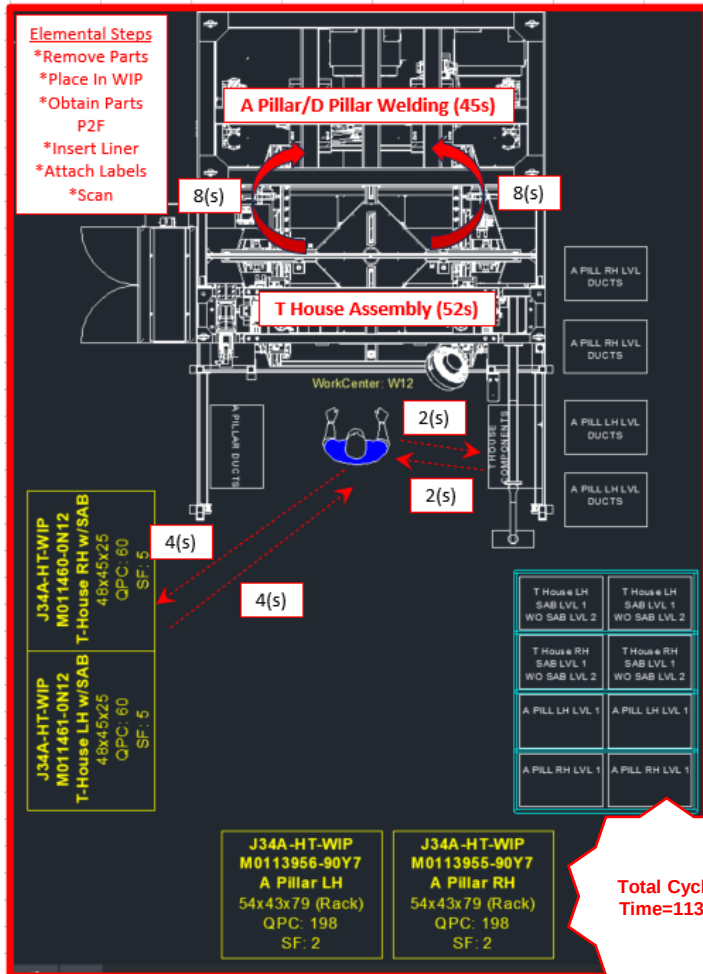
Current Overview

Overview	
Category	Total Mins
Shift Duration (12 hr)	720
Lunch Break	30
Breaks (3)	40
Top Five/5s	10
Total Assembly Time	640

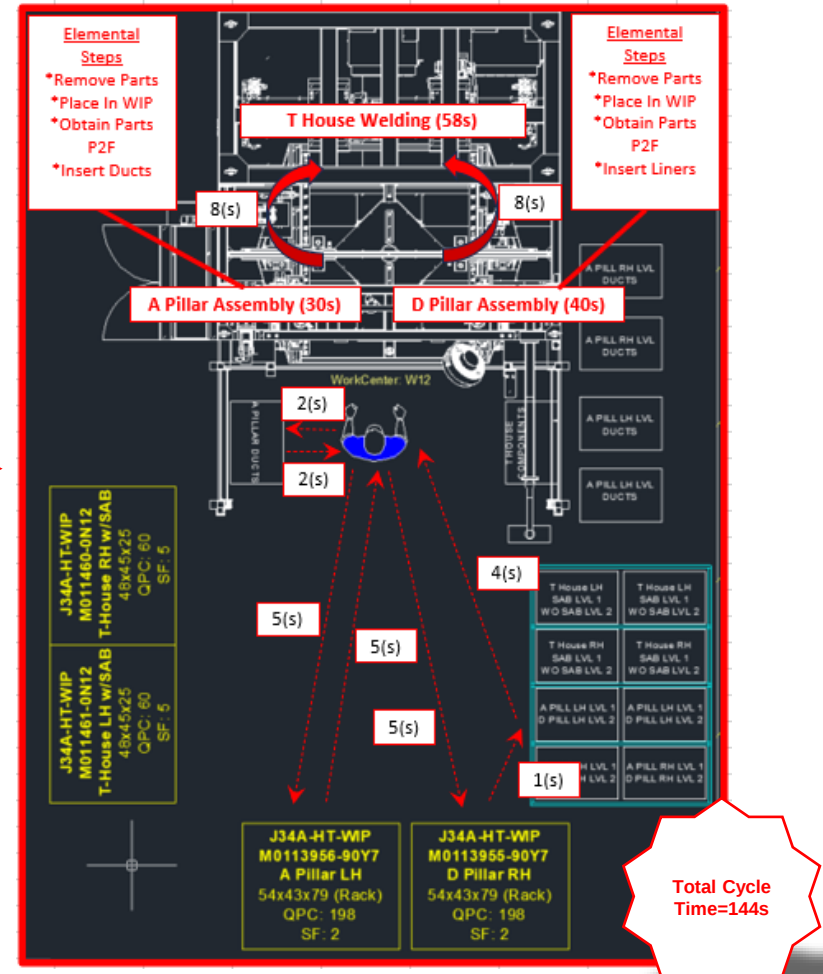
Production Numbers Overview												
Description	10/7/2024	10/8/2024	10/9/2024	10/10/2024	10/11/2024	10/12/2024	10/13/2024	10/14/2024	10/15/2024	10/16/2024	Totals	Shift Averages
A PLR LH	380	332	344	368	380	352	424	332	424	336	3672	367
A PLR RH	380	328	344	364	388	348	432	332	424	336	3676	368
T HOUSE RH	438	280	324	378	370	304	400	356	340	350	3540	354
T HOUSE LH	436	280	326	380	370	308	400	356	342	352	3550	355
											Global Averages	361

Current Cycle Times Analysis

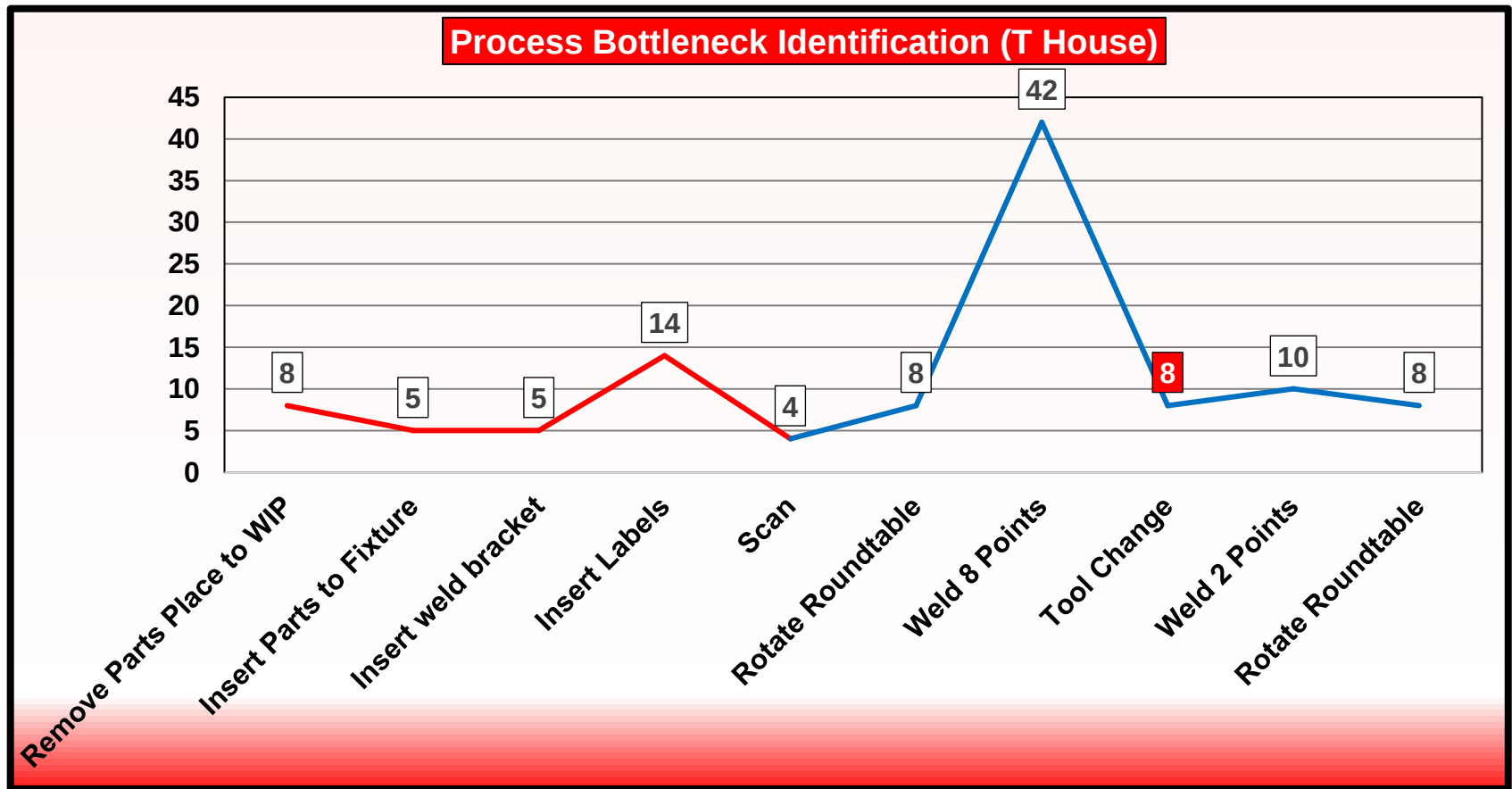
T-House Assembly



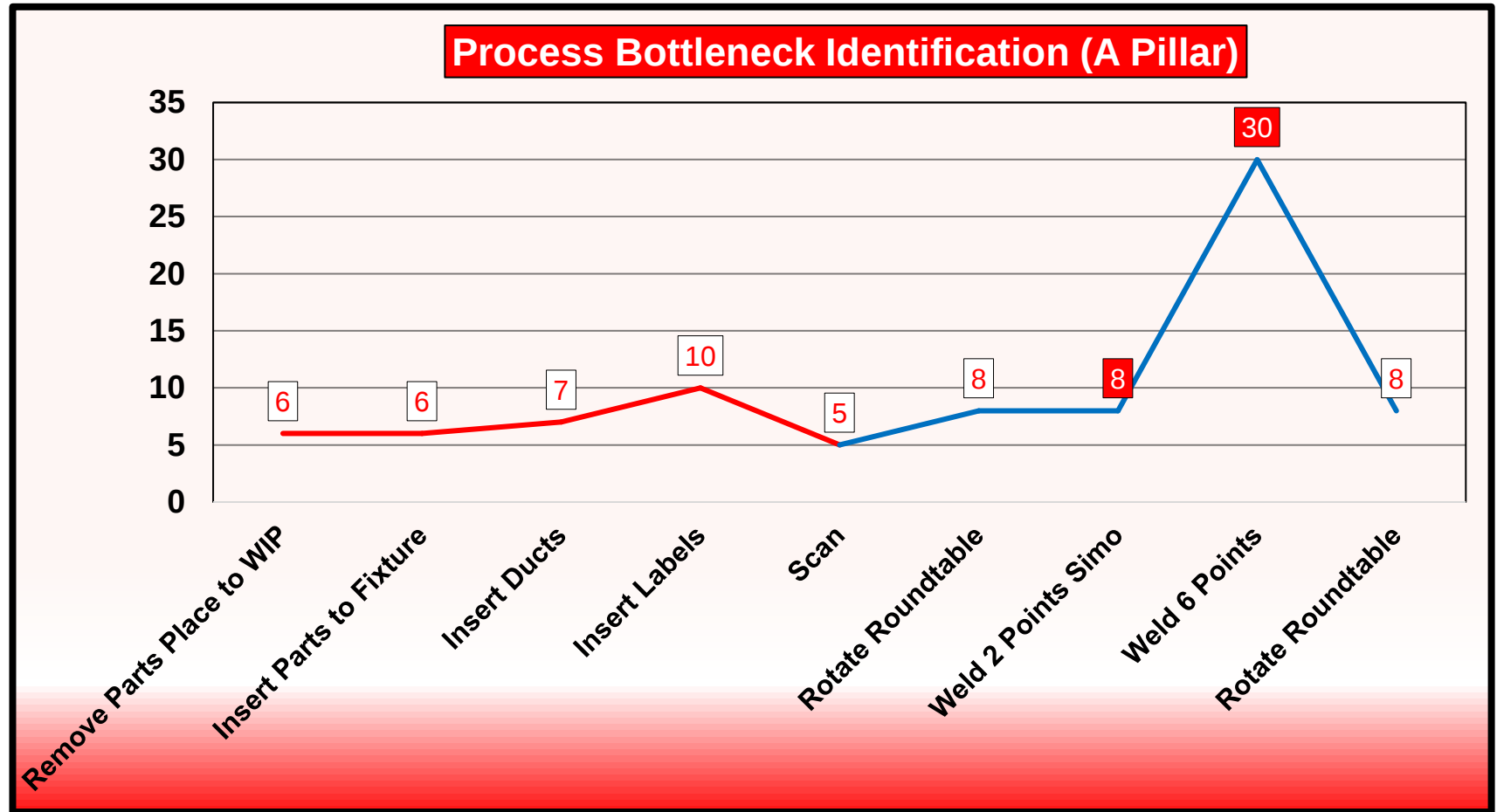
A Pillar/D Pillar Assembly



Current Process Elemental Task Breakdown (T House)

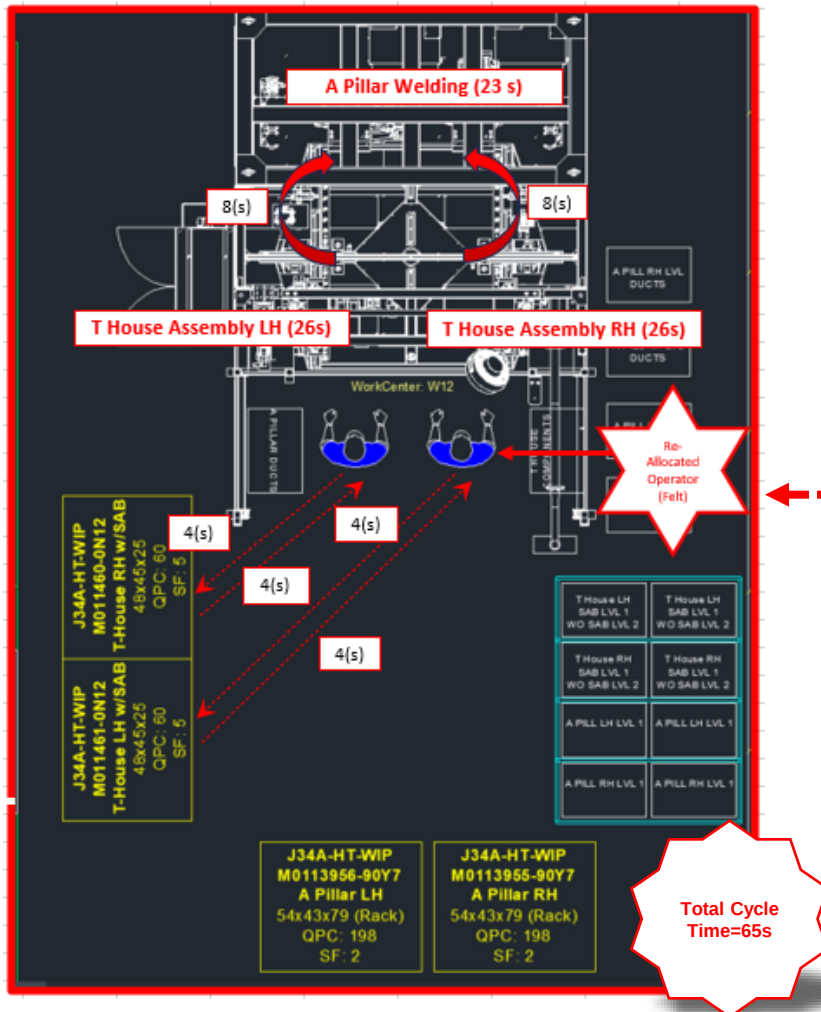


Current Process Elemental Task Breakdown (A Pillar)

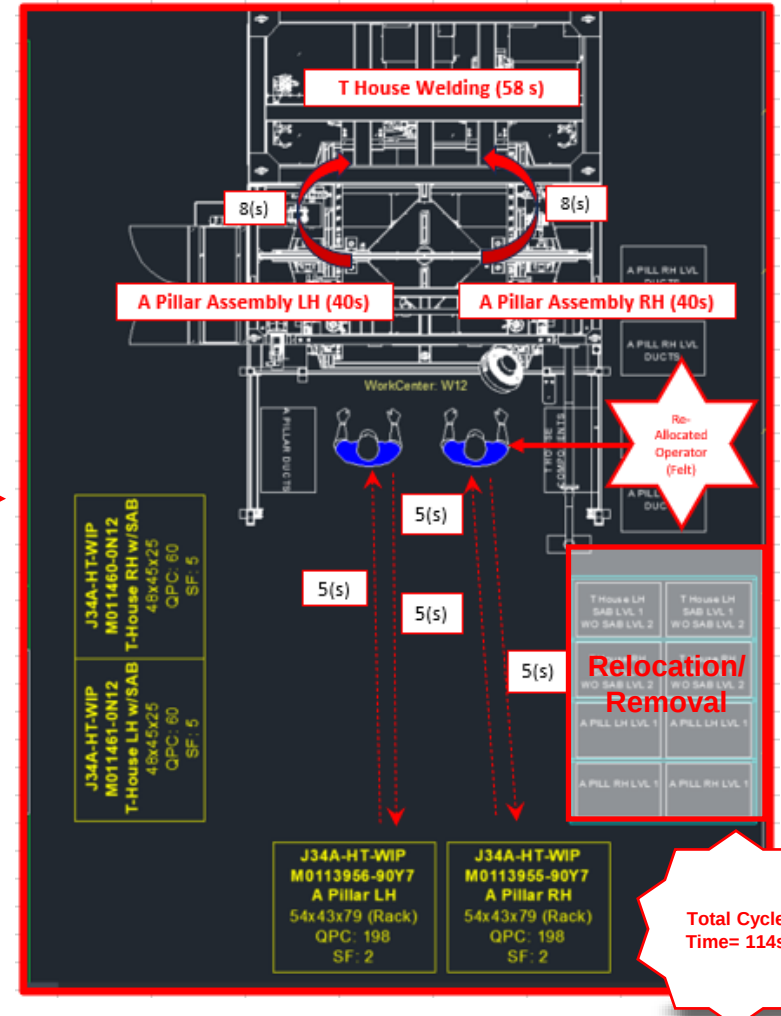


Volume Increase (Senario 1)

T-House Assembly



A Pillar Assembly



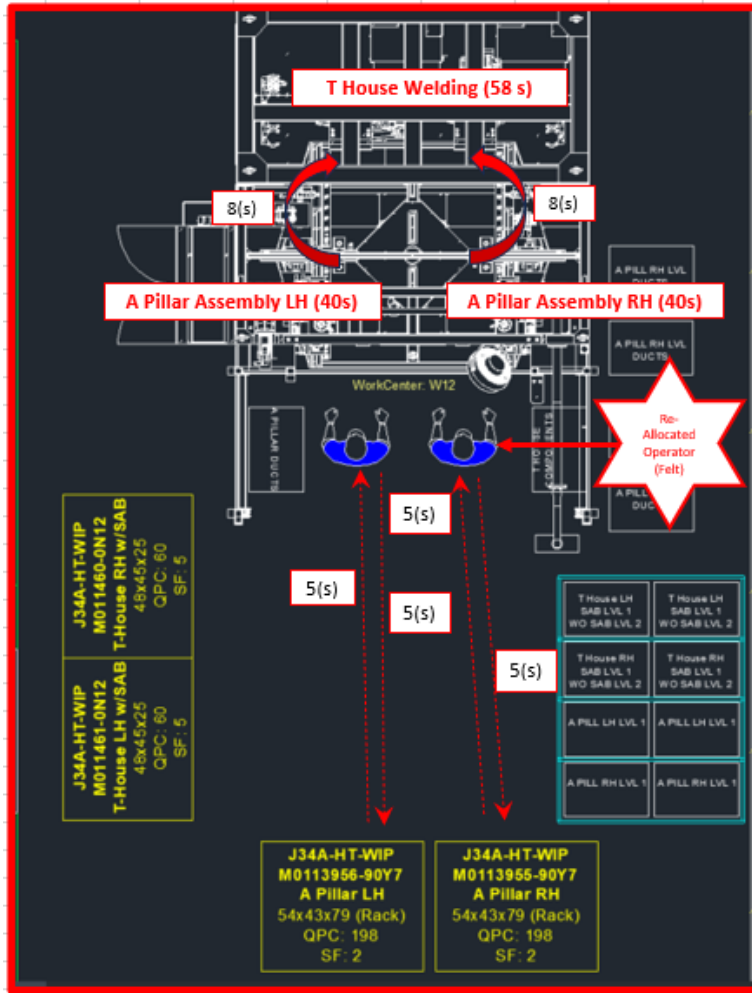
7



T House Throughput Overview



Senario 1 (A Pillar Overview)



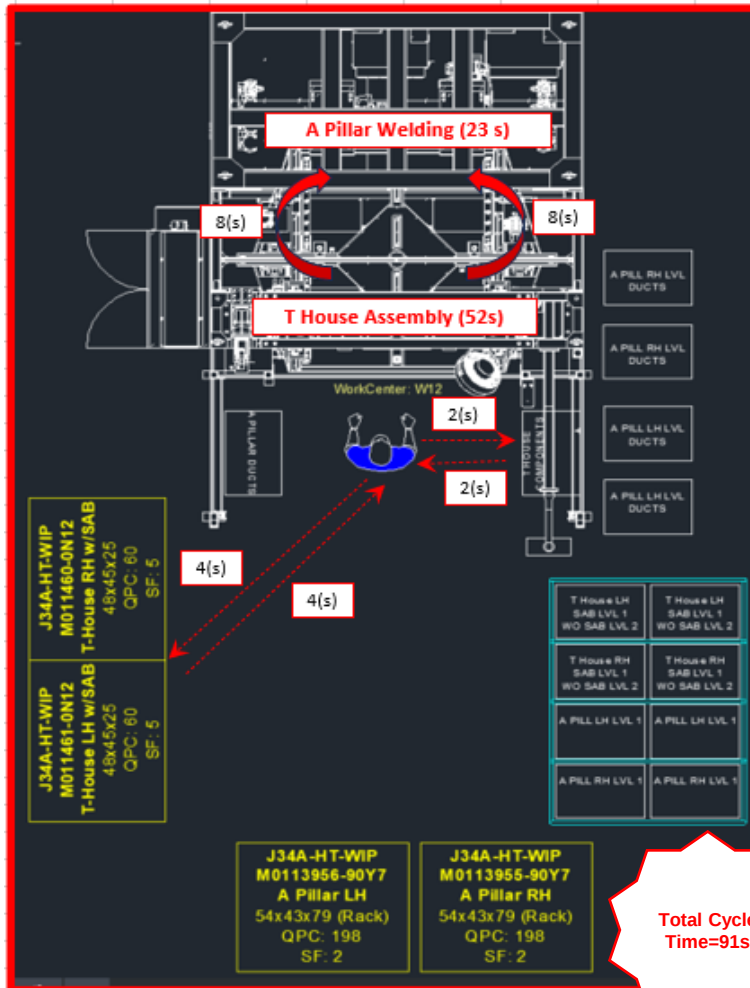
A Pillar Throughput Overview

T House Assembly	26
Roundtable Transition (2 stage)	16
A Pillar Welding	23
Total	65
A Pillar Assembly	40
Roundtable Transition (2 stage)	16
T House Welding	58
Total	114
Global Cycle Time	179
Minutes	2.98
A Pillar Total (s)	79.00
% of Cycle Time	44%

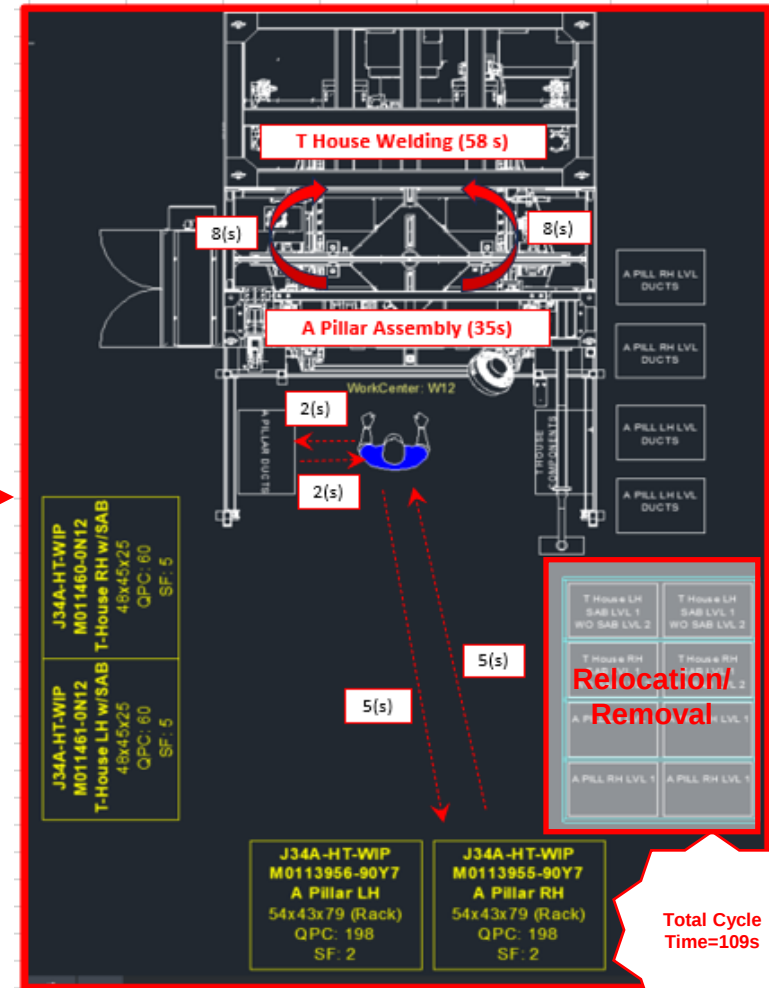
Current Cycle Time= 131s

Volume Increase Senario 2

T-House Assembly



A Pillar Assembly



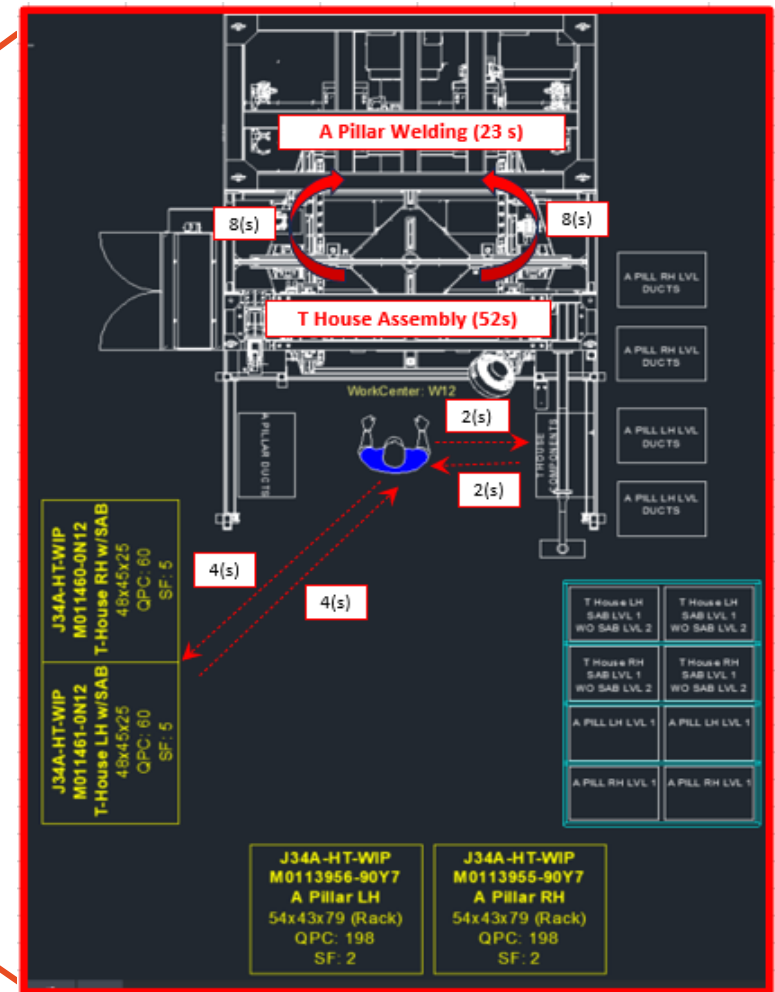
Senario 2 (T House Overview)

0% More
Efficient
Process

T House Throughput Overview

T House Assembly	52
Roundtable Transition (2 stage)	16
A Pillar Welding	23
Total	91
A Pillar Assembly	40
RoundTable Transition (2 stage)	16
T House Welding	58
Total	114
Global Cycle Time	205
Minutes	3.42
T House Total (s)	126.00
% of Cycle Time	61%

Current Cycle Time=126s



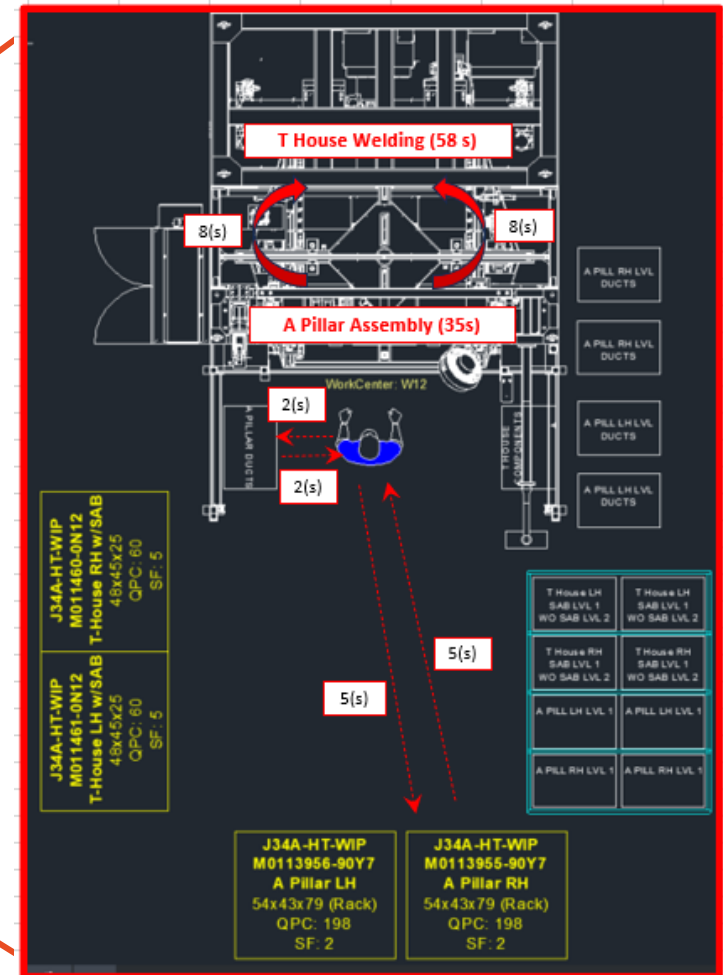
Senario 2 (A Pillar Overview)

40% More
Efficient
Process

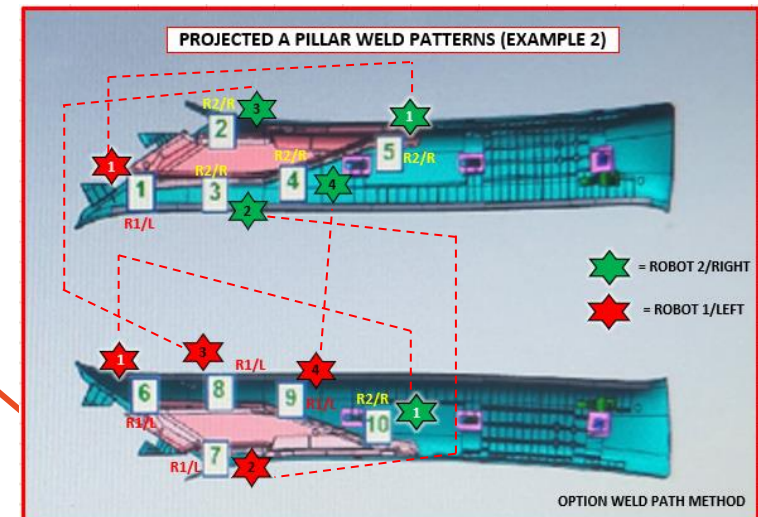
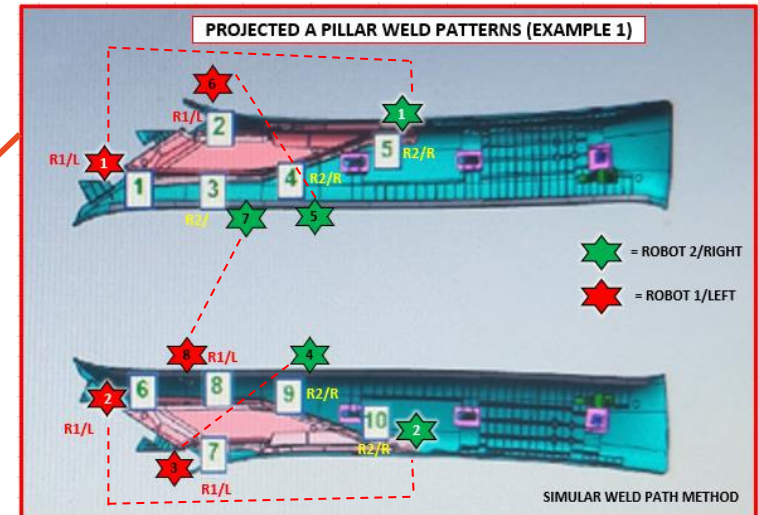
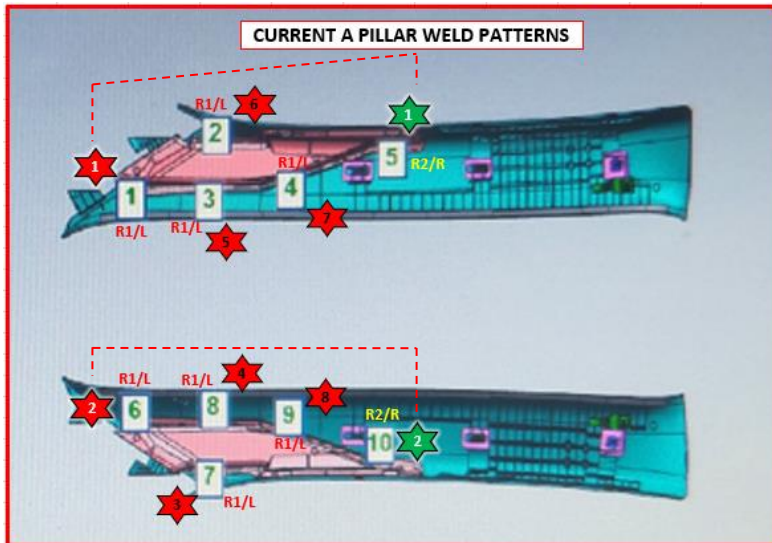
A Pillar Throughput Overview

T House Assembly	52
RoundTable Transition (2 stage)	16
A Pillar Welding	23
Total	91
A Pillar Assembly	40
Roundtable Transition (2 stage)	16
T House Welding	58
Total	114
Global Cycle Time	205
Minutes	3.42
A Pillar Total (s)	79.00
% of Cycle Time	39%

Current Cycle Time= 131s



Weld Pattern Modifications (With Robot Movements)



Full Overview

Current Overview	
T House Assembly	52
Roundtable Transition (2 stage)	16
A Pillar Welding	45
Total	113
A Pillar Assembly	30
D Pillar Assembly	40
Roudtable Transition (2 stage)	16
T House Welding	58
Total	144
Global Cycle Time	257
Minutes	4.28
Hourly Capacity	28

Senario 1 Overview	
T House Assembly	26
Roundtable Transition (2 stage)	16
A Pillar Welding	23
Total	65
A Pillar Assembly	40
Roudtable Transition (2 stage)	16
T House Welding	58
Total	114
Global Cycle Time	179
Minutes	2.98
Hourly Capacity	40

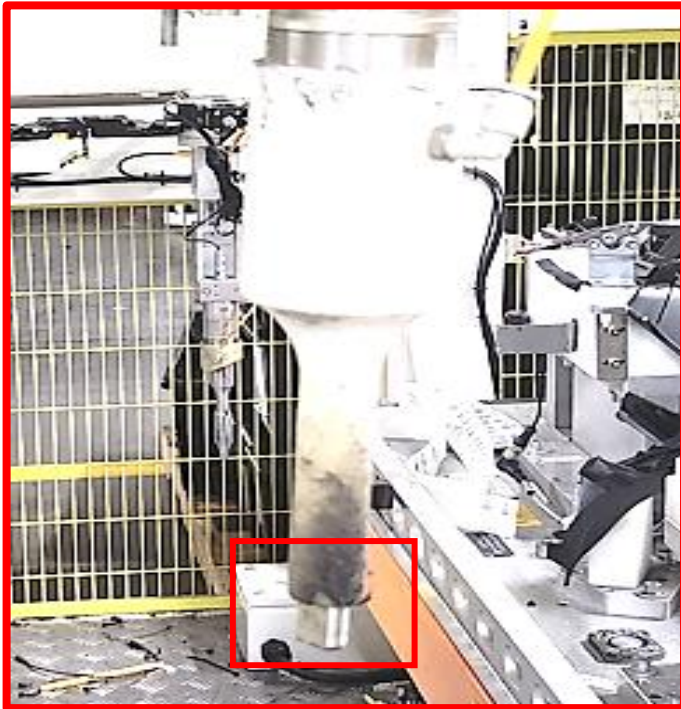


Senario 2 Overview	
T House Assembly	52
Roundtable Transition (2 stage)	16
A Pillar Welding	23
Total	91
A Pillar Assembly	40
Roudtable Transition (2 stage)	16
T House Welding	58
Total	114
Global Cycle Time	205
Minutes	3.42
Hourly Capacity	35

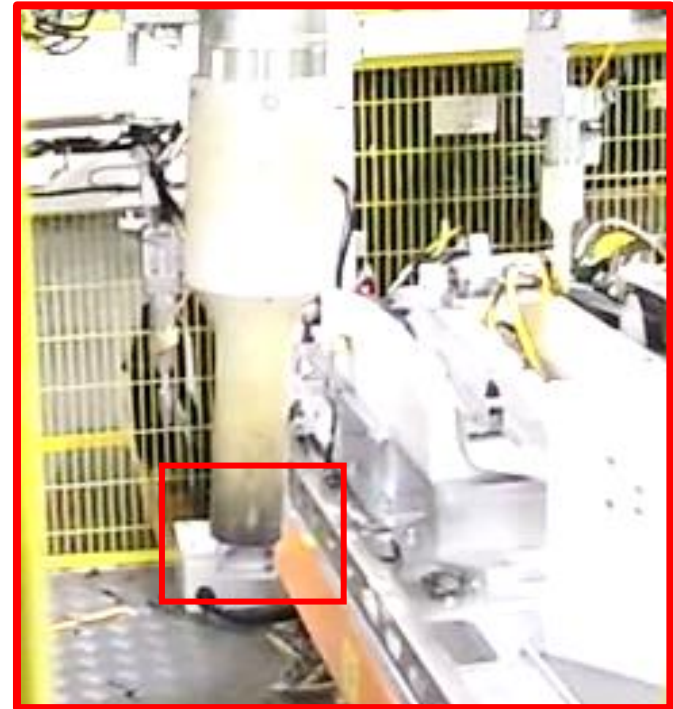


Weld Horn Variants

Small Horn 13mm (w)

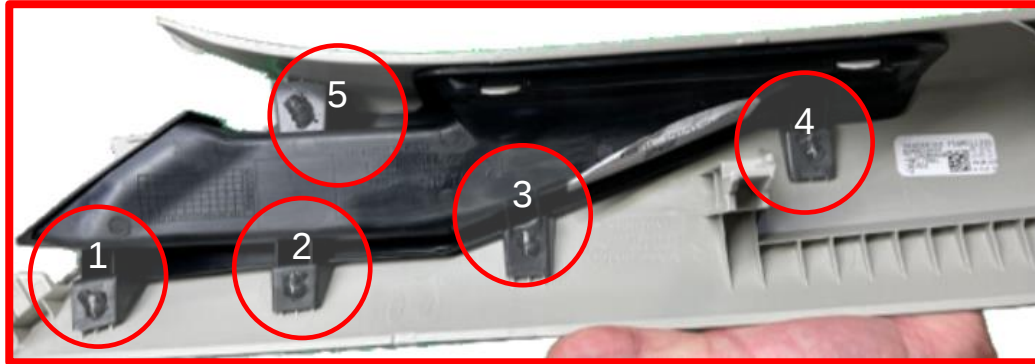


Large Horn 22.5mm (w)



Current Component Welds (Universal Horn Requirements)

A

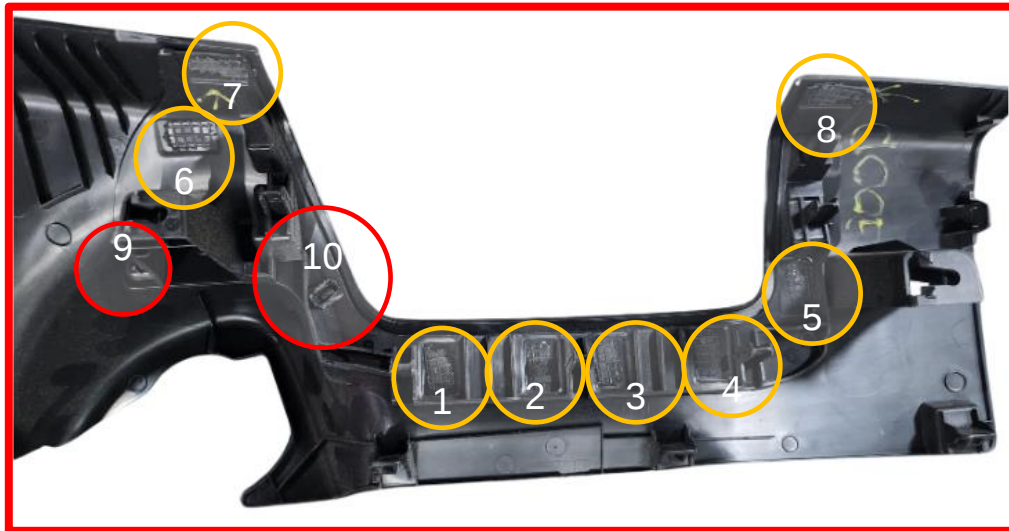


Pillar

 =Small Horn 13mm

 =Large Horn 22.5mm
(Angled For Component)

T



House

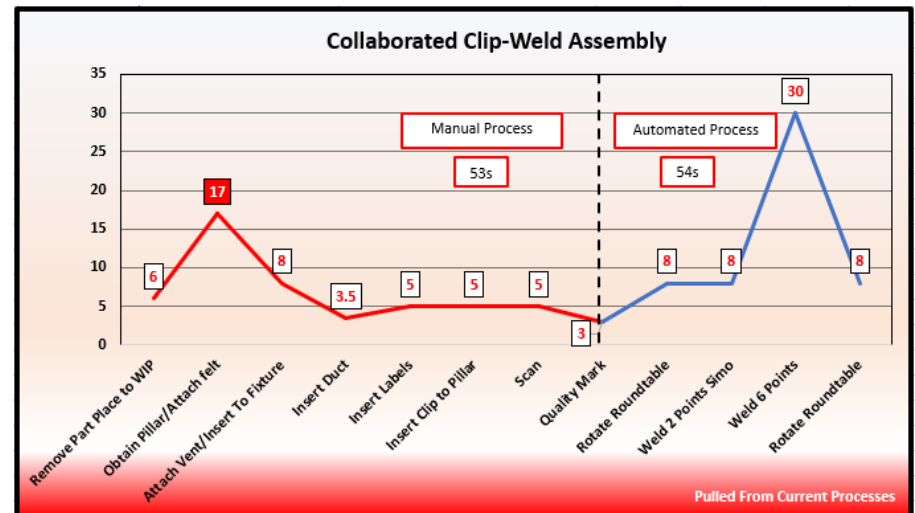
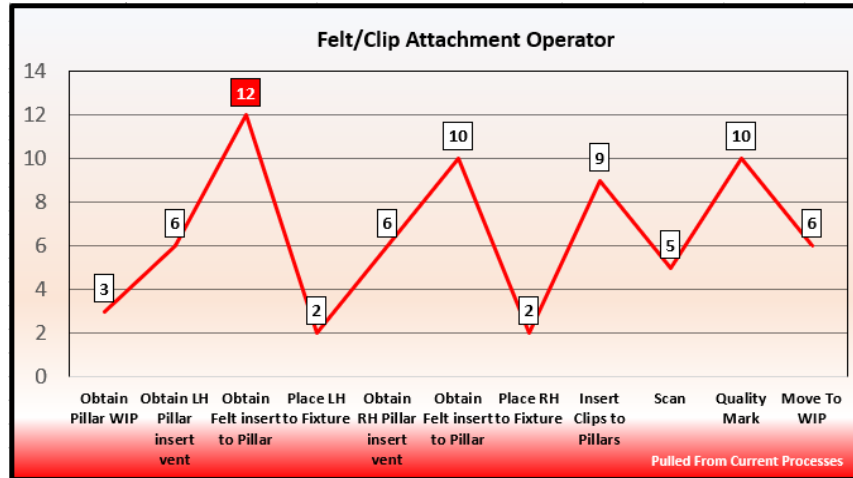


Cable Inefficiency Breakdown

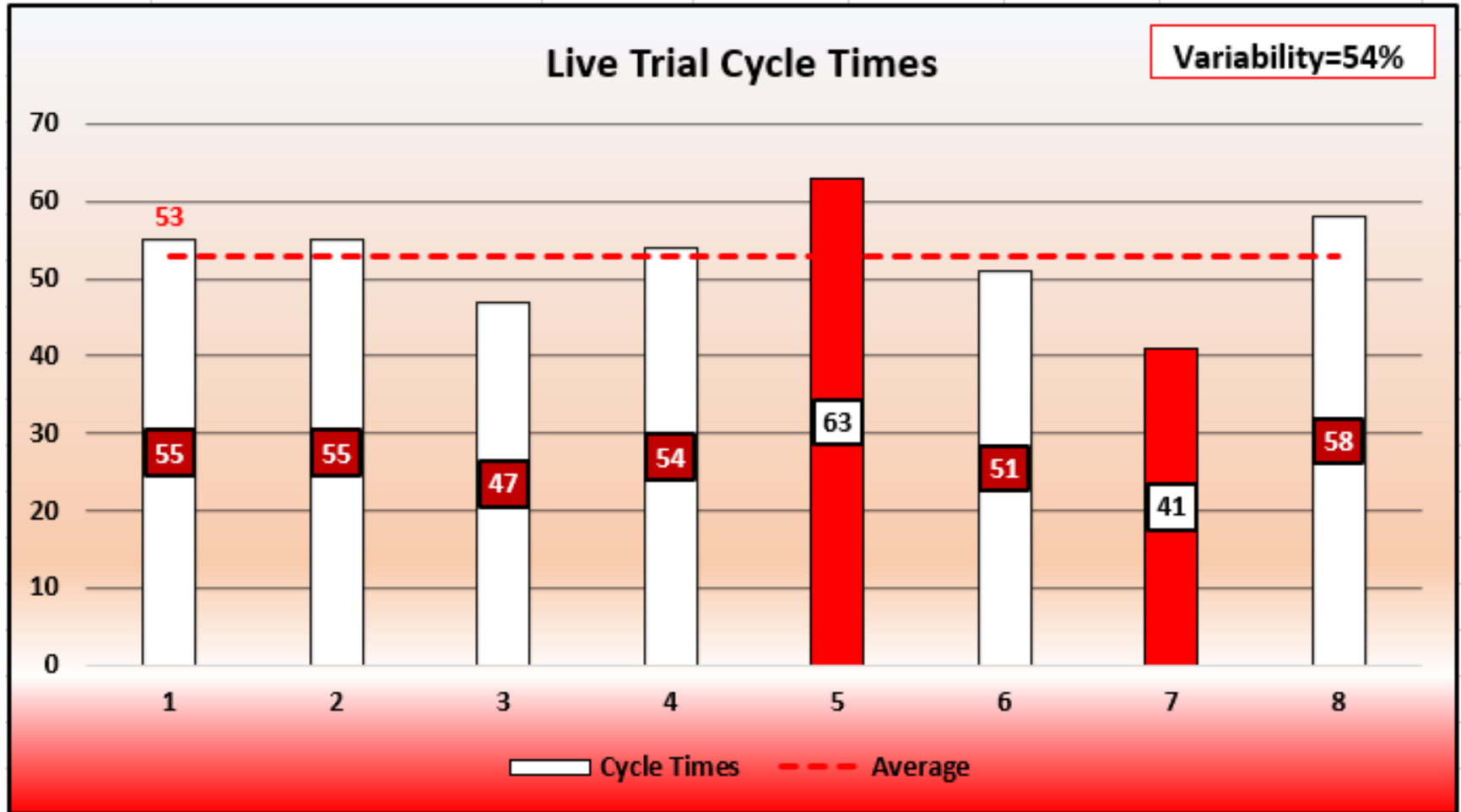
Current Overview (Cable)						
T House Assembly	52					
Roundtable Transition (2 stage)	16	DT/Allowances/Periodical Task				
A Pillar Welding	75	Min	Hourly Capacity	85%	90%	95%
Total	143	2.4	25	21	23	24
A Pillar Assembly	40					
Roudtable Transition (2 stage)	16	DT/Allowances/Periodical Task				
T House Welding	58	Min	Hourly Capacity	85%	90%	95%
Total	114	1.9	32	27	28	30
Global Cycle Time	257					
Minutes	4.28	85%	90%	95%		
Average Hourly Capacity	28	24	25	27		

Current Overview W/O Cable Inefficiency						
T House Assembly	52					
Roundtable Transition (2 stage)	16	DT/Allowances/Periodical Task				
A Pillar Welding	45	Min	Hourly Capacity	85%	90%	95%
Total	113	1.9	32	27	29	30
A Pillar Assembly	40					
Roudtable Transition (2 stage)	16	DT/Allowances/Periodical Task				
T House Welding	58	Min	Hourly Capacity	85%	90%	95%
Total	114	1.9	32	27	28	30
Global Cycle Time	227					
Minutes	3.78	85%	90%	95%		
Average Hourly Capacity	32	27	29	30		

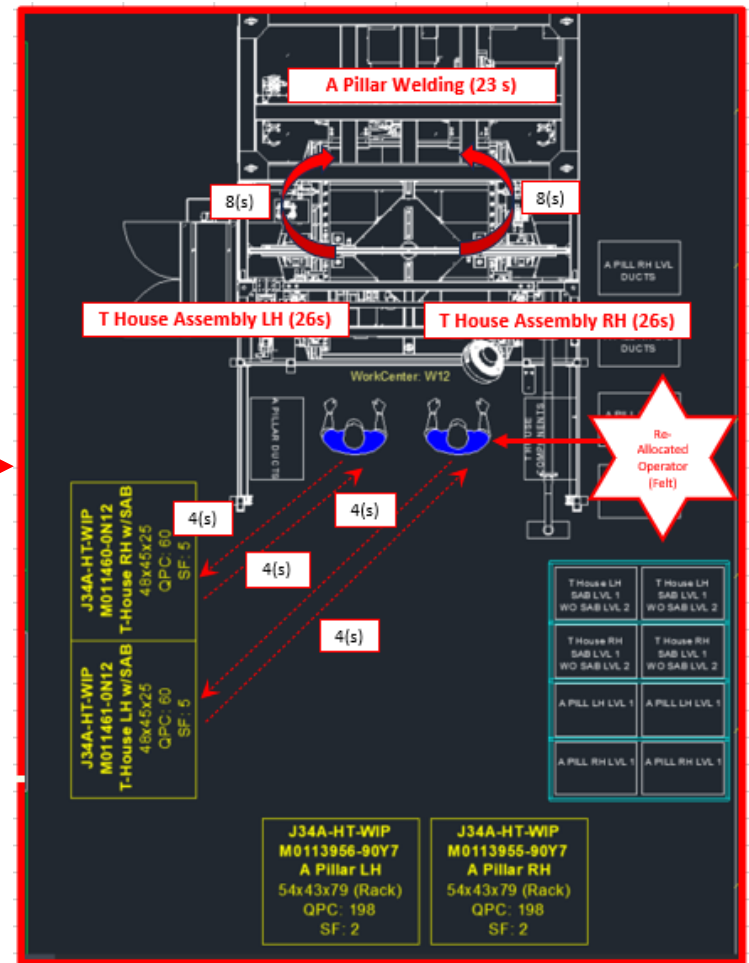
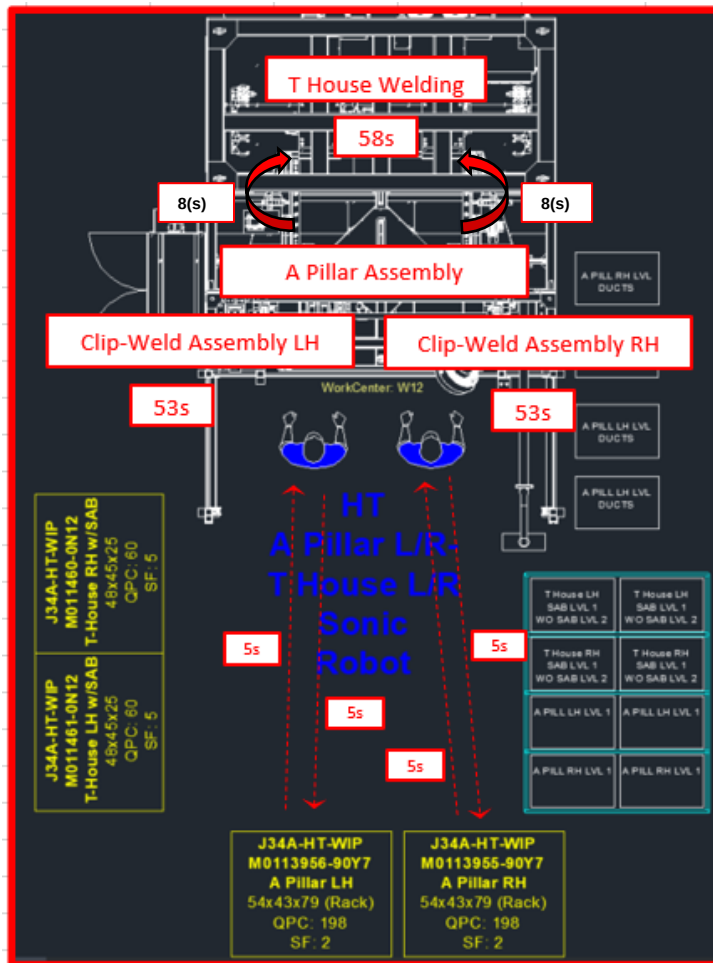
Process Feasibility (Clip Attachment + Weld Assembly)



Live Trial Times (Clip Attachment + Weld Assembly)



Process Feasibility (Clip Attachment + Weld Assembly)

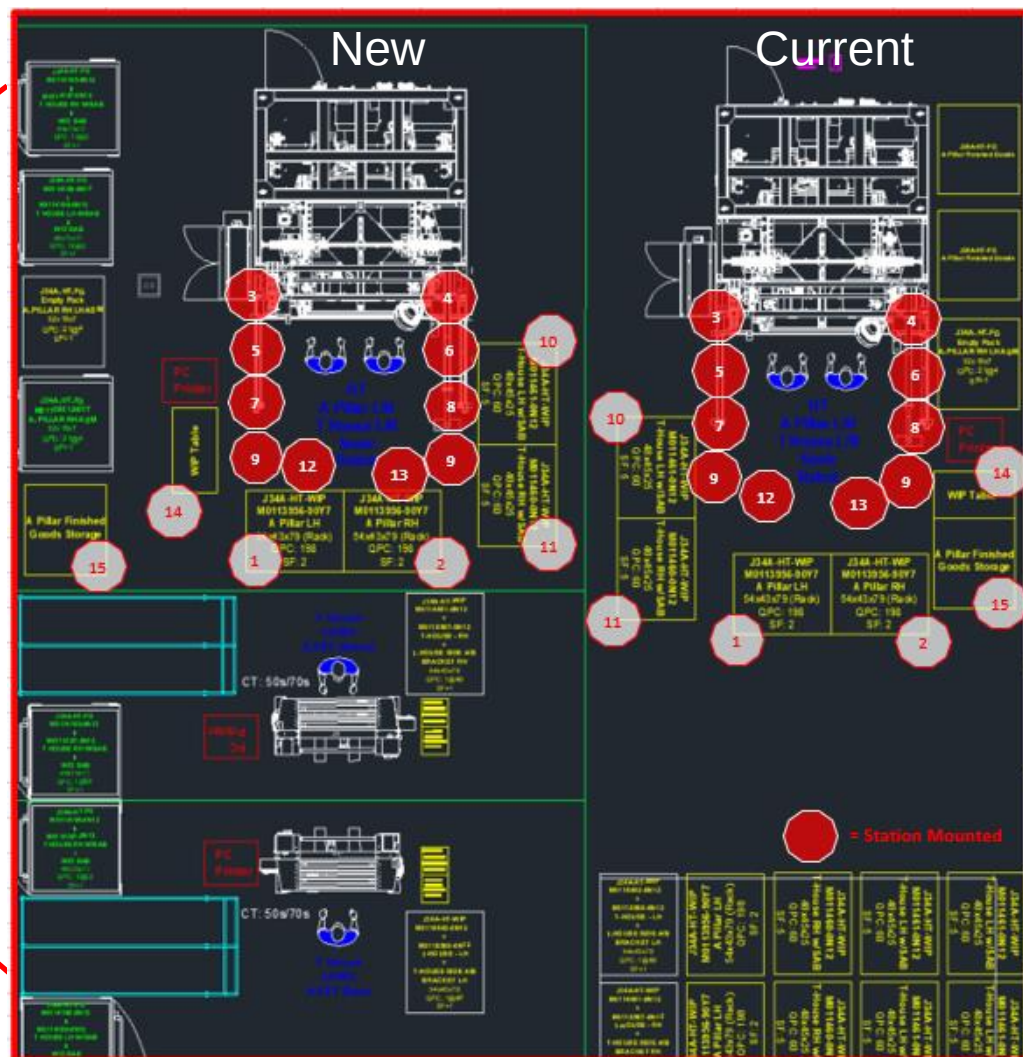


Projected Breakdown

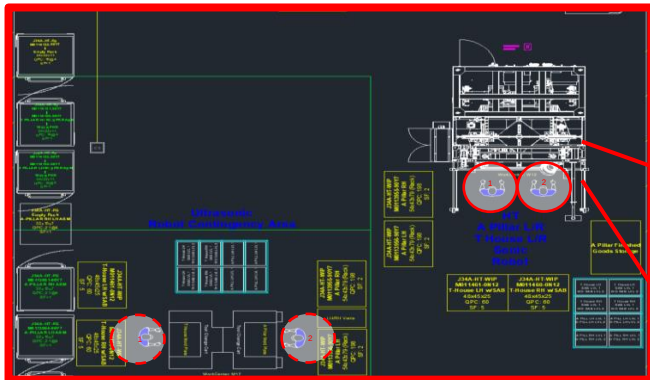
Projected Overview W/O Cable Inefficiency						
T House Assembly	26					
Roundtable Transition (2 stage)	16					
A Pillar Welding	23	Min	Hourly Capacity	85%	90%	95%
Total	65	1.1	55	47	50	53
A Pillar Assembly	53					
Roudtable Transition (2 stage)	16					
T House Welding	58	Min	Hourly Capacity	85%	90%	95%
Total	127	2.1	28	24	26	27
Global Cycle Time	192					
Minutes	3.20					
Average Hourly Capacity	38					

Emergency Contingency Welder Layout Location

#	Material
1	A Pillar RH
2	A Pillar LH
3	A Pillar Ducts LH
4	A Pillar Ducts RH
5	Retention Clip LH
6	Retention Clip RH
7	Grill LH
8	Grill RH
9	Felt Tape
10	T House LH
11	T House RH
12	T House RH Ducts
13	T House LH Ducts
14	WIP Table
15	Finished Goods Racking
16	Empty Totes

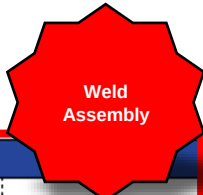


Materials Compensation List (Per Station)



List of Materials			
Part Name	Part #	Quantity Needed (per assembly)	Image
A-Pillar RH	Y0113955	1	
A-Pillar LH	Y0113956	1	
High Retention Clip RH	Y0116889	1	
High Retention Clip LH	Y0116890	1	
Grill RH	Y0113957	1	
Grill LH	Y0113958	1	
Felt Tape	Y1190171	1	

List of Materials			
Part Name	Part #	Quantity Needed (per assembly)	Image
A-Pillar RH	Y0113955	1	
A-Pillar LH	Y0113956	1	
Duct RH	Y0113959	1	
Duct LH	Y0113960	1	
Duct Seal	Y0113961	2	



Pre-Existing PDCA Items



STATUS - Description

1 RED => Task is late

2 YELLOW => Task may be late (3 days left)

3 GREEN => Task is complete and verified for

4 WHITE => Task is on track (more than 3 days left)

5 Need = pending target date

TASK NO.	PRIORITY 1 = High 2 = Medium 3 = Low	AREA	FUNCTION	DATE OPENED	PROBLEM	ACTION	OWNER	START DATE	TARGET DATE
1	1	(Mazda Ultrasonic Welder)	Operations	10/21/2024	A Pillar Welding Time	Relocate/Separate LH-RH nest inside fixture			
2	2	(Mazda Ultrasonic Welder)	Operations	10/21/2024	T House Welding Time	Universal Head for Process (Contact Fanuc)	J.Williams		
3	2	(Mazda Ultrasonic Welder)	Operations	10/21/2024	Operator walk distance to A Pillar WIP	Remove/Relocate Bulk overflow racking (swap with WIP Rack)	J.Williams		
4	2	(Mazda Ultrasonic Welder)	Operations	10/21/2024	T House Welding Time (Servo faults)	Seek different/larger capacity servo	J.Williams		
5	2	(Mazda Ultrasonic Welder)	Operations	10/21/2024	Robot Retraining to Nest Relocation	Reprogram Robot for A Pillar Separation (LH/RH)	J.Williams		
6	3	(Mazda Ultrasonic Welder)	Operations	10/21/2024	Work Area 5s	Designate area for ducts/weld brackets (1 day supply)	J.Williams		
7	2	(Mazda Ultrasonic Welder)	Operations	10/22/2024	No Throughput Documentation	Add Cycle Counter+Throughput Monitor for Welder Throughput	J.Williams		