VALIANT TMS®

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Customer:	**Volvo**
Program:	**2023 P6700**
Commodity:	**Roof Inr/Door Ring LH Asm (17 JPH)**
Plant:	**NPV**
Job #	**16144**
Date:	**3/23/2023**
Cycle Time:	**212**

Operator obtain small parts	How many	1	1.8
Operator load small parts	How many	1	1.8
Operator place small part (no precision)	How many	1	0.5
Operator obtain medium parts	How many	1	2.4
Operator load medium parts	How many	1	3.0
Operator place medium part (no precision)	How many	1	1.0
Operator obtain large parts	How many	1	4.2
Operator load large parts	How many	1	4.2
Operator place large part (no precision)	How many	1	1.8
Operator total walk	Total in feet	6	1.8
Operator hit P.B.			0.0
Operator Load Assist- load/unload part to fixt or rack(includes lwr, open/close clp and raise)	# of loads /unloads	1	12.5
Operator walk with load assist	Total in feet	4	2.0
Fixture - Clamp/Gripper close	# of close		0.0
Fixture - Clamp /Gripper open	# of open		0.0
Fixture - Suction Cup vacuum on	# of vacuum on		0.0
Fixture - Suction Cup vacuum off	# of vacuum off		0.0
Fixture - Manual Clamp close	# of close		0.0
Fixture - Manual Clamp open	# of open		0.0
Fixture - Shot pin extend	# of extends		0.0
Fixture - Shot pin retract	# of retracts		0.0
Fixture - Slide extend	# of extends		0.0
Fixture - Slide retract	# of retracts		0.0
Fixture - Pivot close	# of close		0.0
Fixture - Pivot open	# of open		0.0
Fixture - Trunnion rotates 180	# of rotates		0.0
Fixture - Turn Table rotates 180	# of rotates		0.0
Robot pick part	# of picks	0	0.00
Robot rotate 45	# of rotates		0.0
Robot rotate 90	# of rotates		0.0
Robot rotate 180	# of rotates		0.0
Robot rotate 270	# of rotates		0.0
Robot place part	# of places	0	0.0
Robot moves on 7th axis	Distance (# foot)		0.0
Robot rotate to home	# of rotates		0.0
Robot delay	# of delays		0.0
Robot date scribe	# of date scribe		0.0
Robot check tree (nuts & studs)	# of check positions		0.0
Robot changes EOAT (drop 1 and pick 1)	# of changes		0.0
Weld robot in			0.0
Weld robot welds (GEO)	# of welds -GEO-		0.0
Weld robot welds (Respot)	# of welds -Respot-		0.0
Weld robot out			0.0
Mig robot in			0.0
Mig robot weld	# of welds		0.0
Mig robot weld	Weld Length (mm)		0.0
Mig robot out			0.0
Laser brazing robot in			0.0
Seam detection at start of process	Weld Length (mm)		0.0
Laser brazing robot welds	Weld Length (mm)		0.0
Laser brazing robot out			0.0
Adh/Seal robot in			0.0
Adh/Seal robot	# of Beads		0.0
Adh/Seal robot	Adh/Seal Length (mm)		0.0
Adh/Seal robot out			0.0
Proj/clinch nut/stud Weld robot in			0.0

Proj/clinch nut/stud Weld robot welds	# of welds		0.0
Proj/clinch nut/stud Weld robot out			0.0
DA studs Weld robot in			0.0
DA studs Weld robot welds	# of DA welds		0.0
DA studs Weld robot out			0.0
FDS robot in			0.0
FDS robot Screws	# of screws		0.0
FDS robot out			0.0
SPR robot in			0.0
SPR robot Rivets	# of Rivets		0.0
SPR robot out			0.0
Manual Weld - Operator obtains weld gun (medium)			0.0
Manual Weld - Operator obtains weld gun (large)			0.0
Manual Weld - Operator repositions weld gun (<6")			0.0
Manual Weld - Operator repositions weld gun (>6",<24")			0.0
Manual Weld - Operator repositions weld gun (>24")			0.0
Manual Weld - Operator repositions weld gun through access hole			0.0
Manual Weld - Operator rotates weld gun			0.0
Manual Weld - Operator returns weld gun to hook			0.0
Manual Weld - Operator releases weld gun			0.0
Manual Weld - Operator welds - 1st in a group or only (simple)			0.0
Manual Weld - Operator welds - each additional weld (simple)			0.0
Manual Weld - Operator welds - 1st in a group or only (complex)			0.0
Manual Weld - Operator welds - each additional weld (complex)			0.0
Manual Weld - Operator welds - 1st in a group or only (heavy gauge)			0.0
Manual Weld - Operator welds - each additional weld (heavy gauge)			0.0
		TOTAL ESTIMATED TIME	37.00
		TOTAL AVAILABLE TIME	#REF!
		DIFFERENCE	#REF!

Geo welds =	4.00	secs. Per weld
Respot welds =	3.50	secs. Per weld

MIG welds =	25	inches per min.

Laser brazing =	130	inches per min.

Note: Range of **95 inches/min** to max speed of **173 inches/min.** To achieve higher speeds 6 KW power unit needs to be used. **130 inches/min is an average.**

Adhesive/Seal =	300	mm per sec.

Man and Machine Motions

PRELIMINARY TIMING ESTIMATES

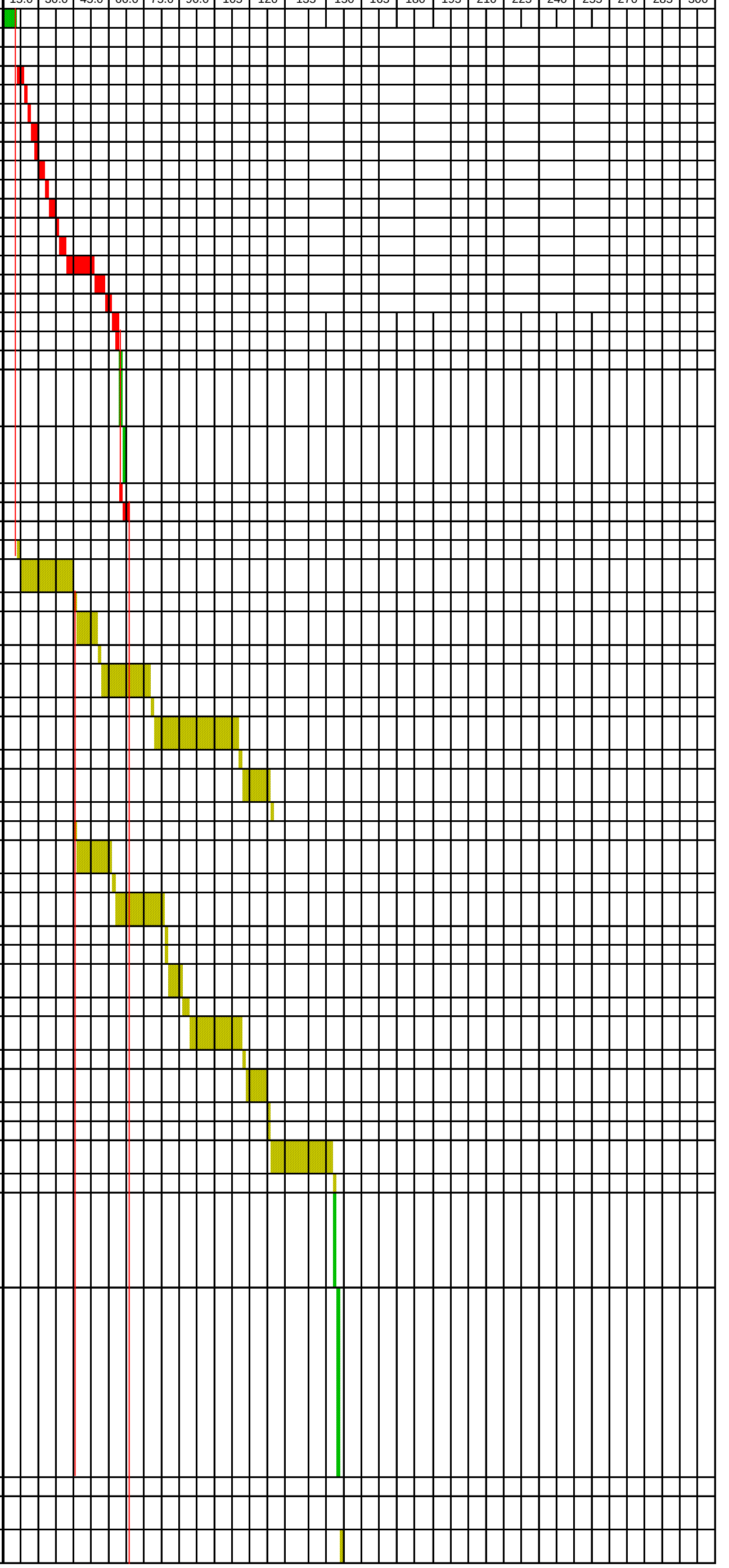
VALIANT TMS
Powered by People

Operator
Machine
Robot
Operator Wait

Volvo
2023 P6700
Door Ring / Roof INR
NPV

TOOL DESCRIPTION:	Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
Door Ring LH - Roof INR	7.4	16.98	212.00	220.46	4.28	598.72	114.68	97.32	54.09	37.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
1	Turntable rotates 180			6.00	6.00
2					
3	**Door Ring Oper Load 010-T1 GEO**				
4	Oper walks into fixture 010-T1		8	2.44	8.44
5	**Oper loads part (4746)**			1.94	10.38
6	**Oper loads part (6424)**			1.55	11.93
7	Oper walks to totes		9	2.74	14.67
8	Oper obtains part from tote (5728)			0.90	15.57
9	Oper walks to fixture		9	2.74	18.31
10	**Oper loads part (5728)**			1.80	20.11
11	Oper walks to assit		9	2.74	22.85
12	oper obtains assist			0.65	23.50
13	Oper walks to dunnage		11	3.35	26.85
14	Oper obtains (9719) w/assist			12.50	39.35
15	Oper walks to fixture		13	3.96	43.31
16	**Oper loads (9719)**			3.23	46.54
17	Oper walks to palm buttons w/assist		8	2.44	48.98
18	Oper depress palm buttons			0.40	49.38
19	Pin Retract **(RWD)**	UQ2.1		1.00	50.38
20	Calmps Close **(RWD)**	UQ3.1 UQ4.1 TO UQ4.6		1.00	51.38
21	Calmps Close **(RWD)**	UQ5.1,UQ 5.2,UQ5.3, UQ6.1		1.00	52.38
22	Oper dispose of assist			1.82	51.20
23	Oper walks to HEADER dunnage		7	2.13	53.33
24	**Roof welding 010-T2 GEO**				
25	Robot V01AR21 moves to weld			1.50	7.50
26	**Robot V01AR21 Geo/respot weld (6) spots SIM TIME**			22.35	29.85
27	Robot V01AR21 repositions			1.50	31.35
28	**Robot V01AR21 Geo/respot weld (2) spots SIM TIME**			9.00	40.35
29	Robot V01AR21 repositions			1.50	41.85
30	**Robot V01AR21 Geo/respot weld (5) spots SIM TIME**			21.05	62.90
31	Robot V01AR21 repositions			1.50	64.40
32	**Robot V01AR21 Geo/respot weld (11) spots SIM TIME**			36.16	100.56
33	Robot V01AR21 repositions			1.50	102.06
34	**Robot V01AR21 Geo/respot weld (3) spots SIM TIME**			12.19	114.25
35	Robot V01AR21 clears fixture			1.50	115.75
36	Robot V01AR22 moves to weld			1.50	31.35
37	**Robot V01AR22 Geo/respot weld (3) spots SIM TIME**			14.44	45.79
38	Robot V01AR22 repositions			2.00	47.79
39	**Robot V01AR22 Geo/respot weld (5)spots SIM TIME**			20.47	68.26
40	Tooling Opens			2.00	70.26
41	Robot V01AR22 repositions			2.00	70.26
42	**Robot V01AR22 Geo/respot weld (1)spots SIM TIME**			6.64	76.90
43	Robot V01AR22 repositions			2.00	78.90
44	**Robot V01AR22 Geo/respot weld (5) spots SIM TIME**			22.88	101.78
45	Robot V01AR22 repositions			2.00	103.78
46	**Robot V01AR22 Geo/respot weld (2) spots SIM TIME**			8.68	112.46
47	Tooling Opens			2.00	114.46
48	Robot V01AR22 repositions			2.00	114.46
49	**Robot V01AR22 Geo/respot weld (6)spots SIM TIME**			23.59	138.05
50	Robot V01AR22 clears fixture			1.50	139.55
51	Pins Retract **(RWD)**	UQ1.1 TO UQ1.6 UQ2.2 TO UQ2.6 UQ3.1		1.00	139.55
52	Clamps Open **(RWD)**	UQ5.1 TO UQ5.6 UQ6.1 TO UQ6.6 UQ7.1 TO UQ7.4 UQ8.1 TO UQ8.4 UQ10.1 UQ10.2		1.00	140.55
53					
54	**Robot V01AR41 Roof INR Unload 010-T2**				
55	Robot V01AR41 moves to pick STA010 T2			1.50	142.05



Man and Machine Motions

PRELIMINARY TIMING ESTIMATES

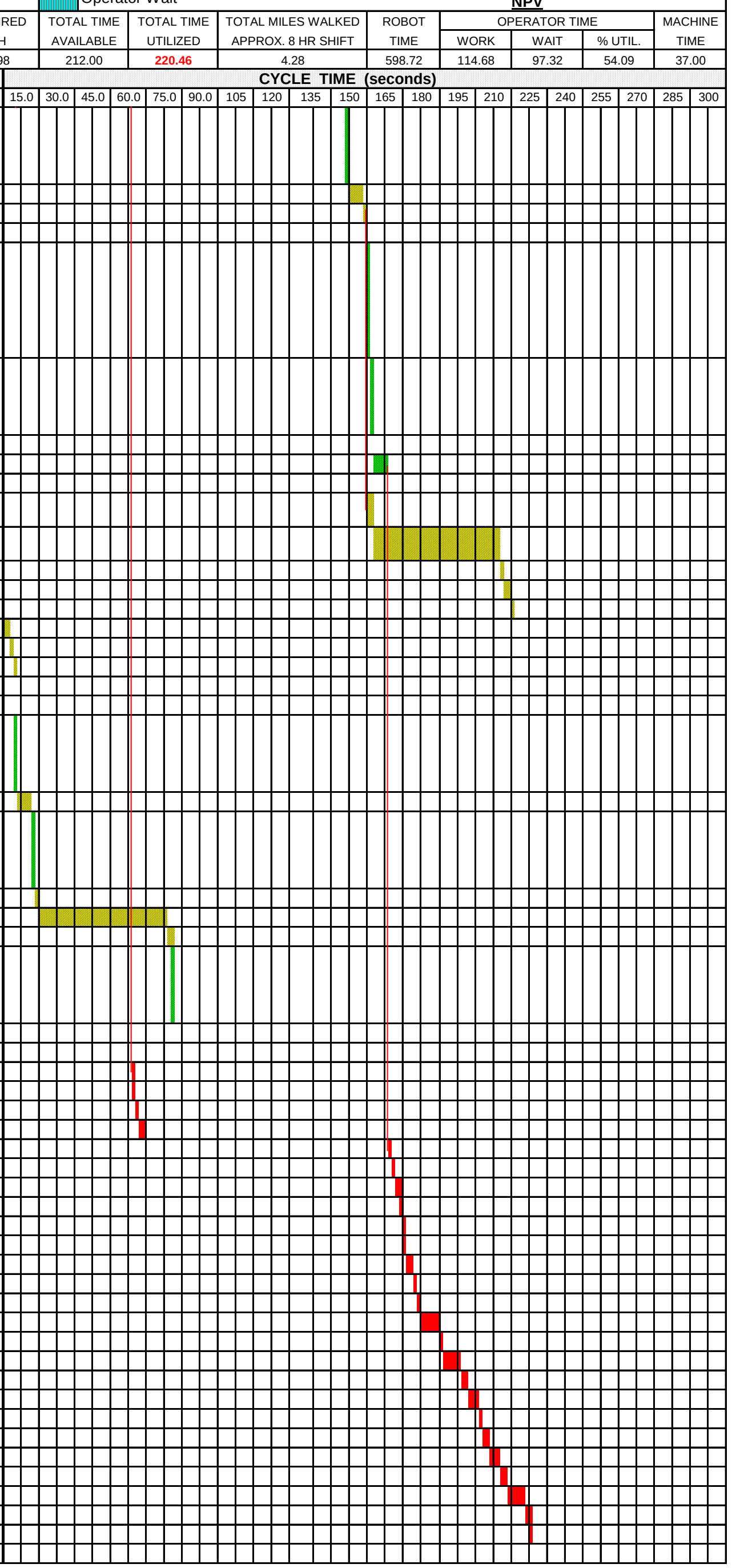
VALIANT TMS
Powered by People

Operator
Machine
Robot
Operator Wait

Volvo
2023 P6700
Door Ring / Roof INR
NPV

TOOL DESCRIPTION:	Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
Door Ring LH - Roof INR	7.4	16.98	212.00	220.46	4.28	598.72	114.68	97.32	54.09	37.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
56	Robot 010-R3 EOAT closes	UQ2.1 UQ2.2 UQ2.3 UQ2.4		1.00	143.05
57	Robot V01AR41 unloads			6.00	149.05
58	Robot V01AR41 clears fixture			1.50	150.55
59					
60	Pin Extend **(RWD)**	UQ1.1 TO UQ1.6 UQ2.1 TO UQ2.6 UQ3.1, UQ11.1		1.00	151.55
61	Clamps Close **(RWD)**	UQ8.1, UQ8.2, UQ8.3, UQ8.4		1.00	152.55
62					
63	Turntable rotates 180			6.00	158.55
64					
65	Robot V01AR41 moves to ped welder RF-020-PW1			3.00	153.55
66	**Ped welder welds (25 welds) SIM TIMING**			51.50	205.05
67	Robot V01AR41 clears ped			1.20	206.25
68	Robot V01AR41 moves vision STA030			3.00	209.25
69	Robot V01AR41 drops ROOF INR			2.75	212.00
70	WRAPPED TIMING			3.25	3.25
71	Robot V01AR41 EOAT open			1.00	4.25
72	Robot V01AR41 clears fixture			1.20	5.45
73					
74	**030 Vision Check ROOF INR**				
75	Clamps Close **(RWD)**	UQ1.1 UQ1.2 UQ1.3 UQ1.4		1.00	6.45
76	Robot V01AR41 unloads to vision			6.00	12.45
77	Robot V01AR41 EOAT open	UQ2.1 UQ2.2 UQ2.3 UQ2.4		1.00	13.45
78	Robot V01AR41 Clears Vision			1.20	14.65
79	Robot performes Vision Check			54.00	68.65
	Vision re-calibrate after every 5th roof			3.00	71.65
80	Clamps Open **(RWD)**	UQ1.1 UQ1.2 UQ1.3 UQ1.4		1.00	72.65
81					
82	**Roof INR Oper Load 010-T2 GEO**				
83	Oper obtains 1 part (7383)			1.55	54.88
84	Oper walks to dunnage		3	0.90	55.78
85	Oper obtains 1 part (0887)			1.55	57.33
86	Oper walks to light screen		8	2.44	59.77
87	Oper walks into fixture STA030		6	1.83	160.38
88	**Oper loads part (7383)**			2.06	162.44
89	**Oper loads part (0887)**			2.06	164.50
90	Oper obtains from tote (4838)			0.90	165.40
91	Oper obtains from tote (4841)			0.90	166.30
92	Oper obtains from tote (4836)			0.90	167.20
93	**Oper loads part (4838)**			1.80	169.00
94	**Oper loads part (4841)**			1.80	170.80
95	**Oper loads part (4836)**			1.80	172.60
96	Oper walks to dunnage		26	7.92	180.52
97	Oper obtains part (0981)			1.55	182.07
98	Oper walks to dunnage		25	7.62	189.69
99	Oper obtains part (0972)			2.40	192.09
100	Oper walks to fixture		15	4.57	196.66
101	**Oper loads part (0981)**			2.06	198.72
102	**Oper loads part (0972)**			2.06	200.78
103	Oper walks to dunnage		15	4.57	205.35
104	Oper obtains 2 parts (5309)			2.84	208.19
105	**Oper loads 2 parts (5309)**			8.44	216.63
106	Oper walks to palm buttons		8	2.44	219.07
107	Oper depress palm buttons			0.39	219.46
108					



Man and Machine Motions

PRELIMINARY TIMING ESTIMATES

VALIANT TMS
Powered by People

Operator
Machine
Robot
Operator Wait

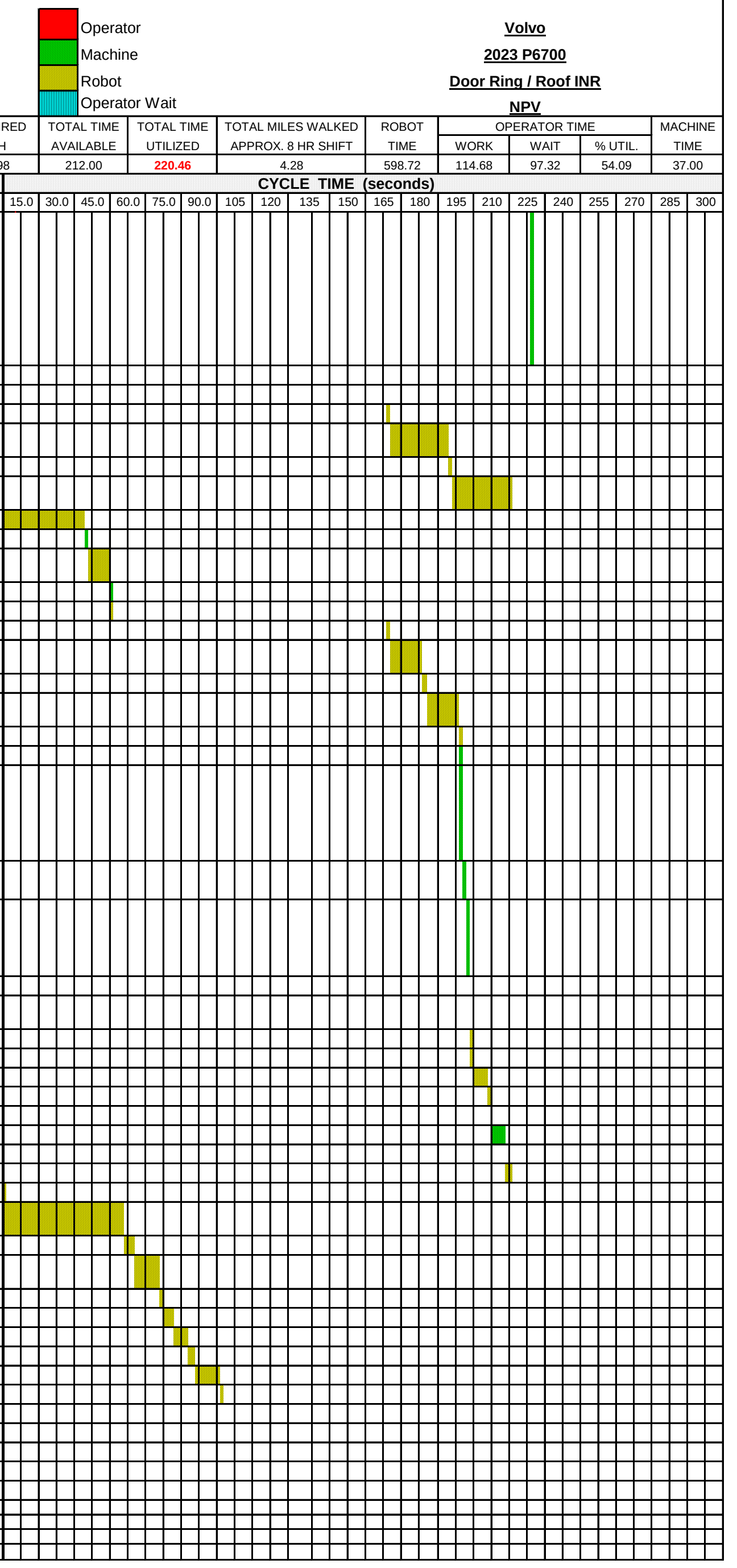
Volvo
2023 P6700
Door Ring / Roof INR
NPV

TOOL DESCRIPTION:

Door Ring LH - Roof INR

Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
7.4	16.98	212.00	220.46	4.28	598.72	114.68	97.32	54.09	37.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
109	Clamps close **(RWD)**	UQ5.1 TO UQ5.6 UQ6.1 TO UQ6.6 UQ7.1 TO UQ7.4 UQ10.1 UQ10.2		1.00	220.46
110					
111	**DOOR RING WELDING 010-T1 GEO**				
112	Robot V01AR21 moves to weld			1.50	160.05
113	**Robot V01AR21 Geo/respot weld (9) spots SIM TIME**			23.73	183.78
114	Robot V01AR21 repositions			2.00	185.78
115	**Robot V01AR21 Geo/respot weld (16) spots SIM TIME**			26.22	212.00
116	**WRAPPED TIMING**			34.42	34.42
117	Tooling Opens			2.00	36.42
118	**Robot V01AR21 Geo/respot weld (01) spots**			8.91	45.33
119	Shot Pin Retract **(RWD)**	UQ3.1		1.00	46.33
120	Robot V01AR21 clears fixture			0.75	47.08
121	Robot V01AR22 moves to weld			1.50	160.05
122	**Robot V01AR22 Geo/respot weld (03) spots SIM TIME**			13.96	174.01
123	Robot V01AR22 repositions			2.00	176.01
124	**Robot V01AR22 Geo/respot weld (04) spots**			12.64	188.65
125	Robot V01AR22 clears fixture			1.50	190.15
126	Pin Extend **(RWD)**	UQ2.1		1.00	190.15
127	Pin Retract **(RWD)**	UQ1.1 UQ1.2 UQ1.3 UQ1.4 UQ1.5		1.00	191.15
128	Clamps Open **(RWD)**	UQ4.1 TO UQ4.6		1.00	192.15
129	Clamps Open **(RWD)**	UQ3.1 UQ5.1 UQ5.2 UQ5.3		1.00	193.15
130					
131	**Robot V01AR41 Door Ring Unload 010-T1**				
132	Robot V01AR41 moves to pick			1.50	194.65
133	Robot V01AR41 EOAT closes			1.00	195.65
134	Robot V01AR41 unloads			6.00	201.65
135	Robot V01AR41 clears fixture			1.50	203.15
136					
137	Turntable rotates 180			6.00	209.15
138					
139	Robot V01AR41 moves to RF-020-PW1			2.85	212.00
140	**WRAPPED TIMING**			0.15	0.15
141	**Ped welder welds (16 welds) SIM TIME**			50.84	50.99
142	Robot V01AR41 moves RTU			5.10	56.09
143	Robot V01AR41 places in finished dunnage			10.00	66.09
144	Robot V01AR41 clears Dunnage			1.50	67.59
145	Robot V01AR41 moves RTU			5.10	72.69
146	Robot V01AR41 picks ROOF INR			6.00	78.69
147	Robot V01AR41 moves to O/H conveyor			3.00	81.69
148	Robot V01AR41 places to conveyor			10.00	91.69
149	Robot V01AR41 clears			1.50	93.19
150					
151					
152					
153					
154					
155					
	Total Cycle Time				220.46
	Estimated Walk Total		180		
	Jobs Per Hour				16.33



Man and Machine Motions

PRELIMINARY TIMING ESTIMATES

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Operator
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Robot
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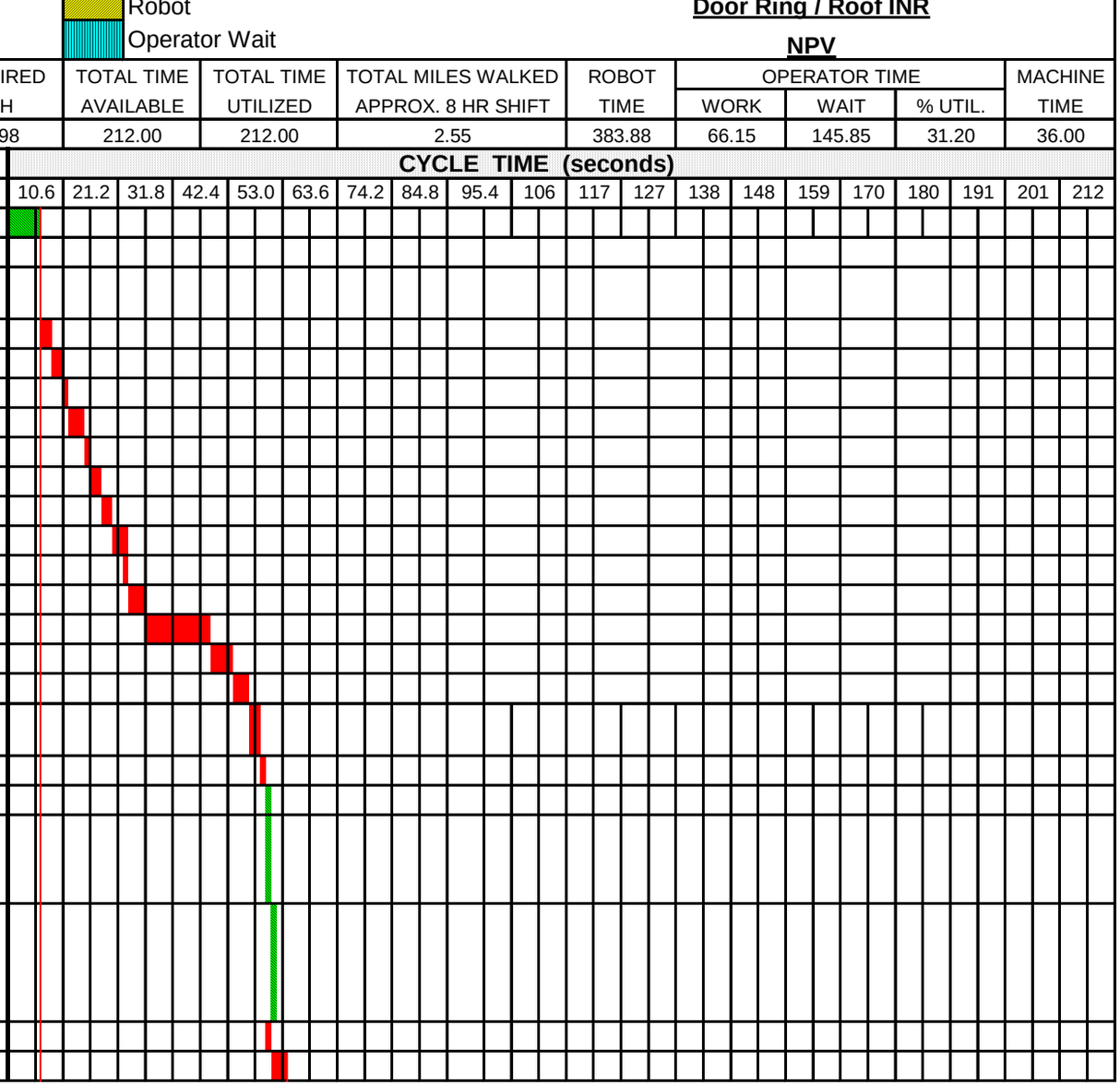
Volvo
2023 P6700
Door Ring / Roof INR
NPV

TOOL DESCRIPTION:

Door Ring LH - Header Sleeper

Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
7.4	16.98	212.00	212.00	2.55	383.88	66.15	145.85	31.20	36.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
1	Turntable rotates 180			6.00	6.00
2					
3	**Door Ring Oper Load 010-T1 GEO**				
4	Oper walks into fixture 010-T1		8	2.44	8.44
5	**Oper loads part (4746)**			1.94	10.38
6	**Oper loads part (6424)**			1.55	11.93
7	Oper walks to totes		9	2.74	14.67
8	Oper obtains part from tote (5728)			0.90	15.57
9	Oper walks to fixture		9	2.74	18.31
10	**Oper loads part (5728)**			1.80	20.11
11	Oper walks to assit		9	2.74	22.85
12	oper obtains assist			0.65	23.50
13	Oper walks to dunnage		11	3.35	26.85
14	Oper obtains (9719) w/assist			12.50	39.35
15	Oper walks to fixture		13	3.96	43.31
16	**Oper loads (9719)**			3.23	46.54
17	Oper walks to palm buttons w/assist		8	2.44	48.98
18	Oper depress palm buttons			0.40	49.38
19	Pin Retract **(RWD)**	UQ2.1		1.00	50.38
20	Calmps Close **(RWD)**	UQ3.1 UQ4.1 TO UQ4.6		1.00	51.38
21	Calmps Close **(RWD)**	UQ5.1 UQ5.2 UQ5.3 UQ6.1		1.00	52.38
22	Oper dispose of assist			1.20	50.58
23	Oper walks to HEADER dunnage		10	3.00	53.58



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Door Ring / Roof INR

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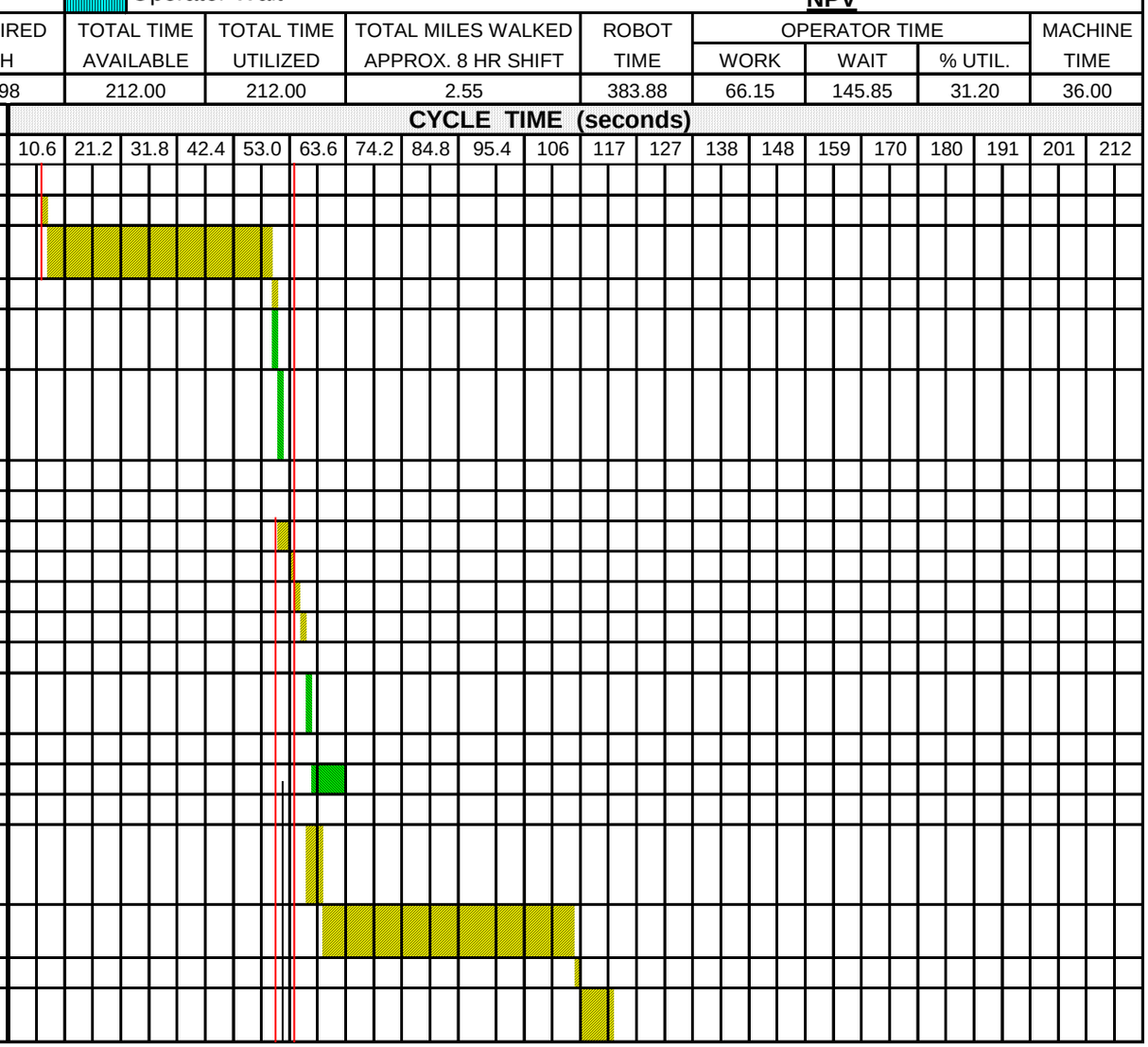
TOOL DESCRIPTION:

Door Ring LH - Header Sleeper

Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
7.4	16.98	212.00	212.00	2.55	383.88	66.15	145.85	31.20	36.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
24	**Header welding 010-T2 GEO**				
25	Robot V01AR21 moves to weld			1.50	7.50
26	**Robot V01AR21 Geo/respot weld (08) spots SIM TIME**			42.18	49.68
27	Robot V01AR21 clears fixture			1.50	51.18
28	Pins Retract **(RWD)**	UQ4.1 TO UQ4.4		1.00	50.68
29	Clamps Open **(RWD)**	UQ9.1 UQ9.2 UQ9.3		1.00	51.68
30					
31	**Robot V01AR41 Header Unload**				
32	Robot V01AR41 moves to pick			1.50	52.68
33	Robot V01AR41 EOAT closes			1.00	53.68
34	Robot V01AR41 unloads			1.50	55.18
35	Robot V01AR41 clears fixture			1.50	56.68
36					
37	Pins Extend **(RWD)**	UQ4.1 TO UQ4.4		1.00	57.68
38					
39	Turntable rotates 180			6.00	63.68
40					
41	Robot V01AR41 moves to ped welder RF-020-PW1			3.00	59.68
42	**Ped welder welds (12) spots SIM TIME**			45.03	104.71
43	Robot V01AR41 clears ped			1.20	105.91
44	Robot V01AR41 moves vision STA030			6.00	111.91



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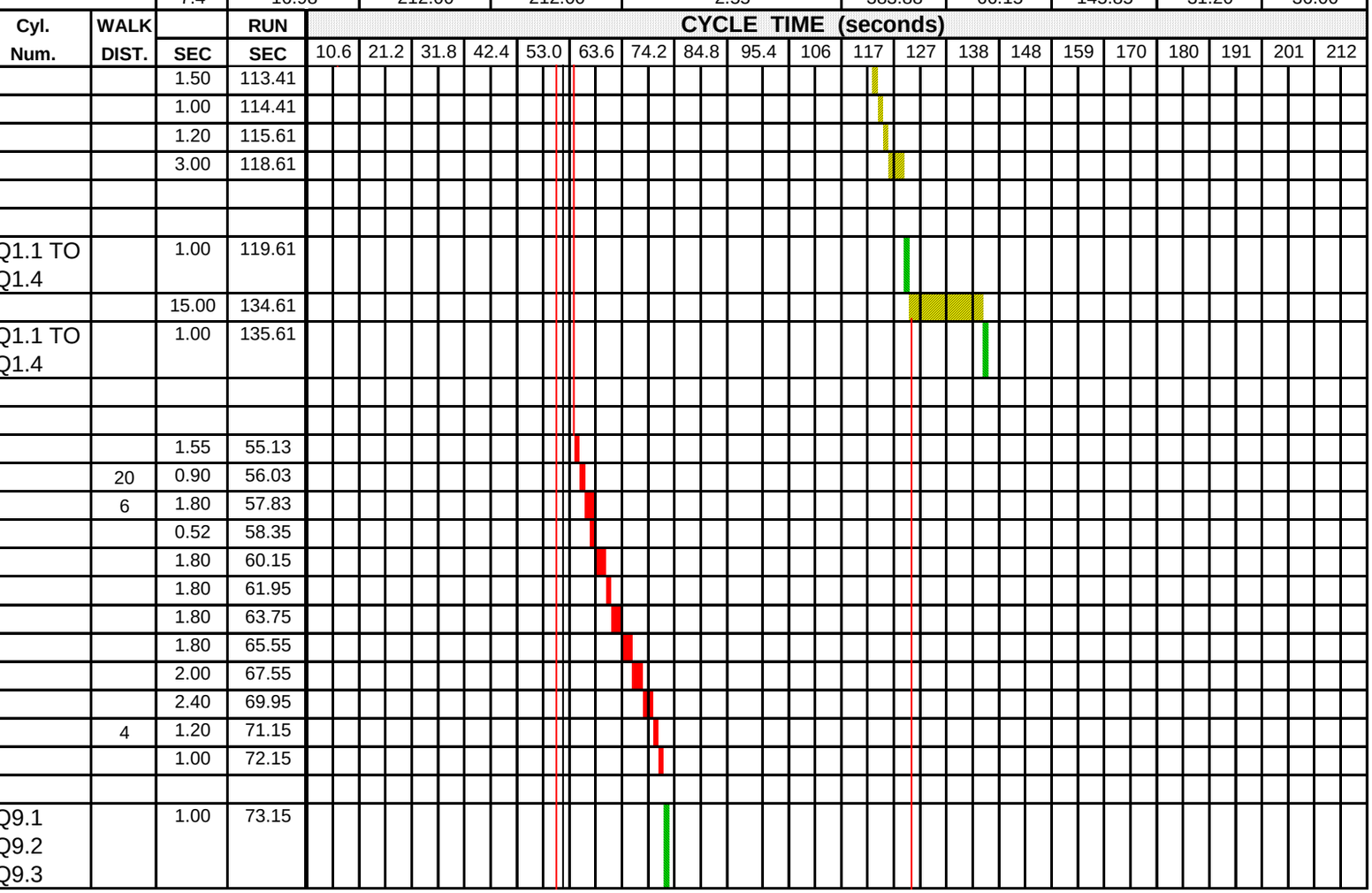
Operator Wait

Volvo
2023 P6700
Door Ring / Roof INR
NPV

TOOL DESCRIPTION:	Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
Door Ring LH - Header Sleeper	7.4	16.98	212.00	212.00	2.55	383.88	66.15	145.85	31.20	36.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
45	Robot V01AR41 moves to load			1.50	113.41
46	Robot V01AR41 EOAT open			1.00	114.41
47	Robot V01AR41 clears fixture			1.20	115.61
48	Robot V01AR41 moves to home			3.00	118.61
49					
50	**030 Vision Check HDR**				
51	Clamps Close **(RWD)**	UQ1.1 TO UQ1.4		1.00	119.61
52	Robot performes Vision Check			15.00	134.61
53	Clamps Open **(RWD)**	UQ1.1 TO UQ1.4		1.00	135.61
54					
55	**Header Oper Load 010-T2**				
56	Oper obtains 1 part (0981)			1.55	55.13
57	Oper walks to light screen		20	0.90	56.03
58	Oper walks into fixture STA030		6	1.80	57.83
59	Oper places (0981) tool side			0.52	58.35
60	Oper obtains from tote (7815)			1.80	60.15
61	Oper obtains from tote (7811)			1.80	61.95
62	**Oper loads part (7815)**			1.80	63.75
63	**Oper loads part (7811)**			1.80	65.55
64	Oper obtains (3568) from tool side			2.00	67.55
65	**Oper loads part (3568)**			2.40	69.95
66	Oper walks to palm buttons		4	1.20	71.15
67	Oper depress palm buttons			1.00	72.15
68					
69	Clamps Close **(RWD)**	UQ9.1 UQ9.2 UQ9.3		1.00	73.15



Man and Machine Motions

PRELIMINARY TIMING ESTIMATES

VALIANT TMS
Powered by People

Operator
Machine
Robot
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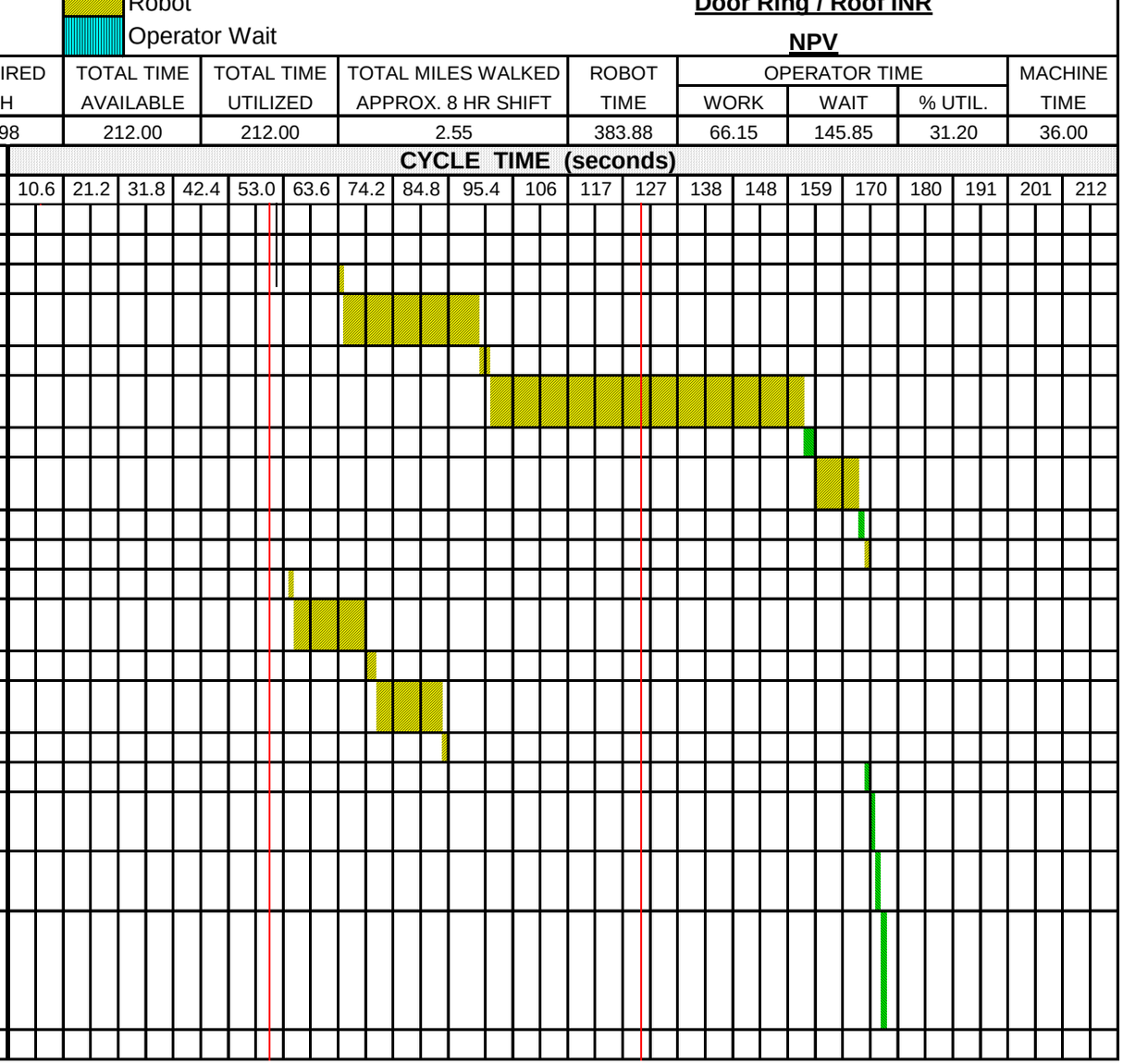
step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
70					
71	**DOOR RING WELDING 010-T1**				
72	Robot V01AR21 moves to weld			1.50	65.18
73	**Robot V01AR21 Geo/respot weld (9) spots SIM TIME**			23.73	88.91
74	Robot V01AR21 repositions			2.00	90.91
75	**Robot V01AR21 Geo/respot weld (16) spots SIM TIME**			60.64	151.55
76	Tooling Opens			2.00	153.55
77	**Robot V01AR21 Geo/respot weld (1) spots**			8.91	162.46
78	Shot Pin Retract **(RWD)**	UQ3.1		1.00	163.46
79	Robot V01AR21 clears fixture			0.75	164.21
80	Robot 010-R02 moves to weld			1.50	55.08
81	**Robot 010-R02 Geo/respot weld (3) spots SIM TIME**			13.96	69.04
82	Robot 010-R02 repositions			2.00	71.04
83	**Robot 010-R02 Geo/respot weld (04) spots**			12.64	83.68
84	Robot 010-R02 clears fixture			1.50	85.18
85	Pin Extend **(RWD)**	UQ2.1		1.00	164.21
86	Pin Retract **(RWD)**	UQ1.1 TO UQ1.5		1.00	165.21
87	Clamps Open **(RWD)**	UQ4.1 TO UQ4.6		1.00	166.21
88	Clamps Open **(RWD)**	UQ3.1 UQ5.1 UQ5.2 UQ5.3		1.00	167.21
89					



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2023 P6700

Door Ring / Roof INR

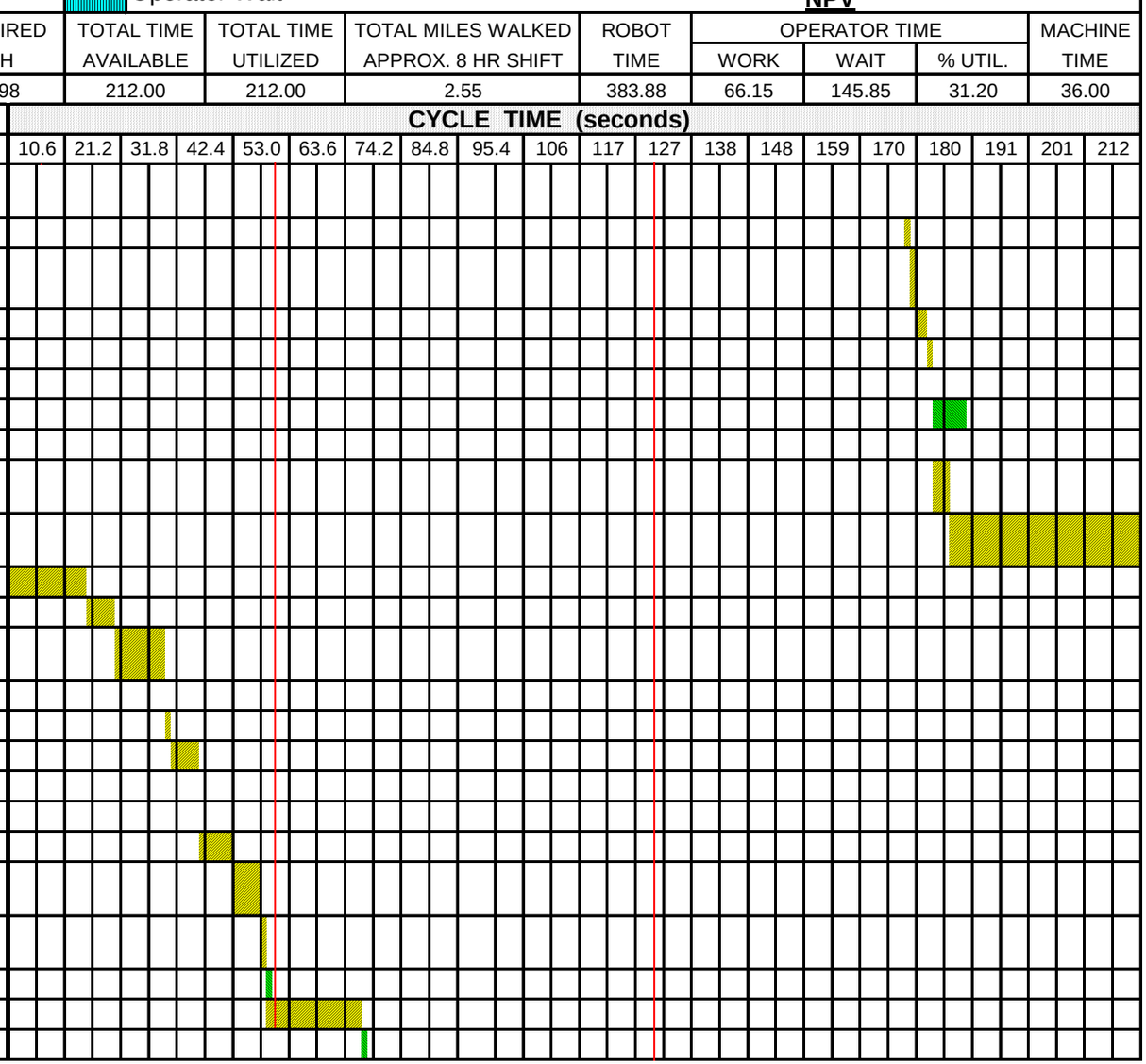
NPV

TOOL DESCRIPTION:

Door Ring LH - Header Sleeper

Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
7.4	16.98	212.00	212.00	2.55	383.88	66.15	145.85	31.20	36.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
90	**Robot V01AR41 Door Ring Unload 010-T1**				
91	Robot V01AR41 moves to pick			1.50	168.71
92	Robot V01AR41 EOAT closes	UQ1.1 TO UQ1.4		1.00	169.71
93	Robot V01AR41 unloads			1.50	171.21
94	Robot V01AR41 clears fixture			1.50	172.71
95					
96	Turntable rotates 180			6.00	178.71
97					
98	Robot V01AR41 moves to RF-020-PW1			3.00	175.71
99	Ped welder welds **(12 welds) SIM TIME**			36.29	212.00
100	**WRAPPED TIME**			14.55	14.55
101	Robot V01AR41 moves RTU			5.10	19.65
102	Robot V01AR41 places in finished dunnage			10.00	29.65
103	EOAT open				
104	Robot V01AR41 clears Dunnage			1.50	31.15
105	Robot V01AR41 moves RTU			5.10	36.25
106					
107	**VISION UNLOAD**				
108	Robot V01AR41 picks HEADER			6.00	42.25
109	Robot V01AR41 moves RTU to scribe			5.10	47.35
110	Robot V01AR41 positions part to Scribe			1.50	48.85
111	Clamps Close **(RWD)**	UQ1.1		1.00	49.85
112	Tool Scribe			18.00	66.85
113	Clamps Open **(RWD)**	UQ1.1		1.00	67.85



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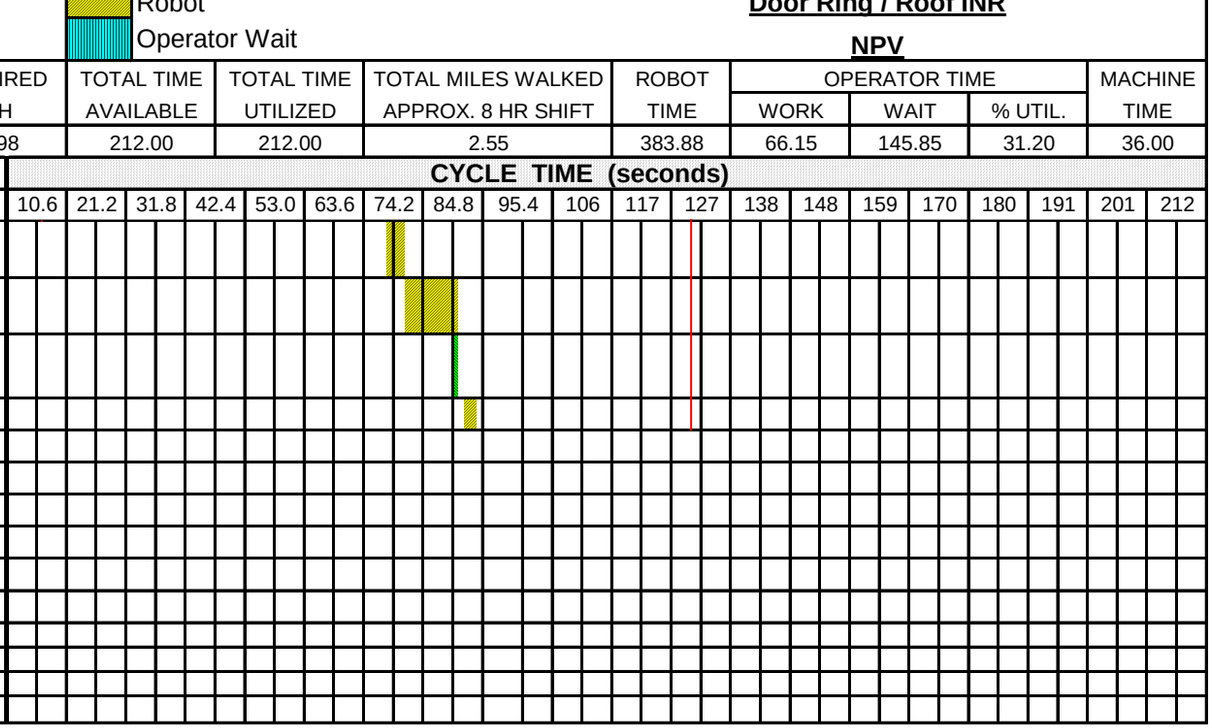
TOOL DESCRIPTION:	Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME WORK	OPERATOR TIME WAIT	OPERATOR TIME % UTIL.	MACHINE TIME
Door Ring LH - Header Sleeper	7.4	16.98	212.00	212.00	2.55	383.88	66.15	145.85	31.20	36.00

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	SEC	RUN SEC
114	Robot V01AR41 moves to O/H conveyor			3.00	70.85
115	Robot V01AR41 places to conveyor			10.00	80.85
116	Robot V01AR41 EOAT Open	UQ1.1 TO UQ1.4		0.05	80.90
118	Robot V01AR41 clears			1.50	82.40
119					
120					
121					
122					
123					
124					
125					
	Total Cycle Time				212.00
	Estimated Walk Total		107		
	Jobs Per Hour				16.98



Robot / Operator Utilization Matrix

Customer: Volvo

Program: P6700

Commodity: Roof Inr & Door Ring LH Sub 17JPH & 20JPH

Over Cycle

Station #	Robot / Operator #	System Cycle Time	Proposed Cycle Time	Utilization
10	OP1	212.00	144.90	68.35%
10	R1	212.00	151.50	71.46%
10	R2	212.00	155.50	73.35%
10	R3	212.00	155.50	73.35%
10	OP1	180.00	144.90	80.50%
10	R1	180.00	151.50	84.17%
10	R2	180.00	155.50	86.39%
10	R3	180.00	155.50	86.39%