



Customer: VOLVO

Program: P6700 TRUCK

Commodity: SIDE SKINS / ROOF / SLEEPER FRT (17 JPH)

Plant: NRV

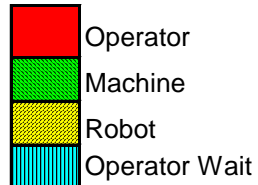
Job # 16147

Date: 3/02/22

Cycle Time: 212

Man and Machine Motions

PRELIMINARY TIMING ESTIMATES



VOLVO
P6700 TRUCK
SIDE SKINS / ROOF / SLEEPER FRT (17 JPH)
NRV

-29.82

TOOL DESCRIPTION:	Hours /Shift	REQUIRED JPH	TOTAL TIME AVAILABLE	TOTAL TIME UTILIZED	TOTAL MILES WALKED APPROX. 8 HR SHIFT	ROBOT TIME	OPERATOR TIME			MACHINE TIME
							WORK	WAIT	% UTIL.	
							7.4	16.98	212.00	

STA 010 thru 20 (DAY)

step #	STATION DESCRIPTION	Cyl. Num.	WALK DIST.	RUN SEC	CYCLE TIME (seconds)																								
					SEC	20.0	40.0	60.0	80.0	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400				
					1	Logic Delay			1.25	1.25																			
2	STA 010 WELDING																												
3	Robot 010-R01 moves in to weld LH SS			1.50	2.75																								
4	Robot 010-R01 welds (6) Geo welds			20.00	22.75																								
5	Robot 010-R01 moves clear			2.00	24.75																								
6	Tooling clamps open			1.00	24.75																								
7	Robot 010-R01 moves to pick LH SS			1.20	25.95																								
8	Robot 010-R01 EOAT closes			1.00	26.95																								
9	Robot 010-R01 clears from weld			4.00	30.95																								
10	010-TT Turntable rotates 180°			6.00	55.83																								
11	Robot 010-R01 moves in to weld RH SS			1.50	57.33																								
12	Robot 010-R01 welds (6) Geo welds			20.00	77.33																								
13	Robot 010-R01 moves clear			2.00	79.33																								
14	Tooling clamps open			1.00	79.33																								
15	Robot 010-R01 moves to pick RH SS			1.20	80.53																								
16	Robot 010-R01 EOAT closes			1.00	81.53																								
17	Robot 010-R01 clears from weld			4.00	85.53																								
18	010-TT Turntable rotates 180°			6.00	95.87																								
19	STA 020 LASER / SCRIBE																												
20	Robot 020-R01 moves to pick Roof Panel from Storage Rack			5.00	5.00																								
21	Robot 020-R01 Picks Roof Panel			6.79	11.79																								
22	Robot 020-R01 EOAT Vacuum On			1.50	13.29																								
23	Robot 020-R01 moves w/ Roof panel to storage stand			5.00	18.29																								
24	Robot 020-R01 loads EOAT with roof to storage stand			10.00	28.29																								
25	Robot 020-R01 Vacuum Off			1.50	29.79																								
26	Robot 020-R01 moves to pick SS EOAT			7.00	36.79																								
27	P&F transfer in for LH SS load			22.00	58.79																								
28	Robot 020-R01 obtains SS EOAT			3.00	39.79																								
29	Robot 020-R01 moves to pick LH SS asm STA 010			5.00	44.79																								
30	Robot 020-R01 picks LH SS			5.04	49.83																								
31	Robot 020-R01 transfers to STA 020 laser booth			4.58	54.41																								
32	Robot 020-R01 unloads cut LH/RH SS from STA 020			4.49	58.90																								
33	Robot 020-R01 moves to scribe cut LH SS			2.96	61.86																								
34	LH SS Scribe Process			14.40	76.26																								
35	Robot 020-R01 moves to pick RH SS from STA 010			6.22	82.48																								
36	Robot 020-R01 picks RH SS and moves to load			4.34	89.87																								
37	Robot 020-R01 transfers to P&F drop location for cut LH SS			4.22	94.09																								
38	Robot 020-R01 loads cut LH SS to P&F (right side)			3.56	97.65																								
39	P&F transfer out w/ LH SS			18.00	115.65																								
40	P&F transfer in for RH SS load			22.00	119.65																								
41	Robot 020-R01 moves to STA 020			4.22	101.87																								

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		0.0
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		0.0
Operator obtain large parts	How many		0.0
Operator load large parts	How many		0.0
Operator place large part (no precision)	How many		0.0
Operator total walk	Total in feet	10	3.0
Operator hit P.B.		1	1.0
Operator Load Assist- load/unload part to fixt or rack(includes lwr, open/close clp and raise)	# of loads /unloads		0.0
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	1	6.0
Robot pick part	# of picks	1	6.00
Robot rotate 45	# of rotates		0.0
Robot rotate 90	# of rotates	1	2.0
Robot rotate 180	# of rotates		0.0
Robot rotate 270	# of rotates		0.0
Robot place part	# of places	1	6.0
Robot moves on 7th axis	Distance (# foot)	1	0.3
Robot rotate to home	# of rotates	1	2.0
Robot delay	# of delays		0.0
Robot date scribe	# of date scribe	1	6.0
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		1	1.5
Weld robot welds (GEO)	# of welds -GEO-	5	20.0
Weld robot welds (Respot)	# of welds -Respot-		0.0
Weld robot out		1	1.5
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			66.30
TOTAL AVAILABLE TIME			106.00
DIFFERENCE			39.70

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

MIG welds =	25	inches per min.
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Laser brazing =	130	inches per min.
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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.
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Powered by People

Robot / Operator Utilization Matrix

Customer: VOLVO

Program: P6700 TRUCK

Commodity: SIDE SKINS / ROOF / SLEEPER FRT (17 JPH)

Over Cycle

Station #	Robot / Operator #	System Cycle Time	Proposed Cycle Time	Utilization
10 (L230)	OPER 1	212.00	121.40	57.26%
10 (DAYCAB)	OPER 1	212.00	48.20	22.74%
10 (L230)	10R1	212.00	88.60	41.79%
20 (L230)	20R1	212.00	62.40	29.43%
10 (DAYCAB)	10R1	212.00	47.00	22.17%
20 (DAYCAB)	20R1	212.00	88.40	41.70%
20 (ROOF)	20R1	212.00	95.60	45.09%