

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



Operator
Machine
Robot
Operator Wait

<u>VOLVO</u> <u>P6700 TRUCK</u>

SIDE SKINS / ROOF / SLEEPER FRT (17 JPH)

<u>NRV</u>

132.87

	STA 010 OPER LOAD			/Shift	JPI		A	VAILAB		UIII	_IZED	А	PPRC	JX. 8 I	HR SH	III I	IIN	VIE.	VVC)RK	_	AH	% U		HIV	
		1		7.4	16.9	98		212.00		79	9.13			1.7			N/			.45	16	5.55	21.	.91	7.0)0
step	STATION	Cyl.	WALK		RUN				_								seco									
#	DESCRIPTION	Num.	DIST.	SEC	SEC	11.0	22	0 33.0	44.	0 55.	0 66	.0 77	7.0 8	8.0	99.0	110	121	132	143	154	165	176	187	198	209	220
1	Logic Delay from robot operation			1.25	1.25																					
2	ROOF/SIDE SKIN (DAYCAB)																									
	Oper walks to fixture		6	1.80	3.05		Ш		Ш	Ш	Ш		Ш	Ш	Ш	Ш	Ш		Ш	Щ	Ш	Ш	$\perp \! \! \perp \! \! \! \perp'$	Ш	Ш	
	Oper loads Outer LH Side Panel (Part #78522925) & LH Side Upper Roof Panel (Part #78521252)			6.00	9.05				Ш		Ш		Ш	Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to palm buttons		9	2.70	11.75	Ш			Ш		Ш		Ш	Ш	Ш	Ш	Ш			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper depress palm buttons			1.00	12.75		Ш		$\perp \perp$	$\perp \perp$	Ш		Ш	Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to part bin		8	2.40	15.15	Ш			Ш	$\perp \perp$	Ш		Ш	Ш	$\perp \perp$	Ш	$\perp \! \! \perp \! \! \perp$			Щ	Ш	Ш	$oxed{oxed}'$	Ш	Ш	
	Oper obtains Outer RH Side Panel (Part #78522952)			2.40	17.55				$\perp \perp$	$\perp \perp$	Ш		Ш	Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to part bin		8	2.40	19.95	Ш	Ш		$\perp \perp$	Ш	Ш		Ш	Ш	Ш	$\perp \! \! \perp$	$\perp \perp \perp$			Щ	Ш	Ш	$oxed{oxed}'$	Ш	Ш	
	Oper obtains RH Side Upper Roof Panel (Part # 78522953)			2.40	22.35		$\perp \perp$		$\perp \perp$	\perp		\perp	Ш	Ш	$\perp \perp$	$\perp \! \! \perp \! \! \! \perp$	$\perp \perp \perp$			Щ	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Turntable rotates 180° (from operation)			6.00	55.83		$\perp \perp$		$\perp \perp$			\perp	Ш	Ш	$\perp \perp$	$\perp \! \! \perp \! \! \! \perp$	$\perp \perp \perp$			Щ	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to fixture		6	1.80	57.63	Ш	Ш	$\perp \perp$	$\perp \perp$	Ш	Щ		Ш	Ш	Ш	Ш	$\perp \perp \perp$			Щ	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper loads Outer RH Side Panel (Part #78522952) & RH Side Upper Roof Panel (Part #78522953)			6.00	61.83		$\perp \perp$		$\perp \perp$	Ш			Ш	Ш	$\perp \perp$	$\perp \! \! \perp \! \! \! \perp$	$\perp \perp \perp$			Щ	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to palm buttons		9	2.70	64.53	Ш	Ш		Ш		Ш		Ш	Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper depress palm buttons			1.00	65.53	Ш	Ш		Ш	Ш	Ш		Ш	Ш	Ш	Ш	Ш		Ш	Щ	Ш	Ш	$\perp \! \! \perp \! \! \! \perp'$	Ш	Ш	
	Clamps close			1.00	66.53		Ш		$\perp \perp$	Ш	Ш		Ш	Ш	$\perp \perp$	$\perp \! \! \perp \! \! \! \perp$	$\perp \perp \perp$			Щ	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to part bin		8	2.40	68.93	Ш	Ш		Ш		Ш		Ш	Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper obtains Outer LH Side Panel (Part #78522925)			2.40	71.33		Ш		$\perp \perp$	$\perp \perp$	Ш		Ш	Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper walks to part bin		8	2.40	73.73	Ш	Ш		Ш		Ш			Ш	Ш	Ш	$\perp \! \! \perp \! \! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Oper obtains Side Upper Roof Panel (Part #78521252)			2.40	76.13	Ш	Ш		Ш	Ш	Ш			Ш	Ш	Ш	Ш		Ш	Щ	Ш	Ш	$\perp \! \! \perp \! \! \! \perp'$	Ш	Ш	
21	Oper walks to Sta 10 light screen		10	3.00	79.13	Ш	Ш		Ш	Ш	Ш			Ш	Ш	Ш	Ш		Ш	Щ	Ш	Ш	$\perp \! \! \perp \! \! \! \perp'$	Ш	Ш	
						Ш	Ш	$\perp \perp$	$\perp \perp$	$\perp \! \! \perp$	Ш	\perp	$\sqcup \!\!\! \perp$	$\perp \perp$	$\perp \perp$	$\perp \!\!\! \perp \!\!\! \perp$	$\perp \!\!\! \perp \!\!\! \perp$		\Box	Ш	Щ	Ш	$\coprod oldsymbol{L}'$	Ш	Ш	Ш
						Ш	Ш	$\perp \perp$	$\perp \perp$	$\perp \! \! \perp \! \! \! \perp$	Ш	\perp	Ш	$\perp \perp$	$\perp \perp$	Ш	$\perp \!\!\! \perp \!\!\! \perp$			Ш	Ш	Ш	$\perp \perp \perp'$	Ш	Ш	
	Total Cycle Time				79.13						$\perp \! \! \perp \! \! \! \perp$		\Box			$oxedsymbol{ox{oxed}}}}}$	\Box				Ш		\coprod	Ш	لل	
	Estimated Walk Total		72				\coprod		$\perp \perp$	$\perp \perp$	Ш					ot	ot				Ш	Ш	\coprod	Ш	Ш	
	Jobs Per Hour				45.49																			Ш	Ш	

Man and Machine Motions





Powered by People -29.82

Operator
Machine
Robot
Operator Wait

<u>VOLVO</u> <u>P6700 TRUCK</u>

SIDE SKINS / ROOF / SLEEPER FRT (17 JPH)

NRV

TO 6	N. DECCRIPTION.			-29.82 Hours REQUIRED					ME TOTAL TIME			TOTAL MILES WALKED			VED	D0	ВОТ	OPERATOR TIME					MACHINE				
lioc	DL DESCRIPTION:																		_	Η,						_	
	STA 010 thru 20 (DAY)			/Shift	JPI		+	VAILA			JTILI2		AP	PRO	X. 8 H	K SH	IF I	_	IME	v	NORK	-	WAIT	\dashv	% UTIL	_	TIME
	OTATION.	T	Indian 16	7.4	16.9	3 8		212.0	00		241.	82		٥٧	N/A	-			1.07	.	N/A		N/A		N/A		210.10
step		Cyl.	WALK	050	RUN	20.0	T 40		٠ . T .		400	T 400	1 4 40		CLE						<u> </u>	Т.	T.	Т	340 36	. Т-	200 T 4
#	DESCRIPTION Logic Delay	Num.	DIST.	SEC		20.0	40.	0 60	0.0	30.0	100	120	140	0 16	0 1	80	200	220	240	26	0 28	0 30	JU 32	20 .	340 36	0 3	380 40
1			<u> </u>	1.25	1.25	▙	1 1			1 1	-	1 1	1 1			1 1	1	1 1		1 1							
2	STA 010 WELDING		<u> </u>	4.50	0.75	┢	+		H		_	┢	++	+	\vdash		-	┝	++	+	\dashv	-		\vdash	++-		+'
3	Robot 010-R01 moves in to weld LH SS		 	1.50	2.75 22.75		388	 '	\vdash	+	_	\vdash	++	-	\vdash	\vdash	-	\vdash	++	+	+	_		Н	++-	\vdash	+'
4	Robot 010-R01 welds (6) Geo welds		<u> </u>	20.00					H	+	_	┢	++	+	\vdash		-	┝	++	+	\dashv	+		\vdash	++-	-	+'
\vdash	Robot 010-R01 moves clear		<u> </u>	2.00	24.75	⊢	#		\vdash	+	-	⊢⊢	++	+		\vdash	-	\vdash	++	+	\dashv			₩	++	+	
6	Tooling clamps open			1.00	24.75	₩	 - -	——'	Н	++		₩	++	\blacksquare	\vdash		+		++	+	\dashv			\vdash	++-	\vdash	 /
	Robot 010-R01 moves to pick LH SS			1.20	25.95	₩	4	——'	₩	+	_	₩	++	+	\vdash	1		\vdash	++	+	\dashv		$\vdash\vdash$	\vdash		\vdash	 /
	Robot 010-R01 EOAT closes			1.00	26.95	₩		——'	Ш	\perp	_	Н-	\vdash	\perp	\vdash		_	\vdash	++	+	\dashv		Ш'	\vdash	++-	\vdash	++-
	Robot 010-R01 clears from weld			4.00	30.95	╙				\perp		₩	\sqcup	\perp	\vdash		-	\vdash	++	\perp	\dashv		Ш'	Н	++-		 '
	010-TT Turntable rotates 180°		ļ	6.00	55.83	$oldsymbol{\sqcup}$	$\bot\bot$			$\perp \downarrow$		Ш	ш		\vdash		_	$oxed{oxed}$	$\bot \bot$	\perp	Щ		Ш'	\sqcup	 -	igwdap	 '
	Robot 010-R01 moves in to weld RH SS		↓	1.50	57.33	$oldsymbol{\sqcup}$	\sqcup					$\sqcup \!\!\!\!\!\perp$	++	$\perp \!\!\! \perp \!\!\! \perp$	igspace		_	$\sqcup \!\!\! \perp$	$+\!\!+\!\!\!+$	+	ightharpoonup	'	\coprod	\sqcup	444	$\perp \!\!\! \perp$	$+\!\!\!\!+\!$
	Robot 010-R01 welds (6) Geo welds			20.00	77.33	Ш	Ш					ш	Ш		igspace				$\bot \bot$		Щ		Ш'	Ш	 '	\perp	 '
	Robot 010-R01 moves clear			2.00	79.33	Ш		'				Ш		\perp	$oldsymbol{oldsymbol{\sqcup}}$				$\bot \bot$	Ш	$oldsymbol{oldsymbol{\sqcup}}$		Щ	Ш	Щ'	$oldsymbol{\perp}$	— —'
	Tooling clamps open			1.00	79.33	Ш		'	Ш			Ш			$oldsymbol{oldsymbol{oldsymbol{eta}}}$				$\perp \perp$		ot		$oxed{oxed}$	Ш	'	$oldsymbol{\perp}$	'
	Robot 010-R01 moves to pick RH SS			1.20	80.53	Ш	Ш					Ш	Ш		Щ				Ш		Щ		Ш	Ш	$\perp \perp \perp'$		$\bot \bot \bot'$
	Robot 010-R01 EOAT closes			1.00	81.53	Ш	Ш	'				Ш	Ш	Ш					Ш					Ш			
	Robot 010-R01 clears from weld			4.00	85.53	Ш																			$\perp \perp \perp'$		
18	010-TT Turntable rotates 180°			6.00	95.87	Ш																			$\perp \perp \perp \perp'$		
19	STA 020 LASER / SCRIBE					Ш	Ш	'				Ш	Ш	Ш					Ш					Ш			
	Robot 020-R01 moves to pick Roof Panel from Storage Rack			5.00	5.00		Ш	'				Ш	Ш	Ш					Ш					Ш			
21	Robot 020-R01 Picks Roof Panel			6.79	11.79																				$\perp \perp \perp'$		
22	Robot 020-R01 EOAT Vacuum On			1.50	13.29																						
	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	П																			TT^{\prime}		TT
26	Robot 020-R01 moves to pick SS EOAT			7.00	36.79	П																			TT^{\prime}		TT
27	P&F transfer in for LH SS load			22.00	58.79	П																		П			
28	Robot 020-R01 obtains SS EOAT			3.00	39.79	П						П												П	\Box		
29	Robot 020-R01 moves to pick LH SS asm STA 010			5.00	44.79	П						П			П								П	П	\Box		$\Box\Box$
30	Robot 020-R01 picks LH SS			5.04	49.83	П																		П			
31	Robot 020-R01 transfers to STA 020 laser booth			4.58	54.41			1																	T		TT
32	Robot 020-R01 unloads cut LH/RH SS from STA 020			4.49	58.90																				T		TT
33	Robot 020-R01 moves to scribe cut LH SS			2.96	61.86	П		\top											\Box		\Box		П	П	T		T
	LH SS Scribe Proccess		İ	14.40	76.26	\sqcap	11	\top			$\dagger \dagger$	\sqcap	\top	\top	\sqcap	ITT	T	\sqcap	\sqcap	11	\top	\Box	\sqcap	一	111	\top	\Box
	Robot 020-R01 moves to pick RH SS from STA 010			6.22	82.48	厂		\top			\top		\top		\sqcap				\sqcap		\Box	\Box	\sqcap	一	\top	\top	
	Robot 020-R01 picks RH SS and moves to load			4.34	89.87	\sqcap	1 1	\top	$\sqcap \Vdash$			\sqcap	$\dagger \dagger$	\top	\sqcap		1	\sqcap	\sqcap	11	11		\sqcap	一	111	\top	\Box
	Robot 020-R01 transfers to P&F drop location for cut LH SS			4.22	94.09	\sqcap	11	\top	\sqcap	11		\sqcap	$\dagger \dagger$	\top	o		T	\sqcap	\sqcap	11	\Box	\Box	\sqcap	一十	111	\top	\Box
	Robot 020-R01 loads cut LH SS to P&F (right side)		1	3.56	97.65	什		\top	$\sqcap \Vdash$	\top			T^{\dagger}	十十	o				TT	11	\forall		一十	一十	111	\top	
	P&F transfer out w/ LH SS			18.00		什		\top	\sqcap	\top	"		T^{\dagger}	\top	o				\sqcap		\forall	\exists	一十	一十	111	\top	
	P&F transfer in for RH SS load		†	22.00			TT	\top	Ш	\top				\top	一	Ħ			TT	\Box	廿		一一	一十	111	一	
40	I di tiansici in loi titi oo load																										

Man and Machine Motions

PRELIMINARY TIMING ESTIMATES



Powered by People -29.82

Operator
Machine
Robot
Operator Wait

<u>VOLVO</u> <u>P6700 TRUCK</u>

SIDE SKINS / ROOF / SLEEPER FRT (17 JPH)

NRV

T00	L DECORIDEION			11	-29.02	וחבה	T-0			- T -		TIN 40	- 1-0	TAL .	AII E C		LVED	T 50	DOT				INIX V	•				
100	L DESCRIPTION:			Hours	REQU JP			OTAL VAILA			UTILI	TIME		PPRC					BOT IME	_	WOR			TOR TI			-1	ACHIN TIME
	STA 010 thru 20 (DAY)			/Shift 7.4	16.		_	212.0		+	241		А	PPRC	N/A		HIFI	+	1.07	_	N/A			/AIT J/A		UTIL. N/A	+	11IVIE 210.10
2422	STATION	Cvd	WALK	7.4	RUN	98		212.0	JU		241	.82					RAE:	(sec			IN/A	١	IN	/A	ľ	WA		10.10
step #	DESCRIPTION	Cyl. Num.	DIST.	SEC		20.0	40	0 60	n n I	80 O	100	120	n I 14					220			in I	280	300	320	340	360	38	0 40
	Robot 020-R01 loads uncut LH & RH SS to STA 020	Nuill.	DIST.	4.49	106.36	20.0	1 70.	0 00	1	1	100	120	1	10 1	T	1	1	1 220	1 7	7 20	,0 ,	1	- 500	1 320	1	1 300	1	4
	Robot 020-R01 moves w/ cut RH SS to date scribe		1	2.96	109.32	\vdash	+	-	Н	+			+		++	+	+	++	1 1	+		+	+	++	\vdash	++	\vdash	+
	RH SS Scribe Process		1	13.87	123.19	\vdash	+	-	Н	+					++		+	\vdash	1 1	+		+	+	++	\vdash	++	\vdash	+
	Robot 020-R01 moves to load cut RH SS to P&F		1	4.22	127.41	\vdash	++	+	╫	+	\vdash			-	\vdash	+	+	++	+	++	-	++	+	$+\!\!+\!\!-$	\vdash	++	H	+
	Robot 020-R01 loads cut RH SS to P&F (left side)			3.56	130.97				H	\top	\vdash	++			H	+	\dashv	H	+	+		+	+	$+\!-\!-$	廾	++	H	+
	P&F transfer out w/ RH SS			18.00	148.97	H	t		Н	+	H	tt				\pm	-		t	$\pm \pm$		+	+	+	廾	++	H	+
48	SIDE SKIN LASER CUT					H	Ħ		╫		H	Ħ					1	Ħ	Ħ	\pm	-	+	_	+	H	++	Ħ	+
-	020-LS Tooling clamps close			1.00	59.90	H	t				H	Ħ	+		Ħ	+	-	Ħ	tt	+	-	+	_	+	廾	++	H	+
	020-TT Turntable rotates 180° to SS cut pos			6.00	65.90	t	tt	-			\Box	††	\top	$\overline{}$	Ħ	11	\dashv		t	+		+		т	\vdash	++	H	$\dashv \dashv$
	Robot 020-R02 moves in			1.50	67.40		t					TT	\top		Ħ				11	11			\top	${f H}$	一	++	Ħ	+
	Robot 020-R02 cuts (7) holes			21.00	88.40		t					TT	\top		Ħ				11	11			\top	${f H}$	一	++	Ħ	+
	Robot 020-R02 repositions			2.00	90.40		t			- 4		TT	\top		H				11	11			\top	${f H}$	一	++	Ħ	+
	Robot 020-R02 cuts (7) holes		1	21.00	111.40				H				\top		H			H	11	11			\top	т	一	++	H	+
	Robot 020-R02 clears		1	1.50	112.90				H				\top		H			Ħ	tt	11			\top	т	一	++	H	+
	020-LS Tooling clamps open			1.00	113.90		Ħ					1 1			Ħ				tt	77		11		\Box	П	+	Ħ	\dashv
	020-TT Turntable rotates 180° to Roof cut pos			6.00	119.90	tt	Ħ		Ħ	1	H				Ħ	T		Ħ	tt	\top		\top		HH	ГŤ	+	Ħ	\forall
	ROOF PROCESS					tt	Ħ		H			Ħ			Ħ		1	Ħ	1 1	11		11		\Box	П	+	H	\dashv
	Robot 020-R01 transfers to tool storage stand			8.11	157.08							TT						Ħ						П	П	T	Ħ	\top
	Robot 020-R01 obtains EOAT w/ Roof Panel			15.42	172.50		T		Ħ			${\sf TT}$	\top							11				\Box	П	TT	Ħ	\top
	Robot 020-R01 Vacuum On			2.17	174.67							П													П			\Box
	Robot 020-R01 moves to load Roof panel to STA 020			6.79	181.46							П													П			\Box
	P&F transfer in for Roof load			22.00	170.97							П													П			\Box
	Robot 020-R01 unloads cut asm from sta 20 fixture			6.00	187.46							T													П		П	\Box
	Robot 020-R01 loads uncut asm to STA 020			4.00	191.46							П			П					11		11			П		П	\Box
	020-TT Turntable rotates 180° & clamps close			5.00	196.46							Π													П		П	\Box
	ROOF LASER CUT											П													П			\Box
	Robot 020-R02 moves in			1.50	192.96							П													П			\Box
	Robot 020-R02 cuts (45) holes			40.10	233.06							П			П										П			\Box
	Wrapped Timing			59.90	59.90																							
	Robot 020-R02 moves out			1.50	61.40																							
	Turntable rotates 180° to SS cut pos			6.00	67.40																							
	ROOF DATE STAMP AND UNLOAD																											
	Robot 020-R01 moves to scribe cut Roof			3.00	194.46																							
	Roof Date Scribe Process			15.66																								
	Robot 020-R01 moves to drop cut Roof to P&F			0.84	210.96																				Ш			
	Robot 020-R01 loads Roof panel to P&F (right side)			12.86	223.82																				Ш		Щ	
	P&F transfer out w/ Roof			18.00	241.82		\coprod					\prod			\Box			\Box							$\Box \Box$	$\perp \Gamma$	Ш	\Box
							Ш		Ш			Ш	Ш		Ш			Ш					\perp		Ш		Ш	$oldsymbol{\perp}$
						oxdot	Ш		Ш			\prod	Ш		Ш			oxdot	$oxed{\Box}$	ot		$oxed{oxed}$		$oxedsymbol{oxedsymbol{oxedsymbol{\sqcup}}}$	Ш	$\perp \perp $	Щ	$oldsymbol{\perp}oldsymbol{\perp}$
						oxdot			Ш			$oldsymbol{\perp}$	$\perp \!\!\! \perp \!\!\! \perp \!\!\! \perp$		$oxed{oxed}$			Ш		Ш		Ш	\perp	$\perp \perp \perp'$	Ш	$\bot \bot$	\sqcup	$\perp \!\!\! \perp \!\!\! \perp$
	Total Cycle Time				241.82				L I			┸╽	_			⊥ା			\perp	⊥ I	[l	<u></u>	<u>L</u> l	<u> </u>	\perp \mid	/

Man and Machine Motions Operator **VOLVO** PRELIMINARY TIMING ESTIMATES P6700 TRUCK Machine VALIANT TMS* Robot SIDE SKINS / ROOF / SLEEPER FRT (17 JPH) Powered by People Operator Wait NRV -29.82 TOOL DESCRIPTION: Hours REQUIRED TOTAL TIME TOTAL TIME TOTAL MILES WALKED ROBOT OPERATOR TIME MACHINE /Shift AVAILABLE UTILIZED APPROX. 8 HR SHIFT TIME WORK WAIT % UTIL. TIME JPH **STA 010 thru 20 (DAY)** 7.4 16.98 212.00 241.82 N/A 361.07 N/A N/A N/A 210.10 STATION WALK CYCLE TIME (seconds) Cyl. RUN step # DESCRIPTION 20.0 40.0 60.0 80.0 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 DIST. SEC Num. SEC Estimated Walk Total 0 Jobs Per Hour 14.89

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	4	0.0
Robot place part	# of places Distance (# foot)	1	6.0 0.3
Robot moves on 7th axis		1	
Robot rotate to home	# of rotates	T	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	Malalia and the A		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	и -£ D 1		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 EST	IMATED TIME	66.30
	TOTAL AVA	ALABLE 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.									
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											

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%
00 (DOOF)	0004	040.00	05.00	45.000/
20 (ROOF)	20R1	212.00	95.60	45.09%
			+	
			+	