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APPENDIXES

APPENDIX A

Most data synthesis

STANDARD OPERATION SEQUENCES

Part Name
Angle support

Part No.
51 MSA 400101

Model
51 MSA 009

No. of setups required
1

No. per model
1

No. of workers required
1

Operation
Bending

Machine
B-4 (NC machine)

No	Method	No	TMU	Total TMU
1	Get+Align plate to machine against stop	1	40	40
2	Push clutch pedal with foot	2,5	40	80
3	Move plate up	3	30	30
4	Align plate to machine against stop	4	20	20
5	Ditto no. 2			
6	Get+Place bended-plate to pile (on hand truck)	6	40	40
				210
				0.126

STANDARD OPERATION SEQUENCES

Part Name Base comp.	Part No. 51 MSA 520303
Model 51 MSA 009	No. of setups required 2
No. per model 1	No. of workers required 1
Operation	Machine

No	Notching Method	N-1 or N-2 No	TMU	Total TMU
	Notch at corner [1,2] and [2,3] and [3,4] continuously			
1	Get+Align plate from hand truck to machine against stops	1,10	60	120
2	Push clutch pedal with foot	2,5,8,11	40	160
3	Overturn plate	3,6	40	80
4	Align plate to machine against stop	4,7	20	40
5	Ditto no. 2			
6-8	Repeat op. no. 3 to 5 For op. no. 6 to 8			
9	Get+Place notched-plate to pile	9,12	60	120
	Notch at corner [1,4]			
10-12	Repeat op. no. 1,2, and 9 For op. no. 10,11, and 12			

	TMU	**520**
	MINUTE	**0.312**

STANDARD OPERATION SEQUENCES

Part Name: Base comp.

Part No.: 51 MSA 520303

Model: 51 MSA 009

No. of setups required: 1

No. per model: 1

No. of workers required: 1

Operation: Punching

Machine: Manual punch press

No	Method	No	TMU	Total TMU
	Punch holes in plate			
1	Get+Align plate from hand truck to machine against stops	1	60	60
2	Push clutch pedal with foot	2	40	40
3	Get+Place punched-plate to pile (on hand truck)	3	60	60

TMU	160
MINUTE	0.097

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Base comp.	51 MSA 520303
Model	No. of setups required
51 MSA 009	2
No. per model	No. of workers required
1	3
Operation	Machine
Bending	B-3 and B-1

No	Method	No	TMU	Total TMU
	Bend at dashed line 1 (use B-3)			
1	Get+Align plate from hand truck to machine against stops	1,15	60	120
2	Push clutch pedal with foot	2,6,9, 13,16	40	200
3	Move plate up and down	3,7,10, 14,17	50	250
4	Turn plate 180 deg. (horizontal)	4,11	60	120
5	Align plate to machine against stop	5,8,12,	40	120
6	Ditto op. no. 2			
7	Ditto op. no. 3			
8	Align plate to machine against stop for bending dashed line 2			
9	Ditto op. no. 2			
10	Ditto op. no. 3			
11-14	Repeat op. no. 4 to 7 for op. no. 11 to 14 (dashed line 3)			
	Bend at dashed line 4 (use B-1)			
15-17	Repeat op. no. 1 to 3 for op. no. 15 to 17			
			TMU	**810**
			MINUTE	**0.486**

STANDARD OPERATION SEQUENCES

Part Name Base pan	Part No. 51 MSA 520304
Model 51 MSA 009	No. of setups required 1
No. per model 1	No. of workers required 1
Operation Punching	Machine Manual punch press

No	Method	No	TMU	Total TMU
	Punch all holes			
1	Get+Align plate from hand truck to machine against stops	1	80	80
2	Push clutch pedal with foot	2,5	40	80
3	Turn plate 180 deg.	3	60	60
4	Align plate to machine against stops	4	40	40
5	Ditto no. 2			
6	Get+place notched-plate to pile (on hand truck)	6	80	80

TMU	**340**
MINUTE	**0.240**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Base pan	51 MSA 520304
Model	No. of setups required
51 MSA 009	2
No. per model	No. of workers required
1	3
Operation	Machine
Bending	B-3,B-1

No	Method	No	TMU	Total TMU
	Bend at side 1,2,3 and 4 (use press brake m/c no. B-3)			
1	Get+Align plate from hand truck to machine against stop	1,18	80	160
2	Push clutch pedal with foot	2,6,10, 14,19,23	40	240
3	Move plate up and down	3,7,11, 15,20,24	90	540
4	Turn plate 90 deg. (horizontal)	4,8,12, 16,21	50	250
5	Align plate to machine against stop	5,9,13, 17,22	40	200
6-9	Repeat op. no. 2 to 5 for op. no. 6 to 9			
10-13	Repeat op. no. 2 to 5 for op. no. 10 to 13			
14-17	Repeat op. no. 2 to 5 for op. no. 14 to 17			
	Bend at side [3,4] and [1,4] (use m/c no. B-1)			
18-22	Repeat op. no. 2 to 5 for op. no. 18 to 22			
23-24	Repeat op. no. 2 and 3 for op. no. 23 and 24			

TMU	**1150**
MINUTE	**0.690**

STANDARD OPERATION SEQUENCES

Part Name Box control	Part No. 51 MSA 520302
Model 51 MSA 009	No. of setups required 3
No. per model 1	No. of workers required 1
Operation Notching	Machine

No	Method	N-1 or N-2 No	TMU	Total TMU
	Notch at corner [1,2] and [2,3]			
1	Get+Align plate from hand truck to machine against stops	1,7,13	60	180
2	Push clutch pedal with foot	,5,8,11 14	40	200
3	Overturn plate	3,9	40	80
4	Align plate to machine against stop	4,10	20	40
5	Ditto no. 2			
6	Get+Place notched-plate to pile (on hand truck)	6,12,15	60	180
	Notch at corner [1,4] and [3,4]			
7-12	Repeat op. no. 1 to 6 for op. no. 7 to 12			
	Notch at corner [2,3]			
13-15	Repeat op. no. 1,2 and 6 for op. no. 13,14,and 15			

TMU	**680**
MINUTE	**0.408**

STANDARD OPERATION SEQUENCES

Part Name Box control	Part No. 51 MSA 520302
Model 51 MSA 009	No. of setups required 2
No. per model 1	No. of workers required 1
Operation Punching	Machine Manual punch press

No	Method	No	TMU	Total TMU
	Punch holes in plate			
1	Get+Align plate from hand truck to machine against stops	1,4	60	120
2	Push clutch pedal with foot	2,5	40	80
3	Get+Place punched-plate to pile (on hand truck)	3,6	60	120
	Punch holes in plate			
4-6	Repeat op. no. 1,2 and 3 for op. no. 4,5,and 6			

TMU	**320**
MINUTE	**0.193**

STANDARD OPERATION SEQUENCES

Part Name: Box control	Part No.: 51 MSA 520302
Model: 51 MSA 009	No. of setups required: 4
No. per model: 1	No. of workers required: 2
Operation: Bending	Machine: B-3 and B-1

No	Method	No	TMU	Total TMU
	Bend at dashed line 1 (use B-3)			
1	Get+Align plate from hand truck to machine against stops	1,5,13, 17	60	240
2	Push clutch pedal with foot	2,6,10, 14,18	40	200
3	Move plate up and down	3,7,11, 15,19	70	350
4	Get+Place bended-plate to pile	4,12,16, 20	60	240
	Bend at dashed line 2 (use B-3)			
5-7	Repeat op. no. 1 to 3 for op. no. 5 to 7			
8	Turn plate 180 deg. (horizontal)	8	60	60
9	Align plate to machine against stop	9	40	40
10-12	Repeat op. no. 2 to 4 for op. no. 10 to 12			
	Bend at dashed line 3 (use B-3)			
13-16	Repeat op. no. 1 to 4 for op. no. 13 to 16			
	Bend at dashed line 4 (use B-1)			
17-20	Repeat op. no. 1 to 4 for op. no. 17 to 20			
			TMU	**1130**
			MINUTE	**0.678**

STANDARD OPERATION SEQUENCES

Part Name Angle	Part No. 42 CA 005 106/B
Model 42 CA 4	No. of setups required 1
No. per model 1	No. of workers required 1
Operation Punching	Machine Manual punch press

No	Method	No	TMU	Total TMU
	Punch holes in plate			
1	Grasp+Align plate from hand truck to machine against stops	1	40	40
2	Push clutch pedal with foot	2	40	40
3	Get+Place Punched-plate to pile	3	30	30

TMU	**110**
MINUTE	**0.066**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Angle	42 CA 005 106/B
Model	No. of setups required
42 CA 4	1
No. per model	No. of workers required
1	1
Operation	Machine
Bending	Manual press brake

No	Method	No	TMU	Total TMU
1	Grasp+Align plate from hand truck to machine against stops	1	40	40
2	Push clutch pedal with foot	2	40	40
3	Move plate up	3	30	30
4	Get+Place bended-plate to pile	4	40	40

TMU	**150**
MINUTE	**0.09**

STANDARD OPERATION SEQUENCES

Part Name Baffle Coil	Part No. 42 CA 004 122
Model 42 CA 4	No. of setups required 1
No. per model 1	No. of workers required 1
Operation Punching	Machine Manual punch press

No	Method	No	TMU	Total TMU
	Punch hole in plate (use hard die)			
1	Get+Align plate from hand truck to machine against stops	1	80	80
2	Push clutch pedal with foot	2,5	40	80
3	Overturn plate	3	40	40
4	Align plate	4	60	60
5	Push clutch pedal with foot			
6	Get+Place Punched-plate to pile	6	80	80

TMU	**440**
MINUTE	**0.264**

STANDARD OPERATION SEQUENCES

Part Name Baffle Coil	Part No. 42 CA 004 122
Model 42 CA 4	No. of setups required 5
No. per model 1	No. of workers required 1
Operation Bending	Machine Manual punch press

No	Method	No	TMU	Total TMU
	Bend at dashed line 1			
1	Get+Align plate from hand truck to machine against stops	1,5,9, 13,17	80	400
2	Push clutch pedal with foot	2,6,10, 14,18	40	200
3	Move plate up + down	3,7,11, 15,19	90	450
4	Get+Place plate to pilr	4,8,12, 16,20	80	400
	Bend at dashed line 2			
5-8	Repeat op. no 1 to 4 for op. 5 to 8			
	Bend at dashed line 4			
9-12	Repeat op. no 1 to 4 for op. 9 to 12			
	Bend at dashed line 5			
13-16	Repeat op. no 1 to 4 for op. 13 to 16			
	Bend at dashed line 3			
17-20	Repeat op. no 1 to 4 for op. 17 to 20			

TMU	**1450**
MINUTE	**0.87**

STANDARD OPERATION SEQUENCES

Part Name Channel hat	Part No. 51 MSA 520305
Model 51 MSA 009	No. of setups required 1
No. per model 2	No. of workers required 2
Operation Forming (use hard die)	Machine P-3

No	Method	No	TMU	Total TMU
1	Get+Align plate from hand truck to machine against stops	1	60	60
2	Push clutch pedal with foot	2,5	40	80
3	Turn plate 180 deg. (horizontal)	3	60	60
4	Align plate to machine against stops	4	40	40
5	Ditto op. no. 2			
6	Get+Place plate to pile	6	60	60

TMU	**300**
MINUTE	**0.180**

STANDARD OPERATION SEQUENCES

Part Name Mounting motor	Part No. 51 MSA 520306
Model 51 MSA 009	No. of setups required 4
No. per model 1	No. of workers required 1
Operation Notching	Machine N-1 or N-2

No	Method	N-1 or N-2 No	TMU	Total TMU
	Notch 90 deg.at corner [1,2] and [1,4]			
1	Get+Align plate from hand truck to machine against stops	1,7,13, 19	60	240
2	Push clutch pedal with foot	2,8,14, 20	40	160
3	Overturn plate	3,9,15, 21	40	160
4	Align plate to machine against stops	4,10,16, 22	40	160
5	Ditto no. 2	5,11,17, 23	40	160
6	Get+Place notched-plate to pile (on hand truck)	6,12,18, 24	60	240
	Notch 90 deg.at corner [2,3] and [3,4]			
7-12	Repeat op. no. 1 to 6 for op. no. 7 to 12			
	Notch 45 deg.at corner [2,3] and [3,4]			
13-18	Repeat op. no. 1 to 6 for op. no. 13 to 18			
	Notch 45 deg.at corner [1,2] and [1,4]			
19-24	Repeat op. no. 1 to 6 for op. no. 19 to 24			

	TMU	**1120**
	MINUTE	**0.672**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Mounting motor	51 MSA 520306
Model	No. of setups required
51 MSA 009	4
No. per model	No. of workers required
1	1
Operation	Machine
Punching	Manual punch press

No	Method	No	TMU	Total TMU
	Punch 6 circular holes (6 mm. dia.)			
1	Get+Align plate from hand truck to machine against stops	1,4,9, 14	60	240
2	Push clutch pedal with foot	2,5,7, 10,12,15	40	240
3	Get+Place punched-plate to pile (on hand truck)	3,8,13, 16	60	240
	Punch rectangalar hole (125.0x200.0 mm.)			
4	Ditto no. 1			
5	Ditto no. 2			
6	Align plate to machine against stops	6,11	20	40
7	Ditto no. 2			
8	Ditto no. 3			
	Punch rectangalar hole (125.0x137.0 mm.)			
9-13	Repeat op no. 4 to 8 for op. no. 9 to 13			
	Punch 125.0 mm circular holes			
14-16	Repeat op no. 1 to 3 for op. no.14 to 16			
			TMU	**760**
			MINUTE	**0.457**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Mounting motor	51 MSA 520306
Model	No. of setups required
51 MSA 009	5
No. per model	No. of workers required
1	3
Operation	Machine
Bending	B-3 and B-1

No	Method	No	TMU	Total TMU
	Bend at dashed line 1 (use B-3)			
1	Get+Align plate from hand truck to machine against stops	1,4,11, 14,17	60	300
2	Push clutch pedal with foot	2,5,9, 12,15,18	40	240
3	Move plate up and down	3,6,10, 13,16,19	50	300
	Bend at dashed line 2 (use B-3)			
4-6	Repeat op. no. 1 to 3 for op. no. 4 to 6			
7	Turn plate 180 deg.(horizontal)	7	60	60
8	Align plate to machine against stop	8	40	40
9-10	Repeat op. no. 2 and 3 for op. no. 9 and 10			
	Bend at dashed line 3 (use B-3)			
11-13	Repeat op. no. 1 to 3 for op. no. 11 to 13			
14-16	**Bend at dashed line 4 (use B-3)**			
	Repeat op. no. 1 to 3 for op. no. 14 to 16			
	Bend at dashed line 5 (use B-1)			
17-19	Repeat op. no. 1 to 3 for op. no. 17 to 19			
			TMU	940
			MINUTE	0.564

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Partition	51 MSA 520301
Model	**No. of setups required**
51 MSA 009	1
No. per model	**No. of workers required**
1	1
Operation	**Machine**
Punching	Manual punch press

No	Method	No	TMU	Total TMU
	Punch all holes			
1	Get+Align plate from hand truck to machine against stops	1	60	60
2	Push clutch pedal with foot	2	40	40
3	Get+Place punched-plate to pile (on hand truck)	3	60	60

TMU	**160**
MINUTE	**0.097**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Partition	51 MSA 520301
Model	No. of setups required
51 MSA 009	3
No. per model	No. of workers required
1	1
Operation	Machine
Notching	N-1 or N-2

No	Method	No	TMU	Total TMU
	Notch at corner [1,2]			
1	Get+Align plate from hand truck to machine against stops	1,4,7	60	180
2	Push clutch pedal with foot	2,5,8, 11	40	160
3	Get+Place notched-plate to pile (on hand truck)	3,6,12	60	180
	Notch at corner [2,3]			
4-6	Repeat op. no. 1 to 3 for op. no. 4 to 6			
	Notch at corner [3,4]&[1,4] continuously			
7	Ditto no.1			
8	Ditto no. 2			
9	Overturn plate	9		40
10	Align plate to machine against stops	10		20
11	Ditto no. 2			
12	Ditto no. 3			

	TMU	**580**
	MINUTE	**0.348**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Partition	51 MSA 520301
Model	No. of setups required
51 MSA 009	1
No. per model	No. of workers required
1	3
Operation	Machine
Bending	B-4 (NC machine)

No	Method	No	TMU	Total TMU
	Bend 90 deg. at dashed lines 1,2,3 and 4 continuously			
1	Get+Align plate from hand truck to machine against stops	1,12,15	60	180
2	Push clutch pedal with foot	2,6,10, 13,16	40	160
3	Move plate up and down	3,7,11, 14,17	50	250
4	Turn plate 90 deg.	4,8	30	60
5	Align plate to machine against stop	5,9	40	80
6-9	Repeat op. no. 2 to 5 for op. no. 6 to 9			
10-11	Repeat op. no. 2 and 3 for op. no. 10 and 11			
	Bend 126 deg. at dashed line 4			
12-14	Repeat op. no. 1 to 3 for op. no. 12 to 14			
	Bend 144 deg. at dashed line 5			
15-17	Repeat op. no. 1 to 3 for op. no. 15 to 17			

TMU	**770**
MINUTE	**0.462**

STANDARD OPERATION SEQUENCES

Part Name Coil Support L/R	Part No. 42 CA 004 123
Model 42 CA 4	No. of setups required 2
No. per model 1 each	No. of workers required 1
Operation Notching	Machine N-1 or N-2

No	Method	No	TMU	Total TMU
	Notch at corner [2,3]			
1	Grasp+Align plate from hand truck to machine against stops	1,4	40	80
2	Push clutch pedal with foot	2,5	40	80
3	Get+Place notch plate to pile	3,6	40	80
	Notch plate at corner [3,4]			
	Repeat op. no. 1 to 3 for op. no. 4 to 6			

	TMU	**240**
	MINUTE	**0.144**

STANDARD OPERATION SEQUENCES

Part Name Coil Support L/R	Part No. 42 CA 004 123
Model 42 CA 4	No. of setups required 1
No. per model 1 each	No. of workers required 1
Operation Punching	Machine Manual punch press

No	Method	No	TMU	Total TMU
1	Grasp+Align plate from hand truck to machine against stops	1	40	40
2	Push clutch pedal with foot	2,5	40	80
3	Turn plate 180 deg. (horizontal)	3	30	30
4	Align plate	4	20	20
5	Push clutch pedal with foot	6	40	40
6	Get+Place Punched-plate to pile			

TMU	210
MINUTE	0.126

STANDARD OPERATION SEQUENCES

Part Name Coil Support L/R	Part No. 42 CA 004 123
Model 42 CA 4	No. of setups required 1
No. per model 1 each	No. of workers required 1
Operation Bending	Machine Manual press brake

No	Method	No	TMU	Total TMU
1	Grasp+Align plate from hand truck to machine against stops	1	40	40
2	Push clutch pedal with foot	2,5	40	80
3	Move plate up + down	3,6	30	60
4	Align plate	4	20	20
5	Push clutch pedal with foot			
6	Move plate up + down			
7	Get+Place bended-plate to pile	7	40	40

TMU	**240**
MINUTE	**0.144**

STANDARD OPERATION SEQUENCES

Part Name Cond. Tray	Part No. 42 CA 005 100
Model 42 CA 4	No. of setups required 2
No. per model 1	No. of workers required 1
Operation Notching	Machine N-1 or N-2

No	Method	No	TMU	Total TMU
	Notch at corner[1,2] and [2,3]			
1	Grasp+Align plate from hand truck to machine against stops	1,7	40	80
2	Push clutch pedal with foot	2,5,8, 11	40	120
3	Overturn plate	3,9	30	60
4	Align plate to m/c against stop	4,10	20	40
5	Ditto op. no. 2	6,12	40	80
6	Get+Place notch plate tc pile			
	Notch plate at corner [],4] and [3,4]			
7-12	Repeat op. no. 1 to 6 for op. no 7 to 12			

TMU	**420**
MINUTE	**0.252**

STANDARD OPERATION SEQUENCES

Part Name Cond. Tray	Part No. 42 CA 005 100
Model 42 CA 4	No. of setups required 1
No. per model 1	No. of workers required 1
Operation Punching	Machine Manual punch press

No	Method	No	TMU	Total TMU
	Punch holes in plate			
1	Grasp+Align plate from hand truck to machine against stops	1	40	40
2	Push clutch pedal with foot	2	40	40
3	Get+Place notch plate to pile	3	40	40

TMU	**120**
MINUTE	**0.072**

STANDARD OPERATION SEQUENCES

Part Name Cond. Tray	Part No. 42 CA 005 100
Model 42 CA 4	No. of setups required 2
No. per model 1	No. of workers required 1
Operation Bending	Machine Manual press brake

No	Method	No	TMU	Total TMU
	Bend at dashed lines 1,2, and 3			
1	Grasp+Align plate from hand truck to machine against stops	1,13	40	80
2	Push clutch pedal with foot	2,6,10, 14	40	160
3	Move plate up	3,7,11, 15	50	200
4	Turn plate 90 deg. (horizontal)	4,8	30	60
5	Align plate	5,9	20	40
6	Push clutch pedal with foot			
7	Move plate up			
8	Turn plate 90 deg. (horizontal)			
9	Align plate			
10	Push clutch pedal with foot			
11	Move plate up			
12	Get+place bended-plate to pile	12,16	40	80
	Bend at dashed lines 1,2, and 3			
13-16	Repeat op. no. 1 to 3 and 12 for op. no 13,14,15 and 16			

	TMU	**620**
	MINUTE	**0.372**

STANDARD OPERATION SEQUENCES

Part Name: Cover Coil	Part No.: 42 CA 004 121
Model: 42 CA 4	No. of setups required: 1
No. per model: 1	No. of workers required: 1
Operation: Punching	Machine: Manual punch press

No	Method	No	TMU	Total TMU
	Punch hole in plate (use hard die)			
1	Get+Align plate from hand truck to machine against stops	1	80	80
2	Push clutch pedal with foot	2,5	40	80
3	Overturn plate	3	40	40
4	Align plate	4	60	60
5	Push clutch pedal with foot			
6	Get+Place Punched-plate to pile	6	80	80

TMU	**440**
MINUTE	**0.264**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Cover Coil	42 CA 004 121
Model	No. of setups required
42 CA 4	3
No. per model	No. of workers required
1	1
Operation	Machine
Punching	Manual punch press

No	Method	No	TMU	Total TMU
	Bend at dashed line 1			
1	Get+Align plate from hand truck to machine against stops	1,5,9	80	240
2	Push clutch pedal with foot	2,6,10	40	120
3	Move plate up + down	3,7,11	90	270
4	Get+Place plate to pilr	4,8,12	80	240
	Bend at dashed line 2			
	Repeat op. no 1 to 4 for op. 5 to 8			
	Bend at dashed line 3			
	Repeat op. no 1 to 4 for op. 9 to 12			

TMU	**870**
MINUTE	**0.522**

STANDARD OPERATION SEQUENCES

Part Name Motor Bracket	Part No. 42 JE 0400 409
Model 42 CA 4	No. of setups required 2
No. per model 1	No. of workers required 1
Operation Notching	Machine N-1 or N-2

No	Method	No	TMU	Total TMU
	1st Notching			
1	Get+Align plate from hand truck to machine against stops	1,7	60	120
2	Push clutch pedal with foot	2,8	40	80
3	Overturn plate	3,9	40	80
4	Align plate	4,10	40	80
5	Ditto op. no. 2	5,11	40	80
6	Get+Place notched-plate to pile	6,12	60	120
	2nd Notching			
7-12	Repeat all operations			

TMU	**560**
MINUTE	**0.336**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Fan Deck	42 CA 004 126
Model	No. of setups required
42 CA 4	1
No. per model	No. of workers required
1 each	1
Operation	Machine
Punching	Manual punch press

No	Method	No	TMU	Total TMU
	Punch rectangular hole in plate			
1	Get+Align plate from hand truck to machine against stops	1,6	80	160
2	Push clutch pedal with foot	2,4,7, 9	40	160
3	Align plate	3,8	60	120
4	Push clutch pedal with foot			
5	Turn plate 180 deg. (horizontal)	5	80	80
	Repeat op. no. 1 to 4 for op. 6 to 9 to punch another hole			
10	Get+Place punched-plate to pile	10	80	80

	TMU	**600**
	MINUTE	**0.360**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Fan Deck	42 CA 004 126
Model	No. of setups required
42 CA 4	3
No. per model	No. of workers required
1 each	1
Operation	Machine

Notching

No	Method	N-1 or N-2 No	TMU	Total TMU
	Notch at corner [1,2] and [1,4]			
1	Get+Align plate from hand truck to machine against stops	1,7	80	160
2	Push clutch pedal with foot	2,5,6, 11,14,17	40	240
3	Overturn plate	3,9	40	80
4	Align plate	4,10,13 16	60	240
5	Ditto op. no. 2			
6	Get+Place notched-plate to pile	6,18	80	160
	Notch at corner [1,2] and [1,4]			
7-10	Repeat op. no. 1 to 5 for op. 7 to 11			
12	Turn plate 90 deg. (horizontal)	12,15	60	120
13	Align plate			
14	Ditto op. no. 2			
15	Turn plate 90 deg.			
16	Align plate			
17	Ditto op. no. 2			
18	Get+Place notched-plate to pile			

TMU	**1000**
MINUTE	**0.600**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Fan Deck	42 CA 004 126
Model	**No. of setups required**
42 CA 4	4
No. per model	**No. of workers required**
1	1
Operation	**Machine**
Bending	B-1 and HACO

No	Method	No	TMU	Total TMU
	Bend at dashed line 1 (use HACO)			
1	Get+Align plate from hand truck to machine against stops	1,5,9, 13	80	320
2	Push clutch pedal with foot	2,6,10, 14,18	40	200
3	Move plate up+down	3,7,11, 15,19	90	90
4	Get+Place bended-plate to pile	4,8,12, 20	80	320
	Bend at dashed line 2 (use HACO)			
5-8	Repeat op. no. 1 to 4 for op. 5 to 8			
	Bend at dashed line 3 (use HACO)			
9-12	Repeat op. no. 1 to 4 for op. 9 to 12			
	Bend at dashed line 4 (use B-1)			
13-15	Repeat op. no. 1 to 3 for op. 13 to 15			
16	Turn plate 180 deg. (horizontal)	16	80	80
17	Align plate	17	40	40
18	Push clutch pedal with foot			
19	Move plate up+down			
20	Get+Place bended-plate to pile			

	TMU	**1410**
	MINUTE	**0.846**

STANDARD OPERATION SEQUENCES

Part Name	Part No.
Motor Bracket	42 JE 0400 409
Model	No. of setups required
42 CA 4	2
No. per model	No. of workers required
1	1
Operation	Machine
Punching	Manual punch press

No	Method	No	TMU	Total TMU
	Punch plate using hard die			
1	Get+Align plate from hand truck to machine against stops	1,7	60	120
2	Push clutch pedal with foot	2,5,8	40	120
3	Turn plate 180 deg.	3	60	60
4	Align plate	4	40	40
5	Ditto op. no. 2			
6	Get+Place punched-plate to pile	6,9	60	120
	Forming (use hard die with m/c 'P-3')			
7	Get+Align plate from hand truck to machine against stops			
8	Push clutch pedal with foot			
9	Get+Place punched-plate to pile			

TMU	**460**
MINUTE	**0.276**

STANDARD TIME CALCULATION

SHEARING OPERATION

Part Name Mounting motor	Drwg. No. 51 MSA 520 306	Page 1 of 4
Model 51 MSA 009	Material 1.6 EG	Date effective
No. per model 1	Unit Weight 1.0 kg.	
Quantity N		

Operation	TMU	Fr	Total (min)
Setup time			
Crank 10 rev. of handwheel for adjusting stop	230	2	0.28
Measure plate length using steel-tape 2 m.	190	2	0.23
Time needed for other activities.	5000	2	6.00
Scrap cut off			
1. Op.-1 Get+Slide 1 plate from pile (on table) to op.-2 & 3.	120	2A	0.14A
2. Op.-2 & 3 Align plate on m/c against stop	60	2A	0.07A
3. Op.-3 Push clutch pedal with foot	60	2A	0.07A
4. Op.- 2 & 3 Get+Move cut-plate to table	100	2A	0.12A
1st side cutting			
1. Op.-2 & 3 Get+Move 1 plate from pile	70	A	0.04A
2. Op.-2 & 3 Align plate on m/c against stop	70	AB	0.04AB
3. Op.-3 Push clutch pedal with foot	60	AB	0.04AB
2nd side cutting			
1. Op.-2 & 3 Get+Move 1 plate from pile	60	AB	0.04AB
2. Op.-2 & 3 Align plate on m/c against stop	70	ABC	0.04ABC
3. Op.-3 Push clutch pedal with foot	60	ABC	0.04ABC

Total leveled minutes 6.51 + 0.44 A + 0.08 B + 0.12 AI

Add 30 % P.F.& D. allowances = 1.3 x (6.51 + 0.44 A + 0.08 B + 0.12 ABC

Remarks :

A = No. of standard plates (4' x 8') from rack.

B = No. of cut-plates cut from 1 standard plate.

C = No. of cut-plates cut from 1 plate of B.

STANDARD TIME CALCULATION

NOTCHING OPERATION

Part Name: Mounting motor	Drwg. No.: 51 MSA 520 306	Page: 2 of 4
Model: 51 MSA 009	Material: 1.6 EG	Date effective:
No. per model: 1	Unit Weight: 1.0 kg.	
Quantity: N		

	TMU	Fr	Min	Total (min)
Setup time		4	2	8.00
Run time				
Grasp+Align plate from hand truck to m/c against stop	-			
Get+Align plate from hand truck to m/c against stop	60	4	0.03	0.144
Push clutch pedal with foot	40	8	0.02	0.192
Overturn plate	40	4	0.02	0.096
Align plate to m/c against stop(s)	40	4	0.02	0.096
Turn plate 180 deg. (horizontal)	80			
Get+Place punched-plate to pile	60	4	0.03	0.144
Move notched-plate lay aside m/c	-			
				0.672

No. of plates x run time = 0.672 N mins.

Total leveled minutes = 8 + 0.672 N mins.

Add 30 % P.F.& D. allowances

= 1.3 (8 + 0.672 N) mins.

STANDARD TIME CALCULATION

PUNCHING OPERATION

Part Name: Mounting motor
Drwg. No.: 51 MSA 520 306
Page: 3 of 4
Model: 51 MSA 009
Material: 1.6 EG
Date effective:
No. per model: 1
Unit Weight: 1.0 kg.
Quantity: N

	TMU	Fr	Min	Total (min)
Setup time		4	5	20.00
Run time				
Grasp+Align plate from hand truck to m/c against stop	-			
Get+Align plate from hand truck to m/c against stop	60	4	0.036	0.144
Push clutch pedal with foot	40	6	0.024	0.144
Overturn plate	40			
Align plate to m/c against stop(s)	40	2	0.024	0.048
Turn plate 180 deg. (horizontal)	80			
Get+Place punched-plate to pile	60	4	0.036	0.144
Move punched-plate lay aside m/c	-			
				0.480

No. of plates x run time = 0.480 N mins.

Total leveled minutes = 20 + 0.480 N mins.

Add 30 % P.F.& D. allowances

= 1.3 (20 + 0.480 N) mins.

STANDARD TIME CALCULATION

BENDING OPERATION

Part Name Mounting motor	Drwg. No. 51 MSA 520 306	Page 4 of 4
Model 51 MSA 009	Material 1.6 EG	Date effective
No. per model 1	Unit Weight 1.0 kg.	
Quantity N		

	TMU	Fr	Min	Total (min)
Setup time		5	10	50.00
Run time				
Grasp+Align plate from hand truck to m/c against stop	-			
Get+Align plate from hand truck to m/c against stop	60	5	0.036	0.180
Push clutch pedal with foot	40	6	0.024	0.144
Move plate up and down	50	6	0.030	0.180
Align plate to m/c against stop(s)	40	1	0.024	0.024
Turn plate 90 deg. (horizontal)	40			
Turn plate 180 deg. (horizontal)	60	1	0.036	0.036
				0.564

No. of plates x run time = 0.564 N mins.

Total leveled minutes = 50 + 0.564 N mins.

Plus 30 % P.F.& D. allowances

= 1.3 (50 + 0.564 N) mins.

Operation Lead Time Calculation

Part Name
Mounting motor

Drwg. No.
51 MSA 520 306

Model
51 MSA 009

Material
1.6 EG

No. per model
1

Unit Weight
1.0 kg.

Quantity
N

(1) (2)

Seq. No.	Operation	Machine	No. of setup	Setup (min)	Run/plate (min)	Run time for n plates (min)	Tot. time (min)
1	SHEAR	S-2	4	6.5		0.44 A + 0.08 AB + 0.12 ABC	(1)+(2)
2	NOTCH	N-1 or N-2	4	8	0.672	0.672 N	(1)+(2)
3	PUNCH	Manual punch press m/c	4	20	0.456	0.456 N	(1)+(2)
4	BEND	B-3	4	40	0.474	0.474 N	(1)+(2)
5	BEND	B-1	1	10	0.090	0.090 N	(1)+(2)
						Total time =	?

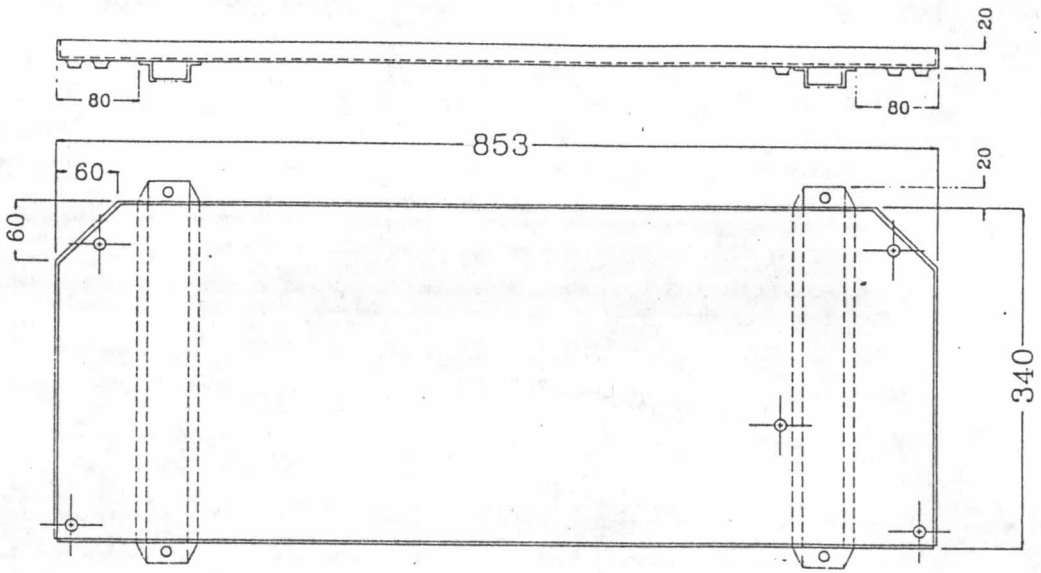
Multiply 1.3 for P.F.& D.

? x 1.3 = [redacted] min.

Operation lead time = [redacted] min.

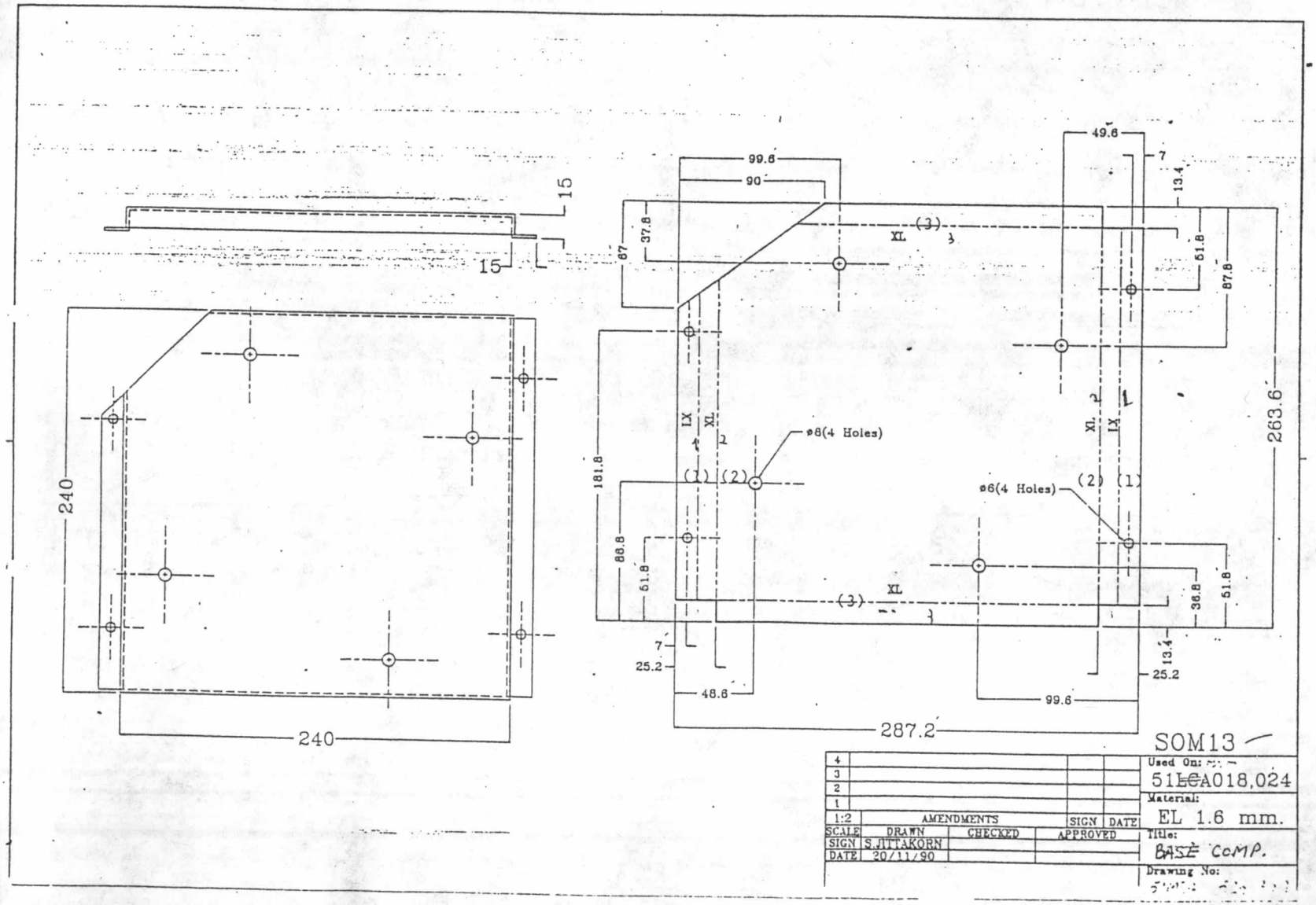
APPENDIX B

Drawings



SOM

4				Used On:
3				51HSA018,024
2				Material:
1				
1:4	AMENDMENTS		SIGN DATE	
SCALE	DRAWN	CHECKED	APPROVED	Title:
SIGN	S.JITTAKORN			BASE · ASS'Y
DATE	26/11/90			Drawing No: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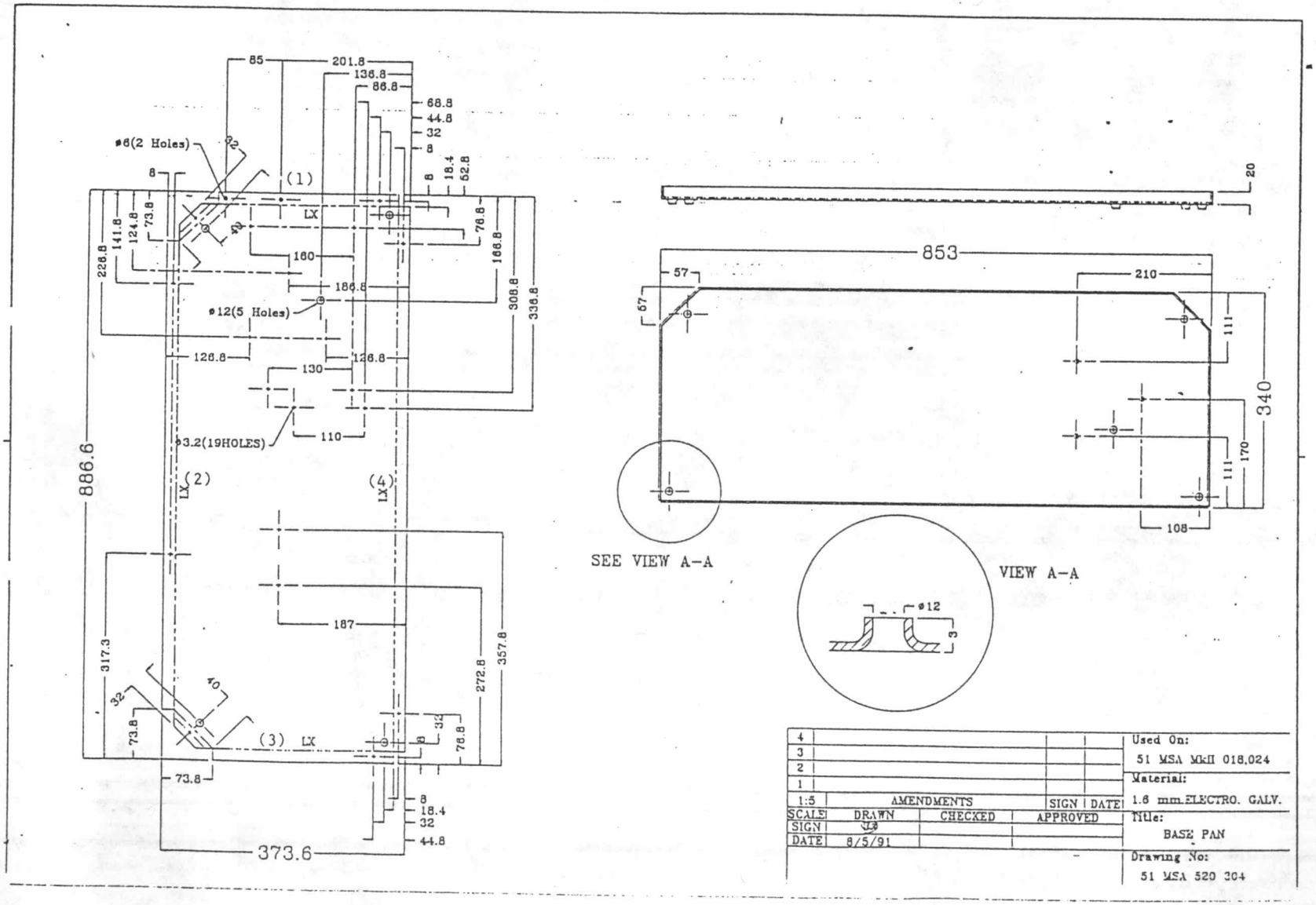
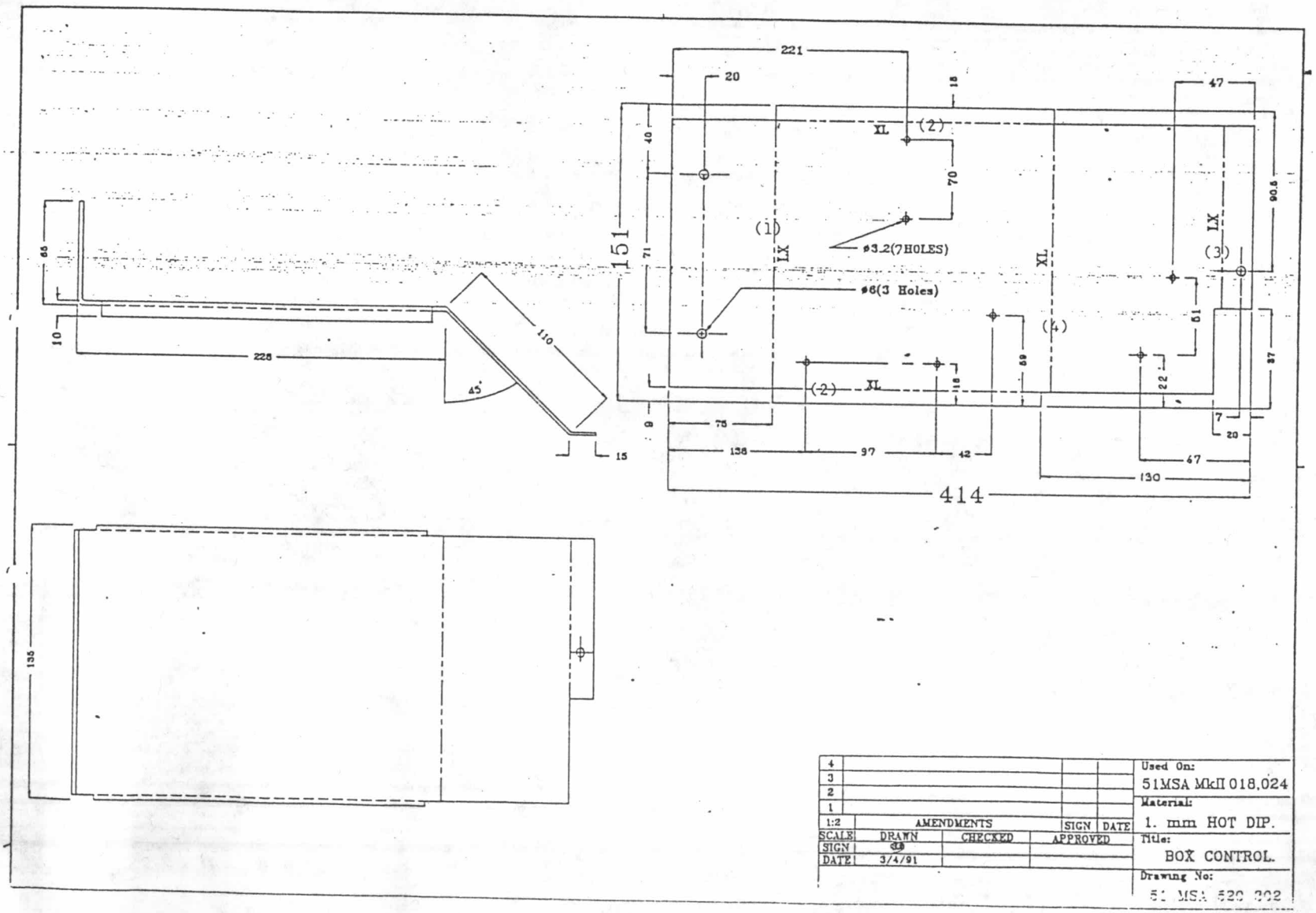
15
240
240
99.6
90
49.6
7
13.4
37.8
87
51.8
87.8
263.6
181.8
ø8(4 Holes)
ø6(4 Holes)
(1) (2)
(2) (1)
(3)
XL
LX
88.8
51.8
36.8
7
25.2
48.8
99.6
287.2
SOM13
AMENDMENTS
SIGN
DATE
SCALE
DRAWN
CHECKED
APPROVED
SIGN
S.JITTAKORN
DATE
20/11/90
1:2
Used On:
51LCA018,024
Material:
EL 1.6 mm.
Title:
BASE COMP.
Drawing No:


85
201.8
136.8
86.8
68.8
44.8
32
8
ø6(2 Holes)
(1)
LX
160
186.8
ø12(5 Holes)
126.8
130
110
ø3.2(19HOLES)
886.6
(2)
(4)
187
317.3
272.8
357.8
(3) LX
373.6
853
210
57
340
111
170
108
20
SEE VIEW A-A
VIEW A-A
ø12
3
Used On:
51 MSA MkII 018,024
Material:
1.6 mm.ELECTRO. GALV.
Title:
BASE PAN
Drawing No:
51 MSA 520 304
AMENDMENTS
SIGN
DATE
SCALE
DRAWN
CHECKED
APPROVED
1:5
8/5/91



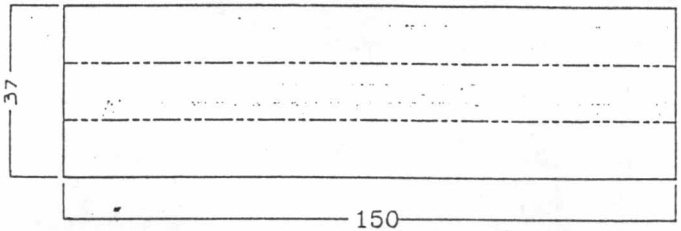
4					
3					
2					
1					
1:2	AMENDMENTS			SIGN	DATE
SCALE	DRAWN	CHECKED	APPROVED		
SIGN					
DATE	3/4/91				

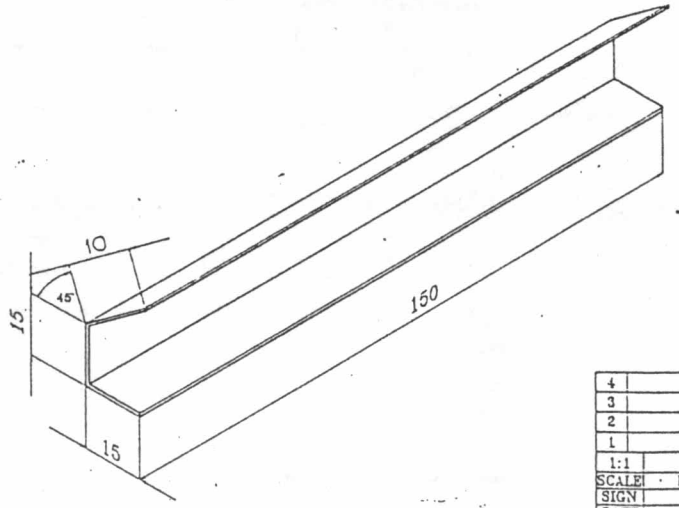
Used On:
51MSA MkII 018,024

Material:
1. mm HOT DIP.

Title:
BOX CONTROL.

Drawing No:
51 MSA 530 302





SOM14

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3				
2				
1				Material: EL 1.0 mm.
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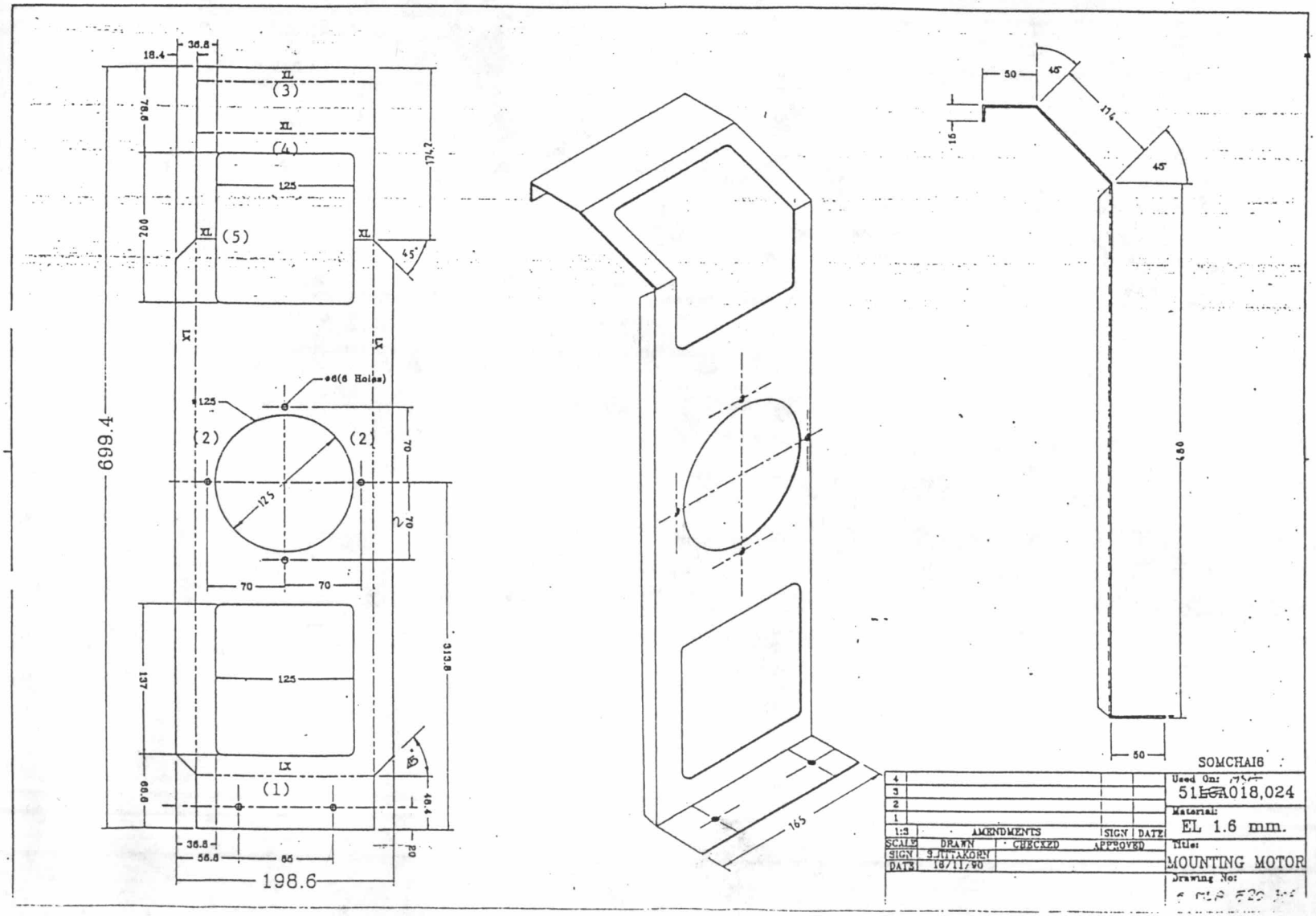
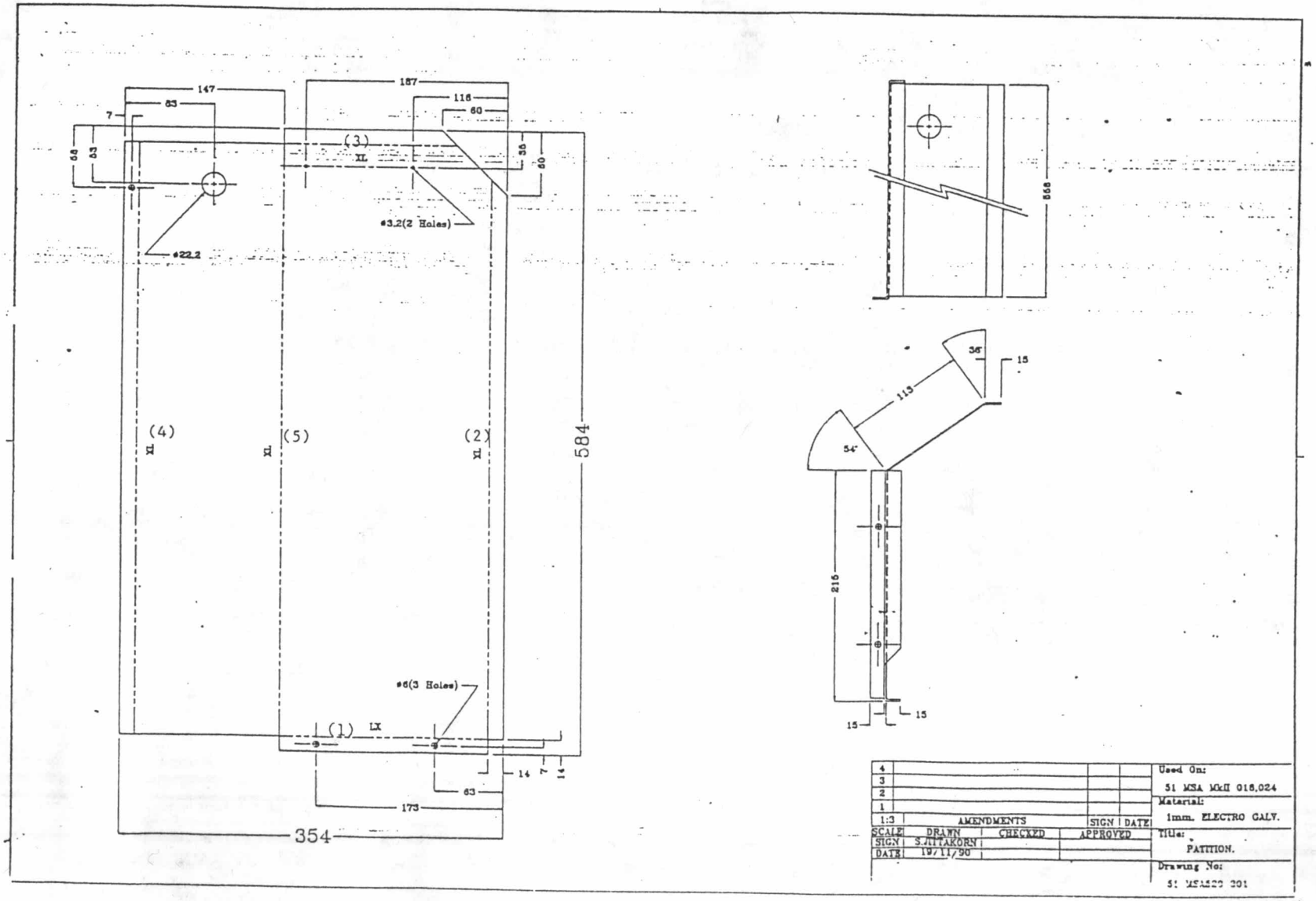
SCALE	DRAWN	CHECKED	APPROVED	Title: 1. mm ELECTRO.
SIGN				
DATE				Drawing No:


18.4
36.8
XL
(3)
(4)
(5)
125
200
174.2
45°
699.4
ø6(6 Holes)
(2)
125
70
137
313.8
(1)
69.8
49.4
36.8
55.8
85
198.6
50
45°
114
18
180
165
SOMCHAIS
Used On: 7ST
51EGA018,024
Material:
EL 1.6 mm.
Title:
MOUNTING MOTOR
Drawing No:
AMENDMENTS
SIGN
DATE
SCALE
DRAWN
CHECKED
APPROVED
SIGN
9JITTAKORN
DATE
18/11/90



4				Used On:
3				51 MSA MkII 018,024
2				Material:
1				1mm. ELECTRO GALV.
1:3	AMENDMENTS		SIGN | DATE	Title:
SCALE	DRAWN	CHECKED	APPROVED	PARTITION.
SIGN	S.JITTAKORN			
DATE	19/11/90			Drawing No:
				51 MSA02 201

APPENDIX C

Work Management Manual

WORK MANAGEMENT MANUAL

The manual is the final product of the MOST Application Systems (MAS). The objective of labor control is for plant managers, supervisors, and foremen to maintain the ability to have work performed effectively. Proper work management in any shop must be based on documentation of all data concerning the available facilities, the methods employed, and standard practices and organizational procedures. It is therefore essential to establish and record all relevant conditions and procedures including standards for operations performed in " *Work Management Manual* "

Such information included in these manuals as of the information for production planning and control, production routings, work processing, establishment of time standards.

The following provides the details of sections in a Work Management Manual :

1. SCOPE

The section is used to identify the types of work and areas in which they are performed, and to describe the products and components which are affected.

2. STANDARD PRACTICES AND POLICIES

This section contains standard practices and policies which are applicable or affect to the work.

3. FACILITIES AND EQUIPMENT

The section is used to identify the facilities and equipment which needed to perform the work covered by the manual.

4. LAYOUTS AND MATERIAL FLOW

This section is used to locate each work area within the department covered by the manual and to describe how materials flow into, through, and out of the work areas.

5. PROCESS DATA

The section is used to describe how process time were derived. Process time is that part of an operation which is considered to be beyond the control of operator, even though it is understood that by changing settings or adjustments on machines the operator can, influence process times.

6. STANDARD TIME CALCULATION

This section describes how to establish a standard.

7. DATA SYNTHESIS AND BACKUP

This section contains all the data and supporting information used in developing the standard time calculations.

9. ALLOWANCE

This section is used to identify allowances needed to perform a work.

1.0 SCOPE

1.1 Plant area

means the working area of the fabrication section ; only shearing, punching, and bending operation.

1.2 Products and components

The fabrication section is reponsible to produce sheet-metal components for all types of air conditioner.

1.3 Materials

The raw materials used in the fabrication section are standard 4 feet x 8 feet hot-dipped and electro galvanized steel sheets. The thickness of sheet metal are 1.0, 1.2, 1.6, 2.0, and 3.0 mm.

1.4 Operations

Shearing, notching, punching, and bending.

2.0 STANDARD PRACTICES AND POLICIES

2.1 Care of equipment and work area

a) Operator should maintain machine, tools, and equipments prompt to be used. If the machine is break down the operator must tell foreman and repair the machine quickly.

b) Before leaving the daily work at the evening, operator must shut off machine switches, clean the work area and keep tools

and equipment at tools kit or the appropriate locations.

2.2 Material service

Material service will be classified according to machine's types and general services as follows :

2.2.1 Material uses at a specific machine

a) Shearing machines

Racks are used to store sheet metals wich are purchased from suppliers.

Tables, which are in front of shearing machine, are used for placing sheet metals (before they are moved to shear).

Bar-Woods are use for stacking the sheared plates for ease to transport by fork truck.

b) Punch press machines

Shelf is used to kept die sets.

Work benches are used for placing instruments such as tool, punch pin, die, stopper etc.

Base plate is used with a set of punch and die assembly.

Manual four-wheels hand trucks are used to assemble a die set and transport die set to punch press machine.

c) Press brake machine

Table is used for placing accessories of machine's upper teeth and lower die.

Bar-Woods are use for stacking the bended plates for ease to transport by fork truck.

2.2.2 General material service

a) *Fork truck* is used for the following tasks :

Transports large and/or heavy load of sheet metals from rack to table in front of shearing machine.

Transports a pile of workpieces (which is stacked on bar-woods or pallet) from floor to floor.

Transports a pile of bended plates to the work center of welding or rolling or powder coating.

Transports a scrap bin.

Handling a die set from floor to punch press machine.

b) *Scrap bin* for collecting the damaged sheet metal or scraps.

c) *Manual four-wheels hand trucks* for transporting workpieces between machines (normally between work center).

d) *Templates*

2.3 Work assignment

Supervisor will control production throughout the shop while a foreman controls only a specific work center.

2.4 The responsibilities of supervisor and foremen

a) Supervisor has the following responsibilities :

Contacts with production officers to get job orders and information about the orders.

Daily production informing.

Informs the plant's news, policies, and information to his workers.

Closely coordinates with foremen.

Closely coordinates with the assembly section.

Others responsibilities correspondent to job description of organization.

b) Foreman has the following responsibilities :

Directs and control the working at a specific work center.

Informs work center manpower of assignments.

Closely coordinates with another work centers.

Others responsibilities correspondent to job description of organization.

2.5 Setup

2.5.1 Shearing machine

Cranks handwheel or pushs a button (depends on machines) to adjust back gauge to the required shear depth. It is often used extened carriage install to machine S-1 because this machine is mainly used for a large workpieces. It may be used front gauge when a lean plate is produces because of the limitation of the machine setup.

2.5.2 Notching machines

Adjusts jigs to the position required.

2.5.3 Manual punch press machines

Two types of die sets are used for punch press machine, one is "*completed die set*" and the other is "*punch holder die set*".

A completed die set is used only for a certain type of

workpiece because of the fixed position of punch and die. When use this type of die, operator will move it (from shelf or floor beside machine) to install on baseplate of machine, then lubricate the die with oil. The machine shut height may be adjusted if necessary.

Punch holder die set is a type of semi-finished die. Many sizes of punch holders are used. Each punch holder has a hole for assembling a certain size of a punch pin and a die. When use the die set, operator will assemble punch holder with another accessories on baseplate and then move it to install on baseplate of machine.

2.5.4 Press brake machines

Press brake machines are classified to two types : manual and NC machine. For manual machine, normally, the setup activities are Changing upper teeth and lower die (if required), adjusting shut height, adjusting the position of lower die for the bending angle required.

2.6 Safety

a) Places or keeps material and equipments to an appropriate locations on floor preventing foot against.

b) Workpieces on hand truck should be stacked with a safe pattern to prevents the workpiece sliding.

c) Get or slide workpiece with carefully, especially for a large workpiece.

d) Wear glove to prevent the sharp edge of material and should wear a metal-head shoes to protect a hard material drop to feet.

e) Protects the loud noise using ear-muff.

f) Should not control machine when sleepy or sick.

g) Check the readiness of machine before start. This includes confirmining that required safety devices are installed and operational.

2.7 Standard operation

The definition of standard operation is the determined standards concerning to operations, methods of operation, management, tools and equipment, and others.

The standard operation will not fixed and can be changed corresponding to the real environment for higher standardized operation.

This section contains only a standard practice for shearing, punching, and bending operation. Such details as machines, materials, and standard times will be contained in another sections.

3.0 FACILITY AND EQUIPMENT

3.1 Production equipment

The production equipment means the machines used in the workplace covered by this manual.

The list of machine and their utilities are shown in Chapter 3 in Table 3.2.

3.2 Auxiliary equipment

Auxiliary equipment is secondary or supporting equipment required to perform the work covered by the manual.

The following are the auxiliary equipment which are used by each types of machines :

3.2.1 Shearing machines are normally used a *steel-tape measure, vernier,* and *C-clamps.*

3.2.2 Notching machines are normally used *vernier, wrench no.17.*

3.2.3 Manual punch press machine

The equipment are classified to 3 groups

a) *Die sets*

Punch holders have the following sizes

4 BN 3, 8 BN 1 1/4, 8 BN 1 3/4, 8 BN 2 1/4, 8 BN 3,

12 BN 1 1/4, 12 BN 2 1/4, 12 BN 5,

18 BN 3/4, 18 BN 2 1/4, and *200 BN 128.*

Baseplate the plate for die set assembly.

Bolts used for tightening punch holders, stoppers and guides to basplate.

Stoppers and *guides* are used as jig and fixture.

b) Tools used for die assembly

Center punch is used to aligns punch holder to the correct positions.

Wrench no.17 is used to tighten a nut of bolt to attach punch holder and/or stopper.

3 mm. and 6 mm. hexagonal key is used to tighten screw of punch and die.

c) Tools used for machine setup

60 mm. wrench is used for tighteningnut to adjust shut height.

8 mm. dia. steel rod is used to adjust the head of punch press machine.

3.3.4 Press brake machine normally used *steel-tape measure, vernier, wrench no. 17,* and *C-clamp.*

3.3 Material handling equipment

See section 2.2.2.

4.0 LAYOUT AND MATERIAL FLOW

See Figure 3.8 and 3.12 in Chapter 3.

5.0 PROCESS DATA

5.1 Workpiece classification

The activities for loading, aligning, and unloading different sizes of sheet-metal parts at machine need different processing time. The workpieces then should be classified to 3 groups as follows :

Group 1. Small or light objects. Objects that are easily grasped, aligned, and manipulate with one hand. The long side should not over 300 mm. and weight should not be over 0.5 kg.

Group 2. Medium objects. Objects that are slightly difficult to load, align, and unload. The long side should not over 600 mm. and index value (plate length multiplied by weight) should not be over 1,000.

Group 3. Large or heavy objects. Objects that are difficult to

handle due to length and/or weight.

Flow diagram which is used for specifying the group for each component are shown by Figure 4.1 (Chapter 4). See also Table 4.1, an example of specified group for sheet-metal parts.

5.2 Setup times

Machine and equipment setup time are following

Machine	minutes	Remarks
Shearing m/c	3 to 5	
Notching m/c	1 to 2	
Punch press m/c	15	excepts CNC m/c.
Press brake m/c	10	excepts NC m/c.

5.3 Activities analysis

See "Activities analysis" of Chapter 4.

6.0 STANDARD TIME CALCULATION

See "Standard time calculation" of Chapter 4.

7.0 DATA SYNTHESIS AND BACKUP

See Appendix A.

8.0 ALLOWANCE

See "Allowances in the standard time" of Chapter 4.

APPENDIX D

MOST Calculation

MOST Calculation

Area :

Fabrication section

Activity :

Shearing

Plate Size :

Small, Medium

No	Method	No	Sequence Model	Fr	TMU
1	Get 1 plate from pile (on hand truck) to m/c.	4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
2	Align plate on m/c against stop.	1	$A_1\ B_0\ G_1\ M_1\ X_0\ I_3\ A_0$		60
3	Push clutch pedal with foot.	2	$A_1\ B_0\ G_0\ M_1\ X_0\ I_3\ A_0$		50
4	Get+Place cut-plate to table.	3	$A_1\ B_0\ G_1\ M_1\ X_1\ I_0\ A_0$		40
5	Get+Place cut-plate from floor to cut-pile (on pallet).	5	$A_1\ B_0\ G_1\ M_1\ X_0\ I_3\ A_0$		60
6	Measure cut-plate length using steel tape 2 m.	6	$A_1 B_0 G_1 A_1 B_0 P_1 M_{32} A_1 B_0 P_1 A_0$	1/2	190

MOST Calculation

Area :

Fabrication section

Activity :

Shearing

Plate Size :

Large

No	Method	No	Sequence Model	Fr	TMU
1	Op.–1 Get+Slide 1 plate from pile (or table) to op–2&3.	1	$A_3\ B_0\ G_3\ M_3\ X_0\ I_0\ A_0$	4/3	90
2	Op.–2&3 Align plate on m/c against stop.	2	$A_3\ B_0\ G_3\ M_3\ X_0\ I_3\ A_0$	7/12	120
3	Op.– 3 Push clutch pedal with foot.	3	$A_1\ B_0\ G_1\ M_1\ X_1\ I_0\ A_0$		40
4	Op.–2&3 Get+Place cut–plate to tabl	4	$A_3\ B_0\ G_3\ M_3\ X_0\ I_1\ A_0$		100
5	Get+Place cut–plate from floor to cut–pile (on pallet).	5	$A_3\ B_0\ G_1\ M_1\ X_0\ I_3\ A_0$		80
6	Measure cut–plate length using steel tape 2 m.	6	$A_1 B_0 G_1 A_1 B_0 P_1\ M_{32} A_1 B_0 P_1\ A_0$	1/2	190

MOST Calculation

Area :

Fabrication section

Activity :

Punching or Notching

Plate Size :

Small

No	Method	No	Sequence Model	Fr TMU
1	Grasp+Align plate from hand truck to m/c against stop.			
2	Push clutch pedal with foot.	1	A_1 B_0 G_1 M_1 X_0 I_1 A_0	40
3	Overturn plate	2	A_1 B_0 G_1 M_1 X_1 I_0 A_0	40
4	Turn plate 180 deg.(horizontal)	3	A_1 B_0 G_1 M_1 X_0 I_0 A_0	30
5	Align plate to m/c against stop(s)	4	A_1 B_0 G_1 M_1 X_0 I_0 A_0	30
6	Move punched-plate or notched-plate lay aside m/c	5	A_1 B_0 G_1 M_1 X_0 I_0 A_0	30
		6	A_1 B_0 G_1 M_1 X_0 I_0 A_0	30

MOST Calculation

Area :

Fabrication section

Activity :

Punching or Notching

Plate Size :

Medium

No	Method	No	Sequence Model	Fr	TMU
1	Get+Align plate from hand truck to m/c against stop.	6	A_1 B_0 G_1 A_1 B_0 P_3 A_0		60
2	Push clutch pedal with foot.	1	A_1 B_0 G_1 M_1 X_0 I_3 A_0		60
3	Overturn plate	2	A_1 B_0 G_1 M_1 X_1 I_0 A_0		40
4	Turn plate 180 deg.(horizontal)	3	A_1 B_0 G_1 M_1 X_0 I_0 A_0		30
5	Align plate to m/c against stop(s)	4	A_1 B_0 G_1 M_1 X_0 I_0 A_0	2	60
6	Get+Place punched-plate (or notched-plate) to pile	5	A_1 B_0 G_1 M_1 X_0 I_0 A_0		40

MOST Calculation

Area :

Fabrication section

Activity :

Punching or Notching

Plate Size :

Large

No	Method	No	Sequence Model	Fr	TMU
1	Get+Align plate from hand truck to m/c against stop.	6	$A_3\ B_0\ G_3\ A_1\ B_0\ P_3\ A_0$		100
2	Push clutch pedal with foot.	1	$A_1\ B_0\ G_3\ M_1\ X_0\ I_3\ A_0$		80
3	Overturn plate	2	$A_1\ B_0\ G_1\ M_1\ X_1\ I_0\ A_0$		40
4	Turn plate 180 deg.(horizontal)	3	$A_1\ B_0\ G_3\ M_1\ X_0\ I_0\ A_0$		40
5	Align plate to m/c against stop(s)	4	$A_3\ B_0\ G_3\ M_1\ X_0\ I_0\ A_0$	2	140
6	Get+Place punched-plate (or notched-plate) to pile	5	$A_1\ B_0\ G_3\ M_1\ X_0\ I_0\ A_0$		60

MOST Calculation

Area :

Fabrication section

Activity :

Bending

Plate Size :

Small

No	Method	No	Sequence Model	Fr	TMU
1	Grasp+Align plate from hand truck to m/c against stop.	6	A_1 B_C G_1 A_1 B_C P_1 A_0		40
2	Push clutch pedal with foot.	1	A_1 B_0 G_1 M_1 X_C I_1 A_0		40
3	Turn plate 90 deg. (horizontal)	2	A_1 B_0 G_1 M_1 X_1 I_0 A_0		40
4	Turn plate 180 deg.(horizontal)	3	A_1 B_0 G_1 M_1 X_C I_0 A_C		30
5	Move plate up and down	4	A_1 B_C G_1 M_1 X_0 I_0 A_0		30
6	Get+Place bended-plate to pile (on hand truck)	5	A_1 B_C G_1 M_1 X_1 I_C A_1		50
7	Align plate to m/c against stop(s)	7	A_1 B_0 G_1 M_C X_0 I_C A_0		20

MOST Calculation

Area :

Fabrication section

Activity :

Bending

Plate Size :

Medium

No	Method	No	Sequence Model	Fr	TMU
1	Get+Align plate from hand truck to m/c against stop.	6	$A_I\ B_0\ G_I\ A_I\ B_0\ P_3\ A_0$		60
2	Push clutch pedal with foot.	1	$A_I\ B_0\ G_I\ M_I\ X_0\ I_3\ A_0$		60
3	Turn plate 90 deg. (horizontal)	2	$A_I\ B_0\ G_I\ M_I\ X_I\ I_0\ A_0$		40
4	Turn plate 180 deg.(horizontal)	3	$A_I\ B_0\ G_I\ M_I\ X_0\ I_0\ A_0$	4/3	40
5	Move plate up and down	4	$A_I\ B_0\ G_I\ M_I\ X_0\ I_0\ A_0$	2	60
6	Get+Place bended-plate to pile (on hand truck)	5	$A_I\ B_C\ G_I\ M_I\ X_3\ I_0\ A_I$		70
7	Align plate to m/c against stop(s)	7	$A_C\ B_0\ G_0\ M_I\ X_0\ I_3\ A_0$		40

MOST Calculation

Area :

Fabrication section

Activity :

Bending

Plate Size :

Large

No	Method	No	Sequence Model	Fr	TMU
1	Get+Align plate from hand truck to m/c against stop.	6	$A_3\ B_0\ G_3\ A_1\ B_0\ P_3\ A_0$		100
2	Push clutch pedal with foot.	1	$A_1\ B_0\ G_3\ M_1\ X_0\ I_3\ A_0$		80
3	Turn plate 90 deg. (horizontal)	2	$A_1\ B_0\ G_1\ M_1\ X_1\ I_0\ A_0$		40
4	Turn plate 180 deg.(horizontal)	3	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	2	60
5	Move plate up and down	4	$A_3\ B_0\ G_3\ M_1\ X_0\ I_0\ A_0$	2	140
6	Get+Place bended-plate to pile (on hand truck)	5	$A_1\ B_0\ G_3\ M_1\ X_3\ I_0\ A_1$		90
7	Align plate to m/c against stop(s)	7	$A_0\ B_0\ G_0\ M_1\ X_3\ I_0\ A_0$		40

About the Writer

Charoen Jaitwijitra was born in December 14, 1962 in Yala province, South of Thailand. The under graduate degree B.Sc. (Industrial Engineering) was obtained at Faculty of Engineering, Prince of Songkla University (PSU) in 1985. Prior to enrolling for a Master Degree at the Industrial Engineering Department, Chulalongkorn University in 1989, he had gained industrial experiences in the food canning for about two years before joining the PSU staff.