

Law data: Demographic characteristics of the participants

ID	Age	Weight	Height	BMI	Experience in weaving	Equipment usage	Duration of work per day	Working accident at the wrist	Address
1	69	68	158	27.24	45	Yes	7	No	Kam Muang District, Kalasin Province
2	53	65	156	26.71	35	No	6	No	Kam Muang District, Kalasin Province
3	45	60	157	24.34	25	Yes	6	No	Kam Muang District, Kalasin Province
4	49	67	163	25.22	35	No	5	No	Kam Muang District, Kalasin Province
5	52	58	142	28.76	30	Yes	5	No	Kam Muang District, Kalasin Province
6	51	65	159	25.71	32	Yes	5	No	Kam Muang District, Kalasin Province
7	66	48	148	21.91	45	Yes	7	No	Kam Muang District, Kalasin Province
8	60	65	158	26.04	35	Yes	6	No	Kam Muang District, Kalasin Province
9	69	70	149	31.53	45	Yes	6	Yes	Kam Muang District, Kalasin Province
10	51	67	154	28.25	25	Yes	6	No	Kam Muang District, Kalasin Province
11	68	64	155	26.64	43	Yes	6	No	Kam Muang District, Kalasin Province
12	61	65	152	28.13	40	Yes	7	No	Kam Muang District, Kalasin Province
13	45	76	156	31.23	25	Yes	6	No	Kam Muang District, Kalasin Province
14	62	73	156	30.00	35	No	5	No	Kam Muang District, Kalasin Province
15	60	68	156	27.94	40	Yes	4	No	Kam Muang District, Kalasin Province
16	54	64	159	25.32	30	Yes	6	No	Kam Muang District, Kalasin Province
17	51	57	145	27.11	31	No	8	No	Kam Muang District, Kalasin Province
18	45	63	165	23.14	25	Yes	6	No	Kam Muang District, Kalasin Province

ID	Age	Weight	Height	BMI	Experience in weaving	Equipment usage	Duration of work per day	Working accident at the wrist	Address
19	44	59	156	24.24	21	Yes	7	No	Kam Muang District, Kalasin Province
20	43	58	149	26.12	20	Yes	6	No	Kam Muang District, Kalasin Province
21	60	67	153	28.62	38	Yes	5	No	Kam Muang District, Kalasin Province
22	50	64	161	24.69	30	Yes	4	No	Kam Muang District, Kalasin Province
23	54	67	150	29.78	30	Yes	6	No	Kam Muang District, Kalasin Province
24	65	66	151	28.95	40	Yes	5	No	Kam Muang District, Kalasin Province
25	61	68	155	28.30	35	Yes	7	Yes	Kam Muang District, Kalasin Province
26	62	68	146	31.90	32	Yes	7	No	Kam Muang District, Kalasin Province
27	52	63	157	25.56	30	Yes	8	No	Kam Muang District, Kalasin Province
28	54	65	149	29.28	34	Yes	7	No	Kam Muang District, Kalasin Province
29	47	59	154	24.88	27	Yes	7	No	Kam Muang District, Kalasin Province

Effect of the cloth-pulling devices on muscle activity (normalised %MVC) while performing the simulated Praewa silk task.

Upperr trapezius muscle

ID	A	MVC30%	B	MVC30%	C	MVC30%
1	48.13	14.44	49.42	14.83	31.56	9.47
2	49.38	14.81	81.14	24.34	50.76	15.23
3	49.39	14.82	55.31	16.59	35.81	10.74
4	58.69	17.61	58.13	17.44	35.09	10.53
5	57.4	17.22	59.17	17.75	53.72	16.12
6	69.45	20.84	58.13	17.44	54.33	16.30
7	69.12	20.74	58.34	17.50	49.19	14.76
8	71.92	21.58	58.2	17.46	48.19	14.46
9	58.61	17.58	47.23	14.17	35.38	10.61
10	60.23	18.07	49.27	14.78	38.96	11.69
11	68.55	20.57	55.37	16.61	42.37	12.71
12	59.32	17.80	45.23	13.57	32.27	9.68
13	74.56	22.37	65.34	19.60	48.24	14.47
14	78.23	23.47	60.29	18.09	58.32	17.50
15	60.23	18.07	56.33	16.90	48.23	14.47
16	62.45	18.74	53.23	15.97	49.24	14.77

ID	A	MVC30%	B	MVC30%	C	MVC30%
17	68.93	20.68	59.24	17.77	51.45	15.44
18	68.34	20.50	52.15	15.65	50.38	15.11
19	60.23	18.07	56.23	16.87	55.43	16.63
20	71.22	21.37	62.34	18.70	54.45	16.34
21	78.34	23.50	65.43	19.63	51.56	15.47
22	72.45	21.74	66.4	19.92	59.29	17.79
23	63.22	18.97	58.23	17.47	41.23	12.37
24	61.75	18.53	57.13	17.14	42.67	12.80
25	69.35	20.81	55.24	16.57	49.67	14.90
26	57.34	17.20	52.53	15.76	42.13	12.64
27	63.23	18.97	50.13	15.04	41.56	12.47
28	68.34	20.50	52.78	15.83	51.05	15.32
29	73.65	22.10	55.35	16.61	39.26	11.78
Mean	64.55	19.37	57.01	17.10	46.27	13.88

A : Traditional cloth pulling, B : Standard cloth-pulling device, C : Cloth-pulling device

Effect of the cloth-pulling devices on muscle activity (normalised %MVC) while performing the simulated Praewa silk task.

Biceps brachii muscle

ID	A	MVC30%	B	MVC30%	C	MVC30%
1	55.38	16.61	59.31	17.79	29.5	8.85
2	48.53	14.56	63.49	19.05	44.47	13.34
3	53.17	15.95	53.05	15.92	33.61	10.08
4	61.46	18.44	58.12	17.44	42.97	12.89
5	60.79	18.24	58.48	17.54	54.78	16.43
6	65.82	19.75	57.13	17.14	53.51	16.05
7	62.18	18.65	59.07	17.72	52.83	15.85
8	65.92	19.78	54.83	16.45	50.13	15.04
9	68.12	20.44	54.82	16.45	49.21	14.76
10	61.76	18.53	53.87	16.16	46.13	13.84
11	63.13	18.94	50.47	15.14	41.02	12.31
12	75.31	22.59	60.54	18.16	49.23	14.77
13	79.82	23.95	67.77	20.33	50.12	15.04
14	74.85	22.46	59.63	17.89	46.28	13.88
15	78.33	23.50	63.56	19.07	47.45	14.24
16	79.34	23.80	57.32	17.20	48.32	14.50

ID	A	MVC30%	B	MVC30%	C	MVC30%
17	65.95	19.79	58.18	17.45	49.24	14.77
18	73.26	21.98	58.36	17.51	46.21	13.86
19	60.34	18.10	58.34	17.50	42.45	12.74
20	74.2	22.26	63.28	18.98	41.24	12.37
21	60.24	18.07	57.43	17.23	51.34	15.40
22	74.23	22.27	69.83	20.95	62.43	18.73
23	61.03	18.31	55.43	16.63	51.03	15.31
24	56.38	16.91	53.34	16.00	49.26	14.78
25	78.34	23.50	63.23	18.97	56.93	17.08
26	61.33	18.40	53.26	15.98	40.21	12.06
27	64.67	19.40	58.34	17.50	41.23	12.37
28	79.34	23.80	63.25	18.98	60.05	18.02
29	62.53	18.76	46.42	13.93	35.33	10.60
Mean	66.41	19.92	58.28	17.48	47.12	14.13

A : Traditional cloth pulling, B : Standard cloth-pulling device, C : Cloth-pulling device

Effect of the cloth-pulling devices on muscle activity (normalised %MVC) while performing the simulated Praewa silk task.

Brachiorradialis muscle

ID	A	MVC30%	B	MVC30%	C	MVC30%
1	72.6	21.78	54.87	16.46	34.1	10.23
2	57.93	17.38	99.61	29.88	43.52	13.06
3	50.87	15.26	53.78	16.13	33.42	10.03
4	50.12	15.04	44.25	13.28	46.23	13.87
5	69.05	20.72	46.28	13.88	44.07	13.22
6	67.01	20.10	55.18	16.55	52.78	15.83
7	64.78	19.43	54.82	16.45	48.73	14.62
8	63.7	19.11	50.41	15.12	46.2	13.86
9	63.26	18.98	52.13	15.64	41.01	12.30
10	59.31	17.79	53.25	15.98	48.21	14.46
11	74.32	22.30	57.23	17.17	43.43	13.03
12	69.71	20.91	55.32	16.60	47.29	14.19
13	75.29	22.59	58.88	17.66	47.26	14.18
14	68.18	20.45	57.98	17.39	48.23	14.47
15	65.81	19.74	52.77	15.83	40.32	12.10
16	74.91	22.47	60.43	18.13	50.17	15.05

ID	A	MVC30%	B	MVC30%	C	MVC30%
17	68.51	20.55	58.44	17.53	46.39	13.92
18	68.64	20.59	57.32	17.20	50.13	15.04
19	57.28	17.18	45.22	13.57	40.21	12.06
20	68.47	20.54	50.83	15.25	43.02	12.91
21	64.4	19.32	53.78	16.13	50.24	15.07
22	67.3	20.19	53.78	16.13	46.24	13.87
23	74.23	22.27	65.34	19.60	51.48	15.44
24	67.31	20.19	57.82	17.35	44.25	13.28
25	64.63	19.39	58.45	17.54	50.13	15.04
26	69.24	20.77	67.78	20.33	52.38	15.71
27	78.35	23.51	68.35	20.51	61.33	18.40
28	61.33	18.40	59.47	17.84	50.21	15.06
29	59.24	17.77	50.21	15.06	38.92	11.68
Mean	66.06	19.81	57.03	17.11	46.20	13.86

A : Traditional cloth pulling, B : Standard cloth-pulling device, C : Cloth-pulling device

Effect of the cloth-pulling devices on muscle activity (normalised %MVC) while performing the simulated Praewa silk task.

Flexor carpi ulnaris muscle

ID	A	MVC30%	B	MVC30%	C	MVC30%
1	100.32	30.10	50.2	15.06	32.4	9.72
2	97.79	29.34	60.64	18.19	38.77	11.63
3	50.67	15.20	51.1	15.33	47.1	14.13
4	54.26	16.28	54.09	16.23	35.71	10.71
5	65.64	19.69	57.65	17.30	45.47	13.64
6	58.12	17.44	57.71	17.31	52.25	15.68
7	68.32	20.50	58.9	17.67	51.4	15.42
8	72.15	21.65	57.23	17.17	50.02	15.01
9	72.13	21.64	54.97	16.49	46.32	13.90
10	61.24	18.37	57.35	17.21	46.32	13.90
11	72.13	21.64	43.76	13.13	34.8	10.44
12	73.21	21.96	57.12	17.14	46.55	13.97
13	57.21	17.16	54.02	16.21	43.21	12.96
14	79.32	23.80	63.82	19.15	56.32	16.90
15	68.94	20.68	58.24	17.47	52.14	15.64
16	64.24	19.27	56.25	16.88	46.23	13.87

ID	A	MVC30%	B	MVC30%	C	MVC30%
17	74.24	22.27	60.32	18.10	52.34	15.70
18	64.78	19.43	59.32	17.80	48.74	14.62
19	60.35	18.11	55.32	16.60	42.75	12.83
20	70.12	21.04	58.2	17.46	47.55	14.27
21	78.23	23.47	63.2	18.96	58.25	17.48
22	69.38	20.81	57.21	17.16	54.24	16.27
23	64.23	19.27	57.53	17.26	46.92	14.08
24	78.34	23.50	65.34	19.60	63.23	18.97
25	74.1	22.23	60.07	18.02	57.28	17.18
26	70.32	21.10	66.92	20.08	57.32	17.20
27	74.17	22.25	60.4	18.12	54.95	16.49
28	73.23	21.97	64.35	19.31	53.82	16.15
29	69.24	20.77	53.72	16.12	42.53	12.76
Mean	70.22	21.06	57.76	17.32	48.45	14.53

A : Traditional cloth pulling, B : Standard cloth-pulling device, C : Cloth-pulling device

Hand activity level using the three cloth-pulling devices

ID	A			B			C		
	HAL	NPF	Ratio	HAL	NPF	Ratio	HAL	NPF	Ratio
1	6	5	1.25	4	4	0.67	2	2	0.25
2	6	6	1.5	3	3	0.43	2	3	0.38
3	3	3	0.43	6	5	1.25	2	4	0.50
4	6	7	1.75	5	5	1.00	2	4	0.50
5	3	3	0.43	5	4	0.80	2	3	0.38
6	6	5	1.25	4	4	0.67	4	4	0.67
7	3	3	0.43	4	4	0.67	4	3	0.50
8	6	5	1.25	4	5	0.83	2	3	0.38
9	4	5	0.83	4	3	0.50	4	3	0.50
10	6	5	1.25	4	4	0.67	3	3	0.43
11	6	5	1.25	4	4	0.67	4	4	0.67
12	6	6	1.5	3	3	0.43	3	4	0.57
13	6	5	1.25	3	3	0.43	3	4	0.57
14	6	7	1.75	5	5	1.00	5	3	0.60
15	6	6	1.5	3	3	0.43	3	3	0.43
16	6	5	1.25	4	4	0.67	4	2	0.33

ID	A			B			C		
	HAL	NPF	Ratio	HAL	NPF	Ratio	HAL	NPF	Ratio
17	6	5	1.25	3	3	0.43	4	3	0.50
18	6	5	1.25	4	5	0.83	4	4	0.67
19	6	5	1.25	3	3	0.43	4	3	0.50
20	6	5	1.25	4	4	0.67	3	4	0.57
21	6	5	1.25	3	3	0.43	4	4	0.67
22	6	6	1.5	3	3	0.43	4	3	0.50
23	6	5	1.25	6	5	1.25	4	3	0.50
24	6	7	1.75	5	5	1.00	4	4	0.67
25	6	6	1.5	5	4	0.80	2	2	0.25
26	6	5	1.25	5	4	0.80	2	4	0.50
27	6	5	1.25	5	4	0.80	2	4	0.50
28	6	5	1.25	4	5	0.83	2	2	0.25
29	6	5	1.25	4	4	0.67	2	2	0.25
Mean			1.25			0.70			0.48

Prawa silk length (in cm) using three cloth-pulling devices

ID	A			B			C		
	15	25	40	15	25	40	15	25	40
1	1.10	2.20	2.60	1.20	2.30	2.60	1.30	2.10	2.60
2	0.10	1.40	2.20	0.20	1.10	2.50	1.10	2.20	2.90
3	0.00	0.80	1.90	0.80	1.70	2.60	1.40	2.30	3.00
4	0.10	1.30	1.90	0.70	2.10	2.50	1.20	2.20	2.70
5	0.40	1.40	2.30	0.80	1.90	2.60	1.40	2.30	3.00
6	0.20	0.80	1.80	0.30	1.00	2.30	0.80	1.70	2.60
7	0.30	0.90	1.90	0.20	1.00	2.10	0.90	2.10	2.80
8	0.10	0.70	1.70	0.10	0.80	2.10	0.80	2.00	2.70
9	0.20	0.70	1.60	0.10	1.20	1.70	0.30	1.40	2.10
10	0.10	0.80	1.70	0.10	1.10	1.80	0.30	1.30	2.00
11	0.00	0.60	1.50	0.20	1.00	1.90	0.20	1.20	2.20
12	0.60	1.10	1.80	0.30	0.90	2.10	0.70	1.50	2.50
13	0.20	0.80	2.00	0.20	1.20	2.30	0.80	1.60	2.30
14	0.80	2.00	2.70	0.70	2.20	3.00	0.50	1.60	2.10
15	0.40	0.80	2.00	0.50	1.30	2.50	1.00	2.10	2.90
16	0.70	1.80	2.80	1.00	2.30	3.20	0.80	1.70	2.70

ID	A			B			C		
	15	25	40	15	25	40	15	25	40
17	0.00	1.20	2.30	0.30	1.10	2.50	0.90	2.20	3.10
18	0.30	1.30	2.10	0.80	1.80	2.60	0.70	1.20	2.30
19	0.10	0.80	2.00	0.40	1.00	2.30	1.20	2.40	3.20
20	0.70	1.90	2.00	0.90	2.10	3.10	1.30	2.10	3.10
21	0.50	1.30	1.80	0.50	1.20	2.00	1.00	2.00	2.70
22	0.20	1.40	2.10	0.80	2.10	2.60	1.10	2.40	3.10
23	0.80	2.00	2.30	1.10	2.20	2.90	1.50	2.60	3.30
24	0.20	1.10	2.10	0.70	1.30	2.50	1.10	2.20	2.90
25	0.00	0.90	1.70	0.10	1.20	1.60	0.30	1.40	2.50
26	0.20	0.90	1.50	0.30	1.00	2.00	0.30	1.30	2.40
27	0.20	1.20	2.00	0.20	1.40	2.10	0.40	1.30	2.30
28	0.30	1.20	1.90	0.50	1.40	2.20	0.20	2.10	2.20
29	0.50	1.40	2.10	0.80	1.70	2.60	1.10	2.30	3.00
Mean	0.32	1.20	2.01	0.51	1.47	2.37	0.85	1.89	2.66

A : Traditional cloth pulling, B : Standard cloth-pulling device, C : Cloth-pulling device

Perceived satisfaction with the three cloth-pulling devices.

ID	A					B					C				
	Quality of devices	Quality of Prawa silk	Effect on the wrist and fingers	Application	Total(100)	Quality of devices	Quality of Prawa silk	Effect on the wrist and fingers	Application	Total(100)	Quality of devices	Quality of Prawa silk	Effect on the wrist and fingers	Application	Total(100)
1	10	17	8	6	41	15	13	16	12	56	20	18	20	25	83
2	9	16	7	5	37	16	15	13	12	56	20	19	20	25	84
3	12	16	9	5	42	15	15	14	13	57	28	17	20	24	89
4	11	17	11	7	46	15	16	13	13	57	20	15	20	21	76
5	9	15	6	7	37	14	14	13	13	54	18	18	19	23	78
6	13	16	8	10	47	16	13	14	12	55	20	19	20	20	79
7	12	15	9	7	43	14	13	15	13	55	20	19	20	25	84
8	11	14	7	8	40	15	14	12	13	54	20	18	20	25	83
9	8	15	5	4	32	14	15	10	13	52	19	20	19	24	82
10	11	16	6	6	39	15	13	15	16	59	18	20	20	22	80
11	12	17	4	7	40	14	14	13	15	56	19	18	20	20	77
12	11	15	7	10	43	15	14	12	14	55	19	19	18	22	78
13	13	13	6	8	40	12	12	12	13	49	20	16	20	24	80
14	15	13	7	8	43	12	14	11	11	48	20	19	19	20	78
15	12	13	8	9	42	13	15	15	13	56	20	19	20	22	81
16	11	13	6	10	40	14	16	16	16	62	20	16	20	19	75
17	11	15	9	7	42	14	14	12	15	55	19	18	20	20	77
18	10	15	7	8	40	14	13	13	14	54	19	19	20	23	81
19	9	15	8	7	39	13	15	13	13	54	18	20	19	24	81
20	9	14	6	7	36	13	13	12	13	51	20	20	20	20	80

ID	A					B					C				
	Quality of devices	Quality of Prawa silk	Effect on the wrist and fingers	Application	Total(100)	Quality of devices	Quality of Prawa silk	Effect on the wrist and fingers	Application	Total(100)	Quality of devices	Quality of Prawa silk	Effect on the wrist and fingers	Application	Total(100)
21	7	14	10	7	38	15	13	11	13	52	20	20	20	20	80
22	9	15	5	7	36	12	12	17	12	53	20	20	19	23	82
23	11	16	7	9	43	11	13	14	12	50	20	19	20	20	79
24	9	16	7	8	40	12	16	13	12	53	20	19	19	24	82
25	9	14	8	10	41	13	14	13	12	52	19	19	20	20	78
26	12	14	7	8	41	13	13	12	12	50	20	17	20	21	78
27	12	14	6	8	40	14	15	13	12	54	20	20	19	19	78
28	12	14	7	8	41	15	15	12	13	55	20	19	20	20	79
29	10	16	8	9	43	14	15	13	15	57	18	18	20	21	77
Mean	10.69	14.93	7.21	7.59	40.41	13.86	14.03	13.17	13.10	54.17	19.79	18.55	19.69	21.93	79.97

A : Traditional cloth pulling, B : Standard cloth-pulling device, C : Cloth-pulling device

The 10 hand anthropometric measurements of the study participants (n = 29)

Hand anthropometric dimensions*	Percentiles			Mean (min–max)	SD	CV
	5 th	50 th	95 th			
Hand length	15.50	14.70	16.20	14.78 (11.50–17.30)	0.82	5.55
Palm breadth	4.60	5.50	6.40	5.51 (4.00–7.20)	0.56	9.98
Palm circumference	15.20	17.80	21.10	17.79 (14.10–21.40)	1.83	10.29
Thumb finger length	5.60	6.20	7.10	6.31 (5.20–7.90)	0.49	7.77
Index finger length	4.70	5.20	7.00	5.43 (4.10–8.70)	0.63	11.60
Palm thickness	1.40	1.60	1.80	1.60 (1.30–1.90)	0.133	8.13
Hand circumference	16.40	20.00	23.10	19.73 (15.60–23.80)	2.15	10.90
Hand breadth	5.60	6.50	8.21	6.66 (4.20–9.00)	0.75	7.83
Maximum spread	13.70	14.75	17.50	15.21 (12.80–24.00)	1.46	10.36
Grip diameter	3.20	4.10	4.60	4.05 (3.00–5.20)	0.36	8.64

*Note: all dimensions are in cm

