

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Berdasarkan penelitian yang telah dilakukan, maka dapat diambil beberapa kesimpulan yaitu sebagai berikut:

- a. Hasil analisis postur kerja dengan menggunakan metode REBA menunjukkan bahwa postur kerja penjahit 1 (Firman) dan postur kerja penjahit 2 (Rifai) mendapatkan *final score* yang sama yaitu 9 dengan *action level* 4 yang berarti *high risk* sedangkan postur kerja penjahit 3 (Wawan) mendapatkan *final score* 8 dengan *action level* 3 yang berarti *high risk*. *Final score* yang didapatkan menunjukkan bahwa level risiko tinggi dan tindakan yang harus diambil adalah perlu segera melakukan tindakan perbaikan.
- b. Perbandingan risiko cedera sebelum dan sesudah melakukan perbaikan untuk aktivitas menjahit dengan analisis REBA adalah proses menjahit dari *high risk* dengan skor 8 dan 9 menjadi *medium risk* dengan skor 7
- c. Perbaikan yang dilakukan mampu mengurangi keluhan *musculoskeletal* yang dirasakan oleh penjahit. Hal tersebut dapat diketahui dari berkurangnya jumlah keluhan yang dialami oleh penjahit pada *Nordic Questionnaire*. Penjahit 1 pada saat melakukan observasi mengeluhkan rasa sakit pada 14 bagian tubuh lalu turun menjadi 6. Penjahit 2 pada saat melakukan observasi mengeluhkan rasa sakit pada 17 bagian tubuh lalu turun menjadi 8. Penjahit 3 pada saat melakukan observasi mengeluhkan rasa sakit pada 18 bagian tubuh lalu turun menjadi 9.

6.2. Saran

- a. Perbaikan yang diusulkan dapat diterapkan oleh konveksi Chester sebagai salah satu fasilitas untuk menunjang kondisi kerja yang lebih baik.
- b. Peneliti selanjutnya dapat melakukan analisis material kayu untuk melakukan pertimbangan dalam penerapan perbaikan kursi jahit.
- c. Peneliti selanjutnya sebaiknya melakukan implementasi perbaikan kursi jahit sesuai dengan desain yang telah dibuat.

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Lampiran 1. Lembar WERA untuk Penjahit 1

Penjahit 1 (Firman)

MICROPLACE ERGONOMIC RISK ASSESSMENT (MERA)

PHYSICAL RISK FACTOR	RISK LEVEL			SCORING SYSTEM																								
	LOW	MEDIUM	HIGH																									
1. Shoulder	<p>1a. Posture</p> <p>Shoulders in neutral position</p> <p>1b. Repetition</p> <p>Shoulder is moderate</p>	<p>2a. Posture</p> <p>Shoulder is moderate</p> <p>Shoulder is moderate</p> <p>2b. Repetition</p> <p>Shoulder is moderate</p>	<p>3a. Posture</p> <p>Shoulder is extreme</p> <p>Shoulder is extreme</p> <p>3b. Repetition</p> <p>Shoulder is extreme</p>	<p>1a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>1b. REPETITION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 1 <input type="text" value="4"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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2. Wrist	<p>2a. Posture</p> <p>Wrist in a neutral position</p> <p>2b. Repetition</p> <p>Wrist in moderate</p>	<p>3a. Posture</p> <p>Wrist is moderate</p> <p>Wrist is moderate</p> <p>3b. Repetition</p> <p>Wrist is moderate</p>	<p>4a. Posture</p> <p>Wrist is extreme</p> <p>Wrist is extreme</p> <p>4b. Repetition</p> <p>Wrist is extreme</p>	<p>2a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>2b. REPETITION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 2 <input type="text" value="5"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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3. Back	<p>3a. Posture</p> <p>Back to neutral</p> <p>3b. Repetition</p> <p>Back to moderate</p>	<p>4a. Posture</p> <p>Back to moderate</p> <p>Back to moderate</p> <p>4b. Repetition</p> <p>Back to moderate</p>	<p>5a. Posture</p> <p>Back to extreme</p> <p>Back to extreme</p> <p>5b. Repetition</p> <p>Back to extreme</p>	<p>3a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>3b. REPETITION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 3 <input type="text" value="4"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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4. Neck	<p>4a. Posture</p> <p>Neck to neutral</p> <p>4b. Repetition</p> <p>Neck to moderate</p>	<p>5a. Posture</p> <p>Neck to moderate</p> <p>Neck to moderate</p> <p>5b. Repetition</p> <p>Neck to moderate</p>	<p>6a. Posture</p> <p>Neck to extreme</p> <p>Neck to extreme</p> <p>6b. Repetition</p> <p>Neck to extreme</p>	<p>4a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>4b. REPETITION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 4 <input type="text" value="5"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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4	2																											
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5. Leg	<p>5a. Posture</p> <p>Legs in neutral</p> <p>5b. Repetition</p> <p>Legs in moderate</p>	<p>6a. Posture</p> <p>Legs in moderate</p> <p>Legs in moderate</p> <p>6b. Repetition</p> <p>Legs in moderate</p>	<p>7a. Posture</p> <p>Legs in extreme</p> <p>Legs in extreme</p> <p>7b. Repetition</p> <p>Legs in extreme</p>	<p>5a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>5b. REPETITION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 5 <input type="text" value="6"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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PHYSICAL RISK FACTOR	RISK LEVEL			SCORING SYSTEM																								
	LOW	MEDIUM	HIGH																									
6. Forceful	<p>Lifting the load</p> <p>0-5kg</p>	<p>Lifting the load</p> <p>5-10kg</p>	<p>Lifting the load</p> <p>more than 10kg</p>	<p>6a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>6b. FORCEFUL</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 6 <input type="text" value="3"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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Low	High																											
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7. Vibration	<p>Minimal use of vibration tool</p> <p>OR</p> <p>Use of vibration tool</p> <p>< 2hrs per day</p>	<p>Occasional use of vibration tool</p> <p>WITH</p> <p>2-4hrs per day</p>	<p>Constant use of vibration tool</p> <p>WITH</p> <p>> 4hrs per day</p>	<p>7a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>7b. VIBRATION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 7 <input type="text" value="6"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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8. Contact stress	<p>Using of tool handle</p> <p>OR</p> <p>wearing hands gloves</p>	<p>Hard/rough/uneven of tool handle</p> <p>OR</p> <p>Use of soft cover of hand gloves</p>	<p>Smooth/round/sharp of tool handle</p> <p>OR</p> <p>Use of soft cover of hand gloves</p>	<p>8a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>8b. CONTACT STRESS</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 8 <input type="text" value="4"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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9. Task duration	<p>Task</p> <p>hr/day</p> <p>< 2hrs per day</p>	<p>Task</p> <p>hr/day</p> <p>2-4hrs per day</p>	<p>Task</p> <p>hr/day</p> <p>> 4hrs per day</p>	<p>9a. POSTURE</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>9b. TASK DURATION</p> <table border="1"> <tr><td>Low</td><td>High</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>5</td><td>1</td></tr> </table> <p>Score 9 <input type="text" value="4"/></p>	Low	High	1	5	2	4	3	3	4	2	5	1	Low	High	1	5	2	4	3	3	4	2	5	1
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FINAL SCORE <input type="text" value="41"/>	
Job/Task: <u>Menjahit</u>	Action Level: <u>High</u>
Date: <u>9 Mei 2019</u>	Risk Level: <u>High</u>
Observer: <u>Martin Mafonggo</u>	Final Score: <u>18-27</u>
	Task (Y)
	Task is acceptable <input type="checkbox"/>
	Task is not acceptable, change is required <input checked="" type="checkbox"/>
	Task is not acceptable, immediate change <input type="checkbox"/>

Based on MERA, an observational tool designed to investigate the physical risk factor associated with VIBRATIONS. Modified from Abdul Fatmahan, 2004. Used with permission and slight modification, version of Fatmahan Fatmahan, 2011, 49-50.

Lampiran 2. Lembar WERA untuk Penjahit 2

Penjahit 2 (Bijaya)

WORKPLACE ERGONOMIC RISK ASSESSMENT (WERA)

PHYSICAL RISK FACTOR	RISK LEVEL			SCORING SYSTEM
	Low	Medium	High	
1. Shoulder	1a. Posture Needs to avoid the neutral position. Repetition in neutral position.	1b. Posture Needs to avoid the neutral position. Repetition in neutral position.	1c. Posture Needs to avoid the neutral position. Repetition in neutral position.	Score 1: 4
	1a. Repetition Needs to avoid the neutral position. Repetition in neutral position.	1b. Repetition Needs to avoid the neutral position. Repetition in neutral position.	1c. Repetition Needs to avoid the neutral position. Repetition in neutral position.	Score 2: 5
2. Wrist	2a. Posture Needs to avoid the neutral position. Repetition in neutral position.	2b. Posture Needs to avoid the neutral position. Repetition in neutral position.	2c. Posture Needs to avoid the neutral position. Repetition in neutral position.	Score 3: 4
	2a. Repetition Needs to avoid the neutral position. Repetition in neutral position.	2b. Repetition Needs to avoid the neutral position. Repetition in neutral position.	2c. Repetition Needs to avoid the neutral position. Repetition in neutral position.	Score 4: 4
3. Hand	3a. Posture Needs to avoid the neutral position. Repetition in neutral position.	3b. Posture Needs to avoid the neutral position. Repetition in neutral position.	3c. Posture Needs to avoid the neutral position. Repetition in neutral position.	Score 5: 4
	3a. Repetition Needs to avoid the neutral position. Repetition in neutral position.	3b. Repetition Needs to avoid the neutral position. Repetition in neutral position.	3c. Repetition Needs to avoid the neutral position. Repetition in neutral position.	Score 6: 4
4. Neck	4a. Posture Needs to maintain neutral position with little head forward.	4b. Posture Needs to maintain neutral position with little head forward.	4c. Posture Needs to maintain neutral position with little head forward.	Score 7: 5
	4a. Repetition Needs to maintain neutral position with little head forward.	4b. Repetition Needs to maintain neutral position with little head forward.	4c. Repetition Needs to maintain neutral position with little head forward.	Score 8: 5
5. Leg	5a. Posture Leg in neutral position sitting with feet on floor / feet sitting with feet on floor.	5b. Posture Leg in neutral position sitting with feet on floor / feet sitting with feet on floor.	5c. Posture Leg in neutral position sitting with feet on floor / feet sitting with feet on floor.	Score 9: 6
	5a. Repetition Leg in neutral position sitting with feet on floor / feet sitting with feet on floor.	5b. Repetition Leg in neutral position sitting with feet on floor / feet sitting with feet on floor.	5c. Repetition Leg in neutral position sitting with feet on floor / feet sitting with feet on floor.	Score 10: 6

PHYSICAL RISK FACTOR	RISK LEVEL			SCORING SYSTEM
	Low	Medium	High	
6. Forceful Lifting the hand	Lifting the hand 8-10kg	Lifting the hand 8-10kg	Lifting the hand 8-10kg	Score 11: 3
	Lifting the hand 8-10kg	Lifting the hand 8-10kg	Lifting the hand 8-10kg	Score 12: 6
7. Vibration	Steady state of vibration tool	Steady state of vibration tool	Steady state of vibration tool	Score 13: 4
	Steady state of vibration tool	Steady state of vibration tool	Steady state of vibration tool	Score 14: 4
8. Contact Stress	Using of tool handle or wearing hand gloves	Using of tool handle or wearing hand gloves	Using of tool handle or wearing hand gloves	Score 15: 4
	Using of tool handle or wearing hand gloves	Using of tool handle or wearing hand gloves	Using of tool handle or wearing hand gloves	Score 16: 4
9. Task duration	Task 10/day	Task 10/day	Task 10/day	Score 17: 4
	Task 10/day	Task 10/day	Task 10/day	Score 18: 4

Job/Task: <u>Menjahit</u>		FINAL SCORE: <u>41</u>	
Date: <u>9 Mei 2019</u>	Accident Level (ILO)	Exposure (hrs)	Task VC
Observer: <u>Markin Desyuggo</u>	None	20-44	Can't read to Lerner
	Minor	45-54	Investigate & treated
	Major		Can't read to Lerner
	Critical		Investigate & treated
	Severe		Can't read to Lerner
	Fatal		Investigate & treated

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Lampiran 3. Lembar WERA untuk Penjahit 3

Penjahit 3 (Woman)

WORKPLACE ERGONOMIC RISK ASSESSMENT (WERA)

PHYSICAL RISK FACTOR	RISK LEVEL			SCORING SYSTEM													
	LOW	MEDIUM	HIGH														
3. Shoulder	3a. Posture	Shoulders in neutral position	Shoulders in moderate flexion	<table border="1"> <tr><th>3a. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	3a. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6
	3a. POSTURE																
	low	2	3	4													
	med	3	4	5													
	high	4	5	6													
3b. Repetition	Shoulder is moderately bent up	Shoulder is moderately bent up with some process	<table border="1"> <tr><th>3b. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	3b. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
3b. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
3c. Posture	Wrists in a neutral position	Wrists are moderate bent up or bent down	<table border="1"> <tr><th>3c. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	3c. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
3c. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
3d. Repetition	3-50 times per 20 minutes	4-9 times per 20 minutes	<table border="1"> <tr><th>3d. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	3d. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
3d. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
3e. Posture	Neck in neutral position	Neck is moderate bent forward	<table border="1"> <tr><th>3e. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	3e. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
3e. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
4. Neck	4a. Posture	Neck in neutral position with little bent forward	Neck is moderate bent forward	<table border="1"> <tr><th>4a. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	4a. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6
	4a. POSTURE																
	low	2	3	4													
	med	3	4	5													
	high	4	5	6													
4b. Repetition	Neck is moderate bent forward with some process	Neck is moderate bent forward with some process	<table border="1"> <tr><th>4b. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	4b. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
4b. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
4c. Posture	Neck in neutral position	Neck is moderate bent forward	<table border="1"> <tr><th>4c. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	4c. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
4c. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
4d. Repetition	Neck is moderate bent forward with some process	Neck is moderate bent forward with some process	<table border="1"> <tr><th>4d. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	4d. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
4d. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
4e. Posture	Legs in neutral position	Legs are moderate bent forward	<table border="1"> <tr><th>4e. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	4e. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
4e. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
5. Leg	5a. Posture	Legs in neutral position	Legs are moderate bent forward	<table border="1"> <tr><th>5a. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	5a. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6
	5a. POSTURE																
	low	2	3	4													
	med	3	4	5													
	high	4	5	6													
5b. Repetition	Legs in neutral position	Legs are moderate bent forward	<table border="1"> <tr><th>5b. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	5b. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
5b. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
5c. Posture	Legs in neutral position	Legs are moderate bent forward	<table border="1"> <tr><th>5c. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	5c. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
5c. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
5d. Repetition	Legs in neutral position	Legs are moderate bent forward	<table border="1"> <tr><th>5d. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	5d. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
5d. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														
5e. Posture	Legs in neutral position	Legs are moderate bent forward	<table border="1"> <tr><th>5e. POSTURE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	5e. POSTURE	low	2	3	4	med	3	4	5	high	4	5	6	
5e. POSTURE																	
low	2	3	4														
med	3	4	5														
high	4	5	6														

PHYSICAL RISK FACTOR	RISK LEVEL	SCORING SYSTEM													
6. Forceful lifting the head	LOW	<table border="1"> <tr><th>6. FORCEFUL</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	6. FORCEFUL	low	2	3	4	med	3	4	5	high	4	5	6
	6. FORCEFUL														
	low	2	3	4											
	med	3	4	5											
	high	4	5	6											
MEDIUM	<table border="1"> <tr><th>6. FORCEFUL</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	6. FORCEFUL	low	2	3	4	med	3	4	5	high	4	5	6	
6. FORCEFUL															
low	2	3	4												
med	3	4	5												
high	4	5	6												
HIGH	<table border="1"> <tr><th>6. FORCEFUL</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	6. FORCEFUL	low	2	3	4	med	3	4	5	high	4	5	6	
6. FORCEFUL															
low	2	3	4												
med	3	4	5												
high	4	5	6												
Score 6	3														
7. Vibration	<table border="1"> <tr><th>7. VIBRATION</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	7. VIBRATION	low	2	3	4	med	3	4	5	high	4	5	6	
7. VIBRATION															
low	2	3	4												
med	3	4	5												
high	4	5	6												
Score 7	6														
8. Contact stress	<table border="1"> <tr><th>8. CONTACT STRESS</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	8. CONTACT STRESS	low	2	3	4	med	3	4	5	high	4	5	6	
8. CONTACT STRESS															
low	2	3	4												
med	3	4	5												
high	4	5	6												
Score 8	4														
9. Task duration	<table border="1"> <tr><th>9. TASK DURATION</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	9. TASK DURATION	low	2	3	4	med	3	4	5	high	4	5	6	
9. TASK DURATION															
low	2	3	4												
med	3	4	5												
high	4	5	6												
Score 9	4														

PHYSICAL RISK FACTOR	RISK LEVEL	SCORING SYSTEM													
FINAL SCORE	LOW	<table border="1"> <tr><th>FINAL SCORE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	FINAL SCORE	low	2	3	4	med	3	4	5	high	4	5	6
	FINAL SCORE														
	low	2	3	4											
	med	3	4	5											
	high	4	5	6											
MEDIUM	<table border="1"> <tr><th>FINAL SCORE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	FINAL SCORE	low	2	3	4	med	3	4	5	high	4	5	6	
FINAL SCORE															
low	2	3	4												
med	3	4	5												
high	4	5	6												
HIGH	<table border="1"> <tr><th>FINAL SCORE</th></tr> <tr><td>low</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>med</td><td>3</td><td>4</td><td>5</td></tr> <tr><td>high</td><td>4</td><td>5</td><td>6</td></tr> </table>	FINAL SCORE	low	2	3	4	med	3	4	5	high	4	5	6	
FINAL SCORE															
low	2	3	4												
med	3	4	5												
high	4	5	6												
Score 10	40														
11. Action Level	<table border="1"> <tr><th>ACTION LEVEL</th></tr> <tr><td>low</td><td>10-17</td></tr> <tr><td>med</td><td>18-24</td></tr> <tr><td>high</td><td>25-34</td></tr> </table>	ACTION LEVEL	low	10-17	med	18-24	high	25-34							
ACTION LEVEL															
low	10-17														
med	18-24														
high	25-34														

Job/Task: *Mengjahit*
 Date: *9 Mei 2019*
 Observer: *Martin Mulyono*

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Lampiran 4. Lembar REBA untuk Penjahit 1

Penjahit 1 (Arman)

REBA Employee Assessment Worksheet

Based on Technical note: Rapid Entire Body Assessment (REBA), Vigliani, McAtamney, Applied Ergonomics 31 (2000) 269-289

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

Step 1a. Adjust:
 If neck is twisted: +1
 If neck is side bending: +1

Step 2: Locate Trunk Position

Step 2a. Adjust:
 If trunk is twisted: +1
 If trunk is side bending: +1

Step 3: Legs

Step 4: Look-up Posture Score in Table A
 Using values from steps 1-3 above, locate score in Table A

Step 5: Add Force/Load Score
 If load < 11 lbs: -0
 If load 11 to 22 lbs: +1
 If load > 22 lbs: +2
 Adjust: If shock or rapid build up of force: add +1

Step 6: Score A. Find Row in Table C
 Add values from steps 4 & 5 to obtain Score A. Find Row in Table C

Scoring:
 1 = negligible risk
 2 or 3 = low risk, change may be needed
 4 to 7 = medium risk, further investigation, change soon
 8 to 10 = high risk, investigate and implement change
 11+ = very high risk, implement change

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position:

Step 7a. Adjust:
 If shoulder is raised: +1
 If upper arm is abducted: +1
 If arm is supported or person is leaning: -1

Step 8: Locate Lower Arm Position:

Step 9: Locate Wrist Position:

Step 9a. Adjust:
 If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B
 Using values from steps 7-9 above, locate score in Table B

Step 11: Add Coupling Score
 Well fitting handle and mid range power grip: **good: +0**
 Acceptable but not ideal hand hold or coupling: **fair: +1**
 Hand hold not acceptable but possible: **poor: +2**
 No handles, awkward, unsafe with any body part: **Unacceptable: +3**

Step 12: Score B. Find Column in Table C
 Add values from steps 10 & 11 to obtain Score B. Find column in Table C and match with Score A in row from step 6 to obtain Table C Score

Step 13: Activity Score
 +1 if more body parts are held for longer than 1 minute (static)
 +1 Repeated small range actions (more than 4x per minute)
 +1 Action causes rapid large range changes in postures of unstable base

SCORES

Neck	1	2	3
Legs	1	2	3
Trunk	1	2	3
Posture Score	2	3	4
Score	4	5	6
Score	5	6	7
Score	6	7	8
Score	7	8	9
Score	8	9	10

Upper Arm	1	2	3
Lower Arm	1	2	3
Wrist	1	2	3
Score	1	2	3
Score	2	3	4
Score	3	4	5
Score	4	5	6
Score	5	6	7
Score	6	7	8
Score	7	8	9

Score A	1	2	3	4	5	6	7	8	9	10	11	12
Score B	1	1	1	2	3	4	5	6	7	7	7	7
Score B	2	1	2	3	4	4	5	6	6	7	7	8
Score B	3	2	3	3	4	5	6	7	7	8	8	8
Score B	4	3	4	4	5	6	7	8	8	9	9	9
Score B	5	4	4	5	6	7	8	9	9	10	10	10
Score B	6	5	6	6	7	8	9	10	10	11	11	11
Score B	7	6	7	7	8	9	10	10	11	11	11	11
Score B	8	7	8	8	9	10	10	11	11	11	11	11
Score B	9	8	9	9	10	10	11	11	11	11	11	11
Score B	10	9	10	10	11	11	11	12	12	12	12	12
Score B	11	10	11	11	11	12	12	12	12	12	12	12
Score B	12	11	11	12	12	12	12	12	12	12	12	12

Table C Score **3** + Activity Score **7** = Final REBA Score **9**

Task name: Penjahit Reviewer: Maxin Mochanggo Date: 9 / 5 / 2019

provided by Practical Ergonomics
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Lampiran 5. Lembar REBA untuk penjahit 2

Penjahit 2 (Rajut)

REBA Employee Assessment Worksheet

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

 Neck Score: 2

Step 1a: Adjust
 If neck is twisted: +1
 If neck is side bending: +1

Step 2: Locate Trunk Position

 Trunk Score: 2

Step 2a: Adjust
 If trunk is twisted: +1
 If trunk is side bending: +1

Step 3: Legs

 Leg Score: 4

Adjust: +60
 Add +1
 Add +2

Step 4: Look-up Posture Score in Table A
 Using values from steps 1-3 above, locate score in Table A.

Step 5: Add Foreload Score
 If load < 13 lbs: +0
 If load 13 to 22 lbs: +1
 If load > 22 lbs: +2
 Adjust: If shock or rapid build-up of force: add +1

Step 6: Score A, Find Row in Table C
 Add values from steps 4 & 5 to obtain Score A.
 Find Row in Table C.

Scoring:
 1 = negligible risk
 2 or 3 = low risk, change may be needed
 4 to 7 = medium risk, further investigation, change soon
 8 to 10 = high risk, investigate and implement change
 11+ = very high risk, implement change

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position

 Upper Arm Score: 3

Step 7a: Adjust
 If upper arm is abducted: +1
 If arm is supported or person is leaning: -1

Step 8: Locate Lower Arm Position

 Lower Arm Score: 3

Step 9a: Adjust
 If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B
 Using values from steps 7 & 8 above, locate score in Table B.

Step 11: Add Coupling Score
 Well fitting flange and snug ring power grip: good: +0
 Acceptable fit on ring and snug or coupling: fair: +1
 Poor fit on ring and/or coupling: poor: +2
 Hand held not acceptable by portable: Unacceptable: +3
 No handles, awkward, unsafe with any tool, part.

Step 12: Score B, Find Column in Table C
 Add values from steps 10 & 11 to obtain Score B.
 Find column in Table C and match with Score A in row from step 6 to obtain Table C Score.

Step 13: Activity Score
 +1 1 or more body parts are held for longer than 1 minute (static).
 +4 Repeated small range actions (more than 4x per minute).
 +1 Action causes rapid large range changes in postures or unstable base.

SCORES

Table A	Neck		
	1	2	3
Legs	1	2	3
Trunk	1	2	3
Trunk Problems Score	1	2	3
Upper Arm	1	2	3
Lower Arm	1	2	3
Wrist	1	2	3
Foreload Score	1	2	3
Score A	1	2	3
Table B	1	2	3
Table C	1	2	3
Score B	1	2	3
Table C	1	2	3

Table C Score: 7 + Activity Score: 2 = Final REBA Score: 9

Task name: Penjahit Reviewer: Mustin Mulya Date: 3 / 5 / 2019

This tool is provided without warranty. The author has provided this tool as a simple means for applying the concepts provided in REBA. © 2019 Human Computing, Inc. provided by Practical Ergonomics reba@ergonomics.com (816) 444-1867

Lampiran 6. Lembar REBA untuk Penjahit 3

Penjahit 3 (Usawan)

REBA Employee Assessment Worksheet

based on Technical note: Rapid Entire Body Assessment (REBA), Adapted: McGarrity, Applied Ergonomics 31 (2000) 261-275

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

Step 2: Locate Trunk Position

Step 3: Legs

Step 4: Look-up Posture Score in Table A
 Using values from steps 1-3 above, locate score in Table A

Step 5: Add Force/Load Score
 If load < 11 lbs: +0
 If load 11 to 22 lbs: +1
 If load > 22 lbs: +2
 Adjust: If stock or rapid build up of force: add +1

Step 6: Score A, Find Row in Table C
 Add values from steps 4 & 5 to obtain Score A. Find Row in Table C

Scoring:
 1 = negligible risk
 2 or 3 = low risk, change may be needed
 4 to 7 = medium risk, further investigation, change soon
 8 to 10 = high risk, investigate and implement change
 11+ = very high risk, implement change

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position:

Step 8: Locate Lower Arm Position:

Step 9: Locate Wrist Position:

Step 10: Look-up Posture Score in Table B
 Using values from steps 7-9 above, locate score in Table B

Step 11: Add Coupling Score
 Well fitting Handle and mid range power grip: +0
 Acceptable but not ideal hand hold or coupling: +1
 Hand hold not acceptable but possible: +2
 No handles, awkward, unsafe with any body part: +3
 Unacceptable: +3

Step 12: Score B, Find Column in Table C
 Add values from steps 10 & 11 to obtain Score B. Find column in Table C and match with Score A in row from step 6 to obtain Table C Score

Step 13: Activity Score
 +1 or more body parts are held for longer than 1 minute (static)
 +1 Repeated small range actions (more than 4x per minute)
 +1 Action causes rapid large range changes in postures or unstable base

SCORES

Table A		Neck	
	(1)	2	3
Legs	1 2 3 4	1 2 3 4	1 2 3 4
Trunk Posture Score	1 2 3 4	1 2 3 4	1 2 3 4
Upper Arm	1 2 3 4	1 2 3 4	1 2 3 4
Lower Arm	1 2 3 4	1 2 3 4	1 2 3 4
Wrist	1 2 3 4	1 2 3 4	1 2 3 4
Upper Arm Score	1 2 3 4	1 2 3 4	1 2 3 4
Lower Arm Score	1 2 3 4	1 2 3 4	1 2 3 4
Wrist Score	1 2 3 4	1 2 3 4	1 2 3 4

Table B		Lower Arm	
	(1)	2	3
Wrist	1 2 3 4	1 2 3 4	1 2 3 4
Upper Arm	1 2 3 4	1 2 3 4	1 2 3 4
Lower Arm	1 2 3 4	1 2 3 4	1 2 3 4
Wrist	1 2 3 4	1 2 3 4	1 2 3 4
Upper Arm Score	1 2 3 4	1 2 3 4	1 2 3 4
Lower Arm Score	1 2 3 4	1 2 3 4	1 2 3 4
Wrist Score	1 2 3 4	1 2 3 4	1 2 3 4

Table C	
Score A	Score B (table B value - coupling score)
1	1 2 3 4 5 6 7 8 9 10 11 12
2	1 2 3 4 5 6 7 8 9 10 11 12
3	1 2 3 4 5 6 7 8 9 10 11 12
4	1 2 3 4 5 6 7 8 9 10 11 12
5	1 2 3 4 5 6 7 8 9 10 11 12
6	1 2 3 4 5 6 7 8 9 10 11 12
7	1 2 3 4 5 6 7 8 9 10 11 12
8	1 2 3 4 5 6 7 8 9 10 11 12
9	1 2 3 4 5 6 7 8 9 10 11 12
10	1 2 3 4 5 6 7 8 9 10 11 12
11	1 2 3 4 5 6 7 8 9 10 11 12
12	1 2 3 4 5 6 7 8 9 10 11 12

6

+

2

Table C Score + Activity Score

8

=

8

Final REBA Score

Task name: Penjahit Reviewer: Martin Madanoff Date: 9 / 5 / 2015

This tool is provided without warranty. The author has provided the tool as a simple means for applying the concepts provided in REBA. provided by Practical Ergonomics
hunker@ergonomics.com (813) 444-1667

Lampiran 7. Lembar Kuisisioner *Nordic* Penjahit 1

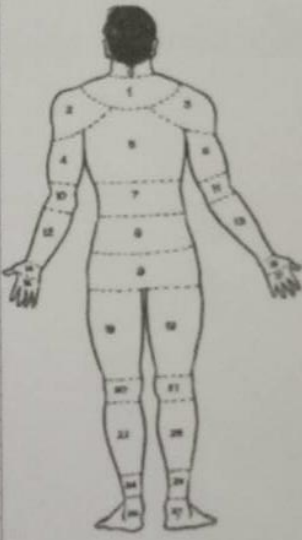
Sebelum

IDENTITAS DIRI

Nama : *Firman*
 Jenis Kelamin : *Laki-laki*
 Usia : *25* Tahun
 Lama Bekerja : *15* Tahun

Jawablah pertanyaan berikut dengan memberi tanda (✓) pada kolom pertanyaan berdasarkan keluhan rasa sakit yang Bapak/Ibu alami pada bagian tubuh sesuai dengan gambar.

No	Jenis Keluhan	Keluhan			
		Tidak Sakit	Agak Sakit	Sakit	Sangat Sakit
0	Sakit/kaku pada leher bagian atas			✓	
1	Sakit/kaku pada leher bagian bawah			✓	
2	Sakit pada bahu kiri			✓	
3	Sakit pada bahu kanan			✓	
4	Sakit pada lengan atas kiri			✓	
5	Sakit pada punggung			✓	
6	Sakit pada lengan atas kanan			✓	
7	Sakit pada pinggang			✓	
8	Sakit pada bokong			✓	
9	Sakit pada pantat			✓	
10	Sakit pada siku kiri	✓			
11	Sakit pada siku kanan	✓			
12	Sakit pada lengan bawah kiri	✓			
13	Sakit pada lengan bawah kanan	✓			
14	Sakit pada pergelangan tangan kiri			✓	
15	Sakit pada pergelangan tangan kanan			✓	
16	Sakit pada tangan kiri	✓			
17	Sakit pada tangan kanan	✓			
18	Sakit pada paha kiri	✓			
19	Sakit pada paha kanan			✓	
20	Sakit pada lutut kiri	✓			
21	Sakit pada lutut kanan	✓			
22	Sakit pada betis kiri	✓			
23	Sakit pada betis kanan	✓			
24	Sakit pada pergelangan kaki kiri	✓			
25	Sakit pada pergelangan kaki kanan	✓			
26	Sakit pada kaki kiri	✓			
27	Sakit pada kaki kanan	✓			



Lampiran 8. Lembar Kuisisioner *Nordic* Penjahit 2

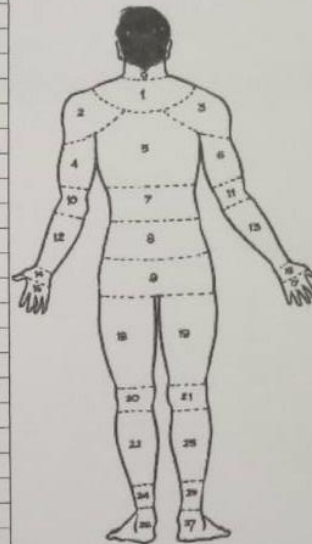
Sebelum

IDENTITAS DIRI

Nama : *Rafiq*
 Jenis Kelamin : *Laki-laki*
 Usia : *41* Tahun
 Lama Bekerja : *7* Tahun

Jawablah pertanyaan berikut dengan memberi tanda (✓) pada kolom pertanyaan berdasarkan keluhan rasa sakit yang Bapak/Ibu alami pada bagian tubuh sesuai dengan gambar.

No	Jenis Keluhan	Keluhan			
		Tidak Sakit	Agak Sakit	Sakit	Sangat Sakit
0	Sakit/kaku pada leher bagian atas			✓	
1	Sakit/kaku pada leher bagian bawah			✓	
2	Sakit pada bahu kiri			✓	
3	Sakit pada bahu kanan			✓	
4	Sakit pada lengan atas kiri	✓			
5	Sakit pada punggung			✓	
6	Sakit pada lengan atas kanan	✓			
7	Sakit pada pinggang			✓	
8	Sakit pada bokong			✓	
9	Sakit pada pantat			✓	
10	Sakit pada siku kiri	✓			
11	Sakit pada siku kanan			✓	
12	Sakit pada lengan bawah kiri	✓			
13	Sakit pada lengan bawah kanan	✓			
14	Sakit pada pergelangan tangan kiri			✓	
15	Sakit pada pergelangan tangan kanan			✓	
16	Sakit pada tangan kiri	✓			
17	Sakit pada tangan kanan			✓	
18	Sakit pada paha kiri			✓	
19	Sakit pada paha kanan			✓	
20	Sakit pada lutut kiri			✓	
21	Sakit pada lutut kanan	✓			
22	Sakit pada betis kiri	✓			
23	Sakit pada betis kanan	✓			
24	Sakit pada pergelangan kaki kiri			✓	
25	Sakit pada pergelangan kaki kanan			✓	
26	Sakit pada kaki kiri	✓			
27	Sakit pada kaki kanan	✓			



Lampiran 9. Lembar Kuisisioner Nordic Penjahit 3

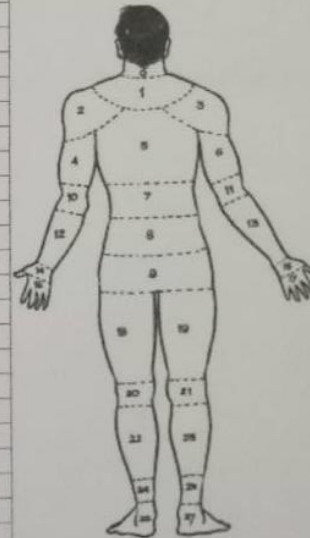
Sebelum

IDENTITAS DIRI

Nama : Wawan
 Jenis Kelamin : Laki - laki
 Usia : 40 Tahun
 Lama Bekerja : 1 Tahun

Jawablah pertanyaan berikut dengan memberi tanda (√) pada kolom pertanyaan berdasarkan keluhan rasa sakit yang Bapak/Ibu alami pada bagian tubuh sesuai dengan gambar.

No	Jenis Keluhan	Keluhan			
		Tidak Sakit	Agak Sakit	Sakit	Sangat Sakit
0	Sakit/kaku pada leher bagian atas			✓	
1	Sakit/kaku pada leher bagian bawah			✓	
2	Sakit pada bahu kiri			✓	
3	Sakit pada bahu kanan			✓	
4	Sakit pada lengan atas kiri	✓			
5	Sakit pada punggung			✓	
6	Sakit pada lengan atas kanan	✓			
7	Sakit pada pinggang			✓	
8	Sakit pada bokong			✓	
9	Sakit pada pantat	✓			
10	Sakit pada siku kiri	✓			
11	Sakit pada siku kanan			✓	
12	Sakit pada lengan bawah kiri			✓	
13	Sakit pada lengan bawah kanan	✓			
14	Sakit pada pergelangan tangan kiri			✓	
15	Sakit pada pergelangan tangan kanan			✓	
16	Sakit pada tangan kiri	✓			
17	Sakit pada tangan kanan			✓	
18	Sakit pada paha kiri			✓	
19	Sakit pada paha kanan			✓	
20	Sakit pada lutut kiri			✓	
21	Sakit pada lutut kanan			✓	
22	Sakit pada betis kiri	✓			
23	Sakit pada betis kanan	✓			
24	Sakit pada pergelangan kaki kiri			✓	
25	Sakit pada pergelangan kaki kanan			✓	
26	Sakit pada kaki kiri	✓			
27	Sakit pada kaki kanan	✓			



Lampiran 10. Lembar WERA Setelah Perbaikan

WORKPLACE ERGONOMIC RISK ASSESSMENT (WERA)		RISK LEVEL			SCORING SYSTEM										
PHYSICAL RISK FACTOR		LOW	MEDIUM	HIGH	1A. REPETITION	2A. POSTURE									
1. Shoulder	1a. Posture	Shoulder in neutral position	Shoulder in moderate movement with some rotation	Shoulder in extreme movement with no rest	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 1: 4
	Low	Med	High												
1	2	3													
4	5	6													
1b. Repetition	1-10 times per minute	11-20 times per minute	Over 20 times per minute	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 2: 3	
Low	Med	High													
1	2	3													
4	5	6													
2. Wrist	2a. Posture	Wrist in neutral position	Wrist in moderate extension or flexion	Wrist in extreme extension or flexion	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 3: 3
	Low	Med	High												
1	2	3													
4	5	6													
2b. Repetition	0-10 times per minute	11-20 times per minute	Over 20 times per minute	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 4: 4	
Low	Med	High													
1	2	3													
4	5	6													
3. Back	3a. Posture	Back in neutral position	Back in moderate flexion or extension	Back in extreme flexion or extension	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 5: 3
	Low	Med	High												
1	2	3													
4	5	6													
3b. Repetition	0-10 times per minute	11-20 times per minute	Over 20 times per minute	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 6: 4	
Low	Med	High													
1	2	3													
4	5	6													
4. Neck	4a. Posture	Head in neutral position with slight neck flexion	Head in moderate neck flexion or extension	Head in extreme neck flexion or extension	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 7: 4
	Low	Med	High												
1	2	3													
4	5	6													
4b. Repetition	0-10 times per minute	11-20 times per minute	Over 20 times per minute	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 8: 4	
Low	Med	High													
1	2	3													
4	5	6													
5. Leg	5a. Posture	Legs in neutral position	Legs in moderate flexion or extension	Legs in extreme flexion or extension	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 9: 6
	Low	Med	High												
1	2	3													
4	5	6													
5b. Repetition	0-10 times per minute	11-20 times per minute	Over 20 times per minute	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	Score 10: 6	
Low	Med	High													
1	2	3													
4	5	6													

PHYSICAL RISK FACTOR	6. Forceful Lifting the load	7. Vibration: Using of vibration tool	8. Contact stress: Using of tool handle Or wearing hand gloves	9. Task duration: Task/hr/day																																				
RISK LEVEL	LOW	MEDIUM	HIGH	HIGH																																				
SCORING SYSTEM	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6	<table border="1"> <tr><th>Low</th><th>Med</th><th>High</th></tr> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table>	Low	Med	High	1	2	3	4	5	6
Low	Med	High																																						
1	2	3																																						
4	5	6																																						
Low	Med	High																																						
1	2	3																																						
4	5	6																																						
Low	Med	High																																						
1	2	3																																						
4	5	6																																						
Low	Med	High																																						
1	2	3																																						
4	5	6																																						
FINAL SCORE	52																																							
JOB/TASK	Majikan																																							
DATE	20 September 2024																																							
OBSERVER	Martin Masjaya																																							
ACTION LEVEL	Low	Med	High	Task (T)																																				
Final Score	15-27	28-41	42-54	Task (T)																																				
Action	Task to meet to baseline	Task to meet to baseline	Task to meet to baseline	Task (T)																																				
Investigate & required change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																				
Test to meet workplace accessibility change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																				

Based on NIOSH or international best practice to investigate the physical risk factor associated with WERA. Model: Nurul Akmal Fadzlan, Amir Hidayatul Bari and Siti Nurul Adhah, Journal of Human Ergology, 2011, 40(2), 104-10.

Lampiran 11. Lembar REBA Setelah Perbaikan

REBA Employee Assessment Worksheet

A. Neck, Trunk and Leg Analysis

Step 1: Locate Neck Position

Step 1a. Adjust:
If neck is twisted: +1
If neck is side bending: -1

Step 2: Locate Trunk Position

Step 2a. Adjust:
If trunk is twisted: +1
If trunk is side bending: -1

Step 3: Legs

Adjust:
30-60°: Add +1
60°: Add +2

Step 4: Look-up Posture Score in Table A
Using values from steps 1-3 above, locate score in Table A

Step 5: Add Force/Load Score
If load < 11 lbs: -1
If load 11 to 22 lbs: +1
If load > 22 lbs: +2
Adjust: If block or rapid build up of force: add +1

Step 6: Score A, Find Row in Table C
Add values from steps 4 & 5 to obtain Score A.
Find Row in Table C

Scoring:
1 = negligible risk
2 or 3 = low risk, change may be needed
4 to 7 = medium risk, further investigation, change soon
8 to 10 = high risk, investigate and implement change
11+ = very high risk, implement change

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position:

Step 7a. Adjust:
If shoulder is raised: +1
If upper arm is abducted: +1
If arm is supported or person is leaning: -1

Step 8: Locate Lower Arm Position:

Step 8a. Adjust:
If wrist is bent from midline or twisted: Add +1
If wrist is bent from midline or twisted: Add +1

Step 9: Locate Wrist Position:

Step 9a. Adjust:
If wrist is bent from midline or twisted: Add +1

Step 10: Look-up Posture Score in Table B
Using values from steps 7-9 above, locate score in Table B

Step 11: Add Coupling Score
Well fitting handle and mid range power grip: **good: +0**
Acceptable but not ideal hand hold or coupling: **fair: +1**
Hand hold not acceptable but possible: **poor: +2**
No handles, awkward, unsafe with any body part: **Unacceptable: +3**

Step 12: Score B, Find Column in Table C
Add values from steps 10 & 11 to obtain Score B. Find column in Table C and match with Score A in row from step 6 to obtain Table C Score

Step 13: Activity Score
+1: 1 or more body parts are held for longer than 1 minute (static)
+1: Repeated small range actions (more than 4x per minute)
+1: Action causes rapid large range changes in postures or unstable base

SCORES	
Table A	Neck
Legs	1 2 3 4
1	1 2 3 4
2	1 2 3 4
3	1 2 3 4
4	1 2 3 4
5	1 2 3 4
6	1 2 3 4
7	1 2 3 4
8	1 2 3 4
9	1 2 3 4
10	1 2 3 4
11	1 2 3 4
12	1 2 3 4

Table B	
Upper Arm	Lower Arm
1 2 3 4	1 2 3 4
1	1 2 3 4
2	1 2 3 4
3	1 2 3 4
4	1 2 3 4
5	1 2 3 4
6	1 2 3 4
7	1 2 3 4
8	1 2 3 4
9	1 2 3 4
10	1 2 3 4
11	1 2 3 4
12	1 2 3 4

Table C		
Score A	Score B	Table C
1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12

Table C Score

+

Activity Score

=

Final REBA Score

Task name: Mopett Reviewer: Monir Madjoo Ego Date: 9/5/2019

This tool is provided without warranty. The author has provided this tool as a simple means for applying the concepts provided in REBA. provided by Practical Ergonomics rhanke@ergosmart.com (815) 444-1667

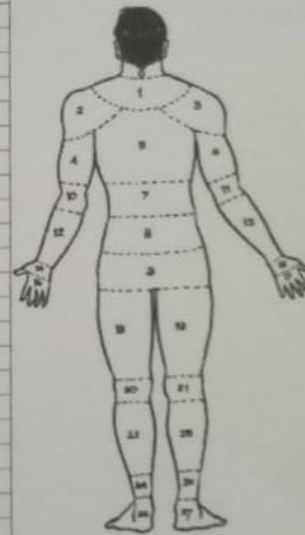
Lampiran 12. Lembar Kuisioner Nordic Setelah Implementasi Penjahit 1

IDENTITAS DIRI

Nama : *Fitriana*
 Jenis Kelamin : *Laki-laki*
 Usia : *25* Tahun
 Lama Bekerja : *10* Tahun

Jawablah pertanyaan berikut dengan memberi tanda (✓) pada kolom pertanyaan berdasarkan keluhan rasa sakit yang Bapak/Ibu alami pada bagian tubuh sesuai dengan gambar.

No	Jenis Keluhan	Keluhan			
		Tidak Sakit	Agak Sakit	Sakit	Sangat Sakit
0	Sakit/kaku pada leher bagian atas			✓	
1	Sakit/kaku pada leher bagian bawah			✓	
2	Sakit pada bahu kiri			✓	
3	Sakit pada bahu kanan			✓	
4	Sakit pada lengan atas kiri	✓		✓	
5	Sakit pada punggung	✓			
6	Sakit pada lengan atas kanan			✓	
7	Sakit pada pinggang	✓			
8	Sakit pada bokong	✓			
9	Sakit pada pantat	✓			
10	Sakit pada siku kiri	✓			
11	Sakit pada siku kanan	✓			
12	Sakit pada lengan bawah kiri	✓			
13	Sakit pada lengan bawah kanan	✓			
14	Sakit pada pergelangan tangan kiri			✓	
15	Sakit pada pergelangan tangan kanan			✓	
16	Sakit pada tangan kiri	✓			
17	Sakit pada tangan kanan	✓			
18	Sakit pada paha kiri	✓			
19	Sakit pada paha kanan	✓			
20	Sakit pada lutut kiri	✓			
21	Sakit pada lutut kanan	✓			
22	Sakit pada betis kiri	✓			
23	Sakit pada betis kanan	✓			
24	Sakit pada pergelangan kaki kiri	✓			
25	Sakit pada pergelangan kaki kanan	✓			
26	Sakit pada kaki kiri	✓			
27	Sakit pada kaki kanan	✓			



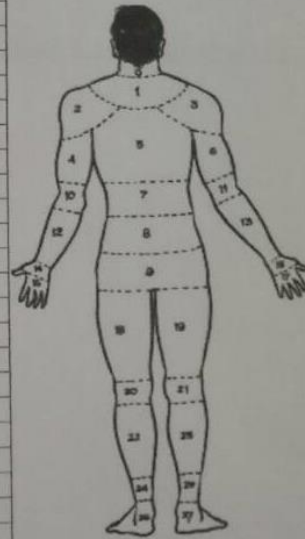
Lampiran 13. Lembar Kuisioner Nordic Setelah Implementasi Penjahit 2

IDENTITAS DIRI

Nama : *Rizki*
 Jenis Kelamin : *Laki-laki*
 Usia : *41* Tahun
 Lama Bekerja : *7* Tahun

Jawablah pertanyaan berikut dengan memberi tanda (✓) pada kolom pertanyaan berdasarkan keluhan rasa sakit yang Bapak/Ibu alami pada bagian tubuh sesuai dengan gambar.

No	Jenis Keluhan	Keluhan			
		Tidak Sakit	Agak Sakit	Sakit	Sangat Sakit
0	Sakit/kaku pada leher bagian atas	✓			
1	Sakit/kaku pada leher bagian bawah	✓			
2	Sakit pada bahu kiri			✓	
3	Sakit pada bahu kanan			✓	
4	Sakit pada lengan atas kiri	✓			
5	Sakit pada punggung	✓			
6	Sakit pada lengan atas kanan	✓			
7	Sakit pada pinggang	✓			
8	Sakit pada bokong	✓			
9	Sakit pada pantat	✓			
10	Sakit pada siku kiri	✓			
11	Sakit pada siku kanan			✓	
12	Sakit pada lengan bawah kiri	✓			
13	Sakit pada lengan bawah kanan	✓			
14	Sakit pada pergelangan tangan kiri			✓	
15	Sakit pada pergelangan tangan kanan			✓	
16	Sakit pada tangan kiri	✓			
17	Sakit pada tangan kanan			✓	
18	Sakit pada paha kiri	✓			
19	Sakit pada paha kanan	✓			
20	Sakit pada lutut kiri	✓		✓	
21	Sakit pada lutut kanan	✓			
22	Sakit pada betis kiri	✓			
23	Sakit pada betis kanan	✓			
24	Sakit pada pergelangan kaki kiri			✓	
25	Sakit pada pergelangan kaki kanan			✓	
26	Sakit pada kaki kiri	✓			
27	Sakit pada kaki kanan	✓			



Lampiran 14. Lembar Kuisioner Nordic Setelah Implementasi Penjahit 3

IDENTITAS DIRI

Nama : Wawan
 Jenis Kelamin : Laki - Laki
 Usia : 40 Tahun
 Lama Bekerja : 9 Tahun

Jawablah pertanyaan berikut dengan memberi tanda (✓) pada kolom pertanyaan berdasarkan keluhan rasa sakit yang Bapak/Ibu alami pada bagian tubuh sesuai dengan gambar.

No	Jenis Keluhan	Keluhan			
		Tidak Sakit	Agak Sakit	Sakit	Sangat Sakit
0	Sakit/kaku pada leher bagian atas	✓			
1	Sakit/kaku pada leher bagian bawah	✓			
2	Sakit pada bahu kiri	✓			
3	Sakit pada bahu kanan	✓			
4	Sakit pada lengan atas kiri	✓			
5	Sakit pada punggung	✓			
6	Sakit pada lengan atas kanan	✓			
7	Sakit pada pinggang	✓			
8	Sakit pada bokong	✓			
9	Sakit pada pantat	✓			
10	Sakit pada siku kiri	✓			
11	Sakit pada siku kanan			✓	
12	Sakit pada lengan bawah kiri			✓	
13	Sakit pada lengan bawah kanan	✓			
14	Sakit pada pergelangan tangan kiri			✓	
15	Sakit pada pergelangan tangan kanan			✓	
16	Sakit pada tangan kiri	✓			
17	Sakit pada tangan kanan			✓	
18	Sakit pada paha kiri	✓			
19	Sakit pada paha kanan	✓			
20	Sakit pada lutut kiri			✓	
21	Sakit pada lutut kanan			✓	
22	Sakit pada betis kiri	✓			
23	Sakit pada betis kanan	✓			
24	Sakit pada pergelangan kaki kiri			✓	
25	Sakit pada pergelangan kaki kanan			✓	
26	Sakit pada kaki kiri	✓			
27	Sakit pada kaki kanan	✓			

