STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN
(NATIONAL OCCUPATIONAL SKILL STANDARD)

INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION
LEVEL 3
TA-014-3:2014

JPK

KEMENTERIAN SUMBER MANUSIA

MALAYSIAN TEXTILE AND APPAREL CENTRE

Department of Skills Development (DSD)

Ministry of Human Resources

62530 PUTRAJAYA, MALAYSIA

STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN (NATIONAL OCCUPATIONAL SKILLS STANDARD)

FOR

INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION LEVEL 3

Version 1.0

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STANDARD PRACTICE

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR

INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION

LEVEL 3

1. INTRODUCTION

The apparel manufacturing industry is primarily a labour-intensive industry that utilises many operator-control tools and equipment to produce garments. The industrial sewing machine is essential equipment for garment making without which, garments cannot be made quickly and economically. The proper maintenance of industrial sewing machines is of vital importance in ensuring that these machines are safe to use, operating at optimum efficiency and producing quality output that complies with production and diverse style requirements. Maintenance jobs include machine installation, set-up, fabrication of attachments and other low cost automation work aids, scheduled maintenance and repair of various types of standard and specialised industrial sewing machines.

Malaysia has an extensive experience as a producer of high end international brands under contract manufacturing arrangement emphasising on design, production and high quality finishing. In addition, various made in Malaysia apparels have also gained international recognition for their quality, reliability and quick as well as prompt delivery. The mixed culture and international exposure of designers have enabled Malaysia to produce varied clothes suitable for all markets, from Asia, Europe to the Middle East. Malaysia is currently known for its fashionable Islamic apparels.

Hence, the development of competent Industrial Sewing Machine Maintenance personnel is of vital importance, not only to meet the shortage of skilled workers in this industry, but also to ensure quality garment outputs that suit the high fashion and increasingly sophisticated market.

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1. Occupational Overview

Industrial Sewing Machine Maintenance Supervision Level 3 personnel plan, monitor and verify technicians' job functions. The routine tasks for this occupation include industrial sewing machine commissioning, industrial sewing machine troubleshooting, industrial sewing machine maintenance job verification, industrial sewing machine maintenance operation monitoring and industrial sewing machine maintenance personnel supervision.

The Industrial Sewing Machine Maintenance Supervision Level 3 personnel are responsible to ensure all safety measures and practices are strictly adhered to at all times. They perform repair work that cannot be solved by Level 2

technicians and ensure preventive and corrective maintenance are performed according to established workplace procedures and industrial sewing machine manual instructions. They supervise technicians' job functions and coach them to provide better maintenance service in order to enhance productivity and quality.

2. Justification and Rationale for NOSS Development

This NOSS development is an initiative to support the high demand for skilled personnel in the apparel manufacturing industry which is facing serious shortage particularly for this job area. Currently, industrial sewing machine maintenance personnel acquire their skills from on-the-job training in an ad hoc manner. This NOSS provides a basis for formal and systematic training. It can also be used to certify experienced maintenance personnel. Trained and competent personnel will be able to support the activities in the apparel manufacturing industry which provides employment opportunities in the private sector and subsequently generate income for the country

This document covers the competency standard of Industrial Sewing Machine Maintenance Supervision (Level 3) that is presently significant in the apparel manufacturing industry.

3. Regulatory Requirements

None

2. OCCUPATIONAL STRUCTURE

The Occupational Structure is described and analysed by means of various classificatory schemes, which consist of similar occupations grouped together according to specific criteria such as skills, employment status, or functions.

1. Occupational Structure

The Occupational Structure of Industrial Sewing Machine Maintenance is as shown in Figure 1.1 on Page iv. Industrial Sewing Machine Maintenance Supervision (Level 3) comes under the sub sector of Apparel Manufacturing while the job area is Machine Maintenance (Sewing Machine).

2. Occupational Area Structure

The Occupational Area Structure for Industrial Sewing Machine Maintenance is illustrated in Figure 1.2 on Page v. After much deliberation among the Panel Experts, the NOSS title for this occupational area is Industrial Sewing Machine Maintenance Supervision under the sub sector of Apparel Manufacturing while the job area is Machine Maintenance (Sewing Machine).

3. NOSS Occupational Area Structure and Level Justification

Industrial Sewing Machine Maintenance Supervision Level 3 is developed in continuation from Industrial Sewing Machine Maintenance Level 2. It describes the competencies required by personnel at the supervisory level who plan, monitor and verify Level 2 technicians' work.

SECTOR	TEXTILE & APPAREL										
SUB SECTOR	APPAREL MANUFACTURING										
AREA	MASS PRODUCTION										
JOB AREA	CUTTING SECTION				SEWING SECTION	FINISHING SECTION				QUALITY ASSURANCE	APPAREL MANUFACTURING MACHINE MAINTENANCE	
	PATTERN MAKING	MARKER PLANNING	CUTTING	EMBROIDERY		TRIMMING	IRONING	FOLDING	PACKING		SEWING MACHINE	PLANT AND FACILITY
LEVEL 5	PLANT MANAGER									QUALITY ASSURANCE MANAGER	MAINTENANCE MANAGER	
LEVEL 4	CUTTING EXECUTIVE				SEWING EXECUTIVE	FINISHING EXECUTIVE				QUALITY ASSURANCE EXECUTIVE	MAINTENANCE EXECUTIVE	
LEVEL 3	*SENIOR PATTERN MAKER	*SENIOR MARKER PLANNER	*CUTTING SUPERVISOR	*EMBROIDERY SUPERVISOR	*SEWING SUPERVISOR	FINISHING SUPERVISOR				QUALITY ASSURANCE SUPERVISOR	INDUSTRIAL SEWING MACHINE SUPERVISOR	PLANT & FACILITY SUPERVISOR
LEVEL 2	*PATTERN MAKER	*PLANNER	*CUTTING OPERATOR	*EMBROIDERY SENIOR OPERATOR	SEWING SENIOR OPERATOR	FINISHING OPERATOR				QUALITY ASSURANCE INSPECTOR	INDUSTRIAL SEWING MACHINE SENIOR TECHNICIAN	MAINTENANCE SENIOR TECHNICIAN
LEVEL 1	NO LEVEL	NO LEVEL	NO LEVEL	*EMBROIDERY OPERATOR	*SEWING OPERATOR	FINISHING OPERATOR				NO LEVEL	INDUSTRIAL SEWING MACHINE TECHNICIAN	MAINTENANCE TECHNICIAN

Fig. 1.1 Occupational Structure for Textile and Apparel Industry Maintenance Personnel

SECTOR	TEXTILE & APPAREL										
SUB SECTOR	APPAREL MANUFACTURING										
AREA	MASS PRODUCTION										
JOB AREA	CUTTING SECTION				SEWING SECTION	FINISHING SECTION				QUALITY ASSURANCE	APPAREL MANUFACTURING MACHINE MAINTENANCE	
	PATTERN MAKING	MARKER PLANNING	CUTTING	EMBROIDERY		TRIMMING	IRONING	FOLDING	PACKING		SEWING MACHINE	PLANT AND FACILITY
LEVEL 5	PLANT MANAGEMENT									QUALITY ASSURANCE MANAGEMENT	MAINTENANCE MANAGEMENT	
LEVEL 4	CUTTING EXECUTION				SEWING EXECUTION	FINISHING EXECUTION				QUALITY ASSURANCE EXECUTION	MAINTENANCE PLANNING & CONTROL	
LEVEL 3	*PATTERN MAKING	*MARKING	*CUTTING SUPERVISION	*EMBROIDERY SUPERVISION	*SEWING SUPERVISION	FINISHING SUPERVISION				QUALITY ASSURANCE SUPERVISION	INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION	PLANT & FACILITY SUPERVISION
LEVEL 2	*PATTERN MAKING	*PLANNING	*CUTTING OPERATION	*EMBROIDERY OPERATION	SEWING OPERATION	FINISHING OPERATION				QUALITY ASSURANCE INSPECTION	INDUSTRIAL SEWING MACHINE MAINTENANCE	MAINTENANCE OPERATION
LEVEL 1	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL	NO LEVEL				NO LEVEL	NO LEVEL	NO LEVEL

Figure 1.1: Occupational Area Structures for Industrial Sewing Machine Maintenance

3. DEFINITION OF COMPETENCY LEVELS

The NOSS is developed for various occupational areas. Candidates for certification must be assessed and trained at certain levels to substantiate competencies. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Level 1	Competent in performing a range of varied work activities, most of which are routine and predictable.
Level 2	Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and required individual responsibility and autonomy.
Level 3	Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.
Level 4	Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.
Level 5	Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.

4. AWARD OF CERTIFICATE

The Director General shall award to any person upon successful completion of the NOSS programme the following skills level qualifications:

a) Malaysian Skills Certificate / Sijil Kemahiran Malaysia (SKM) Level 1, 2 & 3
b) Malaysian Skills Diploma / Diploma Kemahiran Malaysia (DKM) Level 4
c) Malaysian Skills Advanced Diploma / Diploma Lanjutan Kemahiran Malaysia (DLKM) Level 5
d) Statement of Achievement / Penyata Pencapaian (PC)

No person shall be awarded a Certificate unless he/ she satisfies the requirements set by the Malaysian Skills Certification System.

5. JOB COMPETENCIES

Industrial Sewing Machine Maintenance Supervision Level 3 personnel are competent in the following competencies:

5.1 List of Core Competencies

- Industrial Sewing Machine Commissioning
- Industrial Sewing Machine Troubleshooting
- Industrial Sewing Machine Maintenance Job Verification
- Industrial Sewing Machine Maintenance Operation Monitoring
- Industrial Sewing Machine Maintenance Personnel Supervision

5.2 List of Elective Competencies

Industrial Sewing Machine Low Cost Automation Modification

6. WORKING CONDITIONS

6.1 Working environment

The Industrial Sewing Machine Maintenance personnel should be able to work on shift and may be required to extend their working hours (overtime) as required by their employer particularly during peak production period. They are expected to work under factories environment and as such, are required to be disciplined in meeting deadlines and observe the company's Safe Work Procedures (SWP). Good eyesight (non-colour blind) is needed for visual inspection during set up, maintenance and repair of industrial sewing machines.

6.2 Issues Related to Area of Work

It is mandatory for Industrial Sewing Machine Maintenance personnel to wear personal protective equipment (PPE) such as mask, safety shoes, goggles and head cap while performing the job. They are not allowed to wear conductive articles of jewellery and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) to avoid accidents. The Industrial Sewing Machine Maintenance personnel must be able to maintain a high degree of alertness at all times while handling machines, equipment and threads.

7. EMPLOYMENT PROSPECTS

7.1 Malaysian Market

The 2010 Economic Census from the Department of Statistics, Malaysia determined that there are 2,300 firms (minus custom tailors) within the textile and apparel industry in Malaysia which employs 76,578 workers. The two major sectors in the industry are textiles manufacturing which has 959 establishments (42.7%) employing 30,866 workers and wearing apparel manufacturing which has 1,288 establishments (57.3%) employing 45,692 workers. The predominant sub-sectors in textile and apparel industry are manufacture of wearing apparel (55.1%), manufacture of other textiles (27.3%), spinning, weaving and finishing of textiles (15.3%), manufacture of knitted & crocheted apparel (1.5%) and manufacture of articles of fur (0.8%).

The textile and apparel industry is an important industry to the Malaysian economy. The Malaysian exports of textile and apparel industry for the year 2011 totalled RM10.8 billion while imports amounted to RM6.6 billion. In 2011, the textile and apparel industry was the tenth largest export earner, contributing approximately 1.6% to Malaysia's exports and 2.3% to Malaysia's total exports of manufactured goods. Due to its importance, the availability of trained manpower is a key issue for the textile and apparel industry.

The Malaysian textile and apparel industry with the exception of batik making is highly dependent on labour. A large portion of the textile and apparel industry has low technical support particularly industrial sewing machine technicians. The availability of competent technicians is highly important for the growth of the industry and the country.

Upon completion of the Competency Units (Core), other related occupations with respect to employment opportunities are:

- Industrial Sewing Machine Maintenance Trainer
- Industrial Sewing Machine Salesman

Other related industries with respect to employment opportunities are:

- Education (Fashion and Design)
- Fashion house/Boutique
- Industrial Sewing Machine Merchandising
- Tailoring

7.2 International Market

The textile and apparel industry is one of the oldest and largest export industries in the world. It is also one of the most global industries because many nations manufacture products for the international textile and apparel market. Apparel industry is the typical starter industry for countries engaged in export-oriented industrialisation due to low fixed costs and emphasis on labour-intensive manufacturing. According to WTO and OECD statistics, the world merchandise textile and apparel trade grows at 7% annual compound growth rate.

The textile and apparel industry is estimated at USD 702 billion and is expected to grow at a rate of 5% in the next 10 years. The EU, US, China, Japan and India are the biggest market for apparel, but apparel production is primarily concentrated in China, India, Bangladesh, Vietnam and Turkey.

The January 2014 update on World Economic Outlook (WEO), International Monetary Fund (IMF) observed that the global activity strengthened during the second half of 2013 and that global economic recovery will pick up in 2014-2015. Global growth is projected to expand from 3% in 2013 to 3.7% in 2014, rising to 3.9 % in 2015. In this regard, the textile and apparel industry would be expected to grow and demand for skilled workers would be great. Thus, personnel in the area of Industrial Sewing Machine Maintenance are important to meet the demand of the industry not only in Malaysia but also in other parts of the world.

7.3 List of Industry Sector Employers

Some of the major industry employers include:

- Pen Apparel Sdn Bhd
- Tai Wah Garment Industry Sdn Bhd
- Honsin Apparel Sdn Bhd
- Hing Yiap Knitting Industries Sdn Bhd
- Canteran Apparel Sdn Bhd

7.4 **Codes, Standard and Practices in the Sector, Sub sector/ Areas in Malaysia**

- None

8. TRAINING, INDUSTRIAL/ PROFESSIONAL RECOGNITION, OTHER QUALIFICATIONS AND ADVANCEMENT

As for career advancement, most competent technicians learn their craft on the job. They usually begin as qualified industrial sewing machine maintenance technician and gradually learn new skills as they gain experience. Further certification may increase their chances of career advancement. Thus with additional formal training/education and certification, the experienced and competent industrial sewing machine maintenance technician can advance to become a Maintenance Executive and even up to Maintenance Manager.

1. Industrial Recognition/ Professional Qualification

None

2. Other Prominent Qualification Recognised Locally or Internationally

None

3. Types of Occupation for Career Advancement

- Maintenance Executive
- Maintenance Manager
- Factory Manager

4. Related Industries

- Fashion And Design
- Clothing Retail Industry
- Furniture Making
- Vehicle Accessories

9. SOURCES OF ADDITIONAL INFORMATION

1. NATIONAL

- Malaysian Textile and Apparel Centre (MATAC)
  C-9-4, Megan Avenue 1
  189 Jalan Tun Razak
  50400 Kuala Lumpur, Malaysia
  Tel: +603-2162 1454 Fax:+603-21625148
  Email: info@mtma.org.my

- Malaysian Textile Manufacturers Association (MTMA)
  C-9-4, Megan Avenue 1
  189 Jalan Tun Razak
  50400 Kuala Lumpur, Malaysia
  Tel: +603-2162 1454 Fax:+603-21625148
  Email: info@mtma.org.my

- Malaysian Knitting Manufacturers Association (MKMA)
  12-1, Jalan Megat, 83000 Batu Pahat
  Johor, Malaysia
  Tel: 607- 4343203
  Fax: 607 – 4314682
  Email:mkma@streamyx.com
  Website: http://www.mkma.org

- Malaysia External Trade Development Corporation (MATRADE)
  Menara MATRADE, Jalan Khidmat Usaha, Off Jalan Duta
  50480 Kuala Lumpur, Malaysia
  Tel:+603-6207 7077 Fax:+603-6203 7037
  Email: info@matrade.gov.my
  Website: www.matrade.gov.my

- Ministry of International Trade and Industry (MITI)
  Block 10, Government Offices Complex, Jalan Duta
  50622 Kuala Lumpur, Malaysia
  Tel:+603-80008000 Fax:603-62012337
  Email:webmiti@miti.gov.my

- Malaysian Investment Development Authority (MIDA)
  Block 4 Plaza Sentral Jalan Stesen Sentral 5
  50470 Kuala Lumpur, Malaysia
  Tel:+60 3-2267 3633

- Malaysia Production Corporation (MPC)
  Lorong Produktiviti, Off Jalan Sultan
  46200 Petaling Jaya
  Selangor Darul Ehsan, Malaysia
  Tel : 603 - 7955 7266 Fax : 603 - 7957 8068
  Email : marketing@mpc.gov.my

- Department of Occupational Safety and Health (DOSH)
  Ministry of Human Resource
  Level 2, 3 & 4, Block D3, Complex D
  Federal Government Administrative Centre
  62530 W. P. Putrajaya, Malaysia
  Tel: 603 - 8886 5000
  Fax: 603 - 8889 2443
  Email: jkkp@mohr.gov.my
  Web: http://www.dosh.gov.my
- Department of Standards Malaysia (Standards Malaysia)
  Century Square, Level 1 & 2, Block 2300
  Jalan Usahawan,63000 Cyberjaya, Selangor Darul Ehsan, Malaysia
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  Web: http://www.standardsmalaysia.gov.my

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  Selangor Darul Ehsan
  Malaysia
  Tel: 603-55446000
  Fax: 603-55108095
  Email: web@sirim.my
  Web: http://www.sirim.my

2. INTERNATIONAL

- International Organization for Standardization
  ISO Central Secretariat
  1, ch. de la Voie-Creuse, CP 56
  CH-1211, Geneva 20
  Switzerland
  Tel: 41-22-749 01 11
  Fax: 41-22-733 34 30
  E-mail: central@iso.org
  Web: http://www.iso.org

- International Labour Organisation (ILO)
  4 route des, Morillons
  CH-1211,Geneva 22
  Switzerland
  Tel: 41-22-799-6111
  Fax: 41-22-798-8685
  Website: www.ilo.org
  E-mail: ilo@ilo.org

- International Textile and Apparel Association
  PO Box 70687
  Knoxville
  TN 37938-0687
  Telephone: 865-992-1535
  Email:executivedirector@itaaonline.org
  Web : http://www.itaaonline.org

- Taiwan Textile Federation
  5F, TTF Building
  No. 22, Ai Guo East Road
  10092 Taipei
  Taiwan
  Tel: 886-2-2341-7251.
  Fax: 886-2-2391-7712.
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  Web: www.textiles.org.tw

10. ACKNOWLEDGEMENT

This Standard has been proofread by qualified personnel, named as follows;

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A draft of this Standard was circulated to the following list of companies for two weeks for validation and feedback:

1. Trans Pacific Industries Sdn Bhd
2. Tai Wah Garment Industry Sdn Bhd
3. Pegasus Industrial Sewing Machine (M) Sdn Bhd
4. Trans Pacific Industries Sdn Bhd

This Standard has been checked by the MATAC Coordinator, DSD and approved by the members of Skills Development Endorser Committee (SDEC) on **16 October 2014.** The SDEC members as listed below have reached a consensus on this standard.

1. Mr Seow Hon Cheong
2. Ms Ajantha A/P Shabari Shan
3. Mr Cheong Kwok Wah
4. Mr Ooi Chiew Yih

11. COMMITTEE MEMBERS FOR DEVELOPMENT OF STANDARD PRACTICE (SP), COMPETENCY PROFILE CHART (CPC), COMPETENCY PROFILE (CP) AND CURRICULUM of COMPETENCY UNIT (CoCU)

INDUSTRIAL SEWING MACHINE MAINTENANCESUPERVISION LEVEL 3		
PANEL EXPERTS		
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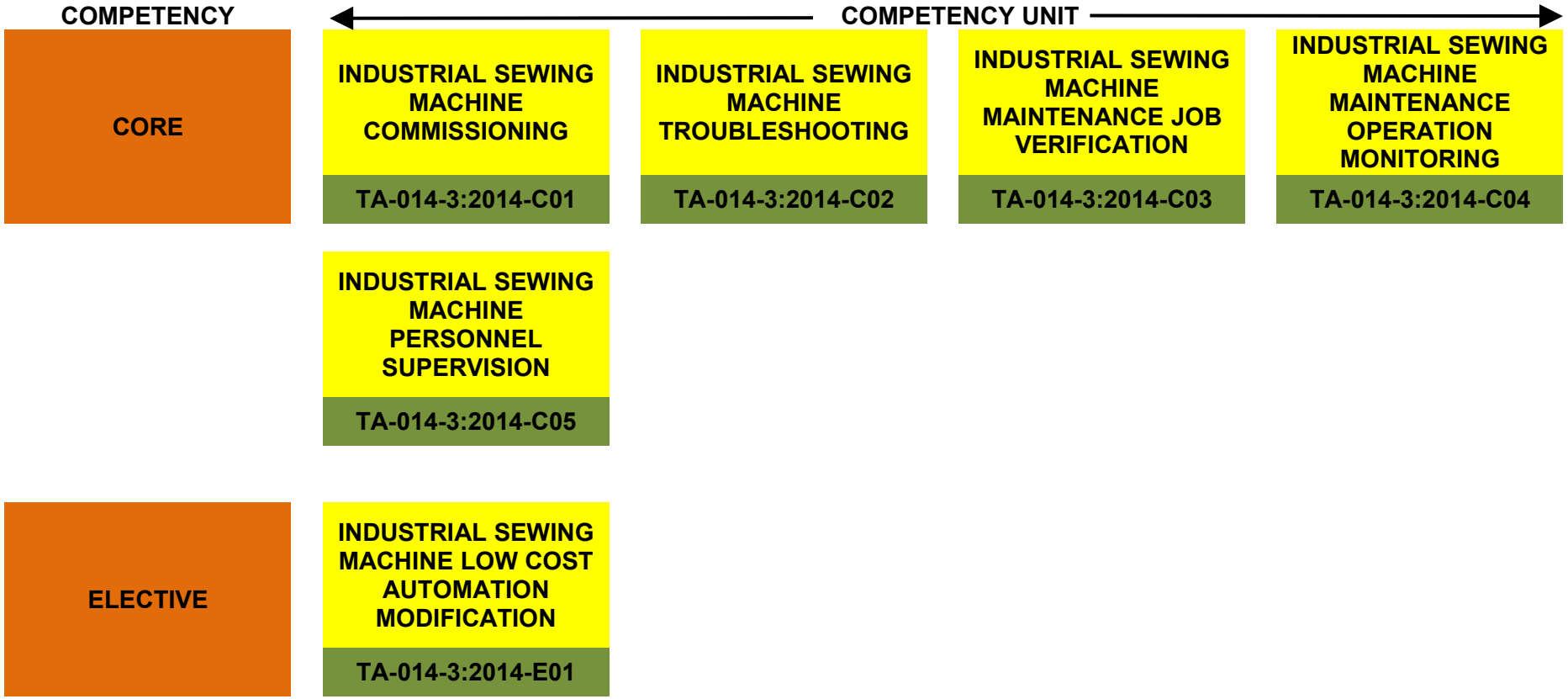
2.	Muhammad Khairudin bin Hashim	Tai Wah Garment Industry Sdn Bhd
3.	Mohammad Shalihin bin Yahya	Tai Wah Garment Industry Sdn Bhd
4.	Mohd Hata Yusof	Knit Textiles
5.	Chong Hoon Long	Keenway Industrial Sdn Bhd
6.	Gan Cheng Say	Tai Wah Garment Industry Sdn Bhd
7.	Teo Chee Wan	Perusahaan Chan Shoo Sing Sdn Bhd
8.	John David Prakash	Kairos Alliance Sdn Bhd
9	Bahaunuddin bin Abdul Rashid	Selembar Gemilang Sdn Bhd
10.	Jamizal bin Mohammad Zinul	Head of Centre/Trainer Malaysian Textile and Apparel Centre (MATAC), Batu Pahat
FACILITATOR		
1.	Nabilah Ooi Binti Abdullah	
DOCUMENTOR		
1.	Regina Leong	Malaysian Textile and Apparel Centre (MATAC)

COMPETENCY PROFILE CHART (CPC)

SECTOR	TEXTILE AND APPAREL		
SUB SECTOR	APPAREL MANUFACTURING		
JOB AREA	MACHINE MAINTENANCE (SEWING MACHINE)		
NOSS TITLE	INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION		
JOB LEVEL	THREE (3)	NOSS CODE	TA-014-3:2014



COMPETENCY PROFILE (CP)

SECTOR	**TEXTILE AND APPAREL**		
SUB SECTOR	**APPAREL MANUFACTURING**		
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**		
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**		
LEVEL	**THREE (3)**	**NOSS CODE**	**TA-014-3:2014**

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
1. Industrial Sewing Machine Commissioning	TA-014-3:2014-C01	Industrial Sewing Machine Commissioning describes the competencies required to verify the readiness of a newly assembled and set up industrial sewing machine for production operation. Garment manufacturing requires various types of industrial sewing machine and each machine has its own system, components and accessories to be installed and set up. Commonly used industrial sewing machines include Lockstitch, Overlock, Button, Bartack, Buttonhole, Coverstitch, Chainstitch and Zig Zag industrial sewing machine. The person who is competent in this CU shall be able to verify industrial sewing machine installation, pre-operating set up, confirm the machine readiness for	1. Verify industrial sewing machine installation	1.1 Industrial sewing machine components for each machine confirmed according to corresponding manual specifications 1.2 Newly assembled industrial sewing machine checked to ensure parts are installed correctly and safely according to corresponding industrial sewing machine manual instructions 1.3 Installation time checked against allocated time to ensure efficiency 1.4 Tools for installation and verification work selected, prepared and used in a safe and effective manner 1.5 Industrial sewing machine installation records confirmed to ensure accuracy 1.6 Verification work carried out

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		production operation and complete the commissioning records accurately. The outcome of this competency is efficient and accurate commissioning of industrial sewing machines that ensures the industrial sewing machines are ready to function safely and according to standard performance.		in compliance with health, safety and environment (HSE) requirements
			2. Verify industrial sewing machine pre-operating setup	2.1 Industrial sewing machine set up work checked to ensure machine systems are set up correctly and safely according to corresponding industrial sewing machine manual specifications 2.2 Set up time checked against allocated time to ensure efficiency 2.3 Tools for set up and verification work selected, prepared and used in a safe and effective manner 2.4 Industrial sewing machine set up records confirmed to ensure accuracy 2.5 Verification work carried out in compliance with health, safety and environment (HSE) requirements
			3. Verify industrial sewing machine readiness for production operation.	3.1 Industrial sewing machine operated in accordance with manual and workplace instructions 3.2 Industrial sewing machine settings tested against specifications and operational standards

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				3.3 Sewn sample examined to confirm stitching formation complies with specified standard 3.4 Additional adjustments to machine settings identified and coordinated according to industrial sewing machine specifications and workplace procedures (if applicable) 3.5 Industrial sewing machine performance, safety compliance and readiness for production confirmed based on verification results 3.6 Verification work carried out in compliance with health, safety and environment (HSE) requirements
			4. Complete industrial sewing machine commissioning records	4.1 Industrial sewing machine commissioning details recorded accurately according to required format 4.2 Non-functional industrial sewing machines documented and reported for further action (if applicable) 4.3 Industrial sewing machine commissioning records compiled and submitted in a timely manner

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
2. Industrial Sewing Machine Troubleshooting	TA-014-3:2014-C02	Industrial Sewing Machine Troubleshooting describes the competencies required to confirm machine malfunction, identify the actual cause and restore the machine back to normal operating performance according to industrial sewing machine maintenance procedures and HSE requirements The person who is competent in this CU shall be able to review industrial sewing machine malfunction identification outcomes, identify root cause of the malfunction, propose and coordinate rectification work, and complete troubleshooting records. The outcome of this competency is efficient restoration of malfunctioned industrial sewing machine to normal operating performance. Correct identification and elimination of malfunction root cause also prevents breakdown recurrence. Thus effective troubleshooting minimises prolonged interruption to production operation.	1. Review industrial sewing machine malfunction identification 2. Identify root cause of industrial sewing machine malfunction	1.1 Industrial sewing machine breakdown report, historical records and relevant information interpreted to assist in review of machine malfunction identification 1.2 Industrial sewing machine condition checked visually and using common hand tools according to industrial sewing machine manual instructions 1.3 Type of malfunction confirmed based on analysis results 1.4 Malfunction identification review carried out in compliance with HSE requirements 2.1 Possible causes of malfunction considered according to industrial sewing machine troubleshooting guidelines 2.2 Test conducted using common hand tools and testing material to determine root cause of malfunction according to industrial sewing machine manual instructions 2.3 Root cause of malfunction confirmed based on test results and other relevant

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				information 2.4 Malfunction root cause identification carried out in compliance with HSE requirements
			3. Propose type of rectification work	**3.1** Possible options to rectify industrial sewing machine malfunction considered in an analytical and logical manner according to troubleshooting guidelines and industry practice **3.2** Best alternative/solution selected according to troubleshooting guidelines and industry practice **3.3** Duration for rectification estimated according to troubleshooting guidelines and industry practice **3.4** Rectification instructions prepared in a clear manner according to workplace format
			4. Coordinate industrial sewing machine rectification work	4.1 Rectification tasks delegated to subordinates according to work schedule and subordinates competency 4.2 Rectification instructions clearly communicated to subordinates and assistance provided, if

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				applicable according to workplace procedure 4.3 Rectification activities monitored according to industrial sewing machine operation manual specifications, workplace procedure and work schedule 4.4 Rectification activities monitored to ensure compliance with HSE requirements
			5. Verify repaired industrial sewing machine performance	5.1 Industrial sewing machine operated according to machine manual instructions 5.2 Industrial sewing machine performance tested in comparison with standard performance to confirm restoration to normal operating condition 5.3 Tools used in a safe and effective manner 5.4 Industrial sewing machine performance test adhered to health, safety and environment (HSE)
			6. Complete industrial sewing machine troubleshooting records.	6.1 Industrial sewing machine troubleshooting work recorded accurately according to required format

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				6.2 Unrectified malfunctions recorded and reported for further action, if applicable 6.3 Industrial sewing machine troubleshooting records compiled and submitted in a timely manner 6.4 Rectification work completed within allocated timeline
3. Industrial Sewing Machine Maintenance Job Verification	TA-014-3:2014-C03	Industrial Sewing Machine Maintenance Job Verification describes the competencies required to carry out the process of ensuring that procedures specified for maintaining industrial sewing machine are adhered according to industrial sewing machine manual specifications, workplace procedures and HSE requirements. Verification methods include visual observation and testing. The person who is competent in this CU shall be able to verify industrial sewing machine production set up, attachment and work aids performance, scheduled maintenance work and completion of repair works. The outcome of this competency is to ensure that industrial sewing machines are maintained to	1. Verify industrial sewing machine production set up	1.1 Industrial sewing machine arrangement confirmed according to lay out plan 1.2 Industrial sewing machine attachments and fixation checked to ensure specific types of attachments are properly fixed 1.3 Industrial sewing machine programme setting and adjustment checked according to style requirements 1.4 Industrial sewing machine production set up records confirmed to ensure accuracy and completeness 1.5 Confirmation of industrial sewing machine readiness for production made in an accurate manner based on verification results 1.6 Verification work carried out in compliance with HSE requirements

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		function safely and at the required standard performance according to industrial sewing machine manual specifications and workplace procedures. Safe and effective machine performance will result in quality consistency in apparel manufacturing.	2. Verify industrial sewing machine attachment and work aids performance	2.1 Testing materials and tools prepared according to type of fabricated attachment and work aids 2.2 Test conducted according to industrial sewing machine operation instructions 2.3 Sewn test material checked to ensure conformance with style requirements 2.4 Improvements to fabricated attachments and work aids proposed (if applicable) for better performance and quality consistency 2.5 Attachment and work aids confirmed ready for use in production based on test results 2.6 Verification work carried out in compliance with HSE requirements
			3. Verify industrial sewing machine scheduled maintenance work	3.1 Industrial sewing machine scheduled maintenance work checked against maintenance schedule and checklist 3.2 Test conducted to confirm industrial sewing machine is operating according to standard performance 3.3 Handling of idle/ unutilised

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				industrial sewing machines verified to ensure proper maintenance and storage according to manual specifications and workplace procedures 3.4 Industrial sewing machine maintenance records checked for accuracy and completeness 3.5 Verification work carried out in compliance with HSE requirements
			4. Verify completion of repair works	4.1 Hand tools and testing material prepared according to type of industrial sewing machine 4.2 Test conducted to confirm industrial sewing machine is operating according to standard performance 4.3 Industrial sewing machine adjustment confirmed according to style requirements 4.4 Industrial sewing machine readiness for production confirmed based on test results 4.5 Verification work carried out in compliance with HSE requirements

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
4. Industrial Sewing Machine Maintenance Operation Monitoring	TA-014-3:2014-C04	Industrial Sewing Machine Maintenance Operation Monitoring describes the competencies required to monitor maintenance operation to ensure compliance with workplace maintenance procedures and health, safety and environment requirements. The person who is competent in this CU shall be able to monitor workplace HSE practices and standards compliance, prepare maintenance schedule, verify spare parts requisition and industrial sewing machine inventory, and participate in production meeting. The outcome of this competency is effective and efficient administration that ensures maintenance operation is performed in a safe and optimal manner.	1. Monitor workplace health, safety, and environmental practices and standards compliance 2. Prepare maintenance schedule	1.1 HSE requirements identified according to legislative and organisational policy 1.2 Types of potential hazards and corresponding safety precautions identified according to HSE guidelines 1.3 Workplace safety compliance ensured according to HSE requirements 1.4 Housekeeping practices compliance (such as 5S) ensured according to workplace procedures 1.5 Accidents and incidents reports compiled accurately and submitted to relevant authority in a timely manner 2.1 Production schedule and industrial sewing machine maintenance records checked to assist in preparing maintenance schedule 2.2 Scheduled maintenance frequency and timing determined according to industrial sewing machine manual specifications 2.3 Type of industrial sewing machine for scheduled maintenance prioritised

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				according to production needs and availability of resources 2.4 Downtime due to maintenance work estimated according to machine manual specifications and workplace procedures 2.5 Number and competency level of maintenance personnel required determined according to type of maintenance work 2.6 Personnel allocated for maintenance work according to availability and competency level 2.7 Maintenance schedule produced according to workplace format and submitted in a timely manner
			3. Verify spare parts requisition	3.1 Types and quantity of spare parts requested checked and compared with stock records according to workplace procedure 3.2 Decision on necessity for spare parts requisition made after considering various options according to workplace procedure 3.3 Alternative solutions in

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				place of new requisition proposed according to workplace procedure 3.4 Spare parts requisition or alternative solution submitted for further action in a timely manner
			4. Verify inventory records	4.1 Industrial sewing machine inventory documents (industrial sewing machine list, parts list, attachment list, lubrication oil list, workshop tools and equipment list) checked for currency and accuracy according to workplace inventory control procedures 4.2 Stock usage and purchase confirmed according to workplace inventory control procedures 4.3 Discrepancies in inventory documents identified, recorded and reported for further action according to workplace inventory control procedures, if applicable 4.4 Inventory documents updated in an accurate and timely manner
			5. Participate in production meeting	5.1 Preparations (such as compilation of documents and required information)

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				for production meeting done according to meeting agenda and minutes 5.2 Ideas and feedback presented in a clear and professional manner according to workplace procedures 5.3 Relevant information on production requirements clarified and confirmed accurately 5.4 Effective interpersonal and communication skills demonstrated during meeting according to workplace procedures
5. Industrial Sewing Machine Personnel Supervision	TA-014-3:2014-C05	Industrial Sewing Machine Personnel Supervision describes the competencies required to coordinate maintenance jobs as well as monitor and appraise maintenance personnel work performance. The person who is competent in this CU shall be able to conduct operational briefing, monitor and appraise subordinates' performance and coordinate subordinates' on-the-job training. The outcome of this competency is to ensure maintenance job meets target performance and	1. Conduct operational briefing	1.1 Purpose and content of briefing determined according to workplace procedures/ job scope 1.2 Meeting logistics determined and related personnel notified according to workplace procedures 1.3 Briefing conducted in a systematic and professional manner according to workplace procedures 1.4 Effective interpersonal and communication techniques applied to elicit and encourage participation and contribution 1.5 Briefing minutes and

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		are performed in compliance with industrial sewing machine specifications, workplace procedures and HSE requirements.		outcomes recorded and presented to superior for review and further action according to workplace procedures
			2. Monitor subordinates' discipline	2.1 Workplace policies and guidelines related to personnel discipline clearly communicated to subordinates in an effective manner 2.2 Subordinates discipline (such as punctuality, attendance, compliance with rules and regulations) observed and recorded according to workplace procedures 2.3 Constructive feedback and counselling given in a manner appropriate to the subordinate according to workplace procedures 2.4 Disciplinary matters handled effectively within own limit of authority according to workplace procedures 2.5 Unresolved disciplinary matters reported to relevant authority for further action 2.6 Respect, integrity and confidentiality maintained and demonstrated in

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				handling disciplinary matters 2.7 Actions taken and details accurately recorded and submitted in a timely manner
			3. Monitor subordinates' performance	3.1 Subordinates job tasks and target performance interpreted according to job description and specified key performance indicators (KPI) 3.2 Actual work status compared with target performance and feedback provided in a professional and timely manner 3.3 Improvement recommended based on progress monitoring records according to workplace procedures 3.4 Assistance provided, if required to expedite work progress 3.5 Maintenance operation monitored to ensure compliance with HSE requirements
			4. Appraise subordinates' performance	4.1 Subordinates appraisal criteria interpreted according to job description, work target and company

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				appraisal guidelines 4.2 Subordinates performance appraised according to specified job description, work target and company's appraisal guidelines 4.3 Performance appraisal form filled up according to workplace appraisal guidelines 4.4 Feedback provided to subordinates for improvement in a professional manner according to workplace procedures 4.5 Types of rewards or recognition recommended in accordance with workplace procedures 4.6 Training required recommended based on subordinates needs 4.7 Completed appraisal form submitted for further action in a timely manner
			5. Coordinate subordinates' on-the-job training (OJT)	5.1 Subordinates OJT needs identified according to Training Needs Analysis (TNA) report 5.2 OJT training materials prepared based on subordinates' needs 5.3 OJT performed according to

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				workplace procedures and in compliance with HSE requirements 5.4 OJT effectiveness assessed based on feedback and subordinates' progress 5.5 Subordinates' progress reports and related OJT documentation submitted in an accurate and timely manner
6. Industrial Sewing Machine Low Cost Automation Modification	TA-014-3:2014-E01	Industrial sewing machine low cost automation (LCA) modification describes the competencies required to design and develop low cost automation for existing industrial sewing machinery with the aim of improving productivity and quality consistency. LCA is defined as the introduction of simple pneumatic, mechanical and electrical devices into existing machinery that creates some degree of automation using mostly standard components. LCA technology is compact, easily available, simple yet effective which is designed and assembled in-house by a team of employees. The person who is competent in this CU shall be able to identify	1. Identify low cost automation modification requirements	1.1 Technical and quality deficiencies of current industrial sewing machine operations and improvement opportunities determined from various sources (such as observation, operators' feedback, machine historical records, continual improvement initiatives) 1.2 Potential low cost automation modifications considered to overcome technical and quality deficiencies or for production operation improvement in accordance with workplace procedures 1.3 Type of low cost automation modification to be assembled determined and confirmed with engineering department according to

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
		low cost automation modification requirements, generate ideas for low cost automation modification, produce low cost automation prototype, analyse effectiveness of low cost automation prototype, implement low cost automation modification and prepare low cost automation modification report. The outcome of this competency is enhancement in productivity, quality consistency and sewing operators' well-being.	2. Generate ideas for low cost automation modification 3. Produce low cost automation prototype	workplace procedures 2.1 Existing industrial sewing machine system/ process analysed and comprehended in all its details to assist in identifying potential modification 2.2 Possible options for modifications explored using various methods and from various sources in line with industry best practice 2.3 Best alternative selected according to workplace requirements and industry best practice taking into consideration factors such as resources availability, time and cost effectiveness 2.4 Proposal prepared and submitted for approval in a timely manner 3.1 Schematic drawing prepared according to technical drawing standard 3.2 Components required for modification specified and selected according to type of low cost automation modification 3.3 Fabrication and construction tools,

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				equipment and materials prepared and used in a safe manner 3.4 Prototype fabricated / constructed according to workplace procedures 3.5 Test run conducted on prototype and adjustments made to ensure modification objective is achieved 3.6 Fabrication of prototype carried out in compliance with HSE requirements
			4. Analyse effectiveness of low cost automation prototype	4.1 Performance of industrial sewing machine after installation of low cost automation prototype compared with that before installation 4.2 Benefits of using low cost automation modification assessed using established assessment criteria (such as operation time, reduction in operators' fatigue, enhancement of quality consistency, cost effectiveness, degree of complexity in constructing low cost automation) 4.3 Cost effectiveness of low cost automation modification compared with

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
				other alternatives 4.4 Feasibility of applying low cost automation modification confirmed based on effectiveness analysis 4.5 Analysis findings documented and compiled for preparing low cost automation modification proposal and submitted for approval
			5. Implement low cost automation modification	5.1 Pilot test on low cost automation modification conducted according to workplace procedures upon management approval 5.2 Effectiveness of low cost automation modification assessed to assist in make or buy decision making 5.3 Full implementation of low cost automation modification coordinated according to workplace procedures upon approval from management 5.4 On-the-job training in using low cost automation modification carried out according to workplace procedures
				6.1 Relevant information on low

CU Title	CU Code	CU Descriptor	CU Work Activities	Performance Criteria
			6. Prepare low cost automation modification report	cost automation modification work compiled and arranged logically and sequentially according to workplace report format 6.2 Report written in a manner that is consistent with intended use and workplace report format 6.3 Report completed and submitted in a timely manner 6.4 Low cost automation modification work completed within allocated timeline

CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**TEXTILE AND APPAREL**						
SUB SECTOR	**APPAREL MANUFACTURING**						
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**						
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**						
COMPETENCY UNIT TITLE	**INDUSTRIAL SEWING MACHINE COMMISSIONING**						
LEARNING OUTCOME	The person who is competent in this competency unit shall be able to verify industrial sewing machine installation and pre-operating set-up in order to commission new industrial sewing machines for production operation. Upon completion of this competency unit, trainees will be able to:- • Verify industrial sewing machine installation • Verify industrial sewing machine pre-operational set-up • Verify industrial sewing machine readiness for production operation • Complete industrial sewing machine commissioning records						
PRE-REQUISITE (if applicable)	Industrial Sewing Machine Maintenance Level 2						
COMPETENCY UNIT ID	TA-014-3:2014-C01	**LEVEL**	3	**TRAINING DURATION**	40 hours	**SKILL CREDIT**	4

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Verify industrial sewing machine installation	i. Types, characteristics and features of industrial sewing machines such as • Lockstitch • Overlock • Interlock • Button hole • Bartack • Zig zag	i. Determine types, quantity and location of newly assembled industrial sewing machines ii. Interpret industrial sewing machine installation procedures iii. Determine industrial	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time	Related knowledge 4	Related knowledge Lecture Discussion Problem-based Learning	i. Type, quantity and location of newly assembled industrial sewing machines confirmed ii. Installation

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Buttoning • Snap Button • Chainstitch ii. Industrial sewing machine parts, components and accessories • Accessories (such as thread stand, table and table stand, drawer) • Mechanical Components (such as machine head, belt, bobbin winder) • Pneumatic components (such as cylinder valve, air regulator, solenoid valve) • Electrical and electronic component (such as Servo Motor/Clutch Motor/Induction Motor, control panel) iii. Verification methods, such as visual check iv. Industrial sewing machine installation work activities: • Table stand and	sewing machine installation tasks for verification iv. Check correctness of industrial sewing machine table stand and top assembly v. Check correctness of industrial sewing machine control box and tools assembly vi. Check correctness of industrial sewing machine head assembly vii. Check correctness of industrial sewing machine accessories assembly viii. Confirm accuracy of industrial sewing machine installation records ix. Complete installation verification records	iv. Thorough and meticulous in verification work v. Emphasise quality and compliance with standard requirements *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related skills 8	Related skills Demonstration Project-based Learning	procedures and tasks for verification interpreted according to manual instructions and checklist iii. Parts, components and accessories checked to ensure correct match with respective industrial sewing machine iv. Table stand and top assembly checked for compliance with manual instructions v. Control box and tools assembly checked for compliance with manual instructions vi. Machine

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	top assembly • Control box and tools assembly • Machine head assembly • ISM accessories assembly v. Common industrial sewing machine installation errors such as • Mismatch of parts and industrial sewing machine • Misalignment of table top and table stand • Motor assembling position error • Motor specification error • Belt and pulley size error vi. Installation verification tools, equipment and materials • Common hand tools vii. Installation records • Type of machine • Serial number • Model • Industrial sewing machine					head assembly checked for compliance with manual instructions vii. Machine accessories assembly checked for compliance with manual instructions viii. Accuracy and completeness of installation records confirmed ix. Installation verification work completed within allocated time x. Installation verification work accurately recorded xi. Personal and workplace safety as well

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	accessories • Location viii. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping					as good housekeeping practised at all times
2. Verify industrial sewing machine pre-operating set-up	i. Types, characteristics and features of industrial sewing machines such as • Lockstitch • Overlock • Interlock • Button hole • Bartack • Zig zag • Buttoning • Snap Button • Chainstitch ii. Industrial sewing machine parts, components and accessories • Accessories (such as thread stand, table and table stand, drawer) • Mechanical Components (such as machine head,	i. Determine pre-operating set-up tasks for verification ii. Interpret pre-operating set-up procedures in industrial sewing machine instruction manual iii. Check to ensure quantity of oil is at specified level iv. Check to ensure needle is securely installed v. Check to ensure machine threading is according to machine manual specifications vi. Check correctness of power supply plug assembly vii. Check correctness of bobbin and bobbin case assembly viii. Check correctness of	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Thorough and systematic in verification work v. Emphasise quality and compliance with standard requirements *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace	Related knowledge 4 Related skills 12	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Oil indicator checked to ensure oil is filled to required level ii. Needle checked to ensure secure installation iii. Threading checked to ensure compliance with manual specifications iv. Power supply plug assembly checked v. Bobbin and bobbin case assembly checked to ensure

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	belt, bobbin winder) • Pneumatic components (such as cylinder valve, air regulator, solenoid valve) • Electrical and electronic component (such as Servo Motor/Clutch Motor/Induction Motor, control panel) iii. Methods for verifying correctness of pre-operating set-up such as • Visual check • Testing iv. Industrial sewing machine pre-operating set-up work activities: • Sewing Machine lubrication • Power supply plug assembly • Needle installation and threading • Bobbin and bobbin case installation • Control box setting • Air filter adjustment v. Common errors in pre-	control box setting ix. Check correctness of air filter adjustment x. Confirm accuracy of industrial sewing machine pre-operating setup records xi. Complete pre-operating set-up verification records	safety <u>*Environmental:*</u> i. Practise good housekeeping			compliance with manual instructions vi. Control box setting and air filter adjustment checked to ensure compliance with manual instructions vii. Accuracy and completeness of pre-operating set up confirmed viii. Pre-operating set-up verification work recorded accurately ix. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	operating set-up, such as • Error in machine setting • Missing parts or components • Motor defect • Error in power supply plug polarity • Lubrication system error • Needle adjustment error • Pedal angle error vi. Pre-operating setup verification tools, equipment and materials • Common hand tools • Testing equipment (such as Multi meter, test pen, test lamp) • Measuring tools (such as ruler, tension meter) vii. Industrial sewing machine pre-operating set-up records • Type of machine • Serial number • Model • Industrial sewing					

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	machine accessories • Location viii. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug, apron) • Workplace and personal safety • Housekeeping					
3. Verify industrial sewing machine readiness for operation	i. Industrial sewing machine operating procedure ii. Industrial sewing machine standard performance iii. Anti-rust prevention	i. Switch on industrial sewing machine to ensure machine is running ii. Confirm oil lubrication system is circulating iii. Check motor direction iv. Check to ensure anti rust prevention action has been taken v. Confirm machine is ready for production operation	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Thorough and systematic in verification work *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:*	Related knowledge 2 Related skills 6	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Newly set-up industrial sewing machine switched on to ensure it is functioning ii. Oil lubrication system checked to ensure smooth circulation iii. Motor direction checked iv. Anti-rust prevention action taken confirmed v. Industrial sewing machine

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			i. Practise good housekeeping			readiness for production confirmed
4. Complete industrial sewing machine commissioning records	i. Checklist for commissioning industrial sewing machine ii. Commissioning records • Location • Type of industrial sewing machine • Date • Format • Irregularities, if any	i. Determine format of commissioning records ii. Determine details to be recorded iii. Record commissioning work done iv. Submit commissioning records to superior for verification	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Accurate, complete and timely in maintaining records *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related knowledge 1 Related skills 3	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Commissioning work details confirmed and recorded ii. Details recorded according to required format iii. Commissioning works completed within allocated time

Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate process information. 01.08 Utilise spreadsheets applications to locate and process information. 01.09 Utilise business graphic application to process information. 01.10 Apply a variety of mathematical techniques. 01.11 Apply thinking skills and creativity. 02.09 Prepare flowcharts. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.09 Manage and improve performance of individuals. 03.10 Provide consultations and counseling. 03.11 Monitor and evaluate performance of human resources. 03.12 Provide coaching/on-the-job training. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans. 05.02 Inspect and monitor work done and/or in progress.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM: TRAINEES)
1. Industrial sewing machines with instruction manuals	
• Lockstitch	1:1
• Interlock	1:5
• Overlock	1:2
• Button Hole	1:25
• Zig Zag	1:5
• Bartack	1:25
• Buttonning	1:25
• Waist band	1:5
• Double needle	1:5
2. Sewing Machine Parts (Needle, needle plate, bobbin, bobbin case, rotary hook, looper, presser foot, belt, upper knife, lower knife, feed dog, cutter, bearing, pulley, nuts, needle holder screws)	As required
3. Hand tools (toolbox, set of screwdrivers, set of spanners, Allen key, adjustable spanner, set of pliers, test pen, scissor, tweezers, diamond file, , lock, set of hammers, set of wrenches, vice)	1: 1
4. Special Tools	
• Bearing puller	1:5
• Torchlight	1:1
• Magnet pen	1:1
• Machinist ruler	1:1
• Timing gauge	1:5
• Needle gauge	1:5
• Tension gauge	1:5
• Vernier calliper	1:5

• Multimeter	1:5
• Test lamp	1:5
• Saw	1:5
• Set of mallets	1:5
5. PPE (Mask, Goggles, Apron, Gloves, Safety Shoes, Ear Plug)	1: 1
6. Lubrication TEM	
• Lubrication Oil	As required
• Oil Can	1: 1
• Oil Pan	1: 1
7. Checklist	
• Installation checklist	1:1
• Setup checklist	1:1
• Commissioning checklist	1:1
8. Trolley	1: 25
9. Computer	1: 5

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CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**TEXTILE AND APPAREL**						
SUB SECTOR	**APPAREL MANUFACTURING**						
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**						
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**						
COMPETENCY UNIT TITLE	**INDUSTRIAL SEWING MACHINE TROUBLESHOOTING**						
LEARNING OUTCOME	The person who is competent in this competency unit shall be able to confirm industrial sewing machine malfunction and its related cause, and restore it back to normal operating condition according to troubleshooting guidelines and manufacturer specifications. Upon completion of this competency unit, trainees will be able to:- • Review industrial sewing machine malfunction identification • Identify root cause of industrial sewing machine malfunction • Propose type of rectification work • Coordinate industrial sewing machine rectification work • Verify repaired industrial sewing machine performance • Complete industrial sewing machine troubleshooting records						
PRE-REQUISITE (if applicable)	Industrial Sewing Machine Maintenance Level 2						
COMPETENCY UNIT ID	TA-014-3:2014-C02	**LEVEL**	3	**TRAINING DURATION**	270	**SKILL CREDIT**	27

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Review industrial sewing machine malfunction diagnosis	i. Types, characteristics and features of industrial sewing machines such as • Lockstitch • Overlock • Interlock	i. Analyse machine breakdown information ii. Analyse machine diagnosis results iii. Check industrial sewing machine condition	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions	Related knowledge 20	Related knowledge Lecture Discussion Problem-based Learning	i. Industrial sewing machine breakdown information, diagnosis results and

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Button hole • Bartack • Zig zag • Buttoning • Snap Button • Chainstitch ii. Industrial sewing machine parts, components and accessories • Accessories (such as thread stand, table and table stand, drawer) • Mechanical Components (such as machine head, belt, bobbin winder) • Pneumatic components (such as cylinder valve, air regulator, solenoid valve) • Electrical and electronic component (such as Servo Motor/Clutch Motor/Induction Motor, control panel) iii. Types of defective stitching formation	iv. Check industrial sewing machine maintenance historical records v. Confirm type of machine malfunction	iii. Work conscientiously within allocated time iv. Meticulous and systematic in analysing diagnosis data v. Observant and alert in identifying machine malfunction *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related skills 40	Related skills Demonstration Project-based Learning	maintenance historical records analysed to assist in confirming actual malfunction ii. Industrial sewing machine condition checked to detect abnormalities iii. Industrial sewing machine malfunction confirmed iv. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Puckering • Jump stitch • Staggering stitch • Uneven stitch • Broken stitch • Ravelled stitch iv. Types of malfunction. • Broken thread • Broken needles • Needle picking • Needle cub • Shading • Scorch • Excessive vibration • Fabric entanglement • Noise abnormalities • Electronic and electrical system malfunction (faulty components, • Mechanical system malfunction • Pneumatic system malfunction v. Sources of information on industrial sewing machine malfunction • Malfunction Reports • Diagnosis results • Historical records vi. Related HSE					

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	requirements • PPE (mask, gloves, apron, safety boots, ear plug, goggles) • Workplace safety • Material Safety Data Sheet (MSDS) • Housekeeping					
2. Identify root cause of industrial sewing machine malfunction	i. Causes of malfunction in feeding mechanism • Faulty feed dog • Error in feed dog height setting • Inappropriate feed dog type • Defective and wrong type of presser foot • Inaccurate presser foot pressure • Defective needle plate ii. Causes of malfunction in driving mechanism • Defective upper and lower looper • Inaccurate setting of upper and lower looper • Defective hook • Inaccurate hook settings	i. Determine possible causes of mechanical system malfunction ii. Determine possible causes of electrical and electronic system malfunction iii. Determine possible causes of pneumatic system malfunction iv. Apply various troubleshooting methods to determine root cause v. Confirm actual cause of problem	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Meticulous and systematic in identifying malfunction root cause *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:*	Related knowledge 25 Related skills 40	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Possible causes of mechanical system malfunction listed ii. Possible causes of electrical and electronic system malfunction listed iii. Possible causes of pneumatic system malfunction listed iv. Root cause analysis methods applied to determine actual cause

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Faulty bobbin and bobbin case • Loosened needle bar • Unstable needle bar • Inaccurate needle bar height setting iii. Causes of malfunction in threading mechanism • Faulty thread take up • Inaccurate thread tension setting • Incorrect needle and thread specification iv. Causes of malfunction in lubrication mechanism • Poor oil circulation • Oil leakage • Faulty oil pump v. Causes of malfunction in electrical and electronic system • Parameter setting error • Faulty components vi. Causes of malfunction in		i. Practise good housekeeping			of malfunction v. Root cause of malfunction confirmed accurately

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	pneumatic system • Rust • Blockage • Defective tubing • Defective components vii. Other causes of malfunction such as sewing operator's negligence viii. Troubleshooting methods • Testing • Visual inspection • Sound analysis • Output sample inspection • Review of maintenance historical records					
3. Propose type of rectification work	i. Types of repair works. • Cleaning • Replacement • Repair • Adjustment • Modification ii. Criteria for selecting solution • Type of malfunction • Availability of resources (spare parts availability) • Time factor	i. List possible solutions for mechanical system malfunction ii. List possible solutions for electrical and electronic system malfunction iii. List possible solutions for pneumatic system malfunction iv. Interpret criteria for selecting best solution to rectify malfunction v. Compare efficacy of various solutions	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Resourceful in generating possible solutions v. Make decisions in a	Related knowledge 10 Related skills 25	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Possible solutions to rectify mechanical system malfunction listed ii. Possible solutions to rectify electrical and electronic system malfunction listed

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Cost factor • Expertise factor iii. Rectification work for electrical and electronic system iv. Rectification work for mechanical system v. Rectification work for pneumatic system	vi. Select the best solution	rational and objective manner <u>*Safety:*</u> i. Use tools in a safe manner ii. Wear PPE at all times <u>*Environmental:*</u> i. Practise good housekeeping			iii. Possible solutions to rectify pneumatic system malfunction listed iv. Solutions assessed based on established criteria v. Best solution selected in a rational and objective manner
4. Coordinate industrial sewing machine rectification work	i. Rectification instructions preparation ii. Task delegation method iii. Basic welding procedures iv. Monitoring techniques v. Methods for verifying rectification activities	i. Prepare rectification instruction ii. Delegate task to subordinate iii. Instruct subordinate iv. Monitor rectification activities v. Provide assistance to subordinates in rectifying complex malfunctions vi. Verify rectifications activities	<u>*Attitude*</u>: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Communicate effectively with personnel at all levels <u>*Safety:*</u> i. Use tools in a safe manner	<u>Related knowledge</u> 25 <u>Related skills</u> 50	<u>Related knowledge</u> Lecture Discussion Problem-based Learning <u>Related skills</u> Demonstration Project-based Learning	i. Rectification instructions prepared and tasks delegated to subordinates ii. Rectification activities monitored and confirmed to ensure compliance and efficiency iii. Assistance provided in rectifying

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			ii. Wear PPE at all times iii. Maintain workplace safety <u>*Environmental:*</u> i. Practise good housekeeping			complex malfunctions iv. Personal and workplace safety as well as good housekeeping practised at all times
5. Verify repaired industrial sewing machine performance	i. Industrial sewing machine operating procedure ii. Preparation of testing materials iii. Stitching formation standard iv. Industrial sewing machine standard performance • Stitch formation • Stitch tension • Stitch quality • System Functionality	i. Prepare testing material ii. Set industrial sewing machine according to operation requirement iii. Operate industrial sewing machine iv. Confirm stitching formation and industrial sewing machine performance	<u>*Attitude*</u>: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Thorough and systematic in checking machine performance v. Emphasise quality output and consistency <u>*Safety:*</u> i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace	<u>Related knowledge</u> 10 <u>Related skills</u> 20	<u>Related knowledge</u> Lecture Discussion Problem-based Learning <u>Related skills</u> Demonstration Project-based Learning	i. Testing materials prepared ii. Industrial sewing machine set and operated according to machine manual instructions iii. Industrial sewing machine stitching formation and performance checked to ensure machine restored to normal operating condition iv. Industrial

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			safety iv. Handle industrial sewing machine components safely <u>*Environmental:*</u> i. Practise good housekeeping			sewing machine readiness for production confirmed v. Personal and workplace safety as well as good housekeeping practised at all times
6. Complete industrial sewing machine troubleshooting records	i. Industrial sewing machine troubleshooting record format ii. Industrial sewing machine troubleshooting record contents. • Type of machine • serial number • Model • maintenance date • quantity • location • Type of rectification (such as replacement, repaired and adjustment) done.	i. Determine required industrial sewing machine and troubleshooting details ii. Record details in required format iii. Submit records for verification	<u>*Attitude*</u>: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Accurate, complete and timely in maintaining records <u>*Safety:*</u> i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety iv. Handle industrial	<u>Related knowledge</u> 1 <u>Related skills</u> 4	<u>Related knowledge</u> Lecture Discussion Problem-based Learning <u>Related skills</u> Demonstration Project-based Learning	i. Troubleshooting work details confirmed and recorded ii. Details recorded according to required format iii. Troubleshooting works completed within allocated time

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
			sewing machine components safely *Environmental:* i. Practise good housekeeping			

Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate a process information. 01.08 Utilise spreadsheets applications to locate and process information. 01.09 Utilise business graphic application to process information. 01.10 Apply a variety of mathematical techniques. 01.11 Apply thinking skills and creativity. 02.09 Prepare flowcharts. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.09 Manage and improve performance of individuals. 03.10 Provide consultations and counselling. 03.11 Monitor and evaluate performance of human resources. 03.12 Provide coaching/on-the-job training. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

04.06 Allocate work. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans. 05.02 Inspect and monitor work done and/or in progress.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM: TRAINEES)
1. Industrial sewing machine	
• Lockstitch	1:1
• Interlock	1:5
• Overlock	1:2
• Button Hole	1:25
• Zig Zag	1:5
• Bartack	1:25
• Buttonning	1:25
• Waist band	1:5
• Double needle	1:5
2. Sewing Machine Parts (Needle, needle plate, bobbin, bobbin case, rotary hook, looper, presser foot, belt, upper knife, lower knife, feed dog, cutter, bearing, pulley, nuts, needle holder screws)	As required
3. Hand tools (toolbox, set of screwdrivers, set of spanners, Allen key, adjustable spanner, set of pliers, test pen, scissor, tweezers, diamond file, , lock, set of hammers, set of wrenches, vice)	1: 1
4. Special Tools	
• Bearing puller	1:5
• Torchlight	1:1

• Magnet pen	1:1
• Machinist ruler	1:1
• Timing gauge	1:5
• Needle gauge	1:5
• Tension gauge	1:5
• Vernier calliper	1:5
• Multimeter	1:5
• Test lamp	1:5
• Saw	1:5
• Set of mallets	1:5
5. PPE (Mask, Goggles, Apron, Gloves, Safety Shoes, Ear Plug)	1: 1
6. Lubrication TEM	
• Lubrication Oil	As required
• Oil Can	1: 1
• Oil Pan	1: 1
7 Manual	
• Service manual	1:10
• Maintenance schedule	1:1
• Production schedule	1:1
8 Maintenance Logbook	1:1
9. Checklist	
• Scheduled Maintenance Checklist	1:1
• Repair checklist	1:1
10 Material Safety Data Sheet (MSDS)	1:1
11. Sewing Materials (Thread, fabric, elastic, piping, lace, button)	As required
12. Attachments (binding, tape binder, piping folder, taping	1:5
13. Work Aids (acrylic board mould, edge guide for sewing straight line	1:5

stitching, edge guide for sewing curve lines stitching, folder for sewing wider hem)	
14. Scheduled Maintenance TEM	
• Air gun	1:5
• Cloth	1:1
• Brush	1:1
• Air compressor	1:25
• Oil pump	1:25
• Cleaning agent	As required
• Paint	As required
• Anti rust agent	As required
• Rope	As required
• Wires	As required
• Cable tie	As required
15. Workplace Safety	
• Signage	1: 25
• Barricades	1: 25
16. Trolley	1: 25
17. Computer	1:5

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CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**TEXTILE AND APPAREL**						
SUB SECTOR	**APPAREL MANUFACTURING**						
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**						
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**						
COMPETENCY UNIT TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE JOB VERIFICATION AND TESTING**						
LEARNING OUTCOME	The person who is competent in this competency unit shall be able to verify maintenance jobs and perform testing to ensure industrial sewing machines are operating at required performance in accordance with workplace maintenance procedures and machine manual specifications. Upon completion of this competency unit, trainees will be able to:- • Verify industrial sewing machine production set-up • Verify industrial sewing machine attachment and work aids fabrication • Verify industrial sewing machine scheduled maintenance • Verify completion of industrial sewing machine repair works						
PRE-REQUISITE (if applicable)	Industrial Sewing Machine Maintenance Level 2						
COMPETENCY UNIT ID	TA-014-3:2014-C03	**LEVEL**	3	**TRAINING DURATION**	140 hours	**SKILL CREDIT**	14

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Verify industrial sewing machine production set-up	i. Types, characteristics and features of industrial sewing machines such as • Lockstitch • Overlock • Interlock • Button hole	i. Determine type and location of industrial sewing machine ii. Determine production set-up tasks for verification iii. Prepare verification tools, equipment and materials	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously	Related knowledge 10	Related knowledge Lecture Discussion Problem-based Learning	i. Type and location of industrial sewing machine confirmed ii. Production set-up tasks for

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Bartack • Zig zag • Buttoning • Snap Button • Chainstitch ii. Industrial sewing machine parts, components and accessories • Accessories (such as thread stand, table and table stand, drawer) • Mechanical Components (such as machine head, belt, bobbin winder) • Pneumatic components (such as cylinder valve, air regulator, solenoid valve) • Electrical and electronic component (such as Servo Motor/Clutch Motor/Induction Motor, control panel) iii. Types of fabrics • Cotton • Rayon	iv. Determine style requirements v. Determine types and thickness of fabric vi. Check industrial sewing machine lay-out vii. Check industrial sewing machine attachment fixation viii. Check industrial sewing machine adjustment ix. Check industrial sewing machine programme setting x. Detect common errors in production set-up xi. Prepare testing material xii. Operate industrial sewing machine xiii. Check industrial sewing machine performance and stitch formation xiv. Confirm industrial sewing machine set-up compliance with style requirements xv. Confirm industrial sewing machine production set up records	within allocated time iv. Meticulous and systematic in verification work v. Emphasise quality output and consistency <u>*Safety:*</u> i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety <u>*Environmental:*</u> i. Practise good housekeeping	<u>Related skills</u> 25	<u>Related skills</u> Demonstration Project-based Learning	verification confirmed. iii. Industrial sewing machine layout confirmed to ensure compliance with production requirements iv. Industrial sewing machine attachments assembly checked to ensure compliance with style requirements v. Industrial sewing machine adjustment and programme setting checked to ensure compliance with style requirements vi. Common

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Polyester • Satin • Silk • Flax • Spandex • Denim iv. Types of attachments • Binding • tape binder • piping folder • taping v. Types of work aids • Acrylic board mould • Edge guide for sewing straight line stitching • Edge guide for sewing curve lines stitching • Folder for sewing wider hem vi. Style requirements • Measurement and tolerances • Required accessories • Type of material • Finishing instructions vii. Methods for verifying correctness of production set-up such as					errors in production set-up listed and confirmed, if any vii. Industrial sewing machine performance and stitch formation checked to ensure compliance with style requirements viii. Industrial sewing machine production set-up records checked for accuracy and completeness ix. Industrial sewing machine production set-up verification records updated

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Visual check • Testing • Sample output inspection viii. Industrial sewing machine production set-up work activities: • Attachment and work aids assembly • Needle installation and threading • Industrial sewing machine speed setting • Stitches density setting • Industrial sewing machine programme setting ix. Common errors in production set-up, such as • Error in machine setting • Non- compliance with production specification • Thread quality (such as thread evenness, thread originated from poor quality fibre) x. Production set-up					x. Industrial sewing machine production set-up verification completed within allocated time xi. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	verification tools, equipment and materials • Common hand tools • Testing equipment (such as Multi meter, test pen, test lamp) • Measuring tools (such as ruler, tension meter) xi. Industrial sewing machine production set-up records • Type of machine • Serial number • Model • Industrial sewing machine accessories • Location xii. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug, apron) • Workplace and personal safety • Housekeeping • Material Safety Data Sheet (MSDS)					
2. Verify industrial	i. Style requirements	i. Check attachments	*Attitude*:	Related	Related	i. Attachments

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
sewing machine attachment and work aids making	• Measurement and tolerances • Required accessories • Type of material • Finishing instructions ii. Types of industrial sewing machine attachment such as • piping folder • taping • binding iii. Types of industrial sewing machine work aids such as • Acrylic board mould • Edge guide for sewing straight line stitching • Edge guide for sewing curve lines stitching • Folder for sewing wider hem iv. Verification methods • Visual check • Testing v. Attachment fabrication records • Type and quantity of attachment • Type and quantity	made to ensure compliance with style requirements ii. Check work aids made to ensure compliance with style requirements iii. Prepare material for testing iv. Fix attachment and work aids to industrial sewing machine v. Sew testing material vi. Check sewn test material against garment specification vii. Check attachment and work aids making records	i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Thorough and systematic in verification work v. Emphasise quality output and consistency *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	knowledge 10 Related skills 25	knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	and work aids checked to ensure compliance with style requirements ii. Testing material prepared iii. Attachments/ work aids fixed on industrial sewing machine iv. Testing material sewn and checked against style requirements v. Attachment and work aid performance confirmed in compliance with style requirements vi. Attachments and work aids making records checked for accuracy and completenes

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	of work aid vi. Attachment and work aids fabrication work activities • Template making • Marking • Cutting • Drilling • Finishing • Tapping • Forming • Soldering vii. Common errors in attachment and work aids fabrication • Error in measurement • Error in construction viii. Attachment and work aids fabrication verification tools, equipment and materials • Common hand tools • Measuring tools (such as ruler, tension meter) ix. Related HSE requirements • PPE (gloves, mask, safety boots, goggles,					s vii. Attachments and work aids verification completed within allocated time viii. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	earplug, apron) • Workplace and personal safety • Housekeeping					
3. Verify industrial sewing machine scheduled maintenance	i. Types of industrial sewing machines such as • Lockstitch • Overlock • Interlock • Button hole • Bartack • Zig zag • Buttoning • Snap Button • Chainstitch ii. Industrial sewing machine parts, components and accessories • Accessories (such as thread stand, table and table stand, drawer) • Mechanical Components (such as machine head, belt, bobbin winder) • Pneumatic components (such as cylinder valve, air regulator, solenoid valve)	i. Determine type and location of industrial sewing machine ii. Determine scheduled maintenance tasks for verification iii. Prepare verification tools, equipment and materials iv. Check industrial sewing machine physical condition servicing v. Check electrical and electronic system servicing vi. Check mechanical system servicing vii. Check pneumatic system servicing viii. Check handling of unutilised/ idle industrial sewing machines ix. Confirm scheduled maintenance records x. Update scheduled maintenance verification records	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety iv. Handle industrial sewing machine components safely *Environmental:* i. Practise good housekeeping	Related knowledge 10 Related skills 20	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Type and location of industrial sewing machine confirmed ii. Industrial sewing machine physical condition checked to ensure industrial sewing machine is in good condition iii. Electrical and electronic system checked to ensure system is in normal operating condition iv. Mechanical system checked to ensure

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Electrical and electronic component (such as Servo Motor/Clutch Motor/Induction Motor, control panel) iii. Types of maintenance such as • Preventive maintenance • Corrective maintenance • Predictive maintenance (for belting, rubber stand, feed bar oil seal) iv. Purpose of maintenance • Maintenance schedule • Maintenance records v. Scheduled maintenance work activities • Upkeeping of machine physical condition • Electrical and electronic system servicing • Mechanical system					system is in normal operating condition v. Pneumatic system checked to ensure system is in normal operating condition vi. Unutilised/ idle industrial sewing machines checked to ensure machines are properly stored at designated areas vii. Scheduled maintenance records checked for accuracy and completenes s viii. Scheduled maintenance verification works recorded

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	servicing • Pneumatic system servicing • Handling of idle/ unutilised industrial sewing machines vi. Maintenance tools, equipment and materials • Common hand tools • Test material • Testing tools (test pen, multi meter, test lamp) • Rug • Cleaning solvent (such as spot lifter) vii. Scheduled maintenance verification methods • Visual inspection • Checking of schedule maintenance records viii. HSE requirements • PPE (mask, gloves, apron, safety boots, ear plug, goggles) • Workplace safety • Material Safety Data Sheet					ix. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	(MSDS)					
4. Verify completion of industrial sewing machine repair works	i. Types of defective stitching formation • Puckering • Jump stitch • Staggering stitch • Uneven stitch ii. Types of malfunction. • Broken thread • Excessive vibration • Fabric entanglement • Noise abnormalities iii. Causes of malfunction in feeding mechanism • Faulty feed dog • Error in feed dog height setting • Inappropriate feed dog type • Defective and wrong type of presser foot • Inaccurate presser foot pressure • Defective needle plate iv. Causes of malfunction in driving mechanism • Defective upper and lower looper • Inaccurate setting	i. Determine type and location of repaired industrial sewing machine ii. Check industrial sewing machine maintenance records iii. Prepare required hand tools and testing material iv. Test machine performance v. Confirm industrial sewing machine readiness for production operation vi. Complete repair verification records	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Thorough and systematic in verification work v. Emphasise quality work *Safety:* ı. Use tools in a safe manner ıı. Wear PPE at all times ııı. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related knowledge 10 Related skills 30	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Type and location of repaired industrial sewing machine confirmed ii. Industrial sewing machine maintenance records checked for completeness and accuracy iii. Verification tools, equipment and materials prepared iv. Industrial sewing machine performance checked to ensure repaired industrial sewing machine is restored to normal

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	of upper and lower looper • Defective hook • Inaccurate hook settings • Faulty bobbin and bobbin case • Loosened needle bar • Unstable needle bar • Inaccurate needle bar height setting v. Causes of malfunction in threading mechanism • Faulty thread take up • Inaccurate thread tension setting • Incorrect needle and thread specification vi. Causes of malfunction in lubrication mechanism • Poor oil circulation • Oil leakage • Faulty oil pump • Causes of malfunction in electrical and electronic system • Parameter setting					operating condition v. Repaired industrial sewing machine readiness for production confirmed vi. Verification work recorded in an accurate manner vii. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	error • Faulty components vii. Causes of malfunction in pneumatic system • Rust • Blockage • Defective tubing • Defective components viii. Other causes of malfunction such as sewing operator's negligence ix. Types of repair works. • Cleaning • Replacement • Repair • Adjustment • Modification x. Repair tools, equipment and materials • Common hand tools • Special tools (such as Needle bar height gauge, Looper and needle timing gauge) • Test material • Testing tools (test pen, multi meter, test lamp) • Rug					

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Cleaning solvent (such as spot lifter) xi. Repair work verification methods • Visual inspection • Testing xii. HSE requirements • PPE (mask, gloves, apron, safety boots, ear plug, goggles) • Workplace safety • Material Safety Data Sheet (MSDS) • Housekeeping					

Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate a process information. 01.08 Utilise spreadsheets applications to locate and process information. 01.09 Utilise business graphic application to process information. 01.10 Apply a variety of mathematical techniques. 01.11 Apply thinking skills and creativity. 02.09 Prepare flowcharts. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.09 Manage and improve performance of individuals. 03.10 Provide consultations and counselling. 03.11 Monitor and evaluate performance of human resources. 03.12 Provide coaching/on-the-job training. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 03.17 Identify staff training needs and facilitate access to training. 04.06 Allocate work. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans. 05.02 Inspect and monitor work done and/or in progress.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM: TRAINEES)
1. Industrial Sewing Machines with instruction manuals	
• Lockstitch	1:1
• Interlock	1:5
• Overlock	1:2
• Button Hole	1:25
• Zig Zag	1:5
• Bartack	1:25
• Buttonning	1:25
• Waist band	1:5
• Double needle	1:5
2. Sewing Machine Parts (Needle, needle plate, bobbin, bobbin case, rotary hook, looper, presser foot, belt, upper knife, lower knife, feed dog, cutter, bearing, pulley, nuts, needle holder screws)	As required
3. Hand tools (toolbox, set of screwdrivers, set of spanners, Allen key, adjustable spanner, set of pliers, test pen, scissor, tweezers, diamond file, , lock, set of hammers, set of wrenches, vice)	1: 1
4. Special Tools	
• Bearing puller	1:5
• Torchlight	1:1
• Magnet pen	1:1
• Machinist ruler	1:1
• Timing gauge	1:5
• Needle gauge	1:5
• Tension gauge	1:5

• Vernier calliper	1:5
• Multimeter	1:5
• Test lamp	1:5
• Saw	1:5
• Set of mallets	1:5
5. PPE (Mask, Goggles, Apron, Gloves, Safety Shoes, Ear Plug)	1: 1
6. Lubrication TEM	
• Lubrication Oil	As required
• Oil Can	1: 1
• Oil Pan	1: 1
7. Manual	
• Service manual	1:10
• Maintenance schedule	1:1
• Production schedule	1:1
8. Checklist	
• Verification checklist	1:1
• Scheduled Maintenance Checklist	1:1
• Repair checklist	1:1
9 Material Safety Data Sheet (MSDS)	1:1
10 Maintenance Log Book	1:1
11. Sewing Materials (Thread, fabric, elastic, piping, lace, button)	As required
12. Attachments (binding, tape binder, piping folder, taping)	1: 5
13. Work Aids (acrylic board mould, edge guide for sewing straight line stitching, edge guide for sewing curve lines stitching, folder for sewing wider hem)	1: 5
14. Computer	1: 5

REFERENCES

1. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 1: Introduction
2. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 2: Sewing Machine Assembly
3. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 3: Sewing Machine Set-Up
4. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 4: Attachment Fabrication
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CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**TEXTILE AND APPAREL**						
SUB SECTOR	**APPAREL MANUFACTURING**						
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**						
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**						
COMPETENCY UNIT TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE OPERATION MONITORING**						
LEARNING OUTCOME	The person who is competent in this competency unit shall be able to perform administrative functions related to industrial sewing machine maintenance in accordance with workplace procedures. Upon completion of this competency unit, trainees will be able to:- • Monitor workplace health, safety and environmental practices and standards compliance • Prepare industrial sewing machine maintenance schedule • Check industrial sewing machine spare parts requisition • Verify inventory records • Participate in production meeting						
PRE-REQUISITE (if applicable)	Industrial Sewing Machine Maintenance Level 2						
COMPETENCY UNIT ID	TA-014-3:2014-C04	**LEVEL**	3	**TRAINING DURATION**	190 hours	**SKILL CREDIT**	19

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Monitor workplace health, safety and environmental practices and standards compliance	i. HSE requirements • Material Safety Data Sheet (MSDS) • PPE • Workplace safety • Signage and barricade • Ergonomics	i. Identify related HSE requirements ii. Identify various types of potential hazards iii. Identify preventive measures iv. Maintain safe workplace v. Check to ensure	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Firm in enforcing HSE compliance	Related knowledge 20	Related knowledge Lecture Discussion Problem-based Learning	i. Industrial sewing machine maintenance HSE requirements confirmed ii. Types of potential

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Housekeeping ii. Types of potential hazards • Electrical Hazard • Shock • Burn • Arc-Blast • Fires • Explosion • Oil leakage • Injuries due to tools usage • Injuries due to lifting iii. Accident preventive measures • PPE Usage • Using electrical protective devices • Safe working habits • Basic of good lifting • Proper machine handling • Proper machine maintenance • Good housekeeping iv. Housekeeping practices (such as 5S) v. HSE compliance monitoring methods • Using HSE	housekeeping practices compliance vi. Check air compressor condition and maintenance historical records vii. Take appropriate actions for non-compliance of HSE requirements viii. Prepare workplace for HSE audit ix. Record and report accidents/ incidents	iv. Communicate effectively with personnel at all levels *Safety:* i. Wear PPE at all times ii. Maintain workplace safety iii. Enforce HSE compliance *Environmental:* i. Practise good housekeeping ii. Optimise resources	Related skills 40	Related skills Demonstration Simulation Project-based Learning	hazards and preventive measures confirmed iii. Housekeeping practices compliance ensured iv. Personal safety practices compliance ensured v. Workplace safety practices ensured vi. Air compressor condition and maintenance historical records checked vii. Appropriate actions taken for non-compliance of HSE requirements viii. Workplace prepared for HSE audit ix. Accidents/ incidents

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	checklist • Visual Manual Inspection (VMI) vi. Preparation of workplace for HSE audit vii. Incidents and accidents • Definition • Reporting Procedure					recorded and reported
2. Prepare industrial sewing machine maintenance schedule	i. Schedule preparation procedure ii. Industrial sewing machine list iii. Maintenance schedule format iv. Personnel competency chart v. Production schedule vi. Production requirements vii. Availability of maintenance personnel viii. Manpower allocation ix. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping • Material Safety	i. Prepare industrial sewing machine list ii. Determine number of maintenance personnel required iii. Match maintenance personnel competency level with maintenance tasks iv. Interpret production schedule v. Prioritise maintenance activities vi. Allocate maintenance personnel to lines of machines vii. Produce schedule	*Attitude*: i. Comply with work instructions ii. Systematic and meticulous in work planning iii. Work conscientiously within allocated time iv. Fair in task distribution *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources	Related knowledge 10 Related skills 20	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Simulation Project-based Learning	i. Industrial sewing machine list produced according to format ii. Number of maintenance personnel required confirmed iii. Maintenance personnel competency level required for maintenance tasks confirmed iv. Maintenance activities prioritised v. Maintenance personnel

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	Data Sheet (MSDS)					allocated to production lines of industrial sewing machines vi. Maintenance schedule prepared in required format taking into consideration minimum disruption to production operation
3. Check spare parts requisition	i. Spare part requisition procedures ii. Type of spare parts • Needle • Rotary hook • Upper knife • Lower knife • Needle screws iii. Stock availability checking methods • Checking of Inventory records • Physical check iv. Factors to consider in spare parts requisition • Cost factor • Production efficiency	i. Check spare parts requisition details ii. Check stock availability iii. Determine necessity for spare parts requisition iv. Propose alternative solutions	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Meticulous and systematic in checking parts requisition v. Objective and rational in decision making	Related knowledge 10 Related skills 20	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Simulation Project-based Learning	i. Spare parts requisition details checked for accuracy ii. Stock availability confirmed iii. Necessity for spare parts requisition decided iv. Alternative solutions other than new requisition proposed

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Urgency factor • Outdated machine factor v. Alternative solutions • Replication in foundry • Refurbishing of spare parts		*Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources			
4. Verify inventory records	i. Stock inventory documents • Industrial sewing machine list • Industrial sewing machine parts list • Industrial sewing machine attachment list • Industrial sewing machine lubrication oil list • Workshop tools and equipment list ii. Stock inventory level iii. Purchase order procedures iv. Discrepancies in inventory records • Wrong part number • Wrong quantity	i. Check industrial sewing machine inventory documents ii. Check industrial sewing machine parts inventory documents iii. Check industrial sewing machine accessories inventory documents iv. Check industrial sewing machine maintenance tools, equipment and material inventory documents v. Verify usage and purchase of stock inventory vi. Update stock inventory documents	*Attitude*: i. Comply with work instructions ii. Work conscientiously within allocated time iii. Pay attention to details iv. Systematic in verification work v. Accurate, complete and timely in maintaining inventory records *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related knowledge 10 Related skills 25	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Simulation Project-based Learning	i. Types of stock inventory documents listed ii. Industrial sewing machine inventory documents checked for accuracy iii. Industrial sewing machine parts inventory documents checked for accuracy iv. Industrial sewing machine accessories inventory

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
						documents checked for accuracy v. Industrial sewing machine maintenance tools, equipment and material inventory documents checked for accuracy vi. Stock usage and purchase checked for accuracy vii. Discrepancies in inventory records noted and reported for further action viii. Stock inventory records updated in a timely and accurate manner

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
5. Participate in production meeting	i. Purpose of production meeting ii. Production meeting agenda • Operation improvement (such as new technology) • Report on machine downtime • Production operation issues • Maintenance schedule • Quality problem iii. Communication skills iv. Interpersonal skills v. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping	i. Determine production meeting agenda ii. Analyse previous meeting minutes iii. Determine machine downtime from maintenance records iv. Prepare relevant documents and data v. Share and present relevant data vi. Propose improvement	*Attitude*: i. Comply with work instructions ii. Work conscientiously within allocated time iii. Communicate effectively with personnel at all levels *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources	Related knowledge 10 Related skills 25	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Production meeting agenda confirmed ii. Meeting minutes interpreted and confirmed iii. Machine downtime records confirmed and reported in meeting iv. Documents and data compiled and reported in meeting v. Feedback related to production and maintenance obtained and provided vi. Improvements opportunities related to production proposed vii. Effective communicati

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
						on skills applied

Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate a process information. 01.08 Utilise spreadsheets applications to locate and process information. 01.09 Utilise business graphic application to process information. 01.10 Apply a variety of mathematical techniques. 01.11 Apply thinking skills and creativity. 02.09 Prepare flowcharts. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.09 Manage and improve performance of individuals. 03.10 Provide consultations and counselling. 03.11 Monitor and evaluate performance of human resources. 03.12 Provide coaching/on-the-job training. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 03.17 Identify staff training needs and facilitate access to training. 04.06 Allocate work. 04.07 Negotiate acceptance and support for objectives and strategies.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

05.01 Implement project/work plans. 05.02 Inspect and monitor work done and/or in progress. 06.07 Develop and maintain networks.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM: TRAINEES)
1. PPE (Mask, Goggles, Apron, Gloves, Safety Shoes, Ear Plug)	1: 1
2. Inventory List	
• Industrial sewing machine list	1:1
• Parts list	1:1
• Accessories List	1:1
• Maintenance Tools, Equipment and Materials List	1:1
3. Manual	
• Service manual	1:10
• Maintenance schedule	1:1
• Production schedule	1:1
4. Checklist	
• Installation checklist	1:1
• Setup checklist	1:1
• Commissioning checklist	1:1
• Verification checklist	1:1
• Scheduled Maintenance Checklist	1:1
• Repair checklist	1:1
5 Material Safety Data Sheet (MSDS)	1:1
6. Maintenance Log Book	1: 1
7.. Computer	1: 5

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4. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 4: Attachment Fabrication
5. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 5: Scheduled Maintenance
6. PSMB. Industrial Sewing Machine Technician Apprenticeship Scheme SMT 6: Troubleshooting
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CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**TEXTILE AND APPAREL**						
SUB SECTOR	**APPAREL MANUFACTURING**						
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**						
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**						
COMPETENCY UNIT TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE PERSONNEL SUPERVISION**						
LEARNING OUTCOME	The person who is competent in this competency unit shall be able to supervise industrial sewing machine maintenance personnel performance in accordance with workplace procedures. Upon completion of this competency unit, trainees will be able to:- • Conduct operational briefing • Monitor subordinates discipline • Monitor subordinates performance • Appraise subordinates performance • Coordinate subordinates on-the-job training						
PRE-REQUISITE (if applicable)	Industrial Sewing Machine Maintenance Level 2						
COMPETENCY UNIT ID	TA-014-3:2014-C05	**LEVEL**	3	**TRAINING DURATION**	170 hours	**SKILL CREDIT**	17

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Conduct operational briefing	i. Briefing frequency • Daily • Monthly • Weekly ii. Briefing contents • Work schedule • Safety • Work Discipline • Current issues	i. Identify briefing details ii. Present briefing details iii. Discuss current operational issues/ topics iv. Clarify and resolve maintenance operational issues v. Provide feedback	*Attitude*: i. Comply with work instructions ii. Work conscientiously within allocated time iii. Communicate effectively	Related knowledge 10	Related knowledge Lecture Discussion Problem-based Learning	i. Briefing details confirmed ii. Briefing details presented in a clear manner iii. Current

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Briefing logistics • Venue • Time • Notification • Agenda • Minutes taking iv. Problem solving skills v. Communication and interpersonal skills vi. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping	vi. Obtain feedback vii. Record briefing minutes and outcomes	iv. Rational and objective in making decisions v. Alert and quick in thinking vi. Demonstrate active listening <u>*Safety:*</u> i. Wear PPE at all times ii. Maintain workplace safety <u>*Environmental:*</u> i. Practise good housekeeping	<u>Related skills</u> 25	<u>Related skills</u> Demonstration Project-based Learning	maintenance operation issues discussed in an effective manner iv. Maintenance operation issues clarified and resolved in an effective manner v. Feedback provided and obtained in a two way communication process vi. Briefing minutes and outcomes recorded for reference and further action vii. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
2. Monitor subordinates discipline	i. Guidelines on personnel discipline ii. Authority limit of supervisors pertaining to personnel discipline iii. Observation skills iv. Feedback giving skills v. Basic counselling skills vi. Types of disciplinary actions vii. Recording of disciplinary actions taken: • Format • Content	i. Interpret guidelines on personnel discipline ii. Determine authority limit of supervisors pertaining to personnel discipline iii. Observe subordinates behaviour iv. Give constructive feedback v. Counsel subordinates vi. Take appropriate disciplinary action vii. Report unresolved disciplinary matters viii. Record disciplinary matters and actions taken	*Attitude*: i. Comply with work instructions ii. Firm in ensuring compliance with rules and regulations iii. Fair in handling subordinates issues iv. Objective and rational in decision making v. Communicate effectively with personnel at all levels *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related knowledge 10 Related skills 25	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Guidelines on personnel discipline and authority limit of supervisors confirmed ii. Subordinates behaviour observed and constructive feedback for improvement or counselling provided, if applicable iii. Appropriate disciplinary action taken within authority limit and recorded iv. Unresolved disciplinary matters reported to relevant party for further action v. Effective communication skills applied

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Monitor subordinates performance	i. Industrial sewing machine maintenance scope of work ii. Methods for comparing target and actual performance iii. Methods of monitoring work progress iv. Reasons for performance gap such as • Deficiency in competency • Deficiency in resources • Inefficient work processes • Attitude v. Monitoring skills vi. Feedback skills vii. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping • Material Safety Data Sheet (MSDS)	i. Determine target performance ii. Observe actual performance iii. Compare actual and target performance iv. Determine performance gap v. Identify reasons for performance gap vi. Propose recommendations for Improvement	*Attitude*: i. Comply with work instructions ii. Work conscientiously within allocated time iii. Emphasise quality output and consistency iv. Communicate effectively v. Observant and effective in providing feedback vi. Emphasise continual improvement *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources	Related knowledge 10 Related skills 25	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Target performance confirmed ii. Actual performance observed and compared with target performance iii. Performance gap identified and reasons confirmed iv. Recommendations proposed for Improvement
4. Appraise subordinates performance	i. Performance appraisal guidelines ii. Performance appraisal	i. Determine personnel performance report format and criteria	*Attitude*: i. Comply with work instructions	Related knowledge	Related knowledge	i. Personnel performance report format

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	instruments iii. Performance report format iv. Methods of conducting appraisal such as: • Observation • Interview • Test v. Performance gap analysis vi. Using appraisal findings vii. Performance reward • Promotion • Recommendation for training • Recommendation for counselling viii. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping • Material Safety Data Sheet (MSDS)	ii. Identify target performance iii. Determine personnel actual performance iv. Recommend types of rewards or recognition v. Determine performance gap vi. Propose follow-up actions vii. Prepare personnel performance report	ii. Work conscientiously within allocated time iii. Observant and thorough in performance appraisal iv. Objective in assessing performance v. Demonstrate fairness in appraising performance vi. Communicate effectively *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources	10 Related skills 25	Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	determined ii. Personnel actual performance assessed against target performance iii. Personnel achievement acknowledged iv. Performance gap determined v. Follow-up actions proposed vi. Personnel performance report prepared in an accurate and timely manner

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
5. Coordinate subordinates on-the-job training	i. Purpose of on-the-job training (OJT) ii. Training methods such as • Shop talk • Demonstration • Discussion • Problem-solving iii. Types of training materials iv. Techniques of providing and obtaining feedback v. Communication skills vi. Interpersonal skills vii. Motivational and counselling skills viii. Methods for measuring OJT effectiveness ix. HSE requirements • PPE (gloves, mask, safety boots, goggles, earplug) • Workplace and personal safety • Housekeeping • Material Safety Data Sheet (MSDS)	i. Identify on-the-job training needs ii. Prepare training materials iii. Organise OJT activities iv. Apply OJT coaching skills v. Motivate subordinates vi. Provide feedback vii. Assess OJT effectiveness viii. Prepare OJT report	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Emphasise continual improvement v. Systematic and meticulous in coordinating OJT vi. Communicate effectively vii. Resourceful in organising OJT *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources	Related knowledge 10 Related skills 20	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. OJT needs confirmed ii. Training materials and aids prepared iii. OJT activities scheduled and organised iv. OJT coaching skills applied in an effective manner v. Feedback provided for improvement vi. OJT effectiveness assessed vii. OJT report prepared in an accurate and timely manner

Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate a process information. 01.08 Utilise spreadsheets applications to locate and process information. 01.09 Utilise business graphic application to process information. 01.10 Apply a variety of mathematical techniques. 01.11 Apply thinking skills and creativity. 02.09 Prepare flowcharts. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.09 Manage and improve performance of individuals. 03.10 Provide consultations and counselling. 03.11 Monitor and evaluate performance of human resources. 03.12 Provide coaching/on-the-job training. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 03.17 Identify staff training needs and facilitate access to training. 04.06 Allocate work. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans. 05.02 Inspect and monitor work done and/or in progress. 06.07 Develop and maintain networks.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM: TRAINEES)
1. Industrial sewing machines with instruction manual	
• Lockstitch	1:1
• Interlock	1:5
• Overlock	1:2
• Button Hole	1:25
• Zig Zag	1:5
• Bartack	1:25
• Buttonning	1:25
• Waist band	1:5
• Double needle	1:5
2. Sewing Machine Parts (Needle, needle plate, bobbin, bobbin case, rotary hook, looper, presser foot, belt, upper knife, lower knife, feed dog, cutter, bearing, pulley, nuts, needle holder screws)	As required
3. Hand tools (toolbox, set of screwdrivers, set of spanners, Allen key, adjustable spanner, set of pliers, test pen, scissor, tweezers, diamond file, , lock, set of hammers, set of wrenches, vice)	1: 1
4. Special Tools	
• Bearing puller	1:5
• Torchlight	1:1
• Magnet pen	1:1
• Machinist ruler	1:1
• Timing gauge	1:5
• Needle gauge	1:5
• Tension gauge	1:5
• Vernier calliper	1:5

• Multimeter	1:5
• Test lamp	1:5
• Saw	1:5
• Set of mallets	1:5
5. PPE (Mask, Goggles, Apron, Gloves, Safety Shoes, Ear Plug)	1: 1
6. Lubrication TEM	
• Lubrication Oil	As required
• Oil Can	1: 1
• Oil Pan	1: 1
7. Material Safety Data Sheet (MSDS)	1:1
8.. Manuals	
• Service manual	1:10
• Maintenance schedule	1:1
• Production schedule	1:1
9.. Checklist	
• Installation checklist	1:1
• Setup checklist	1:1
• Commissioning checklist	1:1
• Verification checklist	1:1
• Scheduled Maintenance Checklist	1:1
• Repair checklist	1:1
10. Computer	1: 5

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CURRICULUM of COMPETENCY UNIT (CoCU)

SECTOR	**TEXTILE AND APPAREL**						
SUB SECTOR	**APPAREL MANUFACTURING**						
JOB AREA	**MACHINE MAINTENANCE (SEWING MACHINE)**						
NOSS TITLE	**INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION**						
COMPETENCY UNIT TITLE	**INDUSTRIAL SEWING MACHINE LOW COST AUTOMATION MODIFICATION**						
LEARNING OUTCOME	The person who is competent in this competency unit shall be able to design and develop low cost automation modification to enhance productivity, quality consistency and operators' well being Upon completion of this competency unit, trainees will be able to:- • Identify low cost automation modification requirements • Generate ideas for low cost automation modification • Develop low cost automation prototype • Analyse low cost automation prototype effectiveness • Implement low cost automation modification • Prepare low cost automation modification report						
PRE-REQUISITE (if applicable)	Industrial Sewing Machine Maintenance Level 2						
COMPETENCY UNIT ID	TA-014-3:2014-E01	**LEVEL**	3	**TRAINING DURATION**	240 hours	**SKILL CREDIT**	24

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
1. Identify low cost automation modification requirements	i. Good manufacturing practices • Lean manufacturing • Kaizen ii. Definition of low cost	i. Interpret workplace guidelines in good manufacturing practices ii. Interpret workplace guidelines in low cost	*Attitude*: i. Comply with work instructions ii. Observant and alert in determining iii. Communicate	Related knowledge 10	Related knowledge Lecture Discussion Problem-based	i. Workplace guidelines in good manufacturing practices and low cost

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	automation iii. Need for low cost automation • Increased productivity • Reduced labour costs • Reduced cycle time • Reduction in operating cost • Improved accuracies with consistency of quality • Suitable for mass production iv. Principles of low cost automation • Affordable • Simple and robust • Internally designed • Easy to assemble and disassemble • Easy to maintain and repair • Provide reasonable flexibility • Of really low cost v. Potential areas for low cost automation modification in sewing operation	automation modification iii. Observe processes in sewing production and gather information iv. Obtain feedback from sewing production department/ operators v. Analyse feedback from sewing operators vi. Obtain feedback from other department/ organization vii. Analyse feedback from organization viii. Determine quality and technical deficiency in sewing production operation and processes ix. Determine type of processes that can be enhanced using low cost automation x. Determine improvement opportunities using low cost automation	effectively with personnel at all levels iv. Resourceful in gathering information *Safety:* i. Wear PPE at all times ii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	 Related skills 20	Learning Related skills Demonstration Project-based Learning	automation modification explained ii. Information and feedback related to sewing production process and industrial sewing machine efficiency gathered from various sources and analysed iii. Technical and quality deficiencies in sewing production operation and processes identified iv. Type of sewing operation processes that may be enhanced using low cost automation

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Presser foot lift • Automatic tape feeder • Pedal reverse • Fabric misalignment alarm • Fabric tensioner • Thread break detector • Bottom fabric illuminating light vi. Source of information to determine needs for low cost automation • Sewing operators' feedback • Observation of sewing operation • Maintenance historical records • Organization's requirements and feedback vii. Related HSE requirements • PPE (mask, gloves, apron, safety boots, ear plug, goggles) • Workplace safety • Material Safety Data Sheet (MSDS)					modification confirmed v. Improvement opportunities using low cost automation modification explored and proposed vi. Personal and workplace safety as well as good housekeeping practised at all times

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	• Housekeeping					
2. Generate ideas for low cost automation modification	i. Source of information to generate ideas for low cost automation • Sewing operators' feedback • Observation of sewing operation • Maintenance historical records • Organization's requirements and feedback • Trade visit • Trade show/exhibition • Catalogue • Suppliers • In-house improvement committee ii. Ideas generation methods: • Brainstorming • Mind mapping • Root cause analysis • Research • Creative thinking… • Design thinking iii. Communication skills iv. Presentation skills	i. Analyse existing industrial sewing machine system ii. Analyse existing sewing operation and processes iii. Obtain ideas from trade visit/ trade show/ exhibition/ industry players iv. Research low cost automation from other countries v. Participate in technology forum/discussion vi. Obtain ideas from in house improvement committee vii. Obtain ideas from industrial sewing machine suppliers viii. Prepare/ Present preliminary proposal for approval	*Attitude*: i. Comply with work instructions ii. Work conscientiously within allocated time iii. Resourceful in generating ideas iv. Demonstrate determination and creativity in generating ideas v. Communicate effectively *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related knowledge 10 Related skills 20	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Existing industrial sewing machine systems and sewing operation analysed to assist in designing low cost automation modification ii. Ideas for low cost automation modification derived from various sources iii. Preliminary proposal for low cost automation modification prepared and presented for approval

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
3. Produce low cost automation prototype	i. Types of low cost automation • Air cylinder • Automatic tape cutter • Step Motor • Automated labelling • Sensor • Timer • Relay ii. Schematic drawing iii. Parts and components of industrial sewing machine iv. Fabrication tools, equipment and material v. Cost calculation vi. Fabrication methods vii. Prototype testing procedures	i. Prepare low cost automation modification schematic drawing ii. Identify parts to be used in the modification iii. Identify the cost of the modification iv. Fabricate prototype v. Test run prototype	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated time iv. Emphasise quality output *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping	Related knowledge 20 Related skills 40	Related knowledge Lecture Discussion Problem-based Learning Related skills Demonstration Project-based Learning	i. Low cost automation modification schematic drawing produced ii. Parts required confirmed iii. Modification cost estimated iv. Prototype fabricated v. Test run carried out to assess prototype performance vi. Personal and workplace safety as well as good housekeeping practised at all times
4. Analyse effectiveness of prototype	i. Analysis tools • Time study • Motion study • Cost Effectiveness study • Performance analysis • Quality analysis ii. Observation skills	i. Interpret criteria for assessing prototype effectiveness ii. Evaluate the output before and after low cost automation modification iii. Determine cost effectiveness of low	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously	Related knowledge 20	Related knowledge Lecture Discussion Problem-based Learning	i. Criteria for assessing prototype effectiveness interpreted and confirmed ii. Prototype effectiveness

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	iii. Analytical skills iv. Criteria for adopting low cost automation modification • Simple to construct • Easy to use • Low maintenance • Reasonable cost • Increase efficiency • Enhance output quality • Space sufficiency • Reduce labour dependency • Reduce sewing operators' fatigue	cost automation modification iv. Determine time effectiveness of low cost automation modification v. Determine efficiency benefits of low cost automation modification vi. Determine quality benefits of low cost automation modification vii. Determine labour efficiency of low cost automation modification viii. Determine duration and complexities to carry out low cost automation modification ix. Decide effectiveness and feasibility of low cost automation modification	within allocated time iv. Thorough and systematic in analysing effectiveness *Safety:* i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety *Environmental:* i. Practise good housekeeping ii. Optimise resources	Related skills 35	Related skills Demonstration Project-based Learning	assessed based on established criteria iii. Decision on feasibility of low cost automation modification made in a rational and objective manner
5. Implement low cost automation modification	i. Proposal preparation ii. Presentation skill iii. Pilot test procedure iv. Project-based Learning management v. Training delivery skill	i. Prepare full proposal on low cost automation modification ii. Present low cost automation modification proposal for approval iii. Conduct pilot test on	*Attitude*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work	Related knowledge 20 Related	Related knowledge Lecture Discussion Problem-based Learning Related skills	i. Full proposal on low cost automation modification produced and presented for approval

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
		low cost automation modification iv. Coordinate production of low cost automation modification v. Carry out training on using low cost automation modification	conscientiously within allocated time iv. Communicate effectively with personnel at all level <u>*Safety:*</u> i. Use tools in a safe manner ii. Wear PPE at all times iii. Maintain workplace safety <u>*Environmental:*</u> i. Practise good housekeeping ii. Optimise resources	<u>skills</u> 40	Demonstration Project-based Learning	ii. Pilot test conducted and feedback obtained for improvement iii. Production of low cost automation modification coordinated iv. Training in using low cost automation modification conducted for sewing operators v. Personal and workplace safety as well as good housekeepin g practised at all times
6. Prepare low cost automation modification report	i. Low cost automation modification record format ii. Low cost automation modification report contents: iii. Type of low cost automation iv. Cost v. Effectiveness study	i. Determine details for low cost automation modification report ii. Compile and organise content systematically iii. Write report in required format iv. Submit report for verification and reference	*<u>Attitude</u>*: i. Comply with work instructions ii. Comply with industrial sewing machine manual instructions iii. Work conscientiously within allocated	<u>Related knowledge</u> 1	<u>Related knowledge</u> Lecture Discussion Problem-based Learning	i. Details and content for low cost automation modification report compiled ii. Content organised in a systematic

Work Activities	Related Knowledge	Related Skills	Attitude/Safety/ Environmental	Training Hours	Delivery Mode	Assessment Criteria
	vi. Drawing vii. Report writing skills		time iv. Accurate, complete and timely in preparing report <u>*Safety:*</u> i. Wear PPE at all times ii. Maintain workplace safety <u>*Environmental:*</u> i. Practise good housekeeping	<u>Related skills</u> 4	<u>Related skills</u> Demonstration Project-based Learning	manner according to format iii. Report produced in an accurate and timely manner

Employability Skills

Core Abilities	Social Skills
01.07 Utilise database applications to locate a process information. 01.08 Utilise spreadsheets applications to locate and process information. 01.09 Utilise business graphic application to process information. 01.10 Apply a variety of mathematical techniques. 01.11 Apply thinking skills and creativity. 02.09 Prepare flowcharts. 02.10 Prepare reports and instructions. 02.11 Convey information and ideas to people. 03.09 Manage and improve performance of individuals. 03.10 Provide consultations and counseling.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

03.11 Monitor and evaluate performance of human resources. 03.12 Provide coaching/on-the-job training. 03.13 Develop and maintain team harmony and resolve conflicts. 03.14 Facilitate and coordinate teams and ideas. 03.15 Liaise to achieve identified outcomes. 03.16 Identify and assess client/customer needs. 03.17 Identify staff training needs and facilitate access to training. 04.06 Allocate work. 04.07 Negotiate acceptance and support for objectives and strategies. 05.01 Implement project/work plans. 05.02 Inspect and monitor work done and/or in progress. 06.07 Develop and maintain networks.	

Tools, Equipment and Materials (TEM)

ITEMS	RATIO (TEM: TRAINEES)
1. Industrial Sewing Machines with instruction manuals	
• Lockstitch	1:1
• Interlock	1:5
• Overlock	1:2
• Button Hole	1:25
• Zig Zag	1:5
• Bartack	1:25
• Buttonning	1:25
• Waist band	1:5

ITEMS	RATIO (TEM: TRAINEES)
• Double needle	1:5
2. Sewing Machine Parts (Needle, needle plate, bobbin, bobbin case, rotary hook, looper, presser foot, belt, upper knife, lower knife, feed dog, cutter, bearing, pulley, nuts, needle holder screws)	As required
3. Hand tools (toolbox, set of screwdrivers, set of spanners, Allen key, adjustable spanner, set of pliers, test pen, scissor, tweezers, diamond file, , lock, set of hammers, set of wrenches, vice)	1: 1
4. Special Tools	
• Bearing puller	1:5
• Torchlight	1:1
• Magnet pen	1:1
• Machinist ruler	1:1
• Timing gauge	1:5
• Needle gauge	1:5
• Tension gauge	1:5
• Vernier calliper	1:5
• Multimeter	1:5
• Test lamp	1:5
• Saw	1:5
• Set of mallets	1:5
5. PPE (Mask, Goggles, Apron, Gloves, Safety Shoes, Ear Plug)	1: 1
6. Fabrication TEM	
• Chisel	1:5
• Grinder	1:5
• Work bench	1: 5
• Hand Drill	1:5

ITEMS	RATIO (TEM: TRAINEES)
• Clipper	1:5
• Punch	1:5
• Deburring tools	1: 5
• Polishing compound	1:5
• Soldering Iron	1:2
• Sheet metal thickness gauge	1:5
• Bench drill	1:5
• Fabrication master templates	1:5
• Tapping tools	1:5
• Micro meter	1:2
• Hack saw	1:2
• Snip	1:2
• Bench Top Shear	1:5
• Prick	1:5
• Sand paper	As required
• Sheet metal	As required
• Soldering flux	As required
• Coolant	As required
7 Sewing Materials (Thread, fabric, elastic, piping, lace, button)	As required
8. Maintenance log book	1: 1
9.. Schematic Drawing	1: 1
10. Sample Proposal	1: 1
11. Workplace Safety	
• Signage	1: 25
• Barricades	1: 25
12. Trolley	1: 25

ITEMS	RATIO (TEM: TRAINEES)
13 Stopwatch	1: 5
14. Computer	1: 5

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8. ISO TC 38. Aug 23 2007. ISO 4916:1991, Textiles -- Seam types -- Classification and terminology. American National Standards Institute (ANSI) ASIN: B000Y2T3GQ
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18. Claire Shaeffer, Sewing for the Apparel Industry (2nd Edition), (2012), ISBN 978-0131884434 19. Denham, Carolyn (2014), Elementary Sewing Skills from Merchant & Mills, Collins & Brown, ISBN 9781909397415	

TRAINING HOURS SUMMARY

SECTOR	: TEXTILE AND APPAREL
SUB SECTOR	: GARMENT MANUFACTURING
JOB AREA	: MAINTENANCE
NOSS TITLE	: INDUSTRIAL SEWING MACHINE MAINTENANCE SUPERVISION
JOB LEVEL	: THREE (3)

CU ID	COMPETENCY UNIT	TRAINING DURATION HOURS
	CORE COMPETENCY UNIT	
TA-014-3:2014-C01	INDUSTRIAL SEWING MACHINE COMMISSIONING	40
TA-014-3:2014-C02	INDUSTRIAL SEWING MACHINE TROUBLESHOOTING	270
TA-014-3:2014-C03	INDUSTRIAL SEWING MACHINE MAINTENANCE JOB VERIFICATION AND TESTING	140
TA-014-3:2014-C04	INDUSTRIAL SEWING MACHINE MAINTENANCE OPERATION MONITORING	190
TA-014-3:2014-C05	INDUSTRIAL SEWING MACHINE MAINTENANCE STAFF SUPERVISION	170
	TOTAL TRAINING DURATION (CORE COMPETENCY UNITS)	**810**
	ELECTIVE COMPETENCY UNIT	
TA-014-3:2014-E01	INDUSTRIAL SEWING MACHINE LOW COST AUTOMATION MODIFICATION	240

GLOSSARY

Attachment and Work Aid	Labour saving devices used to simplify an operation and facilitate the use of sewing machine to make it more adaptable to specific operations
Back-tack	A few stitches taken in reverse to secure a line of stitching
Bar Tack	A group of closely sewn stitches (back and forth from side to side / zig zag)
Bobbin	The spool that sits in the lower part of the machine. It holds the thread that makes the underside of a stitch
Bobbin Case	The part of the machine that houses the bobbin
Broken Stitch	Caused by tight tension, excessive machine speed, sharp feeds or too much pressure.
Chainstitch	A stitch that interloops the needle thread(s) with a bottom looper thread on the underside of the seam. Most main seams sewn in woven apparel are sewn with this stitch formation.
Clutch Motor	Motor runs continuously, and sewing machine is started with a treadle activated clutch and stopped by a heel operated brake
Coverstitch	A stitch often used to seam knitwear, which consists of at least two needle threads, a looper thread and a top thread passing over the edge of the material. Spun or textured polyester thread is generally used to form these stitches.
Cylinder bed	This type of garments sewing machine has an increased working height and a bed in the shape of a horizontal arm. It is especially suitable for sewing on tubular parts, such as cuffs, sleeves, and trouser legs, and also for button sewing and bar tacking. This sewing machine is used extensively in the making of clothing from knitted fabrics.
Feed/ Feed Dog	The metal teeth that stick up above the needle plate. They move the fabric forward as it's being stitched
Flat bed	A type of sewing machine or serger which is intended to be installed into a table or cabinet so that the sewing surface of the machine becomes continuous with the table or cabinet surface. This can be very nice since it helps support large fabric objects that could be sewn.

Hand Pulley	The wheel on the side of the machine that can be turned manually to adjust the height of the needle.
Hem	to bottom edge of fabric which is sewn to hide frayed edges
Jump Stitch	Movement of the sewing head without needle penetration. No sewing occurs during a jump stitch.
Lockstitch	A stitch formed by interlocking needle threads with a bobbin thread. This is the most common stitch formed on industrial sewing machines
Low Cost Automation	Introduction of simple pneumatic, hydraulic, mechanical and electrical devices into the existing production machinery, with a view to improving their productivity.. This will involve the use of standardised parts and devices to mechanise or automate machines, processes and systems.
Malformed Piece	Result from machine fault and/or adjustment or failure of operator to position piece properly.
Needle Bar Stroke	The range of movement of the needle up and down. In general, a longer stroke makes a sewing machine more capable in thick fabric assemblies
Needle Bar/ Needle Clamp	The part that holds the needle
Needle Cub	Threads broken or material damaged by needles. Caused by incorrect size, point or design or' needle.
Needle Picking	Threads broken or material weave distorted by sewing machine needle having burred point
Needle Plate	The flat surface below the needle that the needle goes down through when making a stitch. It can be changed for different stitching jobs. Also called a throat plate
Needle System	Although there are hundreds of different needle systems, every sewing machine has a compatible needle system that is specific to that machine. It is important to know your sewing machine's needle system when you purchase needles
Post bed	This type of sewing machine has an increased working height. Special sewing applications are found in the working of three-dimensional products. e.g. shoes and bags. The post makes it easier to work on tight curves and corners, to sew in sleeves and to complete large, half-assembled products
Presser Foot	The piece that sits below the needle and holds the fabric down as it’s being stitched. It can be changed for different stitching jobs.

Raised bed	The bedplate is in the form of a plinth. It facilitates the assembly of pre-sewn parts and is especially suitable for the fitting of accessories and special attachments. This is the basic form for various specialized garments sewing machines such as buttonholers
Ravelled Stitch	Caused by feed dog cuts on thread, skipped stitches and unbalanced tension
Scorch	Machine temperature too high for fabric. or operator failure to remove piece at proper time.
Seam Puckering	Seam puckering refers to the gathering of a seam during sewing, after sewing, or after laundering, causing an unacceptable seam appearance. Seam puckering is more common on woven fabrics than knits; and it is prominent on tightly woven fabrics. Puckering is usually caused by yarn displacement, excessive thread tension, uneven ply feeding or shrinkage.
Servo Motor	Acts similar to a clutch motor except the motor only runs when engaged resulting in a quieter, lighter, more energy efficient motor with variable speed control. However, slow speed power in heavy fabric assemblies is poor
Shading	Where temperature of machine change colour of fabric
Skipped Stitch	Caused by faulty loop, needle, hook, incorrect tensions or machine timing
Staggered Stitch	Usually caused by faulty feed motion or use of wrong type needle and *or* fittings.
Stitch	A single turn or loop of the thread or yarn in sewing, knitting, and embroidery. All stitches made with a sewing needle with an "eye" or hole are variations on seven basic stitches: running stitch, backstitch, overcast stitch, cross stitch, buttonhole or blanket stitch, chain stitch
Tension Regulator/ Adjuster/ Dial	The mechanism that allows you to adjust the tension of your upper, and sometimes bobbin, thread.
Uneven Stitch	Caused by excessive machine speed, improper fittings, and worn machine parts.