-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **0084364** **-Session-1988-89**
-Superclass- **WH**

-Title- **MAINTENANCE OF AUTOMATIC SHORT CYCLE CHAINSTITCH SEWING MACHINES - BUTTONHOLING**

-DESCRIPTION-

Purpose

This module is designed to develop essential skills and an in depth understanding of maintenance requirements of industrial automatic short cycle chainstitch buttonhole sewing machinery, producing BS stitch types of the 100 and 400 series.

It is intended that this module is taught in conjunction with other related modules and forms part of a programme of study which should include complementary industrial experience.

It is aimed at those following a career in clothing machine engineering.

Preferred Entry Level

84355 Maintenance of Low Arm Blindstitch Machines
84356 Maintenance of Chainstitch Machines - Multi-needle
84357 Maintenance of Chainstitch Machines - Single and Two Needle overedge

Learning Outcomes

The student should:

1. explain the methods of operation and practical applications of short cycle single and two thread chainstitch buttonhole sewing machines:

2. explain the principles of operation of the main stitch forming, clamp control, thread trim, fabric cut, auto start/stop mechanisms on short cycle single and two thread chainstitch buttonhole sewing machines;

3. carry out service procedures in accordance with manufacturers' specifications for automatic short cycle chainstitch buttonhole sewing machines;

4. identify the components, fittings and mechanism settings required for machine conversion for a given sewing application on short cycle single and two thread chainstitch buttonhole sewing machines;

5. diagnose and rectify sewing and mechanical faults and test machines for correct sewing operation.

Content/ Context

Safety and safe working practices should form an integral part of the module activities during investigation of practical machine adjustments and the effects produced in relation to the actual sewing performance of the selected automatic short cycle chainstitch sewing machines.

Corresponding to the Learning Outcome 1-5:

1. Recognition and selection of appropriate machine type from the various machine types for given sewing applications.

A Two thread machines:

(a) cut before;
(b) cut after;
(c) no cut - imitation;
(d) specialised machines.

(i) cord trim - fixed size buttonhole;
(ii) imitation hand - heavy purl formation;
(iii) sham cuff - non bartacking;
(iv) eyelet - 360 degree formation;
(v) lapel - no eye-closed cut;
(vi) cross bar - square bartacks.

Examples

(a) Mens and ladies wear:

(i) trousers, slacks and jeans - fly and band strap buttonholes;
(ii) jackets and coats, - lapel, sleeve and fronts.

(b) (i) dust coats - fronts - lapels;
(ii) boiler suits - fronts, fly and sleeves;
(ii) donkey jackets - fronts - tabs.

B Single thread machines:

(a) buttonhole - flat and simulated purl stitch;
(b) label sewers-overcast stitch;
(c) tackers - straight stitch - single and double row;
(d) double cycle - flat buttonholes.

Examples

(a) Mens and Ladies wear:

(i) shirts and blouses - fronts - sleeves and collars;
(ii) foundation garments - straps;
(iii) house coats - fronts - lapels;
(iv) skirts - waistbands;
(v) leisure suits - knitted tops;
(vi) knitwear - cardigans and casual shirts.

C Efficiency rating:

(a) shape of buttonhole required by operation;
(b) number of stitches required by buttonhole;
(c) handling time of operation;
(d) quality of threads and materials to be used;
(e) arrangement of work;
(f) skill of operative;
(g) speed of machine.

2. A Recognition of the component assemblies and their function in relation to controlling and handling the thread and fabric during the sewing cycle.

(a) the needle and looper thread control system - one and two thread

(i) reciprocating needle bar and pull-off lever;
(ii) tension assemblies: passive and active controls;
(iii) thread guides and eyelets;
(iv) pre-tension controls;
(v) auxiliary thread control - pre-needle and barring tension.

(b) the stitch forming implements:

(i) oscillating loopers (spreaders) - single thread;
(ii) rocking loopers and spreaders (fork and plain) - two thread;
(iii) rotating looper race (turret) control.

(c) needle bar drive motions:

(i) single thread - fixed pivot vibrating reciprocating needle bar;
(ii) two thread - rocking pivot vibrating rotary needle bar;

(d) thread and gimp trimming devices.

(i) thread cutting - stationary and moving knives - cam, wedge and actuator;
(ii) thread pick up hook - pawl and latch;
(iii) thread retainer.

(e) fabric cutting - buttonhole:

(i) single thread - triangular slitting knife - standard cutting action;
(ii) two thread - cutting steel and inverted knife - inverted cutting action - crush cut.

B Recognition of the mechanisms and component assemblies and their function in relation to their control of automatic star/stop drive and work control during the total sewing cycle.

(a) Start/stop drive mechanism:

(i) direct drive (single pulley)
(ii) clutch drive (dual pulley)
(iii) manual start control - pedal;
(iv) auto start control - electro-mechanical;
(v) automatic stop - cam control;
(vi) emergency stop: manual, sensor;
(vii) braking system: latch and lever, shoe and drum

(b) work holding devices:

(i) tacking clamps (feet);
(ii) buttonhole clamps (feet);
(iii) feed plates;
(iv) clamp mats.

(c) work clamp motions and controls:

(i) vertical axis cams:

(a) co-ordinated head feed motion:
(b) co-ordinated bed plate motion.

(ii) horizontal axis cams.

(a) sliding feed plate motion.

(iii) cam types - motions and characteristics:

(a) disc or radial - edge profile;
(b) plate or face - sunken track - raised;
(c) cylindrical - sunken track - edge profile.

(iv) cam followers and function:

(a) knife edge or point - knife actuation;
(d) roller - needle bar vibration;
(c) spherical - tension rocker.

3. Interaction and timing relationship of the component assemblies relating to:

(i) stitch formation;
(ii) clamp control - fabric feed;
(iii) gimp and thread trimming, knives control;
(iv) start-stop mechanism.

Practice in removal and replacement of component assemblies and the use of gauges, marks and fittings; making adjustment to the synchronisation and relative position of the component to achieve a given sewing application.

4. Recognition and selection of appropriate components and fittings to demonstrate the ability to convert the machine for selected sewing operations or production situations.

(i) operations: e.g.:

(a) button holes - standard and special - with and without gimp:

(i) eyelet end - fly bar;
(ii) eyelet end - straight finish;
(iii) no eye - square end;
(iv) no eye - fly bar.

(b) tacking - stress areas;
(c) label sewing - straight and cover stitch;
(d) straps, belts and waistbands;
(e) collars, cuffs and hook bars.

(ii) components and data:

(a) pattern cam:

(i) button hole or tack track shape;
(ii) number of stitches;
(iii) stitch bite;
(iv) cutting space;
(v) trip segments;
(vi) knife control;
(vii) follower gauge and type.

(a) clamp-feet-mats;
(b) feed plate;
(c) needle hole insert;
(d) gearing stitch ratio;
(e) knife cams;

(g) knives - cutting steel;
(h) automatic clamp lift;
(I) special fittings - sequential feed;
(j) head and bed alignment.

5. Diagnosis and rectification of faults with particular reference to:

(i) single thread machines: vibrating needle bar, clamp feed and reversing mechanism, fabric clamping and cutting mechanism, start, top and brake mechanism. Lubrication.

(ii) two thread machines: travelling head, travelling bed, auto clamping and cutting assembly, rotating looper race, rotating needle bar sector, stitch drive assembly, buttonhole shaping mechanism, start, stop and brake mechanisms. Lubrication.

Setting, adjustment and testing machine for producing test samples, for sewing operations and production situations in order to demonstrate techniques of safe operation.

Suggested Learning and Teaching Approaches

Safety, safe working practices, care and use of sewing equipment should be an integral part of all module activities.

This module should be presented in the sewing room/workshop where the tutor should carefully explain and demonstrate the various techniques using a programme of exercises related to a theme or vocational bias which will interest the student. The student should follow an activity based learning approach to become familiar with the chainstitch buttonhole sewing machines in question. Students could work singly or in pairs. In the initial stages the tutor should fully explain and demonstrate each tool gauge operation or process. Terminology and principles relating to chainstitch button hole sewing machines should be introduced in the content of the exercise. Information charts, posters and mechanic's manuals relating to short cycle chainstitch buttonhole sewing machines, needles, thread and fabrics should be displayed to assist the students with the exercises. Student activities should be essentially centred on practical exercise assignments and the tutor would be expected to prepare precise briefs for each assignment exercise. A set of completed exercises should be available for the students to relate and compare standards.

Assessment Procedures

Acceptable performance in the module will be satisfactory achievement of all the performance criteria specified for each Learning Outcome.

The following abbreviations are used below:

LO Learning Outcome
IA Instruments of Assessment
PC Performance Criteria

LO1 EXPLAIN THE METHODS OF OPERATION AND PRACTICAL APPLICATIONS OF SHORT CYCLE SINGLE AND TWO THREAD CHAINSTITCH BUTTONHOLE SEWING MACHINES

PC The student:

(a) lists sewing operations for which each type of chainstitch buttonhole sewing machine is used;
(b) states all of the materials and fittings and equipment required to perform specified operations on:

(i) menswear;
(ii) ladieswear;
(iii) childrenswear;
(iv) knitwear;
(v) workwear.

(c) compiles a list of advantages and disadvantages of single and two thread chainstitch buttonhole sewing machines for specified sewing activities;

(d) states how the number of stitches, bite and cutting space may be altered to suit the given operation.

IA Short Answer Questions.

The student should be set questions to test understanding of methods of operation and practical application of industrial chainstitch buttonhole sewing machines.

The test will consist of 10 questions allocated as follows:

(a) sewing operations 2 questions;
(b) materials, fittings, equipment 3 questions;
(c) advantages/disadvantages 2 questions;
(d) alteration of stitch number, bite, cutting space 3 questions

Satisfactory achievement of the Learning Outcome will be demonstrated by the student producing 6 correct responses, including one from each of (a), (b), (c) and (d).

LO2 EXPLAIN THE PRINCIPLES OF OPERATION OF THE MAIN STITCH FORMING, CLAMP CONTROL, THREAD TRIM, FABRIC CUT, AUTO START/STOP MECHANISMS ON SHORT CYCLE SINGLE AND TWO THREAD CHAINSTITCH BUTTONHOLE SEWING MACHINES

PC The student:

(a) identifies the specific areas related to thread control and stitch forming action of different types of chainstitch buttonhole sewing machines;

(b) turns machines over by hand to demonstrate and describe the action of stitch formation gimp and thread control by the looper and spreaders;

(c) operates the machines by hand, identifies and notes the differences of the start/stop systems.

IA Practical Exercises.

The student should be set practical exercises to test understanding of the operation of specified mechanisms on short cycle chainstitch buttonhole single thread and tacking machines and short cycle two thread chainstitch buttonhole machines. The exercises will comprise as follows:

(a) identification of 5 component areas, using actual machines for reference, by completion of incomplete handout sheets.

(b) operation and description of:

(i) the oscillating action of the loopers in relation to the angled motions of the needle bar;
(ii) the oscillating action of the spreaders in relation to the motions of the needle bar and loopers;
(iii) examination and comparison of start/stop mechanism of short cycle machines.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student providing 4 correct answers to (a) and correctly operating the machinery by hand for (b) to provide accurate descriptions of the function of specified components.

LO3 CARRY OUT SERVICE PROCEDURES IN ACCORDANCE WITH MANUFACTURERS' SPECIFICATIONS FOR AUTOMATIC SHORT CYCLE CHAINSTITCH BUTTONHOLE SEWING MACHINES

PC The student:

(a) adjusts and sets components in correct timing relationships according to manufacturer's specifications;

(b) adjusts or replaces components to produce correct feeding action to permit machines to form the correct shaped buttonhole with correct number of stitches;

(c) works in a safe manner and wears appropriate safety clothing and equipment.

IA Practical Exercise.

The student should be presented with a practical exercise set under workshop conditions to test the application of knowledge and skills required to remove and replace specified machine components.

The exercise will involve the student in servicing one sewing machine, making the necessary adjustments where appropriate. The service will include synchronisation of components, adjustment of feeding mechanism and examination of lubricating system.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student meeting all the performance criteria.

LO4 IDENTIFY THE COMPONENTS, FITTINGS AND MECHANISM SETTINGS REQUIRED FOR MACHINE CONVERSION FOR A GIVEN SEWING APPLICATION ON SHORT CYCLE SINGLE AND TWO THREAD CHAINSTITCH BUTTONHOLE SEWING MACHINES

PC The student:

(a) identifies and removes specified component;
(b) states the function of the removed components;
(c) lists the components to be changed in order to accomplish an alternative operation;
(d) replaces the component with an alternative component stating its function;
(e) works in a safe manner and wears appropriate safety clothing and equipment.

IA Practical Exercise.

The student should be presented with a practical identification exercise set under workshop conditions to test the application of knowledge required for converting a sewing machine for a given application.

The exercise will involve the student removing and replacing specified components (e.g. work clamp assembly) from the machines in order to identify the purpose of the component in relation to machine conversion for a given sewing application.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student meeting all of the performance criteria.

LO5 DIAGNOSE AND RECTIFY SEWING AND MECHANICAL FAULTS AND TEST MACHINES FOR CORRECT SEWING OPERATION

PC The student:

(a) diagnoses faults related to sewing fabric including slipping stitches, incorrect feed, malformed stitches, damage to fabric, and needle deflection;

(b) rectifies the diagnosed faults;

(c) Sets up and threads machine correctly for testing and producing samples of stitch type BS: 100 and 400 series;

(d) produces test samples which show elimination of fault;

(e) works in a safe working manner and wears appropriate safety clothing and equipment.

IA Practical Exercise.

The student should be presented with a practical exercise set under workshop conditions to test application of knowledge and skills required to diagnose and rectify mechanical faults in the machine and test for correct stitch operation.

The exercise will be carried out on one machine containing 5 previously inserted faults.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student meeting all the performance criteria.