**ANNEX 2**

**Familiarization Plan, Checklist, Exercise Sheet, and Assessment Sheet**

To address the requirement of para. 7.2 of Section A-I/12 of the STCW Code, as amended, it is essential that a Familiarization Plan and Checklist are established and subsequently implemented before a practical exercise commences. Below are samples of Familiarization Plan and Checklist that will serve as guide and model for the preparation and development of your own design.

**Sample Familiarization Plan of the Main Switchboard**

|  |  |
| --- | --- |
| Course Title | MLC for Marine Engineer Officers, Function 2: Electrical, electronic and control engineering at the management level |
| Competence | Manage operation of electrical and electronic control equipment |
| KUP | Design features and system configurations of automatic control equipment and safety devices for the following: Generator and distribution system |
| Duration | 15 minutes/group |
| Performance Objective | At the end of the exercise, the trainees must be familiar with the different parts, controls and operational functions of the GAC-5 Main Switchboard Simulator. |
| Training Equipment | Class-S GAC-5 Generator Switchboard Simulator |
|  Trainer Action | Familiarize the trainees with the following:1. House rules.
2. Description of parts and configuration of the simulator with emphasis on the main components.
3. Operation of the simulator.
4. Different scenarios related to generators in parallel.
5. Attend to questions inherent to the familiarization of the system.
 |
| Trainee Action | 1. Refer to the Familiarization Checklist that will be provided to them.
2. Ensure that every item in the checklist are familiarized by checking the box provided.
 |

 **Sample Familiarization Checklist**

|  |
| --- |
| Title: Familiarization checklist of the Main Switchboard Simulator |
| Performance Objective: At the end of the exercise, the trainees must be familiar with the different parts, controls and operational functions of the GAC-5 Main Switchboard Simulator. |
| Duration: 15 Minutes/group |
| **Direction: Tick the box once the following undertakings had been performed and/or fully understood by the trainee(s):** |
| 1. House Rules
 | [ ]  |
| 1. Local Control Panel (Engine Control Position Switch)
 | [ ]  |
| 1. Generator Control Console
 |
| 1. Mode Select Switch
2. Engine Control Position Switch
3. CRT Display Select
4. Synchronizing and Load Sharing Switch
5. Alarm Indicating Panel
6. TG Power Limiter
 | [ ] [ ] [ ] [ ] [ ] [ ]  |
| 1. Synchronizing Panel
 |
| 1. Synchroscope
2. Synchronizing Lamps
3. Power meters
4. Voltmeters
5. Frequency Meters
6. ACB Control Switch
7. Governor Control Switch
 | [ ] [ ] [ ] [ ] [ ] [ ] [ ]  |
| 1. Generator Panels
 |
| 1. Voltmeter
2. Ammeter
3. Reverse Power Relay
4. Air Circuit Breaker
 | [ ] [ ] [ ] [ ]  |

 **Validated by:**

 **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Instructor’s Printed Name and Signature**

**Sample Exercise Plan (Instructor’s Copy)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Title** | Single and parallel running of generators under *manual operation* | Version | **Draft** |
| **Duration** | Briefing-0.5, simulation exercise – 0.2 hr./trainee. (12 min./trainee), and debriefing-1.0 hrs.  |
| **Competence** | Manage operation of electrical and electronic control equipment |
| **KUP** | Design features and system configurations of automatic control equipment and safety devices for the generator and distribution system. |
| **Learning Outcome** | At the end of the exercise, the trainee should be able to manage single and parallel running of generators under *manual* operation.  |
| **Prerequisite competences** | Operational knowledge and skills on generators gained in respective work environment and the competence under Table A-III/1.7 of the STCW Code. |
| **Learning materials** | Instructor’s manualManufacturer’s manualIllustrations/drawingsTraining film |
| **Training Equipment** | Generator switchboard simulator |
| **Initial Condition** | Ship underway1. All components in the system are set in the “local” and “manual” mode
2. The 600kW Turbo Generator (TG) is connected in parallel with the 400kW Diesel Generator.
3. Both generators supply a consumer load of 800kW load.
 |
| **Briefing** | The following must be conveyed by the instructor:1. The initial condition of the simulator exercise.
2. The specific objectives of the exercise.
3. The trainer has the right to stop the exercise when the following conditions are met:
* Exercise exceeds beyond the time allocated to the trainee.
* Trainee deviates immensely from the normal course of action.
* Malfunction arises in any of the main components of the simulator thus resulting in the possible impairment of the system.
1. Additional “House Rules” for the care of the simulator.
2. Ask trainees if they have any clarifications/questions.
 |
| **Simulator Familiarization** | Refer to the Familiarization Plan. |
| **Instructor’s Action** | 1. Check if the initial conditions are met before the commencement of the exercise.
2. Conduct the briefing.
3. Give the trainee enough time to prepare prior to starting the simulation.
4. Commence to run the simulation exercise by playing the scenario.
5. Monitor the trainees thru Instructor monitoring console.
6. Remind the trainee of the time left and actions not related with the exercise.
7. Stop the exercise and inform the trainee of the reason and give further instruction.
 |
| **Trainee’s Action** | Manage the operation of the generators in accordance with the procedures and system parameters of the manufacturer’s guidelines and technical specifications by conducting the following: 1. Check the following parameters:
* Frequency
* Voltage
* Temperatures of the windings of generator in operation
1. Oversee the adjustments of the aforesaid parameters, if not accordance with the manufacturer’s technical specifications or operating manual’s recommendation.
2. Check if the generator’s load has reached its specified limit.
3. If the generator load has reached its specified limit, direct the electrician or OOW to prepare the starting up of the first standby generator and synchronize it with the *running* generator.
4. Check if proper load-sharing is implemented.
5. Check if frequency is adjusted back to its rated value.
6. Check if the total load of the generators in parallel are have reached their specified limits.
7. If the generators’ load has reached its specified limits, direct the electrician or OOW to prepare the starting up of the second standby generator and synchronize it with the generators in the bus bars.
8. Supervise the synchronization and load-sharing process.
9. Ensure that all parameters are in accordance with the manufacturer’s technical specifications or operating manual’s recommendation.
 |
| **Debriefing** | 1. State to trainees the purpose of the debriefing exercise
2. State whether the specific learning objective was achieved during the exercise
3. Provide the result of their action and performance using the printout/checklist provided.
4. Initiate “peer review”.
5. Show them what went wrong.
6. Encourage them to try again and give good hope of success if they fail and require them to repeat the exercise.
7. Always be open to any remark from the trainees and take note of their comments regarding the exercise.
 |

|  |  |
| --- | --- |
| **Practical Exercises****(Formative)** | All actions of the candidate shall be in accordance with the procedures and system parameters of the manufacturer’s guidelines and technical specifications. The candidate’s performance will be monitored and rated by the assessor using a checklist, which will be substantiated by the printout of the system. The passing score is 70%. |
| **Performance Standard** | **%****Weight** | **Specified parameters or limits** | **Actual** **results** | **Rating** |
| **1** | **2** | **3** | **4** | **5** |
| 1. **Verify the system’s rated frequency (e.g. 60 Hz.).**
 | **5** | Not < 57 Hz and Not >63 Hz |  | < 57 or > 63 Hz | 57 or 63Hz | 58 or 62Hz | 59 or 61Hz  | 60 Hz |
| 1. **Oversee the adjustment of the system’s frequency to its rated value.**
 | **5** | Not > 6 sec. |  |  > 6 sec | 6 sec | 5 sec | 4 sec | <3 sec |
| 1. **Check the system’s rated voltage (e.g 440 V).**
 | **5** | Not < 57 Hz and Not >63 Hz |  | < 437 or >443 V | 437 or 443 V | 438 or 442 V | 439 or 441 V | 440 V |
| 1. **Supervise the adjustment of the system’s voltage to its rated value.**
 | **10** | Not > 19 min. |  |  > 24 min  | 20-24 min | 15-19 min | 10-14 min | <10 min |
|  |  |  |  |  |  |  |  |  |
| **6.** |  |  |  |  |  |  |  |  |
| **7.** |  |  |  |  |  |  |  |  |
| **TOTAL** |  | - xx - | - xx - |  |  |  |  |  |

If your simulator has an automatic rating/grading system, you may use it, however the same has to be reflected above i.e. for every activity specified in the performance standard, the equivalent point/s deducted or earned is indicated.

**Sample Exercise Sheet (Trainees’ Copy)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Title** | Single and parallel running of generators under *manual operation* | Version | **Draft** |
| **Duration** | Briefing-0.5, simulation exercise – 4.8 hrs. (12 min./trainee), and debriefing-1.0 hrs.  |
| **Competence** | Manage operation of electrical and electronic control equipment |
| **KUP** | Design features and system configurations of automatic control equipment and safety devices for the generator and distribution system. |
| **Learning Outcome** | At the end of the exercise, the trainee should be able to manage single and parallel running of generators under *manual* operation.  |
| **Prerequisite competences** | Operational knowledge and skills on generators gained in respective work environment and the competence under Table A-III/1.7 of the STCW Code. |
| **Learning materials** | Instructor’s manualManufacturer’s manualIllustrations/drawingsTraining film |
| **Training Equipment** | Generator switchboard simulator |
| **Initial Condition** | Ship underway1. All components in the system are set in the “local” and “manual” mode
2. The 600kW Turbo Generator (TG) is connected in parallel with the 400kW Diesel Generator.
3. Both generators supply a consumer load of 800kW load.
 |
| **Simulator Familiarization** | Refer to the Familiarization Plan. |
| **Instructions** | Manage the operation of the generators in accordance with the procedures and system parameters of the manufacturer’s guidelines and technical specifications by conducting the following: 1. Check the following parameters:
* Frequency
* Voltage
* Temperatures of the windings of generator in operation
1. Oversee the adjustments of the aforesaid parameters, if each is not accordance with the manufacturer’s technical specifications or operating manual’s recommendation.
2. Check if the generator’s load has reached its specified limit.
3. If the generator load has reached its specified limit, direct the electrician or OOW to prepare the starting up of the first standby generator and synchronize it with the *running* generator.
4. Check if proper load-sharing is implemented.
5. Check if frequency is adjusted back to its rated value.
6. Check if the total load of the generators in parallel are have reached their specified limits.
7. If the generators’ load has reached its specified limits, direct the electrician or OOW to prepare the starting up of the second standby generator and synchronize it with the generators in the bus bars.
8. Supervise the synchronization and load-sharing process.
9. Ensure that all parameters are in accordance with the manufacturer’s technical specifications or operating manual’s recommendation.
 |
| **Expected Outcome** | Knowledge, skills and attitude in managing a single and parallel running of generators under *manual* operation with all electrical parameters working within the manufacturer’s technical specifications. A printout of the exercise will attest to extent of learnings achieved by the trainees. |

For purposes of uniformity, the initial condition/s in the practical assessments are somewhat the same only that some elements were altered to provide a seemingly different scenario from that of the practical exercises but the outcome would still be the same. For example, in the practical exercise a 600-kW Turbo Generator was used, while in the assessment it was changed to a 400-kW Diesel Generator. Though there were changes, the process would still be the same.

**Sample Practical Assessment Sheet (Students Copy)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Title** | Single and parallel running of generators under *manual operation* | Version | **Draft** |
| **Duration** | Briefing-0.5 and Practical Assessment – 4.8 hrs. (12 min./trainee)  |
| **Competence** | Manage operation of electrical and electronic control equipment |
| **KUP** | Design features and system configurations of automatic control equipment and safety devices for the generator and distribution system. |
| **Prerequisite competences** | Operational knowledge and skills on generators gained in respective work environment and the competence under Table A-III/1.7 of the STCW Code. |
| **Learning materials** | Instructor’s manualManufacturer’s manualIllustrations/drawingsTraining film |
| **Training Equipment** | Generator switchboard simulator |
| **Initial Condition** | Ship underway1. All components in the system are set in the “local” and “manual” mode.
2. The 400 kW Diesel Generator No. 1 (DG-1) is in parallel with another 400 kW Diesel Generator No. 2.
3. Both generators supply a consumer load of 550 kW load.
 |
| **Instructions** | Manage the operation of the generators in accordance with the procedures and parameters of the manufacturer’s guidelines and technical specifications by conducting the following: 1. Check the following parameters:
* Frequency
* Voltage
* Temperatures of the windings of generator in operation
1. Oversee the adjustments of the aforesaid parameters, if each is not accordance with the manufacturer’s technical specifications or operating manual’s recommendation.
2. Check if the generator’s load has reached its specified limit.
3. If the generator load has reached its specified limit, direct the electrician or OOW to prepare the starting up of the first standby generator and synchronize it with the *running* generator.
4. Check if proper load-sharing is implemented.
5. Check if frequency is adjusted back to its rated value.
6. Check if the total load of the generators in parallel are have reached their specified limits.
7. If the generators’ load has reached its specified limits, direct the electrician or OOW to prepare the starting up of the second standby generator and synchronize it with the generators in the bus bars.
8. Supervise the synchronization and load-sharing process.
9. Ensure that all parameters are in accordance with the manufacturer’s technical specifications or operating manual’s recommendation.
 |
| **Grading System** | At the start of the practical assessment, the trainee has an initial point-grade of One Hundred points (100). For every violation of the identified ***variables or criterion***,which will be explained during the briefing, means a point deduction from the point-grade of the examinee. The candidate-trainee will only be given a maximum of 70 points to pass the assessment. Failure to achieve the 70-point limit means that the trainee will be given a re-sit twice. If he/she fails to pass the re-sit, a re-training will be meted on the trainee.The candidate’s performance will be monitored by the pre-programmed standard encoded in the simulator.  |