



Model Curriculum

QP Name: Green Hydrogen Tube Trailer Driver

QP Code: LSC/Q3901

QP Version: 1.0

NSQF Level: 4

Model Curriculum Version: 1.0

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Training Parameters

Sector	Logistics
Sub-Sector	Land Transportation, Liquid Logistics
Occupation	Green Hydrogen Operations/Handling, Vehicle Operations, Transport Operations
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NC0-2015/8332
Minimum Educational Qualification and Experience	8th grade pass with 6 Years of experience as HMV driver (Should possess valid HMV License endorsed for handling hazardous goods OR 10th grade pass with 3 Years of experience as HMV driver (Should possess valid HMV License endorsed for handling hazardous goods OR Certificate-NSQF (Commercial Vehicle Driver - Level 3) with 3 Years of experience as HMV driver (Should possess valid HMV License endorsed for handling hazardous goods
Pre-Requisite License or Training	Should possess valid HMV License endorsed for handling hazardous goods.
Minimum Job Entry Age	21
Last Reviewed On	30-04-2024
Next Review Date	30-04-2027
NSQC Approval Date	30-04-2024
QP Version	1.0
Model Curriculum Creation Date	15-03-2024
Model Curriculum Valid Up to Date	30-04-2027
Model Curriculum Version	1.0
Minimum Duration of the Course	480
Maximum Duration of the Course	480

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner will be able to:

Compulsory Modules

The table lists the modules, their duration and mode of delivery.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	20	10			30
Module 1: Introduction to Green Hydrogen Tube Trailer - Driver	20	10			30
LSC/N3903 - Perform pre-operation checks of the tube trailer V1.0 NSQF Level 4	20	60	10		90
Module 2: Pre-operative checks for the tube trailer	20	60	10		90
LSC/N3904 - Coordinate the loading and unloading process V1.0 NSQF Level 4	20	60	10		90
Module 3: Monitoring Loading and unloading process	20	60	10		90
LSC/N3905 - Drive the green hydrogen tube trailer safely and efficiently V1.0 NSQF Level 4	20	50	20		90
Module 4: Safe and efficient driving of tube trailer	20	50	20		90
LSC/N3906 - Perform preventive maintenance and upkeep of the tube trailer V1.0 NSQF Level 4	20	60	10		90
Module 5: Preventive maintenance and upkeep of tube trailer	20	60	10		90
LSC/N3907: Adhere to health, safety and emergency protocols while carrying Green Hydrogen V1.0	20	30	10		60

NSQF Level 4					
Module 6: Health, safety and emergency protocols while carrying Green Hydrogen	20	30	10		60
Employability Skills DGT/VSQ/N0101	15	15			30
Total Duration	135	285	60		480

Module Details

Module 1: Introduction to Green Hydrogen Tube Trailer Driver

Mapped to Bridge Module

Terminal Outcomes:

- Describe the Basics of Green Hydrogen
- Brief the applications of green hydrogen in industry, transport and power production.

Duration: 20:00	Duration: 10:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the properties and characteristics of Hydrogen • Discuss various colour code nomenclature of Hydrogen • Elaborate the role of Green Hydrogen in sustainable energy transition. • Discuss key aspects related to production, storage and transportation of Green Hydrogen • Brief the applications of green hydrogen in industry, transport and power production. 	<ul style="list-style-type: none"> • Demonstrate with chart colour code nomenclature of Hydrogen. • Perform an activity to match the process and source of production of different colour codes of hydrogen. • Draw a flow diagram of the green hydrogen value chain. • List down the potential end uses of GH2 across the energy system. • Illustrate the role and responsibilities of the Green Hydrogen Tube Trailer Driver.
Classroom Aids	
Training kit (Facilitator Guide, PowerPoint Presentations), Whiteboard, Flip Chart, Markers, Duster, Projector, Laptop/Computer with Internet, Projector Screen, Visual aids (Videos, diagrams, charts)	
Tools, Equipment and Other Requirements	
Green Hydrogen colour charts, LLMS(learning version)	

Module 2: Pre-operative checks for the tube trailer

Mapped to LSC/N3903, v1.0

Terminal Outcomes:

- Describe the importance of performing pre-operative checks on the tube trailer.
- Demonstrate checking the exterior of the vehicle according to parameters.
- Examine the interior of the trailer according to the checklist.
- Perform the checks to be done on the Green Hydrogen Cylinders.
- Detail the necessary permits and documents required for carrying GH2.
- Discuss the reporting process in case of discrepancies.

Duration: 20:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the importance of performing pre-operative checks on the tube trailer. • List down the checks to be performed on the exterior of the tube trailer. • Describe the process of checking the pressure readings of cylinders. • Detail the necessary permits and documents required for carrying GH2. • Discuss the reporting process in case of discrepancies. 	<ul style="list-style-type: none"> • Demonstrate checking the exterior of the vehicle according to parameters. • Prepare a checklist for checks to be done to the vehicle's interior. • Examine the interior of the trailer according to the checklist. • Perform the checks to be done on the Green Hydrogen Cylinders. • Verify whether the necessary permits and documents for carrying GH2 are available. • Record all pre-operation checks in a designated logbook, noting any discrepancies or concerns.
Classroom Aids	
Training kit (Facilitator Guide, PowerPoint Presentations), Whiteboard, Flip Chart, Markers, Duster, Projector, Laptop/Computer with Internet, Projector Screen, Visual aids (Videos, diagrams, charts)	
Tools, Equipment and Other Requirements	
Functional Green Hydrogen Tube Trailer or a realistic simulator (optional), Wheel chocks, Grounding cable, Reflective triangles and warning signs, Spill containment kit, Pressure gauge tester, Leak detector (soap solution or electronic), Torque wrench for tightening connections, Flashlight, Tools for basic hose and piping inspection (wrench, screwdriver, pliers), Cylinder valve wrench, Fire extinguisher, Sample permits and documents (MSDS, e-waybill, trip sheet), Logbook, Safety data sheets (SDS) for hydrogen, Handouts of regulations and guidelines (CMVR, Hazardous Materials Transportation regulations), Personal protective equipment (Safety Glasses, Gloves, Safety Boots, High Visibility Vest)	

Module 3: Monitoring the Loading and unloading process

Mapped to LSC/N3904, v1.0

Terminal Outcomes:

- Explain the loading and unloading process of GH2.
- Observe loading and unloading activities closely to identify any potential safety risks or procedural deviations.
- Detail the precautions and protocols to be followed while loading and unloading of GH2.
- Perform necessary checks post-loading/ unloading of GH2.
- Maintain records and receipts of the loading/ unloading of cylinders.

Duration: 20:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the potential hazards and risks associated with the transportation of green hydrogen. • Explain the loading and unloading process of GH2. • Detail the precautions and protocols to be followed while loading and unloading of GH2. • List down the check to be done post loading/ unloading of GH2. 	<ul style="list-style-type: none"> • Observe loading and unloading activities closely to identify any potential safety risks or procedural deviations. • Ensure that all safety protocols are followed during the loading/ unloading; intervene immediately to correct any unsafe practices. • Make sure that the load is secured with fastenings, lashings, strappings, etc., and covered according to the route's weather conditions. • Perform necessary checks post-loading/ unloading of GH2. • Report any observed damage to the trailer or tubes to relevant personnel immediately • Maintain records and receipts of the loading/ unloading of cylinders.
Classroom Aids	
Training kit (Facilitator Guide, PowerPoint Presentations), Whiteboard, Flip Chart, Markers, Duster, Projector, Laptop/Computer with Internet, Projector Screen, Visual aids (Videos, diagrams, charts)	
Tools, Equipment and Other Requirements	
Functional Green Hydrogen Tube Trailer or a realistic simulator (optional), Wheel chocks, Grounding cable, Pressure gauges (testers), Leak detector (soap solution or electronic), Sample tubes or cylinders (non-functional), Straps, lashings, and securing equipment, Fire extinguisher, Safety data sheets (SDS) for hydrogen, Personal protective equipment (Safety Glasses, Gloves, Safety Boots, High Visibility Vest)	

Module 4: Safe and efficient driving of tube trailer

Mapped to LSC/N3905, v1.0

Terminal Outcomes:

- Perform starting and manoeuvring of the tube trailer out of premises.
- Detail the traffic laws and regulations specific to transporting hazardous materials.
- Elaborate defensive driving and its significance.
- Navigate diverse routes and adapt to changing conditions.
- Adhere to safety regulations and follow best practices.

Duration: 20:00	Duration: 50:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the contents of CMVR guidelines for carrying Hazardous Materials. • Detail the traffic laws and regulations specific to transporting hazardous materials. • Elaborate defensive driving and its significance. • List down the precautions to be followed while driving a tube trailer. • Detail the aggressive driving practices, which are to be avoided. 	<ul style="list-style-type: none"> • Perform starting and manoeuvring of the tube trailer out of premises. • Perform various defensive driving techniques wherever applicable. • Follow precautions and guidelines while carrying GH2. • Navigate diverse routes and adapt to changing conditions. • Demonstrate using navigation tools like Google Maps and NavIC etc. • Adhere to safety regulations and follow best practices. • Report any incidents, accidents, breakdowns, etc., during driving, if any, to the supervisor/authorized person
Classroom Aids	
Training kit (Facilitator Guide, PowerPoint Presentations), Whiteboard, Flip Chart, Markers, Duster, Projector, Laptop/Computer with Internet, Projector Screen, Visual aids (Videos, diagrams, charts)	
Tools, Equipment and Other Requirements	
Functional Green Hydrogen Tube Trailer or a realistic simulator (optional), Tube Trailer Driving Simulator (optional), Sample traffic signals and Road signs, Fire extinguisher, Route maps and navigation tools demonstrations (e.g., Google Maps simulator), Handouts of regulations and guidelines (CMVR, Hazardous Materials Transportation regulations), Personal protective equipment (Safety Glasses, Gloves, Safety Boots, High Visibility Vest)	

Module 5: Preventive maintenance and upkeep of tube trailer

Mapped to LSC/N3906, v1.0

Terminal Outcomes:

- Explain the importance of conducting routine inspections and maintenance checks on the vehicle.
- Follow (OEM) recommended procedure and checklist for routine servicing the trailer.
- Illustrate the basic diagnostic and functional checks to be done.
- Brief the recurring maintenance and repairs done for smooth vehicle operations.
- Document observations, findings, and actions taken during inspections and repairs in logbooks.

Duration: 20:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of conducting routine inspections and maintenance checks on the vehicle. • List down the checks to be performed at regular interval. • Brief the recurring maintenance and repairs done for smooth vehicle operations. • Appraise the importance of following Original Equipment Manufacturer’s (OEM) manual and instructions. 	<ul style="list-style-type: none"> • Prepare a maintenance checklist. • Follow (OEM) recommended procedure and checklist for routine servicing the trailer. • Conduct regular visual inspections of the entire green hydrogen tube trailer. • Perform scheduled preventive maintenance tasks and minor repairs. • Illustrate the basic diagnostic and functional checks to be done. • Carry out diagnostic procedures as per the troubleshooting checklist prepared by the OEM. • Document observations, findings, and actions taken during inspections and repairs in logbooks.
Classroom Aids	
Training kit (Facilitator Guide, PowerPoint Presentations), Whiteboard, Flip Chart, Markers, Duster, Projector, Laptop/Computer with Internet, Projector Screen, Visual aids (diagrams, charts)	
Tools, Equipment and Other Requirements	
Functional Green Hydrogen Tube Trailer or a realistic simulator (optional), Personal protective equipment (Safety Glasses, Gloves, Safety Boots, High Visibility Vest, Respirator), Basic toolkit (Wrenches, Hammer, Screwdrivers, Socket Sets, Multimeter), Tire changing equipment (jack, lug wrench), Flashlight, Spare fuses and bulbs, Lubricants, coolants and other fluids, Coolant tester, Grease gun, Oil filter wrench, Funnel, Rags, Pressure gauges, Sample instrument panel (optional), Sample worn-out parts and components, Battery tester, Fire extinguisher, Daily maintenance checklists, Manufacturer's service manuals (OEM), Logbook	

Module 6: Health, safety and emergency protocols while carrying Green Hydrogen

Mapped to LSC/N3907, v1.0

Terminal Outcomes:

- Perform the steps for calibrating the performance of equipment.
- Detail the steps involved in maintaining the equipment performance.
- Illustrate the Regulations and Standards levied for handling GH2.
- Comply with the Regulations and Standards for Handling Green Hydrogen.
- Respond promptly and effectively to emergencies and potential hydrogen leaks, including evacuation procedures, communication with emergency services, and implementation of emergency response plans

Duration: 20:00	Duration: 30:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Explain the significance of personal health and fitness for a driver. • Detail safe driving procedures and hazard prevention while carrying GH2. • Elaborate why Compliance with Regulations and Standards is of utmost importance while handling GH2. • Define the first aid to be done for cryogenic burns and asphyxiation due to inhaling GH2. • Detail how to be prepared for handling emergencies like fire. • Describe the importance of maintaining a safe and clean vehicle 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Illustrate the steps for maintaining personal health and fitness. • Demonstrate safe driving procedures for hazard prevention while carrying GH2. • Illustrate the Regulations and Standards levied for handling GH2. • Comply with the Regulations and Standards for Handling Green Hydrogen. • Follow the safety procedures and SOPs while handling green hydrogen. • Demonstrate the control measures to be taken in case of leakage or fire. • Role play with responding effectively to emergencies and incidents. • Perform the steps for maintaining a safe and clean vehicle.
<p>Classroom Aids</p> <p>Training kit (Facilitator Guide, PowerPoint Presentations), Whiteboard, Flip Chart, Markers, Duster, Projector, Laptop/Computer with Internet, Projector Screen, Visual aids (diagrams, charts)</p>	
<p>Tools, Equipment and Other Requirements</p> <p>Fire extinguisher, First-aid kit, Signage and marking, Personal protective equipment (Safety Goggles/Face Shield, Chemical-Resistant Gloves, Flame-Resistant High-Visibility Clothing, Safety Shoes/Boots and Respiratory Protection), Safety Data Sheets (SDS) for hydrogen, Handouts of emergency response protocol, LLMS(learning version)</p>	

Module 7: Employability Skills

Mapped to DGT/VSQ/N0101, v1.0

Terminal Outcomes:

- Appraise the significance of employability skills in meeting the job requirements
- Identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices.
- Illustrate English and communication skills, customer service, entrepreneurship, and getting ready for jobs and apprenticeship.

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Detail the importance of Employability Skills in meeting the job requirements • Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. • Describe positive attitude, self - motivation, problem solving, time management skills and continuous learning mindset in different situations. • Discuss the significance of reporting sexual harassment issues in time • Appraise the significance of using financial products and services safely and securely. • Explain the importance of managing expenses, income, and savings. • Detail the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws • Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely • Categorize the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges • Discuss the significance of maintaining hygiene and dressing appropriately • Discuss how to search and register for apprenticeship opportunities 	<ul style="list-style-type: none"> • Analyze 21st century skills. • Practice appropriate basic English sentences/phrases while speaking • Demonstrate how to communicate in a well -mannered way with others. • Illustrate working with others in a team • Demonstrate how to conduct oneself appropriately with all genders and PwD • Operate digital devices and use the associated applications and features, safely and securely • Differentiate between types of customers • Create a biodata • Experiment with various sources to search and apply for jobs • Identify customer needs and address them • Compose the significance of dressing up neatly and maintaining hygiene for an interview
Classroom Aids	
Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser, UPS, LCD Projector, Computer Tables & chairs	
Tools, Equipment and Other Requirements	
Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below), Scanner cum Printer.	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Any Degree	Handling DG/ Chemicals	2	Handling DG/ Chemicals			

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: "Green Hydrogen Tube Trailer - Driver" mapped to QP: "LSC/Q3901, v1.0". Minimum accepted score is 80%	Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, V2.0". Minimum accepted score is 80%

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Any Degree	Handling DG/ Chemicals	2	Handling DG/ Chemicals			

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: "Green Hydrogen Tube Trailer - Driver" mapped to QP: "LSC/Q3901, v1.0". Minimum accepted score is 80%	Recommended that the Assessor is certified for the Job Role: "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701, V2.0" with Minimum score of 80%

Assessment Strategy

The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria. Accordingly, assessment criteria for each job role is set and made available in qualification pack.

The assessment papers for both theory and practical would be developed by Subject Matter Experts (SME) hired by Logistics Sector Skill Council or with the LSC accredited Assessment Agency as per the assessment criteria mentioned in the Qualification Pack. The assessments papers would also be checked for the various outcome-based parameters such as quality, time taken, precision, tools & equipment requirement etc.

Each NOS in the Qualification Pack (QP) is assigned a relative weightage for assessment based on the criticality of the NOS. Therein each Element/Performance Criteria in the NOS is assigned marks on relative importance, criticality of function and training infrastructure.

The following tools would be used for final assessment:

1. **Practical Assessment:** This comprises of a creation of mock environment in the skill lab which is equipped with all equipment required for the qualification pack.

Candidate's soft skills, communication, aptitude, safety consciousness, quality consciousness etc. is ascertained by observation and marked in observation checklist. The outcome is measured against the specified dimensions and standards to gauge the level of their skill achievements.

2. **Viva/Structured Interview:** This tool is used to assess the conceptual understanding and the behavioural aspects with regard to the job role and the specific task at hand. It also includes questions on safety, quality, environment and equipment etc.
3. **On-Job Training:** OJT would be evaluated based on standard log book capturing departments worked on, key observations of learner, feedback and remarks of supervisor or mentor.
4. **Written Test:** Question paper consisting of 100 MCQs (Hard:40, Medium:30 and Easy: 30) with questions from each element of each NOS. The written assessment paper is comprised of following types of questions:
 - i. True / False Statements
 - ii. Multiple Choice Questions
 - iii. Matching Type Questions
 - iv. Fill in the blanks
 - v. Scenario based Questions
 - vi. Identification Questions

QA Regarding Assessors:

Assessors are selected as per the “eligibility criteria” laid down by LSC for assessing each job role. The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to LSC Assessment Framework, competency-based assessments, assessors guide etc. LSC conducts “Training of Assessors” program from time to time for each job role and sensitize assessors regarding assessment process and strategy which is outlined on following mandatory parameters:

- 1) Guidance regarding NSQF
- 2) Qualification Pack Structure
- 3) Guidance for the assessor to conduct theory, practical and viva assessments
- 4) Guidance for trainees to be given by assessor before the start of the assessments.
- 5) Guidance on assessments process, practical brief with steps of operations practical observation checklist and mark sheet
- 6) Viva guidance for uniformity and consistency across the batch.
- 7) Mock assessments
- 8) Sample question paper and practical demonstration

References

Glossary

Term	Description
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards