COMPETENCY BASED STANDARD

AUTOMOTIVE SERVICE AND REPAIR SECTOR

AUTOMOTIVE SUPERVISOR

SKILLS LEVEL IV

ISCO 7230

ADB Grant 0211-LAO
Strengthening Technical and Vocational Education and Training (STVET) Project

CONTENTS

A Foreword

In order to ensure that the LAO PDR grows competitively over the coming years, we need to establish an ethos of excellence in everything that we do. This includes, particularly the Education & Employment sectors, as symbolized by Technical Vocational Education & Training (TVET).

Research has shown that countries without a functioning and effective TVET system will lose out in the competitiveness ratings, with a consequence negative impact on growth.

This Competency Standard was developed through the Strengthening Technical Vocational Education Training (STVET) Project, managed by SMEC with the support of the Asian Development Bank.

A.1 Project Title

Strengthen Technical Vocational Education & Training in LAO PDR

A.2 Project Donor & Number

ADB Grant No. 0211-LAO (SF)

B Purpose of this competency standard

The Purpose of the Competency Standard for the **AUTOMOTIVE SERVICE AND REPAIR** on **LEVEL IV** is to provide a framework for Competency Based Training (CBT) Programmes resulting in Competent **AUTOMOTIVE SUPERVISOR** to support the automotive service and repair industry/sector in Lao PDR.

The **AUTOMOTIVE SERVICE AND REPAIR LEVEL IV** is defined in reference to the Prime Minister Decree Number 0036/PM published in 2011, the Ministry of Education and Sport Decree Number 4697/MoES11 published 9 December 2011, the Manual for Developing Competency Standards published December 2011 and the ASEAN Regional Qualification Framework in TVET.

C Competency Standard/ Qualification/ Job Description

This Competency, Standards/ Qualification of **AUTOMOTIVE SERVICE AND REPAIR LEVEL IV** provide a structured occupational outcome for domestic & commercial **AUTOMOTIVE SUPERVISOR**.

JOB DESCRIPTION

This qualification covers the skills and knowledge in Basic, Common & Core Competencies required by the automotive service and repair industry/sector for **AUTOMOTIVE SUPERVISOR** to perform and manage advanced diagnostic, troubleshooting and repair operations within an automotive service and repair industry/sector environment. It is suitable for entry into the automotive service and repair industry/sector at **NVQF Level IV** in Lao PDR.

Person deemed competent in this qualification:

- has a broad knowledge in Automotive Service and Repair
- can supervise and/or control the routine work of others in an Automotive Service & Repair environments
- can analyze and troubleshoots occurring work problems
- be responsible for evaluation and improvement of work processes
- can perform a whole range of work at high level of competence
- makes technical decisions

EMPLOYMENT OUTCOMES

The qualification **Level IV** in **AUTOMOTIVE SERVICE AND REPAIR** is for **AUTO MECHANICS, MOTORBIKE MECHANICS** and **AGRO-MACHINERY MECHANICS** who want to further develop and perform their management, organization, technical, diagnostic and repair skills within the automotive service and repair industry/sector.

Employment outcomes targeted by this qualification include:

- **AUTOMOTIVE SUPERVISOR**

APPLICATION

The qualification is in line with CBT principles and is suitable for a Lao PDR occupational pathway

Where common/core units of competency are packaged to suit a particular industry sector or occupational outcome, Registered Training Organizations (RTOs) might issue, for example, a:

Qualification (Diploma) **Level IV in AUTOMOTIVE SERVICE AND REPAIR** (specializing **AUTOMOTIVE SUPERVISOR**)

It should be noted that a qualification with a specialization does not change the title of the qualification

CAREER PATH INFORMATION

CAREER PATH INTO THE QUALIFICATION

This qualification may be accessed by direct entry (RPL). Credit will be granted towards this qualification to those who have completed qualification **Level III** in **AUTOMOTIVE SERVICE AND REPAIR** and work experiences on that Level.

ADDITIONAL QUALIFICATION ADVICE

The qualification **Level IV** in **AUTOMOTIVE SERVICE AND REPAIR** may be attained from a particular occupational outcome and may include a specialization.

Specializations for this qualification include:

- light vehicle
- agro-machinery
- motorbike

Advice is provided at the end of this qualification on additional units of competency for each specialization to those who have completed qualification **Level III** in **AUTOMOTIVE SERVICE AND REPAIR**.

D Outline of this Competency Standard

This Competency Standard contains ***Units of Competency*** as detailed within. These **Units** form the basis for CBT Learning Programmes for AUTOMOTIVE SUPERVISOR. Each **Unit** contains the required **Elements of Competency**. Each **Unit** being able to stand alone when applied in a work situation.

Each **Unit** can be amended in content or structure to meet the evolving needs of the AUTOMOTIVE SUPERVISOR. Changes and amendments to this Competency Standard will be made in line with the existing Quality Assurance Procedures as approved by the appropriate authority.

This Competency Standard is structured in line with the approved Manual for Developing Competency Standards, developed as a part of the STVET programme. For Quality Assurance purposes, each Unit is coded in line with the example below:

Code Example

Occupation	Job	Sub Sector	Level	Unit Type	Unit No.	Version No
Machinery Mechanics and Repair	Automotive Supervisor	Powertrain	NLVQF	Core	Series No	
723	7230	3	4	3	015	01

Code example above displayed as:

723.7230.343.015.01

LAO AUTOMOTIVE SUB-SECTORS

Sub-Sector:
00 No sub-sector
10 General
20 Engine

30 Powertrain
40 Chassis & Suspension
50 Electrical
60 Body & Painting

Each Competency Standard for a Job contains a mix of Units structured as follows:

Basic Units – cover a range of Occupations

Common Units – Common to jobs in the automotive service and repair industry/sector

Core Units – Technical & Specific to this job

E BASIC UNITS OF COMPETENCY

UNIT 1 SUPERVISE APPLICATION OF KEY COMMUNICATION SKILLS IN THE WORKPLACE

Unit Code	**723.7230.041.001.01**
Unit Descriptor	This unit covers the Skills, Knowledge & Attitudes required to supervise the application of key communication skills in the workplace.

UNIT 1 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Meet common and specific communication needs of clients and colleagues	1.1 Specific communication needs of clients and colleagues are identified and met 1.2 Different approaches are used to meet communication needs of clients and colleagues 1.3 Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization
2. Contribute to the development of communication strategies	2.1 Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as required 2.2 Channels of communication are established and reviewed regularly 2.3 Coaching in effective communication is provided 2.4 Work related network and relationship are maintained as necessary 2.5 Negotiation and conflict resolution strategies are used where required 2.6 Communication with clients and colleagues is appropriate to individual needs and organizational objectives
3. Represent the organization	3.1 When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization 3.2 Presentation is clear and sequential and delivered within a predetermined time 3.3 Utilize appropriate media to enhance presentation 3.4 Differences in views are respected 3.5 Written communication is consistent with organizational standards

	3.6 Inquiries are responded in a manner consistent with organizational standard
4. Facilitate group discussion	4.1 Mechanisms which enhance effective group interaction is defined and implemented 4.2 Strategies which encourage all group members to participate are used routinely 4.3 Objectives and agenda for meetings and discussions are routinely set and followed 4.4 Relevant information is provided to group to facilitate outcomes 4.5 Evaluation of group communication strategies is undertaken to promote participation of all parties 4.6 Specific communication needs of individuals are identified and addressed
5. Conduct interview	5.1 A range of appropriate communication strategies are employed in interview situations 5.2 Records of interviews are made and maintained in accordance with organizational procedures 5.3 Effective questioning, listening and nonverbal communication techniques are used to ensure that the required message is communicated.

UNIT 1 Range of Variables

VARIABLES	RANGE
1. Strategies	1.1 Recognizing own limitations 1.2 Referral to specialists 1.3 Utilizing techniques and aids 1.4 Providing written drafts 1.5 Verbal and non-verbal communication
2. Effective group interaction	2.1 Identifying and evaluating what is occurring within an interaction in a non-judgmental way 2.2 Using active listening 2.3 Making decision about appropriate words, behavior 2.4 Putting together response which is culturally appropriate 2.5 Expressing an individual perspective 2.6 Expressing own philosophy, ideology and background and exploring impact with relevance to communication

3. Types of Interview	3.1 Related to staff issues 3.2 Routine 3.3 Confidential 3.4 Evidential 3.5 Non-disclosure 3.6 Disclosure
4. Interview situations	4.1 Establish rapport 4.2 Elicit facts and information 4.3 Facilitate resolution of issues 4.4 Develop action plans 4.5 Diffuse potentially difficult situation

UNIT 1 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated effective communication skills with clients accessing service and work colleagues 1.2 Adopted relevant communication techniques and strategies to meet client particular needs and difficulties
2. Underpinning knowledge and attitudes	2.1 Communication process 2.2 Dynamics of groups and different styles of group leadership 2.3 Communication skills relevant to client groups
3. Underpinning skills	3.1 Full range of communication techniques including: 3.2 Full range of communication 3.3 Active listening 3.4 Feedback 3.5 Interpretation 3.6 Role boundaries setting 3.7 Negotiation 3.8 Establishing empathy 3.9 Communication skills required to fulfill job roles as specified by the organization
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Variety of Information and instruction to the task

	4.3 Communication tools
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning 5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines.

UNIT 2 SUPERVISE DEVELOPMENT OF TEAMS & INDIVIDUALS

Unit Code	**723.7230.041.002.01**
Unit Descriptor	This Unit covers the Skills; Knowledge & Attitudes required supervising the planning of individual and team development needs and facilitating the development of workgroups.

UNIT 2 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Supervise team leadership	1.1 Supervise Learning and development needs implementation in line with organizational requirements 1.2 Learning plan to meet team leadership developmental needs is collaboratively developed and implemented 1.3 Team leaders are encouraged to self-evaluate performance and identify areas for improvement 1.4 Feedback on performance of team leaders & members is collected & evaluated against planned outcomes.
2. Foster individual and organizational growth	2.1 Learning and development program goals and objectives are identified to match the needs. 2.2 Learning delivery methods are appropriate to the learning goals, the learning style of participants & availability of equipment and resources 2.3 Supervise workplace learning and coaching/ mentoring to facilitate individual and team achievement of competencies 2.4 Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements
3. Monitor and evaluate workplace learning	3.1 Feedback from individuals, teams is used to identify and implement improvements in future learning arrangements 3.2 Supervised outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support 3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning 3.4 Records and reports of competency are maintained in

	line with SOP & QMS
4. Develop team commitment and cooperation	4.1 Open communication processes to obtain and share information is used by team 4.2 Decisions are reached by consensus in accordance with the teams agreed roles and responsibilities 4.3 Mutual concern and support is developed within the team
5. Facilitate accomplishment of organizational goals	5.1 Team members actively participated in team activities and communication processes 5.2 Teams members developed individual and joint responsibility for their actions 5.3 Collaborative efforts are sustained to attain organizational goals

UNIT 2 Range of Variables

VARIABLES	RANGE
1. Learning and development needs	1.1 Supervision, coaching, mentoring 1.2 Formal/informal learning program 1.3 Internal/external training provision 1.4 Work experience/exchange/opportunities 1.5 Personal study 1.6 Career planning/development 1.7 Performance appraisals 1.8 Workplace skills assessment 1.9 Recognition of prior learning
2. Monitor performance	2.1 Quality assurance and/or procedures manuals 2.2 Goals, objectives, plans, systems and processes 2.3 Legal and organizational policy/guidelines and requirements 2.4 Safety policies, procedures and programs 2.5 Confidentiality and security requirements 2.6 Business and performance plans 2.7 Ethical standards 2.8 Quality and continuous improvement processes and standards
3. Feedback on performance	3.1 Formal/informal performance appraisals 3.2 Obtaining feedback from supervisors and colleagues

	3.3 Obtaining feedback from clients 3.4 Personal and reflective behavior strategies 3.5 Routine and organizational methods for monitoring service delivery
4. Learning delivery methods	4.1 On the job coaching or mentoring 4.2 Problem solving 4.3 Presentation/demonstration 4.4 Formal course participation 4.5 Work experience 4.6 Involvement in professional networks 4.7 Conference and seminar attendance 4.8 Induction

UNIT 2 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified and supervised learning opportunities for team members 1.2 Gave and received feedback constructively 1.3 Supervised participation of individuals in team work 1.4 Negotiated learning plans to improve the effectiveness of learning 1.5 Prepared learning plans to match skill needs
2. Underpinning knowledge and attitudes	2.1 Supervision, Coaching and mentoring principles 2.2 How to work effectively with team members with diverse work styles, aspirations, cultures and perspective 2.3 How to facilitate team development and improvement 2.4 Learning theory 2.5 Methods and techniques for extracting and interpreting feedback 2.6 Methods for identifying and prioritizing personal development opportunities and options 2.7 Career paths and competency standards in the industry
3. Underpinning skills	3.1 Listening Skills 3.2 Planning Skills 3.3 Learning methods/domains (Blooms taxonomy etc.) 3.4 Communication skills including receiving feedback

	and reporting, maintaining effective relationships and conflict management 3.5 Coaching and mentoring skills 3.6 Monitoring & evaluation skills 3.7 Reporting skills to organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes 3.8 Facilitation skills to conduct small group training sessions 3.9 Interpersonal skills
4. Resource implications	The following resources should be provided: 4.1 Materials relevant to the proposed activity or tasks
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning 5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines

UNIT 3 SUPERVISE PROBLEM SOLVING TECHNIQUES IN THE WORKPLACE

Unit Code	**723.7230.041.003.01**
Unit Descriptor	This Unit covers the Skills Knowledge & Attitudes required to supervise the problem solving techniques in the workplace.

UNIT 3 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Problem analysis	1.1 Supervise evaluation and reporting techniques & reports 1.2 Supervise development of possible cause & solution statements based on findings
2. Solution identification	2.1 Supervise resolution decision making process in accordance with relevant procedures 2.2 Strengths and weaknesses of possible options are considered
3. Solution planning	3.1 Solution based report is prepared 3.2 Recommendations are presented to appropriate personnel
4. Solution implementation & supervision	4.1 Measurable objectives are identified 4.2 Resource needs are identified 4.3 Timelines are identified in accordance with plan 4.4 Corrective actions process is supervised 4.5 Recommendations are actioned & recorded
5. Monitor outcomes	5.1 Recommendations are prepared and submitted to line with procedures. 5.2 Supervised implementation of processes and improvements

UNIT 3 Range of Variables

VARIABLES	RANGE
1. Area of responsibility	Variables may include but are not limited to: 1.1 Work environment 1.2 Problem solution processes 1.3 Preventative maintenance and diagnostic policy

	1.4 Roles and technical responsibilities
2. Communication	Variables may include but are not limited to: 2.1 Listening 2.2 Hand written and printed material 2.3 Electronic mail. 2.4 Verbal communication 2.5 Sign language 2.6 Display units/environments..
3. Documentation	3.1 Audit trails 3.2 Quality Assurance Procedures 3.3 Technical & Operating standards 3.4 Cause & solution records 3.5 Corrective action records
4. Occupational Health and Safety (OHS) procedure	OHS requirement are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures and may include: 4.1 .to conduct of occupational risk assessment and treatments associated with vehicular movements, hazardous substances. Electrical safety manual, lifting and shifting working in proximity to others a site visitors 4.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 3 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Analyzed the problem 1.2 Identified possible solutions 1.3 Implemented solutions 1.4 Recommended solutions to higher management 1.5 Outcome evaluated/monitored
2. Underpinning knowledge and attitudes	2.1 QMS organizational systems and functions 2.2 Maintenance practices & data management 2.3 Data management hardware and software 2.4 Knowledge of the client business domain

	2.5 Broad knowledge base of diagnostic tools 2.6 General principles of OHS 2.7 Divisional/unit responsibilities
3. Underpinning skills	3.1 Communication skills applied 3.2 Supervise Teamwork in reference to personal responsibility 3.3 Time management as applied to self-management. 3.4 Analytical skills in relation to routine malfunctions 3.5 General customer service skills displayed. 3.6 Consistently & effectively applying questioning and active listening skills
4. Resource implications	The following resources should be provided: 4.1 Assessment may require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. 4.2 A bank of scenarios/case studies/what ifs.. 4.3 A bank of questions to determine the reasoning behind the observable actions
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning 5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined 5.6 Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines

UNIT 4 SUPERVISE DATA COLLECTION AND ANALYSIS IN THE WORKPLACE

Unit Code	**723.7230.041.004.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to process, collect analyze, interpret and organize workplace information and other relevant data

UNIT 4 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Study information requirements	1.1 Needs are identified using established research procedures 1.2 Relevant forms and recording systems are used to gather the information 1.3 Respondents are selected to implement survey / research based on established procedures
2. Data processed	2.1 Data are collected and collated based on the prescribed method 2.2 Relevant data are used as references in accordance with the objectives of the program 2.3 Information is compiled according to the required form
3. Analyze, interpret and organize information gathered	3.1 Data are analyzed using relevant methodologies 3.2 Where applicable, statistical analysis/methods are employed according to the objectives of the program 3.3 Graphs and other visual presentations are prepared to facilitate analysis / interpretation of information
4. Present findings/ recommendations	4.1 Report on recommendations are prepared in line with procedures 4.2 Recommendations are presented to appropriate personnel. 4.3 Recommendations are followed-up & monitored as appropriate

UNIT 4 Range of Variables

VARIABLES	RANGE
1. Research procedures	May include but are not limited to: 1.1. Front-end analysis 1.2. Surveys

	1.3. Interviews 1.1 Functional analysis
2. Forms	May include but are not limited to: 2.1 Survey forms/Questionnaires 2.2 Personal information/Profile 2.3 Accident report form 2.4 Requisition slip 2.5 Job orders 2.6 Purchase request form 2.7 Incident report form
3. Methodologies	3.1 Qualitative methods 3.2 Quantitative methods
4. Statistical analysis/methods	4.1 Averages (Mean, Median, Mode) 4.2 Percentage 4.3 Ranks 4.4 Frequency Distribution 4.5 Statistical test
5. Data & Information	5.1 Raw data 5.2 Processed & packaged data 5.3 Papers/Research etc.

UNIT 4 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined information requirements based on organizational goals and objectives. 1.2 Used relevant forms and recording systems to gather data 1.3 Processed data based on the objectives of the program 1.4 Utilized relevant research methods based on the objective of the program 1.5 Analyzed and organized information gathered 1.6 Submitted/Disseminated technical reports to concerned offices
2. Underpinning knowledge and attitudes	2.1 Data processing, Information analysis and interpretation 2.2 Research methods

	2.2.1 Qualitative 2.2.2 Quantitative 2.2.3 Statistical 2.3 Report writing 2.4 Use of relevant software 2.4.1 Spreadsheets 2.4.2 Presentation graphics 2.4.3 Work processor 2.4.4 Statistical package
3. Underpinning skills	3.1 Effective Communication skills 3.2 Research & Analysis techniques & processes 3.3 Data reading & interpretation 3.4 Problem solving
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Access to office equipment and facilities relevant to the unit 4.3 Case studies/scenarios
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning 5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined 5.6 Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines

UNIT 5 PLAN & ORGANIZE WORK FOR SEVERAL WORK TEAMS

Unit Code	**723.7230.041.005.01**
Unit Descriptor	This Unit covers the Skills Knowledge & Attitudes required to plan & organize work for several work teams

UNIT 5 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Set objectives	1.1 Work Objectives set are consistent with and linked to work activities in accordance with organizational aims 1.2 Objectives are stated as measurable targets with clear time frames 1.3 Support and commitment of team members are reflected in the objectives
2. Plan and schedule work activities	2.1 Tasks/work activities to be completed are identified and prioritized as directed 2.2 Tasks/work activities are broken down into steps in accordance with agreed set time frames 2.3 Resources are allocated as per requirements of the activity 2.4 Schedule of work activities is coordinated with personnel concerned
3. Implement work plans	3.1 Work methods and practices are identified in consultation with personnel concerned 3.2 Work plans are implemented in accordance with set time frames, resources & standards 3.3 Appropriate actions are implemented at all times
4. Monitor work activities	4.1 Work activities & performances are monitored and compared with set objectives 4.2 Deviations from work activities are reported and recommendations are in accordance with set standards 4.3 Reporting requirements are compiled in accordance with SoP's & QMS 4.4 Reports are maintained in accordance with standard operating procedures
5. Evaluate works plans & activities	5.1 Plans, strategies & implementation outcomes are evaluated with teams in line with SoP's & QMS

	5.2 Evaluation outcomes are recorded and actioned as required. 5.3 All evaluation data is recorded and used to provide team & supervisor feedback

UNIT 5 Range of Variables

VARIABLES	RANGE
1. Objectives	1.1 Specific 1.2 General
2. Resources	2.1 Personnel 2.2 Equipment and technology 2.3 Services 2.4 Supplies and materials 2.5 Sources for accessing specialist advice 2.6 Budget
3. Schedule of work activities	3.1 Daily 3.2 Work-based 3.3 Contractual 3.4 Regular 3.5 Confidential 3.6 Disclosure 3.7 Non-disclosure
4. Work methods and practices	Work methods and practices may include but not limited to: 4.1 Legislated regulations and codes of practice 4.2 Industry regulations and codes of practice 4.3 Occupational health and safety practices
5. Work plans	5.1 Daily work plans 5.2 Project plans 5.3 Program plans 5.4 Organization strategic and restructuring plans 5.5 Resource plans 5.6 Skills development plans 5.7 Management strategies and objectives
6. Feedback mechanisms	Feedback mechanisms include: 6.1 Reports

	6.2 Verbal (formal & informal) 6.3 Questionnaire 6.4 Survey

UNIT 5 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Set objectives 1.2 Planned and scheduled work activities 1.3 Implemented work plans 1.4 Monitored work activities 1.5 Reported on work plans & activities 1.6 Evaluated & provided feedback on work plans & activities
2. Underpinning knowledge and attitudes	2.1 Organization strategic plan 2.2 SOP's 2.3 QMS 2.4 OHS 2.5 Team work & consultation strategies
3. Underpinning skills	3.1 Planning 3.2 Leading 3.3 Organizing 3.4 Coordinating 3.5 Communication skills 3.6 Interpersonal skills 3.7 Motivation skills 3.8 Presentation skills 3.9 Reporting skills
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Tools, equipment and facilities appropriate to the proposed activities 4.3 Materials relevant to the proposed activities 4.4 Work plan & schedules
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning

	5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined 5.6 Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines

UNIT 6 SUPERVISE ENVIRONMENTAL PROTECTION IMPLEMENTATION

Unit Code	**723.7230.041.006.01**
Unit Descriptor	This Unit covers the Skills Knowledge & Attitudes required to supervise environmental protection implementation in the workplace.

UNIT 6 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Adopt environmental protection policy & principles.	1.1 Environmental legislations/conventions and local regulations are identified & adopted 1.2 Industrial standard/environmental practices are identified according to various environmental concerns & impact. 1.3 Environmental management support systems are established & operational
2. Implement specific environmental programs	2.1 Programs/Activities are identified according to organizations policies and guidelines 2.2 Individual roles/responsibilities are determined and performed based on the activities identified 2.3 Environmental issues are identified & resolved in accordance with organizations' policies and guidelines 2.4 Environmental stakeholders are consulted based on company environmental guidelines
3. Monitor activities on environmental protection /programs	3.1 Activities are periodically monitored and evaluated according to the objectives of the environmental programme. 3.2 Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations. 3.3 Data gathered are analyzed based on environmental requirements. 3.4 Environmental protection recommendations are made & submitted based on the findings. 3.5 Environmental non-compliance issues are reported, monitored and managed.

UNIT 6 Range of Variables

VARIABLES	RANGE
1. Regulations, policy, procedures	May include but are not limited to: 1.1 Clean Air act/law 1.2 Clean Water act/law 1.3 Solid Waste Management 1.4 Montreal Protocol 1.5 Kyoto Protocol
2. Environmental aspects	2.1 Air, water & noise pollution 2.2 Solid waste management 2.3 Deforestation & soil erosion 2.4 Radiation, radio frequency, microwaves, chemicals 2.5 Electrical materials & components safe recycling & storage
3. Environmental standards	3.1 ECC standards 3.2 ISO standards 3.3 Company environmental management systems (EMS)
4. Environmental auditing	4.1 Time structured 4.2 Individual & team 4.3 Auditing data reports
5. Programs/Activities	5.1 Waste disposal (on-site and off-site) 5.2 Repair and maintenance of equipment 5.3 Treatment and disposal operations 5.4 Clean-up activities 5.5 Laboratory and analytical test 5.6 Supervision, Auditing, Monitoring and evaluation 5.7 Environmental advocacy programs 5.8 Reporting and compliance enforcement

UNIT 6 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Application of environmental legislation policy & procedures relating to a range of environmental issues 1.2 Experienced in standard industrial environmental practices covering a range of environmental issues

	1.3 Implemented, monitored & audited environmental practices based on EMS 1.4 Resolved & reported on environmental problems and non-compliances based on EMS & existing legislation
2. Underpinning knowledge and attitudes	2.1 ISO 14001;2004, 14004;2004 2.2 Company EMS, policy & procedures 2.3 Environmental protocols 2.4 Supervisory principles 2.5 Internal & external auditor (EMS) 2.6 Compliance & non compliance
3. Underpinning skills	3.1 Supervisory skills 3.2 Management ISO 14001;2004, 14004;2004 3.3 EMS Auditing skills 3.4 Research & analysis 3.5 Fault finding & solution planning 3.6 Report writing
4. Resource implications	The following resources should be provided: 4.1 Assessment location 4.2 Assessment package, including case studies 4.3 Legislation & Standards 4.4 EMS policy & procedures
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning 5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined 5.6 Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines

UNIT 7 MONITOR GENDER AND SOCIAL EQUITY PRINCIPLES AND POLICIES

Unit Code	**723.7230.041.007.01**
Unit Descriptor	This Unit covers the Skills Knowledge & Attitudes required to monitor application of principles and policies on gender and social equity contributing to positive and productive work environment. This unit deals with ensuring compliance to gender and social equity guidelines in the workplace; implementing gender and social equity in the workplace; and recognizing and preventing gender abuse and other forms of social inequities..

UNIT 7 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Implement guidelines or rules of conduct related to gender and social equity in the workplace	1.1 Workplace practices and work instructions relating to interacting with different social groups based on gender, ethnicity and disability implemented. 1.2 Compliance to relevant legislation, codes and national standards that impact on gender and social equity are monitored in the workplace. 1.3 Introduction of and amendments to guidelines in the work conduct related to gender and social fairness practices are monitored and implemented in accordance with organizational requirements
2. Monitor improvement in workplace guidelines in promoting gender and social equity	2.1 Suggestions are noted and evaluated with designated personnel on how to improve social interaction and communication in the workplace to better promote gender and social equity 2.2 Information is gathered and improvements are suggested to help improve workplace guidelines and policies in promoting observing gender and social fairness. 2.3 Gender and social equity issues in the workplace practices are discussed in the workplace with colleagues and designated personnel. 2.4 Contributions to the review of workplace guidelines and policies gender and social equity guidelines and policies are made within limits of responsibility
3. Monitor, recognize and act on suspected cases of gender and other forms of social	3.1 Signs and manifestations of gender and social inequities and its impact in the workplace are monitored and recognized. 3.2 Information about or observations of a suspected

inequity	problem related to gender and social inequity are reported and acted upon. 3.3 Location and extent of suspected gender and social inequities is accurately recorded. 3.4 Reports on the effect of gender and social inequities are completed according to organizational guidelines.

UNIT 7 Range of Variables

VARIABLES	RANGE
1. Workplace practices and work instructions	May include but are not limited to: 1.1 Social diversity awareness, recognition and analysis in the workplace 1.2 Use of gender fair and socially inclusive language in dealing with co-workers and students 1.3 Sexual harassment and bullying incident recording and reporting procedures 1.4 Verbal instructions from persons with responsibility related to gender and social equity awareness and sensitivity
2. Legislation, codes and national standards	2.1 Code of Conduct on sexual harassment in TVET institutions under MoES 2.2 National Strategy for the Advancement of Women, 2005-2010 (includes goals and programme to promote Lao women's education, skill levels, income generating opportunities, among others 2.3 Lao PDR Law on Development and Protection of Women (Among others, aims to promote women's knowledge and competency, revolutionary morals and virtues, gender equality; seeks to eliminate all forms of discrimination against women; creates enabling conditions for women's participation; and for women to be equal force in national protection and development 2.4 Labor Law of Lao PDR, 1994 (Articles 2, 39 & 35) 2.5 Constitution of Lao PDR, 2003 (Articles 22, 24 & 27, statement on women of all ethnic groups should receive equal treatment in terms of legal rights, economic and social opportunities) 2.6 National obligations to international human rights conventions (Convention on the Elimination of all Forms of Discrimination against Women (CEDAW), 1981; Convention on the Rights of the Child (CRC),

	1990
3. Suggestions	May include but not limited to: 3.1 Be sensitive in terms of gender, ethnicity and disability in verbal and non-verbal communication 3.2 Stop the repetition of sexist and discriminatory sex jokes 3.3 Create and share jokes that are not told at the expense of different social groups 3.4 Recognize the rights of different social groups i.e. women, different ethnic groups, the disabled to equal access to training and skills development, respectful treatment, etc.
4. Designated personnel	May include but not limited to: 4.1 Guiding workplace conduct against committing and reporting sexual harassment 4.2 Using language that is sensitive in terms of gender, ethnicity and disability 4.3 Information on personnel policies that are aligned with national and official policies and guidelines that uphold the rights of women, ethnic groups and the disabled 4.4 Provision of separate and secure accommodations, toilets wash and resting areas for women, ethnic groups and disabled people 4.5 The designation of a gender focal point among teachers, non-teaching staff and among student population
5. Workplace guidelines and policies in observing gender and social fairness	May include but not limited to: 5.1 Guiding workplace conduct against committing and reporting sexual harassment 5.2 Using language that is sensitive in terms of gender, ethnicity and disability 5.3 Information on personnel policies that are aligned with national and official policies and guidelines that uphold the rights of women, ethnic groups and the disabled 5.4 Provision of separate and secure accommodations, toilets wash and resting areas for women, ethnic groups and disabled people 5.5 The designation of a gender focal point among teachers, non-teaching staff and among student

	population
6. Gender and social equity issues	May include but not limited to: 6.1 Sexual harassment 6.2 Bullying 6.3 Voyeurism 6.4 Different forms of gender-based violence 6.5 Inappropriate and discriminatory language 6.6 Sex jokes that are discriminatory against women, ethnic groups, disabled people 6.7 Discrimination in the workplace
7. Signs or manifestations	May include but not limited to: 7.1 Sub-standard performance, social withdrawal of affected group or individual 7.2 Lack of motivation to advance or excel 7.3 Absenteeism, intention to resign without reason 7.4 Display of fear, nervous and seemingly irrational behavior of affected group in the presence of perpetuator
8. Reported	May include but not limited to: 8.1 Verbally (face-to-face or through communication equipment) 8.2 In writing (memo, notes, faxes, email or electronic messages) 8.3 Witness or third party accounts
9. Recorded	May include but not limited to: 9.1 Incident report 9.2 Public petitions 9.3 CCTV in the workplace

UNIT 7 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated knowledge of workplace practices and work instructions 1.2 Described relevant legislations, codes and national standards related to gender and social equity issues in the workplace 1.3 Followed workplace practices, policies and guidelines related to gender and social equity

	1.4 Contributed to improve workplace guidelines in promoting gender and social equity 1.5 Recognized and reported on suspected cases of gender and other forms of social inequity 1.6 Reported, recorded or became aware of the need to report and document lack of compliance with guidelines and policies on gender and social fairness in the workplace
2. Underpinning knowledge and attitudes	2.1 Relevant legislation from all levels of government on gender and other social equity issues involving ethnic groups and disability 2.2 Relevant gender and social equity official legislation, policies and workplace practices and procedures 2.3 Good practice approaches relevant to work area particularly in regard to observance of and compliance with guidelines and policies that uphold and promote gender and social equity. 2.4 Gender and other social equity issues, especially in regard to sexual harassment and gender and other discrimination in the workplace 2.5 Gender issues in workplace traditionally not associated with women 2.6 General work place practices and their potential impact on the gender and other dimensions of social equity.
3. Underpinning skills	3.1 Discuss and explain gender and other social equity issues in workplace 3.2 Communicate with co-workers and students in an inclusive manner that respects the rights of the different groups that constitute the workplace and the classroom 3.3 Recognize signs and manifestations of sexual harassment and other forms of gender-based violence in the workplace 3.4 Follow workplace directions and instructions 3.5 Ability to report and document cases of sexual harassment and other forms of gender-based violence and violence directed at other disadvantaged groups
4. Resource implications	The following resources should be provided: 4.1 Basic sensitization workshop on gender and other social equity issues 4.2 Legislation, policies, procedures, protocols and local

	ordinances relating to gender and social equity 4.3 Case studies and scenarios relating to the reporting and handling of cases of sexual harassment and other forms of gender-based violence
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Observation 5.2 Questioning 5.3 Portfolio/Interview 5.4 Demonstration on simulated situation 5.5 Assessment of knowledge & underpinning skills may be combined 5.6 Evidence provided for Competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency should be assessed in the workplace or simulated environment. 6.2 Competency assessment must be undertaken in accordance with the Lao PDR CBT assessment guidelines

F COMMON UNITS OF COMPETENCY

UNIT 8 SUPERVISE PREPARATION OF MATERIALS, TOOLS & EQUIPMENT

Unit Code	**723.7230.042.008.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required in supervising the preparation of automotive materials, tools & equipment for assigned tasks.

UNIT 8 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Supervise planning of resource requirements.	1.1 Resource requirements are planned for as per job requirements 1.2 Quantity and description of materials conform with the job requirements 1.3 Resource planning list approved by supervisor in line with Standard Operating Procedures (SOP)
2. Supervise requisition & acceptance of resources.	2.1 Supervisor approves request for materials, equipment, and tools according to the SOP. 2.2 Resource acceptance and fit for use check is supervised and recorded in line with SOP

UNIT 8 Range of Variables

VARIABLES	RANGE
1. Manuals and Information	1.1 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 1.2 Repair manual/handbook issued by company/manufacturer/component supplier 1.3 Specification data/manual/handbook issued by company/manufacturer/component supplier 1.4 Periodic Service Maintenance Data manual/handbook issued by company/manufacturer/component supplier 1.5 Tools, workshop-, test equipment and OHS user manual and service guide issued by company/manufacturer/component supplier
2. Applications	Manuals used for System/components may be fitted to: 2.1 Light vehicles 2.2 Agro-Machinery

	2.3 Outdoor power equipment 2.4 Marine craft 2.5 Plant
3. Company/ workshop standard operating procedures	Manuals and Information used for Company/workshop standard operating procedures include: 3.1 Written instructions issued by authorized personal 3.2 Job order slip 3.3 Spare parts ordering form 3.4 Acceptance records 3.5 Resource management reports

UNIT 8 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Resource materials according to quantity and job requirements 1.2 Supervised the acceptance of materials, equipment and tools according to the list prepared and as per company SOP. 1.3 Supervised the inspection of materials, tools & equipment as per quantity and job specifications 1.4 Approved the equipment, tools & equipment as being in conformance as per SOP/QMS
2. Underpinning knowledge and attitudes	2.1 Functions & types of automotive equipment, tools & materials 2.2 Application & management of forms and data records 2.3 Procedure implementation processes
3. Underpinning skills	3.1 Supervising preparation of tools, equipment & materials 3.2 Supervising management of tools, equipment & materials 3.3 Supervising implementation of various procedures
4. Resource implications	The following resources should be provided: 4.1 Workplace location 4.2 Materials relevant to the unit of competency 4.3 Technical data/manual/handbook and specifications relevant to the activities
5. Method of assessment	Competency in this Unit may be assessed through:

	5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 9 SUPERVISE COMPLIANCE WITH PROCEDURES, SPECIFICATIONS & MANUALS

Unit Code	**723.7230.042.009.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to supervise compliance with standard operating procedures (SOP), supporting specifications & manuals.

UNIT 9 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Review SOP's, specifications & manuals	**1.1** Supervise status review of SOP's for approved reports and compliance records in line with quality management system (QMS) requirements. 1.2 Existing specifications & manuals are reviewed as fit for use as per job requirements, in line with SOP & QMS.
2. Interpret compliance of SOP, manuals & specifications	2.1 Relevant documents are applied to work processes 2.2 **Compliance requirements** are interpreted, & applied to a range of work processes.
3. Recording & reporting	3.1 **Compliance data** is recorded for a range of work activities according to job & SOP requirements 3.2 Supervise the process of recording all non-compliance data & actions. 3.3 Ensure that all correct work processes are interpreted in accordance with information contained on the manual or specifications. 3.4 Supervise storage/processing of documents and reports

UNIT 9 Range of Variables

VARIABLES	RANGE
1. Technical documentation	1.1 Manufacturer's Specification Manual 1.2 Repair Manual 1.3 Maintenance Procedure Manual 1.4 Periodic Maintenance Manual.
2. Quality Management System documentation	2.1 ISO 9002 (Quality Management) 2.2 ISO 14000 (Environment) 2.3 ISO 19011 Auditing (Internal & external)

UNIT 9 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified and accessed specification/manuals as per job requirements 1.2 Interpreted manuals in accordance with company/manufacture/ component supplier practices 1.3 Applied information in manuals according to the given task 1.4 Stored manuals in accordance with company/workshop requirements
2. Underpinning knowledge and attitudes	2.1 Mechanical maintenance & repair manuals/handbooks and specifications used in automotive service & repair sector 2.2 Identification of symbols used in the manuals 2.3 Identification of units of measurements 2.4 Unit conversion 2.5 Compliance documents & records
3. Underpinning skills	3.1 Supervisory processes 3.2 Interpretation of automotive service & repair manuals, handbooks and specifications 3.3 Accessing information and data 3.4 Monitoring & evaluation 3.5 Reporting
4. Resource implications	Manuals and Information may include: 4.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 4.2 Safe work procedures related to task 4.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 4.4 Company/manufacturer/component supplier repair manual/handbook 4.5 Company/manufacturer/component supplier specification data/manual/handbook 4.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook 4.7 Relevant Quality & Environmental standards
5. Method of assessment	Competency in this Unit may be assessed through:

	5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 10 SUPERVISE OHS WORK ISSUES IN THE AUTOMOTIVE SERVICE & REPAIR SECTOR

Unit Code	**723.7230.042.010.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to supervise OHS work issues within an Automotive Service & Repair work environment.

UNIT 10 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Risk identification	1.1 OHS Risk Hazards in the work area are identified, assessed and reported to a Supervisor/designated person. 1.2 Supervisor compiles an OHS risk report in line with SOP, QMS & OHS procedures 1.3 Hazardous materials on a work site are correctly identified and used according to company and legislated procedures.
2. Risk assessment	2.1 Supervisor & team assess the OHS risk hazards identified. 2.2 Supervisor implements & manages OHS risk assessment plan.
3. Risk prevention & supervision	3.1 Supervisor ensures that Safe work practices, duty of care requirements and safe work instructions are implemented & maintained. 3.2 OHS, hazard, accident or incident reports contribute to updating workplace procedures & National OHS legislation. 3.3 Correct personal protective equipment (PPE) and clothing for each area of Automotive Service & Repair work are identified, worn, correctly fitted, used and stored according to SOP. 3.4 Measures for controlling risks and Automotive Service & Repair hazards are applied including training & multimedia signage. 3.5 Lists of designated OHS personnel names and contact data are visually available throughout the workplace in a range of media.
4. Emergency procedures	4.1 Response and evacuation procedures are known, practiced and carried out effectively when required

	4.2 Designated personnel are contacted in the event of an emergency. 4.3 First aid treatment of minor injuries is carried out correctly and details recorded for use by OHS Supervisor.

UNIT 10 Range of Variables

VARIABLES	RANGE
1. Risk Identification & Assessment	1.1 Risk analysis models 1.2 OHS regulations 1.3 SOP 1.4 QMS 1.5 Risk reports 1.6 Incident reports
2. Risk Prevention & supervision	2.1 Safe work practices 2.2 Safety training & competency 2.3 Duty of care 2.4 Designated persons 2.5 Risk control plans 2.6 Multi-media signage
3. Emergency procedures	3.1 Evacuation procedures 3.2 First Aid treatment 3.3 External agency support (Fire, Ambulance, Hospitals)
4. Personal Protective Equipment (PPE)	Including but not limited to:- 4.1 Aprons, arm guards, caps, dust masks, respirators, ear muffs, gloves hard hats, reflective vests, overalls safety glasses, boots.
5. Hazards	Including but not limited to:- 5.1 People 5.2 Chemical spills 5.3 Work in confined spaces 5.4 Trenches, excavations 5.5 Falling objects 5.6 Gasses, fires 5.7 Hazardous materials 5.8 Extreme temperatures

	5.9 Infectious diseases 5.10 Handling & moving equipment 5.11 Overhanging, protruding, sharp objects 5.12 Noise, dust, vapors 5.13 Uncontrolled site traffic 5.14 Working at heights

UNIT 10 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Supervise the use of risk information, standards & specifications 1.2 Comply with a safety site plan and National & organizational OHS policy/procedures 1.3 Supervise the effective implementation of required safety actions relevant to a range of situations & in line with OHS policy and procedures.
2. Underpinning knowledge and attitudes	2.1 What makes a risk/hazard situation 2.2 Identifying types of risks/hazards 2.3 OHS and Automotive Service & Repair terminology 2.4 Safe work practices 2.5 Emergency response procedure 2.6 Evacuation procedures 2.7 First Aid procedures
3. Underpinning skills	3.1 Identifying/assessing potential hazards 3.2 Hazard response management & team work 3.3 Communication skills 3.4 Hazard management skills 3.5 Crisis management
4. Resource implications	The following resources should be provided: 4.1 Workplace or simulated work area 4.2 OHS data & records 4.3 SOP 4.4 QMS 4.5 Relevant resources 4.6 Reporting logs
5. Method of assessment	Competency in this Unit may be assessed through:

	5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 11 PROVIDE TECHNICAL GUIDANCE

Unit Code	**723.7230.042.011.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to access and interpret technical information, assist staff with service/repair work, provide technical information to staff, and facilitate continuous education.

UNIT 11 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Assist staff with service/repair work	1.1 Technical guidance, appropriate to skill level and need, is provided to staff when determining the repair/service method 1.2 Staff with advanced technical competence are used as a point of reference 1.3 Technical assistance is provided to staff, to identify difficult faults 1.4 Assistance is provided to staff during work completion, to ensure technical requirements are met 1.5 Potential faults are recognized and precautionary steps are taken to prevent them 1.6 Problems arising from the repair procedure are addressed
2. Provide technical information to staff	2.1 Technical information is made available to staff 2.2 Current technical information is communicated to staff on a regular basis 2.3 Staff are shown how to access, interpret and apply technical information 2.4 A range of information sources is accessed through an established network
3. Facilitate continuous education of self and others	3.1 Sharing of information/knowledge is encouraged to continue expansion of personal and team knowledge 3.2 Training and education opportunities are identified, to meet technical and business needs, and to enhance technical skills of self and staff 3.3 Approval to attend courses is sought from management to ensure current and future technical requirements are met

UNIT 11 Range of Variables

VARIABLES	RANGE
1. Technical requirements for work completion	Technical requirements for work completion may include: 1.1 Manufacturer/component supplier specification 1.2 Organizational quality standards 1.3 Industry standards 1.4 Recommended repair procedures 1.5 Precaution notes
2. Areas of advanced technical competence	Areas of advanced technical competence may include: 2.1 advanced braking systems 2.2 engine management systems 2.3 air conditioning systems, including climate control, gas and degas 2.4 steering alignment (front, rear and 4WS) 2.5 advanced steering systems 2.6 advanced agro-machinery hydraulic systems 2.7 advanced body electric/electronic
3. Tools and Equipment	Tools and Equipment may include: 3.1 Hand tools 3.2 Power tools 3.3 Testing equipment and technical Information to the given task
4. Manuals and Information	Manuals and Information may include: 4.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 4.2 Safe work procedures related to task 4.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 4.4 Company/manufacturer/component supplier repair manual/handbook 4.5 Company/manufacturer/component supplier specification data/manual/handbook 4.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
5. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 5.1 Verbal or written instructions issued by authorized

	personal 5.2 Job order slip 5.3 Spare parts ordering form 5.4 Wearing of Personal Protective Equipment
6. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and company/workshop safety policies and procedures, and may include: 6.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 6.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 11 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 accessing and interpreting technical information, 1.2 assisting staff with service/repair work, 1.3 providing technical information to staff, 1.4 and facilitating continuous education.
2. Underpinning knowledge and attitudes	2.1 coaching principles 2.2 sources of technical information 2.3 technical training and education options for staff 2.4 technical and technological developments to the sector of the industry in which one is employed
3. Underpinning skills	3.1 collect, organize and understand information related to providing technical guidance 3.2 communicate ideas and information to customers and supervisors related to providing technical guidance 3.3 plan and organize activities related to providing technical guidance 3.4 work with others and in a team by seeing and conveying information related to the planning, sequencing and completion of the task 3.5 use mathematical ideas and techniques to count and measure

	3.6 establish diagnostic processes that identify methods related to providing technical guidance 3.7 use the workplace technology related to providing technical guidance
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and eequipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instructions to the task
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 12 INSPECT TECHNICAL QUALITY OF WORK

Unit Code	**723.7230.042.012.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to inspect work done by other staff, apply quality standards to work, and protect customer property and interests.

UNIT 12 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Gather information to carry out inspection	1.1 Occupational Health and Safety (OHS) requirements, including personal protection needs are observed throughout the work 1.2 Information, such as Lao Design Rules, workshop manuals and specifications, are sourced 1.3 Method options are analyzed and those most appropriate to the circumstances are selected and prepared 1.4 Technical and/or calibration requirements for inspection are sourced and support equipment is identified and prepared
2. Inspect work	2.1 Work is identified and confirmed for inspection in accordance with company/workshop procedures 2.2 Inspections are conducted to ensure in-house quality systems and procedures are maintained/followed in accordance with company/workshop and quality procedures 2.3 Level of observation and inspection conducted is appropriate to the skill/experience of the employee 2.4 Faults identified are brought to the relevant person's attention in accordance with company/workshop operating procedures
3. Apply quality standards to work	3.1 Inspections are conducted throughout the course of the work to ensure quality standards are maintained 3.2 Quality standards are applied during work completion to ensure the treatment of customer property meets industry and/or company/workshop standards 3.3 Activities are coordinated throughout the workplace in accordance with company/workshop procedures 3.4 Documents of work quality are maintained according to company/workshop operating requirements

4. Achieve quality work outcomes	4.1 Damage to customer property is avoided through ensuring staff adherence to quality procedures and use of protective materials at all stages of the repair/service 4.2 Quality improvements and/or recommendations are communicated in accordance with company/workshop operating requirements

UNIT 12 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	Work requires individuals to demonstrate discretion, judgment and problem-solving skills in managing own work activities and contributing to a productive team environment.
2. Quality procedures	Quality procedures may be: 2.1 contained in worksite quality system documentation 2.2 work instructions 2.3 safe work procedures 2.4 product specifications 2.5 equipment maintenance schedules 2.6 technical procedures 2.7 adopted or specifically prepared standards
3. Quality inspections	Quality inspections may include: 3.1 periodic inspection during the job 3.2 observation at completion of the job to ensure all ordered parts have been fitted 3.3 components used meet manufacturer/component supplier specifications 3.4 invoicing complies with service/repair/parts order and contains sufficient details of labour and/or components used 3.5 reported and diagnosed problems have been confirmed as rectified via test procedures and presentation of the vehicle or equipment after service/repair meets manufacturer and company/workshop standards
4. Performance indicators	Performance indicators are to account for: 4.1 issues of time, quantity, quality and cost factors and may include establishing time targets for own work

	4.2 identifying reasonable criteria for evaluating own work outcomes 4.3 identifying measures to avoid wastage 4.4 identifying reasonable criteria to judge internal and/or external customer satisfaction 4.5 identifying processes to ensure a 'right first time' approach
5. Loss and damage incidents	Loss and damage incidents may include: 5.1 personal injury, 5.2 loss and damage of plant, equipment and materials
6. Communications	Communications may be: 6.1 verbal, written or by telephone or electronic means
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Testing equipment and technical Information to the given task 7.4 Computer hardware and software to access information
8. Manuals and Information	Manuals and Information may include: 8.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 8.2 Safe work procedures related to task 8.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 8.4 Company/manufacturer/component supplier repair manual/handbook 8.5 Company/manufacturer/component supplier specification data/manual/handbook 8.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
9. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 9.1 Verbal or written instructions issued by authorized personal 9.2 Job order slip 9.3 Spare parts ordering form 9.4 Wearing of Personal Protective Equipment

10. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and company/workshop safety policies and procedures, and may include: 10.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 10.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 12 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and use appropriate procedure, manuals, tools and equipment to carry out inspection 1.2 Observing and applying OHS and safety procedures and requirements, identifying and assessing hazardous situations and rectifying, or reporting to the relevant persons 1.3 Communicating effectively with others involved in or affected by the work 1.4 Conducting work inspection in identifying quality procedures and inspecting work undertaken by others 1.5 Applying quality standards to work 1.6 Performing quality work outcomes, communicating improvements and processing recommendations for change
2. Underpinning knowledge and attitudes	2.1 quality systems in a workplace 2.2 common automotive terminology 2.3 vehicle safety requirements 2.4 planning processes 2.5 OHS regulations/requirements, equipment, material and personal safety requirements 2.6 Company/workshop quality systems and procedures 2.7 Company/workshop environmental control measures 2.8 Company/workshop reporting procedures
3. Underpinning skills	3.1 research and interpretive skills sufficient to locate, interpret and apply manufacturer procedures,

	workplace policies and procedures 3.2 analytical skills required for the identification and analysis of technical information 3.3 plain Lao literacy and communication skills in relation to dealing with others involved in the work 3.4 questioning and active listening skills, for example when obtaining information of technical quality working practices 3.5 as applied to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance 3.6 interacting effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal 3.7 such as number and space and techniques, estimation and approximation, for practical purposes 3.8 capacity to apply problem-solving strategies in purposeful ways, both in situations where the problem and the desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome 3.9 combine the physical and sensory skills needed to operate equipment with understanding of scientific and technological principles needed to explore and adapt systems
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Situations requiring inspections of technical quality 4.3 Specifications and work instructions to the task 4.4 Appropriate tools and equipment to this task 4.5 Materials relevant to the task 4.6 Computer hardware and software, access to electronic communication 4.7 Access to information
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process

		rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 6.2	Competency may be assessed on the job or simulated environment. Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

G CORE UNITS OF COMPETENCY

UNIT 13 ESTIMATE AND CALCULATE COSTS TO REPAIR, MAINTAIN OR MODIFY A VEHICLE

Unit Code	**723.7230.143.013.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to estimate and calculate the costs to repair, maintain or modify a vehicle taking into account materials, labour and overhead costs. It requires the ability to estimate and calculate costs, analyze information, and report and document the costs.

UNIT 13 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Gather information	1.1 Clarify the particular service required 1.2 Obtain and analyze details of the proposed service requirements 1.3 Obtain labour unit cost projections 1.4 Obtain and analyze logistic support contracts, supply agreements or equivalent 1.5 Obtain details of any proposed warehousing and physical distribution systems and related cost factors 1.6 Document and store information ready for retrieval and application
2. Estimate materials and labour	2.1 Estimate cost of repair time 2.2 Estimate labour requirements for direct services and related operations 2.3 Estimate cost of subcontractor work 2.4 Estimate type and cost of parts and materials according to industry and company/workshop pricing standards 2.5 Document final estimate
3. Determine and calculate overheads	3.1 Determine components contributing to overhead costs 3.2 Calculate overhead costs to be attributed to the work in accordance with commercial and company/workshop operating procedures
4. Calculate costs	4.1 Cost repair time in accordance with company/workshop operating procedures 4.2 Cost direct labour costs and subcontractor work 4.3 Cost parts and materials

	4.4 Calculate total job cost, including overheads and mark-up percentages in accordance with company/workshop operating procedures 4.5 Calculate total service cost 4.6 Note potential quotation variations 4.7 Record cost calculations
5. Document and verify details	5.1 Document details of costs and charges in accordance with company/workshop operating procedures 5.2 Verify costs, calculations and other details with relevant company/workshop person 5.3 Document and file details for future reference and in accordance with company/workshop operating procedures

UNIT 13 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	This unit applies to individuals who estimate and calculate the cost to repair, maintain or modify a vehicle in the Automotive Service & Repair Sector. Vehicles may include light vehicles, agricultural and plant equipment and motorbikes.
2. Service requirements	Service requirements may include: 2.1 specialized work 2.2 subcontracting 2.3 replacement parts 2.4 repair timeframe
3. Overhead costs	Overhead costs may include: 3.1 rental and leasing costs 3.2 utilities 3.3 non-production resources 3.4 depreciation of plant and equipment 3.5 warehousing margins 3.6 warehousing costs 3.7 insurance and other costs incurred by doing business 3.8 material/supply costs, including catalogues, contracts, standing agreements, market rates and warehousing margins
4. Information/documents	Information/documents may include:

	4.1 Motor Vehicle Insurance and Repair Industry Code of Conduct 4.2 verbal, written and graphical instructions 4.3 parts listing prices and catalogues 4.4 inventory systems 4.5 material safety data sheets (MSDS) 4.6 diagrams or sketches 4.7 safe work procedures for inspection of vehicles for saleable components 4.8 engineer's design specifications and instructions 4.9 workplace specifications and requirements 4.10 instructions issued by authorized enterprise or external persons 4.11 current driver's license
5. Legislative requirements	Legislative requirements are to be in accordance with applicable Lao legislation, regulations, certification requirements and codes of practice, and may include: 5.1 award and enterprise agreements 5.2 industrial relations 5.3 Lao standards 5.4 Lao Design Rules 5.5 confidentiality and privacy 5.6 Occupational Health and Safety (OHS) 5.7 the environment 5.8 equal opportunity 5.9 anti-discrimination 5.10 duty of care
6. Organizational policies and procedures	Organizational policies and procedures may include: 6.1 financial management 6.2 cost and apportioning overheads 6.3 labour employment costs, including awards and contracts 6.4 quality policies and procedures, including Lao standards 6.5 OHS, sustainability, environment, equal opportunity and anti-discrimination 6.6 manufacturer specifications and industry codes of practice

	6.7 safe work procedures 6.8 reporting and recording procedures
7. Environmental requirements	7.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
8. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 8.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 8.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 13 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 observe safety procedures and requirements 1.2 communicate effectively with others involved in or affected by the work 1.3 select appropriate methods and techniques 1.4 interpret proposals, specifications and instructions for the work 1.5 obtain information relevant to the determination of costs 1.6 calculate and cost, accurately the quantities of parts and materials, the amount of labour and time required to complete the work and overheads for a range of vehicle repair, maintenance and modification quotes 1.7 document the process and outcomes in accordance with enterprise practice.
2. Underpinning knowledge and attitudes	2.1 methods and processes for identifying, apportioning, summarizing and validating total costs for work 2.2 components of labour costs 2.3 current assessing and quoting methodologies 2.4 commercial approaches to warehousing and physical distribution and costing

	2.5 manufacturer and component supplier specifications and manuals, including costing catalogues 2.6 applicable Lao land Automotive Service & Repair legislation, regulations, standards and codes of practice, including Occupational Health and Safety (OHS)), personal safety and environment, relevant to calculating vehicle repair, maintenance and modification costs 2.7 organizational policies and procedures, including quality requirements, reporting and recording procedures, related to calculating vehicle repair, maintenance and modification costs
3. Underpinning skills	Underpinning skills include: 3.1 technical skills to the level required to use internet and other workplace technology related to calculating work costs 3.2 communication skills to the level required to verify costs with others, to report work outcomes and problems, and to relate to people from a range of social, cultural and ethnic backgrounds and of varying physical and mental abilities 3.3 literacy skills to the level required to undertake costing research, and to document and report findings 3.4 numeracy skills to the level required to estimate and calculate labour, materials and on-costs and to validate work costs 3.5 problem-solving skills to the level required to anticipate costing problems and to avoid reworking, wastage, and planning and scheduling problems 3.6 team skills to the level required to work effectively and cooperatively with others to optimize workflow and productivity
4. Resource implications	The following resources should be provided: 4.1 vehicles requiring repair that can be used for quotations 4.2 appropriate worksite and costing details 4.3 manufacturer and component costs, labour rates, commercial and industry information 4.4 Repair Times manuals 4.5 Equipment, including calculators, computer and software 4.6 Internet access

	4.7 enterprise procedures 4.8 specifications and work instruction to the task
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 14 CARRY OUT DIAGNOSIS OF COMPLEX SYSTEM FAULTS

Unit Code	**723.7230.143.014.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to diagnose faults in systems integrating two or more automotive systems or incorporating three or more of mechanical, hydraulic, pneumatic, electrical or electronic media.

UNIT 14 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare for diagnostic procedure	1.1 Nature and scope of work requirements are identified, interpreted and confirmed. 1.2 OHS requirements and company/workshop standard operating procedure needs are observed throughout the work 1.3 Technical and/or calibration requirements for testing and diagnosis are sourced and support equipment is identified and prepared.
2. Analyze reported faults	2.1 Information is gathered from all sources to provide a full overview of all faults and conditions under which they occur. 2.2 Function and operation of the system when operating correctly are identified. 2.3 Systematic fault-finding processes are used across relevant systems to determine the extent of the fault. 2.4 Additional technical sources are consulted to assist with analysis, if necessary. 2.5 Actual faults are distinguished from perceived faults.
3. Identify causes of faults	3.1 Diagnostic equipment and tests are selected to facilitate precise identification of faults and causes. 3.2 Tests are applied systematically and efficiently to gather precise data on system operation. 3.3 Appropriate use is made of technical information to compare gathered data with specifications. 3.4 Test results and gathered data are compared to system specifications and normal functions, and discrepancies are identified. 3.5 Source/cause of fault is isolated and confirmed.

4. Establish repair requirements	4.1 Viability of repair or replacement is assessed. 4.2 Appropriate repair procedures are identified and prescribed to meet customer service requirements. 4.3 Repair requirements are clearly and legibly documented and/or communicated to appropriate persons. 4.4 Repairs involving equipment/skills not held in the workshop are sourced from specialist workshops. 4.5 Customer is informed of the diagnosis and repair requirements.

UNIT 14 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 The unit includes identification and confirmation of the work requirement, preparation for work, diagnosis and identification of the causes of faults, establishment of the repair requirements and completion of work finalization processes, including clean-up and documentation. 1.2 Work requires individuals to demonstrate discretion, judgment and problem-solving skills in managing own work activities and contributing to a productive team environment.
2. Complex systems	A complex system is defined as one which integrates two or more automotive systems, or incorporates three or more of mechanical, hydraulic, pneumatic, electrical or electronic media. Examples include hydraulically/ electronically controlled anti-lock braking systems, engine management systems integrating ignition, fuel and transmission control systems.
3. Diagnostic methods	3.1 Diagnostic methods may include: 3.2 questioning of customer 3.3 road testing 3.4 hydraulic testing (e.g. performance testing of power steering systems) 3.5 electrical testing (e.g. performance testing of engine starting systems) 3.6 electronic testing (e.g. electronic interface diagnostic equipment) 3.7 mechanical testing (e.g. compression testing on engines)

	3.8 chemical testing (e.g. testing of cooling systems) 3.9 technical/service manuals 3.10 component/equipment service history 3.11 body measurements
4. Tools and equipment	Tools and equipment may include: 4.1 testing equipment 4.2 measuring equipment and meters 4.3 code readers 4.4 gauges 4.5 gas analyzers and sensors
5. Materials	Materials may include: 5.1 cleaning materials.
6. Communications	Communications are to include, but are not limited to: 6.1 verbal and visual instructions 6.2 fault reporting 6.3 site specific instructions, written instructions, plans or 6.4 instructions related to job/task, 6.5 telephones and pagers
7. Information and procedures	Information and procedures may include: 7.1 Workplace procedures relating to the use of tooling and equipment 7.2 Workplace procedures relating to reporting and communication 7.3 Manufacturer/component supplier specifications and application procedures for testing equipment and materials 7.4 Manufacturer/component supplier specifications, schematics and operational procedures related to carry out diagnosis of complex system faults 7.5 Vehicle industry publications for technology and technology changes related to the diagnosis of complex system faults
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form

	8.4 Wearing of Personal Protective Equipment
9. Environmental requirements	9.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
10. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 10.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 10.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 14 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 observing safety procedures and requirements 1.2 communicating effectively with others involved in or affected by the work 1.3 selecting methods and techniques appropriate to the circumstances 1.4 completing preparatory activity in a systematic manner 1.5 analyzing faults in complex systems, identifying the cause(s) of faults and establishing repair requirements within an established timeframe for faults incorporating at least three of the following single systems: mechanical, hydraulic, pneumatic and electrical/electronic.
2. Underpinning knowledge and attitudes	2.1 OHS regulations/requirements, equipment, material and personal safety requirements 2.2 function and operation of the appropriate complex automotive systems 2.3 symptom and cause differentiation 2.4 diagnostic procedures and problem-solving techniques 2.5 test procedures and test instrument application 2.6 documenting and reporting procedures 2.7 repair procedures

	2.8 enterprise quality procedures 2.9 work organization and planning processes
3. Underpinning skills	3.1 apply research and interpretive skills sufficient to locate, interpret and apply manufacturer/component supplier procedures, workplace policies and procedures 3.2 apply analytical skills required for identification and analysis of technical information 3.3 apply plain English and Lao literacy and communication skills in relation to dealing with customers and team members 3.4 apply questioning and active listening skills for example when obtaining information from customers 3.5 apply oral communication skills sufficient to convey information and concepts to customers 3.6 apply planning and organizing skills to own work activities, including making good use of time and resources, sorting out priorities and monitoring own performance 3.7 interact effectively with other persons both on a one-to-one basis and in groups, including understanding and responding to the needs of a customer and working effectively as a member of a team to achieve a shared goal 3.8 the capacity to apply problem-solving strategies in purposeful ways, both in situations where the problem and desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome 3.9 use mathematical ideas and techniques to calculate time, assess tolerances, apply accurate measurements, calculate material requirements and establish quality checks 3.10 use workplace technology related to the diagnosis of complex system faults, including the use of measuring equipment, computerized technology and electronics, communication devices and reporting/documenting of results
4. Resource implications	The following resources should be provided: 4.1 workplace location or simulated workplace 4.2 materials relevant to the diagnosis of complex system faults 4.3 equipment, hand and power tooling appropriate to the

	diagnosis of complex system faults 4.4 activities covering the mandatory task requirements 4.5 specifications and work instructions.
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 15 DIAGNOSE COMPLEX FAULTS IN LIGHT VEHICLE TRANSMISSION AND DRIVELINE SYSTEMS

Unit Code	**723.7230.343.015.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to diagnose complex faults in light vehicle transmission and driveline systems in order to initiate action to service, repair, replace or improve performance. The unit involves evaluating system performance and identifying possible operational anomalies.

UNIT 15 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements. 1.2 Specifications for correctly functioning light vehicle transmission and driveline systems are accessed and interpreted. 1.3 OHS requirement needs are considered and observed throughout the work 1.4 Effects of systemic deficiencies/discrepancies or faults in light vehicle transmission and driveline systems are identified and confirmed from indirect and/or direct evidence.
2. Prepare to perform diagnosis	2.1 Criteria for fault diagnosis are developed and adopted to meet the objective of the work 2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems. 2.3 Diagnostic methods, including complexity of diagnostic process, sequence, tests and testing process, are identified and selected from the range of available options 2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and workshop requirements. 2.5 Tooling and materials required to support the diagnostic process are identified, selected and

	prepared for use. 2.6 Light vehicle transmission and driveline system components are prepared for the diagnostic process, including park-up, isolation and cleaning requirements.
3. Apply complex diagnostic process	3.1 Selected diagnostic processes are followed according to specifications and workplace procedures 3.2 Testing is carried out according to workplace procedures and manufacturer and component supplier specifications 3.3 Findings are verified, if necessary, by using reliable alternate or optional processes 3.4 Conclusions are drawn from findings and documented according to workplace requirements 3.5 Information and detail related to the evaluation of diagnosis is provided to the appropriate person or customer in accordance with workshop requirements and practices to confirm further action to be taken
4. Restore the workplace	4.1 Materials that can be reused is collected and stored. 4.2 Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements. 4.3 Waste and scrap is removed following workplace procedures. 4.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 4.5 Unserviceable equipment is tagged and faults identified in accordance with workplace.

UNIT 15 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 Faults may be mechanical, electrical, electronic or hydraulic by nature, requiring the application of complex diagnostic processes to resolve.
2. System Faults	Faults may include: 2.1 faults with: • clutches • torque converters

	• mechanical and automatic transmissions • drive and power take-off shafts • differentials • mechatronic modules and multi-class bus systems • input sensors • output actuators • wiring harnesses • computer systems 2.2 indirect faults caused by the influence of external electrical and electronic systems, which may or may not be faulty in their primary operations 2.3 component specifications, component assembly, component damage and system modifications 2.4 mechanical and hydraulic system faults.
3. System Tests	Tests may include: 3.1 wiring and connector integrity and the operation of input and output devices controlling electronic components and computers 3.2 data interpretation relating to direct, indirect and intermittent causes 3.3 brake fluid testing 3.4 on-road transmission and driveline efficiency testing 3.5 component tests.
4. Test equipment	Testing equipment may include: 4.1 analogue and digital multimeters 4.2 lab oscilloscopes 4.3 scan tools
5. Information and procedures	Information and procedures may include: 5.1 Workplace procedures relating to the use of tooling and equipment 5.2 Workplace procedures relating to reporting and communication 5.3 Manufacturer/component supplier specifications and application procedures for testing equipment and materials 5.4 Manufacturer/component supplier specifications, schematics and operational procedures related light vehicle transmission and driveline systems. 5.5 Vehicle industry regulations

	5.6 Vehicle industry publications related to light vehicle transmission and driveline systems technology and technology changes.
6. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 6.1 Verbal or written instructions issued by authorized personal 6.2 Job order slip 6.3 Spare parts ordering form 6.4 Wearing of Personal Protective Equipment
7. Environmental requirements	7.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
8. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 8.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 8.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 15 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 interpret workplace instructions and locate and apply information 1.2 apply safety requirements, including the use of personal protective equipment 1.3 identify and select appropriate diagnosis processes to be performed 1.4 complete diagnosis of complex faults on a minimum of three different light vehicle light vehicle transmission and driveline systems with real or simulated faults 1.5 document and report outcomes and required actions of diagnosis of complex faults in light vehicle light vehicle transmission and driveline systems.

2. Underpinning knowledge and attitudes	2.1 concepts and principles of light vehicle transmission and driveline systems 2.2 types, functions, operations and limitations of light vehicle transmission and driveline systems and components 2.3 types, functions, operations and limitations of diagnostic testing equipment relating to light vehicle transmission and driveline systems 2.4 testing procedures for light vehicle transmission and driveline systems, including procedures for accessing and interpreting scan tool system data 2.5 methods and processes for documenting and reporting diagnostic findings and recommendations.
3. Underpinning skills	3.1 communication skills to communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, reporting of work outcomes and completion of regulatory, commercial and vehicle information systems inputs 3.2 numeracy skills to use mathematical ideas and techniques to complete measurements, calculate requirements, and present results of diagnosis 3.3 planning and organizing skills to conclude complex diagnostic processes which anticipate and allow for risks, cater for both direct and indirect evidence and avoid or minimize reworking and avoid wastage 3.4 problem-solving skills to use available information to contribute to decision making strategies for solving complex problems as they relate to light vehicle transmission and driveline systems 3.5 self-management skills to plan and organize activities, including the planning of analytical processes, preparation of the worksite and the obtaining of testing equipment and materials to avoid backtracking, workflow interruptions or wastage 3.6 technical skills to use workplace tools relating to the complex diagnosis of light vehicle transmission and driveline systems, including the use of: • specialized tools and equipment • measuring equipment 3.7 technology skills to use workplace technology related to systems diagnosis, information research and

	management systems.
4. Resource implications	The following resources should be provided: 4.1 workplace location or simulated workplace 4.2 vehicles with real or simulated light vehicle transmission and driveline system faults 4.3 tools and equipment appropriate for the diagnosis of complex faults in light vehicle transmission and driveline systems 4.4 technical reference information and workplace instructions.
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 following safety requirements 6.3 applying environmental constraints. 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 16 DIAGNOSE COMPLEX FAULTS IN MOBILE PLANT HYDRAULIC SYSTEMS

Unit Code	**723.7230.043.016.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to diagnose complex faults in mobile plant hydraulic systems in order to initiate action to service, repair, replace or improve performance. The unit involves evaluating system performance and identifying possible operational anomalies. Faults may be electrical, electronic or hydraulic by nature, requiring the application of complex diagnostic processes to resolve.

UNIT 16 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements. 1.2 Specifications for correctly functioning mobile plant hydraulic systems are accessed and interpreted. 1.3 OHS requirement needs are considered and observed throughout the work 1.4 Effects of systemic deficiencies/discrepancies or faults in mobile plant hydraulic systems are identified and confirmed from indirect and/or direct evidence.
2. Prepare to perform diagnosis	2.1 Criteria for fault diagnosis are developed and adopted to meet the objective of the work 2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems. 2.3 Diagnostic methods, including complexity of diagnostic process, sequence, tests and testing process, are identified and selected from the range of available options 2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and workshop requirements. 2.5 Tooling and materials required to support the diagnostic process are identified, selected and prepared for use.

	2.6 mobile plant hydraulic system components are prepared for the diagnostic process, including park-up, isolation and cleaning requirements.
3. Apply complex diagnostic process	3.1 Selected diagnostic processes are followed according to specifications and workplace procedures 3.2 Testing is carried out according to workplace procedures and manufacturer and component supplier specifications 3.3 Findings are verified, if necessary, by using reliable alternate or optional processes 3.4 Conclusions are drawn from findings and documented according to workplace requirements 3.5 Information and detail related to the evaluation of diagnosis is provided to the appropriate person or customer in accordance with workshop requirements and practices to confirm further action to be taken
4. Restore the workplace	4.1 Materials that can be reused is collected and stored. 4.2 Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements. 4.3 Waste and scrap is removed following workplace procedures. 4.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 4.5 Unserviceable equipment is tagged and faults identified in accordance with workplace.

UNIT 16 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 Work applies to and includes system fault and failure diagnosis of hydraulic systems in the mobile plant environment.
2. System Faults	Faults may include: 2.1 indirect faults caused by the influence of external systems (electrical and electronic) which may or may not be faulty in their primary operations 2.2 direct faults in input sensors, output actuators, wiring harness, computer systems, calibration or adjustment specifications

	2.3 component specifications, component assembly, component damage and system modifications 2.4 indirect mechanical faults 2.5 mechanical and hydraulic system faults
3. Diagnostic processes	Diagnostic processes may include: 3.1 analyzing manufacturer and component supplier specifications, schematics and operational procedures related to mobile plant hydraulic systems 3.2 step by step troubleshooting plan 3.3 discover-investigate-fix methodology
4. System Tests	Tests may include: 4.1 wiring and connector integrity 4.2 operation and specification of input and output devices 4.3 controlling electronic components and computers 4.4 data interpretation and readings related to direct indirect and intermittent causes 4.5 hydraulic systems testing 4.6 electrical systems testing 4.7 mechanical systems testing 4.8 road test.
5. Test equipment	Testing equipment may include: 5.1 analogue and digital multimeters 5.2 lab oscilloscopes 5.3 scan tools 5.4 test lights and test LEDs 5.5 pulse generators 5.6 manufacturer and component supplier testing equipment 5.7 pressure gauges
6. Information and procedures	Information and procedures may include: 6.1 Workplace procedures relating to the use of tooling and equipment 6.2 Workplace procedures relating to reporting and communication 6.3 Manufacturer/component supplier specifications and application procedures for testing equipment and materials

	6.4 Manufacturer/component supplier specifications, schematics and operational procedures related to mobile plant hydraulic systems. 6.5 Vehicle industry regulations 6.6 Vehicle industry publications related to mobile plant hydraulic systems technology and technology changes.
7. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 7.1 Verbal or written instructions issued by authorized personal 7.2 Job order slip 7.3 Spare parts ordering form 7.4 Wearing of Personal Protective Equipment
8. Environmental requirements	8.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 16 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 interpret workplace instructions and locate and apply information 1.2 apply safety requirements, including the use of personal protective equipment 1.3 identify and select appropriate diagnosis processes to be performed 1.4 complete diagnosis of complex faults on a minimum of three different mobile plant hydraulic systems with real or simulated faults

	1.5 document and report outcomes and required actions of diagnosis of complex faults in mobile plant hydraulic systems
2. Underpinning knowledge and attitudes	2.1 concepts and principles of mechanical, hydraulic, electronic and pneumatic systems related to mobile plant hydraulic systems 2.2 concepts, types, functions, operations and limitations of mobile plant hydraulic systems and components 2.3 diagnostic theory, including concept, design and planning 2.4 types, functions, operations and limitations of diagnostic testing equipment related to mobile plant hydraulic systems 2.5 testing procedures for mobile plant hydraulic systems, including accessing and interpreting scan tool system data 2.6 methods and processes for documenting and reporting diagnostic findings and recommendations.
3. Underpinning skills	3.1 communication skills to communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, reporting of work outcomes and completion of regulatory, commercial and vehicle information systems inputs 3.2 numeracy skills to use mathematical ideas and techniques to complete measurements, calculate requirements, and present results of diagnosis 3.3 planning and organizing skills to conclude complex diagnostic processes which anticipate and allow for risks, cater for both direct and indirect evidence and avoid or minimize reworking and avoid wastage 3.4 problem-solving skills to use available information to contribute to decision making strategies for solving complex problems as they relate to mobile plant hydraulic systems 3.5 self-management skills to plan and organize activities, including the planning of analytical processes, preparation of the worksite and the obtaining of testing equipment and materials to avoid backtracking, workflow interruptions or wastage 3.6 technical skills to use workplace tools relating to the complex diagnosis of mobile plant hydraulic systems,

	including the use of: • specialized tools and equipment • measuring equipment 3.7 technology skills to use workplace technology related to systems diagnosis, information research and management systems.
4. Resource implications	The following resources should be provided: 4.1 workplace location or simulated workplace 4.2 vehicles systems with real or simulated mobile plant hydraulic system faults 4.3 tools and equipment appropriate for the diagnosis of complex faults in mobile plant hydraulic systems 4.4 technical reference information and workplace instructions.
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 following safety requirements 6.3 applying environmental constraints 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 17 DIAGNOSE AND REPAIR AIR CONDITIONING AND HVAC SYSTEMS

Unit Code	**723.7230.043.017.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to diagnose and repair air conditioning systems including heating, ventilation, air conditioning and cooling (HVAC) systems that are fitted to a range of vehicles and equipment for passenger convenience and comfort. The unit involves diagnosing deviations from correct operation, repairing vehicle air conditioning and HVAC system components and associated systems, and applying post-repair testing procedures.

UNIT 17 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to diagnose and repair air conditioning and HVAC system	1.1 Nature and scope of work requirements are identified, interpreted and confirmed. 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are identified and sourced. Work area, hand tools. Equipment, repair specifications data/manual/handbooks and spare parts are identified and prepared. 1.4 Critical precautions in relation to working with air conditioning, refrigerant and refrigerant oils are observed
2. Diagnose air conditioning and HVAC system	2.1 Air conditioning and HVAC systems are tested to isolate faults according to workplace procedures and without causing damage to components or systems as a result of inappropriate testing procedures 2.2 Faults are identified from test results and causes of faults are determined 2.3 Diagnosis findings are reported according to workplace procedures, including recommendations for necessary repairs or adjustments
3. Repair air conditioning and HVAC system	3.1 Repair options are analyzed and those most appropriate to the circumstances are selected 3.2 Appropriate tools and recognized techniques and materials are selected and prepared

	3.3 Repairs and component replacements and adjustments are carried out without causing damage, according to workplace procedures and manufacturer and component supplier specifications
4. Retest air conditioning and HVAC system	4.1 Retests are carried out to ensure correct and safe air conditioning and HVAC system performance operation 4.2 Post-repair testing is carried out according to workplace procedures and relevant legislation 4.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
5. Restore work area and complete documentation	5.1 Materials that can be reused is collected and stored. 5.2 Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements. 5.3 Waste and scrap is removed following workplace procedures. 5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace. 5.6 Complete and restore Documentation includes job card, check list, reports and workshop handbooks/manuals.

UNIT 17 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 Work applies to automotive air conditioners, including HVAC systems fitted to vehicles in light and heavy vehicle, mining, construction, agricultural, motorbike and outdoor power equipment environments
2. Air conditioning and heating, ventilation, air conditioning and cooling (HVAC) systems:	Air conditioning and HVAC systems may include: 2.1 single zone and multi-zone, including: • climate control • electric compressors 2.2 R12 systems 2.3 R134a systems 2.4 R1234yf systems

	2.5 high and low pressure switches 2.6 pressure relief valve 2.7 temperature sensors 2.8 sunlight sensors 2.9 carbon dioxide sensors 2.10 zone temperature sensors.
3. Options for diagnosing faults	Options for diagnosing faults may include: 3.1 isolation of faults 3.2 component inspection and evaluation 3.3 use and application of air conditioning diagnostic tools.
4. Critical precautions	Critical precautions may include: 4.1 dangers associated with working with refrigerants and lubricants, including: • frostbite (refrigerant boiling point -36.7ºC) • carcinogenic oil • care taken with some flammable refrigerants.
5. System Faults	Faults may include: 5.1 system containing atmospheric air with moisture 5.2 electrical sensor malfunction 5.3 dislodged temperature sensor or transfer valve 5.4 faulty pressure relief valve 5.5 vacuum leak 5.6 air flow restriction or blockage 5.7 receiver drier blockage 5.8 evaporator fan not working 5.9 electrical fault 5.10 electrical system fault.
6. Repair options	Repair options may include 6.1 component repair procedures, including: • removal, replacement and adjustment procedures • dismantle, repair, re-assembly and adjustment procedures
7. Post-repair test	Post-repair testing may include: 7.1 validating effectiveness of the repair action, including the following checks:

	• ambient temperature • centre vent temperature • condenser and suction line temperature • manifold gauge pressure readings • refrigerant leaks 7.2 confirming that reported fault has been rectified 7.3 confirming that no other faults are present as a result of the repair action.
8. Tools and equipment	Tools and equipment are to include the following specialist tools: 8.1 manifold and gauge set 8.2 recovery unit 8.3 vacuum pump may include: 8.4 normal hand tools 8.5 nitrogen cylinder and regulator 8.6 digital vacuum gauge (vacrometer) 8.7 oil injector 8.8 infra-red thermometer (pyrometer) 8.9 electronic temperature probe 8.10 valve core removing/replacement tool 8.11 psychrometer (humidity detector) 8.12 various refrigerant hoses and couplers 8.13 digital Multimeter 8.14 diagnostic scan tool
9. Information on decal sticker	Information on decal sticker must include: 9.1 name of the service organization 9.2 quantity of refrigerant added 9.3 refrigerant and oil type 9.4 service date 9.5 vehicle odometer reading.
10. Information and procedures	Information and procedures may include: 10.1 Workplace procedures relating to the use of tooling and equipment 10.2 Workplace procedures relating to reporting and communication 10.3 Manufacturer/component supplier specifications and

	application procedures for testing equipment and materials 10.4 Manufacturer/component supplier specifications, schematics and operational procedures related to air conditioning systems including heating, ventilation, air conditioning and cooling (HVAC) systems 10.5 Vehicle industry regulations 10.6 Vehicle industry publications related to air conditioning systems including heating, ventilation, air conditioning and cooling (HVAC) systems technology and technology changes
11. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 11.1 Verbal or written instructions issued by authorized personal 11.2 Job order slip 11.3 Spare parts ordering form 11.4 Wearing of Personal Protective Equipment
12. Environmental requirements	12.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
13. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 13.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 13.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 17 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 observe safety procedures and requirements, in particular the dangers associated with handling refrigerants 1.2 select methods and techniques appropriate to diagnosing and repairing an air conditioning system

	1.3 complete preparatory activity in a systematic manner 1.4 diagnose and repair a range of vehicle air conditioning and HVAC systems, including: • climate control • single and multi-zone • electric compressors 1.5 apply safe operation of automotive refrigerant tools and equipment 1.6 record relevant details in relation workplace, manufacturer and component supplier requirements 1.7 demonstrate understanding of the environmental regulations and refrigerant waste disposal procedures 1.8 conduct diagnosis and repair procedures according to workplace, manufacturer and component supplier requirements 1.9 present vehicle and equipment in a condition that complies with workplace requirements 1.10 Perform complete job documentation and clean-up work area and maintain equipment to workplace standards.
2. Underpinning knowledge and attitudes	2.1 OHS regulations, requirements, equipment, material and personal safety requirements, including legislation relating to automotive air conditioning and HVAC systems 2.2 principles of operation of automotive air conditioning and HVAC systems, including: • piston, scroll and rotary vane compressors • electric compressors • variable displacement compressors • clutch less compressors 2.3 application, purpose and operation of air conditioning and HVAC systems, including: • climate control • multi-zone systems 2.4 techniques for reading and interpreting technical information, including: • refrigerant saturation temperatures in relation to ambient temperatures and changing levels of humidity • graphic symbols and diagrams

	2.5 diagnostic and testing procedures, including:
	• use of manifold gauges and surface probe thermocouples for complete system analysis
	• diagnostic procedures for air conditioning and HVAC systems, including:
	  • accessing and interpreting diagnostic trouble codes (DTC)
	  • diagnostic flow charts
	• analysis of system operation using gauges, temperature probes, electrical test equipment, scan tools, oscilloscopes and other industry-relevant test equipment
	• visual, aural and functional assessments, including:
	  • component damage and wear
	  • component corrosion
	  • vacuum and leaks
	2.6 repair procedures, including:
	• component removal and replacement procedures
	• component and associated system adjustment procedures

3. Underpinning skills	3.1 communication skills to: • follow verbal and written instructions • clarify workplace instructions and determine job requirements • gain information from appropriate persons and assistance as required 3.2 initiative and enterprise skills to: • apply learning when diagnosing and repairing various air conditioning and HVAC systems • recognize a workplace problem or potential problem and take action 3.3 learning skills to identify sources of information, assistance and expert knowledge to expand skills, knowledge and understanding 3.4 literacy skills to: • read and follow information in written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • obtain and record measurements

	• document required repairs and parts 3.5 numeracy skills to: • test, measure and analyze test equipment results compared to desired system performance • assess tolerances and apply accurate measurements and adjustments 3.6 planning and organizing skills to: • plan own work requirements and prioritize actions to achieve required outcomes and ensure tasks are completed on time • identify risk factors and take action to minimize them 3.7 problem-solving skills to: • determine the underlying causes of faults • refer problems outside area of responsibility to appropriate person and suggest possible causes • seek information and assistance as required to solve problems 3.8 self-management skills to: • select and use appropriate equipment, materials, processes and procedures • recognize limitations and seek timely advice • follow workplace documentation, such as codes of practice and operating procedures 3.9 teamwork skills to apply knowledge of own role to complete activities efficiently to support team activities and tasks 3.10 technical skills to use workplace technology and tools relating to repairing air conditioning and HVAC systems, including: • specialist tools and equipment • measuring equipment • computerized technology 3.11 technology skills to: • operate diagnostic and test equipment • use technology to collect, analyze and provide information
4. Resource implications	The following resources should be provided: 4.1 workplace location or simulated workplace 4.2 vehicles with air conditioning and HVAC faults relevant

	to the qualification being sought 4.3 equipment appropriate for the diagnosing and repairing a range of vehicle air conditioning and HVAC systems relevant to the qualification being sought, including: • manifold and gauge set • recovery unit • vacuum pump • nitrogen cylinder and regulator • digital vacuum gauge (vacrometer) • digital Multimeter • electronic scales • oil injector • infra-red thermometer (pyrometer) • electronic temperature probe • valve core removing/replacement tool • psychrometer (humidity detector) • various refrigerant hoses and couplers • diagnostic scan tool 4.4 specifications and workplace instructions 4.5 service procedures for above equipment appropriate for the diagnosis, repair, replacement and adjustment of vehicle air conditioning and HVAC systems.
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment.

	6.2 following safety requirements 6.3 applying environmental constraints 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 18 ANALYZE AND EVALUATE ELECTRICAL AND ELECTRONIC FAULTS IN BRAKING SYSTEMS

Unit Code	**723.7230.443.018.01**
Unit Descriptor	This Unit covers the Skills, Knowledge & Attitudes required to analyze and evaluate electrical and electronic faults in braking systems in order to initiate action to sustain, vary or enhance performance.

UNIT 18 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements. 1.2 Benchmark specifications for correctly functioning electrical and electronic braking systems are accessed and interpreted. 1.3 OHS requirement needs are considered and observed throughout the work 1.4 Effects of systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence.
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work. 2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems. 2.3 Analytical and evaluative methodology, including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options. 2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and workshop requirements. 2.5 Tooling and materials required to support the diagnostic process are identified, selected and prepared for use. 2.6 Electrical and electronic braking system components are prepared for the diagnostic process, including

	park-up, isolation and cleaning requirements.
3. Apply the analysis and evaluative methodology	3.1 Selected diagnostic processes are followed according to specifications and workplace procedures 3.2 Tests and testing equipment are applied in accordance with regulatory requirements and manufacturer/component supplier specifications. 3.3 Analytical and other diagnostic findings are verified, if necessary, by using reliable alternate or optional processes, and documented. 3.4 Analytical findings and results are evaluated against the agreed criteria. 3.5 Valid conclusions are drawn from the available evidence and documented to company/workshop requirements. 3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance to company/workshop requirements.
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information. 4.2 A response option is selected from an analysis of the options in accordance with prevailing circumstance and manufacturer/component supplier specifications. 4.3 Selected response option is documented and reported in accordance with regulatory and workshop requirements and practices.
5. Restore the workplace	5.1 Materials that can be reused is collected and stored. 5.2 Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements. 5.3 Waste and scrap is removed following workplace procedures. 5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace.

UNIT 18 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. 1.2 It also requires the candidate to identify, evaluate, select and document the most appropriate response to the stated objective of the analysis and evaluation process.
2. Failure analysis and evaluation process	2.1 The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance.
3. Isolation procedures	3.1 Equipment isolation procedures are to be to industry and enterprise standards and are to include the disarming of supplementary restraint systems (SRS) by manufacturer/ component supplier specifications.
4. System Test	Tests may include: 4.1 wiring and connector integrity 4.2 operation and specification of input and output devices 4.3 controlling electronic components and computers, 4.4 data interpretation and readings related to direct, indirect and intermittent causes.
5. Test equipment	Test equipment's are to include, but not limited to: 5.1 analogue and digital multimeters 5.2 lab oscilloscopes 5.3 data scanners 5.4 test lights and test LEDs and may include: 5.5 pulse generators 5.6 manufacturer/component supplier testing equipment
6. Information and procedures	Information and procedures may include: 6.1 Workplace procedures relating to the use of tooling and equipment 6.2 Workplace procedures relating to reporting and communication 6.3 Manufacturer/component supplier specifications and application procedures for testing equipment and

	materials 6.4 Manufacturer/component supplier specifications, schematics and operational procedures related to braking systems 6.5 Vehicle industry regulations 6.6 Vehicle industry publications related to braking system technology and technology changes
7. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 7.1 Verbal or written instructions issued by authorized personal 7.2 Job order slip 7.3 Spare parts ordering form 7.4 Wearing of Personal Protective Equipment
8. Environmental requirements	8.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 18 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Interpret work order and locate and apply information. 1.2 Apply safety requirements, including the isolation of equipment and use of personal protective equipment. 1.3 Follow work instructions, operating procedures and inspection processes to: • minimize the risk of injury to self and others • prevent damage and wastage of goods, equipment and products • maintain required production output and product

	quality. 1.4 Complete failure analyses on a minimum of three different braking systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and document the most appropriate rectification measure. 1.5 Analyze and validate or recommend variations to a minimum of two available repair/modification procedures for different braking systems. 1.6 Work effectively with others. 1.7 Modify activities to cater for variations in workplace context and environment.
2. Underpinning knowledge and attitudes	2.1 basic mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems. 2.2 general knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation. 2.3 general knowledge of the types, functions and operations of braking systems. 2.4 general knowledge of the theory of diagnosis, including concept, design and planning. 2.5 general knowledge of the concepts, types, functions, operations and limitations of electromechanical and electro-fluid sub-systems within light vehicle, mobile plant, heavy vehicle, transmission/driveline systems. 2.6 detailed knowledge of electrical theory and operation covering automotive digital computers, networked vehicles, voltage, current, resistance, power, capacitance, electrostatics, magnetics, inductance, discrete electronic components, logic families and radio frequency. 2.7 detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment. 2.8 general knowledge of the methods and processes for documenting and reporting diagnostic findings and recommendations. 2.9 general knowledge of personal computer operation
3. Underpinning skills	3.1 research, organize and understand technical information related to contemporary electrical and electronic braking systems, monitoring and testing processes, diagnostic methods and options and safety procedures.

	3.2 communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, reporting of work outcomes and completion of regulatory, commercial and vehicle information systems inputs. 3.3 plan and organize activities, including the planning of analytical processes, establishment of evaluative (success) criteria, preparation and layout of the worksite and the obtaining of testing equipment and materials to avoid backtracking, workflow interruptions or wastage. 3.4 work with others and in a team by recognizing dependencies and using cooperative approaches to optimize workflow and productivity. 3.5 use mathematical ideas and techniques to complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. 3.6 establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimize reworking and avoid wastage. 3.7 use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tooling, calculators and measuring devices.
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Access to a requirement and objective(s) for analysis and evaluation, operational electrical and electronic braking systems with real or simulated faults 4.3 Appropriate tools and test equipment to this task 4.4 Materials relevant to the task 4.5 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time

	to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 following safety requirements 6.3 applying environmental constraints 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 19 ANALYZE AND EVALUATE MOTORBIKE ENGINE AND TRANSMISSION SYSTEM FAULTS

Unit Code	**723.7230.343.019.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to analyze and evaluate motorbike engine and transmission systems in order to initiate action to sustain, vary or enhance performance.

UNIT 19 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements. 1.2 Benchmark specifications for correctly functioning motorbike engine and transmission systems are accessed and interpreted. 1.3 OHS requirement needs are considered and observed throughout the work 1.4 Effects of systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence.
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work. 2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems. 2.3 Analytical and evaluative methodology, including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options. 2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and workshop requirements. 2.5 Tooling and materials required to support the diagnostic process are identified, selected and prepared for use. 2.6 Motorbike engine and transmission system components are prepared for the diagnostic process,

		including park-up, isolation and cleaning requirements.
3. Apply the analysis and evaluative methodology	3.1	Selected diagnostic processes are followed according to specifications and workplace procedures
	3.2	Tests and testing equipment are applied in accordance with regulatory requirements and manufacturer/component supplier specifications.
	3.3	Analytical and other diagnostic findings are verified, if necessary, by using reliable alternate or optional processes, and documented.
	3.4	Analytical findings and results are evaluated against the agreed criteria.
	3.5	Valid conclusions are drawn from the available evidence and documented to company/workshop requirements.
	3.6	Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance to company/workshop requirements.
4. Select response measure	4.1	Options for responding to the objective or need are identified from further research of technical support information.
	4.2	A response option is selected from an analysis of the options in accordance with prevailing circumstance and manufacturer/component supplier specifications.
	4.3	Selected response option is documented and reported in accordance with regulatory and workshop requirements and practices.
5. Restore the workplace	5.1	Materials that can be reused is collected and stored.
	5.2	Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements.
	5.3	Waste and scrap is removed following workplace procedures.
	5.4	Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures.
	5.5	Unserviceable equipment is tagged and faults identified in accordance with workplace.

UNIT 19 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. 1.2 It also requires the candidate to identify, evaluate, select and document the most appropriate response to the stated objective of the analysis and evaluation process.
2. Motorbikes	Motorbikes are to include: 2.1 two-wheel 2.2 four-wheel 2.3 two-wheel fitted with sidecar.
3. Total engine systems	3.1 Total engine systems to be covered in this unit are to include the engine and related fuel, ignition, intake, exhaust, lubrication and cooling systems.
4. Transmission systems	4.1 Transmission systems to be covered by this unit are to include mechanical with variable ratio or constant mesh and chain drive, belt drive and gear drive.
5. Failure analysis and evaluation process	5.1 The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance.
6. Motorbike engine system failures	Motorbike engine system failures covered by this unit are to include: 6.1 engine (poor performance, excessive oil consumption, engine stoppages), 6.2 fuel (contamination, flow, pressure, leakage), 6.3 ignition (no-start, no-run, misfire, erratic operation, lack of power, charging), 6.4 intake (leakage, noise, vibration, inadequate control) 6.5 exhaust (noise, pressure, abnormal emissions, blockages), 6.6 lubrication (pressure, flow, leakage, abnormal engine wear, inadequate filtration, sludge formation, excessive deposits, overheating), 6.7 cooling (overcooling, insufficient cooler flow, coolant out of specification, lack of air flow, internal corrosion), 6.8 mounting (noise, vibration, hardness, clutch shudder, erratic transmission control).

7. Transmission system failures	Transmission system failures covered by this unit are to include: 7.1 abnormal component wear, 7.2 clutch operations, clutch pack slippage, 7.3 chain or belt drive slippage, incorrect belt/chain adjustments, contamination, 7.4 driveline phasing and alignment, 7.5 hard shifting, leaks, 7.6 loose mountings, 7.7 lubrication, 7.8 noises, 7.9 operating temperature, 7.10 rear wheel locking, 7.11 vibrations.
8. Engine and transmission system failures	8.1 Engine and transmission system failures covered by this unit are to include indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations.
9. System Test	Tests to be conducted are to include: 9.1 component wear analysis 9.2 compression 9.3 cylinder leakage 9.4 engine performance 9.5 exhaust gas sampling, flow 9.6 lubricant sampling 9.7 oil consumption, pressure 9.8 sample collection/processing 9.9 sensor integrity and function 9.10 specific gravity, temperature 9.11 transmission clutch slippage 9.12 vacuum 9.13 wiring harness integrity
10. Test equipment	Test equipment's are to include, but not limited to: 10.1 bore gauges 10.2 compression gauges 10.3 computer-based diagnostic system 10.4 cooling system analyzer

	10.5 crank case pressure tester (2-stroke) 10.6 dial gauges 10.7 exhaust gas analyzers 10.8 feeler gauges 10.9 micrometers 10.10 Multimeter 10.11 oscilloscope 10.12 pressure gauges 10.13 spring compression testers 10.14 stethoscope 10.15 temperature gauges 10.16 tension gauges 10.17 timing lights 10.18 torque gauges 10.19 vacuum gauges 10.20 Vernier
11. Information and procedures	Information and procedures may include: 11.1 Workplace procedures relating to the use of tooling and equipment 11.2 Workplace procedures relating to reporting and communication 11.3 Manufacturer/component supplier specifications and application procedures for testing equipment and materials 11.4 Manufacturer/component supplier specifications, schematics and operational procedures related to motorbike engine and transmission systems. 11.5 Motorbike industry regulations 11.6 Motorbike industry publications related to emerging engine and transmission system technology and technology changes
12. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 12.1 Verbal or written instructions issued by authorized personal 12.2 Job order slip 12.3 Spare parts ordering form 12.4 Wearing of Personal Protective Equipment
13. Environmental	13.1 Environmental requirements are to include but are not

requirements	limited to waste management, noise, dust and clean-up management
14. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 14.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 14.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 19 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Interpret work order and locate and apply information. 1.2 Apply safety requirements, including the isolation of equipment and use of personal protective equipment. 1.3 Follow work instructions, operating procedures and inspection processes to: • minimize the risk of injury to self and others • prevent damage and wastage of goods, equipment and products • maintain required production output and product quality. 1.4 Complete failure analyses on a minimum of three motorbike engine and transmission systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and document the most appropriate rectification measure. 1.5 Analyze and validate or recommend variations to a minimum of two available repair/modification procedures for motorbike engine and transmission systems. 1.6 Document and report the diagnostic process and findings and recommended rectification for two of the above. 1.7 Work effectively with others. 1.8 Modify activities to cater for variations in workplace context and environment.

2. Underpinning knowledge and attitudes	2.1 motorbike terminology and definitions. 2.2 general knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation. 2.3 basic electrical theory covering voltage, current, resistance, power, magnetics and inductance. 2.4 mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems. 2.5 general knowledge of the types, functions, operations and limitations of motorbike engines and transmission systems. 2.6 detailed knowledge of the types, function, operations and limitations of motorbike fuel systems/components. 2.7 detailed knowledge of the types, function, operations and limitations of motorbike ignition systems/components. 2.8 detailed knowledge of the types, function, operations and limitations of motorbike intake systems/components. 2.9 detailed knowledge of the types, function, operations and limitations of motorbike exhaust systems/components. 2.10 detailed knowledge of the types, function, operations and limitations of motorbike lubrication systems/components. 2.11 detailed knowledge of the types, function, operations and limitations of motorbike cooling systems/components. 2.12 detailed knowledge of the types, function, operations and limitations of motorbike engine and transmission mounting systems/components. 2.13 general knowledge of the theory of diagnosis, including concept, design and planning. 2.14 detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment. 2.15 general knowledge of automotive digital computing systems. 2.16 general knowledge of the methods and processes for documenting and reporting diagnostic findings and recommendations.
3. Underpinning skills	3.1 research, organize and understand technical

	information related to contemporary motorbike engine and transmission systems, monitoring and testing processes, diagnostic methods and options and safety procedures. 3.2 communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, reporting of work outcomes and completion of regulatory, commercial and vehicle information systems inputs. 3.3 plan and organize activities, including the planning of analytical processes, establishment of evaluative (success) criteria, preparation and layout of the worksite and the obtaining of testing equipment and materials to avoid backtracking, workflow interruptions or wastage. 3.4 work with others and in a team by recognizing dependencies and using cooperative approaches to optimize workflow and productivity. 3.5 use mathematical ideas and techniques to complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. 3.6 establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimize reworking and avoid wastage. 3.7 use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tooling, calculators and measuring devices.
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Access to a requirement and objective(s) for analysis and evaluation, motorbike engine and transmission systems with real or simulated faults 4.3 Appropriate tools and test equipment to this task 4.4 Materials relevant to the task 4.5 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation

	5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 following safety requirements 6.3 applying environmental constraints 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 20 ANALYZE AND EVALUATE LIGHT VEHICLE STEERING AND SUSPENSION SYSTEM FAULTS

Unit Code	**723.7230.243.020.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to analyze and evaluate light vehicle steering and suspension systems in order to initiate action to sustain, vary or enhance performance.

UNIT 20 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements. 1.2 Benchmark specifications for correctly functioning light vehicle steering and suspension systems are accessed and interpreted. 1.3 OHS requirement needs are considered and observed throughout the work 1.4 Effects of systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence.
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work. 2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems. 2.3 Analytical and evaluative methodology, including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options. 2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and workshop requirements. 2.5 Tooling and materials required to support the diagnostic process are identified, selected and prepared for use. 2.6 Light vehicle steering and suspension system components are prepared for the diagnostic process,

		including park-up, isolation and cleaning requirements.
3. Apply the analysis and evaluative methodology	3.1	Selected analytical and diagnostic process is followed in accordance with specifications and directions and/or the locally authorized method.
	3.2	Tests and testing equipment are applied in accordance with regulatory requirements and manufacturer/component supplier specifications.
	3.3	Analytical and other diagnostic findings are verified, if necessary, by using reliable alternate or optional processes, and documented.
	3.4	Analytical findings and results are evaluated against the agreed criteria.
	3.5	Valid conclusions are drawn from the available evidence and documented to company/workshop requirements.
	3.6	Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance to company/workshop requirements.
4. Select response measure	4.1	Options for responding to the objective or need are identified from further research of technical support information.
	4.2	A response option is selected from an analysis of the options in accordance with prevailing circumstance and manufacturer/component supplier specifications.
	4.3	Selected response option is documented and reported in accordance with regulatory and workshop requirements and practices.
5. Restore the workplace	5.1	Materials that can be reused is collected and stored.
	5.2	Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements.
	5.3	Waste and scrap is removed following workplace procedures.
	5.4	Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures.
	5.5	Unserviceable equipment is tagged and faults identified in accordance with workplace.

UNIT 20 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. 1.2 It also requires the candidate to identify, evaluate, select and document the most appropriate response to the stated objective of the analysis and evaluation process.
2. Vehicles	Light vehicles are to include: 2.1 two-wheel 2.2 four-wheel drive vehicles.
3. Failure analysis and evaluation process	3.1 The objective of the failure analysis and evaluation process may be to determine fault rectification measures, to effect variation in system characteristics and parameters or to enhance system performance.
4. Steering systems	must be include: 4.1 Mechanical systems 4.2 Power systems
5. Steering failures	Light vehicle steering failures covered by this unit are to include: 5.1 tire wear 5.2 drivability 5.3 vibration 5.4 directional stability 5.5 tracking 5.6 calibration/adjustment specifications 5.7 component specifications 5.8 component assembly 5.9 component damage 5.10 system modifications.
6. Suspension systems	Suspension systems are to cover: 6.1 Coil 6.2 Spring 6.3 spring leaf types.

7. Suspension system failures	Light vehicle suspension system failures covered by this unit are to include: 7.1 erratic steering 7.2 mechanical damage 7.3 sub-frame alignment 7.4 component damage 7.5 systems modifications.
8. System Test	Tests to be conducted are to include: 8.1 ball-joint wear 8.2 camber, castor, 8.3 leveler operation pitman arm specifications, 8.4 ride height 8.5 steering access inclination 8.6 steering linkage specification 8.7 sub-frame alignment 8.8 thrust line 8.9 toe-in, toe-out turns 8.10 turning radius left/right 8.11 tire pressures, tire tread 8.12 wheel bearing specification
9. Test equipment	Testing equipment's are to include tape measure 9.1 tire pressure gauge 9.2 string line 9.3 adjustable electronic bubble level may include: 9.4 laser wheel alignment system.
10. Information and procedures	Information and procedures may include: 10.1 Workplace procedures relating to the use of tooling and equipment 10.2 Workplace procedures relating to reporting and communication 10.3 Manufacturer/component supplier specifications and application procedures for testing equipment and materials 10.4 Manufacturer/component supplier specifications, schematics and operational procedures related to light vehicle steering and suspension systems.

	10.5 Vehicle industry regulations 10.6 Vehicle industry publications related to emerging steering and suspension system technology and technology changes
11. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 11.1 Verbal or written instructions issued by authorized personal 11.2 Job order slip 11.3 Spare parts ordering form 11.4 Wearing of Personal Protective Equipment
12. Environmental requirements	12.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
13. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 13.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 13.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 20 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Interpret work order and locate and apply information. 1.2 Apply safety requirements, including the isolation of equipment and use of personal protective equipment. 1.3 Follow work instructions, operating procedures and inspection processes to: • minimize the risk of injury to self and others • prevent damage and wastage of goods, equipment and products • maintain required production output and product quality. 1.4 Complete failure analyses on a minimum of three

	different light vehicle steering and suspension systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and document the most appropriate rectification measure. 1.5 Analyze and validate or recommend variations to a minimum of two available repair/modification procedures for different light vehicle steering and suspension systems. 1.6 Document and report the diagnostic process and findings and recommended rectification for two of the above. 1.7 • Work effectively with others. 1.8 • Modify activities to cater for variations in workplace context and environment.
2. Underpinning knowledge and attitudes	2.1 light vehicle terminology and definitions. 2.2 general knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation. 2.3 basic electrical theory covering voltage, current, resistance, power, magnetics and inductance. 2.4 theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems. 2.5 steering system theory, including steering angles (camber, castor, steering access inclination, toe-in and toe-out). 2.6 functions of hydraulic pressure with steering and suspension systems. 2.7 detailed knowledge of the types, function, operations and limitations of light vehicle manual steering, power steering and suspension systems/components. 2.8 general knowledge of automotive digital computing systems. 2.9 general knowledge of the theory of diagnosis, including concept, design and planning. 2.10 detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment. 2.11 general knowledge of the methods and processes for documenting and reporting diagnostic findings and recommendations.
3. Underpinning skills	3.1 research, organize and understand technical information related to contemporary light vehicle steering and suspension systems, monitoring and

	testing processes, diagnostic methods and options and safety procedures. 3.2 communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, reporting of work outcomes and completion of regulatory, commercial and vehicle information systems inputs. 3.3 plan and organize activities, including the planning of analytical processes, establishment of evaluative (success) criteria, preparation and layout of the worksite and the obtaining of testing equipment and materials to avoid backtracking, workflow interruptions or wastage. 3.4 work with others and in a team by recognizing dependencies and using cooperative approaches to optimize workflow and productivity. 3.5 use mathematical ideas and techniques to complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. 3.6 establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimize reworking and avoid wastage. 3.7 use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tooling, calculators and measuring devices.
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Access to a requirement and objectives for analysis and evaluation, light vehicle steering and suspension systems with real or simulated faults 4.3 Appropriate tools and test equipment to this task 4.4 Materials relevant to the task 4.5 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview

	It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 following safety requirements 6.3 applying environmental constraints 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 21 ANALYZE AND EVALUATE LIGHT VEHICLE ENGINE AND FUEL SYSTEM FAULTS

Unit Code	**723.7230.443.021.01**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to analyze and evaluate light vehicle engine and fuel systems in order to initiate action to sustain, vary or enhance performance.

UNIT 21 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Identify and confirm the work requirement	1.1 Work instructions and reports are used to determine the nature and objective of the analysis and evaluation requirements. 1.2 Benchmark specifications for correctly functioning light vehicle engines and fuel systems are accessed and interpreted. 1.3 OHS requirement needs are considered and observed throughout the work 1.4 Effects of systemic deficiencies/discrepancies or faults are identified and confirmed from indirect and/or direct evidence.
2. Prepare for analysis and evaluation	2.1 Evaluative criteria are developed/adopted to meet the objective of the work. 2.2 System performance achievements and/or discrepancies are identified from an analysis of technical support information and available on-board diagnostic systems. 2.3 Analytical and evaluative methodology, including diagnostic process, sequence, tests and testing equipment are developed and/or identified and selected from the range of available options. 2.4 Testing equipment is obtained and prepared for application in accordance with regulatory, manufacturer/component supplier and workshop requirements. 2.5 Tooling and materials required to support the diagnostic process are identified, selected and prepared for use. 2.6 Light vehicle engine and fuel system components are prepared for the diagnostic process, including park-up, isolation and cleaning requirements.

3. Apply the analysis and evaluative methodology	3.1 Selected diagnostic processes are followed according to specifications and workplace procedures 3.2 Tests and testing equipment are applied in accordance with regulatory requirements and manufacturer/component supplier specifications. 3.3 Analytical and other diagnostic findings are verified, if necessary, by using reliable alternate or optional processes, and documented. 3.4 Analytical findings and results are evaluated against the agreed criteria. 3.5 Valid conclusions are drawn from the available evidence and documented to company/workshop requirements. 3.6 Information and detail related to the analysis and evaluation is provided to the appropriate parties in accordance to company/workshop requirements.
4. Select response measure	4.1 Options for responding to the objective or need are identified from further research of technical support information. 4.2 A response option is selected from an analysis of the options in accordance with prevailing circumstance and manufacturer/component supplier specifications. 4.3 Selected response option is documented and reported in accordance with regulatory and workshop requirements and practices.
5. Restore the workplace	5.1 Materials that can be reused is collected and stored. 5.2 Testing equipment and other support materials are cleaned, maintained and prepared ready for further use or stored in accordance with manufacturer/component supplier specifications and workshop requirements. 5.3 Waste and scrap is removed following workplace procedures. 5.4 Equipment and work area are cleaned and inspected for serviceable condition in accordance with workplace procedures. 5.5 Unserviceable equipment is tagged and faults identified in accordance with workplace.

UNIT 21 Range of Variables

VARIABLES	RANGE
1. Application of the Unit	1.1 It includes failure analysis covering the complex diagnosis of multi-system and intermittent faults as well as evaluation of performance achievements and variations. 1.2 It also requires the candidate to identify, evaluate, select and document the most appropriate response to the stated objective of the analysis and evaluation process.
2. Engine and fuel systems	2.1 Engine and fuel systems are to include two-stroke, four-stroke rotary, petrol engine to 8 liters and diesel engine to 8 liters. 2.2 Engine and fuel systems to be covered in this unit are to include the engine and related fuel, ignition, intake, exhaust, lubrication and cooling systems.
3. Failure analysis and evaluation process	3.1 The objectives of the failure analysis and evaluation process may determine fault rectification measures, effect variation in system characteristics and parameters or enhancing system performance.
4. Engine and fuel system failures	Engine and fuel system failures covered by this unit are to include: 4.1 engine (poor performance, excessive oil consumption, engine stoppages) 4.2 fuel (contamination, flow, pressure, leakage) 4.3 ignition (no-start, no-run, misfire, erratic operation, lack of power, charging) 4.4 intake (leakage, noise, vibration, inadequate control 4.5 exhaust (pressure, abnormal emissions) 4.6 lubrication (pressure, flow, leakage, abnormal engine wear, inadequate filtration, sludge formation, excessive deposits, overheating) 4.7 cooling (overcooling, insufficient cooler flow, coolant out of specification, lack or air flow, internal corrosion) 4.8 mounting (noise, vibration, hardness, clutch shudder, erratic transmission control). Engine and fuel system failures covered by this unit are to include: 4.9 indirect faults caused by the influence of external systems which may or may not be faulty in their primary operations.

5. System Test	System tests may include: 5.1 component wear analysis 5.2 compression 5.3 cylinder leakage 5.4 engine performance 5.5 exhaust gas sampling 5.6 flow 5.7 oil consumption 5.8 pressure 5.9 sample collection/processing 5.10 specific gravity 5.11 temperature 5.12 vacuum
6. Test equipment	Testing equipment's are to include: 6.1 bore gauge 6.2 compression gauges 6.3 computer-based diagnostic system (direct and internet) 6.4 cooling system analyzer 6.5 dial gauges 6.6 exhaust gas analyzers 6.7 micrometers 6.8 Multimeter 6.9 oscilloscope 6.10 pressure gauges 6.11 stethoscope 6.12 telescopic gauges 6.13 temperature gauges 6.14 timing lights 6.15 vacuum gauges 6.16 Vernier
7. Information and procedures	Information and procedures may include: 7.1 Workplace procedures relating to the use of tooling and equipment 7.2 Workplace procedures relating to reporting and communication 7.3 Manufacturer/component supplier specifications and

	application procedures for testing equipment and materials 7.4 Manufacturer/component supplier specifications, schematics and operational procedures related to light vehicle engine and fuel systems 7.5 Vehicle industry regulations 7.6 Vehicle industry publications related to light vehicle engine and fuel systems technology and technology changes
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Environmental requirements	9.1 Environmental requirements are to include but are not limited to waste management, noise, dust and clean-up management
10. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 10.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 10.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 21 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Interpret work order and locate and apply information. 1.2 Apply safety requirements, including the isolation of equipment and use of personal protective equipment. 1.3 Follow work instructions, operating procedures and inspection processes to: • minimize the risk of injury to self and others

	• prevent damage and wastage of goods, equipment and products • maintain required production output and product quality. 1.4 Complete failure analysis on a minimum of three light vehicle engine and fuel systems with real or simulated multi-system and intermittent faults and identify, evaluate, select and document the most appropriate rectification measures. 1.5 Analyze and validate or recommend variations to a minimum of two available repair/modification procedures for light vehicle engine and fuel systems. 1.6 Document and report the diagnostic process and findings and recommended rectification for two of the above. 1.7 Work effectively with others. 1.8 Modify activities to cater for variations in workplace context and environment.
2. Underpinning knowledge and attitudes	2.1 light vehicle terminology and definitions. 2.2 general knowledge of the concepts, principles and processes involved in planning and implementing systems analysis and evaluation. 2.3 basic electrical theory covering voltage, current, resistance, power, magnetics and inductance. 2.4 mechanical theory covering the concepts and principles of mechanical, hydraulic and pneumatic systems. 2.5 general knowledge of the types, functions, operations and limitations of light vehicle engines. 2.6 detailed knowledge of the types, function, operations and limitations of light vehicle fuel, ignition, intake, exhaust, lubrication, cooling and engine mounting systems/ components. 2.7 general knowledge of the theory of diagnosis, including concept, design and planning. 2.8 detailed knowledge of the types, functions, operations and limitations of diagnostic testing equipment. 2.9 general knowledge of automotive digital computing systems. 2.10 general knowledge of the methods and processes for documenting and reporting diagnostic findings and recommendations.

3. Underpinning skills	3.1 research, organize and understand technical information related to contemporary light vehicle engine and fuel systems, monitoring and testing processes, diagnostic methods and options and safety procedures. 3.2 communicate ideas and information to enable confirmation of work requirements and specifications, coordination of work with site supervisor, other workers and customers, reporting of work outcomes and completion of regulatory, commercial and vehicle information systems inputs. 3.3 plan and organize activities, including the planning of analytical processes, establishment of evaluative (success) criteria, preparation and layout of the worksite and the obtaining of testing equipment and materials to avoid backtracking, workflow interruptions or wastage. 3.4 work with others and in a team by recognizing dependencies and using cooperative approaches to optimise workflow and productivity. 3.5 use mathematical ideas and techniques to complete measurements, calculate analytical requirements, calibrate and establish testing equipment and present analytical results. 3.6 establish analytical processes, including diagnostic processes, which anticipate and allow for risks, cater for both direct and indirect evidence, avoid or minimize reworking and avoid wastage. 3.7 use the workplace technology related to systems analysis and diagnosis, information research and management systems, testing equipment, maintenance equipment, tooling, calculators and measuring devices.
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Access to a requirement and objectives for analysis and evaluation, light vehicle engine and fuel systems with real or simulated faults 4.3 Appropriate tools and test equipment to this task 4.4 Materials relevant to the task 4.5 Specifications and work instruction to the task

5. Method of assessment	Competency in this Unit may be assessed through: 5.1 Direct observation 5.2 Written and oral questioning 5.3 Portfolio/Interview It is preferable that assessment reflects a process rather than an event and occurs over a period of time to cover varying quality circumstances Competence in this unit may be assessed in conjunction with other functional units which together form part of the holistic work role Assessment of knowledge & underpinning skills may be combined. Evidence provided for competency determination will be Valid, Sufficient & Current
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 following safety requirements 6.3 applying environmental constraints 6.4 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

H ADDITIONAL QUALIFICATION ADVICE

H.1 ADVICE FOR ADDITIONAL CORE UNITS OF COMPETENCY

Additional Units of Competency must adhere to the packaging rules specified above to those who have completed qualification **Level III** in **AUTOMOTIVE SERVICE AND REPAIR** specialized in:

- **AGRO-MACHINERY MECHANIC**
- **AUTO MECHANIC**
- **MOTORBIKE MECHANIC**

AGRO-MACHINERY MECHANIC

The following three (3) Core Units of Competency must be added for those who have completed qualification **Level III** in **AUTOMOTIVE SERVICE AND REPAIR** and specialized in Agro-Machinery Mechanic:

Unit Code	Core Unite Name
723.7231.433.003.01	REPAIR FINAL DRIVE (MOTORBIKE)
723.7231.233.008.01	REPAIR COOLING SYSTEM
723.7231.333.009.01	REPAIR CLUTCH SYSTEM

AUTO MECHANIC

The following three (3) Core Units of Competency must be added for those who have completed qualification **Level III** in **AUTOMOTIVE SERVICE AND REPAIR** and specialized in Auto Mechanic:

Unit Code	Core Unite Name
723.7231.433.003.01	REPAIR FINAL DRIVE (MOTORBIKE)
723.7231.233.004.01	REPAIR SMALL ENGINE
723.7233.133.016.01	REPAIR AGRO-MACHINERY HYDRAULIC SYSTEMS

MOTORBIKE MECHANIC

The following seven (7) Core Units of Competency must be added for those who have completed qualification **Level III** in **AUTOMOTIVE SERVICE AND REPAIR** and specialized in Motorbike Mechanic:

Unit Code	Core Unite Name
723.7231.333.009.01	REPAIR CLUTCH SYSTEM
723.7231.433.010.01	REPAIR STEERING AND SUSPENSION SYSTEM (AOM)
723.7231.433.011.01	REPAIR, BALANCE AND ALIGN WHEEL AND TIRES
723.7231.223.013.01	SERVICE DIESEL FUEL SYSTEM
723.7231.223.014.01	REPAIR ENGINE WEAR
723.7231.533.015.01	REPAIR IGNITION SYSTEM
723.7233.133.016.01	REPAIR AGRO-MACHINERY HYDRAULIC SYSTEMS

H.2 AGRO-MACHINERY MECHANIC

Three (3) Core Units of Competency

UNIT 22 REPAIR FINAL DRIVE (MOTORBIKE)

Unit Code	**723.7231.433.003.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required repairing a motorbike final drive system.

UNIT 22 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair final drive system/ components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose a final drive system	2.1 Final drive system/components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair final drive system/ components	3.1 Repair final drive system/components and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 22 Range of Variables

VARIABLES	RANGE
1. Final Drive System	Systems include: 1.1 Chain, 1.2 Belt or 1.3 Shaft final-drive systems
2. System Components	Components may include: 2.1 Drive chain or Drive Belt or Drive shaft 2.2 Clutch hub 2.3 Tensioner buffer / damper 2.4 Sprocket 2.5 Chain puller 2.6 Chain master link clip 2.7 Centrifugal Pulley 2.8 Cross joint 2.9 Slip joint 2.10 Dive shaft rear wheel assembly bearing 2.11 Gear oil
3. Applications	System may be fitted to: 3.1 Motorbikes
4. Faults	Faults may include: 4.1 Abnormal noises 4.2 Vibrations 4.3 Loss of drive 4.4 Oil leaks 4.5 Failure to operate
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of final drive system/components 5.3 Adjustment of System components 5.4 Road Test Drive
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications

	6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Oiler 7.4 Vernier 7.5 Bearing puller 7.6 Dial test indicator 7.7 Chain rivets extractor
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 22 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for final drive system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a final drive system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Final drive system and components 2.5 Final drive system/ components diagnosis procedure 2.6 Final drive system/ components repair procedure 2.7 Hand/ power tools and workshop Equipment for task 2.8 Vehicle moving, positioning and lifting for task 2.9 Final inspection procedure 2.10 Workshop and Equipment maintenance 2.11 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area

	4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should be take place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 23 REPAIR COOLING SYSTEM

Unit Code	**723.7231.233.008.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required repairing an engine cooling system.

UNIT 23 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair cooling system and/or components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose cooling system problems	2.1 Cooling system and/or components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair cooling system and/or components	3.1 Repair cooling system and/or components and test for correct operation in accordance with company/ manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 23 Range of Variables

VARIABLES	RANGE
1. Cooling System	Systems include: 1.1 Water/liquid cooled engine 1.2 Air cooled engine 1.3 Oil cooled engine
2. System components	Components may include: 2.1 Radiator 2.2 Radiator pressure cap 2.3 Cooling fan 2.4 Water/liquate pump 2.5 Thermostat 2.6 Reservoir tank 2.7 Hose 2.8 Clamp 2.9 Heater core 2.10 Temperature gauge 2.11 Coolant concentration
3. Applications	System may be fitted to: 3.1 Light vehicles including Motorbikes 3.2 Agro-Machinery 3.3 Outdoor power equipment 3.4 Marine craft 3.5 Plant
4. Faults	Faults may include: 4.1 Engine overheating 4.2 Poor passenger room heating 4.3 Leaks 4.4 Corrosion 4.5 Cracks
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of cooling system/components 5.3 Adjustment of System components

	5.4 Static and dynamic functional Cooling System Test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Cooling system pressure gauge test set 7.4 Two post vehicle lift or long floor jack and support stand set
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 23 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for cooling system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a cooling system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Operation and function of cooling system/ components including Types of coolant additive 2.5 Cooling system/ components diagnosis procedure 2.6 Cooling system/ components repair procedure 2.7 Hand/ power tools and workshop equipment for task 2.8 Relevant test equipment for task 2.9 Dangers of working on cooling systems 2.10 Vehicle moving, positioning and lifting for task 2.11 Final inspection procedure 2.12 Workshop and Equipment maintenance 2.13 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records

4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 24 REPAIR CLUTCH SYSTEM

Unit Code	**723.7231.333.009.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required repairing clutch system and/or components for light vehicle to manufacture specifications.

UNIT 24 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair clutch system and/or components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose clutch system problems	2.1 Clutch system and/or components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair clutch system and/or components	3.1 Repair clutch system and/or components and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications. 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 24 Range of Variables

VARIABLES	RANGE
1. Clutch system	Systems include: 1.1 Mechanical clutch systems 1.2 Hydraulic clutch systems 1.3 Single plate friction type 1.4 Dual plate friction type
2. System components	Components may include: 2.1 Clutch pedal 2.2 Clutch cable 2.3 Master cylinder 2.4 Slave cylinder 2.5 Clutch fork 2.6 Release Bearing (Throw out bearing) 2.7 Pressure plate 2.8 Clutch plate 2.9 Flywheel 2.10 Clutch fluid reservoir 2.11 Clutch fluid
3. Applications	System may be fitted to: 3.1 Light Vehicles 3.2 Agro-Machinery
4. Faults	Faults may include: 4.1 No release- preventing shifting. 4.2 Slipping 4.3 Clutch chatters or shudders 4.4 Noise 4.5 The vehicle will not move 4.6 Pedal pulsation 4.7 Clutch system leaks
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of clutch system/components 5.3 Adjustment of system components

	5.4 Hydraulic clutch system bleeding 5.5 Road test drive with functional clutch Test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Clutch pilot shaft guide 7.4 Bush/ bearing puller kit 7.5 Clutch fluid changer/ tank 7.6 Transmission jack 7.7 Two post vehicle lift or long floor jack and support stand set
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include

	prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 24 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for clutch system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a clutch system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Mechanical and hydraulic clutch system and components 2.5 Clutch system/ components diagnosis procedure 2.6 Clutch system/ components repair procedure 2.7 Hand/ power tools and workshop Equipment for task 2.8 Relevant Test equipment for task 2.9 Vehicle moving, positioning and lifting for task 2.10 Final inspection procedure 2.11 Workshop and Equipment maintenance 2.12 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Maintaining orderliness and cleanliness

	3.9 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

H.3 AUTO MECHANIC

Three (3) Core Units of Competency

UNIT 25 REPAIR FINAL DRIVE (MOTORBIKE)

Unit Code	**723.7231.433.003.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required repairing a motorbike final drive system.

UNIT 25 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair final drive system/ components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose a final drive system	2.1 Final drive system/components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair final drive system/ components	3.1 Repair final drive system/components and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 25 Range of Variables

VARIABLES	RANGE
1. Final Drive System	Systems include: 1.1 Chain, 1.2 Belt or 1.3 Shaft final-drive systems
2. System Components	Components may include: 2.1 Drive chain or Drive Belt or Drive shaft 2.2 Clutch hub 2.3 Tensioner buffer / damper 2.4 Sprocket 2.5 Chain puller 2.6 Chain master link clip 2.7 Centrifugal Pulley 2.8 Cross joint 2.9 Slip joint 2.10 Dive shaft rear wheel assembly bearing 2.11 Gear oil
3. Applications	System may be fitted to: 3.1 Motorbikes
4. Faults	Faults may include: 4.1 Abnormal noises 4.2 Vibrations 4.3 Loss of drive 4.4 Oil leaks 4.5 Failure to operate
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of final drive system/components 5.3 Adjustment of System components 5.4 Road Test Drive
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications

	6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Oiler 7.4 Vernier 7.5 Bearing puller 7.6 Dial test indicator 7.7 Chain rivets extractor
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 25 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for final drive system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a final drive system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Final drive system and components 2.5 Final drive system/ components diagnosis procedure 2.6 Final drive system/ components repair procedure 2.7 Hand/ power tools and workshop Equipment for task 2.8 Vehicle moving, positioning and lifting for task 2.9 Final inspection procedure 2.10 Workshop and Equipment maintenance 2.11 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task

	4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should be take place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 26 REPAIR SMALL ENGINE

Unit Code	**723.7231.233.004.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required repairing small engines. These include two and four stroke spark ignition and/or two and four stroke compression ignition engines.

UNIT 26 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair small engine system/ components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose a small engine system	2.1 Small engine system/components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair small engine system components	3.1 Repair small engine system/components and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 26 Range of Variables

VARIABLES	RANGE
1. Small Engine System	Systems include: 1.1 Two and four stroke spark ignition 1.2 Two and four stroke compression ignition 1.3 One to four Cylinder Engines up to 1500cc displacement
2. System components	Components may include: 2.1 Cylinder 2.2 Cylinder head 2.3 Piston and piston rings 2.4 Valve assembly 2.5 Crankshaft assembly 2.6 Connecting rod 2.7 Crankshaft and connecting bearing 2.8 Distribution chain assembly 2.9 Engine oil pump 2.10 Oil mixing pump (Two stroke engine)
3. Applications	System may be fitted to: 3.1 Light vehicles 3.2 Agro-Machinery 3.3 Outdoor power equipment 3.4 Marine craft 3.5 Plant
4. Faults	Faults may include: 4.1 Poor engine performance/ power 4.2 Engine won't start, 4.3 Runs poorly, 4.4 Will not idle smoothly 4.5 Engine leaks
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of small engine system/components 5.3 Removal, dismantling, reassembly, refitting

	5.4 Adjusting and testing
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Measuring instruments (Vernier, micrometer, telescope gauge, dial tester indicator, plastic- gauge, torque wrench, feeler gauge) 7.4 Engine lifting device 7.5 Two post vehicle lift or long floor jack and support stand set 7.6 Lubricant dispensing equipment
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include

	prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 26 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for small engine test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a small engine system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Two and four stroke engine system and components 2.5 Spark and compression ignition system components 2.6 Engine lubrication system 2.7 Engine cooling system 2.8 Small engine system/ components diagnosis procedure 2.9 Small engine system/ components repair procedure 2.10 Hand/ power tools and workshop Equipment for task 2.11 Relevant Test equipment for task 2.12 Dangers of working with test equipment on running engines 2.13 Vehicle moving, positioning and lifting for task 2.14 Final inspection procedure 2.15 Workshop and Equipment maintenance 2.16 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used

	3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using, handling and interpreting test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should be take place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 27 REPAIR AGRO-MACHINERY HYDRAULIC SYSTEMS

Unit Code	**723.7231.133.016.01**
Unit Descriptor	This Unit covers the skills, knowledge & attitudes required to diagnose and repair agro-machinery hydraulic system/components to manufacture specifications.

UNIT 27 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair agro-machinery hydraulic system/components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose agro-machinery hydraulic system/components	2.1 Agro-machinery hydraulic system/components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair agro-machinery hydraulic system/ components	3.1 Repair agro-machinery hydraulic system/ components in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications. 3.3 Perform final test for correct operation, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 27 Range of Variables

VARIABLES	RANGE
1. Agro-machinery hydraulic system	Systems include: 1.1 Hydraulic systems to drive agro-machinery applications
2. System components	Components may include: 2.1 Pumps 2.2 Tanks 2.3 Pipes 2.4 Filters 2.5 Valves 2.6 Distributors 2.7 Pressure regulators 2.8 Actuators 2.9 Cylinders 2.10 Hydraulic motors
3. Applications	System may be fitted to: 3.1 Agro-Machinery 3.2 Outdoor power equipment
4. Faults	Faults may include: 4.1 Oil leaks 4.2 Broken pipes 4.3 Pump 4.4 Filters
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of agro-machinery hydraulic system/ components 5.3 Mount and demount system components 5.4 Adjustment of system components 5.5 Static and dynamic functional system test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications

	6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier **repair** manual/handbook 6.5 Company/manufacturer/component supplier **specification data** manual/handbook 6.6 Company/manufacturer/component supplier **periodic service maintenance data** manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Torque wrench 7.4 Outside micrometer 7.5 Vernier 7.6 Pressure gauge kit 7.7 Oil changer/ tank 7.8 Lifting equipment 7.9 Cleaning Equipment and products
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 27 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for agro-machinery hydraulic system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a agro-machinery hydraulic system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Operation and function of agro-machinery hydraulic system and components 2.5 Mechanic/ technic units of measurement 2.6 Agro-machinery hydraulic system/ components diagnosis procedure 2.7 Agro-machinery hydraulic system/ components repair procedure 2.8 Hand/ power tools and workshop equipment for task 2.9 Relevant test equipment for task 2.10 Dangers of working with agro-machinery hydraulic test equipment 2.11 Vehicle moving, positioning and lifting for task 2.12 Final inspection procedure 2.13 Workshop and Equipment maintenance 2.14 Company/workshop documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment

	3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the workplace or simulated environment. 6.2 The assessment of practical skills should be take place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

H.4 MOTORBIKE MECHANIC

Seven (7) Core Units of Competency

UNIT 28 REPAIR CLUTCH SYSTEM

Unit Code	**723.7231.333.009.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required repairing clutch system and/or components for light vehicle to manufacture specifications.

UNIT 28 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair clutch system and/or components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose clutch system problems	2.1 Clutch system and/or components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair clutch system and/or components	3.1 Repair clutch system and/or components and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications. 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 28 Range of Variables

VARIABLES	RANGE
1. Clutch system	Systems include: 1.1 Mechanical clutch systems 1.2 Hydraulic clutch systems 1.3 Single plate friction type 1.4 Dual plate friction type
2. System components	Components may include: 2.1 Clutch pedal 2.2 Clutch cable 2.3 Master cylinder 2.4 Slave cylinder 2.5 Clutch fork 2.6 Release Bearing (Throw out bearing) 2.7 Pressure plate 2.8 Clutch plate 2.9 Flywheel 2.10 Clutch fluid reservoir 2.11 Clutch fluid
3. Applications	System may be fitted to: 3.1 Light Vehicles 3.2 Agro-Machinery
4. Faults	Faults may include: 4.1 No release- preventing shifting. 4.2 Slipping 4.3 Clutch chatters or shudders 4.4 Noise 4.5 The vehicle will not move 4.6 Pedal pulsation 4.7 Clutch system leaks
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of clutch system/components 5.3 Adjustment of system components

	5.4 Hydraulic clutch system bleeding 5.5 Road test drive with functional clutch Test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Clutch pilot shaft guide 7.4 Bush/ bearing puller kit 7.5 Clutch fluid changer/ tank 7.6 Transmission jack 7.7 Two post vehicle lift or long floor jack and support stand set
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include

	prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 28 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for clutch system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a clutch system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Mechanical and hydraulic clutch system and components 2.5 Clutch system/ components diagnosis procedure 2.6 Clutch system/ components repair procedure 2.7 Hand/ power tools and workshop Equipment for task 2.8 Relevant Test equipment for task 2.9 Vehicle moving, positioning and lifting for task 2.10 Final inspection procedure 2.11 Workshop and Equipment maintenance 2.12 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Maintaining orderliness and cleanliness

	3.9 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

UNIT 29 REPAIR STEERING AND SUSPENSION SYSTEM

Unit Code	**723.7231.433.010.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required to repair steering and suspension system and/or components for light vehicle.

UNIT 29 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair steering and suspension system and/or components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose steering and suspension system problems	2.1 Steering and suspension system and/or components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair steering and suspension system and/or components	3.1 Repair steering and suspension system and/or components and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 29 Range of Variables

VARIABLES	RANGE
1. Steering and suspension System	Systems include: 1.1 Front suspension – dependent system 1.2 Front suspension – independent systems 1.3 Rear suspension – dependent system 1.4 Rear suspension – independent systems 1.5 Steering systems
2. Steering and suspension components	Components may include: 2.1 MacPherson assemblies 2.2 Shock absorbers 2.3 Coil springs 2.4 Leaf springs 2.5 Ball joints 2.6 Control arm 2.7 Suspension arm 2.8 Arm shafts 2.9 Torsion bars 2.10 Sway bar 2.11 Suspension Bush 2.12 Tie roads 2.13 Steering gear 2.14 Power steering pump 2.15 Belt
3. Applications	System may be fitted to: 3.1 Light vehicles 3.2 Agro-Machinery
4. Faults	Faults may include: 4.1 Pulling 4.2 Uneven tire wear 4.3 Noise and vibration while cornering 4.4 Loss of control 4.5 Steering seems to be slipping 4.6 Hard to steer
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including

	damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of steering and suspension system/components 5.3 Adjustment of steering and suspension system components 5.4 Static and dynamic functional steering and suspension Test 5.5 Road test drive
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Torque wrench 7.4 Coil spring compressor 7.5 Ball joint puller 7.6 Grease dispenser 7.7 Fluid changer/ tank 7.8 Hydraulic jack 7.9 Two post vehicle lift or long floor jack and support stand set
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment

9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 29 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for suspension system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a suspension system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Principle operation of hydraulic and gas type suspension system and components 2.5 Principle operation of steering system and components 2.6 Classification of grease and hydraulic lubricants for steering and suspension systems 2.7 Suspension system/ components diagnosis procedure 2.8 Suspension system/ components repair procedure 2.9 Hand/ power tools and workshop equipment for task 2.10 Relevant test equipment for task 2.11 Dangers of working on suspension system/components 2.12 Vehicle moving, positioning and lifting for task

	2.13 Final inspection procedure 2.14 Workshop and Equipment maintenance 2.15 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

UNIT 30 REPAIR, BALANCE AND ALIGN WHEEL AND TIRES

Unit Code	**723.7231.433.011.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required diagnosing, repairing, balancing and aligning wheel and tires for light vehicle. It includes also tube vulcanization.

UNIT 30 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair wheel and tires	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose wheel and tires problems	2.1 Wheel and tires are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair, balance and align wheel and tires	3.1 Repair wheel and tires and test for correct operation in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Balancing the wheel in accordance with company/manufacturer/component supplier specifications 3.4 Aligning wheels in accordance with company/ manufacturer/component supplier specifications 3.5 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job

	cards, check list, reports and workshop manuals.

UNIT 30 Range of Variables

VARIABLES	RANGE
1. Wheel and tires types	Types include: 1.1 Tube tires 1.2 Tubeless tiers 1.3 Steel rim 1.4 Magnesium alloy rim
2. System components	Components may include: 2.1 Tube 2.2 Rim 2.3 Wheel bearing
3. Applications	System may be fitted to: 3.1 Light vehicles 3.2 Agro-Machinery
4. Faults	Faults may include: 4.1 Tire pressure 4.2 Tire tread wear defects and abnormality 4.3 Noise and rolling rumble noticed with wheel speed
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of Wheel and Tire components 5.3 Adjustment of Wheel components 5.4 Static and/or dynamic wheel balancing 5.5 Wheel alignment 5.6 Road Test drive
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair

	manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Tire pressure gauge 7.4 Torque wrench 7.5 Spoke wrench 7.6 Dial tester indicator 7.7 Support stand set 7.8 Tube vulcanizing machine 7.9 Wheel Truing & Balancing Stand 7.10 Wheel aligner
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 30 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for wheel and tire test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair, balance and align of wheel and tire components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Wheel and tire system types and components 2.5 Wheel and tire components diagnosis procedure 2.6 Wheel and tire components repair procedure 2.7 Wheel and tire balance and align procedure 2.8 Hand/ power tools and workshop Equipment for task 2.9 Relevant Test equipment for task 2.10 Dangers of working with wheel and tire balance equipment 2.11 Vehicle moving, positioning and lifting for task 2.12 Final inspection procedure 2.13 Workshop and Equipment maintenance 2.14 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Applying metric and inch size 3.7 Proper handling and use of tools and equipment 3.8 Mounting and demount wheel and tire components 3.9 Using test equipment for task

	3.10 Maintaining orderliness and cleanliness 3.11 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

UNIT 31 SERVICE DIESEL FUEL SYSTEM

Unit Code	**723.7231.223.013.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required to servicing diesel fuel system and/or components.

UNIT 31 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to service diesel fuel system and/or components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare task in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for servicing are sourced. Work area, hand tools, equipment, service specification data/manual/handbook and spare parts are identified and prepared
2. Service a diesel fuel system and/or components	2.1 Service diesel fuel system and/or components and test for correct operation in accordance with company/ manufacturer/component supplier specifications 2.2 Adjustments made during the service are in accordance with manufacturer/component supplier specifications 2.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place
3. Restore work area and complete documentation	3.1 Restore and clean work area, tools and equipment. 3.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 31 Range of Variables

VARIABLES	RANGE
1. Diesel fuel system	Systems include: 1.1 Diesel mechanic control fuel systems 1.2 Diesel electronic control fuel systems 1.3 Common rail diesel injection system
2. System components	Components may include:

	2.1 Fuel Tank 2.2 Fuel Lines 2.3 Fuel Filter 2.4 Fuel Lift/transfer pump 2.5 Inline-injection pump 2.6 Distributer injection pump 2.7 Diesel injectors 2.8 Glow plugs 2.9 Mechanical cable (Throttle, Choke) 2.10 Electrical/ electronic control unit 2.11 Air cleaner assembly
3. Applications	System may be fitted to: 3.1 Vehicles 3.2 Agro-Machinery 3.3 Outdoor power equipment 3.4 Marine craft 3.5 Plant
4. Faults	Faults may include: 4.1 Engine: Poor performance, poor starting 4.2 Blocked Filter 4.3 Leaks
5. Service Methods	Service Methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Adjustment of System components 5.3 Functional Test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier service manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook

	6.6 Company/manufacturer/component supplier periodic service maintenance data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Torque wrench 7.4 Vacuum gauge 7.5 Pressure gauge 7.6 Calibration tools 7.7 Multimeter or Volt and Ohmmeter 7.8 Exhaust gas analyzer
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 31 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Conducting the service of a diesel fuel systems in accordance with workplace and company/manufacturer/component supplier requirements

	1.3 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant service specification data/manual/handbook 2.4 Diesel fuel system and components 2.5 Exhaust gas analyzing 2.6 Diesel Fuel System/Components Service procedure 2.7 Hand/ power tools and workshop Equipment for task 2.8 Test equipment for task 2.9 Final inspection procedure 2.10 Workshop and Equipment maintenance 2.11 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting service specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mount and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*

6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

UNIT 32 REPAIR ENGINE WEAR

Unit Code	**723.7231.223.014.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required diagnosing and repairing engine wear for vehicle to manufacture specifications.

UNIT 32 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair engine wear	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose engine wear problems	2.1 Engine system and/or components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair engine wear on system and/or components	3.1 Repair engine system and/or components and test for correct operation in accordance with company/ manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications. 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 32 Range of Variables

VARIABLES	RANGE
1. Engine system	Systems include: 1.1 Two stoke engine 1.2 Four stoke engine
2. System components	Components may include: 2.1 Engine block 2.2 Cylinder heat assembly 2.3 Crankshaft 2.4 Camshaft 2.5 Piston 2.6 Piston rings 2.7 Connecting road 2.8 Oil pump 2.9 Water pump 2.10 Timing Belt Tensioner 2.11 Timing Belt 2.12 Chain (timing / oil pump) 2.13 Bearings 2.14 Bushes 2.15 Pulleys 2.16 Engine Gasket/ seal 2.17 Motor and Transmission mount
3. Applications	System may be fitted to: 3.1 Light vehicles including Motorbikes 3.2 Agro-Machinery 3.3 Outdoor power equipment 3.4 Marine craft 3.5 Plant
4. Faults	Faults may include: 4.1 Poor engine performance 4.2 Constant excessive white or black smoke from the vehicle exhaust 4.3 Low compression 4.4 Overheat engine 4.5 Engine Noises, grinding, knocking

	4.6 Water and/or oil leaks
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of engine system/components 5.3 Mount and demount system components 5.4 Adjustment of system components 5.5 Static and dynamic functional engine Test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Torque wrench 7.4 Outside micrometer 7.5 Vernier 7.6 Plastic gage 7.7 Feeler gauge 7.8 Stethoscope 7.9 Piston ring compressor 7.10 Piston ring compressor pliers 7.11 Oiler 7.12 Oil changer/ tank 7.13 Engine jack 7.14 Engine support stand
8. Company/ workshop standard operating	Company/workshop standard operating procedures include:

procedures	8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 32 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for engine system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair a engine system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Operation and function of mechanical engine system and components 2.5 Mechanic/ technic units of measurement 2.6 Engine system/ components diagnosis procedure 2.7 Engine system/ components repair procedure 2.8 Hand/ power tools and workshop Equipment for task 2.9 Relevant Test equipment for task

	2.10 Dangers of working with engine test equipment 2.11 Vehicle moving, positioning and lifting for task 2.12 Final inspection procedure 2.13 Workshop and Equipment maintenance 2.14 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

UNIT 33 REPAIR IGNITION SYSTEM

Unit Code	**723.7231.533.015.01**
Unit Descriptor	This Unit covers the Skills, Knowledge and Attitudes required diagnosing and repairing engine ignition system and/or components.

UNIT 33 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair ignition system and/or components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose ignition system problems	2.1 Ignition system and/or components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair ignition system/ components	3.1 Repair ignition system and/or components and test for correct operation in accordance with company/ manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications 3.3 Prepare vehicle for test drive, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, checklist, reports and workshop manuals.

UNIT 33 Range of Variables

VARIABLES	RANGE
1. Ignition System	Systems include: 1.1 Battery or Coil ignition system 1.2 Magneto ignition system 1.3 Electronic control ignition systems
2. System components	Components may include: 2.1 Battery 2.2 Ignition switch 2.3 Ignition coil 2.4 Ignition cable 2.5 Spark plug 2.6 Distributor assembly (incl. Cap, Rotor, Contact breaker and condenser 2.7 Vacuum advance unit 2.8 Ignition control unit 2.9 CDI and magnetic pulse
3. Applications	System may be fitted to: 3.1 Light vehicles including Motorbikes 3.2 Agro-Machinery 3.3 Marine craft 3.4 Plant
4. Faults	Faults may include: 4.1 Engine not starting 4.2 Poor performance 4.3 Overheating 4.4 Cracks
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of ignition system/components 5.3 Adjustment of System components 5.4 Static and dynamic functional ignition System Test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage,

	work schedules/plans/specifications 6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier repair manual/handbook 6.5 Company/manufacturer/component supplier specification data/manual/handbook 6.6 Company/manufacturer/component supplier Periodic Service Maintenance Data manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Vacuum gauge 7.4 Thickness gauge set 7.5 Multimeter or Volt- and Ohmmeter 7.6 Engine analyzer or timing light and dwell tester
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 33 Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for ignition system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of an ignition system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Principe of two and four stoke petrol engines 2.5 Operation and function of ignition system/ components 2.6 Ignition system/ components diagnosis procedure 2.7 Ignition system/ components repair procedure 2.8 Hand/ power tools and workshop equipment for task 2.9 Relevant test equipment for task 2.10 Dangers of working on ignition system/components 2.11 Vehicle moving, positioning and lifting for task 2.12 Final inspection procedure 2.13 Workshop and Equipment maintenance 2.14 Company/workshop Documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment 3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness

	3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the job or simulated environment. 6.2 The assessment of practical skills should betake place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines

UNIT 34 REPAIR AGRO-MACHINERY HYDRAULIC SYSTEMS

Unit Code	**723.7231.133.016.01**
Unit Descriptor	This Unit covers the skills, knowledge & attitudes required to diagnose and repair agro-machinery hydraulic system/components to manufacture specifications.

UNIT 34 Elements & Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA Italicized terms as elaborated in the Rang of Variables
1. Prepare to repair agro-machinery hydraulic system/components	1.1 Nature and scope of work requirements are identified, interpreted and confirmed 1.2 Plan, select and prepare tasks in accordance with OHS requirements and company/workshop standard operating procedures 1.3 Resources required for repairing are sourced. Work area, hand tools, equipment, repair specification data/manual/handbook and spare parts are identified and prepared
2. Diagnose agro-machinery hydraulic system/components	2.1 Agro-machinery hydraulic system/components are diagnosed in accordance with company/manufacturer/component supplier repair manual requirements 2.2 Results are documented and Report is forwarded to persons for action in accordance with workplace procedures
3. Repair agro-machinery hydraulic system/ components	3.1 Repair agro-machinery hydraulic system/ components in accordance with company/manufacturer/component supplier specifications 3.2 Adjustments made during the repair are in accordance with manufacturer/component supplier specifications. 3.3 Perform final test for correct operation, including final inspection to ensure protective guards, safety features and cowlings are in place.
4. Restore work area and complete documentation	4.1 Restore and clean work area, tools and equipment. 4.2 Complete and restore Documentation includes job cards, check list, reports and workshop manuals.

UNIT 34 Range of Variables

VARIABLES	RANGE
1. Agro-machinery hydraulic system	Systems include: 1.1 Hydraulic systems to drive agro-machinery applications
2. System components	Components may include: 2.1 Pumps 2.2 Tanks 2.3 Pipes 2.4 Filters 2.5 Valves 2.6 Distributors 2.7 Pressure regulators 2.8 Actuators 2.9 Cylinders 2.10 Hydraulic motors
3. Applications	System may be fitted to: 3.1 Agro-Machinery 3.2 Outdoor power equipment
4. Faults	Faults may include: 4.1 Oil leaks 4.2 Broken pipes 4.3 Pump 4.4 Filters
5. Repair Methods	Repair methods are to include: 5.1 Aural, visual and functional assessments (including damage, corrosion, fluid levels, leaks, wear and safety aspects) 5.2 Diagnosis of agro-machinery hydraulic system/ components 5.3 Mount and demount system components 5.4 Adjustment of system components 5.5 Static and dynamic functional system test
6. Manuals and Information	Manuals and Information may include: 6.1 Verbal or written and graphical instructions, signage, work schedules/plans/specifications

	6.2 Safe work procedures related to task 6.3 Regulatory legislative requirements pertaining to the automotive industry including Lao Design Rules 6.4 Company/manufacturer/component supplier **repair** manual/handbook 6.5 Company/manufacturer/component supplier **specification data** manual/handbook 6.6 Company/manufacturer/component supplier **periodic service maintenance data** manual/handbook
7. Tools and Equipment	Tools and Equipment may include: 7.1 Hand tools 7.2 Power tools 7.3 Torque wrench 7.4 Outside micrometer 7.5 Vernier 7.6 Pressure gauge kit 7.7 Oil changer/ tank 7.8 Lifting equipment 7.9 Cleaning Equipment and products
8. Company/ workshop standard operating procedures	Company/workshop standard operating procedures include: 8.1 Verbal or written instructions issued by authorized personal 8.2 Job order slip 8.3 Spare parts ordering form 8.4 Wearing of Personal Protective Equipment
9. Occupational Health and Safety (OHS) requirements	OHS requirements are to be in accordance with legislation/regulations/codes of practice and enterprise safety policies and procedures, and may include: 9.1 To conduct of operational risk assessment and treatments associated with Vehicular movements, hazardous substances, Electrical safety manual, lifting and shifting working in proximity to others a site visitors 9.2 Use of personal protective equipment that include prescribed under legislation regulations codes of practice and workplace policies and practice

UNIT 34 Evidence Guide

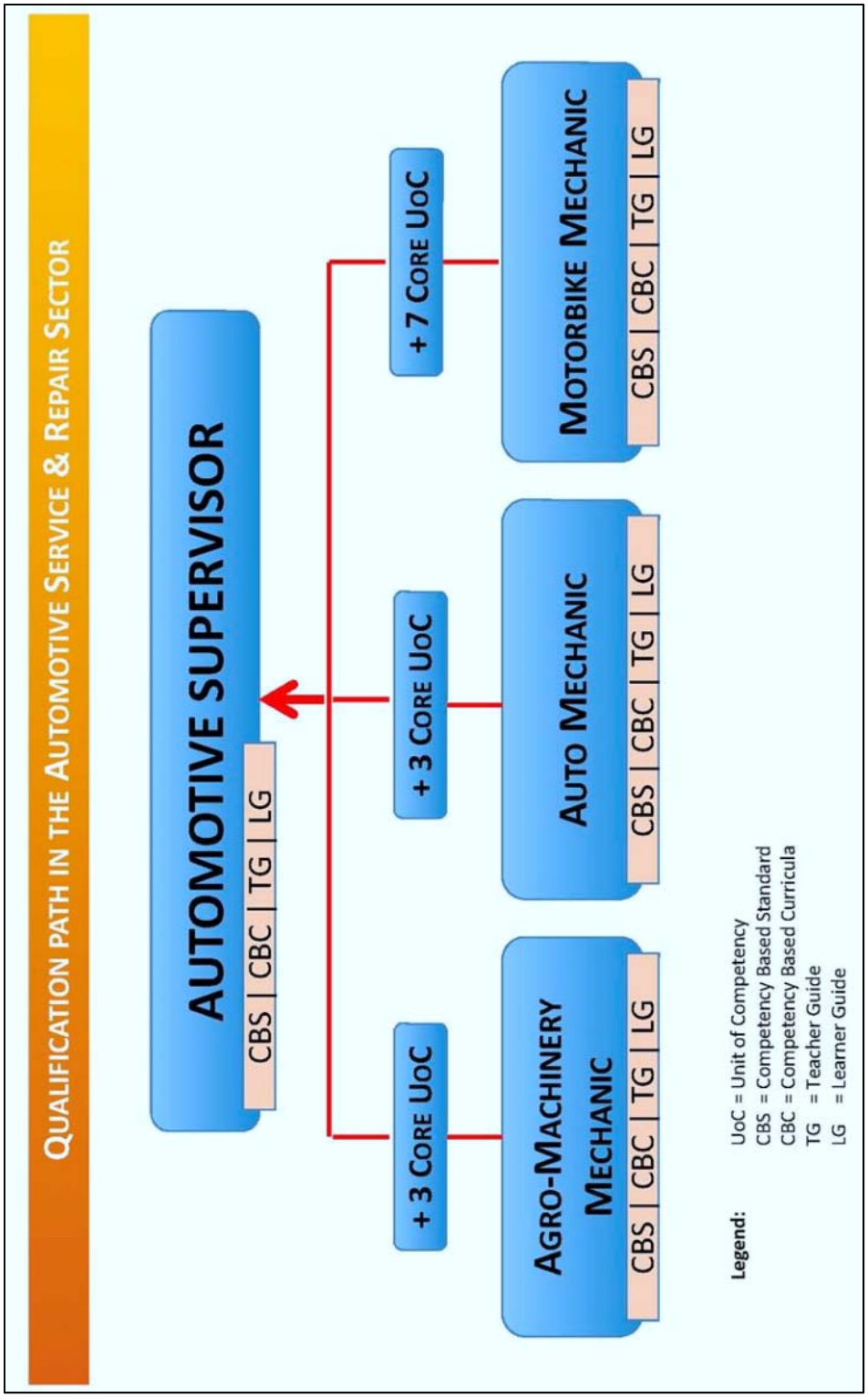
1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Selecting and used appropriate procedure, manuals, tools and equipment to carry out task 1.2 Diagnosing and used method for agro-machinery hydraulic system test in reference to company/manufacturer/component supplier repair requirements 1.3 Conducting the repair of a agro-machinery hydraulic system/ components in accordance with workplace and company/manufacturer/component supplier requirements 1.4 Performing completed job documentation and work area restore
2. Underpinning knowledge and attitudes	2.1 OHS requirements 2.2 Relevant company/workshop operating procedure 2.3 Relevant repair specification data/manual/handbook 2.4 Operation and function of agro-machinery hydraulic system and components 2.5 Mechanic/ technic units of measurement 2.6 Agro-machinery hydraulic system/ components diagnosis procedure 2.7 Agro-machinery hydraulic system/ components repair procedure 2.8 Hand/ power tools and workshop equipment for task 2.9 Relevant test equipment for task 2.10 Dangers of working with agro-machinery hydraulic test equipment 2.11 Vehicle moving, positioning and lifting for task 2.12 Final inspection procedure 2.13 Workshop and Equipment maintenance 2.14 Company/workshop documentation requirements
3. Underpinning skills	3.1 Working safely 3.2 Using Personal Protective Equipment 3.3 Communication effectively 3.4 Organizing materials to be used 3.5 Using and interpreting repair specification data/manual/handbook 3.6 Proper handling and use of tools and equipment

	3.7 Mounting and demount System components 3.8 Using test equipment for task 3.9 Maintaining orderliness and cleanliness 3.10 Maintaining customer records
4. Resource implications	The following resources should be provided: 4.1 Workplace location or simulated work area 4.2 Appropriate tools and equipment to this task 4.3 Materials relevant to the task 4.4 Specifications and work instruction to the task
5. Method of assessment	Competency in this Unit should be assessed through: 5.1 Direct Observation on actual workplace 5.2 Questions to underpinning knowledge 5.3 Demonstration on simulated situation 5.4 Written/Oral examination *Evidence provided for competency determination will be Valid, Sufficient & Current*
6. Context for assessment	6.1 Competency may be assessed on the workplace or simulated environment. 6.2 The assessment of practical skills should be take place after a period of supervised practice and repetitive experience. 6.3 Assessment must be undertaken in accordance with Lao PDR CBT assessment guidelines.

I ANNEX

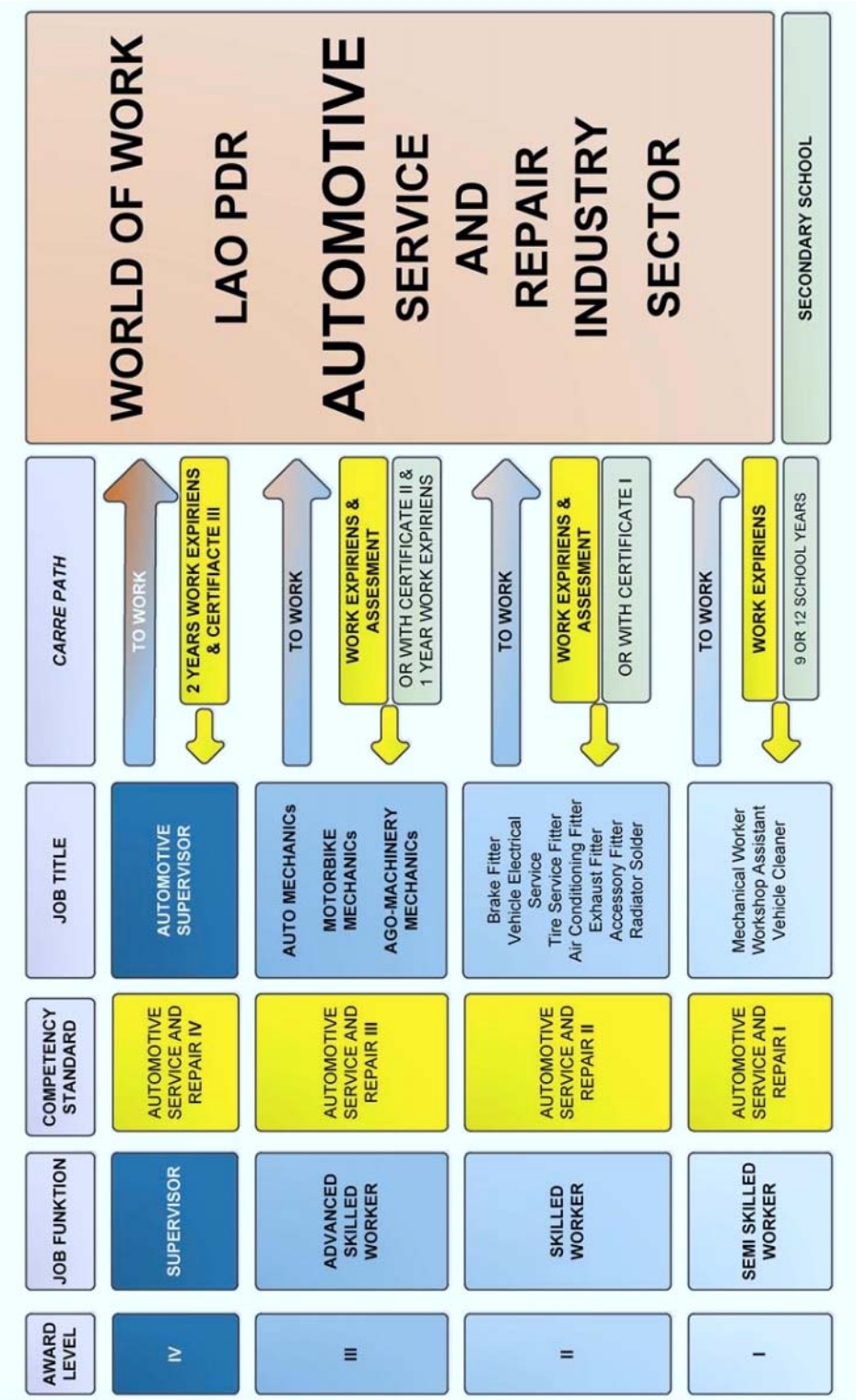
ANNEX:

I.1 CAREER PATH INTO THE QUALIFICATION



ANNEX:

I.2 AWARD & PROGRESSION / ENTRY REQUIREMENTS



ANNEX:

I.3 LAO AUTOMOTIVE SUB-SECTOR CODE

Sub-Sector Code:

00 no work category
10 General
20 Engine
30 Powertrain
40 Chassis & Suspension
50 Electrical
60 Body & Painting

Competency Unit Standards by Sub-Sector:

UNIT NO	UNIT TITLE
00	**NO CATEGORY**
723.7231.031.001.01	LEAD WORKPLAC COMMUNICATION
723.7231.031.002.01	LEAD SMALL TEAMS
723.7231.031.003.01	PRACTICE NEGOTIATION SKILLS
723.7231.031.004.01	SOLVE PROBLEMS RELATED TO WORK ACTIVITIES
723.7231.021.005.01	USE MATHEMATICAL CONCEPTS & TECHNIQUES
723.7231.021.006.01	USE RELEVANT TECHNOLOGIES
723.7231.021.007.01	APPLY GENDER AND SOCIAL EQUITY PRINCIPLES AND POLICIES
723.7230.041.001.01	SUPERVISE APPLICATION OF KEY COMMUNICATION SKILLS IN THE WORKPLACE
723.7230.041.002.01	SUPERVISE DEVELOPMENT OF TEAMS & INDIVIDUALS
723.7230.041.003.01	SUPERVISE PROBLEM SOLVING TECHNIQUES IN THE WORKPLACE
723.7230.041.004.01	SUPERVISE DATA COLLECTION AND ANALYSIS IN THE WORKPLACE.
723.7230.041.005.01	PLAN & ORGANISE WORK FOR SEVERAL WORK TEAMS
723.7230.041.006.01	SUPERVISE ENVIRONMENTAL PROTECTION IMPLEMENTATION
723.7230.041.007.01	MONITOR GENDER AND SOCIAL EQUITY PRINCIPLES AND POLICIES
723.7230.042.008.01	SUPERVISE COMPLIANCE WITH PROCEDURES, SPECIFICATIONS & MANUALS
723.7230.042.009.01	SUPERVISE PREPARATION OF MATERIALS & TOOLS & EQUIPMENT

723.7230.042.010.01	SUPERVISE OHS WORK ISSUES IN THE AUTOMOTIVE MAINTENANCE & REPAIR SECTOR
723.7230.042.011.01	PROVIDE TECHNICAL GUIDANCE
723.7230.042.012.01	INSPECT TECHNICAL QUALITY OF WORK
723.7230.043.016.01	DIAGNOSE COMPLEX FAULTS IN MOBILE PLANT HYDRAULIC SYSTEMS
723.7230.043.017.01	DIAGNOSE AND REPAIR AIR CONDITIONING AND HVAC SYSTEMS
10	**GENERAL**
723.7231.122.001.01	OBSERVE POCEDURES, SPECIFIATIONS & MANUALS OF INSTRUCTION
723.7231.122.002.01	INTERPRET TECHNICAL DRAWING & PLANS
723.7231.122.003.01	PERFORM MENSURATION AND CALCULATION
723.7231.122.004.01	APPLY OCCUPATIONAL HEALTS & SAFETY REQUIERMENTS
723.7231.122.005.01	MOVE VEHICLE
723.7231.122.006.01	MOUNT AND DEMOUNT SYSTEM COMPONENTS
723.7231.132.007.01	PERFORM PERIODICAL MAINTENANCE
723.7231.133.016.01	REPAIR AGRO-MACHINERY HYDRAULIC SYSTEMS
723.7231.133.017.01	REPAIR AGRICULTURAL MACHINERY EQUIPMENT
723.7233.123.020.01	PERFORM ROUTINE BRAZING/WELDING
723.7230.143.013.01	ESTIMATE AND CALCULATE COSTS TO REPAIR, MAINTAIN OR MODIFY A VEHICLE
723.7230.143.014.01	CARRY OUT DIAGNOSIS OF COMPLEX SYSTEM FAULTS
20	**ENGINE**
723.7231.223.007.01	SERVICE PETROL FUEL SYSTEM
723.7231.233.008.01	REPAIR COOLING SYSTEM
723.7231.223.013.01	SERVICE DIESEL FULE SYSTEM
723.7231.223.014.01	REPAIR ENGINE WEAR
723.7231.233.004.01	REPAIR SMALL ENGINE
723.7230.243.020.01	ANALYZE AND EVALUATE LIGHT VEHICLE ENGINE AND FUEL SYSTEM FAULTS
30	**POWER TRAIN**

723.7231.333.009.01	REPAIR CLUTCH SYSTEM
723.7230.343.015.01	DIAGNOSE COMPLEX FAULTS IN LIGHT VEHICLE TRANSMISSION AND DRIVELINE SYSTEMS
723.7230.343.019.01	ANALYSE AND EVALUATE MOTORCYCLE ENGINE AND TRANSMISSION SYSTEM FAULTS
40	**CHASSIS & SUSPENSION**
723.7231.433.001.01	REPAIR BRAKE SYSTEM
723.7231.433.010.01	REPAIR STEERING AND SUSPENSION SYSTEM (AOM)
723.7231.433.011.01	REPAIR, BALANCE AND ALIGN WHEEL AND TIRES
723.7231.433.002.01	REPAIR WHEEL AND TIRES (MOTORBIKE)
723.7231.433.003.01	REPAIR FINAL DRIVE (MOTORBIKE)
723.7231.433.006.01	REPAIR STEERING AND SUSPENSION SYSTEM (MOTORBIKE)
723.7230.443.018.01	ANALYSE AND EVALUATE ELECTRICAL AND ELECTRONIC FAULTS IN BRAKING SYSTEMS
723.7230.443.021.01	ANALYSE AND EVALUATE LIGHT VEHICLE STEERING AND SUSPENSION SYSTEM FAULTS
50	**ELECTRICAL**
723.7231.533.015.01	REPAIR IGNITION SYSTEM
723.7231.533.012.01	SERVICE ELECTICAL LIGHT, SIGNAL AND WIPER SYSTEM
723.7231.523.005.01	SERVICE BASIC ELECTRICAL SYSTEM

ANNEX:

I.4 COMPETENCY STANDARD DEVELOPMENT TEAM

STVET Project

No.	Name and Surname	Organization/Company	Job Expert
1.	Mr Phouang PHOUTHAVONG	STVET Project	NC
2.	Mr Soulikone PHONAMAT	STVET Project	NC
3.	Mr Stephan GIEBEL	STVET Project	IC

Resource Person / Methodologist

4.	Mr Bounsuane NAXIENGKHAM	Vocational Education Development Center	Mech. M&R

Resource Persons / Company & Industry

5.	Mr Somdeth LAKHONVONG	TNK Mitsubishi Lao Trading Co. Vientiane	Auto
6.	Mr Boualoy SIRIPANYA	Lao Toyota Service Co LTD. Vientiane	Auto
7.	Mr Vannakhone THAMOUNTHA	KOLAO	Motorbike

Resource Persons / Public & Private TVET Institutions

8.	Mr. Bounlong RATSAVONG	Vocational Training School Savannakhet	Motorbike
9.	Mr Seesomseun YARTSADAHAK	Lao-German Technical School Vientiane	Agro-Mach.
10.	Mr Phoutthasone KHAMPHANH	Vocational Training School Luang Prabang	Auto
11.	Mr Bontong XAIYAVONG	Vocational Education Development Center	Auto
12.	Mr Xenglor YONGNOU	Lao-Korea Training Center	Auto
13.	Mr Bountiew VANMANEVONG	Vientiane Professional Development College	Agro-Mach.
14.	Mr Khamsing CHANTHAVONGSA	Lao-German Technical School Vientiane	Welding
15.	Mr Sounthone NAMPANYA	Lao-German Technical School Vientiane	Welding
16.	Mr Vandy SISAVATH	Technical College Pakpasak Vientiane	Welding